PROCEEDINGS OF III. INTERNATIONAL AGRICULTURAL, BIOLOGICAL & LIFE SCIENCE CONFERENCE

AGBIOL 2021

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WELCOME NOTES

You are welcome to our III. 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 stiuation again. 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. Due to COVID-19 situation, II. AGBIOL 2020 has organized fully on-line event which was 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. Therefore, this great interest gave ambition to organizers to make it a periodical event then we decided to organize 3rd one in this year.

The Organizing Committee of AGBIOL 2021 considers the health, safety, and security of its conference attendees and community as its top priority. Due to 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 2021 has decided to move towards the organization of on-line again but with limited participation**.** There is a worldwide participation from 44 countries with 422 papers by contributing 1066 authors. Our AGBIOL 21 conference was organized with 288 oral, 134 e-poster presentations.

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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Prof Dr Yalcin KAYA, Assoc Prof Dr Necmi BESER

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APPLICATION OF SMALL-RNA TECHNOLOGIES IN FUNDAMENTAL AND TRANSLATIONAL RESEARCH FOR PLANT PROTECTION: ADVANTAGES, LIMITATIONS AND PROSPECTS

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ABSTRACT

Different types of RNAs such as double stranded RNA (dsRNA) and small interfering RNA (siRNA) can trigger homologous RNA degradation or inhibit mRNA translation and chromatin modification. This process is known as RNA silencing, and plays a significant role in various biological processes including innate immunity, development and control of genomic integrity. In plant-microbe interactions, plants and microbes can exchange RNA molecules, which then integrate into RNA silencing machinery in reciprocal recipient cells. Such cross-kingdom RNA transfer has now been demonstrated in many fungal, oomycete, nematode and bacterial interactions with host plants. Movement of sRNAs from plants to pathogens has been explored using the host-induced gene silencing (HIGS) technique where the sRNAs are generally made from dsRNA in transgenic plants using *Agrobacterium* or virus delivery systems. Another approach for gene silencing in plants is based on exogenous application of sRNAs directly onto plants (referred to as spray-induced gene silencing, SIGS). Both HIGS and SIGS have been used for fundamental research such as functional analysis of genes and translational research such as generating disease-resistant crops or protecting plants against pathogens. Recent developments on sRNA-based strategies, opportunities and challenges that impede the successful translation of these molecules into plant protection will be presented.

Keywords: Small-RNA technologies, SIGS, Gene silencing.

RECOMBINANT PROTEIN PRODUCTION IN YEAST *KOMAGATAELLA PHAFFII* (*PICHIA PASTORIS*)

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ABSTRACT

The *Komagataella phaffii (Pichia pastoris)* recombinant protein production system has been successfully used in the production of many recombinant proteins, almost half of which are biopharmaceuticals. The recombinant proteins produced by this organism have been approved by the FDA for human use as food or drug. *P. pastoris* is capable of rapidly achieving high cell densities in simple media as fast as bacteria and capable of disulfide bond and glycosylation modifications as mammalian cell culture. The ease of genetic manipulations in *P. pastoris* allows to increase the efficiency of this system through metabolic engineering studies. Methanol-inducible alcohol oxidase I (AOX1) and constitutive glyceraldehyde-3-phosphate dehydrogenase (GAP) promoters are widely used in the *P. pastoris* expression system. The genes responsible for the formation and consumption of ethanol in *P. pastoris* were characterized by our research group for the first time in the literature. The gene responsible for the consumption of ethanol was determined as the *ADH2* gene and it was highly expressed on ethanol as a sole carbon source. The potential use of the promoter regions of these genes for recombinant protein production was investigated to express food enzymes in this system and compared to the AOX1 and the GAP promoters.

Keywords: Recombinant protein production, Yeast, Food, Promoter,

LEGACY vs LOW-RISK PESTICIDES PROSPECTS AND CHALLENGES

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Pesticides have been used in agricultural production for many years. All pesticides have some amount of risk. Many of them, currently characterized as legacy, were once used to protect crops and human health but are now canceled or banned because of health risks to humans, animals, or the environment or resistance development. The legacy these pesticides leave behind is their long-lived persistence in the environment and bioaccumulation in the food chain. Nowadays, low-risk compounds are recommended for plant protection and nutrition purposes. In this presentation it is discussed what is known of the low-risk pesticides and the prospects of conventional and legacy pesticides. How feasible is it to register legacy pesticides again? The trends in pesticide market and the challenges for reduced doses, enhanced uptake, translocation, delivery and action are given through the prism of new insights of plant as metaorganism. Technological advantages in precision agriculture, pesticide application technologies, plant phenotyping and pesticide risk mitigation practices could help in the reduction of the risk of unauthorized or other legacy pesticides. Insights and challenges on the pesticides-based weeds / diseases / pest management, pesticide resistance, pesticide tolerant crops, pesticide environmental fate, pesticide risk assessment, pesticide prioritization and of pesticide registration process will be discussed. Interactions of pesticides with physiological processes, plant root exudates and plant microbiome are summarized.

Keywords: legacy pesticides, pesticide registration; resistance management; safe use of pesticides; crop protection

Acknowledgments

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WIDE HYBRIDIZATION AND GENETIC MANIPULATION TECHNIQUES IN PREBREEDING AND GENETIC ENHANCEMENT OF CROP PLANTS

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Exploitable genetic variability is the cornerstone for widening the genetic base of crop plants. While most of the breeding programs rely on the primary gene pool for introgression of desirable traits, the secondary and tertiary gene pools also have been successfully exploited for development of new crops like triticale (*Triticum aestivum* L. x *Secale cereale* L.), *Hordeum vulgare* x *Psathyrostachys fragilis*, *Raphanobrassica* (*R. sativus x B. oleracea*), *Brassica-moricandia / sinapsis / diplotaxis / Crambe*, *Sorghum saccharum* through intergeneric crosses besides, several interspecific hybrids in plants including floriculture and horticultural crops. Following the classical example of the popularly known "Bulbosum technique" in which the chromosomes of *H. bulbosum* were preferentially eliminated in the *H. vulgare x H. bulbosum* crosses leading to haploid development, several ploidy manipulation techniques were employed for development of interspecific and intergeneric hybrids. Generally, cross incompatibility in the interspecific and intergeneric crosses due to variations in ploidy (polyploidy, dysploidy), genomic differences, structural heterozygosity leads to hybrid inviability. In cases where genetic variation is limited in crop gene pool, genetic engineering and gene editing techniques played a pivotal role. In this presentation, the current knowledge of the intergeneric and interspecific crosses and the techniques of ploidy manipulations (anther culture for ploidy reduction, embryo rescue, in vitro colchiploidy for amphidiploidization) for production of successful hybrids and genetic upgradation using modern biotechnological tools towards productive cultivars will be highlighted.

Keywords: Ploidy, Genetic manipulation, Prebreeding, Intergeneric and interspecific hybridization

DEVELOPMENT OF AN INTEGRATED MODEL TO EVALUATE THE CONSEQUENCES OF PRACTICES AND LAND USE ON AGRICULTURAL PRODUCTION IN MOROCCO UNDER CLIMATIC CONSTRAINTS OVER THE NEXT TWENTY YEARS

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ABSTRACT

Climate change is expected to have a significant impact on agricultural production at local and global scale. Higher temperatures and changes in precipitation patterns projected by the Intergovernmental Panel on Climate Change (IPCC) could cause agricultural production to fall in many areas requiring significant changes in farming practices and distribution of agricultural land. A concomitant factor to climate change will be the increase of the population and its distribution and its level of consumption that also influence the strategies of agricultural production, conversion of agricultural land, the type of irrigation and technology development. Determine the consequences of these forcings on land use will depend on our understanding of past changes and market forces on the agricultural sector and how future climate change, technology, the type of irrigation, abundance, government policy vis-à-vis agriculture, the size and distribution of the population will affect agricultural production and its relation to the expansion of agricultural land. It is proposed to develop an innovative methodology that will integrate ground observations, remote sensing, socio-economic and demographic statistics and technology indicators to project the trends and patterns of agricultural land use caused by climate change and human development. A model that links environmental and socio-economic factors to project their impact on the current use of agricultural land and the potential change of this use over the next 20 years

Keywords: demography, technological indicators, land use, climate change, human development.

CHEMICAL COMPOSITION AND INSECTICIDAL ACTIVITY OF ESSENTIAL OILS FROM PIPER GUINEENSE FRUITS AGAINST SITOPHILUS ZEAMAIS (COLEOPTERA: CURCULIONIDAE)

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ABSTRACT

The maize weevil, *Sitophilus zeamais* is a cosmopolitan insect pest of maize and other cereal products causing severe damage throughout the developing world. Synthetic insecticides produce undesirable effects when used as protectant against *S. zeamais* on stored maize. Plant essential oils possess insecticidal properties but information is scanty on the determination of essential oil components of the West Africa black pepper, *Piper guineense* fruits and the use of its individual component as protectant against *S. zeamais*. Essential oil components from the fruit extract of *P. guineense* were obtained using hydrodistillation method and identified with a Gas Chromatography-Mass Spectrometry. Adult *S. zeamais* were exposed to 1.0% (v/v) concentration of eight of the essential oil components in the laboratory (25±2°C ambient temperature and 68±5% relative humidity). The mortality, oviposition and repellent effect of the essential oil constituents on adult *S. zeamais* were evaluated relative to ethanol-treated control. All data were analyzed with analysis of variance and *t* - test and means were separated at 5% level of significance. A total of thirty-seven chemical constituents belonging to monoterpene hydrocarbon (0.83%), oxygenated monoterpene (11.68%), sesquiterpene hydrocarbon (45.17%), oxygenated sesquiterpene (29.88%) and non-terpene hydrocarbon, were identified from volatile fraction of *Piper guineense* fruit extract. Specifically, the highest percentage compositions were 10.58% (Guaiol) > 9.43% (Sesamin) > 7.74% (α-Cadinol) while myrcene (0.03%) was the least compound. Adult *Sitophilus zeamais* mortality in grains treated with eight volatile compounds from *P. guineense* was significantly ($p < 0.05$) higher than the mortality in untreated grains. The highest weevil mortality (95%) was recorded on maize grains treated with ethyl oleate at 96 hours. Oviposition by female *S. zeamais* was significantly ($p < 0.05$) reduced from 5.00 in control to 0.5, 1.25, 2.75, 1.75 and 2.75 in grains treated with ethyl hexadecanoate, ethyl oleate, linalool, methyl linoleate and nerolidol, respectively. Nerolidol ($p = 0.002$) and linalool ($p = 0.003$) had the highest repellent effect on *S. zeamais* while caryophyllene oxide ($p = 0.638$) exhibited the least repellence. The use of essential oil from *Piper guineense* can offer a good source of bio- insecticides against *Sitophilus zeamais* and as a cue to other stored product insect pests. This will help to reduce the attendant problems related to the use of synthetic chemical.

Keywords: West African black pepper, Guaiol, Myrcene, oviposition, repellence.

COMPARATIVE RESISTANCE OF STORED CEREALS AND PULSE TO SITOPHILUS ZEAMAIS MOTSCHULSKY (COLEOPTERA: CURCULIONIDAE)

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ABSTRACT

We hypothesized the degree of resistance of stored grains and pulse to *Sitophilus zeamais*, a cosmopolitan insect pest of stored grains in the tropics. Three varieties each of maize (TZPB SR-W, DMR 9943, DMR 9928), sorghum (NGBO1354, NGBO1469, NGBO1582) and wheat (NGBO1123, NGBO1124, NGBO1224) and a commonly grown cowpea variety (Ife brown) were used for the experiment. In a no-choice experiment, twenty grammes (20 g) of each food variety were weighed into each of ten 1 L kilner jar and five pairs of one-week old *S. zeamais* were introduced into each jar and covered with muslin cloth. Similarly, a free choice experiment was conducted where a white cardboard was cut to give a circular shape fitting into the bottom of a bowl and ten equal sectors were traced on the circular cardboard. Each grain sample (20 g) was randomly placed per sector and 100 adult insects were placed at the centre of each bowl and covered with muslin cloth. The bowls were left undisturbed for 7 days for insect to oviposit. Thereafter, they were transferred into Kilner jars and covered with muslin cloth. All experiments were laid out in a Completely Randomized Design (CRD) with four replications. Data were collected on F1 emergence, percentage survival, period of emergence(days), seed weight loss and susceptibility index. Data were analyzed using ANOVA and means were separated using the New Duncan Multiple Range Test at $p < 0.05$. Considerable variations were observed among the food host/varieties with respect to percentage mortality, number of F1 progeny and median developmental time of *Sitophilus zeamais.* Highest mortality (90%) of *S. zeamais* was observed on Ife-Brown and on wheat variety, NGBO 1123 in all the days of the trials. There was no mortality on DMR 9928, DMR 9943, NGBO 1582 and NGBO 1224 up till the 8th day of the trial. Significantly ($p < 0.05$) higher number (10.67, 9.86) of adult *S. zeamais* emerged from NGBO 1582 (sorghum) and NGBO 1124 (wheat) respectively, in the no-choice test while significantly higher number (5.58, 5.07) of adult *S. zeamais* emerged from maize varieties DMR 9943 and DMR 9928, in the free choice experiment. Susceptibility indices obtained ranged from 0 to 5.8 in the no-choice experiment and 0 to 4.5 in the free choice. Cowpea variety (Ife Brown) and the wheat variety (NGBO 1123) are the least suitable host to *Sitophilus zeamais* in relation to feeding and development. Desirable characteristics from grains these resistant grains could be useful in breeding programs to develop varieties that are resistant to the insect pests.

Keywords: Free choice experiment, Developmental time, Susceptibility index, Breeding programs.

EFFECTS OF DEFICIT IRRIGATION ON PEACH FRUIT QUALITY IN WARM AND ARID AREA

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ABSTRACT

The effects of deficit irrigation (DI) and partial root zone drying (PRD) were investigated on early maturing peach trees (*Prunus persica*) Cv. Flordastar over one season. Water restriction applied from dormancy until harvest was compared with irrigation at full crop evapotranspiration (FI). Two degrees of water restriction were imposed. The DI treatment was 50% of water given to fully irrigated trees and the PRD treatment was 50 of water of FI tress applied to one half of the root system while the other half was dried each 10 days. The impact of different irrigation regimes on fruit composition in carbohydrates and total organic acids, firmness color and secondary metabolites such as polyphenols. The results showed that deficit irrigation increased dry matter content and firmness. Polyphenol content increased under DI and PRD treatments compared to full irrigation. The peaches that have the highest color density were obtained from DI and PRD treatments. Drought (DI and PRD) increased hexoses and sorbitol concentration and decreased total organic concentration. For more efficient use of water resources in case of limited irrigation water, DI and PRD were found to be recommendable for peach orchard under arid conditions because it is not only saves water but also improves fruits quality

Keywords: Deficit irrigation, peach tree, fruit quality, warm area.

DROUGHT STRESS EFFECTS ON MORPHOLOGICAL, PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF CARROT CULTIVARS IN TURKEY

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ABSTRACT

Carrot is highly nutritious and most popular vegetable crop after potato. Drought stress affects almost every region of the world, and approximately one half of our earth is prone to drought stress every year. It mainly disturbs plant water association and diminishes water-use efficiency but, eventually, all plant mechanisms get affected by water scarcity. This study was conducted under greenhouse conditions to evaluate the responses of nine carrot cultivars in response to drought stress. Different physiological traits such as relative water content (RWC), leaf temperature (LT), chlorophyll and carotenoid concentrations were measured. Morphological parameters such as plant length, number of leaves, root length and root diameter were also measured from control and stress treated carrot cultivars. Differential responses of eight carrort cultivars was observed under drought stress. Results showed that all the cultivars showed an extent of decrease in their morphological traits under drought. Likewise, RWC declined significantly in the plants that were subjected to stress conditions. Furthermore, traits including chlorophyll contents and carotenoids were also decreased under drought stress. The cultivar Cosmic Purple showed highest senitivity to drought stress whereas Coral Orange and Tendersweet cultivars showed highest tolerance to drought stress compared to other cultivars in study. As there are no comprehensive studies in literature which deal with affects of drought on carrot's morpho-physiology and biochemical traits, current study laid the basis for understanding the affects of drought on the carrot cultivars and pave path for future abiotic stress breeding of carrots.

Keywords: Abiotic stress, Carrot, Morpho-physiological changes, Biochemical effects, Drought stress.

NEWLY ISOLATED BACTERIOPHAGES CHARACTERIZATION AND REVEALING OF THEIR POTENTIAL FOR CONTROLLING BACTERIAL SPOT DISEASE IN VITRO

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ABSTRACT

Bacterial diseases are one of the main reasons for great crop losses worldwide. Routine disease management practices, such as the use of quality seeds, crop rotation, the growth of less sensitive varieties and the application of copper compounds, fail to provide satisfactory disease control, especially when weather conditions favor the spread of the pathogen. Therefore, new approaches are needed, and phage therapy is a promising trend in controlling bacteriosis in agriculture. Our main goal was the characterization of three newly isolated bacteriophages named BsXeu269p/3, BsXeu105t/1 and BsXeu105t/4 effective against phytopathogenic bacteria *Xanthomonas euvesicatoria*. This bacterium causes a disease known as "bacterial spot" and infect mainly pepper plants but according to the latest data it has also been reported as a pathogen on tomatoes in Bulgaria, too. The causative agents of this bacteriosis includes three more phytopathogenic bacteria: *Xanthomonas vesicatoria*, *Xanthomonas gardneri* and *Xanthomons perforans*. The newly isolated bacteriophages were isolated in 2018 from tomato rhyzospere soil in Bulgaria, Burgas. The initial characterization of the phages includes determination of their: host range, plaques morphology, TEM micrographs and phage survival at two storage temperature – at 40C for a period of 7 months and at -200C for 11 months. Double agar overlay plaque assay (DAOPA) method was used for most of the the analyzes. The host range of the phages was screened with 49 wild type phytopathogenic bacteria. The obtained results showed that all three phage isolates had narrow host range, as they were capable to destroy all tested strains of the species *X. euvesicatoria* (31), but not *Pseudomonas syringae* pv. *tomato* (1 strain), strains of the species *X. vesicatoria* (14 strains) and *X. gardneri* (3 strains). On *X. euvesicatoria* lawn two of the phage isolates (BsXeu269p/3 and BsXeu105t/1) formed plaques type A – large, with a clear center and the third phage isolate (BsXeu105t/4) – plaques type B - smaller, with a small clear center and a halo. TEM micrographs of the three phages reveals that they belong to the *Myoviridae* family – having long contractile tail. The survival of bacteriophages in the form of pure lysate for a period of 7 months at 40C (non-specific temperature) was very good. Two of them (BsXeu269p/3 and BsXeu105t/1) kept 100% of their initial titer, while the titer of the third one (BsXeu105t/4) dropped by one order of magnitude compared to the initial titer. In contrast, long storage at -200C (11 months) led to a slight decrease in the titer of bacteriophages at different ratios. None of them retained 100% of its original titer. The largest decrease in concentration was observed for isolates BsXeu105t/1 and BsXeu105t/4 - by 2 lg while the titer of bacteriophage BsXeu269p/3 decreased only by one lg. The obtained results showed that the newly isolated bacteriophages have good potential as biocontrol agents, but phage isolate BsXeu269p/3 appears to be the best choice for further studies.

Keywords: Xanthomonas euvesicatoria, phage biocontrol, Myoviridae phages, bacterial spot disease.

EFFECT OF CHROMIUM ON PARENTAL STRAIN ALTERNARIA ALTERNATA AND ITS THREE-COLOR MUTANTS STRAINS

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ABSTRACT

In this study, minimal inhibitory concentrations (MICs) of sodium chromate were determined for wild type (w.t) AA1 strain of *Alternaria alternata* with its three derivatives strains are SW1, SW2 and SW3 which have color mutation with lacking melanin genes. MIC of AA1 was reached to 10 mM that less than MICs of other color mutants' strains. However, SW1, SW2 their MICs were reached to 20 mM unlike MIC of SW3 strain that was 14 mM. Stability of growth also was occurred on certain different concentrations of chromate for each strain. Reason of variation in chromate MICs for these strains is still unknown. Probably, because of loss melanin genes that bind or control other physiological properties that related on trace element resistance. Furthermore, 14 resistant strains were distributed between UV induced and spontaneous mutations of chromate were isolated from AA1 and SW2. Reverse mutation also was tested, 10 reverse mutations are reverse whereas 4 strain are forward mutants. Morphological changes also were recorded in these mutants.

Keywords: Alternaria alternate, Color mutations, Chromate, Resistant mutants.

COMPARISON OF DIFFERENT SOWING METHODS IN ORGANIC AND CONVENTIONAL RICE FARMING

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ABSTRACT

The present work was conducted to determine the potentialities of organic rice cultivation in Diyarbakır and to set an example for farmers in transition to organic farming. The local Karacadag rice and Osmancık-97 breeding variety, the most cultivated variety in the Turkey were used in the research a test material. The research was carried out in 3 replications according to the split parcel trial design in random blocks in the 2011 rice growing period in the experimental field of the GAP International Agricultural Research and Training Centre. Were used of transplanting in the organic parcels and spreading methods in the conventional parcels. As the result of research, fertility, the number weed, in organical agriculture treatments showed superior values according to conventional agriculture treatments. Karacadağ variety showed the best value in all characteristics observing. In the economic analysis, organic Karacadağ application was the most profitable method with a net profit of 371.3 TL/da. Local Karacadağ variety proved its ability to adapt to the ecological conditions of the region. It is suggested that the cultivation of the Karacadag rice cultivar in organic agriculture conditions may be expanded in the region.

Keywords: Diyarbakır, Organic rice, transplantıng, weed, fertilitiy.

