



**PROCEEDINGS
OF
II. INTERNATIONAL
AGRICULTURAL, BIOLOGICAL
& LIFE SCIENCE CONFERENCE
E-AGBIOL 2020**

SEPTEMBER 1-3, 2020

EDIRNE, TURKEY



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& LIFE SCIENCE CONFERENCE
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**1 – 3 SEPTEMBER, 2020,
EDİRNE, TURKEY**

**Organized by
Trakya University**

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WELCOME NOTES

You are welcome to our II. AGBIOL Conference that is organized by Trakya University. The aim of our conference is to present scientific subjects of a broad interest to the scientific community, by providing an opportunity to present their work as oral or poster presentations that can be of great value for global science arena. Our goal was to bring three communities, namely science, research and private investment together in a friendly environment of Edirne, Turkey in order to share their interests and ideas and to benefit from the interaction with each other but we have to organize as online due to Covid_19 situation. I hope next one we could host you in Edirne.

In September 2018, we organized the first AGBIOL Conference with more than 700 scientists and researchers from all over the world with over 800 scientific papers. Therefore, this great interest gave ambition to organizers to make it a periodical event then we decided to organize 2nd one in this year.

The Organizing Committee of AGBIOL 2020 considers the health, safety, and security of its conference attendees and community as its top priority. Due to uncertain COVID-19 situation, which results in a very difficult travel restriction for most countries and the fact that there is no definite end in sight, with a careful consideration in all aspects, then AGBIOL 2020 has decided to move towards the organization of a fully on-line AGBIOL 2020 as digital event, in lieu of an in-person event. Despite all limitations, our e-conference will be probably one of the biggest online conferences in recent years in the world with 499 papers and 1133 authors with 333 oral and 166 e-poster presentations from 55 countries.

The participants with paid conference fee will be able to access all the virtual presentation talks in each session, as well as to visit the virtual poster hall via preliminary provided participant ID and codes. The selected ABSTRACTs will be published in the Conference ABSTRACT and Proceedings Book. Participants might send us their full papers, which based on their preferences will be published either in our Conference ABSTRACT and Proceedings Book or in selected International Indexed Scientific Journals.

Conference Topics:

Agriculture, Forestry, Life Sciences, Agricultural Engineering, Aquaculture and Biosystems, Animal Science, Biomedical science, Biochemistry and Molecular Biology, Biology, Bioengineering, Biomaterials, Biomechanics, Biophysics, Bioscience, Biotechnology, Botany, Chemistry, Chemical Engineering, Earth Sciences, Environmental Science, Food Science, Genetics and Human Genetics, Medical Science, Machinery, Pharmaceutical Sciences, Physics, Soil Science.

We would like to thank all of you for joining this conference and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

Prof Dr Yalcin KAYA

Head of the Organizing Committee

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EDITOR OF THE PROCEEDING BOOK

Prof Dr Yalcin KAYA



E-AGBIOL 2020 CONFERENCE PROGRAM



PLENARY SESSION

TUESDAY, SEPTEMBER 1ST, 2020

10 ⁰⁰ – 10 ³⁰	Opening Ceremony and Talks	
10 ³⁰ - 12 ⁰⁰	OPENING SESSION I: Session Chair: PROF. DR. YILMAZ ÇAN , Trakya University, Edirne, Turkey	
10 ³⁰ – 11 ⁰⁰	PROF DR LARA HANNA WAKIM, Holy Spirit University, Lebanon - “Potential use of origanum essential oils as alternative to antibioticGrowth promoters: Effect on resistant <i>E. coli</i> strains isolated from Lebanese raw c Identification of Fungal hicken”	
11 ⁰⁰ – 11 ³⁰	DR YUNUS BAYRAM, Ministry of Agriculture and Forestry, Turkey “Plant health, quarantine and pest management in Turkey”	
11 ³⁰ – 12 ⁰⁰	PROF DR SEZEN ARAT, Tekirdag Namik Kemal University, Turkey - “Transgenic and clone animals from past to present”	
12 ⁰⁰ – 13 ⁰⁰	LUNCH	
13 ⁰⁰ - 15 ⁰⁰	OPENING SESSION II: Session Chair: PROF. DR. MUSTAFA TAN , Trakya University, Edirne, Turkey	OPENING SESSION III: Session Chair: PROF. DR. METIN AYDOGDU , Trakya University, Edirne, Turkey
13 ⁰⁰ – 13 ³⁰	PROF DR MEHMET EMIN CALISKAN, Niğde Ömer Halisdemir University, Turkey - “Breeding climate resilient potato cultivars using conventional and next generation breeding techniques”	PROF DR TEODORA POPOVA, Inst. of Animal Science, Bulgaria - “Black soldier fly (<i>Hermetia illucens</i>) in poultry nutrition- effect on the performance, carcass composition and meat quality in broilers”
13 ³⁰ – 14 ⁰⁰	PROF DR IOANNIS TOKATLIDIS, Democritus University of Thrace, Greece - “Crop adaptation to spacing to promote resilience to environmental diversity”	PROF DR AHMET ULUDAG, Canakkale Onsekizmart University, Turkey - “The Need for Integrated Approach for Fleaban Management”
14 ⁰⁰ – 14 ³⁰	PROF DR YAROSLAV BLUME, Inst. of Food Technology and Genomics -NAS, Ukraine - “Molecular genetics background for breeding of wheat varieties with resistance to highly virulent Asian patotypes of yellow rust”	ASSOC PROF DR OZLEM TOKUSOGLU, Manisa Celal Bayar University, Turkey - “AgriFood and plant based effervescent tablets: Research data on chemical and nutritional quality”
14 ³⁰ – 15 ⁰⁰	DISCUSSION	PROF. DR. NURHAN TURGUT DUNFORD, Oklahoma State University, USA - “Opportunities and challenges for recovering phospholipids from oilseeds”
15 ⁰⁰ – 15 ³⁰	COFFEE BREAK	

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2 nd S	AGBIOL-I	AGBIOL-II	AGBIOL-III	AGBIOL-IV	AGBIOL-V	AGBIOL-VI	AGBIOL-VII I
15 ³⁰ _ 15 ⁴⁵ 1	The responses of wild sunflower crosses to drought stress - Veli Pekcan, M. Ibrahim Yilmaz, Goksel Evci, Yalcin Kaya	Molecular characterization and symbiotic efficiency of rhizobial bacteria isolated from <i>T. foenum graecum</i> (fenugreek) in northwestern Morocco - Najlae Belkadi, Fatima Ezzakkioui, Said Barrijal (378)	Morp+C11ometric parameters of the sagittal otoliths of 10 fish species belonging to Sparidae family from the coastal areas of Çanakkale Strait, Turkey - Hakan Ayyıldız, Aytaç Altın, Emre Kurtkaya (234)	Genetic diversity of kavlca (<i>Triticum dicoccum</i> Schrank) plant of Kars region using SSR markers - Doğan İlhan, Hatice Demir (271)	Determination of accase inhibitor herbicide resistance of wild oats (<i>Avena spp.</i>) in wheat planting areas in Northern districts of Kahramanmaraş - Zekeriya Kantarcı, Betül Gürkan, Kerim Karataş, Nihat Tursun (424)	Effect of orange, apple and tomato pomace on dough rheology property of gluten free bread - Djeghim Fairouz (44)	Warming of beehives by solar energy stored in water - Mohamed Al-Rajhi (472)
15 ⁴⁵ _ 16 ⁰⁰ 2	Development of restorer lines derived from wild annual <i>Helianthus</i> species - Daniela Valkova, Nina Nenova (473)	Selection of mutant groundnut (<i>Arachis hypogaea</i> L.) saline-resistant - Imane Saibari, Abdennaser Fouiees, Ahlam Hamim, Said Barrijal (342)	Length-weight relationships of 16 coastal fish species from the shallow waters of Çanakkale Strait, Turkey - Hakan Ayyıldız, Aytaç Altın, Emre Kurtkaya (191)	Anthocyanins as markers of enhanced plant defence in maize (<i>Zea mays</i> L.) exposed to copper stress - Fadime Eryılmaz Pehlivan (276)	The effect of foliar & soil potassium iodate applications on the morphological properties of spinach - Ali Doğaner, Noyan Eken, Mustafa Harmankaya, Sait Gezgin, Erdoğan Eşref Hakkı (99)	Consumer perception of fresh meat quality in Tirana - Egon Andoni, David Ranucci, Bizena Bijo, Fatmira Shehu, Skender Uku, Enkelejda Ozuni, Dino Miraglia, Laura Menchetti (166)	Influence of the liming on the soil and morphological indicators of lavender grown in organic agriculture - Violeta Valcheva (102)
16 ⁰⁰ _ 16 ¹⁵ 3	Determination of the important quality properties of some sunflower varieties and candidate genotypes - Nursel Çöl Keskin, Rahim Ada, Rifat Kepildek (484)	Somatic embryogenesis induction and alkaloid content of <i>Papaver degenii</i> - Iva Doycheva, Stefan Philipov, Marina Stanilova (354)	The size distribution and catch per unit effort of the blackspot sea bream (<i>Pagellus bogaraveo</i>) in trawl fishery & recreational angling in the Aegean Sea - Fikret Ondes, Uğur Özden, Erhan Irmak (376)	Investigation of the antimicrobial activity of the non-lethal dose of Quaternium-15 on Zebrafish - Güllü Kaymak, Meliha Koldemir Gündüz, Derya Berikten (327)	Comparison of total chlorophyll content, chlorophyll a, b and carotenoids in Prunus rootstocks, CAB 6 P in vitro and in vivo of P. Mahaleb - Edlira Kukali (143)	Determination of heavy metals in milk collected from small farms in three regions of Albania - Fatmira Shehu, Elona Shahu, Ederina Ninga Ninga, Egon Andoni, Bizena Bijo (113)	Efficacy of copper foliar spray in preventing copper deficiency of wheat grown in a calcareous soil - Amlal Fouad, Drissi Saad, Ait Houssa Abdelhadi, Maataoui Abdelwahed, Dhassi Khalid, Makroum Kacem (16)
16 ¹⁵ _ 16 ³⁰ 4	The behaviour of different hybrids of sunflower in the climatic conditions of the 2019 & 2020 years in South-East of	Inventory of ectoparasites of young barn swallow (<i>Delichon urbica</i>) from Mouldi Achouri Colony of the City of Tebessa	Study of manganese content in the exchangeable and carbonate phases in the sediments of the Badovci and Batlava	generating MLO gene mediated resistance to cucumber powdery mildews - Mümin	<i>Bacillus rhizobacteria</i> associated to <i>Phoenix dactylifera</i> of hyper-arid & saline area in Algeria, promote two cowpea plants growth - Benaissa	Impact of microwave treatment on immunoreactivity, primary and secondary structure of wheat gluten -	Impact of pastoral management on the floristic characteristics of the steppe rangelands in

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	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY	2.9.20 WEDNESDAY
09 ⁰⁰ - 09 ¹⁵	11 In Vitro Screening of common bread wheat (<i>Triticum aestivum</i> L.) cultivars in Turkey for high regeneration - Berk Benlioğlu (154)	Studies on therapeutic potentials of bromelain - Neşe Çakır, Ayliz Velioglu Ögünç, Ahmet Özer Şehirli (337)	Recent trends in table olive processing - Aysegül Kumral (230)	Determination of the weed species, their observation, frequencies and densities, in the vineyards in Tekirdağ province - Adnan Kara, Erdal Ata (442)	Influence of water temperature on nitrogen removal from drainage water using denitrification bioreactors - İna Zivatkauskiene, Arvydas Povilaitis (137)	Comparison of different methods used to obtain cherry kernel oil - Meryem Akbaş, Hilal Kılmanoğlu (502)	Studies of old moldovan plum (<i>Prunus domestica</i> L.) Varieties - Maria Pintea (545)
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POTENTIAL USE OF ORIGANUM ESSENTIAL OILS AS ALTERNATIVE TO ANTIBIOTIC GROWTH PROMOTERS: EFFECT ON *E. COLI* STRAINS ISOLATED FROM LEBANESE RAW CHICKEN

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ABSTRACT

Antibiotic resistance, with special reference to poultry production is currently perceived globally. The irrational use of antibiotics in Lebanese poultry production and especially in broilers has led to major antibiotic resistance in these farms and possible transmission of food-borne pathogens to people and increased public concern. The aim of this study was to investigate the incidence of antimicrobial resistance of *E. Coli* in raw chicken meat sold in the Lebanese market and the possibility of using Origanum essential oils of Lebanese origin to replace antibiotics used in poultry production. Raw chicken meat samples (200) obtained from broilers (legs) of retailers and grocery shops in Lebanon were under sterile conditions screened by antimicrobial analysis. To assess the potential of native plant species as alternatives, the essential oils of *Origanum syriacum* L. and *O. ehrenbergii* Boiss were obtained by hydro-distillation using Clevenger apparatus. The antimicrobial activity of serial dilutions of the oils was *in-vitro* tested against isolates by determination of minimal inhibitory concentration (MIC). Our results showed that 80% were found contaminated with *E. coli*. The highest numbers of resistant strains that demonstrated resistance to the highest concentrations of antimicrobial agents were found to ampicillin, Penicillin, Amoxicillin, Streptomycin, and Tetracycline, while highest sensitivity was found in 86.1 % of strains to Amoxicillin/Clavulanic acid exhibiting the lowest MIC values. Both essential oils tested *O. syriacum* and for *O. ehrenbergii* showed a very promising potential in inhibiting the growth of *E. coli* (100%) at a concentration of 400 mg/L. These results can potentially demonstrate the high and economic potential of using these plants as natural and safe additives to promote food safety and limit or reverse resistance arising from the irrational use of antibiotics. Further investigation on the sanitation and hygiene systems applied on the food flow of Lebanese poultry is necessary.

Keywords: Antibiotic resistance, Lebanese broiler chicken, *E. coli*, Origanum essential oil, MIC.

TRANSGENIC AND CLONE ANIMALS FROM PAST TO PRESENT

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ABSTRACT

The first studies to establish transgenic animals were recorded on mice to produce human disease models in the early 1980s. The first applied gene transfer method began as an injection of a cloned DNA fragment into the pronucleus of the single-cell embryo. The biggest problem with this method is that the integration of DNA is random and sometimes the individual being formed is chimeric. In order to solve this problem, a new method was developed so that the genetic material of the embryonic stem cells was altered in a targeted manner by homologous recombination using a template DNA. These modified stem cells were then injected into the embryos of the mice. Both microinjection and gene transfer to stem cells have produced transgenic model laboratory mice on the face and these have been widely used both in basic scientific studies and in the development of treatment strategies of diseases. Both methods were limited to use in livestock. With the discovery of nuclear transfer technology, gene transfer to somatic cells after 1997 allowed targeted genetic changes in livestock. Nuclear transfer can be used for both reproductive and therapeutic cloning. In reproductive cloning, a reconstituted embryo derived from the fusion of an enucleated oocyte and somatic cell is allowed to go to term that results in a cloned animal similar to the nuclear donor. In therapeutic cloning, the reconstituted embryo is allowed to grow to the blastocyst stage and cultured under appropriate conditions to develop stem cell lines. Generation of transgenic animals by somatic cell nuclear transfer adds another variable. In nuclear transfer, genetic modifications are introduced into somatic cells. The genetically modified cells are selected and fused with an oocyte devoid of its genetic material. The reconstituted oocyte is activated, and introduced into the recipient animal where it grows to term like a normal embryo. This method can be used to produce genetically modified animals in all species where nuclear transfer is successful. Despite all these improvements, the success of transgenic animal production is low. Over time, newer techniques, such as site-specific recombinases, ZFNs, and TALENS, have increased the sensitivity of regulation of specific genomic targets in animals. The introduction of CRISPR-Cas9 technology in 2012 gave new impetus to genetic engineering. Since CRISPR enables targeted genome regulation in a simple, efficient and economical way, the process of creating transgenic animals has become easier than ever before. Today, the aim of transgenic animal production has been far beyond the transgenic model mice, which were originally produced to understand human diseases and develop treatment strategies thanks to evolving genetic engineering methods.

Key words : Transgenic animal, embryonic stem cell, nuclear transfer, CRISPR-Cas9

OPPORTUNITIES AND CHALLENGES FOR RECOVERING PHOSPHOLIPIDS FROM OILSEEDS

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ABSTRACT

The term "lecithin" refers to a mixture of phospholipids (PL) usually mixed with vegetable oil. Although various health benefits of PL naturally present in seed oils have been widely reported in scientific literature, these compounds are separated from crude vegetable oils during a refining process referred to as degumming. They end up in the processing byproduct streams. Commercial products containing lecithin or pure PL are usually isolated from the byproducts. The conventional lecithin production techniques utilize large amounts of organic solvents such as acetone and water. This presentation will focus on sustainable processing techniques for separation of PL from crude seed oils, de-oiling crude lecithin produced during conventional degumming processes and enrichment of desirable PL, i.e. phosphatidyl choline (PC) in the final product. Applications of enzyme aided processing and supercritical fluid technology in PL recovery from commodity oils, i.e. canola, and specialty oils such as wheat germ oil will be highlighted. Opportunities and challenges involved in sustainable PL production will be discussed.

Key words : Oilseeds, Phospholipids, lecithin, degumming

CROP ADAPTATION TO SPACING TO PROMOTE RESILIENCE TO ENVIRONMENTAL DIVERSITY

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ABSTRACT

Climate change intensifies environmental diversity. For grain-producing crops, environmental diversity is a root source of a considerable yield gap. To bridge the yield gap crop adaptation to environmental diversity and resilience to climate change largely relies on the improvement of the single-plant ability to respond to additional inputs, i.e. Plant Yield Efficiency (PYE). Because of the inverse relationship of yielding with competitive ability, PYE is tightly connected with the 'weak-competitor' ideotype and thus particular implications arise from the agronomy and breeding perspectives. Crop spacing via improved PYE is essential to (i) mitigate the acquired plant-to-plant variability and optimize resource use, (ii) compensate for yield loss due to missing plants and promote stability, (iii) offer a buffer against unpredictable stresses by means of multi-genotypic varieties, (iv) alleviate the erratic optimum density, stemming from a complex genotype by density by environment interaction, through density-independent varieties, and (v) expand the adoption of the low-input agriculture to conserve natural resources and prevent soil degradation. Genotypes of improved PYE are detectable only at the *nil*-competition regime, i.e., an ultra-low density that precludes plant-to-plant interference for any input. Breeding at *nil*-competition fully satisfies the Falconer's general equation of response to selection, i.e., (i) it maximizes phenotypic expression and differentiation to facilitate the single-plant selection and provide sufficient seed for extensive progeny evaluation, (ii) it optimizes the heritability thanks to moderated environmental influences on genotypic expression and decreased environmental share in the total phenotypic variation, and (iii) it allows the application of high selection pressure thanks to evasion of the confounding effects of competition on yielding capacity.

Key words : Competition; Plant Yield Efficiency; Stability; Yield Gap

**BREEDING CLIMATE RESILIENT POTATO CULTIVARS USING
CONVENTIONAL AND NEXT GENERATION BREEDING TECHNIQUES**

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ABSTRACT

Potato is a cool season crop with an optimal growth temperature between 17 and 21 °C, and it is very sensitive to heat and drought stress. All climate scenarios indicate that the global climate is changing and will continue to change in the near future. The main challenges from climate change to agriculture and food production are the more frequent and severe drought and floods as well as adverse effects of high growth temperatures. Climate change will also bring other problems such as salinity, frost, epidemics of new diseases and pests. The total global yield in the regions currently cropped with potato was calculated to decline up to 32% without adaptation to climate change. The breeding of heat and drought tolerant potato cultivars is one of the most feasible and practical approaches to cope with global warming. However, breeders are generally focused on development of heat or drought tolerant potato cultivars instead of dual tolerance to both stresses. Previous studies indicate that tolerance mechanism for heat and drought is different in potato. Screening of many breeding lines against heat and drought stress under field conditions during early generations is not feasible for many breeding programs due to high cost and labor requirements. Therefore, rapid and reliable screening methods are needed to evaluate large populations in early generations. Biotechnological tools and -omics technologies offer some advantages to breeders for screening large populations especially against biological stress factors, but no sound achievements obtained for abiotic stress factors in potato up to now. Therefore, inclusion of these next generation tools to breeding program is also essential to accelerate breeding process of climate resilient potato cultivars. Currently our research group has several projects to develop novel screening tools to identify heat and drought tolerant genotypes. Main achievements and outputs of our studies will be presented and discussed in this presentation.

Key words : Potato, Plant Breeding, Modern methods, Selection

THE NEED FOR INTEGRATED APPROACH FOR FLEABANES MANAGEMENT

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ABSTRACT

Fleabanes (*Erigeron* spp. or *Conyza* spp.) are important alien plants (invasive) in many parts of the world. Three of them, namely horseweed (*Erigeron canadensis* L.), hairy fleabane (*Erigeron bonariensis* L.), and tall fleabane (*Erigeron sumatrensis* Retz.), all originated from Americas, have dramatically increased in vineyards, orchards, arable areas, roadsides, and urban landscapes worldwide and particularly in Mediterranean type climatic areas. It has been noted that they can cause 30-70 % of crop losses in varying crops. Lack of fleabanes control with post emergent herbicides, such as glyphosate, is emerging problem. Populations of fleabanes in more than 28 countries have already evolved resistance to herbicides, such as paraquat, atrazine, chlorsulfuron, and glyphosate. Furthermore, multiple resistance to different mode of actions (MOA) such as: PSI Electron Diverters, Synthetic Auxins, ALS inhibitors, Photosystem II, PPO inhibitors, and EPSP synthase inhibitors as well as cross resistance have been reported. It is apparent that an integrated approach is essential to combat with fleabanes using information related to their biology and ecology, and recent technologies. These species have some ecological advantages due to their biological features. They have an extended duration of seedling emergence and form overwintering rosettes. In Mediterranean type climates, they can germinate, grow, bloom and bear seeds almost yearlong except winter months. The number of small, wind-dispersed seeds may exceed 200,000 per plant. The optimum germination range have been observed from 10 to 25°C; however, hairy fleabane is capable to germinate even between 4 and 35°C. These three fleabanes have been also confirmed with their interspecific crossing. In addition to losing some chemicals, having a germination and growth flexibility to different climate conditions, and the high competition with field crops make the fleabanes species more difficult to combat than ever. In the future, there will be presumably more sustainable and effective smart technologies such as artificial intelligence robot technologies in the mechanical control of fleabanes, efficient herbicide application methods, microbial biological control agents, crop allelopathy, cover crops, and companion crops. More farmer input via citizen science is also important to obtain effective and sustainable management outcome.

Key words : Fleabanes, invasive plants, crop management, weed control

**BLACK SOLDIER FLY (*HERMETIA ILLUCENS*) IN POULTRY NUTRITION-
EFFECT ON THE PERFORMANCE, CARCASS COMPOSITION AND MEAT
QUALITY IN BROILERS**

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ABSTRACT

The aim of the work was to assess the effect of dietary inclusion of meals derived from Black soldier fly (BSF) larvae on the performance, carcass composition and meat quality in broilers. The trial was carried out with ROSS broilers divided into three groups according to the formulated diets-control (CON), receiving standard diet, T1 –receiving 5% partially defatted BSF meal and T2 –receiving 5% full fat BSF meal. During the first two weeks, all the birds were fed the same starter diet and from 21 to 35 days of age they received the diets containing BSF meals. The performance parameters controlled included body weight, weight gain, feed intake, feed intake per kg live weight and per kg weight gain, as well as the growth rate for each week of the trial. At 35 days of age, 10 broilers from each group were slaughtered and subjected to carcass analysis and analysis of meat quality traits. The inclusion of 5% partially defatted and full fat BSF meal in the diet improved the performance of the broilers at the age of 21 and 35 days. The carcass weight, dressing percentage, content of intestines, gizzard and liver were higher in the groups receiving the insect meals, however, the effect of the inclusion of BSF meals was inconsistent for the major carcass parts. It tended to increase the percentage of the breast cut, while decreasing significantly the thigh muscles in the broilers. The dietary inclusion of the BSF meals was associated with decrease of pH and lighter colour of the meat. The total amount of the saturated fatty acids (SFA) and atherogenic index (AI) were increased, while polyunsaturated fatty acids (PUFA), the ratios between PUFA and SFA (P/S), n-6/n-3 PUFA and hypo/hypercholesterolemic fatty acids (h/H) were decreased in the meat of the broilers consuming insect meals. The results of the study suggest good prospective for further research with the examined BSF meals for broiler nutrition to formulate feeding strategies that will not alter negatively meat quality and its healthy value.

Key words : Black Soldier Fly, Poultry nutrition, Meat quality, Broilers

MOLECULAR GENETICS BACKGROUND FOR BREEDING OF WHEAT VARIETIES WITH RESISTANCE TO HIGHLY VIRULENT ASIAN PATHOTYPES OF YELLOW RUST

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ABSTRACT

Fungi of the genus *Puccinia*, especially species such as *P. graminis*, *P. tritricina* (*recondita*) and *P. striiformis*, can infect valuable cereals - wheat, barley, rye, oats. During epiphytosis, they cause significant and sometimes complete yield loss. These species include a significant number of subspecies, which are divided into races (pathotypes) depending on their virulence. Currently, the most effective way to protect cereal crops from these pathogens is considered to be the creation of resistant varieties carrying the appropriate resistance genes. However, new races of *Puccinia* constantly appear, which are capable of infecting varieties that were previously known as resistant to these pathogens. The most illustrative example is the emergence of the Ug99 strain of the *P. graminis* f. sp. *tritici* causing stem rust in Uganda in 1999. This strain overcame the resistance of the widespread *Sr31* gene and caused significant crop losses in Uganda, Kenya and Ethiopia. In addition, over the past 20 years, 12 new strains have been discovered, derived from Ug99, and against some of them, genes such as *Sr24*, *Sr36* and *SrTmp* were ineffective. In addition to this, a new race of *Puccinia* – TTTTF (not associated with Ug99), was recently discovered in Italy, which caused a local epiphytosis that covered several thousand hectares of wheat in Sicily. However, it should be noted that *P. striiformis*, which causes yellow (striped) rust, is also characterized by the appearance of new highly aggressive races. So, recently in Europe, new aggressive pathotypes of this fungus have been identified: Kranich, Warrior, and Triticale aggressive. All of them come from the Himalayan region populations, which is the center of the emergence of new strains of *P. striiformis*. Three races have supplanted most European strains in the past 8-9 years and are now continuing to spread across the European continent. To date, Ukrainian bread wheat varieties were not analyzed for the presence of genes for resistance to yellow rust. Therefore, we used molecular genetic markers for yellow rust resistance gene identification. Especially it was important to identify wheat varieties that would contain resistance genes to highly virulent rust pathotypes of Asian origin, the use of which in the domestic breeding process should help avoid crop losses in case of spread of dangerous yellow rust strains in Ukraine. Respectively, the damage level of soft wheat varieties by different yellow rust races at the conditions of the North-Eastern Ukraine was monitored and the resistance of the winter wheat collection material to yellow rust in the field was assessed. For these purposes the resistance of winter wheat cultivars to yellow rust was assessed in field infectious nurseries. Then plant (seed) material was collected from resistant and pathogen-resistant soft wheat varieties. Selection of molecular markers that allow to identify and determine the allelic states of the genes *Yr10*, *Yr36*, *YrSP*, *Yr5* and *Yr15*, which are associated with resistance to yellow rust pathotypes, including Asian origin, was performed. Then screening of the soft wheat variety collection of domestic selection for the presence of yellow rust resistance genes was carried out using respective molecular genetic markers. The results of the analysis of 22 wheat varieties and breeding lines, which demonstrated field resistance to yellow rust, indicate that none of them contains the *Yr10* and *Yr36* genes, which are effective against such varieties of yellow rust as Kranich and Warrior. At the same time, it

was finally confirmed that own design primers for *Yr10* gene identification are more reliable and, unlike existing analogues, do not produce non-specific products during PCR. Then it was established that some of these varieties and breeding lines contain alleles of *YrSP*, *Yr5* and *Yr15* genes as well as French variety HIC 064688 CA and Chinese varieties Fan mai 803, Fan mai 7030 and Fan mai 8. In particular, the results of screening of samples using the molecular marker *Xbarc8* to determine the allelic state of the *Yr15* gene indicate that breeding line Uk 1501 and Chinese varieties Fan mai 7030 and Fan mai 803 show the presence of 222 bp DNA fragment associated with the *Yr15* gene resistance allele. The screening results of samples using molecular marker *S23M41-310* to determine the allelic state of the *Yr5* gene revealed that Ukrainian breeding lines Uk 298, Uk 976 and Uk1501 as well as cultivars VB 4/15 (UK), HIC 064688 CA, and Fan mai 8 are characterized by the presence of 275 bp DNA fragment, associated with the *Yr5* gene resistance allele. The screening results of samples using molecular marker *S23M41-140* to determine the allelic state of the *Yr5* gene showed that only the variety Fan mai 803 produces 100 bp DNA fragment associated with the *Yr5* resistance gene allele, however, this fragment was missing in the control, which may indicate a possible pseudo-positive result. The screening results of samples using the molecular marker *dp269* to determine the allelic state of the *YrSp* gene indicate that Ukrainian genotype Uk 3436/11 demonstrates the presence of 198 bp DNA fragment, which associated with the allele of *YrSp* resistance gene. The remaining samples show the presence of two fragments - 198 bp and 209 bp. There is a low probability that these samples are heterozygous for this marker; a possible reason for this result may be the non-optimization of the primers used. The genotypes of domestic (Uk 1501, Uk 298, Uk 976, and Uk 3436/11) and foreign breeding (MIC 064688 CA, VB 4/15, Fan mai 7030 and Fan mai 803) containing gene resistant alleles were identified (*YrSP*, *Yr5* and *Yr15*) to highly virulent yellow rust pathotypes of Asian origin and can be recommended for further use in the breeding process. This will minimize possible losses of wheat yield in the event of a threat of the spread of highly virulent Himalayan origin yellow rust strains in Ukraine. At the same time, the absence of domestic bred varieties containing *Yr10* and *Yr36* resistance gene alleles indicates the need to involve foreign varieties containing these genes in further breeding programs. In all cases the introgression directed by respective markers, rather than by phenotype, will facilitate simultaneous selection for multiple stripe rust resistant genes and will help to avoid escapes during the breeding process.

Key words: Wheat, Rust resistance, Molecular Genetics, Breeding, Molecular markers

AGRIFOOD AND PLANT BASED EFFERVESCENT TABLETS: RESEARCH DATA ON CHEMICAL AND NUTRITIONAL QUALITY

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ABSTRACT

Recently, the potential efficacy of the bioactive phenolics from natural sources has been the focus of great attention owing to their health benefits to human health for reduced risk of coronary heart problems and selected cancers. Plant based food tablets as dietary supplements, and/or fortified foods, food byproduct based food powders may be great value-added products for getting healthy bioactive constituents. Activated phenolic antioxidants, bioactives and probiotics that have been naturally extracted to be highly potent and easily absorbed by using food tablets. For safety manufacturing; unit dose, temper evident, solid preparations of active ingredient and ingredient mix, powder quality should be monitored. Through the powder forming, the flexible design of dosage forms as technical manufacturing parameters has been considered. Due to supplement manufacturing, consumer demand, routes of drug delivery, oral utilization capacity should be examined. In this context, the bulk density, the tapped density as pre-compression parameters have been confirmed while thickness, hardness, % weight variation, % friability, % in- vitro drug release as post-compression parameters have been carried out as physiochemical properties. Not only chemical profiles, functional properties, but also detailed clinical nutrition data of expressed effervescent. In this presentation, agrifood and plant based supplement manufacturing strategies and research data on mulberry-based, citrus-based, tomato-based effervescent chemistry and nutritional quality have been carried out.

Key words : Plant foods, effervescent, strategy, quality, property, suppleme

PLANT HEALTH, QUARANTINE AND PEST MANAGEMENT IN TURKEY

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ABSTRACT

Turkey is among the top ten countries, which provide the largest amount of agricultural production in the world, and also ranked as the first within the EU. Legislative framework of the phytosanitary and quarantine are completely identical or harmonized with the EU legislation. Due to the high diversity of Turkey's vegetation patterns and agricultural potential, there is a high export trade with the EU, Russia, the Far East and many neighbouring countries. Agricultural exports of our country have very important economic value, and the statistical data shows advance level of the agricultural production meeting many of the recipient countries' terms, conditions and demands. Turkey has taken the advantage of growth in global agricultural exports in recent years and opportunities to continue search for new markets and it could enter the market of China, South Korea, Taiwan and Seychelles. By gaining good experience during COVID-19, Turkey both provided the food supply of its own people and met the food needs of many countries. Border controls are conducted by **467** inspectors trough **12** agricultural quarantine directorates and provincial directorates and inspection analysis have been made in advanced labs with rapid analysis techniques by specialized staffs. This success both depends on effective border control, and depends on internal plant health measures and pest management strategies. Turkey has taken many innovative steps that can be counted revolution since the 2000s in the field of phytosanitary and quarantine. Also, changes in Turkish agriculture policies go hand in hand with implementations. Biological and biotechnical control practices have been supported by the government since 2010 and 50% of the producer's expenses have been covered. Thus, environmentally friendly control methods are promoted through subsidies and producer's usages has enlarged. Total supported area was **529 ha** in 2010, whereas it has increased to **28.560 ha** in 2019. **Integrated Pest Management (IPM)** practices have been begun with a small number of producers and in small areas in 2012, while it reached over an area of around **400.000 ha** and **50.000** producers until 2019. Through **the pre-harvest pesticide inspections**, plant samples are taken prior to the harvest while the crops are still in the field, orchard or in greenhouses and **the post-harvest pesticide inspections** made by taking samples from the wholesalers, grocery stores and other sales points, based on the analysis result, inappropriate use of pesticides are not allowed by performing practices such as harvest delay, product destruction, fines in case of non-conformity. Consciousness level of Turkish producers are improved by practical and theoretical trainings, field schools, and different education activities or by demonstrations about plant health and quarantine activities. Turkey has banned **213** active ingredients covering thousands of pesticides since 2009 that are identified as harmful to the environment, non-target organisms and other living things or having toxicology and carcinogenicity findings. These practices have gained public appreciation and trustworthiness of agricultural policies. Considering the amount of pesticides used per unit area in many countries, Turkey use less pesticides than the EU and many other countries (Russia, China, United States, Netherlands, France, Germany, Canada, Israel, Italy, Belgium, South Korea, etc.). In order to control and monitor chemicals, the **QR tracking system** has been implemented by the Ministry of Agriculture and Forestry since 2018, and all pesticide producers and suppliers have to use this QR system. Thus, all processes could be monitored from pesticide

production or entrance point to the last users. It is the fact that, the 2020 year is more varied than before years and extraordinary situation experienced in all countries due to the COVID-19 pandemic. It has shown specifically that food supply is more important and even more important than communication, transportation, defence industry or other technological uses. At the same time, it seems that the virus will remain as a top agenda and the circumstances of the COVID-19 shows that even possibility of some new pandemics and other new diseases may arise. Of course phytosanitary and plant nutrition are integral and essential factors in crop production, and the success in the yield and quality are directly linked with the appropriate practices in terms of these factors. If phytosanitary is managed properly, the health of all living things that benefit from plants is protected. Phytosanitary means also indirectly human health. That is why 2020 was declared as the **International Year of Plant Health** by the United Nations, although it would be remain in the history as the COVID-19 pandemic year.

Key words : IPM, Biological and biotechnical control, subsidies, awareness, plant health year, COVID-19, Turkey

THE DETERMINATION OF YIELD PERFORMANCES OF SOME FORAGE PEA VARIETIES IN TRAKYA REGION

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ABSTRACT

Forage pea (*Pisum sativum ssp. arvense* L.) grows drylands and winter conditions in Turkey and other parts of the world. Therefore, both dry and fresh hay yield is higher and preferred by producers largely for animal feeding. Furthermore, its nutritional value such as fiber value, protein content. etc. is higher and present delicious feed both fresh hay and dry as well as grain for animals. Forage pea production has increased recently in Turkey in different regions especially after government subsidies started on forage pea. The study was conducted to determine yield performance of some candidate forage pea varieties developed by Tragen R&D Co in Edirne and Tekirdag locations in Trakya region in 2018-2019 growing season. Based on study results, some candidate varieties exhibited higher performances both fresh and hay yield than controls. Among candidate forage pea varieties, TG-601 candidate forage pea variety showed promising performance in both locations. Therefore, it sent to registration trials and obtained production permission in 2019 Fall.

Key words: Forage pea, Yield traits, Fresh and dry hay yield, Trakya region, Animal feed

THE YIELD PERFORMANCES OF SOME CONFECTIONERY SUNFLOWER HYBRIDS IN TRAKYA REGION

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ABSTRACT

Confectionery sunflower is the most consumed confectionery product in Turkey. Although there is about 100.000 ha confectionery sunflower planted area in Turkey, Turkish seed confectionery sunflower production is not enough for domestic consumption and there is over 100 million USD imports every year. The most important reasons are lower yields due to using standard seeds then resulted lower quality, some diseases and broomrape parasite problem, higher costs due to lower mechanization uses, etc. The confectionery sunflower seed import mostly from China because of the longer grains and these type seeds invade recently almost all Turkish confectionery market. Beside, Turkey has very big potential for confectionery export due to geographical advantages. However, hybrids having higher yields, quality and uniform seed are preferred both by industry and also by farmers are few in Turkey. Furthermore, certified seed use by producers also lower too. The study was conducted to determine yield performance of candidate sunflower confectionery hybrids developed by Tragen R&D Co in Edirne and Tekirdag locations in Trakya region in 2019. Based on study results, some candidate hybrids exhibited higher performances than control hybrid. TG-400 candidate hybrid showed promising performance in both locations and then it sent to registration trials and obtained production permission in 2020.

Key words: Confectionery sunflower, Yield performance, Hybrid, Trakya region

GENETIC VARIABILITY, ASSOCIATION AND DIVERSITY STUDY AMONG THE SUNFLOWER GENOTYPES AT SEEDLING STAGE BASED ON DIFFERENT MORPHO-PHYSIOLOGICAL PARAMETERS UNDER POLYETHYLENE GLYCOL INDUCED STRESS

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ABSTRACT

Drought stress directly affects growth along with productivity of plants by altering plant water status. Sunflower (*Helianthus annuus* L.) an oilseed crop, is adversely affected by abiotic stresses. The present study was carried out to study the genetic variability and diversity among the sunflower genotypes at seedling stage based on different morpho-physiological parameters under Polyethylene Glycol (PEG) induced stress. A total of twenty-seven genotypes including two hybrids, eight advanced lines and seventeen accessions of sunflower (*Helianthus annuus* L.) were tested at germination and seedling stages in Polyethylene Glycol. Correlation and principle component analysis confirmed that germination percentage, root length, proline content, shoot length, chlorophyll content, stomatal frequency and survival percentage are positively correlated with each other hence; these traits were responsible for most of variation among genotypes. The cluster analysis results showed that genotypes Ausun, line-2, line-8, 17559, 17578, Hysun-33, 17555, and 17587 as more diverse among all the genotypes. These most divergent genotypes could be utilized in the development of inbreed which could be subsequently used in the heterosis breeding.

Key words: Sunflower, drought, stress, polyethylene glycol

***TUTA ABSOLUTA* MEYRICK (*LEPIDOPTERA: GELECHIIDAE*) ECOFRIENDLY
MANAGEMENT STRATEGIES**

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ABSTRACT

Tuta absoluta is one of the most devastating tomato leafminer and it spreads extensively in almost all parts of the world. This insect originated in South America and it has been invading several tomato-producing areas in Europe, Africa and Asia since 2006, in 2010 it was reported in Syria. *Tuta absoluta* has capacity to develop on wide range of solanaceous plants while tomato *Solanum lycopersicum* is its preferred host. It is serious threat for tomato production and feeding of larval stage of *T. absoluta* (the most destructive one) on stem, twigs, leaves and fruits result yield losses that can reach 100% in tomato crops. The biological characteristics leading to successful invasion by *T. absoluta* are its high reproductive capacity as well as the occurrence of several generations per year, the short generation time and it adapts to different environment conditions. Although different environmentally hazardous pesticides are used against *T. absoluta* none of the insecticides give full control due to the resistance development. it exhibited resistance to commonly used broad-spectrum insecticides such as organophosphate, pyrethroid, spinosyn and diamide. Besides, several pesticides active substances proved to exhibit detrimental side effect on non-target arthropods in tomatoes including parasitoids, predators and key pollinators. None of the insecticides gives full control due to resistance development. Therefore, sustainable ecofriendly control alternative to control this devastating pest is great necessary. These include application of bio-pesticides (plants extracts), biological using parasitoids, predators, microbial cells, pheromone-based tactics (early detection, monitoring, mass trapping, mating disruption, and inheritance sterility development), pest resistant plant cultivar production, besides to cultural practices. Hence, refining integrated pest management (IPM) through reducing pesticides and applying sustainable ecofriendly control alternatives is great interest for sustainable healthy farming system.

Key words: *Tuta absoluta*, Management strategies

**BIOLOGICAL CONTROL AGAINST FUSARIUM WILT OF DATE PALM
(*PHOENIX DACTYLIFERA L.*) USING NONPATHOGENIC FUSARIUM
OXYSPORUM**

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ABSTRACT

This study demonstrates a diversity of the endophytic microflora in the soil and rhizosphere of date palm and legumes (Pea and chickpeas) from three different agro-climatic zones in western Algeria. Some nonpathogenic isolates of *Fusarium oxysporum* (NPFO) isolated and selected, were tested to determine their effects on *Fusarium oxysporum* f.sp. *albedinis* (Foa), the causal agent of bayoud disease on date palm. The results "in vitro" tests on PDA and extract soil medium indicate that the NPFO isolates have exhibited a high inhibition toward mycelial growth (PGI) of Foa (68 –79, 83 %); that varies with the medium, nonpathogenic isolate and pathogenic isolate. In the "in vivo" test, the percentage of seedling mortality was between 0% and 10%. The results obtained in the control test date palm wilt disease with FONP were positive and shows an important competition for the sources of nutrition and a reduction of the disease index and a clear induction of the resistance of the plant. The combined effects of direct and indirect actions of Foa antagonists are discussed in the hope of providing a biocontrol strategy against bayoud disease. Based on these encouraging results, it is therefore of interest to further studies in this area in order to select and combined the best indigenous antagonist strains for use in control program.

Key words: Biocontrol, Bayoud, Date palm, *Phoenix dactylifera L.*, endophytic microflora, *Fusarium oxysporum*, West Algeria

AGRICULTURE ENGAGEMENT: EFFECTIVE LEADERSHIP CAN IMPACT THE PRACTICE OF URBAN GARDENING

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ABSTRACT

Educational leaders and community leaders in urban centers could serve as key individuals to promote urban agricultural gardening for students and their families. There are many benefits in urban gardening. Just to name a few, urban gardening can help the sustainability of people within their own communities to gain access to fresher food supplies, improving health issues, expanding knowledge to consumers on eating healthy, spend less time and travel to the grocery store and value-added in becoming more self-sufficient in growing some of their own foods in a natural manner. Leaders within the community could equip individuals with appropriate knowledge and skills about urban gardening. Intergenerational individuals could participate in urban gardening projects collaboratively that could further give them an additional sense of purpose, worth and belonging. Urban gardening could help to create and maintain a more engaged community where people would do healthier socializing in building a healthier, clean and safer environment. With the appropriate permit, urban gardeners could sell some of their products to the public. The purpose of this study is to highlight what is agriculture, value and benefits of urban gardening, educational and urban leadership influence, use of technology to assist in plant growth, gardening innovation, waste and energy, and the theories of economic, and the theories of economic of urban gardening.

Key words: Agriculture Gardening, Economic and Social Development, Urban Centers

**MARKETING ORGANIC FARMERS' COOPERATIVES IN RUSSIA: CASES AND
POLICY RECOMMENDATIONS**

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ABSTRACT

The article analyzes the possibilities of cooperatives for the marketing of organic food products in Russia. The author considers the challenges of state policy in the field of agricultural cooperation, restraining its sustainable development. Based on world and Russian cases, recommendations are offered for the accelerated development of organic farmers' cooperatives. The researcher argues that the changing global agriculture requires the development of new, more modern forms of both agricultural cooperatives and policy measures. The examples and conclusions presented in this work may be useful not only for Russia, but also for other post-Soviet countries in which agricultural cooperation and organic agriculture are at a low level of development.

Key words : agricultural cooperation, farmers' cooperative, organic farming, food security, agricultural policy, rural economy

EFFICACY OF COPPER FOLIAR SPRAY IN PREVENTING COPPER DEFICIENCY OF WHEAT GROWN IN A CALCAREOUS SOIL

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ABSTRACT

Field experiments were conducted to evaluate the response of rainfed wheat (*Triticum aestivum* L.) to foliar copper (Cu) application in correcting Cu deficiency in calcareous soils. Two native soil Cu contents were tested in successive growing seasons. The soil “1” contained 0.35 mg kg⁻¹ of Cu (DTPA extraction). It was evaluated during the 2016-17 season. The soil “2” contained 0.61 mg kg⁻¹. It was studied during the 2017-18 season. The rainfall amount was around 289 mm and 429 mm, respectively, for 2016-17 and 2017-18 seasons. For the soil “1”, the Cu treatments were: control, 0.2%, 0.4%, 0.6%, 0.8%, and 1%. For the soil “2”, the Cu tested levels were: control, 0.01%, 0.03%, 0.05%, 0.1%, and 0.2%. Cu was applied at the early boot growth stage in the sulfate form. The results showed that the response of grain yield to Cu foliar feeding was not related to the tested native soil Cu content. A significant grain yield increase, due to Cu spray, was revealed during the rainfall season (429 mm) in soil “2”. This increase was around 8% at 0.018% of Cu compared to control. However, Cu foliar application higher than 0.03% induced leaf damage. The Cu content of flag leaf and kernels showed a linear response to Cu supply. Flag leaf Cu content was around 5 mg kg⁻¹ in control and exceeded 30 mg kg⁻¹ at Cu application over than 0.03%.

Key words : Copper deficiency; wheat; calcareous soil; foliar spray; phytotoxicity

SOIL BORON MIGRATION AS INFLUENCED BY LEACHING RATE AND SOIL CHARACTERISTICS: A COLUMN STUDY

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ABSTRACT

Soil boron (B) supply is usually used by farmers to correct B deficiency in many crops. The excessive application of this fertilizer may threaten environment components particularly underground water and soil. This study was undertaken to evaluate B migration at different soil characteristics and leaching levels. Three soils were collected from different southwestern Mediterranean areas. Then, three annual leaching rates were tested for each soil: 35 mm, 237 mm, and 565 mm in a sandy soil; 35 mm, 103 mm, and 247 mm in a silty-clay soil; 35 mm, 70 mm, and 140 mm in a claycalcareous soil. The experiments were conducted in PVC columns filled with 30 cm of the studied soils. 0.5 mg kg⁻¹ of B was applied to the surface of each soil. The results showed that B migration is mainly related to leaching rate and clay content. The soil B losses (y) can be predicted using the regression model: $y \text{ (mg kg}^{-1}\text{)} = 0.001a - 0.01b + 0.14$ (adjusted R² = 0.92) where a = leaching rates (mm) and b = soil clay content (%). The B leaching threat is higher on sandy soil compared to other soils. However, soil B accumulation risk seems to occur particularly in silty-clay and claycalcareous soils. Further, bioavailable B enrichment was recorded only on silty-clay soil.

Key words : Boron; mobility; leaching; soil properties

RESPONSES OF RAINFED LENTIL (*LENS CULINARIS*) TO MANGANESE FOLIAR APPLICATION WHEN GROWN IN HIGH-CALCAREOUS SOIL CONDITIONS

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ABSTRACT

This study was designed to evaluate the response of lentil (*lens culinaris*) to manganese (Mn) foliar application in high-calcareous soil. Two field experiments on two clay calcareous soils with different active carbonate and exchangeable Mn contents were carried out during 2017 and 2018 seasons. The first studied soil (sol1) has an exchangeable Mn content of 7.47 mg kg⁻¹ (DTPA extraction) and 8.9% of active carbonate. The second soil (sol 2) has an exchangeable Mn content of 3.28 mg kg⁻¹ and 15.9% of active carbonate. Five foliar spray concentrations of Mn were tested for the both soils (0 or control; 0.5%; 1%; 3% and 8%). Mn was applied in the sulfate form (MnSO₄) twice at flower bud and at flowering. The results showed the absence Mn symptoms deficiency. Also, Mn application did not enhance grain yield and its components for the both studied soils. However, Mn foliar spray at concentration over than 1% resulted in leaf damage. Also, grain yield decline of around 34.5% ,compared to control, was recorded at 8%. Furthermore, no antagonism or synergy between manganese and the other nutrients (N, P, K, Mg, Cu and Zn) has been recorded.

Key words : Lentil, manganese, calcareous soil,

RELATIONSHIP BETWEEN SOME AGRO-MORPHOLOGICAL CHARACTERS AND LODGING RESISTANCE, IN 96 LENTILS (*LENS CULINARIS L.*) ACCESSIONS.

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ABSTRACT

Lodging in crops causes great losses in yield each year. Two field experiments were carried out during two consecutive year to determine the relationship between some agro-morphological characters and lodging resistance in ninety six (96) lentil genotypes represent a wide range of geographic origin. During the two years, the eleven (11) traits of plant height at flowering \ plant height at maturity/plant high index/ number of primary branches/ number of secondary branches/height of the first pod above the soil/stem diameter/ growth habit were measured and correlated with the lodging score. Plant high and stem diameter were indicative for better lodging resistance. Multiple linear regression equations indicated that total of the variation in lodging resistance was based on height of the first pod and plant high.

Key words : lentil -lodging resistance -plant height -Multiple linear regression

CONTRIBUTION TO THE KNOWLEDGE OF THE ENTOMOFAUNA (INSECTS, ARTHROPODA) FROM WEST CROPS (TRITICUM DESF 1889) IN CONSTANTINE REGION, ALGERIA

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ABSTRACT

The present study, carried out on the territory of improvement of hard and soft wheat belonging to the experimental station of the technical institute (ITGC) in El-Khroub, Constantine region (eastern Algerian) . We could identify 65 insect species, with a total of 823 individuals. The inventory in question revealed the presence of 10 orders and 43 families. Among the most frequent orders, we notice the beetles coming in first place with 12 families and 13 species and the Hymenoptera with 8 families and 14 species. The présence of Orthoptera is a fairly significant with 3 families and 4 species. Neuroptera, Thysanoptera, Blattoptera, Lepidoptera, Hemiptera, and Homoptera are noted by only one family. Our results are treated by ecological analyzes. The species *Geotrogus sp*, *Limothrips cerealium*, *Haplothrips tritici*, *Ocneridia volxemii*, *Mayetiola destructor*, are reported as important pests of wheat crops.

Key words : West, Insects, Constantine , crops, *Geotrogus sp*.

**IMPACT OF PASTORAL MANAGEMENT ON THE FLORISTIC
CHARACTERISTICS OF THE STEPPE RANGELANDS IN ALGERIA**

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ABSTRACT

Land degradation in dry Mediterranean regions results from the more or less predominant influence of biological factors physical and socio-economic. Their action combined creates an ecological imbalance which results in a decline in available pastoral resources, resulting in a process of desertification that is often accelerated by anthropogenic pressure and overexploitation of natural resources. The Office of the High Commissioner for Steppe Development (HCDS) has implemented a new method for carrying out development projects, particularly those relating to forage plantations. Our work has been achieved in the region of Laghouat (*Algerian steppe*) and had for objective the study of the floral characteristics of rangelands managed and unmanaged. the analysis of rangeland managed by planting of *Atriplex canescens* and unmanaged, shows that planted rangelands have the best values on the floristic plan (floristic wealth, rate covering vegetative), statistical analysis reveals a significant difference compared to the rangelands unmanaged, which encourages multiply this action for the restoration of the degraded rangelands. This study reveals success of rehabilitation of degraded steppe rangelands.

Key words : Algerian steppe, forage plantation, managing, overgrazing, rangelands.

DYNAMIC MODELING OF CLIMATE CHANGE IMPACT ON AGRICULTURAL LANDS AND WATER RESOURCES

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ABSTRACT

The recent statistics show a clear downward trend of water availability due in particular to climate change. According to The Fifth Assessment Report of IPCC (2014), Climate change will have widespread impacts on African regions. In fact, the recurring droughts that Morocco experienced during the last two decades were accentuated by an increasing demand due to economic development and demographic pressure. In a context of scarcity and a limitation of potential water resources, The Moroccan government is trying to implement new policies requiring the adoption of new management instruments and new institutional forms of organization. Accordingly, this paper proposes a tool of dynamic modeling and decision-making support. It is a nonlinear programming model that integrates the economic, hydrological and agronomic aspects at the river basin scale. This model simulates the impact of climate change on water resources and agriculture. Climate change scenarios include changes in water availability and economic conditions, as well as demand management policy. Under climate change effects, the water shadow price increases to a notably large extent; 1.6 dollars per cubic meter (\$/m³). This implies that climate change has a huge impact on water availability in the area and the actual water pricing policy cannot result in a rational and a sustainable use of the resource. The results show also that the basin's water resources are substitutable and water management policy cannot ignore this aspect and should integrate surface and groundwater resources at the same time. The recent statistics show a clear downward trend of water availability due in particular to climate change. According to The Fifth Assessment Report of IPCC (2014), Climate change will have widespread impacts on African regions. In fact, the recurring droughts that Morocco experienced during the last two decades were accentuated by an increasing demand due to economic development and demographic pressure. In a context of scarcity and a limitation of potential water resources, The Moroccan government is trying to implement new policies requiring the adoption of new management instruments and new institutional forms of organization. Accordingly, this paper proposes a tool of dynamic modeling and decision-making support. It is a nonlinear programming model that integrates the economic, hydrological and agronomic aspects at the river basin scale. This model simulates the impact of climate change on water resources and agriculture. Climate change scenarios include changes in water availability and economic conditions, as well as demand management policy. Under climate change effects, the water shadow price increases to a notably large extent; 1.6 dollars per cubic meter (\$/m³). This implies that climate change has a huge impact on water availability in the area and the actual water pricing policy cannot result in a rational and a sustainable use of the resource. The results show also that the basin's water resources are substitutable and water management policy cannot ignore this aspect and should integrate surface and groundwater resources at the same time.

Key words : Water resources, climate change, drought, Agriculture, integrated economic model

THE INFLUENCE OF APPLICATION OF ZINC OXIDE (ZNO) NANOPARTICLES ON GROWTH AND YIELD COMPONENTS OF BREAD WHEAT (*TRITICUM AESTIVUM* L.)

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ABSTRACT

The properties of nanoparticles and their use have been shown as prominent for application in agriculture. Zinc oxide (ZnO) nanoparticles (NPs) in agricultural production can bring certain benefits, improve zinc deficiencies, promote seed germination, improve plant phenology, plant growth, stem height, root volume and increase biomass in wheat. Otherwise, sufficient concentration could raise negative and possible harmful effects. The objective of this study was to evaluate the impact of seed priming with zinc oxide nanoparticles (ZnO NPs) on plant growth and yield components, plant height and spike length of wheat (*Triticum aestivum* L.). In order to estimate the effects of ZnO NPs on yield component, four winter wheat genotypes namely, NS Pobeda, NS Futura, NS 40S and NK Ingenio were selected. Seeds of each wheat genotypes were primed with different concentrations of ZnO NPs (0, 10, 100 and 1000 mg/L) for 48 h in dark box by continuous aeration. Primed seeds were afterwards sown in soil pots with 60-70% moisture contents during the experiment, till maturity. Results revealed that days to anthesis and maturity significantly increased after application ZnO nanoparticles. Considerable improvement was observed in plant height and spike length of wheat which increased with rates of ZnO NPs, as compared to the control. At rates of 10 mg/L ZnO NPs, the greatest increase in plant height and spike length was observed for genotypes NS Pobeda and NS Futura. At rates of 100 mg/L ZnO NPs, the greatest increase was observed for genotypes NS 40S and NK Ingenio. In condition of maximum rates of ZnO nanoparticles reduced both traits of wheat. Our result indicated plant response to ZnO nanoparticles can significantly increase plant height and spike length of wheat. Plant response to ZnO nanoparticles significantly depends on concentration of application, as well as from wheat genotype.

Keywords: Wheat, Zinc oxide, Nano particles.

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THE DETERMINATION OF YIELD POTENTIAL AND IMPORTANT AGRONOMIC CHARACTERISTICS OF ADVANCED PEANUT BREEDING LINES (F8) BELONGING TO DIFFERENT CROSSING COMBINATIONS IN MAIN CROP GROWING CONDITION

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ABSTRACT

This study was conducted as a main crop in University of Cukurova, Faculty of Agriculture Field Crops Department in 2019. The objective of this study was to determine the yield potential and important agronomic characteristics of advanced peanut breeding lines (F8) in main crop growing condition. In this study, 10 advanced peanut breeding lines belonging to Halisbey x Flower-22 (HC-1, HC-2, HC-3, HC-4 lines), Halisbey x Wilson (HW-1, HW-4, HW-5 lines), Halisbey x NC-7 (HN-3, HN-4 lines) and Halisbey x Ha-Runner (HR-1 lines) crossing and two standard varieties (Halisbey and NC-7) were used as a plant material. The experimental design was a Randomized Complete Block with three replications. Pod number and pod weight per plant, 100-seed weight, shelling percentage, pod and kernel yield per hectare, oil and protein content values of lines were investigated. As a result; the pod number per plant of breeding lines varied between 27.5-38.8 pod plant⁻¹, pod weight was 62.3-87.6 g plant⁻¹, 100-seed weight 80.4-124.3 g, shelling percentage was 66.0-70.9%, pod yield was 6434-7979 kg ha⁻¹ and kernel yield was varied between 4401-5451 kg ha⁻¹. The oil and protein content of breeding lines varied between %45.4-47.9 and % 25.0-27.2, respectively. This breeding program will continue by the selected lines at the future.

Key words : Peanut, Breeding lines, Agronomic characteristic, Pod yield

THE RESEARCHES ON BREEDING OF HIGH OLEIC PEANUT (*ARACHIS HYPOGAEAE L.*) VARIETIES BY THE CROSSING METHOD

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ABSTRACT

This breeding program was initiated in ukurova University, Faculty of Agriculture, Field Crops Department for Atlas Seed Company in 2010 and it continued to 2018. The objective of this breeding program was to breed high oleic acid content and yield peanut varieties. In this study, the crossing breeding method was used and plant selection was made according to “Pedigree selection” method in segregating materials. Halisbey (high yielding) and Brantley (high oleic acid content) varieties were used as parents in this breeding program. Crossing was made and harvested F1 seeds in 2010. It was started to selection single plants at F2 and continued to F6 stages in Atlas seed company research farm. The single plants were selected according to pod yield per plant and fatty acids composition. As a result, a breeding line is known [Masal] was determined a new high oleic peanut variety candidate as a high yield (6694 kg/ha) and high oleic acid content (%80.75).

Key words : Peanut, Variety breeding, Crossing, Pedigree method, High oleic

SELECTION OF PARENTS AND CROSS COMBINATIONS OF SPRING WHEAT (*TRITICUM AESTIVUM L.*) UNDER HEAT STRESSED CONDITIONS FOR YIELD AND YIELD CONTRIBUTING TRAITS

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ABSTRACT

Among different abiotic stresses, heat stress is a main constraint that damage wheat crop productivity. The objective of this study was identification and selection of efficient parents and cross combinations based on general as well as specific combining ability under different climatic conditions (Normal and Heat stressed conditions). To accomplish the goal, genotypes of spring wheat genotypes were exposed to high temperature stress (heat stress) in the plastic (polythene) sheet tunnel. Analysis of combining ability was carried out by Line \times Tester design by crossing 10 lines and 5 testers resulting 50 F1 hybrids sown in a randomized complete block design with three replications during cropping season 2015-16 under heat stress and normal environments. Parameters like spikelet per spike, grains per spikes, thousand-grain weight, and grain yield per plant were investigated. Presence of differences among genotypes were highly significant for all yield and related characters studied. From genetically diverse parents SW89.5277, V-12103 and V-13248 performed excellent general combining ability (GCA) estimates for all traits under study for both normal and heat stressed condition. Different crosses like, V-13013 \times Millat-11 for grains per spikes, Shahkar-2013 \times Chenab-2000 for thousand grain weight and Faisalabad-08 \times V-12082 for grain yield per plant resulted superiority of SCA effects under both normal and heat stressed conditions. These selected genotypes may be used in breeding programs targeting high potential under heat stress. This selected germplasm can be utilized for varietal improvement through the simple/recurrent selection in segregating generations to increase in yield potential of wheat.

Key words : Bread Wheat, General Combining Ability (GCA), Specific Combining Ability (SCA), Heat Stress

PLACE OF ALGERIA IN THE WORLD MARKET OF OLIVES OIL

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ABSTRACT

Algeria has a great history and tradition in the culture of the olive-trees, “It is the eighth producer and the sixth larger consumer of olives oil in the world and it has a specific strategy for the development of the olive-growing sector” Indeed, Algerian oleiculture knew these last decades, of profound mutations, for its levelling necessary to its integration in the mondial economy. In this work, we propose to evaluate the technical and social condition of transformation and conditioning of olives in Algeria, it is a very important segment of the downstream of this sector. That results from the inexistence of a dynamics in this direction. On the other hand, the packaging operations in the olive growers are very classic and traditional. Although he knew reforms, all the actions of the State in this segment remain insufficient compared to the potential of production in quantity and quality, and looking at the results recorded in Tunisia, main competitor on the international markets which means that several technical and socio-economic constraints of order are at the origin of this situation, and also to adapt new measurements allow to ensure their durability in the market.

Key words : Olive sector, Market, actors strategy, Algeria, olive oil.

EFFECT OF HIGH TEMPERATURE STRESS ON GROWTH, PHYSIOLOGY, YIELD AND QUALITY OF FOUR ROCK MELON (*CUCUMIS MELO* VAR. *CANTALOUPENSIS*) VARIETIES

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ABSTRACT

Rock melon (*Cucumis melo* var. *cantaloupensis*) is a high value greenhouse crop and one of the global issues discussed in rock melon industry is the high temperature (HT) stress due to climate change. HT beyond optimum in greenhouse is a critical factor for plant growth and can reduce the economical crop yield. Rock melon is a C₃ plant and under HT stress conditions it produces less in quantity and quality. In this study, four varieties of rock melon (Lady-gold, Lady-green, Himalai-99 and Glamour) were evaluated for their plant physiochemical behaviors under two temperatures (40±5°C and 45±5°C) conditions. Evaluated plant physical, physiological and biochemical characters; leaf area, specific leaf area, relative growth rate (RGR), chlorophyll content, photosynthesis rate, transpiration, stomatal conductance, intercellular Carbon dioxide concentration, lipid peroxidation and fruit yield were significantly affected by the temperature. Fruit firmness and total soluble solid were not affected by the temperature, but differ among the varieties. All evaluated parameters were significantly affected by the variety. Temperature significantly affect the fruit position in main branch. When temperature increases, fruit appear in upper branches. When fruits display in to higher nodes, fruit size become smaller. Compared to 40±5°C, yield reduction of lady-green and glamour was 8.5 and 13.2% and in lady-gold it was 12.5% in 45±5°C. Yield of himalai-99 was recorded 7.7% yield increment in 45±5°C. These results suggest that, it is needed to find a remedy to mitigate the HT stress than optimum temperature created by climate change on Rock melon, cultivate in greenhouse.

Keywords: Rock melon, varietal deference, high temperature stress, greenhouse

EFFECT OF TILLAGE PRACTICES ON YIELD AND PHOSPHORUS UPTAKE OF A DURUM WHEAT CROP UNDER SEMI-ARID CONDITIONS IN NORTHERN ALGERIA.

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ABSTRACT

The cropping systems used in the semi-arid regions of northern Algeria based on monoculture of cereals, fallow and deep and intensive tillage, have exposed the soils of these regions to degradation and loss of production potential, the adoption of the conservation agriculture techniques, especially, conservation tillage seems to be crucial to guarantee a sustainable production in these regions. The effect of three tillage practices: (i) conventional tillage (CT), consisting of moldboard ploughing to 30 cm depth, (ii) reduced tillage (RT) using a cultivator to 7 cm depth, and (iii) no-tillage (NT) with retaining crop residue in surface, on yield and phosphorus uptake of a durum wheat crop (*Triticum durum* var. Simeto) was studied in the growing season 2017-2018. The study was carried out in a trial established since the year 2015 in the semi-arid region of El-Hachimia (northern Algeria), the experiment is conducted in a complete randomized block design with three replicates. Grain, straw and biomass yields were assessed, phosphorus concentration in grain and straw was analyzed, and the total phosphorus uptake was determined by multiplying the grain and straw dry matters by their respective P concentrations. There were no effects of tillage on durum wheat production in this particularly rainy growing season. The favorable climatic conditions had a positive impact on durum wheat grain and biomass production, grain yields of 4.06 Mg ha⁻¹, 4.03 Mg ha⁻¹ and 3.65 Mg ha⁻¹ were obtained by RT, CT and NT systems respectively, which is superior to the average yields obtained usually in the region. A biomass production of 14.9 Mg ha⁻¹, 14.6 Mg ha⁻¹ was recorded by RT and CT respectively and 10.9 Mg ha⁻¹ by NT system. Phosphorus concentration in both grain and straw and the total P uptake by plants were not significantly affected by tillage systems, statistically similar P concentrations were obtained by the three treatments. P content values of: 5.1 g kg⁻¹, 5.2 g kg⁻¹ and 4.8 g kg⁻¹ were found in grain harvested from NT, CT and RT plots respectively, these values are above those reported by several authors, which indicate a fairly good phosphorus nutrition.

Key words : No-tillage, conservation tillage, phosphorus, durum wheat, semi-arid conditions

SHEEP ACTIVITY IN THE ALGERIAN ECONOMY (CASE OF THE TIARET RÉGION)

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ABSTRACT

The sheep meat chain in Algeria is undergoing a series of changes: price differentiation, according to the type of market and demand, structuring of supply according to events (period of high consumption: Aid El-kebir and the month of Ramadhan). Livestock markets are very popular in Algeria. The methodology adopted is based on a weekly monitoring of 2 of the most important livestock markets of a large sheep producing region, which are Sougueur and Hamadia, during the campaign (2018-2019). The choice of these markets was justified by the fact that they are national in scope in terms of transit and marketing of sheep. The data collected related to the following aspects: prices of the various categories of sheep; feed prices; and economic operators of livestock markets. In these markets, transactions are made publicly. In fact, there is a juxtaposition of short and long circuits and sheep meat follows three quite distinct circuits. The marketing system for livestock products and feedstuffs is characterized by the existence of economic agents who are breeders, horse traders, butchers and traders. These operators are in permanent contact with each other. Information on prices and quantities is perfectly accessible at all times and to all operators. No operator by these decisions can alone make the market evolve in a significant way. The objective through this article is to show the sheep chain in the Algerian economy.

Key words : market, price, actor, competition, merchandise, religious festival.

EFFECT OF NITROGEN FERTILIZATION ON THE PRODUCTIVITY AND QUALITY OF WHEAT VARIETIES

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ABSTRACT

The influence of nitrogen fertilization on the productivity and quality of wheat varieties was studied: Sadovo 1 (standard), Avenue, Anapurna and Airbus. The four wheat varieties were grown on Eutric Fluvisols on an experimental field in the region of Plovdiv. The following variants of nitrogen fertilization were studied: N0, N8, N16 и and N24 on a background of P15K10. It was found that with increasing nitrogen fertilizer rate to 160 kg N/ha, the productivity and grain quality of all studied varieties increased in proportion to fertilization. The applied of 240 kg N /ha was economically unjustified, as it did not lead to a significant increase of the quantity and quality of the production, compared to fertilization with 160 kg N/ha, and in some indicators lower values were reported compared to the specified fertilizer rate.

Key words : grain quality, nitrogen nutrition, productivity, wheat

RESPONSIVENESS OF CORN HYBRIDS TO MYCORRHIZAL COLONIZATION: POT AND FIELD COMPARISONS

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ABSTRACT

The arbuscular mycorrhizal (AM) symbiosis may play a key role in plant P nutrition in low-P soils and/or low input agriculture. Cultivars with high mycorrhizal dependency, defined as the difference in plant growth between the mycorrhizal and non-mycorrhizal state divided by the growth of the mycorrhizal, are those that are expected to be benefited most from the symbiosis. Responsive cultivars are often identified from higher extend of root length colonization by AM fungi. The mycorrhizal dependency of nine corn (*Zea mays* L) hybrids was investigated in a pot study with or without *Rhizophagus intraradices* inoculation in a 16 mg kg⁻¹ Olsen-P soil. The same hybrids were tested in two sites, with acid and alkaline soil, under two levels of P (0 and 60 kg P₂O₅/ha), where the AM fungal root colonization was recorded. Of the nine hybrids, two had positive mycorrhizal dependency (13-17%), two were neutral (-0.8 - +3%) and five showed negative mycorrhizal dependency (-15 - -69%). However, there was no difference in colonization between hybrids in the field studies. Mycorrhizal dependency was not related to the extent of root colonization.

Key words: Arbuscular mycorrhizas, Maize, Phosphorus

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**IMPACT OF BIOCHAR ON ABUNDANCE AND DIVERSITY OF SOIL MITES
(ACARI).**

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ABSTRACT

Soil is an important component for monitoring of sustainability of land use in relation to both conservations of natural resources and biodiversity of ecosystems. This work has focused on diversity of soil mites (Acari) in biomonitoring of soil bioindicators. Mite communities are extremely sensitive to all types of soil disturbance & amendments. This article presents a review of some studies on mite communities in order to discuss whether, diversity and numbers of mites present in soil can reflect human impact on ecosystems and landscape, or mites can only be used in monitoring systems. Among soil mites, Oribatids (infraorder) and Mesostigmatids (families) including Ascidae; Digamasellidae; Laelapidae; Macrochelidae; Rhodacaridae are known as important indicator within soil ecosystems, community formation and structure impacted by biochar. The aims of this review: A) Impact of biochar on abundance and diversity; B) soil mites as bio-indicator; C) prediction ability of effectiveness of biochar. This review will be useful tool for future study regarding climate change scenarios and biochar effectiveness.

Key words : Biochar, climate change, soil diversity, mites

DETERMINATION OF OCHRATOXIN A IN OLIVES DURING THE HARVEST PERIOD

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ABSTRACT

Olive is one of the most important agricultural products in our country and ranks first among the world's olive production countries. Unsuitable harvest, storage and environmental conditions may lead to fungal growth and mycotoxin contamination. The toxigenic fungi can produce secondary metabolites called mycotoxins. Mycotoxins may not only have carcinogenic, teratogenic, mutagenic effects on human and animal health but also causes economic losses. Sometimes the presence and production quantities of toxins can reach levels that may pose a risk to the consumer. This study aims to detect Ochratoxin A (OTA) contamination in fifty olive samples from Mersin during the harvest period. OTA occurrence on olive samples were analyzed by HPLC (High-Performance Liquid Chromatography). It was determined that 40.0% of olive samples contained 0.43-4.01 µg/kg of OTA. As a result, OTA contamination was found frequently in olive samples in this study. In addition to OTA contamination in olives should be prevented and provided control measures with the right practices to be carried out during the harvest, post harvest and storage.

Key words : Ochratoxin A, Mycotoxin, HPLC, Olive, Mersin

BUTCHERY ECONOMY DURING THE PERIOD OF COVID 19 IN THE TIARET REGION (CASE OF SHEEP MEAT)

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ABSTRACT

In Algeria, sheep farming was a real national asset that could be appreciated through its high numbers compared to other animal speculations and particularly through the multitude of breeds present, which was an advantage and a sure guarantee for the country. According to official statistics, Algeria had 26 million head of sheep and produced 325,000 tonnes of sheep meat. While about 7,500,000 head of locally produced sheep are slaughtered for slaughter, making 150,000 TCE. This study aims to study the butchering activity, which has so far not been the subject of any in-depth study in Algeria. It has led us to question the logic of butchers carrying out the slaughtering activity as well as their mode of insertion in the sheep meat chain. The methodology implemented was based on a survey during the period of COVID 19, March-April 2020 among 31 butchers. These butchereries are considered to be artisanal units, adapted to the local market, recognized by their suppliers and supplied only live animals and purchasing frequencies; they meet the needs of a varied clientele (households and communities) and are resistant to fluctuations in supply and prices. The margins generated by this traditional butcher's shop are influenced by parameters such as peak consumption periods (religious holiday periods) and the level of live supplies.

Key words : butchery, sheep meat, butcher, slaughter, chain.

DISTRIBUTION OF DTPA-EXTRACTABLE MICRONUTRIENTS AND THEIR RELATIONSHIP WITH SOME SOIL PROPERTIES IN RICE GROWING SOILS OF BIRBHUM DISTRICT, WEST BENGAL, INDIA

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ABSTRACT

A study was under taken to assess the DTPA-extractable micronutrients in soils under rice based cropping system in birbhum district, West Bengal, India. The aim of this study was to examine the micronutrient status of selected soils to investigate the soil fertility and to determine correlation between physico-chemical properties (pH, EC, OC) and available iron (Fe), manganese (Mn), zinc (Zn) and copper (Cu). A total of hundred surface soil samples (0-15 cm) were collected from five selected blocks of Birbhum district (*viz.* Suri II, Rampurhat II, Md Bazar, Nalhathi I, Sainthia) (Twenty soil samples were collected from each block). pH of the collected soil samples varied between 4.93-7.35, indicating that the soils were strongly acidic to neutral in reaction. The electrical conductivity (EC) values were low (0.04-0.19 dS/m) and soils were non-saline in nature i.e. low salt concentration was observed in all five blocks. All the soil samples under investigation were found to contain low (<0.5%) to medium (0.5-1.0%) soil organic carbon content. 4% of the collected soil samples were found deficit in available Zn, 76% were having marginal and 20% were found sufficient in available Zn. All the collected soil samples were found sufficient in available Fe, Mn and Cu. Soil pH correlated significantly and negatively with DTPA-extractable micronutrients. DTPA-extractable micronutrients significantly and positively correlated with soil organic carbon. Non-significant and negative correlation was found between EC and available micronutrient cations (Zn, Fe, Mn, Cu).

Key words : Rice Fields, Physico-chemical properties, Correlation Studies, Micronutrient deficiency, Birbhum.

INHIBITORY EFFECT OF CARVACROL RICH ESSENTIAL OIL ON SEED GERMINATION IN LABORATORY AND FIELD CONDITIONS

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ABSTRACT

Carvacrol is a monoterpenic phenol contained in the essential oil mainly on representatives of Lamiaceae. A number of pharmacological (antioxidant, antibacterial, antifungal, anticancer, anti-inflammatory, hepatoprotective, spasmolytic and vasorelaxant) and biological (insecticidal, larvicidal, ovicidal) activities of this compound have been reported. However studies on the herbicidal potential of carvacrol and carvacrol-rich essential oils are insufficient. Essential oils of *Monarda fistulosa* L., *Satureja pilosa* Vel. and *Origanum vulgare* subsp. *hirtum* Ietswaart. (Greek oregano) cultivated in the experimental field at the Institute of Roses, Essential and Medicinal Cultures, Kazanluk, Bulgaria were evaluated as inhibitors on weed germination. Chemical composition of the essential oils were analyzed by GC/MS. The main component in them was identified as carvacrol. Inhibitory effect of the essential oils on seed germination of *Lolium perrene* L. and *Trifolium pratense* L. were examined as aqueous solutions at concentration range 0,5-3 µL/mL in Petri dishes. Complete inhibition was established at concentration 1,5 µL/mL. Germination inhibitory activity of the essential oil of oregano was assayed in field condition. An aqueous solution of the essential oil at a concentration of 10 µL/mL was included in the superabsorbent TerawetR and the obtained mass was mixed with the seeds of the studied weeds and introduced into the soil on the experimental field. After one month, the result was evaluated by the weight of weeds from the control and experimental areas. Reduction with 86%±5 of the weeds was found in the experimental areas compared to controls. The results showed that carvacrol-rich essential oils had a strong inhibitory effect on weed germination. The application in the field conditions of the essential oil included in the superabsorbent prevents its rapid evaporation and preserves its inhibitory effect.

Key words : *Monarda fistulosa*, *Satureja pilosa*, Greek oregano, bioherbicides, Terawet

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**SUPPORTING OF RURAL DEVELOPMENT INVESTMENTS BASED ON
AGRICULTURE IN KASTAMONU**

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ABSTRACT

Rural development; It is one of the most fundamental elements of countries' having a strong economy and developing. The most important activity area in rural development is agriculture and farming. Kastamonu Province is located in the North of the Central Black Sea region of Turkey at the altitude of 775 meters above sea level. It covers 13108 square kilometers area which consists of 20 towns and 1064 villages within its boundaries. Total agricultural area of Kastamonu province is 359,226 hectares (27.4%). 34.4 percent of this area (123.891 hectares) is used to make dry land farming. The irrigable farming area is 234.335 (65.6%) hectares and within these areas non-irrigated area is 127.715 hectares (75.4%) and 52.825 (24.6%) hectares are irrigated. Kastamonu has an important potential in agriculture and farming area, also it increases its awareness. In addition to this, Kastamonu hosts historical and natural beauties that can be used for lots of different popular touristic activities. Until today in Kastamonu 19 million 849 thousand TL (with %50 grant support) has been given to 255 investment projects and has been provided job opportunity to 500 person. In this study all supporting applications were examined that is used on agriculture sectors in Kastamonu and its districts between 2006-2020.

Key words : Kastamonu, Rural development, Agriculture and farming, KKYDP

IN VITRO EFFICACY OF NATIVE ENTOMOPATHOGENIC FUNGI AGAINST WESTERN FLOWER THRIPS *FRANKLINIELLA OCCIDENTALIS* (PERGANDE) OF TOMATO IN KENYA

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ABSTRACT

Tomato *Solanum lycopersicum* L. is an important crop in Kenya. Arthropod pests are major constraints to its production and farmers rely heavily on synthetic chemicals for control, which increases costs and leads to pollution of the environment. The objective of this study was to evaluate the effectiveness of native Kenyan fungi in managing thrips as an alternative to synthetic pesticides. *In vitro* studies were conducted to evaluate the effectiveness of native fungi against *Frankliniella occidentalis* collected from the tomato fields and maintained in the laboratory. The fungi were isolated from soil samples from tomato fields and identified based on their vegetative and reproductive structures. Treatments included fungal isolates and a control; replicated four times arranged in a completely randomized design. The effect of the fungal isolates on *F. occidentalis* was evaluated by treating thrips with concentrations of 1.0×10^7 conidia ml⁻¹. Data on mortality of *F. occidentalis* was recorded daily for 10 days after treatment. Data on mortality of thrips was subjected to Analysis of Variance (ANOVA) using SAS software version 9.4 to test the effect of different treatments. Means were separated using Student Newman-Keuls test at $P \leq 0.05$. *Gliocladium virens*, *Trichoderma virens*, *Fusarium solani*, *Fusarium oxysporum* and *Trichoderma afroharzianum* were more virulent causing mortalities above 50%. *Gliocladium virens* was the most potent, causing 62.2% mortality in adults and 43.8% in nymphs at 1.0×10^7 conidia ml⁻¹. The findings showed that *G. virens* is a potential candidate for development as a fungal-based bio-pesticide against *F. occidentalis* on tomato.

Key words : *Gliocladium virens*, insecticidal activity, pesticides, thrips, tomato

TOXICITY OF ROSMARINUS OFFICINALIS OIL TO THE PEST TETRANYCHUS URTICAE KOCH (ACARI: TETRANYCHIDAE) AND ITS PREDATOR PHYTOSEIULUS PERSIMILIS ATHIAS-HENROIT (ACARI: PHYTOSEIIDAE)

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ABSTRACT

This study aims to determine the chemical composition of *Rosmarinus officinalis* (Lamiales: Lamiaceae) and its acaricidal effect on the pest mite *Tetranychus urticae* Koch (Acari: Tetranychidae). and its predator *Phytoseiulus persimilis* Athias-Henroit (Acari: Phytoseiidae). The analysis of the chemical composition of the essential oil extracted was carried out on gas chromatography coupled with mass spectrometry. Three major compounds found in the essential of *R. officinalis* were α -pinene (32.64%), β -Humulene (8.71%), and Camphene (5.95%). The toxicity of *R. officinalis* oil was performed using inhalation bioassay on both *T. urticae* and its predator *P. persimilis*. The results obtained showed high toxicity on the mite than to its predator with a mortality rate of 96% and 35.43% respectively at the highest dose of 8%. Besides, the fertility of females, the hatching of eggs, and the emergence of adults in *T. urticae* were also studied using contact bioassay where a total reduction of all three biological parameters was recorded at the dose of 4%. This study revealed the toxicity of this oil on the adults of *T. urticae*, the fertility of the females, the hatching of the eggs, and the emergence of the adults. Besides, the application of this oil will also allow the conservation of *P. persimilis*. Altogether, the combination of toxicity on *T. urticae* and preservation of its predator gives *R. officinalis* essential oil a propitious potential for the control of the pest mite *T. urticae* and maintenance of environmental balance.

Key words : Essential oil, Toxicity, *Rosmarinus officinalis*, *Tetranychus urticae*, *Phytoseiulus persimilis*

PHYSIOLOGICAL AND BIOMETRICAL PARAMETERS OF ORGANICALLY GROWN LETTUCE (*L. SATIVA*)

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ABSTRACT

Global warming is the leading cause of the extreme meteorological events increase in the last three decades. Increase of annual average air temperature and temperature values during winter season and early spring has been recorded in comparison to the (1961-1990) referent period in Plovdiv region. Climate change impacts food security, crop growth, as well as their quality and nutrition value. Therefore, modern scientific research should be focused on growing produce using sustainable and organic methodology that also produces pure and delicious foods. The (type Batavia, variety Maritima) lettuce development was researched in a greenhouse environment in the experimental field of the Agricultural University Plovdiv. During the lettuce growth six different fertilizing variants were used: no fertilizer, one chemical, and four organic fertilizers. The effect of the different fertilizes was studied through specific physiological parameters and productivity. This paper analyzes changes in functional activity of the plant photosynthetic apparatus and productivity of variants with different fertilizers in an *unheated greenhouse*. The ratio between photosynthetic active radiation (PAR) and quantum yield (qY-Fv/Fm) of PS II was determined to be more optimal in dark-adapted leaves for the organic fertilizer variants, compared to the no fertilizer variant. No significant difference was observed in the values of the minimal fluorescence Fo in reaction centers of PS II after the dark-adaptation of leaves using the different fertilizer variants. Higher values of chlorophyll content index (CCI) were documented for organic and chemical fertilizers compared to the no fertilizer variant. Meteorological conditions and main biometrical parameters were studied as well.

Key words : photosynthetic activity, chlorophyll content index, lettuce, yield, greenhouse

IDENTIFICATION OF FUNGAL PATHOGENS LIMITING AVACADO PRODUCTION IN RECENT YEARS

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ABSTRACT

Avocado is grown in limited areas in the world and it is economically important due to rich nutritional value. Avacado commercial production is common at Mediterranean region, Turkey, However, there have been fungal pathogens identified restricting avocado production in recent years. In this study, it was aimed to identify and diagnose fungal pathogens causing diseases on avocado trees and to investigate proper management methods. Fungal isolations were made from root, leaf and branch samples collected from Gazipaşa, Alanya and Fethiye avocado production areas. Microscopic studies revealed that *Phytophthora cinnamoni*, *Macrophomina phaseolina* and *Pestalotiopsis microspora* were causal agents. These fungal pathogens entered from root tissue of avocado plant blocked plant's water and nutrient uptake. The fungal pathogens cause blackening of the roots, vascular vessels, small brown-blackish spots, yellowing and drying on leaves of whole leaves. Control of the fungal pathogens is possible with proper cultural practices, planting resistant avacodo varieties. Alternatively, biological control agents should be considered to control fungal pathogens then chemicals should be last control method of struggle pathogens. For future, studies have commnced for not only identified casual pathogens but also appropriate managements strategies developed for controlling such pathogen in avocado production areas. Otherwise, the above disease pathogens cause deaths even in 8-12 years old avocado trees and result great destruction on yield.

Key words : Avacado, Fungal pathogens, Diagnose, Management

INVESTIGATION OF *USTILAGO MAYDIS* ON MAIZE CHLOROPHYLL CONTENT, RATE OF LIPID PEROXIDATION AND PHENOTYPIC TRAITS

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ABSTRACT

Ustilago maydis has been considered as one of the most common diseases in Hungary. The available control strategies of the pathogen are quite limited due to unsatisfactory effect of fungicides as well as the sometimes inefficient prevention of mechanical injuries, insect damages (which create gateways to infections). For these reasons, disease resistance breeding is so emphatic, since currently there is no hybrid with complete resistance to the *Ustilago maydis* in Hungary as well as in Europe. The main symptoms of the disease are the death of young plants, leaf chlorosis, the appearance of tumors on the stem, and cob. This survey emphasizes the observation of the impact of the *Ustilago maydis* infection on the morphological (plant height, stem diameter, senescence) and physiological (photosynthetic pigments and relative chlorophyll content) parameters of corn and the rate of lipid peroxidation. Furthermore, also the impression of various plant hormones was examined on the course of the infection. Maintenance of the pathogen was conducted under controlled laboratory conditions. *Ustilago maydis* samples were collected from fields and cut under sterile box, cultured on specific, solid corn smut medium, inoculated into liquid medium, and adjusted the appropriate number of cells (sporidium number) in Bürker chamber. The test plants (*Zea mays* L. cv. Armagnac) were grown in greenhouse using peat (fertiliser) with continuous irrigation. Infection with the fungus was timed at 4-5 leaf stage of the young plants. The five treatments were the followings: 1; Untreated (control), 2; infected plant, 3; the infected plant supplemented with ethylene hormone (Ethrel growth regulator, 1% m/V) 4: supplemented with gibberellin hormone (1 x 10⁻³ M concentration); 5: the two plant hormones mentioned above in combination. Two mls of the sporidium suspension (the sporidium concentration of the suspension was approximately 10 000 ml⁻¹.) and 1 ml per each hormone was injected with hypodermic needle into the stem between the second and third nodes. Only sterile distilled water was injected into the control plants. The plant height, stem diameter, and relative chlorophyll content were measured the seventh, eleventh and fourteenth days after infection. The photosynthetic pigments (on the fourth leaf) and rate of lipid peroxidation (LP; fifth leaf) were sampled on the fourteenth day. Results show that the gibberellin treatment contributed to the reduction of corn height, while the ethylene increased the intensity of infection. Studying the combined effect of these two hormones, it can be stated that the effect of gibberellin prevailed one week, while the ethylene prevailed two weeks after the infection. There was no statistically significant difference between the morphology of control and infected plants

(without hormonal treatment). As well as no significant difference was proved between the stem thickness and leaf senescence. Further results underline that the relative chlorophyll content declined steadily in the fourth and fifth leaf due to the infection compared to the control balanced by gibberellin treatment. Examining the rate of lipid peroxidation, it has become obvious that the control plants showed lower malonaldehyde content (MDA) compared to other treated corns. Plants treated with ethylene and gibberellin had lower MDA content than hormone-free ones and the only hormone-treated corns. In terms of photosynthetic pigments, it revealed that infected corns showed lower chlorophyll-*a*, *b* and carotenoids content compared to the control. Results indicate that due to the gibberellin treatment the parameters mentioned above increased, while the ethylene hormone reduced all of them. Examining the combined effect of gibberellin and ethylene, the effect of gibberellin was greater. In conclusion, the *Ustilago maydis* infection had impact on physiological processes of plants, as well as hormone treatment contributed to mitigate and intensify the plant physiological damages of the pathogen.

Key words : *Ustilago maydis*, corn smut, biotic stress, chlorophyll, lipid peroxidation, plant hormones

OLIVE ORCHARD MANAGEMENT AND ZONES OF CULTIVATION AFFECTING BENEFICIAL FAUNA IN CRETE, GREECE

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ABSTRACT

Olive cultivation is a major crop and feature for the Mediterranean. The olive farming practices applied as well as the agroecological zones of cultivation are considered important for the quality as well as the environmental and sustainability performance, including aspects related to the beneficial fauna, of olive production. In this study olive orchards in hills and plains and under different management systems (organic and conventional) were studied in south Crete, Greece. Different management practices and zones of cultivation, including spatial features, were associated with soil arthropods, as beneficial (functional) fauna, and land snails (as part of the Cretan diet). Aspects of olive production were studied for initial conclusions related to the enhancement of the olive agroecosystem for delivering important services, such as pest control or provision of food, other than the olive fruits. Initial results indicate that less intensive management systems and zones of cultivation are positive correlated with the beneficial and edible fauna of olive orchards.

Key words: Olive, pomology, agroecology, management, cultivation zone

ACKNOWLEDGEMENT: The research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme «Human Resources Development, Education and Lifelong Learning 2014- 2020» in the context of the project “Impact of different management systems and spatial factors on the biodiversity of olive agroecosystems” (MIS 5048171).

ALTERATIONS OF THE PATHOGEN (PSTVD) REGION FOR STOPPING INFECTION IN HOST.

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ABSTRACT

With an increase knowledge of Potato Spindle tuber viroid (PSTVd) an effort was made to change in PSTVd genome for minimizing/stopping its infection in plant. In this present study PSTVd RNA was isolated from infected potato plants in Pakistan and confirmed by BLAST, The isolated PSTVd (Accession no 303578.1) show 100% similarity with already deposited PSTVd Strain. Loop “26” of PSTVd was selected and a gene change was made at position 170 out of 359 nucleotides as A to U. The gene changes at position 170 was also confirmed by Mfold Server analysis and BLAST. The mutated PSTVd was applied on 21 one day old *Nicotiana benthamiana* (Model genetic analysis plant) in controlled growth chamber. A positive control (isolated PSTVd) was also applied on experimental host with negative control (water only). After 21 days of post inoculation isolated PSTVd show 90% infection symptoms whereas mutated one showed no symptoms on host. Experimental host remained healthy and keep growing even two months after inoculation. So using molecular genetics/ biology approaches it was determined that a gene change in PSTVd (Pathogen) genome can alter/ finish its mode of infection in host. By this way we could stop infectivity of PSTVd. To best of our knowledge this is first report of PSTVd genome alteration at position 170 for stopping pathogen infection. Mutant generated at this point by changing PSTVd genome completely failed to interact/infect host plant. The results obtained may help to create viroidal resistance plant in future. With an increase knowledge of Potato Spindle tuber viroid (PSTVd) an effort was made to change in PSTVd genome for minimizing/stopping its infection in plant. In this present study PSTVd RNA was isolated from infected potato plants in Pakistan and confirmed by BLAST, The isolated PSTVd (Accession no 303578.1) show 100% similarity with already deposited PSTVd Strain. Loop “26” of PSTVd was selected and a gene change was made at position 170 out of 359 nucleotides as A to U. The gene changes at position 170 was also confirmed by Mfold Server analysis and BLAST. The mutated PSTVd was applied on 21 one day old *Nicotiana benthamiana* (Model genetic analysis plant) in controlled growth chamber. A positive control (isolated PSTVd) was also applied on experimental host with negative control (water only). After 21 days of post inoculation isolated PSTVd show 90% infection symptoms whereas mutated one showed no symptoms on host. Experimental host remained healthy and keep growing even two months after inoculation. So using molecular genetics/ biology approaches it was determined that a gene change in PSTVd (Pathogen) genome can alter/ finish its mode of infection in host. By this way we could stop infectivity of PSTVd. To best of our knowledge this is first report of PSTVd genome alteration at position 170 for stopping pathogen infection. Mutant generated at this point by changing PSTVd genome completely failed to interact/infect host plant. The results obtained may help to create viroidal resistance plant in future.

Key words : PSTVd, pathogen *Nicotiana benthamiana*, BLAST

STUDY OF THE EFFECT OF *CITRUS SINENSIS* AND *CITRUS AURANTIUM* ESSENTIAL OILS ON *TETRANYCHUS URTICAE* KOCH (ACARI: *TETRANYCHIDAE*)

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ABSTRACT

Two essential oils were extracted from the peel of *Citrus sinensis* and *Citrus aurantium* to evaluate their acaricidal effect on the adults, larvae and eggs of the pest mite *Tetranychus urticae* Koch (Acari: Tetranychidae). The repellent effect and the residual activity were also assessed. The chemical composition of two essential oils was assessed by gas chromatography/mass spectrometry. Limonene was obtained as the majority compound in the essential oil of *C. sinensis* (96.11%) and *C. aurantium* (96.10%). The efficacy of both essential oils was studied by means of toxicity tests. Five increasing concentrations of each product were tested: 0.5, 1, 2, 4 and 8% with contact treatment. The toxicity tests demonstrated a good efficacy of the two essential oils studied against the various stages of development of *T. urticae*. At a concentration of 8% of *C. sinensis* and *C. aurantium*, the mortality was 63.33% and 68.74% on adults, 100% and 75% on larvae and 85.41% and 95% on eggs, respectively. These oils had a repellent effect on *T. urticae* adults and they were not very persistent on the leaves. These results indicated that both essential oils have the potential to be developed as botanical acaricides for eco-friendly management of *T. urticae*.

Key words : Essential oil, toxicity, *Citrus aurantium*, *Citrus sinensis*, *Tetranychus urticae*

DROUGHT TOLERANCE OF TWO BULGARIAN WINTER COMMON WHEAT CULTIVARS

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ABSTRACT

Drought tolerance of two winter common wheat cultivars (*Triticum aestivum* L.) was compared under controlled, green house and field conditions. The plants on the field are grown according to the technology accepted in IPGR, Sadovo. In a climatic chamber (Fytoscope FS-RI-1600, Photon System Instruments, Czech Republic) the plants were developed at 20°C/18°C day/night temperature, the light intensity of 300 $\mu\text{mol m}^{-2} \text{s}^{-1}$, 16/8 h light/dark photoperiod and 55% air humidity until 3rd leaf emerged. Measurements of photochemical activity of PSII and thermal energy dissipation after 3 and 7 days of dehydration of wheat plants in a climatic chamber showed higher drought resistance of cultivar Guinness compared to cultivar Nikky. While the ratio Fv/Fm was not significantly affected after 7 days of dehydration of cv. Guinness it decreased by 15% in Nikky, which was accompanied by 35% enhancement in thermal energy dissipation (1-Fv'/Fm'). In addition, the values of 1-Fv'/Fm' remained high in cv. Nikky after 4 days of rehydration of dehydrated plants. The higher drought sensitivity of cv. Nikky was also confirmed by experiments in the greenhouse and in the field. The reduction in dry weight in Guinness was slightly lower than in Nikky. The chlorophyll content and the ratio of chlorophyll content to leaf area were higher in the flag leaves of field-grown plants from Guinness compared to Nikky during the waxy maturity phase and especially after a period of drought and dry winds.

Key words : Drought tolerance, winter common wheat cultivars, photochemical activity of PSII, thermal energy dissipation

MANAGEMENT OF CROWN GALL DISEASE IN THE PRODUCTION OF FLOWER CUTTINGS IN KENYA

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ABSTRACT

Crown gall caused by *Agrobacterium tumefaciens* reduces yields and leads to significant loss of business through restrictions in trade on a wide variety of flower cuttings. The disease has no effective control measure and currently requires high use of synthetic chemicals. This research aimed to identify effective management strategies that minimize pesticide use in production of Asteraceae flower cuttings. Control products were evaluated individually and in combination in a greenhouse study and for suppression of bacterial growth when cultured on treated nutrient agar. Treatments included Sunflower oil, KSP-Colloidal Copper, KOBE-Chrysophanol parietin, Copper oxychloride and Electro-Chemical Activated water. Data on disease severity (galls) and incidence was collected weekly and analyzed using SAS software, by ANOVA and significantly different treatment means separated by Fisher's protected LSD test at $P < 0.05$. In the lab experiment Copper oxychloride was least effective and had the highest number of bacterial cells growing (>100) while ECA water, KSP and oil reduced bacterial growth. Combined ECA water and Oil in NA suppressed bacterial growth completely while Oil alone had than less 50 cells on average. KSP and oil combined resulted into high bacterial growth, suggesting antagonism between the two products. In the greenhouse, Copper oxychloride and KOBE were ineffective and did not cause drying of the galls nor reduce yellowing of plants. Oil was most effective and dried all galls (100%), followed by ECA water (80%) and KSP (50%). ECA water and oil combined was not significantly different ($P > 0.05$) to either product when applied individually. Combined KSP and oil dried only 30% of the galls and 60% of the plants yellowed which was more than when the products were applied individually. No significant difference ($p > 0.05$) was observed between treatments that had more than one strategy applied and those that only had one management strategy. Oil and KSP combined was not effective and seemed to antagonize each other. The most effective treatments were combination of ECA water and oil followed by oil alone and KSP alone. The study demonstrates that Crown gall disease can be effectively managed without use of chemical pesticides.

Key words : *Agrobacterium tumefaciens*, ECA water, KSP, Sunflower oil, KOBE, Copper oxychloride

**STUDY OF POPULATIONS DYNAMICS OF CERATITIS CAPITATA
WEIDEMANN ON *POME ROSACEAE* (PEAR, NASHI) IN THE REGION OF
MOHAMMEDIA- NORTHWEST- ALGERIA**

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ABSTRACT

Studying the dynamics of insect populations is an element key for better understanding and managing fluctuations in insect pest populations. Our study of the population dynamic of the Mediterranean fruit fly *Ceratitis Capitata* Weidemann on pome rosaceae allowed us to distinguish 3 important periods of activity of presence of this pest in orchard of study; the first in autumn, a second one in spring which overlaps with the third which is in summertime, during the winter months (end of December, January and February) Medfly generally overwinters in the form of a pupa buried in the soil. The obtained results show that these three periods of activity are directly related with two major factors which influence the activity of the Medfly; which are the environmental conditions and its climatic factors (T °, H%) and the presence and / or absence of the receptive fruits since this species lays their eggs inside the fruits.

Key words : ceratitis capitata, population dynamic, pest , fluctuations, pome resaceae, climatic factors, activity period

**SEED PRIMING WITH BIOSTIMULANT TERASORB IMPROVES
PHOTOCHEMICAL EFFICIENCY AND REDUCES OXIDATIVE STRESS IN
MAIZE SEEDLINGS EXPOSED TO LOW TEMPERATURE**

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ABSTRACT

Cold stress is one of the most important constrain of the plant productivity. Maize (*Zea mays* L.) as a thermophilic crop is highly sensitive to low temperature especially at early seedling growth. The effects of seed pre-treatment with 0.5% and 5% of TeraSorb solutions on plant performance under short-term cold stress (10°C for 1 h) were investigated. Pre-treated seeds with distilled water served as control. Physiological state of maize seedlings was accessed by measuring of maximal (Fv/Fm) and actual photochemical efficiency (Φ PSII) of photosystem II, as well as zeaxanthin-dependent energy quenching (NPQ). The development of oxidative stress was followed by the level of H₂O₂ accumulation, membrane damage was evaluated through electrolyte leakage and malondialdehyde (MDA) production. The application of the biostimulant TeraSorb as a seed treatment increased Φ PSII, decreased NPQ and reduced MDA level under optimal growth conditions. Moreover, the pre-sowing seed treatment with TeraSorb reduced negative changes in plant performance after chilling stress. The reduction in Φ PSII was less pronounced in TeraSorb-0.5% samples compared to water- and TeraSorb-5% treatments. Interesting to note that the seed priming with TeraSorb-0.5% decreased NPQ, reduced H₂O₂ and MDA production after chilling stress, while in water- and TeraSorb-5% samples H₂O₂ significantly increased in response to low temperature. No significant increase in electrolyte leakage in TeraSorb samples was observed after chilling treatment, suggesting that these plants had the ability to maintain membrane integrity and/or repair membrane damage caused by low temperature. Overall, these results suggest that seed pre-treatment with TeraSorb may benefit for maize seedlings exposed to chilling stress and seed priming with 0.5% TeraSorb seemed to have the best effects.

Key words : Seed priming, biostimulant, cold stress,

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THE CORRELATION OF MACRO AND MICRO NUTRIENT ELEMENTS AND ANTIBACTERIAL ACTIVITY OF THE BROCCOLI (*BRASSICA OLERACEA* VAR. *ITALICA*)

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ABSTRACT

In this study, the correlation of some macro and micro nutrient elements in the broccoli (*Brassica oleracea* var. *italica*) extract with the antibacterial activity of the extract on two Gram positive and two Gram negative bacteria was investigated. The extract of the fresh leaves of broccoli grown in pots in laboratory conditions was obtained with hexane. Some macro and micro nutrient element contents of the leaves were detected with ICP-OES after microwave burning. The results revealed that some macro nutrient elemental contents (P, K, Ca and Mg) of the extract were sufficient when compared to the limit values of Jones (1991). Among the micro nutrients Zn and B were sufficient, but Fe, Cu and Mn contents were insufficient. These values are thought to be related with the nutrient elements in the soil itself since no fertilizer was applied to the soil. The broccoli extract was effective on inhibition of *E. coli*, *P. aeruginosa*, *S. aureus* and *E. faecalis*. The P and K contents were positively correlated with antibacterial effect, while Ca and Mg were negatively correlated. The micro nutrient elements Fe, Mn, Zn, Cu and B were all positively correlated with the antibacterial effect of the extract. The results indicated the importance of the macro and micro nutrient elements on the antibacterial activity of the broccoli plant whose consumption increases day by day. Correct and conscious fertilization in order to increase the Fe, Cu and Mn contents of the plant is thought to enhance the antibacterial activity of the present plant and similar plants.

Key words : *Brassica oleracea* var. *italica*, antibacterial activity, macro elements, micro elements, correlation

MORTALITY AND SUPPRESSION OF DEVELOPMENT AND REPRODUCTION OF SOYBEAN ARMYWORM *SPODOPTERA LITURA* TREATED WITH NEEM OIL FORMULATION

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ABSTRACT

This study was conducted to evaluate the effect of a neem oil formulation (NOF) on mortality, development, and reproduction of the soybean armyworm *Spodoptera litura*. A carbamate insecticide, methomyl, was included in the study for comparison. In leaf-residue feeding tests, LC50 and LC95 of NOF at 9 d after treatment (DAT) were 15.1 and 28.5 ml neem oil/l, respectively, whereas those of methomyl at 4 DAT were 0.13 and 0.26 g a.i./l, respectively. Sublethal treatments of the third-instar larvae *S. litura* with NOF at LC10 and LC25 completely suppressed their pupation, whereas the percentage of pupation in the treatment with methomyl at LC10 and LC25 was 72.0% and 72.7%, respectively, and that in the control was 93.8%. Moreover, sublethal treatments with NOF at LC0.25 to LC5 suppressed normal adult emergence by 88% to 97% compared with control. Those treatments also reduced egg production by the emerging females by 79% to 98% relative to control. Thus, the treatment with neem will not stimulate the increase in *S. litura* reproduction and as such, it is not expected to induce resurgence in *S. litura* population. On the other hand, sublethal treatments with methomyl at LC10 and LC25 increased the fecundity of the emerging females by 30% to 92% compared with control. This suggests the risk of resurgence effect of this synthetic insecticide on *S. litura* through the increase in insect reproduction. Thus, neem is a promising botanical insecticide alternative to synthetic insecticides for the control of *S. litura*.

Key words : Neem, synthetic insecticide, survival suppression, fecundity, resurgence potential

IN VITRO STUDY OF *BOTRYTIS CINEREA* STRAINS SENSITIVITY COLLECTED FROM RED BERRIES IN MOROCCO TOWARDS SOME ANTI-BOTRYTIS FUNGICIDES

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ABSTRACT

In this study, single spores of seven *B. cinerea* isolates were collected from red-berries farms in the Loukkos and Gharb regions, North of Morocco, to evaluate their sensitivity to four commercial anti-botrytis fungicides registered in the country. All four fungicides contain different active ingredients namely: Iprodione, Fenhexamid, Thiophanate-methyl and mixture of Fludioxonil and Cyprodinil. Two main experiments were established *in vitro* for anti-Botrytis inhibitory assay; radial mycelia growth and spore germination inhibition tests at different concentrations. Fungicidal tests showed that all strains of *B. cinerea* were sensitivities to Iprodione with EC50 values (the effective concentrations to cause inhibition by 50%) ranging from 0.008 to 0.34 ppm inhibiting mycelia growth, and between 0.007 and 0.27 ppm inhibiting conidia germination. However, Fenhexamid did not show the same efficacy since all strains were resistant with EC50 values all higher than 5 ppm. For Thiophanate methyl, *Botrytis* strains responded differently to this product. Indeed, only 12.5% of strains were sensitive. EC50 values ranging from 83.28 to 2185.66 ppm for mycelia growth and from 73.17 to 3573.01 ppm for conidia germination. However, only 37.5% of the strains have shown sensitivity to Fludioxonil + Cyprodinil mixture with EC50 values ranging from 0.01 to 67.70 ppm for mycelial growth and between 0.001 and 5.81 ppm for conidia germination. These data may explain the non-efficacy of anti-Botrytis fungicides application in gray mold control in red berries fields in Morocco and highlights the need for new strategies for *Botrytis* management in different red-berries culture.

Key words : *Botrytis cinerea*, site specific fungicide, resistance, early monitoring

GENOTYPIC AND PHENOTYPIC CHARACTERIZATION OF *FUSARIUM* ISOLATES OBTAINED FROM ANTALYA TOMATO PRODUCTION AREAS

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ABSTRACT

There are important biotic pathogens limiting production of tomato grown in Turkey and the world. Soil-borne fungal *Fusarium* pathogens cause tomato root rot, browning in vascular tissues, wilting and chlorosis on leaves leading significant yield loss in tomato grown areas. Antalya and its districts are center of winter grown tomato where more than 60% produced. Surveys have conducted in these areas and 20 *Fusarium* isolates were obtained. In the study, avirulence and virulence situations of the 20 isolates were investigated in molecular methods and 5 different genotypes of tomato varieties were inoculated with the 20 *Fusarium* isolates in pathogenicity tests. Specific primers were developed from *virulence* gene regions; they were analyzed to amplify the responsible genes in polymerase chain reactions (PCR). The pathogenicity tests revealed that 8th, 9th, and 19th isolates were the most virulent, 7th, 10th and 13th isolates were the least virulent found. There is no *Avr1* gene present in 20 *Fusarium* isolates but *Avr2* and *Avr3* genes were detected in 5th and 13th isolates. Additionally, all 20 isolates contained *cell wall degradation* genes. The molecular and pathogenicity studies have already identified possible virulence genes of *Fusarium* isolates and their counterpart in resistance genes of tomato plants. These results will enlighten *Fusarium* pathogens and host tomato interactions in favor of the host plant.

Key words : Fusarium, Tomato, Pathogenicity tests, Virulence, Host-pathogen Interactions

**INDIGENOUS *ENDOPHYTE BACILLUS* SPP. ORGANIC FORMULA
OPTIMIZATION FOR BACTERIAL WILT DISEASE CONTROL OF AND
PROMOTE GROWTH AND YIELDS OF CHILI.**

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ABSTRACT

Our previous studies had obtained 3 isolates of endophytic indigenous bacteria from chili which had ability to control bacterial wilt disease by *Ralstonia syzygii* subsp. *indonesiensesis* and fusarium wilt disease by *Fusarium oxysporum* f.sp *capsici* In field conditions with 100% effectiveness. The isolates were *B. pseudomycooides* strain SLBE1.1SN, *B. thuringiensis* strain SLBE3.1BB and *B. mycooides* strain SLBE1.1AP. To be able to survive and not maintain its ability for biological agents, the right carrier and formula are necessary. Therefore, bacteria need to be formulated with a carrier to maintain the viability of bacteria, to facilitate application, storage and transportation. This study aims to determine the composition of solid formulas from organic waste that are effective, can be long-stored and stable for controlling bacterial wilt disease and promote growth and yield of chili. This experiment design using a factorial in a completely randomized design, consisting of 2 factors, type of isolate (*Bacillus thuringiensis* strain SLBE3.1BB, *Bacillus mycooides* strain SLBE1AP, *Bacillus pseudomycooides* strain SLBE1.1SN, *Bacillus cereus* strain SLBE3.1AP), *Bacillus mycooides* strain SLBE1.1AP, *Bacillus pseudomycooides* strain SLBE1.1SN, *Bacillus cereus* strain SLBE3.1AP), and type of formula ((bagasse (AT), rice bran (DP), paddy straw (JP), bagasse + rice bran (AT + DP), bagasse + paddy straw (AT + JP) and rice bran + paddy straw (DP + JP) added 5% sucrose to each formula)). The results showed that *B. thuringiensis* strain SLBE3.1BB. in the bagasse + paddy straw formula is the best isolate as growth promotor (effectiveness of increasing plant height 25.72%, leaf number 18.56%) and yield (16.27%) and able to induced resistance to bacterial wilt disease without any symptoms appear until the end of observation.

Key words : solid formula, in planta assay, formula effectiveness

INCREASED EFFECTIVITY OF BACILLUS CEREUS IN LIQUID WASTE BASED FORMULA AS YIELDS PROMOTOR OF CHILI (*CAPSICUM ANNUUM L*) AND CONTROL OF APHIDS (*APHIS GOSSYPPI*)

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ABSTRACT

One of the methods of biological control that can be used is the use of microorganisms from endophytic bacterial groups as biopesticides. However, bacterial suspension generally could not be stored for long term usage. Without a good formulation, *Bacillus* sp. inoculants could not last long and their ability as a biological agent and bioactivator were reduced. This study aims to obtain the best type of *Bacillus cereus* formula to suppress aphids (*Aphis gossypii*) attack with the highest effectiveness; (2) identify the ability of the *Bacillus cereus* formula to increase yields of chili. This research designed in an experimental study with two design methods, complete random design for greenhouses study and factorial design for field study with factors of formula (coconut water and tofu waste), and factors of storage duration (2, 4, and 6 weeks) and a control as a comparison. The results showed that all combinations of treatment factors were able to promote growth and control aphids. Coconut water formula in 2 weeks storage time showed the best growth increase and attack rate of aphids (*A. gossypii*) with an attack rate of 17.50% compared to controls (55.75%).

Key words : liquid waste; formulation; *B. cereus*; endophytic; indigenous.

RENEWABLE ENERGY AND SUSTAINABLE AGRICULTURE

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ABSTRACT

Sustainable agriculture produces long-term crops and livestock in sustainable ways. The agricultural sector is one of the most energy-intensive sectors and is currently heavily dependent on the use of fossil fuels. The agri-food chain accounts for around 30% of the global energy demand (FAO 2016). Energy plays a key role in improving productivity and agricultural production systems since energy requirements are highly diverse and can be met in various ways. The use of fossil fuels in agriculture leads to an increase in greenhouse gas (GHG) emissions in the agricultural sector, which in turn affects agricultural products. According to IPCC reports, total GHG emissions from the agri-food chain account for more than 30% of global GHG emissions per year (IPCC 2018). In order to mitigate climate change and reduce GHG emissions, current fossil fuel-based energy generation needs to be shifted to renewable energy, such as solar, wind and geothermal. There are various energy-related opportunities for mitigation and adaptation in agriculture. Improvements will be made through improved access to electricity, more efficient use of resources and increased use of renewable energy sources in agriculture. This would have the dual advantage of supplying renewable energy inputs to agriculture, thus increasing productivity, and reducing climate change commitments. This study explains in detail the role of renewable energy in agriculture by linking all aspects of sustainability.

Key words : Sustainability, agriculture, climate change, renewable energy

MORPHO-PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES TO FOLIAR APPLICATION OF LIQUID SEAWEED EXTRACTS OF *ULVA RIGIDA* IN WHEAT PLANTS (*TRITICUM DURUM* L.)

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ABSTRACT

Many research studies have shown the importance of seaweed extract in agriculture. Marine macroalgae are rich in diverse compounds like lipids, proteins, carbohydrates, phytohormones, amino acids, osmoprotectants and minerals (Nabti and al., 2016). In this study, we have tried to characterize Moroccan macroalgae species *Ulva rigida* collected from coastal area of Akhfenir in order to evaluate their potential to improve growth plant. The proximate composition, mineral element (Ca, K, Mg, Na and Cl), pigments, amino acid, proteins, lipids, polyphenol contents were determined in liquid extract obtained from green seaweed (SWE) *Ulva rigida*. Results show that the application of SWE at different concentrations (0,12.5,25,50%) significantly enhanced growth parameters, especially with 25% of seaweed liquid extract. Therefore, algal treatment by foliar application is proved to be an effective technique to improve the growth of wheat plants (Latique and al., 2017). This study provides important information on the characterization, identification and utilization of seaweed resources for agriculture as biostimulants.

Keywords : Green seaweed extract ; Moroccan ; Marine macroalgae ; Wheat ; Biostimulants.

DOES CERIUM AFFECT CADMIUM ACCUMULATION IN ROCKET PLANT AND SOIL?

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ABSTRACT

Cerium (Ce) is widely used in nanotechnology, agriculture, and food industry, and it has been associated with toxic outcomes on different organisms as it ends in different environmental matrixes after use. In this research, rocket (*Eruca vesicaria* subsp. *Sativa* (Miller)) plant was grown by applying Ce element. The five doubling concentrations of Ce varying from 25 to 400 mg kg⁻¹ were introduced into the pots in parallel to the control pots in three replicates. The relation of the level of pollution by spiking Ce in pots together with the cadmium in the soil and the plant was investigated. Experiments were carried out in triplicates according to Randomized Complete Blocks Design. Then, rocket plants were grown in these pots and Ce and Cd analyzes were carried out with the required methods in soil contents and plant. Ce and Cd were found to be toxic at the plant and soil levels and statistically significant at 5% level. The amount of cadmium, in both the soil and the plant, has increased in Ce pots applied in increasing doses and control pots. In proportion to the applied Ce a positive effect on the cadmium uptake in the soil was observed that caused to increased cadmium concentration in the plant. As a result of Duncan analysis, the amount of cadmium in the soil was statistically different between the control pots and the Ce pots applied. However, the cadmium contents among the doses applied to Ce were included in the same group. Ce application was effective, but it was determined that the applied different amounts did not significantly affect Cd accumulation.

Keywords: *Toxicity, Ce, Cd, Heavy metal toxicity*

HEAVY METAL TOXICITY ASSESSMENT IN *LEPIDIUM SATIVUM*

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ABSTRACT

Growing industrial activities and uncontrolled agronomic practices lead to excessive accumulation of harmful substances such as heavy metals in water and soil matrixes. In recent decades, a great concern has been dedicated to remediating contaminated sites using plants. Various plants have been used to assess the toxic effect of toxic compounds. *Lepidium sativum* L. is one of the most useful standardized test with its high sensitivity to the pollutants and its ability to germinate in a short period (3 days). The endpoints of this method are reported to be the percentage of seed germination and the length of the root. In this study, the literature on phytotoxicity of heavy metals on *L. sativum* is revised. Environmental risk assessment of various metals is given through data on *L. sativum*. According to the bioavailability data of metals, phytoremediation technology is evaluated for abatement of metals.

Keywords: Heavy metal toxicity, *Lepidium sativum*, Toxicity test, Remediation

**EFFECTS OF MODIFIED ATMOSPHERE PACKAGING ON QUALITY OF
OYSTER MUSHROOM (*PLEUROTUS OSTREATUS*) AT DIFFERENT STORAGE
TEMPERATURES**

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ABSTRACT

In this research, effects of modified atmosphere packaging (MAP) on quality parameters of oyster mushroom (*Pleurotus ostreatus*) at different storage temperatures were carried out. In this context, oyster mushrooms grown on cotton culture were stored at 0-2 °C (bulk cold storage temperature), 10-12°C (supermarket shelf condition temperature) and 4-6 °C (consumer refrigerator temperature) for 7 days respectively. Some quality parameters such as skin color (L*- brilliance), weight loss, soluble solids content, protein content and visual quality were assessed after harvest and after storage period. According to the results, MAP treatment prevented the quality losses including all parameters assessed at each storage temperature. Moreover the best results of quality parameters were fixed on oyster mushrooms stored at 0-2 °C. However, quality losses were insignificant with MAP treatment at other storage temperatures.

Key words : Oyster mushroom, modified atmosphere, storagetemperature, quality

ASSESSMENT OF THE LAND SUITABILITY FOR CULTIVATION OF ISTRIA IN CROATIA

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ABSTRACT

Istria is the largest peninsula in the Republic of Croatia with 2.813 km², covering about 5% of total country area. Settlements and water in Istria occupy 0,5% of the area, rocks 27,4%, forests 32,0% while agricultural land covers 112.831,9 hectares or 40,1% of the area. The main goal of this paper was to determine types and characteristics of Istrian soils as well as evaluate suitability of agricultural soils for cultivation. Suitability evaluation is made according to the pedological map at the scale 1:300.000. The pedological map was made according to data from the Basic Soil Map of the Republic of Croatia, at the scale 1:50.000. Soil mapping units were assessed according to their suitability for cultivation, in accordance with FAO methods and criteria of land evaluation. It is determined 19 pedosystematic units which are shown in 22 mapping units and grouped with respect to the degree of suitability and type of limitation into suitability categories, classes and subclasses. In the pedosphere of Istria agriculture areas the major percentage includes automorphic soils with 94,4%, followed by hydromorphic soils with 3,9%, while hydromeliorated soils with canals or pipe drainage make only 1,7% of the area. Having in mind the characteristics of soil, the relief and the climate, it was found 74.683,6 hectares (66,2% of total agriculture area) of agricultural soils in Istria that are suitable for cultivation, of which 2.744,8 hectares (2,4%) are good soils without greater limitations, 51.735,0 hectares (45,9%) are moderate limited soils with particular limitations and 20.203,8 hectares (17,9%) are limited productive soils with serious limitations. Unsuitable soils for cultivation make 38.148,3 hectares (33,8% of total agriculture area), of which 3.021,3 hectares (2,7%) are temporarily unsuitable soils that require radically land reclamation and 35.127,0 hectares (31,3%) are permanently unsuitable soils because their melioration is not possible or economically justified. The main limitations for cultivation are rockiness, terrain slope, climate and physical and chemical characteristics of soil. Istria is the area with significant land resources and removal or reduction of existing restrictions is necessary for successful and intensive cultivation.

Key words : assessment, land, suitability, agriculture, Croatia

DIAGNOSIS OF SHEEP AND GOAT FARMING CONDITIONS IN ALGERIA

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ABSTRACT

In Algeria, agriculture is one of the priorities of economic and social development programs. Indeed, it occupies a strategic place in terms of feeding the population and improving food security. It also has spillover effects on the rest of the economy upstream and downstream of productive activities. Rearing small ruminants is one of the most important agricultural activities in the world and plays a fundamental role at the economic, ecological, environmental and cultural levels. Studies relating to the description and characterization of sheep and goat farming in Algeria are relatively rare and are much less numerous than those existing for cows. These various considerations led us to consider this study at the end of Take stock of structural characteristics and functional of some production units in the wilaya Sétif, in order to establish a diagnosis of the conditions of sheep and goat farming in the region (this information will be necessary for the development of this sector). Forty collective and private farms in 17 municipalities oriented towards a sheep and / or goat breeding activity were selected and visited to collect useful information for understanding the different breeding strategies. A classification of these farms into different groups according to the similarity of farming practices was carried out. The analysis of the different driving parameters revealed:

- The low technicality of breeders
- At the level of all the farms surveyed, the animals receive the same rations without taking into consideration their physiological stages (flushing and steaming are poorly known among the majority of breeders).
- In winter and autumn, when climatic conditions make grazing difficult, all breeders resort to food supplementation (generally consisting of hay and / or straw),
- Regarding the structure of the herds, 70% of the farms surveyed have mixed herds of sheep and goats. In addition, 60% of the herds (sheep and goats) are specialized in fattening and meat production.
- Principal component analysis (PCA), carried out in our work; allowed us to obtain three groups of farms which differ mainly in the availability of grassland, fodder supply and the size of the herd.

These various observations lead us to conclude that sheep and goat farming in this region is still looking for the suitable model for aspects of sustainability.

Key words : keywords: sheep and goat farming - systems -farming practices - semi arid.

SEAWEED EXTRACT EFFECT ON GROWTH AND ANTIOXIDATIVE MECHANISMS IN WHEAT PLANTS (*TRITICUM DURUM* L.)

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ABSTRACT

The effect of seaweed extract (SWE) obtained from *Ulva rigida* in wheat plants (*Triticum durum* L.) was studied. Examination of growth parameters and some physiological and biochemical parameters showed that SWE enhanced vegetative growth in wheat plants cultivated under optimum condition. The effect of the seaweed extracts, *Ulva rigida*, was also evaluated on the antioxidant system through the determination of enzyme activities such as superoxide dismutase (SOD), glutathione S-transferases (GST) and glutathione reductase (GR). In the present study, the SOD activity did not show a significant difference between the control plants and those treated with 12.5% of the seaweed extract, However, we surprisingly noticed a decrease in the SOD activity after treatment with 25% and 50% of the seaweed extract. Our data reveal that in leaves of wheat, the GR activity was enhanced at the concentration of 25% of URE. Our results indicated also that GST activity increased only at the concentration of 50% of URE. This result could be related to the negative effect of high concentration of seaweed extracts on plant growth who could activate oxidative stress in the treated plants, the 50% concentration used in this study may be considered as too high to be used as biostimulant and should therefore be avoided for wheat plants. As this work has been conducted in only 4 weeks, another study for the whole cycle of wheat should be conducted to validate this hypothesis. Consequently, the present findings encourage the application of such seaweed as natural fertilizer in agricultural sector because it can enhance the growth and contributes to protection of wheat plant against oxidative deterioration.

Keywords : Seaweed extracts, Wheat, Growth, Morocco, *Ulva rigida*, Antioxidant enzymatic activity: SOD, GST, GR.

**STUDY OF STRUCTURAL ELEMENTS OF PRODUCTIVITY AND
DETERMINATION OF CORRELATIONS BETWEEN THEM IN *TRITICOSECALE*
GENOTYPES**

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ABSTRACT

During the period 2017-2019 in the experimental field of IPGR "K. Malkov"- Sadovo the structural elements of productivity of 35 triticale genotypes were studied. Biometric indicators: plant height, length of central spike, number of spikelets per central spike, number of grains per central spike, grain weight per central spike, harvest index, productive yield per m², weight of 1000 grains and hectoliter mass were evaluated. Five triticale genotypes exceed the standard by the grain weight per central spike. Two breeding lines show over 500 productive tillers per m². The number BGR30814 is characterized by the highest number of grains per central spike and twenty-six genotypes exceed the standard in terms of the grain weight per central spike. The variation in productivity indicators is assessed as weak to strong. There is weak variation by the indicators hectoliter mass and weight of 1000 grains. The most variable indicators are the number and weight of grains per central spike. The strongest proven correlation is observed between indicators length of central spike and number of spikelets per central spike. The greatest influence, as a source of variation, is exerted by the genotype on the traits length of central spike and plant height. The growing conditions show a primary influence on the indicators number of spikelets per central spike and hectoliter mass.

Key words : Triticosecale, elements of productivity, correlations, coefficient of variation, source of variation, genotype, environment

**NATIONAL INVENTORY AND PLANT GENETIC RESOURCES
DOCUMENTATION IN BULGARIA**

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ABSTRACT

Conservation of agricultural biodiversity is a complex interdisciplinary process, which is the object of different national and international initiatives. The European countries unite their efforts in this direction by organizing the European Cooperative Programme for Plant Genetic Resources (ECPGR). One of the priorities of the programme is adapting uniform mechanisms for registration and description of their seed accessions stored. The National *ex situ* collection in the Genebank of IPGR Sadovo is part of the European Search Catalogue for Plant Genetic Resources, EURISCO (<http://eurisco.ecpgr.org>). The database (Bulgarian National Inventory) includes passport information about 69,395 accessions, registered according to FAO/Bioversity Multi-Crop Passport Descriptors. Based on cooperation in A European Genebank Integrated System (AEGIS), 261 Bulgarian genotypes, identified as “unique germplasm” of local origin, are registered with AEGIS status. A condition for inclusion of plant genetic resources into the AEGIS collection (<http://aegis.cgiar.org>) is safety duplication of accessions in another genebank, or in the Global Seed Vault in Svalbard. European Information Systems provide free access for potential users to conserved genotypes according to the principles of the International Treaty on Plant Genetic Resources for Food and Agriculture and the implementation of the Nagoya Protocol on equitable distribution of their benefits. Electronic portals eliminate the restrictions associated with sterically distant locations of genebanks and as a result, improve coordination between organizations and researchers in the area of plant genetic resources and have an active impact on preservation of natural ecosystems. The present study provides an overview of plant genetic resources of the Bulgarian National Inventory, based on EURISCO, as well as a documentation process of plant genetic resources in Bulgaria.

Key words : plant genetic resources, databases, free access, EURISCO, AEGIS, Bulgaria

EFFECT OF DIFFERENT PHOSPHORUS DOSE APPLICATIONS ON YIELD AND SOME YIELD COMPONENTS OF BITTER VETCH (*VICIA ERVILIA L.*)

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ABSTRACT

This research was carried out in Konya ecological conditions in 2019 in order to determine the effects of 5 different phosphorus doses (0, 4, 8, 12 and 16 kg/da) on yield of vetch (*Vicia ervilia* L.). The experiment was set up in 3 repetitions according to the random blocks trial pattern. In the study, plant height, pod length, pod width, number of pods in the plant, grain number in the plant, thousand grain weight and grain yield were investigated. The effect of phosphorus doses on plant height, number of pods, thousand grain weight and grain yield was found statistically significant at the level of 5%. According to the phosphorus doses applied in the vetch, plant length is 24.2-28.3 cm, pod length is 1.61-1.81 cm, pod width is 42.3-46.0 cm, pod number is 17.3-28.8, pellet number is 38.7-63.07, thousand grain weight is 31.3-36.6 g and grain yield varied between 48.1-86.7 kg/da. While the highest grain yield was obtained in 12 kg/da and 16 kg/da phosphorus application, the lowest values in all parameters were obtained from control plots where no phosphorus application was made.

Key words : Bitter vetch, phosphorus fertilizer, grain yield, thousand grain weight.

COMPARATIVE STUDY OF 11 APRICOT CULTIVARS IN THE CONDITIONS OF COASTAL REGION OF ALBANIA

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ABSTRACT

The study of 11 apricot cultivars was carried out in a collection planted in the Experimental Base of ATTC Vlore during the period 2017-2020, to evaluate, compare and list among apricot varieties, according to a common protocol for vegetative, pomological, horticultural and technological characteristics, in order to come to the aid of farmers who grow apricots that often fail to plant new cultivars suitable for the conditions of their farms. Antonio Errani, Bulida, San Castrese and Pellecchiella cultivars were planted in 2010, while Spring Blush, Luna, Bora, Magic Cot, Prima, Tsunami, Rubista cultivars were planted in 2014, having the same rootstock (Myrobalan 29C). The results of the study showed that cultivars have different habitats and capacity of growth. The cultivars San Castrese, Pellecchiella and Spring Blush resulted in strong growth, while the cultivar Rubista resulted to have less potential of growth. Early flowering resulted in Magic Cot and San Castrese, while the later one was recorded the Rubista cultivar. Spring Blush, Magic Cot, Prima, Tsunami, Bulida cultivars need pollinating plants, while others are self-pollinating. Fruit ripening compared to the standard (San Castrese), has been Tsunami (-28), Spring Blush (-27), Luna, Magic Cot (-25), Prima (-23), Rubista (-19), Antonio Errani (-18), Bora (-15), Bulida (-12) and Pellecchiella (+15) which was also the cultivar with later ripening in this test. The comparison of fruit size pointed out as cultivars with larger fruit cultivars Bora and Antonio Errani, while with smaller fruit Spring Blush, San Castrese and Rubista. The most acidic fruit is the San Castrese cultivar. The total yield has been varied over the years and has confirmed the impact that environmental conditions have on apricot production. Bora and Pellecchiella cultivars have had more cracked fruit compared to the others, during rainy years. Economic analysis showed that cultivars with earlier ripening are more effective than late ripening varieties.

Key words : Apricot, Cultivars, Self Pollinating, Regionalization, Maturity

NEW RECORDS FOR ENTOMOPATHOGENIC FUNGI OF *CAPNODIS TENEBRIONIS* LINNEAUS, 1758 AND THEIR PATHOGENICITY ON DIFFERENT STAGES

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ABSTRACT

Capnodis tenebrionis (Linnaeus, 1758) (Coleoptera: Buprestidae) which is called The Mediterranean flatheaded peachborer, is an important pest of stone fruit trees in Turkey as well as Mediterranean countries. Control of *C. tenebrionis* is difficult despite the chemical practices that are subscribed; sufficient time cannot be achieved. Therefore, the importance of biological control with fungi, bacteria or nematods was increasing. The study aim was to determine entomopathogenic fungi and their pathogenicity of *C. tenebrionis* life stages. We surveyed entomopathogenic fungi on *C. tenebrionis* in Tekirdağ during 2015-2016. Three different fungi; *Baeuvera bassiana* (Balsamo) Vuillemin, 1912 (Deuteromycota: Hyphomycetes); *Lecanicillium fungicola* Zare & W. Gams, 2008 (Ascomycota: Ascomycetes) and *Fusarium acuminatum* Ellis & Everhart, 1916 (Ascomycota: Hypocreales) were recorded. Their pathogenicity studies were carried on *C. tenebrionis* egg, first instar larvae and adult at 27±1°C in vitro. 1 x 10⁸ conidia/ml was used for *B. bassiana* and *L. fungicola*, 1 x 10⁶ conidia/ml was used for *F. acuminatum* with 0.2% Tween 80. For control only 0.2% Tween 80 were used. According the results the most pathogenic fungus on adults was *B. bassiana* (92.5± 1.63%), however, *F. acuminatum* (81.25± 2.26%) on eggs. When new hatched larvae fed on two different foods (artificial diet / branch), the effects of fungi varied according to the food culture. While *L. fungicola* and *F. acuminatum* showed low effect on branch culture, in contrast, mortality of larvae in branch was high rate (100%) when they were treated with *B. bassiana*. Further studies need to work on optimum concentrations of these fungi against *C. tenebrionis* adults and field application performance on stone fruit orchard.

Key words: *Baeuveria bassiana*, Biologic control, *Capnodis tenebrionis*, *Lecanicillium fungicola*, *Fusarium acuminatum*

COMPARATIVE ANALYSIS OF ORGANIC TREATMENTS APPLIED TO VEGETABLE CROPS

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ABSTRACT

Organic farming is an agricultural production system ensuring a sustainable development approach. It is an agricultural production management system that does not use chemical fertilizers, pesticides, synthetic industrial products or GMOs (Genetically Modified Organisms). The main objective of this study is to evaluate the impact of 4 different organic treatments (T1, T2, T3, T4) on the profitability of 4 vegetable crops. We used the partial budgeting to compare the benefits of the use of these treatments. It is a decision-making tool for any change in the production system and could be useful for economic planning process at the farm level. Dominance analysis shows that, for pepper and cucumber, both T3 and T4 treatments are dominated because they require higher production costs with lower net benefits than the other treatments. While the two treatments T2 and T4 were dominated for beans and courgette crops. The Marginal Return Rate of the Comparative Analysis shows that T1 treatment remains the best choice in terms of economic and marginal profitability, followed by T3 treatment. Thus, organic amendments without enrichment (T1, T3) are the most attractive for farmers because they generate less cost and more profit seen that the yield is higher for these two cases.

Key words: Organic, vegetable crops, treatment, partial budgeting, dominance

INVESTIGATION OF RELATIONSHIP BETWEEN PHYSIOLOGICAL AND GENETIC CHARACTERISTICS OF *FUSARIUM GRAMINEARUM*

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ABSTRACT

Fusarium graminearum is considered as the primary causal agent of Fusarium head blight (FHB) outbreaks. It causes severe yield loss in wheat and barley production. In this study, it was aimed the investigation of the relationship between some physiological and genetic characteristics in *F. graminearum*. A total of 31 isolates were grown on potato dextrose agar (PDA) for 7 days at 26 ± 2 °C. The minimum mean linear growth rate (LGR) were obtained as 9,6 mm/day while maximum mean LGR as 13,3 mm/day according to measurement on 4th and 7th day of cultivation. Isolates were divided into two groups as $x < 10$ mm/day and $10 < x < 20$ mm/day. Only two isolates (FgM10 and Fgsh4) showed LGR lower than 10 mm/day. Isolates had the relatively moderate level of radial growth capacity. ITS5/NL4 region with 1147 bp length was amplified through polymerase chain reaction (PCR) from genomic DNAs of 7-day-old cultures. Then digested with restriction enzymes (*EcoRI*, *PstI*). PCR-RFLP analysis revealed that *EcoRI* yielded same banding patterns (271 and 876 bps) whereas *PstI* digestion resulted in two different profiles. One consisted of 386 and 761 bps lengths fragments, another of 420 and 727 bps. Gene expression analysis were carried out in Fgsh4 (LGR=9.6 mm/day), Fg174 (LGR=11.3 mm/day) and FgM1 (LGR=13.3 mm/day) isolates which were represented relatively low, moderate and high LGR capacity, respectively. Expression levels of *FgMgv1*, *tri4* and *MAT1/2* genes were determined by real time PCR (qPCR). Relatively higher expression levels of *FgMgv1*, *tri4* and *MAT1-2* genes was obtained from the isolates with higher LGR. Significant differences ($p < 0.05$) were observed in the expression of each gene. This study showed that there was a correlation between the radial growth rates of isolates, their aggressiveness and mycotoxin production capacities.

Keywords: *Fusarium graminearum*, Linear Growth Rate, PCR-RFLP, Gene Expression, Mycotoxin

RESPONSE OF BARNYARD GRASS (*ECHINOCLOA SPP.*) TO SOME HERBICIDES IN THE FIELD CONDITIONS IN EDIRNE, TURKEY

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ABSTRACT

Edirne is one of the most prominent province in terms of rice production. Rice production has been continued in the same places with sequential years in Edirne, Turkey, and this production approach has been caused that some weed species become more dominant compared to others. Barnyard grass is one of these weed species. Trying to control these weeds by only herbicides has accelerated herbicide resistance cases in rice fields. Herbicides are generally applied at more than their recommended rates when it was realized that their efficacy was below general expectations. This behaviour of herbicide applicant has sharpened herbicides resistant cases and increased herbicide resistance severity. In this study, the herbicides, Cyhalafop Butyl (100 g/l)+Penoxsulam (13.3 g/l), Bispyribac sodium (420 g/l), Cyhalofop Butyl (200 g/l), Penoxsulam (22.5 g/l), Imazamox (40 g/l), Clomazone (48 g/l), used in rice fields in Edirne Province, Turkey for so long time were tested to determine their field performance in a rice field where known as rich herbicide resistant barnyard grass. The field trial was conducted in İpsala, Edirne, Turkey according to randomised complete block design with 4 replicates. The herbicide efficacy evaluations were visually done at a scale 0-100 in where 0 is equal plants in the untreated control plants and 100 completely killed by herbicide. In the field experiments, recommended rates and double rates of them were applied to barnyard grass at 2-4 true leaf stages. Among these herbicides, only imazamox and clomazone effectively controlled barnyard grass biotypes at their recommended rates whereas other herbicides did not control the weed even if at moderate level at the double of their recommended rate. To prevent the agro-environment from unnecessary herbicide usage and control herbicide resistant barnyard grass biotypes effectively, these ineffective herbicides are not allowed to use them in rice fields of İpsala, Edirne Province, Turkey.

Key words : herbicide, weed, resistance, rice, barnyard grass

CREATING THE DATABASE OF HERBARIUM OF PLANT PROTECTION CENTRAL RESEARCH

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ABSTRACT

Approximately 6000 plant samples belong to 85 families in the Herbarium of Plant Protection Central Research Institute has been collected from 1938 (Dr. Bremer) up to new within the studies carried out on the weed and flora researches. The plant samples as part of the studies on 2 thesis of Masters of Science, 3 thesis Philosophy of Doctorate and various samples send to describe has comprised the herbarium. In addition to them, the same samples collected by the foreign plant taxonomists within writing “Flora of Turkey” and stored in Diyarbakır Plant Protection Research Institute were gifted and added to the herbarium. The aim of this study is to create a database which study online via web Technologies, to storage and inquiry the information related with plant name, detailed information and taxonomy. To achieve this aim, 2757 plant samples belonged 79 families had the feature which may include into the herbarium were evaluated. It is determined that the scientific names of 374 plant species has been changed; the info of them was added to the database. The plant samples evaluated in the herbarium were 1121 perennial, 1261 annual, 76 biennial, 74 annual, biennial or perennial, 105 annual or biennial, 23 annual or perennial, 86 biennial or perennial and 11 unknown. The plant samples in the database consisted of woody (35), herbaceous (2565), semi-shrub (14), herbaceous or semi-shrub (11), tree or small tree (2), shrub (81), shrub or small tree (7), woody herbaceous (32) and woody-climber (2). A 196 plant samples were endemic plant while 2551 plant samples were not endemic, and 11 plant samples were unknown. According to phyto-geographic regions, the plant samples has been Mediterranean (125), Europe-Siberian (215), West Mediterranean (5), unknown (1780), Multiple (3), East Mediterranean (80), Hirkan-Blacksea (1), İnan-Turan (487), Blacksea (54), Cosmopolitan (4), Omni-Mediterranean (3). The plant samples were heavily collected from Ankara (957), Çankırı (276), Bolu (192), Sivas (173), Zonguldak (118), Afyonkarahisar (113), Bartın (93) and Yozgat (88). The regions of these samples mainly collected were cereal fields, orchards, vineyards and follow fields.

Key words : Herbarium of Plant Protection Central Research Institute, flora, weed, database

THE COMPARISON OF STATISTICAL ANALYSIS IN AGRICULTURAL SECTOR

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ABSTRACT

In recent years there has been a significant increase in the number of scientific studies in agricultural sector. Studies are being held in agricultural sector in specific areas or issues by using different methods. The methods used in agricultural sector can be divided into two groups as qualitative and quantitative analysis. While qualitative ones are seen as the analysis based upon secondary data and descriptive comments, quantitative ones are formed as measurable analysis and generally take advantage of statistical methods. In this context, in this study the studies that are carried out by different statistical methods in agricultural sector have been collected and compared. As a result it has been determined that in agricultural sector parametric analysis are used. It has also been determined that, in recent years the models that can be calculated by machine learning technique (artificial neural nets, support vector machines etc.) are used. According to this, in guessing methods for the future, it can be said that machine learning techniques give more real results, ARDL bound testing best explains the causality among variables, and regression analysis gives the best results about the relationship and the direction among variables.

Key words : Agriculture, Statistics, ARDL, Regression

**THE DETERMINATION OF THE FACTORS THAT AFFECT COUNTRIES'
ECONOMIC GROWTH: THE SAMPLE OF OECD COUNTRIES**

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ABSTRACT

Economic growth refers to the increase in the real GDP and this study mainly aims to determine the factors that affect this indicator. For this reason, some data (belong to the years between 1990 and 2019), such as purchasing power parity-PPP- per capita, health, education and social expenses, agricultural GDP, R&D intensity, unemployment rate, inflation, foreign trade balance and foreign exchange rate have been prepared and with 1.320 data in total a panel regression analysis has been done among 43 OECD member countries. In this study, it is initially determined that the data is suitable with the panel data by using the Hausmann, F and Breusch-Pagan LM test. According to the results of this analysis, the relationship between the growth and other variables is estimated via fixed effect panel regression model. In the study the explanatory power of the model is calculated as 92% and it is determined that the model is meaningful for the F test. According to the analysis results, it is seen that between the growth and purchasing power parity-PPP- per capita, education and social expenses, R&D intensity, inflation, foreign trade balance and foreign exchange rate there has been a positive and meaningful relationship. On the other hand, it is also seen that between the growth and health expenses, agricultural GDP and unemployment rate there has been a negative but meaningful relationship. As a result, some necessary policy suggestions are given in order to have sustainable growth rate for notably OECD countries and others.

Key words : Economic Growth, OECD, Panel Regression Analysis

METHOD COMPARISON IN VALUATION OF AGRICULTURAL LANDS IN URBAN SPRAWL

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ABSTRACT

It loses the agricultural quality of agricultural lands located in urban sprawl areas, which are the transition zone between rural and urban areas. These areas, which are under the pressure of urbanization, tend to turn into plot. In the valuation literature, different methods are used to determine value of agricultural lands and plots. However, as there is uncertainty in the urban sprawl areas, there is a problem in determining the value. The research was carried out by interviewing 50 agricultural enterprises in the urban sprawl of Meram district of Konya. Value of agricultural lands were determined according to the Income Method and Market Value Method. In the surveyed lands, the land value was determined by the market value method as 52.792,54 TL/da and by the income method as 54.300,35 TL/da with 3% capitalization rate. In order to make an objective valuation, the factors affecting the value of the real estate must be taken into consideration. Therefore, Hedonic Price Model was applied to analyze the factors affecting the value of agricultural lands of uncertain quality in urban sprawl. In the model, land sales values was taken as the dependent variable; shape of the land, yield, production pattern, irrigation possibilities, distance to the settlement, distance to the road, frequency of sales, density of social reinforcement were taken as the independent variables. The average land value was determined 56.447,41 TL/da according to Hedonic Price Model. In the study, the values determined by the income method and the market value method were found close to each other, and it would be more appropriate to use both methods to confirm each other in the valuation of urban sprawl. In addition, the Hedonic Price Model revealed how important and effective the factors affecting the value.

Key words : Urban Sprawl, Valuation, Agricultural Land

SNP (SINGLE NUCLEOTIDE POLYMORPHISM) AND NGS (NEXT GENERATION SEQUENCING) APPLICATIONS IN HORTICULTURE

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ABSTRACT

Molecular techniques are used extensively to determine genetic diversity in species and populations. Many molecular markers are used in plant genome studies. There are three types of marker systems: hybridization-based DNA markers, PCR-based DNA markers, and DNA chip / sequencing-based DNA markers. SNPs are the most abundant in the genome, show the most common DNA polymorphism and are most suitable for analysis on large genomic scales. SNP markers are a very important tool for improving selection efficiency in marker assisted selection (MAS) protocols in plant breeding. SNP based marker systems have been studied in many fruit, vegetable, mushroom and ornamental plant species. DNA sequence analysis or sequencing are methods used to determine DNA basic structures and nucleotide base sequencing. Sequencing of the genome for SNP discovery is particularly difficult and costly for large genome species. To overcome this challenge, new generation sequencing (NGS) based genotyping methods have been developed. NGS method has many advantages. The most important advantage is that it can be sequenced at the same time and sequence information can be obtained without electrophoresis. Today, NGS platforms with different technology have been developed that perform high resolution sequencing of very high amounts of different DNA sequences in a single reaction in parallel reactions. Current NGS technologies fall into categories such as second generation, third generation and fourth generation. In complex, ploid and large genomes, it is difficult to correctly align alleles in each single locus, and methods using restriction enzymes have been developed to reduce complexity in the NGS method: RAD-seq (Restriction Site-Associated DNA Sequencing), CRoPS (Complexity Reduction of Polymorphic Sequences), GBS (Genotyping-by-Sequencing) and DArTseq (Diversity Array Technology). By using these technologies in sequence mapping, it is possible to create high density genetic maps. With these maps, large genome analysis in QTL, map-based cloning and recombination rates can be performed.

Key words : Horticulture, SNP, NGS, GBS, RAD, DArT, CRoPS

ECONOMIC ANALYSIS OF AGRICULTURAL ENTERPRISES OPERATING IN THE FIELD OF ANIMAL PRODUCTION

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ABSTRACT

Animal production: It can be expressed as the breeding of animals of economic value, utilization and marketing of these animals. Livestock breeding, especially in rural development, is the insurance of the economy. The aim of this study is to determine the effect of cost change in crop production on the animal product market. In this sense, the enterprises in the province of Konya, which are constituting 5.34% of the beef and dairy cattle operations on cattle farms of Turkey, were the main population of the study. In the study, Ereğli, Karatay, Çumra, Meram, Karapınar, Ilgın and Cihanbeyli districts which constitutes 61.41% of the beef stocks of Konya province were selected, with the use of the purpose sampling method. Agricultural enterprises, operating on cattle breeding activity in selected districts, constituted the population of the research. In determining samples from this population of enterprises, the number of cattle from enterprises registered on the 2017 Turkey Veterinary Information System (TURKVET) is taken as basis. Thus, a framework table was prepared based on the total number of 458,529 cattle from the settlements included in the population. The data used in the study were obtained by questionnaire from 107 cattle breeding establishments determined with 5% error in 95% confidence interval and with stratified random sampling method. With the primary data obtained, social, economic and technical situation of agricultural holdings are analyzed and their financial analysis and analysis of socio-economic structures of them have been made. The data collected in the study belong to the 2017-2018 production period, and the surveys were conducted between October 2018 and December 2018. In this study, the importance of enabling the enterprises engaged in animal production to produce feed and feed additives on their own farms has been revealed in terms of animal product costs and policy recommendations have been made for the sector.

Key words : Animal Production, Fattening, Milk, Economic Analysis, Financial Analysis

THE EFFECTS OF DEFICIT IRRIGATION AND ZINC FERTILIZER APPLICATION ON DRY MATTER AND YIELD IN COWPEA (*VIGNA UNGUICULATA* L.)

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ABSTRACT

Cowpea (*Vigna unguiculata* L.) is an important edible legume plant with a high protein rate of % 25. It is grown in tropical and subtropical regions with a different precipitation rate all over the world. Overall, it is adapted better to drought, high temperature and other abiotic stress factors than other plants. In Turkey, the cowpea cultivation area consists of nearly around 20 thousand hectares. This experiment was carried out in 2019 at Adnan Menderes University Faculty of Agriculture trial areas-Aydın/Turkey. The aim of this study was to investigate the effect of zinc fertilizer application (0 and 3 kg da⁻¹) in deficit irrigation and full irrigation (% 50 and %100 respectively) in cowpea varieties (Akkız and Karagöz) on dry matter accumulation and grain yield. The dry matter accumulations were determined as stem drymatter (SDM) and leaf dry-matter (LDM). According to the results the highest amounts of LDM (103.98 g) and SDM (110.6 g) were obtained from the Akkız variety at the non-zinc fertilization in deficit irrigation conditions. The highest grain yield results were obtained from the Akkız variety in full irrigation and zinc fertilization with 225 kg da⁻¹.

Key words: *Cowpea, deficit irrigation, zinc fertilization, dry matter, yield.*

SEED SETTING CHARACTERISTICS OF FIDDLENECK (*PHACELIA TANACETIFOLIA* BENTH.)

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ABSTRACT

Fiddleneck (*Phacelia tanacetifolia* Benth.) is a genus of about 200 species of annual or perennial herbaceous plants. The genus of fiddleneck is one of the top 20 most common bee plants as a rich source of nectar and pollen, most preferred by honey bees. This study aims to obtain general information about the fertilization physiology of the fiddleneck. For this purpose, 3 different of fiddleneck cultivars (Sağlamtimur, Stala and Enton) were used as materials. The study was carried out with the complete randomized split plots design with three replications at the experimental area of Ankara University Agriculture Faculty Field Crops Department during 2017-2018. In the study, the number of flowers in the bunch, the number of fruits in the bunch, the number of flowers / fruits and 1000 seed weight characters were examined. The number of flowers (192.23) has reached the highest number of flowers in the plots with the Stala cultivar, which were released free in 2017. The highest number of fruits (202.45) was observed in Stala variety and released free plots. Due to the low number of fruits in the inbred plots, Stala cultivar had a maximum flower / fruit rate in 2018 with (2.21). In both trial years, the Sağlamtimur cultivar had highest 1000 seed weights (1.74 and 1.67 gr), while the Stala cultivar had the lowest 1000 seed weights (1.66 and 1.59 gr). In terms of the characters studied, the Stala variety has become the more prominent cultivar of the fiddleneck than the others

Key words : bee plant, bee forages, self-fertilization, thousand seed weight

POTENTIAL OF PUMPKIN GENETIC RESOURCE FOR USING ROOTSTOCK

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ABSTRACT

Cucurbita (squash and pumpkins) are sources of rootstocks for grafting cucumber, watermelon and melon and genetic diversity is important for grafting. In this study, Özde F1 cucumber (*Cucumis sativus* L.) seedlings were grafted on commercial RS 841 rootstock and two local landraces (20 and 21 belonging to *Cucurbita moschata*). Non grafted plants were used as control. Grafted plants on local 20 rootstocks had higher yield and number of fruits per plant compared to non grafted plants. Likewise, cucumber fruit flesh and fruit rind firmness improved in grafted plants. In addition, grafting had no effect on plant height and content of soluble solids. On the other hand, more research is needed to understand the effect of rootstock-scion interaction on cucumber growth and fruit quality for local rootstocks.

Key words : Diversity, Pumpkin, Grafting, Yield, Seedling

THE EFFECTS OF DEFICIT IRRIGATION ON NET PHOTOSYNTHESIS RATE, STOMATAL CONDUCTANCE, INTRACELLULAR CO₂ CONCENTRATION AND TRANSPIRATION RATE IN SUGAR BEET

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ABSTRACT

In this study, the effects of deficit irrigation applications on net photosynthesis rate (A), stomatal conductance (gs), intercellular CO₂ concentration (C_i) and transpiration rate (E) physiological parameters in sugar beet were examined in Bursa Uludağ University Agricultural Application and Research Center in 2019. Plants were irrigated with drip irrigation method and physiological measurements were made on 12th August, 29th August and 9th September. Irrigations were scheduled based on the replenishment of 100 (S1), 67 (S2), 33 (S3), and 0% (S4) of soil water depletion from a soil depth of 90 cm using a 7-day irrigation interval. According to the research results; It was determined that all physiological parameters were significantly affected by different water stress conditions (p< 0.01) on all of the measurement days. The A, gs, C_i and E values measured in the irrigation treatments have changed in that intervals respectively; 6.03-19.00 μmol CO₂ m⁻² s⁻¹, 0.0747-0.4742 mol H₂O m⁻² s⁻¹, 237.83-294.00 μmol CO₂ mol⁻¹, 1.89-5.31 mmol H₂O m⁻² s⁻¹.

Keywords: Deficit Irrigation, Sugar Beet, Net Photosynthesis Rate, Drip Irrigation

**EMPLOYMENT IN THE AGRICULTURAL SECTOR IN TURKEY: AN
EVALUATION OF PROBLEMS**

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ABSTRACT

Turkey is a country where agricultural production is intensive in terms of geographical features and climate conditions. Therefore, the position of the agricultural sector in the labor market has a very position. In fact, the employment rate in the agricultural sector is around 18%. The agricultural sector, which has such a great importance for the labor market in Turkey, has faced a lot of problems with the impact of neo-liberal policies and globalization. Since the agricultural sector refers to a labor-intensive sector, it is inevitable that the policies to be developed against these problems should be employment-oriented. In this context, the problems faced by the employment in the agricultural sector; rural disintegration, informalization and seasonal work, problems arising from the labor law, low wages, lack of education and productivity have been evaluated in the axes and the current situation has been put forward and the identified problems have been aimed to lead the policies to be developed.

Key words : Agricultural employment; labor market, agricultural sector.

YOUTH IN TURKEY: EMPLOYMENT IN THE AGRICULTURAL SECTOR

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ABSTRACT

Employment in Turkey is known as one of the problematic areas of youth employment in the agricultural sector, now being empathize with many triggers and causes migration from rural areas to urban areas. Since young people are one of the main actors of development and agriculture sector is one of the important elements of development, it is important to put forward the general framework on the subject. Therefore, it is necessary to first identify the current demographic situation for young people and then to focus on the barriers to employment in agriculture. Therefore, it is necessary to first identify the current demographic situation for young people and then to focus on the barriers to employment in agriculture. In this context, first of all, demographic current situation is presented and the reasons that restrict the employment of youth in rural areas are; education, financing, driving and attractive factors will be evaluated under the headings of entrepreneurship.

Key words : Youth employment; labor market, agricultural sector.

TILLAGE EFFECTS ON SOIL PHYSICAL QUALITY UNDER SOYBEAN-WHEAT CROPPING SYSTEMS

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ABSTRACT

Current agricultural practices are degrading once-productive soil in Ukraine. Conventional agricultural practices based on annual deep tillage, monocropping, indiscriminate use of unbalanced fertilization and reactive agrochemicals, and irrigation inefficiency are responsible for soil-water-plant ecosystems degradation. Effects of these practices, together with climate change, are accelerating higher evaporative demand, secondary salinization, and soil compaction with deficit productive moisture recharging, restricted water permeability and reduced biodiversity, and consequently, degrading soil quality and economic crop productivity. The adverse effects on soil quality physical properties under irrigated agriculture were most pronounced in the southern Steppe of Ukraine. In response to soil quality degradation and increasing freshwater demand, the looming prospect of poor soil quality and reduced freshwater availability for irrigation demands a solution to develop sustainable agricultural systems in Ukraine. The objective of our research was to evaluate the impact of variable tillage systems and chemical inducing of plants on soil compaction (bulk density), porosity, water permeability, and moisture availability of the dark-chestnut middle-loam under irrigated soybean-wheat cropping systems in the southern Steppe of Ukraine. A two-factorial experiment in randomized complete block design was established at the experimental fields of the Askanian State Agricultural Research Station of the Institute of Irrigated Agriculture in 2018. While the tillage factor was consisted of continuous no-till (NT) vs. conventional plowing (CT), the chemical inducing factor was control vs. salicylic acid (SA) application. First year's results showed that bulk density, as a measure of soil compaction, was 1.22 g/cm³ under NT than that of 1.20 g/cm³ under CT. The 2nd year's bulk density of soil under NT was 1.21 g/cm³, which was slightly less than the bulk density of 1.23 g/cm³ under CT. Bulk density in both CT and NT increased with soil depth. Total porosity was similar between CT and NT; however, there was an increasing trend in soil porosity under NT over time. As for water permeability, it was higher in the 1st year under CT (@ 0.5 mm) with respect to NT, but NT had the higher water permeability (@ 1.38 mm) in the 2nd year. Soil moisture reserve varied over time as the 2018 was a dry year when compared with 2019, which was a medium-wet one. In the 1st year (before planting soybeans), the productive soil moisture reserve at 0-30 cm depth was 485 m³/ha under CT and 515 m³/ha under NT. In contrast, there were drastic reductions in soil productive moisture reserves with -92 m³/ha under CT and -12 m³/ha under NT, when planting winter wheat. In other words, NT had the lowest productive moisture deficits by 7.7-folds than under CT. In response to autumn-winter precipitation during the spring regrowth of wheat, the productive moisture reserves replenished and/or recharged evenly throughout the soil profile to field moisture capacity under both tillage systems. In conclusion, our results showed that there was a trend to improve the soil physical quality and hydrologic properties under NT due to temporal increase in soil porosity, productive moisture reserve capacity and water permeability, than under CT.

Key words : Conventional plowing, no-till, bulk density, total porosity, water permeability, soil moisture

DEVELOPMENT OF RESTORER LINES DERIVED FROM WILD ANNUAL HELIANTHUS SPECIES

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ABSTRACT

Hybrid material, obtained by applying interspecific hybridization between cultivated sunflower and accessions of wild annual species *H. argophyllus*, *H. debilis* and *H. praecox*, maintained and preserved in the collection of DAI-General Toshevo, was used for obtaining of new sunflower fertility restorer lines. Sib-pollination, self-pollination and backcrossing were successfully applied. New R-lines were developed from preliminary tested hybrid material, obtained by repeated individual selection. They were characterized by resistance to foliar pathogens (*Phomopsis helianthi*/*Diaporthe helianthi* Munt.-Cvet. et al., *Phoma macdonaldii* Boerema), downy mildew (*Plasmopara halstedii* (Farl.) Berl. And deToni/*Pl. helianthi* Novot.), and to the parasite broomrape (*Orobanche cumana* Wallr.). The new restorer lines combined useful agronomic traits – suitable vegetation period, prolonged period of flowering, high seed set and seed oil and protein content, as well as very good combining ability. As a result of the investigation, some new hybrids were produced.

Key words : *H. argophyllus*, *H. debilis*, *H. praecox*, resistance, foliar diseases, broomrape

MECHANIZATION APPLICATIONS IN POULTRY FARMS

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ABSTRACT

Poultry industry, which has an important place in agricultural production, is successful in following up the mechanization, and technological developments, besides successful in the implementation of developments. Nowadays, the importance of mechanization applications in the poultry industry cannot be disregarded due to reduce production costs and labor needs, standardization of production, to enhance productivity and product quality. In addition, another significant issue in poultry production is animal welfare. Mechanization applications, that prioritize animal welfare, are highly effective and widely used for such as enriched cage systems, feeding and drinking systems, manure removal, egg collection. Aim of the study is to present a review of the mechanization applications used in modern poultry facilities and the latest technological developments in this field.

Key words : Mechanization, Poultry, Automation, Welfare, Product quality

SUMMARY OF THE WORK CARRIED OUT ON THE QUALITY OF COW'S MILK IN ALGERIA

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ABSTRACT

Milk is a food whose nutritional importance is well established. Several research teams are currently working on the milk sector in Algeria. One of the objectives of this research is to increase milk production and improve the technological and hygienic quality of milk and dairy products. It is with this in mind that we have carried out this bibliographical summary of research work on milk quality. The general objective is to characterize the physico-chemical and microbiological quality of fresh milk in different regions of Algeria. Milk quality parameters vary widely and are generally satisfactory. The physico-chemical composition of the milks can be qualified as average for the majority of the samples. The results of the physico-chemical analyzes are generally included in ranges close to the international standards adopted for this product, with an average pH of 6.44; an average acidity of 16.8 ° D and density of 1030.49, fat content of 34.68g / l and the average protein rate of 35.13g / l. Microbiological results are highly variable with unacceptable averages exceeding the maximum standard of 105 CFU / ml. It emerges from this an insufficient mastery of hygiene, whether during milking or in the overall environment of livestock buildings. The visualization of the results of the different quality parameters at the geographical level revealed that the Sétif region offers great prospects in the field of dairy processing given the physicochemical characteristics of the milk produced in the region. These results can be taken into consideration to improve the methods of support and extension in this sector of activities with the aim of ensuring the development of dairy cattle breeding in Setif (Algeria) and the improvement of the quality of milk produced in the region.

Milk is a food whose nutritional importance is well established. Several research teams are currently working on the milk sector in Algeria. One of the objectives of this research is to increase milk production and improve the technological and hygienic quality of milk and dairy products. It is with this in mind that we have carried out this bibliographical summary of research work on milk quality. The general objective is to characterize the physico-chemical and microbiological quality of fresh milk in different regions of Algeria. Milk quality parameters vary widely and are generally satisfactory. The physico-chemical composition of the milks can be qualified as average for the majority of the samples. The results of the physico-chemical analyzes are generally included in ranges close to the international standards adopted for this product, with an average pH of 6.44; an average acidity of 16.8 ° D and density of 1030.49, fat content of 34.68g / l and the average protein rate of 35.13g / l. An examination of the statistical data of the physicochemical parameters revealed that the fat content is the most variable parameter between the different regions studied. Microbiological results are highly variable with unacceptable averages exceeding the maximum standard of 105 CFU / ml. It emerges from this an insufficient mastery of hygiene, whether during milking or in the overall environment of livestock buildings. The visualization of the results of the different quality parameters at the geographical level revealed that the Sétif region offers great prospects in the field of dairy processing given the physicochemical characteristics of the milk produced in the region. These results can be taken into consideration to improve the methods of support and extension in this sector of activities with the aim of ensuring the development of dairy cattle breeding in Setif (Algeria) and the improvement of the quality of milk produced in the region.

Key words : Keyword: bibliographic review, milk, physico-chemical quality, hygienic quality, Algeria

**DETERMINATION MOLECULAR CHARACTERISATION OF GRAPEVINE
DECLINE AGENT *DIPLODIA SERIATA* AND DETERMINATION OF IN VITRO
ANTIFUNGAL EFFICIENCIES OF SOME FUNGICIDES AGAINST THE DISEASE
AGENT**

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ABSTRACT

It is aimed to determine the molecular characterization and sensitivity of some of the fungicides of the Botryosphaericea family member *Diplodia seriata*, which was isolated from the Sultani seedless root regions of the 2-10 year-old vines showing signs of decline and eventually death in the vineyard areas of Manisa Province in 2019-2020. The isolates obtained from the root and crown parts of the vine samples brought to the Plant Health Laboratory of Manisa Viticulture Research Institute by the producers were determined as *Diplodia seriata* according to morphological and molecular methods. The sequence of the isolate selected for phylogenetic analysis was first aligned using the CLUSTALW program included in the MEGAX program. The phylogenetic tree obtained after multiple alignment of the base sequences for each gene (neighbor joining tree) was created using the Maximum Likelihood method with the MEGAX (version 10.1.7) program. *Diplodia seriata* is known to be a pathogen in vines in previous studies. Antifungal efficacy of 7 different concentrations (0, 1, 3, 10, 30, 50, 100 µl ml⁻¹) of 5 fungicides such as fosetyl-Al + triadimenol, azoxystrobin + difeconazole, fludioxanil + cyprodinil, metrafenone, fluopyram was determined for the control against the agent.

Key words : Botryosphaericea, Decline, *Diplodia seriata*, , *Vitis vinifera* L.

DETERMINATION AND MOLECULAR CHARACTERIZATION OF FUNGAL FACTORS CAUSING ROOT AND CROWN DISEASES IN YOUNG VINEYARDS

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ABSTRACT

In 2019-2020, morphological and microscopic diagnoses of root and crown diseases obtained from the root region of vine samples taken from vineyards of 9-10 years old belonging to table and dried grape varieties in Denizli were carried out. As a result of morphological and microscopic examinations, *Rosellinia* spp., *Dactylonectria* spp. *Botryosphaeria* spp. Molecular characterization of the species was carried out. The sequences of the isolates selected for phylogenetic analysis were firstly aligned using the CLUSTALW program included in the MEGAX program. Genetic distances were calculated using the most appropriate model for each gene region. Neighbor-joining (NJ) method was used to make phylogenetic inference. The phylogenetic tree obtained after multiple alignment of the base sequences for each gene (neighbor joining tree) was created with the program MEGAX (version 10.1.7) using the Maximum Likelihood method and the statistical reliability of a particular sequence in the phylogenetic tree and tree bootstrap method that was calculated with 1000 repetitions.

Key words : grapevine, root and crown diseases, *Vitis vinifera* L.

TRIAZOLE AND STROBILURIN FUNGICIDES SENSITIVITY OF *PYRENOPHORA TRITICI-REPENTIS* ISOLATES ORIGINATED FROM EASTERN ALGERIA

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ABSTRACT

Tan spot of wheat, caused by the fungus *Pyrenophora tritici-repentis*, is a destructive disease worldwide that can cause serious losses in quality and quantity of wheat grain production. This disease is widespread in the cereals production areas Algeria, causing considerable losses of yield and obliging farmers to use different class of fungicides. 100 isolates of *P. tritici-repentis* collected from different fields in eastern of Algeria during four successive agricultural seasons (2012–2015) were tested in vitro for their sensitivity to the fungicides that commonly in use in the country: azoxystrobin (Amistar), propiconazol (Tilt250EC) and azoxystrobin combined with prothioconazole (Amistar Xtra). In vitro assays showed a decrease in the sensitivity of the isolates of *P. tritici-repentis* to these three fungicides during the four years of testing. For Amistar, IC 50 values range from 7.5 ppm to 15 ppm, between 5 ppm and 12.5 ppm for Tilt 250EC and between 5 ppm and 10 ppm for Amistar Xtra, the combination of triazoles (Cyproconazole) with strobilurins (azoxystrobin) appears to have good antifungal activity on *P. tritici-repentis*, whereas the strobilurins or triazoles used alone show low antifungal activity

Key words : antifungal activity, durum wheat, tan spot, fungicides

AGRONOMIC RESPONSE OF THREE MAIZE GENOTYPES TO FIVE PESTICIDES IN COMBINATION WITH MYCORRHIZAL FUNGUS

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ABSTRACT

The aim of this work was to study the best combination of three maize genotypes and pesticides that is the least costly to plant physiology and agronomic traits. Three fungicides (azoxystrobin, fludioxonil and potassium phosphonate), one plant-defense promoter (acibenzolar-s-methyl) and one insecticide (thiamethoxam) were used for this study. Following a two-year series of experiments three maize genotypes were tested in randomized complete blocks replicated thrice (A was an experimental open-pollinated line, while B and C were commercial hybrids). The plot included three rows 4m long and 0,75m apart, while the in-row distance between individual plants was 15 cm. Within a plot, each row corresponded to a different treatment applied twice (i.e. E = application with the pesticide, Co = control, M = application of the pesticide plus the use of an arbuscular mycorrhizal fungus). Each genotype was twice applied (during sowing and germination) by each pesticide 1 = fludioxonil, 2 = azoxystrobin, 3 = acinenzolar-s-methyl (ASM), 4 = thiamethoxam, 5 = potassium phosphonate (PP), separately. In sowing each pesticide was applied in its recommended dose while a double dose was used during plant germination. Several agronomic traits were measured at the maturity stage, including plant height, shoot diameter, number of ears per plant, ear length and weight, wet and dry kernel weight. The results showed that the hybrid B displayed a better response for most of the inspected characteristics especially with the use of acibenzolar-s-methyl and potassium phosphonate. That was a sign of a beneficial interaction of this genotype with the treatment of those two substances, improving grain yield components like number, length and weight of ears, as well as kernel weight. The combine application of pesticides and arbuscular mycorrhizal fungus had a significant effect on specific agronomic traits. The combined application of ASM and the mycorrhizal fungus showed better results for the inspected characteristics of plant height, ear length and weight, wet and dry kernel weight. That means that the interaction between the application of this plant-defense promoter and the arbuscular mycorrhizal fungus has significant effect on these specific agronomic traits of the plant and it's the least costly combination regarding the plant growth and total yield.

Key words : Pesticides Maize, Arbuscular mycorrhizal fungus.

Acknowledgment: This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE (project code: T1EDK-00739)

DIMENSIONS OF MIDDLE-BELT LEAVES IN BASMA TOBACCO VARIETIES

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ABSTRACT

Macedonian tobacco production is recognizable around the world by oriental types of tobacco, represented by a large number of varieties. The morphological properties of tobacco are a very important factor in determining primarily the type of tobacco, and then the individual varieties within the species. These traits of each species or variety are more or less different and are genetically controlled. Experience to date in this area shows that tobacco plants of a certain type under the influence of agro-ecological conditions and agro-technical measures in vegetation can also show strong variations in terms of bio-morphological properties, especially leaf dimensions. Important indicators for determining the quality of raw tobacco are: insertion, leaf size, content, elasticity, color, degree of damage. Therefore, the aim of the study was to present the characteristics of Basma's varieties from the middle belt insertion: length, width and angle of attachment to the lower middle, right middle and upper middle leaf, in the stage of technological maturity. The study was conducted in the field of the Tobacco Institute in Prilep; trial was set up in 5 replications, using a random block system, including 4 oriental varieties of tobacco: three Basma: MK - 1, MB - 2 and MB - 3 and Yaka 7 - 4 / 2 as a control (\emptyset). Basma varieties were created by the Scientific Institute for Tobacco - Prilep, and the state commission for the variety recognized them in 2010. The obtained data were statistically processed and tested by LSD test. In terms of leaf dimensions, the length of the lower middle leaf for the MB-3 variety showed statistically significant differences compared to the control variant. On average, all varieties of Basma have slightly larger leaf dimensions compared to control (\emptyset), but the dimensions of the middle belt leaves, in the MB-3 variety, are important for achieving higher green mass yield per plant or per hectare and obtaining quality raw tobacco. Macedonian tobacco production is recognizable around the world by oriental types of tobacco, represented by a large number of varieties. The morphological properties of tobacco are a very important factor in determining primarily the type/variety of tobacco, and they differ to a greater or lesser extent and are genetically controlled. Experience to date in this area shows that tobacco plants under the influence of agro-ecological conditions and agro-technical measures can also show strong variations in terms of bio-morphological properties, especially leaf dimensions. Important indicators for determining the quality of tobacco are: insertion, leaf size, content, elasticity, color, degree of damage. Therefore, the aim of the study was to present the characteristics of Basma's varieties from the middle belt insertion: length, width and angle of attachment to the lower middle, right middle and upper middle leaf, in the stage of technological maturity. The study was conducted in the field of the Tobacco Institute in Prilep; trial was set up in 5 replications, using a random block system, including 4 oriental varieties of tobacco: three Basma: MK - 1, MB - 2 and MB - 3 and Yaka 7 - 4 / 2 as a control (\emptyset). Basma varieties were created by the Scientific Institute for Tobacco - Prilep. The obtained data were statistically processed and tested by LSD test. In terms of leaf dimensions, the length of the lower middle leaf for the MB-3 variety showed statistically significant differences compared to the control variant. On average, all varieties of Basma have slightly larger leaf dimensions than the control variant (\emptyset), but the MB-3 variety stands out because of the leaf dimensions in the middle belt.

Key words : Oriental tobacco, basma, middle-belt leaves, dimensions

CAPNODIS TENEBRIONIS (LINNEAUS,1758) LIFE CYCLE ON ARTIFICIAL DIET

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ABSTRACT

The Mediterranean flatheaded peachborer, *Capnodis tenebrionis* (Linnaeus, 1758) (Coleoptera: Buprestidae) was reared on an artificial diet to investigate its life cycle. In this study, the artificial diet mix has been used as a nutrient by modifying the literature (Gindin et al. 2009). The mixture prepared from three cherry rootstocks (MaXMa, Gisela 5, Kuşkirazı) was used instead of peach cortex. All rearing was carried out in controlled environment rooms maintained at 26±1 °C, 50±5 % RH and an 16:8 h photoperiod in 25 x 25 x 35 cm cages. Eggs are white and oval in shape, the width as 1.11 ± 0.01 mm (0.89 -1.12 mm) and the length was determined as 1.70 ± 0.01 mm (1.51 -1.82 mm). Eggs were opened in 14.25 ± 0.04 days. Larval development at 26±1 °C is 84.14 ± 0.59 days; prepupa duration was 2.40 ± 0.16 ♂, 2.36 ± 0.15 ♀; pupa time was determined as 5.40 ± 0.16 ♂ and 5.36 ± 0.15 days ♀. In adults, gender and height values were measured by making the gender discrimination according to the shape of the end of the abdomen. The total development period lasted 105 - 111 days and it had 5 larval periods until it was mature at 26 ± 1 °C.

Key words : Capnodis, artificial diet, cherry

**EFFECTS OF DIFFERENT PRUNING PRACTICES ON LEAF DEVELOPMENT
AND LIGHT OBSTRUCTION OF KIWI (*Actinidia deliciosa*)**

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ABSTRACT

In this study, the relationship between types of pruning and light obstruction was investigated for Hayward kiwi species under ecological conditions of the province Samsun. Prunings were performed at two different periods as of winter pruning (long, medium and short pruning) and summer pruning (heavy and light pruning). It was found that light-obstruction rates (%) of winter prunings were ordered from higher to lower as long, medium and short pruning. Additional summer prunings beside winter prunings didn't have statistically significant effects on light-obstruction. It was determined that percent light-obstruction got a constant state 4 weeks after the beginning of shoot development (end of May – first week of June). Light-obstruction rates were generally about 60-80% for all types of prunings. Increases were also observed in leaf areas based on pruning types in the order of short, medium and long pruning. Based on the results of this study, it can be stated that short pruning was a significant practice in kiwi culture for sufficient light intensity; however, a mixed pruning practice mostly short pruning with some medium pruning was recommended to prevent excessive exhaustion of the plant.

Key words : kiwifruit, pruning, light, growth, light obstruction

THE EFFECT OF POTASSIUM ON SUGAR BEET UNDER SALT STRESS

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ABSTRACT

Salinity is an important type of abiotic stress that limits vegetative production in the world, especially in arid and semi-arid climatic regions. The aim of this study is to mitigate salt stress damage in the sugar beet plant, which is an important part of crop production, with potassium application. Experiment was designed according to a design of random blocks with 4 different doses (10, 20, 40, 80 mg kg⁻¹ K) potassium and 3 different salt levels (0, 100, 150 mM NaCl) and 3 replicates. At the end of the experiment leaf length, leaf width, leaf proportional water content, membrane damage in cells, malondialdehyde (MDA) content, chlorophyll content, plant phenol content were determined. The data obtained from the experiment were evaluated by one-way analysis of variance (One-Way ANOVA) using a statistical package program. According to the results of variance analysis, leaf width, leaf length, leaf proportional water content, membrane damage, chlorophyll content, MDA content were found statistically significant in salt x potassium interaction. Due to the positive effects of potassium on the parameters known to increase the plants' stress tolerance, it is thought that may be beneficial in reducing the salt stress in order to make the sugar beet less affected by salt stress.

Key words: Potassium, Salt Stress, Sugar Beet

SUSCEPTIBILITY OF LENTIL (*LENS CULINARIS*) POPULATIONS TO THE PEA APHID *ACYRTHOSIPHON PISUM*

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ABSTRACT

The susceptibility of six lentil (*Lens culinaris*) genotypes, i.e., three commercial cultivars ('Samos', 'Dimitra' and 'Elpida') and three landraces (ILL-590, FLIP 03-24L and FLIP 02-1L), to the pea aphid *Acyrtosiphon pisum* was assessed under laboratory conditions. In a multi-choice arrangement set-up, young potted lentil seedlings with four expanded leaves were placed on the corners of a regular pentagon in a randomized complete block design. Cohorts of young pea aphid adults had access to all different tested plants and their numbers on the plants of each genotype were recorded after 24 hours. No significant differences were found in aphids allocation among the different lentil genotypes suggesting no differences in potential antixenosis traits of the tested plants. In another set of laboratory trials, potential antibiosis and/or tolerance traits of the different lentil genotypes were assessed. The intrinsic rate of population increase (*rm*) of the pea aphids on the different lentil genotypes and the seedling's survival as well as increase in fresh biomass weight were used as indices of antibiosis and tolerance, respectively. Young potted lentil seedlings with four expanded leaves were individually infested with two nymphs of the pea aphid and after one and two weeks the population density of the aphids as well as the survival and fresh weight of the surviving plants were recorded. The highest *rm* value of the pea aphid was recorded on the FLIP 03-24L landrace, whereas the estimated *rm* values on the other lentil genotypes were similar and significantly lower. The lowest survival percentage (~40 %) of lentil seedlings was recorded for the FLIP 02-1L landrace, whereas that of the young seedlings of the other tested genotypes was similar ranging from 55 to approx. 80 %. The highest increase of the fresh biomass of lentil seedlings was recorded for the 'Samos' cultivar for which survival (~65 %) was among the highest values recorded, whereas the respective population build-up of the pea aphid was among the lowest recorded (*rm* = 1.47 days⁻¹). Based on the above indices we conclude that, among the cultivars/landraces tested, the 'Samos' cultivar could be considered the most resistant to the pea aphid. Further experiments are required to be able to identify underlying antibiosis and/or tolerance traits.

Key words : *Lens culinaris*, pea aphid, *Acyrtosiphon pisum*

Acknowledgment: This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE (project code: T1EDK-04633).

THE RACIAL BELONGING OF *Puccinia helianthi* SCHWEIN - THE PATHOGEN OF SUNFLOWER RUST IN SOME REGIONS OF THE RUSSIAN FEDERATION

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ABSTRACT

Sunflower rust, caused by a highly specialized fungus *Puccinia helianthi* Schwein, was observed in Russia as early as 1866. There were descriptions of systematically recurring epiphytotics of the disease until 1983. The presence of race 1(100) of rust pathogen isolates, collected in the south of the USSR, was determined in 1962. The dominance of this race in the Northern Caucasus was confirmed in 1981-1983 and the presence of a less virulent race 3(300) was also noted. At the same time, a native sunflower variety Kremniy, resistant to rust, was developed in VNIIMK. Due to the introduction of this variety and its analogues into production, the rust problem in the Russian Federation was solved for a long time. Since then, the determination of *Puccinia helianthi* races has not been carried out in Russia. However, over the past two decades, in different years, depending on weather conditions, a strong prevalence of rust has been observed in the Tambov, Lipetsk, Saratov, Krasnodar regions, and in others places. The objectives of our research was to determine the races of rust pathogen from the Krasnodar, Saratov and Lipetsk regions, using an international standard set of sunflower differentiating lines. Eight lines were used: SM-90, SM 29, P-386, HAR-1, HAR-2, HAR-3, HAR-4, HAR-5. The sunflower variety VNIIMK 8883 was used as susceptible to all races. Six races of *P. helianthi* were identified. The samples from the Krasnodar region were races 100 and 300. These races, including the other two (700 and 772), were found in the Lipetsk region. The isolates from the Saratov region were races 300, 700, 710 and 772. Thus, in three regions of the Russian Federation six races of *Puccinia helianthi* were found on sunflower: 100, 300, 700, 710, 722, 772. It is possible that other races are present in the country; therefore, it is necessary to continue the study by surveying a larger number of fields in different regions.

Key words : sunflower, rust, obligate parasite, fungus, races

ASSESSING THE CONSUMPTION LEVEL OF PRO VITAMIN, A CASSAVA PRODUCTS AMONG RURAL HOUSEHOLDS IN SOUTH-EAST AND SOUTH-SOUTH NIGERIA

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ABSTRACT

Pro-vitamin A cassava (yellow roots) products which include garri, fufu, flakes, tapioca, flour for cake, bread, chin-chin, boons among other snacks have nutritional, health and economic values for consumption among rural households in south-east and south-south Nigeria. The cassava was developed by International Institute for Tropical Agriculture (IITA), Ibadan in partnership with the National Root Crops Research Institute (NRCRI), Umudike, Nigeria having observed that millions of poor rural households, irrespective of age, sex or geographic location consume less vitamin A than the body needs while women and children remain the most vulnerable. As a result, suffer poor immune system, blindness and poor vision. The consumption of pro-vitamin A cassava could help Nigeria reduce economic losses in gross domestic product estimated at about \$1.5 billion and improves nutrition of poor Nigerians who cannot afford alternatives. On that note, multistage random sampling was adopted in the selection of the sample size of 480 rural households cumulatively chosen from Imo, Anambra, Delta and AkwaIbom states. About 8 agricultural zones, 24 blocks, 48 circles and 120 respondents from each state were randomly selected. Focus Group Discussion and well-structured questionnaire were used to elicit information from the respondents while descriptive and inferential statistics (Duncan multiple range test) were used to analyze the data collected. Result emerging from analysis showed mean scores of consumption and use of pro-vitamin A cassava products in Imo ($\bar{x}=1.90$), Anambra ($\bar{x}=1.93$), Delta ($\bar{x}=1.90$) as below the bench mark of 2.00 and therefore considered low consumption except AkwaIbom ($\bar{x}=2.14$) having high consumption. The study concluded that there were low levels of consumption of pro-vitamin A products across the states. Therefore, there is need to encourage the rural households expand the production of pro vitamin A cassava and also boost promotional activities, such as field days and nutritional information campaigns to increase the consumption level in order to achieve the focus on eradicating vitamin A deficiency (VAD) through a cheaper cost effective sustainable means accessible to even the rural poorer households in Nigeria.

Key words : Keywords: Consumption, Pro vitamin A cassava Products, Rural Households.

AN ASSESSMENT TO WEEDS IN RICE PRODUCTION IN TURKEY

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ABSTRACT

Rice, which is a member of the family Poaceae, produces in 31 provinces of Turkey; however, the production is not enough to fulfil the consumption of the country. Considering this situation, determining the plant protection factors (diseases, pests and weeds) that are problematic in rice production areas and implementing management studies for these factors are important for increasing sustainable production of rice. In current study, assessment of weeds was done which have the direct and indirect impacts, in rice production in Turkey. Results showed the presence of 95 weeds taxa from 26 families were dominated in rice cultivation areas. Considering the families belonging to the determined taxa, Poaceae was registered as the most important family containing with 23 taxa, followed by Cyperaceae (14 taxa) and Asteraceae (11) respectively. When taxa are examined according to their life forms; 49 taxa were terrestrial, 35 taxa were aquatic and 11 taxa were both terrestrial and aquatic. Considering their life span, 54 taxa have perennial, 38 taxa have annual and three taxa have multiple life forms. When the studies on the presence of weeds in the paddy fields by regions are examined, it was determined that the studies were mostly done in the Marmara Region (10 studies) and subsequently it was investigated in the Black Sea (5) and South East Anatolia (3) regions. As a result of this study, suggestions about common measures that can be applied in rice production fields in all regions against weeds have been presented and thus, a resource has been tried to be provided for management studies. Finally, it should be noted that when considering the rice cultivation area in Turkey, the studies about the problems and control measures of weed species in rice production are limited. For this reason, we emphasize that increasing the studies on the subject in all regions will be beneficial for reaching the rice consumption needed throughout the country and attaining sustainability in rice production. This study includes of the author Ali Rıza Bör the master thesis some data, the undergraduate diploma thesis data of the author Ezgi Eroğlu and additional researches.

Key words : control measures, management, plant protection, Poaceae, rice, sustainability, weed

GREEN FERTILIZERS FROM MUSTARD AND RAPESEED PLANTS AS A WAY OF CONTROL OF BROOMRAPE (*OROBANCHE CUMANA* WALLR.) PARASITIZING ON SUNFLOWER

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ABSTRACT

O. cumana, an obligate parasite of sunflower, is widely spread in most countries cultivating this crop. It is one of the main factors limiting the cultivation of sunflower. Our laboratory experiments with broomrape seeds treated with extract from the crushed green mass of common mustard showed inhibition of both seed germination and growth of seedling, which penetrates the sunflower root. The aim of our research was to determine in greenhouse conditions the influence of application of oil crops (*Brassicaceae*) green fertilizers on the sunflower infection with broomrape. We used the green mass of white, black, common mustard and winter rapeseed as a green fertilizer. We added the crushed green mass of these crops (62.5-90.0 g) to vessels with a soil-sand mixture mixed with broomrape seeds. Such amount of green mass per vessel is comparable with the average green mass yield of these crops (15.5–22.5 t/ha) that is plowed into the soil as a green manure. After 15 days, we sowed the seeds of sunflower variety susceptible to all races of broomrape. We did not add the green fertilizers in the control variants. The growing of sunflower plants lasted for 45 days. We revealed the significant differences in the infection degree compared with the control at a 5 % significance level. The green fertilizer of white mustard (variety Ruslana) showed the highest percentage of decrease in the infection degree – 44.7 %. The common mustard (Yunona) and black mustard (Niagara) reduced the infection by 25.9 and 27.0 %, respectively, the rapeseed (Tavrion) – by 24 %. Thus, this experiment showed a significant decrease in sunflower plants infection with broomrape under presowing application of the crushed green mass of white, black, common mustard and winter rapeseed. We recommend using the green manures of these crops to reduce infection of sunflower crops with broomrape and as an environmentally safe method of clearing the field from its seeds.

Key words : sunflower, broomrape, green fertilizer, mustard, rapeseed

**PEACH THINNING TO REDUCE CROP LOAD AND IMPROVE CROP VALUE OF
FLORDASTAR ' PEACH.**

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ABSTRACT

The present work deals with the study of thinning effects on early peach variety "*Flordstar*" grown in irrigated areas of Tataouine. The objective is to evaluate the impact of different hand thinning regimes on productivity and quality of "*Flordstar*" variety. Four hand thinning methods were applied EM0, EM10, EM15 and EM20. The results obtained show a significant effect of different treatments for thinning on the total load of trees and the unit weight at harvest. Based on qualitative parameters, fruits from the EM15 and EM20 schemes have expressed the most important quality potential compared to other regimes (EM10 and EM0). These results indicate that the most severe thinning treatments appear to be the most adequate for the production of early peach variety in the Region of Tataouine. The thinning practices reported to the peach *Flordstar* deserve to be investigated thorough the profitability of the sector and the nutritional importance of these fruits

Key words : Hand thinning, crop load, fruit quality, peach tree

FLAG LEAF IN BREAD WHEAT (*TRITICUM AESTIVUM L.*) GENOTYPES AND ASSOCIATION WITH YIELD AND YIELD COMPONENT UNDER RAINFED CONDITION

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ABSTRACT

An experiment was carried out to assess of flag leaf fresh and dry weight of advanced bread wheat genotypes and relation with yield component. A total of 25 bread wheat genotypes were tested during 2017-2018 growing year at four environments condition in Trakia region, Turkey. The experiment was conducted in randomized completely blocks design with four replications. Grain yield, flag leaf fresh and dry weight, days of heading, plant height, peduncle length, spike length, spike number per square meter, spikelet number per spike, kernel number per spike, and spike weight were investigated. There were significant differences ($P<0.01$, and $P<0.05$) among genotypes for grain yield. Mean grain yield for 25 genotypes was 7172 kg ha⁻¹. The highest grain yields performed by genotypes Köprü (7781 kg ha⁻¹) while the lowest by G9 (6124 kg ha⁻¹). Ten flag leaf fresh and dry weights of the plant were weighted at heading growth stages (Z55). There were significant differences among genotypes for flag leaf fresh and dry weight. Flag leaf fresh weight was varied among genotypes from 3.25 g to 9.15 g and, mean was 4.95 g. Flag leaf fresh weight of plants was weighted maximum in G17 (9.15 g), G21 (8.41 g) and G16 (8.37 g). Ten flag leaf dry weight was varied among genotypes from 1.36 g to 2.37 g and, mean was 1.71 g. The highest flag leaf dry weight was found in G17 (2.37 g), G16 (2.30 g), and G7 (2.24 g). Flag leaf fresh and dry weight was slightly positively correlated with days of heading. Flag leaf fresh and dry weight positively affected yield component in genotypes. There was a positive significant relation between spike length with flag leaf fresh ($r=0.526^{**}$) and dry weight ($r=0.529^{**}$). Flag leaf fresh ($r=0.513^{**}$) and dry weight ($r=0.568^{**}$) was also significantly positively associated with spikelet number per spike. Kernel number per spike was slightly significant positively correlated with flag leaf fresh weight ($r=0.377$) and significantly correlated with flag leaf dry weight ($r=0.398^*$). Flag leaf positively affected and increased spike weight in genotypes and it was found significant association among flag leaf fresh ($r=0.489^*$) and dry weight ($r=0.531^{**}$) with spike weight. Result showed that flag leaf fresh and dry weight could be used in selection in bread wheat for yield component.

Key words : Bread wheat, Genotypes, Flag leaf, Yield component

**EFFECT OF THE ENVIRONMENTAL CONDITION IN LEAF RUST AND
RESPONSE OF BREAD WHEAT (*TRITICUM AESTIVUM L.*) CULTIVARS UNDER
RAINFED CONDITION**

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ABSTRACT

The prevalence level and development of leaf diseases depend on many factors, particularly climatic conditions. Leaf rust is the most widespread and imported diseases of wheat in the region. Temperature, rainfall and humidity are one of the abiotic environmental factors may influence bread wheat yield during grain filling period in Trakya region, Turkey. It was investigated effect of the temperature, rainfall and humidity during GS31-47, GS49-75, and GS77-90 into yield and leaf rust of the bread wheat cultivars. Temperature, rainfall and humidity from shooting up to grain filling period were taken in experimental area. This research was established with 25 genotypes in RCBD with 4 replications in Edirne, between 2005 and 2015 growing seasons. Aldane, Selimiye, Pehlivan and Gelibolu cultivars were selected from this experiment. Grain yield, leaf rust, days of heading, plant height and relationship amongst these traits were investigated based on cultivars. According to result there were significant differences for yield and other investigated traits. The highest average yield was 863.6 kg in 2008, and in 2014 with 824.4 kg/da. The lowest yield was determined in 2016 where leaf rust infection was higher under environmental condition. Pehlivan and Gelibolu were susceptible cultivars. In this study it was investigated in order to determining correlation coefficient of the characters based on cultivars. It was found various relations among investigated parameters. There was significant negative relation between grain yield and leaf rust in cv. Pehlivan ($r = -0.644^*$) and Selimiye ($r = -0.652^*$). Leaf rust negatively affected and decreased grain yield in Gelibolu ($r = -0.437$) and Aldane ($r = -0.337$) cultivar. The rainfall during GS31-47 growth stage negatively affected and increased infection of leaf rust in Selimiye and slightly affected other cultivars based on their development of growth period. Rainfall during GSGS31-47 growth stage contributed to leaf rust epidemic in susceptible cultivar Pehlivan. There was no any effect during GS77-90 between yield and leaf rust. There were various degrees of leaf rust infection and correlation between yield and leaf rust based on mean and maximum temperature during GS31 and GS90. The mean and maximum temperature during GS31-47 promoted leaf rust infection in Selimiye cultivar. Increasing in temperature during GS49-75 growth stage negatively affected leaf rust in Pehlivan cultivar.

Key words : Bread wheat, Cultivar, Climate effect, Yield, Leaf rust

DETERMINATION OF ACCASE INHIBITOR HERBICIDE RESISTANCE OF WILD OATS (*AVENA SPP.*) IN WHEAT PLANTING AREAS IN NORTHERN DISTRICTS OF KAHRAMANMARAS

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ABSTRACT

This study was carried out between 2015 and 2016 in order to determine the resistance of Accase inhibitor herbicides to wheat cultivation areas in Kahramanmaraş Göksun, Afşin and Elbistan districts. In the surveys conducted in the region between 2015 and 2016, *Avena spp.* seeds were collected from 25 different cultivation areas and field edges without herbicides for comparison. The seeds were blended and planted in the cuvettes and tested by screen screening test to detect durable (R) and sensitive (S) populations. Clodinafop-propargyl application dose of 20 ml / da was applied as 4 repeats in 2-5 leaf periods and it was observed that all plants could not survive on the 28th day and it was found to be sensitive to Clodinafop propargyl (S).

Key words : Wheat, Weed, *Avena spp.*, Herbicide, Resistance

SEEDLING PROPERTIES AND FIRE BLIGHT RESISTANCE ON OPEN-POLLINATED CHAENOMELES JAPONICA HYBRIDS IN TURKEY

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ABSTRACT

Chaenomeles japonica (Thunb.) Lindl. (Japanese quince) is an important fruit species that widely used for food industry, medicinal purposes and also decorative ornamental. It contains high amount of L-ascorbic acid, pectin, dietary fiber, polyphenols, flavonols, proanthocyanidins, quercetin, catechin, epicatechin, procyanidin, chlorogenic acid, B1, B2. *C. japonica* is also known a new host of *Erwinia amylovora* and there is limited study in worldwide. In this study, seedling properties and fire blight resistance of open-pollinated *C. japonica* hybrids were determined. Germination started 18 days after sowing and ended 31 days later with 96.42% germination rate. Nearly 6 weeks after seed sowing, seedling deaths were occurred at 23.80% level due to fungal diseases during the development period. Coefficient of variation (CV) was obtained for seedling parameters (total shoot length, stem diameter) and fire blight susceptibility on 3 months old seedlings. CV of total shoot length, stem diameter, and SI were calculated as 19.31, 14.02, and 118.58 %, respectively. It is understood that *C. japonica* has a high germination rate and homogenously seedling reproduction, with seedling parameters that had CV values less than 20 %. Forty-one healthy hybrids in active growing period were selected for fire blight inoculation. Fire blight susceptibility index (SI) were ranged 3.90-100 % and hybrids were grouped as highly resistant (15 hybrids), resistant (18 hybrids), medium susceptible (3 hybrids), susceptible (2 hybrids), and highly susceptible (3 hybrids) according to the Gardner scale. As a result of the correlation analysis, significant negative correlation was observed between SI and total shoot length ($R = -0.634$, $P \leq 0.0001$), stem diameter $R = -0.5073$, $P \leq 0.0001$). According to these results, it was determined that susceptibility of fire blight was high in hybrids which had thinner stem diameter and shorter shoot length. In the light of the results obtained from this study, we suggest that resistant individuals could be used as a parent for registered cultivars or further studies.

Key words : Seed germination, stem diameter, Japanese quince, *Erwinia amylovora*, disease resistance.

DETERMINATION OF THE WEED SPECIES, THEIR OBSERVATION, FREQUENCIES AND DENSITIES IN THE VINEYARDS IN TEKİRDAĞ PROVINCE

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ABSTRACT

This research was conducted in June 2015 in grape fields of Tekirdağ province in order to investigate the weed species, intensity and the frequency of occurrence. To do this, survey was realized on an area covering 50 vineyards in two towns of Tekirdağ province. As a result, 65 weed species from 23 different families were determined. Among these, *Convolvulus arvensis* L. (field bind weed) (31,49 plants/m²), *Cynanchum acutum* L. subsp. *acutum* (swallow wort) (13,87 plants/ m²), *Chenopodium album* L. (common lamb's quarters) (13,73 plants/ m²), *Solanum nigrum* L. (black night shade) (10,20 plants/ m²), *Sorghum halepense* (L.) Pers. var. *halepense* (johnson grass) (9,07 plants/ m²), *Amaranthus retroflexus* L. (redroot pigweed) (8,06 plants/ m²), *Portulaca oleracea* L. (common purslane) (6,73 plants/ m²), *Cynodon dactylon* (L.) Pers. var. *dactylon* (bermuda grass) (4,45 plants/ m²), *Cirsium arvense* (L.) Scop. (canada thistle) (4,16 plants/ m²) and *Setaria viridis* (L.) P. *beauv.* (green foxtail) (4,03 plants/ m²) were the most frequently determined 10 species. According to their frequencies; *Convolvulus arvensis* (93,33%), *Chenopodium album* (84,16%), *Solanum nigrum* (76,66%), *Sorghum halepense* (72,5%), *Amaranthus retroflexus* (63,33%), *Xanthium strumarium* (common cocklebur) (62,5%), *Cirsium arvense* (60,83%), *Cynanchum acutum* (60%), *Lactuca serriola* (milk thistle) (45%) are the most common weed species in the Tekirdağ province

Key words : Weed, vineyard, frequency, intensity, Tekirdağ.

WARMING OF BEEHIVES BY SOLAR ENERGY STORED IN WATER

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ABSTRACT

This study was conducted to investigate the possibility of utilizing solar energy stored in water for warming the environment of bee hives and its effect on hive temperature, honey area, pollen area, sealed brood area and the number of occupied frames. Six Langstroth hives were used containing honeybee colonies of equal strength from the species of hybrid *carniolan*. Two groups as follows: (G1) control group (untreated hive), and (G2) modified beehives that treated with solar energy system. The solar energy system consists of insulated wooden drawer located under the bee hive, contained tied water bags and covered with polyethylene sheet. Solar energy stored in water was used to minimize the variation of inside air temperatures between the daylight and night times. The highest degree of hive temperature, honey area, pollen area, sealed brood area and number of occupied frames (37.9 °C, 916 cm², 842 cm², 3688 cm² and 9 frames) were investigated at the end of March for the modified beehives, respectively. The lowest degree of hive temperature, honey area, pollen area, sealed brood area and number of occupied frames (22.7 °C, 98 cm², 219 cm², 911 cm² and 3 frames) were investigated at January for the control groups of beehives, respectively. There was a significant increase in hive temperature, honey area, pollen area, sealed brood area and bee population when used heat stored in water for warming the environment of bee hives.

Key words : Warming, beehives, solar energy, water

**DETERMINATION OF SAMPLE SIZE ON DIFFERENT PEARSON
CORRELATION COEFFICIENT BY POWER ANALYSIS**

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ABSTRACT

The study was carried out to determine the minimum sample numbers of different correlation coefficients (0.3 -0.99) and the test power (70% - 95%) that is to be used in order to be statistically significant. The material of the study consists of random numbers generated from multivariate normal distribution with parameters $X \sim N(\mu, \Sigma)$. When the population correlation coefficient (ρ) is 0, the correlation coefficient (r) calculated from the sample was checked for significance with the t test. When this situation is tested in 10000 simulations, the number of observations in the required sample obtained in each of the 5% power increases between 70% and 95% were determined. It was observed that similar or very close n values were obtained by controlling this situation with different power analysis programs. In the significance control of the correlation coefficient, r test statistics were taken between 0.3 and 0.99 and the number of experimental units required for 95% power varied between 138 and 5. The required sample size varies between 112 and 4 at 90% power value, and when the power value decreases to 70%, the sample size changes between 67 and 4. When the correlation coefficients are 0.90 and above, the required sample size do not change much in the situations of between 70% and 85% power. In the correlation coefficient (r) statistics, which is widely used in scientific studies and to provide the researchers with easy use by calculating the number of sample sizes required to reach sufficient power values. In this way, determining the sample sizes in advance will provide the opportunity to find financing more easily by preventing waste and financial loss in scientific studies.

Key words : Pearson Correlation, Power analysis, Sample size, Monte Carlo simulation

PERFORMANCE EVALUATION OF HAND-MOVE SPRINKLER IRRIGATION SYSTEM: A CASE STUDY IN RWANDA

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ABSTRACT

The use of modern high-efficiency water-saving irrigation technology is encouraged in agricultural sector to address the issue of sustainable global food security with dwindling land and water resources. Water is one of the most important input which is essential for crop production. Both its shortage and excess directly affect the growth and development of plant and consequently its yield and quality. In some dry areas, where rainfall is low such as the area of the present study, Government of Rwanda emphasized irrigated agriculture in marshlands as well as on hillsides through gravity and pressure irrigation projects. Pressurized irrigation methods like sprinkler, center pivot and drip systems are highly efficient and being popularized by Government of Rwanda. The present study has been conducted in Government funded irrigation project installed in eastern part of the country, Matimba sector of Nyagatare District in the dry season with the main objective of evaluating the performance of existing sprinkler irrigation system. The study was done in maize field irrigated by hand move sprinkler irrigation system. Water used during irrigation was pumped from Muvumba river. Catch cans tests were conducted to determine the performance of irrigation system in the field condition. The performance indicators like system application efficiency, coefficient of uniformity, distribution uniformity, pressure variation and water application rate were analysed as well as crop water requirement for maize was determined. The results of this study revealed that the performance of existing hand move-sprinkler irrigation system was satisfactory. The uniformity coefficient was under the category of desirable whereas the distribution uniformity found was falling under very good category. The system water application rate was much less than the infiltration rate of the soil of the study area. The pressure variation analyses indicate that, the operating pressure of the system affected the uniformity of sprinkler application and the amount applied because the applied water depth increase proportionally with the working pressure.

Key words : Keywords: Sprinkler irrigation, Performance evaluation, coefficient of uniformity, distribution uniformity, operating pressure.

**LENGTH-WEIGHT RELATIONSHIPS OF 16 COASTAL FISH SPECIES FROM
THE SHALLOW WATERS OF ÇANAKKALE STRAIT, TURKEY**

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ABSTRACT

Length–weight relationships (LWRs) for 16 young of the year (YOY) fish species from the coastal areas of Çanakkale Strait, Turkey, were estimated. The YOY fish samples were collected by beach seine during the period of April 2019, and January 2020. The values of parameter b for the YOY 16 species ranged from 2.36 to 3.99, while the parameter a ranged from 0.0009 to 0.0542.

Key words : Length-weight relations, young of the year, coastal, Çanakkale

Acknowledgements: This study was funded by the Scientific and Technological Research Council of Turkey (TÜBİTAK, project number: 118O321).

MORPHOMETRIC PARAMETERS OF THE SAGITTAL OTOLITHS OF 10 FISH SPECIES BELONGING TO SPARIDAE FAMILY FROM THE COASTAL AREAS OF ÇANAKKALE STRAIT, TURKEY

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ABSTRACT

This study aimed to compare the morphometric parameters between the right and left sagittal otoliths of ten species belonging to the Sparidae family, from the coastal areas of Çanakkale Strait, Turkey. A total of 600 specimens were collected monthly using beach seine (0–2 m) and beam trawl (5–20 m) from June 2013 to June 2014. The morphometric parameters such as length, width, area and perimeter of the sagittal otoliths were measured and compared between right and left otoliths. The relationships between otolith morphometric parameters (length, width, area and perimeter) and total length were also examined. These relationships can be useful for researchers who examining stomach contents of piscivorous predators.

Key words : Otolith morphometry, Sparidae, Çanakkale

Acknowledgements: This study was funded by the Scientific and Technological Research Council of Turkey (TÜBİTAK, project number: 118O321).

HEMATOLOGICAL AND BIOCHEMICAL PROFILE FOR HEALTHY JUVENILES OF ACIPENSER GUELLENSTAEDTII, ACIPENSER RUTHENUS AND THEIR HYBRID

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ABSTRACT

Sturgeons are important fish species because they have a high economic value for both caviar and meat production and, therefore, aquaculture shows a great interest for their production. For sturgeon aquaculture, which usually implies long production cycle, animal welfare is associated with high quality products. Periodically, in sturgeon farms, welfare should be assessed rapidly, non-invasively through a set of blood indicators against a reference set of values. The objective of this research was to evaluate and compare some hematological and biochemical parameters of cultured Russian sturgeon (*Acipenser gueldenstaedti*), sterlet sturgeon (*Acipenser ruthenus*) and hybrid of Russian sturgeon with sterlet sturgeon juvenile at six and ten months of rearing in a flow-through aquaculture. The hematological profile was determined using the routine methodology of fish hematology while blood plasma chemistry was investigated with VetTest® Chemistry Analyser, using IDEXX VetTest kits. In the present paper the data obtained for groups of clinically healthy sturgeons were also integrated with indicators from bibliography in order to create reference values for the assessed species. The results show a great inter and intraspecific variability for various groups of parameters. Nevertheless, the hybrid has a hematological profile closed to that of Russian sturgeon. Sturgeons are important fish species because they have a high economic value for both caviar and meat production and, therefore, aquaculture shows a great interest for their production. For sturgeon aquaculture, which usually implies long production cycle, animal welfare is associated with high quality products. Periodically, in sturgeon farms, welfare should be assessed rapidly, non-invasively through a set of blood indicators against a reference set of values. The objective of this research was to evaluate and compare some hematological and biochemical parameters of cultured Russian sturgeon (*Acipenser gueldenstaedti*), sterlet sturgeon (*Acipenser ruthenus*) and hybrid of Russian sturgeon with sterlet sturgeon juvenile at six and ten months of rearing in a flow-through aquaculture. The hematological profile was determined using the routine methodology of fish hematology while blood plasma chemistry was investigated with VetTest® Chemistry Analyser, using IDEXX VetTest kits. In the present paper the data obtained for groups of clinically healthy sturgeons were also integrated with indicators from bibliography in order to create reference values for the assessed species. The results show a great inter and intraspecific variability for various groups of parameters. Nevertheless, the hybrid has a hematological profile closed to that of Russian sturgeon.

Key words : sturgeons, welfare, hematological profile

INFLUENCE OF CLIMATIC DISTURBANCES ON THE APPEARANCE OF ALLENIAUTIQUE GROWTH RECORDS OF ALEPPO PINE IN THE SOUTHERN MEDITERRANEAN

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ABSTRACT

This study incorporates data from periodic radial increments carried out on samples of Aleppo pine wood and sections from artificial and homogenous reforestation and corresponding rainfall slices at the same time periods. Reports of the relative discrepancies of successive rings (ERC) show a clear regressive trend in young trees. Thus the mean sensitivity (SM) and the inter-dating (SR) coefficients for young trees and the oldest confirm the relatively strong dependence of the former on climatic factors, particularly rainfall. The results of this work show a fairly strong correlation between the periodic radial increase over 5 years and the corresponding rainfall over the same period. Thus, from the analysis of the results obtained it is established that the rainfall variations have a more marked influence on the young subjects. These various observations led us to ask ourselves a certain number of questions relating to the interpretation of the values of the mean sensitivities and the coefficients of inter-dating. Indeed, if on the one hand all the samples of the same age have equivalent average sensitivities; It remains to be seen whether there is a definite relationship between mean annual rainfall and annual radial increase. On the other hand, the relation between the periodic rainfall over 5 years and that of the current radial increase of the same periods remains established. On the basis of these results, it seems possible that from these results, confirmed by the values of the correlation coefficients, it is possible to consider placing the dendroclimatology of the Aleppo pine of this Maghreb region in a valid approach to knowledge and The determination of the local Mediterranean climate, particularly the periodic five-year rainfall.

Key words : Rainfall variations; Radial increase; Mean sensitivity (SM); Inter-dating coefficients (SR); Aleppo pine

DETERMINATION OF REPRODUCTIVE PARAMETERS OF DAIRY HEIFERS BORN AND RAISED IN TUNISIA

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ABSTRACT

The objective of the study was to determinate fertility's parameters of dairy heifer born and raised in Tunisia. The study was held in a heifer production center situated in the north of Tunisia, from June to July 2018. Ninety-six (96) Holstein heifers were followed for their reproductive performance during the study. The age of breeding (AB) and at the first calving (AFC) and the interval of birth – fertilizing insemination (IBFI) of heifers, were determined. Moreover, the success rate at the first insemination (%SFI), the pregnancy rate (%P) and coital index (CI) of heifers were determined. Results showed that the AB, AFC and IBFI of heifers were respectively 17 ± 1.5 , 27 ± 1.6 and 18 ± 1.5 months. The %SFI and %P were 43% and 61%. The CI of the heifer's production center was 1.7. The results suggest that %P and CI are acceptable, and despite the delay of AB, AFC and IBFI, we can also consider these parameters acceptable in this center. However, the %SFI is considered weak compared to the standard. Therefore, to improve this latter, it is recommended: *i*) to determine the semen quality of bulls used in the artificial insemination of heifers, *ii*) and to take more attention for the estrus detection method used in the center in order to optimize timing insemination.

Key words : Hostein, heifers, fertility parameters, %SF, born and raised in Tunisia

MONITORING HOLSTEIN HEIFER CALF GROWTH USING 3 METHODS OF MEASURE

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ABSTRACT

The objective of the study was to follow up Holstein heifer calf growth born and raised in the north of Tunisia. The growth of 16 Holstein heifer calf were monitored during 6 weeks on the summer season in a heifer production center. Heifer calf were divided in 3 age groups (group 1: 5-7 months, n=6; group 2: 8-9 months, n=4; group 3: 10-12 months, n=6). Live weight (LW) of heifers calf was determined every week using 3 methods: i) LW1 with barymetric body measurements, ii) LW2 with cattle tape measurement, iii) and LW3 with weight scale. Results showed that LW3 (group 1=153 kg, group 2=189 kg, group 3=245 kg) was lower than LW2 (group1=178 kg, group 2=197 kg, group 3=263 kg) and LW1 (group1= 168 kg, group 2=187 kg, group 3=264 kg) in the 3 group age heifers. The average daily gains of heifer calf (ADG) was higher in group 2 compared to groups 3 and 1 (821 g/d vs 690 and 357 g/d). The results suggest that the growth rate was lower in the 3 groups compared to the standard of dairy heifer. This result leads to a delay in the puberty and thus in some reproductive parameters such the age at the first insemination and calving. We recommend that food ration must be checked to avoid growth delay in heifer calf.

Key words : Holstein, heifer calf, body measurements, live weight, average daily gain

**GENOTYPE BY CALVING SEASON INTERACTION FOR MILK PRODUCTION
TRAITS OF COWS OF TUNISIAN DAIRY SIRES**

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ABSTRACT

The aim of this study was to assess the magnitude of genotype by calving season interaction on milk production traits (milk yield, protein yield and fat yield) under Tunisia climatic conditions. A total 3421 lactations from 1374 Holstein cows were used. Two environmental gradients were formed: the cold season runs from September to April and the hot season starts in May and ends in August. From 335 sires we have retained 45 sires with at least 4 descendants in each environment. Two main statistical methods are used in data analysis: 1) analysis of variance with two factors (genotype, environment) and Multivariate Linear Mixed Model included random effects from sire and maternal grandfather. Significant effects of genotype×season interactions were found ($P<0.01$) for all the studied traits. The results showed differences in the heritability estimates. Heritability values ranged between 0.20 and 0.26 for hot season and from 0.05 to 0.08 for cold season. Spearman's rank correlation ranged from 0.69 to 0.76 and consequently there is a re-ranking of individuals. It is more appropriate to take environmental conditions into account when choosing genetic material.

Key words : genotype by environment interaction, dairy cattle, Tunisia

EFFECTS OF RUMEN PROTECTED CHOLINE SUPPLEMENTATION ON DAIRY CATTLE

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ABSTRACT

Trimethyl- β -hydroxyethylammonium, a vitamin-like ingredient also known as choline is a vital nutrient for health, reproduction as well as production performance for animals. During milk production, it has been prescribed as limiting nutrients in dairy cow's ration. As such supplementation of choline in ruminants ration leads to ruminal degradation; that's why it is recommended to supplement choline in rumen-protected form. Phosphatidylcholine is made-up of choline which helps in the formation of lipoprotein of very low density. Fatty liver can be caused, due to deficiency of choline due to the export of triglycerides from the liver. It is supplemented in dairy cows' diet 3 weeks before and 4 weeks after parturition to subside over energy requirements during this critical transition phase. It helps to overcome negative energy and hormonal balance in the transitional phase of dairy cattle. It helps to improved fat, energy corrected milk, proteins, to overcome risks of mastitis and retained placenta, improves milk production along with composition and reproduction performance. Rumen protected choline (RPC) supplementation during transition period reduces inflammation indicator leading to decreased rectal temperature as well as reduced fibrinogen and haptoglobin concentration in plasma. A combination of RPC along with L-carnitine resulted in a higher liver health index as well as reproduction index. Blend of RPC and long-chain fatty acid calcium salts increase the concentration of total monounsaturated fatty acid and total *cis* polyunsaturated fatty acid as well as an omega-3 fatty acid. The optimum level of RPC supplementation in most trials is 12.9 g/d to obtain maximum health, production as well as reproduction potential. This review describes the influence of RPC on animal production, reproduction, and biological health parameters of dairy cattle.

Key words : Rumen protected choline, transition phase, dairy cattle, postpartum complications

**SOME SYSTEMATICS DATA FOR SPECIES MIRIDAE – PLANT BUGS
(HEMIPTERA) IN HABITATS IN COASTAL (KAVAJA)**

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ABSTRACT

Systematic data on plant bugs Miridae (Hemiptera) collected during 2017 and 2019 from coastal habitats near Kavaja, were compiled. From this study we determined 15 genus and 21 species. From our taxonomic analysis, genus *Deraeocoris* was the most represented with 3 species (frequency, 14.29%). Most of the species, 15 species and 71.42% we have found in habitats of Spille (Kavaj coastal region). Based on the Jaccard Index of Similarity coefficient, habitats of Spille and M.Robit showed higher similarity (42.10%) than the other stations that means similarity with each-other in ecological factors and habitats.

Key words : True Bugs, Albanian Hemiptera, coastal habitats, Kavaja

EPIDEMIOLOGY AND DIAGNOSIS OF CYSTIC ECHINOCOCCOSIS IN INTERMEDIATE HOST IN THE PROVINCE OF DJELFA (ALGERIA)

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ABSTRACT

The aim of this study was to determine the prevalence of Cystic Echinococcosis (CE) and the comparison between the results of the post mortem and serological diagnosis of this infestation in the intermediate host in the province of Djelfa (ALGERIA). The study was carried out on a total of 192 animals composed of 40 cattle, 96 sheep and 56 goats. A prevalence of 30%, 21.8% and 14.3% was recorded by the post mortem examination, against a prevalence of 35%, 36.4%, 19.6% recorded by the ELISA test in cattle, sheep and goats respectively. High significant dependence between the 2 methods of diagnostic (necropsy examination and ELISA test) was found concerning the prevalence of hydatidosis ($P < 0.05$). Concordance of results (convergence) between the two diagnostic methods was observed in 81% of the examined cases. However, a discord in the results (divergence) between the two methods was found in 19% of the examined cases. In all screened animals there was a statistically significant difference between the two sexes ($P < 0.05$). A higher prevalence 73% was recorded in adult infested animals (cattle, sheep and goats) as compared to younger animals 27% ($P < 0.05$). The lungs were the mostly affected organ with the cystic echinococcosis ($P < 0.05$) with a prevalence of 62.5%, 58.3% and 57.1% respectively in goats, cattle and sheep. These results indicate the importance of cystic echinococcosis in slaughtered domestic animals in the province of Djelfa and an ELISA test could be used for immunodiagnosis of this disease for epidemiological studies and surveillance schemes.

Key words : Prevalence, Echinococcus granulosus, ELISA, Necropsy, Djelfa.

EFFECTS OF MSTN GENE POLYMORPHISMS AND RNAI ON MEAT YIELD IN LIVESTOCK

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ABSTRACT

Advanced agricultural technologies are needed to meet the increasing global food demand in parallel with the human population. In this context, the meat industry needs to increase meat efficiency sustainably. Therefore, understanding the genes that support animal growth and carcass characteristics is therefore of great importance. Myostatin (MSTN), which is also known as growth and differentiation factor 8 (GDF8), acts as a negative regulator of embryonic and fetal skeletal muscle growth. Variation in the MSTN gene has been associated with muscling in certain sheep and cattle breeds. With the development of advanced genetic methods such as genotyping and sequencing, the genome of livestock has been discovered and animal breeding has gained a new dimension. These innovations have resulted in dramatic improvements in product yield, fertility, survival in different environments, and resistance to disease. Recent methods in genome editing have generated enthusiasm among animal breeders by enabling applications in animal breeding programs aimed at accelerating genetic gain. One of these methods, RNA interference (RNAi), is a sequence-specific post transcriptional gene silencing process used to analyze gene function and develop new animal models. In previous studies aimed at increasing meat yield, RNAi technology is adapted to repression of MSTN of livestock such as cattle, sheep and chicken. The aim of this review is to evaluate the possibilities of usage the RNAi gene regulation system in livestock breeding programs and to investigate the polymorphisms associated with meat yield in the MSTN gene.

Key words : MSTN, RNAi, Meat yield, Livestock, Breeding

MOLECULAR APPROACHES IN DETERMINING MEAT QUALITY

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ABSTRACT

Consumer requests are come at the beginning of the most important features in the quality of a meat. Meat color, pH, marbling score (MS) and tenderness of meat (texture) are the most important features that determine meat quality and are among the consumer requests. Characters such as tenderness and color of the meat come hereditary. Therefore, the tenderness of the meat stands out as quite an important feature. As well as meat tenderness, food analysis such as cooking loss, water holding capacity, MS, color, pH-temperature measurements are also taken as the basis for determining the quality of the meat offered for consumption. It is an important problem that beef is not as high quality as the consumers want. This is related to the animal's genotype and environmental conditions (age, species, race, care and feeding conditions, etc.). The fact that fattening is economical and qualified is a must for quality and economical meat production. This means too, that cattle of genotype known to produce better quality meat, By determining the genetic variations in the quantitative character locus (KKL) with technological and molecular genetic methods, today it is used in animal breeding studies for the production of quality beef. Gene markers are used to determine the genetic value of cattle and to increase genetic progression in populations by indirect selection. Marker Supported Selection (MDS) is performed by using KKL, which enable for the selection of cattle at a young age, regardless of gender and is not affected by environmental conditions. KKL analyzes are based on the link between some gene markers and KKL. The main purpose of the formed KKL maps is to identify the genes that cause variation in quantitative properties and mutations in these genes. Genetic studies have been performed on this topic in beef cattle, Linear correlation relationship between single nucleotide polymorphisms (SNP) on meat quality has been revealed. Nowadays, Sequencing and PCR-RFLP method is most commonly used to detect mutations in marker genes.

Key words : Meat quality, marker genes, KKL, MDS, SNP

THE UTILIZATION OF MUSHROOM PRODUCTION WASTES AS FEEDS

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ABSTRACT

Mushroom production waste is the substrates or composts that remain after the mushroom harvesting. These composts are materials that include different agricultural product wastes (straw, poultry litter etc.), urea and limestone. Mycelial action on the compost can increase the feed value of the spent mushroom substrates due to a change in the solubility and degradability of its lignocellulosic biomass and nutrients. Therefore, this study reviewed information relating to the nutritional properties, in vitro and in situ digestibility and degradability, that is, feed value of different edible mushroom production wastes, as well as yield and product quality for livestock, especially ruminants. The results of the reviewed studies were discussed concerning the feed value of the mushroom production wastes and their utilisation in animal diets. In conclusion, the nutritive value and the use of the wastes as feed depend on the ingredients that impact its acceptability and nutrient balances.

Key Words: Feedstuff, mushroom compost, mushroom production, spent mushroom substrates

HEPATOTOXICITY OF A COPPER QUINOLATE FUNGICIDE IN MALE WISTAR RATS

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ABSTRACT

This work is based on the study of the sub-acute toxicity of a pesticide widely used in agriculture, an antifungal agent "Copper Quinolate". The aim of this work is to elucidate the toxic effects of the oral administration of three doses of CuQ (47; 67.1; 94 mg/kg) for 3 weeks on weight development and liver function in male Wistar rats. For this purpose several biochemical assays were performed (ASAT; ALAT; PAL; GT; Albumin; Bilirubin and total plasma proteins). Monitoring of body weight changes during the treatment period showed a decrease in body weight in high and middle dose treated rats compared to controls. Our results revealed an increase in absolute and relative liver weights, particularly in rats treated with CuQ at medium and high dose levels. The results of biochemical assays revealed a significant increase in the activity of the hepatic enzymes ASAT; ALAT; PAL as well as bilirubin, especially at high and medium doses. While albumin and total plasma proteins were decreased in rats exposed at high and medium doses. These results show that the high and medium doses of Copper Quinolate tested induce a toxic effect on liver function.

Key words : Copper Quinolate, hepatotoxicity, biochemical parameters, liver

COMPARISON OF BUFFALO AND BEEF COMPOSITION BY MEAT QUALITY

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ABSTRACT

The aim of this study is to compare the quality and composition of buffalo meat with cattle, to give information about their physicochemical and functional properties and to draw attention to their nutritional properties. Since buffalo meat is known as hard, dry and low quality, it is mostly converted to products such as sausage and salami. This situation is entirely related to the age of the buffalo, and is due to the old buffalo being sent to the slaughterhouse. Researchers report that the taste of buffalo meat is similar to beef, and the meat of buffalo cut at a young age is more delicious. Therefore, it is important for consumers and producers to compare the chemical content of buffalo meat with beef, which has the biggest share in meat production, and to know its nutritional properties. When the physicochemical properties of the meats of these two species are examined; the buffalo meat is darker red and the subcutaneous fat thickness is thinner. Although protein, vitamin and mineral levels in buffalo meat are higher than beef, calories are lower in terms of cholesterol and fat. Low fat level in buffalo meat is generally associated with the degree of marble in meat. Researchers report that buffalo meat contains less saturated fatty acids than beef, and the optimal ratio of omega-6/omega-3 (n-6/n-3) (7) is in buffalo calf meat. Since buffalo meat has low fat, cholesterol and saturated fatty acid levels, it has important advantages compared to beef. It is also possible to say that it is an extremely healthy meat. In this context, it is thought that conducting detailed scientific studies to determine the quality and composition of buffalo meat will contribute positively to increasing the recognition of this meat as well as the awareness of producers and consumers.

Key words : Buffalo, beef, meat, quality and composition

CURRENT STATUS OF CATTLE BREEDING IN DADAY DISTRICT OF KASTAMONU PROVINCE OF TURKEY

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ABSTRACT

The aim of this study is to determine the current situation of cattle breeding in Daday district of Kastamonu province. The research was carried out via surveys in 46 dairy farms. Dairy farms are classified into 3 groups as small-scale (1-10 heads), medium-scale (11-20 heads) and large-scale (>21 heads) according to the number of animals. In the study, the averages age of small, medium and large scale farms were 49.8, 48.8 and 47.8, while the livestock experiences were determined as 26.7, 28.8 and 31.2 years, respectively. While small-scale farms were mostly graduated from primary school (33.3%) and middle school (33.3%), 66.6% of medium-scale farms were high school and 60.0% of large-scale farms were secondary school graduates. In the study, it was concluded that small (61.1%) and medium-scale (50%) farms mostly produce milk, and 50% of large-scale farms produce both milk and meat. The majority of the breeders (67.4%) stated that they have animal care and feeding knowledge. Furthermore, 41.3% of dairy farmers stated that they preferred dair farming as they live in village, 32.5% as they obtained additional income, 17.6% as dairy farming is their traditional occupation and the remaining (18.7%) as they accept dairy farming as a profitable farming type. While 91.3% of the farms use closed barns, others use semi-open barns. It was determined that 91.3% of the farms benefited from the grassland and 45.7% of them make grassland and additional feeding. In feeding, roughage and concentrate are usually given separately (76.1%). In addition, it was determined that calves were given concentrated feed within three weeks (67.4%), preferred alfalfa dry grass as roughage (82.6%) and fed with milk for four months (66.7%). It has been observed that 80.4% of the breeders are willing to renew their farms.

Key words : Kastamonu, cattle breeding, management, feeding, barn

**THE FIRST RECORD OF BREEDING AREA OF CINEREOUS VULTURE IN
EASTERN BLACK SEA REGION IN TURKEY.**

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ABSTRACT

The Cinereous Vulture *Aegypius monachus*, the largest bird of prey of the West Palearctic region, is a primary scavenger categorized globally as “Near Threatened” (NT). It is regarded as within the scope of conservation priority in Turkey, as for global ecosystem. In this context, the determination of the new nesting sites in Turkey is considered as the main conservation activities that should be done. So far, nest sites of the species have been identified in north-western Anatolia, but no traces of nesting sites have been found in the eastern Black Sea region. At first, four active nests belonging to the cinereous vulture were identified during the 2019 breeding season in the Erzurum Aşkale region. Despite all the cinereous vulture nest on black pine *Pinus nigra* detected so far in Turkey, it was observed that nest in Aşkale founded on the oleaster-leafed pear *Pyrus elaeagnifolia*. According to the preliminary observation data, the pear trees with nests are located in the upper region of sloping valleys. As a result, a new nest site of the cinereous vulture population of Turkey has been identified, and a new information for nest and nest site selection of the species has been revealed. In the region, it is decided to carry out detailed studies about the species, particularly the completion of missing information about the eastern part of the Turkey population.

Key words : Cinereous Vulture, Eastern Black Sea population, Nest tree selection, The oleaster-leafed pear

EVALUATION OF HEAVY METALS IN DIFFERENT TISSUES OF RED MULLET

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ABSTRACT

The concentration levels of mercury, lead, cadmium and chrome were measured in muscle and liver tissue of Red mullet (*Mullus barbatus*). Fish samples were collected and purchased from the main fresh fish market of Tirana. A total of 40 samples of muscle and liver tissue were determined by using atomic absorption spectrophotometer (AAS). The results of the study showed that Hg levels ($p=0.001$) varied significantly between tissues of Red mullet samples. Based on the results concentration level of Hg, Pb and Cr measured in muscle samples tissue resulted to be within the permissible levels for human consumption set by EC legislation. Cadmium made an exception (0.09 mg/kg ww). The results of our study gives important information on heavy metal contamination of Red mullet tissues. Furthermore, the data suggests that Red mullet should be object of further monitoring with the aim to safeguard Tirana consumer's health from heavy metals.

Key words : Heavy metals, Red mullet, Muscle tissue, Liver tissue

INVENTORY OF EMBRYO COLLECTION RESULTS IN IMPROVED BREED COWS IN ALGERIA

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ABSTRACT

The embryo production in cattle may be an alternative to the decline in fertility due to selection. However, the variability in the reaction of cows to superovulation treatments is a limiting factor. In Algeria, very few embryo production trials have been carried out despite the gain in quality that this technique could bring. In this work, we present an inventory of the harvests carried out during a period of eight years (2010 to 2018) in cows of improved breed reared in stations and on private farms following a classic superovulation treatment (8 injections of FSH at 12 hours interval). Cows received a dose of 400 to 500 µg which was divided over 4 days into twice daily injections with a dose of prostaglandin on the third day of treatment to induce luteolysis. A double artificial insemination was carried out on the fifth day and embryo collection carried out seven days later via the cervical route by rinsing the uterine horns with physiological phosphate buffered saline (PBS). The collection liquid is sent to the laboratory for research of embryos which are classified according to morphological criteria (Eldsen et al 1978). A total of thirty-three collections were carried out, the cows with less than four luteum on the ovaries the day of harvesting have not been collected. To test the normality of the results we used the Shapiro-Wilk test, and then they were compared to theoretical values thanks to the single sample student test. An overall weak reaction was observed with an average corpora lutea of 11.06 per cow. The collections gave an average of embryos of 6.3 including 2.9 usable (transferable or freezable), the best collections gave 20 embryos; several null collections (0 embryos) were observed. This result can be attributed mainly to a lack of mastery of breeding management and in particular feeding. In our farms, no rationing strategy is applied; sudden changes are often made due to fluctuations in the availability of feed and its quality with periods of sold out. Several authors report that these variations certainly imply obvious disturbances in ovarian functioning. In conclusion, this work has allowed us to master the different stages of the embryo production technique, an important vulgarization work on the techniques of breeding and rationing must be done with the breeders, which will result in to minimize the influence of these factors on embryo collection results.

Key words : Embryo production, superovulation, breeding management, Cattle

THERMAL CAMERA USE IN ANIMAL PRODUCTION

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ABSTRACT

Thermal cameras are devices where temperature measurement is made by using a method of imaging from a certain distance without directly touching the surface with infrared rays. These cameras (depending on the specification of the camera) can detect very small temperature differences. The detected temperatures are shown as photographs where different temperatures are shown in different colors. Thus, it gives information about the surface temperatures, or afterwards, detailed analysis can be made on the images thanks to the camera software programme. Due to its accurate, fast and easy evaluation, it finds uses in many different sectors as well as in the livestock sector. There are researches that thermal camera technology can be used in the detection and control of ovulation, stress factors such as pain, disease, and inflammation, also in evaluating the deterioration processes of feed and silage. The aim of the study is to present a review about thermal camera technology and its usage possibilities in animal production.

Key words : Thermal camera, infrared thermography, silage, aerobic stability

EFFECTS OF SACCHAROMYCES CEREVISIAE-DERIVED PREBIOTIC SUPPLEMENTATION ON CAECAL MICROBIOTA COMPOSITION OF BROILER CHICKENS

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ABSTRACT

This study aimed to investigate the effect of *Saccharomyces cerevisiae*-derived prebiotic supplementation on the caecal microbiota composition of broilers. A total of 192 male Arbor Acres strains were reared in cages. Dietary mixtures were: the control group (T0) received the basal diet, and the experimental groups (T1, T2, and T3) received a basal diet supplemented with 1; 1.5 and 2 g/kg of prebiotic, respectively. One bird from each cage was selected, slaughtered on 21st and 42nd day, and the intestinal tract was eliminated directly after dressing. Caecum content was evacuated to perform microbiological analysis. The supplementation of prebiotic to broiler's diet-induced modulation of caecal microbiota by a significant increase in the caecal population of *Lactobacillus* in experimental groups. Also, a significant decrease in the caecal population of *Escherichia coli* was observed in treated animals compared with the control. These findings suggest that *Saccharomyces cerevisiae*-derived prebiotic can increase gut microbiota diversity and hence improve chicken gut health.

Key words : *Saccharomyces cerevisiae*-derived prebiotic, gut microbiota, levels, broilers.

**EFFECTS OF FENUGREEK SEED (*TRIGONELLA FOENUM GRAECUM*)
SUPPLEMENTATION ON PERFORMANCE OF MID LOCATIONAL GOATS**

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ABSTRACT

Galactogenic plants are used to increase milk production both in human and lactating animals. There is a limited numbers of studies in the literature about the use of fenugreek seeds for increasing ruminant animal's milk production. This study was aims to determine the effects of fenugreek seeds on performance of mid lactational goats. For this purpose, 20 heads of Turkish Saanen goats were used as an animal material of the study. The experiment animals kept in individual cages during the study. The study was carried out on the basis of two group Control (CON; n=10) was fed with total mixed rations (TMR) while the Fenugeek group (FG; n=10) was fed with total mixed rations (TMR) and 100 g/day fenugreek seeds. In the experiment feed intake was recorded daily, body weight, milk yield and milk nutrient composition were determined weekly interval. There were no differences between the groups about daily dry matter, crude protein and metabolizable energy intake ($P>0.05$). The fenugreek supplementation did not change live weight ($P=0.4940$) and milk production ($P=0.9251$). But increased 3.5% fat corrected milk yield (FCM). The fenugreek supplementation was increased milk fat ($P<0.0001$) and total solids ($P=0.0002$) concentration. In conclusion fenugreek seeds supplementation level at 100 g/day were significantly increase fat concentration in goat's milk. There is a need for future studies to determine the effects of supplementing different level of fenugreek seeds and it is effects on milk fatty acid profile.

Keywords: Galactogen, lactation, milk production, milk fat, Turkish Saanen goat

TAIL BEAT FREQUENCY OF RUSSIAN STURGEON DURING INCREASED SWIMMING SPEEDS

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ABSTRACT

Caudal fin is one of the major structures of locomotor design in both bony and cartilaginous fishes. To be capable of moving forward, any aquatic organism must generate enough thrust to overpower the drag forces exerted upon its body by the surrounding environment. Most swimming studies have been performed on teleost fish, especially rainbow trout (*Oncorhynchus mykiss*). According to these studies, at low water speeds, trout maintain a constant swimming, through frequent movements of the pectoral fin and slower in the case of the caudal fin. At high speeds, on the other hand, it adopts a different strategy, relying on more frequent rhythmic movements of the caudal fin, trying to maintain its body balance through spontaneous movements. According to the literature in the case of teleost species, tail beat frequency follows a direct proportional relationship to swimming speed. However, in the case of cartilaginous fish few studies performed on *Acipenserides*, report a docile behavior and rare spontaneous movements, with certain variations related to tail beat frequency, mainly due to sturgeon stationary behavior. In this context, the present study aims to describe the relation between different swimming speeds and tail beat frequency of Russian sturgeon (*Acipenser gueldenstaeditii*). The experiment took place at the Romanian Center for the Modeling of Recirculating Aquaculture Systems (MoRAS), facility of Dunărea de Jos, University of Galați. The trials were performed in a swimming respirometer, at 22°C. The swimming of the fish was videotaped, with the help of a video camera incorporated in the respirometry system. The camera was mounted at a height of 0.5 m above the swimming tunnel, thus making it possible to record the tests. The videos were imported into the Windows Movie Maker software and analyzed “frame-by-frame” for 1 minute/swimming speed. Quantification of the frequency of caudal fin movements was possible by observing the upper lobe, a movement being considered complete when the upper lobe of the caudal fin completed the maximum amplitude and returned to the initial position. The evaluation of TBF highlighted individual differences among the tested specimens. The general trend for this parameter is a positive one, but slightly lower values are observed, which can illustrate the stationary behavior adopted by sturgeons as a measure to optimize energy costs.

Key words : Russian sturgeon, respirometer, tail beat frequency, oxygen consumption

**THE SIZE DISTRIBUTION AND CATCH PER UNIT EFFORT OF THE
BLACKSPOT SEA BREAM (*PAGELLUS BOGARAVEO*) IN TRAWL FISHERY AND
RECREATIONAL ANGLING IN THE AEGEAN SEA**

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ABSTRACT

The blackspot sea bream, *Pagellus bogaraveo*, is one of the economically important fish species in the Mediterranean and targeted by both commercial and recreational fishers. This study aimed to determine size distribution and catch per unit effort of the blackspot sea bream in trawl and recreational fisheries. For this aim, samples were collected from commercial trawl boat, recreational charter boat and shore based fishery observations in Sığacık Bay. The sampling was conducted in 2019 and 2020. The depth of fishing grounds were 200-340 m, 80-90 m and 1-3 m in trawl fishery, charter fishing and shore based recreational fishing, respectively. The main target species was shrimp in trawl fishery, whereas bogue, common Pandora, sea bream and blackspot sea bream were target species of recreational fishery in sampling area. The mean tow duration was 3 hrs for trawl operations. For charter fishery, the spin rod and J hook (no. 6) was used, hook number was three and the bait was razor clam. For shore based recreational fishery, same fishing rod, hook type and bait type were used but hook size was 9. The catch per unit effort (CPUE) was estimated based on number of fish per 30-minute session. The mean size (total length) of the blackspot sea bream was 18 ± 3 cm in trawl fishery, 15 ± 1 cm and 7 ± 1 cm in boat based and shore based recreational fisheries, respectively. There was a statistically significant difference in the total length of blackspot sea bream in these three different fishing types ($P < 0.001$). The total length-weight relationship for all individuals was: $W = 0.0124TL^{3.0267}$, $R^2 = 0.99$. The mean CPUE was 0.9 ± 0.7 indiv. per angler per 30 min in charter fishing and 3.4 ± 1.9 indiv. per angler per 30 min in shore based recreational fishing, whilst the mean CPUE was 2.4 ± 2.5 indiv. per 30 min (15 ± 15 indiv. /tow) in trawl fishery. Although there is no minimum landing size limit for the blackspot sea bream in Turkey, this species has been listed at IUCN Red List as near threatened species thus it is critically important that the reproductive ecology and population structure of this species should be urgently investigated.