IMPLEMENTING SPATIAL MODELING FOR ECONOMIC DEVELOPMENT: A CASE STUDY FROM MOROCCO

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ABSTRACT

The effects of climate change can be dramatic on agriculture because production is closely linked to the quantity and distribution of annual rainfall in rain-fed areas and to the amount of water stored in reservoirs and aquifers for irrigated perimeters, especially in Morocco. In addition, with yields uncertainty in this context, the uncertainty of farmers' incomes is felt. Remote sensing information can provide irreproachable benefits to society. Indeed, resource management and political decisions can be better informed by coupling past and present observations through remote sensing data. In this regard, this research constitutes a contribution to reduce climatic risk effects using an innovative approach that takes into account the phenological stage and growth phase shifts in time and space, as well as the technological difference between different production units. In order to compensate the variability of farm income risk caused by growth phase offsets in time and space and by the technological difference between production units, the wheat yield was estimated from its phenological metrics. Accordingly, Stepwise regression was used to spatially develop the wheat yield estimation model based on remotely sensed phenological metrics. In this research, we considered intensity and probability of risk linked to the variation in agricultural incomes, based on trends in yield levels and prices over sixteen crop years, from 2001 to 2017 using a new index. The results allow detecting spatio-temporal differences in the study area. Furthermore, they identify four categories of agricultural areas according to their risk level of loss in wheat production value. The one, which represents nearly a quarter of total agricultural area, was the most affected by the loss in wheat production value. Overall, the results could form the basis to help policymakers and wheat growers prevent and reduce unacceptable losses in the value of production under irregular rainfall conditions. This can be done by implementing preventive or protective measures aimed at achieving a maximum level of security, particularly in arid zones.

Keywords: Spatial modelling, agriculture, risk, yield estimation, production value, Morocco.

GENETICALLY MODIFIED ORGANISMS IN AGRICULTURE USAGE STATUS AND EFFECTS ON HUMAN HEALTH

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ABSTRACT

This study was carried in Akçakale and Harran districts of Şanlıurfa on the use of genetically modified organisms in agriculture and to determine its effects on human health. Six villages were selected; three from each district and 30 people from each village with 180 fodder plant producers were interviewed using the stratified sampling technique. 2018 data were taken in the form of questionnaire which was administered to the farmers in the villages, and the surveyed people's average age was 32.2 years. The 180 farmers were interviewed on the use of genetically modified organisms, benefits and harms to people, etc. The ideas on issues and the effects on their normal lives to understand questions were asked. 60.28% of the farmers surveyed in two districts of Şanlıurfa know the concept of GMO (Genetically Modified Organisms) and their harm, while 39.72% of them stated that they had never heard about it and it was not important. According to the research results, 52.4% of the farmers who participated in the GMO survey were of the view that most chemical pesticides used in agriculture are harmful to human health, hence they are trying to use hormones and organic nutrition with less pesticide. As a result, farmers in the region are of the view that adequate level of information on the use of GMO to choose from manufactured products in this respect will be beneficial to them.

Keywords: Biotechnology, genetics, organism.

ASSESSMENT OF TOLERANCE TO WATER STRESS AND NITROGEN DEFICIT IN ALGERIAN MAIZE POPULATIONS (ZEA MAYS L.) FROM THE SAHARA DESERT

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ABSTRACT

Drought and low nitrogen are major stresses for maize (*Zea mays* L.), and maize populations from the Sahara Desert are potential sources of stress tolerance. The objectives were to assess tolerance, varietal and heterosis effects of Algerian populations under no-nitrogen fertilization and water stress. A diallel among six Algerian maize populations was evaluated under drought (300 mm irrigation) vs. control (600 mm) and no-nitrogen fertilization vs. 120 kg/ ha-1 N fertilization. Genotypes showed significant differences and genetic effects for water and nitrogen stress tolerance. Varietal effects and heterosis were significant only under water stress for ASI, suggesting that both additive and non-additive genetic action were important for inheritance of this trait under stress. Varietal effect for yield was significant under nitrogen supply, under well-watered and under water stress, indicating that there is a genetic diversity for yield and, particularly, under drought stress. However, heterosis effect was significant under all treatments. Under well-watered with nitrogen supply, plant height is mainly controlled by additive effects. For ASI, the most promising populations were AOR and BAH under drought, MST under water and nitrogen stress and also under control conditions, and SHH under all stress conditions. For plant height, the most promising populations were BAH under water and nitrogen stress, IGS under well-watered with or without nitrogen supply, and IZM under control conditions. Focusing on yield, we propose a reciprocal recurrent selection to take advantage of additive and non-additive effects, using AOR and IGS, since they showed good performance in optimum and stress conditions, for improving yield heterosis for AOR×IGS. These populations and BAH could be sources of inbred lines tolerant to drought and no-nitrogen fertilization. These populations and crosses could be used as base material among Algerian populations for breeding programs focusing on tolerance to water or nitrogen stress.

Keywords: maize; Algerian germplasm; varietal effect; heterosis; drought; nitrogen fertilization.

CLIMATE CHANGE IMPACT ON WATER MANAGEMENT IN THE SOUSS-MASSA AREA

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ABSTRACT

In addition to the recurring droughts that Morocco experienced during the last two decades, this tendency is accentuated by an unceasingly increasing demand, in particular under the effect of the demographic pressure and the economic development. In a context of scarcity and a limitation of potential resources not yet mobilized, Morocco is confronted with the need of changing its supply policy to a demand management one. The implementation of such policy requires the adoption of new management instruments and new institutional forms of organization. Accordingly, the present study proposes a tool of modeling and decision-making support which integrates the economic, institutional, hydrological and agronomic aspects. The proposed approach is based on optimization techniques and positive mathematical programming to calibrate an empirical model. Using climate change impact scenarios, this integrated economic model is tested for the basin of Souss-Massa. These simulations include changes in water availability and economic conditions, as well as demand management policy. The study results show that the demand management policy at the river basin level should take into account the regional specificities. 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. In drought conditions, the water marginal value 'shadow price' increases considerably such that water pricing policy alone cannot result in a rational and a sustainable use of the resource.

Keywords: Water resources, climate change, mathematical programming, integrated economic model, scenario.

ECONOMIC ASSESSMENT 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.

Keywords: Organic, treatment, partial budgeting, dominance, marginal return rate.

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIBACTERIAL EFFICIENCY OF ALGERIAN ESSENTIAL OILS AGAINST PECTOBACTERIUM SPP. PHYTOPATHOGENIC BACTERIA CAUSATIVE AGENT OF SOFT ROT ON POTATO

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ABSTRACT

The essential oils (EOs) are rich sources of pharmacologically active phytochemicals, which justifies their health and industrial applications. Hence, this study has been carried out to characterize the chemical composition and to evaluate the antioxidant and antibacterial efficiency of essential oils from five Algerian Cupressus sempervirens and *Juniperus phoenicea* L. varieties from the north of Algeria. The analysis and identification of the components of the the EOs was performed using gas chromatography coupled to a mass spectrometry system (GC/MS). Their antibacterial activity was studied in vitro against three bacterial strains of pectobacterium spp. phytopathogenic bacteria causative agent of soft rot on potato. The results of *in vitro* antibacterial activity showed that all EOs possessed more or less antibacterial activity against the tested bacteria. *Pectobacterium carotovorum* was the most susceptible microorganism to all EOs. Similar result on plants *Solanum tuberosum* L. tuber, was obtained. A decrease in soft rot development with almost complete inhibition in presence of EOs was observed.

Keywords: Essential oil, Cupressus sempervirens, Juniperus phoenicea, soft rot on potato.

THE EVAULATION OF DIFFERENT BIOINSECTICIDES IN THE CONTROL OF FALL WEBWORM, HYPHANTRIA CUNEA (FAMILY: EREBIDAE)

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ABSTRACT

Fall webworm, *Hyphantria cunea* (Drury, 1773) (Fam: Erebidae) is one of the important pests of hazelnut in Turkey. The synthetic insecticides are mainly preffered to control this insect in Turkey. The biological control options are very limited. In this study, the effectiveness of six different bioinsecticides (Spintor, Florbac, Biobit, Delfin, Rapax, Rebound) against other agricultural pests were tested. Thus, it is aimed to increase the biological control options against *H. cunea*. Their active substances were Spinosad (Spintor), *Bacillus thrungiensis aizawai* Bonnefoi & de Barjac, 1963 (Florbac) and *Bacillus thuringiensis* (Bt) *kurstaki*, Berliner, 1915 (Biobit, Delfin, Rapax, Rebound). They were tested in laboratory and natural conditions. Field trials were conducted in Düzce in 2019. According to data spinosad is the most effective and exhibited highest mortality on different instars of *H. cunea*. Then comes the strains of *Bt aizawai* and *Bt kurstaki*, respectively. At the end of 96 hours in laboratory experiments, spinosad caused 98% death in 2nd and 3rd instars of *H. cunea* and 83% in 4th and 5th instars. *Bt aizawai* caused 98% mortality in the 2nd and 3rd instars, 43% of the 4th and 5th instars, *Bt kurstaki* strains killed 95% of the 2nd and 3rd instars, 51% of 4th and 5th instars. Spinosad also showed the most effective results in field trials. Older larvae were found to be less sensitive in the study. This situation is thought to be related to the phenomenon known as "maturation immunity". In this study, it was shown that bioinsecticides with the active ingredient spinosad and *Bt aizawai* can also be used against *H. cunea*.

Keywords: Fall webworm, Hyphantria cunea, Bacillus thrungiensis, Bacillus aizawai, Spinosad.

SENESCENCE, TOTAL REFLECTANCE AND CHLOROPHYLL CONTENTS AT FULL HEADING RELATIONSHIPS WITH AGRONOMIC TRAITS OF DURUM WHEAT (TRITICUM DURUM DESF.) GENOTYPES GROWING UNDER SEMI-ARID CONDITIONS.

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ABSTRACT

This study was conducted during the 2020/2021 cropping season at Setif Agricultural Experimental Station ITGC in Algeria. We aim to show the relationships of physiologic traits (senescence, reflectance at total band and chlorophyll contents in the flag leaf and at full heading) with grain yield and some agronomic traits. The genetic material used consists of 11 advanced lines and 4 genotypes which 3 are local landrace used as control to evaluate their performances. Genotypes were sowing at November 19 in a random block design with three replications. The analysis of variance (ANOVA) show that genotype effect was very high significant ($P<0.001$) for all senescence parameters, reflectance at total band and chlorophyll contents at full heading. ANOVA also showed that genotype effect was significant ($P<0.05$; 0.001) for thousand kernels weight, number of spikes per meter square, number of days to heading and plant height. The study of the correlations among physiologic traits showed a high and significant ($P < 0.01$; 0.001) correlation between all senescence parameters. A significant ($P<0.05$; 0.01) and negative correlation was observed between reflectance at total band and average of velocity and chlorophyll contents. The correlations among agronomic traits reveled that grain yield was highly and significantly ($P<0.01$; 0.001) correlated with above ground biomass; harvest index; thousand kernels weight and number of spikes per meter square .The correlations between physiologic and agronomic traits reveled that number of spikes per meter square was significantly ($P<0.05$) and positively correlated with average of velocity and negatively correlated with sum of temperatures at mid-senescence, number of days to heading was significantly ($P<0.05$;0.01) and negatively correlated with senescence average and maximum of senescence average and a significant correlation ($P<0.05$) between plant height and sum of temperatures at mid-senescence

Keywords: Durum wheat; grain yield; senescence; reflectance; chlorophyll contents; full heading; semi-arid.

DROUGHT TOLERANCE OF SOME DURUM WHEAT (TRITICUM DURUM DESF.) GENOTYPES GROWING UNDER SEMI-ARID CONDITIONS.

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ABSTRACT

The aim of this study was to test the behavior of 5 genotypes cultivated in normal and irrigated conditions with regard to drought stress. We used seven indices of tolerance and resistance to drought stress. Analyze of variance showed that the geometric mean productivity, mean productivity, stress tolerance index, yield stability index, stress sensitivity tolerance and tolerance intensity were effective in judging tolerance to water stress, Boussellem and Oum Rabie was the best at water stress resistance genotypes. Correlation analysis showed that GMP is both an indicator of high performance under both conditions and of resistance to stress (r=0.56* in a stress state and r=0.82*** in a non-stress state) . Boussellem and Oum Rabie were the strongest in yield and the most adapted to water stress thanks to their values for this index (8.84 and 9.06 respectively). SSI testified to the high yield in non-stress condition (r=0.82***), therefore Ofanto was a good cultivar in non-stess condition. PCA classified the genotypes Bousselem and Oum Rabie on the first component which combined the performance in yield under both conditions with the mean productivity, geometric mean productivity, and stress tolerance index. In conclusion, the Oum Rabie and Bousselem genotypes were the best performing under both conditions and the best adapted to drought stress, while Ofanto was a good cultivar in non-stress conditions. MP, GMP and STI indices was the best to judge the adaptability of our genotypes to drought stress

Keywords: Durum wheat, drought tolerance index, semi-arid, Algeria.

THE INVOLVEMENT OF THE INDUCTION OF ANTHOCYANIN BIOSYNTHESIS AND TRANSPORT IN TOXIC BORON RESPONSIVE REGULATION IN ARABIDOPSIS THALIANA

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ABSTRACT

Recently, boron (B) has been found to form a complex with anthocyanin, which could be evidence for the B tolerance mechanisms that reduce free B in the leaf tissues of plants. However, the molecular mechanism of anthocyanin biosynthesis and transport has not been satisfactorily elucidated in plants exposed to toxic B. Therefore, the changes in expression levels of some of the phenylpropanoid pathway genes, early and late flavonoid biosynthetic genes, and transcription factors related to anthocyanin biosynthesis and transport were determined in Arabidopsis thaliana under B toxicity. Accordingly, 1 mM boric acid treatment did not cause any significant change in the expression levels of anthocyanin biosynthesis genes such as PAL1, PAL2, C4H, 4CL3, CHS, ANS and transcription factors such as MYBD and TT8 in Arabidopsis thaliana. However, 3 mM boric acid treatment induced the expression levels of anthocyanin biosynthesis genes such as C4H, 4CL3 and transcription factors including MYB75, MYB114 and anthocyanin transporter genes such as TT13 and TT19. In addition to B-anthocyanin, B-anthocyanins conjugated with glutathione (GSH) complexes can also participate in the internal B tolerance mechanism in plants. Therefore, the direct role of the B-anthocyanin complex without GSH conjugation needs to be determined. For this purpose, anthocyanin accumulation was determined in slim1 mutant Arabidopsis thaliana exposed to excess B because SLIM1 transcription factor activates sulfate acquisition for S assimilation, which generates cysteine, the substrate for GSH. Accordingly, it was gradually increased through increasing toxic B levels in both wild type (WT) and slim1 mutant plants. slim1 mutant had more anthocyanin accumulation than WT under control and all toxic B conditions. In conclusion, increases in expression levels of MYB75, MYB114, TT13, TT19 and in anthocyanin level in slim1 mutant in response to increased toxic B levels showed that anthocyanins may play a primary role in B tolerance in plants.

Keywords: Anthocyanin biosynthesis, anthocyanin transport, Arabidopsis thaliana, boron toxicity, expression, SLIM1.

EVALUATION OF COMMERCIAL TOMATO ROOTSTOCKS FOR RESISTANCE AGAINST MELOIDOGYNE LUCI POPULATIONS

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ABSTRACT

Root-knot nematodes (*Meloidogyne* spp.) are considered one of the most destructive soil-borne pathogens, limiting tomato products. The *Mi* gene in tomato cultivars provides resistance to several root-knot nematode species, including *Meliodogyne luci*. However, virulent nematode populations, defined as the ability to break this gene, were reported. In contrast to tomato cultivars, rootstocks have not been screened for resistance against *M. luci*. Therefore, the study was conducted to determine the response of six commercial tomato rootstocks to avirulent and virulent populations of *M. luci.* Five plants of each rootstock, one per pot, were inoculated with 5000 eggs (Pi). Susceptible tomato cultivar Barbaros was included as a control. The pots were arranged in a completely randomized design in a plant growth room at 24±2°C. Eight weeks after nematode inoculation, the root galling (based on 0-5 scale) and the number of egg per plant (Pf) were determined, and reproduction factor (Rf=Pf/Pi) was calculated. The reproduction index (RI = Pf on the tomato rootstocks/Pf on susceptible cultivar Barbaros x 100) was used to assess the level of resistance of the rootstocks. All the rootstocks inoculated with the avirulent population of *M. luci* had low root galling (≤1) and Rf (<1). The rootstocks responded as highly resistant (RI<10%) to this population of *M. luci*. However, these rootstocks showed very high root galling (≥4.4) that were not significantly different from the susceptible control when inoculated with the virulent population of *M. luci*. The virulent nematode population reproduced in all tested rootstocks (Rf>1). Arazi, Arbiore, Embajador and Interpro responded as moderately resistant (10≤RI<50%), whereas Armstrong and Kardia were susceptible (RI≥50%).

Keywords: resistance, root-knot nematode, rootstock, tomato, virulent.

THE EFFECTS OF NITROGEN DOSE AND HARVEST TIME IN FORAGE COWPEA AND SOYBEAN GENOTYPE ON THE YIELD AND SOME FEATURES

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ABSTRACT

In this study, the effects of different nitrogen doses (4-6-8-10 N kg/da) and different harvest times (pod setting and seed formation) on yield and some agricultural characteristics were determined in forage cowpea (Ülkem and Genotype) and forage soybean (Yemsoy and Yeşilköy). The research was conducted with 4 replications according to split-split plot design, on the experimental area of Ondokuz Mayıs University, Faculty of Agriculture, Agricultural Application and Research Center in 2020. Plant height, main stem thickness, fresh forage yield, and hay yields were determined in the harvested plots. It was determined that there are statistically significant differences between the examined features. The highest plant height was determined in the Yemsoy cultivar (124.42 cm) at N10 dose during the pod setting period while the lowest plant height was determined in the Ülkem cultivar (33.00 cm) at N4 dose in the pod setting period. The main stem thickness of the cultivars varied between 6.21-11.15 mm in the pod setting period and between 6.97-11.19 mm in the seed formation period. The highest fresh forage yield was obtained in Yemsoy and Yeşilsoy cultivars (5886.88-6319.38 kg/da) at N6 dose during the pod setting period, respectively. During the seed formation period, the highest fresh forage yield was obtained in the Yemsoy cultivar (7681.25 kg/da) at the N6 dose. In terms of hay yield, in the pod setting period, the highest yield was obtained in Yeşilsoy and Yemsoy cultivars at N6 dose (1994.83-2051.87 kg/da), respectively. Similarly, in the seed formation period, the highest yield was obtained in Yeşilsoy and Yemsoy cultivars at N6 dose (2045.48-2511.06 kg/da), respectively. According to the results of the one-year data obtained, it was concluded that forage soybean varieties were more suitable to be grown by giving 6 kg nitrogen dose per decare in terms of high yield under irrigated conditions in the summer period.

Keywords: forage cowpea, forage soybean, nitrojen, yield, harvest time.

DIVERSITY AMONG COWPEA (VIGNA UNGUICULATA L. WALP) LOCAL BULGARIAN ACCESSIONS. BIOCHEMICAL ANALYSES OF SEED COMPOSITION

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ABSTRACT

Cowpea (*Vigna unguiculata* L. Walp) is a legume crop with high nutritional value of the seeds, excellent forage characteristics of straw and with positive agrotechnical impact on subsequent crops. Vigna seeds are rich source of proteins, carbohydrates, omega-3 and 6 fatty acids, alpha-tocopherol and other valuable components (Antova et al 2014). In Bulgaria this crop is cultivated in limited areas predominantly in the southern parts of the country, near Turkey and Greece (Dimitrovgrad, Haskovo, Kapitan Andreevo and the Petrich region). Cowpea plants manifest high drought and heat tolerance, thus making this species a very promising selection in view of future climate changes as an alternative crop of *Phaseolus vulgaris* L., which is the main legume type cultivated in Bulgaria. Twenty-six local accessions from the collection of the Institute of Plant Genetic Resources and one Bulgarian variety "Hrisi" (selection of the IPGR, Sadovo, Bulgaria) were characterized in terms of seed phenotype, soluble protein content (Bradford, 1976) and electrophoretic pattern (10% SDS-PAGE), trypsin-inhibitory activity (microassay according to Bacon et al 1995), total sugar content (Anthrone method) and phenolic content (Folin-Ciocalteu method). Despite the variability in seed coat phenotype and hilum coloration, form (ovoid, rhomboid or reniform) and weight (ranging from 8 to 28 g of 100 seeds), the seed protein content and electrophoretic pattern did not present variability with a sole exception found in the accession with the lowest trypsin-inhibitory activity. Antitrypsin activity measured in the tested accessions showed significant variations comprising a– 3-fold difference between the highest and the lowest detected levels. Carbohydrate content did not vary substantially among the accessions. Phenolic content was linked to trypsin inhibitory activity. A plausible explanation of this finding could be the common function of both compounds in plant defense against herbivores and phytopathogens.

Keywords: cowpea, alternative crops, trypsin inhibitors, sugars, phenolics.

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PROBLEMS AND PROPOSAL OF SOLUTIONS IN ORGANIC FARMING

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ABSTRACT

Interest in organic farming is increasing day by day in our country. The fact that people have to keep their immune systems strong, especially during the Covid-19 pandemic process, has directed people to organic products. Due to the increasing demand for organic products, it should be required to gain momentum in its cultivation. However, organic farming growers in our country face various problems at the beginning of their work. These is generally organic seed and organic seedling supply, organic fertilization, organic spraying. This is followed by the marketing of organic products grown under very difficult conditions and informing the consumers in order to eliminate the problems in marketing. The dissemination and sustainability of organic agriculture is not possible only by increasing the production areas and amount. It is important to ensure that consumers also prefer organic products and to be informed for this purpose. Informing producers and consumers will increase the supply and demand of organic products, thus increasing both commercial production and the production of products that are beneficial to the environment, nature, and human health. The aim of the study; It is to offer solutions by considering the problems faced by organic agriculture growers from the first time they start to work, until the harvest and sales point.

Keywords: Organic production, problem, solution.

ORGANIC FARMS IN AGRICULTURAL TOURISM

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ABSTRACT

In recent years, there have been changes in people's tourism preferences. Ecotourism has become a popular and preferred type of tourism. As people become more conscious, they reach saturation in a short time from crowded and usual tourism centers, ecotourism is starting to be preferred because of its serenity and nature's ability to treat people. Especially people living in big cities and families with children prefer ecotourism alternatives. Agritourism, which is one of the ecotourism alternatives; it not only creates an alternative job opportunity for farmers but also becomes a stop for people who like to spend time in nature. It is one of the places where families can have a good time with their children in organic farms, which are included in agricultural tourism. organic farms: In addition to giving people the opportunity to examine organic cultivation on-site and reach organic products, it is the most ideal place for children to spend time in nature and see the products grown on the farm, pick from the branch and consume healthy products. In our study, by giving information about organic farms, which plants are grown in which season, marketing opportunities of these products grown in organic farms, and life in organic farm where visitors can have a good time are mentioned.

Keywords: Organic, farm, agricultural tourism.

CONTACT INSECTICIDAL EFFECTS OF SOME ESSENTIAL OILS (JUNIPERUS EXCELSA AND CEDRUS ATLANTICA) ON APHIS FABAE SCOPOLI (HEMIPTERA: APHIDIDAE)

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ABSTRACT

Aphids can cause significant economic losses in agricultural productions because they have the ability of fast reproduction. In other hand, they are vector of several plant diseases and viruses. Therefore, in the scope of biological control studies, it is important to reveal the effects of some essential oils against aphids. In this study, essential oils of *Juniperus excelsa* and *Cedrus atlantica* were studied insecticidal effects on black bean aphid *Aphis fabae* Scopoli (Hemiptera: Aphididae). The lethal and sublethal effects of essential oils of *J. excelsa* and *C. atlantica* on one day old adults of *A. fabae* were investigated under laboratory conditions. The trials were evaluated at the different concentrations (0.5, 1, 2, 4, 6, 8, 10, 12 µL/L), for 24 h after treatments. After this process, lethal concentrations (LC50, LC90) of EOs were calculated according to the obtained data. Life table parameters of new emerged aphid surveyed at sub-lethal concentrations (LC40, LC30) of EOs and these parameters were calculated by Euler-Lotka equation. According to the results, the mortality rate of EOs increased with the increasing of concentration. Lethal concentrations (LC50, LC90) of *J. excelsa* were calculated as 7.03 and 63.13 µL/L, respectively. Lethal concentrations (LC50, LC90) of *C. atlantica* were calculated as 8.49 and 66.23 µL/L, respectively. Sub-lethal concentrations (LC40, LC30) of EOs caused decrease in adult longevity, fertility of surviving aphids and intrinsic rate of increase. It has been concluded that the essential oils can be used in the control of these pests.

Keywords: Aphis fabae, essential oils, lethal effects, Juniperus excelsa, Cedrus atlantica.

THE INVESTIGATION OF THE IMPACT OF DIFFERENT PLANT GROWTH REGULATORS ON MICROPROPAGATION OF ARONIA (ARONIA MELANOCARPA (MICHX) ELLIOT)

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ABSTRACT

The low rate of germination of *Aronia melanocarpa* species, whose value added has increased significantly in recent years, and the production of plants obtained by seed, which is a generative method, show expansion. Therefore, the usage of micro-propagation techniques has more importance to produce Aronia species. This thesis has investigated the mass production of Aronia plant which will contribute to fruit diversity of our country with tissue culture methods which allow rapid, virus and disease-free proliferation. For that purpose, ' Viking " and " Nero nodal segments of Aronia are used as explants, and different doses of sodium hypochlorite (5%, 10%, 20%) in surface sterilization, different plant growth regulators, chemicals that will increase the success of shoot development, tillering and rooting and various combinations of regulators and chemicals are used to identify the best practices for mass production. The best result in surface sterilization is obtained from 10% sodium hypochlorite treated 10 minutes. DKW (Driver and Kuniyuki) containing Gamborg B5 Vitamins as basic plant media, MS (Murashige and Skoog), plant growth regulators (0,1mg/L from IBA and 0,1mg/L of GA3) and different doses of cytokinin source (BAP and KINETIN), 0.5, 1 ve 2 mg/L, are used. The best shoot growth and the maximum tillering are obtained from the combination of 2mg/L BAP+0.5 KİN + 0. 1mg/L l IBA+0.1mg/L GA3. ½ MS primary nutrient containing Gamborg B5 Vitamins, different doses of IBA (1, 2 ve 3 mg/L) and NAA' (1, 2 ve 3 mg/L) are used for rooting stage. The best result is obtained from the plant media combined of 2 mg/l IBA +0,5 mg/l NAA.

Keywords: Aronia, micropropogation, PGRS, tillering, rooting.

BEHAVIOR OF SEVERAL SUNFLOWER HYBRIDS TO THREE DIFFERENT SOWING DATES UNDER SPECIFIC CLIMATIC CONDITIONS IN TULCEA COUNTY

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ABSTRACT

In Romania sunflower is the most important oily crop being used in human and animal nutrition. Sowing date is an important factor for sunflower crop technology, and it is strongly linked with abiotic factors (soil humidity and temperature). Research was performed in field experiments in Tulcea county in 2020 under conditions of non-irrigated culture. Three Romanian origin hybrids were sown at three different dates: 15 March, 25 March and 10 April. The assessments were performed for yield components (number of achenes per capitulum; 1000 - seeds weight; hectolitre weight). The results indicate that the highest yield was obtained at the second sowing date followed by the last. The aim of this experiment was to observe how several sunflower hybrids behave in different sowing dates.

Keywords: sowing date, sunflower, hybrids, yield components.

ANALYSIS OF DIVERSITY AS A FACTOR OF RESILIENCE IN AGRICULTURAL SYSTEMS: THE CASE OF A SEMI-ARID ZONE IN MOROCCO

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ABSTRACT

The farms of the Tadla plain are characterized by a diversity of production strategies, that is considered one of the characteristics of richeness of the agriculture in the region of Beni Mellal-Khenifra, and the maintenance of this diversity in the ability to remain productive in the long term, is increasingly mentioned as an objective. Nevertheless, the diversity of production systems of the farms makes the study of these units more complex. To this end, the objective of this work is to establish a structural typology that will make it possible to group the farms of the Tadla plain into types that are representative of the diversity observed, in order to guide studies and development actions according to the specificity of each type of farm. Based on data from a survey of 150 farmers, a statistical analysis was applied to the farms, taking into account three criteria: the useful agricultural area, the cropping system and the number of sheep/cattle. The typological approach allowed us to classify the 150 farms surveyed in 4 more or less homogeneous types. Type 1: large farms with a diversified production system (cereals, barley, fodder, citrus, sugar beet) and a very large sheep/cattle population (representing 6.7% of the farms surveyed). Type 2: large farms with a diversified production system (cereals, barley, fodder, sugar beet, market gardening) and a very low sheep/bovine population (representing 10.7% of the farms surveyed). Type 3: small farms with a production system based mainly on cereals and sugar beet. Type 4: small farms with a diversified production system (cereals, fodder, sugar beet, olive trees, citrus fruits, market gardening) and a significant presence of olive trees. This study appears to be sufficient to understand the diversity of farms in order to guide development efforts and ensure the resilience of agricultural activity.

Keywords: Agriculture, sustainable development, resilience of farming systems, typology, the Tadla plain, Morocco.

IMPACT OF NEONICOTINOID INSECTICIDES RESIDUES APPLIED AS SEED TREATMENTS ON MAIZE CROP AND ON BEES AND HIVE PRODUCTS

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ABSTRACT

Romania registered in the last years record productions for maize, being, in 2019, on the first place in Europe and being, according to Eurostat data, the eighth agricultural power in Europe. The European Commission closely monitors the possible relations between bee health and pesticides and is determined to take the most cautious approach possible to protect bees. In 2013, the Commission severely restricted the use of plant protection products and treated seeds containing three of these neonicotinoids (clothianidin, imidacloprid and thiamethoxam) to protect honeybees (Regulation (EU) No 485/2013). Due to the restrictions imposed on Romanian farmers, they are facing an alarming increase in the population density of some soil pests, the most dangerous being *Tanymecus dilaticollis* and *Agriotes* spp., no insecticides being available for maize seed treatment against *T. dilaticollis* in Romania. In this context, since 2018, the Ministry of Agriculture and Rural Development together with the Academy of Agricultural and Forestry Sciences funded research to monitor populations of *Tanymecus dilaticollis* and *Agriotes* spp., but also the residues level of neonicotinoid substances from soil, plants in various development stages (leaves and inflorescences), as well as in bees and hive products (pollen, honey). Studies were performed in three areas of Romania, respectively, Moldova (Neamt County) and south of country (Calarasi County) where *Tanymecus dilaticollis* exceed the economic damage threshold (4-5 adults/sqm) and Dealurile Subcarpatice (Arges county), where *Agriotes* spp. populations exceed the economic damage threshold (2-4 larvae/sqm), areas with maize. Regarding the evolution of maize leaf weevil population in the period 2018-2020, from the data obtained it can be observed that the number of adults/sqm has remained above the economic damage threshold. Regarding neonicotinoids residues monitoring, the samples were taken from maize crops at various growth stages, including inflorescences, from bees, pollen, and honey samples, too. Residue's level was determined in accredited laboratories from Germany, France and Bulgaria using certificated methods. The statistical analysis shows very low variability between annual samples, most samples being, in terms of residues, below the limit of quantification. Of the total samples, most with residues content above LOQ, are soil samples, a normal situation, as the neonicotinoids were applied as seed treatment. It is also very important to mention that the lowest percentage of samples with residues above the limit of quantification, was recorded in inflorescences, honey and bees' samples, the annual deviations being insignificant. It has to be highlighted that the environmental factors, especially the humidity, influenced the repeatability of the results (for example: the rainfalls during the sowing period favored the toxic substances levigation in soil).

Keywords: seed treatment, neonicotinoids, maize, honeybees, residues.

EFFECTS OF EXOGENOUS SALICYLIC ACID AND STRIGOLACTONE TREATMENTS ON SEEDLING GROWTH OF IN TOMATO UNDER SHORT-TIME DROUGHT STRESS

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ABSTRACT

Drought is the main stress factor that negatively affects the growth and development of plants. Salicylic acid (SA) is a plant growth regulator associated with stress tolerance in plants. SA plays a triggering role in the regulation of stress tolerance responses by activating the plant's signal transduction pathways under stress conditions. On the other hand, strigolactones (SLs) stimulate seed germination, promote leaf senescence by modulating root structure, and have a positive regulatory effect on plant responses to some abiotic stresses. The aim of this study is the effects of SA and GR24, a synthetic SL, on the negative effects of drought stress on Full F1 seedlings, a commercial tomato variety most preferred by professional farmers in Çanakkale, on total chlorophyll content (SPAD), relative water content (RWC), specific leaf area (SLA) is determined based on H2O2 amounts and shoot-root length. 45-day-old Full F1 seedlings were irrigated with Hoagland Nutrient Solution (100%) and grown in pots containing perlite and peat in the laboratory. After 5 days of acclimatization, the seedlings were divided into 2 groups: Control group [Control (K), Salicylic Acid (SA), Strigolactone (GR24) and Salicylic Acid + Strigolactone (SA+GR24)] and Drought group [Drought (D), Salicylic Acid (D-SA), Strigolactone (D-GR24) and Salicylic Acid + Strigolactone (D-SA+GR24)]. Exogenous GR24 (0.015 mM) and SA (0.1 mM) (with Tween 20) were applied to 50-day-old seedlings. Combined application of SA and GR24 increased root length by 20%, RWC by 8%, and SLA by 32% in seedlings under drought stress. In addition, it was determined that the amount of H2O2, which increased with drought stress, decreased by 27% with the application of SA+GR24. As a result, it was determined that the combined application of SA and GR24 was more effective in drought tolerance of tomato seedlings compared to their single application.

Keywords: Drought Stress, Tomato, Salicylic Acid, GR24, Lycopersicum esculentum 'Full F1'

STUDY OF THE MORPHOMETRIC VARIABILITY OF DATE PALM CULTIVARS (PHOENIX DACTYLIFERA L.) ENDEMIC TO THE LAGHOUAT REGION

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ABSTRACT

The present study is a contribution to the knowledge of the biodiversity of the date palm (*Phoenix dactylifera L.*) for a better management and valorization of the biomass. We used the IPIGRI descriptors for the morphologic characterization of the dates of 4 cultivars at the late stages (Tmar and Bser) from the region of Laghouat, Algeria. We then proceeded to the classification and quality assessment. The varieties of local dates are "Tadala, Tizzaouet, Senouci and Oum-Nakhil". We also studied the ethnobotanical and physiological characters of the cultivars. This study allowed us to highlight an interesting morphometric variability between the four varieties of dates. They have been found to have good commercial quality for the local and international market. The cultivars displayed interesting physiological characteristics from an agronomic point of view.

Keywords: Morphometrical variability; morphologic characters; date quality; Phoenix dactylifera; ethnobotanical study; physiologic characters.

DETERMINATION OF SOME CHARACTERISTICS OF MIXTURES OF GELEMEN CLOVER (TRIFOLIUM MENEGHINIANUM CLEM.) AND SOME ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM* L.)

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ABSTRACT

The aim of this study is to determine the mixing ratio, plant height and hay yields in the Gelemen Clover + annual ryegrass mixture to be grown in Samsun conditions and to investigate the possibilities of placing especially one-year forage crops in the rotation systems to be applied. In the study, Ilkadım and Kocayaşar varieties, which are annual ryegrass varieties, and Yörem55 varieties, which are Gelemen Clover varieties, were used. The experiment was carried out in the Çarşamba district trial area of the Black Sea Agricultural Research Institute in the 2020-2021 growing season.In the research; 3 lean sowing processes, 100% for Gelemen clover (GC), Annual Ryegrass (ARGİ) 100%, Annual ryegrass (ARGK) 100%; There are 7 different mixtures of one-year grass (ARGİ) and 7 different mixtures with One-year Grass (ARGK). The study was planned to have a total number of 17 procedures. Mixing ratios are GC 80% + ARGİ 20%, GC 70% + ARGİ 30%, GC 60% + ARGİ 40%, GC 50% + ARGİ 50%, GC 40% + ARGİ 60%, GC 30% + ARGİ 70%, GC 20% + ARGİ 80%), GC 80% + ARGK 20%, GC 70% + ARGK 30%, GC 60% + ARGK 40%, GC 50% + ARGK 50%, GC 40% + ARGK 60%, GC 30% +ARGK 70%, GC 20% + ARGK 80%. The hay harvest was made during the 50% flowering period of the Gelemen clover. The plant heights in the study were determined as 63.96 – 97.00 cm in the Gelemen clover, 71.53 – 126.63 cm in the annual grass cultivar İlkadım, and between 115.96 – 123.63 cm in the Kocayaşar cultivar. The highest fresh hay yield was determined in 4066 kg/da and 20% GC + 80% ARGI mixture, while the lowest wet grass yield was determined in 50% GC + 50% ARGK mixture (2227.7 kg/da). Dry hay yield varied between 478.4 – 911.5 kg/da. The highest hay yield was obtained from the mixture of 20% GC + 80% ARGI.

Keywords: Annual Ryegrass, Gelemen Clover, Hay Yield, Mixture Ratio.

DETERMINATION OF IMAZAMOX RESISTANT FAT HEN BIOTYPES IN SUNFLOWER

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ABSTRACT

Sunflower is one of the most important oilseed plants of Turkey and is used in both appetizers and oil production. Although it is grown in almost every region of the country, The Thrace Region, which has suitable ecological conditions for sunflower in terms of breeding; therefore, it provides approximately half of our country's sunflower production. The condition of the region also gives a chance the weed to grow in. To prevent its adverse impacts on the sunflower the herbicides belonged to various mode of action are commonly used in the sunflower. The most popular herbicide used in sunflower fields of the Region is doubtlessly imazamox. The use of imazamox is required in the areas which infested by broomrape. Use of imazamox without any crop rotation may accelerate the appearance of imazamox resistant populations The aim of this study is to determine the resistance status of imazamox resistant fat hen (*Chenepodium album* L.) populations in the Thrace Region. A survey program was conducted to collect fat hen seeds from sunflower in Çanakkale, Kırklareli, Edirne and Tekirdağ Provinces in the Region from 2017 to 2019. Two step resistance confirmation test was employed: Screen and Dose-Response. After the screen test, ten fat hen populations were identified as resistant biotypes, and they were included in the dose-response test. The resistance data in the dose-response assay were evaluated with non-linear regression analysis. Resistance index values were only calculated for 4 imazamox resistant biotypes since the data obtained from other resistant populations were not suitable for non-linear regression. Resistance index values changed from 4.74 to 8,07. The results of the study showed that imazamox resistance was severe in the imi-tolerant sunflower fields of Thrace Region, and integrated weed management practices should be applied in these fields as soon as possible.

Keywords: Imazamox, herbicide resistance, fat hen, Chenopodium album, sunflower.

A FORTHCOMING THREAT FOR WINTER WHEAT: FERAL RYE (SECALE CEREALE L.)

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ABSTRACT

Feral rye (*Secale cereale* L.) is an annual grassy weed species which is a native weed to Anatolia and is commonly found in wheat fields. It has a growth ability faster than wheat because it is more tolerant to adverse climatic and environmental conditions. Therefore, feral rye competes for nutrient, water, and space with wheat from the beginning of growth to the harvest. In addition to its direct impact, feral rye seed is generally harvested during wheat harvest, reduces value of wheat seed, and may carry the ergot which is a fungus cause an important human disease, ergotism, by its ergotoxine and alkaloids. A roadside survey was conducted along Ankara-Bilecik state road to determine the presence and abundance of feral rye in wheat fields adjoining to the road in 2020 and 2021. As a result of the survey, feral rye was found nearly in one-third of Eskişehir and Ankara's wheat field, and quarter of Bilecik's. It was also found that feral rye infestations in wheat was two commonly ways; scattered and patch. The abundance of feral rye in Ankara, Eskişehir, and Bilecik were changed in 0.23-8.79, 0.32-10.35 and, 0,12-14.63 plant m-2, respectively. A preliminary study was also conducted in Gölbaşı, Ankara and Bozöyük, Bilecik to determine yield losses in wheat due to natural feral rye infestation. Grain yield loss in scattered field was 18.47% in Gölbaşı whereas it was changed 4.23 to 13.72% in Bozöyük. The grain loss in patches reached to 62.81%, depending on the feral rye number in the patch. These results indicated that feral rye is a significant weed species in Ankara, Eskişehir and Bilecik Province, and its impact on the wheat yield will increase in the near future.

Keywords: Wheat, Secale cereale, feral rye, survey.

EVALUATION OF 2 YEAR AGRONOMIC CHARACTERISTICS OF 43 CAMELINA SATIVA GENOTYPES OF DIFFERENT ORIGINS IN MEDITERRANEAN CLIMATE CONDITIONS

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ABSTRACT

This research was carried out in the agricultural fields of Ege University Faculty of Agriculture, Department of Field Crops between 2019-2021. The research was planned according to the randomized blocks experimental design. In this study, 43 different camelina genotypes were used and these genotypes were imported from the US Department of Agriculture. The origins of these genotypes are based on 8 different countries. The features examined in the research are; plant height, branch height, number of branches, number of capsules per plant, number of seeds per capsule, thousand grain weight and yield. The main purpose of the research is to obtain vegetable oil from the seeds of camelina genotypes, whose agronomic properties have been examined for 2 years, by cold pressing method and to determine the quality characteristics of these vegetable oils. The next step of the research is to determine the amounts of oleic acid, linoleic acid, erucic acid, palmitic acid in camelina oils.

Keywords: Camelina sativa, Mediterranean.

DOUBLE-INOCULATION EFFECT OF ENDOPHYTIC PSEUDOMEUNAS WITH RHIZOBIUM SULLAE ON THE GROWTH OF LEGUME SULLA FLEXUOSA

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ABSTRACT

Legumes establish symbiotic relationships with different microorganisms, notably endophytes that live inside different plant tissues without harming their host. Nowadays, the use of plant growth-promoting endophytes is considered one of the significant approaches for stable production of crops which ensures sustainable agriculture. Our strategy focuses on isolating, and screening beneficial endophytic bacteria based on their ability to promote plant growth while enhancing use of mineral nutrients. 35 endophytes isolated from surface sterilized nodules of *Sulla pallida* grown Touissit, Oujda region. 15 bacteria were able to solubilize tricalcium phosphate (TCP) and the solubilization halos were between 0.1 and 0.7 cm. According to ERIC-PCR analysis, the selected strains grouped into 6 groups, the representative strains were identified based on 16S rRNA sequences analysis as *Pseudomonas* and *Enterobacter* genera. the 6 phosphate solubilizing bacteria (PSB) were checked for their plant growth promoting (PGP) abilities under *in vitro* conditions. The results showed that 4 of the selected bacteria were able to produce HCN, while the amounts of IAA produced by these bacteria were between 1.23 mg L-1 and 3.43 mg L-1. In addition, 3 isolates were positive to produce ACC deaminase. Most of our isolates were capable of producing siderophores. A quantitative assay of TCP solubilization was conducted too, and solubilized P concentrations were between 20.99 mg L-1 and 137.39 mg L-1, accompanied by a decrease in the pH of the media. Furthermore, an abiotic stress was conducted, only 2 isolates HP2 and HP24 were able to grow at salt concentrations up to 7.5% and in the presence of PEG (20%). These two strains of *Pseudomonas* were chosen to test their ability to enhance the growth of *Sulla flexuosa* in the presence of strain *R. sullae* KS6 under culture chamber conditions. The results indicate that double-inoculation (HP2+HP24) with *R.sullae* significantly increased shoot and root length as well as in dry weight. In the present study, the obtained data suggest that the application of PGPBs could be a promising strategy for enhancing the legumes production.

Keywords: Abiotic stress, Bio-inoculant, Co-inoculation, Endophytes, Legumes, Pseudomonas, Rhizobium sullae.

IN VIVO PLANT PROMOTING EFFECT OF BACTERIA ISOLATED FROM THE COELOMIC FLUID OF THE EARTHWORM APPORRECTODEA MOLLERI

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ABSTRACT

Earthworms as a dominant macrofauna of many terrestrial soil systems, interact with soil microorganisms to promote decomposition, mineralization, and recycling of the organic material. Several studies have focused on the identification of microorganisms associated with the earthworm's digestive tract. In order to determine functional roles, research must also determine the effects that earthworm's associated microorganisms have on the soil system. In the present work, we were interested in the microorganisms possibly associated with the earthworm at the level of the coelomic fluid (CF), which is in continuous contact with the rhizosphere. Seven identified CF bacteria were selected previously based on qualitative and quantitative screening of plant growth promoting traits. Bacterial isolates were tested in the greenhouse for their ability to promote plant growth (Corn). In addition, biochemical analysis, showing the effect of the tested bacteria on soil chemical and biological properties were performed. The results of the study highlighted those earthworms, in their coelomic fluid, harbour plant growth-promoting bacteria (PGPB), which stimulate plant growth, and which could be involved in improving soil fertility and agriculture.

Keywords: Earthworm, Coelomic fluid, microorganisms, molecular identification, PGPR.