Key words : catch characteristics, Sparidae, length-weight relationship, Turkey

EFFECT OF PROBIOTIC ENZYME PREMIX ON PERFORMANCE IN PRE-WEANING HOLSTEIN CALVES

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ABSTRACT

The effect of using probiotic enzyme premix on performance in Holstein breed calves. A total of 12 pre-weaning Holstein breed calves were used in the study at an average age of 10 days. Two groups of 6 calves were formed. While the control group was fed with colostrum only. In addition to colostrum, 5g/day probiotic enzyme premix was added to the experimental group. The study was continued for 28 days. From the beginning, live weights of all animals are determined every week. It is calculated in live weight with the difference between the initial and final weights. Variance analysis was used for statistically repeated measurements. Student t test was used to body weight gain. When time is ignored in terms of live weight, there is no statistical difference between the groups. But when group effect is ignored, time effect is statistically significant. The difference between the groups in terms of body weight gain was not found statistically significant. As a result, a probiotic enzyme premix can be used to improve performance in pre-weaning Holstein breed calves.

Key words : Pre-weaning calf, Holstein, performance, probiotic enzyme premix

**CONTRIBUTION TO THE KNOWLEDGE OF THE POLLINATING
ENTOMOFAUNA OF CUCUMBER (*CUCUMIS SATIVUS L.*) IN THE MILA
REGION**

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ABSTRACT

The observations made during the flowering period during the year 2018 on cucumber in the study station (Boumalek) located in the wilaya of Mila; have shown the presence of several pollinating species for the cultivation of cucumber. Regarding the study of the effect of entomophilic pollination (open pollination) on the yield of cucumber in comparison with self-pollination showed that the latter is significantly improved in the presence of insects. Foraging speed, pollinating efficiency of species and time spent on flowers were also studied. The number of pollen grains deposited by the most abundant species is counted under an optical microscope to name the most efficient species for the pollination of the plant

Key words : pollinators, foraging behavior, pollinator efficiency, yield, cucumber

INVENTORY OF FORAGING INSECTS AND DETERMINATION OF THEIR POLLINATING EFFICIENCY ON VICIA FABA.

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ABSTRACT

Observations were made on an alimentary proteinaceous plant “ the bean “. Trips were made in the region of El Eulma (wilaya of Sétif) during the flowering period (April-May) and at the rate of three trips per week. Quadrats (1m² each) are delimited in the plot to proceed with the counting and capture of foraging insects. Parameters of the pollinating efficiency of foragers as well as the effect of cross-pollination on plant's grain yield have been measured. The results obtained showed that three orders of insects visited the flowers of the beans during the flowering period: Hymenoptera, Diptera and Lepidoptera. Hymenoptera are the most abundant foragers. The honey bee and a wild Apidae: *Eucera* sp, are the most common visitors. 14% of the honey bee visits can be pollinating while the wild Apidae made 100% positive visits. Regarding the effect of cross-pollination on the plant's yield, we found that the percentage of pods formed at fruit set, which is 95% is significantly higher in the presence of insects more than in its absence (13%).

Key words : Apidae, pollinators, pollinator efficiency, grain yield, beans.

THEILERIOSIS IN COW - A CASE REPORT

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ABSTRACT

Theileriosis is a tick-borne disease of cattle caused by protozoan parasite *T. parva* and *T. annulata*. A spread of infection are in direct correlation with population dynamic of ixodid ticks. Theileriosis can affect cattle of all ages, however heavily pregnant, lactating, and stressed cows tend to be at greatest risk, due to resultant reduction in immunity. Because the parasite is living inside the red blood cells, the body attacks its own infected red blood cells (haemolysis) to destroy the parasite induced anemia of animals. Theileriosis rarely occurs in cows in Serbia and in about last fifty years only few cases have been reported. For these reasons, we give an overview of the case of cow theileriosis recorded this year (2020). In one cow aged 3 years, which is 8 months pregnant, we occurred signs of fever (rectal temperature > 39°C), anaemia and jaundice. The cow gave birth soon after that and later drop in milk production. Soon after these symptoms appeared difficulty breathing, with rapid and shallow breaths, depression, weakness and inappetence. Based on the clinical symptoms, a suspicion of infection with blood parasites was established and blood was taken for analysis. The blood smears were air-dried, fixed in absolute methanol for 1 minute and stained in 10% Giemsa stain for 20-30 minutes and after that examined by light microscope. The theileria were identified by morphological characteristic. The cow was given an antipyretic and then a depot of tetracycline. In addition, she received dexamethasone and vitamin preparations. After three days, a new blood test was performed and a significant drop in the number of parasites was found. the therapy was repeated and no parasites were found in the blood at the next examination. The cow started giving milk again and achieved a milk yield of 16 liters per day.

Key words : cow, theileriosis

IS THE EXPLOITABLE BIOMASS (B) VULNERABLE TO CHANGES OF NATURAL MORTALITY (M) BY AGE? CASE OF THE ROUND SARDINELLA

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ABSTRACT

A proper estimation of biomass is critical for environmental and decision making to conserve fish stocks. This work aims to explore the vulnerability of biomass estimation to the variability of natural mortality M by age. 2460 individuals of all sexes, sizes ranging from 7.25 to 21.75 cm, were studied. Monthly sampling was conducted from December 2018 to March 2020 from landings of seiners in the central region of Algeria between Tenes and Bejaïa. Descriptive statistics were performed using FISAT II and VIT4Win. The results generated two different scenarios: first, the current total biomass (B_c) was estimated at 8686.6 tons for $M = \text{constant} = 0.51 \text{ yr}^{-1}$; secondly total biomass was estimated at $B_c = 10636.4$ tons for $M = \text{variable by age } n$, M_n , [$M_1 = 1.130$; $M_2 = 0.791$; $M_3 = 0.721$; $M_4 = 0.606$; $M_5 = 0.545 \text{ yr}^{-1}$]. Evaluating B_c with constant M showed a decrease of 1914.19 tons compared to biomass assessment with M_n . Judging by these results, considering that mortality M varies with age has a great impact on biomass evaluation. Naturally, juvenile fish are exposed to larger predation mortality than an adult fish. This difference in predation mortality may be quite significant. Finally, we recommend adjusting the catch effort factor $FC = 1$ to $F_{0.1} = 0.54$ for M variable. This precautionary approach would permit long-term renewal of the stock of *S. aurita* in the central region of the Algerian coast (increasing sea biomass from 10632.91 to 14848.9 tons).

Key words : *Sardinella aurita*, Algeria, Biomass (B), Mortality (M), Stock assessment.

A STUDY ON POTENTIAL ANTIBACTERIAL ACTIVITY OF NEWLY SYNTHESIZED LANTHANIDE DERIVATIVES AND THEIR COMPLEXES WITH NALIDIXIC ACID

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ABSTRACT

Schiff bases are organic compounds with great utility in important fields such as medicine, agriculture, and cosmetic products. This study was performed to establish the antibacterial activity of lanthanide derivatives and their complexes with nalidixic acid. The antibacterial activity was investigated using micro-broth dilution techniques to establish the minimum inhibitory concentration for each compound investigated. lanthanide derivatives and their complexes with nalidixic acid and its complexes were found to exhibit antibacterial activities against *Escherichia coli* with MICs ranging between 4-256 µg/mL. lanthanide derivatives and their complexes with nalidixic acid and its complexes showed no activity against *Salmonella enterica*, *Klebsiella pneumonia*. Although *Staphylococcus aureus* and MRSA were resistant to nalidixic acid alone they were susceptible to some lanthanide derivatives and their complexes with nalidixic acid with MICs ranging between 4-132 µg/mL and 4-256 µg/mL respectively. It was clear that lanthanide derivatives and their complexes with nalidixic acid could be a potential antibacterials against *Escherichia coli* and showed a promising improvement against Gram positive bacteria. Further study should test the toxicity of lanthanide derivatives and their complexes with nalidixic acid.

Key words : Ntimicrobial, nalidixic acid, S. aureus, E. coli

IMPACT OF VARICOCELE ON MALE FERTILITY IN THE WESTERN REGION OF ALGERIA

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ABSTRACT

Introduction and aims: One of the most common causes of male infertility is varicocele. This study attempts to determine the prevalence of varicocele in male infertility and assess the impact of this disease in semen quality parameters. **Material and methods:** We conducted a cross section study in a period of one year, starting from January 1st, 2014 to December 31st, 2014, on 320 patients consulting for fertility disorder at the Medical Assisted Procreation Unit (MAP) of Oran, in Western Algeria. The patients participated in an interview with a questionnaire inquiring about their demographics, general health issues, lifestyles and infertility factors. **Results:** The results show that the average age of patients was 40.39 ± 7.59 years, more than 73% of them were 35 years of age or older. The infertility was of primary type in 82% of patients; the average duration of infertility was 5.20 ± 3.79 years. Regarding the different aetiologies of male infertility, 29% of the patients had it from idiopathic causes. The first main known reported cause of infertility was varicocele in 24% (n=76) of cases in which 83.5% concerned the left varicocele, 2.5% the right varicocele, and 14% were bilateral. The study showed that the majority of cases include quantitative and qualitative anomalies of the sperm analysis. **Conclusion:** Our conclusion is that varicocele has a significant impact on male fertility; its prevalence is 24%. This affection alters both the quantitative and qualitative parameters of sperm. Varicocelectomy seems to be a potential cure.

Key words : Infertility, Varicocele, Semen Analysis, Oran

DESIGNING STRUCTURAL-MOTIFS FOR THE PREPARATION OF ACYLATED PROINSULIN AND THEIR REGIOSPECIFIC CONVERSION INTO INSULIN MODIFIED AT LYS29 (K29)

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ABSTRACT

Eight proinsulin encoding genes were prepared and their translation products, when treated with a cocktail of trypsin and carboxypeptidase B, analyzed for the following features. One, their ability to undergo facile removal of the N-terminal linker, generating the phenylalanine residue destined to be the N-terminal of the B-chain of insulin, at a rate similar to that involved in the removal of the C-peptide. Two, processing of diarginyl insulin, produced in the latter process, by carboxypeptidase B then needed to be rapid to remove the two arginine residues, Three, both these operations were to be efficient whether the N-terminal methionine was acylated or not. Four, the proinsulin constructs needed to contain a minimum number of sites for acylation. The aforementioned features were monitored by mass spectrometry and the proinsulin derivative containing MRR at the N-terminal and K64 mutated to Q64, designated as MRR-(Q64) human proinsulin [MRR-(Q64) hpi] optimally fulfilled these requirements. The derivative was smoothly acylated with reagents of two chain lengths (acetyl and dodecanoyl) to give acetyl/dodecanoyl MRR-(Q64) hpi. Acetyl MRR-(Q64) hpi, using the cocktail of the two enzymes, was smoothly converted into, acetyl insulin. However, when dodecanoyl MRR-(Q64) hpi was processed with the above cocktail, carboxypeptidase B (whether from animal pancreas or recombinant) showed an unexpected specificity of acting on the K29-T30 bond of the insulin derivatives when K29 contained a large hydrophobic acyl group, generating dodecanoyl des-30 insulin.

Key words : Acetyl proinsulin, Acetyl insulin, Dodecanoyl proinsulin, Dodecanoyl insulin, Lauryl proinsulin, Lauryl insulin, Carboxypeptidase B, unusual specificity

KNOWLEDGE AND AWARENESS ABOUT HEPATITIS-B AND PREVALENCE OF HBV VACCINATION AMONG MEDICAL STUDENTS

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ABSTRACT

Background:

Hepatitis is one of the alarming communicable disease in the world which is spread through the blood semen, saliva of an infected person. The agent is Hepatitis-B virus which is a DNA virus family of Hepadnaviridae. Hepatitis-B is a preventable disease by vaccination and has total four doses(first or initial dose,one and two months later from first dose and the last dose is taken after 1year from initial dose which is named as Booster dose).In EPI schedule total six vaccine preventable diseases namely measles, tetanus, polio, diphtheria, pertussis and tuberculosis are covered where hepatitis is not included. A cross sectional study was conducted among the medical students of northern Bangladesh in January, 2020 using a pretested self administrated structured questionnaire. χ^2 test was used to identify the knowledge about hepatitis and awareness of taking HBV vaccine. Total 253 medical students from different medical colleges under MBBS and BDS course participated. Among them 50.6% was male and 40.4% was female and 74.1% was from town and 25.5% was from village. From all participants 57.37% was vaccinated with full dose completed, 26.29% didn't complete dose (Booster dose) and 13.15% never received vaccine. From the Unvaccinated persons 16.33% didn't know about the organisation from where vaccine is received and who knew about the organisation form where vaccine can take, more than 90% mentioned the name of SHANDHANI (A free blood donating and vaccination organisation). Along with HBV vaccination 53.78% could mention that they also completed EPI schedule, 20.32% couldn't remember and 23.9% didn't complete EPI. Before taking vaccine 64.94% was go through screening procedure and 15.54% didn't now about screening. From our study we can say that we need more awareness for taking vaccine and government should include HBV in EPI. And also need to organise awareness program among the community people and students of all sectors.

Key words : Virus, hepatitis, Hepatitis -B, Symptom, Awareness

**ANTI-OVARIAN CANCER POTENTIAL OF THE PHENOLIC COMPOUNDS
EXTRACTED FROM ARTEMISIA CAMPESTRIS L. STEMS.**

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ABSTRACT

Natural phenolic compounds isolated from plants are a large and diverse family of phytochemicals classified into several subgroups such as. These phenolic compounds have been considered as one of the interesting secondary metabolites for their anti-cancer activities for a long time (1). The prepared chloroform and methanol crude extract from stems, were evaluated for their cytotoxicity *in vitro* against three human ovarian cancer cell lines namely, OVCAR-4, FOUV-1 and COV-362, as well as normal epithelial cells (HOE) using SRB assay. Significant cytotoxicity was observed with methanol extracts against OVCAR-4 and FOUV-1 cell lines compared with CBPT and HOE, and moderate cytotoxicity with stem extract against COV-362, while chloroform have been found significantly to be active compared with only HOE (P<0.05) against OVCAR-4 and FOUV-1. Since these extracts have been shown a high significant anti-ovarian toxicity, we also evaluated representative phenolic compounds from each extract using GCMS.

Key words : *A. campestris* L., total phenolic compounds, cytotoxic activity, chloroform and methanolic extracts.

**A CROSS SECTIONAL STUDY ON KNOWLEDGE ABOUT HEPATITIS-B AND
IT'S VACCINATION AMONG THE MEDICAL STUDENTS AND
ORGANISATIONS INVOLVED IN VACCINATION PROGRAM**

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ABSTRACT

Hepatitis is one of the alarming communicable disease in the world which is spread through the blood semen, saliva of an infected person. The agent is Hepatitis-B virus which is a DNA virus family of Hepadnaviridae. Hepatitis-B is a preventable disease by vaccination and has total four doses(first or initial dose, one and two months later from first dose and the last dose is taken after 1year from initial dose which is named as Booster dose).In EPI schedule total six vaccine preventable diseases namely measles, tetanus, polio, diphtheria, pertussis and tuberculosis are covered where hepatitis is not included. A cross sectional study was conducted among the medical students of northern Bangladesh in January, 2020 using a pretested self administrated structured questionnaire. χ^2 test was used to identify the knowledge about hepatitis and awareness of taking HBV vaccine. Total 253 medical students from different medical colleges under MBBS and BDS course participated. Among them 50.99% was male and 40.01% was female and 47.82% was from town and 52.17% was from village. From all participants 57.31% was vaccinated with full dose completed,26.29% didn't complete dose(Booster dose) and 13.44% never received vaccine, From the Unvaccinated persons 16.33% didn't know about the organisation from where vaccine is received and who knew about the organisation form where vaccine can take,more than 90% mentioned the name of SHANDHANI(A free blood donating and vaccination organisation).Along with HBV vaccination 53.78% could mention that they also completed EPI schedule,20.32% couldn't remember and 23.9% didn't complete EPI.Before taking vaccine 64.94% was go through screening procedure and 15.54% didn't know about screening. From our study we can say that we need more awareness for taking vaccine and government should include HBV in EPI.And also need to organise awareness program among the community people and students of all sectors.

Key words : Hepatitis, Virus,Infection, Vaccine, Doses,Booster dose

ANALYSIS OF CRISPR/CAS-SYSTEM OF PSEUDOMONAS AERUGINOSA STRAIN NCTC10728 AND SCREENING OF PHAGES THROUGH SPACERS OF CRISPR BACTERIA ARRAYS BY BIOINFORMATICS TOOLS

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ABSTRACT

Background. Due to widespread and uncontrolled use of antibiotics in medicine and agriculture, many pathogenic bacteria have acquired multidrug resistance (MDR), on the basis of which "superbacteria" were formed. The problem of "superbacteria" (superbugs) has become relevant for health care around the world. The most dangerous for humans are "superbacteria" such as strains of *Pseudomonas aeruginosa*, which cannot be destroyed antibiotics of the carbapenem class. These strains made antimicrobial antibiotic therapy extremely difficult or practically impossible, which necessitated the search for alternative methods of treating bacterial infections caused by such "superbacteria." Among alternative strategies in the fight against bacteria with MDR can be the use of bacteriophages. **Aims.** The purpose of our investigation is to search and to analyze the structural elements of CRISPR / Cas- systems in the genomic strain *Pseudomonas aeruginosa* NCTC10728 to identify their structural properties and to assess the diversity of detected phage races detected through their CRISPR-arrays. **Materials and methods.** This approach is demonstrated by means of a developed algorithm from search software bioinformatics methods. **Results.** Analysis of the genome of the *P. aeruginosa* strain NCTC10728 has showed that the CRISPR / Cas system identified in its structure is of type I-E. It was found that Cas genes and CRISPR arrays are located next to these CRISPR arrays. The spacer structures in the detected CRISPR arrays are identical to the phage protospacers, the hosts of which are bacteria of the following genera – *Arthrobacter*, *Mycobacterium*, *Gordonia*, *Streptomyces*, *Rhodococcus*, *Propionibacterium*. **Conclusions.** The developed algorithm of program methods for locating CRISPR / Cas-systems allows determining the degree of resistance of bacteria to specific bacteriophages, which should ensure the effectiveness of targeted phage therapy of infections caused by pathogenic bacteria, including "superbacteria".

Key words : genome of *P. aeruginosa* strain NCTC10728, bioinformatics tools, CRISPR / Cas-system, spacers, repeats, protospacer, bacteriophages.

RELATIONSHIP OF C - REACTIVE PROTEIN AND TESTOSTERONE IN NEWLY DIAGNOSED ANGINA PECTORIS PATIENTS OF LOCAL POPULATION IN PAKISTAN

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ABSTRACT

Objective: To evaluate the relationship of hs-CRP and testosterone with potential risk factors of IHD patients. **Study Design:** Cross-Sectional study (Correlation study design). **Place and Duration of Study:** Punjab Institute of cardiology Lahore, Pakistan (Emergency department and Jillani block). **Methodology:** A cross-sectional study was done on 200 subjects in Punjab Institute of cardiology Lahore, Pakistan. All the subjects were non diabetic and non-hypertensive. They were divided into two groups as IHD group (n = 100) and control group (n = 100). The relationship of hs-CRP was seen with TC, TG, LDL-C and CK-MB, HDL-C and testosterone in IHD group and compared with control group. Difference between the groups was determined with the help of independent T- test. The relationship between the parameters was found out by bivariate Pearson correlation analysis. The analysis was done with the help of SPSS version 13.0 (ILO, Chicago). **Results:** The hs-CRP had significant direct relationship with TC, TG, LDL-C and CK-MB in IHD group as compared to control group. While inverse relationship was found between hs-CRP with HDL-C and testosterone in IHD group as compared with control group. The relationship of testosterone with TC, TG and LDL-C was significantly inverse in IHD group when compared with control group while the HDL-C showed the significant direct relationship with testosterone in IHD group. **Conclusion:** It is concluded that hs-CRP is an important risk factor for the progression of IHD and it is directly related with several other risk factors of IHD.

Key words : Ischemic heart disease, high sensitive C-reactive protein, Total Cholesterol, triglycerides, Low Density lipids, high density lipids.

EXTRACTION, TOTAL PHENOLIC CONTENTS, FREE RADICAL SCAVENGING AND LIPID PEROXIDATION CAP

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ABSTRACT

Origanum majorana is one such herb which has been used in traditional medicine for its therapeutic properties. This study was carried out to determine the antioxidant activities of decoction extract (DecE) of this plant. Water was used to extract bioactive compounds from aerial part of *Origanum majorana* L. by decoction model. The antioxidant properties of the Aerial part extracts were evaluated using 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging, β -carotene linoleate acid. Total polyphenol contents were determined using Folin-Ciocalteu's reagent. Total flavonoid contents were estimated using 2% alumine chloride. The result showed that the DecE contains high amount of total polyphenols and flavonoids with 283.83 ± 3.18 μg gallic acid equivalent/mg of dry weight and 07.22 ± 0.36 μg quercetin equivalents /mg dry weight respectively. The DecE possess an important DPPH effect with an IC₅₀ value of 0.026 ± 0.0006 mg/ml. Using the β -carotene/linoleic acid bleaching assay, the DecE had an important antioxidant activity with 61.48 % of inhibition. These results indicate that the aerial part of *Origanum majorana* L. extract has potent antioxidant activities and may prove to be of potential health benefit.

Key words : *Origanum majorana* L, antioxidant activity, polyphenols, decoction extract.

BIOCHEMICAL PROTECTIVE REACTIONS OF WHEAT PLANTS INFECTED BY PHYTOPATHOGENS TO PRESERVE THE CROP YIELD

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ABSTRACT

Wheat is the main food crop for humanity. One of the factors that essentially reduce wheat yields are phytopathogens of fungal and viral etiology. Our results showed that in last years one of the most widespread and harmful pathogens for wheat in Ukraine are *Wheat streak mosaic virus* (WSMV) and *Fusarium nivale* Ces (*Microdochium nivale*). Using of different methods (immunological, microscopic, biochemical) for diseases diagnostics is required for selection of healthy and resistant plants in breeding process. Important role in plant defense against pathogens play biochemical protective reactions. It was established that *Wheat streak mosaic virus* (WSMV) infection significantly (in 4 times) reduces the grain productivity of winter wheat cv. Julia. *Fusarium nivale* Ces (*Microdochium nivale*) decrease the grain productivity of wheat cv. Kosach in 2 times. WSMV induces an increase of hydrogen peroxide content in 2.8 times, intensification of lipid peroxidation in 1.5 times, decrease of some antioxidant enzymes activity (catalase, ascorbate peroxidase, glutathione peroxidase). It was shown that peroxidase activation, increasing of reduced glutathione content in the wheat plants infected by WSMV is a protective response to secondary oxidative stress, which aims to maintain ROS homeostasis. Significant increase in the content of soluble sugars, flavonoids, PR-proteins was detected in WSMV-infected wheat plants. It was established that *Fusarium nivale* Ces causes activation of lipid peroxidation, peroxidase in 2 times, reduction of activity of superoxide dismutase and catalase. The detected dislocation of pro- / antioxidant balance in wheat plants infected by viral and fungal diseases in direction of hydrogen peroxide, lipid peroxidation products accumulation may be a signal to activation of other defense mechanisms, formation of plant resistance and further preserve the wheat yield. The obtained results can be used in the plant breeding for selection of wheat varieties with economically valuable traits and complex resistance to viral and fungal diseases.

Key words: Wheat, Wheat streak virus, *Fusarium*., biochemical protective reactions, crop yield

ANTIOXIDANT ACTIVITY AND PHENOLIC CONTENT OF LEAVES AND FLOWERS EXTRACTS FROM ALGERIAN ATRIPLEX HALIMUS SSP. SCHWEINFURTHII

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ABSTRACT

Atriplex halimus ssp. *Schweinfurthii*, locally called "Guettaf", is a medicinal plant belonging to the family of *Chenopodiaceae*. In Algeria, it grows spontaneously in steppic areas and it is widely used in traditional medicine for the treatment of diabetes and heart diseases. Extracts from the studied plant are prepared using maceration technique with four solvents of different polarities; the extraction yield is 19.87% for aqueous extract and 10.92% for methanol extract, while for acetone and hexane fractions it was lower (1.56% and 0.88%, respectively). The highest amounts of polyphenols are found in acetone and aqueous extracts (28.75 and 28.10 µg gallic acid equivalent / mg extract, respectively). Hexane and acetone extracts are the richest in flavonoids (43.96 and 31.94 µg equivalent of quercetin / mg of extract, respectively), while acetone extract showed the highest content of tannins (76.18 µg equivalent of tannic Acid / mg of extract). The DPPH test showed that extracts do not possess an important anti-radical power; the best activity is shown by hexane extract with an IC50 of 7.24 mg / ml. The most important reducing power evaluated by FRAP method is presented by acetone extract which possessed a dose-dependent activity with a maximal absorbance value of 1.05 at a concentration of 6 mg/ml. In the β-carotene / linoleic acid test, all extracts showed an important antioxidant activity, while the highest percentage inhibition is shown by hexane extract with 92.47%.

Key words : *Atriplex halimus* ssp. *schweinfurthii*, aqueous extract, organic extracts, antioxidant activity, polyphenols, DPPH, FRAP, β-carotene.

STUDIES ON THERAPEUTIC POTENTIALS OF BROMELAIN

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ABSTRACT

Bromelain is a complex natural mixture of proteolytic enzymes derived from pineapple (*Ananas cosmosus*) and possesses notable therapeutic properties. The proteolytic enzyme bromelain which consists of a group of sulfhydryl and other cysteine proteases is exclusively present in pineapple fruit pulp and residues. From the agricultural point of view, since bromelain can be obtained from all part of the pineapple plant wastes, it has gained popularity in functional food list within being a commercial crop. There is also continued interest in bromelain, which has been used for many years in folk medicine for various health problems. Due to its efficacy after oral administration, its safety and lack of undesired side effects, bromelain has earned growing acceptance and compliance among patients as a phytotherapeutical drug. The potential therapeutic value of bromelain is due to its biochemical and pharmacological properties. Although the complete molecular mechanism of action of bromelain has not been completely identified, the research on the effects of bromelain focused on its anti-inflammatory, fibrinolytic, antitumoral and antibacterial activity. The aim of this study is to describe the promising clinical applications and therapeutic effects of bromelain considering the reported data.

Key words : Pineapple, Bromelain, Phytotherapeutical drugs, Functional foods

CHANGES IN BIOCHEMICAL BLOOD PARAMETERS IN ARBIA GOATS OF NORTH-EASTERN ALGERIA DURING LACTATION AND DRY PERIOD

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ABSTRACT

Farmers in Algeria are more interested in goats rearing and breeding, as a result of the high demand of their products by consumers. The nutritional importance of goat's milk is well known and there is also importance in their kid's meat. The Arbia goat is one of the most popular breeds for milk and meat production. Therefore it's important to conserve, and control the health of goats for increasing animal production. However, in the last few years, many researchers had shown that blood parameters of small ruminants were influenced by many factors such as age, different climate, breed and physiological stages of production. The aim of this study was to investigate the variations in some biochemical blood parameters during lactation and dry period in Arbia goats in semi-arid zones of North-Eastern Algeria. Ten healthy Arbia goats (12±0 months old) were chosen from one farm in Touzeline (20 km from Oum El Bouaghi province). Blood was collected once from each doe in the 3rd (early lactation), 8th (mid lactation) week of lactation and during 2nd week of dry period. Plasma glucose (Glu), cholesterol (Chol), triglycerides (TG), urea, creatinine (Creat) were measured. Plasma levels of Chol and urea were not significantly affected by different stages of lactation and dry period of the Arbia goats. During mid lactation, Glu recorded the lowest level compared to early lactation and dry period. Compared to early lactation, TG increased ($p<0.05$) and Creat decreased ($p<0.05$) in dry period. In conclusion, the obtained results would certainly help breeders and clinical veterinarians in order to control health and nutritional status of Arbia goats in semi-arid zones of Algeria to increase the animal production.

Key words : Biochemical parameters, Arbia goats, lactation, dry period, Algeria

**IN SILICO COMPARISON OF BIOACTIVE PEPTIDES FROM EDIBLE INSECTS
(*TENEBRIO MOLITOR*, *ALPHITOBIOUS DIAPERINUS*, *HERMETIA ILLUCENS*) AS
ALTERNATIVE PROTEIN SOURCES**

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ABSTRACT

Alternative protein sources will be of great importance in near future because of the current increasing trend in the world population. When selection procedure of alternative protein sources is applied, bioactive peptide contents of alternative protein source will also be important. Among alternative protein sources, edible insect species are attraction points since some of them are currently consumed by some populations. In this study, we investigated the bioactive peptide contents from *Tenebrio molitor* (Yellow mealworm beetle), *Alphitobius diaperinus* (Small worm beetle) and *Hermetia illucens* (Black soldier fly) by using BIOPEP, an in silico tool for bioactive peptides. The results were also compared with common protein sources. In conclusion, alternative protein sources can be used in different sectors such as food and pharmacy. Before using these sources, bioactive contents of the protein sequences should be studied. In silico approaches provide important contributions to the researcher for understanding the value of the studied proteins.

Key words : alternative protein source, in silico analysis, *Alphitobius diaperinus*, *Hermetia illucens*, *Tenebrio molitor*.

ANTIOXIDANT AND ANTI-ENZYME ACTIVITIES OF EXTRACTS OF LYCIUM FROM ALGERIA

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ABSTRACT

Lycium is one of the genera of the Solanaceae family, including about 80 species. The species of this genus have long been used in traditional medicine and as functional food around the world. Previous phytochemical studies on the genus *Lycium* indicated the presence of phenolic compounds. The objective of this study was to evaluate the *in-vitro* antioxidant and anti-enzyme activities of crude ethanolic extract and fractions obtained from the leaves and roots of *Lycium europaeum* L. Phenolic compounds and flavonoids were quantitatively analyzed. The antioxidant effect was determined by DPPH, ABTS, superoxide radical scavenging, inhibition of β -carotene bleaching, ferric reducing antioxidant power and CUPRAC assays. The enzyme inhibitory activities of the extracts were tested also *in-vitro* against acetylcholinesterase, butyrylcholinesterase, alpha-amylase, alpha-glucosidase and urease. High phenolic and flavonoid contents were obtained in the polar extracts. For what, concerning the antioxidant activities, the n-butanol fraction showed high activity in all assays. Moreover, the n-butanol fraction exhibited also anti-cholinesterase and urease inhibitory activities. The obtained results indicate that the plant extracts can serve as a potential source of natural antioxidants and enzyme inhibitors.

Key words : *Lycium europaeum*, antioxidant activity, anti-cholinesterase activity, flavonoids, phenolic

ANTIBACTERIAL AND ANTI-BIOFILM ACTIVITIES OF ZIRCONIUM DIOXIDE NANOPARTICLES (ZRO₂) ON STAPHYLOCOCCUS AUREUS STRAINS

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ABSTRACT

Introduction: The antibiotic resistance of certain pathogenic bacteria causes a huge problem of public health. The formation of biofilms by the adherence of bacteria to medical devices, implants and damaged tissues is the main origin of nosocomial infections. Nanotechnology is expected to open new avenues to fight and prevent disease using atomic scale tailoring of materials. **Description of the work:** In this study, the antibacterial activity of zirconium dioxide ZrO₂ nanoparticles (NPs) were carried out by the determination of the minimum inhibitory concentration (MIC) using agar-medium diffusion method against two strains: *Staphylococcus aureus* ATCC 43300 and *Staphylococcus aureus* ATCC 25923 while anti-biofilm activity was tested using 96-well microtiter plate method on *Staphylococcus aureus*. Our results showed that the minimum inhibitory concentration was 64 µg/ml for *Staphylococcus aureus* ATCC 43300 and 0.5 µg / ml for *Staphylococcus aureus* ATCC 25923 and a considerable anti-biofilm activity on the biofilm formed by strain tested which was significantly reduced by 68.35% after contact with nanoparticles of ZrO₂. **Conclusion:** Biological tests reveal that ZrO₂ NPs have great inhibiting effects and anti-biofilm potential against *S. aureus* bacterial strains which making them attractive candidate to be an effective alternative to antibiotics.

Key words : Antibacterial activity, Nanoparticles, Zirconium dioxide, Anti-biofilm activity, *Staphylococcus aureus*.

EFFECT OF LEAVES DRYING MODE ON TERPENOID CONTENTS IN PISTACIA LENTISCUS L.

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ABSTRACT

Pistacia lentiscus, from Anacardiaceae family, is a shrub growing in scrubland and scrub in Mediterranean climates. Its medicinal properties are innumerable due to its richness in secondary metabolites (Kordali et al., 2003; Ait Said et al., 2011). These genetic compounds can be modulated by different biotic and abiotic factors (Fernandez et al., 2013). The objective of this study is to compare the composition of terpene compounds in this species according to the drying mode of its leaves. For this purpose, we have harvested leaves from the female trees, in the flowering stage, in the Tizi Ouzou region. One part of these leaves is air-dried in the shade and the other part by freeze-drying. In both cases, the leaves are finely ground and then analyzed by gas chromatography coupled to a mass spectrum (CGMS), using dodecane as the internal standard for quantification. The results obtained reveal significant differences in both qualitative and quantitative terpenes contents between the two drying methods used. Total terpene contents are significantly higher in freeze-dried leaves, the majority families are represented by hydrocarbon monoterpenes and sesquiterpenes. On the other hand, leaves air-dried in the shade accumulates more oxygenated compounds. In conclusion, freeze-drying method which should be the best conserve of the chemical compounds in their natural state, would be the technique of drying biological material that is most recommended in phytochemical studies.

Key words : Extraction; leaves; *Pistacia lentiscus*; drying; terpenes

**CYTOPROTECTIVE EFFECT OF MELATONIN ON GONADAL TOXICITY
INDUCED BY LOCAL LINURON HERBICIDE IN WISTAR RATS**

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ABSTRACT

This study was conducted to evaluate the effectiveness of supplementation of an antioxidant. Melatonin perform on oxidative status (antioxidant defense system) in an animal model showing pathological lesions induced by a local herbicide: linuron. Indeed, the administration of linuron caused pathophysiology which was revealed on the one hand, by the formation of pre-tumoral cells located within the seminiferous tubes and on the other hand by the reduction of glutathione -S - transferase (GST), and a significant decrease in reduced glutathione (GSH) levels, which are biomarkers of oxidative stress. Melatonin preventive treatment of rats with linuron decreased Significantly the incidence of pre-tumoral lesions, with improved activity of the antioxidant defense status GSH, GST. This suggests that melatonin can act as an effective chemo-preventive agent against testicular cancer via the reduction of radical attacks on the testicles.

Key words : testicles; melatonin; linuron; oxidative stress.

**STUDY OF THE PROTECTIVE EFFECT OF MELATONIN ON
HEPATOTOXICITY INDUCED BY A LINURON HERBICIDE IN WISTAR RATS.**

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ABSTRACT

The purpose of this work is to evaluate the toxic effects of a pesticide widely used in agriculture as a herbicide, at a dose of 100 mg/kg/day, for 30 days in an experimental model in Wistar rats, while assessing the preventive effects of melatonin, at a dose of 500 µg/ml/day. Indeed, the administration of linuron caused an inflammatory state which is revealed on the one hand, by significant changes in the parameters related to liver function and on the other hand by the reduction of reduced glutathione (GSH) and a considerable increase in glutathione S-transferase (GST) and glutathione peroxidase (Gpx) levels, which are biomarkers of oxidative stress. The preventive treatment of the rats with melatonin in the presence of linuron improved the activity of the antioxidant defense status GSH, GST, Gpx. Of this, it should be stated that people exposed to pesticides, and mainly farmers as well as consumers of pesticide-treated products, face a real danger of their health being affected. This suggests that melatonin can act as an effective preventive agent to reduce the intensity of oxidative stress generated in an experimental model and will represent a potential treatment for the deleterious effects of linuron.

Key words : Linuron ; melatonin; GSH; GST; Gpx; oxidative stress.

INVESTIGATION OF THE EFFECTS OF CALCIUM SIGNALING PATHWAY ON THE CELL CYCLE REGULATION AND TRANSCRIPTION OF GENES THAT INVOLVES IN GLUCOSE METABOLISM

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ABSTRACT

Calcium is an important biometal ion and acts as an activator of signaling pathways in controlling many metabolic events in cells. The effects of calcium signaling are exerted through the calcium/calmodulin pathway. Crz1 is the transcription activator that activates the transcription of numerous genes in response to calcium signaling in yeast. On the other hand, Glucose is an important carbon and energy source for yeast and transported into yeast cells by hexose transporters via facilitated diffusion mechanisms. Glucose also acts as a hormone-like substance in yeast. In response to glucose signaling, expression of the 20% of yeast genes either activated or repressed by at least 2-fold. Glucose also affects growth-related events in the yeast cells. Glucose is transported into yeast cells by Hexose Transporters (HXTs) via facilitated diffusion mechanisms. Glucose can be metabolized in the glycolytic pathway. Besides, it can be converted in to reserve carbohydrates trehalose and glycogen in yeast. In this study, we have investigated the effects of calcium signaling on the expression of HXT2, HXT4, and TPS1 genes that are required for glucose transport and trehalose biosynthesis, respectively. Our results indicated that calcium signaling activates transcription of HXT2, HXT4, and TPS1 genes under glucose repressed conditions. Interestingly, calcium did not have any effects on the transcription of these genes under glucose derepressed growth conditions. Also, it appears that protein kinases Hog1p and Snf1p involves partially in the calcium-dependent activation of basal transcription in HXT2, HXT4, and TPS1 genes. We have also investigated the effects of calcium signaling on the growth rate and cell cycle regulation in yeast. Our results show that calcium acts on the cell cycle via Snf1 kinase and affects the G1 to S transition stage since calcium stops cell cycle in G1 stage in snf1 mutant yeasts. Calcium also interferes with the growth rate in yeast. Furthermore, our results indicated that calcium ions activate the glycogen storage in hog1 kinase-deficient yeasts. In silico analyses of the promoter regions of HXT2, HXT4 and TPS1 genes indicated that transcription of these genes is activated by multiple regulatory factors whose activities depend on calcium signaling.

Key words : Calcium signaling, Cell cycle, Growth rate, HXT Genes, *Saccharomyces cerevisiae*.

**STUDY OF ANTIBACTERIAL EFFECT OF THE ESSENTIAL OIL OF A
MEDICINAL PLANT EUCALYPTUS CAMALDULENSIS**

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ABSTRACT

The first objective of our study is to better understand *Eucalyptus camaldulensis* through the study of its aromatic fraction (HE). We have shown the organoleptic characteristics of the essential oil of this essence which is dark yellow in color, with a pleasant odor and a characteristic taste. The yield of essential oil obtained by the Clevenger type hydrodistillation of the *Eucalyptus camaldulensis* plant is 0.96%. The second objective is the qualitative and quantitative study of the antibacterial activity of the essential oil of *Eucalyptus camaldulensis* on different bacterial strains. Pure essential oils and their dilutions (1/2, 1 / 4, 1 / 6, 1/8 and 1/16) were tested on the bacterial strains studied (3 strains at gram + and 4 strains at Gram-). The results of the antibacterial activities have shown that the essential oil of *Eucalyptus camaldulensis* has a good inhibitory activity different from one strain to another so that their average diameter of inhibition is as follows: *S. aureus* (17 mm), *E. coli* (15.66 mm), *K. pneumoniae* (13.66 mm), *S. saprophyticus* (12 mm), *P. mirabilis* (8 mm) and *E. faecalis*. The minimum inhibitory concentration (MIC) of (0.06% to 0.16%) (v / v) was sufficient to stop the growth of *K. pneumoniae* and *E. coli*. While *S. aureus*, *S. saprophyticus* and *P. mirabilis* resisted up to an essential oil concentration of 1% (v / v). Elsewhere, *E. faecalis* and *P. aeruginosa* showed no sensitivity to with essential oils of *Eucalyptus camaldulensis*.

Key words : *Eucalyptus camaldulensis*, Hydrodistillation, essential oil, antibacterial activity, MIC

**CONTRIBUTION TO THE STUDY OF THE ANTIBACTERIAL EFFECT OF
ARTEMISIA HERBA ALBA ASSO "CHIH".**

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ABSTRACT

Artemisia herba alba Asso « chih » is an abundant medicinal and aromatic plant founded on the highlands of Algeria in the semi-arid regions. This study aims to examine the antibacterial activity of the sagebrush harvested from the El Kouif region of the province of Tebessa. The extraction of HE was carried out trough hydrodistillation. The average yield obtained is quite significant at $0,85\% \pm 0,012$. The antibacterial study of essential oils by the aromatogram method revealed an inhibitory activity on the growth of the tested germs except for *Pseudomonas aeruginosa* which shows resistance for essential oils obtained. *Klebsiella pneumoniae* is the most sensitive to essential oils with an inhibition zone of 16,5mm. The minimum inhibition dilution obtained range from 0,0312 to 0,5 (v / v) (ul/ ul). *E-coli*, *Klebsiella pneumonia*, *Klebsiella oxytoca*, *Enterococcus faecalis* are the strains with the lowest MIC. On the other side, *Staphylococcus aureus* is the strain with the highest MIC. Overall, the results are promising and they open up new perspectives in the field of natural applications that can be a valid alternative to replace chemicals.

Key words : *Artemisia herba alba Asso*, Hydrodistillation, essential oil, antibacterial activity, MIC, aromatogram.

SELECTIVE AUTOPHAGY SIGNALS REGULATE THE GENE EXPRESSION IN TY RETROTRANSPOSONS

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ABSTRACT

S. cerevisiae, the first eukaryotic organism whose genome has been sequenced is a GRAS model organism used in genetic studies. This model organism contains five different types of retrotransposon, called Ty1-Ty5, in its genome. Ty retrotransposons are known as pseudoviruses due to their similarity to retroviruses. These viruses are distinguished by their long terminal repeats. Ty1 and Ty2 have a similar genome structure and have a 334 bp long terminal repeat sequence at the 5' and 3' ends. Ty1 presents as 30 copies per genome, while Ty2 is about 10 copies per genome in yeast. Their transcriptions are controlled by different transcription factors encoded from the yeast genome. Their coding regions composed of two open reading frames, called TYA and TYB. The virus-like particle is encoded from TYA. Enzymes protease, reverse transcriptase, and integrase that are required for the viral life cycle are encoded from TYB. The TYA and TYB open reading frame overlap in the 38-nucleotide on the coding region. TYB is translated as TYA:TYB fusion protein. This synthesis is controlled by a frameshift mechanism. Ty viruses do not encode any regulatory factors for their gene expressions. Like many other known viruses, Ty viruses use host-encoded factors necessary for their transcriptions and translations. This suggests that any stress conditions created in the organism will also affect the gene expression of Ty viruses. Autophagy is a conserved mechanism by which proteins and damaged organelles are eliminated to maintain the cell's homeostasis. Degradation of damaged organelles is eliminated by selective autophagy types. In this study, we have analyzed the effects of selective autophagy on the gene expression in Ty1 and Ty2 using lacZ reporter vectors of these retrotransposons. Reticulophagy was induced by adding DTT that activates unfolded protein signaling pathways, to the growth medium of yeast cultures. It is known that unfolded protein signaling pathways activate cellular events known as reticulophagy. Mitophagy, which is selective degradation of mitochondria, activated by shifting yeast cells from non-fermentable carbon sources (such as glycerol, lactate) to glucose media. Our results indicate that gene expressions in Ty1 and Ty2 are differentially regulated by selective autophagy signaling pathways. It seems that transcription of Ty1 is not affected by mitophagy and reticulophagy signaling. However, Ty2 transcription is activated by both mitophagy and also by reticulophagy signaling at significant levels. Induction of mitophagy signaling resulted with 8-fold increase in the Ty2 transcription. Moreover, it seems that mitophagy signaling acts through the regulatory elements that locates within the enhancer region of Ty2. Because we found that mitophagy signaling also activates Ty2 enhancer dependent transcription of a heterologous promoter in yeast. Our results also indicated that reticulophagy signals, induced by ER stress, activates Ty2 transcription by 6-fold. Also, we found that reticulophagy signal activates the programmed frameshift rate in Ty1 and Ty2 by 2-fold. These results suggest that selective autophagy signaling affects the gene expression in retroviral-like elements that might modulate their propagation rate within the host cells.

Key words : *S. cerevisiae*, Ty retrotransposons, reticulophagy, mitophagy, frameshift

INVENTORY OF ECTOPARASITES OF YOUNG BARN SWALLOW (*DELICHON URBICA*) FROM MOULDI ACHOURI COLONY OF THE CITY OF TEBESSA. NORTHEAST OF ALGERIA.

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ABSTRACT

During the wintering season (2019-2020), the collection and quantification of ectoparasites was carried out for the first time on the young barn swallows “*Delichon urbica*” from 18 nests in Mouldi Achouri colony of the city of Tebessa. The results showed that fleas (*Ceratophyllus gallinae*, *Ceratophyllus hirundinis*, *Callopsylla sp.*, *Cimex hirundinidus*, *Xenopsylla trispinis*, *Ornithomya sp*) are the most abundant. They represent 73,06% of the overall total of the sample, followed by mites (*Ornithomya sp*, *Ixodes frontalis*) with 21,14% and finally, lice (*Menacanthus sp*) with 5,76%.

Key words: *ectoparasites, Delichon urbica*, fleas, mites, lice, Tebessa.

EVALUATION THE COASTAL WATERS QUALITY OF THE ALGERIAN WEST COAST BY THE EVALUATION OF METALLIC CONTAMINATION IN THE GREEN ALGA ENTEROMORPHA LINZA.

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ABSTRACT

Biomonitoring of marine ecosystems has required the development of a multitude of approaches used and approved by scientists because of their reliability in providing relevant information on the health status of organisms and different compartments of the marine environment. Benthic species, populations and stands, by recording all natural and/or anthropogenic variations, are a true memory of the past and/or present conditions of the marine environment; as such, they can be considered as a true "black box" of the environment. In order to follow the chemical pollution by heavy metals in the marine environment, as well as the ecological and ecotoxicological disturbances resulting from this contamination that this study has been carried out. The aim of this work is to determine the concentrations of heavy metals in seawater and surface sediments, as well as the green alga *Enteromorpha linza* (Linnaeus) at eight sites along the coast of Oran (Ain Franine, Saint Roch, Bouisville, Saint Germain, Cap Blanc, Madragh, Etoile and Maddagh1). Research also focuses on the effects of high element concentrations on bioaccumulating organisms. The objectives of this research are : 1) The selection of the study area and sites exposed to human pressures: industrialization, urbanization, port activities, fishing, shipping and tourism development; 2) Selection and identification of the green algal species selected for sampling at the target sites. Its availability is essential to compare results; 3) Assessing the distribution and bioavailability of heavy metals in seawater, sediment and the green algae *Enteromorpha linza* present in the eight stations. 4) comparison of the metallic trace elements contents in these different compartments but also in the different study stations; 5) Define whether the levels of metal contamination are reflected in the tissues of this bioaccumulating species. This ecotoxicological approach represents a good means of assessing the quality of aquatic ecosystems.

Key words : Biomonitoring, bioaccumulation, heavy metals, pollution, algae, coastal water, sediments, Algerian west coast.

A FLORISTIC STUDY OF BENTHIC MARINE ALGAE FROM THE ALGERIAN WEST COAST

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ABSTRACT

As part of the monitoring of the health of the coastline of Oran, a study of the biodiversity and distribution of intertidal benthic macroalgae was carried out. These marine macroalgae were chosen because they play an important role in the nutrient dynamics of coastal ecosystems and are very good bioindicators of marine water quality. The present work is an ecological diagnosis of the Bay of Oran using benthic macroalgae as a bioindication tool. A floristic inventory was carried out during the autumn season at nine (9) targeted stations: Ain Franine (S1), Saint Roch (S2), Bouisville (S3), Ain Turck (S4), Cap Falcon (S5), Etoile (S6), Les Dunes (S7), Madragh (S8) and Madagh1(S9). Therefore, it seemed interesting to us to carry out this study whose objective is to : i.) Establish an inventory of the macroalgae inhabiting the intertidal zone of this coast; ii.) Determine the geographical distribution of benthic macroalgae at the level of the Oranian coastline, iii.) Select the most representative species in this area, applying the methodology adopted for the study of the phycoflora of this coastline, according to bibliographic databases ; iv.) Perform a global analysis of phytobenthos by comparing analytical and synthetic parameters. The results obtained reveal the presence of a total of eighteen (18) species of algae which were inventoried including five (5) species of Chlorophyceae, five (5) species of Rhodophyceae and (8) species of Pheophyceae. The calculation of the analytical and synthetic parameters (mean recovery (Ri), global mean recovery (RMG) and specific richness (Q)) showed a heterogeneity in the distribution of macroalgae between the different stations as well as a very important diversity at the level of the station (S1) which was characterized by the presence of fourteen (14) species of algae of the three groups compared to the other stations. The algal flora of the coastline of Oran was characterized by the dominance of Chlorophytes, followed by Pheophytes and Rhodophytes. This observation clearly indicates the difference in environmental quality at the nine (9) targeted stations and illustrates the interest of using macroalgae in the ecological diagnosis of marine ecosystems.

Key words : Macroalgae, Chlorophytes, Rhodophytes, Pheophytes, Oran Bay. Intertidal zone, mean cover, global mean cover, specific richness.

INCREASED INSECTICIDE RESISTANCE LEVELS REVEAL HIGH INSECTICIDE PRESSURE ON AN. CLAVIGER POPULATIONS COLLECTED FROM THE AEGEAN, MEDITERRANEAN AND SOUTH EAST REGIONS OF TURKEY

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ABSTRACT

Anopheles claviger is widely distributed in the Palearctic region. It has been found up to 2300 meters in all geographical regions of Turkey. *An. claviger* bite mostly large mammals however it also feeds on human in the absence of animal resources. Thus, their importance for malaria vectors varies between distribution area. Although epidemiological importance of *An. claviger* is not large due to small populations, it is a well-known principal malaria vector in the eastern Mediterranean region. In this study, it is aimed to detect insecticide resistance levels and underlying resistance mechanisms of *An. claviger* populations collected from the Mediterranean, Aegean and Southeast Anatolia regions of Turkey. Larvae and adult samples of *An. claviger* were collected from 9 locations of the Mediterranean regions of Turkey between April and September 2015. Mean Mortality rates and ANOVA analysis followed by Tukey's HSD test were performed through Statistica version 12.0. All biochemical analyses including non-specific esterase (NSE), mixed function oxidase (MFO), glutathione S-transferase (GST) and Acetylcholinesterase (AChE) assay were carried out by following the test procedure provided by WHO 1998. α -naphthyl acetate, β -naphthyl acetate and p-nitrophenyl acetate were used as substrates of esterase enzyme for the calculation of non-specific esterase activity. MFO level was calculated using heme-peroxidase assay based on heme-protein amount. Bioassay results indicated that mortality rates varied between 68.3% and 88.3% for DDT and all *An. claviger* populations were resistant to DDT. Mortality rates changed between 71.6% and 91.6% for malathion; 76.6% and 95% for propoxur. Most of the populations were resistant to malathion and propoxur while some of them were possible resistant to those insecticides. All of the Mediterranean population were still susceptible to permethrin while some populations have begun to have resistance against permethrin in the Aegean and Southeastern regions. ANOVA results showed statistically difference between the Mediterranean and Southeastern populations in DDT, malathion and propoxur mortality rates ($p < 0.05$). Mortality rates for propoxur were also statistically different between the Aegean and Southeastern populations ($p < 0.05$). Biochemical analyses results revealed that all of the populations had higher median alpha and beta esterase activity in relation to the reference strain except the Kahta population ($p < 0.05$). Similarly, all of the populations had increased median PNPA and MFO rates in relation to the reference strain ($p < 0.05$). All of the populations had higher AChE inhibition rates comparing to the reference strain and all of the populations had insensitive AChE rates expressed higher than 30% critical level except the Karacasu population ($p < 0.05$). Bioassay results show high insecticide resistance in *An. claviger* populations demonstrating high insecticide pressure within these populations. Overall results indicate the presence of multiple resistance mechanisms in these populations. Therefore, insecticide resistance management strategies are urgently needed for effective vector control implementation otherwise populations might gain resistance against all possible insecticides in the future.

Key words : *An. claviger*, insecticide resistance, GST, Acetylcholinesterase, MFO, esterase

THE ALLELOPATHIC EFFECT OF ALLIUM AKAKA S. G. GMELIN EXTRACTS ON GERMINATION OF PORTULACA OLERACEA L. WEED

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ABSTRACT

Weeds compete with crop plants resulting with a considerable loss in their productivity. Pulling by hand or physically cutting of weeds were among the traditional methods of weed control. In recent years, herbicides, modern and alternative strategies for weed control have been used. These weed control methods have served to control the weed development and improve the crop productivity. Allelopathy is a biological phenomenon by which an organism produces biochemical that influence the germination, growth, survival, and reproduction of other organisms. Allelopathic interactions are important factors in determining species distribution and abundance within plant communities by releasing of biochemical that called allelochemicals. This study focused on the evaluation of the weed control potential of the *Allium akaka* S. G. GMELIN water extract on *Portulaca oleracea* germination. For this purpose, different concentrations of the *Allium* water extract were tested as 2 mg/mL, 4 mg/mL, 8 mg/mL and 16 mg/mL. Distilled water was used as control. Twenty purslane seeds were placed in small jars (6 cm diameter) containing a double layer of filter paper moistened with 5 mL of *A. Akaka* extracts or distilled water. Each application was conducted at least three replications. Seeds having an emerged 2 mm radicle were considered as germinated. The germinated seeds were counted at the end of the seventh day. Also, the effects of *Allium* water extract were evaluated on root and shoot development. The extracts did not cause any changes in the germination percentage of the purslane seeds at any of the concentrations. However, the root and shoot lengths were significantly affected, especially at the concentration of 16 mg/mL. Increase in extract concentration was gradually inhibited the root growth. While the average root length in the control was measured as 3.91 cm, it was measured as 0.71 cm in 16 mg/mL extract application. The shoot length was also suppressed by the application of 16 mg/mL extract concentration. Suppressing weeds by allelopathic phenomenon is included among the important innovative weed control methods. So, this preliminary experiment can be improved for the weed control management.

Key words : Allelopathy, *Allium akaka*, *Portulaca oleracea*, Germination, Weed control

WATER EXTRACT OF HELICHRYSUM PALLASII (SPRENGEL) LEDEB. PREVENTS ROOT DEVELOPMENT OF TOMATO (*LYCOPERSICON ESCULENTUM*) AND COMMON PURSLANE (*PORTULACA OLEARECEA*)

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ABSTRACT

Weeds compete with the crop plants for available nutrients and moisture in soil, space and light. Therefore, the physiological activities and growth of crops are negatively affected in the presence of weeds. Using of the allelopathic effects of the plant substances is a new strategy to struggle with weeds. The aim of this study was to investigate the allelopathic effect of water extract of *Helichrysum pallasii* (SPRENGEL) LEDEB. on germination of tomato (*Lycopersicon esculentum* Mill. cv. S.C. 2121) and common purslane (*Portulaca olearecea* L. cv. BT Yeşilkulak) plants. Seeds were surface sterilized with 5 % of sodium hypochloride for 10 minutes and washed with sterile distilled water. Additionally, seeds were treated with 70 % of ethanol and washed with sterile distilled water. We tested four different concentrations of *Helichrysum pallasii* water extract: 5 mg/mL, 10 mg/mL, 20 mg/mL and 40 mg/mL. Sterile distilled water was used as a control application. 10 seeds of tomato and 20 seeds of portulaca were planted in to glass jars including two layers of filter paper. Filter papers were wetted with 5 mL of extracts for each application and sterile distilled water for control. Jars were incubated in controlled growth room (16/8 hours light/dark photoperiod and 25 + 1 °C) for one week. This study was conducted on at least three replicates for each application. Statistical analyses were performed using by GraphPad Prism 8.0.1 package program One -Way Anova analysis. At the end of the study, germination rate was calculated and shoot and root lengths were measured. Germination rate of tomato plant treated with 10 mg/mL, 20 mg/mL and 40 mg/mL extract was significantly lower than control and 5 mg/mL extract. Especially, 40 mg/mL of extract prevented germination of the tomato seeds. The *Helichrysum* extract did not significantly affect the portulaca germination. According to shoot length results of tomato, 5 mg /mL, 10 mg/mL and 20 mg/mL *Helichrysum* extract caused importantly decrease in shoot length according to control. Additionally, shoot length of tomato was significantly affected depends on increasing extract concentrations. Similar results were determined for tomato root length. Importantly decrease in shoot length of common purslane was measured in only 20 mg/mL extract application compared to others. The all concentrations of the water extract of *Helichrysum* negatively affected root length of common purslane according to control. According to our results, the water extract of *Helichrysum* may have a weed control potential.

Key words : *Helichrysum pallasii*, Common purslane, Tomato, Allelopathy, Weed control

CHEMICAL AND ANTIBACTERIAL INVESTIGATIONS OF ROSMARINUS OFFICINALIS

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ABSTRACT

Rosmarinus officinalis was extracted using Soxhlet extraction method, hexane extract and acetone extract were obtained. Four phenolic compounds were diagnosed with HPLC after acid hydrolases of acetone extract (Kemferol, Gallic acid, Catechine and Qurcetine) and nine fatty acids were diagnosed with GLC after the saponification of hexane extract (Hexanoate, Myristate, Myristoleate, Palmatic, Stearic, Arachidate, Araghidatente and Lignocerate). The inhibitory effect of the active compounds separated against two types of Gram negative bacteria *E. coli* and *Proteus vulgaris* was tested using the disc diffusion method and there was a noticeable and differentiated effect compared to the antibiotic used.

Key words : Key words: *Rosmarinus officinalis*, GLC analysis, HPLC analysis, Phenolic compound, Antibacterial activity.

**GREEK NATIVE FOREST FRUIT TREES AND SHRUBS: COLLECTION,
DOCUMENTATION AND EX SITU CONSERVATION FOR SUSTAINABLE
UTILIZATION**

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ABSTRACT

To date, there is an increasing interest for the cultivation of the minor crops and traditional varieties of fruit trees, but documented propagation material is scarce or not always readily available. The present study is part of the national Greek research project “Eco-Variety” (T1EDK-05434) which focuses on the collection, conservation, propagation, evaluation and sustainable utilization of Greek native forest fruit trees and shrubs (wild-growing but with potential to become minor crops), as well as with local varieties of fruit trees that are traditionally cultivated or neglected/abandoned. In the framework of this project, literature review has been completed regarding the occurrence sites of the eight (8) selected wild-growing native species (*Rosa canina*, *Rubus idaeus*, *Cornus mas*, *Sambucus nigra*, *Prunus spinosa*, *Vaccinium myrtillus*, *Rhus coriaria*, *Amelanchier ovalis*) and several botanical collections have been implemented for the acquisition of propagation materials. For each of them, the three partners have collected living plants and/or cuttings from at least three different locations/populations originating from at least three research areas. Furthermore, soil and fruit specimens were collected and analyzed from each population, while fresh leaf specimens were used for DNA barcoding of the respective plant materials. Information regarding the habitat, the geographical coordinates and altitude was recorded at each collection site. In total, 103 accession numbers of the above species were thus documented. Most accession numbers were collected from *Rubus idaeus* (18 accession numbers), *Cornus mas* (17) and *Prunus spinosa* (15), while for *Rhus coriaria*, *Rosa canina*, *Sambucus nigra* and *Vaccinium myrtillus*, 10, 11, 12 and 11 accession numbers were collected, respectively. Currently, these valuable plant materials are being maintained, propagated *ex situ* and evaluated under field conditions in pilot cultivations (Thermi, Thessaloniki, Northern Greece).

Key words : Greek flora, wild collections, conservation

PREVENTION OF SOIL CONTAMINATION WITH OIL AND OIL PRODUCTS IN THE SAMUR-SHABRAN TERRITORY OF AZERBAIJAN

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ABSTRACT

In the modern era, we aim to develop pollution levels in soils contaminated or coated with oil and oil products related to minerals extracted from the earth's crust and methods for the study of indicator plants. In this regard, the environmental and geo-botanical researches of Azerbaijan's "Siyazan oil" were carried out. The study shows that the region is heavily contaminated with oil and oil waste, including mineralized water, and chemical reagents of curly rocks. Geo-botanical indication studies to study indicator plants in soils polluted with oil and oil products and conduct scientific and research works in the territory were carried out at three phases (preparatory, field and cameral). It is recommended to determine the followings on the selected exemplary "facilities": Systematization of polluted fields from the impact of bore and mineralized lay waters on the ecological classification; Classification of the degree of soil pollution with oil and oil products (according to the indicator plants); Determination of fullness and usefulness scale of indicator plants at the level of formation and Geo-botanical indication studies to study indicator plants in soils polluted with oil and oil products and conduct scientific and research works in the territory were carried out at three phases (preparatory, field and cameral). It is recommended to determine the followings on the selected exemplary "facilities": Systematization of polluted fields from the impact of bore and mineralized lay waters on the ecological classification; Classification of the degree of soil pollution with oil and oil products (according to the indicator plants); Determination of fullness and usefulness scale of indicator plants at the level of formation and association, as well as, specifying indicators; Scheme and mapping of geo – botanical indication, association, as well as, specifying indicators; Scheme and mapping of geo – botanical indication. Classification of pollution rates of oil and oil products in bore and mineralized waters in "Siyazan oil" is developed. The formation, restoration and recultivation of saline soils in oil fields and (*Halocnemum strobilaceum* (Pall.) Bieb.), (*Petrosimonia brachiata* (Pall.) Bunge.) so on suggests that the soil is contaminated by oil products. According to the results of our research work, "the map of induction" of indicator plants of oil and oil products and polluted lands is prepared by us. The map of induction will provide scientific and practical implementation of environmental protection measures after the development of soil recultivation projects and the integrity of surface and aerospace surveys of phytochemical maps. Based on the above mentioned, a map with same name was made referring to the indication of soils polluted with oil products and layer waters. For this, first of all, according to the classification for the legend or the content of the plants of soils polluted with phytoecological principles and phytoindicators, ecological and geobotanical map was compiled an the following works were done: Physical and chemical properties of soil (granulometric composition, salinization etc.); Impact of different processes on the areas (natural and anthropogenic factors); Compiling hydroindication map; Compiling the map on the agricultural perspective or development (in the area); Compiling ecological – geobotanical map. According to the legend of ecological – geobotanical map compiled, ecological factors, conditional signs of dominant (indicator) plants and colors of ecological types are mentioned in its contour.

Key words : ecosystem, phytocenosis, formation, association, dominant, subdominant, edificator, endemism

THE INFLUENCE OF DIFFERENT SEED TREATMENTS ON SEEDS SOWING CHARACTERISTICS OF ILEX AQUIFOLIUM L.

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ABSTRACT

Plants from the group of evergreen deciduous shrub used in landscaping practice in our country are not many. *Ilex aquifolium* L. is one of those plants. With its high decorative qualities and unpretentiousness to the environmental conditions, the plant deserves wider use. Problem in the production of seedlings is the deep peace of seeds and consequent low germination. This study was conducted to explore some options for treatment of sowing seeds of *Ilex aquifolium* L. and increase their germination. They were used variations of soaking in tap, hot water and a solution of GA3 at concentrations of 0.5 or 1,0 gl-1. The seeds were stratified after different treatments. Were used seeds with or without endocarp. Stratification was done in pure washed river sand at a temperature of 400 C for 90 days. All treated seeds showed a higher rate of germination as compared with the control. The highest germination rate - 86.7 %- were seeds treated with hot water and then stratified for 90 days. Treatment with GA3 without endocarp seeds showed a higher germination rate - 74.5% and the necessity of shortening the period of stratification in comparison with seeds with endocarp. It was found that soaking in a hot or tap water and the subsequent 90-day stratification applicable treatments that would result in practice of ornamental nurseries in our country.

Key words : *Ilex aquifolium* L.; seed propagation; presowing treatments; GA3

**APPLICATION FOLIAR FERTILIZER AGRO ARGENTUM FORTE IN
CULTIVATING SEEDLINGS OF THREE SPECIES TILIA**

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ABSTRACT

Species of the genus *Tilia* are some of the most common plants in our landscaping practice. One of the key problems in the production of seedlings of these species is the slow growth of seedlings in the first years of their cultivating. The application of foliar fertilizers is one way to solve this problem. This study examines the impact of foliar fertilizer Agro Argentum Forte on growth processes and biometric characteristics of annual seedlings of three types of lime: *T. cordata* Miller; *T. platyphyllos* Scop. and *T. tomentosa* Moench. Foliar fertilizer Agro Argentum Forte was used in 5 different concentrations: 0.3%; 0.6%; 0.9%; 1.2% and 1.5%. Treatment began with the formation of the first leaf at 90% of the plants grown and was applied every 14 days throughout the growing season to the end of September. It was found that the growth characteristics of the treated plants exceed substantially those of the untreated control plants. With the highest and thickest stems of seedlings are three types of limes treated with 0,9% Agro Argentum Forte. Treatment with 1.2% concentration positively influences the number and size of leaves. Impact on biometric characteristics of the root system was not established. No difference was observed in biometric characteristics between the three types of linden treated with different concentrations of foliar fertilizers. We suggest the use of Agro Argentum Forte in nursery practice in concentration 1.2%.

Key words : Limes, seedlings, foliar fertilizer, Agro Argentum Forte

ANTIBACTERIAL ACTIVITIES OF DIFFERENT VARIETIES OF BRASSICA OLERACEA

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ABSTRACT

Various varieties of the *Brassica oleracea* species have been consumed all around the world as fresh, cooked, juice or pickles. The consumption of these popular vegetables are increasing day by day. The plants of this species contain numerous vitamins, phytochemicals, antioxidants and fiber, and hence suggested to be frequently eaten up for a healthy life. Different parts of these plants, such as sprouts, leaves, roots or stem contain different amounts of various bioactive ingredients, which are beneficial against disorders such as asthma, cancer, diabetes, or neural diseases. The anticancer features of these ingredients have been subject to many researches. In addition to prevent tumorigenesis, the varieties of *Brassica oleracea* species have antibacterial hallmarks, thanks to the phytochemicals they possess. The antibacterial activities of different varieties of the species *Brassica oleracea* were reviewed in this paper. The antibacterial activities of the plants extracts are attributed to secondary metabolites such as phenolic compounds, glycosides, terpenoids and alkaloids. The varieties of the *Brassica oleracea* contain different kinds of these secondary metabolites which can be extracted by a range of different solvents. The solvents used determine the active phytochemicals extracted, hence the antibacterial activity as different metabolites act on different groups of microorganisms. Therefore, it is important to determine the extraction method and solvents in a goal oriented manner. Moreover, the cultivation of the varieties of *Brassica oleracea* can be assorted accordingly, especially for use in traditional medicine.

Key words : *Brassica oleracea*, Antibacterial activity, extract

ASPERGILLOSIS IN DOMESTIC MAMMALS AND DOMESTIC POULTRY

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ABSTRACT

Aspergillosis is an important fungal disease that affects mammals and poultry. The skin, bones, eyes and brain can also be affected by this disease along with the respiratory system. Although *Aspergillus fumigatus* is mostly responsible for aspergillosis, it can be effective in species such as *Aspergillus flavus* and *Aspergillus niger*. *Aspergillus* species can be found widely in nature in both indoor and outdoor weathering, and can thrive in wide heat ranges. They can breed through contaminated food, air, water and various environmental sources. Aspergillosis is an infection that begins with the inhalation of spores, especially *Aspergillus fumigatus*. Transmission from one animal to another is rare. The disease causes severe economic damage to livestock, especially poultry farms. Aspergillosis has been reported from mammalian species in dogs, cats, sheep, cattle, horses, and rabbits. Aspergillosis has been reported in chickens, turkeys, ducks, geese, ostriches and parrots. The reason poultrys are more susceptible to aspergillosis than other living things is because of their anatomical features. The absence of epiglottis and therefore the inability of particles to pass to lower parts of the respiratory system, the creation of false layers limited to Cilia released from cylindrical cells along the respiratory tract, the absence of diaphragm, the lack of a strong coughing reflex make the poultrys more sensitive than other creatures. Aspergillosis is a very important economic disease of young poultrys. It is emphasized that immunodeficiency, which is seen as due to some causes such as stress, coexistence of large numbers of animals or adverse environmental conditions, plays an important role in the emergence of the disease. Contamination by eggs following ovulation and constitutes a serious problem, covering a period of incubation period in infected chicks from eggs, the last egg in the shell cause the emergence of fungi. In order to prevent *Aspergillus* infections, the coops need to be well ventilated, hygienic conditions and proper heat. Animals should be sent to slaughter and shelters should be disinfected with antifungal drugs. Aspergillosis has also been reported in mammals. *Aspergillus fumigatus* is the primary cause of aspergillosis in mammalian animals. The disease is effective in the respiratory system, gastrointestinal system and other organs in mammals. Stress, overexposure to fungal contamination, long-term antibiotic treatment are effective in the emergence of the disease. In dogs, nosebleeds, runny nose, nasal ulcer, sinusitis, weight loss, high fever, muscle pain, novelization, lameness are seen. In horses, air sac mycosis, nosebleeds, difficulty swallowing, neurological disorder, placentite, abort occur. Cattle are seen more in the winter months. Silage and wet straw not stored in suitable conditions may be the source of *Aspergillus fumigatus*. In cattle, mastitis, placentite, diarrhea, ocular infection, and mycotic pneumonia are symptoms of aspergillosis. This review aims to summarize current information about *Aspergillus* and aspergillosis and to investigate aspergillosis in mammalian and poultry species. As the most common animal pathogen is *Aspergillus fumigatus*, most of the data at hand is associated with *Aspergillus fumigatus*.

Key words : : *Aspergillus*, Aspergillosis, Domestic mammals, Domestic poultry

DERMATOPHYTE INFECTIONS IN DOMESTIC MAMMALS AND DOMESTIC POULTRY

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ABSTRACT

Fungi that are not invasive to living tissues, usually clinging to the outer layer of skin, hair and nails, causing pathological changes in humans and animals with proteolytic enzymes with keratinolytic activity are called dermatophytes. Dermatophytes can descend deep into the Stratum corneum layer of the host. Thus, they cause inflammatory reactions. The diseases caused by dermatophytes are called dermatophytosis. Fungi that cause dermatophytosis have been observed in various parts of the world and have also caused significant economic losses. The fact that dermatophytosis has a zoonotic character increases the importance of the disease. They always reproduce in infected tissue by forming hyphae and arthrospores. For this reason, genus and species distinctions can be made by the special Spore and hyphae morphologies they form in cultures, as well as by the colony structures they form in the media. These resistant forms can remain viable for longer than 12 months in suitable environments. They breed slowly. They need additional growth factors. They're aerobic. Colonies are pigmented. They are divided into three genera: *Microsporum*, *Trichophyton*, *Epidermophyton*. Dermatophytosis is one of the most common skin diseases of pet and farm animals worldwide. Very young and very old animals are very susceptible to infection. Infection, in animals in general, different parts of the body hair loss, skin dandruff, skin and hair color opening, nail and horn causes various lesions that occur in lifeless tissues such as. High humidity and environmental temperature, neck-shoulder region of leash, chain, harnesses due to the traumatized, hair brushing or grooming during wear, malnutrition, immune system suppression is the cause of dermatophytosis. The causative in the poultry is *Microsporum gallinae*. Poultry such as turkey, rooster, chicken, especially ostrich, peacocks, such as poultry is also very common. It is also occasionally found in cage birds. Poultry is contaminated with food and contaminated animals. The role of geographic location, climate, heat and humidity in transmission is important. Bathing needs of birds and keeping the body wet and moist are among the factors that prepare them. Because the infection is zoonotic, veterinarians, caregivers and farm-dwelling families in zoos or farms are at risk. Dermatophytosis is very common in cattle. The most frequently isolated factor is *Trichophyton verrucosum*. The disease is more common in young and confined animals. In cases where large numbers of cattle are kept together, and during the winter season, the incidence is high. The most common pathogen in horses is *Trichophyton equinum*. Infection mostly occurs in young horses. Lesions are found in the shoulder, neck, back and waist areas. Infected hairs break or break easily and remain in place 1-4 cm diameter alopecia foci covered with a grey scaly scab. The most frequently isolated factor in dogs is *Microsporum canis*. Young dogs are most affected by infection. Lesions are in the form of flaking, scabbing, and alopecia foci, where erythema is shaped. It is commonly seen in cats. The causative is *Microsporum canis*. Cats are the natural host of *Microsporum canis* and are a source of infection for humans and animals. Asymptomatic carriers are common in cats. Most dermatophytes isolated from domestic animals also cause disease in humans. As pets are a potential source of transmission for humans, studies should be increased to determine the factors causing dermatophytosis at the species level. At the same time, pet owners should be made aware of dermatophytosis and should be ensured to keep their animals under regular veterinary supervision.

Key words: Dermatophytes, Dermatophytosis, Zoonosis, Domestic Mammals, Domestic Poultry

THE MOST COMMON INFECTIONS OF PREGNANT WOMEN AT CHUC

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ABSTRACT

Pregnant women typically represent a high risk of severe complications during infectious processes. We are interested in studying the prevalence of infectious pathologies of women pregnant comes to consult at CHUC maternity level. A retrospective study over a period from February 10, 2019 to April 10, 2019 has been carried out. Among the 1122 cases studied, 28% were infected, most of whom were: multiparous, in the first trimester of pregnancy, with a medical and / or surgical history. From the results obtained, we found a presence of all types of microorganism in the population studied (bacterial, viral, parasitic and fungal), with a predominance of bacterial infections compared to others (82%) followed by fungal infections (10%), parasitic infections (5%) and viral infections (4%). Our work shows that urinary tract infections (43%) were the most incriminated, compared to other. Vaginal infection (26%) was classified as the second most important type of infection developed by mothers. Pelvic infection (20%) was in the third position, while listeriosis (5%), toxoplasmosis (4%), hepatitis (1%) and rubella (2%) were ranked last with very low percentages. Finally, the presence of AIDS is rare with only one case. Pregnant women's infection remains a major concern, mainly due to the severity potential of maternal and fetal damage.

Key words : Pregnancy, Infection, Retrospective study, CHUC.

CONTRIBUTION TO THE EVALUATION OF THE LEVEL OF CONTAMINATION BY PESTICIDES OF WATER QUALITY BY THE USE OF A BIO INDICATOR THE BOGUE BOOPS BOOPS (LINNÉ, 1758) FISHED IN THE BAY OF GHAZAOUET (N,W ALGERIA)

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ABSTRACT

Contribution to the evaluation of the level of contamination by pesticides of water quality by the use of a bio indicator the bogue Boops *boops* (Linné, 1758) fished in the bay of Ghazaouet (N,W Algeria. Eco-toxicological monitoring of chemical contaminants and their effects on all the components of a coastal marine ecosystem is today essential from an individual scale to a population scale [1]. Our work aims to assess the degree of pollution by pesticides in the gill, muscle of the bogue Boops *boops* (Linné, 1758) and marine waters of Ghazaouet. The sampling campaign spanned 12-month period (2018 /2019). Out of 380 bogue a specimens and 12 sea water samples from Ghazaouet. The pesticide analysis was carried out using the **SPE / GC / MS** method (Solid Phase Extraction coupled with gas Chromatography and mass Spectrometry). We have demonstrated by GC / MS in sea water, gills and muscle the bogue the presence of organic contaminants namely: Lindane, DDT, DDE and DDD. The organochlorine contaminants found are accumulated in the gills as well as the bogue muscles. The waters of Ghazaouet Bay are impacted by organochlorine pesticides. These results underline that the west Algerian coastline is not spared from chemical pressure.

Keywords : bogue, pesticides, SPE /GC/MS, Ghazaouet, sea water

EFFECT OF POLYMER-GRAFTED SINGLE-WALLED CARBON NANOTUBES ON PEA THYLAKOID MEMBRANES

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ABSTRACT

Carbon nanotubes are nanotools for broad industrial and biomedical application. In the field of nanoagronomy their potential is explored mainly in terms of nanocarriers of agrochemicals and nanobionic sensors. Single-walled carbon nanotubes (SWCNT) were recently shown to penetrate plant cell walls and membranes but their effect on the functional and structural properties of the photosynthetic apparatus is far from being understood. In this work we explore the effect of foliar application of polymer-grafted SWCNT on intact pea plants with particular emphasis on the structural organization and pigment composition of the photosynthetic thylakoid membranes. Transmission electron microscopy showed that upon treatment with SWCNT in the range 10 – 300 mg/L the membranes preserve their stacked configuration. However, extended luminal space that was proportional to the increase in SWCNT concentration was observed. Biochemical granal separation by digitonin treatment revealed increased stacking in the 100 and 300 mg/L variants. Only slight variations were observed in the photosynthesis-related pigments chlorophyll *a* and *b*, β -carotene, neoxanthin and lutein, however dramatic reduction in the deepoxidation index was revealed for the 300 mg/L treated plants. The presented results demonstrate that foliar application of polymer-grafted SWCNT alters the structural organization and photoprotection capability of pea thylakoid membranes. Apparently, the used nanotubes are capable to reach and penetrate the photosynthetic organelles and therefore can be used in future to generate protocols for enhancement of the photosynthetic process especially in conditions of environmental stress.

Key words : single-walled carbon nanotubes, thylakoid membranes, photosynthetic pigments

Acknowledgements: This work was financially supported by the National Science Fund, Bulgaria (grant number KP-06-H36/8).

INVESTIGATION OF EFFECTS OF DAM AND SEQA GENES ON BIOFILM FORMATION IN SALMONELLA WITH COMPLEMENTATION TEST

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ABSTRACT

In this study, the effects of the genes that encoded DNA adenine methylase enzyme (*dam*) and replication origin sites sequestration regulator protein (*seqA*) on biofilm formation in identified the different *Salmonella* serovarieties isolated from Turkey, were investigated by plasmid (pBAD24) complementation test with a promoter that inducible expression of genes of interest in the presence of arabinose was used. For this purpose, chromosomal *dam* and *seqA* genes have been deleted primarily by red recombinase enzyme system based mutation studies in the examined serovarieties. When the biofilm formation properties of the obtained *dam* and *seqA* deletion mutants were examined, it was determined that the ability of biofilm formation in these mutants decreased statistically significantly compared to wild type strains ($p < 0.05$). In the second step to test the accuracy of the data obtained, the *dam* and *seqA* genes were cloned behind the promoter found in the pBAD24 vector and induced in the presence of arabinose. After the cloned recombinant vectors were transformed into *dam* and *seqA* deletion mutants, arabinose was added to the growth media to activate transcription of *dam* and *seqA* genes. All of the *Salmonella* serovarieties complemented with the recombinant pBAD24 plasmid and mutant gene were either produced with similar to wild type strains or higher ($p < 0.05$) biofilm levels. These findings brought certainty to the findings obtained from mutation studies. Because of the common misleading in defining the phenotypic effects of mutations is the mixing of the polar effects of the mutations with their direct effects. Therefore, these data prove that in *Salmonella*, the main function of replication time is to regulate the *d* and *s* genes, which are the regulation of pathogenicity-related properties, as well as in the biofilm regulation.

Key words : Salmonella, dam, SeqA, Biofilm, Plasmid complementation

FOLIAR APPLICATION OF POLYMER-MODIFIED SINGLE-WALLED CARBON NANOTUBES AFFECTS THE PHOTOSYNTHETIC LIGHT UTILIZATION IN PEA PLANTS

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ABSTRACT

Increased environmental spread of carbon-based nanomaterials raises the question of their modes of interaction with plants and therefore with the whole terrestrial ecosystem. Carbon-based nanoparticles such as single-walled carbon nanotubes (SWCNT) have demonstrated promising applicability in plant biology as novel carrier molecules, optical probes, etc. but knowledge on their physiological effects on higher plants metabolism is still missing. In this work we have tested the photosynthetic activity of pea plants sprayed with three concentrations (10, 100 or 300 mg/L) of SWCNT which were grafted with Pluronic P85 co-polymer. The data showed that the highest applied SWCNT concentration reduced the net photosynthetic rate and intrinsic water-use efficiency, and increased intercellular CO₂ concentration in treated pea plants. Moreover, these plants also exhibited reduced actual quantum yield of photosystem II (proportional to the rate of linear electron transport) and lower fraction of operational photosystem II reaction centers. No significant alteration in the maximum photochemical efficiency of photosystem II after 15 min of illumination was found in the different tested samples but significantly slower kinetics of the generation of non-photochemical quenching of chlorophyll *a* fluorescence was evident for the 100 and 300 mg/L variants. In conclusion, our data demonstrate strong concentration-dependent effects of foliar application of P85-modified SWCNT in concentrations above 10 mg/L on the functionality of the photosynthetic apparatus of pea plants. Thus, lower concentrations can be regarded physiologically safe and hence can be further explored as potential carriers of beneficial phytochemicals. Acknowledgements: This work was financially supported by the National Science Fund, Bulgaria (grant number KP-06-H36/8).

Key words : single-walled carbon nanotubes, photosynthesis, photosystem II

**THE EFFECT OF A NISIN PRODUCER STRAIN *L. LACTIS* SUBSP. *LACTIS* LL27
ON THE FORMATION OF *LISTERIA* AND *SALMONELLA* BIOFILM
STRUCTURES**

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ABSTRACT

In this study, the antibiofilm efficacy of the *L. lactis* LL27, isolated from raw milk and identified as nisin producer, against *Salmonella* Typhimurium and *Listeria monocytogenes* biofilms was investigated. For this purpose, the autoaggregation capabilities of each strain were determined first. The strain with the highest autoaggregation ability was determined as *L. monocytogenes* ATCC7644 (0.55), followed by *S. Typhimurium* 14028 (0.677) and *L. lactis* LL27 (0.184). In the cocultures of *L. monocytogenes* ATCC7644 and *S. Typhimurium* 14028 treated separately with *L. lactis* LL27, coaggregation rates (average 0.46) were found close to the autoaggregation rates of the pathogens in question. However, these rates were found to be statistically significant ($p < 0.05$) higher than the autoaggregation rate of *L. lactis* LL27 strain. Biofilm experiments were started, as this indicates that the nisin producer strain of *L. lactis* LL27 may affect the formation of biofilms by reducing the autoaggregation ability of the pathogens in question. *Salmonella* biofilm capacity increased statistically significantly ($p < 0.05$) in *L. lactis* LL27 + *L. monocytogenes* ATCC7644 and *L. lactis* LL27 + *S. Typhimurium* 14028 cocultures. The most interesting result in the study was the statistically significant decrease ($p < 0.05$) in biofilm production capacity on the 3rd day in *L. monocytogenes* ATCC7644 + *S. Typhimurium* 14028 cocultures. These data indicate that direct use of starter culture strains in the fight against biofilm structures of pathogens may promote biofilm production, as opposed to the antagonistic effect expected.

Key words : *L. lactis*, *S. Typhimurium*, *L. monocytogenes*, biofilm

THE EFFECTS OF TEBUCONAZOLE ON CELLULAR AND MOLECULAR LEVEL OF FUSARIUM REFERENCE STRAINS

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ABSTRACT

Fusarium graminearum and *F. culmorum* are a predominant agent of Fusarium head blight and crown rot diseases worldwide. Both of these phytopathogenic fungi lead to mycotoxin contamination and reduction in crop quality and quantity. Tebuconazole is a pesticide belongs to the triazole class, which is frequently used in disease management. In this study, effects of the tebuconazole on reference strains of these two *Fusarium* species were investigated at cellular and molecular levels. The effective concentration (EC50) values of tebuconazole that reduced the reproduction of *F. graminearum* PH-1 and *F. culmorum* FcUK99 reference strains by 50% were determined as 0.94 and 0.80 µg/mL, respectively. According to EC50 value, the toxic effect of the pesticide was also demonstrated with WST-1. The cytotoxicity values of tebuconazole on *F. graminearum* PH-1 and *F. culmorum* FcUK99 were detected as 43%- 32%, respectively. Gene expression analysis showed *mgv1*, *mst20*, *cyp51* and *CAT* genes were controlled by upregulation whereas *tri5* was downregulated gene. Fold change values obtained from real time polymerase chain reaction (qPCR) were calculated as 2.58±0.47 for *mgv1*, 1.91±0.2 for *mst20*, 10.67±3.24 for *cyp51*, 2.89±0.04 for *CAT* and 0.40±0.12 for *tri5*. Apoptosis and oxidative stress were displayed through AoEb (acridine orange-ethidium bromide) staining and DCF-DA (2',7'-dichlorodihydrofluorescein diacetate) staining in *Fusarium* reference strains exposed to tebuconazole with fluorescence microscopy. Also, fold changes in catalase activity were detected as 3.52±0.61 and 4.39±0.19 in *F. culmorum* and *F. graminearum*, respectively. Findings obtained from this study revealed that tebuconazole caused damage to *Fusarium* cells by inducing apoptosis and oxidative stress, and at the same time and increasing toxicity. Findings obtained from the study provided valuable data for strategies to be used to combat *Fusarium* pathogens. As a result, data will contribute to disease management programs.

Key words : *Fusarium graminearum*, *Fusarium culmorum*, Fusarium head blight, crown rot, Tebuconazole, qPCR

TARGETED GENOTYPE ANALYSIS OF FUSARIUM ISOLATES IN 3-ADON CHEMOTYPE

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ABSTRACT

Phytopathogenic *Fusarium* species cause severe product losses and this is not only affect national agriculture, but also threaten public health through mycotoxins produced by pathogens. In this study, chemotyping of *F.graminearum*, *F.culmorum*, *F.proliferatum* and *F.oxysporum* were performed in molecular level via targeted genotype analysis with the aim of a mycotoxin (NX-2) investigation with unknown distribution and revealing mycotoxin production capacity of isolates. In this context, a total of 78 *Fusarium* isolates were studied. Fungal identification was performed by amplification of 28S rDNA region (620bp). The isolates were identified at species level by scanning OPT18 (478bp), and UBC85 (332bp) SCAR markers. Also, *TEF1 α* (Translated Elongation Factor 1 α) gene was amplified for species identification and amplification products (700bp) were sequenced and aligned with the sequences in the reference *Fusarium* genomes in database by using bioinformatic tools. Amplification of *tri13* in the Tri5 gene cluster was targeted for identification of deoxynivalenol (DON) (282bp) and nivalenol (NIV) (1075bp) chemotypes. For further subchemotype analysis, *tri3* gene was targeted. 3-acetyldeoxynivalenol (3-ADON) and 15-acetyldeoxynivalenol (15-ADON) subchemotypes are identified by the amplicon sizes 583bp and 863bp, respectively. For targeted genotype analysis, isolates were screened in terms of DON mycotoxin production capacity of *tri5-tri6* intergenic region. Isolates were classified as large and small amount producers according to 200bp and 650bp fragments sizes. Also, 821bp long *tri1* gene region was amplified in order to cut with *ApoI* restriction endonuclease to investigate NX-2 chemotype. However, it is determined experimentally that these isolates were not NX-2 producers. In spite of this finding, in one isolate *ApoI* cut site was defined bioinformatically. So, the data demonstrated that this isolate may be in NX-2 chemotype and further studies and detailed analysis must be pursued to confirm it. Consequently, these findings will contribute to the mapping of potential toxicological risks in the agro-ecological region.

Key words : *Fusarium* spp., chemotyping, targeted genotyping, Deoxynivalenol (DON), Nivalenol (NIV), small / large amount DON producer, NX-2

PROTECTIVE EFFECT OF TEUCRIUM POLIUM ON TESTICULAR TOXICITY INDUCED BY ACRYLAMIDE IN MALE ALBINO WISTAR RATS

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ABSTRACT

Teucrium polium L. (TP) is a widespread medicinal and traditional of the Lamiaceae family, it's rich in polyphenolic compounds that have potent oxidative stress as found in previous investigations. Therefore, TP can be used to protect organisms from the toxic effects of some chemicals. Acrylamide (ACR) is a toxic industrial chemical which can be found in carbohydrates-rich food prepared at high temperatures causing several toxic effects. The present study was designed to evaluate the protective effect of TP against acrylamide induced testicular toxicity in rats. There are no data on this subject. Male Albino Wistar rats were divided into four groups: group I was used as control, group II received acrylamide (20mg/kg bw), group III received extract of TP (400 mg/kg bw) and group IV received extract of TP and acrylamide by gavage for twenty one days. Body weight of each rat was measured every day. At the end of the experimentation, blood samples were collected to determine plasma testosterone concentrations. The removed testis with epididymis was prepared for histological studies. Our results indicated that body weights of rats treated with acrylamide were significantly decreased compared of control group. Acrylamide also caused a significant decrease in Testosterone levels. Moreover, microscopic observation of the testes and epididymis sections showed that acrylamide reduced size of the epididymis tubules with reduced number of spermatozoa in the tubules lumen, and the testis showed atrophied seminiferous tubules with regression of spermatogenesis as indicated by the absence of sperms in their lumen and the lost of germ cells in some tubules. Pretreatment with TP, significantly increased testosterone levels and recovered both testicular and epididymis tissues from damage with an increase in spermatogenesis. In conclusion, TP has the ability to protect testes from acrylamide toxicity and play a crucial role in reproduction function of male rats.

Key words : *Teucrium polium*, Acrylamide, Testosterone, Histopathology, Testis, Epididymis, Rats

DETERMINATION OF LANTHANUM AND CERIUM TOXICITY IN SOME AQUATIC PLANTS

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ABSTRACT

Rare earths elements consist of 15 elements between lanthanum and lutetium. These elements form more than a hundred minerals and are of economic importance nowadays. Two of these elements are Lanthanum (La) and Cerium (Ce) used in micronutrient fertilizers. Therefore, these two elements are common soil pollutants. Watercress (*Nasturtium officinale*) and *Ceratophyllum demersum* have the ability to accumulate pollutants such as heavy metal. They are suitable for toxicological examination of water-soluble pollutants. In this study, the effects of La and Ce elements on the viability of two aquatic plants and the results of their different concentrations were compared. Data were recorded by applying La (5, 20, 100, 250, 500 mg L⁻¹) and Ce (5, 20, 100, 250, 500 mg L⁻¹) doses to *C. demersum* and *N. officinale* plants. The viability of the *N. officinale* plant started to decrease after 5 ppm La and Ce. Vitality has decreased below 50% in 250 and 500 ppm La application in watercress. Vitality has decreased below 50% in 250 and 500 ppm Ce application in watercress. In all 7, 14 and 21 applications of La and Ce 500 ppm applications, viability dropped below 10%. It was determined that *N. officinale* reacted similar to lanthanum and cerium. The viability of *C. demersum* plant started to decrease as of 5 ppm La and Ce. In *C. demersum* plant, viability decreased below 50% in 100, 250 and 500 ppm La application. In *C. demersum* plant, viability decreased below 50% in 100, 250 and 500 ppm Ce application. There is no vitality in all 7, 14 and 21 applications of La and Ce 250 and 500 ppm applications. It was determined that *C. demersum* reacted similar to lanthanum and cerium. It is evaluated that *C. demersum* is more sensitive to La and Ce metals than *N. officinale*. It has been determined that the metal exposure time is not very important in high applications. Short-term exposure shows the same effect.

Key words : *Nasturtium officinale*, *Ceratophyllum demersum*, Lanthanum, Cerium, toxicity

DETERMINATION OF DNA CHANGES CAUSED BY LANTHANUM AND CERIUM TOXICITY IN WATERCRESS (*NASTURTIUM OFFICINALE*)

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ABSTRACT

Watercress (*Nasturtium officinale* R. Br) is a fast-growing aquatic or semi-aquatic plant and its leaves are consumed by people as vegetables. Being a member of the Brassicaceae family, the plant can tolerate toxic metals in water and soil. Therefore, *N. officinale* plant is suitable for toxicological examination of water-soluble pollutants. Heavy metal accumulation is a very important problem in terms of environment, ecology and nutrition. Low concentrations of rare earth elements can promote plant growth, but high concentrations can inhibit plant growth and also affect human health. Lanthanum (La) and Cerium (Ce) are widely used in micronutrient fertilizers. Therefore, these two elements are common soil pollutants. Slow accumulation of rare earth elements, which are considered to be less toxic to the environment, may cause some problems. Heavy metals cause not only biochemical changes in plants but also DNA damage. For this purpose, different doses of La (0, 2, 5, 20, 50, 100, 250 mg L⁻¹) and Ce (0, 2, 5, 20, 50, 100, 250 mg L⁻¹) were applied in the watercress plants. Then DNA isolation was done from plant samples. DNA damage was investigated using Random Amplified Polymorphic DNA (RAPD) technique with 6 different primers. Genomic stability was calculated based on the change in RAPD bands. Different band formation was determined in the samples exposed to heavy metal compared to the control samples. According to the study results, DNA stability is highly affected by metal pollution. This will help us understand metal genotoxicity. It was also determined that RAPD technique can be an important tool in determining the genotoxicity caused by the exposure of heavy metal in the aquatic environment.

Key words : *Nasturtium officinale*, Lanthanum , Cerium, DNA Change

ALTERNATIVE PROTEIN AND BIOFUEL SOURCE: DUCKWEED

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ABSTRACT

Duckweed are aquatic plant in Araceae family and Lemnoideae subfamily. Up to now, 37 species have been identified in 5 genera (Landoltia, Lemna, Spirodela, Wolffia and Wolffia). They are distinguished from other aquatic plants by their small size. This subfamily contains the world's smallest flowering plants. For this reason, these plants are used as model plants. It is also a suitable plant for toxicity studies and is used for phytoremediation purposes. Recent studies have shown that these plants can be used in larger areas. Duckweed have fast growth rates. Growth rates are twice as high as other vascular plants. Doubling times are 48-96 hours. For this reason, plants with high biomass potential. The biomass of these plants is high in biofuel production potential because it contains highly fermentable sugar. Duckweed are a good product for bioethanol production because it contains high starch and can be used as an alternative source. By using these plants, the costs of bioethanol production can be reduced. Water birds, poultry, fish and other animals use duckweed as food. It is important that these plants are a good source of protein for animal feeding. In terms of the amount of protein, it is the second herbal product which comes after soybean. They contain on average 20-35% protein, 4-7% fat and 4-10% (dry weight) starch. It has also been reported that duckweed is used as human nutrients in some poor parts of Thailand and Myanmar. There is no evidence that these plants are harmful. It shows that the high amount of protein and high biomass can be an alternative source of protein and biofuels.

Key words : Protein, Biofuel, Duckweed

EVALUATION OF ANTIBACTERIAL ACTIVITY OF NATURAL EXTRACTS AGAINST MULTIDRUG RESISTANT SALMONELLA SPP.

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ABSTRACT

In last decade, there is an increasing interest in researches for production of biologically active compounds from natural sources. In Algeria, medicinal plants are frequently used for the treatment of various infectious diseases. The objective of this study was to evaluate the antibacterial activity of *Punica Granatum L*, *Vitis vinifera L*. and *Olea europea L* fruit extracts against multidrug resistant *Salmonella spp*. The total phenolic content of extracts was determined with Folin-Ciocalteu. For the antibacterial activity agar diffusion methods and minimum inhibitory concentration (MIC)-determination were used. Results showed that the peel and seed ethanol extracts of *Punica granatum* contains the highest values of phenolic compounds (880.06, 1160.1 mg GAE/100g, respectively). The three extracts possessed antibacterial activity against all the strains tested particularly against *Salmonella paratyphi A*.

Key words : *Salmonella spp*, antibacterial activity, *Punica Granatum L*, *Vitis vinifera L*, *Olea europea*.

INVESTIGATION OF THE ANTIMICROBIAL ACTIVITY OF THE NON-LETHAL DOSE OF QUATERNIUM-15 ON ZEBRAFISH

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ABSTRACT

Natural or synthetic preservatives are added to products such as foods, medicines and personal care products to prevent microbial growth, unwanted chemical changes and accidental contamination during consumer use. Hexamethylenetetramine chloralyl chloride (Quaternium-15), quaternary ammonium salt, which is used as a surfactant and preservative in many cosmetics and industrial substances, is also among these substances. Quaternium-15 is found in shampoos, conditioners, liquid soaps, shaving products, moisturizing creams and lotions, sunscreens, cleaners, disinfectants and laundry soaps, plastic gloves, metalworking fluids and cutting fluids, latex paints, glues and adhesives, food packaging, paper, cardboard and polyurethane resins. In order to determine the antimicrobial activity of the dose of quaternium-15, which has no negative effects on the vital activity of adult zebrafish (*Danio rerio*), gram (-): *Pseudomonas aeruginosa* ATCC 277853, *Escherichia coli* ATCC 25922, gram (+): *Staphylococcus aureus* ATCC 29213, *Enterococcus faecalis* ATCC 29212 and *Candida parapsilopsis* ATCC 22019 were used. As a control, Vancomycin 30µg for bacteria and Amphotericin-B 100U for yeast were prepared and disc diffusion method was applied. When the antimicrobial effect of the determined dose of Quaternium-15 was examined, it was determined that it was not effective in some bacterial species and fungi. It has been determined that it has a very weak effect compared to the antibiotic used as a control. Considering that Quaternium-15 is used as a protective additive, it is foreseen that it should be used at very high rates in order to provide effective protection in cosmetics and industrial products. It is known that quaternium-15 is a very strong formaldehyde releaser and therefore causes skin disease in humans.

Key words : antimicrobial activity, preservative, quaternium-15, bacteria, fungi.

GENETIC DIVERSITY OF REED CANARYGRASS POPULATIONS OF BALTIC STATES

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ABSTRACT

Reed canarygrass (*Phalaris arundinacea* L.) is a common perennial grass belonging to family Poaceae, subfamily Pooideae, Poodae, Poeae. This species is widespread in the northern part of the world, growing naturally in Europe. It is known as an economically important species, cultivated for biofuel, ornamental and bioremediation purposes. *P. arundinacea* acquires special value in a changing climate due to its ability to adapt in both dry and wet areas. The genetics of this plant have been studied to assess its invasiveness in North America, but information on natural populations in Central and Eastern European countries is still lacking. Present study was aimed at evaluation of molecular diversity of reed canarygrass populations growing along riverbanks in their natural distribution range. Fifty-one populations of *P. arundinacea* were selected in the Baltic States, and some populations were collected from Western Europe and East Asia. We used 14 pairs of microsatellite primers for molecular diversity analysis. The highest and lowest genetic diversity was recorded in Lithuanian populations. The within diversity of *P. arundinacea* populations is greater than that of populations rather than among them. Principal coordinate analysis revealed Asian populations at marginal positions. The same populations of Asia were the most different according to Bayesian clustering. This analysis showed that current populations are admixtures of several genetic groups (STRUCTURE analysis). Study was funded by Lithuanian Research Council, Grant number No. SIT-02/2015.

Key words : *Phalaris arundinacea*, Poaceae, natural distribution range, riparian vegetation, SSR

SOME ASPECTS OF NUTRITION OF LYTHRUM SALICARIA

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ABSTRACT

In recent decades, big attention is paid to the quality of wetlands. Till now, collected data on adverse pollutant effects on the aquatic macroflora are not sufficient to get ideas about long-term consequences. Land use is accompanied by pollution, in particular due to the use of fertilizers in agriculture. Reminders of unexplored nutrients (N in special), finally are moving from the soil into inland waters. Nutrient assessment could help to understand sensitivity of water ecosystems. *Lythrum salicaria* is wetland species that is growing naturally along riverbanks in Europe. Due to secondary metabolites this plant is used for medicinal purposes, valuable for ornamental gardening and for apiculture, important indicator of soil salinity. *Lythrum salicaria* is alien in the United States of America and Canada. Various biological characteristics have been recorded for this species within invasive range of its distribution, but information on ecophysiological parameters is still lacking, especially in the Baltic countries. Our task was to evaluate the differences in leaf N concentration for *L. salicaria* populations growing in distinct parts of Lithuanian riverbanks. Our study included populations of 7 riparian species sampled in the Nemunas river and sea basins. Three independent batches of whole leaves were dried, powdered, and analyzed by the Kjeldahl method. Nitrogen concentration was expressed as a percentage of dry mass (d. m.). The mean leaf N concentration in *L. salicaria* populations was 2.98 % d. m. The lowest N concentration (2.35 % d. m.) was recorded in the populations taken on the banks of the Nemunas river, and the highest (3.94 % in d. m.) was observed in the population along the Neris river. The difference between the most contrasting populations was 1.68-fold ($p < 0.05$). The average leaf N concentration values in Lithuanian *L. salicaria* populations were lower than in other neighboring species, such as *Phalaris arundinacea*, *Stuckenia pectinata*, *Bidens frondosa*, *Phragmites australis*, *Nuphar lutea* or *Echinocystis lobata*. To determine the potential effects of anthropogenic activities and the river quality on nitrogen concentrations in plants, *L. salicaria* populations were divided into 2-5 groups according to: land cover type (based on COoRdinate environmental information classification system; CORINE), river status, geographical location, river size and river regulations. Significantly higher ($p < 0.05$) leaf N concentration was found in *L. salicaria* populations growing near agricultural areas (3.2 % M.) compared to populations near artificial areas (2.8 % d. m.) or forest (2.7 % d. m.). Significantly higher ($p < 0.05$) leaf N concentration was found in *L. salicaria* populations growing near small rivers (3.4 % d. m.) compared to large ones (2.8 % d. m.). *L. salicaria* growing in the center of Kaunas city was found to have a higher than median N concentration, which might be related to point sources of pollution. The majority (77 %) of sampled *L. salicaria* populations were growing in natural parts of the rivers, where the mean value of leaf N population concentration was lower (2.9 % d. m.) compared to the concentration of N populations from regulated river parts (3.2 % d. m.). *L. salicaria* populations might be considered to be affected by neighboring agricultural areas, and N nutrition conditions might be different along the rivers of different sizes.

Key words : land cover, nitrogen, purple loosestrife, riparian plants, river regulation, water macrophytes

LINKS BETWEEN SOME IMPORTANT LITHUANIAN MACROPHYTES AND LAND USE & COVER TYPES

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ABSTRACT

Permanent extension of anthropogenic activities and severe climatic fluctuations threaten the sustainability of ecosystems worldwide. Recently, there has been an increasing attention on ensuring the sustainable use of agricultural, forest and aquatic ecosystems while preserving biodiversity and ecosystem services. Climate change may have various forms and extent depending on geographic region and habitat type. Extreme climate change is likely to have a negative impact on aquatic ecosystems. In order to predict and control the status of the surface waters, it is important to get ideas about the changes in the concentration of key chemicals / nutrients. Nitrogen deposition data together with inland water parameters provide message that nitrogen loads may affect the vegetation of the Baltic States. The aim of this study was to determine the concentrations of nitrogen as the most important nutrient element among the seven most common riparian plants of Lithuania and to evaluate the relations with land use and cover types in the context of changing climate. The mean values (N % of dry mass, DM) of the leaf N concentration, of selected aquatic macrophytes were as follows: *Lythrum salicaria* (3.0) < *Stuckenia pectinata* (3.1) < *Phalaris arundinacea* (3.5) < *Bidens frondosa* (3.8) < *Phragmites australis* (4.0) < *Nuphar lutea* (4.1) < *Echinocystis lobata* (4.2). Use of the CORINE land cover classification revealed, that in riparian sampling sites, neighboring areas were of agricultural use as predominant type of the cover (for 6 out of 7 species), while *Bidens frondosa* was dominated besides artificial cover. *Stuckenia pectinata* was not observed near the areas of artificial cover. Classification of water macrophytes according to their geographical location and water pollution in 1992–1996 in the fragments of the rivers bordering agricultural areas, did not reveal differences in leaf nitrogen concentrations. The nitrogen concentration in the leaves of riverine plant species was not affected by the type of land cover and did not depend on the size of the river also did not depend on status of the river. Among the selected species, the most nitrophilic was the invasive in Lithuania species *Echinocystis lobata*, which is currently spreading along the banks of larger rivers. It may be concluded that the current levels of nitrogen entering riparian ecosystems determine the prevalence of macrophyte species that consume relatively large amounts of nitrogen. Study was funded by Lithuanian Research Council, Grant number No. SIT-02/2015.

Key words : eutrophication, riparian vegetation, nitrogen concentration, nutrition, invasive plant

NITROGEN NUTRITION OF ECHINOCYSTIS LOBATA DEPENDS ON HABITAT

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ABSTRACT

Climate change is often associated with global warming. Vegetation is very sensitive to temperature changes. *Echinocystis lobata* is annual, thermophilic species, invasive in Lithuania. This plant grows along river banks, hydrochory is one of the reasons of successful its spread. Aquatic ecosystems are heavily affected by human activities, fertilisers in special. However, there is still a lack of information on this topic in the Baltic States. Plant nitrogen (N) concentrations could be helpfull tool assessing the impact of pollution on alien species spread. The aim of our study is to estimate the nitrogen concentration of the leaves of *Echinocystis lobata* populations depending on some parameters of the habitats: river size, condition, origin, land use types and geographical location. The 18 populations of *E. lobata* were collected in the Nemunas basin. Leaf N concentration expressed as a percentage of the dry mass (% d. m.) ranged from 3.72 % d. m. (Nemunas population) up to 4.91% d. m. (Atmata population). The most contrasting populations differed 1.32 times ($p < 0.05$). The mean leaf N concentration in the populations was 4.18% d. m. Compared to the most common adjacent riparian species of Lithuania - *Lythrum salicaria*, *Stuckenia pectinata*, *Phalaris arundinacea*, *Bidens frondosa*, *Phragmites australis*, *Nuphar lutea*, *E. lobata* populations had the highest leaf N concentration. Higher than average N concentrations were found in the populations growing in the center of Kaunas city, were former big enough N pollution from point sources was documented. Large rivers are more vulnerable to plant invasions, as can be seen in the case of *E. lobata*, which has spread intensively in Lithuania in recent decades. Larger Lithuanian rivers flow through the most populated cities, which are good donors of seeds of alien plant species grown as ornamental plants, thus facilitating multiple introductions. Large rivers can bring seeds from southern countries where the temperature is more favorable for the thermophilic *E. lobata*. In addition, large rivers flow near agricultural areas, discharging municipal wastewater rich in N pollutants. In some cases, river regulation increases the number of terophytes, including invasive species. In Lithuania, 83 % of river fragments are regulated, but the *E. lobata* populations analyzed in our study grew only in natural parts of rivers. According to the results of our study N, the success of *E. lobata* invasion in Lithuania may depend in part on the increased concentration of N in the aquatic environment. It can be concluded that the current N content entering water ecosystems is high enough to encourage the spread of nitrophilic species.

Key words : invasive plant, Kjeldahl method, riparian vegetation, wild cucumber

SOME SPECIES OF ASTRAGALUS L. (FABACEAE) LEAF ANATOMY IN THE SECTION OF ANTHYLLOIDEI DC.

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ABSTRACT

In this study, some species (*Astragalus tortuosus* DC., *A. szowitsii* Fisch. & Mey., *A. ermineus* Matthews, *A. surugensis* Boiss. & Hausskn., *A. halicacabus* Lam., *A. chardinii* Boiss. and *A. wagneri* Bunge) of *Astragalus* leaves in the section *Anthylloidei* DC., spread in Turkey, were investigated anatomically. Plant samples were collected during their flowering periods between 2011 and 2014. Cross and surface sections were taken from the collected samples by hand and examined with Sartur Reagent and photographs were taken under a light microscope. As a result of examined the sections, the species have similar characteristics in terms of anatomical features and the number of stomata has been found to have more important taxonomic value in distinguishing the species.

Key words : Astragalus, Anthylloidei, Leaf, Anatomy

POLLEN MORPHOLOGY OF SOME POA TAXA IN TURKEY

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ABSTRACT

The genus *Poa* L. which is the largest genus of grasses, contains approximately 575 species worldwide. In Turkey, There are 31 species and 6 of these taxa are Turkish endemics. In this study, 12 taxa of the genus *Poa* which is naturally distributed in Turkey were examined palynologically with Light microscope (LM) and Scanning Electron microscope (SEM). Clustering analysis was performed with the data matrix based on palynological features to determine whether the palynological data were systematically important, or not. Pollen exine ornamentations were categorized by using Image processing programs. Pollen types of 12 *Poa* taxa were determined as Monoporate. The pollen shape of *P. trivialis* was subprolate while the pollen shape of other taxa was determined as prolate-spheroidal. The thickness of the exine was determined between 1,43-2,01 µm. The porus shape was observed as Prolate-Spheroidal in 12 *Poa* taxa. The pores have operculum and the annulus diameter is between 4.10-5.23 µm. As a result, we were found that the types of ornamentation were a distinctive character among the studied taxa. But Exine ornamentation types can not be used in sectional distinction as a result of UPGMA dendrogram.

Key words : *Poa*, Pollen, Turkey

ASSESSMENT OF ECOLOGICAL QUALITY BASED ON AQUATIC MACROPHYTES IN LAKE GÖLHISAR

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ABSTRACT

Lake Gölhisar which is located southwest of Burdur, is a karst lake and the only natural lake in the Dalaman Stream sub-basin of Western Mediterranean Basin. It is also important for tourism and fishing activities. In this study, we aimed to present the ecological quality in the Lake Gölhisar based on presence and coverage of aquatic macrophytes. For this purpose, the lake had been visited and sampled throughout 4 different vegetation periods in 2014 and 2015. Nine emergent taxa (*Alisma lanceolatum* With., *Bolboschoenus maritimus* subsp. *maritimus* (L.) Palla, *Echinochloa crus-galli* (L.) P. Beauv., *Mentha longifolia* subsp. *typhoides* (Briq.) Harley, *Phragmites australis* (Cav.) Trin. ex Steud., *Schoenoplectus lacustris* subsp. *lacustris* (L.) Palla, *Setaria viridis* (L.) P. Beauv., *Typha angustifolia* L., *Veronica anagallis-aquatica* (L.), three submerged taxa (*Ranunculus peltatus* subsp. *fucoides* (Freyn) Muñoz Garm., *Utricularia* sp., *Stuckenia pectinata* (L.) Börner) and two macroalgae (*Cladophora* sp. Kützing, *Spirogyra* sp. Link) were recorded throughout 4 vegetation periods. Ecological quality calculation was measured by using Lake LEAFPACS2 index methodology. As a result of calculation, we measured ecological quality of Lake Gölhisar as moderate with 0,56. Calculation is also consistent with the physicochemical parameters of the lake which are between eutrophic-hypereutrophic. A wetland management plan for conservation and sustainability of the ecosystem in the Lake Gölhisar should be developed without delay. Conservation and sustainability will become more complicated in the future as organic pollution further degrades water quality.

Key words : Macrophytes, Lake, LEAFPACS2, Gölhisar, Denizli.

Acknowledgement: This study was supported by the Republic of Turkey Ministry of Agriculture and Forestry, General Directorate of Water Management.

ASSESSMENT OF ECOLOGICAL STATUS OF THREE NORTH AEGEAN DAM RESERVOIRS BASED ON AQUATIC MACROPHYTES

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ABSTRACT

According to European Union Water Framework Directive, macrophytes are one of the important biological groups to assess freshwater quality. In this study, the water quality of three dam reservoirs which are located in the North Aegean Basin, Turkey was assessed using LEAFPACS2 index. Surveys carried out during the project ‘‘Establishment of a Water Quality Ecological Assessment System Specific to Our Country’’ which were conducted by the General Directorate of Water Management of the Ministry of Agriculture and Forestry, between September 2014 and August 2015, as 4 periods. A total of 15 different macrophyte taxa were recorded from these 3 dam reservoirs. Seven submergent taxa (*Potamogeton nodusus* Poir., *Potamogeton perfoliatus* L., *Zannichellia palustris* L., *Ceratophyllum demersum* L., *Myriophyllum spicatum* L., *Ranunculus trichophyllus* Chaix ex Vill., *Potamogeton crispus* L.); six emergent taxa (*Carex* sp. (1), *Carex* sp. (2), *Paspalum distichum* L., *Echinochloa crusgalli* (L.) P. Beauv., *Vitex agnus-castus* L., *Cynanchum acutum* subsp. *acutum* L.) and two algae taxa (*Spirogyra* sp. and *Chara* sp.) were sampled. LEAFPACS2 calculations could not be performed for 2 reservoirs (Bayrami and Seviřler Reservoirs), because all sampled taxa from these two reservoirs were collected from littoral zone. LEAFPACS2 calculation of Ayvacık Reservoir was performed according to optimum vegetation period of which *Potamogeton nodusus* Poir., *Potamogeton perfoliatus* L., *Potamogeton crispus* L., *Ceratophyllum demersum* L., *Myriophyllum spicatum* L. and *Chara* sp. were recorded. Based on LEAFPACS2 calculation, water quality of Ayvacık Dam Reservoir were classified as in good ecological status.

Key words : Macrophytes, Dam, Reservoir, LEAFPACS2, North Aegean

BIOREMIDANT PROPERTIES OF PLANT ORIGIN B. THURINGIENSIS MP7B ISOLATE AND ITS EFFECT ON THE DEVELOPMENT OF ZEA MAYS IN THE PRESENCE OF LEAD

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ABSTRACT

In recent years rapid increase environmental pollution has pushed researchers to seek natural alternatives. For this purpose, the identification of the fruit isolate MP7B, determination of its properties promoting plant growth, its metal tolerances (Pb, Cu, Ag, Zn), its contribution to the germination and development of the corn plant in the presence of lead were investigated. It was determined that the isolate was Gram positive spore (Bacillus) bacteria, it can reproduce well in wide temperature and pH range, it has amylase, nitrate and strong lecithinase activity. When plant growth promoting properties were examined, strong siderophore production, phosphate solubility, ACC deaminase and good level of indole acetic acid activity were observed. It was determined that all the heavy metals tried could be produced in different concentrations. MP7B, lead MIC and MBC values were determined as 25 to > 100 mM, respectively. It was observed that it can grow in a wide pH range in the presence of lead, but the logarithmic time is longer. It was determined that MP7B had high maize germination success in the presence of lead. Isolate was defined as Bacillus thuringiensis by traditional and molecular methods. The efficiency of MP-7B isolate on the development of Zea mays and its bioremidant / adsorption properties in the presence and absence of lead were investigated by ICP-OES analysis. It was determined that the strain of MP7B (Bacillus thuringiensis) could absorb the lead, promoting the growth of the corn plant, thereby potentially bioremediation strain.

Key words : Bioremediation, Bacillus, Heavy Metal, Plant growth, Zea mays.

**THE METHYLENETETRAHYDROFOLATE REDUCTASE GENE
POLYMORPHISMS AND ALZHEIMER'S DISEASE**

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ABSTRACT

Objective; The implication of Methylenetetrahydrofolate (MTHFR) gene polymorphisms in Alzheimer's disease (AD) risk is still controversial. This study aims to investigate the relationship between C677T and A1298C polymorphisms in MTHFR gene, and Alzheimer's disease in an Algerian population. Subjects and Methods: This case-control study involved comparing a group of 100 patients that had developed Alzheimer disease to 100 controls. Polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) was utilized to genotype MTHFR polymorphisms. Results: logistic regression showed a non-significant association for 667 MTHFR CT and TT genotypes between patients and controls. However, the CC wild type variant was found to confer protection against AD development. The genotypes distribution in cases was 26% CC (wild homozygous genotype), 46% CT (mutant heterozygous genotype) and 28% TT (mutant homozygous genotype). In the control group, the CC genotype frequency was 41%, CT 41% and TT 18%. No statistically significant difference in the A1298C MTHFR polymorphism distributions was found between the two groups. Conclusion; our results did not reveal an association between C677T and A1298C MTHFR polymorphisms and AD risk.