CHARACTERIZATION OF SEWAGE SLUDGE AND THEIR IMPACT ON THE GERMINATION AND GROWTH OF LENS CULINARIS AND MEDICAGO SATIVA

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ABSTRACT

Sewage sludge is a semi-solid residual product of the wastewater treatment process. It is a combination of water and inorganic and organic materials collected from wastewater from several sources (domestic wastewater, industries). They are well known for their richness in nutrients and organic matter essential to the growth of plants, hence the interest to value them as a natural amendment called compost through the process of stabilization composting. The current study aims to study and highlight the effect of the sewage sludge on the growth of the three seeds: *Lens culinaris; Medicago sativa* and *Lepidium sativum*, through the seed germination test which designates a powerful test to examine the toxicity of sludge leachate. This germination test was conducted on two different matrices including tap water as a control and sludge leachate, for about 72 hours in the dark at room temperature. Based on all the results achieved, it was revealed that the sewage sludge sampled has a high germination power due to its organic matter content of about 65.47% as well as the elements essential for the development of plants such as phosphorus (380mg/l). With a germination index (GI) that differs from one seed to another, while noting that the *L. culinaris* has the highest GI of 139.58% followed by *L. sativum* (GI = 128.34%) and *M. sativa* (GI = 95.25%).

Keywords: Sewage sludge, germination test, Lens culinaris; Medicago sativa and Lepidium sativum.

USE OF MEDIOUNA'S LEACHATE AS A FERTILIZER IN AGRICULTURE OF LENS CULINARIS AND MEDICAGO SATIVA AND EVALUATION OF HIS PHYTOTOXICITY

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ABSTRACT

Since 1986 the municipal solid wastes produced by the city of Casablanca are stockpiled in Mediouna landfill installed on old 70-hectares quarries with a leachate collection system. The landfill receives municipal solid wastes produced by the city of Casablanca, whose the daily waste output exceeds 4000 tonnes. In 2015, the annual waste output was 7,4 million tonnes, compared to 6,3 million tonnes in 2007; i.e. an increase rate of 17.5%. Leachate production in Morocco is estimated at over 800,000 m3/year. Due to the difficulties associated with treatment costs, the leachate is generally collected in a leachate evaporation pond. This research aims to develop a green technology allowing the use of leachate as fertilizer in agriculture through evaluation of phytotoxicity of different leachate dilution. Furthermore, Potential Hydrogen (pH = 8,99), Conductivity (σ = 33,31 ms/cm), Suspend Solid (SS = 1900 mg/l), Dissolved Oxygen (DO = 0 mg O2/l), Temperature (T°C = 21,13 °C), the nutrients as Nitrite (NO3- = 68,23 mg N/l), Nitrate (NO2- = 0,44 mg N/l), Ammonium ion (NH4+ = 3505,6 mg N/l), Biochemical oxygen demand (BOD = 3000 mg O2/l), Chemical oxygen demand (COD = 14800 mg O2/l) and Orthophosphates (PO4 3- = 12,71 mg P/l) were measured. Municipal solid waste leachate phytotoxicity tests were performed using the germination test by direct application of leachate to reference soil in 0,5 %, 1%,1,5%, 2%, 3%, 4%, 5%, 7%, 10%, 12% and 15% concentration. *Lens culinaris* and *Medicago sativa* seeds were exposed to different leachate dilution with tap water as a control, for about 72h in the dark at room temperature. The evaluation of phytotoxicity of the two species has shown a low germination index (GI) for high concentrations 10%, 12% and 15%, observing that *L. culinaris* has a GI respectively of 28,29%, 27,59% and 14,11% comparing to *M. sativa* 29,3%, 6,5% and 2,12%. These results can be explained by the presence of inhibitor elements as heavy metals in the leachate. A decrease of phytotoxicity was observed for the concentrations 1%,1,5%, 2%, 3%, 4%, 5% and 7%, the value of the GI was higher than 50% for the two species. In the case of the remaining concentration 0,5% and 1% the results of GI had shown an absence of phytotoxicity (GI >80%) for the two species.

Keywords: Leachate; Green technology; Germination test; Lens culinaris; Medicago sativa.

EVALUATION OF THE EFFECT OF THREE DOSES OF SPIROTETRAMAT ON THE DIASPINE SCALE PARLATORIA ZIZIPHI IN CITRUS ORCHARDS

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ABSTRACT

The control of *Parlatoria ziziphi* (Lucas, 1853) was studied in citrus orchards at Mechraa Belksiri in Gharb area of Morocco. Three doses of Spirotetramat (T0=0 L/Ha, T1=0,625 L/Ha, T2=0,755 L/Ha, and T3=1 L/Ha) were applied on 4 ha of Valencia late orchard (each dose for 1 ha of Valencia late). The effect of Spirotetramat was evaluated on two stages of larvae (L1 and L2) via the mortalities and survivals *of P. ziziphi* and three stages of females counting F1, F2 and F3 via the mortalities and survivals. Results showed that, the Spirotetramat was effective on larvae and females of *P. ziziphi*. In females, Among the 11229 females recorded, 93% were inhibited, while only 7% were intact after the treatment period. Finally, our study highlights that the all doses tested were effective on the *P. ziziphi* population; and the use of small doses of the pesticide will reduce the environmental impact and resistance of the pest.

Keywords: Parlatoria ziziphi, pest, Spirotetramat, Valencia late, Morocco.

DETERMINATION OF GERMINATION TEMPERATURES IN SOME COOL SEASON AND WARM SEASON PLANTS

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ABSTRACT

Every day, new species are added to the plants cultivated in agricultural areas. In this study, it has been tried to determine the optimum germination temperature of some cultivated plants that have just started to be cultivated or are not very common. For this purpose, grass family *Eragrostis teff* (Zucc) Trotter), *Phalaris canariensis* L., *Panicum miliaceum* L. and *Lolium multiflorum* Lam., broadleaf species *Amaranthus* sp., *Chenopodium quinoa* Willd., *Fagophyrum esculentum* Moench. and *Salvia hispanica* L. were examined. 4x100 seeds of each species were monitored in germination cabinets at 0, 5, 10, 15, 20 and 25 0C for 14 days and their germination rates were determined. The research was carried out with 4 replications according to the completely randomized experimental design, and the differences between the means were evaluated with the LSD multiple comparison test. No germination was observed in both groups at 0 0C. Germination rates increased depending on the increase in temperature, and this increase differed according to the species. In the grasses, *Lolium multiflorum* was the species that germinated the most at low temperatures and the earliest to reach full germination. *Eragrostis teff* started to germinate at 10 0C (7.2%) and reached 96.7% germination at 25 0C. Among broadleaf species, *Chenopodium quinoa* is the species that germinates more at low temperature. *Amarathus* sp. were able to reach high germination rates at 20 0C and 25 0C. These obtained data reveal important results for the cultivation of the new species and sowing times.

Keywords: New plants, germination, temperature.

FIRST RECORD OF A HIGH VIRULENCE INFECTION TYPE OF BLACK STEM RUST RACE OF GRAMINEOUS CROPS IN IRAQ

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ABSTRACT

Two highly sever abnormally infections more different than the ordinary black stem rust in such aspect that not seen before was observed on different winter wheat cultivars in Tuwaitha experimental station in Baghdad and other surveyed governorates. The first one was in the year 2000 where the race UG99 was not so known in the world in that time. Pustules of that infection were covered nearly all the foliage of some plants of four introduced Pakistanis winter wheat cultivars. The second was observed in the last few days of April 2013 on other winter wheat cultivar "Xenon". In the two states the infection pustules were longer, elongated (1-30mm) or more, thicker (5-10/cm2) than the ordinary black stem rust, and some of them were continuously abnormally rapid grown in single striate line, or they closely attached nearly around the stem at the down part or the top of plants to about 10 cm or more, orange to red, brown then black color. On some spring wheat and barley two types of infection symptoms of black stem rust were observed in the field. The first type was of the ordinary black stem rust which was less length (1-4 mm), and thickness (1-3 pustules/cm2). The second type was of the same colors of development stages and somewhat late than the ordinary black stem rust, but with more pustules thickness, mostly longer (2-10 mm) or sometimes 10 - 25 mm or more, by a single pustule isolate technique each type of infection was inoculated to two lines of each spring wheat and barley and winter wheat cultivars previously cultivated each in greenhouse section. Results indicated the presence of two types of infections of black stem rust that was differentiated on winter and spring wheat previously in the field. The first type was of the ordinary black rust which showed symptoms of pustules length and density as it mentioned above. The other type was characterized with more severity, activity, and virulence, with longer and thicker pustules that similar to UG99 infection type which appeared in some African and Asian countries in the last two decades. But on spring wheat and barley the second type pustules density, length, and virulence were different than ordinary black stem rust, but most times not easily differentiated.

Keywords: wheat and barley diseases, rust diseases, black stem rust, UG99, wheat epidemic diseases.

NEW THREE SECONDARY GENES OF ZUCCHINI YELLOW MOSAIC VIRUS RESISTANCE

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ABSTRACT

Within a program of re-rooting of some cucurbit's genotypes, with emphasis on the genetic resistance characteristics of viral diseases, including Zucchini Yellow Mosaic Virus and their insect vectors. Leaf colorations of squash are very important of indirect resistance traits, where three shapes of white or silvery color were differentiated. The first one is the full leaf silvery color; it includes the entire leaf upper surface that makes the leaf be seen not clear green and so unattractive to viruliferous insects. This shape may appear early with the third leaf stage. The second shape is the white net leaf color, where all the vein of leaf colored whitely and the leaf appears like the spider net, and so it repellent the viruliferous insects. The third shape is the white spotted leaf color, as it looks like florescence spots, where they reflect the sun light in a way that disturb the insects like the bright reflective things do, more of that from our previous tests the infection of virus did not happen in these spots, so it reduces the area of infection, This trait always appeared lately after the other two shapes. Studies of genetic behaviors by hybridization of these traits genotype with others haven't these characters explain that these traits submitted to the simple mendelian inheritance, as their separation ratio in the second generation were (1 non colored : 3 colored). These upshots revealed that each shape of leaf coloration controlled by one dominant gene of two alleles, and so they were simply inherited and easy transmitted to other genotypes, but their appearance highly affected by genotype variations and environment factors.

Keywords: vegetable breeding, virus resistance, cucurbits viruses, squash diseases, genetic resistance.

ANTIOXIDANT ACTIVITY IN FLOWERS OF ERICA ARBOREA L FROM ALGERIA

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ABSTRACT

Erica arborea L is a medicinal plant africain miditerranean which has importants bioactivities. In this study, we are interested to determine the phenolic compounds and antioxidant activity of *Erica arborea L* of Algerian origin. The qualitative analyse of the methanolic extract of the flowers of *Erica arborea* by phytochimecal screening showed a great diversity of compounds. *E arborea* presented high contents in polyphenols, tannins, alkaloids, and flavonoids with a total absence of anthocyanins, terpènoids and coumarins. Antioxidant activity was evaluated *in vitro* by ferric reducing antioxidant power (FRAP) tests. At 2000 mg / ml, the methanolic extracts was showed a high inhibition percentage with a better reducing capacity of 1.8. Therefore, based in our study the *Erica arborea*, can be used to extract and purify phytochemicals with potentially beneficial effects on health and to prevent oxidative processes.

Keywords: Erica arborea, FRAP , phenolic compounds, antioxidant activity.

CHEMICAL PROPERTIES OF SOME WILD FRUIT SPECIES IN TURKEY

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ABSTRACT

Turkey is the gene center of many fruit species due to its geographical location and climatic characteristics. In addition to the fruits are grown by cultivation in Turkey, there are also fruit types that grow naturally. Determining the chemical properties and nutritional content of these fruits is an important stage in evaluating the diversity. In this study, it was aimed to determine some chemical properties of fruits belonging to hawthorn (*Crataegus* L.), apple (*Malus*) and jujube (*Ziziphus jujuba*) genotypes. The pH, TSC (total soluble content), acidity, vitamin C, sugar compounds, TPC (total phenolic contents), and phenolic compounds were investigated in fruits. As a result of the analyzes, pH, TSC, and acidity values of fruits belonging to hawthorn, apple, and jujube genotypes were determined to change between 2.8-4.22, 9.6-27.6 (%), and 0.26-1.1 (%), respectively. Among the genotypes, the highest vitamin C and TPC values were 33.9 mg/100 g and 1221.76 mg GAE/100 g, respectively. Phenolic compound determinations of fruit extracts were carried out by the HPLC-DAD system, and different amounts of gallic acid, catechin, epicatechin, epigallocatechin gallate, rutin, and caffeic acid components were determined.

Keywords: Wild fruits species, Phenolic compounds, HPLC, Vitamin C

DETERMINATION OF GEMINATION CHARACTERISTICS OF COVERED *LOLIUM PERENNE* (L.) SEEDS UNDER DROUGHT STRESS

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ABSTRACT

Lolium perenne (L.) is one of the most used turfgrass species for establishment multipurpose turfgrass both in Turkey and around the world. *Lolium perenne* (L.) is sensitive to environmental abiotic stress conditions such as drought and salinity. Aim of this study is to improve the germination properties of *Lolium perenne* (L.) seeds (turf varities of Sun and Ringle) under drought stress. The seeds of Sun and Ringle were covered with seed coating solution, included *Endomycorrhiza, Trichoderma spp., Bacillus subtilis, Bacillus megaterium.* Coating solution was applied 4 liters 1000 kg seeds-1. This germination experiment was conducted in randomized parcel design with 4 replications. A total 6 different drought stress levels (0, -2, -4, -6, -8, -9.8 Mpa) were created in this study and used Polyethylene glycol-6000 (PEG-6000). 20 seeds were laid in each petri dish and placed in germination cabinet (70% humidity, 20 oC temperature, 14 hours light-2000 lux and 10 hours darkness). At the end of the 14th day, germination rate was calculated and the fresh weight of the shoots and roots, and length of shoots and roots were determined. The results obtained in this study indicated that the coating treatments improved to germination properties of *Lolium perenne* (L.) seeds under drought stress.

Keywords: Lolium perenne (L.), seed coating, drought stress, germination.

ASSESSMENT OF GREENHOUSE GAS (GHG) EMISSIONS IN RELATION TO THE DIFFERENT TYPES OF LIVESTOCK IN THE GOVERNORATE OF MANNOUBA: MITIGATION AND ADAPTATION OPTIONS.

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ABSTRACT

The main objective of this study is the estimation of the carbon footprint of the livestock sector using the FAO GLEAM tool, mainly through the recognition of the significant emission points of greenhouse gases. (GHG) in the life cycle of animal production. We assessed these emission in relation to the different types of livestock farming in the governorate of Mannouba and proposed mitigation options. Results showed that in 2020, the overall GHG emissions from animal sectors in the governorate of Manouba are estimated at 5Mega Ton CO2-eq and that 55% of these animal emissions are composed of methane, 27% in the form of nitrous oxide and 18% is in the form of carbon dioxide. The high intensity of GHG emissions observed is particularly due to the production of milk and sheepmeat because most farming systems are extensive, lowly productive and based on poor pasture and food resources. The small ruminants are the main contributors to the emissions with a percentage higher than 66% (65% of emissions come from sheep and 1% from goats). In the second place we found cattle with, 28% and finally poultry which participate in a lower extend, at a rate of only 6%. It should be noted that the majority of GHG emissions mainly come mainly from enteric fermentation, effluent management, livestock feed production and energy consumption. On the light of these results and the farming conditions in Mannouba, the sheep sectors seem to have the greatest environmental impact in terms of GHG emissions as compared to other species. Also, by focusing on the results through the type of production, we also note that bovine milk has a high intensity of GHG emissions. Consequently, actions targeted on these two species could have an impact and lead to potentially promising avenues of mitigation.

Keywords: Emissions, GHG, Manouba, Livestock, Mitigation, adaptation.

INFLUENCE OF MINERAL NUTRITION ON THE PRODUCTIVITY OF MISCANTHUS GIGANTEUS

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ABSTRACT

The task of the search and implementation of alternative and renewable energy sources and energy-saving technologies is facing the whole world. A special place in the structure of renewable energy sources is occupied by biofuels, which worldwide are considered to be an important resource for diversification of energy sources and energy security. It is well known that biofuels have two advantages over traditional fuels: they are produced from renewable raw materials, and they are much less polluting. The wide range of promising high-productive energy crops used for the production of solid fuels includes perennial cereals. *Miscanthus giganteus*, which has a long-term use cycle and is grown to produce biomass as a raw material for biofuel production is among those crops. For the five years of the *Miscanthus giganteus* plantations use, under condition of application of urea fertilization (N30-45) on the background of mineral fertilizers (P60K60), a profit increase by 8.78-18.96 thousand UAH/ha at the level of profitability of cultivation 147-166.9% compared to the variant without fertilization was obtained. Thus, combination of phosphorus-potassium fertilizers with urea on plantings of *Miscanthus giganteus* makes it possible to improve the growing and development conditions of plants and to obtain on the fifth-year dry matter yield at the level of 19.72-24.23 t/ha, which provided a 21.67-28.15 t/ha solid fuel yield, energy from fuel – 400.89-520.77 GJ/ha and the level of profitability – 147.0-167 %.

Keywords: Renewable energy sources, Miscanthus giganteus.

TOTAL PHENOLIC CONTENT, ANTIOXIDANT ACTIVITIES, AND POLYPHENOL OXIDASE (PPO) ENZYME INHIBITION OF TOTAL EXTRACTS OF WILD STRAWBERRY (*ARBUTUS UNEDO*) FRUIT AND LEAF

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ABSTRACT

Arbutus unedo L., the strawberry tree (*Ericaceae* family) fruit, is an evergreen shrub or small tree and it is widely distributed in the Mediterranean region and North Africa. This fruit is suitable for the production of alcoholic beverages, jams, jellies and marmalades and in some countries, such as Spain and Morocco, Arbutus unedo is frequently used in the traditional medicine. In traditional folk medicine, A. unedo has been used in antiseptics, diuretics and laxatives and to treat arterial hypertension. The leaves have been reported as possessing several biological properties such as astringent, human platelet anti-aggregant due to its relative high amounts of tannins, urinary antiseptic, anti-inflammatory, anti-diarrheal, anti-hypertension and anti-diabetic. In this study, total extracts were obtained from Wild Strawberry (Arbutus Unedo) Fruıt and Leaf. Their total phenolic content, ABTS and DPPH activities as antioxidant activity and inhibition effects on Polyphenol Oxidase (PPO) were evaluated.

Keywords: Antioxidant activity, PPO inhibition, Arbutus Unedo.

SALICYLIC ACID ALLEVIATES THE ADVERSE EFFECTS OF SALT STRESS ON FABA BEAN (*VICIA FABA* L.) BY PROMOTING ANTIOXIDANT RESPONSE

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ABSTRACT

Soil salinity is a major threat to growth and agricultural production, especially in arid and semi-arid regions. This constraint induces osmotic, ionic and oxidative stress. Consequently, many strategies have been shown to be effective in inducing tolerance to salinity, especially those involving phytohormones. This work aims to studying the role of salicylic acid (SA) in mitigating salinity effects on the faba bean (*Vicia faba* L.) grown under hydroponic culture. In this context, the seedlings of *Vicia faba* L. (HISTAL variety) are cultivated in hydroponics in the presence or in the absence of NaCl (0, 150 and 300 mM) for 20 days. After acclimatization, the stressed plantlets receive three salicylic acid hormonal sprays (1 mM) for 10 days. Growth parameters (fresh weight and dry weight of leaves and roots), and biochemicals (H2O2, MDA, total polyphenols, and flavonoids) are evaluated on treated seedlings. Results indicate that the saline stress negatively influences the growth of faba bean seedlings under the two saline concentrations tested, this saline stress induces oxidative stress resulting in high levels of H2O2 levels causing lipoperoxidation indicating the instability of the cell membrane, this stress is also accompanied by stimulation of the antioxidant system such as polyphenols and flavonoids. Salicylic acid decreases the damage caused by NaCl by lowering the levels of H2O2 and MDA especially at the foliar level, this reduction of oxidative stress is linked to the activation of the antioxidant cascade. Therefore, salicylic acid can be considered as a potential growth regulator to improve the saline stress response of the faba bean.

Keywords: salicylic acid, growth, bean, salinity, oxidative stress.

EVALUATION OF PROLINE, CHLOROPHYLL, AND CAROTENOID CONTENTS OF TWO GLOBE ARTICHOKE [*CYNARA CARDUNCULUS* VAR. *SCOLYMUS* (L.) FIORI] LEAVES BASED ON THE GROWING SEASON

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ABSTRACT

Globe artichoke [*Cynara cardunculus* var. *scolymus* (L.) Fiori], a member of the *Asteraceae* family, has been known since ancient times. Both edible parts of this valuable vegetable and waste material (artichoke leaf) parts are rich in antioxidants and polyphenols as well as possessing healing properties against certain diseases. When the life cycle of plants is taken into consideration, the processes which are highly affected by environmental conditions are photosynthesis and cell growth. Chlorophyll level is known as a good indicator of the photosynthesis of plants. Carotenoids, one of the important functions of which protects chlorophyll from photo-oxidation, can prevent the destruction of chlorophyll. Therefore, chlorophyll and carotenoids play an important role in photosynthesis and the protection of photosynthetic pathways against harmful free radicals. The proline concentration present in various plants is increased in many different stress conditions, such as cold, temperature, salinity, drought, UV, and heavy metals, thus, providing better tolerance to stress conditions. The aim of the present study was to comparatively evaluate the proline, chlorophyll (a and b), and carotenoid contents of the young and mature leaves of two OP cultivars (Bayrampaşa and Sakız) based on different growing seasons. Obtained results demonstrated that there were differences between two OP artichoke cultivars based on the growing season and young and mature leaves with regards to proline, chlorophyll (a and b), and carotenoid contents. Findings revealed that proline and chlorophyll b levels in autumn were quite promising, while in terms of chlorophyll and carotenoid levels winter was prominent. Regarding the young and mature leaves, high proline and chlorophyll levels were found to be dominant in young leaves. On the other hand, chlorophyll b and carotenoid were highly accumulated in mature leaves.

Keywords: Artichoke, Carotenoid, Chlorophyll, Proline.

INFLUENCE OF QUINCE ROOTSTOCKS ON VEGETATIVE GROWTH AND YIELD OF 'HAFIF ÇUKURGÖBEK' LOQUAT CULTIVAR

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ABSTRACT

'Hafif Çukurgöbek' loquat budded on three quince rootstocks (BA-29, A, and C) were evaluated in 2018 and 2019 in Hatay, Turkey. Fruit ripening was the earliest in BA-29 rootstock in both years. Quince-C rootstock gave higher values in terms of annual shoot length, scion and rootstock diameter compared to Quince-A and BA-29 rootstocks. The differences between the rootstocks in terms of vegetative parameters were found to be statistically significant at 1% level. Our preliminary data indicate that dwarfing quince rootstocks can be used in intensive plantings of loquat. In this study, BA-29 and Quince C rootstock performed better than Quince-A. Considering yield, BA-29 rootstock seems the best choice.

Keywords: loquat, quince rootstocks, vegetative growth, yield.

USING OF HAWTHORN AS ROOTSTOCK IN LOQUAT CULTIVATION

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ABSTRACT

This research was carried out in 2018-2021 years in Hatay, Turkey**.** The aim of the research is to

illuminate the possibilities of using of hawthorn (*Crataegus* spp) as rootstock in loquat *(Eriobotrya japonica Lindl*.) growing. For this aim, cv. Hafif Çukurgöbek (HÇG) was budded on the hawthorn rootstock at different 5 dates (8th February 2018; 18th May 7th August, and 31st October 2019; and 6th May 2020) in 2018-2020 years with the chip budding. Also, it was budded on the same rootstock 24th June 2020 with shield budding. The ratios of bud-take successes were determined after 45 days of the budding operations. After 60 days, the ratio of bud-sprout was recorded. In addition, the bud shoot length and bud shoot diameter and rootstock trunk diameter in all plants were assigned in the study. The trial was planned in a completely randomized design with 6 replications and 10 plants per replication. Differences among means were analyzed by the Tukey's HSD method using SAS program. The highest values of bud take and sprouting rates (respectively, 47.6 % and 70 %) were taken from budding done on 7th August 2019. This was followed by 31st October 2019 with 41.67 % bud take and with 21.43%. bud sprout. The lowest budding success rate (10.58 %) was taken from the buddings which were done on 8th February 2018. Buddings done on 18th May 2019 yielded the higher values of bud shoot length and diameter. In the buddings made in 2020 year, the highest budding success was obtained from the "T" budding made on June 24 (68.20%). The results of this study show that hawthorn can be used in loquat cultivation as rootstock.

Keywords: Eriobotrya japonica Lindl., Crataegus spp., grafting, vegetative growth.

COMPERATION EFFECTS OF GREEN AND COMMERCIAL SYNTHESIS ZNO NANOPARTICLES ON MDA AND PROLINE CONTENT IN PEPPER UNDER DROUGHT STRESS

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ABSTRACT

Plants are exposed to various biotic and abiotic environmental stresses throughout their lives. These stresses negatively affect all metabolic events in plants and cause serious crop losses. Drought is one of the most important abiotic stress factors and affects almost 20% of arable land around the World. Today, many studies are carried out to increase plant tolerance to drought stress. However, the targeted success has not been achieved yet. One of the most important reasons for this is that the stress tolerance mechanism is very complex. Recently, efforts to increase stress tolerance with exogenous applications are a widely used approach. In this study, ZnO nanoparticles synthesized by chemical and green synthesis methods were applied to pepper plants under mild, moderate and severe drought conditions at three different concentrations (100, 500 and 1000 mg/L) and the changes in proline and mda contents were investigated. According to our results, drought increased both MDA and proline content. However, exogenous nanoparticle applications decreased both MDA and proline content, although the doses and nanoparticle types differed. The results showed that exogenous ZnO nanoparticle applications have the potential to be used to reduce the harmful effects of drought stress. With comprehensive studies on this subject, the roles played by ZnO nanoparticles in stress tolerance can be revealed in detail in the future.

Keywords: Green synthesis, ZnONpS, Drought stress, Capsicum annuum, MDA, Proline.

CURRENT SITUATION OF TETRANYCHUS URTICAE (ACARI: TETRANYCHIDAE) IN NORTH AFRICA: THE SUSTAINABLE CONTROL METHODS AND PRIORITIES FOR FUTURE RESEARCH

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ABSTRACT

In North Africa, *Tetranychus urticae* is the primary phytophagous mite relating to the family of Tetranychidae. Unfortunately, it is a source of an important annual casualties in crop production. It is a generalist species that can feed on hundreds of hosts plants and produces significant damages. The control of *T. urticae* in North Africa has been principally based on acaricide sprays. However, new alternative methods have shown effective results, such as artificial ultraviolet-B, natural enemies, and the introduction of new genetic methods**.** This review aims to present a synthesis of information surrounding control methods of *T. urticae* in North Africa. We highlight the principal findings of previous studies. Then, we discuss current control methods, propose new innovative research, and sustainable approaches to control this pest. Similarly, the artificial ultraviolet-B is recently being confirmed in several highly developed countries. The control method can potentially extrapolate in North African regions due to its positive ecological results. Further, studies proved the use of natural enemies, myco-metabolites, Bacteria metabolites, and the introduction of a genetic method that can successfully defeat the populations of *T. urticae*. On the other hand, new methods, shus as a combination of more than one of these methods in integrated control of the *T. urticae* system, would provide the healthiest and efficient policy. We also discuss high-priority research guidelines to investigate new sustainable management strategies. The setting up an integrated long-term ecological monitoring program in different Northwest African countries and incorporating new technologies into monitoring programs is an urgent need to fight this devastating pest. These programs must take in count the climate conditions, phenology of pests, infestation rates and propagation speed of pests in each North African country. All these elements are suggested to control pests, respect the environment and public health.

Keywords: Tetranychus urticae, North Africa, integrated control, phytophagous, damage.

AWARENESS OF OLIVE GROWERS TO WEEDS IN OLIVE ORCHARDS IN EDREMIT

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ABSTRACT

Olive has been considered a divine tree in the Mediterranean region from ancient times. The tree is vulnerable to weed presence on the early growth stage, and they cause many adverse impacts on the olive tree, including wild fire, but it was ignored by growers during the youth infertility in many times. Edremit district provides the most suitable growing conditions to olive tree; therefore, with 11 million olive trees the district is a prominent location in Turkey. This study was conducted to determine the attitude of olive growers to the weeds in the Edremit district of the Balıkesir Province, Turkey. For this aim, a questionnaire form consisted of 29 questions was prepared and applied to 20 olive orchard growers in Edremit. The results showed that half of the grower was under 50 years old, and graduated from high school or higher. Interestingly, one-third of the grower was the only peasant, and the average orchard size was lower than 5 ha in Edremit. The weeds were *Cynodon dactylon, Sorghum halepense, Tifolium pratense, Xanthium spinosum, Tribulus terrestris, Cyperus rotundus*. The growers were mainly controlled them with ploughing, cutting, and herbicides. One-quarter of them only used glyphosate in the spring months to control weeds, but most of these growers applied the herbicide using knapsack sprayer. Even if the growers have general information about the loss of herbicide efficacy, half of them had any info or no action if loss of herbicide efficacy occurred. It was understood from the growers' response that the olive growers in Edremit need an education on weed control practices and herbicides may use in olive orchards.

Keywords: Growers' profile, orchard size, tillage, cutting, herbicide, glyphosate.

PGP-ACTIVITIES OF NEWLY ISOLATED RHIZOSPHERE STRAINS FOR ANTIFUNGAL BIOCONTROL

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ABSTRACT

The use of antagonistic microorganisms as an alternative control to chemical pesticides has gained importance in recent years. An antifungal test was used to determine the PGP activity of the newly isolated strains to be used as biocontrol agents in plants diseases caused by micromycetic pathogens. Four newly isolated strains from different regions in Bulgaria were identified from genus *Bacillus* - *Bacillus subtilis* (M1, SZ1, SZ2 and AZ5) by classical phenotypic techniques and 16S rDNA sequence analysis. Antifungal activity of identified strains was estimated on single layer agar method against test micromycete strains *Penicillium claviforme*, *Trichoderma sp*., *Fusarium sp*. and *Aspergillus flavus*. Strain *Bacillus subtilis* SZ2 showed antifungal activity against all tested myctomycetes strains compare to the control variant. Complete inhibition of micromycete growth was observed by strain of *B. subtilis* M1 against *Trichoderma* sp. Strong antifungal activity (up to 55%) of strains *Bacillus subtilis* SZ2, *Bacillus subtilis* M1 and *Bacillus subtilis* AZ5 strains against the tested micromycetes *Penicillium claviforme*, *Trichoderma sp.*, *Fusarium sp.* and *Aspergillus flavus* were observed. Based on the obtained data it could be stated, that tested *Bacillus* strains demonstrated a broad-spectrum antifungal activity against the four tested fungal species.

Keywords: Bacillus subtilis, antifungal activity, Penicillium claviforme, Trichoderma sp., Fusarium sp., Aspergillus flavus.

BACILLUS STRAINS AS AN EFFECTIVE TREATMENT OF MOBILE FORMS OF PHOSPHORUS IN BULGARIAN SOILS

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ABSTRACT

Strains of genus *Bacillus* have the potential to increase the availability of phosphorus to plants by dissolution of inorganic phosphate, which favours the growth of plant species and that has an important economic and agricultural impact. Soils with low phosphate intensity (Leached chernozem) were enriched with poorly soluble phosphorus compounds and inoculated with the tested strains from genus *Bacillus* (*Bacillus subtilis* T 2, *Bacillus amyloliquefaciens* T 3, *Bacillus subtilis* T 4, *Bacillus subtilis* T 10, *Bacillus thuringiensis* T 17 and *Bacillus cereus* T 18). Tested strains were inoculated (2 ml and 15 ml) in the soil and incubated for 25 days at 28oC. After the incubation period, the degradation of phosphorite flour to available phosphorus was examined by the classical method of Egner-Riehm and by extraction with CaCl2. As a result of the experiments, it was found that the studied strains have a positive impact on the increasing of phosphorus mobility in soils with low phosphate intensity treated with hardly degradable phosphors.

Keywords: Bacillus, leached chernozem, phosphorus.

SEASONAL ABUNDANCE AND CHEMICAL CONTROL OF DIFFERENT INSECT PESTS OF CHILLI CROP (*CAPSICUM ANNUUM* L.)

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ABSTRACT

Pakistan is an agricultural country, and its 60% population is connected directly or indirectly with this sector. Chilli (*Capsicum annuum* L.) is very important vegetable crop that belongs to family solanaceae. Pakistan is among top five producers of chilli production in the world. The major few issues regarding its production are the infestation of different insect pests and diseases. In sucking insect pest's thrips (*Scirtothrips dorsalis* Hood), whiteflies (*Bamisia tabaci*), aphids (*Aphis gossypii*), mites (*Polyphagotarsonemus latus* Bank and *Tetranychus urticae*), while in chewing, fruit borer (*Helicoverpa armigera* L.) is very common and significant. The experimental trials showed that weather parameters create a huge impact on the prevalence of different insect pests in chilli crop. From the findings, it is noted that during first week of April, the maximum mean population of aphid was recorded as 11.47 per leaf, which was greater than other insect pests like whiteflies, mites, thrips, and fruit borers 2.83, 2.60, 2.44 and 1.77 respectively. Among abiotic factors, the temperature played a major role in the fluctuation of the insect pest population as compared to other factors like relative humidity and rainfall. Further, temperature has also shown a positive correlation, while both other abiotic factors showed a negative correlation with the pest prevalence. In the experiment, the chilli pests like, whitefly, thrips, aphids and bud mites were managed by applying Lufeuron 50% EC insecticide. The numbers of pest were continuously decline after the application of insecticide in the crop. It was also noted that maximum mortality of each pest was observed after 72h of application of Lufenuron. 50% EC.

Keywords: Chilli crop, sucking pest, abiotic factors, Seasonal abundance.

INSECTICIDAL EFFECT OF TWO NATIVE ENTOMOPATHOGENIC NEMATODE SPECIES AGAINST SITOPHILUS ORYZAE

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ABSTRACT

Stored product pests are responsible for losses of up to 10% during grain storage worldwide. Various cultural, physical, and chemical control methods are used to protect the stored products. On the other hand, the effectiveness of entomopathogenic nematodes (EPNs), frequently used in the biological control of insects, in reducing stored product pests has not been studied much before. In the present study, the insecticidal effects of two native EPNs species *Steinernema feltiae* and *S. weiseri* isolated from Ankara province were evaluated for the control of the *Sitophilus oryzae* adults under controlled conditions. Suspensions of the nematodes were applied at four different concentrations (100, 250, 500, and 1000 infective juveniles [IJs] insects-1) and incubated at 25°C. Insect mortality was assessed daily for 10 days. The study was carried out in 2021 at Directorate Plant Protection Central Research Institute in Ankara, Turkey. The results showed that the *S. oryzae* mortality was significantly greater in the nematode treatments than in the control. There were Nematode×Time and Nematode×Dose interaction, and the difference between species, time, and doses were statistically significant. The mortality of *S. oryzae* reached 98.1% and 94.2% after 10 days of exposure to *S. feltiae* and *S. weiseri*, respectively, at the highest dose applied. In the highest dose of *S. feltiae* application, the mortality rate of this species was determined as 17.2% at the end of 24 hours, while it was determined as 46.6% at the end of the 5th day and increased above 90% after the 8th day. In the *S. wieseri* application, over 90% mortality was determined on the 9th day. However, for both EPN species, mortality rates remained below 90% even after the 10th day, except for the highest dose application. Based on these results, native *S.feliae* and *S. weiseri* isolates shows promise as biological control agent for the management of *S. oryzae*.

Keywords: Steinernema feltiae, Steinernema weiseri, Stored product pests, Wheat, Warehouse.

TESTING OF VALIDITY OF CV FOR YIELD PER PLANT ASSOCIATION WITH MEAN GRAIN YIELD IN MAIZE

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ABSTRACT

The objective was to test in maize (Zea mays L.) the validity of the theoretical background of the hypothesis that coefficient of variation (CV) for grain yield per plant and mean yield are connected exponentially, following the Taylor's Power Law (TPL) model. Field experimentation was conducted across two sites, and two seasons. Data from 26 subplots, in the first site averaged CV values of 22.6%, and mean yields of 19.1 t/ha, following the TPL model. The same was true for the second site that averaged CVs and means of 41.5% and 14.3 t/ha. Considering the way CV is calculated, a test was performed on the simple correlation between logarithms of variances and respective means to investigate if there is as systematic variance dependence on mean, questioning thus the reliability of TPL. Validity of TPL was verified in the first site. Nevertheless, there was a systematic dependence of yield variance on mean yield in the second site, implying that the CV ~ yield correlation might be not biologically meaningful. Conversion of variance to remove dependence on mean did not validate the CV ~ yield negative relationship, meaning that caution is needed when interpreting the CV as a stability index for intra-crop variation. 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).

Keywords: interplant variation; intra-genotype competition; acquired inequality; Taylor's Pawer Low.

EFFECT OF MYCORRHIZAL FUNGUS ON THIAMETHOXAM UPTAKE AND TRANSLOCATION ON MAIZE AND RESPECTIVE RESIDUES ON GUTTATION

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The aim of this study was to detect and compare the residue levels of the neonicotinoid insecticide thiamethoxam on guttation when the maize is grown by the use of arbuscural mycorrhizal fungi (AMF). A maize inbred line was selected (A) for both experimental systems (field and pot). The neonicotinoid insecticide Actara® (Syngenta Hellas) was used for both systems. The insecticide was applied with the use of an Eppendorf dispencer set at 10ml. In the first application the insecticide was applied in its recommended dose, while during the second application a double dose was used. The plots for the field cultivation were established in randomized complete block design replicated thrice. Each plot was separated in 3 different rows, one for each treatment (E = application with the pesticide, C = control, M = application of the substance plus the use of an arbuscular mycorrhizal fungus). The pots on the pot system were also thrice replicated and the treatments were signed accordingly. Guttation was collected in 6 different samplings, in the first morning hours for both cropping systems. A HPLC-DAD analysis was used for determining the residue levels of thiamethoxam on guttation. The results revealed that the plants of E treatment, that were developed in the pot cultivation, had residue levels ranged from 0,24ppm (1^{st} sampling) to 0,78 (6^{th} sampling), while plants of the same treatment that were field cultivated showed residue levels ranging from 0,56ppm (1^{st} sampling) to 0,19ppm (6^{th} sampling). Results of the pot cultivated plants for M treatment showed residue levels ranging from 0,26ppm (1^{st} sampling) to 1,1ppm (6^{th} sampling), while the field cultivated plants of the same treatment showed results ranging from 1,66ppm (1^{st} sampling) to 0,11ppm (6^{th} sampling). These results suggest that plants that were grown by the combined use of AMF (treatment M), developed a more dense and extensive rhizosphere that was able to absorb larger amounts of the active substance in comparison with that of the plants of the E treatment.

Acknowledgments

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)

IMPACT OF AUTOMATIC STEERING SYSTEMS ON FUEL AND TIME SAVING DURING GRAIN HARVESTING

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ABSTRACT

More and more farms are appreciating the benefits of satellite-controlled automatic steering systems for agricultural machinery. These technologies allow farmers to take full advantage of the performance of tractors and combines for field work. In modern combines, the automatic cruise control system selects the driving speed and continuously regulates it according to controlled parameters. For the study, three CLAAS Lexion 770 TT (Terra Track) model combines were used. The combines equipped with: Mercedes-Benz 585 HP, T4 exhaust-compliant engine, S7 automatic steering system display with RTK correction signal. Fuel consumption data was recorded and saved at harvest. The dependence of fuel consumption on different parameters such as type of crop harvested, grain moisture, field configuration and other parameters were analyzed. It has been found that fuel consumption using an automatic steering system depends not only on the accuracy of the correction signal, but also on the length of the driving lines and the total number of driving sections. Studies shown, that combine harvesters, with an automatic steering system, used fuel more efficiently, which means that the average fuel consumption of the combine was reduced by 0.2 t per year.

Keywords: Automatic steering, combine harvester, fuel consumption.

INFLUENCE OF DIFFERENT SPREADING TECHNIQUES ON PRECISE SPREADING OF ORGANIC GRANULAR FERTILIZERS IN THE SOIL

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ABSTRACT

Soil fertilization is integral to modern farming to ensure sufficient mineral and organic matter in the soil. Organic fertilizers are rapidly gaining popularity due to their natural and rich composition, produced from manure and meat-and-bone flour, which is produced in huge quantities in the livestock sector. Given the fact that the soil is degraded during farming and the lack of useful substances is observed due to the different soil composition and topography, it is important to note the importance of the precise use of fertilizers. The precise application of organic granular fertilizers to the soil ensures the optimal amount of fertilizer. Experimental studies were performed using different spreading techniques using manure spread and centrifugal mineral fertilizer spreader, spreading two types of granular organic fertilizers and evaluation of the obtained results. The parameters determined during the experimental studies were used to develop a theoretical model. The simulation was performed using SolidWorks and EDEM computer software. The influence of environmental factors has been determined to ensure the exact uniformity of application of organic fertilizers.

Keywords: Granular organic fertilizer, soil, spreading, precise.

CULTIVATION OF LOCAL POPCORN GENOTYPES AS A SECOND CROP IN KAHRAMANMARAS CONDITIONS

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ABSTRACT

Popcorn is a snack plant with widespread consumption in our country and around the world. Although the increasing commercialization rate in agriculture with the spread of hybrid varieties has narrowed the production area of local plant species, the production of local pop corn varieties continues today. Therefore, in this study, 17 local popcorn genotypes and 3 commercial popcorn cultivars were grown as the second crop in Kahramanmaraş climatic conditions. In the study, local popcorn genotypes were determined by plant height, first ear height, first node diameter, ear length, ear diameter, the row number of ears, the number of grains on the ear row, number of ears per plant, and ear tassel-out time, ear silk-out time, grain yield per decare and the relationships between these properties were investigated. According to the results of the research, the plant height of the local popcorn populations was 216 - 166 cm, the height of the first ear 107 -63 cm, the diameter of the first node 22.6 - 16.7 mm, the diameter of the node of ear 16.4 -11.8 mm, ear length 17,267 - 12,833 cm, ear diameter 32,513 - 26,120 mm, the row number of ear 16.8 -12.26, the number of grain on the ear row 38.86 -26.33, the number of ears per plant 1.8 -12 pieces, ear silk-out time 56 -48 days, the ear tassel-out time 68 -56 days and grain yield per decare 478 -260 kg/da. In the study, positive correlations were found between first ear height and plant height, ear length and ear diameter, the number of grains on the ear row and ear length, the ear tassel-out time and grain yield per decare, ear silk-out time and first node diameter, ear silk-out time and the ear tassel-out time.

Keywords: Popcorn, Local Genotypes, Grain Yield, Correlation.

DETERMINATION OF YIELD AND TECHNOLOGICAL PROPERTIES OF SOME SOYBEAN GENOTYPES IN MAIN CROP CONDITIONS IN DIYARBAKIR

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ABSTRACT

This study was carried out to determine the high yielding new soybean genotypes adopted to main crop conditions in Diyarbakır province of Turkey. Arısoy, Bravo cultivars, and KA12-12-1, KA12-12-2, KA12-13-1, KA12-14-1, KA12-15-1, KA12-15-2, KA12-15-3, KA12-15-4, KA12-15-1 lines in total 11 genotypes, were used as research materials in the experiment. The experiments were conducted in the trial field of "GAP International Agricultural Research and Educational Center" with randomized complete block design with two replications in 2019. According to the findings of experiment, plant height, first pod height, pods per plant, grain number per pod, 1000 seed weight, seed yield, oil content and protein content ranged between 101.3-139.3 cm, 8.7-16.0 cm, 52.1-61.9, 2.7-2.9, 134.8-170.5 g, 3346-4743 kg/ha, 20.5-23.2% and 33.6-37.6%, respectively. Results of this study indicated that; Arısoy cultivar and KA12-12-1, KA12-13-1, KA12-14-1, KA12-15-1 lines, it was determined that they gave high yields in Diyarbakır main crop conditions.

Keywords: Diyarbakır, main crop, seed yield, soyabean cultivars.