Key words : C677T and A1298C MTHFR gene polymorphisms, Alzheimer's disease, Algerian population.

THE EFFECT OF ANTIBACTERIAL DRESSING ON WOUND HEALING

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ABSTRACT

Antibacterial wound dressing materials based on hydrogel and silver nanoparticles were developed. The materials were used for investigation of healing effect on rats/Albino. An open wound (1.5 cm in diameter) was created on the rats. The open wound was infected with *Staphylococcus Aureus*. Four rat groups were formed each group include 6 rats: Group 1; open wound with no bandage, Group 2; with bandage, Group 3; with antibacterial hydrogel based bandage, Group 4; antibacterial hydrogel was directly applied on wound. The bandages and hydrogel were changed for every two days. The wound healing of Group1 and Group 2 was slow and also infection developed in some rats. The infection formation slowed wound healing. The Group 4 exhibited healing but the best healing was observed in Group3. During the bandage change process, the normal bandage became difficult to separate because it stuck to the wound. But the hydrogel based antibacterial bandage was easily separated from the wound as it did not stick to the wound. And also silver nanoparticle present in the structure prevented infection development during the healing process. As a result, using antibacterial wound dressing is an effective way for wound healing. Antibacterial wound dressing inhibited the infection development and also contributed to healing by absorbing the fluid flowing from the wound.

Key words : antibacterial wound dressing, wound healing, haydrogel, nano silver

IN VITRO PRODUCTION OF DIFFERENT BASILICUM SPECIES TO INCREASE SECONDARY METABOLITE PRODUCTION

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ABSTRACT

Plants in the genus *Ocimum* have traditionally been used to relieve various disease symptoms such as pain, fever and inflammation. Many studies have proven that these herbs have important medicinal properties, such as antibacterial, anti-inflammatory, antiviral and antioxidant activities. For this reason, basil leaves are widely used as a medicine in various diseases. The pharmacological activities of some extracts of these plants were studied in vitro and in vivo without identifying bioactive components. The traditional method of spreading *Ocimum basilicum* are seeds. However, the weak germination potential limits its proliferation. Since in vitro micro-propagation is an effective way of rapid proliferation of species that have limited application of traditional methods, this study will also work with regeneration of basil in tissue culture. Different types of *basilicum* such as sweet basil, dark basil and big leaf basil were used for tissue culture in this study. Different explant of *basilicum* were incubated in MS medium with different concentration of plant growth regulator. The maximum yield of production callus of basilicum was observed in MS medium supplemented with 2 mg/L 2,4-Dichlorophenoxyacetic acid (2,4-D). The indirect organogenesis was observed in MS medium was including 0.5 mg/L Benzylaminopurine (BAP) and 2 mg/L Naphthylacetic Asit (NAA). Secondary metabolites can be increased by applying stress conditions to these calli in vitro conditions.

Key words : basilicum, secondary metabolite, callus, stress, elicitors.

REPRODUCTION OF BASIL (*OCIMUM BASILICUM*) PLANT IN TISSUE CULTURE, AG NANOPARTICLE SYNTHESIS AND EFFECTIVENESS OF PARTICULES IN A-549 LUNG CANCER CELL LINE

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ABSTRACT

Lung cancer is a common type of cancer that is highly invasive and rapidly metastasized. It is a major health problem in the world and is the most common type of cancer in Turkey. Also, since current treatments can adversely affect healthy cells, many side effects are observed. Phytotherapy is one of the alternative treatment methods investigated in order to reduce the side effects as much as possible. In this study, the *Ocimum basilicum* plant, whose anticancer effect was observed in the literature, was selected. Nanoparticles were obtained from basil extract with concentration of 10% g/mL, using the green synthesis method, using water as a solvent. Silver NP was chosen because it is thought to have a broad spectrum antimicrobial effect and may contribute to treatment. The basil were produced in plant tissue culture in order to provide sufficient biomass without being dependent on the outside in supplying the plant. Besides, the most productive hormones of plant in tissue culture are tried. 2 mg/L 2.4D for callus development and 0.5 mg/L BAP+2 mg/L NAA combined hormones have been found to be the most effective for full plant growth in jar. Furthermore, NPs were synthesized from basil both green leaf and dried spice states. The efficacy of synthesized NPs in the lung cancer cell line (A-549) was observed at concentrations of 0.025, 0.05, 0.1, 0.25, 0.5 and 1 mg/mL. By comparing the effectiveness of particles and extract on cells, NPs were found to be more effective than the extract. However, these concentrations were able to reduce viability by up to 84.11%. More intensive concentrations will be tried to reduce viability to less than 50%. In summary, it is predicted that NPs synthesized can be used in the phytotherapeutic treatment of lung cancer with the antimicrobial effect of silver and the presence of anticancer bioactive components in the basil.

Key words : *Ocimum Basilicum*, Tissue Culture, Ag Nanoparticles(NP), Green Synthesis, Lung Cancer

**THE DEPOLLUTION OF THE WHEY REJECTED BY THE CHEESE INDUSTRIES
USING CHEMICAL, PHYSICAL AND MICROBIOLOGICAL METHODS
(BIOCHEMICAL OXYGEN DEMAND MEASUREMENT BOD5).**

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ABSTRACT

In most developing countries, the cheese industry releases thousands of liters of whey a day into the wild. This whey is considered a waste (an unwanted product). It has great biological value but it is also very polluting and harmful to the environment. The aim of this study is to evaluate several methods of depolluting whey on a laboratory scale and extrapolate the results on a large scale (industrial scale). First, the physico-chemical characterization of the whey harvested from *Giplait Tlemcen* (Northwest region of Algeria) was carried out by determining the different parameters that are water, dry extract, protein, lactose and *fat* content and also acidity (pH). After that, different treatments were realized on our samples: physical (saline and thermic precipitation), chemical (alcoholic liquid/liquid extraction) and microbiological (bioreactor system incubation). The measurement of Bod5 of the different samples was made before and after treatment in order to evaluate the depollution performance using an *Oxitop* device, lactic strains isolated from dairy products marketed in the same region and an adapted formula for converting the data we obtained. The results showed that the deproteinization and de-sugaring by microbiological culture had the highest depollution efficiency (a decrease of the BOD5 that reached 29%), these results can be obtained by ultrafiltration, nanofiltration, reverse osmosis and also by bioreactor systems on an industrial scale. As a conclusion, the depollution of the whey goes through its de-sugaring, and the best methods of depollution/valorization and the most easily applicable ones are the drying/atomization and the ultrafiltration/nanofiltration.

Key words : Whey, Depollution, BOD5

**ANTIFUNGAL ACTIVITY AND INHIBITION MECHANISMS OF VARIOUS
PLANT DERIVED NATURAL COMPOUNDS WITH THE EMPHASIS ON
TERPENOIDS AGAINST YEAST CELLS**

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ABSTRACT

Microorganisms develop resistance due to excessive and improper usage of synthetic chemicals as antimicrobials which have high toxic effects in food industry. Therefore, biological preservatives having antifungal properties began to take place of toxic chemicals. Essential oils derived from plants which prevents the deterioration of biofilm formed by yeast and prolongs shelf life as protective agents have recently become important in food industry. However, there is a significant restriction on the usage of essential oils due to variations in their content depending on the extraction methods and storage time. Thus, direct usage of active substances involved in the plant extracts may be preferred for industrial production. On the other hand, knowledge about antifungal mechanisms of substance is an important factor to determine the areas where the components can be used effectively. Cell membrane has a vital role because of providing cellular integrity and homeostasis and carrying out molecular transport. Antifungal agents have activity at very low concentrations via disrupting cell membrane integrity. They can be used for preservation of foods, as well as for additives which are not toxic, and decreasing contamination and biofilm formation via coatings in food industry. We have recently shown that the essential oils and their phenolic terpenoid ingredients disrupt cell membrane integrity and cause leakage of ions resulting in the cell death. In this presentation, antifungal effects of limonene, eugenol, thyme, carvacrol, p-cymene and α -pinene which are included in some essential oils highly such as orange, lemon, turpentine, thyme and oregano against *S. cerevisiae* cells will be discussed. Moreover, antifungal properties of the active ingredients will be defined with a series of experiments. pH and conductivity measurement in the extracellular medium and detection of pre-mRNA leakage will be presented to show the disruption of the membrane integrity. We will also demonstrate that, in addition to the hydrophobic aromatic portion of terpenoids allowing their accumulation in the membrane, presence of the phenolic –OH group is essential for their antimicrobial activity.

Key words : *S. cerevisiae*, limonene, eugenol, thyme, carvacrol, p-cymene, α -pinene

**THE RELATIONSHIP BETWEEN THE CHEMICAL COMPOSITION OF TWO
APIACEOUS SPECIES ESSENTIAL OILS AND THE ANTI-OXIDATIVE EFFECTS
OF THEIR COMBINATION**

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ABSTRACT

Our work is in this context by highlighting the relationship between the chemical composition of the essential oils (EOs) and the biological activities of two local plants of the Apiaceae family; *D. gracilis* and *C. montanum* which have not been studied before. The EOs were obtained by hydrodistillation using a Clevenger apparatus. Chemical analysis of essential oils was done by CPG coupled with MS. The synergistic/antagonistic anti-oxidative effect of the associations between the two essential oils (EOs) was tested by the DPPH test. The assessment involves the measured value of the mixture and the calculated value for each EO tested alone. Chemical analysis showed that both EOs are very rich in phenylpropanoids with 71.1% in the EO of *C. montanum* with Nothoapiol at 62% and 35.6% in the oil of *D. gracilis* which contained two main constituents; the Elemicin (35.3 %) and the Geranyl acetate (26.8 %). For the synergistic effect, the values found for the IC₅₀ of the EOs, tested alone were, 0.001mg / ml for *C. montanum* and 0.002mg / ml for *D. gracilis*. The mixture of the two EOs gave an IC₅₀ of 0.002 mg / ml. Despite the activity, calculated directly from the mixture from the curve, of the two EOs (0.002mg / ml) is very low compared to the BHT IC₅₀ (0.087 mg / ml), this activity is considered antagonistic since the sum of the two individual activities (0.003 mg / ml) is greater than the measured value. These activities can be classified as follows; EO of *Carum*> Mixture of EOs> *Daucus* EO> Quercetin> Rutin> BHT>. These activities are concentration dependent and are attributed to phenylpropanoid molecules acting as electron receptors.

Key words : Aromatherapy, anti-oxidative, essential oils, phenylpropanoides, Nothoapiole.

INVESTIGATION OF BIOLOGY TEACHERS' ATTITUDES TOWARDS USING LABORATORY MATERIALS

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ABSTRACT

In order for biology lessons with important topics related to daily life to be loved by students, to increase their success and to train potential scientists who want to develop themselves in this field, teachers should use student-centered contemporary teaching methods. Laboratory studies improve students' critical thinking, understanding science, operation skills, manual skills. In addition, laboratories are a part of education because they enable them to use information, develop a general concept, define a new problem, explain an observation, and make a decision. However, most studies conducted in our country reveal that teachers do not use laboratories effectively in their lessons and that biology laboratories are not made at a sufficient level. The practical achievements in the curriculum are closely related to the available facilities of schools and the attitudes of teachers. When the data obtained as a result of the studies conducted are investigated, it is seen that there are many results such as improving laboratory facilities, eliminating the lack of equipment and participation of biology teachers in in-service training seminars for laboratory use. In this study, it is aimed to determine the attitudes of biology teachers towards laboratory studies in biology lessons and to suggest solutions to the problems encountered.

Key words : Biology teacher, Laboratory lesson, Microscope, Biology education

COMPARISON OF THE STRUCTURE OF CHITIN EXTRACTED FROM PUPA, COCOON AND PUPA EXUVIAE OF THE TURKISH MULBERRY SILKWORM BOMBYX MORI L.

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ABSTRACT

Since the demand for valuable silk fabric is much higher than the amount of fabric produced, interest in silkworm cultivation is getting increase. With the increase in production, the low commercial value by-products of the silk industry such as pupa, pupa exuviae, and stained and hole cocoons go to waste. This study aimed 1) to identify the structure of the chitins isolated from pupa, waste cocoons, and pupa exuviae left in the cocoon, of Turkish mulberry silkworm, 2) to transform these biowastes from agricultural production into biotechnological product chitin, and to determine possible application areas of this chitin. The chitin samples were examined by Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Scanning Electron Microscopy (SEM), and X-Ray Diffraction (XRD) analyses. Although the pupa and pupa exuviae chitin were determined to be in the α -form, we couldn't decide on that cocoon chitin is in which crystalline form. Considering the results of the analysis and previous studies, we believed that this material isolated from cocoon may be the residues of N-acetyl-D-glucosamine (GlcNAc), the degraded product of the chitin. The yield (17.2%), surface morphology, crystallinity (CrI: 63.1%) and thermal stability (DTGmax: 330 °C) of this cocoon chitin material were determined. Also, the crystallinity of the silkworm pupa chitin (CrI: 80.7%) and the thermal stability of the pupa exuviae chitin (DTGmax: 415 °C) were determined for the first time, and the thermal stability was quite high. Silkworm pupa exuviae can be used as the source of chitin due to its high chitin content (13% of dry weight). Also, porous pupa exuviae chitin can be used in tissue engineering and drug release and the chitins with high thermal stability from pupa and pupa exuviae can be used in heat treatment-resistant, fireproof garments, and thermal therapies.

Key words : Turkish silkworm, chitin, thermal stability, crystallinity, biotechnological application

ADSORPTION PROPERTIES OF XAD-16 RESIN FOR THE REMOVAL OF DIFFERENT CLASSES OF DYES

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ABSTRACT

Dye effluents released into the water as a result of industrial processes threaten human health. These pollutants not only cause the wastewater to become toxic, but also prevent the recovery and reuse of water for a variety of purposes. Nowadays, when “green chemistry” applications are gaining importance, many studies are carried out to clean the water environment. The adsorption process is one of the methods that is used effectively. Synthetic resins that can be used as adsorbents are polymer based, nontoxic, chemically inert, can be modified, stored and regenerated in room conditions without degradation. These properties have increased the use of polymeric synthetic resins. In this study, commercially available Amberlite XAD-16 was used for the adsorption of brilliant green (BG), aniline blue (AB), malachite green (MG) and brilliant cresyl blue (BCB) dyes. Adsorption from aqueous media on the resin has been investigated in a batch system. In order to determine the capacity of the adsorbent, Langmuir and Freundlich isotherms were examined. In addition, initial concentration of the dye, amount of resin, contact time, temperature and pH values were adjusted experimentally in order to illuminate the adsorption mechanism. It was observed that the most effective adsorption in the pH range examined occurred at the natural pH values of the dyestuff solutions and the experiments were continued in that range. It was determined that the increase in temperature contributed positively to adsorption. The pseudo-first order and pseudo-second order kinetic mechanisms were examined and it was found that the adsorption processes of almost all dyes followed the pseudo-second order kinetics with the exception of MG. Thermodynamic data of the reactions were also calculated and ΔG° values were found to be negative when ΔH° and ΔS° values were positive for all dyes. This finding indicated that the adsorption process was spontaneous and endothermic for all investigated dyes.

Key words: Adsorption, XAD-16, dyes, adsorption isotherms, adsorption kinetics

DETERMINATION OF ZINC AND SELENIUM BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

The production of wine begins from vine and grape cultivation. Grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, different wine production areas affect the content of wine. Turkey is known for its old history about viticulture. It has an important position in the world. Soil and trace elements in the soil have an important role in the journey of wine production. Therefore, the trace elements that make wine a healthy drink should be in the desired range. The excessive presence of trace elements causes the toxic effect in wine. It is also necessary to pay attention in wine analysis. Based on this, we analyzed zinc (Zn) and (Se) selenium in wine samples produced in our country's region, Trakya. Zinc is the most abundant essential element in the body after Iron. It should be noted that it is primarily a trace element that plays an important role in DNA synthesis, cell division and the synthesis of other proteins. It is very important for body development and immunity, for insulin and sperm formation. Zinc is involved in the formation of different enzymes. Therefore, deficiency causes problems in sexual development, dwarfism and different growth problems, anemia, chromosomal abnormalities and also skin diseases [1]. In exposure of Se, high doses produce systemic effects; can cause immunological, cardiovascular, dermatological, ophthalmological, neurological, reproductive, developmental, genotoxic and carcinogenic opposite effects and even death [2]. In our study, analysis of Zn and Se elements in 48 wine samples was performed by the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) device. In order to prove the accuracy of the method and eliminate chemical interferences, standard addition method was applied to the wine samples. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5mL of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes, as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Zn is 0,633±0,005 mg/L. Average sample value for Se is 0,0013±0,0009 mg/L. The limited value of American Environmental Protection Agency (EPA) standards for Se in drinking water is 0,07 mg/L [3]. According to Turkish Food Codex, the upper limit determined for Zn in wines is 5 mg/L [4]. As the result of the evaluation according to these data, Zn and Se are below these limits.

Key words : Vine, trace element, Zn, Se, ICP-MS

DETERMINATION OF ARSENIC BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

The production of wine begins from vine and grape cultivation. Grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, different wine production areas affect the content of wine. Turkey is known for its old history about viticulture. It has an important position in the world. Soil and trace elements in the soil have an important role in the journey of wine production. Therefore, the trace elements that make wine a healthy drink should be in the desired range. The excessive presence of trace elements causes the toxic effect in wine. It is also necessary to pay attention in wine analysis. Based on this, we analyzed arsenic (As) in wines produced in our country's region, Trakya. Arsenic exposure has been shown to cause heart disease, skin lesions, cancer and as the result of advanced exposures can cause death as well [1]. In our study, analysis of As in 48 wine samples was performed by the (Inductively Coupled Plasma-Mass Spectrometry) ICP-MS device. In order to prove the accuracy of the method and eliminate chemical interferences, standard addition method was applied to the wine samples. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5mL of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes, as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for As is 1,719±0,12 ppb. The limited value of American Environmental Protection Agency (EPA) standards for As in drinking water is 100 ppb [2]. According to Turkish Food Codex, the upper limit determined for As in wines is 200 ppb [3]. As the result of the evaluation according to these data As is below these limits.

Key words: Vine, trace element, As, ICP-MS

DETERMINATION OF STRONTIUM BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

In course of time, as trace elements pollute the environment and threaten the health of living organisms by creating a toxic effect, the concept of `heavy metal` began to emerge. When metallic pollution occurs, they are not going to disappear, they will turn into complexes and the chances of it becoming more toxic increase because deposits occur [1]. Toxic elements caused by air pollution, pesticides, minerals, trace elements will be absorbed by soil and through bioaccumulation they will pass into the nutrients and in this way metallic toxicity becomes a cycle. Vine, grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, wineries affect the content of wine. Turkey has a very old history related to viticulture and it has an important position in the world [2]. Trace elements that make wine a healthy drink should be in desired ranges. For that reason, it is necessary to pay attention also in wine analyzes. We aimed to determine Sr by ICP-MS in wines produced in Trakya Region to see its efficacy and to evaluate it in health terms based on the result of its concentration. In this work Sr content of 48 different kind of white, rose and red wines from Trakya has been determined by ICP-MS. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5ml of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes as the device parameters were determined from the menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Sr is 0.6 mg /L. Average Japanese wine value for Sr in a work by Sachie H and her friends in Japan in white wines is 1.393 mg/ L and in red wine is 1.636 mg/ L [3]. As the result of the evaluation according to these datas, Sr value in wines that are produced in Trakya is below these limits. There is not any work about the limitation of Sr in wines. Related to the quantity of Sr and fingerprint technique it is possible to find wine's origin. In a work published in 2019, Ekaterina E and her friends found that isotopes of Strontium (⁸⁷Sr/⁸⁶Sr) and high amount of Strontium were the parameters for characterizing its origin and to understand if wine was original or not [4]. In that case it is used as comparable parameter, however it is a heavy metal and heavy metals can cause illness and also death by harming human health, even in very small amounts, such as ppm. Normally, if there is no accumulation and also if there are used in the right amount, metals and salts are used as medicines. An article published in 2004 by Ferda Ö and Esra E explained that the tissue Strontium usually affects into is bone because sometimes in abnormal situations the body binds Strontium instead of Calcium, but if it is taken in appropriate doses it will be used as medicine in osteoporosis. The tolerated dose of Sr as medicine is 2g per day [5].

Key words: Heavy metal, vine, grape, wine, Sr, ICP-MS

DETERMINATION OF CADMIUM BY ICP-MS IN WINE SAMPLES PRODUCED IN TRAKYA REGION

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ABSTRACT

Wine is an alcoholic beverage produced by partially or completely fermentation of grapes. It is a complex structure composition comprising water, alcohol, organic and inorganic compounds, flavoring and phenolic compounds, nitrogen compounds, lipids, vitamins, minerals, dissolved gases and amino acids. [1]. Turkey has a very old history related to viticulture and it has an important position in the world, as well. Vine, grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, wineries affect the content of wine. It is necessary to pay attention also in wine analyzes, because trace elements that make wine a healthy drink should be in desired ranges. [2]. We aimed to determine Cd by ICP-MS in wines produced in Trakya Region to see its efficacy and to evaluate it in health terms based on the result of its concentration. Cd is one of the most toxic metals that it cannot be present in human body, definitely. Cd, which is taken into the body by inhalation, causes diseases such as constant headaches, dizziness, nausea, vomiting, insomnia, asthma, anemia, osteoporosis and cancer (lung and prostate). [3]. In this work Cd content of 48 different kind of white, rose and red wines from Trakya has been determined by ICP-MS. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5ml of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes as the device parameters were determined from the menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Cd is 0.001897 ppm. The work about the determination of heavy metals content of Trakya wines by AAS that was published in 2008, showed that Cd concentration was higher. The highest concentration of Cd was shown especially in red wines (0,7729 ppm). The average value of Cd in red wine samples was 0,2529 ppm. It obtained that pesticides were the main reason of its accumulation in plants [4]. According to Turkish Food Codex, the upper determined limit for Cd in wines is 0.01 ppm [5]. The limited value of OIV (International Organisation of Vine and Wine) standards for Cd in wine is 0.01 ppm [6]. As the result of the evaluation according to these datas, Cd is below these limits.

Keywords: Vine, grape, Cd, ICP-MS, Trakya

ANTIFUNGAL ACTIVITY OF UNFRACTIONATED END-PRODUCTS OF SEVERAL LUPINUS AGAINST FUSARIUM OXYSPORUM

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ABSTRACT

Fabaceae family has been recognized to produce a high diversity of secondary metabolites to defend themselves against herbivores, competing plants and pathogens. *Lupinus* plants are legumes members that form root nodules to fix atmospheric nitrogen and produce more nitrogen-containing secondary metabolites, especially alkaloids, than other plants. Most of those compounds exhibit some biological, pharmacological or toxicological activity and they are synthesized, e.g., as a result of fungal infection or stresses by other factors, so this ability can be explored to find bioactives against phytopatogens. Therefore, as part of our research on antifungal botanicals, the aim of the present study was to assess the antifungal activity of ethanol-soluble raw extracts of four four Lupin species (*Lupinus bogotensis*, *L. guascensis*, *L. mirabilis* and *L. pubescens*). Extracts from leaves, stems, flowers and seeds were evaluated using a micro-scale amended medium protocol and the response to extracts on *F. oxysporum* was then determined, using different concentrations (0.1-10 µg/µL range). Lupin-derived extracts exhibited antifungal activity through mycelial growth inhibition at different levels following a dose-response behavior. The LC-MS-based chemical variability of prepared extracts was integrated with the resulting antifungal activity data through biochemometrics using OPLS-DA modelling in order to determine statistically the active compounds. A prenylated isoflavone and an alkaloid were found to be the most influencing compounds for discriminating active and non-active extracts. Lupin-derived extracts could be considered as potential sources of antifungal compounds. *The present study is a product derived from the Project IMP-CIAS-2924 financed by Vicerrectoría de Investigaciones at UMNG - Validity 2018.*

Key words : Lupinus, Antifungal, Fusarium oxysporum

PROCESS MODELING AND OPTIMIZATION OF BIOGAS PRODUCTION FROM CHICKEN MANURE VIA ANAEROBIC DIGESTION

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ABSTRACT

In this work, the important process parameters affecting biogas production from chicken manure by anaerobic digestion were modeled and optimized using central composite design (CCD) based on response surface methodology (RSM). The independent process parameters were selected as total solids percentage (TS%), inoculum ratio (IR, %), the amount of pumice utilized as support material (PMC, g/L), and particle size of the used material (mm), while the selected responses were chosen as the cumulative biogas production (mL) and removal of chemical oxygen demand (removal of COD, %). The experiments were conducted under mesophilic conditions (37±2), 35 days of digestion time, 95 rpm of stirring speed, 500 mL serum bottles with an active volume of 400 mL. The experimental results indicated that the independent terms (TS%, IR, PMC, and particle size) have significant effect on the selected responses. ANOVA results showed that the quadratic models obtained by CCD for each response were statically importance ($p < 0.05$) and valid to estimate the biogas production from chicken manure by anaerobic digestion. The optimal conditions predicted from RSM for maximum cumulative biogas production were achieved with TS% of 8.92%, IR of 26%, PMC of 6.39 g/L, and particle size of 1.77 mm. Moreover, the optimum points were determined as TS% of 8.10%, IR of 24.62%, PMC of 7.04 g/L, and particle size of 1.76 mm for maximum removal of COD. Under these conditions, the maximum cumulative production and removal of COD were calculated as 8965.87 mL and 68.47%, respectively.

Keywords: *Anaerobic digestion, Biogas production, Chicken manure, Optimization, Response surface methodology.*

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ENHANCED REMOVAL OF ARSENATE FROM AQUEOUS ENVIRONMENTS BY A NOVEL CLAY-POLYMER BRUSH HYBRID MATERIAL: MODELING AND OPTIMIZATION STUDIES BY RESPONSE SURFACE METHODOLOGY APPROACH

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ABSTRACT

The release of a large number of contaminants such as heavy metals, dyes, and pesticides to the aquatic stream from industrial sectors is of great concern due to causing serious health problems for human life and the ecological environment. Among these pollutants, arsenic (As), a heavy metal, has major harm to living healthy. Long-term exposure to this toxic metal could engender serious disease including lung cancer, kidney failure, skin lesions, bladder, and hyperkeratosis. On the other hand, As, a toxic metal, is predominantly existed in two inorganic forms in water resources. One among these is arsenate (As(V)) in oxic condition, indicating that are dangerous for human health and must be removed from aquatic environments. In present work, a novel clay-polymer brush hybrid material prepared by coating bentonite with poly(N-akriloilglisinamit) (poli(NAGA)@B) was investigated for the removal of As (V) from aqueous environments. Response surface methodology (RSM) was used to optimize and model the removal percentage of As(V) with four independent parameters using central composite design (CCD). CCD based on RSM was employed to optimize and model the effects of four independent parameters, such as pH (3–6), initial As (V) concentration (C_0) (0.5-10 mg/L), poli(NAGA)@B dosage (5-40 mg), and contact time (10-150 min). The obtained results showed that the optimal adsorption conditions were established at pH of 4.36, C_0 of 7.30 mg/L, poli(NAGA)@B dosage of 25.75 mg, and contact time of 83.37 min for the maximum %As(V) removal. The maximum adsorption removal percentage of As (V) was %90.95 under the obtained optimal points, indicating that poli(NAGA)@B has superior performance for the removal of As (V) from aqueous environments.

Keywords: Adsorption, Arsenate, Bentonite, Optimization, Polymeric brush, Response surface methodology.

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SUSTAINABILITY ASPECTS OF SOLID OXIDE FUEL CELLS

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ABSTRACT

Energy consumption is steadily increasing, with a growing world population affecting our socio-economic conditions. Environmentally friendly, efficient and secure energy supply is one of the most important issues in the world in terms of technical, economic, social and legal aspects. Fuel cells, as future energy storage devices, are predicted to have a high potential for environmental benefits. Fuel cells that have the potential to grow to a sufficient size for commercial electricity generation applications are beneficial as being efficient and environmentally friendly, as no combustion is needed. Between fuel cells, solid oxide fuel cells (SOFCs) achieve better performance and higher power density, as well as being useful in large, high-power applications such as full-scale industrial stations and large-scale power production stations. SOFCs are also famous for being flexible in the use of fuel such as fossil fuels, e.g., natural gas. This study highlights the importance of solid oxide fuel cell technology in terms of environmental sustainability. Additionally, the benefits of SOFCs over other fuel cell systems are acknowledged. It is well known that the design and operation of SOFC are subject to restrictions on the basis of requirements for materials and fuel specifications. The drawbacks and benefits of SOFCs in relation to energy, the environment and sustainable development are therefore discussed comprehensively.

Key words : Energy; Environment; Solid Oxide Fuel Cells; Sustainability.

EFFECT ON AGRICULTURAL SOIL OF FERTILIZATION WITH SEWAGE SLUDGE: A VIEW ON POLLUTION BY MICRO-PLASTIC PARTICLES

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ABSTRACT

The problematic of microplastics (MPs) has invaded the world, but few take it seriously. What treatment plants deal with in water matrix is surprising and always the impurities end up being trapped in the sludge evidently exposed to the soil triggers the risk of toxicity and stunted development. Microplastics prevalence in agriculture soil publications are very few and reach only 3,86% (He et al., 2018). At present, 13 studies across 11 countries are made to highlight more the biosolids state. An Australian study confirmed that sludge ranged 11,48 to ~ 12,84 million particles/day but currently, there is no a standardized method for the analysis of MPs on aqueous or solid substrates (Subash Raju et al., 2018). In this study, this is a review of the methods followed by different authors depending on each of the aspects that most influence the determination of MPs in the solid substrate: Existence of organic matter and nutrient content, methods of separation by density, types of filters, optical visualization and chemical characterization devices. The process of sample purification and MPs extraction is finalized by a microscopic visualization step and chemical characterization by FTIR. MPs research include many main issues namely sampling strategy (techniques, analytical methods); description of objects (kind of plastics, shapes, sizes); investigation areas (water, amendment, soil, air, products, biota); determination of particle numbers; quantification of degradation processes and determination of biological effect on biota. Although the available evidence suggests that the total environmental exposure to microplastics ingestion and the chemicals associated are minimal, the studies so far contain a significant data gaps which need to be enhanced in future research.

Key words : Agriculture, FTIR, microplastics, sludge, soil, toxicity

DETECTION OF NUTRITIOUS ELEMENTS IN ROADSIDE PLANTS WITH HEAVY TRAFFIC

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ABSTRACT

Air pollution has negative effects on human health, plants and animal health. Air pollution can occur from car exhaust, factory emissions, fuel combustion and other sources. Air pollution occurs when a gas mixture of solid and liquid particles enters into the air due to the incomplete combustion of carbonic compounds in solid fuels and fuel oils. Air pollution negatively affects the nutritive elements in plants. Decreases in the amount of some elements cause nutritional deficiencies in the plant, and increases can damage the plant. In this study, the city center of Erzurum in Turkey in the area with heavy traffic from roadside soil samples were taken deep into the forest. In these samples, the amount of nutrient elements that must be present in the plant were analyzed with the ICP-MS device. According to the results, it has been observed that these nutritious elements increase as they move away from the road.

Key words : ICP-MS, toxicity, nutritious elements

EXPERIMENTS AND SIMULATION ON BIOLOGICAL TREATMENT OF FOOD INDUSTRIAL WATER EFFLUENTS: MILK AND JUICES PROCESSING CASE

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ABSTRACT

In Albania there exist distributed round the country a series of milk and juices processing plants. An enormous quantity of polluted waters continuously is discharged in water streams or rivers passing by these factories. So it is imperative and a must for finding the most effective methods of treating them smartly in order to get rid of surrounding environment contamination, and possibly profiting some usable materials, or simply for material and energy balance improvement. Such a kind of watery discharges have a high content of BOD and COD, high levels of particles in the form of suspended solids, grease, lipids, proteins, and also nutrients such as nitrogen (ammonia, nitrite, and nitrate), phosphates etc. Our study took into consideration primarily their characterization for specific ingredients, and through laboratory tests and computer simulation, tried to define specific processes as most technical effective and economically feasible. The most difficult has been irregularity of the components present in different factories discharges, and the quite a big discrepancy in chemical composition and in most physical properties. These situation asks for an abnormality factor during mathematical models and process simulations in order to describe correctly the system and planning to design a pilot wastewater treatment plant suitable for low testing capacities through using mainly activated sludge treatment for carbon removal, nitrification and denitrification. Throughout the work has been used the STOAT as computed simulation program helping to build a proper systematic model and then was trying to best fit the experimental data comparing with theoretical calculation data. Applying also the descriptive statistics has been reached some optimistic prediction results and defining the proper processing of these contaminated wastewater.

Key words : Wastewater from meat processing, decantation, coagulation, activated sludge, biodegradation, modeling, simulation, design.

HYDROCHEMICAL ASSESSMENT AND GROUNDWATER QUALITY USING STATISTICAL APPROACHES OF THE TERMINAL COMPLEX AQUIFER IN THE REGION OF OUED RIGH (ALGERIAN SAHARA)

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ABSTRACT

Oued Righ valley is part of the northeastern Algerian Sahara, it is characterized by an arid desert climate with very high temperatures in summer. The complex terminal aquifer waters's in Oued Righ evoke serious problems related to the physical and the chemical quality; Larger variations in conductivity are observed that probably due to multiple geochemical processes; these waters which are highly mineralized and concentrated of some elements shown the higher value in recommended potable waters norms of Algeria. In this work, several hydrochemical and statistical approaches are using to demonstrate the correlation between the chemical composition of water of the Terminal Complex and lithology.

Key words : Oued Righ, Terminal Complex , mineralized, hydrochemical, statistical.

**EVALUATING THE EFFECTS OF SOCIAL CONDITIONS ON PERIODIC
CHANGES IN CULTIVATED LANDS AND GRASSLANDS BY REMOTE SENSING
IN VAN LAKE BASIN**

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ABSTRACT

Purpose of the study was to define periodic cultivated and grassland areal changes between 1973 and 2015 with about 14-15 years periods. Three different socio-economic terms (1973-1987, 1987-2002, 2002-2015) were assessed in the study. In first term, rural population and urban population were in a balance in the region. In second term, immigration started from rural areas to urban areas because of security problems and industrial development and in third period, security problems decreased and people was adapted to the urban life in the region. Landsat earth observation satellite dataset was used to be base material and end of July or August images were obtained for each research years. Object based classification technique was applied to extract cultivated lands and grasslands. According to the results, cultivated lands were increased around 130%, and grasslands were decreased around 8% in 43 years. Grasslands were only increase in first period about 18% due to animal husbandry was priority income in the region. However, rural areas were abandoned because of security problems and industrial development in western cities. So that animal husbandry was lost the importance in the region. People was started to do field agriculture instead of animal husbandry in second and third periods. Cultivated areas were increased around 38%, 37% and 22% in first, second and third periods respectively.

Key words : Agricultural areal change, Van Lake Basin, Periodic change, Social policies

MODELLING THE (A)-FACTOR IN A PNEUMATIC BIOREACTOR USING THE TAGUCHI APPROACH

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ABSTRACT

The goal of this paper is to build a relationship for the prediction of α -factor based on the Taguchi approach. The tests were carried in an experimental pilot who comprises a rectangular tank of 84.6 L, fed with synthetic wastewater in the presence of air to preserve the biomass proliferation. The observations reveal that an increase of MLSS to 16 mg. L⁻¹ reduces the α -factor from 0.79 to 0.1. The interpretation of the biological and physical factors impacts on α -factor led to elaborate a surface response RSM and multiple linear regression MLR models at a confidence level of 95%. The R² of the MLR models showed significant values of about ≥ 80 %. It was concluded that the limits of the operating conditions and the design geometry play a key role in the model's ability to explain the experimental change of (α)-factor.

Key words : Oxygen Transfer Coefficient, Taguchi Approach, Activated Sludge, (α)-factor

OVERVIEW OF THE FAUNA BIODIVERSITY IN TURKEY

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ABSTRACT

Biodiversity means the diversity of species in an area. Greater numbers of animal and plant species mean the richness of biodiversity on a particular plot of area. Conservation of biodiversity is very important for mankind. Topics such as natural balances, food sources, industry and economy are directly related to biodiversity. For this reason, the extinction of the species means that human beings will disappear in the future. There are many factors that threaten biodiversity today. The extinction of wild animal and plant species has been one of the most remarkable environmental problems for a long time. A species loss occurring elsewhere in the World can directly have negative consequences for the life of all living things. Integrated approaches of appropriate conservation and sustainable development strategies provide important opportunities for conservation of biodiversity. High species diversity is very important for natural sustainability, and conservation and monitoring of diversity of life is essential for human survival. Biodiversity is tried to be protected by various protection methods such as conservation areas, combat with invasive species, biosafety studies and gene conservation. The fact that protection concerns society raises the concept of public interest. In this study, the importance of biodiversity, the overall situation in Turkey and fauna biodiversity impact factors, destruction and threats to biological diversity are investigated. In addition, informations on biodiversity conservation and sustainability has been discussed.

Key words : Biodiversity, Fauna, Sustainable development, Environment

IMPACT OF CLIMATE VARIATIONS ON THE FLORISTIC DIVERSITY OF PROTECTED STEPPIC RANGELANDS - THE CASE OF THE ALGERIAN STEPPE

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ABSTRACT

The primary purpose of the present work consists of evaluating the floristic diversity of the protected *Stipa tenacissima* rangelands under the conditions of climatic disturbances that have affected the Algerian steppe. The floristic inventory was carried out in stations which represent rehabilitated and restored areas. We took reference stations near of this rangelands. The number of phytoecological surveys carried out was 195 surveys, with 135 species registered. All phytoecological surveys were performed subjectively, while respecting the station scale, and taking in to account the criteria relating to the structural, floristic and ecological homogeneity. The recorded statements were subjected to a Factorial Analysis of Correspondence (FAC) and a Hierarchical Ascending Classification (HAC). The interpretation of the results of the factorial analysis of correspondence have allowed to highlight the main groupings currently characterizing the *Stipa tenacissima* steppes. The results obtained helped to show the changes that occurred in the floristic composition of the vegetation in the protected rangelands. The environmental disturbances that the Algerian steppe is experiencing have led to a regressive dynamic of the *Stipa tenacissima* rangelands.

Key words : : Floristic diversity; Protected Steppic rangelands; Climatic disturbances; Regressive dynamic; *Stipa tenacissima*

ADSORPTION OF BENZALKONIUM CHLORIDE ON HOUSEHOLD PAPER TOWEL

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ABSTRACT

Benzalkonium chloride (BKC) is a cationic surfactant with biocide proprieties. It is widely used in cleaning and personal hygiene products, as well as in some pharmaceuticals. Unfortunately, it negatively affects planktonic growth and biofilm formation, thus its release in waste waters represents a hazard to the environment. Adsorption is both an economically sustainable, and environmentally friendly way of reducing the concentration of such pollutant organic species from aqueous solutions. This work focuses on low-cost, accessible, and already standardized materials (thus no modification of adsorbent characteristics is to be employed), for the adsorption of benzalkonium chloride. Various suitable household adsorbents were evaluated in terms of standardization, cost, and removal efficiency. It was concluded that paper towels satisfy all requirements and were therefore used for further experiments. These were carried out by using aqueous mixtures containing BKC within the range of 0.25 to 1 g/L concentration, as well as 10 g/L adsorbent, respectively. The temperature was varied between 18 and 45 °C. Kinetic experiments were conducted by recording absorbance values for the aqueous phase, at 262 nm. Depending on employed experimental conditions, equilibrium was reached between a few hours and 14 days. Testing various kinetic models led to the conclusion that the overall process follows a Lagergren pseudo-second order one. Rate coefficients and equilibrium adsorption capacities were calculated by means of the second-order rate law, at different temperatures, thus leading to the determination of the overall activation energy. Various thermodynamic models (adsorption isotherms) were compared at 298 K. The Redlich-Peterson and Langmuir models were in best agreement with experimental data. Values of Gibbs free energy and overall activation energy, respectively, suggest that the process involves mainly chemisorption. Comparison among adsorption capacities of various adsorbent species as well as among the pseudo-second order rate coefficients of the processes, further emphasized the fact the household paper towel was a good choice for the economically sustainable removal of benzalkonium chloride from grey waste waters.

Key words : benzalkonium chloride, adsorption, household paper towel

**EVALUATION OF THE STREAMS IN THE CAMILI BIOSPHERE RESERVE
AREA (ARTVIN, BORÇKA) ACCORDING TO PHYSICOCHEMICAL VARIABLES
AND SOME HABITAT CHARACTERISTICS**

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ABSTRACT

Camili District, the first biosphere reserve area of Turkey, is a part of the Caucasus Biodiversity Hotspot. Besides, many conservation areas such as Borçka-Karagöl Nature Park, Camili-Gorgit Nature Conservation Area and Camili-Efeler Nature Conservation Area are also within the boundaries of the region. The present study aimed (1) to determine the sections with reference habitat conditions by locating the anthropogenic effects on the streams forming the Camili Basin, (2) to determine the water quality classes of the sampling sites according to the physicochemical variables, and (3) to classify the sampling sites according to the EU Water Framework Directive, System A and B classification. Within the scope of the study, 23 sampling sites were determined from the region. In each site, water temperature, pH, electrical conductivity, total dissolved solids, the concentration of dissolved oxygen were measured, and then water quality classes of the sites were determined. Besides, by locating whether there was any human destruction on and around the sites, reference habitats were determined according to the natural habitat conditions of the sampling sites. In addition, some information such as stream order, current velocity, altitudes, stream region, distance from the source, and land slopes were also provided. As a result of the evaluation, 17 sites that were not under the influence of agriculture-animal husbandry, permanent settlement and physical destruction were identified as the sites with reference habitat characteristics. Seven of them were on 1st stream order, 12 of them on 2nd stream order, three of them on 3rd order, and one of them on 4th stream order. According to physicochemical variables, the water qualities of 12 sites were determined as Class I, four sites were Class II, six sites were Class III, and one site was Class IV. According to the results of the assessment of the stream orders, six of the 17 reference sites were located on 1st stream order, 10 of them on 2nd stream order, and one them on 3rd stream order. Any reference site was not found on 4th stream order. As stream order increases, the physicochemical and hydromorphological features of streams change, as well. As a result of these changes, natural deterioration in water and habitat qualities can be observed. However, the distortions observed in the sampling sites that did not meet the reference conditions in the present study were not natural but human-caused. Therefore, the reason for not having any reference site on 4th stream order was due to anthropogenic effects. Streams in an isolated and protected area, such as the study area, are expected to have high water quality. However, as a result of water quality assessments, it was observed that some sites had III. and IV. Class water quality. The variable that caused this situation was pH. The pH value decreases due to episodic acidification, which is generally encountered during melting periods of snow and ice masses. Due to the fact that the periodically occurring and the temporary phenomenon was observed during the sampling period, it resulted in low water quality values. If the situation observed in pH values was ignored, the water quality of all sites corresponded to the I. and II. Class. Continuing conservation work is essential to maintaining the quality of river habitats in the region.

Key words : Biodiversity hotspot, Habitat quality, Protected area, Turkey, Water quality.

COMPARISON OF DIFFERENT ESTIMATION METHODS IN BIVALVE GROWTH

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ABSTRACT

A total of 594 samples of the smooth clam *Callista chione* were collected monthly from Martil coast of the eastern Moroccan Mediterranean Sea, from July 2016 to July 2017. This study tested four widely used methods to estimate Von Bertalanffy growth parameters. Total length of samples was measured, arranged in size groups and analyzed through FiSAT II software against percentage size frequencies using automatic scan of ELEFAN I, Shepherd's method and Powell-Wetherall Plot. The Ford-Walford (F-W) plot method was applying from mean length-at-age data. Results showed different values of growth parameters for the various methods. The asymptomatic length L_{∞} ranged between 94.5 and 103.1 mm and the growth rate K varied from 0.38 to 1.4 per year. Age at zero length t_0 was estimated following von Bertalanffy plot to be 0.43. The F-W plot presented the most objective method and recorded the closest values to reality compared to the other methods. This study demonstrates that length frequency distribution analysis request the perfection of the length range of the samples to obtain better results. In fact, the knowledge of the species growth is an important input for fishery management. Based essentially on the characteristics of the studied population, the choice of the right method is the key to the success of the study for a better stock assessment.

Key words : *Callista chione*, ELEFAN I, Ford-Walford, growth, Powell-Wetherall, Shepherd's

**STUDY OF MANGANESE CONTENT IN THE EXCHANGEABLE AND
CARBONATE PHASES IN THE SEDIMENTS OF THE BADOVCI AND BATLLAVA
LAKES (KOSOVO)**

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ABSTRACT

The study was carried out to investigate the manganese content in the sediments of the lakes. The water analyzes of the Badovci Lake, showed a higher concentration compared to the limits of the Directive EC 98/83, while the waters of the Batllava Lake were below these limits. The analysis of the lakes sediments by the fractionation method showed high values of the manganese content in the carbonate and exchangeable phases. These values are worrying because the manganese bound in these phases can very easily pass into equilibrium in the solid/liquid phase, and become bioavailable in the aquatic ecosystem. Also, according to the risk criteria (Risk Assessment Code), manganese content in the sediments of two lakes was classified as high risk, because in both lakes the sediments showed manganese content higher than 30%.

Key words : Manganese, exchangeable, sediment, Kosovo

THE LEAD MOBILITY AND TOXICITY ASSESSMENT IN THE SEDIMENTS OF THE BATLLAVA AND BADOVCI LAKES (KOSOVO) THROUGH POLLUTION INDICATORS

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ABSTRACT

The purpose of this paper was to evaluate the mobility and toxicity of lead in the sediments of the Batllava and Badovci lakes. Pollution indicators were used to confirm the level of sediment pollution such as contamination factor, pollution load index, geoaccumulation index and enrichment factor. The study shows that sediments from these lakes have lead contents that exceed values by international guidelines limits. According to lead content classification, lake sediments are classified as light to medium toxic. Lead concentration was also analyzed in the waters of two lakes, and concentration measured was at very low values compared to EC Directive 98/83, respectively below the detection level < 0.01 mg/L. The average value of Pb in the Badovci Lake sediment was 166 mg/kg, while in the Batllava Lake 30.6 mg/kg. Comparing with international guidelines and by some lakes in the region, the sediment of the Badovci Lake exceeds the international guidelines values and the referent lakes of the region. The pollution indicators in the sediment of the Badovci Lake were CF 10.42 classified as very high, PLI 10.42 extreme, Igeo 2.09 medium to high, and EF 1.88 minimum. Whereas in the Batllava were CF 1.92 medium, PLI 1.92 medium, Igeo 0.38 low to moderate, and EF 1.72 minimal. These lakes should be monitored more frequently due to the possibility of changing lead content by changing environmental conditions. The Batllava Lake sediment in terms of lead content, according to the pollution indicators used it was in better condition compared to the Badovc Lake sediment.

Key words : Toxicity, mobility, lead, Kosovo

ASSESSMENT OF CONTAMINATION BY METALLIC TRACE ELEMENTS IN SOLE SOLEA SOLEA (LINNAEUS, 1758) FISHED IN THE BAY OF GHAZAOUET (NW ALGERIA)

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ABSTRACT

The present work consists in evaluating the quality of the West Algerian coast using a biological approach based on the estimation of the contents and the bioavailability of two metallic trace elements copper and lead in a teleostean fish: *Solea solea* (Linnaeus, 1758), fished in the bay of Ghazaouet. Sampling was spread over a period of six months on 100 individuals, including 45 females and 55 males. The metal analysis was carried out on the whole population, two organs were removed. The determination of metals was carried out by flame atomic absorption spectrophotometry (S.A.A). The comparative analysis of the mean lead and copper concentrations in the branchial and muscular tissues show that the importance of the metallic accumulation is in the following decreasing order: gills > muscle. The results that we have recorded indicate that there is a downward trend in the average levels of the two pollutants during the winter period compared to the fall period. The seasonal factor is therefore important and numerous studies have shown that the metal concentrations measured in marine species vary seasonally. We conclude that the sole coming from Ghazaouet bay does not seem to present a real danger for the consumer compared to the Maximum Acceptable Dose (DMA), it should be remembered that these micropollutants have a cumulative effect through the trophic chain, and that they have a long-term harmful effect on public health.

Key words : *Solea solea*; Metallic pollution; S.A.A; D.M.A; Bay of Ghazaouet

CLIMATE CHANGE IN TURKEY

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ABSTRACT

The present study aimed to investigate the climate change inducted by global warming in Turkey. The reasons for climate change experienced due to global warming could be categorized in two groups: natural and artificial reasons. Natural causes of global climate change include magnetic solar storms, deviations in the axis of the Earth, and the increase of the kurtosis of the Earth orbit around the Sun, the El Nino effect, and artificial causes (anthropogenic activities) include fossil fuel consumption, greenhouse gases, and the reduction of the ozone layer. The increase the density of atmospheric greenhouse gases such as Carbon Dioxide (CO₂), Methane (CH₄), chlorofluorocarbon gases (CFC-11, HCF-C22, CF₄, etc.) and Nitrogen (N₂O) is the main source of global warming. The carbon dioxide emissions in Turkey are concentrated in two industries: the energy sector (86.3%) and industrial processes (13.4%). Methane emissions are mainly due to agriculture (62.30%) and energy industry activities (21.30), waste emissions (16.4%), while N₂O emission sources include agricultural activities (71%), waste emissions (15.1%), energy sector (10.7%) and industrial processes (3.3%). When compared to 1990, CO₂ emission per capita has increased about 1.5-fold today, which is a serious warning to take precautions. As a result, a reduction in the diversity of species to climate change as it is seen today in Turkey.

Key words : Global warming, climate change, CO₂, N₂O, CH₄

COMPARISON OF THE STRUCTURE OF CHITIN EXTRACTED FROM PUPA, COCOON AND PUPA EXUVIAE OF THE TURKISH MULBERRY SILKWORM *BOMBYX MORI* L.

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ABSTRACT

Since the demand for valuable silk fabric is much higher than the amount of fabric produced, interest in silkworm cultivation is getting increase. With the increase in production, the low commercial value by-products of the silk industry such as pupa, pupa exuviae, and stained and hole cocoons go to waste. This study aimed 1) to identify the structure of the chitins isolated from pupa, waste cocoons, and pupa exuviae left in the cocoon, of Turkish mulberry silkworm, 2) to transform these biowastes from agricultural production into biotechnological product chitin, and to determine possible application areas of this chitin. The chitin samples were examined by Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Scanning Electron Microscopy (SEM), and X-Ray Diffraction (XRD) analyses. Although the pupa and pupa exuviae chitin were determined to be in the α -form, we couldn't decide on that cocoon chitin is in which crystalline form. Considering the results of the analysis and previous studies, we believed that this material isolated from cocoon may be the residues of N-Acetyl-D-glucosamine (GlcNAc), the degraded product of the chitin. The yield (17.2%), surface morphology, crystallinity (CrI: 63.1%) and thermal stability (DTGmax: 330 °C) of this cocoon chitin material were determined. Also, the crystallinity of the silkworm pupa chitin (CrI: 80.7%) and the thermal stability of the pupa exuviae chitin (DTGmax: 415 °C) were determined for the first time, and the thermal stability was quite high. Silkworm pupa exuviae can be used as the source of chitin due to its high chitin content (13% of dry weight). Also, porous pupa exuviae chitin can be used in tissue engineering and drug release and the chitins with high thermal stability from pupa and pupa exuviae can be used in heat treatment-resistant, fireproof garments, and thermal therapies.

Key words : Turkish silkworm, chitin, thermal stability, crystallinity, biotechnological application

PRODUCTION OF HIGH PERFORMANCE TISSUE SCAFFOLDS BY ELECTROSPINNING TECHNIQUE

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ABSTRACT

With the newly developed production techniques, it has started to be used as a biomaterial in ceramics. The characteristic properties of ceramics are that they are hard, porous, brittle, resistant to corrosion and body fluids, high compression strength and biocompatible properties. Thanks to these features, it is used in dental, orthopedic and heart related applications. Calcium-phosphates (Ca-P) form the basis of the inorganic part of the bone. Ca-P is used in a similar way to synthetic bones. Hydroxyapatite (HA) is widely used in hard tissue formation with its high osteoconductivity, low degradation rate and high mechanical strength with hard tissues and very good biocompatibility. Polystyrene (PS) can provide repair of bone tissue repair and bone tissue regeneration. It allows the cultured cells to be adhered, multiply, and differentiated. Cell combination and proliferation make up the tissue. It is one of the most preferred methods due to the similarity to the natural extracellular matrix (ECM) of the structure obtained by the electrospinning technique in the production of nanofiber tissue scaffolds. In this study, PS polymer was made into solution with the help of ethyl acetate (EA) solvent. By supplying 1%, 5% and 8% natural source hydroxyapatite (NSHA) to PS, a solution with four different compositions was obtained. Nanofiber containing membranes were obtained by electrospinning, a nanotechnological method, from 10% PS, 10% PS- 1% NSHA, 10% PS- 5% NSHA and 10% PS- 8% NSHA solutions. The material properties of the produced membranes were determined by structural (FTIR, Fourier Transform Infrared Spectroscopy), morphological (SEM, Scanning Electron Microscope), mechanical (TENSILE) and biological (CELL CULTURE) analysis. As a result of the obtained findings, it will be able to show the ideal tissue scaffold material properties for tissue engineering applications.

Key words : Polystyrene, natural source hydroxyapatite, electrospinning, nanofiber membrane, tissue engineering.

EFFECTS AND CHARACTERIZATION OF ELECTROSPINNING TECHNIQUE WORKING PARAMETERS ON POLYMERIC MEMBRANE MORPHOLOGY

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ABSTRACT

When the concept of fiber in general is considered, the term "nano" refers to the size of the fiber diameter. One of the most important techniques developed to form fibers is the electrospinning method. With this production method, it is possible to obtain nano-sized, low weight and high mechanical strength biocompatible materials. Electrospinning technique is the process of converting fluid into nanoscale fibers by giving a kilovolt tension to viscous liquids at very small flow rates. Applying high voltage to the polymer solution is the key point of the electrospinning process. When voltage is applied, the electric field obtained affects the stretching and acceleration of the jet. The distance between the needle tip and the collector plate will determine the distance at which the jet will occur and affect the intensity of the electrostatic forces. At this distance, fiber formation occurs, the solvent is removed and the fiber solidifies, the time of storing the fiber in the collector takes place in the meantime. Feed rate is an important parameter affecting the speed of the jet and the material transfer rate. In this study, polymeric membranes were obtained by electrospinning technique using different biocompatible polymers such as polycaprolactone (PCL), polyvinylalcohol (PVA) and polyacrylonitrile (PAN). The morphological effects of the electrospinning technique on the nanofiber membranes obtained by keeping the voltage, working distance and feed flow characteristics constant among each other were investigated. Material properties were determined by conducting morphological (SEM-Field Emission Gun Scanning Electron Microscope), structural (FTIR-Fourier Transform Infrared Spectroscopy) and mechanical (TENSILE) analysis to the produced polymeric membranes. The polymeric membranes obtained are aimed to be used for purposes in sectors such as health, filtration, defence, textile and agriculture.

Key words : Polycaprolactone, Polyvinyl Alcohol, Polyacrylonitrile, Electrospinning, Nanofiber, Membrane.

PRODUCTION OF CHICKEN FEATHER AND POMEGRANATE (MOMORDICA CHARANTIA) REINFORCED POLYVINYL ALCOHOL ANTI-SCAR WOUND HEALING MEMBRANES

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ABSTRACT

Only 30 thousand tons of chicken feathers (CF) a year in Turkey is emerging waste. Despite the increasing environmental problems day by day, all kinds of works are important steps for our world. Compared to artificial materials, the use of natural and nature compatible materials is becoming a common subject of thought for all scientists. CF contains 91% creatine. CF has similar properties with other fiber materials and is similar to wool due to its creatine structure. It is 6-8 times more resistant than cellulosic fibers. It has superior properties compared to natural fibers such as wool and cotton in special applications. The most striking feature is that the CF radius is thinner and therefore the absorption feature is higher than other fibers. CF is used in many sectors and it has usage as a wound healing and scar removal due to absorption feature. Pomegranate (*Momordica Charantia*) (P), which is a fragmented, leafy, climber, herbaceous plant, has many effects in the health sector. It is used especially for the rapid healing of wounds. The wound area may be bumpy. Therefore, CF cannot provide an effective use and sufficient recovery time since it will flow over the wound. By using the nanotechnological electrospinning technique, the nanofiber membrane is produced to accelerate wound healing by ensuring that the wound is not allowed to breathe and allow bacteria to pass. In this study, anti-scar wound healing membrane was produced by using electrospinning technique from polyvinyl alcohol (PVA) solutions with P and CF additives. It is aimed to be an ideal wound healing biomaterial as a result of the values obtained by performing morphological (Scanning Electron Microscope (SEM)), mechanical (Tensile), biological (Cell Culture) characterization to the produced membranes.

Key words : Pomegranate, chicken feather, polyvinyl alcohol, electrospinning, nanofiber, wound healing.

PRODUCTION OF ANTI-SCAR WOUND BANDAGES WITH NANOTECHNOLOGY ADDITIVE FROM SPIDER WEB, TEA TREE OIL, ECHINACEA AND ALOE VERA ADDITIVE POLYMER SOLUTIONS

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ABSTRACT

Spider web (SW) has been used as a wound healing material in the regions for many years. Age tree oil (ATO) is a natural antibacterial and antifungal agent. When 100% ATO was applied to the cut with the help of gauze, it showed a quick healing feature. Echinacea (E) can help the wound heal in high stress processes, but it does not have such an effect in low or medium stress processes, in this case, it can affect wound healing for a long time with the help of polyvinyl alcohol (PVA) and polycaprolactone (PCL) polymers. Wound healing membranes are produced with electrospinning technique that does not contain chemicals and has the ability to form perfect films. In this study; the nanofiber membrane is produced by nanotechnological electrospinning technique using PVA polymers containing SW and E additive PCL, ATO and AV additives. Morphological (Scanning Electron Microscope (SEM)), mechanical (Tensile), biological (Cell Culture) characterization studies have been performed on the produced nanofiber membranes. In the light of the obtained values, in addition to many applications of the health sector, it can be especially fast wound healing and scar removal material.

Key words : Spider web, tea tree oil, echinacea, aloe vera, polycaprolactone, polyvinylalcohol, electrospinning, wound healing

COMPARISON OF THE STRUCTURE OF CHITIN EXTRACTED FROM PUPA, COCOON AND PUPA EXUVIAE OF THE TURKISH MULBERRY SILKWORM *BOMBYX MORI* L.

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ABSTRACT

Since the demand for valuable silk fabric is much higher than the amount of fabric produced, interest in silkworm cultivation is getting increase. With the increase in production, the low commercial value by-products of the silk industry such as pupa, pupa exuviae, and stained and hole cocoons go to waste. This study aimed 1) to identify the structure of the chitins isolated from pupa, waste cocoons, and pupa exuviae left in the cocoon, of Turkish mulberry silkworm, 2) to transform these biowastes from agricultural production into biotechnological product chitin, and to determine possible application areas of this chitin. The chitin samples were examined by Fourier Transform Infrared Spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Scanning Electron Microscopy (SEM), and X-Ray Diffraction (XRD) analyses. Although the pupa and pupa exuviae chitin were determined to be in the α -form, we couldn't decide on that cocoon chitin is in which crystalline form. Considering the results of the analysis and previous studies, we believed that this material isolated from cocoon may be the residues of N-acetyl-D-glucosamine which is the degraded product of the chitin. The yield (17.2%), surface morphology, crystallinity (CrI: 63.1%) and thermal stability (DTGmax: 330 °C) of this cocoon chitin material were determined. Also, the crystallinity of the silkworm pupa chitin (CrI: 80.7%) and the thermal stability of the pupa exuviae chitin (DTGmax: 415 °C) were determined for the first time, and the thermal stability was quite high. Silkworm pupa exuviae can be used as the source of chitin because of its high chitin content (13% of dry weight). Also, porous pupa exuviae chitin can be used in tissue engineering and drug release and the chitins with high thermal stability from pupa and pupa exuviae can be used in heat treatment-resistant, fireproof garments, and thermal therapies.

Key words : Turkish silkworm, chitin, thermal stability, crystallinity, biotechnological application

DOES FOLIAR APPLICATION OF SINGLE-WALLED CARBON NANOTUBES AFFECT THE PHOTOSYNTHETIC ELECTRON TRANSPORT CHAIN IN HIGHER PLANTS?

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ABSTRACT

Application of carbon-based nanomaterials is considered as highly promising for improvement of a number of agricultural practices e.g. for decreased usage of pesticides and newly formulated fertilizers. However wide application of the carbon-based nanomaterials is impossible without thorough investigation on their effects on the basic metabolic pathways in higher plants and especially – on photosynthesis. In the current work we explored the photosynthetic apparatus functionality in pea (*Pisum sativum* cv. RAN1) plants sprayed with three concentrations (10, 100 or 300 mg/L) of single-walled carbon nanotubes (SWCNT) grafted with Pluronic P85 polymer. For this purpose we recorded fluorescence induction curves of chlorophyll *a* by means of M-PEA fluorimeter (Hansatech Instruments Ltd) and performed differential curves analysis and JIP test of the chlorophyll *a* fluorescence induction curves. Both types of analyses proved that the photosynthetic apparatus of 10 mg/L-treated plants is barely affected. Differential curves of 100 mg/L- and 300 mg/L-sprayed plants demonstrated concentration-dependent changes in the shape of the induction curves, more specifically in the J-I and I-P phases of the curves which points to slower reduction of plastoquinone and end acceptors. Furthermore, JIP test of these two variants revealed that while photosystem II is suppressed by the application of SWCNT (PIABS), the efficiency of electron flow towards the end acceptors of photosystem I is enhanced (ϕRo). The JIP analysis also indicated higher propensity for functional grouping of the light-harvesting antennae (P2G) and increased dissipation of excitation energy (DI0/RC) which implies organizational alterations of the photosynthetic machinery in these two variants. Our results point that the utilized SWCNT interfere with the photosynthetic electron transport chain in higher plants.

Key words : single-walled carbon nanotubes, photosynthesis, JIP test

Acknowledgements: N.P. is thankful for the financial help from the Bulgarian Ministry of Education and Science National Programme „Young Scientists and Postdoctoral Fellows“.

IDENTIFICATION OF VOLATILE ORGANIC COMPOUNDS FROM LOCALLY ISOLATED SOIL MICROBE WITH ANTIFUNGAL ACTIVITY AGAINST OIL PALM PATHOGEN GANODERMA BONINENSE

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ABSTRACT

The sustainability of oil palm plantation is threatened by the Basal Stem Rot (BSR) disease which causes huge economic losses to Indonesia and Malaysia annually. BSR is caused by the phytopathogenic fungus, *Ganoderma boninense*. Fungicides have been applied to halt the spread of this fungus, however, consistent use of these chemicals have negative impacts on the environment such as damaging the beneficial soil microbe community and development of fungicide resistance in the pathogen. Therefore, the development of a new strategy which is environmentally friendly such as the application of biological control is essential. Therefore, this study aims to determine the Volatile Organic Compounds (VOCs) from locally isolated soil microbe with antifungal activity against *G. boninense*. Dual-chamber assay against *G. boninense* showed strong antagonistic effects against the *G. boninense*; with Percent Inhibition of Radial Growth (PIRG) values of more than 70%. Several VOCs were known to act as antifungals such as Benzyl cyanide and hexamethylcyclotrisiloxane were identified from the Gas Chromatography-Mass Spectrometry (GC-MS) analyses. These findings indicate that local isolates can potentially be used to develop bio-chemical agents in managing the spread of *G. boninense* and ensuring sustainable production of the oil palm industry.

Key words : antifungal; bio-chemical agents; *Ganoderma boninense*; oil palm; *Streptomyces* sp.

**EFFECT OF TWO PHYTOECDYSTEROIDS ON DEVELOPMENT AND
DETOXIFICATION ENZYMES ACTIVITIES OF THE INSECT PEST *TRIBOLIUM
CASTANEUM***

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ABSTRACT

The indiscriminate use of insecticides is causing the appearance of pest populations resistant to insecticides and serious environmental and health issues. To avoid these problems, the search for new biopesticides of plant origin is currently one of the most actively investigated subjects. Phytoecdysteroids are secondary metabolites produced by many plant species. They represent analogs of insect hormones (ecdysteroids) which are involved in insect growth, development and reproduction. In this work, we carried out the effect of two phytoecdysteroids (20-Hydroxyecdysone and Makisterone-A) on the insect pest, *Tribolium castaneum* (coleoptera:tenebrionidae). We started our study by testing the ingestion effect of those molecules at different concentrations (300, 600, 900 and 1200 ppm), on some post-embryonic development parameters as mortality, pupation and adult emergence rate. We investigated our study further by testing the effect of these phytoecdysteroids on detoxification enzymes activity such as glutathione S transferase, esterase and cytochrome P450 monooxygenases of *Tribolium castaneum* larvae. Our results show that when 20-Hydroxyecdysone and Makisterone-A were incorporated to diet of *T. castaneum*, it induced an increase of larval mortality and a decrease of pupation and adult emergence rate in a dose dependent manner. Makisterone-A was the most toxic phytoecdysteroid. When 20E and MakA were incorporated to diet in a dose of 1200, the mortality rate varied, respectively, from 48 to 93%. Same thing for the level of pupation which varied from 42 to 7% and adult emergence rate was between 32 and 0%, respectively, for 20E and MakA for the highest dose of 1200 ppm. Treatment provoked, also, an induction of the activity of glutathione S transferase and esterase using Mtb as substrate, whereas the activity of cytochrome P450 monooxygenases and esterase using 1-NA as substrate decrease for the two phytoecdysteroids in a dose dependent manner. Indeed, for a dose of 1200 ppm, glutathione S transferase activity increased with $337,4 \pm 8,5$ and $273,7 \pm 6,8$, respectively for 20E and MakA. Likewise, the activity of esterase using Mtb as substrate increased to achieve $28,87 \pm 4,2$ and $58 \pm 5,2$ for 20E and MakA, respectively. This work establishes the potent bioinsecticide effect of 20-Hydroxyecdysone and Makisterone-A on *T. castaneum* and show that the small structural changes between these molecules were able to influence on their toxicity level. In addition, phytoecdysteroids are innocuous to vertebrate and environment and are thought to have potential value in crop pest management.

Key words : *Tribolium castaneum*; Insect pest; Phytoecdysteroids; Bioinsecticides; Detoxification enzymes.

EFFECT OF EXPOSURE ROUTES ON THE EFFICIENCY OF THREE ESSENTIAL OILS AGAINST THE INSECT PEST *TRIBOLIUM CASTANEUM*

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ABSTRACT

In this study, we further determined whether the route exposure will affect the efficiency of 3 EOs ((*Mentha pulegium*, *Rosmarinus officinalis*, *Artemesia herba-alba*) on the insect pest *Tribolium castaneum* larvae. Their toxicity was carried out through contact and ingestion routes. In addition, we have tested their effect on some detoxification enzymes such as Glutathione-S-transferase and esterase. Our results show that the efficiency of the three EOs on *Tribolium castaneum* depends on the route of exposure and concentration. For the contact route, *M. pulegium* showed the highest toxicity (100%), followed by *R. officinalis* (15%) and *A. herba-alba* (5%) at 24h after treatment at a concentration of 2.4%. For the ingestion route, *A. herba-alba* showed the highest ingestion toxicity followed by *M. pulegium* and *R. officinalis* causing respectively 20%, 15%, and 10% of larval mortality at the concentration of 2.4%. Regarding detoxification enzymes, we noted a large fluctuation in the activity of Glutathione-S-transferase and esterase in treated larvae depending on the concentration and exposure route. For example, in the larvae treated by 1.6% of *M. pulegium* EO, the activity of glutathione S-transferase was $17.5 \pm 3,07$ and $57.52 \pm 2,03$ respectively for ingestion and contact toxicity. For control larvae, the activity of this enzyme achieved 11.7 ± 0.6 nmol substrate conjugated/min/mg protein. In conclusion, *M. pulegium* EO showed a higher insecticidal effect through the contact route. This EO presents promising and potential eco-friendly biopesticide against the insect pest *Tribolium castaneum*.

Key words : Biopesticides, Essential oils, Toxicity, detoxification, Stored grain pest

ANTIBIOTIC RESISTANCE IN ALGERIAN WILDLIFE

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ABSTRACT

Resistance to antibiotic is one of human health public dilemma. Moreover, misuse of antibiotic molecules in human and animal therapy may have an important role in widespread of multidrug resistance to antibiotic. From nature and hospital environment several bacterial strain expressed resistance to numerous antibiotics molecules. Water and wastewater may play an important role in the dissemination of resistance gene. On another hand, soil constitute a reservoir for resistant gene. Moreover, wildlife animal may vehicle resistant gene and resistant bacteria in all over the world. This resistance dissemination motivates as to build on a systematic review of the antibiotic resistance in Algerian wildlife in order to highlight on the resistance prevalence in Algerian wildlife and transmission pathways. To achieve this points, we treated three different part: the most resistant bacteria observed in wildlife, the way that the resistant bacteria exchange between wildlife and the other host involved and look on the possible association with certain ecological traits of the host.

Key words : Algerian Wildlife, Antibiotic resistant, bacteria

**ESTIMATION OF ANTIOXIDANT RESPONSES AND ENDOCRINE DISRUPTION
IN A FRESHWATER SPECIES EXPOSED TO A MIMETIC ESTROGEN SPECIES
MOS OF FUNGAL ORIGIN.**

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ABSTRACT

Xeno-estrogens are artificial products that can be agricultural, pharmaceutical or industrial origin. We have undertaken work to examine the possible effects a stressor; a systemic fungicide which is also an estrogen mimetic: The Mancozeb, on tadpoles of an amphibian species; green frog *Rana saharica*. We have studied the oxidative stress of these organisms caused in an artificial environment created in laboratory. This has been evaluated on the one hand, by the assay of some enzymatic biomarkers (CAT, GST and AchE). We were able to highlight impairment of the metabolism of the tadpoles through disturbances in the rate of substances dosed in the whole body of the tadpoles compared to the controls. On the other hand, haematological assays confirmed the endocrine disrupting effect through an increase in the level of estradiol in the blood of tadpoles.

Key words : *Rana saharica*., xeno-estrogen, toxicity, oxydatif stress, endocrine disruption.

**HIGHLIGHTING THE ROLE OF HUMAN ORAL MICROBIOME AND THEIR
RELATIONSHIP AMONG MOST PREVALENT HUMAN ORAL CAVITY
DISEASES CAUSED BY BACTERIA**

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ABSTRACT

The oral microbiome plays a very vital role in health as well as in disease. It is consisted of protective bacteria, temporary intruders and opportunistic pathogens which occupy particular niches in the oral cavity. Most of oral microorganisms are commensal which assumes a vital job in keeping up the balance of mouth biological community. However, some of the microbes are responsible for causing oral disease especially dental caries and periodontitis.

Key words : Oral Microbiome , Oral Disease , Bacteria

**ANTIFUNGAL ACTIVITY OF GARLIC ESSENTIAL OIL (ALLIUM SATIVUM L.)
APPLIED ON TWO WHEAT FUNGI**

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ABSTRACT

Essential oils have marked properties that are valued in many areas including the biocontrol of bio-aggressors; indeed, antimicrobial qualities have been attributed to garlic essential oil. The aim of our work is to study the antifungal effect of this oil extracted from a variety called "Chinese red" cultivated in Algeria on two types of potentially mycotoxigenic fungi of wheat: *Aspergillus niger* and *Fusarium sp.* This activity was evaluated using the method of dilution in solid medium, where different concentrations were tested: 1, 3, 5, 10, 25 and 50µl/15ml. The results obtained indicate no inhibitory effect at the lowest concentration of essential oil on the two fungal strains. Comparatively, *Aspergillus niger* showed a low sensitivity to concentrations of 3 to 10 µl/ml with an inhibition rate (I) of about 14%. Whereas *Fusarium sp* was significantly inhibited and more sensitive (I=60%). However, the high antifungal activity was observed for an inhibition rate of 100% when the concentrations reached 25 and 50µl/15ml, while no significant difference was found for the sensitivity of fungi to these concentrations. In conclusion, the antifungal activity of garlic essential oil revealed an inhibition of fungal growth at most concentrations, of which *Fusarium sp* appears to be more sensitive at low concentrations.

Key words : garlic essential oil, antifungal activity, *Fusarium sp*, *Aspergillus niger*

**INFLUENCE OF RAPE SEEDS TREATMENT WITH BIOACTIVE PRODUCTS
OBTAINED FROM COLLAGEN EXTRACT ON GERMINATION, PLANT
DEVELOPMENT AND YIELDS**

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ABSTRACT

The paper aims to present the results of the Coll-Rape project started three years ago, in which a series of bioactive composites obtained from collagen and keratin extracts, by-products left over from the processing of cattle and sheep skins have been tested. Not having a practical applicability, until now these products were discarded. Following the laboratory tests, it has been found that the new products are stimulating the germination of rape seeds, an effect that also extends during the first stages of vegetation in the field. Several formulas of treating seeds have been tested, on different varieties, with various amounts of bioactive additive and mixed with classic fungicide. In the agricultural year 2018-2019, 84 test plots have been sown in southern Romania, noting that the use of sprayed (coating) seeds with bioactive composites led to accelerated plant development, but also to protect them in the early stages of development. The lots have been carefully monitored and periodic measurements have been made, from emergence to harvest. After harvesting, all data have been statistically processed by the Anova program, highlighting the fact that treatment with 2 l product/t seed leads to yields increases of 200-500 kg, depending on the amount of fungicide it combines with. The use of bioactive extracts in agriculture is an innovation and an additional help, especially for organic farming. One of the tested products is already in the process of approval as a biostimulator of rape seeds.

Key words : biostimulator, collagen, rape, coating, yield

BIOSYNTHESIS OF FLAVOR COMPOUNDS BY BIOTRANSFORMATION OF GENETICALLY MODIFIED HAIRY ROOTS OF *HYPERICUM PERFORATUM* (L.) WITH *PLEUROTUS FLABELLATUS*

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ABSTRACT

In the present study, we aimed to biosynthesize the complex natural flavors by biotransformation of genetically modified hairy roots of *Hypericum perforatum* (L.) with basidiomycete *Pleurotus flabellatus* (PFLA). The well-known concept of fermentative flavor production by traditional food biotechnology was translated to the cultivation of the biochemically complex basidiomycetes. PFLA was grown in solid and liquid media using hairy roots of genetically modified *H. perforatum* (L.) as the only source of carbon and nitrogen. After the fermentation was finished, cultures were extracted using headspace solid-phase microextraction coupled with double gas chromatography mass spectrometry-olfactory (HS-SPME-GC/MS-MS-O). Altogether eleven new volatile compounds were produced from which six have shown to be flavor compounds (ethyl octanoate; [E,E]-2,4-decadienal; hexanal; 1-octen-3-one; 2-octenal; 1-octen-3-ol). All volatiles, including flavor compounds producing from PFLA have been identified by injection of analytical standards on polar VF-WAX column using headspace solid-phase microextraction gas chromatography mass spectrometry (HS-SPME-GC-MS), calculation their Kovats Index, comparing of their mass spectra with those of authentic standards and to the NIST database.

Key words : *H.perforatum* (L.), *P.flabellatus*, biotransformation, flavor compounds

**PRODUCTION OF FLAVOR COMPOUNDS BY BIOTRANSFORMATION OF
HYPERICUM PERFORATUM (L.) WITH *LYCOPERDON PYRIFORME***

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ABSTRACT

Lycoperdon pyriforme (LYP) seems to be very effective in biosynthesis of new volatile compounds by fermentation of genetically modified hairy roots of *Hypericum perforatum* (L.). The well-known concept of fermentative flavor production by traditional food biotechnology was translated to the cultivation of the biochemically complex basidiomycetes. LYP was grown in solid and liquid media using hairy roots of genetically modified *H. perforatum* (L.) as the only source of carbon and nitrogen. Fermentation took place for eight days, during which cultures were extracted day by day by using headspace solid-phase microextraction coupled with double gas chromatography mass spectrometry-olfactory (HS-SPME-GC/MS-MS-O). From all sixteen new volatile compounds produced during this biotransformation by LYP, seven have shown to be flavor compounds, from which six are identified (1-decen-3-one; 2-octenal; β -linalool; \pm trans Nerolidol; 1,3-dichloro-2-methoxybenzene and hexanal) and one not known compound. All volatile compounds producing from LYP including flavor compounds have been identified by injection of analytical standards on polar VF-WAX column using headspace solid-phase microextraction gas chromatography mass spectrometry (HS-SPME-GC-MS), calculation their Kovats Index, comparing of their mass spectra with those of authentic standards and to the NIST database.

Key words : *H.perforatum* (L.), *L. pyriforme*, biotransformation, flavor compounds

GENERATING MLO GENE MEDIATED RESISTANCE TO CUCUMBER POWDERY MILDEWS

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ABSTRACT

Cucumber is an important plant infected with fungal pathogens, *Podosphaera xanthii* and *Golovinomyces cichoracearum* cause powdery mildew disease and result economic loss in yields. Due to disadvantages of the chemicals used against the powdery mildews, resistant varieties should be used to control them. Our preliminary studies have revealed that local, wild and breeding varieties have different resistance levels to powdery mildew pathogens. Resistance to powdery mildew is specific and its inheritance is polygenic, therefore, broad spectrum resistance are required. *MLO* genes were first found in monocotyledon barley plants and then were discovered other dicotyledons plants. The *MLO* genes are responsible for resistance and susceptibility of plants to powdery mildew pathogens. The cucumber plants have 14 *MLO* genes but *CsaMLO1*, *CsaMLO8* and *CsaMLO11* genes which encode proteins are dominant genes resulting susceptibility to powdery mildews. In this study, it is aimed to obtain broad spectrum mildew resistance in cucumber to powdery mildews with creating a specific mutation using CRISPR/Cas9 system where an effective gene regulation technique on dominant *MLO* genes. Guide RNAs are specific for the *CsaMLO1*, *CsaMLO8* and *CsaMLO11* targeted regions have screened in whole cucumber genome and their constructs have designated. Molecular studies have been commenced to find the targeted genetic structures by CRISPR/Cas9 method where a base mutation will be deleted on each 3 genes. These individual deletions on each *MLO* genes will be disable their function likely in chemical and irradiation mutations in breeding programs.

Key words : MLO, powdery mildew, cucumber, resistance, CRISPR/Cas9, gen editing

***TRICHAPTUM BIFORME*, AN INTERESTING FOREST BASIDIOMYCETE WITH ANTIMICROBIAL ACTIVITY**

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ABSTRACT

Resistance of pathogenic microorganisms continued to threaten public health. The discovery of new antibiotic molecules was necessary. According to the bibliography, mushrooms were reservoirs of antibiotic molecules. Our aim was a screening for antimicrobial molecules in the extract of a basidiomycete mushroom called *Trichaptum biforme*. At our knowledge, little work was reported on the antimicrobial activity of this mushroom. *Trichaptum biforme* was one of the most spreaded forest basidiomycete in Algeria. This mushroom presented a cap with concentric zones and spines. It grew on oak coak trees. In the practical part of our study, sporophores of *Trichaptum biforme* were harvested in winter, in M'sila forest (Oran). The mushroom identification was carried out by macroscopic and microscopic methods. Extract was obtained by the Soxhlet method from dried sporophores of *Trichaptum biforme*. This extract was tested *in vitro*, in Petri dishes by the diffusion disc method, on the growth of a Gram+ and Gram- bacteria: *Staphylococcus aureus* ATCC 25923 and *Escherichia coli* ATCC 25922. To obtain the chemical identification of the extract, we used the GC-MS method. The results obtained showed a remarkable inhibitory effect of the *Trichaptum biforme* extract on the growth of the two pathogenic bacterial strains tested. The antibacterial activity of the extract against the bacterial strains tested showed that this extract is biologically bacteriostatic. Chemical analysis of the extract by GC-MS method allowed us to identify 30 components. Among them, Octodrine, caryophyllene oxide, phenolic compounds, fatty acids and fatty acids esters were noted as key compounds in the *Trichaptum biforme* mushroom extract. These components were involved in the antimicrobial activity. *Trichaptum biforme* was therefore an interesting candidate for obtaining antimicrobial bioactive substances with therapeutic interest.

Key words : *Trichaptum biforme*, *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, Extract, Soxhlet, GC-MS

**OPTIMIZATION OF PROCESS PARAMETERS FOR ENZYME ASSISTED
ULTRASONICATION EXTRACTION (EAUE) OF ZEAXANTHIN FROM
TRICHODESMIUM THIEBAUTII (NIOT 152)**

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ABSTRACT

The carotenoid pigment zeaxanthin (3, 3' dihydroxy β -carotene) is a xanthophyll compound which harbors paramount importance in pharmaceutical, food and feed industry globally. The yellow pigment zeaxanthin is synthesized de nova by most of the bacteria, fungi and microalgae. The marine Cyanophycean microalgae *Trichodesmium thiebautii*, is capable of accumulating xanthophyll carotenoid zeaxanthin. The present study successfully demonstrated statistical optimization of novel enzyme assisted ultrasound extraction (EAUE) of zeaxanthin from *T. thiebautii* (NIOT 152). Zeaxanthin extraction conditions were optimized using a two-step sequential statistical optimization involving Plackett Burman (PB) method for initial screening of crucial parameters followed by response surface methodology (RSM) for optimization of identified vital process parameters. PB experiments revealed three independent variables as important factors affecting zeaxanthin extraction namely, enzyme concentration, sonication time and solid liquid ratio, which were further optimized using RSM. The obtained data were subjected to two way ANOVA, multiple regression analysis and Fischer's F test and were fitted into a quadratic model and the significance was set at 5% level. The optimized parameters for EAUE of zeaxanthin extraction from *Trichodesmium thiebautii* was solid liquid ratio of 63:1, ultrasonication time of 44.57 minutes and enzyme (hemicellulase) concentration of 32.66%. The results were validated using confirmatory experiments and a zeaxanthin content of 5.16 ± 0.34 mg g⁻¹ was obtained, which was 2.8 fold higher than the unoptimized control conditions (1.84 ± 0.12 mg g⁻¹). The model for maximizing the zeaxanthin extraction yield from *T. thiebautii* had a high coefficient of determination (R^2) of 0.9850, which further confirmed the reliability and precision of optimization experiments. The results showed that *T. thiebautii* (NIOT 152) could be a potential candidate for commercial exploitation of high value pigment zeaxanthin.

Key words : *Trichodesmium thiebautii*, zeaxanthin, Plackett Burman, response surface methodology, enzyme assisted ultrasonication.

PRODUCTION AND CHARACTERIZATION OF ALGINATE WOUND DRESSING CONTAINING ESSENTIAL OIL

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ABSTRACT

In the wound healing process, the use of appropriate dressing is as important as the use of drugs. The main feature of an ideal dressing is that it creates a barrier to prevent contamination in the wound environment, thereby reducing the risk of infection. Wound dressings based on sodium alginate, a biocompatible and biodegradable polymer; have wide applications since they provide adequate air permeability and keep the ambient humidity at an ideal level. Sodium alginate is abundant in nature and inexpensive, making it an advantageous material for biomedical applications. Antimicrobial and pain-relieving pharmaceutical active substances may be added to alginate films and they can be used especially in food packaging and medical fields. In recent years, studies on the use of dressings providing potential benefits, such as antimicrobial properties, have started to attract attention. Use of essential oils are especially preferred when antimicrobial dressings without synthetic active substances are desired. Lavender essential oil is an active ingredient that can reduce the risk of contamination in the wound area thanks to its antibacterial effect. In this study, it was aimed to develop antimicrobial dressings by adding lavender essential oil as a bioactive component to the alginate films, which are capable of swelling in humid conditions. Films produced using sodium alginate were crosslinked using CaCl₂ to strengthen its structure. Thus, the sodium in the structure of alginate was replaced with calcium and cross-linked alginate chains were obtained which were firmly attached to each other. By this way calcium alginate films were produced. Glycerol, a plasticizing agent, has been added to reduce the brittleness and to increase the flexibility of the alginate films enabling them to be easily used on the wound surface. The necessary components such as alginate, plasticizer and essential oil were added in different proportions for optimization of flexible, homogeneous and antibacterial films. Water content, solubility and swelling properties of the films prepared by gel casting method were tested. The antibacterial properties of the biocomposite films were determined using the disk diffusion method. For this purpose, two Gram positive (*Staphylococcus aureus*, *Bacillus subtilis*) and two Gram negative (*Escherichia coli*, *Klebsiella pneumoniae*) bacteria were used.

Key words : Biopolymer, biomaterial, alginate, dressing, essential oil, lavender

GENETIC DIVERSITY OF KAVILCA (*TRITICUM DICOCCUM* Schrank) PLANT OF KARS REGION USING SSR MARKERS

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ABSTRACT

Wheat constitutes the most important grain group in our country as in all countries of the world. Due to its rich climatic characteristics and geostrategic importance, our country also has important genetic resources for the cultivation and development of many local wheat varieties. For this reason, it is very important to determine local wheat genotypes that can adapt to different ecological conditions in our country and define ones having high performance in terms of efficiency and quality characteristics to make them useful. Kavılca wheat (*Triticum dicoccum* Schrank) is grown in and around Kars City in northeastern Anatolia region is seen as very valuable in this sense. In the light of this basic information, in this study, 10 different populations of local Kavılca wheat grown in Kars province, which are important genetic sources, were genotyped with 11 SSR markers for diversity analyses. *Triticum aestivum* L. genotypes, which are two culture wheat varieties and have been obtained from different regions of Kars, were also included in the analysis to determine whether there is a difference in diversity level. Within the scope of the study, genetic diversity analysis were performed. The level of genetic variation between populations has also been found to be high. In addition, this local wheat variety has a higher genetic diversity and allelic richness than modern wheat *Triticum aestivum* L. It is thought that this research will provide a reference to the widespread use of Kavılca wheat agriculture in our country and its use in breeding studies. In addition, it has been determined that SSR markers can give more comprehensive results with higher numbers in wheat genotyping studies.

Key Words: Kavılca wheat, Genetic diversity, SSR, Kars

STUDY OF NATURAL PREVALENCE OF VARIATIONS ASSOCIATED WITH RESISTANCE TO NS5A INHIBITORS IN TREATMENT NAIVE HCV GENOTYPE 1A PATIENTS IN PAKISTAN

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ABSTRACT

In the last decade, the prevalence rate of hepatitis C virus has increased in Pakistan. According to WHO report of July 2019, 10 million people in Pakistan are infected with hepatitis C. Among HCV genotypes, genotype 1a shows more hindrance to treatment as compared to other genotypes of HCV. In recent years, Direct acting Antiviral Agents (DAA) has been launched as a standard anti-viral therapy in the Pakistan. HCV shows high mutation rate, due to which, the possibility of the emergence of drug resistant variants may results into the treatment failure. The aim of this study was to find the potential variations in NS5A region of HCV genotype 1a that can show the resistance to DAA during the treatment of naive HCV patients of Pakistan. To achieve our objectives, serum samples were collected from HCV 1a treatment naive patients. Domain I of NS5A gene was amplified and purified. Sequencing was performed and these sequences were analyzed for potential variation. The results showed that Pakistani sequences were polyphyletic since they were grouped into two different clades with different possible ancestors. The nucleotide distance between Pakistani sequences ranged from 0.01 to 0.15. The average distance between all sequences was 0.1 ± 0.01 . Evolutionary, the distance between amino acid sequences was also calculated. The results showed that the range of amino acid substitution per site between Pakistani sequences was 0.01-.25. The overall mean distance between amino acid sequences was 0.17 ± 0.02 . The number of variations were observed in Pakistani sequences. One of the amino acid mutations is Q30R which was previously reported in genotype 1a. This variation was significantly associated with daclatasvir resistance in previous studies. The prevalence of Q30R mutation was 33% in our study, indicating possible resistance to daclatasvir treatment.

Key words : Prevalence, HCV genotype 1a, NS5A, Direct acting Antiviral Agents (DAA), Q30R

THE EFFECTS OF GAMMA IRRADIATION ON SUNFLOWER POLLEN VIABILITY AND MORPHOLOGY

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ABSTRACT

Haploid plants can be induction of maternal haploids embryos by pollination with irradiated pollen has been an effective method in different plants. Penetration of different types of irradiation (uv, gamma, X-rays) varies in species, depending on the size and shape of the pollen grain, and the thickness of the pollen wall. Commonly pollen is irradiated with gamma rays because of their simple application, good penetration, reproducibility, high mutation frequency, and low disposal (lethal) problems. Gamma-irradiated pollen can germinate on the stigma, grow through the style and reach the embryo sac. Despite, being unable to fertilize the egg cell and the polar nuclei, it stimulates the development of haploid embryos. This method requires immature embryo rescue under in vitro conditions. Among the different factors influencing the efficiency of the progress, the irradiation dose, the developmental stage of the embryo during in vitro culture, the culture media composition and the culture conditions are especially important. The general objective of the present study was to evaluate the effect of ⁶⁰Co gamma radiation and illuminate pseudo-pollination during the haploid induction with irradiated pollen in sunflower. Female flowers of sunflower were pollinated using pollen collected from different genotypes and mixed with three doses of gamma rays, 500, 750 and 1000 Gy γ -ray doses, which have been applied for parthenogenetic induction in sunflower. In order to examine the effect of irradiation doses on pollen viability, the pollen of the control (no irradiated) group and irradiated groups were stained with aniline blue (cotton blue) prepared in lacto phenol. While the pollens of the control group showed 92% viability, the viability of the irradiated pollen decreased by more than 50% compared to the control group. Polar and equatorial axis lengths of 50 pollen were measured for each group to examine whether irradiation doses caused a change in the morphological structure of the pollen. In irradiated pollen, polar and equatorial axis lengths were found to be higher than those of the control group. Based on the results obtained showed that the effects of radiation depend on the dose applied and interaction with the pollen donor genotypes and mother genotypes used and the doses used in the study can be used to obtain haploid plants in sunflower.

Key words : pollen, pollen irradiation, haploid

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ISOLATION OF *BACILLUS* PROBIOTICS FROM UNCONVENTIONAL SOURCES

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ABSTRACT

Nowadays, the interest and use of probiotics is continuously increasing. However, probiotic isolation from other origins than the human origin is insufficiently investigated. In the other hand, bacteria isolated from underground ecosystems are known by their antibacterial and enzymatic potential. However, this discipline is poorly studied in Algeria and to our knowledge this is the first study considering probiotic potential of microorganisms isolated from underground ecosystems. In the present study, an attempt was made to isolate, screen and identify potential probiotic *Bacillus* from caves. A number of 16 samples from different cities in Algeria (Constantine, Guelma, Bejaia, Tebessa, Bouira), considering cave types (Carbonate caves, sandstone, horizontal, vertical, with presence and absence of bats) had been studied. *Bacillus* isolates had been selected by using heat treatment method and then screened according to their probiotic potentialities: i) safety: using blood agar test, lecithinase test, *Bacillus cereus* medium test and antibiotic sensitivity had been studied using different types of antibiotics; Inhibiting protein synthesis (Amikacin, Ciprofloxacin, Erythromycin, Gentamycin) inhibiting cell wall synthesis (Oxacillin, Cefazolin, Vancomycin, Ampicillin, Amoxicillin, Imipenem,), Inhibition RNA polymerase action (Rifampicin), ii) growth in 37°C, iii) resistance to different pH range iv) enzymatic potential (Gliadin and lactose degradation). Results showed 15 isolates of *Bacillus* (selected from a number of 250 isolates) with non pathogenic character, ability to degrade gliadin and lactose in solid and liquid medium and a probiotic profile. In this study the ability of cave microorganisms to be potential probiotics had been confirmed. Hence, the study of probiotics isolated from other ecosystems than human origin may lead to discover better resources for digestive diseases. Further studies considering the antibiotic resistance genes and antibiotic resistance transfer for a better identification and guarantee of biological safety of selected *Bacillus* are required. As well; a molecular identification of selected microorganisms is needed.

Key words : Probiotics, *Bacillus*, caves, extracellular enzymes.

SELECTION OF MUTANT GROUNDNUT (*ARACHIS HYPOGAEA* L.) SALINE-RESISTANT

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ABSTRACT

Two groundnuts (*Arachis hypogaea* L.) genotypes Kp29, Fleur 11 were evaluated to the effect of salinity stress. The experiments were placed in a completely random design with three replicates to select the resistant genotype as a source for future research in our breeding programs. To evaluate the effect of salinity stress, we conducted two experiments, the first one focused on the seed's germination parameters, development, and growth under salt stress (NaCl) [0.0, 50, 100 and 150 mM]. The second experiment focused on the effect of saline soils on the physiological factors of plants. The results showed that salinity negatively impacts the germination, development of epicotyls, hypocotyls, root length and also physiological parameters of the mutant genotypes. Furthermore, Groundnut seeds of these two genotypes are differently sensitive to salinity.

Key words : *Arachis hypogaea*.L, mutation, resistance, salt stress.

STUDY OF THE CHEMICAL COMPOSITION, PROTEOLYSIS, LIPOLYSIS AND FREE FATTY ACID DURING THE RIPENING OF FRESH MOROCCAN GOATS' MILK CHEESE

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ABSTRACT

Cheese ripening is a slow process, involving a concerted series of microbiological, biochemical and chemical reactions. Primary degradation of milk constituents by glycolysis, lipolysis and proteolysis leads to the formation of a whole range of precursors of flavor compounds. These changes are followed and/or overlapped by a series of secondary catabolic reactions, overlapped by a series of secondary catabolic reactions, which are responsible for the unique aroma profile of a particular variety of cheese. Lipolysis, primary proteolysis and secondary proteolysis during ripening of a goats' milk cheese manufactured with commercial starter (A), commercial rennet and starter culture (B) and starter culture composed by *Lactococcus lactis* subsp. *lactis*, *Lactococcus lactis* subsp. *cremoris*, *Lactococcus lactis* subsp. *lactis* var. *diacetylactis* strains and without added rennet. (C) were studied. The concentration of acetic acid and total C4:0–C18:2 FFA in cheeses A, B and C, increased throughout ripening. The total FFA contents in cheese A and B was significantly higher ($P < 0.05$) from those in cheese C throughout ripening. The short chain FFAs represented approximately 13, 14 and 14% of the TFFA content in cheeses A, B and C respectively, at 5 d. The percentage of medium chain FFAs (C10:0-C14:0) representing approximately 28, 29 and 38% of total FFAs in cheeses A, B and C respectively, at 5 d. The percentages of long chain FFAs (C16:0-C18:2) represented approximately 59, 58 and 48% in cheeses A, B and C respectively, at 5 d. In Moroccan goat's cheese, intense proteolytic activity took place during ripening. In the cheeses produced with commercial rennet and starter culture, proteolysis was more intense and after a 5-day ripening period values of 7.15, 12.51 and 6.11 for TN (Total Nitrogen), water-soluble nitrogen (WSN) at pH 4.6 and non-protein nitrogen (NPN) were obtained.

Key words : Goat Milk Cheese, lipolysis, proteolysis, Free Fatty Acid

**ISOLATION AND SCREENING OF MICROALGAL STRAINS OF
HAEMATOCOCCUS PLUVIALIS FROM MOROCCAN FRESHWATER**

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ABSTRACT

Haematococcus pluvialis is a flagellated green alga that accumulates large quantities of the carotenoid astaxanthin (3, 3'-dihydroxy- β -carotene-4, 4'-dione). Astaxanthin is a secondary metabolite, synthesized by *H. pluvialis* in a response to stress conditions such as high light, salinity, high temperature. Natural astaxanthin has significantly greater antioxidant capacity than the synthetic one, in a view of this the use of *H. pluvialis* for the production of astaxanthin maybe considered as a viable alternative to synthetically produced one. We carried out an isolation and screening of a new *H. pluvialis* strains with high astaxanthin production potential from Moroccan freshwater. The isolated strains were assessed for their growth and astaxanthin accumulation under different stress conditions associated with high light intensity. The main goal of the present study was to select highly astaxanthin-producing *H. pluvialis* strains from the Moroccan environment. The identification of *H. pluvialis* was made according to morphological criteria. The Moroccan strains were cultivated in BBM culture media and the growth was monitored by cell counts using haemocytometer, optical density at 680 nm and chlorophyll production rates.

Key words : *Haematococcus pluvialis*, carotenoids, growth rate, purification

INFLUENCE OF AROMATIC PLANTS ON BACK-FAT PORK QUALITY

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ABSTRACT

The back-fat pork is an important raw material in the meat industry production, it has long been used in the processing of meat products such as sausages, they also play an important role in stabilizing emulsions meat-based, improved flavor and acceptability of food. Having too much soft fat can cause a lot of problems during processing and produce a rancid flavor. In this context, the objective of this study is to test the effect of nine aromatic plants from different regions of Morocco on back-fat pork during a storage process that lasts 210 days in order to select the best plants in terms of protect the quality of this fat especially towards the phenomenon of oxidation (responsible for rancidity). In this work, the effect of aromatic plants on pork fat is significant ($P < 0.05$). It has been found that all plants have been shown to promote degradation - hydrolysis - of pork fat which is revealed very high values of the index and the degree of acidity of the control. While these plants have a significant protective effect against oxidation of fat despite this degradation, the indices of peroxidation and TBA of the fat mixed with aromatic plants were lower than the control; it is also representative at the determining of the amount percentage of polyunsaturated fatty acids. Nutmeg has been the most effective plant in presenting the least elevated values of the parameters studied, while lemon balm is the latest in revealing values very close to those of control fat.

Key words : Aromatic plant, fat, hydrolysis, peroxidation and pork

SOMATIC EMBRYOGENESIS INDUCTION AND ALKALOID CONTENT OF *PAPAVER DEGENII*

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ABSTRACT

Papaver degenii is a Bulgarian local endemic and glacial relict which is included in the Red Book of Bulgaria as “vulnerable”. The species contains alkaloids from the isopavine group which have biological activity connected with treatment of neurodegenerative diseases. Somatic embryogenesis (SE) is a valuable method which is preferred for *in vitro* propagation of species from the Papaveraceae family. This is the first report on induction of indirect SE in *P. degenii*. The aim of the study was to induce SE in *P. degenii* and to investigate the influence of the callus-inducing medium and type of the gelling agent on the regeneration effectiveness, and a phytochemical analysis of the obtained plants. The callus was induced from root explants cultivated on MS medium supplemented with two combinations of plant growth regulators (1 mg/l 2,4-D, 0.5 mg/l TDZ, 0.5 mg/l BAP; 1.2 mg/l NAA, 0.7 mg/l BAP). The calli were cultivated on media B5 or 2B5 (B5 with doubled macrosalts) gelled with agar or Gelrite. The number of the regenerated plants was evaluated. The raw alkaloid mixtures were obtained by usual chemical procedure. The percentage content of the alkaloids was determined by GC-MS. The results revealed that the callus formed on the medium with 2,4-D, TDZ, BAP induced an average 329 plants on agar and 127 on Gelrite, whereas the callus induced on the medium with BAP and NAA regenerated an average 25.5 plants on agar and 28 plants on Gelrite. The alkaloid content of all *in vitro* plant samples was similar. The alkaloid amurensinine was presented in the highest percentage followed by allocryptopine and protopine. In conclusion, the callus formed on medium supplemented with 2,4-D, TDZ, BAP induced more plants, especially on the medium gelled with agar. The main alkaloid in all studied samples was the isopavine amurensinine. This work was supported by the Bulgarian Ministry of Education and Science under the National Research Programme “Young scientists and postdoctoral students” approved by DCM № 577 / 17.08.2018.

Key words : Gelling agent, callus, *in vitro* plants, amurensinine

PHYSIOLOGICAL STUDY OF SEEDS OF THREE DURUM WHEAT GENOTYPE

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ABSTRACT

The objective of this work was to carry out a study to test the viability and vigor of three varieties of durum wheat; Simeto, Amar 6, Vitron. Analyzes were performed on germination, seedling height, leaf area and biomass. The results obtained show that there is a genotypic effect on the one hand, but also that the response to the various treatments imposed were specific to each variety, concerning the biomass (fresh matter and dry matter, the height of the seedlings, the leaf area, it seems that there is a preference and an advantage displayed by the large category of seeds. These results were somewhat expected, because, a seed benefits from more nutrients in its albumen; and the catabolism of these will allow better growth. The different organs of the seedling will benefit from this advantage; which is a determining parameter in the life of the seed. Now, these results obtained under optimal conditions, in the laboratory, may not be the same if we imposed stress on these same categories of seeds. Finally, this modest contribution will have made it possible to know more about how three genotypes work on one of the most important aspects in seed physiology. The objective of this work was to carry out a study to test the viability and vigor of three varieties of durum wheat; Simeto, Amar 6, Vitron. Analyzes were performed on germination, seedling height, leaf area and biomass. The results obtained show that there is a genotypic effect on the one hand, but also that the response to the various treatments imposed were specific to each variety, concerning the biomass (fresh matter and dry matter, the height of the seedlings, the leaf area, it seems that there is a preference and an advantage displayed by the large category of seeds. These results were somewhat expected, because, a seed benefits from more nutrients in its albumen; and the catabolism of these will allow better growth. The different organs of the seedling will benefit from this advantage; which is a determining parameter in the life of the seed. Now, these results obtained under optimal conditions, in the laboratory, may not be the same if we imposed stress on these same categories of seeds. Finally, this modest contribution will have made it possible to know more about how three genotypes work on one of the most important aspects in seed physiology.

Key words : durum wheat - biomass. - seed physiology - Viability - Vigor.

COMPARATIVE STUDY OF PHYSICOCHEMICAL PROPERTIES AND FATTY ACID PROFILES OF COMMERCIAL CHEESES FROM NORTHERN MOROCCO

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ABSTRACT

In this study, the objective was to compare the differences in physicochemical properties and fatty acid profiles of traditional cheeses made from goat, cow and their mixtures milk. For this purpose, seven traditional cheeses commercially available were obtained from dairy farms and open-air public markets in Tangier. These cheeses originated from different parts of Northern Morocco. Physical and chemical parameters such as pH, titratable acidity, total solids, ash content, and fat were assessed. Cheeses were also analyzed for fatty acid composition by Gas Chromatography (GC). Non-significant differences in pH and titratable acidity were detected between the different samples studied; the averages were about 4.07 and 3.44g/l respectively. Differences in the percentages of total solids, ash content and fat were showed between some samples. There was not a certain correlation between cheese milk origin (cow, goat, or mixtures) and the contents of ash and total solids; it seems that they are affected by the cheesemaking process. Regarding cheeses made with goat milk, peaks with notable percentages corresponded to palmitic acid (29.06%) followed by oleic acid (20.58%), stearic acid (11.71%), capric acid (11.12%) and myristic acid (10.79%) by means of average. For cow cheese, palmitic acid still the most abundant fatty acid but with a percentage of 35.41% followed by oleic acid (22.33%). Remarkable difference was noted in percentages of capric acid; it was less present in cheeses made with cow (3.55%) and mixtures of goat and cow (2.46%). Fatty acids have multiple nutritional properties and play an important role in the determination of the flavor, color and the texture of cheeses. From our results, it was concluded that they are dependent of milk type; hence, analyzing fatty acid profile could be a key tool to distinguish milk origins allowing deter of fraudulent commercial practices.

Key words : Traditional cheese, physicochemical parameters, fatty-acid profile, Gas Chromatography

SCREENING PROBIOTIC STRAINS FOR SAFETY: EVALUATION OF VIRULENCE AND ANTIMICROBIAL SUSCEPTIBILITY OF ENTEROCOCCI FROM GOAT STOOL.

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ABSTRACT

Enterococci are extensively studied as potential candidate probiotics; many studies have been conducted to evaluate the probiotic characteristics of *Enterococcus* strains, due to safety concerns, lack of safety information, and legislation. However, some strains such as *E. faecium* M74 and *E. faecium* SF-68 are included as food supplements in several probiotic preparations, Enterococci probiotics can be used in the treatment and/or prevention of certain human and animal diseases such as the alleviation of irritable bowel syndrome symptoms and antibiotic-induced diarrhea and prevention of different functional and chronic intestinal diseases. The present study focused on probiotic characterization and safety evaluation of *Enterococcus* isolates from goat stool and screen out potential probiotic candidates. For safety evaluation of strains, we determined the DNase, gelatinase and hemolytic activities, and antimicrobial susceptibility of Enterococci. Results of antimicrobial susceptibility showed that 17 *Enterococcus* isolates were sensitive to Cefoxitin (30 µg) and Tetracycline (30 µg). In contrast, 27 isolates were able to grow with a concentration of Norfloxacin (10µg), and a high number of *Enterococcus* was resistant to this antibiotic. Similarly, many of the *Enterococcus* isolates (26 were resistant to Oxacillin. For vancomycin (30µg), there were only 6 resistant strains and sensitivity for 14 isolates. Gentamycin (10µg) was inhibited by 24 isolates as well as Trimethoprim (1.25 µg) were further assessed for their probiotic properties. All strains survived well in simulated gastric fluid and intestinal tract; with a maximum percentage of survival rates (99.32%). 30 strains could resist 1% to 4.0% bile salts. None of the strains analyzed in the present study showed hemolytic abilities, or other detrimental enzymatic activities. These results deliver useful information on the safety of Enterococci in goat stool, and provide a protocol to screen probiotics for absence of virulence and antimicrobial susceptibility of Enterococci.

Key words : Enterococci, safety, probiotic, virulence, antibiotic susceptibility.

KINETICS OF MINIMUM INHIBITORY CONCENTRATIONS OF PLANT EXTRACTS AGAINST PATHOGENIC BACTERIA AND FOOD SPOILAGE FUNGI

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ABSTRACT

The increasing number of the reported food borne pathogens and plant diseases caused by fungal strains constitute an emerging threat to global food security. Many pathogens could influence the stability of food commodities by reducing their shelf life and altering their organoleptic properties and therefore render them unfit for human consumption. In order to combat this emanate dilemma, an array of strategies have been adopted for food conservation which relay on suppressing the growth of food spoiling pathogens. This could be achieved by hindering essential factors for microbial survival by adding suppressive substances and applying physical or chemical pressure, however, the incorporation of chemicals as food preservatives has been the subject of major concerns from consumers due to their highly toxic nature and non biodegradable characteristic. Thus, the search for new safe and environmental friendly alternatives is wildly required. Products of natural origin have been used in traditional practices throughout history and offer less damaging outcomes. For this reason, The objective of this study is to elucidate the effectiveness of plant extracts (Hexanic, dichloromethan, methanolic and aqueous extracts) deriving from the Moroccan medicinal plant *Cistus ladanifer* on the growth of two well known plant pathogens *Botrytis cinerea* and *Fusarium oxysporum* as well as a panel of food borne bacterial pathogens *Escherichia coli* ATCC25922, *Pseudomonas aeruginosa* ATCC27853, *Salmonella typhimurium* ATCC14028, *Staphylococcus aureus* B1, *Listeria monocytogenes* ATCC19144, *Enterococcus faecalis* ATCC19433 as well as a yeast strain *Candida albicans*. The antifungal activity was determined using the agar dilution method in PDA medium (Potato Dextrose Agar). All extracts have been screened at concentrations ranging from 10 to 0, 02 mg/ml. In order to determine the antifungal kinetics, the radial growth of mycelia was measured daily for 7 days. Survivor–time studies of the bacterial strains and *c. albicans* have been determined for extracts which exhibited an antibacterial effect during the preliminary assays (well diffusion and microdilution assays); the testing was carried out in real time using a reverse-spin bioreactor. The results obtained during this study showed that all of the tested extracts have a moderate to high effect on the growth of the mentioned fungi. The Methanolic extracts of *C. ladanifer* proved to be the most efficient towards *F. oxysporum* whilst the highest inhibition rate for *B. cinerea* was registered with the dichloromethane extracts, this extracts has been equally effective on *C. albicans* and *S. aureus* demonstrating a total growth inhibition against both strains. The results obtained emphasized *C. Ladanifer* extracts as strong candidates for a potential application in food systems.

Key words : Antibacterial activity; organic extracts; food borne pathogens; plant pathogenic fungi.

**ISOLATION AND SCREENING OF MICROALGAL STRAINS OF
HAEMATOCOCCUS PLUVIALIS FROM MOROCCAN FRESHWATER**

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ABSTRACT

Haematococcus pluvialis is a flagellated green alga that accumulates large quantities of the carotenoid astaxanthin (3, 3'-dihydroxy- β -carotene-4, 4'-dione). Astaxanthin is a secondary metabolite, a synthesized by *H. pluvialis* in a response to stress conditions such as high light, salinity, high temperature. Natural astaxanthin has significantly greater antioxidant capacity than the synthetic one, in a view of this the use of *H. pluvialis* for the production of astaxanthin maybe considered as a viable alternative to synthetically produced one. We carried out an isolation and screening of a new *H. pluvialis* strains with high astaxanthin production potential from Moroccan freshwater. The isolated strains were assessed for their growth and astaxanthin accumulation under different stress conditions associated with high light intensity. The main goal of the present study was to select highly astaxanthin-producing *H. pluvialis* strains from the Moroccan environment. The identification of *H. pluvialis* was made according to morphological criteria. The Moroccan strains were cultivated in BBM culture media and the growth was monitored by cell counts using haemocytometer, optical density at 680 nm and chlorophyll production rates.

Key words : *Haematococcus pluvialis*, carotenoids, astaxanthin, purification, growth rate .

MOLECULAR CHARACTERIZATION AND SYMBIOTIC EFFICIENCY OF RHIZOBIAL BACTERIA ISOLATED FROM TRIGONELLA FOENUM GRAECUM (FENUGREEK) IN NORTHWESTERN MOROCCO

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ABSTRACT

The purpose of the present study was to characterize the bacteria nodulating the legume *Trigonella foenum graecum*, based on molecular techniques and on their symbiotic performance. A total of 47 isolates, having rhizobia characters, were collected from *Trigonella foenum graecum*'s nodules coming from 6 different sites of the North and West-Centre region of Morocco, representing the material subject of this study. The study of the genetic diversity of the 47 isolates was carried out using the Rep-PCR technique. 13 isolates representative of each Rep-PCR profile formed the subject of PCR amplification of the 16S rDNA gene. The nearly complete sequence of the 16S rRNA gene from a representative strain of each REP-PCR pattern showed that all strains were closely related to members of the genus *Sinorhizobium*. The symbiotic power of the isolates was assessed by inoculating the *Trigonella foenum graecum* plants with the 13 representative isolates. The results showed that all isolates have the ability to nodulate this plant and improve the development of its root system and its aerial parts; therefore, the KhZ9, BnM1, HdG3, KsS7 and KhZ6 isolates were considered as the most efficient in the collection, and could be used as biofertilizers. In addition, it was noted that the most infectious isolates (forming the largest number of nodules) were the least effective. The purpose of the present study was to characterize the bacteria nodulating the legume *Trigonella foenum graecum*, based on molecular techniques and on their symbiotic performance. A total of 47 isolates, having rhizobia characters, were collected from *Trigonella foenum graecum*'s nodules coming from 6 different sites of the North and West-Centre region of Morocco, representing the material subject of this study. The study of the genetic diversity of the 47 isolates was carried out using the Rep-PCR technique. 13 isolates representative of each Rep-PCR profile formed the subject of PCR amplification of the 16S rDNA gene. The nearly complete sequence of the 16S rRNA gene from a representative strain of each REP-PCR pattern showed that all strains were closely related to members of the genus *Sinorhizobium*. The symbiotic power of the isolates was assessed by inoculating the *Trigonella foenum graecum* plants with the 13 representative isolates. The results showed that all isolates have the ability to nodulate this plant and improve the development of its root system and its aerial parts; therefore, the KhZ9, BnM1, HdG3, KsS7 and KhZ6 isolates were considered as the most efficient in the collection, and could be used as biofertilizers. In addition, it was noted that the most infectious isolates (forming the largest number of nodules) were the least effective.

Key words : Symbiotic characterization, molecular characterization, *Trigonella foenum graecum*, rhizobia, biofertilizer.

DETERMINATION OF EXPRESSION OF MITOGEN-ACTIVATED PROTEIN KINASES (MAPKS) DURING DROUGHT STRESS IN CITRUS ROOTSTOCKS, SOURORANGE, CARRIZO AND TROYER

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ABSTRACT

Citrus constitute one of the widely produced and consumed fruits in the world and Turkey. Biotic and abiotic stresses are the the main factors adversely affecting the growth and development of citrus fruits. Among these stresses, drought stands out as leading problem for citrus production in the long term. Plants developed some resistance mechanisms to survive negative effects of abiotic and biotic stresses. Mitogen-Activated Protein Kinases (MAPK) plays an important role in this mechanism. MAPKs gradually activate the pathways involved in plants for growth, development, and programmed cell death as well as abiotic stresses such as drought. In this study, first, MAPK-3, 4, and 9 genes, which are known to be regulated by drought stress in other plants, were selected from citrus. The expressions of these selected MAP kinase genes during drought stress in citrus rootstocks, Sour orange, Carrizo, and Troyer citranges, which are extensively used in citrus production in Turkey were subjected to 14 days of drought stress. Leaf samples were collected at 0, 9, 12, and 14 days of drought stress and total RNA was isolated from these collected leaf samples. Then, cDNA was synthesized from these isolated RNAs using reverse transcription method. Finally, the expression levels of MAPK3, 4, and 9 genes, which are activated by drought stress, were analyzed using cDNAs and primers specifically designed for MAPK genes by SYBR green based real-time PCR method. As a result of these analysis, changes in the expression of MAPK genes were determined in different citrus rootstocks.

Key words : MAPK, Citrus, Drought, Rootstock, Signal Transduction, Gene Expression

CONTRIBUTION TO THE STUDY OF SOME NUTRITIONAL ASSOCIATIONS ON SOME PHYSIOLOGICAL AND BIOCHEMICAL SORTING ON A VARIETY OF DURUM VITRON WHEAT

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ABSTRACT

Seeds obtained from different fertilization were used in order to evaluate at a juvenile stage , the water status ,the energy status ,the biochemical status as well as the growth kinetics in a hard wheat variety Vitron. The results obtained show that the contribution of fertilising element is important ,even determining in the regulatory mechanisms of the plant. Indeed the PMG (weight of a thousand grains) was correlated with the presence of NPK fertilizers for cell turgor and gradual water loss responses followed fertilizer levels. The accumulation of osmoregulators was dependent on the nature of the fertilizer input. In assisted treatment with GNSS ;the accumulation is low ,especially in soluble sugars. Finally ,this work will have the merit of exploring a physiological aspect which allows a better knowledge of the responses of the plant ,compared to exogenous inputs of fertilizer.

Key words : durum wheat -fertilization-osmoticums - physiological

BSMV-IGS AS A TOOL FOR STUDYING POWDERY MILDEW RESISTANCE IN BARLEY

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ABSTRACT

Barley stripe mosaic virus (BSMV) is widely used for virus induced gene silencing (VIGS) in barley. Although there are some difficulties and questions in this technique, it is still a strong tool for studying powdery mildew resistance in barley. There are many genes silenced for understanding the resistance mechanism against *Blumeria graminis* f. sp. *hordei* such as HvGCN2, HvSRP72, HvCAS, Rar1, Hsp90, Sgt1, HvDRF, putative LLR-RLK, Blufensin1, Blufensin2, HvWRKY10, HvWRKY19, HvWRKY28, HvCS, HvASa2, HvCM1, HvBI-1, HvSod1, Mlo, HvWRKY3. In this study, BSMV-IGS method, its' difficulties in application, which mechanisms were enlightened in powdery mildew resistance and how powdery mildew resistance was scored in silenced plants will be discussed.