DETERMINATION OF THE BEST SEEDING DATE FOR SEED PRODUCTION IN ANNUAL RYEGRASS

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ABSTRACT

This research was carried out in Samsun ecological conditions in the vegetation period of 2020-2021 in order to determine the most suitable seeding date in terms of seed yield in two newly registered annual ryegrass cultivars. Six different planting times (15 October, 30 October, 15 November, 30 November, 15 January, 1 February) were applied in the study, and Ilkadım and Koca Yaşar varieties were used as plant material in the experiment. The experiment was set up according to split plot design in randomized blocks with four replications. While there was no difference between the cultivars in terms of the characteristics examined, it was determined that the differences between seeding dates were significant. The highest plant height was obtained from the plantings made between October 15 and November 30, and it was determined that the plant height shortened as the planting date was delayed. Both the spike length and the spikelet number decreased as the planting date was delayed. The highest seed yield was obtained from the planting done on November 15, as 220 kg/da. While the autumn sowings were in the same statistical group, the seed yield decreased significantly in the sowings made in January and February and fell to 130.7 kg/da in the 1 February sowing. While there was no difference between autumn sowings in terms of thousand-grain weight, it was determined that there was a significant decrease in January and February sowings. According to the one-year results obtained from this study, it can be recommended to plant Ilkadım and Koca Yaşar annual ryegrass cultivars in the coastal areas of Samsun between 15 October and 15 November in terms of seed yield.

Keywords: Annual ryegrass, seeding date, cultivar, seed yield.

SOME TRITICALE (TRITICOSECALE WITT.) GENOTYPES PERFORMANCES AT A MARGINAL REGION: KARAPINAR DISTRICT

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ABSTRACT

The number of climatic events that are called "extraordinary" in our country and in other countries around the world is increasing every year; periodic drought is one of them. Triticale is a type of cereal that has been developed for marginal areas and its prevalence and importance is increasing in the world year by year. Karapınar district is 95 km away from Konya province; has a typical continental climate, summers are very hot and dry, winters are cold and snowy. According to 21 years of observation data, the annual average temperature is 10.9 C0 degrees. It is one of the least rainy places in Turkey. According to 29-year observation data, the annual precipitation amount is 279.5 mm. For this, the vegetation is weak and deforested. The most important area of Turkey exposed to wind erosion is Karapınar and its surroundings. (This area is approximately 20% of the area exposed to erosion throughout the country). In this research, 3 standard varieties (Tatlıcak-97, Alperbey and Özer) and 8 lines, according to the random blocks trial pattern, for 2 years (2018-2020) under absolute dry conditions, grain yield and their performances in terms of quality were examined in the trial area within the Soil, Water Combacting Desertification Institute in Karapınar district of Konya province. According to the results obtained, the average grain yield was determined as 2.098 t/ha; The highest grain yield was determined from Tri-5 (2.653 t/ha) line, and Alperbey variety (2.241 t/ha) gave above average grain yield among the varieties. The highest quality scores from lines; for protein ratio: Tri-1-Tri-3 & Tri-8 (11.1 %-11.4 % & 11.5 %); for 1000 kernel weight: Tri-1-Tri-3-Tri 5-Tri-7 & Tri- 8 (31.6 %-31.1%- 32.6%-30.5 & % 32.6); for test weight: Tri-2-Tri-6-Tri-8 (70.7 Kg -71.9 Kg & 71.3 Kg) and for SDS: Tri-1-Tri-3-Tri-6-Tri-7& Tri-8 (16.8ml-16.8ml-16.5ml-16.0 ml-15.3 ml) respectively. The result average of 2 years, Tri-1, Tri-3, Tri-5 and Tri-7 lines have shown high performance in this marginal area both in terms of grain yield average and quality and

in the following years with these lines research will be continuing to determine whether are suitable for absolute dry and marginal areas.

Keywords: Triticale, drought, climate change, yield, quality.

THE EFFECTS OF COLD STORAGE ON VIABILITY AND GERMINATION LEVELS OF QUINCE POLLEN

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ABSTRACT

In hybridization breeding studies, one of the most important factor determining the success of parent combinations, whose flowering dates do not overlap with each other, is the storage of pollen under appropriate conditions. Knowing the germination and viability of pollen under different storage conditions is extremely important for the process and success of hybridization studies. In this study, the pollen germination and viability of 3 quince genotypes (Genotype 2152, Genotype 2423, Quince A) were determined directly after detonation of anthers in artificial light (fresh pollen) and after storage at +4 °C for 1 month (cold-stored pollen). The interaction of genotype, application and genotype x application was found significant in both examined parameters. Pollen viability rates were determined between 80.89-85.35% in fresh pollen, and between 50.37-81.71% in cold-stored pollen. Only viability of Quince A pollen did not affect after cold storage and had the same statistical level with fresh pollen. On the other hand, pollen germination rates varied between 31.55-58.15% in fresh pollen, while this rate was observed as 6.02-6.82% in cold-stored pollen. Pollen germination rates of genotypes were lower than pollen viability in both fresh and cold-stored pollen. In addition, when the relationship between pollen viability and germination rates was examined regardless of the applications, a positive (R=+0.442) and significant (P≤0.0005) correlation was found between the two parameters. It was determined that the germination rates of the cold-stored pollen decreased at higher rates than the viability rates. Low germination rates will negatively affect the success of hybridization studies. It will be important to determine the most appropriate method with the studies to be done by adding different times and temperatures.

Keywords: *Cydonia oblonga* M., pollen storage, pollen viability, pollen germination.

GROWTH-DEVELOPMENT, YIELD AND QUALITY CHARACTERISTICS OF ARONIA VARIETIES GROWN IN POTS

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ABSTRACT

This study was carried out to determine the growth, development, yield and some quality characteristics of Nero and Viking aronia varieties grown in open field and pot in Samsun ecological conditions. Three-year-old aronia plants were planted in 80-liter pots containing a 1:1:1 (v/v) mixture (barnyard manure+soil+sand) and 5 plants were included in each replication. Number of shoots, flower buds and clusters, berry weight (g), yield (g/plant), firmness (N), number of fruits per cluster, must yield (ml/100g), TSSS (%) and pH values were measured in Aronia cultivars. In addition, monthly shoot growth rate (cm/month) was determined and phenological observations recorded. According to Viking and Nero aronia varieties, the number of shoots (7.8 and 7.6 pieces), the number of flower buds (22.63 and 22.85 pieces), the number of clusters (45.06 and 44.80 pieces), the weight of berry (8.16 and 8.29 g), the fruit number in the bunch (21.45 and 21.73 pieces), berry firmness (4.90 and 5.15 N), amount of must (49.67 and 51.67 ml/100 g) and TSS (17.07 and 16.30) and pH values (3.65 and 3.61) were found to be close to each other. Bud burst (10 March), flowering (26 April), berry set (12 May) and harvest time (24 August) were also similar in cultivars. It was also revealed that while the shoot length was 97.47 cm and 95.47 cm on March 11, respectively, in Viking and Nero varieties, it reached 124.73 and 120.73 cm in August, five months later.

Keywords: aronia, yield, berry.

EFFECTS OF BIOGAS DIGESTATE AND SYNTHETIC FERTILIZER ON GROWTH AND YIELD OF LETTUCE IN DIFFERENT HYDROPONIC GREENHOUSE PRODUCTION SYSTEMS

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ABSTRACT

As the world's population grows, so does the demand for food, resulting in increased agricultural production. As a result, greenhouse vegetable production rises. This process necessitates the use of a lot of synthetic fertilizers. Synthetic fertilizers are known to be harmful to the environment because they are made from fossil fuels. In this context, anaerobic digestion is a used as low-cost waste management method and produces renewable energy from dairy waste which could be used as a bio-fertilizer for vegetable production. Anaerobic digestate has been reported to achieve more sustainable growth and yield and is considered a good alternative to synthetic fertilizers due to the wide range of macro and micro-nutrients available. Considering this, yield and quality parameters of lettuce plants grown with biogas digestate and synthetic fertilizer in hydroponic cultivation were investigated. The hydroponic culture was done with 3 different techniques: aeroponic cultivation, nutrient film technique, and substrate cultivation. In the study, Yedikule lettuce variety (*Lactuca sativa* var. Longifolia) was used to compare different hydroponic growing systems. As a result of the study, lettuce plants grown in synthetic fertilizer (Hoagland solution) showed higher chlorophyll content, root dry weight, and yield. However, when biogas digestate was used as a sole mineral nutrient source for lettuce production, lower chlorophyll content, root dry weight and final yield were obtained.

Keywords: Sustainable production, Chemical fertilizer, Anaerobic digestion, Biogas slurry, Agriculture.

DEVELOPMENT OF HIGH-YIELDING AND HIGH QUALITY (LARGE SEED SIZE) WINTER CHICKPEA VARIETIES FOR MOROCCO

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ABSTRACT

The main objective of chickpea *(Cicer arietinum L.)* breeding program is development of high-yielding, disease-resistant and stable varieties with acceptable seed quality characteristics. In fact, development of extra-large seeded Kabuli chickpea cultivars is one of the most viable options as these fetches premium price in market and have consumers' preference. The present investigation was carried out to describe the development of new high-yielding and large seed size varieties that are released in the last decade in Morocco. In this respect, multi-environmental trials were performed between 2015 and 2018 to screen for several abiotic and biotic stresses in the field and greenhouse. This study identified tow promising lines that had high grain yield as well as tolerance to drought, resistance to Aschochyta blight, and good grain quality. They have the largest seeds among the available varieties, with only slight cost to grain yield, thus corresponding to farmers' demand. Moreover, these lines were approved by the Office National de Securité Sanitaire des produits Alimentaires (ONSSA) and are targeted for dissemination and adoption by Moroccan farmers.

Keywords: Winter varieties, large seeds, grain yield, Aschochyta blight.

POSSIBILITIES OF USING WIND TURBINES IN DISINFECTION OF GREENHOUSE SOILS

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ABSTRACT

Our country has a significant potential when it comes to wind and solar energy, two of the renewable energy sources. Wind energy takes its highest value on the coasts of the Marmara and Aegean Seas. Hence, the use of electrical energy obtained from the wind turbines in Tekirdağ located in the north of the Marmara Sea, in terms of agricultural production, has been addressed. The electrical energy obtained from wind turbines is used for heating the resistance wiring whose electricity consumption is low (25 Wm-1) whose temperature increases up to 70-80 oC. Soil disinfection can be carried out in a greenhouse by increasing the soil temperature through placing them into the soil at a depth of 10-15 cm. The fact that the wind turbine system to be established for this purpose will be 4-5 kWh will fulfill the need. The use of chemical agents in disinfection to be conducted with chemical substance (pesticide) that are very toxic to living beings will also be eliminated. In the disinfection application, a solarization application by covering the greenhouse soil with a transparent polyethylene cover will also increase the success of the disinfection process. Such works must be performed in the summer months when there is no production in greenhouses. The electrical energy obtained from the wind turbines can ensure the operation of the fans in the ventilation of the greenhouses, at times when the production is performed in the greenhouses. It may also meet the energy needs of some tools and equipment.

Keywords: Wind energy, Wind turbine, Greenhouse, Soil disinfection, Solarization.

ROOT ARCHITECTURE AND DEVELOPMENT OF AMERICAN GRAPE ROOTSTOCKS GRAFTED WITH FOXY GRAPES (VITIS LABRUSCA L.) CULTIVARS

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ABSTRACT

One of the important factors affecting rootstock performance in grafted grapevine production is root structure and its ability for different soil. In the present study, foxy grape varieties registered for the first time in the Black Sea Region in Turkey by the selection, and several American grape rootstocks were bench grafted. In this study, it is aimed to examine the root architecture of foxy grape grafted saplings for their root architecture and the development of rootstocks. In the experiment 'Rizessi', 'Çeliksu', 'Ülkemiz' and 'Rizellim' foxy grape cultivars grafted on 140Ru, SO4 and 110R rootstocks. WinRhizo root analysis program (Regent Instrument Inc. Canada, ver.2013) was used to determine rootstocks' architecture and development of grafted vine saplings. Roots prepared for scanning were placed on the scanning part of the device and transferred to the computer context. Root length and mean root diameter are two of the essential features that reveal the root architecture of rootstocks. In the study, root length (cm), root surface area (cm2), root diameter (mm), root volume (cm3), root tip number (piece), root branching number (piece), root intersection number (piece), root age and their dry weight (g) were determined. Total root length was determined between 330.05 - 595.40 cm ('Rizellim'/SO4 and 'Çeliksu'/140Ru) and mean root diameter of 2.04 - 3.13 mm ('Çeliksu'/140Ru and 'Rizessi'/110R). Negative relationships were found between root length and mean root diameter. Among the rootstocks, the highest root surface area was 399.67 cm2, root volume was 29.32 m3, the number of root tips was 1605.75, the number of root forks was 5421.89, and the number of root crossing was 671.61 on 110R rootstock. In all combinations obtained as a result of the study, it was determined that the rootstocks showed good root development and were in harmony with the new foxy grape cultivars.

Keywords: WinRhizo, American vine rootstocks, Foxy grape, Root architecture.

CHANGES IN PHYSICAL AND QUALITY CHARACTERISTICS OF SWEET CORN VARIETIES DURING STORAGE

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ABSTRACT

Researh was established in Isparta University of Applied Sciences, Faculty of Agriculture, Field Crops laboratory in 2020, to determine effects on physical and quality of sweet corn varieties during storage. The study was established in completely randomized plot design with 3 replications. In study, two hybrid sweet corn (Batem Tatlı and Kompozit Şeker) were used. In experiment, sweet corn varieties were stored in modified atmosphere bags (MAP) in the refrigerator (+4°C) for different periods (5, 10, 20, 30 and 40 days). In the study, weight loss, dry matter content, color parameters (L* and C*), total soluble sugar content, ash ratio, crude protein ratio and water-soluble dry matter content were investigated according to storage time. When the sweet corn cultivars were stored for different periods, at the end of the 40th day, the ash ratio, crude protein ratio, total soluble sugar content, SÇKM, brightness (L*) and vitality (C*) values decreased; weight loss and dry matter ratio increased were determined. As a result, sweet corn varieties should be consumed fresh after being harvested, and it can be recommended to be consumed within 5 days at most when they need to be kept at +4°C. After the 5th day, it has been determined that there will be great losses in terms of quality and physical properties.

Keywords: Sweet corn, storage, physical properties, quality properties, sugar content.

COMPARISON OF GERMINATION RESPONSES ON MUNGBEAN (VIGNA RADIATA (L.) WILCZEK) POPULATIONS AT DIFFERENT TEMPERATURES UNDER SALT STRESS

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ABSTRACT

Abiotic stress conditions affect the productivity of sustainable agriculture worldwide. This study was conducted in order to determine the role of temperature and salinity on Mungbean (*Vigna radiata* (L.) Wilczek) populations, in regard to their germination requirements. Mungbean is an ecologically important food grain legume crop. Susceptibility towards temperature and salinity stress has limited the productivity of mungbean. In this study, two mungbean populations (G1, G2), three temperature (15°C, 25°C, 35°C) and three salinity stress levels (0, 100 mmHos, 200 mmhos) were used. The data obtained in the study were subjected to analysis of variance in accordance with the completely randomized design with triplicate. Petri dishes were allowed to stay at different three temperature (15°C, 25 °C, 35 °C) for 9 days and salt solution was added when required, then measured. Increasing salinity and temperature affected negatively to mungbean populations. Results showed that optimal germination for both populations under stress conditions occurred at higher temperatures (25°C and 35 °C) for mungbean. In addition, low temperature lead to a markedly decrease in seed germination. The inhibitory effects of the temperature were greater than salinity for both populations. These results suggest that temperature and salinity stress showed different effects, and the temperature-salinity tolerance of mungbean populations is greatly affected by the interactions of temperature and salinity.

Keywords: Abiotic stress, early seedling, germination rate, germination indexes, salinity

A STUDY ON DROUGHT ANALYSIS USING TIME SERIES, STANDARDIZED PRECIPITATION INDEX (SPI) AND STANDARDIZED PRECIPITATION EVAPOTRANSPIRATION INDEX (SPEI) IN BURSA REGION

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ABSTRACT

All agricultural activities are directly related to the climate. In recent years, temperature increases and changes in precipitation regimes adversely affect the Mediterranean Basin, which includes our country. While increasing temperatures and irregular precipitation increase the need for irrigation in crop production in some regions, excessive and irregular precipitation in some regions seriously damages production. Nowadays, climate change has been accepted by many climate scientists as a problem that cannot be ignored. In our country, drought is one of the natural disasters that will affect agricultural production the most. In this study, a drought analysis was made for Bursa, which is one of the important cities of our country in agricultural production. In addition, non-parametric Mann-Kendall and Sen's Trend Analyzes were conducted between 1990-2019 for precipitation and temperature values. According to results of the trend analysis, statistically significant trends could not be reached in the precipitation data, increasing trends were observed in the temperature data. SPI and SPEI methods were used for drought analysis, although extreme values were reached for the years 1960 – 2019 as a result of both methods, it was determined that normal drought levels were dominant in general.

Keywords: Drought, Precipitation, Temperature, Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI), Trend Analyzes.

MAPPING OF AGRICULTURAL FROST PROBABILITY IN THE IMPACT OF GLOBAL CLIMATE CHANGE, SUSURLUK BASIN EXAMPLE

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ABSTRACT

The frost event that occurred in different regions of Turkey with the change of the climate zone deeply affects agricultural production. Accordingly, it is necessary to predict the regions and periods where frost risk may occur, according to digital models, in order to reduce losses in agricultural production. Study has carried out in the Susurluk basin, where the daily minimum temperature values of the meteorological stations in the basin were used. The days when frost is expected to occur at different probability levels in the spring and autumn periods were determined by geostatistical methods. The results obtained were determined by giving frost risk maps for 80%, 50%, 20% probability levels in the spring and autumn periods, together with the digital elevation map (DEM).

Keywords: Agricultural frost, Risk mapping, DEM, Susurluk Basin, Geostatistics

ENERGY AND MATTER IN SUSTAINABLE AGRICULTURE

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ABSTRACT

Many philosophers, thinkers from ancient times before the new era took notions of earth, water, air and the sun as a fundament of philosophical ideas of nature and the world. In particular, the sun was a cult in ancient Egypt as well as ancient Greece (Pharaon Amenofis IV, Pythagora). All four factors, earth, water, air and sun must be present in agriculture. Knowing the scientific fact that energy can't be obtained from nothing, when asked where it comes from on earth, the answer is that it comes from the sun. In addition to this energy, one negligible part is the energy of the moon's impact and the destructive energy of earthquakes from the depths of the Earth's crust. So, without the sun, that is, without its energy, there would be no plant species and no plants at all, no animal life, no man on earth, no light or movement. One of the reasons for stabilising agriculture is the consumption of energy and matter in this production system. Structural organization of all ecosystems, including agrosystems, consists of four components, three biotic or living components, and one abiotic or inanimate component. Nonliving or abiotic component consists of chemical and physical factors of the environment biotic component. It's climate, water, air, and soil. The abiotic component of the pond is water, while air, soil and sunlight constitute abiotic actors in the garden, in the grain fields or in the pasture. Three biotics components of each ecosystem are products, consumers, and decomposers. Ecosystem Integrity depends on the efficiency of energy flow and the efficiency of the circling of matter, which is necessary for capture and processing of solar energy. Therefore, the food chain is an energy process defined by the direction of energy flow through the ecosystem. By applying the first and second laws of thermodynamics to the flow of energy through the agrosystem, more than 90% of the total energy gas caught or assimilated by the product disappears from the food chain, every time that same energy is transformed and switched from one to the other trophy level. Looking at this matter from the point of view of energy, there is a possibility of changing the state of such systems through a part of free energy that is not included in this time entropy, as well as additional forces, work, or additional energy with the aim of achieving the effects. This would open a new area of research. One of the goals could be carbon dioxide or carbon dioxide consumptian or carbon emissions to reduce carbon dioxide in the atmosphere. This would have a positive impact on the reduction of the effect of "greenhouse gases", which is responsible for climate change and all the negative consequences that we are suffering now.

Keywords: Energy, matteri, sustainable agriculture.

AQUACULTURE POTENTIAL OF COMMON MEAGRE (ARGYROSOMUS REGIUS, ASSO 1801) IN FLOATING CAGES IN DAKHLA BAY-MOROCCO

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ABSTRACT

This study is one of the first contributions to the monitoring of the rearing of common meagre *Argyrosomus regius* in floating cages moored in Dakhla Bay. Zootechnical monitoring of two production cycles was carried out in order to define the aquaculture potential of common meagre in Dakhla Bay. The first batch is composed by 20000 fingerlings of 4.5±0.13 g in mean weight and 6±0.19 cm in fork length, and received on August 26, 2019, under a condition factor of about 2.08; the second batch is composed by 30000 individuals of 3 ± 0.12 g and 6±0.21 cm, and received on June 04, 2020 under a condition factor of about 1.39. These fingerlings were stocked in circular HDPE cages of 12 meters in diameter (565 m3 in volume) located in front of the Boutalha foreshore at 10-12 m depth; with a starting density of 0.43 kg.m-3 and 0.87 kg.m-3 respectively for batch 1 and batch 2. The stocked population was fed with an imported granulated feed, with a feeding rate of 2 to 3 times per day during the pre-on-growing phase and once per day during the on-growing phase. During the first trial which took 16 months, we have recorded a high growth potential of the common meagre. The fish reached 1265±69.2 g in mean weight and 48±4.32 cm in mean length with a specific growth rate SGR of 0.46%.day-1 and a daily growth index DGI of 2.45 g.fish-1.day-1. The feed conversion index was 1.28 (FER=0.78), the final density was 36.94 kg.m-3 and the condition factor (k) registered a mean value all cycle of 2.18. The survival rate obtained during the first harvest was about 89.66%. While the fish of the second cycle have reached the weight of 690 ± 23.41 g and the size of 38.5±3.16 cm after completing 12 months of rearing, with an SGR of 0.61 %.day-1 and a DGI of 1.75 g.fish-1.day-1 ; a CI of 1.14 (FER=0.88), the final density is 31.06 kg.m-3 and the condition factor is 1.38. The survival rate obtained was about 92.83%. The mean monthly profile of rearing medium parameters such as water temperature, dissolved oxygen, salinity, turbidity, and pH were respectively 17.1 to 23.64°C, 6.99 to 9.07 mg.l-1, 36.76 to 38.20 psu, 1.41 to 17.30 FNU and 8.12 to 9.20. These findings reinforce the position of the common meagre as a very promising species for the aquaculture diversification in Dakhla Bay, and in Morocco in general.

Keywords: Moroccan aquaculture, Dakhla Bay, common meagre, fish farming, growth performance.