Key words : BSMV, VIGS, Barley, Powdery mildew

BI-ENZYMATIC ELECTROCHEMICAL CARBON GRAPHITE GENOSENSOR FOR HUMAN CYTOMEGALOVIRUS DNA DETECTION

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ABSTRACT

A bi-enzymatic electrochemical genosensor for the detection of Human Cytomegalovirus DNA has been developed using screen printed carbon electrodes SPEs. The sensing areas of the electrodes were firstly modified with a monolayer of NeutrAvidin. An enzyme-amplified scheme based on the coupling of the NeutrAvidin to the biotinylated HCMV target DNA, tagged with the Horseradish Peroxidase (HRP) is reported. The enzyme catalyses the oxidation of its substrate (hydrogen peroxide) by mean of a co-substrate: a single electron-donor ($[\text{Os}(\text{bpy})_2\text{pyCl}]^+$). The determination of the precise amount of ssDNA probes immobilized into the sensing surface of the SPEs is made possible by a systematic measuring of the enzymatic catalysis by mean of the cyclic voltammetric responses which are function of the scan rate and the concentrations of the substrate and the co-substrate. The assay was firstly characterized using synthetic oligonucleotides. Relevant parameters such as probe concentration, immobilization time and the different washing steps are then determined. The genosensor response was found to be linearly related to the oligonucleotide concentration between 0,6 to 100 nM; the detection limit was about 60 pmol. L⁻¹. The analytical procedure was then applied for the detection of a 406 pb HCMV DNA, amplified by polymerase chain reaction PCR from biotinylated primers. The sensitivity of the genosensor is found to be near 3 nM. The newness of this work comparing to the precedent studies of immobilization and determination of the amounts of HCMV is the fact that eight simultaneous measurements are possible to achieve. Later, the use of the alkaline phosphatase (AP) as an enzyme label and the amplification of its analytical response with a diaphorase (DI) secondary enzyme were investigated in an electrochemical hybridization assay involving arrays of carbon screen-printed DNA biosensors for the sensitive quantification of an amplified 406-base pair human cytomegalovirus DNA sequence (HCMV DNA). For this purpose, PCR-amplified biotinylated HCMV DNA targets were simultaneously bound to the monolayer of neutravidin irreversibly adsorbed on the surface of the electrodes and hybridized to complementary digoxigenin-labeled detection probes. The amount of hybrids immobilized on the electrode surface was labeled with an anti-digoxigenin AP conjugate and quantified electrochemically by measuring the activity of the AP label through the hydrolysis of the electroinactive p-aminophenylphosphate (PAPP) substrate into the p-aminophenol (PAP) product. The intensity of the cyclic voltammetric anodic peak current resulting from the oxidation of PAP into p-quinoneimine (PQI) was related to the number of viral amplified DNA targets present in the sample, and a detection limit of 10 pM was thus achieved. The electrochemical response of the AP label product was further enhanced by adding the diaphorase enzymatic amplifier in the solution. In the presence of the auxiliary enzyme DI, the PQI was reduced back to PAP and the resulting oxidized form of DI was finally regenerated in its reduced native state by its natural substrate, NADH. Such a bienzymatic amplification scheme enabled a 100-fold lowering of the HCMV DNA detection limit obtained with the monoenzymatic system.

Key words : Screen-printed carbon electrodes; DNA Biosensor; HCMV; Polymerase Chain Reaction; Hybridization; HRP; cyclic voltammetry. Alkaline phosphatase, Diaphorase, bi-enzymatic detection.

ANTIMICROBIAL ACTIVITY OF BIOLOGICAL EXTRACTS FROM THE TWO PLANTS CURCUMA XANTHORRIZA AND ZINGIBER OFFICINALE

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ABSTRACT

Today, traditional herbal medicines still used by a large part of the population in most developing countries. If these uses justified by, validated effects and the plants could be sources of exploitable active biomolecules. These antimicrobial agents could become a necessary requirement for reducing viruses such as covid-19 coronaviruses and bacteria that are developing resistance against antibiotics. *Curcuma xanthorriza* and *Zingiber officinale* are two plants from the family of *Zingiberaceae* which have been used since antiquity in traditional medicine on all continents, and mainly in tropico-equatorial regions, for their odoriferous, culinary (spicy) and therapeutic properties, and because of its richness in active compounds which have a variety of biological activities. This therapeutic activity motivates as to build on a systematic review of natural antimicrobials from the two plants of the *Zingiberaceae* family *Curcuma xanthorriza* and *Zingiber officinale*. The phenolic compounds, flavonoids and essential oil compounds present in these plants could be candidates for some of its activities antifungal, antibacterial and antiparasitic; and therefore for its therapeutic use.

Key words: antimicrobial activity, phenolic compounds, volatile compounds.

CONTRIBUTION OF AMPELOGRAPHY FOR THE IDENTIFICATION OF AUTOCHTHONOUS GRAPEVINE VARIETIES IN NORTH-WESTERN OF MOROCCO

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ABSTRACT

The diversity of the autochthonous Moroccan varieties of grapevine is still not much studied, the big number of grape varieties local introducing fluctuations between them requires their characterization with a view to identifying them. Canvassing's were accomplished in the northwest of Morocco in stations of the region of Ouezzane with their coordinated GPS and the collection of the samples of leaves and bunches. Three varieties which carry very close nominations were studied by using quantitative and qualitative descriptors established by OIV: morphology of the leaf, size and weight of the bunch, forms size and weights of the berry, and the measure of the rate of sugar complete by method sulfuric phenol (DUBOIS 1956). The comparison of leaves shows a similarity at the level of their form to know pentagonal form with three lightly opened lobes having teeth of two straight and on both sides convex sides with a light difference concerning anthocyanique pigmentation, while the color of berries, their sizes, number of pips reveals a very clear difference between the three varieties. For the rate of sugar, they can say that the content of sugar is medium (% in sugar ~18 %) compared with reference stocks, this rate which is in narrow relation with environmental conditions. Seen the pressure of the appellations which change a region in other one for the same variety, the ampelographic studies must be supplemented by the amperometry what encourages to deepen identifications to see even attaining molecular level in case of similarities between grape varieties.

Key words : ampelography, characterization, autochthonous grapevines, Morocco.

LC-MS-BASED CHEMICAL VARIABILITY OF CAPE GOOSEBERRY SEEDLINGS UNDER DIFFERENT GERMINATION CONDITIONS

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ABSTRACT

Physalis peruviana (commonly called as “Cape Goosberry” or “Uchuva”) is a wild herbaceous plant that belongs to the Solanaceae family. It is known for the production of sweet fruits possessing good levels of vitamin A, C, phosphorus and fiber. Although their fruits are mainly used to prepare syrups, jams or to consume directly, it is not the only part of the plant that could be used. The leaves and roots are also employed for their medicinal properties. Being a native plant of the Andes, it finds in Colombia the perfect conditions for development until the level that is currently the first fruit product for exporting. It is usually cultivated in soils that have been affected by excessive fertilization. Although it occurs in other countries, the ecotype produced in Colombia is the sweetest one and, therefore, the most desirable. However, there is no standard protocol for germination and it is believed that soil salinity has an effect on it. The present study, therefore, determined the differences on metabolic profiles of *P. peruviana* seedlings under greenhouse conditions, whose seeds were germinated using different treatments. Thus, five seedlings of each treatment were taken in stage 105 at BBCH scale and then subjected to ethanolic maceration to obtain the extract by concentration under reduced pressure. A 2.5 mg/mL solution was then prepared from each resulting extract to be analyzed by HPLC-ESI-MS. The respective germination percentages were then determined and descriptive statistical analysis and multivariate analysis were consequently performed. The treatment using charcoal favored germination (>97%). This fact could be due to the presence of hormone-related compounds in charcoal, so the germination was found to be homogeneous and early. Additionally, this treatment favored the synthesis of flavonoids, since outstanding metabolites were then annotated using mass spectra data in comparison to databases. On the other hand, saline treatment delayed germination (>60%). The production of phenols and flavonoids was negatively affected. Commercial seeds barely reached 8%, so storage has a negative effect on the viability of the seed and produce fewer flavonoids than phenols. Finally, fermentation does not shorten the time of germination. Apparently, there are three metabolites related to the treatments of higher germination. Their structural identification is currently in progress. *The present study is a product derived from the Project IMP-CIAS-2924 financed by Vicerrectoría de Investigaciones at UMNG - Validity 2018.*

Key words : Cape Gooseberry, Seedlings, Germination, LC-MS

TRANSCRIPTIONAL DYNAMICS OF *HvDDB1* AND *HvDDB2* GENES IN BARLEY SEEDLINGS EXPOSED TO UV STRESS

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ABSTRACT

In plants, ultraviolet light (UV) is a major DNA damaging agent inducing a variety of DNA lesions, the most prevalent being cyclobutane pyrimidine dimers (CPDs). Plant CPD repair pathways are classified as light-dependent (photorepair) and light-independent (dark repair). Our previous research showed that in barley seedlings the fast repair of CPD was entirely dependent on their post-radiation recovery under light whereas no substantial damage removal could be detected under dark conditions. Therefore, we asked whether and to what extent dark repair might contribute to barley UV tolerance by studying its activity at the level of gene expression *HvDDB1* and *HvDDB2* (DNA Damage Binding proteins 1 and 2) are key factors of Nucleotide Excision Repair (NER), which is a classical dark mechanism. The heterodimer *HvDDB1-HvDDB2* has a crucial role in the initiation of NER sub-pathway known as Global Genome Repair via recognition of UV damage. In this work, we characterized the expression profiles of barley *HvDDB1* and *HvDDB2* genes under normal and UV stress conditions. Barley seedlings were treated with UV-C radiation and then exposed to intense light or kept in darkness for recovery. RNA was isolated from leaves collected at different time-points after treatment. *HvDDB1* and *HvDDB2* sequences were identified by BLAST analysis and primers were designed to amplify selectively the target transcript sequences. The mRNA levels of *HvDDB1* and *HvDDB2* in the UV exposed plants were assessed by real-time RT-PCR and compared to those measured in the non-treated controls. The results showed specific transcription profiles of *HvDDB1* and *HvDDB2* genes and dynamic changes in their expression suggesting for their involvement in UV damage tolerance in barley genome.

Key words : UV stress, barley, gene expression, DNA repair

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BIOCLIMATES OF THE LUMBARDH VALLEY OF PRIZREN, KOSOVO

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ABSTRACT

The climate of a region is the main determining factor in the distribution of vegetation in that region. The study of the average multi-year performance of the climate and its two main determining parameters, the regime of temperatures and precipitation, as well as their analysis through bioclimatic indicators, allows to judge the distribution and type of vegetation in that region. For proper explanation of the relationships between climate and vegetation, for the purpose of phyto-climatic characterization, based on thermal and pluviometric data, in this study are used the bioclimatic indicators proposed by Rivas Martinez, the pluvial-factor indicator of Lang, the drought indicator of De Martonn and the ombro-thermal diagrams of Walter and Leith, as the most suitable methods for this purpose. They are valuable indicators in order to determine its climatic features in relation to vegetation for the Mediterranean environment, where also the Prizren region in Kosovo is part of it too. Calculating the values of bioclimatic indicators and analyzing them enables us to compare between different types of bio climates and the bio climates between different areas (thermotypes and ombrotypes) and to evaluate the extent and type of vegetation for each bioclimatic type. Precisely, this study, located in the Lumbardh valley of Prizren in Kosovo, serves this purpose.

Key words : climate, bioclimatic indices, precipitation, temperature, mediterranean vegetation

EFFICIENT PRODUCTION OF TRITICUM AESTIVUM-HORDEUM VULGARE HYBRIDS & CHARACTERIZATION OF THEIR CHROMOSOMES USING FISH

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ABSTRACT

Hybridization has played an important role in the evolution of many lineages. It is becoming increasingly clear that gene flow between divergent taxa can generate new phenotypic diversity, allow for adaptation to novel environments, and contribute to speciation. The present study was executed to analyze the karyotypes in the hybrids of *Triticum aestivum* var Ujala and *Hordeum vulgare* (NARC-4083, NARC-4084, NARC-4086) accessions using Fluorescence *in situ* Hybridization. Seeds of wheat and barley were allowed to germinate in laboratory on moistened filter paper in incubator at 25°C. For the production of hybrid plants, first the florets of barley were made male sterile by removing their anther before anthesis. Suitable anthers of *Triticum aestivum* for pollination were selected and were dabbed on the surface of barley stigma very gently as not to harm the ovary. Pollinated florets were treated with Gibberellic Acid at a concentration of 75 ppm to promote fertilization & hybrid embryo development as well as to avoid their early death. During the present piece of work two-step ovary culture media were used. First in order to rescue the embryo and to save it from early abortion the F1 hybrid ovaries were germinated *in vitro* by culturing them on MS basal medium supplemented with kinetin (0.2 mg/L) and BAP (0.2 mg/L) for one week. Then for the better growth and nourishment of embryos they were cultured on Gamborg medium supplemented with 2,4-D (0.2 mg/L), before transferring them to soil. To observe the variations in chromosome pairing FISH technique was used. The roots of F1 hybrid plants were fixed using Formaldehyde solution (2%). Suspensions of the intact chromosomes were prepared by vortexing the root tips in ice cold LB01 Lysis buffer. The observation of DAPI (4',6-diamidino-2-phenylindole dichloride) stained F1 hybrid chromosomes were characterized by using the Labomed Lx-400 Fluorescent Microscope. This preliminary study can lead to detailed karyotypic genomic analysis of these hybrids on a wider scale, which might give a better understanding of gene expression during such crosses. Cross between wheat and barley may provide an excellent generation having characteristic of both the crop.

Key words : Karyotyping, F1 hybrids, Gamborg media, LB01 lysis buffer, DAPI stain

SUNFLOWER DEVELOPMENT – CORRELATIONS IN MALE AND FEMALE REPRODUCTIVE STRUCTURES FORMATION

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ABSTRACT

Sunflower is one of the major world oilseeds and very important for agriculture. Improving our knowledge about sunflower development and the correlations between the male and female reproductive structures formation is necessary for successful breeding work. Schneider A.A. and Miller J.F. (1981) offered description of sunflower growth stages highlighting several Vegetative stages (V1, V2...) and Reproductive Stages (R1, R2...) based on external morphological features. The R5.1, R5.2 ... stages is based on the the percentage ratio of blossoming flowers and does not take into account the development of male and female reproductive structures. Toderich K.N. (1988) investigated the correlations between development of male and female reproductive structures and identified 8 stages in the tubular flower development. We propose to improve the classification of Schneider and Miller (1981) using their own data and taking into account the research Toderich K.N. (1988). We distinguish stages not only on the basis of the number of flowering circles in the sunflower head, but also taking into account changes in reproductive structures - the stages of pollen formation and ovule development. Thus, the visible external morphological characteristics of the sunflower inflorescences and flowers will be associated with the internal reproductive structures which develop inside the flowers. Proper assessment of the development stages of sunflower will be useful and significant for agrotechnical and breeding work. For example, treatment with gibberellin to produce plants with a sterile male structures is most effective in R-1 stages (before microsporocytes formation). Also, when treating sunflower plants with substances with possible mutagenic properties, it is necessary to take into account that the cells are most sensitive to them during meiosis, which undergoes in sunflower in the female and male spheres at different times.

Key words : sunflower, reproductive structures, flower development, correlation

EVOLUTION OF THE WEED DIVERSITY IN FACE OF AGRICULTURAL INTENSIFICATION PRACTICES

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ABSTRACT

A comparative survey of weed flora according to an altitudinal gradient from Atlantic coast to a height of 680m also corresponding to an inverse intensification gradient of agriculture pitting traditional agroecosystems against modern intensive agroecosystems was performed in north morocco (Tingitane peninsula) to assess the effects of crop management practices on the diversity, structure, and composition of weed communities. A total of 133 floristic surveys were realized in six agricultural sites between March and June 2016. We have identified 177 species belonging to 36 botanical families including 31 dicotyledons and 5 monocotyledons. Three families: Asteraceae, Poaceae, and Fabaceae add up 43% of the total staff complement alone. The biological aspect shows a prevalence of the therophytes with 79,9% followed by the hemicryptophytes and geophytes with respectively 10,2 and 6,8%. Mediterranean taxa are dominating 57,4% of the total staff complement. To classify qualitatively the nature of the agroecosystems in the six sites we use five indexes of agroddiversity, the results show that the Tankoube site is the most diversified in terms of agroddiversity, followed successively by the sites of Tafza, Bellota, Boujdiane, Khemis Sahel and Laaoumra which comes last. Biodiversity index results of weed indicated a similar gradient to agroddiversity indices, so we can explain these results by modernization of agriculture. The factorial analysis of correspondences (A.F.C.) highlight three species groups: Groupe of modern agroecosystems species, groupe of species linked to mechanized agroecosystems, and groupe of traditional agro-ecosystems species.

Key words : Weeds, Agroecosystemes, north morocco, biodiversity

ANTIOXIDANT PROPERTIES OF LEAF EXTRACTS OF WILD AND CULTIVATED ROCKETS

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ABSTRACT

Rocket species such as *Diplotaxis tenuifolia* L. (wild) and *Eruca sativa* L., (cultivated) are eaten in salads, especially in Mediterranean countries, now in all over the world. They are all glucosinolate-containing species belong to the family Brassicaceae. These raw plant materials of both species have rich bioactive phytochemicals such as glucosinolates, phenolics, flavonoids, and vitamins such as vitamin C. These compounds have the ability of scavenging free radicals, inhibiting lipid peroxidation, and chelating metals, besides playing a vital role in the stability of food products, as well as in defense mechanisms of biological systems. A comparative study of antioxidant compounds, flavonoids and vitamin C, and also antioxidant activity was carried out in wild rocket and salad rocket. Total phenolic and flavonoid contents were determined using the Folin-Ciocalteu reagent. The total phenolic content in the ethanol extracts of *D. tenuifolia* L. was more (130.38 ± 2.0 mg GA/g) than that in *E. sativa* L. (84.46 ± 4.21 mg GA/g), while the concentration of total flavonoids in *D. tenuifolia* L. was higher than that in *E. sativa* L. (43.11 ± 1.02 mg rutin/g and 24.96 ± 1.26 mg rutin/g, respectively). The antioxidant activity of the ethanol extracts of the two cultivars using the (1,1-diphenyl-2-picrylhydrazyl) (DPPH) and superoxide dismutase (SOD) assays; *D. tenuifolia* L. $22.71 \pm 0.38\%$ DPPH activity and *E. sativa* L. showed a lower, activity of $12.48 \pm 1.20\%$. The relatively high radical scavenging of stable DPPH by acetone extract of the *D. tenuifolia* L. leaf might be due to the high level of flavonoids which might account for such a strong activity. These plants are excellent sources of antioxidants especially with their high content of phenolic compounds. Obtained results demonstrate that wild *D. tenuifolia* L. has higher antioxidant properties than the cultivated *E. sativa* L. As a result, it can be proposed as a sustainable source of nutrients with high bioactive potential, suggesting this edible wild plant as a vegetable in a healthy diet. Mediterranean and Aegean Region pilot sites of Turkey has excelled in raising awareness of the conservation and sustainable use of wild edibles.

Key words : *Diplotaxis tenuifolia* L., *Eruca sativa* L., antioxidant, phenolics

**ANTHOCYANINS AS MARKERS OF ENHANCED PLANT DEFENCE IN MAIZE
(ZEA MAYS L.) EXPOSED TO COPPER STRESS**

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ABSTRACT

Anthocyanins are important plant pigments having roles in many physiological and ecological functions; that are controlled by numerous regulatory factors. The accumulation of anthocyanins in *Z. mays* causes the plants stems to exhibit red coloration when encountering gradually increasing copper treatments (1, 5 and 10 mM of Cu in a period of 5 days) on maize seedlings. Stress injury was measured in terms of chlorophyll (a and b), carotenoid and anthocyanin contents, malondialdehyde (MDA), hydrogen peroxide (H₂O₂). Carotenoid and anthocyanin contents dramatically increased by increasing concentrations of Cu stress. MDA and H₂O₂ levels were found to significantly increase at high Cu treatments (5 and 10 mM of Cu). Chlorophyll content was observed to be highest at 1 mM Cu and then decreased at 5 and 10 mM of Cu. In addition, significant increases were determined in the activities of catalase (CAT), superoxide dismutase (SOD), glutathione reductase (GR) and ascorbate peroxidase (APX) under high Cu concentrations, while glutathione S-transferase (GST) and peroxidase (POX) activities showed no change. Treatments above 5 and 10 mM of Cu triggered copper stress in maize seedlings. The results of this study provide evidence that maize seedlings represent a high tolerance to gradually increasing copper treatments. Improved copper tolerance may relate to high anthocyanin and carotenoid content besides antioxidant enzymes activity may improve metal chelating ability of anthocyanin pigments. Data presented in this study may also contribute to better understanding of phytoremediation studies in maize exposed to high copper contenting soils.

Key words : Anthocyanin, copper, maize, antioxidant

ASSESSMENT OF ALKANNIN CONTENT IN THE ROOTS OF BULGARIAN POPULATIONS OF *ALKANNA TINCTORIA*

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ABSTRACT

Alkanna tinctoria (L.) Tausch, Boraginaceae is a medicinal plant used since ancient times because of its antimicrobial and anti-inflammatory properties. The roots of the plant are used for the treatment of many skin diseases. Naphthoquinone derivatives (alkannin esters) are main components of the roots and determine their pharmacological activity. The plant grows wild mainly in arid maritime areas of southern Europe. In Bulgaria it is represented with several small populations in southwestern (the Struma Valley) and Southeastern (eastern Rhodopes) part of the country and is included in the Red Data Book of the Republic of Bulgaria for species forbidden for collection from their natural habitats. The use of the plant in the food and pharmaceutical industry on the one hand and the limited distribution to the other requires its in vitro micropropagation and/or cultivation. To select the most promising starting material, it is necessary to evaluate the alkannin content in the wild growing populations of the species. This determined the purpose of the present study comparative analysis of alkannin content in the roots of *A. tinctoria* Bulgarian populations. The samples were collected from populations located along the Struma Valley from the town of Kresna to the village of Kulata, southwestern Bulgaria. Commercial product of *A. tinctoria* roots was used as a control sample. The alkannin content was determined in methanolic extracts of the studied samples by GC/MS. The highest alkanine content, essential exceeding that of the control sample was determined in the root extract of the population from Ploski village. Comparable alkannin content to that of control sample was found in the sample from Culata village. Also significant alkannin content although lower than the control sample was determined in the samples from villages Ilindentsi, Struma and Topolnitsa. The lowest alkannin content was found in the sample from villages Mirevo, as well as in the samples Spatovo and Harsovo. The comparative analysis of the alkannin content in the roots of the studied samples determined the populations from the villages Ploski and Culata with the highest content which defines them as perspective for starting material for micropropagation and cultivation. The authors are grateful for the financial support by the Bulgarian National Science Fund, Bulgarian Ministry of Education and Science (Grant KII-06-H26/6, 13.12.2018).

Key words : GC/MS, naphthoquinones, Struma valley

**IN SEARCH FOR LEFTOVERS OF TERTIARY FLORA ON DOLOMITE ROCKS
IN CENTRAL BOSNIA (W. BALKAN)**

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ABSTRACT

During most of the Tertiary, the Mediterranean basin had arid climate, which is the reason for Tertiary flora in the area to be subtropical with dominance of evergreen plants (Braun-Blanquet, 1923). The most prominent Tertiary relict plant species in Bosnia and Herzegovina (B&H) today is the illyrian pine (*Pinus nigra* subsp. *austriaca*). Its current distribution in B&H is disjunct and limited to specific types of bedrock. The province of relict pine woods (*Erico-Pinetea*) in B&H occurs both on ultra-mafic and dolomite rocks, because of high magnesium content in the undeveloped type of soils, which is preferred by illyrian pine. The vegetation of pine woods on dolomite encompasses large number of relict species originating in Tertiary. These are xeric and thermophilous species which are competitive on extreme dry habitats, such as dolomite. We analyzed vegetation of four localities within stands of illyrian pine situated near Sarajevo city, on patches of dolomite bedrock, outside of main dolomite complexes in the country. We applied the Central-European method of phytocoenological relevé (Braun-Blanquet, 1964). For investigated plant communities we analysed floral elements of diagnosed taxa and constructed the corresponding spectra. For the statistical analysis we used R ver. 3.5.2. The Bray-Curtis similarity index was applied in order to compare the communities on dolomite with each other, and also with adjacent communities on different type of bedrock. The significant difference in both floristic composition and proportion of the Tertiary relicts for the vegetation occurring on different types of bedrock was observed.

Key words : Tertiary, relicts, disjunctive areal, ecological niche, dolomite

TERRARIUM, A NEW PERSPECTIVE: TOOL FOR RESEARCH AND EDUCATION

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ABSTRACT

The aim is the construction of a terrarium as a support element for interior plant collection. The paper presents the idea of terrarium as a novelty in terms of laboratory research tool, introducing the concept of living piece of glazed box prone to natural life observation. The potential research tool of these installations, made by enthusiasts and passionate hobbyists and botanist collectors from abroad, led to the creation of a new current, independent of aquascaping. The arrangement of terrariums allows the use of a variety of extravagant and rare plants, as objects of stand-alone glazed research box or, by introducing an animal, transforming them into vivarium (nurseries), made under the guidance of functional design rules. Through this paper we present terrarium from a new perspective: as a tool for research and education, in view of the fact that terrariums help us to make collections of rare plants, put in a unique composition. The aim is to allow us to observe the coexistence and behavior of different species associations put together, but also the educational role through which we make people aware and responsible for the fragility of nature. The paper exemplifies the different types of terrariums intended for vivariums, depending on the simulated habitat, the general constructive elements of a terrarium - from the substrate to the artificial lighting - but also the abiotic factors we work with in a vivarium. At the end of the paper describe structured according to the steps in arranging a fully controlled terrarium, but also the observation in time of the evolution and competitiveness of the plants used and the technical problems of control and maintenance encountered.

Key words : Terrarium; research tool; Moss terrarium; Dendrobates vivarium; Orchidarium

STUDIES ON IVY ON THE HISTORICAL MONUMENTS AND THE IMPORTANCE OF THE PRESERVATION PROCESSES BASED ON LIVING PLANT WALLS

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ABSTRACT

The preservation of the ivy on the historical monuments is a subject that has been largely debated because the views regarding its benefits and disadvantages are quite different. A series of laboratory studies have been made to prove the degree to which ivy roots affect the walls and its potential benefits, such as the protection of the walls covered by it from extreme temperatures and rain. The present paper covers two main aspects: an introduction in landscaping focusing on the form-function relationship and its influence on the evolution of landscaping styles, as well as a short presentation of the historical parks, seen as an applicable model for the conservation of buildings and green areas in the vicinity of buildings, a presentation of the main degradation factors that affect historic buildings and the importance of the preservation processes based on living plant walls. The second aspect presents the species *Hedera helix* seen as an invasive plant. Despite the fact that it's highly decorative and confers a medieval aspect to buildings, the wild variety is more harmful than some of the cultivated species we studied. In making a decision whether to keep or remove the ivy layer off a building, one must first evaluate both the benefits of ivy growing on and its damages. The paper analyzes the laboratory experiments that have been made in our unit and provide a list of cultivated varieties of ivy to replace the wild form.

Key words : *Hedera helix*, living plant walls

**ETHNOBOTANICAL STUDY ON MEDICINAL AND AROMATIC PLANTS USED
BY THE LOCAL PEOPLE RESIDENTS OF MILA CITY (NORTH-EAST OF
ALGERIA)**

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ABSTRACT

Mila is a city of Algeria located in the North-East of the country, bordered to the East by the cities of Constantine and Skikda, to the West by the city of Setif, to the south by the city of Batna, in the North -West by the city of Jijel, in the North- East by the city of Constantine, and in the South East by the city of Oum El Bouaghi. the topography of the city is divided into 3 morphological groups, the high mountains, the high plains and the combination of valleys, hills and foothills. This diversity has also resulted in a varied and well-stocked vegetation cover that is very rich in medicinal plants and herbs for the residents of the region and neighboring states. The aim of the study is to establish a catalog of the medicinal plants the most used (cited) in the Mila city by the different age categories of the local people against several diseases. An ethnobotanical study on medicinal and aromatic plants was carried out in the Mila region (North-East of Algeria), validated questionnaires were given to 48 participates from the local population in the different districts of the study area, and the data were analyzed through informant consensus factor (ICF), the use value of species (UV) and the fidelity level (FL). The results indicated that among 48 of inhabitants surveyed, 75% are men and 25% are women, the age category that use the traditional therapy are those belongings to the age group between 61 and 70 years, the average of plant users are illiterate, with an intermediate socio-economic situation. 71 medicinal plants belonging to 39 different families were identified during the survey, which Lamiaceae were the most family used by the local population to treat various human diseases in Mila region. This study proved that folk medicine is still widely practiced by the population in Mila (North-East of Algeria).

Key words : Ethnobotanical study , Mila, medicinal plants

**TO THE STUDY OF ENDEMIC AND SUBENDEMIC SPECIES OF THE
ASTERACEAE FAMILY IN THE FLORA OF THE MIL STEPPE (IN AZERBAIJAN
REPUBLIC)**

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ABSTRACT

Endemic species are the biological treasure of every country. They show a restricted distribution and thus are often endangered. Responsibility for the protection of these species is high. Despite these facts they are widely neglected in nature conservation work. They are the most interesting topic of faunistics and biogeography and the biological treasure of every country. It was determined that total species content of endemics and subendemics at Mil steppe consists of 40 species which belong to 31 genera and 20 families. 25 of them are Caucasus endemics, 11 species are Azerbaijan endemics and 4 species are subendemics. Families which are represented with most species are Asteraceae (7), Fabaceae (5), Liliaceae (4). Each of families of Chenopodiaceae and Iridaceae are represented with 3 species, each of Orchidaceae, Scrophulariaceae, Plantaginaceae families with 2 species. Each of rest families are represented with one species. Caucasian endemics which are belong to Asteraceae family are *Echinops orientalis* Trautv., *Tragopogon tuberosus* C. Koch., *Taraxacum Grossheimii* Schischk., *Stizolophus coronopifolius* (Lam.) Azerbaijan endemics which are belong to Asteraceae family are *Tragopogon macropogon* CAMEy, *Tragopogon karjagini* Kuth., *Taraxacum desertorum* Schieschk. Life forms, ecological groups of them relation with moisture, and geographical types of these species were studied. Endemic species are the biological treasure of every country. They show a restricted distribution and thus are often endangered. Responsibility for the protection of these species is high. Despite these facts they are widely neglected in nature conservation work. They are the most interesting topic of faunistics and biogeography and the biological treasure of every country. It was determined that total species content of endemics and subendemics at Mil steppe consists of 40 species which belong to 31 genera and 20 families. 25 of them are Caucasus endemics, 11 species are Azerbaijan endemics and 4 species are subendemics. Families which are represented with most species are Asteraceae (7), Fabaceae (5), Liliaceae (4). Each of families of Chenopodiaceae and Iridaceae are represented with 3 species, each of Orchidaceae, Scrophulariaceae, Plantaginaceae families with 2 species. Each of rest families are represented with one species. Caucasian endemics which are belong to Asteraceae family are *Echinops orientalis* Trautv., *Tragopogon tuberosus* C. Koch., *Taraxacum Grossheimii* Schischk., *Stizolophus coronopifolius* (Lam.) Azerbaijan endemics which are belong to Asteraceae family are *Tragopogon macropogon* CAMEy, *Tragopogon karjagini* Kuth., *Taraxacum desertorum* Schieschk. Life forms, ecological groups of them relation with moisture, and geographical types of these species were studied.

Key words : endemic, subendemic, endangered, Asteraceae, Mil steppe

**FUNCTIONAL AND STRUCTURAL ANALYSIS OF PAKISTANI PSTVD RNA
MEDIATING LONG DISTANCE TRAFFICKING IN HOST PLANT**

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ABSTRACT

Long distance and short distance trafficking of various plant viruses and viroidal RNA is a key process across different cell boundaries. These are proved to be good model system for understating regulatory system of plant systemic movement. In present research we have studied structure and function of RNA motif (Loop '26') of Potato Spindle tuber viroid (PSTVd) which is necessary for movement in leaves of targeted host plant (*Nictiana benthamiana*). Different molecular techniques like RT-PCR and Northern blotting with microscopy techniques showed that Loop 26 trafficking defective mutants were visible only palisade mesophyll cells, which proved this loop play an important role for mediating trafficking to spongy cell from palisade. Our data fully supported broad implications for analyzing RNA Loops motifs establishing trafficking of RBA in other biological systems.

Key words : PSTVd, Northern Blotting, RT PCR

**CONTRIBUTION TO THE KNOWLEDGE OF PONTECHIUM MACULATUM
(BORAGINACEAE), A SPECIES OF HIGH CONSERVATION CONCERN IN THE
BULGARIAN FLORA**

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ABSTRACT

Pontechium maculatum (Boraginaceae) is a species of high conservation concern in the Bulgarian flora. It is assigned a national IUCN category 'Vulnerable', legally protected according to the national Biological Diversity Act, and listed in Annex II of the Habitats Directive (Council Directive 92/43/EEC). Recent studies in one of the largest populations in the country revealed some new data about the species which are reported here. The population studied is situated in Mt Lozenska, Mt Sredna Gora (*Western*) floristic region. Relevant taxonomic literature states that *P. maculatum* is a biennial plant, however, our observations revealed the plants in Mt Lozenska are perennial (possibly short-lived). A great variation in the corolla-colour was observed, most plants having bluish to violet corolla and only a few – reddish to dark red. This can be explained by either natural variation in the population, not reported in the taxonomic literature so far, or by hybridisation with *Echium vulgare* which co-occur in the same locality. Large fluctuation in the number of flowering plants in two consecutive years was recorded, with some 180 blooming specimens in 2019 and only about 25 in 2020. Studies in the genome size of this population revealed the plants have significantly higher DNA-content (1C-value) than plants from the typical populations of the species in Northeast Bulgaria floristic region, e.g. Kabiuyushka Mogila locality. Further biosystematics studies (chromosome number, genome size, genetic studies, etc.) are currently in progress to explain the observed phenomena within the Bulgarian populations of *P. maculatum*. This work has been carried out in the framework of the National Science Program "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters", approved by the Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science (MES) of Bulgaria (Agreement № D01-230/06.12.2018). The financial support of Sofia Municipality for part of the field work under the project "Monitoring of endangered, rare and vulnerable plant and animal species and plant communities in Lozenska planina Mt." (Agreement № COA19-ДГ55-261) is gratefully acknowledged as well.

Key words : Biological type, *Echium s.l.*, *Echium russicum*, rare species, species of conservation concern

ANATOMICAL STUDIES ON *Verbascum bugulifolium* Lam. (RIVA MULLEIN)

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ABSTRACT

The genus *Verbascum* L. contains approximately 360 species worldwide. In Turkey, There are 255 species and 106 hybrids which belongs 12 different artificial groups. 198 of these taxa are Turkish endemics and endemism ratio is more than 50%. *Verbascum bugulifolium* Lam. has a narrow distribution in Northwestern part of Turkey and IUCN category evaluated as EN. In this study, basal leaf, stem and root anatomy of *V. bugulifolium* was investigated. Anatomical structures of basal leaf, stem and root were determined. Also we described anatomical properties like cell shape, length and width of *V. bugulifolium*. All these investigations and observations compared with the other anatomical studies, especially closely related *Verbascum* species. As a result of this study, we found that periderm of roots are 1-2 layered and narrow. Endodermis of roots are 2-3 layered, mostly rectangular and rarely orbicular shaped. Cortex region of roots are generally narrow and 5-8 layered. Also cortex cells mostly hexagonal, rarely ovate and orbicular shaped. Upper and lower epidermis of basal leaves are 1 layered, ovate and rectangular shaped. Spongy parenchyma of basal leaves are 5-7 layered, mostly ovate and orbicular, rarely rectangular shaped. Palisade parenchyma of basal leaves are 4-6 layered, prominently rounded rectangular shaped. Stomas of basal leaves are anomocytic. Epidermis of stems 1 layered, mostly ovate, rarely orbicular shaped. Phloem and xylem region of stems are narrow. Cortex region of stems are 3-9 layered. Also cortex cells are orbicular and ovate shaped.

Key words : *Verbascum bugulifolium*, Riva mullein, anatomy

ANATOMY AND MICROMORPHOLOGY OF *POA JUBATA* A. KERN. (POACEAE BARN.)

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ABSTRACT

The genus *Poa* L. has about 500 species worldwide. The genus *Poa* L. is the largest in the Poaceae Barn. family in terms of taxa number. *Poa* genus is represented by 32 taxa in Turkey. *Poa jubata* A. Kern is a rare species with a rare distribution in South-eastern Europe. The distribution of this taxon is limited in Albania, Bulgaria, Croatia, Greece and Turkey's Thrace region. In this study, the anatomy and the floret micromorphology of *Poa jubata* A. Kern were studied. The root, stem and leaf cross sections of the taxon were examined and light microscope images were obtained. Gluma and lemma surface images were examined by electron microscopy. To examine the root, stem and leaf anatomy of *P. jubata*, the method used by Johansen (1944)'s paraffin method and Metcalfe (1960) was followed. The cross-sections were taken for each organ using a microtome. The cross-section of each tissue was made into a permanent preparation. The tissues were examined by light microscopy. Lemma and gluma epidermal properties were examined, Ellis (1979), Acedo & Llamas (2001) and Ortunez & Fuente (2010)'s studies have been followed terminologically. It was determined that the root of *P. jubata* consists of epidermis, exodermis, cortex, endodermis, pericycle and central cylinder regions. Parenchymatic cells were detected in the root cortex. It was seen that the cortex structure of *P. jubata* is of orizoid type. The endodermis was determined to be in a single row, with a thick wall and without any intercellular space. It was observed that the thickening was in the shape of a horseshoe. It has been determined to have Casparian strip. Length of vascular bundle, width of vascular bundle, number of cell lines of sclerenchyma were determined on stem anatomy of *P. jubata*. In the anatomy of the leaf, abaxial epidermis, stomata cells, midrib, trichome and adaxial epidermis structures were examined. The distinction between palisade and spongy parenchyma is not clear in mesophyll tissue. Micro-hairs appear on the inside of the leaf. Vascular bundles are clearly angularly placed. Vascular bundles in the leaves are located in one row from one end of the leaf to the other in cross sections. Long cells were seen and their length was measured in SEM images of lemma and gluma. Crown cells, silica body and epicuticular waxes were seen from short cells in both floret parts. However, prickle and macro hair were not seen.

Key words : *Poaceae, Poa jubata*, Plant Anatomy, Micromorphology

SYNTHESIS AND BIOLOGICAL ACTIVITY OF N,N,S-SCHIFF-BASE RHODIUM PENTAMETHYLCYCLOPENTADIENYL COMPLEXES

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ABSTRACT

This work concerns the development and structural characterization of 5-methyl-4-((pyridin-2-ylmethylene) amino)-4H-1,2,4-triazole-3-thiol, a tridentate Schiff base, and its use as a chelating ligand for the preparation of a serie of organometallic complexes of rhodium (III). The addition, in alcoholic solution, of Schiff base to the precursor complex $[(\eta^5\text{-C}_5\text{Me}_5)\text{RhCl}_2]_2$ previously developed, has resulted a serie of final complexes. Structural elucidation of rhodium(III) complexes revealed the formation of piano stool half sandwich complexes, where the coordination of the central metal cation is ensured by the polyhapto ligand π -donor (pentamethylcyclopentadienyl) and an alkoxyated derivative of the chelating Schiff base. The introduction, during the complexation reaction, of an alkoxy group from the reaction media on the carbon of the imine function, transforms the Schiff base (L) into a tridentate alkoxyated derivative (L-OR) (R = CH₃, CH₃CH₂ or CH(CH₃)₂, depending on whether the reaction is performed in methanol, ethanol or isopropanol, respectively). The alkoxyated derivative obtained is found to be a tridentate ligand, coordinating the metal in a tridentate mode (S, N, N), while the polyhapto ligand π -donor is linked through π bonds. This alkoxylation generates two chiral centers in the different organometallic species. After development, structural characterization and study of mechanism formation of the various organometallic complexes, they were subjected to in vitro tests to explore their antiproliferative activity against cancerous (A2780 and A2780cisR) and non cancerous (HEK293) cell lines, the results obtained were compared with those of two other complexes with proven biological properties, namely cisplatin and RAPTA-C.

Key words : Organometallic piano stool complexe ; rhodium(III) ; Schiff base ; Bio-organometallic chemistry

DYEING OF COTTON FABRIC PRETREATED WITH CHITOSAN WITH ACID DYES IN ONE STEP

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ABSTRACT

Auxiliary chemicals that are most likely to contain toxic compounds and non-biodegradable dyestuff used in the coloring of textile products cause water and environmental pollution. Increasing global pollution threats, a decrease in natural resources, and new legal environmental regulations make mandatory the use of environmentally friendly new materials in textile production and the evaluation of natural wastes. For this reason, textile production processes that reduce pollution are gaining importance. In this study, we investigated the effect of chitosan, a biodegradable natural biopolymer from waste shells of crustaceans, in dyeing cotton fabrics with acid dyes. Cotton fabrics treated and not treated with commercial chitosan were dyed in different recipes with acid dyes. The color values, color yields, and washing fastness properties of these fabrics and the conductivity of the waste flote were measured and the results were compared with each other. Unlike previous studies, the results were presented visually and numerically. The results of this study showed that the cotton fabric can be dyed in the desired color intensity and sufficient washing fastness values without the need for salt and any other chemicals, with the acid dyes used for coloring nylon and wool fibers, after pretreating with chitosan. It has also been demonstrated that the conductivity values of the dyeing waste flote can be reduced by using chitosan. Thus, besides reducing the salinity burden that creates a risk in water and soil, it has been demonstrated that 100% cotton textile materials can be dyed with acid dyes in sufficient color yield and washing fastness with the help of chitosan. With this method, the dyebility of the cotton and nylon mixture products in a single bath, with a single dyestuff, using less energy and water, in a short time will provide an important advantage for enterprises and environmental health.

Key words : Salinity, cotton dyeing, chitosan, color measurement, environmental pollution, acid dyestuff

EFFECT OF ANNEALING ON THE TRANSFORMATION OF CARBONATE IN THE SLUDGES OF WASTEWATER TREATMENT PLANTS: CASE OF THE STATION OF JIJEL (ALGERIA)

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ABSTRACT

The main waste produced by a treatment plant is sludge. There are three main routes for its disposal: incineration, landfill and spreading. The cost of removing sludge from a treatment plant can reach 60% of its operating cost. One way of upgrading this sludge is its use as a cement additive for the production of cement clinker. The clinker is produced by annealing and grinding a mixture of 80% limestone and 20% clay. The two elements are mixed and heated at very high temperature. The aim of this work is the study of the effect of annealing on the evolution of carbonates in the sludge of wastewater treatment plants. The sludge produced by the wastewater treatment plant of Jijel city in Algeria was used in this study. The carbonate content analysis was performed using a Bernard calcimeter. XRD analysis was used to confirm the transformation of calcium carbonate contained in the sludge to calcium oxide. An increase in the carbonate concentration under the effect of temperature was observed up to 400°C. A decrease in this concentration was observed after 400°C to vanish after 900°C. The XRD spectra have confirmed this result. The characteristic peak of calcium carbonate has decreased gradually with increasing the annealing temperature to disappear at 900°C. The characteristic peak of calcium oxide absent at low temperature has appeared with the increase of the latter. The increase in the carbonate concentration under the effect of temperature before 400°C is the result of the drying of the sample of sludge. The decrease in calcium carbonate concentration between 400 and 900 °C is due its transformation into calcium oxide. This causes an increase in the calcium oxide concentration in the sample. Calcium carbonate disappears completely from the sample above 900 ° C.

Key words: Sludge; Bernard calcimeter; wastewater treatment plants; XRD; calcium carbonate; calcium oxide.

SYNTHESIS OF TiO₂ NANOPARTICLES VIA DIFFERENT METHODS: STRUCTURAL, OPTICAL AND PHOTOCATALYTIC PROPERTIES

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ABSTRACT

TiO₂ photocatalysis is an advanced oxidation process to eliminate organic pollutants in water or air. These pollutants are converted to small molecules such as CO₂, H₂O at the end of the process. The method is based on the usage of UV-A light and TiO₂ as a semi-conductor together. TiO₂ is the most popular and used photocatalyst due to its unique properties such as chemical inertness, being low-cost, non-toxicity, having good photostability and having high oxidative power. In this study, TiO₂ nanoparticles (TiO₂ NP) were synthesized by two methods namely, an acid-catalyzed and a modified sol-gel method without any impurity. The prepared photocatalyst samples were characterized by FTIR, XRD, ESEM-EDX, UV-DRS and BET, techniques. The photocatalytic performances of the photocatalysts were determined by examining the degradation reaction of 4-nitrophenol under UV-A light. The results indicated that the preparation method affects the structural, optical and photocatalytic properties of the synthesized TiO₂ NP photocatalysts. ESEM micrographs of the synthesized TiO₂ samples showed almost spherical particles. A higher photocatalytic performance was obtained for the TiO₂ NP sample synthesized by modified sol-gel method.

Keywords: 4- nitrophenol, photocatalysis, sol-gel, TiO₂ nanoparticles.

**SYNTHESIS AND THERMOELECTRIC PROPERTIES OF POLYTHIOPHENE
AND POLYTHIOPHENE/PEDOT IN THE PRESENCE OF 4-
(HEPTYLOXY)BENZOIC ACID LIQUID CRYSTAL**

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ABSTRACT

Thermoelectric materials are a class of semiconducting functional materials that can convert temperature difference into electric potential difference by Seebeck effect. Poly(3,4-ethylenedioxythiophene) (PEDOT) is the most promising among the conductive polymers studied. On the other hand, the conductivity of polythiophene (PTH) is not high enough although its thermal and environmental stability is superior. The conductivity and consequently power factor of the conductive polymers can be enhanced if the charge carrier mobility is increased by means of synthesizing more oriented and longer chains [1]. Since liquid crystals are self-orienting materials, it can be expected to orient the polymer chains formed during their synthesis. In this study, firstly the liquid crystal 4-(heptyloxy)benzoic acid was used during the synthesis of PTH by expecting it to orient the polymer chains. Then, PTH/PEDOT nanocomposites were prepared by synthesizing PEDOT in the presence of PTH using chemical oxidation method in the organic media. The samples were characterized by FT-IR, UV-Vis and dynamic light scattering techniques. Seebeck coefficient and electrical conductivity were measured from the thin films on the glass substrate. It was observed that by introduction of the liquid crystal, PTH and PTH/PEDOT composites turned to the n-type from p-type material.

Key words : polythiophene, poly(3,4-ethylenedioxythiophene), thermoelectrics, Seebeck coefficient

EVALUATION OF ACID ADDITION ON THE MICROWAVE DIGESTION OF HEAVY METALS IN COMMERCIAL HERBAL TEAS BY ICP-MS

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ABSTRACT

Herbal tea bag usage is very common nowadays due to their healthful and delighting effects. Herbal teas are preparing by infusion or decoction of different parts of the plants such as leaf, flower or radix. During preparation of tea bag infusions some metals could be dissolve in the water. Heavy metals are toxic for health and they present in herbs because of the environmental pollution (1).The aim of the study is determination of the acid addition during the extraction procedure of tea infusions. Infusion of samples prepared at 90 °C by using ultrapure water (18.2 MΩ). Infusion samples extracted by microwave digestion with and without nitric acid addition. As, Co, Cr, Cu, Li, Ni, Sr, V, Zn, Ag, Cd, Bi, Pb levels of tea bag infusions by inductively coupled plasma-mass spectrometry (ICP-MS). The precision and accuracy of the method was evaluated by applying standard (6Li, 45Sc, 72Ge, 115In, 209Bi) addition method to the samples. Ten different herbal tea bag samples collected from local markets. Nitric acid added samples metal levels slightly higher than the other samples. Based upon the Turkish Food Codex Tea Communique (2015/30) and U.S. Food and Drug Administration, all samples infusions were found to be safe for human consumption.

Key words : Heavy Metal, ICP-MS, Herbal tea, Microwave digestion, Nitric acid

DETERMINATION OF ZINC AND SELENIUM BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

The production of wine begins from vine and grape cultivation. Grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, different wine production areas affect the content of wine. Turkey is known for its old history about viticulture. It has an important position in the world. Soil and trace elements in the soil have an important role in the journey of wine production. Therefore, the trace elements that make wine a healthy drink should be in the desired range. The excessive presence of trace elements causes the toxic effect in wine. It is also necessary to pay attention in wine analysis. Based on this, we analyzed zinc (Zn) and (Se) selenium in wine samples produced in our country's region, Trakya. Zinc is the most abundant essential element in the body after Iron. It should be noted that it is primarily a trace element that plays an important role in DNA synthesis, cell division and the synthesis of other proteins. It is very important for body development and immunity, for insulin and sperm formation. Zinc is involved in the formation of different enzymes. Therefore, deficiency causes problems in sexual development, dwarfism and different growth problems, anemia, chromosomal abnormalities and also skin diseases [1]. In exposure of Se, high doses produce systemic effects; can cause immunological, cardiovascular, dermatological, ophthalmological, neurological, reproductive, developmental, genotoxic and carcinogenic opposite effects and even death [2]. In our study, analysis of Zn and Se elements in 48 wine samples was performed by the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) device. In order to prove the accuracy of the method and eliminate chemical interferences, standard addition method was applied to the wine samples. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5mL of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes, as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Zn is 0,633±0,005 mg/L. Average sample value for Se is 0,0013±0,0009 mg/L. The limited value of American Environmental Protection Agency (EPA) standards for Se in drinking water is 0,07 mg/L [3]. According to Turkish Food Codex, the upper limit determined for Zn in wines is 5 mg/L [4]. As the result of the evaluation according to these data, Zn and Se are below these limits.

Key words : vine, trace element, Zn, Se, ICP-MS

DETERMINATION OF ARSENIC BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

The production of wine begins from vine and grape cultivation. Grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, different wine production areas affect the content of wine. Turkey is known for its old history about viticulture. It has an important position in the world. Soil and trace elements in the soil have an important role in the journey of wine production. Therefore, the trace elements that make wine a healthy drink should be in the desired range. The excessive presence of trace elements causes the toxic effect in wine. It is also necessary to pay attention in wine analysis. Based on this, we analyzed arsenic (As) in wines produced in our country's region, Trakya. Arsenic exposure has been shown to cause heart disease, skin lesions, cancer and as the result of advanced exposures can cause death as well [1]. In our study, analysis of As in 48 wine samples was performed by the (Inductively Coupled Plasma-Mass Spectrometry) ICP-MS device. In order to prove the accuracy of the method and eliminate chemical interferences, standard addition method was applied to the wine samples. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5mL of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes, as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for As is 1,719±0,12 ppb. The limited value of American Environmental Protection Agency (EPA) standards for As in drinking water is 100 ppb [2]. According to Turkish Food Codex, the upper limit determined for As in wines is 200 ppb [3]. As the result of the evaluation according to these data As is below these limits.

Key words : vine, trace element, As, ICP-MS

DETERMINATION OF STRONTIUM BY ICP-MS IN WINE SAMPLES THAT ARE PRODUCED IN TRAKYA REGION

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ABSTRACT

In course of time, as trace elements pollute the environment and threaten the health of living organisms by creating a toxic effect, the concept of `heavy metal` began to emerge. When metallic pollution occurs, they are not going to disappear, they will turn into complexes and the chances of it becoming more toxic increase because deposits occur [1]. Toxic elements caused by air pollution, pesticides, minerals, trace elements will be absorbed by soil and through bioaccumulation they will pass into the nutrients and in this way metallic toxicity becomes a cycle. Vine, grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, wineries affect the content of wine. Turkey has a very old history related to viticulture and it has an important position in the world [2]. Trace elements that make wine a healthy drink should be in desired ranges. For that reason, it is necessary to pay attention also in wine analyzes. We aimed to determine strontium (Sr) by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) in wines produced in Trakya Region to see its efficacy and to evaluate it in health terms based on the result of its concentration. In this work Sr content of 48 different kind of white, rose and red wines from Trakya has been determined by ICP-MS. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5ml of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Sr is 0.6 mg /L. Average Japanese wine value for Sr in a work by ICP-OES of Sachie H and her friends in Japan in white wines is 1.393 mg/ L and in red wine is 1.636 mg / L [3]. As the result of the evaluation according to these data, Cd value in wines that are produced in Trakya is below these limits. There is not any work about the limitation of Sr in wine samples. Related to the quantity of Sr and fingerprint technique it is possible to find wine's origin. In a work published in 2019, Ekaterina E and her friends found that isotopes of strontium (⁸⁷Sr/⁸⁶Sr) and high amount of strontium were the parameters for characterizing its origin and to understand if wine was original or not [4]. In that case it is used as comparable parameter, however it is a heavy metal and heavy metals can cause illness and also death by harming human health, even in very small amounts, such as ppm. Normally, if there is no accumulation and also if there are used in the right amount, metals and salts are used as medicines. An article published in 2004 by Ferda Ö. and Esra E. explained that the tissue Strontium usually affects into is bone because sometimes in abnormal situations the body binds strontium instead of calcium, but if it is taken in appropriate doses it will be used as medicine in osteoporosis. The tolerated dose of Sr as medicine is 2 g per day [5].

Key words : Heavy metal, vine, grape, wine, Sr, ICP-MS

DETERMINATION OF CADMIUM BY ICP-MS IN WINE SAMPLES PRODUCED IN TRAKYA REGION

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ABSTRACT

Wine is an alcoholic beverage produced by partially or completely fermentation of grapes. It is a complex structure composition comprising water, alcohol, organic and inorganic compounds, flavoring and phenolic compounds, nitrogen compounds, lipids, vitamins, minerals, dissolved gases and amino acids. [1]. Turkey has a very old history related to viticulture and it has an important position in the world, as well. Vine, grape varieties, soil and climate, winemaking procedure, factors such as transportation and storage of wine, wineries affect the content of wine. It is necessary to pay attention also in wine analyzes, because trace elements that make wine a healthy drink should be in desired ranges. [2]. We aimed to determine cadmium (Cd) by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) in wines produced in Trakya Region to see its efficacy and to evaluate it in health terms based on the result of its concentration. Cd is one of the most toxic metals that it cannot be present in human body, definitely. Cd, which is taken into the body by inhalation, causes diseases such as constant headaches, dizziness, nausea, vomiting, insomnia, asthma, anemia, osteoporosis and cancer (lung and prostate). [3]. In this work Cd content of 48 different kinds of white, rose and red wines from Trakya has been determined by ICP-MS. The wine samples solubilized in microwave oven. We put 5mL from each sample in different conical containers and added 5ml of concentrated HNO₃ on them separately. After waiting 15 minutes, 1 mL of 30% H₂O₂ was added to each sample. The thawed wine samples were placed in teflon vials of microwave. Sensors for pressure and temperature regulation were properly fitted. Then, solubilization process was applied to the samples for 45 minutes as the device parameters were determined from the software menu. Solubilized samples were determined by the ICP-MS device. Average sample value for Cd is 0.001897 ppm. The work about the determination of heavy metals content of Trakya wines by AAS that was published in 2008, showed that Cu concentration was higher. The highest concentration of Cd was shown especially in red wines (0,7729 ppm). The average value of Cd in red wine samples was 0,2529 ppm. It obtained that pesticides were the main reason of its accumulation in plants [4]. According to Turkish Food Codex, the upper determined limit for Cd in wines is 0.01 ppm [5]. The limited value of OIV (International Organisation of Vine and Wine) standards for Cd in wine is 0.01 ppm [6]. As the result of the evaluation according to these data, Cd is below these limits.

Key words : Vine, grape, Cd, ICP-MS, Trakya

ANTIFUNGAL ACTIVITY OF UNFRACTIONATED END-PRODUCTS OF SEVERAL LUPINUS AGAINST FUSARIUM OXYSPORUM

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ABSTRACT

Fabaceae family has been recognized to produce a high diversity of secondary metabolites to defend themselves against herbivores, competing plants and pathogens. *Lupinus* plants are legumes members that form root nodules to fix atmospheric nitrogen and produce more nitrogen-containing secondary metabolites, especially alkaloids, than other plants. Most of those compounds exhibit some biological, pharmacological or toxicological activity and they are synthesized, e.g., as a result of fungal infection or stresses by other factors, so this hability can be explored to find bioactives against phytopatogens. Therefore, as part of our research on antifungal botanicals, the aim of the present study was to assess the antifungal activity of ethanol-soluble raw extracts of four four Lupin species (*Lupinus bogotensis*, *L. guascensis*, *L. mirabilis* and *L. pubescens*). Extracts from leaves, stems, flowers and seeds were evaluated using a micro-scale amended medium protocol and the response to extracts on *F. oxysporum* was then determined, using different concentrations (0.1-10 µg/µL range). Lupin-derived extracts exhibited antifungal activity through mycelial growth inhibition at different levels following a dose-response behavior. The LC-MS-based chemical variability of prepared extracts was integrated with the resulting antifungal activity data through biochemometrics using OPLS-DA modelling in order to determine statistically the active compounds. A prenylated isoflavone and an alkaloid were found to be the most influencing compounds for discriminating active and non-active extracts. Lupin-derived extracts could be considered as potential sources of antifungal compounds. *The present study is a product derived from the Project IMP-CIAS-2924 financed by Vicerrectoría de Investigaciones at UMNG - Validity 2018.*

Key words : Lupinus, Antifungal, Fusarium oxysporum

PROCESS MODELING AND OPTIMIZATION OF BIOGAS PRODUCTION FROM CHICKEN MANURE VIA ANAEROBIC DIGESTION

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ABSTRACT

In this work, the important process parameters affecting biogas production from chicken manure by anaerobic digestion were modeled and optimized using central composite design (CCD) based on response surface methodology (RSM). The independent process parameters were selected as total solids percentage (TS%), inoculum ratio (IR, %), the amount of pumice utilized as support material (PMC, g/L), and particle size of the used material (mm), while the selected responses were chosen as the cumulative biogas production (mL) and removal of chemical oxygen demand (removal of COD, %). The experiments were conducted under mesophilic conditions (37±2), 35 days of digestion time, 95 rpm of stirring speed, 500 mL serum bottles with an active volume of 400 mL. The experimental results indicated that the independent terms (TS%, IR, PMC, and particle size) have significant effect on the selected responses. ANOVA results showed that the quadratic models obtained by CCD for each response were statically importance ($p < 0.05$) and valid to estimate the biogas production from chicken manure by anaerobic digestion. The optimal conditions predicted from RSM for maximum cumulative biogas production were achieved with TS% of 8.92%, IR of 26%, PMC of 6.39 g/L, and particle size of 1.77 mm. Moreover, the optimum points were determined as TS% of 8.10%, IR of 24.62%, PMC of 7.04 g/L, and particle size of 1.76 mm for maximum removal of COD. Under these conditions, the maximum cumulative production and removal of COD were calculated as 8965.87 mL and 68.47%, respectively.

Key words : Anaerobic digestion, Biogas production, Chicken manure, Optimization, Response surface methodology.

**ENHANCED REMOVAL OF ARSENATE FROM AQUEOUS ENVIRONMENTS BY
A NOVEL CLAY-POLYMER BRUSH HYBRID MATERIAL: MODELING AND
OPTIMIZATION STUDIES BY RESPONSE SURFACE METHODOLOGY
APPROACH**

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ABSTRACT

The release of a large number of contaminants such as heavy metals, dyes, and pesticides to the aquatic stream from industrial sectors is of great concern due to causing serious health problems for human life and the ecological environment. Among these pollutants, arsenic (As), a heavy metal, has major harm to living healthy. Long-term exposure to this toxic metal could engender serious disease including lung cancer, kidney failure, skin lesions, bladder, and hyperkeratosis. On the other hand, As, a toxic metal, is predominantly existed in two inorganic forms in water resources. One among these is arsenate (As(V)) in oxic condition, indicating that are dangerous for human health and must be removed from aquatic environments. In present work, a novel clay-polymer brush hybrid material prepared by coating bentonite with poly(N-akriloilglisinamit) (poli(NAGA)@B) was investigated for the removal of As(V) from aqueous environments. Response surface methodology (RSM) was used to optimize and model the removal percentage of As(V) with four independent parameters using central composite design (CCD). CCD based on RSM was employed to optimize and model the effects of four independent parameters, such as pH (3–6), initial As(V) concentration (Co) (0.5-10 mg/L), poli(NAGA)@B dosage (5-40 mg), and contact time (10-150 min). The obtained results showed that the optimal adsorption conditions were established at pH of 4.36, Co of 7.30 mg/L, poli(NAGA)@B dosage of 25.75 mg, and contact time of 83.37 min for the maximum %As(V) removal. The maximum adsorption removal percentage of As(V) was %90.95 under the obtained optimal points, indicating that poli(NAGA)@B has superior performance for the removal of As(V) from aqueous environments.

Key words : Adsorption, Arsenate, Bentonite, Optimization, Polymeric brush, Response surface methodology.

ULTRAVIOLET PROTECTION OF CLOTHING (REVIEW)

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ABSTRACT

Ultraviolet (UV) is the name given to rays in the range of 100-400 nm in wavelength. Some of these rays come to our world from the sun. UV rays are classified as UVA, UVB and UVC according to the length and shortness of the wavelength. The highest frequency of these rays is UVC and it is the most harmful variety for human health. However, rays with UVB and UVA frequency can reach the earth's surface. Prolonged exposure to these rays creates risks for human health. In this study; types of UV rays, damages to human health, UV protective clothing / fabrics, factors affecting UV protection were mentioned. The information in this study was obtained by searching the literature.

Key words : Clothing, Protection, Ultraviolet rays

EFFECT ON AGRICULTURAL SOIL OF FERTILIZATION WITH SEWAGE SLUDGE: A VIEW ON POLLUTION BY MICRO-PLASTIC PARTICLES

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ABSTRACT

The problematic of microplastics (MPs) has invaded the world, but few take it seriously. What treatment plants deal with in water matrix is surprising and always the impurities end up being trapped in the sludge evidently exposed to the soil triggers the risk of toxicity and stunted development. Microplastics prevalence in agriculture soil publications are very few and reach only 3,86% (He et al., 2018). At present, 13 studies across 11 countries are made to highlight more the biosolids state. An Australian study confirmed that sludge ranged 11,48 to ~ 12,84 million particles/day but currently, there is no a standardized method for the analysis of MPs on aqueous or solid substrates (Subash Raju et al., 2018). In this study, this is a review of the methods followed by different authors depending on each of the aspects that most influence the determination of MPs in the solid substrate: Existence of organic matter and nutrient content, methods of separation by density, types of filters, optical visualization and chemical characterization devices. The process of sample purification and MPs extraction is finalized by a microscopic visualization step and chemical characterization by FTIR. MPs research include many main issues namely sampling strategy (techniques, analytical methods); description of objects (kind of plastics, shapes, sizes); investigation areas (water, amendment, soil, air, products, biota); determination of particle numbers; quantification of degradation processes and determination of biological effect on biota. Although the available evidence suggests that the total environmental exposure to microplastics ingestion and the chemicals associated are minimal, the studies so far contain a significant data gaps which need to be enhanced in future research.

Key words : Agriculture, FTIR, microplastics, sludge, soil, toxicity

DETECTION OF NUTRITIOUS ELEMENTS IN ROADSIDE PLANTS WITH HEAVY TRAFFIC

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ABSTRACT

Air pollution has negative effects on human health, plants and animal health. Air pollution can occur from car exhaust, factory emissions, fuel combustion and other sources. Air pollution occurs when a gas mixture of solid and liquid particles enters into the air due to the incomplete combustion of carbonic compounds in solid fuels and fuel oils. Air pollution negatively affects the nutritive elements in plants. Decreases in the amount of some elements cause nutritional deficiencies in the plant, and increases can damage the plant. In this study, the city center of Erzurum in Turkey in the area with heavy traffic from roadside soil samples were taken deep into the forest. In these samples, the amount of nutrient elements that must be present in the plant were analyzed with the ICP-MS device. According to the results, it has been observed that these nutritious elements increase as they move away from the road.

Key words : ICP-MS, toxicity, nutritious elements

EXPERIMENTS AND SIMULATION ON BIOLOGICAL TREATMENT OF FOOD INDUSTRIAL WATER EFFLUENTS: MILK AND JUICES PROCESSING CASE

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ABSTRACT

In Albania there exist distributed round the country a series of milk and juices processing plants. An enormous quantity of polluted waters continuously is discharged in water streams or rivers passing by these factories. So it is imperative and a must for finding the most effective methods of treating them smartly in order to get rid of surrounding environment contamination, and possibly profiting some usable materials, or simply for material and energy balance improvement. Such a kind of watery discharges have a high content of BOD and COD, high levels of particles in the form of suspended solids, grease, lipids, proteins, and also nutrients such as nitrogen (ammonia, nitrite, and nitrate), phosphates etc. Our study took into consideration primarily their characterization for specific ingredients, and through laboratory tests and computer simulation, tried to define specific processes as most technical effective and economically feasible. The most difficult has been irregularity of the components present in different factories discharges, and the quite a big discrepancy in chemical composition and in most physical properties. These situation asks for an abnormality factor during mathematical models and process simulations in order to describe correctly the system and planning to design a pilot wastewater treatment plant suitable for low testing capacities through using mainly activated sludge treatment for carbon removal, nitrification and denitrification. Throughout the work has been used the STOAT as computed simulation program helping to build a proper systematic model and then was trying to best fit the experimental data comparing with theoretical calculation data. Applying also the descriptive statistics has been reached some optimistic prediction results and defining the proper processing of these contaminated wastewater.

Key words : Wastewater from meat processing, decantation, coagulation, activated sludge, biodegradation, modeling, simulation, design.

**HYDROCHEMICAL ASSESSMENT AND GROUNDWATER QUALITY USING
STATISTICAL APPROACHES OF THE TERMINAL COMPLEX AQUIFER IN THE
REGION OF OUED RIGH (ALGERIAN SAHARA)**

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ABSTRACT

Oued Righ valley is part of the northeastern Algerian Sahara, it is characterized by an arid desert climate with very high temperatures in summer. The complex terminal aquifer waters's in Oued Righ evoke serious problems related to the physical and the chemical quality; Larger variations in conductivity are observed that probably due to multiple geochemical processes; these waters which are highly mineralized and concentrated of some elements shown the higher value in recommended potable waters norms of Algeria. In this work, several hydrochemical and statistical approaches are using to demonstrate the correlation between the chemical composition of water of the Terminal Complex and lithology.

Key words : Oued Righ, Terminal Complex , mineralized, hydrochemical, statistical.

**EVALUATING THE EFFECTS OF SOCIAL CONDITIONS ON PERIODIC
CHANGES IN CULTIVATED LANDS AND GRASSLANDS BY REMOTE SENSING
IN VAN LAKE BASIN**

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ABSTRACT

Purpose of the study was to define periodic cultivated and grassland areal changes between 1973 and 2015 with about 14-15 years periods. Three different socio-economic terms (1973-1987, 1987-2002, 2002-2015) were assessed in the study. In first term, rural population and urban population were in a balance in the region. In second term, immigration started from rural areas to urban areas because of security problems and industrial development and in third period, security problems decreased and people was adapted to the urban life in the region. Landsat earth observation satellite dataset was used to be base material and end of July or August images were obtained for each research years. Object based classification technique was applied to extract cultivated lands and grasslands. According to the results, cultivated lands were increased around 130%, and grasslands were decreased around 8% in 43 years. Grasslands were only increase in first period about 18% due to animal husbandry was priority income in the region. However, rural areas were abandoned because of security problems and industrial development in western cities. So that animal husbandry was lost the importance in the region. People was started to do field agriculture instead of animal husbandry in second and third periods. Cultivated areas were increased around 38%, 37% and 22% in first, second and third periods respectively.

Key words : Agricultural areal change, Van Lake Basin, Periodic change, Social policies

MODELLING THE (A)-FACTOR IN A PNEUMATIC BIOREACTOR USING THE TAGUCHI APPROACH

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ABSTRACT

The goal of this paper is to build a relationship for the prediction of α -factor based on the Taguchi approach. The tests were carried in an experimental pilot who comprises a rectangular tank of 84.6 L, fed with synthetic wastewater in the presence of air to preserve the biomass proliferation. The observations reveal that an increase of MLSS to 16 mg. L⁻¹ reduces the α -factor from 0.79 to 0.1. The interpretation of the biological and physical factors impacts on α -factor led to elaborate a surface response RSM and multiple linear regression MLR models at a confidence level of 95%. The R² of the MLR models showed significant values of about $\geq 80\%$. It was concluded that the limits of the operating conditions and the design geometry play a key role in the model's ability to explain the experimental change of (α)-factor.

Key words : Oxygen Transfer Coefficient, Taguchi Approach, Activated Sludge, (α)-factor

**COMPARISON THE BIOREMEDIATION PERFORMANCE OF SOME
MICROCOCCUS STRAINS ON IMIDACLOPRID INSECTICIDE VIA TOTAL
ORGANIC CARBON AND TURBIDITY**

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ABSTRACT

The efficiency of some micrococcus strains on imidacloprid (C₉H₁₀ClN₅O₂) bioremediation with total organic carbon (TOC) and population dynamics of these bacterial strains revealed out during biodegradation phase under agitated culture conditions. Micrococcus sp. DR44, Micrococcus sp. HEXBA04, Micrococcus sp. Pv8, Micrococcus sp. BP3_1A, Micrococcus sp. NCTC2665 are identified with 16sRNA in Polymerase Chain Reaction (PCR) and used in this study. To prepare the bioremediation media, 1 ml of imidacloprid and 1 ml of enriched bacteria (each of micrococcus strains) were added to 98 ml 0.8 % isotonic saline water. The imidacloprid was prepared in the concentration of 1600 ppm (advised concentration for farmers). Turbidity measurements were taken from imidacloprid media at 650 nm (Photolab 6600 UV-VIS Spectrophotometer) while TOC assays were performed with High Temperature Combustion Method. As a result, the highest and lowest TOC removal efficiency was determined by Micrococcus sp. BP3_1A as 94% and Micrococcus sp. HEXBA04 as 53%, respectively at the end of the 144th hour. According to the results TOC removal efficiency showed some differences depend on the bacterial species. It was also observed that Micrococcus sp. BP3_1A can be a suitable bacteria for bioremediation of receiving environments contaminated by imidacloprid.

Key words : Imidacloprid; Bioremediation; Total Organic Carbon; Turbidity

AREAS OF USE OF BIOMASS ENERGY AND ITS INTEGRATION INTO BUILDING ENVELOPE

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ABSTRACT

Today, the rapid depletion of natural energy resources and the effects of global climate change have accelerated the orientation to renewable energy sources. Renewable and clean energy sources such as solar, wind, biomass, etc. are used to meet energy needs. Renewable energy sources are very important because they are environmentally friendly and can provide a continuous flow. Biomass energy, one of the sources of renewable energy, is a species of plant and animal-derived energy that has been used for a long time. Biomass energy is used for purposes such as heating, electricity generation, fuel, and is used both as the main energy source and as auxiliary energy to the system in buildings where energy needs are high. In this context, biomass energy is often used in heating and electricity generation systems of buildings and is involved in mechanisms such as pellet stove, biomass boiler, biomass cogeneration. This process continues with studies on the use of biomass energy in the building envelope. The integration of biomass into the building envelope is achieved by photobioreactor systems, which can be found as open and closed systems in many forms such as flat, panel, tubular, vertical column. Although the integration of these systems into the building envelope is with various living things, the situations such as the visual effect and the energy generated by this visual effect are considered to be positive; Also, the factors such as how the biomass source used in the systems is obtained, which systems are used, and whether the places, where the structure is located, receive the solar rays are decisive in regard to cost. In this study, it is aimed to investigate the integration of renewable clean energy sources such as biomass into the building envelope, where energy consumption and efficiency in buildings are very important today. For this purpose, sample buildings using biomass energy were studied. Although biomass energy is used to meet energy needs in these sample buildings, it was found that studies on the integration of biomass energy into building envelopes are more limited. In this context, it is thought that more detailed research should be carried out and applications related to the use of biomass energy in building envelopes should be increased.

Key words : Energy, Renewable Energy, Biomass Energy, Building Envelope

ADSORPTION OF BENZALKONIUM CHLORIDE ON HOUSEHOLD PAPER TOWEL

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ABSTRACT

Benzalkonium chloride (BKC) is a cationic surfactant with biocide proprieties. It is widely used in cleaning and personal hygiene products, as well as in some pharmaceuticals. Unfortunately, it negatively affects planktonic growth and biofilm formation, thus its release in waste waters represents a hazard to the environment. Adsorption is both an economically sustainable, and environmentally friendly way of reducing the concentration of such pollutant organic species from aqueous solutions. This work focuses on low-cost, accessible, and already standardized materials (thus no modification of adsorbent characteristics is to be employed), for the adsorption of benzalkonium chloride. Various suitable household adsorbents were evaluated in terms of standardization, cost, and removal efficiency. It was concluded that paper towels satisfy all requirements and were therefore used for further experiments. These were carried out by using aqueous mixtures containing BKC within the range of 0.25 to 1 g/L concentration, as well as 10 g/L adsorbent, respectively. The temperature was varied between 18 and 45 °C. Kinetic experiments were conducted by recording absorbance values for the aqueous phase, at 262 nm. Depending on employed experimental conditions, equilibrium was reached between a few hours and 14 days. Testing various kinetic models led to the conclusion that the overall process follows a Lagergren pseudo-second order one. Rate coefficients and equilibrium adsorption capacities were calculated by means of the second-order rate law, at different temperatures, thus leading to the determination of the overall activation energy. Various thermodynamic models (adsorption isotherms) were compared at 298 K. The Redlich-Peterson and Langmuir models were in best agreement with experimental data. Values of Gibbs free energy and overall activation energy, respectively, suggest that the process involves mainly chemisorption. Comparison among adsorption capacities of various adsorbent species as well as among the pseudo-second order rate coefficients of the processes, further emphasized the fact the household paper towel was a good choice for the economically sustainable removal of benzalkonium chloride from grey waste waters.

Key words : benzalkonium chloride, adsorption, household paper towel

EVALUATION OF THE STREAMS IN THE CAMILI BIOSPHERE RESERVE AREA (ARTVIN, BORÇKA) ACCORDING TO PHYSICOCHEMICAL VARIABLES AND SOME HABITAT CHARACTERISTICS

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ABSTRACT

Camili District, the first biosphere reserve area of Turkey, is a part of the Caucasus Biodiversity Hotspot. Besides, many conservation areas such as Borçka-Karagöl Nature Park, Camili-Gorgit Nature Conservation Area and Camili-Efeler Nature Conservation Area are also within the boundaries of the region. The present study aimed (1) to determine the sections with reference habitat conditions by locating the anthropogenic effects on the streams forming the Camili Basin, (2) to determine the water quality classes of the sampling sites according to the physicochemical variables, and (3) to classify the sampling sites according to the EU Water Framework Directive, System A and B classification. Within the scope of the study, 23 sampling sites were determined from the region. In each site, water temperature, pH, electrical conductivity, total dissolved solids, the concentration of dissolved oxygen were measured, and then water quality classes of the sites were determined. Besides, by locating whether there was any human destruction on and around the sites, reference habitats were determined according to the natural habitat conditions of the sampling sites. In addition, some information such as stream order, current velocity, altitudes, stream region, distance from the source, and land slopes were also provided. As a result of the evaluation, 17 sites that were not under the influence of agriculture-animal husbandry, permanent settlement and physical destruction were identified as the sites with reference habitat characteristics. Seven of them were on 1st stream order, 12 of them on 2nd stream order, three of them on 3rd order, and one of them on 4th stream order. According to physicochemical variables, the water qualities of 12 sites were determined as Class I, four sites were Class II, six sites were Class III, and one site was Class IV. According to the results of the assessment of the stream orders, six of the 17 reference sites were located on 1st stream order, 10 of them on 2nd stream order, and one them on 3rd stream order. Any reference site was not found on 4th stream order. As stream order increases, the physicochemical and hydromorphological features of streams change, as well. As a result of these changes, natural deterioration in water and habitat qualities can be observed. However, the distortions observed in the sampling sites that did not meet the reference conditions in the present study were not natural but human-caused. Therefore, the reason for not having any reference site on 4th stream order was due to anthropogenic effects. Streams in an isolated and protected area, such as the study area, are expected to have high water quality. However, as a result of water quality assessments, it was observed that some sites had III. and IV. Class water quality. The variable that caused this situation was pH. The pH value decreases due to episodic acidification, which is generally encountered during melting periods of snow and ice masses. Due to the fact that the periodically occurring and the temporary phenomenon was observed during the sampling period, it resulted in low water quality values. If the situation observed in pH values was ignored, the water quality of all sites corresponded to the I. and II. Class. Continuing conservation work is essential to maintaining the quality of river habitats in the region.

Key words : Biodiversity hotspot, Habitat quality, Protected area, Turkey, Water quality.

COMPARISON OF DIFFERENT ESTIMATION METHODS IN BIVALVE GROWTH

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ABSTRACT

A total of 594 samples of the smooth clam *Callista chione* were collected monthly from Martil coast of the eastern Moroccan Mediterranean Sea, from July 2016 to July 2017. This study tested four widely used methods to estimate Von Bertalanffy growth parameters. Total length of samples was measured, arranged in size groups and analyzed through FiSAT II software against percentage size frequencies using automatic scan of ELEFAN I, Shepherd's method and Powell-Wetherall Plot. The Ford-Walford (F-W) plot method was applying from mean length-at-age data. Results showed different values of growth parameters for the various methods. The asymptomatic length L_{∞} ranged between 94.5 and 103.1 mm and the growth rate K varied from 0.38 to 1.4 per year. Age at zero length t_0 was estimated following von Bertalanffy plot to be 0.43. The F-W plot presented the most objective method and recorded the closest values to reality compared to the other methods. This study demonstrates that length frequency distribution analysis request the perfection of the length range of the samples to obtain better results. In fact, the knowledge of the species growth is an important input for fishery management. Based essentially on the characteristics of the studied population, the choice of the right method is the key to the success of the study for a better stock assessment.

Key words : *Callista chione*, ELEFAN I, Ford-Walford, growth, Powell-Wetherall, Shepherd's

**THE RESPONSE OF CATALASE ENZYME (CAT) TO ATMOSPHERIC LEAD (PB)
BIOACCUMULATED BY THE CRYPTOGAMIC SPECIES "LOBARIA
PULMONARIA" TRANSPLANTED IN THE ORAN REGION**

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ABSTRACT

The aim of our study is to evaluate catalase (CAT) enzyme response to the stress caused by one of the most hazardous xenobiotics; lead (Pb) bio-accumulated by the lichenic bio-indicator *Lobaria pulmonaria*, transplanted in the region of Oran and used in active bio-monitoring of atmospheric pollution in the mentioned region. Spatio-temporal monitoring of bio-accumulated lead concentrations was carried out as well as catalase (CAT) activity in lichenic thallus that were transplanted in 12 study sites, which have been chosen based on the pollution sources and meteorological parameters of the region. Spatial and temporal monitoring of bioaccumulated lead concentrations showed the presence of this hazardous xenobiotic in *Lobaria pulmonaria*'s thallus with the highest concentrations in thallus that were transplanted in areas with heavy urban traffic as well as industrial areas with a significant increase in lead bioaccumulation over time at the various study sites. The monitoring of enzymatic activity, in our case catalase (CAT), allowed us to note an activation of the catalase activity manifested by the augmentation of catalase activity. The activation of an antioxidant response on catalase, considered as a biomarker of stress, in the bio-indicator transplanted in the region of Oran reflects the first sign of stress induced by the presence of one of the most hazardous xenobiotic; lead. *Lobaria pulmonaria* is then proven to be a good bio-indicator of atmospheric lead pollution.

Key words : Enzymes, *Lobaria pulmonaria*, catalase (CAT), atmospheric pollution, lead (Pb) bio-indicator, biomarker, Oran

**STUDY OF MANGANESE CONTENT IN THE EXCHANGEABLE AND
CARBONATE PHASES IN THE SEDIMENTS OF THE BADOVCI AND BATLLAVA
LAKES (KOSOVO)**

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ABSTRACT

The study was carried out to investigate the manganese content in the sediments of the lakes. The water analyzes of the Badovci Lake, showed a higher concentration compared to the limits of the Directive EC 98/83, while the waters of the Batllava Lake were below these limits. The analysis of the lakes sediments by the fractionation method showed high values of the manganese content in the carbonate and exchangeable phases. These values are worrying because the manganese bound in these phases can very easily pass into equilibrium in the solid/liquid phase, and become bioavailable in the aquatic ecosystem. Also, according to the risk criteria (Risk Assessment Code), manganese content in the sediments of two lakes was classified as high risk, because in both lakes the sediments showed manganese content higher than 30%.

Key words : Manganese, exchangeable, sediment, Kosovo

THE LEAD MOBILITY AND TOXICITY ASSESSMENT IN THE SEDIMENTS OF THE BATLLAVA AND BADOVCI LAKES (KOSOVO) THROUGH POLLUTION INDICATORS

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ABSTRACT

The purpose of this paper was to evaluate the mobility and toxicity of lead in the sediments of the Batllava and Badovci lakes. Pollution indicators were used to confirm the level of sediment pollution such as contamination factor, pollution load index, geoaccumulation index and enrichment factor. The study shows that sediments from these lakes have lead contents that exceed values by international guidelines limits. According to lead content classification, lake sediments are classified as light to medium toxic. Lead concentration was also analyzed in the waters of two lakes, and concentration measured was at very low values compared to EC Directive 98/83, respectively below the detection level < 0.01 mg/L. The average value of Pb in the Badovci Lake sediment was 166 mg/kg, while in the Batllava Lake 30.6 mg/kg. Comparing with international guidelines and by some lakes in the region, the sediment of the Badovci Lake exceeds the international guidelines values and the referent lakes of the region. The pollution indicators in the sediment of the Badovci Lake were CF 10.42 classified as very high, PLI 10.42 extreme, Igeo 2.09 medium to high, and EF 1.88 minimum. Whereas in the Batllava were CF 1.92 medium, PLI 1.92 medium, Igeo 0.38 low to moderate, and EF 1.72 minimal. These lakes should be monitored more frequently due to the possibility of changing lead content by changing environmental conditions. The Batllava Lake sediment in terms of lead content, according to the pollution indicators used it was in better condition compared to the Badovc Lake sediment.

Key words : Toxicity, mobility, lead, Kosovo

LEAD ELICITS 20-HYDROXYECDYSONE ACCUMULATION IN SPINACH

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ABSTRACT

Among heavy metals, Pb is one of the most harmful owing to its abundance in polluted environments. It exerts toxic effects on germinating wheat seeds [1]. General symptoms of Pb toxicity are stunted growth, chlorosis, and blackening of the root system. Lead decreases the photosynthetic rate activities of metalloenzymes may decline as a consequence of displacement of an essential metal by lead from the active sites of the enzymes [2]. After entering the cell, Pb changes the hormonal status, but experimental reports addressing the effects of Pb on phytohormones and secondary metabolites are not well available [3]. Phytoecdysteroids (PEs) are secondary metabolites produced by a wide range of vascular plant species [4; 5]. *Spinach* (*Spinacia oleracea* L.) is one of the very few crop plants that produce large amounts of PEs [6]. Comparative studies of wheat and spinach seeds showed that the latter were much more tolerant towards lead stress [7], and previous studies showed that a methanolic extract of spinach leaves was able to protect germinating wheat seeds against the deleterious effects of Pb treatment [8]. The responsible substances for this effect of the spinach extract (SE) were not identified in that study, but further studies showed that 20-Hydroxyecdysone (20E), the major PE present in spinach, had a protective role against lead stress in wheat (*Triticum aestivum* L.) seedlings [9]. The biosynthesis of 20E in spinach is stimulated by insect attack, mechanical damage or jasmonic acid treatment of roots (as a defense mechanism) [10; 11]. The aim of the present study was to evaluate a possible accumulation of 20E in spinach seedlings under the abiotic stress induced by high Pb concentrations. The effect of Pb (1.5, 3, and 15 μ M) on 20-hydroxyecdysone (20E) accumulation in spinach (*Spinacia oleracea*) organs was investigated in hydroponically grown seedlings. Upon Pb exposure, a dose-dependent enhanced accumulation of 20E was observed, especially in roots and young apical leaves.

Key words : spinach; phytoecdysteroids; abiotic stress; lead.

**ACTIVATION ENERGY OF THE THERMAL DECOMPOSITION OF SEWAGE
SLUDGE OF JIJEL CITY, ALGERIA**

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ABSTRACT

Energy recovery from sewage sludge using thermochemical process, such as combustion have demonstrated great potential as other ways of valorization of sewage sludge. The aim of this study is the determination of activation energy and the components responsible for this energy. The combustion experiment was carried out in air using TGA on a sewage sludge from the municipal wastewater treatment plant of Jijel city in Algeria (150000 inhabitants). The deconvolution of TGA curve allowed us to observe three main first order reactions with three values of activation energy in the interval of temperature from 200 °C to 600 °C. The major organic components responsible for combustion in sludge are hemicellulose, cellulose and lignin. The first peak after deconvolution situated between 200 °C and 280 °C can be attributes to the combustion of hemicellulose at $T_{max1} = 236.66$ °C activation energy $E_{a1} = 247.42$ Kj/mol, the second peak between 310 °C and 344 °C, this temperature ranges include the combustion of cellulose at $T_{max2} = 329.12$ °C and $E_{a2} = 93.98$ Kj/mol, the last peak between 447 °C and 508 °C of the combustion of lignin at $T_{max3} = 472.5$ °C with $E_{a3} = 285.23$ Kj/mol. Those values revealed for combustion show that this sludge could be potential sources as solid fuel for energy recovery.

Key words: Combustion, sewage sludge, thermogravimetry, TGA, kinetic parameters.

**QUALITY ANALYSIS OF PHYSICAL, CHEMICAL, BIOLOGICAL AND
HYDROMORPHOLOGICAL PARAMETERS IN THE NITRATE VULNERABLE
ZONE (NVZ)**

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ABSTRACT

The aim of this study was to analyse various factors that may affect the ecological condition of an agricultural catchment area. It was selected for analysis the catchment of the Orla River (river length of 88 km, catchment area of 1546 km²). The catchment area is predominantly agricultural character and its entire area has been declared as an agricultural nitrate vulnerable zone. A total of 27 survey sites were selected on the main watercourse and its tributaries. Analyses were conducted in the years 2010-2012 to determine physical and chemical parameters of water (pH reaction, conductivity, dissolved oxygen, total nitrogen, organic nitrogen, ammonia nitrogen, nitrates, total and reactive phosphorus) as well as biological parameters (macrophytes) and hydromorphology. Macrophyte surveys were carried out using the Macrophyte Method for River Assessment. The MIR values ranged from 22.4 to 49.3. A total of 18 survey sites were classified as having a moderate ecological status, five sites as poor, three as good and only one as very good. Hydromorphology was analysed using River Habitat Survey method. Values of habitat quality assessment (HQA) ranged from 11 to 64. Values of habitat modification score (HMS) ranged from 0 to 63. From among 27 research points, only two were in the second hydromorphological state class. The remaining points have been classified into class III (41% of survey points), IV (33% of survey points) and V (19% of survey points). The results indicate the impact of land use in the catchment on water conductivity and concentrations of nutrients in the main watercourse and its tributaries, and in water quality in the southern part of the catchment in relation to the rest of the study area. This is probably connected with a greater share of forests and surface waters in that area.

Key words : Orla River, agricultural catchment, nitrate vulnerable zone, river habitat survey, macrophytes

**MAPPING AND QUANTITATIVE ASSESSMENT OF WATER EROSION
THROUGH VISUAL INTERPRETATION OF SATELLITE IMAGES AND GIS**

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ABSTRACT

Soil erosion by water is a global phenomenon, it is the main factor of land degradation and siltation of dams. In Algeria this phenomenon has taken on worrying dimensions, since most of the dams are silted up. In this study we propose to show the gravity and the evolution of erosion through the analysis of the factors responsible for it in the basin of the BOUHANIFIA dam in Algeria. It is based on the integration of data from the processing of satellite images and cartographic data into a GIS for the identification and mapping of areas at risk of water erosion. The method adopted is that of RUSLE, which is the combination of six specific factors that describe the characteristics of the watershed. The integration of the thematic layers of the factors of this model in the GIS geographic information system makes it possible to identify the impact of each factor in soil losses, to classify by relative importance the erosion zones, and to quantify the losses in the ground

Key words : soil erosion ;rusle ; GIS; basin ; BOUHANIFIA ;ALGERIA

BIOCHEMICAL AND HISTOPATHOLOGICAL MONITORING OF HEAVY METAL POLLUTION IN CATFISH (*SILURUS GLANIS*) TISSUES IN SAPANCA LAKE

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ABSTRACT

This study aims to determine the toxic effects of heavy metal pollution in Sapanca Lake on the catfish (*Silurus glanis* Linnaeus, 1758) by biochemical and histological methods. For this reason, fish samples were taken from the Kırkpınar location of the lake with the help of professional fishermen every month of 2015. Heavy metal (Cu, Fe, Zn, Pb, and Cd) analyzes in fish tissues (muscle, liver, gill) were determined with ICP-OES and compared with reference materials. In addition, catalase enzyme activity (CAT), total glutathione (GSH) and lipid peroxidation (MDA) levels, which are oxidative stress bioindicators in tissues, were measured by spectrophotometric methods. Histopathological findings in liver and gill tissue were determined by Hematoxylin & Eosin staining. As a result, the amount of Cu, Fe, and Cd in the fish were liver > gill > muscle and Zn amount was gill > liver > muscle. Generally, determined metal concentrations can be listed as Fe > Zn > Cu > Cd > Pb in muscle and Fe > Zn > Cu > Pb > Cd in liver and gill. According to the result of staining with H&E, the primary findings in the gills are the separation of the primary lamella and hyperplasia and irregularity in the secondary lamella. In the liver, necrotic conditions such as an obstruction in sinusoids, an increase in kupffer cells, and karyolysis in hepatocytes were observed. Enzymatic and non-enzymatic antioxidants are at different levels according to months, and these methods are useful in the biological monitoring of environmental pollution. The fact that the amount of heavy metal in fish tissues does not exceed the specified standards, however, the presence of biochemical and histopathological findings in fish tissues suggest that the lake is under the influence of not only heavy metals but also other sources of pollution.

Key words : heavy metal, pollution, catfish, oxidative stress, Sapanca Lake

THE EFFECT OF HEAVY METALS AND SUBSTRATES ON CHELIDONIUM MAJUS L. SEED GERMINATION AND SEEDLING GROWTH

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ABSTRACT

Heavy metals are among the main pollutants in the environment. Soil and water quality directly influence people's health and the quality of the environment. Heavy metals affect plant development, seed germination, slow down photosynthesis and decrease yield, seed production and crop quality. *Chelidonium majus* L. is a perennial medicinal species which is widely distributed across Europe. It grows in habitats which are antropogenically created and maintained. The species is an appropriate object of study in order to investigate its sensitivity to the toxic effects of heavy metals because of its growth in populated areas and common occurrence. The aim of the study was to evaluate seed germination ability and seedling development on two substrates supplemented with different types and concentrations of heavy metals. The substrates used in the study were filter paper moistened with distilled water and water agar supplemented with Pb(NO₃)₂, ZnSO₄ - 100, 150 and 250 mg/l Pb²⁺ or Zn²⁺ and CdCl₂ - 1, 5 or 10 mg/l Cd²⁺. Seed germination on filter paper for all heavy metals used was over 75%. But further seedling development was retarded in all cases and the most hampered were these treated with Zn²⁺. Seeds germinated on water agar were strongly influenced by heavy metal supplementation, where the germination percentage for all heavy metals was under 50%, except for Pb²⁺ which was over 75%. Primary root growth was also strongly affected by heavy metal supplementation and the primary roots of the seeds treated with Pb²⁺ and Zn²⁺ were reduced and dark. Hypocotyl growth was affected in the highest degree by Zn²⁺. The results showed that germination and seedling growth are affected by the substrate, the type of heavy metal and concentration used.

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Key words : Heavy metals, filter paper, water agar, root growth, hypocotyl growth

LEVELS OF SELECTED HEAVY METALS (CD, NI, PB, CR, CU, ZN, FE, MN, NA AND K) IN THE ROW GOAT'S MILK FROM NORTHERN MOROCCO

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ABSTRACT

Goat's milk production has always been a fundamental part of the economy, diet and cultural heritage in the mountainous regions of Northern Morocco. Today, the consumer is becoming more demanding and requires foods with good nutritional quality and without health risk to humans. The present study was designed to analyze heavy metals (Cd, Ni, Pb, Cr) and essential metals (Cu, Zn, Fe, Mn, Na, K) in goat milk samples collected in one of the most productive regions in Morocco. Trace element analysis in milk was performed using mass spectrometry. The highest concentrations were observed on the level of the Pb content which varies between 48.7 µg/kg and 120.75 µg/kg. The lowest content was recorded for Cd, in the most areas this concentration is of 0.25 µg/kg, but it exceeded 1 µg/kg in area A. Concerning Cr, its concentration is in lower part of the threshold of detection for the area H, but the maximum content arrives at 26.63 µg/kg. We should mention the absence of Ni in milk in all the sites of sampling. Concerning the essential metals, the highest concentrations are Zn which varies between 1862.50 µg/kg and 3845.63 µg/kg, Fe which average in the various areas was 1171.9 µg/kg, and then K with an average of 1148.4 µg/kg. For Na, the average value of the content of milk is the half of that noted for K (472µg/kg). However, the lowest contents are the following: Cu with an average concentration of 64.3µg/kg and the Mn which reaches an average of 83.86 µg/kg. The technological progress, the various industrial material and the agricultural activities are considered to be the important sources of the environment's and the food chain's contamination.

Key words : Goat's milk, Northern Morocco, heavy metals, essential metals.

STUDY OF THE PHYSICO-CHEMICAL AND BACTERIOLOGICAL QUALITY OF SURFACE WATER IN THE ORAN REGION

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ABSTRACT

Water is an essential resource. Its use for food, body hygiene or recreational requires a high level of physico-chemical, chemical and microbiological quality. The substances they transport are in fact likely to be ingested, inhaled, or to come into contact with the skin. Therefore, the analysis of eight parameters in addition to pH and which are the electrical conductivity, total phosphorus, chloride, Ammonium, Sulfate, Nitrate, Chemical Oxygen Demand (COD) and Matter in suspension (MES) as well as the analysis of total coliforms, faecal streptococci and clostridium were carried out on the waters of three lakes, Dayat Morsli, Telamine, and Gharabas, located in western Algeria in the Oran region. The results show that the three lakes are saline wetlands where total phosphorus is found at lower concentrations while chlorides, Ammonium and Sulfate are found at concentrations above standards. The pH of Lake Dayat Morsli, the Nitrate of Lake Telamine, the COD and the MES of Lakes Dayat Morsli and Telamine exceed international standards.

Key words : Bacteriology, physicochemical parameters, Pollution, Wetlands

**USE OF PRINCIPLE COMPONENT ANALYSIS TO EVALUATE THE SURFACE
AND GROUNDWATER QUALITY OF HASANAĞA STREAM BASIN**

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ABSTRACT

Hasanağa Stream Basin is located in Edirne Province and it is one of the most significant sub – basin of Tunca River. In this research, surface and groundwater quality of Hasanağa Stream Basin were evaluated by using Principle Component Analysis (PCA). Water samples were taken from 17 stations (7 of them from surface water and 10 of them from groundwater) selected on the basin in winter seasons of 2019. Total of 8 variables including electrical conductivity (EC), total dissolved solids (TDS), salinity, turbidity, nitrate, nitrite, phosphate and sulphate were measured and PCA were applied to detected data in order to determine the effective factor on water quality. According to detected data, 2 factors named as "Agricultural Factor" and "Salinity Factor" explained 74% of the total variance.

Key words : Hasanağa Stream Basin, Surface – groundwater quality, Principle Component Analysis

AN APPLICATION OF RIVER POLLUTION INDEX TO EVALUATE THE WATER QUALITY OF MERIÇ RIVER

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ABSTRACT

Meriç River is the most significant aquatic ecosystem of Thrace Region of Turkey. In this research, water quality of Meriç River was evaluated by using River Pollution Index (RPI). Water samples were taken from 2 stations (upstream and downstream) selected on the river in winter seasons of 2020. Total of 4 variables including dissolved oxygen (DO), biological oxygen demand (BOD), suspended solids (SS) and ammonium (NH₃) were measured and RPI were applied to detected data in order to assess the water quality. According to detected data, upstream of Meriç River has “Good” water quality characteristic and downstream of Meriç River has “Less polluted” water quality characteristic.

Key words : Meriç River, Water quality, River Pollution Index

**IS THE EXPLOITABLE BIOMASS (B) VULNERABLE TO CHANGES OF
NATURAL MORTALITY (M) BY AGE CASE OF SARDINA PILCHARDUS
(WALBAUM, 1792)**

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ABSTRACT

For this study, 3571 individuals of all sexes, with sizes ranging from 7.25 to 17.75 cm, were studied. Monthly sampling was conducted from December 2018 to March 2020 from landings of seiners operating in the central region of Algeria between Tenes and Bejaia. To feature a potential effect of changes in characteristic mortality (M) on the biomass level of *Sardina pilchardus*, it was important to estimate its value for the entire population at first and then for each age class. The Virtual Population Analysis (VPA) was then run with a constant estimation of M [0.6 yr⁻¹] and a variable one [from age 1 to 4 = 1.466; 0.818; 0.680; and 0.591 yr⁻¹]. The outcomes appeared for both constant and variable M a condition of "not overfishing and not overfished", with, for constant M a biomass estimation of 5636 tons and 6453 tons for variable M. The addition in biomass level estimation was around 13%, when the estimation of the yield every year stayed fundamentally the equivalent [around 2912 tons]. Finally, we recommend incorporating changes of natural mortality (M) in biomass estimation studies to get closer to reality. Indeed, early ages small pelagic fishes are the most vulnerable classes to mortality caused by predation or pollution induced stress. This fact must be taken into serious consideration for a better monitoring of exploitable stocks, without ignoring the degree of uncertainty of estimates.

Key words : *Sardina pilchardus*, Algeria, Natural Mortality M, Biomass.

**POTENTIAL SOURCES AND ROUTES OF COVID-19 (SARS-COV-2)
TRANSMISSION IN WATER SYSTEMS IN AFRICA AND SUSTAINABLE
PREVENTIVE MEASURES**

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ABSTRACT

The emergence of the novel coronavirus (COVID-19) pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has almost wrecked the health systems in most countries, especially in Africa. This has resulted in a critical focus by governments on precautionary measures to mitigate the scourge. SARS-CoV-2 has been detected in wastewater systems raising an alarm for Africa in view of the poor water, sanitation and hygiene (WASH) systems. The non-resilient policies governing sanitation and water management systems in most African countries expose them to higher risk levels for the spread of COVID-19. In this regard, this study examined the potential sources and routes of SARS-CoV-2 transmission in wastewater systems in Africa through synthesis and review of published works. The study also proposed sustainable preventive measures that are useful to all other developing countries in the world. Altogether, hospital sewage, waste from isolation and quarantine centres, contaminated surface and groundwater sources, faecal-oral transmission, and contaminated sewage are identified as the potential sources and routes of SARS-CoV-2 transmission in water systems in Africa. These can be effectively addressed by improved WASH services and public awareness campaigns, decentralization of wastewater treatment facilities, utilizing low-cost point-of-use integrated wastewater treatment systems, legally backed policy interventions, and Community-Led Total Sanitation. This study will serve as a guide to the monitoring and containment of the ongoing COVID-19 pandemic in Africa and the rest of the developing world.

Key words : COVID-19; Coronavirus transmission; SARS-CoV-2; wastewater systems; sustainable preventive measures; Africa

PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF STAPHYLOCOCCUS AUREUS ISOLATED FROM FOOD PRODUCTS IN ALGERIA

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ABSTRACT

The aim of this study was to characterize *S. aureus* isolates of food origin (dairy and meat products, pastries, and sandwiches) determining the carriage in enterotoxin genes and the antimicrobial resistance pheno/genotypes. For this, 300 samples were collected and submitted for the isolation of *S. aureus* strains. The presence of enterotoxin genes was investigated by multiplex-PCRs. Antibiotic susceptibility of isolates was determined by disc diffusion method and molecular characterization of methicillin-resistant *S. aureus* was carried out by *spa* and MLST. Overall, 51 out of 300 samples (17%) were contaminated with *S. aureus*, and 104 isolates were recovered. Sixty-five of these isolates (62.5%) harbored one or more genes encoding for staphylococcal enterotoxins, being *seg* and *sei* the most observed genes. Most of isolates showed resistance for penicillin (95.19%) and 5 isolates were methicillin-resistant (MRSA) harbouring the *mecA* gene. All MRSA isolates belonged to the sequence-type ST5 and to two different *spa*-types (t450 and t688); the MRSA-t450 isolate carried the *scn* gene (specific marker of the immune evasion cluster system), but the four MRSA-t688 isolates were *scn*-negative. The MRSA isolates carried enterotoxin genes but were negative for the genes of the Pantone Valentine leukocidine (*lukF/S-PV*). The presence of enterotoxigenic *S. aureus* isolates, including MRSA, in food samples can represent a risk for public health. For this, the application of good manufacturing practices and hazard analysis and critical control point (HACCP) systems are crucial for ensuring the microbial safety and quality of food products.

Key words : *S. aureus*, food products, enterotoxin genes, methicillin-resistant *S. aureus*, antimicrobial sensitivity

ECDYSTEROIDS OF A MEDICINAL PLANT "AJUGA IVA" AND THEIR TOXICOLOGICAL EFFECTS IN VIVO

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ABSTRACT

In recent years, many medical plants or their preparations are used in the composition of food supplements.

The main objective of our study is to extract the ecdysteroids from a medicinal plant "Ajuga Iva" widely used in traditional medicine and to examine their toxicological aspects. We carried out firstly the extraction of the ecdysteroids by maceration then the identification of the extract and secondly the evaluation of their toxicity. In our study, we carried out an extraction process containing two steps: maceration and purification; in order to obtain, from the aerial part of the Ajuga iva plant, an extract of ecdysteroids which represents the active substance responsible for increasing protein synthesis (Parr MK1, et al.,2014). Toxicological study of Ajuga iva was done at doses up to 2000 mg/Kg in laboratory animals (mice). Evaluation of the acute toxicity of the obtained, showed that oral administration of a single dose ≤ 2000 mg/kg showed no mortality or signs of morbidity over the entire observation period of 14 days. Our results are consistent with the results of toxicological studies conducted on extracts of the plant Ajuga iva by El Hilaly et al. 2004. This toxicological study allowed us to determine the dose to be administered to subsequently assess the nutritional and physiological effects on the extracted ecsteroids.

Key words : Medicinal plant, ecdysteroids, dietary supplement, acute toxicity.

EFFECT OF ORANGE, APPLE AND TOMATO POMACE ON DOUGH RHEOLOGY PROPERTY OF GLUTEN FREE BREAD

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ABSTRACT

In recent years, demand of functional bakery products has been increasing. Fruit and vegetable by-products have been investigated to obtain functional bakery products.

In the production of gluten-free bread deficient gas retention and the resulting low loaf volume are the major challenges encountered. Inclusion of fruit and vegetable by-products in gluten-free products can improve their rheology and texture properties and increasing their nutritional quality as these by-products are economical and natural sources of functional ingredients including high levels of dietary fiber, vitamins, antioxidants and proteins. The objective of this work was to study the effect of orange, apple and tomato pomace on dough rheology property of gluten free bread. The gluten-free formulation consisted of mixture of Corn/ Chickpea flours (2/1 w/w). Orange, apple and tomato pomace containing peel and pulp were dried, grounded and added at different percentages (0 to 7.5) %. The rheological properties of dough during fermentation were determined using a Rheofermentometer F3 (CHOPIN, France). Fermentation is carried at 37°C. From the test two curves were obtained: Dough development during proofing and gas production of dough. From this two curve, the following parameters were obtained: maximum height dough (H_m) and the CO₂ retention coefficient (RC). The results indicate that the maximum height (H_m) and RC were increased by the addition of orange, apple or tomato as compared to control (0%). The highest H_m was at addition level of 2.5% tomato pomace. In general, the addition of by-products to gluten free formulation modifies the rheology property of the dough.

Key words : Gluten free bread, by-products, pomace, rheological properties, H_m , RC.

EFFECTS OF ULTRASONICATION ON ANTHOCYANIN CONTENTS OF FRUIT JUICES

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ABSTRACT

Fruit juices are processed against microbial contamination, most commonly via thermal preservation techniques, of which reduce nutritional composition and organoleptic properties. Rising public interest in safer and more nutritional foods have increased the popularity of non-thermal methods, including ultrasonication. Ultrasound, when applied to liquid mediums like fruit juices, creates acoustic cavitation that generates bubble formation, which then will be collapsed causing thermal, mechanical and chemical impacts. These impacts of ultrasonication, make it useful in the fruit juice processing. Anthocyanins are colored pigments that are found in plants including fruits, especially berries, cherries and grapes. As a functional ingredient, anthocyanins show anti-diabetic, anti-inflammatory and antimicrobial effects, also helps preventing cancer and cardiovascular diseases. This paper summarizes the effects of ultrasonication on anthocyanin contents of fruit juices.

Key words : Ultrasound, Ultrasonication, Anthocyanin

IMPACT OF MICROWAVE TREATMENT ON IMMUNOREACTIVITY, PRIMARY AND SECONDARY STRUCTURE OF WHEAT GLUTEN

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ABSTRACT

Celiac disease (CD) is an autoimmune enteropathy, triggered in genetically predisposed individuals because of ingestion of gluten forming proteins found in cereals such as wheat, rye, and barley. Currently, the only effective treatment available for CD is a strict gluten free diet for life. Nevertheless, this treatment has some disadvantages, like contamination risk with gluten, vitamin and mineral deficiencies, metabolic syndrome, an increased cardiovascular risk and psychological problems. For improve life quality of celiac patients, physical treatments are recently used to modify immunological properties of wheat gluten proteins. The purpose of this study was to evaluate the effect of microwave on mainly immunoreactivity, primary and secondary structure of wheat gluten proteins. The gluten powder was subjected to microwave and analysed by R5 competitive ELISA, SDS PAGE and Fourier-transform infrared spectroscopy FTIR. The response surface methodology was applied. Composite Central Design CCD was used, with two factors power and time varied from 200 to 1000 Watt and from 20 to 60 s respectively. The results obtained showed that secondary structure of gluten proteins was affected by the microwave treatment whereas, primary structure was not reflecting any impact. In fact, the microwave treatment increased the amount of potentially toxic epitopes released after peptic and tryptic digestion, showing inefficiency as a treatment to detoxify the gluten for celiac disease patients

Key words : wheat gluten, celiac disease, microwaves, immunoreactivity, structure

THE EFFECT OF GENDER ON THE LIKE OF SHALGAM

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ABSTRACT

According to TS11149 shalgam juice standard, shalgam juice is defined as a product that is obtained by adding black carrot, turnip and chilli powder (if desired) to the extract obtained with after adding the bulgur flour, sour dough, drinking water and salt to the lactic acid fermentation and made durable by heat treatment if desired. Shalgam juice is a highly valuable traditional product with its rich vitamin and mineral content, digestive regulating effect, appetizing and natural probiotic product (Canbaş & Fenercioğlu, 1984, Özler & Kılıç, 1996). Shalgam juice contains calcium, iron and vitamins A, B, C (Canbaş & Fenercioğlu, 1984). Shalgam juice; is a very functional traditional drink that removes toxins from the body, reduces kidney stone formation, treats acne, eczema, abscess and hematoma, diuretic, cleans the lungs and bronchi (Coşkun, 2017). ur dough is generally used as yeast in the production of turnip juice (Üçok and Tosun, 2012). It has been determined that products made by adding bulgur flour (instead of bulgur), sour dough and turnip have higher consumer taste (Canbaş & Fenercioğlu, 1984). There are two types of production, namely traditional fermentation (two-stage) and direct fermentation (single-stage) (Üçok and Tosun, 2012). Fermentation begins with *Leuconostoc mesenteroides*, continues with *Lactobacillus brevis*, *Pediococcus pentosaceus* and *Lactobacillus plantarum*, and is completed with acid-resistant *L. plantarum* bacteria (Üçok and Tosun, 2012). In this study, the importance of gender in the consumption preferences of shalgam juice, which is a traditional beverage with many beneficial effects on health, was investigated. Sensory analysis of shalgam juice, which is a commercial product of a known brand, was performed on 45 people (women: 25 men: 20) using a 5-scale scoring test. Shalgam juice was asked to score from 1 to 5 as color, odor, aroma, sourness, and general taste. Gender differences in shalgam juice consumption preferences were evaluated in independent variables with T test and one-way analysis of variance (ANOVA) in SPSS 22 program. The level of significance in difference was determined as $p < 0.05$. According to the result obtained, the difference created by gender in the scores is not statistically significant for each of the categories of color, odor, aroma, sourness, general taste ($p > 0.05$). While women scored higher in color, sourness, general taste categories (average 4.00, 3.44, 3.72 respectively) than men (average 3.80, 3.20, 3.35 respectively); men (3.35) rated the odor criterion higher than women (3.32).

Key words : shalgam, gender, consumption preference, sensory analysis

ULTRASOUND-ASSISTED EXTRACTION OF TANNINS FROM PLANT SOURCES

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ABSTRACT

Growing industrial demand for phytochemicals in regard to their rising commercial values, draws increasing attention to more effective extraction methods. Ultrasound-assisted extraction is a powerful alternative to conventional methods and offers several advantages such as effective applicability in varying matrices, higher extraction yields, reduced process times, lower water and energy demands and higher purity of extracts. Tannins are the second most abounding natural phenolic compounds that can be found in almost all plant sources and are considered to be a precious renewable aromatic resource as bio-based polymers. In this study, ultrasound-assisted extraction of tannins from plant sources and the parameters affecting extraction yield were examined.

Key words : ultrasound, extraction, phytochemical, tannin

**MICROBIOLOGICAL SAFETY AND QUALITY OF MOZZARELLA CHEESE,
PRODUCED BY TWO BUSINESS OPERATORS IN THE TIRANA CITY**

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ABSTRACT

Dairy products are an excellent growth medium for a wide range of microorganisms and, thus, display a reduced shelf life. The quality and safety of fresh cheese such as Mozzarella are strictly related to their microbial content. In particular, some microbiological parameters have to be checked for safety, such as *E. coli*, its concentrations are indicators of the hygienic state of the products and *Salmonella spp* and *Listeria monocytogenes* as safety indicators. In this study, these indicators were evaluated in 100 cheese samples Mozzarella, originating from 2 business operators in Tirana city. The study was conducted in the period 2013-2017. The results of the analytical test, based on Ordinance no 234/2014 "On approval of regulation on microbiological criteria on food" Commission Regulation (EC) 2073/2005, showed that 16/100 (16%) positive samples for *E. coli*, while for *Salmonella.spp* and *Listeria monocytogenes* no positive samples were found.

Key words : Mozzarella, *E. coli*, *Salmonella.spp*, *Listeria monocytogenes*, food safety

DETERMINATION OF HEAVY METALS IN MILK COLLECTED FROM SMALL FARMS IN THREE REGIONS OF ALBANIA

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ABSTRACT

In Albania, the issue of monitoring the quality and safety of food products remains an important concern. The aim of this research was to evaluate the possible contamination by heavy metals of milk from small farms in Lushnja, kavaja and Fieri Regions. A total of 120 milk samples were collected from 12 dairy farms (n = 10 per farm) and analyzed with AAS Thermo-SOLAAR for two heavy metals: Cd and Pb. The determination of these two chemical elements was performed in according with EC No 1881/2006. Each sample, homogenized and powdered, was mineralized in a microwave oven. Quantitative analyses of Cd and Pb were performed using an atomic absorption spectrophotometer with graphite furnace. The data of this study showed that two heavy metals (Pb and Cd) were below their respective MRLs in all analyzed samples. Despite the results described above, the possibility that milk and dairy products exceeding the standards for these indicators cannot be excluded. Since environmental pollution due to these metals increases every year, this can lead to the appearance of these contaminants in the dairy industry at some point.

Key words : Milk, pollution, heavy metals, food safety, Cd, Pb

THE INFLUENCE OF TWO STARTER CULTURES ON THE COLOR AND SENSOR PROPERTIES OF MACEDONIAN TRADITIONAL SAUSAGE

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ABSTRACT

Sausages belong to the widest range of meat products available in a wide variety of species and with various commercial names. The aim of this paper is to monitor the influence of two starter cultures on the instrumental values for color and sensor properties of industrially produced *Macedonian traditional sausage*. The research covered three variants: Variant 1: Control variant (conventionally produced Macedonian traditional sausages using nitrite salt and powdered acerola); Variant 2: Macedonian traditional sausages where the basic formulation was enriched by addition of starter culture CS-300 (*Staphylococcus carnosus ssp. utilis* + *Staphylococcus carnosus*) in combination with Swiss chard powder and powdered acerola; Variant 3: Macedonian traditional sausages where the basic formulation was enriched by addition of starter cultures CS-300 (*Staphylococcus carnosus ssp. utilis* + *Staphylococcus carnosus*) and BLC-78 (*Pediococcus acidilactici* + *Staphylococcus carnosus*) in combination with Swiss chard powder and powdered acerola. The lightness of the color (L^*) continuously decreases in the control variant, resulting in a loss of color in the specified time interval. This phenomenon is not observed in the samples from variant 2 and variant 3. From the aspect of retaining the values for redness (a^*) and the yellowness (b^*), better effect showed the starter culture CS-300. Thus, the samples of this variant showed statistically significant ($p < 0.05$) better values for color saturation (C). On the other hand, according to the sensor analysis, the sausages from the variant 3 have statistically significant ($p < 0.05$) higher grades for weighted average (4.52) and percent of maximum possible quality (90.40%) at the 30th day of production. Even that the sausages from the variant 3 have higher grades from the sensor analysis, starter culture CS-300 is recommended, while better stability of the color is achieved during the storage period, as well as a good quality. At the same time a safe product is obtained where the use of nitrite salt is completely eliminated.

Key words : Macedonian traditional sausages, starter cultures

NON-NUTRITIVE SWEETENERS EFFECT AGAINST DIABETES AND WEIGHT MANAGEMENT

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ABSTRACT

Consumption of sugar sweetened beverage is one of its dietary causes, as sugar plays an important role in our daily life. Sucrose is highly metabolically active and result in weight gain and type-II diabetes. These side effects make companies to launch various synthetic sweetening agents known as alternative sweeteners or non-nutritive sweeteners. NNSs are ubiquitous and widely used every day in a variety of food, dietary products and beverages. Most NNSs are not metabolized by the body so, they do not contribute any energy or very low calories, so especially advantageous for person are diets requiring calorie restriction (diabetes or overweight). Six of these agents e.g. aspartame, saccharine, neotame, acesulfame-K, sucralose and Stevia have previously received a generally recognized as safe status and approved by FDA. These are claimed to promote weight loss and avoiding other problems associated with excessive caloric intake and also deemed safe for consumption by diabetes and help them achieving good glycemic control. Glycosides present in them like stevia sides in Stevia which is extracted from natural source have anti-hyperglycemic, anti-oxidant, and anti-hyperglycemic effects. These also help preventing tooth decay. NNSs are efficacious weight management strategy and good for diabetes are may provide very low calories and much sweeter than table sugar Thus, satisfying sweet cravings is their major advantage. Recommendations about alternative sweaters used should be tailored to the specific dietary and lifestyle patterns as each of the available sweaters has certain advantages and disadvantageous in case of long term usage.

Key words : Diabetes, glycemic control, calorie restriction, non-nutritive sweeteners, glycosides

**MICROBIAL AND PHYSICOCHEMICAL PROPERTIES OF KOMBUCHA
FERMENTATION AND ALTERNATE SUBSTRATE SOURCES: A REVIEW**

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ABSTRACT

Kombucha tea is an alcohol-free, low-acid beverage that is increasingly popular among traditional fermented foods, fermented by the symbiotic culture of yeast and acetic acid bacteria. Kombucha culture is known as tea fungus and it produces microbial cellulose. Acetic acid, glucuronic and gluconic acids are main metabolites that are produced other than microbial cellulose as a result of the fermentation. Because kombucha is a fermented beverage, it has many functional features which contain various phenolic and antioxidant substances, as well as having probiotic and antimicrobial properties. Black tea is generally used as a substrate in the production of traditional kombucha tea. However, in the literature, use of different substrates are available, such as green tea, coconut, oolong tea, peppermint, lemon herb, milk, mulberry leaf, soy and cherry juice. It is stated that biochemical and therapeutic properties of the produced beverage change, according to the type and amount of substrate used in fermentation, carbon source and rate, fermentation time, culture composition. In this review, it is aimed to investigate the kombucha tea fermentation process, the substrates used, the dominant microflora and the metabolites produced.