FORMULATION OF EUROPEAN SEABASS FEED BASED ON LOCAL INGREDIENTS AND VALORIZATION OF BY-PRODUCTS OF SHRIMPS

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ABSTRACT

In view of the stagnation in the production of fishmeal from fisheries, it was necessary to develop an alternative formulation way in order to reduce the proportion of fishmeal in aquaculture feeds. In this context, this study will focus on the formulation of a fish feeds using the locally available raw material by incorporating shrimp shells as substituents for fishmeal while maintaining the nutritional quality of the fish feed. The purpose is double, finding an alternative to the fish meal by developing a new formulation and solving the environmental problem of shrimp waste management in the context of sustainable development. Shrimp by-products generated from shrimps processing industries, are considered economical, a source of abundant and good quality protein for fish feed. In this present work, these by-products, which contained about 41% protein, were used as a substitute for fishmeal. 04 iso-proteinic feeds 42% ± 0.7 and iso-energetic 2207 KJ / 100g ± 9 (Fat level 17.95% ± 0.5 Ash level 10.93% ± 0.26), were processed by replacing the fishmeal with shrimp by-products in different proportions of 0%, 11%, 22% and 33%. Other ingredients such as Corn gluten, Soybean meal, Wheat flour, sunflower oil, fish oil, and mineral and vitamin premixes were also used in the formulation. The biochemical composition of these feeds did not differ significantly $p > 0.05$ No significant difference ($p > 0.05$) in the weight and size of Dicentrarchus labrax juveniles fed by the different feeds for a period of 191 days were observed. In all cases, an excellent correlation between the weight and size of juvenile fish was observed. No significant difference in the growth and feed efficiency of juveniles fed with, R2, R3 or R4, or with the control feed, was observed. The result of the 191-day rearing study indicates that shrimp by-products could substitute up to 22% for fishmeal in seabass feed with economic benefits while maintaining feed quality.

Keywords: by-products of shrimps,European seabass feed, fishmeal.

LAND CONSOLIDATION AND SHARE PARCEL USE: THE CASE OF KESIK VILLAGE

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ABSTRACT

Agricultural land in our country is being fragmented in a way that makes it difficult to process the soil. The most important causes of land fragmentation are fragmentation through inheritance and transfer, as well as through sales made by shares and division. Land torn apart by share sales shows that parcels that appear to be one piece are used by dividing them by more than one person. Land consolidation studies examine the ownership status of existing parcels in the project area. Parcels that are divided into shares in accordance with the wishes of landowners are combined with land consolidation work. In this study, stock land use was examined in accordance with the data obtained from land consolidation studies conducted in Kesik village of Yeşilhisar District of Kayseri province. Before the land consolidation study, the number of parcels in the project area was 2136, while after the consolidation it was reduced to 1562 parcels. In this case, the consolidation rate is 26%. Looking at the parcel data before consolidation, it is seen that there are 1278 shares on 382 parcels.

Keywords: Land Consolidation, Share Parcel Use.

THE ESTABLISHMENT AND POPULATION CHARACTERISTICS OF THE INVASIVE BLUE CRAB CALLINECTES SAPIDUS IN THE LAGOON OF NARTA, ALBANIA

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Abstract

The aim of this study is to evaluate the establishment of blue crab population in Narta Lagoon, to monitor its distribution, to assess its abundance and to analyze its population structure and biometric characteristics. Comparative analyses were done between data collected in 2012 and those collected during 2014 - 2015. Blue crab individuals were collected from gillnets and fyke nets of local fishermen. Abundance, carapace width and height, as well as weight of each collected individual have been evaluated. Questionnaires were also distributed to local fishermen, in order to gather additional information on the presence, state and impact of the blue crab to other populations of Narta Lagoon. Based on the collected data and analysis in this study, the population of the blue crab *Callinectes sapidus* can be considered as established in the Narta Lagoon.

Keywords: Blue crab, Narta Lagoon, abundance

FEASIBILITY OF FARMING THE RED ALGA GRACILARIA SP USING ROPE CULTIVATION IN THE BOUTALHA AQUACULTURE PARK ALONG THE DAKHLA BAY, MOROCCO

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ABSTRACT

We carried out a trial of experimental farming of the agar-yielding alga known as *Gracilaria Sp* using a horizontal rope farming method along the Boutalha coast, Dakhla bay. This agarophyte's mean daily growth rate (DGR) ranged from 4.7 ±0.57 percent day-1 to 8.25 ±0.62 percent day-1. Similarly, the mean horizontal rope yield ranged from 1.55 ±0.07 kg to 2.62 ±0.05 kg fresh wt m-1. DGR and biomass yield were both positively correlated to temperature, according to a Pearson correlation. Furthermore, the DGR was strongly connected with air temperature (r = 0.916; p 0.01), while biomass yield was correlated with surface seawater temperature (r = 0.986; p 0.001). The value of the crop was US$5577, while the investment required for the requisite culture rope infrastructure was US$1797, resulting in a profit of US$1890 for single farmers in Boutalha aquaculture park. consequently, commercial farming of *Gracilaria sp* in Dakhla bay waters could help artisanal, coastal fishermen diversify their livelihoods while also encouraging indigenous agarose production.

Keywords: Agar-yielding alga, Gracilaria Sp, Dakhla bay, diversification of livelihood, sustainable farming.

DETERMINATION OF ENTERIC METHANE EMISSIONS AMOUNT FROM SHEEP BREEDING BETWEEN 2004-2020 IN TURKEY

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ABSTRACT

Animal production is one of the most important sources of methane (CH4) emissions in agriculture. Especially, ruminant livestock animals account for the majority of global anthropogenic methane emissions. The primary sources of methane emissions from livestock animals are microbial fermentation (80%) and manure (20%). Methane is a serious greenhouse gas with 25 times the effect of carbon dioxide (CO2). Therefore, its impact on global warming cannot be ignored. Sheep breeding is common in Turkey as it requires less capital and investment, creates labour capital in the region where it is made, adapts quickly to climate conditions and is a preferred source of animal protein. According to the Turkish Statistical Institute (TUIK) data, the sheep population has increased by 66% in the last 17 years. In this study, enteric methane emissions from sheep production in Turkey in the last seventeen years were determined by the Tier-2 method determined by the Intergovernmental Panel on Climate Change (IPCC). Methane emission factor (EF) was determined on average 11,9 kg CH4/head/year, and the gross energy was determined 33,3 MJ/day. Accordingly, enteric methane emissions from sheep breeding have increased by 72,9% since 2004, and it has been calculated that 517 kilotonnes of CH4 emissions were realized in 2020. It is predicted that the increase in emissions will continue depending on the increase in sheep numbers for the following years. For this reason, effective precaution should be taken on a farms basis or nationwide to reduce enteric methane emissions. Scientists need to focus more on this issue.

Keywords: Enteric fermentation, Methane, Sheep, Tier-2, Turkey.

POLLUTION LOADS OF MANURE FROM LIVESTOCK PRODUCTION IN BURSA REGION

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ABSTRACT

One of the serious problems in livestock farms is manure. It hasn't corrected manure management, control and storage, manure causes environmental problems such as global warming, acidification, eutrophication. It is important to determine the pollution potential of manure for livestock operations, region and national wide, monitoring them and determining their effect potentials. This study aimed to determine the potential of manure-related pollution caused by livestock in Bursa. For 2019, pollution occurred from poultry (laying hens and broiler) 395027,2 tons/year, sheep and goat 276312,5 tons/year and cattle (dairy cattle, beef and calves) 3200018,5 tons/year. For 2020, pollution potential was calculated 407475,4 tons/year pollution from poultry (laying hens and broiler), 278142,3 tons/year from sheep and goat and 3088401,1 tons/year from cattle (dairy cattle, beef cattle and calves). Using the relevant coefficients, the total pollutant dispersed loads from farm animals were obtained as 78210,9, 22098,2 and 3236,1 tons/ton live animal weight for BOD, TN and TP for 2020, respectively. For 2019, it was calculated as 80135,1, 22653 and 3337,5 ton/ton live animal weight for BOD, TN and TP, respectively. Since the pollution from livestock operation is not a point source pollutant, its harmful effects are quite large. In this study, attention is paid to the pollution dimensions, and the damages it can cause and the precautions that can be taken are emphasized.

Keywords: Global warming, Livestock, Manure, Non-point source pollution.

THE IMPORTANCE OF ENVELOPE MATERIAL IN TUBE DRAINAGE SYSTEMS AND THE NEW GENERATION OF ENVELOPE MATERIALS

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ABSTRACT

The main purpose of agricultural drainage is to remove excess water from the plant root zone in a controlled manner, or to prevent salinity that may occur due to high ground water, especially in arid and semi-arid regions. For this purpose, the system that is widely used both in our country and in the world is closed (pipe) drainage systems. The most important problem in these systems is the sedimentation-related clogging. An important part of the research on drainage engineering in Turkey consists of determining the appropriate envelope materials used to prevent siltation. One of the most important criteria used in the selection of suitable envelope materials is the ingress resistance performance of the envelope materials. The most common envelope materials used in practice are sand-gravel and geotextiles. Sand-gravel envelope material has been replaced by geotextile envelope materials due to its high cost as well as the difficulty of its procurement and logistics. Recently, new generation envelope materials have been developed and started to be used. One of the most important of these is Hidroluis drain-envelope combination developed in Turkey. The difference of this combination from traditional envelope materials is the way, method, and architecture of water discharge. At the same time, being the least dependent material on soil type increases the usage areas and reduces the cost. In this study, an evaluation of the traditional envelope materials, which is widely used in Turkey, and the new generation Hidroluis drain-envelope combinations is determined within the scope of the research.

Keywords: drainage, Hidroluis, envelope materials.

VARIATION OF CALPAIN GENOTYPES IN TURKISH GREY STEPPE AND ANATOLIAN BLACK BULLS

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ABSTRACT

Calpain 1 (*CAPN1*) gene is known as the micromolar calcium-activated neutral protease gene and it degrades calcium-dependent cysteine protease, μ-calpain, which reduces myofibrillar proteins in postmortem conditions. This gene has important effects on muscle metabolism and development. The bovine *CAPN1* gene is located at the telomeric end of chromosome 29. This genomic region includes a considerable overlap of QTLs regulating not only beef tenderness but also various growth traits, weaning weight, carcass characteristics, and feed efficiency. Cytosine/guanine (C/G) alteration at the nucleotide position 947 in exon 9 of the *CAPN1* gene is defined as one of the most important genetic markers in the mechanism of postmortem tenderness. Although this gene has been widely studied among various cattle breeds, there is limited information on Turkish native cattle. Therefore, the present study aimed at determining the genetic variability of the *CAPN1* in some Turkish native cattle breeds. In this respect, 99 Turkish Grey Steppe and 41 Anatolian Black bulls were genotyped by the PCR-RFLP. Genomic DNA was extracted by the phenol-chloroform method. PCR-RFLP was performed using appropriate primer sequences, PCR conditions, restriction enzyme, and incubation processes. The digestion products were electrophoresed and visualized by a gel imaging system. The genotypic and allelic frequencies were calculated using standard procedures. The Hardy-Weinberg equilibrium (HWE) was tested by Fisher's exact test. The population genetic parameters including gene heterozygosity (He), the polymorphism information content (PIC), the effective allele numbers (Ne), and the fixation index (FIS) were evaluated based on allelic frequencies. Moreover, the Shannon-Weaver diversity index (H) was calculated. Results revealed that the GG genotype was remarkably predominant in both native breeds. On the other hand, it was observed that the CC genotype was absent resulting in notably low C allele frequency (0.13 and 0.12 in Turkish Grey Steppe and Anatolian Black, respectively). The exact test showed a deviation from HWE for both breed-specific and total cattle population evaluation. Population genetics assessment provides substantial clues about population structure defined by genetic variation in a particular gene or genes. Population parameters indicated low genetic variabilities in the studied breeds. In this context, He, PIC, and Ne were found to be 0.2262, 0.2006, and 1.2923, respectively in Turkish Grey Steppe cattle. Concerning Anatolian Blacks, He, PIC, and Ne values were 0.2112, 1889, and 1.2677. Consistent with these results, FIS and H indexes revealed a low genetic diversity. Taken together, the *CAPN1* marker showed low informativeness in Turkish Grey Steppe and Anatolian Black cattle. The same interpretation applies to the entire cattle population (n= 140). In recent years, although projects and studies on the genetics of native cattle breeds have been carried out in Turkey, these studies have not been sustained consistently. It is important to note that these native animal breeds are one of the basic constituents of biodiversity in Turkey. They are local gene resources that should be protected at the national and international levels. On the other hand, native breeds exhibit high adaptability for surviving under challenging environmental conditions and low-quality feed opportunities. Molecular genetic studies on native breeds should be encouraged to reveal broader perspectives regarding significant biological processes and to achieve a better understanding of complex traits such as growth, muscle development, and feed efficiency.

Keywords: Turkish Grey Steppe cattle, Anatolian Black cattle, CAPN1, single nucleotide polymorphism, population genetics

SPIDER POPULATIONS ON HERBACEOUS PLANTS IN ÇORUM PROVINCE

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ABSTRACT

Spiders are capable of living in all types of habitats in the world have 49525 known species. They are represented by 1129 species belonging to 54 families in Turkey. In this study, we investigated spider populations on Harbaceous Plants in Çorum province. Samples were collected by catching by hand and sweeping with insect net between the months of June-August 2015-2018 and they stored in 96% ethanol at -20 ˚C. Specimens were often caught from Astaraceae. Morphological identifications were based on reference publications on the taxonomy of Palearctic region spiders with species nomenclature following the World Spider Catalog. Spiders were deposited in the University of Gaziantep, Zoology Museum (GAUZM). In this study, 463 specimens belonging to 16 families were determined and the adult spiders were diagnosed on species basis. We identified 24 species *(Phylloneta impressa, Kochiura aulica, Enoplognatha latimana, E. ovata, Mangora acalypha, Linyphia triangularis, Oxyopes lineatus, Pisaura mirabilis, Tetragnatha intermedia, T. montana, T. extensa, Uloborus walckenaerius, Tibellus oblongus, Philodromus cespitum, P. longipalpis, P. albidus, Pulchellodromus glaucinus, Heliophanus edentulus, Thomisus onustus, Ebrechtella tricuspidata, Xysticus cor, X. acerbus, Tmarus stellio, Runcinia grammica*). The ratio of female/male ratio and adult / juvenil were 2,4:1 and 1,5:1, respectively. The species reported through previous studies was supported with new localities in this study.

Keywords: Spider, Harbaceous plants, Astaraceae, Çorum.

ANALYSIS OF THE g.332G>A MUTATION IN EXON 3 OF OVINE LEPTIN GENE IN KIVIRCIK BREED

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ABSTRACT

Leptin is a 16 KD protein and is encoded by the leptin (*LEP*) gene. *LEP* has been demonstrated to be significantly associated with the regulation of appetite and energy metabolism in mammals, and therefore, it has been shown to be a significant genetic marker regarding feed intake, body weight, growth rate, and fat deposition. Based on these essential impacts of the gene, it has been widely studied to evaluate its association with meat and milk production. On the other hand, the role of the *LEP* on reproductive performance such as puberty, litter size, spermatogenesis, maturation, capacitation, and the motility of sperm has been reported. Ovine *LEP* is located on chromosome 4 and it consists of three exons and two introns. Although the gene's effects were well-characterized in cattle, information on the *LEP* in small ruminants is relatively limited. Moreover, there is no publicly available report about the *LEP* g.332G>A mutation in Turkish native sheep breeds. Therefore, the objective of this study was to analyze the genotypic distribution and population genetic characteristics of the g.332G>A mutation located on exon 3 of ovine *LEP* gene in Kıvırcık sheep. A total of 91 animals were used in the present study. DNA isolation was performed using the phenol-chloroform method and the PCR-RFLP procedure was applied for the genotyping. A 463 bp fragment was amplified using 5′-TGTTGTCCCCTTCCTCCTG-3′ and 5′-CCCACATAGGCTCTCTTCTGC-3′ sequences as the forward and reverse primers, respectively. The amplicons were digested by the AlwNI restriction nuclease. The genotypic and allelic frequencies expected/observed, and Nei's heterozygosities (He) were calculated, and Hardy-Weinberg Equilibrium (HWE) was tested by chi-square test. The effective allele numbers (Ne), polymorphism information content (PIC), and the fixation index (FIS) were estimated using appropriate formulas. The Shannon-Weaver diversity index (H′) was also calculated. Results revealed that the heterozygous genotype was predominant in the Kıvırcık breed. In this respect, 41 sheep were genotyped as the GA (45%). The AA genotype frequency was considerably low (13%) resulting in low frequency (36%) of the A allele. The distributions of genotypes agreed with HWE within the *LEP* marker. Population genetic parameters indicated that the *LEP* g.332G>A is a mildly informative marker for the Kıvırcık sheep breed. In this context, PIC and Ne values were found to be 0.3546 and 1.8546, respectively. FIS was calculated as 0.1102. He was 0.4608 and the H' was estimated at 0.6534. Thus *LEP* g.332G>A showed an admissible diversity in the Kıvırcık breed. This sheep breed is one of the most important native livestock genetic resources of Turkey. It is a thin-tailed breed, and its meat is preferred widely by the consumer because of superior meat quality characteristics. Unconscious crossbreeding and importation have resulted in a decrease or loss of diversity on Turkish native sheep breeds without characterization. This has also resulted in difficulties in finding purebred individuals. This study focused on the population genetic properties of the g.332G>A mutation in the ovine *LEP* gene. The present results showed that the selected marker exhibited a non-objectionable variation in Kıvırcık sheep to consider it in genetic association studies. However, analyzes with larger sample sizes are needed. To the best of the author's knowledge, this is the first report about the genetic variability of the *LEP* g.332G>A mutation in the Kıvırcık breed. Thus, the results may be useful and informative for further detailed analyzes.

Keywords: sheep, Kıvırcık, LEP, mutation, PCR-RFLP.

EFFECT OF HOUSING SYSTEM ON BROWN CALVES BEHAVIOURAL PATTERNS-CASE STUDY

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ABSTRACT

The aim of the study was to quantify the impact of housing on Brown calves' behavioural patterns. In order to investigate these effects 24 calves were separated from damns within the first hour after birth and were housed either individually (n=12) or in pair (n=6 pairs) in pens. The inactive standing, exploring of new habitat and playing behaviour were recorded on days 10, 20, 40 and 60 after birth. Individually housed calves spent more time ($P \leq 0.011$) standing inactive (6.19±0.22 bouts / day compared to those housed in pair (4.09±0.31 bouts / day). The pair housed calves spent significantly less time ($P \leq 0.027$) to explore the new habitat (4.1±0.78 bouts / day) compared to individually housed ones, which resulted in higher frequency of exploration bouts (6.12±0.91 bouts / day). Also, paired calves spent more time ($P \leq 0.001$) in social contact, playing with the partner (7.12±0.3 bouts / day) compared with individually housed calves (0.11±0.003 bouts / day). These results indicate that housing calves in pairs improve the welfare conditions, social opportunities, and expression of desired behaviours patterns.

Keywords: behavioural patterns, Brown calves, housing, welfare and social benefits.

THE IMPACT OF ELECTRICAL CONDUCTIVITY, DAYS IN MILK AND PARITY ON MILK PERFORMANCE AND CHEMICAL COMPOSITION RELATED TRAITS IN BROWN BREED

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ABSTRACT

The aim of the current research was to quantified milk production and chemical composition under the influence of electrical conductivity, parity and days in milk in Brown cows. Study was performed at Research and Development Station for Bovine Arad, on 80 Brown cows (12 primiparous, 68 multiparous). Significantly higher values ($p \leq 0.019$) of electrical conductivity were recorded for primiparous (11.22±0.017 mS/cm) compared with multiparous (7.63±0.18 mS/cm). During the first 30 days of milk electrical conductivity was higher (10.11±0.27 mS/cm) than for 31 to 60 days in milk interval (8.17±0.19 mS/cm; $p \leq 0.001$) and for 61 to 100 interval (7.14±0.13 mS/cm, $p \leq 0.001$). Multifactorial regression model employed highlights significant influence of month of calving ($p \leq 0.001$) and days in milk ($p \leq 0.022$) on the electrical conductivity, while parity had no influence ($p > 0.44$). Medium and negative correlations were calculated for electrical conductivity and chemical components (fat R=-0.12, protein R=-0.17), while to milk production correlation was positive (R=0.13). No significant correlations were calculated according to lactose content (R=-0.009). Dynamics of milk production and chemical composition have been significantly influenced by month of calving ($p \leq 0.001$), days in milk ($p \leq 0.001$) and cows' parity ($p \leq 0.004$). This study found no significant influence of milk electrical conductivity on milk production or chemical composition ($p > 0.61$).

Keywords: Brown breed, chemical composition, electrical conductivity, mastitis, milk production.

DEMONSTRATION OF THE EFFECTS OF PLANT PHENOLIC CONTENTS ON IMMUNITY VIA INVERTEBRATE MODEL ORGANISM *GALLERIA MELLONELLA*

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ABSTRACT

Although medicinal and aromatic plants are the first disease treatment methods of people, they are still used as an adjunct to the treatment of various diseases today. Today, the active ingredients of some of the medicines are obtained from plants. Although herbal sources are not sufficient for treatment alone, they are considered as supportive elements. These beneficial effects of plants are due to their phenolic content. The leaves of *Olea europea* with oleuropein, *Hypericum perforatum* with hypericin, *Artemisia annua* with quinic acid and *Helichrysum arenarium* with chlorogenic acid can be given as examples of these plants. Various benefits of plant phenolic contents have been demonstrated by in vitro studies. However, in vivo studies are too few to compare with these. In today's pandemic conditions, it has been observed that various plants are consumed with the belief that they strengthen immunity before vaccines are developed. Some academic studies have expressed an opinion in this direction. Evaluation of the effects of plant phenolic components on immunity has become a necessity due to these conditions. Invertebrate model organisms, which can be reproduced quickly, produced in large quantities with low physical facilities, and produce results comparable to data obtained from mammalian subjects, provide great benefits in such studies. *Galleria mellonella* is widely preferred in immune studies due to these features. It is a suitable model for evaluating the effects of human and other animal pathogens and determining the effects of treatment methods developed against these pathogens. In this study, it is aimed to give general information about the methods used to determine the effects of some plant phenolic contents on immunity from *G. mellonella*. In addition, in this study, the extraction methods of plant phenolic contents, the effect of physical conditions on the extracts obtained, the methods of dissolving the extracts in solvents suitable for the model organism and applying to the subjects were also focused. When the studies are examined, it is understood that plant phenolic contents have positive effects at low doses, while it has negative effects on immunity at high doses.