Key words : Kombucha, Tea fungus, Microbiology, Fermented foods

CONSUMER PERCEPTION OF FRESH MEAT QUALITY IN TIRANA

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ABSTRACT

The quality of meat products differs from intrinsic and extrinsic indications so that it can be established in accordance with preferences of consumer. This survey examines the consumer confidence, attitude and behavior towards the quality of fresh meat in Tirana. The source of information and data were collected from a detailed questionnaire using random interviews 367 persons in different areas in the city of Tirana. Chi squared or Fisher's exact tests was utilized to analyze relationships between two categorical variables. A significant relationship between education, income and frequency of meat consumption was observed. Place of origin (51.6%) was the most extrinsic factor that consumer prefer more while colour (49.2%) was the most important intrinsic cues. The quality of meat products differs from intrinsic and extrinsic indications so that it can be established in accordance with preferences of consumer. This survey examines the consumer confidence, attitude and behavior towards the quality of fresh meat in Tirana. The source of information and data were collected from a detailed questionnaire using random interviews 367 persons in different areas in the city of Tirana. Chi squared or Fisher's exact tests was utilized to analyze relationships between two categorical variables. A significant relationship between education, income and frequency of meat consumption was observed. Place of origin (51.6%) was the most extrinsic factor that consumer prefer more while colour (49.2%) was the most important intrinsic cues.

Key words : Keywords: meat quality; Tirana consumers' perception; survey

A COMPARATIVE STUDY OF BIOACTIVE COMPOUNDS OF “ROSEMARINUS OFFICINALIS L” EXTRACTED BY ULTRASOUND, MICROWAVE AND MACERATION, AND THEIR EFFECTS ON PREVENTING SOYBEAN OIL DURING FRYING.

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ABSTRACT

There is a trend toward the use of natural antioxidant molecules because of the toxic effects of synthetic antioxidants (1,2). The current study aims to extract rosemary polyphenols and evaluate the effects of their addition on the stability of soybean oil as natural antioxidants. The highest extraction yield of total phenolic content (TPC) (10.71%±0.03) was obtained by microwave assisted extraction (MAE), at a shorter time (5 min), compared to ultrasound-assisted extraction (UAE): (10.09%±0.03) and extraction by maceration (CME): (8.98%±0.09) for 1 hour. The polyphenols extracted by MAE had the highest anti-radical capacity against DPPH° (IC₅₀=0.218 ± 0.01 mg/ml) compared to UAE (IC₅₀=0.402± 0.02 mg/ml) and CME (IC₅₀=3.702 ± 0.003 mg/ml) respectively. The best power reduction activity was also provided by the EMO technique (A= 0.158±0 .01) compared to the other methods: UAE (0.3± 0.004) and EMC (0.4± 0.12) respectively. In this study a second level Box-Behnken design was used to evaluate the combined effect of two independent variables: ratio and time, which are coded as X1 (extract concentration: ppm) and X2 (time: min) respectively, in the enrichment of soybean oil. The optimal conditions used in this study are: 75 ppm and extraction time of 10 min. In addition, the radical scavenging activity of the treated oil (DPPH° test) and its stability against lipid autoxidation (heating test and Rancimat) confirmed its enrichment in antioxidants. Indeed, the incorporation of TPC improved the stability of the oil from 4 h to 9 h of heating at 180°C, the induction time from 10 h to 14.65 h. The anti-radical test of the oils indicated that the ability to trap the DPPH° radical by the enriched soybean oil is much greater (77.92 ± 1.38%) than crude soybean oil (23.56± 0.78%). Evaluation of the sensory properties of soybean oils (with or without TPC) revealed that mayonnaise prepared with enriched soybean oil is highly appreciated, but for fries the difference is not significant. Rosemary polyphenols could be recommended as an alternative antioxidant.

Key words : Microwave extraction, Rosemary, Soybean oil, Antioxidants activities, Rancimat

PROFILE OF FREE FATTY ACIDS IN YOGHURTS MANUFACTURED ON THE BASIS OF ORGANIC COW MILK

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ABSTRACT

The dynamic increased interest in organic food results from the increase in the supply of naturally produced food and the possibility of carrying out more and more extensive research on the functionality of BIO products, taking into account the impact on health. Due to their high quality and proven health-promoting properties, fermented milk products from organic production have gained greater importance among consumers in the recent years. Organic milk yoghurts have a better fatty acid profile than conventional yoghurts. The specific and complex composition of fatty acids contained in milk fat allows for its perfect absorption, making it the best edible fat. Lipid fraction also includes a small portion of fatty acids which are not esterified in triglycerides. They are freely dispersed chiefly in the milk fat phase and slightly in the milk water phase, and they are termed free fatty acids (FFAs). The usual FFA content in milk fat is 0.5-1.2 mmol/100 g. However, raw milk quality or type of heat treatment determine FFA content in dairy products. The aim of the study was to determine the profile of free fatty acids in yoghurts manufactured on the basis of organic cow milk. The milk for yoghurt production was obtained from the certified organic farm located in southern Poland (mountainous areas). Yogurts were produced by the water bath method (the thermostatic method). Milk was heat-treated at 85°C for 30 min. Next it was cooled to 37°C and inoculated with the thermophilic yogurt cultures, i.e. FD-DVS YC-380 Yo-Flex (Chr. Hansen, Denmark) mixed strain culture containing *Streptococcus thermophilus* and *Lactobacillus delbrueckii* ssp. *bulgaricus*. Fatty acid methyl esters (FAME) were prepared in order to determine the amount of free fatty acids in the fresh prepared yoghurts. For this purpose the gas chromatograph (Shimadzu GC2010, Japan) interfaced with a quadrupole mass spectrometer and autosampler was used. The following groups of free fatty acids were determined: SCFFA – short chain free fatty acids (C4-C8), MCFFA – medium chain free fatty acids (C10-C14), LCFFA – long chain free fatty acids (C15-C24), SFFA – saturated free fatty acids, UFFA – unsaturated free fatty acids, MUFFA – monounsaturated free fatty acids, PUFFA – polyunsaturated free fatty acids, and all FFA. All FFA in the analyzed organic yoghurts accounted for 0.440 g/100 g fat. It was stated that long chain free fatty acids (C15-C24) were the most dominant (0.317 g/100 g fat), and in particular palmitic (C16:0) and oleic (C18:1n9c) acids. Content of UFFA (0.151 g/100 g fat) was two times smaller than SFFA (0.303 g/100 g fat). Further research is needed to gain detail information about the typical characteristic of yoghurts, especially with regard to free fatty acids. *This research was funded by the Ministry of Science and Higher Education as part of the “Regional Initiative of Excellence” program for 2019-2022, project number 029/RID/2018/19.

Key words : cow's milk, yoghurt, organic production, fat profile

INVESTIGATION OF EFFECTS GLUCOSE, FRUCTOSE, GLYOXAL (GO) AND METHYLGLYOXAL (MGO) IN SOME PROCESSED FOODS

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ABSTRACT

Modern processing methods have increased dramatically over the past 30 years. These changes in the diet are associated with an increased exposure to advanced glycation endproducts (AGEs), which are compounds formed in food during heating and storage (Poulsen et al., 2013). Food process methods bring about oxidation of protein, oxidation of lipid, glycolytic and polyol pathway in human metabolism resulting most potent precursors dicarbonyls products such as glyoxal (GO) and methylglyoxal (MGO) (Luevano et al., 2010). Especially, sugars from our diet, including glucose and fructose, combine with endogenous proteins non-enzymatically and form advanced glycation end products (AGEs). These products unwanted on human body because AGEs produce reactive oxygen species, leading to inflammation and cellular damage (Suzuki et al., 1999; Bonnefont-Rousselot, 2002; Thornalley et al., 1999; Blackley et al., 2014). In addition, amount of GO and MGO are linked with some disease such as Alzheimer's disease, Parkinson's disease, MS even MGO amount using as a marker in plasma person who diabetes (Mahar et al., 2010; Ogasawara et al., 2016). When the GO and MGO levels were compared between the healthy individuals and diabetic patients, the GO and MGO levels were found 4-fold and 14-fold high in diabetic patients, respectively (Scheijen & Schalkwijk, 2014). In this study focus on fruit-based sugar containing products, its effect of levels of GO and MGO. Because of that higher correlation was reported between the level of GO and MGO with glucose and fructose than sucrose (Amrein et al., 2006). Further studies are needed to support these results.

Key words : glucose, fructose, glyoxal, methylglyoxal, processed foods, HPLC

DETERMINATION OF SOME PHYSICOCHEMICAL AND SENSORY PROPERTIES OF SÜTLAÇ PRODUCED WITH DIFFERENT WHEAT VARIETIES

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ABSTRACT

It was determined that Iza Sütlaç has the highest mineral value (1.03%); rice Sütlaç has the lowest value (0.80%). It was determined that Iza Sütlaç has the highest mineral value (1.03%); rice Sütlaç has the lowest value (0.80%). It was determined that Iza Sütlaç has the highest protein value (5.08%); rice Sütlaç has the lowest protein value (%3,88). The differences on dry matter, mineral and protein values between rice Sütlaç and Sütlaç with different wheat were statistically significant ($p < 0.05$). In general, the differences between the control group and the Sütlaç with different wheat in terms of L * and a * values were found statistically significant ($p < 0.05$). Except for the Iza Sütlaç and the control group, the difference between the other Sütlaç's water holding capacity was found statistically insignificant ($p > 0.05$). It was determined that the viscosity, firmness and adhesiveness stickiness values of Siyez Sütlaç and Iza Sütlaç are higher than rice Sütlaç. With storage, a statistically significant change was detected only in pH and water holding capacity values of Sütlaç samples ($p < 0.05$). In general, with storage it was determined that the average water holding capacity, viscosity, firmness and adhesiveness values of rice Sütlaç have decreased. As a result of sensory analysis, it was determined that the highest value in terms of color-appearance belongs to the control group and the highest structure-consistency, taste-smell and general acceptability values belong to Siyez Sütlaç. The difference between the general acceptability scores of rice Sütlaç and Sütlaç with different wheat groups was found statistically insignificant ($p > 0.05$).

Key words : Sütlaç, Wheat, Einkorn, Emmer, Iza, Spelt

RECENT TRENDS IN TABLE OLIVE PROCESSING

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ABSTRACT

Table olives have great economic importance especially for the Mediterranean countries and other olive-producing areas because of high production and consumption rates. Olive fruit cannot be consumed directly, because of its bitter taste, caused by the bitter glucoside oleuropein. A series of debittering processes are applied to raw olive fruits to make them edible. There are several trade preparations for table olives such as alkali treated olives, natural olives, dehydrated/shrivelled olives and olives darkened by oxidation. The quickest and the most widespread preparation technique is the treatment of raw fruits with dilute alkali solutions. But recently, there is an increasing consumer demand for natural products and processing methods, due to the negative impacts of chemicals on human health and environment. The most popular and chemical-free olive types are natural black olives and dehydrated black olives. Natural black olives are obtained, by placing fruits directly in brine, in which they undergo spontaneous or induced fermentation. On the other hand, dehydrated black olives are generally obtained by partial dehydration in coarse salt. Nevertheless, the duration of debittering is quite longer and sodium content of the final products is significantly higher in natural processes in comparison with the alkali treated ones. To overcome the disadvantages of both chemical and natural methods, recent research studies are focused on chemical-free alternative methods which reduce the sodium content and shorten the debittering process. In this context, new approaches such as the use of other chlorine salts, enzyme applications, and ultrasound, vacuum and drying treatments are on the agenda of investigators. The aim of this study is to display the mechanism of olive debittering, and discuss the contribution and possible uses of these new techniques.

Key words : debittering, alternative methods, chemical-free

SEARCH OF SALMONELLA SPP IN CHEESE AND MILK OF BOVINE ORIGIN

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ABSTRACT

Dairy products can be a source of food poisoning. Contamination of milk can occur either directly on the farm during mammary pathologies, or during processing at the plant level. In the present investigation we studied the risk of food poisoning with *Salmonella spp* through the consumption of dairy products. For this, we conducted a microbiological analysis of 100 samples of mastitis milk (including 58 clinical mastitis and 42 sub-clinical mastitis) and 80 samples of soft cheese. The results showed the absence of *Salmonella spp*. in all the milk and soft cheese samples analyzed, which leads us to conclude that there is a low risk of human contamination when consuming these dairy products.

Key words : *Salmonella spp*, mastitis milk, soft cheese, food poisoning.

**DETERMINATION OF THE ENCAPSULATION EFFECTIVENESS OF L.
PARACASEI PROBIOTIC BACTERIA**

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ABSTRACT

The quality of commercial probiotic products marketed as functional food, dietary supplements and medicines is an important consideration. Although there are many scientific studies about the specific clinical benefits of probiotic microorganisms, legal regulations are needed at the stage of production. Within the scope of the study, it is aimed to provide composition optimization of encapsulation coating agents (peeling alginate, inulin and chitosan) of *Lactobacillus paracasei* bacteria using a lyophilizer. The experiments in the study were designed according to the response surface method (RSM), sodium alginate (1-5%), inulin (1-7%), chitosan (0.5-2%) and calcium carbonate (0.5-1.5). four-factor central unified design model was created by selecting the quantities as independent variables. After determining the effect of bacteria with applied encapsulation technique on heat tolerance, pH tolerance, color, variance analyzes were made by modeling the data. According to the results obtained, it was determined that the encapsulated bacteria produced by using the formulations obtained as a result of the optimization performed in the pH tolerance test values maintain their vitality compared to the non-encapsulated bacteria after standing at pH 2 for 90 minutes. The inclusion results showed that the addition of prebiotic to the walls of probiotic microcapsules provides improved protection for active organisms. The authors thank to the Amasya University Scientific Research Project for financial support (Project No: FMB-BAP 19-0425).

Key words : *Lactobacillus paracasei*, Encapsulation, Sodium Alginate, Inulin, Chitosan

CHARACTERIZATION THE ANTIOXIDANT POTENTIAL OF MILK FROM DIFFERENT SPECIES OF FARM ANIMALS

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ABSTRACT

Today's consumers of food products focus not only on their nutritional value and flavour, but also on their health-promoting properties, which play a key role in human health. Consumption of products which are natural sources of bioactive substances improves the body's antioxidant status and reduces the risk of diseases of civilization, such as cardiovascular disease, diabetes, and cancer. It also raises the body's immunity to infections. Sources of bioactive substances, including those with antioxidant properties, include milk and dairy products. The aim of this study was to compare the composition of milk obtained from various species of farm animals in terms of content of antioxidant substances. Milk contains a number of biologically active substances, from both the lipid fraction (fatty acids, fat-soluble vitamins A, D3, E, K, and β -carotene, phospholipids, and sphingomyelins) and the aqueous protein fraction (casein, whey proteins, peptides, amino acids, water-soluble vitamins, and minerals). One of the most important antioxidants in milk is vitamin E, particularly its active form α -tocopherol. Its effect consists in scavenging of organic free radicals as well as termination of lipid peroxidation and quenching of singlet oxygen. Beta-carotene (provitamin A) exerts a similar effect, as it quenches singlet oxygen and interacts with organic peroxides generated in lipid peroxidation. Goat and sheep milk has higher content of these vitamins than cow milk. High antioxidant activity is also exhibited by whey proteins, which make up 20-25% of the total protein in cow milk, including albumins (α -lactalbumin and β -lactoglobulin) and lactoferrin. This is due to the presence of sulphur-containing amino acids, mainly cysteine, which is essential for synthesis of glutathione, one of the most important antioxidants in the human body [Król et al., 2011]. Goat and buffalo milk is the most similar to cow milk in terms of the structure of the protein fraction. Sheep milk has higher content of whey proteins. In donkey and horse milk, whey proteins account for more than 50% of total protein [Barłowska et al., 2011]. Donkey milk also has high content of polyunsaturated fatty acids such as C18:2 and C18:3, believed to have numerous health-promoting properties. Camel milk also exhibits valuable properties, due to its high content of antibacterial substances and vitamin C content 30 times that of cow milk [Haddadin et al., 2008]. Vitamin C performs a very important antioxidant function, is a strong inhibitor of lipid peroxidation, and promotes regeneration of vitamin E [Jopkiewicz, 2018]. Milk obtained from various animal species contains a rich complex of antioxidants. Antioxidants are present in both the aqueous protein phase and the lipid phase. They support the body in combating free radicals and protect against degenerative changes and the development of cancer cells. Importantly, antioxidants of the hydrophilic and lipophilic environment act synergistically, enhancing their effects in the body.

Key words : Antioxidant potential, fat fraction, milk, protein, vitamins.

SEX EFFECT ON PHYSIC-CHEMICAL CHARACTERIZATION OF RABBIT MEAT QUALITY OF THE LOCAL ALGERIAN BREED

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ABSTRACT:

The objective of this research is to study the effect of sex factor on rabbit meat quality of local Algerian breed of rabbits by measuring some major physic-chemical parameters involved in defining the final meat quality. Ten rabbits (5/5) of different sex were used for the extraction of *Longissimus dorsi* (LD) muscle, in order to use it for the analysis of the physic-chemical parameters namely: pH, water holding capacity, percentage of released water, and cooking losses percentage. The main results of our study have shown that the sex factor does not have an effect on pH and water holding capacity; however, this factor affects significantly percentage of released water, and cooking losses percentage at the 5% threshold. The results obtained from this study confirm the data presented in the literature and field studies concerning the significant effect of the sex factor on the quality and tenderness of rabbit meat.

Keywords: rabbit meat, local Algerian breed, pH, sex

BIOACTIVE COMPONENTS OF SPIRULINA PLATENSIS AND THEIR USE IN FOODS

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ABSTRACT

Spirulina platensis is a symbiotic, multicellular, filamentous, blue green algae belonging to the Oscillatoriaceae family. It is a rich source of nutraceutical food, thanks to its high content of amino acids, polyunsaturated fatty acids, polysaccharides, phytochemicals and vitamins. *S. platensis*, which has been consumed as food by Mexicans for more than a thousand years in the world, is also used in the production of protein-rich and low-calorie food in the food industry, which is functional in the food industry, in the production of phycocyanin, which is in the composition of the natural colorant called “lina blue”. *Spirulina platensis* plays an important role in removing heavy metals such as cadmium, copper, lead and nickel with its large surface area, high binding affinity and simple nutritional requirements. It is widely used as an animal feed in aquaculture as a feed ingredient and in poultry breeding. Meat production is proposed as the source of methane gas, which plays an important role in climate change caused by greenhouse gases in the world. It is recommended to use the reported *Spirulina platensis* (60-70% on a dry basis), which is a harmless protein source, instead of red meat, which is consumed as a source of protein in nutrition. In recent years, protein hydrolysates such as alkalase, pepsin, papain, trypsin, protamex, protease K and peptides obtained using *Spirulina platensis* have been reported in studies showing that they exhibit antioxidative, antibacterial, antihypertensive, antitumor, antiproliferative, anticancer, antidiabetic, antiviral and iron chelating properties.

Key words : *Spirulina platensis*, natural color, protein source, bioactive ingredient, nutraceutical food

GENETIC DIVERSITY ANALYSIS OF SEVERAL PEPPER (*CAPSICUM ANNUUM* L.) VARIETIES CULTIVATED IN ROMANIA USING ISSR AND RAPD MARKERS

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ABSTRACT

Numerous varieties of *Capsicum annuum* L. with multiple valuable traits, such as adaptation to biotic and abiotic stress factors, can be found in south-east Romania, the Buzău region, well known for vegetable cultivation and an important area of biodiversity conservation. However, there is no data at molecular level on the local genetic diversity and conservation status. To obtain useful information toward a sustainable agriculture, management and conservation of local pepper varieties, we analysed the structure, diversity and genetic relationships of seven local *C. annuum* varieties with major importance, using ISSR and RAPD molecular markers. Preliminary results indicated that varieties under study consisted of several genetic groups, based on autochthonous varieties. The level of genetic diversity detected by ISSR and RAPD markers revealed a high level of polymorphism and demonstrated the the structure and genetic differentiation of local pepper varieties. These analyses have proved that *C. annuum* local varieties from south-east Romania constitute a valuable genetic resource that can be used in genetic improvement and conservation programs.

Key words : *Capsicum annuum* L., genetic analysis, ISSR, RAPD, south-east Romania

**STUDY OF MATHEMATICAL MODELS WITH TWO, THREE AND FOUR
CONSTANT OF RHEOLOGICAL PROPERTIES AGAINST TEMPERATURE, FOR
ALBANIAN RED WINES**

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ABSTRACT

In the first phase, several physicochemical and sensory properties of red wines available in Albanian market were investigated, which can be used as a way of characterizing the wine quality. The density, total and volatile acidity, alcohol content, reduced sugars, free and total SO₂, pH and polyphenol index following the analytical methods described in Albanian standard were determined. The limit values of physicochemical properties in red wines comply with the national law of the Albanian Food Law and EU Food legislation. The results indicated that all the samples possess good quality of sensory properties. In the second phase, in order to describe the temperature dependence of the dynamic viscosity of commercial red wines, was performed the experimental data fitting to mathematical models with two, three and four constant. The mean absolute percentage error, which indicates the deviance of the observed values from the theoretical ones, was calculated. Firstly, it was experimentally seen that the dynamic viscosity decreases with the temperature increment. Secondly, the mathematical model chosen to represent this behaviour was highly effective with mean absolute percentage errors below 10%.

Key words : red wine, quality, mathematical model

AUTHENTICITY AND QUALITY OF INDUSTRIALLY AND CONVENTIONALLY PRODUCED MOLASSES DETERMINED USING CARBON ISOTOPE ($\delta^{13}C$) RATIOS AND 5-HYDROXYMETHYL FURFURAL (HMF) LEVELS

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ABSTRACT

Molasses (pekmez) that is produced by applying heat treatment to fruits, is an important food product in old Anatolian culture. According to the duration and temperature of the heat treatment, 5-hydroxymethylfurfural (HMF) compound is formed in molasses which might pose health risk at high levels. In addition, HMF compound, which can occur as a product of the Maillard reactions even at low temperatures, is considered as a quality indicator in molasses. The addition of cane sugar or corn syrup and the mislabelling are common fraudulent practices in molasses markets. Therefore, carbon isotope ratio could be a useful indicator for authenticity testing of molasses. This study examined sixty-seven molasses of seven fruit type (grape, carob, mulberry, juniper, sugar beet, apple and pear) samples from Turkey. It was aimed to compare the HMF values of industrially and conventionally produced samples. Furthermore, carbon isotope ratio analysis was used to investigate the authenticity of samples. Carbon isotopic analyses of molasses showed that 51.6 % of industrially produced molasses and 61.1 % of conventionally produced samples tested were of questionable authenticity. Commercial molasses samples (n = 31) had $\delta^{13}C$ values and HMF levels that ranged from -24.90 to -11.42 ‰ and 0.08 to 643.04, respectively. In addition, conventionally produced samples (n = 36) had $\delta^{13}C$ values and HMF levels that ranged from -24.41 to -8.88 ‰ and 0.32 to 2243.72, respectively. The findings of this study show the common and prevalent issues of molasses authenticity, the mislabelling of fruit origin and quality according to stable carbon isotopes and HMF levels.

Key words : 5-hydroxymethylfurfural, molasses, authenticity, carbon isotope ratio

EFFECT OF WHEAT-BRAN SUPPLEMENTATION ON POST-PRANDIAL ACUTE GLYCEMIC RESPONSE AND QUALITY OF TRADITIONAL PASTA

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ABSTRACT

The World Health Organization claims that the consumption of diets containing minimum 25 g/day of dietary fibers reduces, for normal adults, the risk of coronary heart diseases, type 2 diabetes and improves weight maintenance. The aim of this study was to assess the effect of wheat bran incorporation into traditional pasta called 'Nwassers' on quality characteristics and post-prandial acute glycemia responses in healthy volunteers. Biochemical and technological properties of pasta were evaluated. The study design to evaluate the blood glucose was a randomized, single-blind, cross-over study. After overnight fasting, 10 recruited healthy subjects consumed traditional pasta enriched with no fibers (control), 3% (nutrition claim: source of fibers) or 6% (nutrition claim: rich in fibers) wheat bran. Blood samples were drawn before and 30, 45, 60, 90, 120 and 180 min after the 50 g- meals to determine blood glucose concentration. Area under curve (AUC) was calculated. The addition of 3% or 6% wheat bran into Nwassers has significantly changed pasta ash, protein, carbohydrates and fat contents and increased calorie values ($p < 0.05$). Technological characterization of bran-enriched pasta has pointed out a higher water absorption capacity, when compared to control ($p < 0.05$), but no significant changes were noticed for oil absorption capacity and swelling index. The optimal cooking time was significantly affected by bran supplementation. Moreover, significant variations in enriched pasta color were perceived: the values of the total color difference (ΔE) were respectively 3.030 for 3% and 6.086 for 6% so the difference can be noticed by an unexperienced observer. Interestingly, enrichment of traditional pasta with 6% of wheat bran has significantly ($p < 0.05$) reduced post-prandial blood glucose ($AUC_{6\%} 186.7 \pm 5.6$ g/L.min) of healthy subjects, when compared to control ($AUC_{control} 198.7 \pm 5.6$ g/L.min), but not with 3% enriched pastas ($AUC_{3\%} 196.6 \pm 6.6$ g/L.min). In conclusion, the wheat-bran supplementation improves the quality of traditional pasta and offers a healthy alternative for the consumers.

Key words : Dietary fibers, Biochemical composition, Calorie Value, Technological parameters, Blood glucose response

THE INFLUENCE OF SOIL CHARACTERISTICS ON ALBANIAN MERLOT WINE

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ABSTRACT

In this article it is presented the study of soil characteristics impact on the wine quality extracted from grapes grown in these vineyards. The studied lands are located in the southern area of the Albanian territory, which are known for the production of the Merlot variety. The study lands are rural areas away from the impact of the industrial activity. As shown by many authors, the quality of grape products is significantly related to the physicochemical characteristics of the soil, its geographical location, and the conditions in which it grows. Furthermore, physicochemical analyses of red wine are important in establishing their quality and authenticity. In this context, attention is paid to the mechanical and physicochemical characteristics of soils such as: granulometry, pH, electrical conductivity, and the content of humus, nitrogen, phosphorus, potassium and carbonate. While the wine was determined by density, pH, total acidity, volatile acidity, ethyl alcohol content, free and total SO₂, and reducing sugars following standard methods of the Albanian Food Law. The experimental results showed that the soils were characterized by low alkalinity pH reaction and high content of the macro elements, especially phosphorus. Meanwhile the wines produced from Merlot grapes cultivated in these lands resulted in very good quality, with an optimal pH value and qualified with high alcohol content.

Key words : Merlot wine, soil characteristics, wine quality

PHYTOESTROGENS AND THE IMPORTANCE OF PHYTOESTROGENS AS FUNCTIONAL FOOD INGREDIENTS

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ABSTRACT

Depending on today's living and working conditions, consumers have focused on the efforts to protect or improve their health status, especially due to intense work pace and increased stress level. Consequently, awareness and demand for functional food is increasing day by day. Functional foods are defined as food or components of it that provide important health benefits on human metabolism and physiology, protect the individual against diseases or contribute to its recovery, as well as it contains the basic nutrients that the body needs. These foods can be obtained by applying various technological or enrichment methods, as well as in the natural form of food. Foods can be made functional by adding various functional food ingredients. Food supplements produced for this purpose are also available on the market. Many plants have positive effects on human health due to the functional food components they contain. For this reason, studies on functional food components are increasing day by day. The most studied functional food ingredients are phenolic substances, antioxidants, dietary fibers, oligosaccharides, probiotics, prebiotics, vitamins, polyunsaturated fatty acids, sulfur-containing components, phytosterols and phytoestrogens. One of the plant-derived phenolic compounds is phytoestrogens. Also, phytoestrogens are in the class of naturally occurring estrogens. They have antioxidant properties as they ensure the protection of DNA by binding metals with the hydroxyl group in their structure. In addition, they can change the effectiveness of some enzymes that play a role in body estrogen metabolism. These components are important because of their positive effects on some types of cancer, heart disease, menopausal symptoms, and treatment of osteoporosis. In this review, the structure of the phytoestrogens as a functional food component, its types, general effects on health, the foods it contains, its bioavailability, the effects of food processing methods on these components and analysis methods are examined.

Key words : Phytoestrogens, functional food, health.

TECHNOLOGICAL AND FUNCTIONAL FEATURES OF SOME LACTOBACILLUS SP. AND LACTOCOCCUS SP. STRAINS

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ABSTRACT

The aim of this study is to determine the exopolysaccharide (eps) production ability, antimicrobial activity and resistance of gastric and intestinal media of some lactic acid bacteria strains which isolated from Tarhana. It is a food obtained by drying and grinding the dough fermented after fermenting the dough kneaded with wheat flour, yogurt, pepper, salt, onion, tomato and herbal ingredients. In this study, it was determined that three of the strains EPS-producing belonged to *Lactobacillus plantarum* species, one belonged to *Lactococcus brevis* species and one belonged to *Lactococcus lactis* species. Some features (such as rheological properties) of the eps produced by these strains were examined. On the other hand, the resistances of gastric and intestinal media of these strains, and the antimicrobial activities of them against some pathogenic strains (*Bacillus cereus* (NRRL-B 209), *Escherichia coli* (ATCC 25922), *Candida albicans* (ATCC 10131), *Saccharomyces cerevisiae* *Staphylococcus aureus* (ATCC 33862), *Listeria monocytogenes* (ATCC 7644)) were tested. In addition, pH, temperature and salt resistances of the strains were investigated for their technological properties. With this study, the results have been presented so that the strains examined can be used in various areas.

Key words : Exopolysaccharide, Antimicrobial, Gastric and Intestinal Media, Lactobacillus spp. Lactococcus spp.

POSSIBLE EFFECT OF NUTRITION ON COVID-19 OR OTHER VIRAL INFECTIONS

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ABSTRACT

Although there are no foods to prevent or treat the coronavirus alone; it has been proven that a healthy and balanced nutrition is crucial for health, particularly in times when the immune system might need to fight back. The current review aims to reveal the possible effect of food systems on viruses, which have a significant effect on the immune system. It provides insights about the properties of bioactive ingredients of foods and herbs for the support of the human immune system against infections. We aim to review the evidence surrounding the role of dietary protein, omega-3 fatty acids, vitamin A, vitamin D, vitamin E, vitamin B1, vitamin B6, vitamin B12, vitamin C, iron, zinc, and selenium as a possible adjuvant in the management of patients with SARS-CoV-2 infection. In addition to revisiting the hidden potential of traditional remedies including functional foods, antioxidant, and antiviral herbs. This review discusses the relationship between intestinal microbiota, using of prebiotics to enhance propagation of probiotic strains and indigenous beneficial microbes and weaken viral replication, assisting in the treatment of COVID-19. Finally, further studies are needed to clarify the role that a balanced diet which supplementing with appropriate nutrients, functional foods, antioxidants and antiviral herbs play in the prevention and in treatment of viral infections

Key words : COVID-19, Viral Infections, Nutrition, Functional Food, Natural Nutritional Supplement

PHOTOCHEMICAL COMPOUNDS BETWEEN GUT MICROBIOTA, CANCER AND PHYSIOLOGICAL DYSFUNCTION.

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ABSTRACT

Gut microbiota mainly dominated by bacteria attribute to the divisions *Bacteroidetes* and *Firmicutes*, plays an important role in host physiology and influences several relevant functions. Bacteria diversity in gut microbiota is driven by dietary factors and influences metabolic and immune functions of the host's physiology. Imbalance in the gut microbiota, named dysbiosis, can lead to the development of various diseases, such as cancer and even psychological dysfunction. Therefore, Gut microbiota is an appropriate target for nutritional interventions to improve health. These facts motivate us to highlight the influence of phytochemicals on gut microbiota and look for an alternative treatment of inflammatory diseases by using nutritional supplements. Among dietaries phytochemicals elements we found several chemical compounds such as polyphenols and their derivatives, carotenoids, and thiosulfates. Polyphenols as the largest group can gather four main groups: flavonoids, phenolic acids, stilbenoids, and lignans. These compounds, which constitute a natural reservoir, have proved their efficiency as antioxidant and anti-inflammatory molecules. From this point, we may classify these compounds as an alternative molecule to treat or prevent the development of cancer or even psychological dysfunction.

Key words : Gut microbiota; dietaries phytochemicals; polyphenols; cancer; inflammatory; psychological dysfunction.

HISTOLOGICAL STUDY OF CALLOGENESIS IN CICER ARIETINUM AND SEARCH FOR GENOTYPES RESISTANT TO ASCOCHYTA RABIEI

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ABSTRACT

The chickpea *Cicer arietinum* is one of the leguminous most appreciated by consumers in the Mediterranean basin. It is a very important source of protein to balance the diet of the poorest populations. Nevertheless, its crop yields are still very limited, which is due to the existence of several biotic and abiotic stresses, the main one being *Ascochyta rabiei*, the causal agent of antrachnosis. Traditional breeding methods have proved to be ineffective, hence the need to resort to biotechnological methods. This work is part of this approach. In a first place, a study is undertaken to determine the callogenicity of stem and leaflet explants from 3 genotypes of chickpea, FLIP 84-92 C, ILC 32-97, ILC 263, cultured on Murashige and skoog (MS) medium with different hormonal balances of auxin (IAA, 2,4-D) and cytokinin (kinetin). A very satisfactory callogenesis was recorded in the different explants of all the genotypes studied on MS3 medium: (2mg AIA / 2mg kinetin). We used in a second place, a pathosystem of *Cicer arietinum* callus/*Ascochyta rabiei*. The follow-up of this interaction by a histological approach revealed the presence of the pathogen's fruiting bodies in callus tissues of genotypes ILC 32-97 and ILC 263. The latter showed a high sensitivity to the pathogen with an abundance of pycnidia in the tissues. This study resulted in the selection of a FLIP 84-92 C resistant genotype against *Ascochyta rabiei*, where histological sections showed a total absence of inter and intracellular fruiting bodies of the pathogen.

Key words : *Ascochyta rabiei*; hormone balance; callogenesis; *Cicer arietinum*; histology

**PRODUCTION OF A PROTEIN CONCENTRATE FROM HAZELNUT MEAL
OBTAINED AS A HAZELNUT OIL INDUSTRY BY-PRODUCT AND ITS
APPLICATION IN A FUNCTIONAL BEVERAGE**

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ABSTRACT

Hazelnut meal, obtained after pressing and extraction of hazelnuts for oil production, is generally being used as a feed ingredient. However, its high nutritional value makes it a potential raw material for food applications. This study aimed to extract protein from hazelnut meal, to evaluate its functional properties, and to apply it in a functional beverage. Hazelnut meal protein (HMP) was extracted by isoelectric precipitation. HMP with 86.8% protein was obtained. Essential amino acid concentration (36.65%) of HMP was considerably higher than many plant-based proteins. Moreover, branched-chain amino acids concentration composed of 12.33% of total protein. Water and oil absorption capacities of HMP was 2.21 ± 0.03 (g water/g protein) and 4.85 ± 0.28 (mL oil/g protein), respectively. Functional beverages with 2% and 4% of HMP were produced and compared to a reference beverage in terms of physicochemical and sensory properties. All physicochemical properties investigated significantly differed except turbidity and viscosity. Sensory evaluation revealed that overall acceptability of the formulations was comparable to each other and that both HMP beverages were preferred by the panelists. Results suggested that hazelnut meal can be a protein source for functional foods and partially replace the existing sources in a more environmentally friendly, cheap and sustainable manner.

Key words : Hazelnut meal ; Waste utilization; Protein extraction; Functional food; Sensory analysis

THE ROLE OF DAIRY INDUSTRY IN ENVIRONMENTAL POLLUTION

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ABSTRACT

The food industry has great importance in terms of meeting the nutritional needs of the rapidly growing world population. The product range and capacity increase in line with consumer demands in the dairy sector, which is one of the most significant branches of the food industry. The external environment (ecosystem), in which living organisms across the world maintain their relationships throughout their lives, is increasingly being polluted and harmed as a consequence of population growth and technological advancement. Pollution caused by industries is one of the most important problems in the world. The food industry is one of the leading sectors which demands excessive usage of water. In the dairy industry, for every liter of milk to be processed, 2-6 times as much wastewater is released based on the product variety. Wastewater from the dairy industry includes proteins, lactose, milk fat contained in the milk formula, grease, washing water, detergent and disinfectants, whey and buttermilk produced during cheese and butter production. The discharge of raw wastewater leads the dissolved oxygen to diminish in the environment. Dairy industry wastewater is generally treated by biological and physicochemical methods. The selection of the appropriate method according to the wastewater composition determines the treatment system's success. Throughout this compilation, the features of dairy waste and environmentally friendly methods which can facilitate the recycling of dairy waste will be addressed.

Key words : Wastewater, Whey, Buttermilk, Environment, Pollution

CHOOSE YOUR SIDE! A2 OR A1-MILK

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ABSTRACT

Milk and dairy products are critical for satisfying the need of the body for daily fat, protein, sugar, mineral substances, and vitamins since they contain many nutrients. The role of dairy products in human nutrition has become more controversial in recent years. Milk protein is divided into two as casein and serum proteins. Beta-casein accounts for 37% of casein, which constitutes approximately 80% of the protein in cow milk. It has been reported that beta-casein, composed of 209 amino acids, has 13 distinct genetic variants in cow milk, the most prominent of which are stated to be the forms of A1, A2, and B. Difference is observed only in one amino acid between A1 and A2 variants. During the digestion of milk, beta-casomorphin (BCM-7), which consists of 7 amino acids, manifests due to histidine at position 67 in the form of A1, while this peptide does not manifest in the form of A2 due to the proline in this position. BCM-7, which has opioid properties, affects around 25% of the human population. Some research groups claim that type 1 diabetes, heart disease, infant mortality, autism, and digestive problems could be linked with BCM-7. Owing to these studies, interest in milk containing A2 variant has risen. Studies performed revealed that in the beginning, A2 variant was commonly seen in dairy cows, and the form of A1 arose due to mutations. Although A2 form is observed in modern dairy cattle breeds, its prevalence varies. The prevalence of A2 allele in the Holstein-Friesian is 60%, 65% in the Swiss Brown Fleckvieh, and around 90% in the Guernsey. However, there is no A1 allele observed in purebred Asian and African cattle, and it is seen either rarely or never in other mammalian species. In this compilation, an objective evaluation will be conducted by taking into account the studies that demonstrated the relationship of A2 milk with diseases and the counter claims of various organizations (EFSA, American Nutrition experts, etc.).

Key words : Beta-casomorphin, A2-Milk, A1-Milk, Beta-casein

EVALUATION OF ABAMECTIN AND IMIDACLOPRID FOR PROPHYLACTIC AND CURATIVE CONTROL OF (*CALLOSBRUCHUS MACULATUS* (F.) INFESTING STORED COWPEA (*VIGNA UNGUICULATA* L. (WALP.))

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ABSTRACT

Cowpea (*Vigna unguiculata* L. (Walp.)) is an important grain legume and the bruchid *Callosobruchus maculatus* (F.) is the major pest of stored cowpea in West Africa. Laboratory studies were conducted under uncontrolled conditions (27 – 32°C and 56 - 63% r.h.) to evaluate the insecticidal efficacy of abamectin and imidacloprid against this pest. Abamectin and imidacloprid were tested as dose rates of 1, 2, 3, 4 and 2, 4, 6, 8, 10 mg (a.i.)/kg of grain, respectively. Untreated grain served as control. Experimental unit consisted of 50 g grain samples infested with 20 mixed-sex adults of *C. maculatus*. Grains were either treated and then infested (prophylactic treatment test) or infested and then treated (curative treatment test). Results showed that in both tests abamectin was more effective than imidacloprid. In the prophylactic treatment test, abamectin caused 100% adult mortality after 72 h of exposure to grains treated at 4 mg/kg, while imidacloprid which induced same level of adult mortality after 96 h of exposure to grains treated at 10 mg/kg. Similarly, number of progeny, percentage seed damage and weight losses were higher in imidacloprid treated than abamectin treated grains. At the dose rates tested, both insecticides showed higher effectiveness for prophylactic than curative control of *C. maculatus*.

Key words : Abamectin, Imidacloprid, Stored cowpea, *Callosobruchus maculatus*, control

COMPARISON OF DIFFERENT METHODS USED TO OBTAIN CHERRY KERNEL OIL

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ABSTRACT

Sour cherries are among the most widely produced fruits in our country and in the world. In addition to being consumed fresh, it is also consumed as processed products such as frozen sour cherry, canned food and fruit juice. However, in the course of processing of sour cherries, large amounts of cherry seeds are separated as waste. Cherry kernels are among the wastes that should be evaluated because they are rich in phenolic substances and antioxidants and have high oil content. Sour cherry seeds which rich in unsaturated fatty acids, are an important source of oil with 32-36% oil content. Generally used methods to obtain these oils are mechanical press method and solvent extraction. While the yield obtained by mechanical pressing method is relatively low, solvent extraction causes environmental pollution and organic solvent residues in oil. For this reason, interest in developing alternative and different methods to these methods has increased in recent years. In this review, comparison of different methods used to extract oil from cherry kernel will be examined.

Key words : Sour cherry, oil extraction, solvent extraction, mechanic press

DIFFERENTIAL SCANNING CALORIMETRY PATTERNS OF EXTRA VIRGIN OLIVE OIL AND REFINED OLIVE OILS

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ABSTRACT

In this study, thermal behaviors of extra virgin olive oil (EVOO) and refined olive oil (ROO) were determined. The phase transitions were monitored under crystallization and melting conditions between at -80oC and +30oC region. Three exothermic and two endothermic peaks were detected basically. The oil samples separate statistically from each other via ΔH (J/g) parameter. The onset temperature (T_{on}) did not show any significant impact ($P>0.05$) to differentiate oil type. It can be obviously concluded that differential scanning calorimetry (DSC) could be used as a powerful instrumental analysis method that does not require sample preparation to separate olive oil forms. For this reason, it can be said that fraudulent EVOOs mixed by refined olive oils can be easily determined with DSC.

Key words : extra virgin olive oil, refined olive oil, DSC, melting, crystallization

Acknowledgements: I would like to gratefully thanks to TARIŞ for sending EVOO and refined olive oil samples. In this study, DSC instrument in the laboratory of Hacettepe University Food Engineering Department was used. This research was financially supported by Çankırı Karatekin University Scientific Research Projects Coordination Unit (MF080120B30).

EFFECTS OF SOYBEANS POWDER ON ENHANCING NUTRITIONAL VALUES OF A FISH SHAPED BREAD

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ABSTRACT

Life is the most precious God given asset, which everybody globally cares the most. Daily breakfast consumption is a routine way of keeping our body healthy. Having said this, bread particularly made from wheat flour is daily used over breakfast globally. Therefore, new technologies enhancing nutritional values of bread is required in order to support the measures of malnutrition prevention in every moities of the World. It is in this regard, this study aimed at determining the effect of soybeans powder on enhancing nutritional values of the fish shaped bread, which is a Korean unique product. The study was conducted at food science and technology laboratory of University of Rwanda and designed in triplicates following completely randomized design. The treatments used for this study were: 0% of soybean powder, 10g of red bean paste and 100% wheat flour (Treatment 1), 5% of soybean powder, 10g of red bean paste and 95% wheat flour (Treatment 2), 10% of soybean powder, 10g of red bean paste and 90% wheat flour (Treatment 3) and 15% of soybean powder, 10g of red bean paste and 85% wheat flour (Treatment 4). Results of the study indicated that while fat content experienced a downward trends, soybean powder incorporated into the fish shaped bread substantially enhanced nutritional values of the fish shaped bread (Dry matter, Calcium, Iron, Magnesium, Phosphorous, crude protein, total soluble sugar content and fat content). We concluded that soybean powder deserves to be incorporated into fish shaped bread for improving nutritional values in order to take care of our body by consuming a breakfast using nutrient loaded fish shaped bread.

Keywords: soybean powder, fish shaped bread and nutritional value

EFFECTS OF SOYBEANS POWDER ON SENSORY PROPERTIES OF A FISH SHAPED BREAD

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ABSTRACT

Bread is one of the important aspects of every breakfast globally. Physical appearance, sweetness, texture and smell (aroma) are key factors attracting people buying bread. Fish shaped bread is a unique brand found in Korea and is tremendously consumed every day. So, this study was carried out at food science and technology laboratory of University of Rwanda and aimed at enhancing physical appearance, sweetness, texture and smell (aroma) of this Korean amazing fish shaped bread on the basis of soybean powder. During this experiment, 0% of soybean powder, 10g of red bean paste and 100% wheat flour (Treatment 1), 5% of soybean powder, 10g of red bean paste and 95% wheat flour (Treatment 2), 10% of soybean powder, 10g of red bean paste and 90% wheat flour (Treatment 3) and 15% of soybean powder, 10g of red bean paste and 85% wheat flour (Treatment 4) were used in triplicates following a completely randomized design. After bread production, sensory evaluation was conducted on the physical appearance, sweetness, texture and smell (aroma) of the new brand of fish shaped bread. The overall acceptability of the fish shaped bread were: Product S1 (0% of roasted soybean flour and 10g of red bean paste): 80.5 %, Product S2 (5% of roasted soybean flour and 10g of red bean paste): 72.5%, product S3 (10% of roasted soy bean flour and 10g of red bean paste): 78.6%, and then Product S4 (15% of roasted soybean flour and 10g of red bean paste): 75.9%. Statistical analysis showed a significant difference among products and the overall acceptability was higher in the fish shaped bread without soybean (0% of roasted soybean flour) than the fish shaped bread supplemented with soybean powder. Therefore, soybean incorporation into the production of fish shaped bread may be suggested as it improves nutritional values of the fish shaped bread.

Keywords: Soybean powder, fish shaped bread and Sensory properties

COVID-19 : IMPACT OF SERVICE AND FOOD QUALITY ON STUDENT SATISFACTION AND FOOD WASTAGE IN A TUNISIAN CANTEEN

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ABSTRACT

The coronavirus disease (Covid-19) pandemic has led to far-reaching health, social, and economic consequences. In order to secure the safety of students and staff, the Ministry of Higher Education and Scientific Research has established general guidelines for University campuses including canteens, based on prevention and protective measures. Food wastage is a major global issue impairing food security. The objective of the present study was to evaluate these Covid-19 measures on food wastage in a Tunisian University canteen. Because of the Covid-19 crisis, the university canteen has changed their practices by setting up a meal bag service for lunch and dinner. Face to face interviews based on a structured questionnaire, were conducted on 121 student respondents (mean age 22 years old, 82% women) during two weeks in June 2020. Interestingly the Covid-19 crisis has positively impacted the students' awareness about food wastage since 13.8% of respondents declared not throwing away food and 55.2% claimed to have reduced their food waste levels. Most of respondents (72.4%) have highly appreciated the new concept based on take-away. About 63.1% declared eating at least every other day at the canteen, and 67.8% going more often. Interestingly 93.1% claimed to have noticed improvements in the quality of food meals. These changes were related to better food presentation (69% of respondents), better food safety perception (63.2%), better overall sensory quality (35.6%), whereas only 1.1% claimed not having observed any changes. Food quality service has been evaluated as very good by 41.5% of respondents, and quality of prepared foods as good by 43.7%. However, most of respondents (71.3%) affirmed not finishing their plates. The most discarded dishes were pasta (89%), soups (81%), stews (80%) and turkey meat (66%) whereas fruits (63%), yoghurts (60%), Tunisian speciality tajine (56%), rice (53%) and chicken meat (49%) were not discarded. In conclusion, our study has shown that providing good take-away meals has potential for reducing food wastage among students, strengthening the importance of food safety and convenience as effective tools for food waste prevention.

Key words : Covid-19, Food wastage reduction, Takeaway meals, Safety measures, Student satisfaction

EFFECT OF INITIAL VEGETABLE OIL QUALITY ON THERMAL STABILITY OF OIL BLENDS

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ABSTRACT

This study examined thermal stability of two vegetable oils, soybean oil (SBO) and rice bran oil (RBO), and their blend during extended high heat exposure. The objective was to evaluate the effect of initial oil quality on thermal stability of the pure and blended oils. Quality of the oils was assessed by analyzing peroxide, anisidine and carbonyl values and free fatty acid contents before and after heat exposure. Thermal stability of the oils was evaluated by heating them up to 96 h under the food frying conditions typically practiced in food service industry. Although the initial quality of the SBO was higher than that of the RBO, SBO deteriorated much faster than the RBO during food frying. The SBO-RBO blend performed better than the pure SBO and RBO. There were slight differences in the oil contents of the potatoes fried in three oils, however, there was no apparent trend by time or type of the oil and the variations were not substantial for practical purposes. This study demonstrated that blending SBO with RBO could be a viable option for extending fry life of SBO without significantly altering the oil absorption profile of the product. SBO is the preferred frying oil by the food service industry due to its broad availability and relatively lower cost than the other commodity oils. Hence, findings of this study establishing that initial oil quality does not necessarily ensure thermal stability have significant practical implications for extending fry life of oils used in food service industry.

Key words : Soybean oil; rice bran oil; thermal stability of oils; frying; oil quality, oil oxidation

SURVEY ON PREPARATION OF A TRADITIONAL ROASTED MULTIGRAIN FLOUR : BSISSA

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ABSTRACT

Bsissa is one of the oldest traditional breakfasts in North Africa. It is made of roasted multigrain flour based on cereals, legumes, spices and herbs. Bsissa is usually consumed mixed with water, milk or oil. This traditional preparation plays an important role in Tunisian heritage food and we can find many recipes differing from region to another. In order to investigate the processes of Bsissa preparation and to determine its common recipe, a survey was conducted in the city of Lamta. This city, located in the central coast of Tunisia, is known by its culinary heritage and specially by its festival of Bsissa organized annually in May. First, and in order to determine the know-how of artisan women, fifteen of them were interviewed. The results showed that the average age of producers is 49 years old and that all of them are artisans who sell their goods at fairs or on order. The majority of them inherited the recipe from their antecedents (73 %) and the rest have followed training. The investigation showed that 67% of producers buy their raw materials from supermarkets, 16 % from farmers and the rest from both. All the interviewed reported that after purchasing the ingredients, the preparation of Bsissa begins with the cleaning of the grains, followed by roasting, grinding and finally sieving to preserve them in the form of a homogeneous powder. They claimed that Bsissa flour can be stored for 3 to 12 months, at room temperature, in a non-humid place. In a second part of this work, 103 samples of Bsissa were collected and characterized. The number of Bsissa ingredients ranged from 1 to 9. This diversity of composition can satisfy the preferences of a wide range of consumers. Bsissa samples were prepared mostly from cereal 74.75% (Durum wheat, Sorghum, Barley, Oat) and legumes 18.44% (fenugreek, lentil) and finally 6.79% of Bsissa samples were based on sesame. Chickpea, anise seed, fennel seed and tabel (mixture of Tunisian spices) were the most common ingredients in all the different Bsissa recipes, respectively 16.38%, 12.56%, 11.32% and 11.08%. Finally, the estimation of the nutritional composition of these different recipes by CIQUAL Table (Anses, 2020), confirmed their high nutritional value and the role that this traditional food can play in the food intake of consumers.

Key words : Bsissa, Heritage food, Multigrain, Recipe, Survey, Artisan women.

ANTIPROLIFERATIVE EFFECT AND BIOACTIVE PHENOLIC PROFILE OF CULTIVATED TURKISH ARONIA (*ARONIA MELACARPA SP. VIKING*) BASED TEA

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ABSTRACT

Aronia berries, or chokeberries, are small, dark fruits that grow on shrubs of the Rosaceae family. They're native to North America but grown in other parts of the world, including across Europe. In this study, aronia berry plant had cultivated in Yalova, Turkey and planted Turkey variety had examined as nutritional values. With analytical determinations, it has been determined phenolic acids, gallic acid, epigallocatechin, catechin, chlorogenic acid, hydroxycinnamic acid, neochlorogenic acid, vanillic acid, siringic acid, caftaric acid, p-coumaric acid, ferulic acid, t-sinapic acid as flavanols (catechins); utin (quercetin-3-glycoside), kaempferol-3-rutinoside, quercitrin (quercetin-O-glycoside), quercetin, astragalín (kaempferol-O-glycoside), kaempferol as flavonols and their glycosides. It was determined that quercetin and chlorogenic acid inhibited the proliferation of SKBR-3 breast cancer cells as a result of their 5-100 μM concentration through 48 hours' incubation. It is seen that the 100 μM quercetin decreases SKBR-3 cells to 56.25% level and inhibits the cell proliferation at the level of 43.75%. It was found that chlorogenic acid diminished SKBR-3 proliferation to 62.5% level and inhibited the SKBR-3 cell proliferation at the level of 37.50%. It is seen that catechin bioactive reduces SKBR-3 cells to 65.66% and inhibits the cell proliferation by 34.34% even at only 10 μM concentration ($p < 0.05$). These are shown that our developed aronia plant tea can be used as healthy antiproliferative supplement.

Key words : Aronya, Aronia melanocarpa, SKBR-3 breast CA cell, phenolic, Q- TOFF-MS

DIETARY FIBER A NATURAL BARRIER AGAINST ALARMINGLY INCREASING METABOLIC DISORDERS

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ABSTRACT

Dietary fiber is a non-starchy poly saccharide having ten or more monomeric unit. Chronic disorders are increasing alarmingly round the globe. Dietary fiber consists of natural bio actives having potential to reduce and manage these disorders. These non-starchy polysaccharides from various natural sources inversely affect chronic disorders. Dietary fiber has significant role in reduction of serum glucose level by increasing insulin sensitivity and delayed gastric emptying. Dietary fiber attenuates serum cholesterol level by fecal egestion and preventing bile reabsorption. Dietary fiber has significant effect on reduction of arterial blood pressure. Low fermentable fiber inversely effects the aggression of colorectal, pancreatic and prostrate carcinoma. Dietary fiber is a non-starchy poly saccharide having ten or more monomeric unit. Chronic disorders are increasing alarmingly round the globe. Dietary fiber consists of natural bio actives having potential to reduce and manage these disorders. These non-starchy polysaccharides from various natural sources inversely affect chronic disorders. Dietary fiber has significant role in reduction of serum glucose level by increasing insulin sensitivity and delayed gastric emptying. Dietary fiber attenuates serum cholesterol level by fecal egestion and preventing bile reabsorption. Dietary fiber has significant effect on reduction of arterial blood pressure. Low fermentable fiber inversely effects the aggression of colorectal, pancreatic and prostrate carcinoma.

Key words : Dietary fiber, lipid profile, serum glucose level, hypertension, carcinoma

FOOD SAFETY PRESENT SCENARIO: A ROAD MAP OF PAKISTAN

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ABSTRACT

Food safety refers to the potentially hazardous agents or contaminants present in food that can cause food borne illness. These extraneous agents are causing morbidity and mortality. Contamination of food by various agents includes physical, chemical and microbiological. Food safety ensures that what we eat, chew or drink is safe for human health. Whole food chain should be monitored right from production to consumption. Public health burden of the developing countries is increasing beyond their resources. In developing countries like Pakistan, food safety issues result in serious health issues. Diarrhea is perhaps most important problems are responsible for more than half of the global burden of foodborne diseases, causing 550 million people to fall ill and 230,000 deaths every year. Children are at particular risk of foodborne diarrheal diseases, with 220 million falling ill and 96000 dying every year. There is persistent rise in the health expenditure of Pakistan. Pakistan is spending 0.5 to 0.8 percent of its GDP. Total health expenditure during 2016-17 remains at 145.97 billion showing an increase of 9 percent over the last year. Pakistan has dire need of revamping the food safety policy and infrastructure.

Key words : Food safety; food chain; contaminants; foodborne illness; food safety policy

PROPERTIES OF YOGURT ENRICHED WITH OLEORESIN EXTRACTS ADDED WITH DISSOLVED IN HIGH OLEIC SUNFLOWER OIL

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ABSTRACT

In the study, oleoresin containing capsaicin were extracted by solvent extraction from red hot pepper peel and seeds, which are wasted of tomato sauce, and were used in yogurt production. The extracts were used after being dissolved with high oleic acid content sunflower oil. Oleoresin and capsaicin were insoluble in water, but they have good solubility in oil and alcohol. In addition, animal dairy products can dissolve capsaicin molecules due to casein molecules they contain. Oleoresin extract was extracted and used in the production of yogurt has functional properties. Thus, it is aimed to obtain a product with richer nutritional value and a new taste. For this purpose; oleoresin extract obtained from peel (peel extracts, PE) and seeds (seed extracts, SE) was added to milk with different percentages (1.5% PE, 3% PE, 1.5% SE, 3% SE, 1.5% PE+SE, 3% PE+SE) for yogurt production. The analysis that are pH, acidity, ash content, fat content, sensory evaluation and color properties, were performed, immediately. Color components (L*, a*, b*) were measured with a Minolta colorimeter and h*, ΔC^* , ΔE^* values were calculated using color coordinates. There were reductions in L* (60.44 – 29.77) of yogurt samples by enriched process, especially for samples which contain 3% PE and 1.5%SE. An increase was observed for a* values from -1.435 to 19.35 for same samples. Although the seed extracts also had a red color, they did not give the expected color in yogurt. For sensory evaluation, when color and appearance properties were evaluated, samples with the highest red color (1.5% P+S, 3%P) were mostly preferred. Besides, these samples were also evaluated with the highest score for structural properties. The panelists signed with highest score for taste properties and general acceptabilities for 3% P+S samples which samples have the lowest score for color and appearance properties. It comes out that consumers expect bitterness in taste as well as red color in appearance.

Key words : Capsaicin, high oleic sunflower oil, oleoresin, yogurt.

COMPARE OF THE CHEMICAL COMPOSITION OF TOMATO SEED OIL EXTRACTED WITH DIFFERENT SOLVENTS

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ABSTRACT

In this study, 4 different solvents were used by soxhlet method to obtain oil from tomato seeds (TS). These solvents were acetone (5.1 polarity, 20.7 dielectric constant, destructive, flammable), ethyl acetate (4.4 polarity, 6.02 dielectric constant, acutely toxic, flammable), chloroform (4.1 polarity, 4.81 dielectric constant, toxic), and petroleum ether (0.1 polarity, toxic, highly flammable). Primarily, the yields and quality of the oils obtained with these solvents were compared. Different chemical and physicochemical properties were determined for 4 different tomato seed oil (TSO) samples obtained, including refractive index (RI), acidity (%), free fatty acid (FFA), peroxide value (PV), saponification value (SV), iodine value (IV), anisidine value (An-V), total oxidation value (totox), conjugated diene-triene value. In addition, the fatty acid compositions (FAC) of the samples were determined by chromatographic analysis. The first and most important result obtained in our study was that TS must be dried before oil extraction. Although there are some studies using non-dried seeds as a material, it has been observed that the effect of drying process on oil yield is very important. In addition, as shown in some other studies, the dried and grounded TS should be previously holding before extraction in solvent. The highest oil yield was obtained with acetone (23.38%), followed by ethyl acetate (21.64%) and chloroform (.83%), while the lowest oil yield was obtained with petroleum ether (18.32%). RI values belong to the samples were between 1.4645-1.4697. FFA and acidity were found to be significantly different from each other ($p < 0.05$). While these values were between 1.54-1.79 FFA and 3.06-3.54% acidity for all samples, it was determined as 4.42 FFA and 8.78% acidity for ethyl acetate extraction samples. Thus, it has been shown that polar solvents extract more free fatty acids than non-polar solvents. Similarly, the peroxide values (PV) of oils obtained by extraction of petroleum ether (20.36 meq g O₂ / kg) and ethyl acetate (11.16 meq g O₂ / kg) were also found to be very high. For all samples, the iodine values (IV) were between 103-106 g iodine / 100 g oil and saponification value (SV) values between 194-195 mg KOH / g oil. An-Vs were found between 8.86-12.65 and significantly different ($p < 0.05$). A good cooking vegetable oil should have An-V less than 10. Only chloroform extracted samples had An-V (8.86) less than 10, a slightly higher values was found for other samples. For an edible oil, totox value calculated with PV and An-V values is expected to be lower than 30. Chloroform (20.50) and acetone (23.06) both gave the best results and met the expected value with their totox values below 30. However, totox value of the oil obtained by petroleum ether extraction was determined to be the highest (53.27) and well above the limit value. In addition to the general properties determined, it is expected that the amounts of conjugated diene and triene that give data about the secondary oxidation products that may occur in extraction are low for vegetable oils. Here, the lowest values were determined for the samples obtained by ethyl acetate and chloroform extraction. Finally, the fatty acid compositions of the obtained TSOs were determined. 12 fatty acid methyl esters were determined in TSOs extracted with different solvents. The highest levels of major fatty acids in the samples were linoleic acid (32.77% -41.95%), palmitic acid (23.75% -32.27%), oleic acid (16.17% -24.52%) and stearic acid (7.76% -12.82%). Although the fatty acid compositions of the oils were obtained from tomato seeds produced in Kırklareli are similar to other results reported in the literature. Besides, it is seen that the saturated fatty acid composition is somewhat high.

Key words : Extraction, fatty acid, oil, tomato seed oil, waste material.

EFFECTS OF DIFFERENT FACTORS ON GERMINATION OF ARGAN SEEDS

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ABSTRACT

The argan tree is an Algerian-Moroccan endemic species, which belongs to the *Sapotaceae* family. In Algeria, the tree covers the southeast margins of the distribution. This taxon is a source of socio-economic and ecological importance. However, the argan forest is facing degradation and natural regeneration is mainly absent. The study's aim is to improve knowledge of regeneration ecology by researching optimal germination conditions in order to ensure reforestation establishment by planting. To evaluate the morpho-physiological variability in response to improving different factors (harvest period, longevity, envelope, mother tree and biometrics of the seeds), we collected Argan fruits from Oued Elma (Tindouf) in June, July and August for four consecutive years. A quantitative evaluation of the amylase activity evolution of germinating seeds has been done. On average, walnuts showed the following dimensions: 1.96 cm long, 1.37 cm wide, 0.71 circularity index, 2.58 g weight, and two loculi. There was a significant correlation between weight and width and circularity index ($p=0.01$). The harvest period has a significant effect on germination ($P < 0.01$). The late-season seeds have a low germination potential, from which 79% was recorded for the June harvest, and 67% for the month of August. there was a decline in germination as storage durations increase, removal of shell improved germination parameters, with a shorter latency period (2-6 days) and an 80% germination rate for seeds harvested in June. These showed a rapid increase in amylase activity with peaked at 3rd week. In addition, the effect of the mother tree is not significant, which suggests that the Tindouf argan tree has very similar characteristics in terms of germination. The results obtained in this study provide a seed selection basis for reforestation programs.

Key words : *Argania spinosa*, biometry, germination, harvest date, Tindouf

INFESTATION OF SOM PLANT LEAVES (*MACHILUS BOMBYCINA*) BY THRIPS PEST (*THRIPS TABACI*) AND ITS SUSTAINABLE MANAGEMENT USING PHYTO-CHEMICALS

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ABSTRACT

Som plant (*Machilus bombycina* King) is an important plant in agroforestry system. It is cultivated in north-east part of India in warm humid climate. It is cultivated in agricultural land by the marginal farmers of these areas for multi-storeyed cultivation and income. Large number of crops like pumpkin, turmeric, colocasia etc is cultivated in the som plant land (intercropping). Localized small/cottage industries are involved with this plant like sericulture industry (muga silk worm cultivation). Clothes are produced from this sericulture industry. Leaves of som plants are major food of muga silk worm. Nutritional value of food plants i.e. leaves plays an important role in the larval growth and silk productivity. Benchamin and Giridhar (2005) reported that the muga silk (*Antherea assama*) was produced only in India. The plant also has timber value. Due to attack of insect pest, it becomes difficult for the farmers to conduct rearing (Singh *et al.*, 2000). The plant is susceptible to various insect pests of which Thrips (*Thrips tabaci* L.) causes heavy damage to tender leaves of the plant. It was found from the investigation that thrips was active throughout the year. Lower population was recorded during 3rd week of March to last week of June and higher population was during last week of November to 3rd week of January. Peak population (12.77/3 leaves) was recorded on 49th standard week i.e., 1st week of December. Thrips population had significant positive correlation with relative humidity (maximum) while significant negative correlation with temperature. This indicates that activity of thrips population increases with the rise of relative humidity and decreases with the rise of temperature. Under the present investigation Imidaclopride pesticide was found most effective against thrips providing 75.18% suppression closely followed by Azadirachtin, 64.94% suppression. It was revealed that extracts of Garlic, Tobacco, *Spilanthes* and *Polygonum* plant gave moderate results, recording about 53.33%, 48.55%, 47.24% and 46.71% thrips suppression respectively. The polygonum (*Polygonum hydropiper*) plant (floral parts), pongamia (*Pongamia pinnata*) leaves, garlic (*Allium sativum*), spilanthes (*Spilanthes paniculata*) (floral parts) were extracted in methanol. The tobacco (*Nicotiana tabacum*) leaves were extracted in water. Imidaclopride is a highly toxic synthetic insecticide and so there is every possibility to contaminate som plant leaves with the toxic chemicals, as som leaf is the major food component of muga silk worm rearing. Plant extracts are of biological origin having low or no hazardous effect on health and environment and so can be incorporated in Integrated Pest Management (IPM) and organic cultivation.

Key words : Incidence, climatic factors, muga silk, plant extracts, organic cultivation, environmental sustainability

CARBON STOCK OF PINUS SYLVESTRIS L. AFFORESTATION AREAS: A CASE STUDY IN ATATÜRK UNIVERSITY FUAT TANRIVERDI GROVE

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ABSTRACT

Forest ecosystems play an important role in global climate change. In forest ecosystems, soil and litterfall accepted within carbon pools. Scots pine is the most common tree species planted in Erzurum. Taking Scots pine (*Pinus sylvestris* L.) plantation in Ataturk university as the research object, litterfall and soil organic carbon stocks of Scots pine (*Pinus sylvestris* L.) afforestation planted for 35 years ago have been determined. As a result, it was calculated that a total of 113.44 Mg C ha⁻¹ of organic carbon stored in this afforestation area, including 92.27 Mg C ha⁻¹ and 21.17 Mg C ha⁻¹ in litterfall.

Key words : Scots pine, Carbon stock, afforestation, soil organic carbon, litterfall

**STAND DYNAMICS OF THE SWEET CHESTNUT (*CASTANEA SATIVA* MILL.)
FORESTS IN TURKEY**

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ABSTRACT

The aim of the study is determination of stand structure of sweet chestnut (*Castanea sativa* Mill.) forests in the Black Sea region. Sweet chestnut is the only species naturally found in Europe and Asia Minor. The species is mainly distributed over the North Anatolia (Black Sea Coast), Marmara and Western Anatolia in Turkey. Within the scope of the study, it was selected eight sample plots that located in Rize, Sinop and Bartın Forest Management Directorates. Firstly, general and special site properties of sample plots were determined. Stand profiles were taken in the size of 20×30 meters (600 m²) and 20×50 meters (1000 m²). The crown projection, the length, the breast height diameter and the height the base of crown of all the trees were measured in each sample plots. Stand profiles and their crown projections were drawn for each sample plot, after that the average of tree height and breast height diameter, total basal area, the total number of tree in one hectare and crown closure were found. In the study, chestnut stands were nearly 50-60 years old. The total number of trees in one hectare was found as 427 in Bartın, 433 in Sinop and 432 in Rize. Total basal area of chestnut stands located in Rize, Sinop and Bartın occurred as 32.13 m²/ha, 31.76 m²/ha and 35.73 m²/ha, respectively. The average of tree height varied between 12.9 to 18.9 m and the average of tree diameter ranged from 30.02 cm to 35.73 cm. Sweet chestnut usually forms mixed stand types with some broadleaved species such as beech, alder, hornbeam. Mixed forms are located as clump and group rather than individual.

Key words : stand structure, sweet chestnut, silvicultural treatment, stand profile

FIRE EFFECTS ON CORK OAK WOODS STRUCTURE AND DIVERSITY IN ALGERIA

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ABSTRACT

Little is known about the effects of fire on vegetation dynamic or about fire-plant trait interactions in the forests of Algeria, where disturbance by Wildfires is generally frequent and intense. We focused on Chrea National Park and choose cork oak (*Quercus suber* L.) ecosystem because of its high economic and ecological importance. Sixty-one plots were established taking into account the height and density of the woody species. For each plot, floristic composition and environmental variables were evaluated. Furthermore, easily discernible traits of species (life forms, dispersal mode, Grime's strategies and regenerative traits) were used to analyse fire effects on functional composition. TWINSpan (Two-Way Indicator Species Analysis) results revealed that the current landscape is a mosaic of five vegetation types, with two types of woodlands and three types of shrublands. According to the CCA (Canonical Correspondence Analysis) results, these vegetation types were significantly correlated with a dynamic gradient caused by fire disturbance, which masks the effects of the dominant mesological factors (altitude and exposure). Moreover, fire effects are strongly dependant on species' biological and life history traits. In fact, PCA (Principal Component Analysis) indicated that the abundance of seeders, ruderal stress-toleros species, therophytes, and Anemochorous species was associated with recent and/or recurrent burned shrublands. Conversely, competitive stress-tolerant species, phanerophytes, zoochorous species and resprouters decreased with increases in fire recurrence and reductions in time since the last fire. Further measures for the conservation of forest ecosystems against wildfires, in the protected areas of Algeria, must be undertaken.

Key words : summer wildfires, cork oak woodlands, regressive dynamic, plant traits, conservation

ASSESSMENT OF GENETIC DIVERSITY OF TURKISH AND ALGERIAN NATIVE SHEEP BREEDS

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ABSTRACT

The present study was conducted to investigate the genetic diversity of native sheep breeds reared in Turkey and Algeria. A total of 240 animals representing eight native sheep breeds raised in Algeria (Hamra, Ouled Djellal, Sidaou and Tazegzawt) and Turkey (Akkaraman, South Karaman, Karacabey Merino and Kırıcık) were genotyped with 14 microsatellite markers. A total of 340 alleles were detected with a mean number of alleles (Na), effective alleles (Ne) and polymorphic information content (PIC) were found to be 24.29, 10.99 and 0.90, respectively. The mean of the expected (He) and observed heterozygosity (Ho) values for all studied locus were 0.76 and 0.90, respectively. All FIS value were obtained as positive except OarCP34 locus. The genetic diversity parameters such as Na, Ho and He obtained from the studied Algerian sheep breeds were higher than the Turkish native sheep breeds. Mean value of DST, GST and HT were found as 0.054, 0.060 and 0.91, respectively. The mean global coefficient of gene differentiation (GST) showed that approximately 94.0% of the genetic variation was within-population and 6.0% was across the populations. The private alleles observed in this study were highest (17) in the Ouled Djellal sheep breed, with 66 total private alleles. However, only 14 of it had a frequency higher than 5%. As a result, the dendrogram that the Algerian sheep breeds were completely separated from the Turkish sheep breeds. ΔK value indicated that the most suitable group number was 4 (K=4). It can be said that the microsatellite markers used in the present study are sufficient to identify the genetic diversity of the sheep populations studied.

Key words : diversity genetic, sheep, native breeds, Turkey, Algeria

APOPTOTIC EFFECTS OF L-DOPA, P-COUMARIC ACID AND COMBINATIONS ON MOUSE BRAIN CANCER NEUROBLASTOMA (N1E-115) CELL LINE

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ABSTRACT

Dopamine secreted from the brain is a neurotransmitter substance and provides communication between nerve cells. In its deficiency, many diseases such as cancer occur, as well as neurodegenerative diseases. L-dopa (3,4-Dihydroxy-L-phenylalanine), which is an amino acid, is used in treatment as dopamine cannot exceed the blood brain barrier. It is thought that L-dopa is metabolized to dopamine in the brain and its mechanism of action is this way. L-dopa is the precursor to the biosynthesis of both melanins and catecholamines. In both situation, it has been revealed by studies that brain cancer and neurodegenerative diseases decrease in the brain. Therefore, L-dopa administration may play an important role in the prognosis of the disease by increasing both melanins and catecholamines. p-coumaric acid (PCA) is a phenolic class compound obtained from plants. There are studies explaining the antioxidant mechanism of phenolic compounds, including PCA. Many studies so far; showed the link between the consumption of natural ingredients, its protective effects on diseases. Recently, antioxidants have been reported to protect the human body against various types of cancer and cardiovascular diseases. This study aimed to investigate the apoptotic effects of L-dopa, p-coumaric acid and its combination on Neuroblastoma (N1E-115) cell line, which are different doses of mouse brain cancer in 24 hours. Mouse brain cancer cell line (N1-115); Dulbecco's Minimum Essential Medium (DMEM) was produced in HAMS F 12 (1: 1) + 5% newborn bovine serum (FBS). Cells were added between 0.19-200 μ M doses and serial cells were added and L-dopa, p-coumaric acid and combinations were added and incubated for 24 hours at 37 ° C in an environment containing 5% CO₂. Cell viability was determined by MTT method (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide). IC₅₀ values of the studied items were determined by PROBIT analysis of SPSS 22 statistical program and applied to N1E-115 cell lines. RNA isolations, fluorescent staining, apoptotic cell images and intracellular element analysis with ICP-MS. Gene expression levels were analyzed by cDNA synthesis from isolated RNAs. IC₅₀ values of L-dopa, p-coumaric acid and combinations applied in N1-115 cells at 24 hours were determined as 85,197 μ M, 81,818 μ M and 83,399 μ M, respectively. The application of the L-Dopa and p-coumaric acid combination to neuroblastoma cells was found to suppress the BCL-2 gene, which is an apoptosis inhibitor, and the BAX gene increased 3.04 fold compared to the control. This increase in BAX expression level disrupted the mitochondrial membrane and initiated apoptosis by releasing cytochrome-c into cytosol. In the application of L-dopa and p-coumaric alone, the increase in BAX expression level could not suppress the activity of BCL-2. However, increased BAX gene expression changed the BAX / BCL-2 ratio. At the same time, L-dopa, p-coumaric acid and combination administration disrupted the mitochondria ion balance (Na⁺, K⁺). With the application of L-dopa, the ions increased 1.55 fold, while the application of p-coumaric acid and combination decreased 0.73 and 0.41 fold, respectively. As a result; In the brain cancer cell line neuroblastoma (N1E-115) line, it was determined that L-dopa and p-coumaric acid increase the expression of apoptosis genes and trigger apoptotic cell death by disrupting the mitochondria ion balance depending on the dose and time.

Key words : p-coumaric acid, L-Dopa, Anti-oxidant, Anti-Cancer, Brain Tumor

INVESTIGATION OF THE EFFECTS OF P-COUMARIC ACID AGAINST DOPAMINE TOXICITY IN MOUSE BRAIN CANCER NEUROBLASTOMA (N1E-115) CELL LINE

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ABSTRACT

Dopamine (DA) is an important neurotransmitter, as well as a neurotoxin known to play a role in many neurodegenerative diseases. Dopamine easily produces reactive oxygen species (ROS) and can also be oxidized to a reactive quinone by enzyme catalyzed or metal-reinforced reactions. Some of these reactions are cytotoxic, but the mechanisms by which DA causes cell death are unknown. L-dopa (3,4-Dihydroxy-L-phenylalanine) is used for the treatment of dopamine deficiency. However, the administration of L-dopa alone causes an increase in the dopamine signal and this is thought to have toxic effects. p-coumaric acid (PCA) is a plant-derived phenolic compound. Phenolic compounds are known to have positive effects on the antioxidant system. This study aims to investigate the effects of PCA against the toxicity caused by increased DA signals by the application of L-dopa in the Neuroblastoma (N1E-115) cell line. Mouse brain cancer cell line (N1-115); Dulbecco's Minimum Essential Medium (DMEM) was grown with HAMS F 12 (1: 1) + 5% newborn bovine serum (FBS) and was diluted between 0.19-200 μ M doses with L-dopa, p-coumaric acid and combinations. The cells to which it was added were incubated for 24 hours at 37 ° C in an environment containing 5% CO₂. Cell viability was determined by MTT method (3- (4,5-dimethylthiazol-2-yl) -2,5-diphenyltetrazolium bromide) and IC₅₀ values of the studied substances were determined by PROBIT analysis of SPSS 22 statistical program and applied to N1E-115 cell lines. DNA-RNA isolations were performed. Gene expression levels were analyzed by cDNA synthesis from isolated RNAs. Genetic stability was calculated by performing RAPD PCR from DNA. IC₅₀ values of l-dopa, p-coumaric acid and combinations applied in N1-115 cells at 24 hours were determined as 85,197 μ M, 81,818 μ M and 83,399 μ M, respectively. The application of L-dopa, p-coumaric acid and their combinations created oxidative stress in N1E-115 cells and respectively, 2.54 fold in the Superoxide dismutase (SOD) gene, 23.49 fold, 3.68 fold 1.49 fold in the Catalase (CAT) gene, 5.39 times, It was determined that it caused oxidative stress by creating 4.83 times increase. L-dopa, p-coumaric acid and their combinations, respectively, according to control in p21 gene expression; It was found to be 1.28 fold, 3.28 fold and 3.20 fold. This increase in p21 gene expression compared to control suggests that the cell cycle stops in G1 phase in response to stress in application groups and DNA damage repair caused by oxidative stress has begun. Moreover, in the RAPD-PCR results, L-dopa and p-coumaric acid alone were interpreted as having a more toxic effect on cancer cells, and that combination administration may have created antagonistic effect on cells. As a result; In the mouse brain cancer cell line neuroblastoma (N1E-115) line, combination administration was determined to have less cytotoxic effect than single administration of substances, and p-coumaric acid had a protective effect on dopamine-induced stress.

Key words : p-coumaric acid, L-Dopa, Anti-oxidant, Anti-Cancer, Brain Tumor

SOY PHYTOESTROGENS AS EPIGENETIC MODULATORS IN PROSTATE CANCER

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ABSTRACT

Prostate cancer is the most frequently diagnosed cancer for men in Western countries. Prostate cancer is caused by multi-factorial processes, and epigenetic alterations are important key factors for tumorigenesis. Epidemiological studies provide evidence that nutritional factors, especially consumption of soy isoflavones, have considerable effects on decreasing morbidity and mortality of prostate cancer. The modulatory effects of soy phytoestrogens on epigenetic regulation mechanisms gain importance due to their role on providing further opportunity for prostate cancer prevention. phytoestrogens have a remarkable potential on the regulation of DNA methylation patterns in prostate cancer cells. Phytoestrogens may enhance the reactivation of methylation-silenced genes by inhibition of DNA methyltransferases (DNMT) activity or increasing protein levels of histone acetyltransferase 1, which leads to histone 3 lysine 9 acetylation. Recently, we analyzed the regulatory effects of genistein and daidzein on DNA methylation by using methyl-DNA immunoprecipitation method coupled with Human DNA Methylation Microarrays (MeDIP-chip) in LNCaP and DU-145 cells. We observed that methylation profiles of 58 genes were altered with genistein and daidzein treatments in prostate cancer cells. In addition, the methylation frequencies of *MAD1-like 1 (MAD1L1)*, *TNF receptor-associated factor 7 (TRAF7)*, *lysine (K)-specific demethylase 4B (KDM4B)*, and *human telomerase reverse transcriptase (hTERT)* genes were remarkably modified. In conclusion, soy phytoestrogens can regulate gene activity by altering DNA methylation and/or histone modification patterns. Since epigenetic mechanisms are reversible processes, the role of soy phytoestrogens on epigenetic mechanisms gains importance, correspondingly, epigenetics-driven novel therapeutic candidates warrant further consideration in future “omics” studies of prostate cancer.

Key words : prostate cancer cell lines, soy phytoestrogens, epigenetics, DNA methylation, DNA methylation microarray

HESPERIDIN SENSITIZE A549 HUMAN LUNG CANCER CELLS TO BLEOMYCIN

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ABSTRACT

Cancer is the most common cause of death worldwide after cardiovascular diseases. This devastating disease is a great health and economic burden to societies. Great efforts are being made today to develop new clinical treatment approaches to cancer. Lung cancer (LC) is the most common type of cancer worldwide. Most of the LC cases are classified as non-small cell lung carcinoma (NSCLC). Antineoplastic drug bleomycin (BL) is widely used in cancer treatment. However, this drug causes serious side effects, including pulmonary toxicity, nephrotoxicity, and significant gastrointestinal reactions. In addition, patients often experience physical and mental problems, and BL treatment reduces their quality of life. Therefore, in order to ensure that patients with NSCLC get good results from treatment and improve the quality of life, it is of great importance to develop new treatment approaches that reduce the toxicity and side effects of BL. Natural compounds obtained from plants have anticancer potential and increase their effectiveness when used in combination with chemotherapeutic drugs. Most natural compounds act on multiple targets in cellular signal transduction. For this reason, extensive studies are conducted on natural compounds. Hesperidin is a flavonoid, that abundant in vegetables and fruits, and one of the most important bioflavonoids in orange and lemon. Hesperidin has many beneficial effects such as anti-allergic, antioxidant, anti-inflammatory and anticancer effects. In this study, the synergistic effects of Bleomycin and Hesperidin on cell proliferation, apoptosis and autophagy in A549 non-small cell lung cancer cells were investigated. Anti-proliferative, apoptotic and autophagic effects of Bleomycin and Hesperidin were determined by various analyzes. In addition, the interactions of the combined doses of Bleomycin and Hesperidin, the expression levels of some proteins involved in apoptotic and autophagic pathways were determined. In conclusion, the combined treatment of hesperidin and bleomycin increases the anticancer efficacy of bleomycin at lower doses in A549 human lung cancer cells. These findings show that hesperidin can be considered as an important herbal compound in reducing the side effects and increasing the effectiveness of bleomycin.

Key words : Cancer, hesperidin, apoptosis, bleomycin, flavonoid

UNDERGRADUATE STUDENT NURSES' PERCEPTIONS OF INTIMATE PARTNER VIOLENCE, AWARENESS AND FREEDOM LEVEL IN NURSING CARE

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ABSTRACT

Intimate Partner Violence (IPV); Is an important public health problem in Turkey. Nurses play an important role in the evaluation, intervention and support of women who are exposed to violence. It is reported by the World Health Organization that women below the age of 50 are 61% physically abused by their partners. In universities, nursing undergraduate education; student nurses should be ensured to be ready for these future roles. The knowledge and attitudes of undergraduate students about IPV should be evaluated. It's important in terms of making the necessary interventions into the undergraduate education processes. Our study was conducted September 2019- January 2020 with 276 volunteer students in Trakya University School of Health Sciences undergraduate program. After asking their sociodemographic characteristics, IPV questions were asked to evaluate the level of knowledge, attitude and awareness about IPV. This questionnaire consisted of 3 subscales. These are; " Nursing self-efficacy", " nursing roles and values ", " preparation for education ". The results of the study; showed that the awareness level of IPV of students is low. The scores of the students from three subscales were low. Their self-efficacy perceptions were low in recognizing a woman who was subjected to violence and creating necessary care and support interventions. The issue of informing the victim about their legal rights was a concern for students. They didn't fully know the role of nurses in preventing abuse. The area where students had the best level of self-confidence was their ability to communicate. The knowledge, attitude of being aware of IPV and providing effective interventions are directly related to the self-efficacy of the nurses. This will increase the quality of social health service. The students aren't fully aware of the importance and impact on the individual, social level. In order to prevent IPV, one of the duties of healthcare professionals is; to realize violence, to apply care interventions of physical violence, to provide psychosocial support. This social problem is less detected; it can reduce the benefit to women. They had low confidence in understanding women who had been subjected to violence, but who didn't express it directly. In order for nurses to take a more active role in preventing violence against women in society, it's not only individual patient care; it's important that they have preventive approach skills.

Key words : Intimate Partner Violence, University Students, Women's Health

DEPRESSION AND ATTEMPT TO SUICIDE AMONG MEDICAL STUDENTS IT'S CAUSE

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ABSTRACT

The rate of suicidal attempt among the medical students is increasing day by day. The main reason in attempt to suicide of a medical student is depression, huge exam pressure, unexpected grade, loneliness and unfriendly education system. From last five years report (Google search and previous research) a large number of medical students died by suicide due to unexpected result and depression from study. A online based cross sectional study was done to collect data. The questionnaire had two parts (1) personal information and reason behind suicide attempt, and (2) their advice to come out from this problem. The latest version of SPSS was used for data analysis. Total 291 students an age group of 18-23 was participated, among the participants 26 were tried to do suicide. 209 students stay in hostel and rest of stay with their family. 26.74% are introvert and 35.76% can not share their depression with friends or family. The most interesting part is 7.64% take antidepressant drug to reduce depression and they take drug for a sound sleep and it's percentage is 18.40%. Although the ideal time to go to bed at night is between 11am to 12am but 64.24% sleep after 2am and that's why they can't wake up early and as follow miss morning class and do bad in academic results. 60.76% of them are said that they are not satisfy to their study and they think the main reason to failure is unfriendly education system in undergraduate medical sector. Attempt to suicide in medical students is not accepted although it is increasing day by day and the main reason behind it is depression which is coming form unexpected result, unfriendly education, lack of scope of sharing. We think ministry of medical education should make a discussion to solve this problem and provide a healthy education system in medical sector.

Key words : Depression, suicide

PSYCHOSOCIAL PROPERTIES OF CLINICAL LEARNING ENVIRONMENT FROM THE PERSPECTIVE OF STUDENTS IN HEALTH LICENSE EDUCATION

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ABSTRACT

Nursing undergraduate education has long been an important requirement in providing human resources to the health sector. In order to become a good clinical nurse, it is necessary to have in-depth knowledge in medicine. Besides; they need to have great clinical experience. To become a professional nurse, they must go through challenging learning processes. Health professionals must practice in clinical areas to develop their basic skills. The purpose of our study; To present a comprehensive picture of students' perceptions about the obstacles that nursing students may encounter in clinical settings. Our study was carried out with Trakya University School of Health Science Nursing undergraduate students in November 2019- May 2020. The Clinical Learning Environment Inventory (CLEI) was used. This scale consists of 42 items. The scale has two versions; 1. "Real learning environment"; 2. "Preferred learning environment". The scale; examines students' perception of psychosocial features of real learning environments. At the same time, the scale; evaluate how they want the ideal learning environment to be. It consists of six subscales. The sub-scales are: personalization, student participation, satisfaction, task orientation, teaching innovation, individualization. 280 nursing undergraduate students participated in our study. In the study, the average age of the students was 19.7. The number of Girls in our study is 159; men were 121. After the students were asked about their sociodemographic characteristics, the clinical learning environment inventory (CLEI) was used. It consists of 42 items. It asks students to perceive the psychosocial characteristics of real learning environments and how they think of the preferred or ideal learning environment. In terms of gender; There was no statistical difference for the scale ($p=0.232$). When the participants are evaluated according to their country; No statistical significance was found for the scale ($p=0.171$). In the study, Participants; scores from personalization and student participation subscales were higher in the real learning environment. The students; scores from satisfaction, teaching innovation, individualization subscales; it was higher in idealized clinical settings. The total scale scores of the 4th grades are for both environments; It was higher than the scores of students in the 1st, 2nd and 3rd grades. Nursing students may have to deal with patients with different physical and psychological problems and contribute to their care during their clinical practice. However, students; With systematic home visits, public health interventions, rehabilitation center project studies, they can gain experience outside of a more medically oriented environment. Thus, it will be easier for students to have a wide perspective and their self-confidence will be increased. Undergraduate nursing education programs should be developed with a proactive and holistic approach in order to create a sensitive nursing workforce in the future.

Key words : Clinical Learning Environment, Clinical Learning Environment Inventory (CLEI), health science undergraduate education

ALTERNATIVE TREATMENT FOR ENTEROBIUS VERMICULARIS INFECTION BY USING ESSENTIAL OILS OF CLOVES AND PROBIOTICS: SPIRULINA SP. AND SACCHAROMYCES CEREVISIAE. THERAPEUTIC ASSAYS ON RABBITS TAKEN AS STUDY MODELS

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ABSTRACT

The exposure to childhood cosmopolitan parasites, such as oxyurosis or *Enterobius vermicularis* infection, is extremely widespread in the world, particularly in children's communities. This infection causes a large number of digestive disorders, evoking in addition to physical manifestations, psychological disturbances such as shyness, social isolation or the shameful feeling because it is a disease related to hygiene. The aim of our study is to find a less toxic therapeutic alternative than the widely used vermifuges, which are certainly effective but which nevertheless remain pesticides and biocides which -in high doses- are extremely toxic, and at low doses can cause significant endocrine disruption. Part from the problem posed by the chemical nature of vermifuges, the access to care is becoming increasingly difficult in some parts of the world, given the socio-economic conditions of many families. Also, we must not overlook the fashion effect that encourages the increasing use of organic herbal treatments, thus marking the return to nature and gentle therapeutic practices that can only be beneficial for humans and the planet. This work consists of the use of rabbits as animal models for therapeutic tests based on the use of different concentrations of essential oils (cloves essential oil and garlic and cloves essential oils mixture) as well as the use of probiotics at different concentrations (*Spirulina sp* and *Saccharomyces cerevisiae* and a mixture of both probiotics) in a preventive and a curative treatment. Both treatments (essential oils and probiotics) showed very encouraging results. The use of probiotics has shown very good results in both preventive and curative approaches, and presents a good alternative for the chemical treatment.

Key words : *Enterobius vermicularis*, digestive parasites, alternative treatment, Essential oils of cloves, *Spirulina sp*, *Saccharomyces cerevisiae*

NUMERICAL INVESTIGATION ON THE EFFECTS OF A NATURAL GAS BURNER TIP LENGTH ON THE COMBUSTION PARAMETERS

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ABSTRACT

In this paper, the effects of a natural gas burner tip length on the combustion parameters are studied numerically with the use of the Fluent Code. A back pressure combustion chamber was used as the combustion medium. Pure methane was taken as fuel for the numerical analysis. Four different combustion cases were analysed by changing the burner tip length. The investigated combustion parameters were the flame length, flame temperature and the NOX emissions in the flue gas. The obtained results show that the present natural gas burner has an optimum tip length in terms of reducing the NOX emissions and obtaining an acceptable flame length.

Key words : Methane, Flame length, NOx emissions

**SOLUTIONS FOR PROBLEMS VIA KAIZEN APPLICATION AS LEAN
MANAGEMENT IN PRODUCTION – CASE STUDY**

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ABSTRACT

In recent years, Lean philosophy gained more popularity among other kinds of production strategies. Via this study, it is aimed to improve production lines by means of lean methods for an exclusive company that is situated in İstanbul/TURKEY. There occurred some problems as a nature of production and in order to diminish these, the problems of production were controlled via Lean Management methods, especially via Kaizen, and new solutions for developing production were done and applied. The solutions for problems were defined via lean system which targets at improving efficiency in recent industry world such as KAIZEN. Kaizen philosophy was effectively applied by means of Why-why analyse and PDCA (Plan-Do-Check-Act) methods. The main aim was to make an end for customer complaints and have more products which have required quality and minimum problem. Three of the applied KAIZEN methods were explained with details in this study.

Key words : Lean Management, Kaizen, Solution

KAIZEN APPLICATIONS AS LEAN MANAGEMENT IN INDUSTRY – CASE STUDY

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ABSTRACT

This study focused on developing production stages as much as required in processes those were performed for an exclusive company which works in İstanbul/TURKEY. So as to accomplish this, some problems of production were inspected via Lean Management methods and new ways for improvement of products were done and applied. Necessary studies were performed via lean system which aims for developing efficiency in recent industry world such as KAIZEN. In order to apply Kaizen effectively, Why-why analyse and PDCA (Plan-Do-Check-Act) methods were used. The kaizen's goal was to reduce rate of problems occurred during production and gain more successful products. One of the applied KAIZEN methods was explained with details in this study.

Key words : Lean Philosophy, Kaizen, Problem, Product

**INVESTIGATION OF THE DRYING BEHAVIOR AND WATER ACTIVITY OF
MINT LEAVES, DRIED IN A CONVEYOR TYPE DRYER AND IN A
CONVECTION OVEN**

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ABSTRACT

Consumption habits are changing and demand is increasing the food sector, parallel to the increasing world population. Harvesting some agricultural products in the seasons and drying with minimal loss is of great importance. Characteristics of the product, climate conditions of the region, land structure, energy cost, installation cost of the system, and drying time are the main factors that affect the choice of drying method. Amount lost during drying, color, aroma, preservation of existing properties, hygiene and water activity affect the quality of the product. In this study, drying behavior and water activity of mint leaves in two different drying methods were compared. First, a sample of 20 grams of fresh mint leaves was dried at 65 °C air temperature in a conveyor dryer. Then a similar sample was dried in a convection oven under the same conditions. In the experiments, drying in the convection oven was faster in the first hour. The total drying time took 2 hours in both furnaces. The water activity of mint leaves, dried in the conveyor dryer was found to be 0.4942. The water activity of mint leaves dried in a convection oven was determined to be 0.5139. Further studies to compare the water activity and quality of the products, dried by using different methods, may prove useful.

Key words : Conveyor dryer, convection oven, water activity, mint leaves

**ISOLATION, IDENTIFICATION AND ANTIBACTERIAL ACTIVITY OF
ENDOPHYTIC FUNGI FROM THE ALGERIAN MEDICINAL PLANT ARTEMISIA
HERBA ALBA**

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ABSTRACT

The aim of this study is to isolate and identify endophytic fungi from the Algerian medicinal plant *Artemisia herba alba*, then to evaluate the antibacterial activity of these fungi and their extracts. The isolation and identification allowed us to obtain ten (10) fungal strains belonging to four genera: *Fusarium*, *Penicillium*, *Alternaria* and *Aspergillus*. The antibacterial activity of the fungi was evaluated by the agar-fungi disk diffusion method, against five human pathogenic bacteria; where all isolated fungal strains exhibited antibacterial activity against at least one of the bacteria tested with an inhibition zone (IZ) ranging from 7.5 to 25 mm. In addition, *Fusarium sp* and *Penicillium sp1* have the highest antibacterial activity with an IZ of 23.5 and 25 mm) against *S. aureus* and *B. subtilis*, respectively. After fermentation, the secondary metabolites of four endophytic fungi (one fungus of each genus) were extracted using the butanol solvent. Then, the antibacterial activity of extracts of the endophytic fungi was determined and results show that *Penicillium sp2* has the highest effect against *Bacillus subtilis* with IZ of 27.3 mm. This study is the first report about the antimicrobial activity of endophytic fungi residing in *A. herba alba*, in which the fungus *Penicillium* and *Fusarium* demonstrated the ability to produce bioactive agents with pharmaceutical potential, and may provide a new lead in the pursuit of new biological sources of drug candidates. Moreover, the present study helped to justify the use of *A. herba alba* in traditional medicine.

Key words : Endophytic fungi; *Artemisia herba alba*; Antibacterial activity; Bioactive compounds.

THE SYNERGISTIC POTENTIAL OF PELARGONIUM ENDLICHERIANUM FENZL. ESSENTIAL OIL AND DIFFERENT ANTIBIOTIC COMBINATIONS AGAINST LISTERIA MONOCYTOGENES

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ABSTRACT

The main aim of the study was to combine *Pelargonium endlicherianum* essential oil with benzylpenicillin, gentamicin and ciprofloxacin, which are frequently used in the treatment of infections, and to reveal the antimicrobial effect against *Listeria monocytogenes* in an in vitro experimental model. The combined use of *P. endlicherianum* essential oil with benzylpenicillin, gentamicin and ciprofloxacin has been demonstrated using minimum inhibition concentration and agar well diffusion methods against *L. monocytogenes*. The bactericidal effect of essential oil and antibiotic is dynamically demonstrated depending on the time and antibiotic intensity with the time kill method. When used essential oil alone and in combination with antibiotics, the permeability of the bacterial outer membrane was analyzed with a U.V spectrophotometer. The detection of synergy at the 24th hour after treatment and the combination of drugs compared to essential oil treatment showed a decrease in the number of viable bacterial cells. The combined use of essential oil with benzylpenicillin, ciprofloxacin and gentamicin has been found to have a synergistic effect on *L. monocytogenes*. A synergistic interaction was observed between the antibiotics against *L. monocytogenes* and the essential oil in the Time kill study to determine the decrease in the number of live bacteria due to time. In this study, the mechanism of action of penicillin, gentamicin and ciprofloxacin antibiotics was further expanded in combination with essential oil obtained from *P. endlicherianum* and increased the membrane permeability activity of these antibiotics. According to the results of the study, it has been shown that antibiotic efficacy increases as a result of the combination of benzylpenicillin, ciprofloxacin and gentamicin used against *L. monocytogenes*, thereby preventing bacteria from developing resistance against antibiotics and providing an effective treatment.

Key words : *Pelargonium endlicherianum* Fenzl., Essential oil, benzylpenicillin, ciprofloxacin, gentamicin, synergism

ANTIOXIDANT AND ANTICHOLINESTERASE EFFECTS OF PHAEOLUS SCHWEINITZII AND PHELLINUS IGNIARIUS MUSHROOMS

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ABSTRACT

Free radicals are produced from oxygen during aerobic respiration and excessive formation and accumulation cause oxidative stress. It has been reported in previous studies that oxidative stress causes various diseases and antioxidants help to prevent or reduce the damages caused by oxidative stress. AChE and BChE inhibition theory is very popular among the other strategies in the treatment for Alzheimer's disease (AD) and also it is well known that antioxidants have an important role in the treatment of AD. Antioxidant and anticholinesterase effects of the hexane and methanol extracts of *P. schweinitzii* and *P. igniarius* mushrooms were examined in this study. β -carotene-linoleic acid, DPPH• scavenging, ABTS•+ scavenging, CUPRAC and metal chelating assays were used for testing of antioxidant effect. Also, Ellman method was used for anticholinesterase effect. The best antioxidant effect was recorded in *P. schweinitzii* methanol extract in β -carotene-linoleic acid (IC₅₀: 1.16±0.14 μ g/mL), DPPH• scavenging (80.56±0.53 %), ABTS•+ scavenging (IC₅₀: 2.96±0.15 μ g/mL) and CUPRAC (A_{0.50}: 5.26±0.19 μ g/mL) assays except metal chelating assay. At 200 μ g/mL concentration, *P. schweinitzii* methanol extract was found as the best inhibitor against AChE (56.38±0.09 %) and BChE (85.64±0.16 %).

Key words : *Phaeolus schweinitzii*, *Phellinus igniarius*, Antioxidant, Anticholinesterase activity

THE ENVIRONMENTS WHERE MICROPLASTICS ARE PRESENT AND THE PROBLEMS CAUSED BY MICROPLASTICS IN WASTEWATER TREATMENT PLANTS

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ABSTRACT

The present study aimed to determine the environments where microplastics are present, analysis methods and the problems that microplastics lead to in wastewater treatment plants. Microplastics could be classified in 3 main categories; meso-plastics, micro-plastics, and nano-plastics based on their size and in 2 categories; primary and secondary microplastics based on formation method. The microplastics have been detected in wastewater treatment plants, seas, estuaries, rivers, soil, lakes and atmospheric environments, and even the poles. To analyze the microplastics, they should first be purified. FITIR and Raman Spectrophotometry are traditional detection and identification methods, while FIT detector, NR staining, TGA-DSC, TED-GC-MS combined with FITIR are among the new detection methods. Although microplastics do not pose problems in coarse grids when they are at high densities in primary treatment, they lead to clogging problems in fine grids. In the secondary treatment; however, the rise in flocculant content leads to clogging problems due to retention on membrane surface, reducing the disinfection mechanism performance. Furthermore, the adsorption rate in mud is around 99%. Since wastewater treatment plants are not designed for the removal of specific pollutants, they are inadequate in the removal of microplastics. For the sustainability of future generations and ecosystems, it is essential to determine the most suitable and rapid removal methods for microplastics.

Key words : Microplastics, FITIR, wastewater treatment plant, removal method.

**QUALITY ANALYSIS OF PHYSICAL, CHEMICAL, BIOLOGICAL AND
HYDROMORPHOLOGICAL PARAMETERS IN THE NITRATE VULNERABLE
ZONE (NVZ)**

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ABSTRACT

The aim of this study was to analyse various factors that may affect the ecological condition of an agricultural catchment area. It was selected for analysis the catchment of the Orla River (river length of 88 km, catchment area of 1546 km²). The catchment area is predominantly agricultural character and its entire area has been declared as an agricultural nitrate vulnerable zone. A total of 27 survey sites were selected on the main watercourse and its tributaries. Analyses were conducted in the years 2010-2012 to determine physical and chemical parameters of water (pH reaction, conductivity, dissolved oxygen, total nitrogen, organic nitrogen, ammonia nitrogen, nitrates, total and reactive phosphorus) as well as biological parameters (macrophytes) and hydromorphology. Macrophyte surveys were carried out using the Macrophyte Method for River Assessment. The MIR values ranged from 22.4 to 49.3. A total of 18 survey sites were classified as having a moderate ecological status, five sites as poor, three as good and only one as very good. Hydromorphology was analysed using River Habitat Survey method. Values of habitat quality assessment (HQA) ranged from 11 to 64. Values of habitat modification score (HMS) ranged from 0 to 63. From among 27 research points, only two were in the second hydromorphological state class. The remaining points have been classified into class III (41% of survey points), IV (33% of survey points) and V (19% of survey points). The results indicate the impact of land use in the catchment on water conductivity and concentrations of nutrients in the main watercourse and its tributaries, and in water quality in the southern part of the catchment in relation to the rest of the study area. This is probably connected with a greater share of forests and surface waters in that area.

Key words : Orla River, agricultural catchment, nitrate vulnerable zone, river habitat survey, macrophytes

**MAPPING AND QUANTITATIVE ASSESSMENT OF WATER EROSION
THROUGH VISUAL INTERPRETATION OF SATELLITE IMAGES AND GIS**

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ABSTRACT

Soil erosion by water is a global phenomenon, it is the main factor of land degradation and siltation of dams. In Algeria this phenomenon has taken on worrying dimensions, since most of the dams are silted up. In this study we propose to show the gravity and the evolution of erosion through the analysis of the factors responsible for it in the basin of the BOUHANIFIA dam in Algeria. It is based on the integration of data from the processing of satellite images and cartographic data into a GIS for the identification and mapping of areas at risk of water erosion. The method adopted is that of RUSLE, which is the combination of six specific factors that describe the characteristics of the watershed. The integration of the thematic layers of the factors of this model in the GIS geographic information system makes it possible to identify the impact of each factor in soil losses, to classify by relative importance the erosion zones, and to quantify the losses in the ground

Key words : soil erosion ;rusle ; GIS; basin ; BOUHANIFIA ;ALGERIA

BIOCHEMICAL AND HISTOPATHOLOGICAL MONITORING OF HEAVY METAL POLLUTION IN CATFISH (*SILURUS GLANIS*) TISSUES IN SAPANCA LAKE

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ABSTRACT

This study aims to determine the toxic effects of heavy metal pollution in Sapanca Lake on the catfish (*Silurus glanis* Linnaeus, 1758) by biochemical and histological methods. For this reason, fish samples were taken from the Kırkpınar location of the lake with the help of professional fishermen every month of 2015. Heavy metal (Cu, Fe, Zn, Pb, and Cd) analyzes in fish tissues (muscle, liver, gill) were determined with ICP-OES and compared with reference materials. In addition, catalase enzyme activity (CAT), total glutathione (GSH) and lipid peroxidation (MDA) levels, which are oxidative stress bioindicators in tissues, were measured by spectrophotometric methods. Histopathological findings in liver and gill tissue were determined by Hematoxylin & Eosin staining. As a result, the amount of Cu, Fe, and Cd in the fish were liver > gill > muscle and Zn amount was gill > liver > muscle. Generally, determined metal concentrations can be listed as Fe > Zn > Cu > Cd > Pb in muscle and Fe > Zn > Cu > Pb > Cd in liver and gill. According to the result of staining with H&E, the primary findings in the gills are the separation of the primary lamella and hyperplasia and irregularity in the secondary lamella. In the liver, necrotic conditions such as an obstruction in sinusoids, an increase in kupffer cells, and karyolysis in hepatocytes were observed. Enzymatic and non-enzymatic antioxidants are at different levels according to months, and these methods are useful in the biological monitoring of environmental pollution. The fact that the amount of heavy metal in fish tissues does not exceed the specified standards, however, the presence of biochemical and histopathological findings in fish tissues suggest that the lake is under the influence of not only heavy metals but also other sources of pollution.

Key words : heavy metal, pollution, catfish, oxidative stress, Sapanca Lake

THE EFFECT OF HEAVY METALS AND SUBSTRATES ON CHELIDONIUM MAJUS L. SEED GERMINATION AND SEEDLING GROWTH

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ABSTRACT

Heavy metals are among the main pollutants in the environment. Soil and water quality directly influence people's health and the quality of the environment. Heavy metals affect plant development, seed germination, slow down photosynthesis and decrease yield, seed production and crop quality. *Chelidonium majus* L. is a perennial medicinal species which is widely distributed across Europe. It grows in habitats which are antropogenically created and maintained. The species is an appropriate object of study in order to investigate its sensitivity to the toxic effects of heavy metals because of its growth in populated areas and common occurrence. The aim of the study was to evaluate seed germination ability and seedling development on two substrates supplemented with different types and concentrations of heavy metals. The substrates used in the study were filter paper moistened with distilled water and water agar supplemented with Pb(NO₃)₂, ZnSO₄ - 100, 150 and 250 mg/l Pb²⁺ or Zn²⁺ and CdCl₂ - 1, 5 or 10 mg/l Cd²⁺. Seed germination on filter paper for all heavy metals used was over 75%. But further seedling development was retarded in all cases and the most hampered were these treated with Zn²⁺. Seeds germinated on water agar were strongly influenced by heavy metal supplementation, where the germination percentage for all heavy metals was under 50%, except for Pb²⁺ which was over 75%. Primary root growth was also strongly affected by heavy metal supplementation and the primary roots of the seeds treated with Pb²⁺ and Zn²⁺ were reduced and dark. Hypocotyl growth was affected in the highest degree by Zn²⁺. The results showed that germination and seedling growth are affected by the substrate, the type of heavy metal and concentration used.

Key words : Heavy metals, filter paper, water agar, root growth, hypocotyl growth

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LEVELS OF SELECTED HEAVY METALS (CD, NI, PB, CR, CU, ZN, FE, MN, NA AND K) IN THE ROW GOAT'S MILK FROM NORTHERN MOROCCO

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ABSTRACT

Goat's milk production has always been a fundamental part of the economy, diet and cultural heritage in the mountainous regions of Northern Morocco. Today, the consumer is becoming more demanding and requires foods with good nutritional quality and without health risk to humans. The present study was designed to analyze heavy metals (Cd, Ni, Pb, Cr) and essential metals (Cu, Zn, Fe, Mn, Na, K) in goat milk samples collected in one of the most productive regions in Morocco. Trace element analysis in milk was performed using mass spectrometry. The highest concentrations were observed on the level of the Pb content which varies between 48.7 µg/kg and 120.75 µg/kg. The lowest content was recorded for Cd, in the most areas this concentration is of 0.25 µg/kg, but it exceeded 1 µg/kg in area A. Concerning Cr, its concentration is in lower part of the threshold of detection for the area H, but the maximum content arrives at 26.63 µg/kg. We should mention the absence of Ni in milk in all the sites of sampling. Concerning the essential metals, the highest concentrations are Zn which varies between 1862.50 µg/kg and 3845.63 µg/kg, Fe which average in the various areas was 1171.9 µg/kg, and then K with an average of 1148.4 µg/kg. For Na, the average value of the content of milk is the half of that noted for K (472µg/kg). However, the lowest contents are the following: Cu with an average concentration of 64.3µg/kg and the Mn which reaches an average of 83.86 µg/kg. The technological progress, the various industrial material and the agricultural activities are considered to be the important sources of the environment's and the food chain's contamination.

Key words : Goat's milk, Northern Morocco, heavy metals, essential metals.

STUDY OF THE PHYSICOCHEMICAL AND BACTERIOLOGICAL QUALITY OF SURFACE WATER IN THE ORAN REGION

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ABSTRACT

Water is an essential resource. Its use for food, body hygiene or recreational requires a high level of physico-chemical, chemical and microbiological quality. The substances they transport are in fact likely to be ingested, inhaled, or to come into contact with the skin. Therefore, the analysis of eight parameters in addition to pH and which are the electrical conductivity, total phosphorus, chloride, Ammonium, Sulfate, Nitrate, Chemical Oxygen Demand (COD) and Matter in suspension (MES) as well as the analysis of total coliforms, faecal streptococci and clostridium were carried out on the waters of three lakes, Dayat Morsli, Telamine, and Gharabas, located in western Algeria in the Oran region. The results show that the three lakes are saline wetlands where total phosphorus is found at lower concentrations while chlorides, Ammonium and Sulfate are found at concentrations above standards. The pH of Lake Dayat Morsli, the Nitrate of Lake Telamine, the COD and the MES of Lakes Dayat Morsli and Telamine exceed international standards.

Key words : Bacteriology, physicochemical parameters, Pollution, Wetlands

**IS THE EXPLOITABLE BIOMASS (B) VULNERABLE TO CHANGES OF
NATURAL MORTALITY (M) BY AGE CASE OF SARDINA PILCHARDUS
(WALBAUM, 1792)**

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ABSTRACT

For this study, 3571 individuals of all sexes, with sizes ranging from 7.25 to 17.75 cm, were studied. Monthly sampling was conducted from December 2018 to March 2020 from landings of seiners operating in the central region of Algeria between Tenes and Bejaia. To feature a potential effect of changes in characteristic mortality (M) on the biomass level of *Sardina pilchardus*, it was important to estimate its value for the entire population at first and then for each age class. The Virtual Population Analysis (VPA) was then run with a constant estimation of M [0.6 yr⁻¹] and a variable one [from age 1 to 4 = 1.466; 0.818; 0.680; and 0.591 yr⁻¹]. The outcomes appeared for both constant and variable M a condition of "not overfishing and not overfished", with, for constant M a biomass estimation of 5636 tons and 6453 tons for variable M. The addition in biomass level estimation was around 13%, when the estimation of the yield every year stayed fundamentally the equivalent [around 2912 tons]. Finally, we recommend incorporating changes of natural mortality (M) in biomass estimation studies to get closer to reality. Indeed, early ages small pelagic fishes are the most vulnerable classes to mortality caused by predation or pollution induced stress. This fact must be taken into serious consideration for a better monitoring of exploitable stocks, without ignoring the degree of uncertainty of estimates.

Key words : *Sardina pilchardus*, Algeria, Natural Mortality M, Biomass.

**POTENTIAL SOURCES AND ROUTES OF COVID-19 (SARS-COV-2)
TRANSMISSION IN WATER SYSTEMS IN AFRICA AND SUSTAINABLE
PREVENTIVE MEASURES**

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ABSTRACT

The emergence of the novel coronavirus (COVID-19) pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has almost wrecked the health systems in most countries, especially in Africa. This has resulted in a critical focus by governments on precautionary measures to mitigate the scourge. SARS-CoV-2 has been detected in wastewater systems raising an alarm for Africa in view of the poor water, sanitation and hygiene (WASH) systems. The non-resilient policies governing sanitation and water management systems in most African countries expose them to higher risk levels for the spread of COVID-19. In this regard, this study examined the potential sources and routes of SARS-CoV-2 transmission in wastewater systems in Africa through synthesis and review of published works. The study also proposed sustainable preventive measures that are useful to all other developing countries in the world. Altogether, hospital sewage, waste from isolation and quarantine centres, contaminated surface and groundwater sources, faecal-oral transmission, and contaminated sewage are identified as the potential sources and routes of SARS-CoV-2 transmission in water systems in Africa. These can be effectively addressed by improved WASH services and public awareness campaigns, decentralization of wastewater treatment facilities, utilizing low-cost point-of-use integrated wastewater treatment systems, legally backed policy interventions, and Community-Led Total Sanitation. This study will serve as a guide to the monitoring and containment of the ongoing COVID-19 pandemic in Africa and the rest of the developing world.

Key words : COVID-19; Coronavirus transmission; SARS-CoV-2; wastewater systems; sustainable preventive measures; Africa

FRUITS MORPHOLOGICAL QUALITATIVE TRAITS, BIOCHEMICAL COMPONENTS AND PUNGENCY STRENGTH OF SPICY PEPPER FROM MALEH VALLEY IN MOROCCO

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ABSTRACT

Phenotypic diversity, biochemical components and pungency strength were assessed for eighteen spicy pepper accessions from Maleh valley in Morocco. Six plant samples were randomly collected in farmers' field across three target localities during 2015 growing season. Eight fruits from each plant sampled were characterized using eight phenotypic qualitative traits and biochemical components. Results revealed a wider genetic variability within accessions (52%) than among accessions (43%), and among sites (5%) leading to a substantial genetic differentiation among accessions ($\Phi_{PR}=0.453^{***}$) and within accessions ($\Phi_{PT}=0.477^{***}$) and a strong seed exchange network. The greater part of trait frequency was accounted for fruit shape ($SWI=0.132$), texture of fruit surface ($SWI=0.270$), fruit attitude ($SWI=0.260$), pericarp sinuation ($SWI=0.119$) and for fruit color ($SWI=0.246$) and brightness ($SWI=0.218$). Biochemical components analysis revealed that spicy fruits of Maleh valley are identified as high nutritional value; carbohydrates (53.2mg/g FW), total phenolic compounds (73.3mgGAE/100g), and Total lipids (1.27mg/g DM) composed mainly of unsaturated fatty acid (87%) and a high ratio of ω_6/ω_3 (5.6). Furthermore, Capsaicinoids concentration (2.16mg/gDM) varied among accessions from 1.67 to 2.82 while the ratio of capsaicin/dihydrocapsaicin (1.83) was similar in all accessions. Fruit spicy was categorized into highly pungent group (27550.5 - 44780.7 SHU) according to Scoville organoleptic test.

Key words : Spicy Pepper, Phenotypic Characters, Biochemical Composition, Pungency, Morocco

SEED NUTRITIONAL QUALITY OF SOME MOROCCAN LENTIL LANDRACES

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ABSTRACT

The malnutrition and micronutrient deficiencies affect adversely human health and productivity as the decrease of work capacity and school performance. Addressing nutrients deficiency through plant breeding would be the appropriate approach to promote healthy and nutritional status mainly for low incomes people. The genetic resources available among landraces might enhance breeders' efficiency for crop nutritional value improvement. Lentil landraces have been on-farm conserved in Morocco to insure home-consumption and livelihood food security. Seeds constitute an economic dietary source of protein, essential minerals and antioxidant compounds. Thus current study aims on assessing nutritional value of eight lentil landraces compared to four improved varieties. Results evidenced a large range of nutrients content variability in regards to crude proteins (26.8 - 33.8%), total carbohydrate (46.4- 58.3%), neutral fibers (39.7-46.4%), lipids content (1.13-2.10 mg/100g) composed mostly of unsaturated fatty acid (83.9%) revealing the healthy source of lentils. The major compounds of total phenols (7.60 mg/100g) are the condensed tannins (6.04mg/g DM) which concentrated mainly in seed coat (67%). The large range variability of micronutrients concentration as iron (6.57-8.26), magnesium (102.0-126.8), zinc (3.74-4.83) revealed the beneficial healthy source of lentil seeds as they provide essential nutrients of human requirements and the sustainability of local genetic cores in providing optional genetic resources of genotypes or allelic variants of candidate gene(s) useful in pre-breeding for developing new varieties with nutritional beneficial traits.

Key words : Lentil, landraces, varieties, nutritive value, Morocco

PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF STAPHYLOCOCCUS AUREUS ISOLATED FROM FOOD PRODUCTS IN ALGERIA

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ABSTRACT

The aim of this study was to characterize *S. aureus* isolates of food origin (dairy and meat products, pastries, and sandwiches) determining the carriage in enterotoxin genes and the antimicrobial resistance pheno/genotypes. For this, 300 samples were collected and submitted for the isolation of *S. aureus* strains. The presence of enterotoxin genes was investigated by multiplex-PCRs. Antibiotic susceptibility of isolates was determined by disc diffusion method and molecular characterization of methicillin-resistant *S. aureus* was carried out by *spa* and MLST. Overall, 51 out of 300 samples (17%) were contaminated with *S. aureus*, and 104 isolates were recovered. Sixty-five of these isolates (62.5%) harbored one or more genes encoding for staphylococcal enterotoxins, being *seg* and *sei* the most observed genes. Most of isolates showed resistance for penicillin (95.19%) and 5 isolates were methicillin-resistant (MRSA) harbouring the *mecA* gene. All MRSA isolates belonged to the sequence-type ST5 and to two different *spa*-types (t450 and t688); the MRSA-t450 isolate carried the *scn* gene (specific marker of the immune evasion cluster system), but the four MRSA-t688 isolates were *scn*-negative. The MRSA isolates carried enterotoxin genes but were negative for the genes of the Pantone Valentine leukocidine (*lukF/S-PV*). The presence of enterotoxigenic *S. aureus* isolates, including MRSA, in food samples can represent a risk for public health. For this, the application of good manufacturing practices and hazard analysis and critical control point (HACCP) systems are crucial for ensuring the microbial safety and quality of food products.

Key words : *S. aureus*, food products, enterotoxin genes, methicillin-resistant *S. aureus*, antimicrobial sensitivity

ECDYSTEROIDS OF A MEDICINAL PLANT "AJUGA IVA" AND THEIR TOXICOLOGICAL EFFECTS IN VIVO

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ABSTRACT

In recent years, many medical plants or their preparations are used in the composition of food supplements. The main objective of our study is to extract the ecdysteroids from a medicinal plant "Ajuga Iva" widely used in traditional medicine and to examine their toxicological aspects. We carried out firstly the extraction of the ecdysteroids by maceration then the identification of the extract and secondly the evaluation of their toxicity. In our study, we carried out an extraction process containing two steps: maceration and purification; in order to obtain, from the aerial part of the Ajuga iva plant, an extract of ecdysteroids which represents the active substance responsible for increasing protein synthesis (Parr MK1, et al.,2014). Toxicological study of Ajuga iva was done at doses up to 2000 mg/Kg in laboratory animals (mice). Evaluation of the acute toxicity of the obtained, showed that oral administration of a single dose \leq 2000 mg/kg showed no mortality or signs of morbidity over the entire observation period of 14 days. Our results are consistent with the results of toxicological studies conducted on extracts of the plant Ajuga iva by El Hilaly et al. 2004. This toxicological study allowed us to determine the dose to be administered to subsequently assess the nutritional and physiological effects on the extracted ecsteroids.

Key words : Medicinal plant, ecdysteroids, dietary supplement, acute toxicity.

UTILIZING DNA BARCODING TO AUTHENTICATION FISH SPECIES IN SEAFOOD PRODUCTS

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ABSTRACT

Currently, food safety and the quality of the product are crucial issues for human health. The requirement of the detect food quality precisely leads to increase the quality control analyses via the latest molecular-based method. DNA barcoding is a standard and reliable molecular method for the enforcement of regulations for the food controlling system. Counterfeit labeling or mislabeling in seafood products is the main problem throughout the world that cause consumer rights violation. In Azerbaijan, the authentication of food products to prevent mislabeling food components and propagation of counterfeit products in food trade is regulated by the Azerbaijan Food Safety Agency. According to the European food control system, laboratory certification requirement in fish production based on DNA barcoding analyses is a reliable issue to struggle with fish fraud. Morphological characterization as traditional methods for identification of fish species are not always practical to authenticate seafood products available. So, alternative identification methods like DNA based approaches are required to identify animal species to help consumers, retailers, and government to correctly identify food species. Among genetic markers the DNA barcoding system based on cytochrome oxidase I mitochondrial gene (COI) is more efficient methods for identification vertebrate and invertebrate species. In Azerbaijan for the first time we are going to utilize the DNA barcoding technology method to investigate the prevalence of mislabeling among fish products from supermarkets and restaurants. Fish sampling will be collected from sushi restaurants and frozen mislabeled seafood products in supermarkets in Baku, Azerbaijan. All identification procedures will be performed with mitochondrial cytochrome oxidase I (COI) gene fragment. Using mitochondrial DNA more promising in comparison to nuclear DNA as it possesses heat resistant, recovery frequency, and high level of quantities in the cell. The DNA barcoding method assists to ensures a scientific nomenclature with certified common fish names. This accurate fish identity will implement routinely to maintain consumer rights from mislabeling and counterfeiting. This investigation also will prevent people from allergic reactions due to the presentation of wrong labeled products.

Keywords: mislabeling, fish, DNA barcoding, cytochrome oxidase I

EFFECTS OF ULTRASONICATION ON ANTHOCYANIN CONTENTS OF FRUIT JUICES

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ABSTRACT

Fruit juices are processed against microbial contamination, most commonly via thermal preservation techniques, of which reduce nutritional composition and organoleptic properties. Rising public interest in safer and more nutritional foods have increased the popularity of non-thermal methods, including ultrasonication. Ultrasound, when applied to liquid mediums like fruit juices, creates acoustic cavitation that generates bubble formation, which then will be collapsed causing thermal, mechanical and chemical impacts. These impacts of ultrasonication, make it useful in the fruit juice processing. Anthocyanins are colored pigments that are found in plants including fruits, especially berries, cherries and grapes. As a functional ingredient, anthocyanins show anti-diabetic, anti-inflammatory and antimicrobial effects, also helps preventing cancer and cardiovascular diseases. This paper summarizes the effects of ultrasonication on anthocyanin contents of fruit juices.

Key words : Ultrasound, Ultrasonication, Anthocyanin

IMPACT OF MICROWAVE TREATMENT ON IMMUNOREACTIVITY, PRIMARY AND SECONDARY STRUCTURE OF WHEAT GLUTEN

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ABSTRACT

Celiac disease (CD) is an autoimmune enteropathy, triggered in genetically predisposed individuals because of ingestion of gluten forming proteins found in cereals such as wheat, rye, and barley. Currently, the only effective treatment available for CD is a strict gluten free diet for life. Nevertheless, this treatment has some disadvantages, like contamination risk with gluten, vitamin and mineral deficiencies, metabolic syndrome, an increased cardiovascular risk and psychological problems. For improve life quality of celiac patients, physical treatments are recently used to modify immunological properties of wheat gluten proteins. The purpose of this study was to evaluate the effect of microwave on mainly immunoreactivity, primary and secondary structure of wheat gluten proteins. The gluten powder was subjected to microwave and analysed by R5 competitive ELISA, SDS PAGE and Fourier-transform infrared spectroscopy FTIR. The response surface methodology was applied. Composite Central Design CCD was used, with two factors power and time varied from 200 to 1000 Watt and from 20 to 60 s respectively. The results obtained showed that secondary structure of gluten proteins was affected by the microwave treatment whereas, primary structure was not reflecting any impact. In fact, the microwave treatment increased the amount of potentially toxic epitopes released after peptic and tryptic digestion, showing inefficiency as a treatment to detoxify the gluten for celiac disease patients

Key words : wheat gluten, celiac disease, microwaves, immunoreactivity, structure

EVALUATION OF TOTAL PHENOLIC, FLAVONOIDS AND ANTIOXIDANT ACTIVITY OF CALENDULA OFFICINALIS (L.) EXTRACTS COLLECTED IN KOSOVO

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ABSTRACT

The antioxidant capacities, total phenolic and flavonoid content of five different extracts (diethyl ether, chloroform, ethyl acetate, n-butanol and water) of *Calendula officinalis* (L.) growing wild in Kosovo were analyzed. Antioxidant activity was determined by DPPH assay. Total phenolics and total flavonoids content in the extracts was determined spectrophotometrically. Statistical analysis was performed using SPSS version 13.0 and Excel 2010. The amount of total phenolics in *C. officinalis* (L.) extracts ranged from 7.30 mg/g to 37.60 mg/g (expressed as gallic acid equivalent, mg GAE/g of dried extract). The amount of total flavonoids in *C. officinalis* (L.) extracts ranged from 10.15 mg/g to 27.52 mg/g (expressed in rutin equivalent, mg RE/g dried extract). Ethyl acetate (EtOAc) and water (H₂O) extracts of *C. officinalis* (L.) expressed very strong scavenger activity, 15.13 µg/mL and 15.20 µg/mL, respectively. The observed differences in antioxidant activity could be partially explained by the levels of phenolics and flavonoids in extracts of *C. officinalis* (L.). This plant can be used to discover bioactive natural products that may serve as leads in the development of new additives for application in food technology.

Key words : Extracts, Phytochemical, Antioxidant, *Calendula officinalis* (L.), Kosovo.

THE EFFECT OF GENDER ON THE LIKE OF SHALGAM

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ABSTRACT

According to TS11149 shalgam juice standard, shalgam juice is defined as a product that is obtained by adding black carrot, turnip and chilli powder (if desired) to the extract obtained with after adding the bulgur flour, sour dough, drinking water and salt to the lactic acid fermentation and made durable by heat treatment if desired. Shalgam juice is a highly valuable traditional product with its rich vitamin and mineral content, digestive regulating effect, appetizing and natural probiotic product (Canbaş & Fenercioğlu, 1984, Özler & Kılıç, 1996). Shalgam juice contains calcium, iron and vitamins A, B, C (Canbaş & Fenercioğlu, 1984). Shalgam juice; is a very functional traditional drink that removes toxins from the body, reduces kidney stone formation, treats acne, eczema, abscess and hematoma, diuretic, cleans the lungs and bronchi (Coşkun, 2017). Sour dough is generally used as yeast in the production of turnip juice (Üçok and Tosun, 2012). It has been determined that products made by adding bulgur flour (instead of bulgur), sour dough and turnip have higher consumer taste (Canbaş & Fenercioğlu, 1984). There are two types of production, namely traditional fermentation (two-stage) and direct fermentation (single-stage) (Üçok and Tosun, 2012). Fermentation begins with *Leuconostoc mesenteroides*, continues with *Lactobacillus brevis*, *Pediococcus pentosaceus* and *Lactobacillus plantarum*, and is completed with acid-resistant *L. plantarum* bacteria (Üçok and Tosun, 2012). In this study, the importance of gender in the consumption preferences of shalgam juice, which is a traditional beverage with many beneficial effects on health, was investigated. Sensory analysis of shalgam juice, which is a commercial product of a known brand, was performed on 45 people (women: 25 men: 20) using a 5-scale scoring test. Shalgam juice was asked to score from 1 to 5 as color, odor, aroma, sourness, and general taste. Gender differences in shalgam juice consumption preferences were evaluated in independent variables with T test and one-way analysis of variance (ANOVA) in SPSS 22 program. The level of significance in difference was determined as $p < 0.05$. According to the result obtained, the difference created by gender in the scores is not statistically significant for each of the categories of color, odor, aroma, sourness, general taste ($p > 0.05$). While women scored higher in color, sourness, general taste categories (average 4.00, 3.44, 3.72 respectively) than men (average 3.80, 3.20, 3.35 respectively); men (3.35) rated the odor criterion higher than women (3.32).

Key words : shalgam, gender, consumption preference, sensory analysis

ULTRASOUND-ASSISTED EXTRACTION OF TANNINS FROM PLANT SOURCES

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ABSTRACT

Growing industrial demand for phytochemicals in regard to their rising commercial values, draws increasing attention to more effective extraction methods. Ultrasound-assisted extraction is a powerful alternative to conventional methods and offers several advantages such as effective applicability in varying matrices, higher extraction yields, reduced process times, lower water and energy demands and higher purity of extracts. Tannins are the second most abounding natural phenolic compounds that can be found in almost all plant sources and are considered to be a precious renewable aromatic resource as bio-based polymers. In this study, ultrasound-assisted extraction of tannins from plant sources and the parameters affecting extraction yield were examined.

Key words : ultrasound, extraction, phytochemical, tannin

**MICROBIOLOGICAL SAFETY AND QUALITY OF MOZZARELLA CHEESE,
PRODUCED BY TWO BUSINESS OPERATORS IN THE TIRANA CITY**

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ABSTRACT

Dairy products are an excellent growth medium for a wide range of microorganisms and, thus, display a reduced shelf life. The quality and safety of fresh cheese such as Mozzarella are strictly related to their microbial content. In particular, some microbiological parameters have to be checked for safety, such as *E. coli*, its concentrations are indicators of the hygienic state of the products and *Salmonella spp* and *Listeria monocytogenes* as safety indicators. In this study, these indicators were evaluated in 100 cheese samples Mozzarella, originating from 2 business operators in Tirana city. The study was conducted in the period 2013-2017. The results of the analytical test, based on Ordinance no 234/2014 "On approval of regulation on microbiological criteria on food" Commission Regulation (EC) 2073/2005, showed that 16/100 (16%) positive samples for *E. coli*, while for *Salmonella.spp* and *Listeria monocytogenes* no positive samples were found.

Key words : Mozzarella, *E. coli*, *Salmonella.spp*, *Listeria monocytogenes*, food safety

DETERMINATION OF HEAVY METALS IN MILK COLLECTED FROM SMALL FARMS IN THREE REGIONS OF ALBANIA

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ABSTRACT

In Albania, the issue of monitoring the quality and safety of food products remains an important concern. The aim of this research was to evaluate the possible contamination by heavy metals of milk from small farms in Lushnja, kavaja and Fieri Regions. A total of 120 milk samples were collected from 12 dairy farms (n = 10 per farm) and analyzed with AAS Thermo-SOLAAR for two heavy metals: Cd and Pb. The determination of these two chemical elements was performed in according with EC No 1881/2006. Each sample, homogenized and powdered, was mineralized in a microwave oven. Quantitative analyses of Cd and Pb were performed using an atomic absorption spectrophotometer with graphite furnace. The data of this study showed that two heavy metals (Pb and Cd) were below their respective MRLs in all analyzed samples. Despite the results described above, the possibility that milk and dairy products exceeding the standards for these indicators cannot be excluded. Since environmental pollution due to these metals increases every year, this can lead to the appearance of these contaminants in the dairy industry at some point.

Key words : Milk, pollution, heavy metals, food safety, Cd, Pb

**DETECTING FOOD FRAUD: THERMAL BEHAVIOUR OF VIRGIN OLIVE OILS
AND DIFFERENT EDIBLE OIL BLENDS**

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ABSTRACT

Crystallization properties of 9 different edible oils (refined canola, soy, hazelnut, cottonseed, high oleic sunflower, palm super olein, pomace and olive oils) as an adulterant into extra virgin olive oil with 3%, 5%, 10% and 25% ratio (v/v) were studied by using differential scanning calorimeter (DSC) in this research. The phase transitions were monitored by cooling and heating the samples between at -80oC - +30oC region. As a result of the statistical evaluation of the obtained data, 3% mixture of some oils can be determined by DSC, while oils which chemical composition is very similar to extra virgin olive oil could not be separated even at the level of 25%. On the other hand, while the T on temperature parameter in the exothermic region was statistically significant ($P<0.05$) in the separation of some vegetable oil sources. In addition, the mixture rates could be separated via ΔH difference.

Key words : Differential Scanning Calorimetry, Edible Oils, Adulteration, Olive Oil

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THE INFLUENCE OF TWO STARTER CULTURES ON THE COLOR AND SENSOR PROPERTIES OF MACEDONIAN TRADITIONAL SAUSAGE

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ABSTRACT

Sausages belong to the widest range of meat products available in a wide variety of species and with various commercial names. The aim of this paper is to monitor the influence of two starter cultures on the instrumental values for color and sensor properties of industrially produced *Macedonian traditional sausage*. The research covered three variants: Variant 1: Control variant (conventionally produced Macedonian traditional sausages using nitrite salt and powdered acerola); Variant 2: Macedonian traditional sausages where the basic formulation was enriched by addition of starter culture CS-300 (*Staphylococcus carnosus ssp. utilis* + *Staphylococcus carnosus*) in combination with Swiss chard powder and powdered acerola; Variant 3: Macedonian traditional sausages where the basic formulation was enriched by addition of starter cultures CS-300 (*Staphylococcus carnosus ssp. utilis* + *Staphylococcus carnosus*) and BLC-78 (*Pediococcus acidilactici* + *Staphylococcus carnosus*) in combination with Swiss chard powder and powdered acerola. The lightness of the color (L^*) continuously decreases in the control variant, resulting in a loss of color in the specified time interval. This phenomenon is not observed in the samples from variant 2 and variant 3. From the aspect of retaining the values for redness (a^*) and the yellowness (b^*), better effect showed the starter culture CS-300. Thus, the samples of this variant showed statistically significant ($p < 0.05$) better values for color saturation (C). On the other hand, according to the sensor analysis, the sausages from the variant 3 have statistically significant ($p < 0.05$) higher grades for weighted average (4.52) and percent of maximum possible quality (90.40%) at the 30th day of production. Even that the sausages from the variant 3 have higher grades from the sensor analysis, starter culture CS-300 is recommended, while better stability of the color is achieved during the storage period, as well as a good quality. At the same time a safe product is obtained where the use of nitrite salt is completely eliminated.

Key words : Macedonian traditional sausages, starter cultures

NON-NUTRITIVE SWEETENERS EFFECT AGAINST DIABETES AND WEIGHT MANAGEMENT

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ABSTRACT

Consumption of sugar sweetened beverage is one of its dietary causes, as sugar plays an important role in our daily life. Sucrose is highly metabolically active and result in weight gain and type-II diabetes. These side effects make companies to launch various synthetic sweetening agents known as alternative sweeteners or non-nutritive sweeteners. NNSs are ubiquitous and widely used every day in a variety of food, dietary products and beverages. Most NNSs are not metabolized by the body so, they do not contribute any energy or very low calories, so especially advantageous for person are diets requiring calorie restriction (diabetes or overweight). Six of these agents e.g. aspartame, saccharine, neotame, acesulfame-K, sucralose and Stevia have previously received a generally recognized as safe status and approved by FDA. These are claimed to promote weight loss and avoiding other problems associated with excessive caloric intake and also deemed safe for consumption by diabetes and help them achieving good glycemic control. Glycosides present in them like stevia sides in Stevia which is extracted from natural source have anti-hyperglycemic, anti-oxidant, and anti-hyperglycemic effects. These also help preventing tooth decay. NNSs are efficacious weight management strategy and good for diabetes are may provide very low calories and much sweeter than table sugar Thus, satisfying sweet cravings is their major advantage. Recommendations about alternative sweaters used should be tailored to the specific dietary and lifestyle patterns as each of the available sweaters has certain advantages and disadvantageous in case of long term usage.

Key words : Diabetes, glycemic control, calorie restriction, non-nutritive sweeteners, glycosides

**MICROBIAL AND PHYSICOCHEMICAL PROPERTIES OF KOMBUCHA
FERMENTATION AND ALTERNATE SUBSTRATE SOURCES: A REVIEW**

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ABSTRACT

Kombucha tea is an alcohol-free, low-acid beverage that is increasingly popular among traditional fermented foods, fermented by the symbiotic culture of yeast and acetic acid bacteria. Kombucha culture is known as tea fungus and it produces microbial cellulose. Acetic acid, glucuronic and gluconic acids are main metabolites that are produced other than microbial cellulose as a result of the fermentation. Because kombucha is a fermented beverage, it has many functional features which contain various phenolic and antioxidant substances, as well as having probiotic and antimicrobial properties. Black tea is generally used as a substrate in the production of traditional kombucha tea. However, in the literature, use of different substrates are available, such as green tea, coconut, oolong tea, peppermint, lemon herb, milk, mulberry leaf, soy and cherry juice. It is stated that biochemical and therapeutic properties of the produced beverage change, according to the type and amount of substrate used in fermentation, carbon source and rate, fermentation time, culture composition. In this review, it is aimed to investigate the kombucha tea fermentation process, the substrates used, the dominant microflora and the metabolites produced.

Key words : Kombucha, Tea fungus, Microbiology, Fermented foods

CONSUMER PERCEPTION OF FRESH MEAT QUALITY IN TIRANA

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ABSTRACT

The quality of meat products differs from intrinsic and extrinsic indications so that it can be establish in accordance with preferences of consumer. This survey examines the consumer confidence, attitude and behavior towards the quality of fresh meat in Tirana. The source of information and data were collected from a detailed questionnaire using random interviews 367 persons in different areas in the city of Tirana. Chi squared or Fisher's exact tests was utilized to analyzed relationships between two categorical variables. A significant relationship between education, income and frequency of meat consumption was observed. Place of origin (51.6%) was the most extrinsic factor that consumer prefer more while colour (49.2%) was the most important intrinsic cues. The quality of meat products differs from intrinsic and extrinsic indications so that it can be establish in accordance with preferences of consumer. This survey examines the consumer confidence, attitude and behavior towards the quality of fresh meat in Tirana. The source of information and data were collected from a detailed questionnaire using random interviews 367 persons in different areas in the city of Tirana. Chi squared or Fisher's exact tests was utilized to analyzed relationships between two categorical variables. A significant relationship between education, income and frequency of meat consumption was observed. Place of origin (51.6%) was the most extrinsic factor that consumer prefer more while colour (49.2%) was the most important intrinsic cues.

Key words : Keywords: meat quality; Tirana consumers' perception; survey

A COMPARATIVE STUDY OF BIOACTIVE COMPOUNDS OF “ROSEMARINUS OFFICINALIS L” EXTRACTED BY ULTRASOUND, MICROWAVE AND MACERATION, AND THEIR EFFECTS ON PREVENTING SOYBEAN OIL DURING FRYING.

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ABSTRACT

There is a trend toward the use of natural antioxidant molecules because of the toxic effects of synthetic antioxidants (1,2). The current study aims to extract rosemary polyphenols and evaluate the effects of their addition on the stability of soybean oil as natural antioxidants. The highest extraction yield of total phenolic content (TPC) (10.71%±0.03) was obtained by microwave assisted extraction (MAE), at a shorter time (5 min), compared to ultrasound-assisted extraction (UAE): (10.09%±0.03) and extraction by maceration (CME): (8.98%±0.09) for 1 hour. The polyphenols extracted by MAE had the highest anti-radical capacity against DPPH° (IC50=0.218 ± 0.01 mg/ml) compared to UAE (IC50=0.402± 0.02 mg/ml) and CME (IC50=3.702 ± 0.003 mg/ml) respectively. The best power reduction activity was also provided by the EMO technique (A= 0.158±0 .01) compared to the other methods: UAE (0.3± 0.004) and EMC (0.4± 0.12) respectively. In this study a second level Box-Behnken design was used to evaluate the combined effect of two independent variables: ratio and time, which are coded as X1 (extract concentration: ppm) and X2 (time: min) respectively, in the enrichment of soybean oil. The optimal conditions used in this study are: 75 ppm and extraction time of 10 min. In addition, the radical scavenging activity of the treated oil (DPPH° test) and its stability against lipid autoxidation (heating test and Rancimat) confirmed its enrichment in antioxidants. Indeed, the incorporation of TPC improved the stability of the oil from 4 h to 9 h of heating at 180°C, the induction time from 10 h to 14.65 h. The anti-radical test of the oils indicated that the ability to trap the DPPH° radical by the enriched soybean oil is much greater (77.92 ± 1.38%) than crude soybean oil (23.56± 0.78%). Evaluation of the sensory properties of soybean oils (with or without TPC) revealed that mayonnaise prepared with enriched soybean oil is highly appreciated, but for fries the difference is not significant. Rosemary polyphenols could be recommended as an alternative antioxidant.

Key words : Microwave extraction, Rosemary, Soybean oil, Antioxidants activities, Rancimat

PROFILE OF FREE FATTY ACIDS IN YOGHURTS MANUFACTURED ON THE BASIS OF ORGANIC COW MILK

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ABSTRACT

The dynamic increased interest in organic food results from the increase in the supply of naturally produced food and the possibility of carrying out more and more extensive research on the functionality of BIO products, taking into account the impact on health. Due to their high quality and proven health-promoting properties, fermented milk products from organic production have gained greater importance among consumers in the recent years. Organic milk yoghurts have a better fatty acid profile than conventional yoghurts. The specific and complex composition of fatty acids contained in milk fat allows for its perfect absorption, making it the best edible fat. Lipid fraction also includes a small portion of fatty acids which are not esterified in triglycerides. They are freely dispersed chiefly in the milk fat phase and slightly in the milk water phase, and they are termed free fatty acids (FFAs). The usual FFA content in milk fat is 0.5-1.2 mmol/100 g. However, raw milk quality or type of heat treatment determine FFA content in dairy products. The aim of the study was to determine the profile of free fatty acids in yoghurts manufactured on the basis of organic cow milk. The milk for yoghurt production was obtained from the certified organic farm located in southern Poland (mountainous areas). Yogurts were produced by the water bath method (the thermostatic method). Milk was heat-treated at 85°C for 30 min. Next it was cooled to 37°C and inoculated with the thermophilic yogurt cultures, i.e. FD-DVS YC-380 Yo-Flex (Chr. Hansen, Denmark) mixed strain culture containing *Streptococcus thermophilus* and *Lactobacillus delbrueckii* ssp. *bulgaricus*. Fatty acid methyl esters (FAME) were prepared in order to determine the amount of free fatty acids in the fresh prepared yoghurts. For this purpose, the gas chromatograph (Shimadzu GC2010, Japan) interfaced with a quadrupole mass spectrometer and autosampler was used. The following groups of free fatty acids were determined: SCFFA – short chain free fatty acids (C4-C8), MCFFA – medium chain free fatty acids (C10-C14), LCFFA – long chain free fatty acids (C15-C24), SFFA – saturated free fatty acids, UFFA – unsaturated free fatty acids, MUFFA – monounsaturated free fatty acids, PUFFA – polyunsaturated free fatty acids, and all FFA. All FFA in the analyzed organic yoghurts accounted for 0.440 g/100 g fat. It was stated that long chain free fatty acids (C15-C24) were the most dominant (0.317 g/100 g fat), and in particular palmitic (C16:0) and oleic (C18:1n9c) acids. Content of UFFA (0.151 g/100 g fat) was two times smaller than SFFA (0.303 g/100 g fat). Further research is needed to gain detail information about the typical characteristic of yoghurts, especially with regard to free fatty acids. *This research was funded by the Ministry of Science and Higher Education as part of the “Regional Initiative of Excellence” program for 2019-2022, project number 029/RID/2018/19.

Key words : cow's milk, yoghurt, organic production, fat profile

INVESTIGATION OF EFFECTS GLUCOSE, FRUCTOSE, GLYOXAL (GO) AND METHYLGLYOXAL (MGO) IN SOME PROCESSED FOODS

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ABSTRACT

Modern processing methods have increased dramatically over the past 30 years. These changes in the diet are associated with an increased exposure to advanced glycation endproducts (AGEs), which are compounds formed in food during heating and storage (Poulsen et al., 2013). Food process methods bring about oxidation of protein, oxidation of lipid, glycolytic and polyol pathway in human metabolism resulting most potent precursors dicarbonyls products such as glyoxal (GO) and methylglyoxal (MGO) (Luevano et al., 2010). Especially, sugars from our diet, including glucose and fructose, combine with endogenous proteins non-enzymatically and form advanced glycation end products (AGEs). These products unwanted on human body because AGEs produce reactive oxygen species, leading to inflammation and cellular damage. In addition, amount of GO and MGO are linked with some disease such as Alzheimer's disease, Parkinson's disease, MS even MGO amount using as a marker in plasma person who diabetes. When the GO and MGO levels were compared between the healthy individuals and diabetic patients, the GO and MGO levels were found 4-fold and 14-fold high in diabetic patients, respectively. In this study focus on fruit-based sugar containing products, its effect of levels of GO and MGO. Because of that higher correlation was reported between the level of GO and MGO with glucose and fructose than sucrose (Amrein et al., 2006). Further studies are needed to support these results.

Key words : glucose, fructose, glyoxal, methylglyoxal, processed foods, HPLC

RECENT TRENDS IN TABLE OLIVE PROCESSING

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ABSTRACT

Table olives have great economic importance especially for the Mediterranean countries and other olive-producing areas because of high production and consumption rates. Olive fruit cannot be consumed directly, because of its bitter taste, caused by the bitter glucoside oleuropein. A series of debittering processes are applied to raw olive fruits to make them edible. There are several trade preparations for table olives such as alkali treated olives, natural olives, dehydrated/shrivelled olives and olives darkened by oxidation. The quickest and the most widespread preparation technique is the treatment of raw fruits with dilute alkali solutions. But recently, there is an increasing consumer demand for natural products and processing methods, due to the negative impacts of chemicals on human health and environment. The most popular and chemical-free olive types are natural black olives and dehydrated black olives. Natural black olives are obtained, by placing fruits directly in brine, in which they undergo spontaneous or induced fermentation. On the other hand, dehydrated black olives are generally obtained by partial dehydration in coarse salt. Nevertheless, the duration of debittering is quite longer and sodium content of the final products is significantly higher in natural processes in comparison with the alkali treated ones. To overcome the disadvantages of both chemical and natural methods, recent research studies are focused on chemical-free alternative methods which reduce the sodium content and shorten the debittering process. In this context, new approaches such as the use of other chlorine salts, enzyme applications, and ultrasound, vacuum and drying treatments are on the agenda of investigators. The aim of this study is to display the mechanism of olive debittering, and discuss the contribution and possible uses of these new techniques.

Key words : debittering, alternative methods, chemical-free

SEARCH OF SALMONELLA SPP IN CHEESE AND MILK OF BOVINE ORIGIN

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ABSTRACT

Dairy products can be a source of food poisoning. Contamination of milk can occur either directly on the farm during mammary pathologies, or during processing at the plant level. In the present investigation we studied the risk of food poisoning with *Salmonella spp* through the consumption of dairy products. For this, we conducted a microbiological analysis of 100 samples of mastitis milk (including 58 clinical mastitis and 42 sub-clinical mastitis) and 80 samples of soft cheese. The results showed the absence of *Salmonella spp*. in all the milk and soft cheese samples analyzed, which leads us to conclude that there is a low risk of human contamination when consuming these dairy products.

Key words : *Salmonella spp*, mastitis milk, soft cheese, food poisoning.

DETERMINATION OF THE ENCAPSULATION EFFECTIVENESS OF L. PARACASEI PROBIOTIC BACTERIA

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ABSTRACT

The quality of commercial probiotic products marketed as functional food, dietary supplements and medicines is an important consideration. Although there are many scientific studies about the specific clinical benefits of probiotic microorganisms, legal regulations are needed at the stage of production. Within the scope of the study, it is aimed to provide composition optimization of encapsulation coating agents (peeling alginate, inulin and chitosan) of *Lactobacillus paracasei* bacteria using a lyophilizer. The experiments in the study were designed according to the response surface method (RSM), sodium alginate (1-5%), inulin (1-7%), chitosan (0.5-2%) and calcium carbonate (0.5-1.5). four-factor central unified design model was created by selecting the quantities as independent variables. After determining the effect of bacteria with applied encapsulation technique on heat tolerance, pH tolerance, color, variance analyzes were made by modeling the data. According to the results obtained, it was determined that the encapsulated bacteria produced by using the formulations obtained as a result of the optimization performed in the pH tolerance test values maintain their vitality compared to the non-encapsulated bacteria after standing at pH 2 for 90 minutes. The inclusion results showed that the addition of prebiotic to the walls of probiotic microcapsules provides improved protection for active organisms. The authors thank to the Amasya University Scientific Research Project for financial support (Project No: FMB-BAP 19-0425).

Key words : *Lactobacillus paracasei*, Encapsulation, Sodium Alginate, Inulin, Chitosan

CHARACTERIZATION THE ANTIOXIDANT POTENTIAL OF MILK FROM DIFFERENT SPECIES OF FARM ANIMALS

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ABSTRACT

Today's consumers of food products focus not only on their nutritional value and flavour, but also on their health-promoting properties, which play a key role in human health. Consumption of products which are natural sources of bioactive substances improves the body's antioxidant status and reduces the risk of diseases of civilization, such as cardiovascular disease, diabetes, and cancer. It also raises the body's immunity to infections. Sources of bioactive substances, including those with antioxidant properties, include milk and dairy products. The aim of this study was to compare the composition of milk obtained from various species of farm animals in terms of content of antioxidant substances. Milk contains a number of biologically active substances, from both the lipid fraction (fatty acids, fat-soluble vitamins A, D3, E, K, and β -carotene, phospholipids, and sphingomyelins) and the aqueous protein fraction (casein, whey proteins, peptides, amino acids, water-soluble vitamins, and minerals). One of the most important antioxidants in milk is vitamin E, particularly its active form α -tocopherol. Its effect consists in scavenging of organic free radicals as well as termination of lipid peroxidation and quenching of singlet oxygen. Beta-carotene (provitamin A) exerts a similar effect, as it quenches singlet oxygen and interacts with organic peroxides generated in lipid peroxidation. Goat and sheep milk has higher content of these vitamins than cow milk. High antioxidant activity is also exhibited by whey proteins, which make up 20-25% of the total protein in cow milk, including albumins (α -lactalbumin and β -lactoglobulin) and lactoferrin. This is due to the presence of sulphur-containing amino acids, mainly cysteine, which is essential for synthesis of glutathione, one of the most important antioxidants in the human body. Goat and buffalo milk is the most similar to cow milk in terms of the structure of the protein fraction. Sheep milk has higher content of whey proteins. In donkey and horse milk, whey proteins account for more than 50% of total protein [Barłowska et al., 2011]. Donkey milk also has high content of polyunsaturated fatty acids such as C18:2 and C18:3, believed to have numerous health-promoting properties. Camel milk also exhibits valuable properties, due to its high content of antibacterial substances and vitamin C content 30 times that of cow milk [Haddadin et al., 2008]. Vitamin C performs a very important antioxidant function, is a strong inhibitor of lipid peroxidation, and promotes regeneration of vitamin E. Milk obtained from various animal species contains a rich complex of antioxidants. Antioxidants are present in both the aqueous protein phase and the lipid phase. They support the body in combating free radicals and protect against degenerative changes and the development of cancer cells. Importantly, antioxidants of the hydrophilic and lipophilic environment act synergistically, enhancing their effects in the body.

Key words : Antioxidant potential, fat fraction, milk, protein, vitamins.

SEX EFFECT ON PHYSIC-CHEMICAL CHARACTERIZATION OF RABBIT MEAT QUALITY OF THE LOCAL ALGERIAN BREED

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ABSTRACT

The objective of this research is to study the effect of sex factor on rabbit meat quality of local Algerian breed of rabbits by measuring some major physic-chemical parameters involved in defining the final meat quality. Ten rabbits (5/5) of different sex were used for the extraction of Longissimus dorsi (LD) muscle, in order to use it for the analysis of the physic-chemical parameters namely: pH, water holding capacity, percentage of released water, and cooking losses percentage. The main results of our study have shown that the sex factor does not have an effect on pH and water holding capacity; however, this factor affects significantly percentage of released water, and cooking losses percentage at the 5% threshold. The results obtained from this study confirm the data presented in the literature and field studies concerning the significant effect of the sex factor on the quality and tenderness of rabbit meat.

Key words : Rabbit meat, local Algerian breed, pH, sex

BIOACTIVE COMPONENTS OF SPIRULINA PLATENSIS AND THEIR USE IN FOODS

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ABSTRACT

Spirulina platensis is a symbiotic, multicellular, filamentous, blue green algae belonging to the Oscillatoriaceae family. It is a rich source of nutraceutical food, thanks to its high content of amino acids, polyunsaturated fatty acids, polysaccharides, phytochemicals and vitamins. *S. platensis*, which has been consumed as food by Mexicans for more than a thousand years in the world, is also used in the production of protein-rich and low-calorie food in the food industry, which is functional in the food industry, in the production of phycocyanin, which is in the composition of the natural colorant called “lina blue”. *Spirulina platensis* plays an important role in removing heavy metals such as cadmium, copper, lead and nickel with its large surface area, high binding affinity and simple nutritional requirements. It is widely used as an animal feed in aquaculture as a feed ingredient and in poultry breeding. Meat production is proposed as the source of methane gas, which plays an important role in climate change caused by greenhouse gases in the world. It is recommended to use the reported *Spirulina platensis* (60-70% on a dry basis), which is a harmless protein source, instead of red meat, which is consumed as a source of protein in nutrition. In recent years, protein hydrolysates such as alkalase, pepsin, papain, trypsin, protamex, protease K and peptides obtained using *Spirulina platensis* have been reported in studies showing that they exhibit antioxidative, antibacterial, antihypertensive, antitumor, antiproliferative, anticancer, antidiabetic, antiviral and iron chelating properties.

Key words : *Spirulina platensis*, natural color, protein source, bioactive ingredient, nutraceutical food

GENETIC DIVERSITY ANALYSIS OF SEVERAL PEPPER (*CAPSICUM ANNUUM* L.) VARIETIES CULTIVATED IN ROMANIA USING ISSR AND RAPD MARKERS

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ABSTRACT

Numerous varieties of *Capsicum annuum* L. with multiple valuable traits, such as adaptation to biotic and abiotic stress factors, can be found in south-east Romania, the Buzău region, well known for vegetable cultivation and an important area of biodiversity conservation. However, there is no data at molecular level on the local genetic diversity and conservation status. To obtain useful information toward a sustainable agriculture, management and conservation of local pepper varieties, we analysed the structure, diversity and genetic relationships of seven local *C. annuum* varieties with major importance, using ISSR and RAPD molecular markers. Preliminary results indicated that varieties under study consisted of several genetic groups, based on autochthonous varieties. The level of genetic diversity detected by ISSR and RAPD markers revealed a high level of polymorphism and demonstrated the the structure and genetic differentiation of local pepper varieties. These analyses have proved that *C. annuum* local varieties from south-east Romania constitute a valuable genetic resource that can be used in genetic improvement and conservation programs.

Key words : *Capsicum annuum* L., genetic analysis, ISSR, RAPD, south-east Romania

**STUDY OF MATHEMATICAL MODELS WITH TWO, THREE AND FOUR
CONSTANT OF RHEOLOGICAL PROPERTIES AGAINST TEMPERATURE, FOR
ALBANIAN RED WINES**

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ABSTRACT

In the first phase, several physicochemical and sensory properties of red wines available in Albanian market were investigated, which can be used as a way of characterizing the wine quality. The density, total and volatile acidity, alcohol content, reduced sugars, free and total SO₂, pH and polyphenol index following the analytical methods described in Albanian standard were determined. The limit values of physicochemical properties in red wines comply with the national law of the Albanian Food Law and EU Food legislation. The results indicated that all the samples possess good quality of sensory properties. In the second phase, in order to describe the temperature dependence of the dynamic viscosity of commercial red wines, was performed the experimental data fitting to mathematical models with two, three and four constant. The mean absolute percentage error, which indicates the deviance of the observed values from the theoretical ones, was calculated. Firstly, it was experimentally seen that the dynamic viscosity decreases with the temperature increment. Secondly, the mathematical model chosen to represent this behaviour was highly effective with mean absolute percentage errors below 10%.

Key words : red wine, quality, mathematical model

AUTHENTICITY AND QUALITY OF INDUSTRIALLY AND CONVENTIONALLY PRODUCED MOLASSES DETERMINED USING CARBON ISOTOPE ($\delta^{13}C$) RATIOS AND 5-HYDROXYMETHYL FURFURAL (HMF) LEVELS

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ABSTRACT

Molasses (pekmez) that is produced by applying heat treatment to fruits, is an important food product in old Anatolian culture. According to the duration and temperature of the heat treatment, 5-hydroxymethylfurfural (HMF) compound is formed in molasses which might pose health risk at high levels. In addition, HMF compound, which can occur as a product of the Maillard reactions even at low temperatures, is considered as a quality indicator in molasses. The addition of cane sugar or corn syrup and the mislabelling are common fraudulent practices in molasses markets. Therefore, carbon isotope ratio could be a useful indicator for authenticity testing of molasses. This study examined sixty-seven molasses of seven fruit type (grape, carob, mulberry, juniper, sugar beet, apple and pear) samples from Turkey. It was aimed to compare the HMF values of industrially and conventionally produced samples. Furthermore, carbon isotope ratio analysis was used to investigate the authenticity of samples. Carbon isotopic analyses of molasses showed that 51.6 % of industrially produced molasses and 61.1 % of conventionally produced samples tested were of questionable authenticity. Commercial molasses samples (n = 31) had $\delta^{13}C$ values and HMF levels that ranged from -24.90 to -11.42 ‰ and 0.08 to 643.04, respectively. In addition, conventionally produced samples (n = 36) had $\delta^{13}C$ values and HMF levels that ranged from -24.41 to -8.88 ‰ and 0.32 to 2243.72, respectively. The findings of this study show the common and prevalent issues of molasses authenticity, the mislabelling of fruit origin and quality according to stable carbon isotopes and HMF levels.

Key words : 5-hydroxymethylfurfural, molasses, authenticity, carbon isotope ratio

EFFECT OF WHEAT-BRAN SUPPLEMENTATION ON POST-PRANDIAL ACUTE GLYCEMIC RESPONSE AND QUALITY OF TRADITIONAL PASTA

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ABSTRACT

The World Health Organization claims that the consumption of diets containing minimum 25 g/day of dietary fibers reduces, for normal adults, the risk of coronary heart diseases, type 2 diabetes and improves weight maintenance. The aim of this study was to assess the effect of wheat bran incorporation into traditional pasta called 'Nwassers' on quality characteristics and post-prandial acute glycemia responses in healthy volunteers. Biochemical and technological properties of pasta were evaluated. The study design to evaluate the blood glucose was a randomized, single-blind, cross-over study. After overnight fasting, 10 recruited healthy subjects consumed traditional pasta enriched with no fibers (control), 3% (nutrition claim: source of fibers) or 6% (nutrition claim: rich in fibers) wheat bran. Blood samples were drawn before and 30, 45, 60, 90, 120 and 180 min after the 50 g- meals to determine blood glucose concentration. Area under curve (AUC) was calculated. The addition of 3% or 6% wheat bran into Nwassers has significantly changed pasta ash, protein, carbohydrates and fat contents and increased calorie values ($p < 0.05$). Technological characterization of bran-enriched pasta has pointed out a higher water absorption capacity, when compared to control ($p < 0.05$), but no significant changes were noticed for oil absorption capacity and swelling index. The optimal cooking time was significantly affected by bran supplementation. Moreover, significant variations in enriched pasta color were perceived: the values of the total color difference (ΔE) were respectively 3.030 for 3% and 6.086 for 6% so the difference can be noticed by an unexperienced observer. Interestingly, enrichment of traditional pasta with 6% of wheat bran has significantly ($p < 0.05$) reduced post-prandial blood glucose (AUC_{6%} 186.7 ± 5.6 g/L.min) of healthy subjects, when compared to control (AUC_{control} 198.7 ± 5.6 g/L.min), but not with 3% enriched pastas (AUC_{3%} 196.6 ± 6.6 g/L.min). In conclusion, the wheat-bran supplementation improves the quality of traditional pasta and offers a healthy alternative for the consumers.

Key words : Dietary fibers, Biochemical composition, Calorie Value, Technological parameters, Blood glucose response

THE INFLUENCE OF SOIL CHARACTERISTICS ON ALBANIAN MERLOT WINE

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ABSTRACT

In this article it is presented the study of soil characteristics impact on the wine quality extracted from grapes grown in these vineyards. The studied lands are located in the southern area of the Albanian territory, which are known for the production of the Merlot variety. The study lands are rural areas away from the impact of the industrial activity. As shown by many authors, the quality of grape products is significantly related to the physicochemical characteristics of the soil, its geographical location, and the conditions in which it grows. Furthermore, physicochemical analyses of red wine are important in establishing their quality and authenticity. In this context, attention is paid to the mechanical and physicochemical characteristics of soils such as: granulometry, pH, electrical conductivity, and the content of humus, nitrogen, phosphorus, potassium and carbonate. While the wine was determined by density, pH, total acidity, volatile acidity, ethyl alcohol content, free and total SO₂, and reducing sugars following standard methods of the Albanian Food Law. The experimental results showed that the soils were characterized by low alkalinity pH reaction and high content of the macro elements, especially phosphorus. Meanwhile the wines produced from Merlot grapes cultivated in these lands resulted in very good quality, with an optimal pH value and qualified with high alcohol content.

Key words : Merlot wine, soil characteristics, wine quality

PROPERTIES OF SUMAC PLANT AND ITS IMPORTANCE IN NUTRITION

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ABSTRACT

Sumac is the common name of the *Anacardiaceae* family, belonging to the *Rhus* genus, with more than 250 species of flowering plants, and the most known among these species is *Rhus coriaria*. When the general characteristics of the *Anacardiaceae* family are examined, it is seen that there are plants in the form of bush or shrub, which find themselves naturally distributed in temperate and warm climates. Sumac can also grow in areas that are not suitable for agriculture, and this shows the potential for commercialization of sumac plants without competing for land uses. Sumac, a natural source of bioactive compounds; It has significant potential with components that can be used in many different fields such as organic acids, fatty acids, amino acids, vitamins, minerals, anthocyanins, and phenolic acids. It also shows a strong antioxidant effect due to the phenolic compounds it contains, especially gallic acid and its derivatives. In the food industry, sumac (*Rhus coriaria* L.) is used as a spice and sumac sour to give aroma and flavor in many dishes. It is also considered a valuable raw material for the food industry due to its bioactive components. Today, increasing the usage areas of sumac plant in the food sector and knowing its contribution to human health are increasing the interest of consumers for sumac every day. In this review article, information is given about the properties of sumac plant and its importance in nutrition.

Key words : Sumac, *Rhus coriaria* L., Sumac plant, Importance in nutrition

PHYSICOCHEMICAL PROPERTIES OF SUMAC (*RHUS CORIARIA* L.) FRUIT

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ABSTRACT

In this study, some physicochemical properties of sumac fruits were investigated. Sumac plants grown naturally in Sazlıdere Village of Keşan district of Edirne were selected as research material. Free fatty acidity, peroxide number, fatty acid composition, amount of phenolic substance, antioxidant activity values, tocopherol content, and sterol compositions were determined in sumac fruits (dry matter and crude oil ratios) and after obtaining oils with solvent extraction. As a result of the analysis, the dry matter ratio and crude oil ratio of sumac fruit were found to be 96.17% and 24.58%, respectively. When the fatty acid compositions were examined, it was observed that the essential fatty acids of sumac fruit were oleic acid (43.43%), linoleic acid (30.34%) and palmitic acid (22.22%). Free fatty acidity, peroxide number, phenolic amount and antioxidant activity values were found to be 2.85%, 7.09 meqO₂/kg, 147.0 mgGAE/g oil and (EC₅₀) value 84.93 mg/ml, respectively. When the sterol and tocopherol compositions of sumac oil were examined, it was determined that the most abundant sterol was β-sitosterol (78.51%) and the most abundant tocopherol was α-tocopherol (374.24 mg/kg).

Key words : Sumac, Sumac oil, Physicochemical properties

COMPARATIVE STUDY OF PHYSICOCHEMICAL PROPERTIES AND FATTY-ACID PROFILES OF COMMERCIAL CHEESES IN NORTHERN MOROCCO

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ABSTRACT

In this study, the objective was to compare the differences in physicochemical properties, fatty acid profiles and establish data linkages of traditional cheeses made from goat, cow and their mixtures milk. For this purpose, seven traditional cheeses commercially available were obtained from dairy farms and open-air public markets in Tangier. These cheeses originated from different parts of Northern Morocco. Physical and chemical parameters such as pH, titratable acidity, total solids, ash content, and fat were assessed. Cheeses were also analyzed for fatty acid composition by Gas Chromatography (GC). Non-significant differences in pH and titratable acidity were detected between the different samples studied; the averages were about 4.07 and 3.44g/l respectively. Differences in the percentages of total solids, ash content and fat were showed between some samples. There was not a certain correlation between cheese milk origin (cow, goat, or mixtures) and the contents of ash and total solids; it seems that they are affected by the cheesemaking process. Regarding cheeses made with goat milk, peaks with notable percentages corresponded to palmitic acid (29.06%) followed by oleic acid (20.58%), stearic acid (11.71%), capric acid (11.12%) and myristic acid (10.79%) by means of average. For cow cheese, palmitic acid still the most abundant fatty acid but with a percentage of 35.41% followed by oleic acid (22.33%). Remarkable difference was noted in percentages of capric acid; it was less present in cheeses made with cow (3.55%) and mixtures of goat and cow (2.46%). Fatty acids have multiple nutritional properties and play an important role in the determination of the flavor, color and the texture of cheeses. From our results, it was concluded that they are dependent of milk type; hence, analyzing fatty acid profile could be a key tool to distinguish milk origins allowing prevention and deter of fraudulent commercial practices.

Key words : Traditional cheese, physicochemical parameters, fatty acid profile, Gas Chromatography

PHYTOESTROGENS AND THE IMPORTANCE OF PHYTOESTROGENS AS FUNCTIONAL FOOD INGREDIENTS

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ABSTRACT

Depending on today's living and working conditions, consumers have focused on the efforts to protect or improve their health status, especially due to intense work pace and increased stress level. Consequently, awareness and demand for functional food is increasing day by day. Functional foods are defined as food or components of it that provide important health benefits on human metabolism and physiology, protect the individual against diseases or contribute to its recovery, as well as it contains the basic nutrients that the body needs. These foods can be obtained by applying various technological or enrichment methods, as well as in the natural form of food. Foods can be made functional by adding various functional food ingredients. Food supplements produced for this purpose are also available on the market. Many plants have positive effects on human health due to the functional food components they contain. For this reason, studies on functional food components are increasing day by day. The most studied functional food ingredients are phenolic substances, antioxidants, dietary fibers, oligosaccharides, probiotics, prebiotics, vitamins, polyunsaturated fatty acids, sulfur-containing components, phytosterols and phytoestrogens. One of the plant-derived phenolic compounds is phytoestrogens. Also, phytoestrogens are in the class of naturally occurring esterogens. They have antioxidant properties as they ensure the protection of DNA by binding metals with the hydroxyl group in their structure. In addition, they can change the effectiveness of some enzymes that play a role in body estrogen metabolism. These components are important because of their positive effects on some types of cancer, heart disease, menopausal symptoms, and treatment of osteoporosis. In this review, the structure of the phytoestrogens as a functional food component, its types, general effects on health, the foods it contains, its bioavailability, the effects of food processing methods on these components and analysis methods are examined.

Key words : Phytoestrogens, functional food, health.

TECHNOLOGICAL AND FUNCTIONAL FEATURES OF SOME LACTOBACILLUS SP. AND LACTOCOCCUS SP. STRAINS

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ABSTRACT

The aim of this study is to determine the exopolysaccharide (eps) production ability, antimicrobial activity and resistance of gastric and intestinal media of some lactic acid bacteria strains which isolated from Tarhana. It is a food obtained by drying and grinding the dough fermented after fermenting the dough kneaded with wheat flour, yogurt, pepper, salt, onion, tomato and herbal ingredients. In this study, it was determined that three of the strains EPS-producing belonged to *Lactobacillus plantarum* species, one belonged to *Lactococcus brevis* species and one belonged to *Lactococcus lactis* species. Some features (such as rheological properties) of the eps produced by these strains were examined. On the other hand, the resistances of gastric and intestinal media of these strains, and the antimicrobial activities of them against some pathogenic strains (*Bacillus cereus* (NRRL-B 209), *Escherichia coli* (ATCC 25922), *Candida albicans* (ATCC 10131), *Saccharomyces cerevisiae* *Staphylococcus aureus* (ATCC 33862), *Listeria monocytogenes* (ATCC 7644)) were tested. In addition, pH, temperature and salt resistances of the strains were investigated for their technological properties. With this study, the results have been presented so that the strains examined can be used in various areas.

Key words : Exopolysaccharide, Antimicrobial, Gastric and Intestinal Media, Lactobacillus spp. Lactococcus spp.

POSSIBLE EFFECT OF NUTRITION ON COVID-19 OR OTHER VIRAL INFECTIONS

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ABSTRACT

Although there are no foods to prevent or treat the coronavirus alone; it has been proven that a healthy and balanced nutrition is crucial for health, particularly in times when the immune system might need to fight back. The current review aim to reveal the possible effect of food systems on viruses, which have a significant effect on the immune system. It provides insights about the properties of bioactive ingredients of foods and herbs for the support of the human immune system against infections. We aim to review the evidence surrounding the role of dietary protein, omega-3 fatty acids, vitamin A, vitamin D, vitamin E, vitamin B1, vitamin B6, vitamin B12, vitamin C, iron, zinc, and selenium as a possible adjuvant in the management of patients with SARS-CoV-2 infection. In addition to revisiting the hidden potential of traditional remedies including functional foods, antioxidant, and antiviral herbs. This review discusses the relationship between intestinal microbiota, using of prebiotics to enhance propagation of probiotic strains and indigenous beneficial microbes and weaken viral replication, assisting in the treatment of COVID-19. Finally, further studies are needed to clarify the role that a balanced diet which supplementing with appropriate nutrients, functional foods, antioxidants and antiviral herbs play in the prevention and in treatment of viral infections

Key words : COVID-19, Viral Infections, Nutrition, Functional Food, Natural Nutritional Supplement

PHOTOCHEMICAL COMPOUNDS BETWEEN GUT MICROBIOTA, CANCER AND PHYSIOLOGICAL DYSFUNCTION.

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ABSTRACT

Gut microbiota mainly dominated by bacteria attribute to the divisions *Bacteroidetes* and *Firmicutes*, plays an important role in host physiology and influences several relevant functions. Bacteria diversity in gut microbiota is driven by dietary factors and influences metabolic and immune functions of the host's physiology. Imbalance in the gut microbiota, named dysbiosis, can lead to the development of various diseases, such as cancer and even psychological dysfunction. Therefore, Gut microbiota is an appropriate target for nutritional interventions to improve health. These facts motivate us to highlight the influence of phytochemicals on gut microbiota and look for an alternative treatment of inflammatory diseases by using nutritional supplements. Among dietaries phytochemicals elements we found several chemical compounds such as polyphenols and their derivatives, carotenoids, and thiosulfates. Polyphenols as the largest group can gather four main groups: flavonoids, phenolic acids, stilbenoids, and lignans. These compounds, which constitute a natural reservoir, have proved their efficiency as antioxidant and anti-inflammatory molecules. From this point, we may classify these compounds as an alternative molecule to treat or prevent the development of cancer or even psychological dysfunction.

Key words : Gut microbiota; dietaries phytochemicals; polyphenols; cancer; inflammatory; psychological dysfunction.

**HISTOLOGICAL STUDY OF CALLOGENESIS IN CICER ARIETINUM AND
SEARCH FOR GENOTYPES RESISTANT TO ASCOCHYTA RABIEI**

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ABSTRACT

The chickpea *Cicer arietinum* is one of the leguminous most appreciated by consumers in the Mediterranean basin. It is a very important source of protein to balance the diet of the poorest populations. Nevertheless, its crop yields are still very limited, which is due to the existence of several biotic and abiotic stresses, the main one being *Ascochyta rabiei*, the causal agent of anthracnosis. Traditional breeding methods have proved to be ineffective, hence the need to resort to biotechnological methods. This work is part of this approach. In a first place, a study is undertaken to determine the callogenicity of stem and leaflet explants from 3 genotypes of chickpea, FLIP 84-92 C, ILC 32-97, ILC 263, cultured on Murashige and skoog (MS) medium with different hormonal balances of auxin (IAA, 2,4-D) and cytokinin (kinetin). A very satisfactory callogenesis was recorded in the different explants of all the genotypes studied on MS3 medium: (2mg AIA / 2mg kinetin). We used in a second place, a pathosystem of *Cicer arietinum* callus/*Ascochyta rabiei*. The follow-up of this interaction by a histological approach revealed the presence of the pathogen's fruiting bodies in callus tissues of genotypes ILC 32-97 and ILC 263. The latter showed a high sensitivity to the pathogen with an abundance of pycnidia in the tissues. This study resulted in the selection of a FLIP 84-92 C resistant genotype against *Ascochyta rabiei*, where histological sections showed a total absence of inter and intracellular fruiting bodies of the pathogen.

Key words : *Ascochyta rabiei*; hormone balance; callogenesis; *Cicer arietinum*; histology

**PRODUCTION OF A PROTEIN CONCENTRATE FROM HAZELNUT MEAL
OBTAINED AS A HAZELNUT OIL INDUSTRY BY-PRODUCT AND ITS
APPLICATION IN A FUNCTIONAL BEVERAGE**

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ABSTRACT

Hazelnut meal, obtained after pressing and extraction of hazelnuts for oil production, is generally being used as a feed ingredient. However, its high nutritional value makes it a potential raw material for food applications. This study aimed to extract protein from hazelnut meal, to evaluate its functional properties, and to apply it in a functional beverage. Hazelnut meal protein (HMP) was extracted by isoelectric precipitation. HMP with 86.8% protein was obtained. Essential amino acid concentration (36.65%) of HMP was considerably higher than many plant-based proteins. Moreover, branched-chain amino acids concentration composed of 12.33% of total protein. Water and oil absorption capacities of HMP was 2.21 ± 0.03 (g water/g protein) and 4.85 ± 0.28 (mL oil/g protein), respectively. Functional beverages with 2% and 4% of HMP were produced and compared to a reference beverage in terms of physicochemical and sensory properties. All physicochemical properties investigated significantly differed except turbidity and viscosity. Sensory evaluation revealed that overall acceptability of the formulations was comparable to each other and that both HMP beverages were preferred by the panelists. Results suggested that hazelnut meal can be a protein source for functional foods and partially replace the existing sources in a more environmentally friendly, cheap and sustainable manner.

Key words : Hazelnut meal ; Waste utilization; Protein extraction; Functional food; Sensory analysis

EVALUATION OF ABAMECTIN AND IMIDACLOPRID FOR PROPHYLACTIC AND CURATIVE CONTROL OF (*CALLOSBRUCHUS MACULATUS* (F.) INFESTING STORED COWPEA (*VIGNA UNGUICULATA* L. (WALP.))

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ABSTRACT

Cowpea (*Vigna unguiculata* L. (Walp.)) is an important grain legume and the bruchid *Callosobruchus maculatus* (F.) is the major pest of stored cowpea in West Africa. Laboratory studies were conducted under uncontrolled conditions (27 – 32°C and 56 - 63% r.h.) to evaluate the insecticidal efficacy of abamectin and imidacloprid against this pest. Abamectin and imidacloprid were tested as dose rates of 1, 2, 3, 4 and 2, 4, 6, 8, 10 mg (a.i.)/kg of grain, respectively. Untreated grain served as control. Experimental unit consisted of 50 g grain samples infested with 20 mixed-sex adults of *C. maculatus*. Grains were either treated and then infested (prophylactic treatment test) or infested and then treated (curative treatment test). Results showed that in both tests abamectin was more effective than imidacloprid. In the prophylactic treatment test, abamectin caused 100% adult mortality after 72 h of exposure to grains treated at 4 mg/kg, while imidacloprid which induced same level of adult mortality after 96 h of exposure to grains treated at 10 mg/kg. Similarly, number of progeny, percentage seed damage and weight losses were higher in imidacloprid treated than abamectin treated grains. At the dose rates tested, both insecticides showed higher effectiveness for prophylactic than curative control of *C. maculatus*.

Key words : Abamectin, Imidacloprid, Stored cowpea, *Callosobruchus maculatus*, control

COMPARISON OF DIFFERENT METHODS USED TO OBTAIN CHERRY KERNEL OIL

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ABSTRACT

Sour cherries are among the most widely produced fruits in our country and in the world. In addition to being consumed fresh, it is also consumed as processed products such as frozen sour cherry, canned food and fruit juice. However, in the course of processing of sour cherries, large amounts of cherry seeds are separated as waste. Cherry kernels are among the wastes that should be evaluated because they are rich in phenolic substances and antioxidants and have high oil content. Sour cherry seeds which rich in unsaturated fatty acids, are an important source of oil with 32-36% oil content. Generally used methods to obtain these oils are mechanical press method and solvent extraction. While the yield obtained by mechanical pressing method is relatively low, solvent extraction causes environmental pollution and organic solvent residues in oil. For this reason, interest in developing alternative and different methods to these methods has increased in recent years. In this review, comparison of different methods used to extract oil from cherry kernel will be examined.

Key words : Sour cherry, oil extraction, solvent extraction, mechanic press

EFFECTS OF SOYBEANS POWDER ON ENHANCING NUTRITIONAL VALUES OF A FISH SHAPED BREAD

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ABSTRACT

Life is the most precious God given asset which everybody globally cares the most. Daily breakfast consumption is a routine way of keeping our body healthy. Having said this, bread particularly made from wheat flour is daily used over breakfast globally. Therefore, new technologies enhancing nutritional values of bread is required in order to support the measures of malnutrition prevention in every moities of the World. It is in this regard, this study aimed at determining the effect of soybeans powder on enhancing nutritional values of the fish shaped bread, which is a Korean unique product. The study was conducted at food science and technology laboratory of University of Rwanda and designed in triplicates following completely randomized design. The treatments used for this study were: 0% of soy beans powder, 10g of red bean paste and 100% wheat flour (Treatment 1), 5% of soy beans powder, 10g of red bean paste and 95% wheat flour (Treatment 2), 10% of soy beans powder, 10g of red bean paste and 90% wheat flour (Treatment 3) and 15% of soy beans powder, 10g of red bean paste and 85% wheat flour (Treatment 4). Results of the study indicated that while fat content experienced a downward trend, soybeans powder incorporated into the fish shaped bread substantially enhanced nutritional values of the fish shaped bread (dry matter, Calcium, Iron, Magnesium, Phosphorous, crude protein, total soluble sugar content and fat content). We concluded that soybeans powder deserves to be incorporated into fish shaped bread for improving nutritional values in order to take care of our body by consuming a breakfast using nutrient loaded fish shaped bread.

Key words : soybeans powder, fish shaped bread and nutritional value

EFFECTS OF SOYBEANS POWDER ON SENSORY PROPERTIES OF A FISH SHAPED BREAD

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ABSTRACT

Bread is one of the important aspects of every breakfast globally. Physical appearance, sweetness, texture and smell (aroma) are key factors attracting people buying bread. Fish shaped bread is a unique brand found in Korea and is tremendously consumed every day. So, this study was carried out at food science and technology laboratory of University of Rwanda and aimed at enhancing physical appearance, sweetness, texture and smell (aroma) of this korean amazing fish shaped bread on the basis of soybeans powder. During this experiment, 0% of soybeans powder, 10g of red bean paste and 100% wheat flour (Treatment 1), 5% of soybeans powder, 10g of red bean paste and 95% wheat flour (Treatment 2), 10% of soybeans powder, 10g of red bean paste and 90% wheat flour (Treatment 3) and 15% of soybeans powder, 10g of red bean paste and 85% wheat flour (Treatment 4) were used in triplicates following a completely randomized design. After bread production, sensory evaluation was conducted on the physical appearance, sweetness, texture and smell (aroma) of the new brand of fish shaped bread. The overall acceptability of the fish shaped bread were: Product S1 (0% of roasted soybean flour and 10g of red bean paste): 80.5 %, Product S2 (5% of roasted soybean flour and 10g of red bean paste): 72.5%, product S3 (10% of roasted soy bean flour and 10g of red bean paste): 78.6%, and then Product S4 (15% of roasted soy bean flour and 10g of red bean paste): 75.9%. Statistical analysis showed an insignificant difference among products in terms of the overall acceptability of the fish shaped bread compared with the control (0% of roasted soybean flour). Therefore, soybean incorporation into the production of fish shaped bread is suggested as soybean improves nutritional values of the fish shaped bread.

Key words : Soybeans powder, fish shaped bread and Sensory properties

COVID-19 : IMPACT OF SERVICE AND FOOD QUALITY ON STUDENT SATISFACTION AND FOOD WASTAGE IN A TUNISIAN CANTEEN

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ABSTRACT

The coronavirus disease (Covid-19) pandemic has led to far-reaching health, social, and economic consequences. In order to secure the safety of students and staff, the Ministry of Higher Education and Scientific Research has established general guidelines for University campuses including canteens, based on prevention and protective measures. Food wastage is a major global issue impairing food security. The objective of the present study was to evaluate these Covid-19 measures on food wastage in a Tunisian University canteen. Because of the Covid-19 crisis, the university canteen has changed their practices by setting up a meal bag service for lunch and dinner. Face to face interviews based on a structured questionnaire, were conducted on 121 student respondents (mean age 22 years old, 82% women) during two weeks in June 2020. Interestingly the Covid-19 crisis has positively impacted the students' awareness about food wastage since 13.8% of respondents declared not throwing away food and 55.2% claimed to have reduced their food waste levels. Most of respondents (72.4%) have highly appreciated the new concept based on take-away. About 63.1% declared eating at least every other day at the canteen, and 67.8% going more often. Interestingly 93.1% claimed to have noticed improvements in the quality of food meals. These changes were related to better food presentation (69% of respondents), better food safety perception (63.2%), better overall sensory quality (35.6%), whereas only 1.1% claimed not having observed any changes. Food quality service has been evaluated as very good by 41.5% of respondents, and quality of prepared foods as good by 43.7%. However, most of respondents (71.3%) affirmed not finishing their plates. The most discarded dishes were pasta (89%), soups (81%), stews (80%) and turkey meat (66%) whereas fruits (63%), yoghurts (60%), Tunisian speciality tajine (56%), rice (53%) and chicken meat (49%) were not discarded. In conclusion, our study has shown that providing good take-away meals has potential for reducing food wastage among students, strengthening the importance of food safety and convenience as effective tools for food waste prevention.

Key words : Covid-19, Food wastage reduction, Takeaway meals, Safety measures, Student satisfaction

EFFECT OF INITIAL VEGETABLE OIL QUALITY ON THERMAL STABILITY OF OIL BLENDS

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ABSTRACT

This study examined thermal stability of two vegetable oils, soybean oil (SBO) and rice bran oil (RBO), and their blend during extended high heat exposure. The objective was to evaluate the effect of initial oil quality on thermal stability of the pure and blended oils. Quality of the oils was assessed by analyzing peroxide, anisidine and carbonyl values and free fatty acid contents before and after heat exposure. Thermal stability of the oils was evaluated by heating them up to 96 h under the food frying conditions typically practiced in food service industry. Although the initial quality of the SBO was higher than that of the RBO, SBO deteriorated much faster than the RBO during food frying. The SBO-RBO blend performed better than the pure SBO and RBO. There were slight differences in the oil contents of the potatoes fried in three oils, however, there was no apparent trend by time or type of the oil and the variations were not substantial for practical purposes. This study demonstrated that blending SBO with RBO could be a viable option for extending fry life of SBO without significantly altering the oil absorption profile of the product. SBO is the preferred frying oil by the food service industry due to its broad availability and relatively lower cost than the other commodity oils. Hence, findings of this study establishing that initial oil quality does not necessarily ensure thermal stability have significant practical implications for extending fry life of oils used in food service industry.

Key words : Soybean oil; rice bran oil; thermal stability of oils; frying; oil quality, oil oxidation

SURVEY ON PREPARATION OF A TRADITIONAL ROASTED MULTIGRAIN FLOUR: BSISSA

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ABSTRACT

Bsissa is one of the oldest traditional breakfasts in North Africa. It is made of roasted multigrain flour based on cereals, legumes, spices and herbs. Bsissa is usually consumed mixed with water, milk or oil. This traditional preparation plays an important role in Tunisian heritage food and we can find many recipes differing from region to another. In order to investigate the processes of Bsissa preparation and to determine its common recipe, a survey was conducted in the city of Lamta. This city, located in the central coast of Tunisia, is known by its culinary heritage and specially by its festival of Bsissa organized annually in May. First, and in order to determine the know-how of artisan women, fifteen of them were interviewed. The results showed that the average age of producers is 49 years old and that all of them are artisans who sell their goods at fairs or on order. The majority of them inherited the recipe from their antecedents (73 %) and the rest have followed training. The investigation showed that 67% of producers buy their raw materials from supermarkets, 16 % from farmers and the rest from both. All the interviewed reported that after purchasing the ingredients, the preparation of Bsissa begins with the cleaning of the grains, followed by roasting, grinding and finally sieving to preserve them in the form of a homogeneous powder. They claimed that Bsissa flour can be stored for 3 to 12 months, at room temperature, in a non-humid place. In a second part of this work, 103 samples of Bsissa were collected and characterized. The number of Bsissa ingredients ranged from 1 to 9. This diversity of composition can satisfy the preferences of a wide range of consumers. Bsissa samples were prepared mostly from cereal 74.75% (Durum wheat, Sorghum, Barley, Oat) and legumes 18.44% (fenugreek, lentil) and finally 6.79% of Bsissa samples were based on sesame. Chickpea, anise seed, fennel seed and table (mixture of Tunisian spices) were the most common ingredients in all the different Bsissa recipes, respectively 16.38%, 12.56%, 11.32% and 11.08%. Finally, the estimation of the nutritional composition of these different recipes by CIQUAL Table (Anses, 2020), confirmed their high nutritional value and the role that this traditional food can play in the food intake of consumers.

Key words : Bsissa, Heritage food, Multigrain, Recipe, Survey, Artisan women.

DIETARY FIBER A NATURAL BARRIER AGAINST ALARMINGLY INCREASING METABOLIC DISORDERS

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ABSTRACT

Dietary fiber is a non-starchy poly saccharide having ten or more monomeric unit. Chronic disorders are increasing alarmingly round the globe. Dietary fiber consists of natural bio actives having potential to reduce and manage these disorders. These non-starchy polysaccharides from various natural sources inversely affect chronic disorders. Dietary fiber has significant role in reduction of serum glucose level by increasing insulin sensitivity and delayed gastric emptying. Dietary fiber attenuates serum cholesterol level by fecal egestion and preventing bile reabsorption. Dietary fiber has significant effect on reduction of arterial blood pressure. Low fermentable fiber inversely effects the aggression of colorectal, pancreatic and prostrate carcinoma. Dietary fiber is a non-starchy poly saccharide having ten or more monomeric unit. Chronic disorders are increasing alarmingly round the globe. Dietary fiber consists of natural bio actives having potential to reduce and manage these disorders. These non-starchy polysaccharides from various natural sources inversely affect chronic disorders. Dietary fiber has significant role in reduction of serum glucose level by increasing insulin sensitivity and delayed gastric emptying. Dietary fiber attenuates serum cholesterol level by fecal egestion and preventing bile reabsorption. Dietary fiber has significant effect on reduction of arterial blood pressure. Low fermentable fiber inversely effects the aggression of colorectal, pancreatic and prostrate carcinoma.

Key words : Dietary fiber, lipid profile, serum glucose level, hypertension, carcinoma

FOOD SAFETY PRESENT SCENARIO: A ROAD MAP OF PAKISTAN

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ABSTRACT

Food safety refers to the potentially hazardous agents or contaminants present in food that can cause food borne illness. These extraneous agents are causing morbidity and mortality. Contamination of food by various agents includes physical, chemical and microbiological. Food safety ensures that what we eat, chew or drink is safe for human health. Whole food chain should be monitored right from production to consumption. Public health burden of the developing countries is increasing beyond their resources. In developing countries like Pakistan, food safety issues result in serious health issues. Diarrhea is perhaps most important problems are responsible for more than half of the global burden of foodborne diseases, causing 550 million people to fall ill and 230,000 deaths every year. Children are at particular risk of foodborne diarrheal diseases, with 220 million falling ill and 96000 dying every year. There is persistent rise in the health expenditure of Pakistan. Pakistan is spending 0.5 to 0.8 percent of its GDP. Total health expenditure during 2016-17 remains at 145.97 billion showing an increase of 9 percent over the last year. Pakistan has dire need of revamping the food safety policy and infrastructure.

Key words : Food safety; food chain; contaminants; foodborne illness; food safety policy

PROPERTIES OF YOGURT ENRICHED WITH OLEORESIN EXTRACTS ADDED WITH DISSOLVED IN HIGH OLEIC SUNFLOWER OIL

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ABSTRACT

In the study, oleoresin containing capsaicin were extracted by solvent extraction from red hot pepper peel and seeds, which are wasted of tomato sauce, and were used in yogurt production. The extracts were used after being dissolved with high oleic acid content sunflower oil. Oleoresin and capsaicin were insoluble in water, but they have good solubility in oil and alcohol. In addition, animal dairy products can dissolve capsaicin molecules due to casein molecules they contain. Oleoresin extract was extracted and used in the production of yogurt has functional properties. Thus, it is aimed to obtain a product with richer nutritional value and a new taste. For this purpose; oleoresin extract obtained from peel (peel extracts, PE) and seeds (seed extracts, SE) was added to milk with different percentages (1.5% PE, 3% PE, 1.5% SE, 3% SE, 1.5% PE+SE, 3% PE+SE) for yogurt production. The analysis that are pH, acidity, ash content, fat content, sensory evaluation and color properties, were performed, immediately. Color components (L^* , a^* , b^*) were measured with a Minolta colorimeter and h^* , ΔC^* , ΔE^* values were calculated using color coordinates. There were reductions in L^* (60.44 – 29.77) of yogurt samples by enriched process, especially for samples which contain 3% PE and 1.5%SE. An increase was observed for a^* values from -1.435 to 19.35 for same samples. Although the seed extracts also had a red color, they did not give the expected color in yogurt. For sensory evaluation, when color and appearance properties were evaluated, samples with the highest red color (1.5% P+S, 3%P) were mostly preferred. Besides, these samples were also evaluated with the highest score for structural properties. The panelists signed with highest score for taste properties and general acceptabilities for 3% P+S samples which samples have the lowest score for color and appearance properties. It comes out that consumers expect bitterness in taste as well as red color in appearance.

Key words : Capsaicin, high oleic sunflower oil, oleoresin, yogurt.

EFFECTS OF DIFFERENT FACTORS ON GERMINATION OF ARGAN SEEDS

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ABSTRACT

The argan tree is an Algerian-Moroccan endemic species, which belongs to the *Sapotaceae* family. In Algeria, the tree covers the southeast margins of the distribution. This taxon is a source of socio-economic and ecological importance. However, the argan forest is facing degradation and natural regeneration is mainly absent. The study's aim is to improve knowledge of regeneration ecology by researching optimal germination conditions in order to ensure reforestation establishment by planting. To evaluate the morpho-physiological variability in response to improving different factors (harvest period, longevity, envelope, mother tree and biometrics of the seeds), we collected Argan fruits from Oued Elma (Tindouf) in June, July and August for four consecutive years. A quantitative evaluation of the amylase activity evolution of germinating seeds has been done. On average, walnuts showed the following dimensions: 1.96 cm long, 1.37 cm wide, 0.71 circularity index, 2.58 g weight, and two loculi. There was a significant correlation between weight and width and circularity index ($p=0.01$). The harvest period has a significant effect on germination ($P < 0.01$). The late-season seeds have a low germination potential, from which 79% was recorded for the June harvest, and 67% for the month of August. there was a decline in germination as storage durations increase, removal of shell improved germination parameters, with a shorter latency period (2-6 days) and an 80% germination rate for seeds harvested in June. These showed a rapid increase in amylase activity with peaked at 3rd week. In addition, the effect of the mother tree is not significant, which suggests that the Tindouf argan tree has very similar characteristics in terms of germination. The results obtained in this study provide a seed selection basis for reforestation programs.

Key words : *Argania spinosa*, biometry, germination, harvest date, Tindouf

INFESTATION OF SOM PLANT LEAVES (*MACHILUS BOMBYCINA*) BY THRIPS PEST (*THRIPS TABACI*) AND ITS SUSTAINABLE MANAGEMENT USING PHYTO-CHEMICALS

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ABSTRACT

Som plant (*Machilus bombycina* King) is an important plant in agroforestry system. It is cultivated in north-east part of India in warm humid climate. It is cultivated in agricultural land by the marginal farmers of these areas for multi-storeyed cultivation and income. Large number of crops like pumpkin, turmeric, colocasia etc is cultivated in the som plant land (intercropping). Localized small/cottage industries are involved with this plant like sericulture industry (muga silk worm cultivation). Clothes are produced from this sericulture industry. Leaves of som plants are major food of muga silk worm. Nutritional value of food plants i.e. leaves plays an important role in the larval growth and silk productivity. Benchamin and Giridhar (2005) reported that the muga silk (*Antherea assama*) was produced only in India. The plant also has timber value. Due to attack of insect pest, it becomes difficult for the farmers to conduct rearing (Singh *et al.*, 2000). The plant is susceptible to various insect pests of which Thrips (*Thrips tabaci* L.) causes heavy damage to tender leaves of the plant. It was found from the investigation that thrips was active throughout the year. Lower population was recorded during 3rd week of March to last week of June and higher population was during last week of November to 3rd week of January. Peak population (12.77/3 leaves) was recorded on 49th standard week i.e., 1st week of December. Thrips population had significant positive correlation with relative humidity (maximum) while significant negative correlation with temperature. This indicates that activity of thrips population increases with the rise of relative humidity and decreases with the rise of temperature. Under the present investigation Imidaclopride pesticide was found most effective against thrips providing 75.18% suppression closely followed by Azadirachtin, 64.94% suppression. It was revealed that extracts of Garlic, Tobacco, *Spilanthes* and *Polygonum* plant gave moderate results, recording about 53.33%, 48.55%, 47.24% and 46.71% thrips suppression respectively. The polygonum (*Polygonum hydropiper*) plant (floral parts), pongamia (*Pongamia pinnata*) leaves, garlic (*Allium sativum*), spilanthes (*Spilanthes paniculata*) (floral parts) were extracted in methanol. The tobacco (*Nicotiana tabacum*) leaves were extracted in water. Imidaclopride is a highly toxic synthetic insecticide and so there is every possibility to contaminate som plant leaves with the toxic chemicals, as som leaf is the major food component of muga silk worm rearing. Plant extracts are of biological origin having low or no hazardous effect on health and environment and so can be incorporated in Integrated Pest Management (IPM) and organic cultivation.

Key words : Incidence, climatic factors, muga silk, plant extracts, organic cultivation, environmental sustainability

CARBON STOCK OF PINUS SYLVESTRIS L. AFFORESTATION AREAS: A CASE STUDY IN ATATÜRK UNIVERSITY FUAT TANRIVERDI GROVE

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ABSTRACT

Forest ecosystems play an important role in global climate change. In forest ecosystems, soil and litterfall accepted within carbon pools. Scots pine is the most common tree species planted in Erzurum. Taking Scots pine (*Pinus sylvestris* L.) plantation in Ataturk university as the research object, litterfall and soil organic carbon stocks of Scots pine (*Pinus sylvestris* L.) afforestation planted for 35 years ago have been determined. As a result, it was calculated that a total of 113.44 Mg C ha⁻¹ of organic carbon stored in this afforestation area, including 92.27 Mg C ha⁻¹ and 21.17 Mg C ha⁻¹ in litterfall.

Key words : Scots pine, Carbon stock, afforestation, soil organic carbon, litterfall

**STAND DYNAMICS OF THE SWEET CHESTNUT (*CASTANEA SATIVA* MILL.)
FORESTS IN TURKEY**

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ABSTRACT

The aim of the study is determination of stand structure of sweet chestnut (*Castanea sativa* Mill.) forests in the Black Sea region. Sweet chestnut is the only species naturally found in Europe and Asia Minor. The species is mainly distributed over the North Anatolia (Black Sea Coast), Marmara and Western Anatolia in Turkey. Within the scope of the study, it was selected eight sample plots that located in Rize, Sinop and Bartın Forest Management Directorates. Firstly, general and special site properties of sample plots were determined. Stand profiles were taken in the size of 20×30 meters (600 m²) and 20×50 meters (1000 m²). The crown projection, the length, the breast height diameter and the height the base of crown of all the trees were measured in each sample plots. Stand profiles and their crown projections were drawn for each sample plot, after that the average of tree height and breast height diameter, total basal area, the total number of tree in one hectare and crown closure were found. In the study, chestnut stands were nearly 50-60 years old. The total number of trees in one hectare was found as 427 in Bartın, 433 in Sinop and 432 in Rize. Total basal area of chestnut stands located in Rize, Sinop and Bartın occurred as 32.13 m²/ha, 31.76 m²/ha and 35.73 m²/ha, respectively. The average of tree height varied between 12.9 to 18.9 m and the average of tree diameter ranged from 30.02 cm to 35.73 cm. Sweet chestnut usually forms mixed stand types with some broadleaved species such as beech, alder, hornbeam. Mixed forms are located as clump and group rather than individual.

Key words : stand structure, sweet chestnut, silvicultural treatment, stand profile

FIRE EFFECTS ON CORK OAK WOODS STRUCTURE AND DIVERSITY IN ALGERIA

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ABSTRACT

Little is known about the effects of fire on vegetation dynamic or about fire-plant trait interactions in the forests of Algeria, where disturbance by Wildfires is generally frequent and intense. We focused on Chrea National Park and choose cork oak (*Quercus suber* L.) ecosystem because of its high economic and ecological importance. Sixty-one plots were established taking into account the height and density of the woody species. For each plot, floristic composition and environmental variables were evaluated. Furthermore, easily discernible traits of species (life forms, dispersal mode, Grime's strategies and regenerative traits) were used to analyse fire effects on functional composition. TWINSpan (Two-Way Indicator Species Analysis) results revealed that the current landscape is a mosaic of five vegetation types, with two types of woodlands and three types of shrublands. According to the CCA (Canonical Correspondence Analysis) results, these vegetation types were significantly correlated with a dynamic gradient caused by fire disturbance, which masks the effects of the dominant mesological factors (altitude and exposure). Moreover, fire effects are strongly dependant on species' biological and life history traits. In fact, PCA (Principal Component Analysis) indicated that the abundance of seeders, ruderal stress-toleros species, therophytes, and Anemochorous species was associated with recent and/or recurrent burned shrublands. Conversely, competitive stress-tolerant species, phanerophytes, zoochorous species and resprouters decreased with increases in fire recurrence and reductions in time since the last fire. Further measures for the conservation of forest ecosystems against wildfires, in the protected areas of Algeria, must be undertaken.

Key words : summer wildfires, cork oak woodlands, regressive dynamic, plant traits, conservation

ASSESSMENT OF GENETIC DIVERSITY OF TURKISH AND ALGERIAN NATIVE SHEEP BREEDS

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ABSTRACT

The present study was conducted to investigate the genetic diversity of native sheep breeds reared in Turkey and Algeria. A total of 240 animals representing eight native sheep breeds raised in Algeria (Hamra, Ouled Djellal, Sidaou and Tazegzawt) and Turkey (Akkaraman, South Karaman, Karacabey Merino and Kivircik) were genotyped with 14 microsatellite markers. A total of 340 alleles were detected with a mean number of alleles (Na), effective alleles (Ne) and polymorphic information content (PIC) were found to be 24.29, 10.99 and 0.90, respectively. The mean of the expected (He) and observed heterozygosity (Ho) values for all studied locus were 0.76 and 0.90, respectively. All FIS value were obtained as positive except OarCP34 locus. The genetic diversity parameters such as Na, Ho and He obtained from the studied Algerian sheep breeds were higher than the Turkish native sheep breeds. Mean value of DST, GST and HT were found as 0.054, 0.060 and 0.91, respectively. The mean global coefficient of gene differentiation (GST) showed that approximately 94.0% of the genetic variation was within-population and 6.0% was across the populations. The private alleles observed in this study were highest (17) in the Ouled Djellal sheep breed, with 66 total private alleles. However, only 14 of it had a frequency higher than 5%. As a result, the dendrogram that the Algerian sheep breeds were completely separated from the Turkish sheep breeds. ΔK value indicated that the most suitable group number was 4 (K=4). It can be said that the microsatellite markers used in the present study are sufficient to identify the genetic diversity of the sheep populations studied.

Key words : diversity genetic, sheep, native breeds, Turkey, Algeria

SOY PHYTOESTROGENS AS EPIGENETIC MODULATORS IN PROSTATE CANCER

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ABSTRACT

Prostate cancer is the most frequently diagnosed cancer for men in Western countries. Prostate cancer is caused by multi-factorial processes, and epigenetic alterations are important key factors for tumorigenesis. Epidemiological studies provide evidence that nutritional factors, especially consumption of soy isoflavones, have considerable effects on decreasing morbidity and mortality of prostate cancer. The modulatory effects of soy phytoestrogens on epigenetic regulation mechanisms gain importance due to their role on providing further opportunity for prostate cancer prevention. phytoestrogens have a remarkable potential on the regulation of DNA methylation patterns in prostate cancer cells. Phytoestrogens may enhance the reactivation of methylation-silenced genes by inhibition of DNA methyltransferases (DNMT) activity or increasing protein levels of histone acetyltransferase 1, which leads to histone 3 lysine 9 acetylation. Recently, we analyzed the regulatory effects of genistein and daidzein on DNA methylation by using methyl-DNA immunoprecipitation method coupled with Human DNA Methylation Microarrays (MeDIP-chip) in LNCaP and DU-145 cells. We observed that methylation profiles of 58 genes were altered with genistein and daidzein treatments in prostate cancer cells. In addition, the methylation frequencies of *MAD1-like 1 (MAD1L1)*, *TNF receptor-associated factor 7 (TRAF7)*, *lysine (K)-specific demethylase 4B (KDM4B)*, and *human telomerase reverse transcriptase (hTERT)* genes were remarkably modified. In conclusion, soy phytoestrogens can regulate gene activity by altering DNA methylation and/or histone modification patterns. Since epigenetic mechanisms are reversible processes, the role of soy phytoestrogens on epigenetic mechanisms gains importance, correspondingly, epigenetics-driven novel therapeutic candidates warrant further consideration in future “omics” studies of prostate cancer.

Key words : prostate cancer cell lines, soy phytoestrogens, epigenetics, DNA methylation, DNA methylation microarray

HESPERIDIN SENSITIZE A549 HUMAN LUNG CANCER CELLS TO BLEOMYCIN

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ABSTRACT

Cancer is the most common cause of death worldwide after cardiovascular diseases. This devastating disease is a great health and economic burden to societies. Great efforts are being made today to develop new clinical treatment approaches to cancer. Lung cancer (LC) is the most common type of cancer worldwide. Most of the LC cases are classified as non-small cell lung carcinoma (NSCLC). Antineoplastic drug bleomycin (BL) is widely used in cancer treatment. However, this drug causes serious side effects, including pulmonary toxicity, nephrotoxicity, and significant gastrointestinal reactions. In addition, patients often experience physical and mental problems, and BL treatment reduces their quality of life. Therefore, in order to ensure that patients with NSCLC get good results from treatment and improve the quality of life, it is of great importance to develop new treatment approaches that reduce the toxicity and side effects of BL. Natural compounds obtained from plants have anticancer potential and increase their effectiveness when used in combination with chemotherapeutic drugs. Most natural compounds act on multiple targets in cellular signal transduction. For this reason, extensive studies are conducted on natural compounds. Hesperidin is a flavonoid, that abundant in vegetables and fruits, and one of the most important bioflavonoids in orange and lemon. Hesperidin has many beneficial effects such as anti-allergic, antioxidant, anti-inflammatory and anticancer effects. In this study, the synergistic effects of Bleomycin and Hesperidin on cell proliferation, apoptosis and autophagy in A549 non-small cell lung cancer cells were investigated. Anti-proliferative, apoptotic and autophagic effects of Bleomycin and Hesperidin were determined by various analyzes. In addition, the interactions of the combined doses of Bleomycin and Hesperidin, the expression levels of some proteins involved in apoptotic and autophagic pathways were determined. In conclusion, the combined treatment of hesperidin and bleomycin increases the anticancer efficacy of bleomycin at lower doses in A549 human lung cancer cells. These findings show that hesperidin can be considered as an important herbal compound in reducing the side effects and increasing the effectiveness of bleomycin.

Key words : Cancer, hesperidin, apoptosis, bleomycin, flavonoid

UNDERGRADUATE STUDENT NURSES' PERCEPTIONS OF INTIMATE PARTNER VIOLENCE, AWARENESS AND FREEDOM LEVEL IN NURSING CARE

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ABSTRACT

Intimate Partner Violence (IPV); Is an important public health problem in Turkey. Nurses play an important role in the evaluation, intervention and support of women who are exposed to violence. It is reported by the World Health Organization that women below the age of 50 are 61% physically abused by their partners. In universities, nursing undergraduate education; student nurses should be ensured to be ready for these future roles. The knowledge and attitudes of undergraduate students about IPV should be evaluated. It's important in terms of making the necessary interventions into the undergraduate education processes. Our study was conducted September 2019- January 2020 with 276 volunteer students in Trakya University School of Health Sciences undergraduate program. After asking their sociodemographic characteristics, IPV questions were asked to evaluate the level of knowledge, attitude and awareness about IPV. This questionnaire consisted of 3 subscales. These are; " Nursing self-efficacy", " nursing roles and values ", " preparation for education ". The results of the study; showed that the awareness level of IPV of students is low. The scores of the students from three subscales were low. Their self-efficacy perceptions were low in recognizing a woman who was subjected to violence and creating necessary care and support interventions. The issue of informing the victim about their legal rights was a concern for students. They didn't fully know the role of nurses in preventing abuse. The area where students had the best level of self-confidence was their ability to communicate. The knowledge, attitude of being aware of IPV and providing effective interventions are directly related to the self-efficacy of the nurses. This will increase the quality of social health service. The students aren't fully aware of the importance and impact on the individual, social level. In order to prevent IPV, one of the duties of healthcare professionals is; to realize violence, to apply care interventions of physical violence, to provide psychosocial support. This social problem is less detected; it can reduce the benefit to women. They had low confidence in understanding women who had been subjected to violence, but who didn't express it directly. In order for nurses to take a more active role in preventing violence against women in society, it's not only individual patient care; it's important that they have preventive approach skills.

Key words : Intimate Partner Violence, University Students, Women's Health

DEPRESSION AND ATTEMPT TO SUICIDE AMONG MEDICAL STUDENTS IT'S CAUSE

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ABSTRACT

The rate of suicidal attempt among the medical students is increasing day by day. The main reason in attempt to suicide of a medical student is depression, huge exam pressure, unexpected grade, loneliness and unfriendly education system. From last five years report (Google search and previous research) a large number of medical students died by suicide due to unexpected result and depression from study. A online based cross sectional study was done to collect data. The questionnaire had two parts (1) personal information and reason behind suicide attempt, and (2) their advice to come out from this problem. The latest version of SPSS was used for data analysis. Total 291 students an age group of 18-23 was participated, among the participants 26 were tried to do suicide. 209 students stay in hostel and rest of stay with their family. 26.74% are introvert and 35.76% can not share their depression with friends or family. The most interesting part is 7.64% take antidepressant drug to reduce depression and they take drug for a sound sleep and its percentage is 18.40%. Although the ideal time to go to bed at night is between 11am to 12am but 64.24% sleep after 2am and that's why they can't wake up early and as follow miss morning class and do bad in academic results. 60.76% of them are said that they are not satisfy to their study and they think the main reason to failure is unfriendly education system in undergraduate medical sector. Attempt to suicide in medical students is not accepted although it is increasing day by day and the main reason behind it is depression which is coming from unexpected result, unfriendly education, lack of scope of sharing. We think ministry of medical education should make a discussion to solve this problem and provide a healthy education system in medical sector.

Key words : Depression, suicide

PSYCHOSOCIAL PROPERTIES OF CLINICAL LEARNING ENVIRONMENT FROM THE PERSPECTIVE OF STUDENTS IN HEALTH LICENSE EDUCATION

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ABSTRACT

Nursing undergraduate education has long been an important requirement in providing human resources to the health sector. In order to become a good clinical nurse, it is necessary to have in-depth knowledge in medicine. Besides; they need to have great clinical experience. To become a professional nurse, they must go through challenging learning processes. Health professionals must practice in clinical areas to develop their basic skills. The purpose of our study; To present a comprehensive picture of students' perceptions about the obstacles that nursing students may encounter in clinical settings. Our study was carried out with Trakya University School of Health Science Nursing undergraduate students in November 2019- May 2020. The Clinical Learning Environment Inventory (CLEI) was used. This scale consists of 42 items. The scale has two versions; 1. "Real learning environment"; 2. "Preferred learning environment". The scale; examines students' perception of psychosocial features of real learning environments. At the same time, the scale; evaluate how they want the ideal learning environment to be. It consists of six subscales. The sub-scales are: personalization, student participation, satisfaction, task orientation, teaching innovation, individualization. 280 nursing undergraduate students participated in our study. In the study, the average age of the students was 19.7. The number of Girls in our study is 159; men were 121. After the students were asked about their sociodemographic characteristics, the clinical learning environment inventory (CLEI) was used. It consists of 42 items. It asks students to perceive the psychosocial characteristics of real learning environments and how they think of the preferred or ideal learning environment. In terms of gender; There was no statistical difference for the scale ($p=0.232$). When the participants are evaluated according to their country; No statistical significance was found for the scale ($p=0.171$). In the study, Participants; scores from personalization and student participation subscales were higher in the real learning environment. The students; scores from satisfaction, teaching innovation, individualization subscales; it was higher in idealized clinical settings. The total scale scores of the 4th grades are for both environments; It was higher than the scores of students in the 1st, 2nd and 3rd grades. Nursing students may have to deal with patients with different physical and psychological problems and contribute to their care during their clinical practice. However, students; With systematic home visits, public health interventions, rehabilitation center project studies, they can gain experience outside of a more medically oriented environment. Thus, it will be easier for students to have a wide perspective and their self-confidence will be increased. Undergraduate nursing education programs should be developed with a proactive and holistic approach in order to create a sensitive nursing workforce in the future.

Key words : Clinical Learning Environment, Clinical Learning Environment Inventory (CLEI), health science undergraduate education

ALTERNATIVE TREATMENT FOR ENTEROBIUS VERMICULARIS INFECTION BY USING ESSENTIAL OILS OF CLOVES AND PROBIOTICS: SPIRULINA SP. AND SACCHAROMYCES CEREVISIAE. THERAPEUTIC ASSAYS ON RABBITS TAKEN AS STUDY MODELS

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ABSTRACT

The exposure to childhood cosmopolitan parasites, such as oxyurosis or *Enterobius vermicularis* infection, is extremely widespread in the world, particularly in children's communities. This infection causes a large number of digestive disorders, evoking in addition to physical manifestations, psychological disturbances such as shyness, social isolation or the shameful feeling because it is a disease related to hygiene. The aim of our study is to find a less toxic therapeutic alternative than the widely used vermifuges, which are certainly effective but which nevertheless remain pesticides and biocides which -in high doses- are extremely toxic, and at low doses can cause significant endocrine disruption. Part from the problem posed by the chemical nature of vermifuges, the access to care is becoming increasingly difficult in some parts of the world, given the socio-economic conditions of many families. Also, we must not overlook the fashion effect that encourages the increasing use of organic herbal treatments, thus marking the return to nature and gentle therapeutic practices that can only be beneficial for humans and the planet. This work consists of the use of rabbits as animal models for therapeutic tests based on the use of different concentrations of essential oils (cloves essential oil and garlic and cloves essential oils mixture) as well as the use of probiotics at different concentrations (*Spirulina sp* and *Saccharomyces cerevisiae* and a mixture of both probiotics) in a preventive and a curative treatment. Both treatments (essential oils and probiotics) showed very encouraging results. The use of probiotics has shown very good results in both preventive and curative approaches, and presents a good alternative for the chemical treatment.

Key words : *Enterobius vermicularis*, digestive parasites, alternative treatment, Essential oils of cloves, *Spirulina sp*, *Saccharomyces cerevisiae*

NUMERICAL INVESTIGATION ON THE EFFECTS OF A NATURAL GAS BURNER TIP LENGTH ON THE COMBUSTION PARAMETERS

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ABSTRACT

In this paper, the effects of a natural gas burner tip length on the combustion parameters are studied numerically with the use of the Fluent Code. A back pressure combustion chamber was used as the combustion medium. Pure methane was taken as fuel for the numerical analysis. Four different combustion cases were analysed by changing the burner tip length. The investigated combustion parameters were the flame length, flame temperature and the NOX emissions in the flue gas. The obtained results show that the present natural gas burner has an optimum tip length in terms of reducing the NOX emissions and obtaining an acceptable flame length.

Key words : Methane, Flame length, NOx emissions

**SOLUTIONS FOR PROBLEMS VIA KAIZEN APPLICATION AS LEAN
MANAGEMENT IN PRODUCTION – CASE STUDY**

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ABSTRACT

In recent years, Lean philosophy gained more popularity among other kinds of production strategies. Via this study, it is aimed to improve production lines by means of lean methods for an exclusive company that is situated in İstanbul/TURKEY. There occurred some problems as a nature of production and in order to diminish these, the problems of production were controlled via Lean Management methods, especially via Kaizen, and new solutions for developing production were done and applied. The solutions for problems were defined via lean system which targets at improving efficiency in recent industry world such as KAIZEN. Kaizen philosophy was effectively applied by means of Why-why analyse and PDCA (Plan-Do-Check-Act) methods. The main aim was to make an end for customer complaints and have more products which have required quality and minimum problem. Three of the applied KAIZEN methods were explained with details in this study.

Key words : Lean Management, Kaizen, Solution

KAIZEN APPLICATIONS AS LEAN MANAGEMENT IN INDUSTRY – CASE STUDY

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ABSTRACT

This study focused on developing production stages as much as required in processes those were performed for an exclusive company which works in İstanbul/TURKEY. So as to accomplish this, some problems of production were inspected via Lean Management methods and new ways for improvement of products were done and applied. Necessary studies were performed via lean system which aims for developing efficiency in recent industry world such as KAIZEN. In order to apply Kaizen effectively, Why-why analyse and PDCA (Plan-Do-Check-Act) methods were used. The kaizen's goal was to reduce rate of problems occurred during production and gain more successful products. One of the applied KAIZEN methods was explained with details in this study.

Key words : Lean Philosophy, Kaizen, Problem, Product

**INVESTIGATION OF THE DRYING BEHAVIOR AND WATER ACTIVITY OF
MINT LEAVES, DRIED IN A CONVEYOR TYPE DRYER AND IN A
CONVECTION OVEN**

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ABSTRACT

Consumption habits are changing and demand is increasing the food sector, parallel to the increasing world population. Harvesting some agricultural products in the seasons and drying with minimal loss is of great importance. Characteristics of the product, climate conditions of the region, land structure, energy cost, installation cost of the system, and drying time are the main factors that affect the choice of drying method. Amount lost during drying, color, aroma, preservation of existing properties, hygiene and water activity affect the quality of the product. In this study, drying behavior and water activity of mint leaves in two different drying methods were compared. First, a sample of 20 grams of fresh mint leaves was dried at 65 °C air temperature in a conveyor dryer. Then a similar sample was dried in a convection oven under the same conditions. In the experiments, drying in the convection oven was faster in the first hour. The total drying time took 2 hours in both furnaces. The water activity of mint leaves, dried in the conveyor dryer was found to be 0.4942. The water activity of mint leaves dried in a convection oven was determined to be 0.5139. Further studies to compare the water activity and quality of the products, dried by using different methods, may prove useful.

Key words : Conveyor dryer, convection oven, water activity, mint leaves

**ISOLATION, IDENTIFICATION AND ANTIBACTERIAL ACTIVITY OF
ENDOPHYTIC FUNGI FROM THE ALGERIAN MEDICINAL PLANT *ARTEMISIA
HERBA ALBA***

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ABSTRACT

The aim of this study is to isolate and identify endophytic fungi from the Algerian medicinal plant *Artemisia herba alba*, then to evaluate the antibacterial activity of these fungi and their extracts. The isolation and identification allowed us to obtain ten (10) fungal strains belonging to four genera: *Fusarium*, *Penicillium*, *Alternaria* and *Aspergillus*. The antibacterial activity of the fungi was evaluated by the agar-fungi disk diffusion method, against five human pathogenic bacteria; where all isolated fungal strains exhibited antibacterial activity against at least one of the bacteria tested with an inhibition zone (IZ) ranging from 7.5 to 25 mm. In addition, *Fusarium sp* and *Penicillium sp1* have the highest antibacterial activity with an IZ of 23.5 and 25 mm) against *S. aureus* and *B. subtilis*, respectively. After fermentation, the secondary metabolites of four endophytic fungi (one fungus of each genus) were extracted using the butanol solvent. Then, the antibacterial activity of extracts of the endophytic fungi was determined and results show that *Penicillium sp2* has the highest effect against *Bacillus subtilis* with IZ of 27.3 mm. This study is the first report about the antimicrobial activity of endophytic fungi residing in *A. herba alba*, in which the fungus *Penicillium* and *Fusarium* demonstrated the ability to produce bioactive agents with pharmaceutical potential, and may provide a new lead in the pursuit of new biological sources of drug candidates. Moreover, the present study helped to justify the use of *A. herba alba* in traditional medicine.

Key words : Endophytic fungi; *Artemisia herba alba*; Antibacterial activity; Bioactive compounds.

THE SYNERGISTIC POTENTIAL OF PELARGONIUM ENDLICHERIANUM FENZL. ESSENTIAL OIL AND DIFFERENT ANTIBIOTIC COMBINATIONS AGAINST LISTERIA MONOCYTOGENES

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ABSTRACT

The main aim of the study was to combine *Pelargonium endlicherianum* essential oil with benzylpenicillin, gentamicin and ciprofloxacin, which are frequently used in the treatment of infections, and to reveal the antimicrobial effect against *Listeria monocytogenes* in an in vitro experimental model. The combined use of *P. endlicherianum* essential oil with benzylpenicillin, gentamicin and ciprofloxacin has been demonstrated using minimum inhibition concentration and agar well diffusion methods against *L. monocytogenes*. The bactericidal effect of essential oil and antibiotic is dynamically demonstrated depending on the time and antibiotic intensity with the time kill method. When used essential oil alone and in combination with antibiotics, the permeability of the bacterial outer membrane was analyzed with a U.V spectrophotometer. The detection of synergy at the 24th hour after treatment and the combination of drugs compared to essential oil treatment showed a decrease in the number of viable bacterial cells. The combined use of essential oil with benzylpenicillin, ciprofloxacin and gentamicin has been found to have a synergistic effect on *L. monocytogenes*. A synergistic interaction was observed between the antibiotics against *L. monocytogenes* and the essential oil in the Time kill study to determine the decrease in the number of live bacteria due to time. In this study, the mechanism of action of penicillin, gentamicin and ciprofloxacin antibiotics was further expanded in combination with essential oil obtained from *P. endlicherianum* and increased the membrane permeability activity of these antibiotics. According to the results of the study, it has been shown that antibiotic efficacy increases as a result of the combination of benzylpenicillin, ciprofloxacin and gentamicin used against *L. monocytogenes*, thereby preventing bacteria from developing resistance against antibiotics and providing an effective treatment.

Key words : *Pelargonium endlicherianum* Fenzl., Essential oil, benzylpenicillin, ciprofloxacin, gentamicin, synergism

BIOLOGICAL ACTIVITIES OF ALGERIAN PLANT ROSA CANINA METHANOLIC EXTRACT IN RATS

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ABSTRACT

Medicinal plants represent one of the main sources of drugs for approximately 80 % of the African populations. The know-how of the African traditional healers, of a priceless value, is a starting point for the pharmacological and phytochemical investigation of these natural drugs. Several exotic fruits are employed in traditional medicine as potential sources of healthy compounds. Fruits of *Rosa canina L.* are largely consumed in rural sectors of the area of Batna in Algeria. Current work has the aim to better characterize the presence of bioactive compounds in *R. canina* fruits. The preparation of the extracts was made by the method of the solid-liquid extraction: the vegetable material is subjected to exhaustion, by using three solvents with increasing polarity: diethyl ether, chloroform and methanol. The extraction was repeated three times with each solvent with the aim of increasing the extraction yield. Our research is centered towards the quantification of phenolic compounds by the use of two methods in order to determine total polyphenols: Fast Blue BB and Folin-Ciocalteu. In the present study the anti-inflammatory effect of methanolic extracts of *R. canina* fruits were tested in rats by paw edema assay using different inducers. The data show that the extract inhibits the development of the rat paw edema. Additionally, we tested the antipyretic activity in a rat model; hyperthermia in the rat was induced by brewer's yeast and was reduced by the two concentrations used of methanolic extract of *R. canina* fruits (100 and 150 mg/l). In conclusion, the current data show the potential role of the methanolic extracts of the fruits of *R. canina* as therapeutic agents and report the presence of secondary metabolites and particularly polyphenols as the active compounds.

Key words : *Rosa canina L.*, Polyphenols, Anti-inflammatory activity, Antipyretic activity.

IN VITRO ANTIOXYDANT ACTIVITY OF CITRULLUS COLOCYNTHIS EXTRACTS

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ABSTRACT

Citrullus colocynthis L. (Cucurbitaceae) is a medicinal plant, typically Mediterranean, largely used in folk medicine in the Mediterranean countries including Algeria. The aim of the present research is to assess the in vitro effects of aqueous and ethanolic extracts of flowers and fruits of *C. colocynthis* as antioxidants. The ethanolic extracts contained higher total polyphenols and flavonoids than the aqueous extracts. The fruits were rich in polyphenols and/or flavonoids whilst the flowers were relatively poor. Furthermore, all extracts had antioxidant effects with higher levels in the fruits, followed by flowers. These results demonstrated the antioxidant effect of fruits and flowers of *C. colocynthis* and give a comparative data on the extracts of these parts that can be used in the diseases where inhibition of oxidative stress is required. In conclusion, this plant has a strong pharmacological power, which supports their medicinal traditional use.

Key words : *Citrullus colocynthis* L., ethanolic extract, aqueous extract, antioxydant activity.

DEVELOPMENT AND CHARACTERIZATION OF ENTERIC-COATED PECTIN BEADS CONTAINING PREGABALIN

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ABSTRACT

The oral route is the most popular and most convenient way in the administration of drugs. There are many polymeric biomaterials such as naturally sourced proteins and polysaccharides used in oral drug delivery systems. The use of pectin, one of them, is highly interesting as a carrier for many active substances in order to achieve controlled release in pharmaceutical applications. Pregabalin (PGB), a member of the gamma-aminobutyric acid class, is considered one of the first drugs to come to mind for the treatment of neuropathic pain (NA). PGB has been proven to be effective for both central and peripheral NA and provide rapid pain relief. However, increasing the amount of dose in daily intake has been associated with the formation of stomach ulcers. For this purpose, in our study, enteric-coating of pectin beads containing PGB was carried out with two different techniques, and thus it was aimed to prevent stomach ailments, especially stomach ulcers that may develop due to PGB dosing. In this context, PGB's quantification method was developed and validated, bead formulations were developed and enteric coatings were performed. Subsequently, in-vitro characterization studies were carried out. As a result, the coating thickness, high encapsulation efficiency (77%) of the E6 coded formulation we developed was found to be quite satisfactory. It may also be an alternative carrier system in the future for patients who experience stomach complaints due to PGB use.

Key words : Pregabalin, Pectin, Beads, Enteric-Coating, Neuropathic Pain, Stomach Ulcers

**DEVELOPMENT AND CHARACTERIZATION OF FLOATING PECTIN
HYDROGEL PELLETT FORMULATIONS CONTAINING PREGABALIN**

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ABSTRACT

Pregabalin (PG) is primarily prescribed for painful diabetic neuropathy (pDPN), post-herpetic neuralgia, radicular pain, and fibromyalgia, also it is used in clinical practice to treat general anxiety disorder due to its anxiolytic properties. Pectin is a water-soluble ionic polysaccharide found naturally in the cell walls of many plants. As a result of the interaction of pectin with calcium ions, a hydrophilically coated insoluble carrier system is formed by complexing between surfaces and this provides sustained-release. In this direction, floating pectin pellets containing PG were developed in our study. It has been found that floating and pregabalin containing pectin pellets have not been studied in the literature. With this study, it was aimed that PG should make an sustained-release in the stomach content and reduce the daily dose intake of the patient. Within the scope of the study, validation of PG's quantification method, development of pellet formulations, and in-vitro characterization studies were performed. The formulations have been successfully developed without using any film coating agent to prolong drug release. Considering the results obtained, it was determined that the 6D code formulation continued PG release for 24 hours with an average encapsulation efficiency of ~82%. We anticipate that the formulation we developed will provide an alternative to the extended-release pregabalin preparations in the current pharmaceutical market.

Key words : Pregabalin, Pectin, Pellet, Sustained-Release, Neuropathic Pain, Pharmaceutical Market

**THE EFFECTS OF PLANT DENSITY ON YIELD OF LAVANDULA CULTIVARS
GROWN ORGANICALLY IN ÇANAKKALE CONDITIONS**

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ABSTRACT

This research was carried out in Yaylacık village of Ezine between 2016-2019 in order to determine the effect of planting shape on yield and quality in lavender varieties grown organically under Çanakkale ecological conditions, according to the trial pattern of split parcels. In the research, the main plots of the varieties (Hemus, Sevtopolis and Drujba varieties belonging to *Lavandula angustifolia* type and Super A variant of *Lavandula intermedia* type) formed the planting form (140x99, 140x66, 140x33, 70x66 and 70x33). According to the two-year averages, the flower yield of the varieties with wet stalks varied between 355.98-598.93 kg/da, the highest yield of the stalked flowers was 70x33 cm planting in Super A cultivar, and the lowest mean stalk yield was 70x33 in Sevtopolis cultivar. Obtained in the form of cm planting. The average of dried flower yield from varieties varied between 143,78-208,91 kg/da, the highest dried flower yield was obtained from Super A variety, followed by Drujba variety.

Key words : Lavender cultivars, Planting Shape,

**PREPARATION, CHARACTERIZATION AND IN-VITRO EVALUATION OF
SUSTAINED RELEASE 6-MERCAPTOPYRINE-LOADED SOLID LIPID
NANOPARTICLES**

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ABSTRACT

6-Mercaptopurine (6-MP) is widely used cytotoxic and immunosuppressant drug and is used in human leukemia and many other diseases such as inflammation of colon and small intestine e.g. Crohn's disease and ulcerative colitis, systemic autoimmune disease and rheumatoid arthritis. The use of this drug is restricted due to its poor bioavailability and short plasma half-life. In order to reduce these drawbacks, 6-mercaptopurine loaded solid lipid nanoparticles (6-MP-SLNs) were prepared and characterized. For characterization studies; particle size, polydispersity index (PDI), zeta potential (ZP), encapsulation efficiency (EE %), recovery % were determined and in vitro dissolution test studies were conducted. Release profiles shown that nanoparticles prolonged short half life of 6-MCP and obtained sustained release. These results demonstrate that 6-MP-loaded SLNs are good candidates for enhancement bioavailability and sustain release systems.

Key words : 6-mercaptopurine, nanoparticle, drug delivery, sustained release, solid lipid nanoparticle

DETERMINATION OF THE ANTI-ALZHEIMER ACTIVITY OF BELLEVALIA EDIRNENSIS ÖZHATAY & MATHEW (ASPARAGACEAE) CALLUS TISSUE EXTRACTS

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ABSTRACT

The genus *Bellevalia* is represented by about 80 species, mostly spreading on the Mediterranean region. There are 33 species of the genus *Bellevalia* in Turkey and 21 of these species are endemic. Therefore, this type of endemism rate in Turkey is 62,5%. There are three *Bellevalia* species in Trakya and only *Bellevalia edirnensis* is endemic to Balkans. According to IUCN (International Union for Conservation of Nature) Red List Categories *Bellevalia edirnensis* is CR (critically endangered). In this study, the anti-alzheimer activity of the callus extracts of *Bellevalia edirnensis* was investigated. After collecting *Bellevalia edirnensis* seeds from its natural habitat, callus tissues obtained as a result of mature embryo culture and the callus tissues were extracted with 100% of ethanol. Its anti-alzheimer activity was determined using the Ellman method, which is a spectrophotometric method. Galantamine was used as a standard. The concentrations of substances and standard drug were prepared at 4000 ppm. Results were calculated as % inhibition with standard deviations. Anti-alzheimer activities of callus tissue culture were determined at 10, 25, 50 and 100 µM and the inhibitions were 18.87±1.11, 26.16±0.27, 34.14±0.54 and 48.86±1.42 µM, respectively. The anti-alzheimer activity of galantamine, was found to be 84.81±0.27, 83.67±0.17, 83.09±0.23 and 81.75±0.76 µM, respectively. According to these results, it has been found that *Bellevalia edirnensis* has moderate anti-alzheimer activity.

Key words : Endemic Plant, Anti-alzheimer activity, Embryo Culture, Biotechnology

**DETERMINATION OF THE ANTIDIABETIC ACTIVITY OF CALLUS TISSUE
EXTRACTS OF BELLEVALIA EDIRNENSIS ÖZHATAY & MATHEW: AN
ENDEMIC PLANT FROM BALKANS**

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ABSTRACT

The genus *Bellevalia* Lapeyr is represented by about 80 species, mostly spreading on the Mediterranean region. *Bellevalia* Genus has 33 taxa in Turkey and 21 of these endemic. Therefore, this type of endemism rate in Turkey is 62,5%. Hazard category of *Bellevalia edirnensis* according to IUCN (International Union for Conservation of Nature) criteria is CR (critically endangered). In this study, the antidiabetic activity of the callus tissue extracts of *Bellevalia edirnensis* ÖZHATAY & MATHEW endemic plant was investigated. After collecting *Bellevalia edirnensis* seeds, callus tissues obtained as a result of mature embryo culture and the callus tissues were extracted with 100% of ethanol. Its antidiabetic activity was performed according to α -glucosidase inhibition assay. Genistein was used as a standard. The concentrations of substances and standard drug were prepared at 1000 ppm. Results were calculated as % inhibition with standard deviations. Antidiabetic activities of callus tissue culture were determined at 10, 25, 50 and 100 μ M and the inhibitions were 7.03 ± 7.82 , 12.48 ± 5.24 , 14.21 ± 5.14 and 15.72 ± 2.05 μ M, respectively. The antidiabetic activity of genistein, was found to be 30.21 ± 4.14 , 60.90 ± 4.39 , 65.38 ± 2.49 and 82.62 ± 2.90 μ M, respectively. According to these results, it has been found that *Bellevalia edirnensis* has moderate antidiabetic activity.

Key words : *Bellevalia edirnensis*, Antidiabetic activity, Embryo Culture, Biotechnology

ULTRA FAST LIQUID CHROMATOGRAPHIC (UFLC) ANALYSIS OF CAPSAICINOIDS IN CHILLI SAUCE

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ABSTRACT

Plant secondary metabolites are small natural compounds synthesized either as defensive chemicals against environmental stress, or as hormones mediating plant growth and development. Since 1970s, a growing number of studies of plant secondary metabolites have been initiated; their chemical, biological and physiological properties, as well as medicinal values and environmental fate remain of interest to scientists till today. Capsaicinoids are biosynthesized as secondary metabolites by chilli sauces. Their major components of capsaicinoids are capsaicin (CPS) and dihydrocapsaicin (DCPS). In current study, quantification of the capsaicinoids in chilli sauces based on a sensitive ultra fast liquid chromatography (UFLC) method and derivatization with dansyl chloride (DNS-Cl) is described. Phenol groups within the capsaicin and dihydrocapsaicin are suitable for derivatization reaction with dansyl chloride (5-(dimethylamino) naphthalene-1-sulfonyl chloride) in a pH medium adjusted to pH 10 with 0.5 M sodium bicarbonate which leads formation of a derivative highly fluorescent properties that can be measured at 520 nm following excitation at 360 nm wavelength. Separation of the compounds was performed on a chromatographic system having a mobile phase formed by a mixture of methanol and acetic acid solution (0.5 M, pH 7.0 with NaOH) under gradient elution with a flow rate of 0.4 mL/min using a C18 column (100 * 4 mm, 3µm). The retention time values observed are around 4 min. The calibration graph for capsaicin and dihydrocapsaicin was linear from 0.02 to 200.0 µg/mL. The proposed method can be used effectively for quantification of capsaicinoids in chilli sauces. The proposed analytical procedure represents a simple, time and cost effective method with a suitable selectivity for the quantification of capsaicinoids in chilli sauces which can be a method of preference in food industry.

Key words : Capsaicin, Dansyl chloride, Dihydrocapsaicin, UFLC, Validation

A NEW HPLC METHOD FOR THE DETERMINATION OF ALLICIN AND S-ALLYL CYSTEINE IN GARLIC (*ALLIUM SATIVUM L.*) EXTRACTS

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ABSTRACT

Allium sativum L., which is known as garlic, is a member of Liliaceae family, is a foodstuff with various medical effects antibacterial, antispasmodic, anticancer, antihyperlipidemic, hypotensive, vasodilator, antiviral. Due to the uncomfortable and persistent flavor, the food preparations contain s-allyl cysteine as an alternative to allisin, which is an end product of fermentation of allisin. In this study, a new high performance liquid chromatography method was developed to determine the amount of allisin and s-allyl cysteine present in *Allium sativum* L. extracts. In the method, a mobile phase system consisting of C-18 column (5µm * 4.6 * 150 mm) and ethanol water isocratically eluted with the flow rate of 1 mL/min. Measurements were made at 254 nm in the method used for UV detection. Retention times for allisin and s-allyl cysteine were 11 and 2.4 min, respectively. The method was validated according to ICH criteria. The linearity of the method is between 2-100 µg/mL and 5-30 µg/mL for allisin and s-allyl cysteine, respectively. Relative standard deviation values of the same day analyzes were calculated between %0.36-1.21. The relative standard deviation between %4.78-6.32. This method, developed and validated, has been applied to three different trade extracts. This new method which is quite fast, simple and economical, can be used in the analysis of *Allium sativum* L. extracts, which are named as black garlic in the contents of food supplements.

Key words : Allium sativum, Allicin, S-Allyl Cysteine, HPLC-UV method

DESIGN AND INVESTIGATION OF INDUCED TRANSMISSION FILTER USING MULTI-LAYER DEPOSITION IN 532 NM AND 1064 NM

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ABSTRACT

In this paper, the design of induction transducer filters at 532 nm and 1064 nm is studied and this design is comprised of multilayer dielectric materials such as TiO₂, SiO₂, MgF₂, ZrO₂, and Ag. The highest throughput of filters is caused by non-absorbent dielectric interference films. On the other hand, the bandwidth is also increased by increasing the number of layers, which is technically difficult to do. One way to solve this problem is to use metal and create an induction filter. Induction filters are filters that need to be introduced to many optical concepts such as reflection, crossing, anti-reflection, ejaculation destruction factor, and so on. Transactional filters are a type of bandpass filters that pass through a band of wavelengths and reflect other wavelengths. To build these filters we first determine the optical constants, layer thickness, layer admixture, and environment.

Key words : Induced Transmission Filter, multi-layer, optic, deposition

**CORRELATION BETWEEN THE MULTIFRACTAL STRUCTURE AND
CRYSTALLINE PROPERTIES OF SYNTHESIZED BI DOPED ZNO
NANOPOWDERS**

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ABSTRACT

Semiconductor oxides have received growing interest in recent decades, for their application in several fields including the manufacture of varistor devices. In this paper we investigate one of the best materials to obtain excellent varistor device, it is ZnO material. To do this pure and Bi doped ZnO nanopowders have been synthesized at different sintering temperatures by a soft chemistry method, the sol-gel route. Investigations were made by XRD and AFM to determine structural properties and morphological grainsizes of Bi phases. The electrical characteristics J(E) were measured to correlate these results with the varistor effect. XRD spectra confirmed the würtzite structure and the presence of many transition phases for each sintering temperatures. On the other hand TEM images allowed us to study the location of different phases, their morphology and the size of particles. A large capacity of absorbance with a considerable amount of water in a small volume at higher temperatures is obtained and a good optimization of nano varistor performances has been recorded.

Key words : Varistors, Sintering temperature, Transition phases.

**THE DC/AC ELECTRICAL AND GAS SENSING PROPERTIES OF CD-DOPED
ZNO SENSORS**

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ABSTRACT

We report a cheap and productable Successive Ionic Layer Adsorption and Reaction method to synthesize Cd doped ZnO sensors. Various Cd doping was used for this research and the effect of Cd doping amount was studied. The DC/AC electrical and gas sensing properties of films are investigated as a function of operating temperature and the effect of gas concentrations. It was found that the amount of Cd doping effects the DC/AC electrical properties. For gas sensing properties, the maximum value was found and after that the sensing properties was studied in detail.

Key words : gas sensors, impedance, dielectric

TWO-TIER TEST ABOUT ELECTROSTATIC PHENOMENA TO DIAGNOSE STUDENTS' CONCEPTUAL REASONING

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ABSTRACT

Since the advent of constructivism in the nineties, many research done about students' conceptual representations of physical concepts, such as heat and temperature (Chua et al., 2012), force, movement and gravity (Bar et al., 2016)), current and voltage (Métioui and Levasseur, 2011), electric charge (Bilal and Erol, 2009; Criado and García-Carmona, 2010). Most of the conceptual representations identified are erroneous relative to scientific explanations despite teaching. In the electrostatic, the central theme of the present study, which researches with students from secondary school to university, shows that most conceptual difficulties stem from a gap in the representations of the electric charge concept. For that, some research develops constructivist sequences relating to the teaching of electrostatic and helps the student understand the concepts of charge (Baser and Geban, 2007). However, despite a significant contribution from this research, most educators do not consider the students' conceptual difficulties, widely diffused in the review of the international literature. Many factors explain this fact: the training of teachers in didactics, the curriculum's constraints, and many students in the classrooms. Coppens et al. (2009) point out in this regard that "[...] physics teachers often do not have the time or the didactic skills necessary to detect these conceptions." (p. 37) To overcome some of these difficulties, more and more researchers developed two-tier diagnostic tests to elicit students' misconceptions about 1. Electrical circuits (Hildegard, 2017; Métioui and Trudel, 2020), 2. Mechanics (Kaniawati et al., 2019), 3. Heat, temperature, and energy (Gurcay and Gulbas, 2015; Kamcharean and Wattanakasiwich, 2016), and 4. Electrostatic (Hermita et al., 2017). Note that these developments allow teachers to obtain quick information on their students' conceptual understanding before and after teaching. There are few two-tier tests on topics in electrostatic. In this study, we developed a Two-Tier Test about electrostatic to diagnose students' conceptual difficulties. At first, we proceed to elicit their alternative conceptions with classical methods such as a paper-pencil questionnaire. We have retained three questions with two choices (True or false), and they had to justify their decision. The justifications stage is crucial since it allows us to be sure that the student's choice is not unpredictable and founded on conceptual reasoning. For that, the questions selected cannot be solved by referring to formulas or techniques learned mechanically. Secondly, we constructed the two-tier test from the students' conceptual representations identified following the data analysis from the paper and pencil questionnaire. The two-tier diagnostic test developed in the present research will help educators to identify their students' alternative concepts about electrostatic phenomena.

Key words : Two-tier test, electrostatic, high school, university, students

HISTORICAL DEVELOPMENT ABOUT DALTON, THOMSON, RUTHERFORD, BOHR, AND SCHRÖDINGER ATOMIC MODELS: CONTINUITY OR EPISTEMOLOGICAL RUPTURE?

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ABSTRACT

The research results on the study of the nature of science (NOS) are unanimous. Educators should take account of their teaching of the historical, social, and epistemological dimensions in the construction of science and technology (Niaz, 2009; Métioui & Trudel, 2013). In this perspective, the traditional teaching (experimental findings/laws/theories) is questioning because, in such education, we do not present to the students a "glimpse of scientific practice imbued with arguments, controversies, and competition between rival theories/explanations." (Niaz et al., 2002, p. 524). The historian of science Thomas Kuhn (1970) refers to the notions of paradigm and paradigm shift to explain how science constructs. For him, the paradigmatic change that he qualifies as a scientific revolution is not just a matter of logical-mathematical considerations. This research aims to clarify the paradigmatic framework of each of the atomic models developed by Dalton, Thomson, Rutherford, Bohr, and Schrödinger. Then, we will see that these models are epistemologically in rupture. They provoke change in the rules that govern the practice of scientists in the study of the composition of matter and its physical and chemical properties. Even if these scientists kept in their vocabulary the word atom, this last acquires a new meaning to what the Greek atomists Leucippus and Democritus had advanced. This research aims to specify the theoretical and experimental framework underlying each model's development to show if they are epistemologically continuous or discontinuous. As a result of the analyzes carried out, the atomic models, from Dalton to Schrödinger, are in logical discontinuity. The modes of construction of knowledge, developed in each model, are not based, among others, on the same epistemological premises. Besides, this study of different models allows, in a teaching and learning context, to highlight the complex mechanisms that characterize the development of atomic models that are neglecting in traditional teaching.

Key words : Atomic models, history of science, epistemology, teaching

INFLUENCE OF THE LIMING ON THE SOIL AND MORPHOLOGICAL INDICATORS OF LAVENDER GROWN IN ORGANIC AGRICULTURE

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ABSTRACT

The influence of liming on the content and distribution of calcium along the depth of the profile and on the growth, development and morphological changes in lavender grown in organic production was observed in the conditions of field experiment on the complex of genetically acid soils. Soil samples were collected in three consecutive years and plant samples in two. The ameliorative effect of the liming during the three years continues, although with a slower rate of neutralization of the acid positions. The applied rates of 3 and 4 t/ha, summarized for all depths showed that a stable effect in regard to acid-alkaline balance was achieved at 4 t/ha ameliorant. The applied calcium-containing ameliorants into the soil did not lead to a sharp change in the content of this element in the plant biomass. Liming had a positive effect on the leaf mass, the number of inflorescences and the overall habit of the plants.

Key words : acidity, calcium, lavender, liming, magnesium

STUDY OF THE CONTENT AND DISTRIBUTION OF ACTIVE CALCIUM ON THE SOIL PROFILE OF NON-CARBONATE SOILS IN THE KAZANLAK HOLLOW

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ABSTRACT

The content and the forms of calcium association in the soils is a complex characteristic of the plant nutrient regimes, soil buffering, condition and capacity of the sorption complex, the degree of development of the soil profile and some economic characteristics related to the general functionality and suitability of the soil for agriculture. Each of these calcium conditions in the soil is established by different research methods, and they in turn are associated with models of interpretation of the role of Ca in the respective aspect - genesis and development of the soil profile, physico-chemical characteristics of acid-alkaline balance, condition and stability of the organic-mineral absorption complex, conditions of mineral nutrition of the plants, etc. In a large part of the studied genetically acid soils it was found that the structure of harmful soil acidity was based on increased levels of easily mobile aluminum, hydrogen and manganese, as well as a strong reduction in the levels of the easily mobile exchangeable bases. In order to neutralize the harmful acidity and to cover the cost levels in the calcium balance and ultimately to increase the yield, a balance rate must be calculated, leading not to complete neutralization of the constant sorption positions, but to reduction of the toxic action of mobile aluminum, hydrogen and manganese.

Key words : acidity, buffering, calcium

EFFECT OF LEONARDITE OBTAINED FROM TWO DIFFERENT LOCATIONS ON CARBON, NITROGEN CONTENT AND CARBON NITROGEN RATIO IN SOIL

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ABSTRACT

Organic materials have an important place in the sustainability of agricultural ecosystems. Many organic materials have a direct positive effect on soil properties such as increasing the carbon storage capacities as well as improving the physical, chemical and biological properties of the soil. Leonardite is one of the most preferred organic soil conditioner, which is rich in humic acid and formed by oxidizing organic materials without being affected by carbonization processes. Leonardite has an important potential in terms of soil reclamation and crop production. In this study, changes in total carbon (TC), total nitrogen (TN) and carbon / nitrogen (C/N) ratio of sandy loam soil after applications of leonardite obtained from Kayseri-Develi (LD) and Çanakkale-Yenice (LY) with five different doses (4%, 8%, 12%, 16%, 20%) have been determined. For this purpose, the LD and LY added soil was incubated for 3 months. At the end of the incubation period, the effects of leonardites on soil total carbon and total nitrogen were investigated. Regardless of the doses applied, the effect of both leonardite applications on the C% content was found to be approximately 60% higher than the control soil. Nevertheless, the content of N% of the LD applied soils was found to be 5% lower, and 15% lower in those applied LY. Among all applications, the highest C% value was found in 20% LY application and the highest N% value was found in the soil where 8% LD was applied; the lowest C% value was determined in control, the lowest N% value was determined in 8% LY application. C/N ratios increased by 71% and 88% for LD and LY, respectively.

Key words : Leonardite, Soil, Total Carbon, Total Nitrogen, C/N ratio

GROUNDWATER GEOCHEMISTRY AND RISK OF SODIZATION OF IRRIGATED SOIL (CASE OF THE ZIBAN OASES – ALGERIA)

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ABSTRACT

The Ziban Oases are characterized by an important agricultural economical aspect which includes a divers palm tree heritage- more then 2.8 million trees. This latter, is centred in particular on the production of Deglet-Nour dates which are known for their nutritional qualities. These oases are situated under a Saharan bioclimatic stage, which confronts them to a significant water deficit of 2100 mm throughout the year. This tangible threat to sustainable development, has led farmers to an exploitation, often incidental, of the groundwater without prior knowledge of the hydro-chemical parameters or the geochemical facies of these waters. In this context; the results show that water of the groundwater is strongly mineralized with a calcium sulfate facies. The piezometric map of the aquifer has highlighted the risk of waterlogging of palm groves in the absence of an effective drainage. The salinity map of these oases showed a salinization variation between 4.33 and 34.8 dm/m, from northwest to southeast without reaching the Oued Djeddi natural outlet, also, a risk of sodization or alkalinization of these alluvial soils is palpable with pH ranging from 7.06 to 8.31 due to irrigation by these waters. The geochemical approach highlighted the contribution of this groundwater to gypsum precipitation, accompanied by calcium subtraction and a trend towards sodium chlorinated facies during the water concentration phases. The Ziban Oases are characterized by an important agricultural economical aspect which includes a divers palm tree heritage- more then 2.8 million trees. This latter, is centred in particular on the production of Deglet-Nour dates which are known for their nutritional qualities. These oases are situated under a Saharan bioclimatic stage, which confronts them to a significant water deficit of 2100 mm throughout the year. This tangible threat to sustainable development, has led farmers to an exploitation, often incidental, of the groundwater without prior knowledge of the hydro-chemical parameters or the geochemical facies of these waters. In this context; the results show that water of the groundwater is strongly mineralized with a calcium sulfate facies. The piezometric map of the aquifer has highlighted the risk of waterlogging of palm groves in the absence of an effective drainage. The salinity map of these oases showed a salinization variation between 4.33 and 34.8 dm/m, from northwest to southeast without reaching the Oued Djeddi natural outlet, also, a risk of sodization or alkalinization of these alluvial soils is palpable with pH ranging from 7.06 to 8.31 due to irrigation by these waters. The geochemical approach highlighted the contribution of this groundwater to gypsum precipitation, accompanied by calcium subtraction and a trend towards sodium chlorinated facies during the water concentration phases.

Key words : Groundwater, geochemistry, concentration factor, sodization, Ziban Oases.

EVALUATION OF MULTIELEMENT EXTRACTANTS FOR PREDICTION OF AVAILABLE PLANT NUTRIENTS IN SLIGHTLY ALKALINE SOILS IN KAHRAMANMARAS-TURKEY

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ABSTRACT

In many countries, few existing extractions such as ammonium bicarbonate-DTPA (AB-DTPA) and Mehlich 3 have long been used as a multielement soil test. A multielement extraction is attractive to soil testing laboratories because it reduces labor, time and chemical losses and allows simultaneous measurement of a few elements by using the Inductively Coupled Plasma (ICP). However, information on their efficiencies for assessing the availability of nutrients in Turkey soils is still inadequate. The objective of this study was to evaluate AB-DTPA and Mehlich 3 for simultaneous measurement of 10 elements (phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sodium (Na), iron (Fe), manganese (Mn), copper (Cu), zinc (Zn), and boron (B)) in slightly alkaline Kahramanmaras soils. Routine soil tests (Olsen for P; NH₄OAc for K, Ca, Mg, and Na; DTPA for Fe, Mn, Cu, and Zn; Hot water for B) with AB-DTPA and Mehlich 3 were employed for comparison. Pearson correlation analysis were applied to investigate the relationship between AB-DTPA or Mehlich 3 and the respective soil test. The results can be summarized as follows: 1) with both extractants were obtained the best measurement for K and Cu; 2) correlations had been found for all elements with AB-DTPA, but a relationship could not determined with Mehlich 3 for Na and B; 3) while the highest relationship was achieved in Zn ($r= 0.998^{**}$) with AB-DTPA, found in K ($r= 0.876^{**}$) with Mehlich 3; 4) while a low negative relationship at the level of 1% was found with AB-DTPA for Ca, a moderately positive relationship at the level of 1% was determined with Mehlich 3. Accordingly, simultaneous measurements of 10 elements with AB-DTPA and 8 elements with Mehlich 3 could be suggested in soils.

Key words : Multielement extractants, AB-DTPA, Mehlich 3, available plant nutrition, slightly alkaline soils

THE EFFECTS OF TILLAGE ON SOME PHYSICAL AND CHEMICAL SOIL PROPERTIES IN AN OLIVE ORCHARD IN AYDIN.

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ABSTRACT

Olives, which is one of the most valuable products in Turkey, is widely grown in the Aegean region. Therefore, good soil management is needed for both fruitful yields and for the soil sustainability. Proper tillage methods are therefore important to improve and stock soil organic matter and have major effects on the physicochemical and biological soil properties. This study results show how it changes between the soil samples taken right under the canopy, from the tree crown projection and from the rows between the trees at 0-30 cm and 30-50 cm soil depths in Aydin- Erbeyli Research Station. The organic matter content of these soils indicates higher values in the depths of 0-30 cm compared to 30-50 cm within the tree borders of all three regions. The highest amount of organic matter content was obtained on average in the untilled olive tree region. Considering the results obtained, the amount of soil organic matter had a positive effect on aggregation and the highest soil aggregate rates were observed in the canopy and border region at depths of 0-30 cm. Approximately 2.5 times more water-resistant stable aggregate percentages were in the inner border of the soil crown projection. The micromorphological visualization of the macro-aggregates (> 0.2 mm) was detailed more precisely to see the aggregation of these soils in depths of 0-30 cm. Accordingly, the thin section samples taken near the olive root region showed that the aggregation was approximately 50% higher in these soils. In addition, due to the high biological activity and the presence of organic residues, a good degree of ventilation and intensive worm waste were observed in the thin sections near the root zone. In order to ensure sustainability, the results showed that good soil management and proper tillage is required.

Key words : Tillage, olive orchard, soil organic matter, soil aggregate stability.

THE EFFECTS OF DIFFERENT MANAGEMENT SYSTEMS IN TWO LONG-TERM TILLAGE SYSTEMS IN GERMANY

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ABSTRACT

Long-term field trials are important to investigate the influence the effects of different tillage systems on soil physical and chemical properties and so their effects on yield. The focus was to find out the effects on a field crop rotation site in Dedelow to compare different methods of conventional tillage, conservation tillage and no-tillage. This plot experiment in Dedelow – Germany was created in 1985 as a factorial strip system with crop rotation. According to the results in 2007, the conventional tillage showed the highest grain maize yield values (1234 kg da-1) and the lowest were obtained in the conventional tillage system with a value of 1062 kg da-1. The soil water stabile aggregate values in all systems in both 10-15 cm and 20-25 cm soil depths were near to each other and there were no significant statistically differences between them. The soil organic matter content differences in all tillage systems were in both 10-15 cm and 20-25 cm depths nearly the same but the conventional tillage system showed higher values though. Another field trial - created in 1923 - in Berlin-Dahlem is today one of the oldest long-term field trials in Germany and in the world. This trail consists of mainly two different tillage systems as plough 17 cm and 28 cm soil depth. The grain yields for winter wheat (2007) in Berlin-Dahlem showed for both tillage systems in the "lime and farmyard manure" treatments the highest values but the shallow tillage system grain yield values were higher. The soil water stabile aggregate values in both 10-15 cm and 20-25 cm soil depths were higher according to the deep tillage system. The importance of the soil organic matter content showed its effects in the shallow tillage systems in 10-15 cm soil depth with higher values.

Key words : Tillage, soil organic matter, soil aggregate stability, maize, wheat.

**THE OPPURTINITIES USING OF TRITICALE (X TRITICOSECALE WITTMACK)
IN MARGINAL LANDS**

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ABSTRACT

Cereals, which have a large share in human nutrition and meet most of the calorie needs, are also important as both roughage and concentrate feed in animal nutrition. Marginal areas are highly inclined, uneven and low soil depth. The slope of the marginal areas is 12% in places where precipitation is less than 640 mm, while the slope is more than 18% in places where precipitation is more than 640 mm. Soil depth is below 50 cm and they are arid and inefficient areas. Triticale also occupies an important place among plants such as thyme and capers, which can be yielded by adapting to these conditions. Triticale is tolerant of harsh climatic conditions and drought and can evaluate acidic and saline soils. Its efficiency in marginal areas is quite high. Therefore, it can provide high profit with high efficiency in marginal areas. It is an important grain that can be an alternative to forage crops especially in the evaluation of marginal areas in agriculture-based regions. At the end of the 19th century, triticale breeding activities accelerated. In these studies, it was determined that triticale is an important alternative grain for the evaluation of marginal agricultural areas (unproductive, arid, salty, high slope). It has been seen that wheat and barley, which are widely produced, can yield high yields under high conditions and their grains are of high quality.

Key words : The Oppurtinities Using Of Tri kale (X Triticosecale Wittmack) In Marjinal Lands

**SOIL CLASSIFICATION IN NAGARI SUNGAI KAMUYANG, WEST SUMATRA,
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ABSTRACT

This study was aimed to examine the classification of soil in Nagari Sungai Kamuyang, West Sumatra, Indonesia by the USDA Soil Taxonomy up to the level of family. This research was conducted in Nagari Sungai Kamuyang, Luak District, Limapuluh Kota Regency, West Sumatra-Indonesia, Laboratory of Soil Science Andalas University, and Laboratory of Soil Chemistry and Laboratory of Soil Mineralogy of Soil Research Center, Bogor. This research used a survey method with several stages: Preparation, Pre-Survey, Main Survey, Soil Analysis, and Data Processing. Based on the results on the research of soil classification in Nagari Sungai Kamuyang, found differences in the results in classification of Soil in Nagari Sungai Kamuyang served Land Unit Map Sheet Solok by Soil and Agroclimate Research Center in 1990, which is only on the profile SL3 showing characteristics of Andisols while on the other profiles show Inceptisols characteristics. The results of soil classification based on the USDA Soil Taxonomy System, on SL1, SL2, SL4, SL5, SL6, and SL7 profiles were classified into Ordo: Inceptisols, Sub Ordo: Udepts, Greatgroup: Dystrudepts, Sub Group: Andic Dystrudepts, Family: Fine silt, Kaolinit, Isohypertemic, Andic Dystrudepts. SL3 profiles was classified into Ordo: Andisols, Sub Ordo: Udands, Great Group: Hapludands, Family: Medial, Amorphic, Isohypertermic, Typic Hapludands

Key words : Soil classification, USDA soil taxonomy system, Sungai Kamuyang

THE EFFECTS OF NITROGEN APPLICATIONS WITH PHOSPHORUS AND POTASSIUM ON SOME NUTRIENT ELEMENT AMOUNTS OF SUNFLOWER (*HELIANTHUS ANNUUS L.*) VARIETIES IN THRACE REGION

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ABSTRACT

This research was conducted to determine the effects of increasing doses of nitrogen (N) applications both with phosphorus (P) and potassium (K) on some nutrient element amounts of sunflower (*Helianthus annuus L.*) varieties during a two years period in 2015-2016 vegetation seasons. Increasing doses of nitrogen (0, 4, 8, 12, and 16 kg da⁻¹ N) and 8 kg da⁻¹ P₂O₅ and 8 kg da⁻¹ K₂O were applied to the soil under non-irrigated field conditions in Thrace region. It was observed that increasing the doses of N had statistically significant effect (p<0.05) on the nitrogen amounts of sunflower cultivars in both years. The highest nitrogen amount in the first year (3.02 %) and also combined of the two years results (2.92%) were found at 12 kg da⁻¹ N dose, however in the second year (2.96 %) it was determined at 4 kg da⁻¹ N dose. Increasing N doses also affected the yield and the highest yield (279.81 kg da⁻¹ and 332.64 kg da⁻¹) was found at 16 kg da⁻¹ N dose in both two years when compared to control. Increasing the nitrogen did not affect the other nutrient concentrations significantly. But the results taken in two years period were found statistically significant. The result of P, K, Mg, Cu, Zn, Mn and B were found higher in the first year than the second year. Statistically significant differences were also determined between the varieties of the sunflower on K, Ca and B amounts. It has been concluded that in addition to nitrogen, the plant nutrients such as phosphorus and potassium are also required to be up taken by the plant in order to obtain a high yield and quality product in sunflower cultivation.

Keywords: Yield, sunflower, nutrient elements, interaction

THE EFFECTS OF NITROGEN APPLICATIONS WITH PHOSPHORUS AND POTASSIUM ON YIELD AND ON SOME GROWTH PARAMETERS OF SUNFLOWER (*HELIANTHUS ANNUUS L.*) VARIETIES IN THRACE REGION

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ABSTRACT

This research was conducted to determine the effects of increasing doses of nitrogen (N) applications both with phosphorus (P) and potassium (K) on some growth parameters of sunflower (*Helianthus annuus L.*) varieties during a two years period in 2015-2016 vegetation seasons. Increasing doses of nitrogen (0, 4, 8, 12, and 16 kg da⁻¹ N) and 8 kg da⁻¹ P₂O₅ and 8 kg da⁻¹ K₂O were applied to the soil under non-irrigated field conditions in Thrace region. It was observed that increasing N doses affected the yield, yield according to 10 % moisture, and oil yield statistically significant (p<0.01). The highest yield (279.81 kg da⁻¹ and 332.64 kg da⁻¹), yield according to 10 % moisture (3995.70 kg da⁻¹ and 3213 kg da⁻¹), and oil yield (128.64 kg da⁻¹ and 152.42 kg da⁻¹) were found at 16 kg da⁻¹ N dose in both two years. However the least amounts of these parameters were found at control plots where no fertilizer applied. An increase was also occurred with the application of only phosphorus and potassium income. Effects on the plant height, table diameter, thousand grain weight, day number of 50 % flowering and physiological maturity were not found statistically significant. There was no significant difference between years except yield according to 10 % moisture and day number of 50 % flowering. However plant height (p<0.01), table diameter (p<0.05), thousand grain weight (p<0.05), and physiological maturity (p<0.05) results of the varieties were found significant. In obtaining high yields in sunflower plants; besides the varieties, it was concluded that by taking into consideration the plant nutrient concentrations in the soil, the effect of phosphorus and potassium fertilizers, which will be applied in addition to nitrogen may be important.

Keywords: Yield, sunflower, nutrient elements, interacti

CHANGES OF SATURATED HYDRAULIC CONDUCTIVITY AND SOME SOIL CHEMICAL PROPERTIES AT VARYING SOIL DEPTHS UNDER DIFFERENT SOIL MOISTURE REGIMES AND NITROGEN TREATMENTS IN A CLAY TEXTURED SOIL

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ABSTRACT

This study aimed to determine the changes of some soil physical and chemical properties at varying soil depths under different soil moisture regimes and nitrogen (N) treatments in a fine textured soil where pepper was grown in field conditions. Experiments included three different soil water regimes (100%FI (Full Irrigation), 75%FI and 50%FI) and 4 different N fertilizer doses (N₀: unfertilized, N₇₀: 70 kg N/ha, N₁₄₀: 140 kg N/ha, N₂₁₀: 210 kg N/ha). One-third of the nitrogen was applied at sowing in all treatments. The rest was applied through fertigation through growing period. Irrigation interval was set as four days based on evaporations from Class A pan. The results of the study showed that the effects of N treatments under different soil moisture regimes on some soil physical properties (field capacity, permanent wilting point, available water capacity and bulk density) except saturated hydraulic conductivity (K_{sat}) for 0-30 cm depth did not differ significantly across treatments. However, the K_{sat} was not affected by treatments at the lower soil depths (30-60 and 60-90 cm). Soil moisture regime x N treatment interactions for 0-30 cm depth did have significant effects on the electrical conductivity (EC), cation exchange capacity (CEC) and K_{sat}. EC, available P₂O₅, available K₂O, organic matter and CEC values of the soils increased with increasing N treatments under different soil moisture regimes. In addition, the soil properties showed differences with soil depth. Significant positive correlations were observed between K_{sat} and EC (0.376*), between available P₂O₅ and CEC (0.554**), between available K₂O and CEC (0.479**).

Keywords: Electrical conductivity, Inorganic fertilizer, Saturated hydraulic conductivity, Soil nutrition, Soil water contents

INVESTIGATION OF SYNTHESIS AND ELECTROCHEMICAL EFFICIENCY OF CARBON SUPPORTED Pd-OS/WO₃-C ANODE CATALYSTS BY THE POLYOL METHOD FOR DIRECT METHANOL FUEL CELLS

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ABSTRACT

With the increase of industry in the world, energy needs to increase rapidly. Scientific environments and energy producers; Since the fossil energy resources are limited and these energy resources are in danger of being exhausted in the future, they have turned to alternative energy sources. Fuel cells are also one of the most important energy sources of the future. In recent years, direct feed fuel cells have been among the most studied topics due to their advantages such as easy transportation, refueling, and high energy conversion. Pd is a good catalyst in the synthesis of small organic molecules. However, Pd fuel cells are poisoned under these conditions with CO gas formed at low temperatures. In this study, it has been investigated that the Pd-Os/WO₃-C catalyst will be a good methanol fuel cell catalyst in studies with direct feed methanol fuel cells. The catalyst's polyol method was prepared and the effect of the catalyst preparation method on the methanol electrooxidation activity was investigated. The catalysts were investigated by CV measurements and CA measurements, and the catalysts' ability to oxidize methanol was investigated. according to the results obtained, Os-Pd / WO₃-C catalyst prepared for increasing the efficiency of methanol fuel cells; As it is a durable, cheap and active electrode material that makes methanol oxidation more efficient, it has been found that it can be used directly as an anode catalyst in methanol fuel cells.

Key words : Fuel cell, methanol, Pd, Os, polyol method.

PRODUCTION OF K₂NiO₄-TYPE MATERIALS AS NEW CATHODE MATERIALS FOR SOLID OXIDE FUEL CELLS FUEL CELL FOR UNMANNED AERIAL VEHICLES

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ABSTRACT

It seems to be a very good option to use this energy source in unmanned aerial vehicles, since fuel cells can provide up to 3 times more flying time compared to the same weight lithium polymer batteries currently used in terms of weight-to-fly time ratio, and developments in the fuel cell are investigated very quickly. Developments and successes in this area will also enable new studies to expand the fuel cell and expand the areas where it can be applied. A fuel cell is a device that directly, and continuously converts the stored chemical energy into electrical energy. Depending on the electrolyte materials used, there are several fuel cell types and among them, solid oxide fuel cells (SOFCs) have received much attention because of their high energy conversion efficiency and fuel flexibility. The material selection is very important for fuel cell performance. The requirements for cathode materials are high electronic and low ionic conductivity, high porosity, and chemical compatibility with other components of the fuel cells. K₂NiF₄- structure materials are promising cathode materials. Pr_{2-x}Sr_xCoO₄ (x= 0- 2) and Sr_{1,4}La_{0,6}Mn_{1-x}CoxO_{4-δ} materials were synthesized using conventional solid-state reaction method. Their structures and morphologies were investigated by room temperature XRD and SEM. The chemical compatibility of the prepared cathode with a common solid electrolyte (samarium-gadolinium co-doped ceria has been checked by means of PXD). The effect of the amount of compression during the assembly of the fuel cells, the use of the pressurization valve during the operation of the fuel cell and the times of opening and closing of this pressurization valve on the performance of the air-permeable permeable membrane K₂NiF₄- structure fuel cell are examined, and the performance of the produced fuel cell is observed over time and experiments are carried out on unmanned aerial vehicles.

Key words : Unmanned aerial vehicle, solid oxide fuel cells, membrane.

THE IMPORTANCE OF ENERGY IN LOGISTICS SECTOR

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ABSTRACT

In the energy sector, it is important to find the raw material resources necessary for production as much as production, how much energy can be produced from these resources, to extract the resources, to move to the production areas, and to market the produced energy. These factors, which are important in energy production, should be determined in advance and planning should be done. Among these factors, the connection between energy and raw materials, and the transportation of materials to be used in the construction of power plants is important. Because logistics service is very important both for the transportation of the materials required for the installation of the facilities where the energy will be produced and for the transportation of the raw materials necessary for the energy production. If the equipment and materials required for the installation of the facilities such as power plants, refineries cannot be brought to the installation site in time, the installation of the facility is delayed and the enterprises are economically damaging. In the transportation of raw materials, when there is a delay in logistics services, the production is disrupted, and the enterprises are both harming and losing their reliability. In logistics services, it is also important to deliver the equipment, materials and raw materials instead of carrying them intact, without damage. Energy sector and logistics sector are sectors that are interconnected as fields of activity. For these reasons listed above, relations between logistics services and energy are extremely important.

Key words : Energy, Logistics, Raw Materials, Manufacturing, Service

**A STUDY ON COMPARISONS OF PARAMETER ESTIMATION METHODS FOR
THE EXPONENTIATED WEIBULL DISTRIBUTION**

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ABSTRACT

Exponentiated Weibull distribution, introduced as an extension of the Weibull distribution, is characterized by bathtub shaped, unimodal failure rates besides a broader class of monotone failure rates. In this study, we deal with the problem of estimating parameters of the two-parameter exponentiated Weibull distribution. First, we investigate Maximum likelihood (MLE) method to estimate unknown parameters. The asymptotic normality of the MLE are used to compute the approximate confidence intervals for these parameters. Markov Chain Monte Carlo (MCMC) samples using Metropolis Hasting sampling scheme are used to produce the Bayes estimates and the credible intervals for the unknown parameters. The performance of classical and Bayesian estimators are compared with respect to their mean squared errors through a simulation study. Finally, results from simulation studies assessing the performance of the maximum likelihood and Bayes estimators are discussed.

Key words : Bayesian Estimation, Markov Chain Monte Carlo, Metropolis Hasting sampling

DETERMINATION OF BUDDING SUCCESS IN LOQUAT BUDDED ON HAWTHORN ROOTSTOCK

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ABSTRACT

The purpose of the work was to find out the success of budding of loquat (*Eriobotrya japonica* Lindl.) on hawthorn (*Crataegus* spp) rootstock and the effect of this rootstock on the growth of the nursery plants. For this purpose, Hafif Çukurgöbek loquat cultivar was budded on the hawthorn rootstocks with the chip budding method on 6th May and 24th June, 2020. Loquat seedling was used as the control rootstock in the study. The experiment was laid out in a split-plot experimental design with nine replications and ten plants per replication. The percentage values were transformed by the angle transformation before submitting the data to the analysis of variance. The means were separated by Tukey's Honestly Significant Difference (HSD) method at $p=0.01$. The average success rate of budding was better in June (78.39%) than in May (28.43%). In the both budding periods, it was found that buddings on loquat seedling (respectively, 50.0% and 88.6%) were more successful than the ones on hawthorn (respectively, 68.18% and 6.86 %). However, the highest bud sprout rate (100 %) was taken from the buddings which were done on hawthorn rootstock in June. Budding performed in June gave the higher values (86.53%) of bud sprout rate than the budding done in May (35.87 %). As result, preliminary data obtained from this research show hawthorn rootstock as dwarf rootstock in intensive loquat cultivation can be used. However, researches need to be continued, especially to determine all the characteristics regarding yield and fruit quality.

Keywords: *Loquat, hawthorn, budding success, high density.*

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EFFECTS OF QUINCE ROOTSTOCKS ON PHENOLOGICAL PROPERTIES AND FRUIT SET RATES IN HAFIF ÇUKURGÖBEK LOQUAT CULTIVAR

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ABSTRACT

In the research, it was aimed to determine the effects of different quince rootstocks on phenological stages and inflorescence properties besides to the success of obtaining dwarf loquat nursery, which was a requirement of intensive loquat cultivation. For this purpose, two years old tree of Hafif Çukurgöbek (HÇG) loquat cultivar budded on BA-29, Quince-A and Quince-C quince rootstocks was used. The experimental plants were planted at high density with planting spaces of 1.0 m x 0.5 m in January 2017. The plants were irrigated by drip irrigation since their transplantation. The experiment was arranged according to a completely randomized designed with 5 replications and 6 plants were used in each replicate. In the study, effects of the rootstocks on the flowering periods, the inflorescence characteristics, flowering and fruit set rates of the cultivar were evaluated. Flowering period of the Hafif Çukurgöbek/Quince rootstock combination were completed between 12 Nov. and 26 Jan. The first flowering was observed on the plants with Quince-C rootstock and Quince-A, plants with BA-29 rootstock began flowering later. Plants with Quince-C rootstocks reached full bloom seven days before the other rootstocks. In terms of the fruit set, BA-29 and Quince-C rootstocks were found earlier than the Quince-A rootstocks. The earliest fruit ripening was observed on plants with BA-29 rootstock (18 May). Blossoming percentages were significantly affected by rootstocks. The highest blossoming rate was observed on Quince-C (97.77%), followed by BA-29 (88.90%). Effect of the rootstocks on initial fruit set, fruit set and final fruit set rates were found to be statistically significant at $P < 0.01$ level. The highest rates were taken in plants with BA-29 rootstock and this was followed by Quince-C. As a result, in terms of the several parameters, Quince-C and BA-29 rootstocks were found better than the Quince-A.

Key words: Loquat, dwarf rootstock, flowering, fruit set

Acknowledgements

This research was supported by the Hatay Mustafa Kemal University, Scientific Research Projects Unit (18-YL-027).

ASSOCIATION OF CANOPY SPECTRAL REFLECTANCE INDICES AND YIELD COMPONENTS OF WINTER WHEAT (*TRITICUM AESTIVUM* L.)

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ABSTRACT

Grain yield of wheat is a complex trait made up of the interaction between different yield components and environmental effects. Due to the importance of yield traits, breeders need efficient and precise methods to measure differences among genotypes. Since that spectral proximal sensing is promising for high-throughput non-destructive phenotyping, recent findings suggest that multispectral proximal sensors can be used in place of labour intensive methods to estimate specific plant traits. The objective of this study was to evaluate the impact of different spectral vegetation indices (SVI) in assessing stem height and spike length in 4 winter wheat genotypes grown in different conditions of seed priming. Seeds of each winter wheat genotypes were primed with different concentrations of zinc oxide nanoparticles (ZnO NPs) and after sown in soil pots. Spectral reflectance from the plants at different growth stages during vegetation was measured using an active multispectral, optical sensor namely Plant-O-Meter. Since that device provides four indicative wavelengths between 465, 535, 630 and 850 nm, several SVIs were selected and calculated. The results revealed that most of SVIs measured at full flowering stage were positively correlated ($P < 0.05$) with stem height and spike length of wheat. The greatest positive association was observed for the following SVIs: normalized difference vegetation index cereal yield (NDVI), green normalized difference vegetation index (NDVI_g), green ratio vegetation index (GRVI), green chlorophyll index (GCI), green soil adjusted vegetation index (GSAVI), green optimized soil adjusted vegetation index (GOSAVI), normalized difference water index (NDWI), transformed difference vegetation index (TDVI), infrared percentage vegetation index (IPVI) and red blue normalized difference vegetation index (RBNDVI). Negative correlation was observed for normalized difference water index (NDWI) in all observed stages. Overall, statistically significant correlations were more influenced by the phenological stage of estimation and the index used.

Keywords: *Wheat, Spectral reflectance, Zinc oxide, Nanoparticles.*

BIODEGRADABLE ANTIBACTERIAL FOOD PACKAGE

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ABSTRACT

Plastic is one of the most commonly used materials for food packaging. Plastics are generally produced using oil derivative materials, which is both high in cost and takes too long to recycle. Nonetheless, plastic packages are also one of the most important reasons underlying environmental pollution. Thus, the aim of this research is to obtain silver nanoparticles through thyme, rosemary and daphne extracts and observe their antibacterial properties in order to produce a biodegradable antibacterial food package by using green polymers with the successful extracts. First, the herb extracts were obtained and used for obtaining silver nanoparticles. The antibacterial effects of the extract + silver nanoparticles were tested on *S. aureus*, *E. coli*, *B. subtilis*, *V. parahaemolyticus* bacteria using the disk diffusion test. As a result, we observed that the inhibition effects of thyme and daphne extracts on bacteria are higher compared to other extracts. Therefore, we produced three different food packages using thyme extract and green polymers (starch, PVA and HEC). These packages were used on meat and cheese. As a result of the research conducted, we determined that the use of food packages containing PVA+HEC+Thyme is more beneficial than using packages that take too long to recycle and are unhealthy and harmful to nature.

Anahtar Kelimeler: Recyclable, Biodegradable, PVA, HEC, Thyme

INVESTIGATION OF DANDELION (*TARAXACUM OFFICINALE*) PLANT AS AN ALTERNATIVE SOURCE FOR A NATURAL RUBBER PRODUCTION

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ABSTRACT

Rubber that is one of the most important polymers naturally produced by plants is a strategic raw material. Since they are used in many areas and natural rubber sources are highly destroyed, synthetic rubbers are produced especially using some petroleum-based polymers. In this study, it is intended to find a natural alternative to the rubber trees that are endangered and to the synthetic rubbers that are difficult to recycle and expensive. In this study, first, *T. officinale* plant was collected from natural areas through such a way that the roots of the plant were not damaged. After the well-washed plant roots were broken into small pieces, they were kept in different solvents for 24 hours. After they filtered and formic acid was added, the prepared samples were kept for 24 hours. The part sinking to the bottom was taken and dried in a fume hood. Since the obtained material was in a small amount, the test paste was prepared by using 100 g of the obtained rubber, 100 g natural rubber from rubber tree, 1 % sulfur and 2 % extender material. After the paste had reached the desired consistence, it was taken into hot press machine and the vulcanization process was completed (at 140 °C, for 7 minutes). Because too little substance in less variety was added into the molded material, vulcanization curve test was only performed by the rheometer machine. As a result of the study, it was determined that by adding some substances to the structure of the obtained rubber during the vulcanization according to the desired purpose, it can be used in various fields, and thus, *T. officinale* can be an alternative natural rubber source.

Key words: *Taraxacum officinale*, rubber, synthetic, recycling

NATURAL SOLUTION FROM MEXICAN MARIGOLD (*T. ERECTA* L.) AGAINST THE VAGINITIS PROBLEMS OF WOMEN

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ABSTRACT

One of the most common health problems encountered by women is vaginal discharge that occurs due to various reasons. Vaginitis that manifests itself with these vaginal discharges is the number one disease seen in women. In this study, it was aimed to investigate the effects of extracts, obtained from *T. erecta*, on some microorganisms that cause discharges occurring out of menstrual cycles in women, and to find natural, practical and useful solutions. In the study, first of all, a survey was conducted to obtain data about how much women have knowledge about this subject and the sample of the Mexican marigold (*T. erecta*) to be used as a material were collected and dried. Three different extracts were obtained from the flowers of the plant, its leaf+stem and its flower+leaf+stem parts. The antimicrobial activities of these extracts were determined on *Enterococcus faecalis*, *Escherichia coli*, *Lactobacillus acidophilus* bacteria and *Candida albicans*, which cause vaginitis and urinary tract infections. As a result of the study, it was determined that those other than the leaf+stem extract were effective on the bacteria and that since the extract obtained from flowers does not have much effect on the *L. acidophilus*, which is important in vaginal flora, this extract must be used in the products to be produced. Using the obtained extract, natural, practical, and easily accessible gel and pads, which are alternative to the medicines that are used when faced with these problems and that are generally synthetic and affect other organs in the body, have been produced. These products can be also helpful in the treatment of urinary tract infections. It is thought that the produced products will be developed and brought into use by experts in the field.

Key words: Vaginal discharge, vaginitis, *T. erecta*, gel, pad, urinary tract infections

INVESTIGATION OF THE EFFECTS OF WALL PAINT AND FILMS PRODUCED USING ALOE VERA GEL IN RADIATION PROTECTION

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ABSTRACT

Emission or transmission of energy in the form of electromagnetic waves or particles is called radiation. Besides natural radiation, people are also intertwined with electromagnetic waves due to the development of technology. In this study; It is aimed to investigate the effect of Aloe vera in the protection of ionizing and non-ionizing radiation by producing wall paints and films containing aloe vera gel. The plants, in the form of seedlings, were multiplied and the gel was obtained when the leaves got matured. Gel was used to produce wall paint and film. The protective effect of the wall paint against ionizing radiation was analyzed by using neutron counting with Polymaster device and gamma counting with HpGe detector. The shielding effect of non-ionizing radiation features was determined by Using the 3 film, produced with different properties, shielding effect of non-ionizing radiation was determined by RF analysis. As a result of the study, it has been determined that the protective feature of the wall paint against ionizing radiation was not the desired size, but the shielding feature of the films against non-ionizing radiation was at the same level with the standards. By using the data obtained, glass films, tulle, curtains and other protective products can be produced by using natural materials instead of chemicals and materials that are difficult to recycle, answers to natural problems can be found natu

Key words: *Aloe vera*, Wall Paint, Film, Ionizing and Non-Ionizing Radiation

ALOEHEC BAND-AID AND DIAPERS

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ABSTRACT

Some of the most important problems in injuries are wound care and hygiene. Bleeding and discharge in the wounds cause some problems, microorganisms gain resistance against the chemical antibiotics used. Today, various polymeric films are produced and studies are carried out for this purpose. In this study; It has been investigated whether the films produced using aloe vera gel and HEC (Hydroxyethyl cellulose) natural polymer can be used as band-aid and in diaper production. Gel was obtained using mature leaves of the plants being grown. In the study, four different films were produced, not containing aloe vera gel, in the amounts of 1%, 5% and 10% gel. Dry weights of the films were measured by taking samples of 1 cm² from the films. The samples were weighed again after waiting for 10 minutes in an aqueous environment and their water absorption capacities were calculated. It has been determined that the water absorbing capacity of the film containing 10% gel is 70% and this film was used in the tests made with diaper and band aid. It has been determined that the films produced by using the plant with antimicrobial and tissue regenerating components can be used in wound treatment due to the high liquid absorption capacities, especially wound tracking can be performed in open wounds, and diapers can be produced for children with sensitive skin by using aloe vera instead of chemical water absorbents and antibiotics. In addition, it has been observed that answers to current problems such as antibiotic resistance and recycling can be found naturally.

Key words: Aloe vera, HEC, Band-Aid, Diapers

DETERMINATION OF LIGNAN AND TOCOPHEROL LEVELS IN SOME SESAME POPULATIONS AND VARIETIES

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ABSTRACT

Sesame (*Sesamum indicum* L.) is widely grown in tropical regions of the world and in our country in the Aegean, Mediterranean and South eastern Anatolia regions. The oil obtained from sesame is differentiated from all other vegetable oils due to its contribution to nutrition and health. In this study, the amounts of tocopherol, tocotrienol, and lignan (sesamin and sesamol) contained in the seed oils of 19 sesame populations and 5 sesame varieties obtained from different locations of Anatolia and grown in Çukurova were examined. It was determined that the α -tocopherol ratios in sesame seed oils ranged between 1.08-2.63 $\mu\text{g/g}$ oil and an average of 1.51 $\mu\text{g/g}$ oil. It was determined that α -tocotrienol ratios varied between 0.96-1.80 $\mu\text{g/g}$ oil and average 1.26 $\mu\text{g/g}$ oil. It was determined that the γ -tocopherol ratios ranged between 41.50-75.74 $\mu\text{g/g}$ oil and the average was 54.12 $\mu\text{g/g}$ oil. It was determined that the total tocopherol ratios ranged between 42.93-76.92 $\mu\text{g/g}$ oil and an average of 55.64 $\mu\text{g/g}$ oil. In the results of the research, unlike the literature, the determination of α -tocotrienol and the low γ -tocopherol ratios stand out. It was determined that the ratios of sesamol among the lignans determined in sesame seed oils varied between 0-0.59 $\mu\text{g/g}$ oil and the average was 0.19 $\mu\text{g/g}$ oil. It was determined that the sesamin ratios ranged between 2.34-14.31 mg/g oil and an average of 7.53 mg/g oil. It was determined that the sesamol ratios ranged between 0.23-1.65 mg/g oil and an average of 0.80 mg/g oil. From the results of the research, it has been determined that the sesamin rates are quite high, unlike the literature, especially in sesame populations.

Key words: Sesame seed oil, tocopherol, tocotrienol, sesamin, sesamol

Acknowledgement: This study was carried out with the support of Adana Alparslan Türkeş Science and Technology University Scientific Research Projects Coordinator. Project Number: 18103035

**DIVERSITY OF EPIPHYTIC FUNGI OF LEAVES OF *PUNICA GRANATUM*,
VARIETY MESSAAD (DJELFA, ALGERIA)**

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ABSTRACT

The fungal biodiversity in orchards present in arid environments seems to have an arsenal of species very efficient in the face of difficult biotic and abiotic conditions. Indeed, the beneficial interactions between these microorganisms and their host can offer very interesting opportunities, in terms of efficiency and sustainability for agriculture, especially in the current environmental situation. The identification of this fungal diversity associated with local varieties is the fundamental basis for understanding the operating modes which govern these interactions, and which ultimately exhibited significant advantages in the agronomic, ecological and socioeconomic fields. Our study focused on a local Algerian variety, very resilient, conducted according to the principles of conservation agriculture. It is *Punica granatum*, variety Messaad. We have carried out a census of the diversity of leaf epiphytic fungi associated with it. The sampling of twelve vigorous trees was carried out in the region of Messaad (Djelfa, Algeria), for the fall season 2018. The isolation of leaf epiphytic fungi was done according to the protocol of Pusz et al (2015). The supernatant was cultured on PDA medium, at room temperature. A determination according to the macroscopic and microscopic characteristics was carried out for the strains taken. Eleven genera have been identified; the others have been grouped under the nomenclature of US (unidentified strains). The most abundant genera are *Cladosporium*, *Aspergillus*, *Aureobasidium* and *Ulocladium*. It was noted that the majority of isolates identified present a dark pigmentation of the walls, due to the presence of melanin in the latter. It should also be noted that the fungal genera identified are characterized by their ubiquity. Our results show the presence of epiphytes on the leaves of our tree. The epiphytes whose interactions are generally of the commensal type, can following established affinities with its host, switch to an endophytic interaction thus taking part the resilience of our variety.

Key words: Conservation agriculture, Messaad pomegranate, epiphytic fungi, leaves, aridity.

**EFFECTS OF BISPHENOL-A ON THE ACTIVITIES OF GLUTATHIONE
PEROXIDASE AND SUPEROXIDE DISMUTASE IN THE GILL OF CRAYFISH
(*ASTACUS LEPTODACTYLUS*)**

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ABSTRACT

Bisphenol A (BPA) is one of the important component of plastics. BPA is considered an endocrine disrupter as it interferes with the production, secretion, transport, and function of natural hormones. In the present study, the acute toxic effects of BPA were assessed on the gill of crayfish (*Astacus leptodactylus*) by measuring the activities of glutathione peroxidase (GSH-Px) and superoxide dismutase (SOD) which are well-known antioxidant enzymes. Crayfish were exposed to four concentrations of BPA (LC50, LC50/2, LC50/4, LC50/8) for 96 hours. GSH-Px and SOD activities increased significantly in all BPA concentrations compared to control reveals that BPA has a potential to induce the oxidative stress. Further studies are needed to better understand the toxic effect of BPA on the antioxidant system in crayfish.

Key words: Crayfish, Gill, Bisphenol, Plastics, Toxicity

THE EFFECT OF POTASSIUM ON ROOT-KNOT NEMATODE (*MELOIDOGYNE INCOGNITA*) IN TOMATO

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ABSTRACT

With correct and sufficient potassium application, soil, environment and food safety and product yield increase and the use of pesticides in nematode control is reduced. In this study, the aim was to reduce the damage of the root-knot nematode (*Meloidogyne incognita*) on tomato plants by potassium application. The experiment was designed according to a design of random blocks with 4 different doses (10, 20, 40, 80 mg kg⁻¹ K) of potassium and 2 different nematode statuses (yes, no) and 4 replicates. In the study, registered nasal variety tomato seedlings sensitive to nematode were used and the plants were grown with Hoagland nutrient solution. At the end of the experiment the growth rate of the roots was evaluated according to the 0-10 scale, and leaf length, leaf width, and leaf proportional water content, membrane damage in cells, chlorophyll a, chlorophyll b, total chlorophyll and carotenoid contents were determined. The data obtained from the experiment were evaluated by one-way analysis of variance (One-Way ANOVA) using a statistical package program. According to the root knot scale, it was observed that the growth in the roots increased at low potassium doses (10, 20 mg kg⁻¹ K) compared to high potassium doses (40, 80 mg kg⁻¹ K). Potassium application statistically (P <0.05) not affected the membrane damage, chlorophyll a, chlorophyll b, total chlorophyll, carotenoid and leaf proportional water content. In both (yes, no) statuses of the nematode, as the potassium dose increased, the leaf proportional water content increased, while membrane damage decreased. According to the results, it can be said that potassium application can alleviate the damage of root-knot nematode (*Meloidogyne incognita*) on tomato plants.

YIELD DETERMINATION OF SOME SUNFLOWER HYBRIDS IN DROUGHT CONDITIONS IN TRAKYA REGION, TURKEY

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ABSTRACT

Sunflower (*Helianthus annuus* L.) is the most important oil crops in Turkey. Hybrids exists totally in sunflower production both in Turkey and also in other main sunflower producer countries in the world due to higher yielding, homogeneity and adaption capability. Downy mildew and broomrape parasite is two main factors reducing seed and oil yield as well as abiotic stress such as drought, higher temperatures during growing period and lower soil fertility in sunflower production. The study conducted to determine their performances of some sunflower candidate hybrids in conducted yield trials in Tekirdag and Edirne existing in Trakya Region which is European part of Turkey which has more than 40 % of Turkish sunflower production. Furthermore, Trakya region exist in Black sea region which has over 60% of world sunflower planted areas so these results represent base performances of sunflower planted areas in the world. The candidate hybrids were existed in yield trials and all important yield traits were measured and compared with control hybrids which are most selling commercial hybrids in the market in 2017. Some candidate hybrids had higher performances than control hybrids in the study.

Keywords: Sunflower, Sustainable production, Hybrid, Seed yield, Yield traits, Yield performance,

EVALUATION OF FORAGE PEA LINES IN REGARD TO EARLINESS AND GRAIN YIELD

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ABSTRACT

Five hybrid lines of forage peas (No. 14, No. 6, No. 12A, No. 13 and No. 9) and the Mir variety (standard) were studied in terms of ripeness and yield of grain and green mass. The study was performed in the experimental field of Institute of Forage Crops - Pleven, Bulgaria. The occurrence of the phenological stages beginning of flowering, full flowering, and technical maturity (days) was monitored. At the full bottom pods stage the green mass yield (kg/da), and at the technical maturity stage the grain yield (kg/da) were recorded. The line No. 14 (vegetation period 218 days) was found to develop faster than other lines. Plants from this line enter the flowering stage much earlier than the Mir variety and reach technological maturity at the earliest. At ripeness, the lines are arranged: line No. 14 (218 days), line No. 12A (222 days), Mir variety (224 days), line No. 6 (225 days) and line No. 13 (233 days). Lines No. 13 and PL managed in the most unfavorable environment to fully manifest their biological potential and to accumulate more green mass (2007 and 2059 kg/da, respectively). In terms of grain yield, line No. 14 exceeds the standard by 35.42% on average over the period. Grain yield after it, lines No. 6 and 12A are ranked, with an excess of 21.53% and 20.83% respectively. For breeding purposes line No. 14 may be used in terms of ripeness, lines No. 14, 2A and 6 in terms of grain yield. The study is a contribution to the selection for the creation of new genotypes of forage peas with pronounced ripeness, increased ecological stability of both, green mass and grains.

Keywords: Forage pea, Grain yield, Yield traits, Yield performance, Earliness

YIELD STABILITY IN CONFECTIONERY SUNFLOWER

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ABSTRACT

Confectionary sunflower is the most consumed confectionery product in Turkey. Although there is about 100.000 ha confectionery sunflower planted area in Turkey, Turkish seed confectionery sunflower production is not enough for domestic consumption and there is over 100 million USD imports every year. The most important reasons are lower yields due to using standard seeds then resulted lower quality, some diseases and broomrape parasite problem, higher costs due to lower mechanization uses, etc. The confectionery sunflower seed import mostly from China because of the longer grains and these type seeds invade recently almost all Turkish confectionery market. Beside, Turkey has very big potential for confectionery export due to geographical advantages. However, hybrids having higher yields, quality and uniform seed are preferred both by industry and also by farmers are few in Turkey. Furthermore, certified seed use by producers also lower too. The study was conducted to determine yield performance of candidate sunflower confectionery hybrids developed by Tragen R&D Co in Edirne and Tekirdag locations in Trakya region in 2019. Based on study results, some candidate hybrids exhibited higher performances than control hybrid. TG-400 candidate hybrid showed promising performance in both locations and then it sent to registration trials and obtained production permission in 2020.

Key words: Confectionery sunflower, Yield performance, Hybrid, Trakya region

THE EFFECT OF ORGANIC AND INORGANIC FERTILIZERS ON THE PLANT PROPERTIES OF PEA

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ABSTRACT

This research was conducted to determine on subsoil and aboveground parts of pea the effect of organic and inorganic fertilizers in Dicle University Agriculture Faculty Department of Field Crops Greenhouse. The research was carried out in randomized blocks according to the experimental design and divided into three replications. In research, plant height, fresh and dry plant, stem + leaf, root, nodule and leaflet weight, number of nodules and leaf area traits were examined in pre-blooming, full-blooming and post blooming periods. As a result of the research, Fossil application has the most effect on pea plant characteristics in pre-blooming period. It has been determined that the applications made during the full-blooming period have a significant effect on all the investigated properties. In the post blooming period, it was determined that organic fertilizers had the most effect on the investigated properties. Take into considering the combined analysis results of the three periods, it was found that Nutri-umix mostly contributed to the 8 traits, and Fossil and Bacteria on 6 traits. The results have shown that organic farming practices can be preferred instead of conventional farming practices in pea cultivation. Thus, deterioration of the soil structure will be prevented and food pollution will be prevented.

Keywords: Pea, *Pisum sativum*, Organic fertilizer, Inorganic fertilizer

STOMATAL CONDUCTANCE INDEX CHANGES IN WILD CICER GENOTYPES AT HIGH VAPOR PRESSURE DEFICIT

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ABSTRACT

Genetic variation in resistance to drought and heat stress is not very large among cultivated chickpeas. Hence, revealing the sources of resilience from wild species in chickpeas is important. In this study, changes in the stomatal conductance index of wild chickpea genotypes were evaluated in terms of response to high temperature stress under increasing VPD conditions. The research material is composed of 26 genotypes of wild chickpea and 4 varieties of chickpea. The *Cicer reticulatum* contains 20 of the 26 wild chickpea genotypes, and the *Cicer echinospermum* genus contains 6. Before the plants were measured, in the Dicle University Faculty of Agriculture were grown to the randomized complete bloc design with 4 replications in the greenhouse conditions. Increased stress on VPD was created by changing temperature and humidity under controlled measurement conditions. Measurements were carried out during pre-flowering and pod filling period under controlled conditions. Significant differences in plant temperature and stomatal conductance index (*lg*) have been identified among the genotypes in both periods. In general, the limits of change in plant temperature and stomatal conductivity were found very broad in wild chickpea genotypes with high genotypic variation. While the average *lg* was higher than the culture genotypes in the wild species during the pre-flowering period, it was found lower in the generative period. The high *lg* value suggested plant cooling capability and transpiration height in genotypes. 11 wild chickpea genotypes in the vegetative period and 5 wild chickpea genotypes in the generative period had a higher *lg* value than the average cultivar value. *lg* in *reticulatum* was found to be higher than *echinospermum* genotype levels in both periods of the wild species. In both periods, the genotypes of Eğıl-073 and Sırnak 060 have a higher *lg* than the culture genotypes and showed stable resistance to heat stress. The findings show that existing genotypes could be used as starting material in chickpea breeding programs for heat and drought resistance.

Keywords: Stomatal Conductance Index (*lg*), Wild Cicer, High Vapor Pressure Deficit

Acknowledgement: This study was supported by Dicle University BAP Coordinatorship - DÜPAP ZİRAAT.17.026 project.

CHARACTERIZATION OF RICE CULTIVARS (*ORYZA SATIVA L.*) IN TURKISH MARKET UTILIZATION FROM MOLECULAR MARKERS

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ABSTRACT

This study was carried out to analysis of genetic diversity of rice marketed in Turkey. Sixty registered Turkish rice varieties (*Oryza sativa L.*) including 3 landraces and 2 introduced varieties used as a material. A total of 50 SSR markers distributed to all 12 rice chromosomes were used for the diversity analysis of the genotypes. Out of these, 43 SSRs produced clear, distinct polymorphic bands among the rice varieties, and a total of 227 alleles were obtained. The number of alleles per locus ranged from 9 to 1. The mean number of alleles per locus was 5.25, and 22 markers (51%) had 6 or more alleles. Clustering of 60 varieties based on 43 SSR markers produced 4 main clusters with the dissimilarity coefficient of 0.50. While aromatic varieties were placed into an out-group Rocca and Baldo which are parents of many rice varieties and 47 varieties were placed into the same clusters. This SSR polymorphism analysis revealed genomic relationships in rice marketed in Turkey. The results of the analysis may be used for Turkish rice cultivar identification at polished rice market and breeding programs.

Keywords: Dendrogram, genetic diversity; Rice (*Oryza sativa L.*); SSR markers; Turkish Rice cultivar

SEED QUALITY RELATIONSHIPS IN CONFECTIONERY PUMKIN

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ABSTRACT

Confectionary pumpkin (*Cucurbita pepo* L.) is one of the most consumed confectionary product in Turkey. There are few hybrids in confectionary pumpkin production in Turkey and seed quality is the most important problem in Turkish confectionary market as well as in production. Hybrids are preferred both by industry for homogenous seeds and also by producers for uniform plants and having higher yields and quality. The study was conducted to determine of seed quality characteristics of inbred lines and their F₁ hybrids with other yield traits. The relationships of thousand seed weight, seed length and width as seed quality traits with leaf length and width, vine length, fruit diameter, length and width, flesh thickness, number of seeds and seed weight per fruit were investigated based on correlation and regression analysis among these traits in the study. The correlation analysis indicated that fruit width is the most important character for seed quality having higher positive relationships with these three seed quality traits as well as with seed yield in both inbred lines and hybrid. Fruit diameter and seed number per fruit seems other essential characters for seed quality in confectionary pumpkin other than this trait following it respectively. In conducted regression studies, linear relationships in positive way were observed especially between fruit width and these three seed quality traits.

Key words: Sunflower, Oil content, Drought, Drought tolerance, Inbred lines, Yield traits

OIL CONTENT DETERMINATION ON SUNFLOWER SEEDS ON DROUGHT CONDITIONS

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ABSTRACT

Sunflower (*Helianthus annuus* L.) is one of the most important oil crop in the world and mostly produce for oil. Due to the global warming and unexpected climatic changes especially extreme heat and droughts in recent years, as a spring crop sunflower affects severely from these climatic conditions in the vegetation period and lose seed yield hardly. Plant breeding longer process taking at least ten years to develop cultivars. Therefore, sunflower breeders should consider future climatic conditions, hence it seems that drought tolerance should consider primarily in their breeding programs. Oil content is the most important trait in sunflower then the major goal in the breeding studies, likewise it is the most affected yield trait in sunflower from drought conditions. The study was conducted to determine of the oil contents from drought some inbred lines and their hybrids developed lately in National Sunflower Project conducting by Trakya Agriculture Research Institute (TARI). Based on the study results; the significant relationships were observed between oil content and other yield traits in drought conditions. While oil content of inbred lines affected negatively mostly from thousand seed weight and head diameter, leaf number, leaf area and seed yield followed this trait respectively. Based on path analysis for contribution of yield traits on determining of oil content; it determined that seed and oil yield were the most direct affected traits then followed by oil yield in sunflower inbred lines in negative way, and other yield traits mostly affected oil content determination in drought stress conditions over these two traits. In the sunflower hybrid evaluations in three different locations mentioned that thousand seed weight, seed yield and leaf area as well as leaf number are the most important yield traits affecting positively of oil content determination in drought stress conditions.

Key words: Sunflower, Oil content, Drought, Drought tolerance, Inbred lines, Yield traits

A RESEARCH ON SEED YIELD OF *BORAGO OFFICINALIS*

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ABSTRACT

Borago officinalis L. (Hodan) is an annual, allogam, a member of the family *Boraginaceae*. It is frequently visited by insects and bees due to its nectar content. Continuous flowering causes seeds to not mature homogeneously and seed lost. Besides, seed yield is low due to self incompatibility. This research in order to determine the effect of bee and insect population on seed yield of *Borago officinalis*, in the experimental field of the Faculty of Agriculture of Ondokuz Mayıs University, with a variety, with four replications was established according to the randomized blocks desing. The seedling planting was made on 27.05.2019, with a distance of 60x40 cm, with 25 plants in the plot. In the experiment, two applications were carried out as plots left for bee and insect visits (open) and plots without insect / bee visits (closed). Closed plots were closed with dense perforated tulle before blooming from 1.5m height for no insects / bees could enter. In the research, flowering started on 16.06.2019 and completed on 26.08.2019. The observations and measurements were made on 10 plants randomly selected from each plot. The data obtained were analyzed with the unpaired t test. In the study, the average plant height varied between 94.55 cm- 67.40 cm, branch number 5.83- 5.43 number/plant, fresh plant weight 710.41- 602.62 g/plant, dry plant weight 110.85- 89.04 g/plant respectively in open and covered applications. he average plant seed yield (5.06 g/plant) and 1000 grain weight (18.63 g) were higher in open plants than in closed plants (4.28 g / plant, 16.5 g, respectively). Seed yield per decare was measured at 25.41-21.49 kg / da in open and closed applications, respectively. As a result, it was observed that bee and insect visits increased the seed retention rate of *Borago officinalis* by 15%.

Keywords: Hodan, *Borago officinalis*, bee/insect population, seed yield

THE BEHAVIOUR OF DIFFERENT HYBRIDS OF SUNFLOWER IN THE CLIMATIC CONDITIONS OF THE YEARS 2019 AND 2020 IN SOUTH-EAST OF ROMANIA – DOBROGEA

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ABSTRACT

The experimental field was placed in Amzacea, Constanta County within the climatic conditions of years 2019 and 2020 (Dobrogea area), had the largest weight regarding the surface cultivated in Romania with sunflower crop between 10-12%. The most drought area in Romania is Dobrogea (average 1961-1990: 464 mm. rainfall). Climatic change in recent years has accentuated this tendency. The number of hybrids taken into account was nineteen in 2019 and twenty in 2020. Of all tested hybrids eleven of them have been monitored in both years (Genesis, Janis, Terramis, Loris, Odessa, Diamantis, Onestar, Eiffel, Aromatic, P64LE99, P64LE25). Genesis has been planted in two periods of the time. When the planting was delayed the yield was decreased between 1000 - 300 kg/ha. The aim of this study was i) the behaviour of the hybrids in the unbelievable dry conditions, ii) to see the yield and the behaviour of sunflower hybrids to the attack of main pathogens - *Sclerotinia sclerotiorum*, *Phomopsis helianthi*, *Orobanche cumana*, iii) how the planting date influence the yield, iv) the importance of the pesticides used.

Keywords: sunflower, technological improvement, pest behaviour, yield, drought

**PROPAGATION THE TAHAR APPLES (*MALUS SYLVESTRIS SPP. ORIENTALIS*)
BY SEED**

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ABSTRACT

In this study, it was carried out on seeds taken from Tahar apples selected from Nevşehir province Ürgüp district and its surroundings in order to determine the propagation ability of Tahar apple, which has the potential to be rootstock for cultivated apples. After the seeds obtained were soaked in water for 24 hours, they were stratification in sand at + 4°C. The seeds, which remained in 60 days of stratification, were removed from the stratification when the signs of germination were seen from the ends, and planted in the peat + sand medium. The germination rate of apple seeds in stratification was determined to be 90%. The seeds planted in the peat + sand medium were transferred to the land when they reached 15 cm in length, and the retention rates were 100%. The vegetations transferred to the land have been observed in a vegetation period and have reached 30 cm in length and 0.5 cm in diameter. Consequently, due to the dwarf feature of Tahar apple, it was concluded that under normal care conditions, the slow growing of the seeds, and propagation of Tahar apple from seed was important for creating variation although it is a time consuming job.

Keywords: Tahar apple, seed, propagation, stratification

IN VITRO SCREENING OF COMMON BREAD WHEAT (*TRITICUM AESTIVUM* L.) CULTIVARS IN TURKEY FOR HIGH REGENERATION

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ABSTRACT

In this research, 19 winter wheat cultivars were used. These genotypes were used in our experiment since they have high adaptation ability to the biotic and abiotic stress factors and used as parents for wheat breeding, were investigated in terms of tissue culture parameters using mature embryos. Mature embryos were aseptically removed from soaked seeds and placed scutellum up in petri dishes contains 2 mg l⁻¹ 2,4-D as callus induction media, and then they were left at dark. After 14 days, developed calli were transferred in the dishes to MS-0 mediums for the regeneration. When mature embryos of 19 winter wheat registered cultivars were checked, significant differences were observed in “Callus Induction”, “Callus Weight”, “Regeneration Capacity” and “Culture Efficiency” parameters. The aim of using these parameters is to determine the susceptibility of genotypes to tissue culture. So, in terms of these parameters have the highest varieties value (96.7%, 0.76 g, 100.0% and 96.7%), for Bayraktar-2000 and (100.0%, 1.01 g, 100.0% and 100.0%) for Kate A-1 and a remarkable genotypic effect was detected on the tissue culture parameters responses among the used genotypes in this experiment. On the other hand, it has been seen that there is remarkable germplasm transferring ability among them, and this/these potential(s) allow a possible direct gene transfer possibility(ies) for desired trait(s) using with advanced molecular and biotechnological methods such as biolistic, etc. in the future.

Key words: winter wheat, *Triticum aestivum* L., embryo culture, regeneration

MODELLING OF GRANULAR MANURE FERTILISZERS SPREADING PROCESS

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ABSTRACT

The objective of the research the spreading simulation model of the fertilizers. For the development of the centrifugal fertiliser spreader simulation modelling the EDEM (Extended Distinct Element Method) software was used. The modelling of the granular fertiliser spreading process was compiled. It was possible to develop the numerical model that corresponds to a real fertiliser spreader. This model allows to determine the most suitable parameters for spreading granular organic fertiliser. It can also be used to evaluate the distribution of fertiliser in the soil. The results of the research showed that the distance travelled by the fertiliser partially depends on its particle size, the initial speed, the type of fertiliser itself and the parameters of the disc blades.

DETERMINATION OF YIELD AND YIELD PROPERTIES IN CORN-COWPEA MIXED SOWING SYSTEMS

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ABSTRACT

Livestock profitability can be achieved by providing the sufficient quality feed with reasonable prices. It is necessary to increase the yield to be obtained from the unit area due to current agricultural areas showed decreasing tendency. This study was carried out to determine the yield, yield characteristics, and some quality characteristics of different corn and cowpea mixture cultivation under Samsun conditions in four replicates according to randomized complete block experimental design. In this research, in addition to alone planting of corn and cowpea, six different treatments, 1Corn + 1Cowpea, 1Corn + 2Cowpea, 2Corn + 1Cowpea and 2 Corn + 2 Cowpea, were included. In all treatment plots, plant height, corncob number, leaf weight, stem weight, corncob weight, cowpea culling rate, stem diameter, cowpea leaf culling rate, dry and green yields were evaluated. As a result; the highest green yield was in alone corn treatment plots with 8225 kg da⁻¹, it was followed by 1 corn + 2 cowpea with 7641 kg da⁻¹, 2 corn + 2 cowpea 5617 kg da⁻¹, and alone cowpea treatments with 5600 kg da⁻¹. The highest dry matter yield was obtained from 1corn + 2 cowpea application with 3714 kg da. 1 corn + 2 cowpea treatment was superior to other mixture treatments in terms of corncob weight and cowpea culling rate. The mixture with the highest LER (Land Equivalent Ratio) value was 1 corn + 2 cowpea with 1.69 value. It is concluded that 1 corn + 2 cowpea mixture is more suitable for dry matter production for the coastal region of Samsun.

Keywords: Corn, cowpea, mixture, yield, quality.

**COMPARISON OF THE GROWTH PERFORMANCE OF COMMON BEAN
(PHASEOLUS VULGARIS L.) GROWN UNDER FIELD AND GREENHOUSE
CONDITIONS**

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ABSTRACT

Bean is one of the most cultivated edible legume plants in the world. Although it is seen as a dry bean national food in our country, it is seen that there has been a decrease in the production of bean in our country in the last 30 years compared to world production. The study aims to investigate the effect of plant genotype and environmental conditions on plant growth. For this purpose, 5 commercial (Akman, Göksun, Göynük, Karacaşehir, and Önceler) and 5 local (Bitlis 76, Bitlis 117, Hakkari 12, Tunceli 1, and Van 59) bean genotypes were selected. Selected genotypes were grown simultaneously in the greenhouse and the field between March and July 2020 in Mersin province. Morphological observations such as leaf and seed structure were made, and the number of seed for each genotype was determined. According to the results, although the greenhouse provides more uniform conditions than the field, plants found in nature showed the best growth performance compared to the plants grown under greenhouse conditions. Although Bitlis 117 genotype gave the highest number of seeds in both greenhouse and field conditions, it gave 5 times more seeds in field conditions than in greenhouse conditions.

Keywords: *Field, Greenhouse, Growth performance, Mersin, Phaseolus vulgaris L.*

Acknowledgment: The study described here was carried out within the Project (No. 119O003) funded by the Scientific and Technological Research Council of Turkey (TÜBİTAK)

ANALYSIS OF THE DIVERSITY, PERFORMANCE AND ADAPTIVE CHOICES OF FARMING SYSTEMS: A CASE STUDY OF SOUTHERN TUNISIA

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ABSTRACT

Farming systems in Tunisian arid zones are more and more exposed to socio-economic and environmental changes. This may turn down their resilience and performances. The aim of this study is to assess the farming systems' performance and to identify the farmers' adaptive choices in Southern Tunisia. A farming system typology based on the 2004-2005 structure survey database was performed using expert methods and multidimensional analyzes. Through multidimensional analyzes, we have identified three types of farming systems: "Irrigated farming systems", "Rain-fed olive farming systems", and "Livestock farming systems". Representative farms were selected by local field experts to fulfill an in-depth investigation of the defined farming systems types. Furthermore, two-field investigations were conducted with the selected farming systems, during the 2017-2018 agricultural season. Characterization of representative farming systems approves their technical and socioeconomic performance diversity according to the farm capital endowment and the farmers' adaptive choices. These findings indicate that agricultural policies should be designed to respond to the particular context of each farming system's type.

Keywords: Tunisian arid regions; farming systems; performances; diversity; typology

CAPNODIS TENEBRIONIS (LINNEAUS, 1758) LIFE CYCLE ON ARTIFICIAL DIET

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ABSTRACT

The Mediterranean flatheaded peachborer, *Capnodis tenebrionis* (Linnaeus, 1758) (Coleoptera: Buprestidae) was reared on an artificial diet to investigate its life cycle. In this study, the artificial diet mix has been used as a nutrient by modifying the literature (Gindin et al. 2009). The mixture prepared from three cherry rootstocks (MaXMa, Gisela 5, Kuşkirazı) was used instead of peach cortex. All rearing was carried out in controlled environment rooms maintained at 26 ± 1 °C, 50 ± 5 % RH and an 16:8 h photoperiod in 25 x 25 x 35 cm cages. Eggs are white and oval in shape, the width as 1.11 ± 0.01 mm (0.89 -1.12 mm) and the length was determined as 1.70 ± 0.01 mm (1.51 -1.82 mm). Eggs were opened in 14.25 ± 0.04 days. Larval development at 26 ± 1 °C is 84.14 ± 0.59 days; prepupa duration was 2.40 ± 0.16 ♂, 2.36 ± 0.15 ♀; pupa time was determined as 5.40 ± 0.16 ♂ and 5.36 ± 0.15 days ♀. In adults, gender and height values were measured by making the gender discrimination according to the shape of the end of the abdomen. The total development period lasted 105 - 111 days and it had 5 larval periods until it was mature at 26 ± 1 °C.

Keywords: Artificial diet, Cherry, *Capnodis tenebrionis*

NEW RECORDS FOR ENTOMOPATHOGENIC FUNGI OF *CAPNODIS TENEBRIONIS* (LINNAEUS, 1758) (COLEOPTERA: BUPRESTIDAE) AND THEIR PATHOGENICITY ON DIFFERENT STAGES

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ABSTRACT

Capnodis tenebrionis (Linnaeus, 1758) (Coleoptera: Buprestidae) which is called The Mediterranean flatheaded peachborer, is an important pest of stone fruit trees in Turkey as well as Mediterranean countries. Control of *C. tenebrionis* is difficult despite the chemical practices that are subscribed; sufficient time cannot be achieved. Therefore, the importance of biological control with fungi, bacteria or nematods was increasing. The study aim was to determine entomopathogenic fungi and their pathogenicity of *C. tenebrionis* life stages. We surveyed entomopathogenic fungi on *C. tenebrionis* in Tekirdağ during 2015-2016. Three different fungi; *Baeuvera bassiana* (Balsamo) Vuillemin, 1912 (Deuteromycota: Hyphomycetes); *Lecanicillium fungicola* Zare & W. Gams, 2008 (Ascomycota: Ascomycetes) and *Fusarium acuminatum* Ellis & Everhart, 1916 (Ascomycota: Hypocreales) were recorded. Their pathogenicity studies were carried on *C. tenebrionis* egg, first instar larvae and adult at 27±1°C in vitro. 1 x 10⁸ conidia/ml were used for *B. bassiana* and *L. fungicola*, 1 x 10⁶ conidia/ml was used for *F. acuminatum* with 0.2% Tween 80. For control only 0.2% Tween 80 were used. According the results, the most pathogenic fungus on adults was *B. bassiana* (92.5± 1.63%), however, *F. acuminatum* (81.25± 2.26%) on eggs. When new hatched larvae fed on two different foods (artificial diet / branch), the effects of fungi varied according to the food culture. While *L. fungicola* and *F. acuminatum* showed low effect on branch culture, in contrast, mortality of larvae in branch was high rate (100%) when they were treated with *B. bassiana*. Further studies need to work on optimum concentrations of these fungi against *C. tenebrionis* adults and field application performance on stone fruit orchard.

Keywords: *Beauveria bassiana*, biological control, *Capnodis tenebrionis*, *Fusarium acuminatum*, *Lecanicillium fungicola*

**DETERMINATION OF SOME MORPHOLOGICAL AND MOLECULAR
CHARACTERIZATION OF *SOLANUM OCHRANTHUM***

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ABSTRACT

Wild species is used as sources biotic and abiotic stress tolerance and morphological traits to increase the performance of modern tomato cultivars. In this study, morphological and molecular parameters of *Solanum ochranthum* wild tomato genotype was determined. Seedling of plants were grown in greenhouse with a randomized complete block design was applied with 2 replications, each consisting of 20 plants. According to UPOV, morphological traits were evaluated. Also using the MAS method, Tomato Yellow Leaf Curl Virus (TYLCV), Tomato Spotted Wilt (TSWV), Tomato crown and root rot (*Fusarium oxysporum* f.sp. *radicis lycopersici* = FORL) and Fusarium Wilt (*Fusarium oxysporum* f.sp. *lycopersici* = FOL) were determined for Ty-3, Sw-5, Frl and I-2 genes, respectively. To development new varieties tomato breeding programs have been systematic and the breeders need to use different genotypes in gene pool. Wild tomato species have a broad genetic diversity and also, these materials can be used as a genetic source for their valuable traits.

Keywords: breeding, molecular marker, morphological traits, wild tomato

**THE EFFECT OF A NISIN PRODUCER STRAIN *L. LACTIS SUBSP. LACTIS* LL27
ON THE FORMATION OF *LISTERIA* AND *SALMONELLA* BIOFILM
STRUCTURES**

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ABSTRACT

In this study, the antibiofilm efficacy of the *Lactococcus lactis* subsp. *lactis* LL27 strain isolated from raw milk and identified as nisin producer, against *Salmonella Typhimurium* and *Listeria monocytogenes* biofilms were investigated. In the research primarily, autoaggregation capabilities of each strain were determined. The strain with the highest autoaggregation ability was determined as *L. monocytogenes* ATCC7644 (0,677), followed by *S. Typhimurium* 14028 (0,55) and *L. lactis* subsp. *lactis* LL27 (0,184). In the cocultures of *L. monocytogenes* ATCC7644 and *S. Typhimurium* 14028 treated separately with *L. lactis* subsp. *lactis* LL27, coaggregation rates (average 0,46) were found close to the autoaggregation rates of the aforementioned pathogens. However, these rates were found to be statistically significant ($p < 0,05$) higher than the autoaggregation rate of *L. lactis* subsp. *lactis* LL27 strain. Biofilm experiments were started, as this indicates that the nisin producer strain of *L. lactis* subsp. *lactis* LL27 may affect the formation of biofilms by reducing the autoaggregation ability of the pathogens in question. *Salmonella Typhimurium* 14028 biofilm capacity statistically significant increase ($p < 0,05$) in the cocultures of *L. lactis* subsp. *lactis* LL27 + *L. monocytogenes* ATCC7644 and *L. lactis* subsp. *lactis* LL27 + *S. Typhimurium* 14028. The most interesting result in the study was the statistically significant decrease ($p < 0,05$) in biofilm production capacity on the 3rd day in *L. monocytogenes* ATCC7644 and *S. Typhimurium* 14028 cocultures. These data indicate that direct use of starter culture strains in the fight against biofilm structures of pathogens may promote biofilm production, as opposed to the antagonistic effect expected.

Keywords: *L. lactis*, *S. typhimurium*, *L. monocytogenes*, biofilm

**THE FIRST CHARACTERIZATION OF POMEGRANATE SEEDLINGS OF
HICAZNAR AND SILIFKE AŞISI CULTIVARS**

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ABSTRACT

Turkey is one of the major pomegranate producing countries in the world and it has made considerable progress in pomegranate production, processing and marketing. Total pomegranate production of Turkey reached approximately 560 thousand tonnes in 2019. Turkey is also an important pomegranate exporter country in the world, pomegranate export of Turkey increased at 203 thousand tons in 2018. Although Hicaznar cv. has been mainly growing and exporting in Turkey, new varieties are still needed for pomegranate cultivation. The aim of this study was to obtain new pomegranate varieties with soft seeds, red fruit peels and arils and some other superior properties. In the study, 300 pomegranate seedlings were obtained from open pollinated seeds of Hicaznar and Silifke Aşısı cultivars. The pomegranate seedlings obtained were planted at a distance of 5x1.5 m. in the field at Alata Horticultural Research Institute. The fruits were obtained from 134 pomegranate seedlings. After, pomological characters belonging to all seedling have been examined. It has determined that 24 seedlings have soft seed, 27 seedlings have medium soft seed and 83 pomegranate seedlings have hard seeded. The fruit skin and aril colors of the seedlings showed a wide distribution.

Keywords: Pomegranate, Breeding, Seedling, Variety

THE STATUS OF PEEL MINERAL CONTENTS AND POMOLOGICAL PROPERTIES RELATION TO FRUIT CRACKING IN POMEGRANATE

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ABSTRACT

There are a lot of problems in pomegranate growing. The fruit splitting is the main quality problem in pomegranate growing. Fruit splitting is a physiological disorder that occurs because of the different growth rates between peel and flesh of fruit. There are a lot of causes for fruit cracking in pomegranate growing. The aim of this experiment was examination of the effects of peel mineral content and pomological properties on fruit cracking in pomegranate (*Punica granatum* L.). The experiment was carried out on İzmir 8, İzmir 10, İzmir 16, İzmir 1264, İzmir 1513, Wonderful and Türkmen cvs. as 5 replicates at the pomegranate orchard of Alata Horticultural Research Institute, Erdemli, Mersin, Turkey. The fruit peel minerals and water contents and pomological characters have been examined in cracked and intact fruits belonging to all cultivars. It was determined that the cracked fruits have lower fruit weight, size, peel thickness, peel water ratio, and potassium contents.

Keywords: Pomegranate, Fruit cracking, Mineral, Pomology

IRRIGATION SCHEDULING OF WALNUT TREES WITH LEAF WATER POTENTIAL MEASUREMENTS

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ABSTRACT

The study was conducted under the drip irrigation method in 2018 and 2019 by creating three different irrigation treatments, which 75%, 100 and, 125% of the 5-day total reference evapotranspiration values calculated according to the Penman-Monteith method were applied. Soil moisture was monitored gravimetrically in the study. In the first year, evapotranspiration was measured between 577.70 mm and 723.75 mm according to the treatments. In the second year, evapotranspiration was measured between 584,21 mm and 816,31 mm. For irrigation scheduling, leaf water potential measurement, one of the measurement techniques based on plant monitoring, was carried out. In the study, two-year average leaf water potential measurement results ranged from -11.2 to -9.1 bar. As a result of the research, it can be suggested to apply irrigation at walnut trees at a pressure of approximately -10 bar. In addition, 100% irrigation treatment comes to the fore again due to water saving. The leaf water potential measurements over -10 bar in walnut trees indicate that significant losses can occur in yield and quality.

Keywords: Irrigation scheduling, drip irrigation, leaf water potential, walnut

Acknowledgments: This study (Project no: NKUBAP.03.DS.18.162) was supported by Tekirdag Namık Kemal University Scientific Research Projects (BAP).

**EFFECTS OF DIETARY L-ALLIIN AND OLEUROPEIN ON GROWTH
PERFORMANCE AND BODY COMPOSITION OF TILAPIA NILOTICUS
(*OREOCHROMIS NILOTICUS*)**

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ABSTRACT

The study was conducted to evaluate the growth performance and body composition of *Oreochromis niloticus* (average initial body weight 34.37 ± 0.29 g) fed diets containing different levels (0.25, 0.5, 1 mg/kg) of L-Alliin and Oleuropein, for a period of 60 days. The addition of L-Alliin to the feed increased the final weight ($p < 0.05$). The level of L-Alliin and Oleuropein in fish diets did not affect body crude protein, ash contents, body moisture and lipid ($p > 0.05$).

Key words : *Tilapia Niloticus*, L-Alliin, Oleuropein, growth performance, body composition

POSSIBILITIES OF USING SOLAR PANELS IN SMALL RUMINANT BARN

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ABSTRACT

Our production of red meat from animal proteins, which are of great importance in the nutrition of the people of our country, is not enough. Due to the rapid increase of population, our consumption of red meat per capita decreases over the years. If the required support is given to sheep and goat breeding from the Ministry of Agriculture and Forestry, an increase in the number and productivity of animals over the years can be a significant solution to the problem of meeting the protein needs. Environmental control of the active sheep folds of animals will increase their efficiency in sheep and goats. When the outside weather conditions are warm and windless, weather conditions inside the sheep folds can be achieved by mandatory ventilations. Failure to provide suitable weather conditions in the barn decreases the productivity of animals and the risk of getting some diseases. In mandatory ventilation and cooling, electrical fans and fan-pads are needed. However, animal barns are required to be to rural areas according to the environmental laws and regulation, which means access to the electricity is difficult if not impossible. Because of that, solar panels can be utilized in animal barns to generate electricity to power fans and fan-pads. The projected ventilation and cooling required for the floor area of 374 m² (11.0 * 34.0) and 300 heads sheep fold is suitable for the use of 4 aspirators and fan-pads. For this system, a 4.0 kWh solar panel system provides the necessary energy. It can be used in panels and increased excess energy is stored in batteries, which can be used in other appliances in the barn.

Keywords: *Green energy, sheep-goat fold, solar panel system, ventilation, cooling.*

COMPARISON OF NUTRIENT AND FATTY ACID CONTENTS OF MAIZE PRODUCED AS THE FIRST CROP AND THE SECOND CROP

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ABSTRACT

The present study was carried out to determine of nutrient and fatty acid contents of maize varieties grown as the first crop in Batman and the second crop in Mardin. In the research, four different types of maize were used. These maize varieties are PR (Pioneer), which is P1921 and P2088 as the first crop in Batman province, and PR32T83 and P0729 grown as the second crop in Mardin province between September and November, 2017-2018. It has been studied total 48 maize samples. In each one of Batman and Mardin province, 24 maize samples, from 3 fields for each variety, 6 fields in total and 4 samples from each field. For the maize varieties used in the study, it was determined that crude ash (CA) ranged between percent 0.13-1.22, organic matter (OM) 85.82-89.61, crude protein (CP) 5.60-6.89, crude oil (CO) 0.97-1.69, crude cellulose (CC) 2.55-2.96, free-nitrogen substance 75.73-79.50, acid detergent fiber (ADF) 2.69-3.03, neutral detergent fiber (NDF) 8.58-13.08, acid detergent lignin (ADL) 3.00-303, starch ratio 64.22-64.95, sugar 1.20-1.21, metabolic energy (ME) ruminant (Mcal /kg) 2.86-2.90, poultry (kcal/kg) 3126.96-3194.61, palmitic acid 3.50-3.68, oleic acid 8.16-8.63, linoleic acid 16.00-16.98, omega 6 fatty acid 16.00-16.98 and saturated fatty acids 32.27-34.17 %. The difference between the first crop and the second crop CA, OM, CP, CO, CC, NDF, ME poultry, palmitic acid, oleic acid, linoleic acid, omega 6 and saturated fatty acid levels were statistically significant ($p < 0.05$ and 0.001). In general, it was determined that maize cultivars grown as the first crop were higher in terms of nutrient content and maize cultivars grown as the second crop were higher in terms of fatty acid content. Considering the importance of maize in animal nutrition, it can be recommended to grow PRT83 in Mardin province and P2088 in Batman province.

Keywords: Nutrient, Fatty acid, The fist crop, The second crop, Grain maize

CONTAMINATION CONTROL OF IN VITRO CULTURES OF *PASSIFLORA* SPECIES FOR MULTIPLICATION

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ABSTRACT

This study was conducted to obtain biological material regenerated from *Passiflora caerulea* and *Passiflora quadrangularis* by direct and indirect organogenesis, in order to enrich the assortment of flowering plants in Romania. The endogenous latent contamination of the plant material used for in vitro culture initiation is one of the biggest problems, demanding a special approach. The explants disinfection steps was organized as a trifactorial experience which included two variants of NaOCl concentrations (0, 5%, 10%), three immersion times in the sterilizing solution (10, 15 and 20 minutes) and the four types of explants (apical buds, fragments of young and mature leaves, and flower explants represented by pedicel, receptacle and sepals) taken from mature plants, in the stage of active growth. The explants were pretreated with 70% EtOH solution with a few drops of Tween 20, for 1 minute, and rinsed with distilled water, then disinfected according to the experimental variants. The explants were initiated on Murashige and Skoog, (1962) MS medium in order to stabilize the culture. The leaves explants reacted best to the treatment with 5% hypochlorite for 15 minutes. *P. caerulea* registered an average contamination rate of 52.78%, lower than *P. quadrangularis* in which case the explants obtained an average contamination rate of 58.24%.

Keywords: *Passiflora caerulea*, *Passiflora quadrangularis*, explants, contamination, hypochlorite.

**IN VITRO PLANT TISSUE CULTURE: MEANS FOR PRODUCTION
OF PASSIFLORA SPECIES**

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ABSTRACT

Passiflora genus includes over 500 species native to tropical and subtropical areas of America, appreciated for the production of fruit and medicinal value. Their ornamental potential is especially appreciated in North America and in Europe. With the expansion of the flower trade and the use of secondary metabolites in the pharmaceutical industry, a need for the constant monopolization of new technologies and alternative in vitro techniques that allow to obtain a uniform, high quality material free of pests and diseases occurs. *Passiflora*'s tissue cultures began to be studied in 1966, raising more and more interest of researchers worldwide. Depending on the source and type of the explant, plant growth regulators, and the used genotype, direct and indirect organogenesis are the main regeneration pathways for *Passiflora*. The latest approaches regarding the choice of explant and its source, the plant material surface sterilization and the specific requirements of each micropropagation stage are presented within our review. To this genus, the reduced gas exchange of in vitro growing of seedlings has been shown as the main cause of lack of success. In this regard, for regeneration and obtained improvements in morphogenesis, different protocols have been developed by using inhibitors of ethylene. In recent years, studies suggest that via somatic embryogenesis, starting from mature and immature zygotic embryos, regenerated plants that have maintained their mother plant ploidy can be successfully obtained. This confirms the callus cultures as main path to obtain in vitro regenerated *Passiflora* plants.

Keywords: *Passiflora*, Regeneration, Organogenesis, Somatic embryogenesis.

AMF SPATIAL AND SEASONAL DISTRIBUTION IN MAIZE GROWN UNDER NIL COMPETITION CONDITIONS

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ABSTRACT

Arbuscular mycorrhizal (AM) symbiosis is an obligatory symbiosis among soil born fungi from the phylum Glomeromycota and terrestrial plants. AM symbiosis is well documented in several agricultural systems. However, such data is scarce at the honeycomb experimental design, which ensures the absence of competition and can be a powerful tool for plant evaluation under field conditions. Arbuscular mycorrhizal symbiosis was studied in maize grown according to the honeycomb design during a two-year period. AM colonisation and Glomeromycota spore frequency was recorded in relation to genotype and location. Data analysis suggested that the host rather than the location in the field determines the Glomeromycota population.

Keywords: Arbuscular Mycorrhizal Fungi, Honeycomb, Maize

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THE EFFECT OF FOLIAR AND SOIL POTASSIUM IODATE APPLICATIONS ON THE MORPHOLOGICAL PROPERTIES OF SPINACH

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ABSTRACT

Iodine is not considered an absolutely essential nutrient for plants, but previous studies have shown that iodine can be included in the useful element group. In our project, iodine was applied as potassium iodate to spinach (*Spinacia oleracea* L.) and the effect of iodine on the morphological properties of spinach were investigated. Iodine treatments were applied to the soil in 4 doses (0-10-20-40 mg kg⁻¹) at the time of sowing, and to the leaves in 4 doses (0%, 0.0025%, 0.05%, 0.1% KIO₃) 1 month before harvest and again 2 weeks before harvest. According to the results obtained, the greatest increase in plant fresh weight, plant dry weight and plant height compared to the control group in soil application was determined in the 10 mg kg⁻¹ dose application. In foliar application however, morphological parameters decreased as the application dose increased compared to the control group.

Keywords: Iodine, Leaf, Morphology, Soil, Spinach

Acknowledgement: This research was supported by Selçuk University Scientific Research Coordination Project 20201024.

PYROLYSIS OF AVOCADO SEED AS AN APPROACH FOR BIO-WASTE UTILISING

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ABSTRACT

Bio-waste which is available in large quantities worldwide is rich in biodegradable organic matter. By utilizing from bio-waste as feedstocks to attain valuable bio-based products, resource and waste problems will be solved as being “double green”. The bio-waste utilization aids decrease pollution while providing renewable energy and bio-based chemicals for the upcoming utilizations. Consequently, bio-waste resource utilization has involved growing attention in scientific and industrial societies.

The characteristic of avocado seed as a bio-waste was analysed using elemental analysis resulted as 39.89% C, 5.43% H, 0.43% N, 45.2% O content. Higher heating value was calculated using Dulong Formula as 13.70 MJ/kg. The raw milled bio-waste was characterized by FT-IR containing the wavenumbers in the range of 4000-400 cm⁻¹. The spectra bands for bio-waste demonstrated characteristic peaks of cellulose, hemicellulose and lignin. The mean moisture and ash contents of the “as received” avocado seeds employed in this study were 6.54 wt% and 2.42 wt.%, respectively. Pyrolysis of avocado seed was carried out in a Heinze reactor at 500°C with a heating rate of 10°C/min and retention time of 20 min. The pyrolysis experiment yielded liquid product (32%), solid product “char” (34%) and non-condensable gas (34%) with biomass conversion of 67%. Based on the results, it was confirmed that avocado seed can be utilized as a potential bio-waste according to pyrolysis results but liquid properties as a bio-fuel oil and solid product char properties as an activated carbon should be evaluated in detail.

Keywords: Avocado seed, biomass, bio-waste, pyrolysis, waste management.

THE RESEARCHES ON BREEDING OF HIGH OLEIC PEANUT (*ARACHIS HYPOGAEAE* L.) VARIETIES BY THE CROSSING METHOD

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ABSTRACT

This breeding program was initiated in Cukurova University, Faculty of Agriculture, Field Crops Department for Atlas Seed Company in 2010 and it continued to 2018. The objective of this breeding program was to breed high oleic acid content and yield peanut varieties. In this study, the crossing breeding method was used and plant selection was made according to “Pedigree selection” method in segregating materials. Halisbey (high yielding) and Brantley (high oleic acid content) varieties were used as parents in this breeding program. Crossing was made and harvested F₁ seeds in 2010. It was started to selection single plants at F₂ and continued to F₆ stages in Atlas seed company research farm. The single plants were selected according to pod yield per plant and fatty acids composition. As a result, a breeding line is known [Masal] was determined a new high oleic peanut variety candidate as a high yield (6694 kg/ha) and high oleic acid content (%80.75).

Keywords: *Peanut, Variety breeding, Crossing, Pedigree method, High oleic*

**DETERMINATION OF THE IMPORTANT QUALITY PROPERTIES OF SOME
SUNFLOWER VARIETIES AND CANDIDATE GENOTYPES**

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ABSTRACT

The main objective of the experiment was determined suitable sunflower candidate genotypes. The experiment was conducted under Konya-Ilgın conditions in 2018 growing seasons in Randomized Complete Block Design with three replications. The experiment materials were the sunflower candidate genotypes which was developed by Associate Professor Rahim Ada and some sunflower varieties. The observations were made hull ratio (%), oil content (%), protein content (%). According to the results of the experiment, significant differences were found in all properties among the varieties and candidate genotypes statistically. The highest hull ratio was obtained from 4CMS X SARM 6, 4CMS X NP, Bosfora, 4CMS X SB ve 4CM X C75 as 28.57 %, 27.53 %, 27.35 %, 26.84 %, 26.38 % respectively. In addition to, the highest oil content was obtained from 4CMS X CO, 4CMS X C21, 4CM X C75 as 48.29 %, 47.65 %, 46.75 % respectively. Finally, the highest protein content has been obtained from 4CMS X YK-YRKKY with 20.84 %. The increase in sunflower production will be possible by expanding plantation areas, increasing the yield per unit area and producing varieties with high yield. In addition to high yield, improvement of important quality properties is also comprised of the important yield components. The experiment results indicated that in terms of the important quality properties of 4CM X C75 was a promising candidate genotype for sunflower production in Turkey.

Keywords: Sunflower, *Helianthus annuus* L., breeding.

EVALUATION OF THE YIELD AND QUALITY PROPERTIES OF SOME POTATO VARIETIES AND CANDIDATE GENOTYPES IN YENIŞEHİR- BURSA ECOLOGICAL CONDITIONS

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ABSTRACT

The experiment was implemented to evaluate the yield and quality properties of potato varieties and candidate genotypes were examined in 2019 growing seasons under Yenişehir-Bursa conditions. The experimental design was a Randomized Complete Block Design with three replications. Eight potato candidate genotypes (“EA10”, “GAF4”, “MK-2”, “AH-11”, “AFK-3”, “AA12”, “HA5”, “LOH3Y”) which were developed by Associate Professor Rahim Ada and the four potato varieties (Marabel, Florice, Melody, Lady Olympia) were used as a plant material in this experiment. The plant height (cm), number of stems per plant, number of tuber per plant, total tuber yield ($t\ ha^{-1}$), dry matter content (%), yield of chips (%), yield of french-fries (%) were examined. According to results of this experiment, significant differences were found in all properties among the potato varieties and candidate genotypes statistically. The plant height changed between 48.3-107.3 cm, number of stems per plant was 4.6-10.0, number of tuber per hill was 4.3-16.6, total tuber yield per hectare was 18.9-52.1 $t\ ha^{-1}$. In addition, dry-matter content changed between 16.7-25.0 %, yield of chips was 60.3-36.1 %, yield of french-fries was 55.0-70.8 %. The highest total tuber yield was obtained from Florice variety (52.1 $t\ ha^{-1}$) and “GAF4” potato candidate genotype (49.6 $t\ ha^{-1}$), and the lowest total tuber yield was obtained from “EA10”, “MK-2”, “HA5” potato candidate genotypes (18.9, 19.9, 21.0 $t\ ha^{-1}$, respectively). The experiment results indicated that potato varieties and candidate genotypes were found different significantly in terms of quality and “GAF4” potato candidate genotype was found promising.

Keywords: Potato breeding, adaptation, yield, quality.

TUBER PRODUCTION IN POTATO WITH SPROUT METHOD

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ABSTRACT

This research, in order to reduce the cost of seed tubers per unit area in potato production, instead of using a tuber directly, producing tubers with the less costly shoot method and in order to determine its effect on yield, was conducted at 36° 25' 35.51"-41° 12' 35.06" coordinates in Samsun Province, at 2018. The Orchestra potato variety and 1 potato genotype were used as seed sources. For the Sprout production, 100 tubers which is average 80gr, it was filled with perlite:peat mixture in the ratio of 1:3, and it was sewn into perforated plastic cases with dimensions of 400x600x200 (h) mm, 5 cm deep, on 29.03.2018. When the shoot length was 10-15 cm, it was separated from the mother tubers and transplanted into the field the same day. The research was established according to the strip plots experimental design. The fertilizer application to the main plots, the planting pattern (tuber and sprout) to the sub-plots, with 70x30cm distance at 3 repetitions. There are 48 plants in a plot. In the study, fertilizer and planting practices were found significant at $p < 0.01$ in terms of tuber number per plant, tuber yield per plant, and total tuber yield. The highest total tuber yield (42.67 tons/ha) was determined in tuber planting with organic + chemical fertilizer application, and the lowest (16.28 ton/ha) sprout planting with chemical fertilizer application. Average tuber yield in Sprout planting (18.24ton/ha) was found lower than tuber planting (37.70 ton/ a). The average number of tubers was measured as 18.2 number/plant in tuber planting and 6.65 number/plant in sprout planting. In the study, 3 healthy sprouts were obtained from one tuber. Although sprout planting reduced the cost of seed tubers, it caused a decrease in tuber yields. The production with tuber, the plant's use of the main tuber as a food source has increased the number of branches, the number of tubers and the yield of tubers. In the future, it will be beneficial to carry out more detailed studies on increasing the yield in potato production with sprout in order to reduce the cost of seed and transport healthy plants to the field.

Key words: Sprout, Potato, Tubers, Cost

A RESEARCH ON CAPIA PEPPER FARMERS' PESTICIDE USE: CASE STUDY OF ÇANAKKALE PROVINCE

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ABSTRACT

The aim of this study is to investigate the pesticide use behavior of capia pepper producers in Çanakkale province. According to data from the 2018, Çanakkale is in the first place in Turkey for cappaia pepper production. The share of Çanakkale's capia pepper production in Turkey is 19.4% in 2018. Yenice district alone meets 60.6% of the production of capia pepper in Yenice district in Çanakkale in 2018. For this reason, this research was carried out in Yenice district of Çanakkale province. In Yenice district, 11 villages that produce the most capia pepper were visited. A face-to-face questionnaire was conducted with 206 farmers as a result of simple random sampling formula calculated with 90% confidence interval and 0.05% margin of error. Arithmetic means and frequency table methods were used to evaluate the data obtained from the surveys. According to the research results, the average age of consumers in the research area is 46,3. More than half of the capia pepper producers are primary school graduates (51.0%). All farmers have social security. The rate of farmers who are members of at least one agricultural cooperative is 70, 9 %. Also, 42, 7 % of the farmers have another non-agricultural income. The farming experience of capia pepper producers has been calculated as 25,5 years on average The average production area of capia pepper producers is 20,9 decares. The average capia pepper yield per decare in the study area was calculated as 3.199,3 kg. Considering the pesticide supply locations of the farmers, it is seen that they mostly prefer private pesticide dealers. Farmers mostly apply spraying when they see diseases and pests in the field. Farmers usually decide on drug doses based on the advice of the agricultural engineer or the prospectus. They prefer tractor or dorsal pulvizerator in pharmaceutical applications. Empty packages are often destroyed by burning or throwing them at the edge of the field. They often throw away outdated medicines or burn them. Farmers stated that they found the drugs generally dangerous for the environment. According to the results of the research, although the producers of capia pepper know that the wrong drug use is harmful for the environment, they practice harmful practices.

Key words: Capia peper, pesticide, Çanakkale.

Acknowledgement: This study has been produced from the master's degree and BAP project on "Determination of the Attitude and Behaviors of the Knowledge Levels of the Capya Pepper Producers on Pesticide Use: The Case of Çanakkale Province". Supported by Çanakkale Onsekiz Mart University BAP unit. (Project number: FYL-2019-2997)

**THE MORPHOLOGICAL, ANATOMICAL AND PALYNOLOGICAL
INVESTIGATIONS ON *VIOLA* L. (*VIOLACEAE*) IN EUROPEAN PART OF
TURKEY**

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ABSTRACT

In this study, *Viola odorata* L., *Viola kitaibeliana* Roem. & Schultes ve *Viola tricolor* L., *Viola arvensis* Murray belonging to genus *Viola* L. of family *Violaceae* were compared by their morphological, anatomical and palynological features. The examined samples taxa were collected from European part of Turkey in 2012-2013. The collected plants are protected as herbarium and stock materials. In the morphological studies, identifications of the taxa and the morphological investigations were determined from herbarium materials. In this study, morphological characteristics of the stem, root, leaf, flower and fruit were examined and morphological features have been displayed in pictures. In the present study, the anatomical investigations at stock materials were also determined. In the anatomical section, the transverse sections from stem, root, leaf, along with the surface views from the leaf (the upper and the lower) were examined and presented with their microphotographes. The leaves were found out to be bifacialwith stomata cells that are anomocytic. Besides, in the anatomical section, the existence of crystal way determined. All species were detected in the presence of crystal. In which parts of the crystals was shown to be. In the palynological section, the pollen grain preparates which became permanent with Wodehouse method were examined in light photomicroscope. The pollen types for *Viola odorata* L. tricolporat and for other species stefanokolporat, all the pollen shapes are spheroidal, the pollen the ornamentations are scabrate. The results found in the species investigated morphological, anatomical and palynological species in Turkey as has been shown for the first time.

Keywords: *Viola* L., *Violaceae*, Anatomy, Morphology, Palynology

TOXIC EFFECT OF LEAD AND CADMIUM ON RAT BRAIN TISSUE AND PROTECTIVE ROLE OF SESAMOL

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ABSTRACT

Lead and cadmium are heavy metals. Lead is one of the oldest metals used by humans since ancient times. Living beings are frequently exposed to this metal due to its various uses such as cosmetics, automobile industry and battery production. Cadmium enters the body through the respiratory and digestive tract. Intake of high levels of cadmium with food causes acute toxicity. Sesamol (5-hydroxy-1,3-benzodioxyl) is an antioxidant compound containing methylenedioxy group just like vitamin E. Sesamol is derived from sesame oil. The sesame oil their positions *Sesamum indicum L.* is obtained from plants. Oxidative stress is an important marker that plays a role in the pathogenesis of chemicals. In this study, oxidative stress parameters such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione-S-transferase (GST) and the lipid peroxidation marker malondialdehyde (MDA) level were investigated. For this purpose, lead, cadmium and sesamol were administered to experimental animals by oral gavage. Experimental animals are divided into 8 equal groups. These; control group, sesamol applied group, lead nitrate applied group, cadmium chloride applied group, lead nitrate + cadmium chloride applied group, lead nitrate + sesamol applied group, cadmium chloride + sesamol applied group, lead nitrate + cadmium chloride + sesamol applied group. Ethics committee approval was obtained from Gazi University Animal Experiments Local Ethics Committee for this experimental study (G.Ü. ET-17.086). Brain tissues taken from rats after 28 g applications were frozen in liquid nitrogen and then stored at -80. Antioxidant enzyme activity and lipid peroxidation levels were studied spectrophotometrically. It was observed that there was a statistically significant decrease in the levels of antioxidant enzymes SOD, CAT, GPx and GST in the brain tissues of rats treated with lead, cadmium and lead cadmium compared to the control and sesamol groups. Cooperation with sesamol k t of lead, cadmium, and if the brain tissue of rats exposed to lead cadmium increase in enzyme level was observed that many therapeutic role sesamol. On the other hand, MDA level was significantly increased in the brain tissues of rats treated with lead, cadmium and lead cadmium compared to control and sesamol groups. It was observed that there was a decrease in the brain tissues of the rats administered with sesamol and cadmium and lead cadmium. As a result, it is possible to say that sesamol has a healing role on oxidative damage caused by heavy metals.

Keywords: Brain, lead, cadmium, oxidative stress, sesamol

PRELIMINARY MORPHOLOGICAL AND BIOCHEMICAL EVALUATION OF ANNUAL AND PERENNIAL WILD *HELIANTHUS* SPECIES

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ABSTRACT

Helianthus is a diverse genus comprised of 51 species and 19 subspecies with 14 annual and 34 perennial species. Wild sunflower relatives constitute a genetic resource of useful traits for crop improvement through the transfer and integration of genes into the cultivated *Helianthus annuus* genome, broadening the narrow genetic base of cultivated sunflower. Wild sunflower species are phenotypically and genetically more diverse than cultivated *H. annuus* and their genetic potential has not been fully exploited. In the current study, an evaluation of morphological and biochemical traits of annuals *Helianthus argophyllus* (5 populations), *H. porteri*, *H. agrestis*, *H. paradoxus* (2 populations), diploid perennials *H. nuttallii* (6 populations), *H. salicifolius* (2 populations), *H. winteri*, and hexaploid *H. laetiflorus* was performed. Relative water content (%), the total antioxidant capacity (DPPH) and FRAP (Ferric reducing antioxidant power), total flavonoid content, total protein content and peroxidase activity were estimated. There was a highly significant variation among all genotypes for all the characteristics studied. Further screening of the wild species as a potential source of useful traits for the improvement of agronomic performance of cultivated sunflower will be carried out.

Key words: Antioxidants, cultivated sunflower, flavonoids, *Helianthus annuus*, enzymes, wild species

Acknowledgement: This work has been carried out in the framework of the bilateral grant project numbered as 119O218 and titled “Determination of nuclear DNA content and ploidy level of wild sunflower species and their interspecific hybrids utilizing flow cytometry and their evaluation based on some yield traits” between the Bulgarian Academy of Sciences and TÜBİTAK (Scientific and Technical Research Council of Turkey).

COMPARATIVE ANALYSIS OF GENES ASSOCIATED WITH DNA METHYLATION IN WHEAT CULTIVARS WITH CONTRASTING DROUGHT TOLERANCE

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ABSTRACT

Drought is the most severe natural hazard that affects crop development and productivity. The frequency and severity of drought events tend to be recurring and can shrink food supplies. Wheat crop is highly vulnerable to drought and providing information on the biological effects of dehydration on plants could support the development of adequate drought mitigation strategies. We studied the effect of severe drought stress on specific morphological traits and the expression of genes contributing to maintenance DNA methylation at early developmental stage of four Bulgarian winter wheat cultivars (Zlatitsa, Sadovo-1, KM135 and Yantar). DNA methylation is a key epigenetic modification that contributes to gene regulation and maintenance of genome integrity. Assessment of stress and recovery levels using plant growth parameters and leaf relative water content displayed cultivar-specific reduction in plant growth and RWC with a larger decrease in Zlatitsa. The levels of MET1 transcripts increased in Zlatitsa and Sadovo, and remained almost unchanged in KM135 and Yantar cultivars. The cultivars behaving as drought tolerant tend to have a higher expression level of DDM1 in leaves, whereas more susceptible cultivars displayed less abundant DDM1 transcripts. The observed differences in the parameters studied imply for the existence of different adaptation strategies to dehydration in wheat cultivars and for the direct or indirect involvement of methylation machinery in the cultivar-specific response to drought stress.

Key words: Wheat, drought, DNA methylation, MET1, DDM1

Acknowledgement: This work has been carried out in the framework of the National Science Program "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters", approved by the Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science (MES) of Bulgaria (Agreement № Д01-322/18.12.2019). The first selection of wheat genotypes was performed within the frame of the project No DN06/12/19.12.2016 funded by the National Science Fund of MES of Bulgaria.

ESTIMATION OF HARVEST LOSSES FOR DURUM WHEAT (*TRITICUM DURUM* DESF.) DUE TO HUMIDITY IN THE SEMI-ARID REGION OF SÉTIF

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ABSTRACT

This experimental study was carried out during the 2018/2019 campaign at two sites located in two different agro-ecological zones North (Beni Fouda) and Center (ITGC Station) of the wilaya of Sétif. Its objective is to determine the ideal moisture content of the grain at harvest, and therefore the optimum harvest date to reduce losses and keep production at its real level without altering technological and commercial quality criteria. This study focused on two varieties of durum wheat (V1: Bousselem and V2: Oued el Bared) the first on site 1, the second on site 2. We also carried out physicochemical analyzes of the technological quality of the grains of harvested wheat. The results obtained revealed that the optimum harvest date for the V1 tested at ITGC is beyond June 15th and before June 18th; for the V2 (Oued el Bared) of site 2, it is between June 27th and July 1st. Those results generated losses which turned out to be greater in the Center estimated at 3.45qx / ha per day than in the North estimated at 0.34qx / ha. This is probably specifically in direct relation with the temperatures accumulated during the period of the test in addition to other climatic factors such as the rainfall which is known to be more important in the North of Setif than elsewhere. Concerning the results generated by laboratory analyzes, the protein level is markedly higher in V2 than in V1; when in midday (Mitadinage), V2 was the most affected (between 20 and 40%). This study showed that the protein level changes with humidity as well as yield. We therefore believe that for a first test, we have achieved our objectives; however, these dates can only be regulatory references after being confirmed by similar studies taken two to three times at the same sites.

Key words: Durum wheat, varieties, moisture, yield, technological quality, harvest losses

THE RESPONSES OF WILD SUNFLOWER CROSSES TO DROUGHT STRESS

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ABSTRACT

Sunflower (*Helianthus annuus* L.) is the most planted oil crop in Turkey and it grows mainly in rain fed regions especially in Trakya Region which is European part of Turkey has about 50% of Turkish sunflower production areas. Therefore, sunflower encounters frequently in some seasons with severe droughts affecting yield highly then sunflower breeders look for resistance genes especially from wild sunflowers which adapted dry areas. *Helianthus mollis* is known and exists in one of the most tolerant wild sunflower species in *Helianthus* genus. The study was conducted to determine drought tolerances of the crosses of common sunflower with *Helianthus mollis* and also the crosses with wild *Helianthus annuus* species and cultural type sunflower inbred lines under controlled environmental conditions in Trakya Agricultural Research Institute, Edirne Turkey. Flowering period (day), Physiological Maturity Period (day), Seed Filling Period (day), Growing Degree Days at Flowering and Physiological Maturity Periods, Plant Height (cm), Head Diameter (cm), Average yield per head (g), Oil Content (%), 1000 Seed Weight (g), Leaf number, Leaf Area (cm²) and Total *Chlorophyll* contents were measured at R3, R5-1 and R6 growing periods. Based on study results, head diameter, leaf area, oil content, seed yield per head and 1000 seed weights of wild crosses were lower than control (Tunca commercial sunflower hybrid) as expected. However, in other observed yield traits, the large variations were observed among crosses existed in the study. *Chlorophyll* contents of crosses were compared relatively at R3, R5-1 and R6 growing periods too. Based on total *chlorophyll* contents of crosses, some promising crosses for drought tolerance levels comparing check Tunca hybrid. As results, these results indicated that wild crosses could be used commonly in the drought tolerance studies and selected ones will be included to sunflower breeding program. Then, they will use directly or indirectly associating initial program to obtain and develop drought tolerant genotypes.

Keywords: Drought tolerance, Sunflower, Wild crosses, Yield traits, Total *Chlorophyll* contents

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