Keywords: Phenolic compounds, aromatic plants, medicinal plants, Galleria mellonella, immune effects.

INSECTS "BLOOD MORPHOLOGY" (ON THE EXAMPLE OF A HONEYBEE) - IS IT POSSIBLE?

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ABSTRACT

Scientists and ecologists are alarming that the increasing changes and environmental pollution have a degrading effect on all living organisms. The influence of negative factors is usually visible in changes in the „biochemical picture", metabolism and often impaired immune system (higher incidence of autoimmune diseases). In order to obtain information on the health status of many mammals (humans, companion animals and farm animals), appropriate biochemical analytical panels containing information on the activity or concentration of key ions, proteins, carbohydrates, lipids or enzyme groups are made. Based on the defined reference values for these indicators, the physiological state of the organism and possible disorders indicating diseases are determined. It turns out that the state of health can be tested in this way not only in humans or other vertebrates, but also in invertebrates exposed to negative factors. This is particularly important in the study of insects, which, being one of the most diverse and numerous groups of organisms, remain in close relationship with many ecological niches, and in the relationship with humans (beekeeping, silk farming ect.). The morphology of the insects' "blood" has been made possible by expanding the knowledge base on their metabolism and biochemical changes. Research focused on utility insects, in particular on honeybees, but also on silkworms and model organisms, such as the fruit fly and the greater mole; allow to identify trends that already help scientists in determining their health, developmental stage, malformations, diseases. These insect studies also help to determine the effects of the test substances on their bodies (in particular regarding the treatment and supplementation of bees). Obtaining results is possible thanks to the development of methods of collecting insect „blood" samples – hemolymph. The hemolymph washes all the tissues inside the insects: it collects and distributes particles throughout the body, making it an ideal material for analyzes. In our research and other scientists work, the most frequently defined parameters in the hemolymph are key to immunity: activity of proteolytic enzymes, phenyloxidase activity, lysozyme and other important molecules informing about the functioning of the metabolism and the level of homeostasis of the body: calcium, magnesium, uric acid, urea, glucose and markers ALT, AST, ASP. Research is also being carried out on the antioxidant system that defends the organism of animals exposed to common reactive molecules that cause chronic inflammation and premature aging. Thanks to the research in which factors classified as negative or positive were tested, it was possible to obtain a profile of relevant trends and trends, which we currently use to classify given factors as positive or negative (depending on the similarity to the data obtained previously). Despite many studies on the metabolism and biochemistry of insects, it is important to remember about the differences between the types and species of these animals. Parameterization, however, makes it possible in the future to react faster and to support the resistance of beneficial insects and to limit the decline in their numbers (and economic losses).

Keywords: immunity, pollinators, honeybee, metabolism, biochemistry of insect.

AGGRESSION AND IMMUNITY OF HONEYBEE (*APIS MELLIFERA*)

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ABSTRACT

Insect breeding has been around since antiquity. During many centuries, invertebrates have been repeatedly subjected to variable environmental factors and selection carried out by nature, and then intensively by human. One of such invertebrates is the honeybee, which today has many breeds and breeding lines with different characteristics. Adapting the characteristics of bees to their needs has led to many behavioral, biochemical, and physiological changes. There have been alarming reports for several years about high declines in the populations of these pollinators around the world. It was suspected that many years of selection could have contributed to the reduction of the insects' defensive abilities, as a result of which the immune system was weakened / impaired. Similar trends are observed in silkworms, which, during many years of breeding, were not able to survive in the natural environment. Currently, silkworms are found only in artificial populations, where the occurrence of diseases is in most cases associated with a lethal effect. In this case, disease can only be prevented using various antibiotics. We have also observed a similar situation in recent years in vertebrates - the bachycephalic dogs' breed. The trend is observed in the honeybee. Medicines/treatments to help keep families relatively healthy are growing in number. Often, unfortunately, the problem does not lie in the disease itself, but is the result of a weakened immune system and susceptibility to the development of parasites/pathogens. Recent studies show that strong selection, including the desired gentleness, may negatively affect the immune response of bees due to the correlation of specific genes and their expression corresponding to these two features (changes in family and individual immunity). Turning off or weakening one trait also weakens the other trait. In addition to genetic testing of bees, the results of behavioral and biochemical studies may also prove such a combination of features. Tests of some breeds and lines showed lower rates of immune activity than in more primitive, wild bees or those with more intense aggressive behavior. We also suspect on the basis of observations that the differences between the resistance correlated with aggression may also occur between the same breeds, lines and even families on the apiary. Genetic and biochemical studies as well as observations of behavior raise the question of the rightness and purpose of selection in given ranges, and to what point the selection of human characteristics improves the organism, and when it causes the disturbance of key functions.

Keywords: pollinators, honeybee, immunity, behavior, social insect, insect.

BOVINE CORONAVIRUS (BCOV): AN OVERVIEW OF ITS MECHANISMS OF ACTION AND ITS RELEVANCE TO LIVESTOCK ANIMALS AND HUMAN IN TERMS OF DISEASE

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ABSTRACT

The existence of coronaviral diseases in animals was known long before the emergence of the human coronavirus (SARS-CoV-2). Coronaviruses (CoVs) are large, positive-stranded, spherical pleomorphic enveloped RNA viruses with protrusions on the surface, belonging to the family Coronaviridae of the order Nidovirales. Bovine coronavirus (BCoV) is endemic to the worldwide cattle population and has long been studied in veterinary medicine for its effects on animal health, welfare, and production. SARS-CoV-2 and BCoV are pneumoenteric beta coronaviruses that cause upper and lower respiratory tract infections. BCoV has been reported to be very similar to human coronavirus (HCoV-OC43) and porcine hemagglutinating encephalomyelitis (PHEV) and includes the same virus strains (Betacoronavirus 1). BCoV causes respiratory and gastrointestinal diseases in young and adult cattle. Both SARS-CoV-2 and BCoV cause diseases in the relationship between the host and the environment. The infecting virus causes disease by binding to the N-acetyl-9-O-acetylneuraminic acid receptor on the host cell. Knowledge of BCoV pathogenesis can contribute to a better understanding of SARS-CoV-2 and be used as a model for further progression. It can draw on the experience of the animal health profession in the development and use of coronavirus vaccines to prevent BCoV infections.

Keywords: Coronavirus, BCoV, livestock animals, bovine, RNA virus.

ENTRERIC METHANE MITIGATION OPTIONS IN RUMINANTS

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ABSTRACT

We have been facing a problem that has been threatening our planet and our future for years, global warming. Besides various factors, livestock activities and especially ruminants cause global warming. Greenhouse gases such as methane, carbon dioxide and nitrous oxide, which are produced as a result of livestock activities, are the main threats to our planet. Ruminants are responsible for 93% of animal-based greenhouse gas emissions in a year. In this amount, enteric methane emission is important as it constitutes 47% of the livestock sector. It is also estimated that the number of ruminants will increase in the future with the increase in the human population. Therefore, methane emissions must be reduced immediately. Scientists working on this subject suggested that many substances such as oil, oil seeds, various algae, plants, methane inhibitors, nitrate, sulfate, saponin, tannins and ionophore reduce gas emission. Among them, algae such as Asparagopsis taxiformis, plants containing various phyto-chemicals, and methane inhibitors have been reported to reduce methane emission up to 95%. Therefore, it is necessary for researchers to conduct more studies on these products. Increasing the usability of products that are economical and not harmful to animal health is important for our planet and our future.

Keywords: ruminant, greenhouse gases, methane, enteric, climate change.

SEASONAL AND ANNUAL VARIATION IN BOTANICAL COMPOSITION, BIOMASS PRODUCED AND IN VITRO DIGESTIBILITY OF A PERMANENT GRASSLAND IN CENTRAL ALGERIA.

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ABSTRACT

Permanent grasslands are the major terrestrial ecosystem. They have various functions, including preservation of animal and plant biodiversity, carbon storage, reduction of erosion risks and a landscape function. For decades, Algeria has had an endemic and persistent fodder deficit (-7 billion fodder units). The use of permanent grasslands can help reduce this deficit by providing free UF. This study was carried out on a permanent grassland plot in the centre of the country over two years of study during winter and spring, in order to identify the advantages of these areas and their quantitative and qualitative potential. Sampling is carried out according to the method of Theau et al (2010) using a 50 cm square frame and walking through the plot in a zigzag pattern. After determining the botanical composition, the fresh and dry yields are determined. The samples are dried and ground to determine the chemical composition and in vitro digestibility according to Tilley and Terry (1963). The results show that leguminous plants dominate in winter and spring in both years with over 53%. The dry yield in spring is higher in the second year (105 Qx/ha). The analysis of variance shows a significant difference in DIV in favour of winter with more than 60% for both years, explained by the botanical composition of the plant cover. In spring, there was a significant difference in chemical composition, especially for cellulose and hemicellulose nitrogen content ($P<0.0001$) in both years. The development of permanent grasslands therefore appears to be an essential element, hence the need to give them a more important place in the Algerian forage calendar.

Keywords: permanent grasslands, Algeria, yield, chemical composition, in vitro digestibility.

RELATIONSHIP BETWEEN REPRODUCTION PERFORMANCES AND COAT CHARACTERISTICS OF MONTBELIARDE COWS DURING HOT SEASON IN ALGERIA

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ABSTRACT

Our study aimed to study the relationship between reproduction performances and coat characteristics of Montbéliarde cows born in Algeria or imported from Europe, during the hot season in Algeria. Hair coat traits (hair coat color, Hair Weight, hair length, number of hairs per unit area, hair total diameters and hair medulla diameters) were estimated in 18 imported cattle and 49 locally born cows. These traits were measured in an area of 20cm below the dorsal line in the center of the thorax. Results showed that significant effect of hair total diameter was observed on interval from calving to conception (IC) for imported MB cows, suggesting less incidence of heat stress on reproduction efficiency of cows with thin diameter hair coat. MB cows with short hair coat significantly registered a greater number of mating per conception (2,28±1,93 Vs 1,67±0,92) and IC (98,04±78,81Vs 74.53 ± 35.60 days) when compared to cows with long hairs. Hair works as a temperature regulator in association with muscles in the skin and may affect reproduction performances during hit stress season. It can be assumed that length and total diameter of hairs for MB breed appear to be related to their reproductive efficiency

Keywords: Hair coat, Reproduction, Montbeliarde cow, Hot season.

TYPOLOGICAL CHARACTERISTICS OF SHEEP FARMS IN RELATION TO A POTENTIAL RISK OF CONTAMINATION WITH NEOSPORA CANINUM IN THE CENTRAL REGION OF ALGERIA

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ABSTRACT

The aim of this work was to produce a typology of sheep farms in five districts of the central region of Algeria and to identify the elements linked to the contamination with Neospora caninum. It concerned 195 farms and was conducted from March 2016 to March 2018. A multiple correspondence analysis individualized three groups of modalities with a variance between groups of 47%. The results showed that the farming system was extensive with semi-tie-stall housing, the number of sheep was small (<50 heads), the dominant breed was the Ouled Djellal (29.74%) and the sheep lived with the goats (36.92%). The dominant pathologies were parasitic, respiratory, and reproductive, and abortions were present at 96%. This survey allowed us to identify breeding practices linked to possible contamination with Neospora caninum, such as cohabitation with goats and the fate of abortions and afterbirths. The presence of dogs was the most important factor (72.30%).

Keywords: Typology, sheep, abortions, neosporosis.

INFLUENCE OF AGE ON SOME HAEMATOLOGICAL PARAMETERS OF LAMBS OULED DJELLEL IN SEMI ARID REGION OF ALGERIA

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ABSTRACT

Many studied showed that blood parameters were affected by many factors such as breed of sheep (genetic variations), the age, and geographical locations with different climates. The aim of the study was to determine the effect of age on some haematological parameters of Ouled *djellel* lambs reared in semi arid zone conditions of Oum El bouaghi province located in North-East of Algeria. The research included twenty-four healthy lambs reared at the experimental station in Ain Mlila (36◦ 03` N. 6◦ 57` E), Oum El Bouaghi, Algeria.The blood samples were obtained at 42, 63, 84 and 105 days of age. Blood was collected once from jugular vein of each animal, into EDTA tubes at 9:00 am before the morning feeding and to avoid suckling, lambs were separated from the sheep the day before sampling for 12 h. Hematological analysis involved erythrocytes, different types of leukocytes, leucocytes platelets count, haemoglobin concentration and haemotocrit by using automated hematology. The parameters leukocyte, erythrocyte, and haemoglobin, did not change significantly with age ($p > 0.05$). However, the platelets concentration and haemotocrit percent were influenced by age ($P < 0.05$). Significant increase in platelets counts were seen on 42 th day compared with 63 th, 84 th and 105 th day of age and on the 84 th day compared with 63 th and 105 th day of age, but the haemotocrit percent decreased only on 105 th day compared with that determined at 42 th, 63 th and 84 th day of age. The trend of values during postnatal development involves large physiologic changes and indicated differences when compared to other breeds of sheep. The effect of age and local conditions on haematological parameters in Ouled *Djellel* lambs can be used as criteria for diagnosis and prognosis of diseases, as well as for assessment of nutritional and the health status of these animals during the postnatal and growth periods.

Keywords: hematological parameters, age, lamb of Ouled Djellel, semi-arid zone, Algeria.

DETERMINATION OF FACTORS INFLUENCING THE UREA LEVEL IN DAIRY COWS MILK

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ABSTRACT

One of the biggest feeding issues in dairy cows is the efficient use of dietary protein. The simplest indicator of the efficiency of nitrogen use in dairy cows would be the urea level in milk. For this, our study will focus on the various factors influencing uremia in milk in dairy cows. The best control of these factors aims to control them to better enhance the value of food protein and reduce the negative impacts of urea. The concentration of urea in milk reflects the concentration of urea in the blood and other body fluids, its increase is caused by the excess protein in the ration, resulting in an excess of nitrogen released into the environment, a waste in budgetary costs of protein intakes and an impact on the health of the cow. A high level of urea in milk can be caused by an excess of protein in relation to the energy available to use it, or by poor ruminal degradation. This requires reducing the protein in the ration. Disruption of volatile fatty acids and effective fiber deficiency can, in turn, reduce the growth of microorganisms. A low urea level in milk can result in a lack of ammonia in the rumen, resulting in too low a level of crude protein. Diet, environment, stage of lactation and disease also affect urea levels. These factors as well as diseases affect the productivity of the herd. These are mainly metabolic diseases and other diseases that lead to decreased productivity such as mastitis caused by excess urea.

Keywords: Urea, milk, dairy cow, variation factors.

ASSESSMENT OF THE EFFECT OF THYMBRA CAPITATA EXTRACT ON GALLERIA MELLONELLA HEMOLYMPH ANTIOXIDANT ENZYMES

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ABSTRACT

Conehead thyme (*Thymbra capitata*) is widely distributed on the coastlines of Mediterranean countries and in the Aegean and Mediterranean region coastlines of our country. In addition, it is known that it has been consumed as an insect repellent and medicinal plant since ancient times. The most important active ingredient of *T. capitata* is carvacrol, and this phenolic compound constitutes 72% of the essential oil of the plant. The antibacterial, antifungal and antioxidant properties of this plant species are known. The great wax moth (*G. mellonella*) is widely used for immune research. This invertebrate model organism is suitable for research with human pathogens. Data from this organism are as reliable as data from mammalian models. This study was carried out to determine the effect of antioxidant properties of *T. capitata*on the antioxidant enzyme activity of the model organism *Galleria mellonella* hemolymph. The areolar parts of *T. capitata* collected from the Çanakkale province were dried under laboratory conditions, then the leaves were extracted and extracted with 70% ethanol in a Soxhlet device. Stock solution was prepared by dissolving the extract in phosphate buffered saline (PBS) at a rate of 20 mg mL-1. 18-2 mg mL-1 dilutions of this stock solution were determined as experimental doses. According to the results of our study, *T. capitata* has no effect on the amount of malondialdehyde. There was no significant difference between control and PBS groups on superoxide dismutase and Catalase at doses below 10 mg mL-1, but it was determined that all 10-20 mg mL-1 doses significantly reduced enzyme activities compared to control and PBS. According to the results of our study, the use of this plant species, whose beneficial properties are known, above a certain dose leads to negative results.

Keywords: Thymbra capitata, Galleria mellonella, hemolymph, Suuperoksit Dismutaz, Catalase, Malondialdhyde.

STUDY OF THE EFFECT OF EXCESS OF NITROGEN INTAKE ON DAIRY CATTLE

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ABSTRACT

The objective of this study is to describe the effects of chronic excess nitrogen on clinical, environmental and economic parameters. Significant correlations have been observed between urea levels in cattle and their metabolism and health status. Microbial activity requires relatively constant physicochemical conditions of the ruminal contents. Disorders of the functioning of the ruminal ecosystem can be acute or chronic and affect both energy, nitrogen and vitamin metabolism. The mechanisms of acute disorders such as acute ruminal acidosis and urea poisoning are well known, as are the associated therapeutic measures. Ruminal, blood and clinical effects of excess urea have been well described for urea intoxication. Chronic nitrogen excess can result from a moderate and persistent imbalance between nitrogen inputs and nitrogen requirements, but also between nitrogen inputs and energy inputs. On animals, soluble nitrogen can potentially and indirectly increase the risk of energy deficit on the one hand. Thus, urea and ammonia have a deleterious effect on hormonal synthesis, decrease in the efficiency of immune functions, breast and uterine infections. Excess soluble nitrogen has also been associated with increased lameness. On the other hand, excess nitrogen acts directly on the environment, air and soil, and on the breeder, more particularly, the economic side and expenses, because of the poor valuation of protein inputs.

Keywords: Urea, Nitrogen, dairy cow, excess, protein inputs.

CURRENT SITUATION OF GOAT FARMING IN ALGERIA

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ABSTRACT

Goat farming is one of the most traditional agricultural activities in Algeria. The goat industry remains an underdeveloped activity, despite this the number of goats continues to increase, still associated with sheep farming, and located mainly in regions of difficult access. The goat herd represents about 14% of the national herd and ranks second after the sheep species. In 2016, it was estimated at 4.9 million heads, of which nearly 60% were goats. In full demographic growth, the demand for goat products has only increased in recent years, which is pushing breeders more interested in this type of breeding. Although most of the goats are local breeds such as the "Makatia", "M'Zabia" and "Kabylie dwarf" goats, there are also European breeds such as the Alpine and the Saanen. The goat makes better use of local natural resources than other ruminants thanks to its particular skills and represents an interesting source of various products useful for humans, especially milk with its multiple nutritional qualities and its composition, it is rich in basic nutrients (proteins, carbohydrates and fats). But in Algeria goat farming is characterized by low milk production because goats are mainly raised for their meat, which is increasingly valued by a large section of society. The conduct of goat farming in Algeria is generally extensive. The herds are small in size and are characterized by low productivity. Food is mainly based on pasture. Some breeders add supplementation. Some freshly introduced dairy breeds are raised in intensive mode.

Keywords: goat, breeds, food, production, farming method, Algeria.

ANALYSIS OF ONE-WAY REPEATED MEASURE ANOVA USING SPSS: APPLICATION TO EGG SHELL THICKNESS OF QUAILS

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ABSTRACT

Experiments that are obtaining data from the same experimental unit at different time points or different circumstances are called repeated measure experiments. There is a relation between data groups due to their origin of same experimental unit; therefore, the assumption of independency is violated, and classic one-way analysis of variance cannot be applied. Instead, its nonparametric alternative Kruskal-Wallis or repeated measure analysis of variance is preferred. In this study, shell thickness data of three different parts (at the equator, pointy and blunt end) from the eggs of White Japanese Quails (*Coturnix japonica*) are analyzed with one-way repeated measure analysis of variance on the commonly used statistical software SPSS and results are interpreted. Analyses revealed that shell thickness at the pointy end and equator in the average are statistically same (0.217 mm and 0.220 mm; $p>0.05$); whereas the average blunt end thickness (0.240 mm) was found statistically different from the others ($p<0.001$)

Key words: Repeated measures, SPSS, Quails, Conturnix, Egg shell thickness.

THE APHID SPECIES (HEMIPTERA: APHIDOIDEA) DETECTED ON POACEAE MEMBERS IN KARAMAN PROVINCE

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ABSTRACT

Aphids are significant agricultural pests due to their unique biological features. They weaken their host plants by feeding on phloem sap, injecting their saliva and transmitting various viruses. Aphids become important pests in a short period of time in ephemeral habitats due to their rapidly adaptive features to new environment. The study conducted in Karaman province between March 2020 and June 2021. During the study *Aphis craccivora, Metopolophium tenerum, Rhopalosiphum padi, Sitobion avenae, Sitobion fragariae, Sitobion lambersi, Sitobion miscanthi and Sitobion yakini* were determined on leaves, spica and stem of varios members of Poaceae family while *Paracletus cimiciformis* was detected on root of Poaceae members. *Stobion yakini* was a new entry for Turkish aphid fauna. This study aimed to provide detailed information about the aphid species determined on Poaceae members that distributed in Karaman provinces. These are preliminary results of the ongoing study and further analyses might have further contribution.

Keywords: Aphid, Poaceae, Karaman, New record, Turkey

Acknowledgement: Authors thank to TUBİTAK (Project number: 119Z250) for supporting this study.

DETERMINATION OF PLANT NUTRIENT CONTENTS OF SOME LOCAL BARLEY (*HORDEUM VULGARE* L.) VARIETIES OF EASTERN AND SOUTHEASTERN ANATOLIA REGIONS

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ABSTRACT

Barley is a very important animal feed plant in terms of protein content as well as plant nutrients and vitamins it contains. In this study, it was aimed to determine macro (N, P, K, Ca and Mg) and micro-nutrients (Fe, Mn, Zn and Cu), and protein contents of local barley varieties of Eastern and Southeastern Anatolia Regions. For this purpose, leaf and grain samples were taken from 25 barley varieties. Total N, P, K, Ca, Mg, Fe, Mn, Zn and Cu were analyzed in the leaves and grain samples, and crude protein contents were determined in the grain samples.
It was determined that the total N, P, K, Ca, Mg, Fe, Mn, Zn and Cu contents of leaf samples of local barley varieties of Eastern and Southeastern Anatolia Regions were 2.24 - 4.38 %, 0.03 - 0.06 %, 0.75 - 1.79 %, 0.96 - 2.43 %, 0.19 - 0.34 %, 50 - 216 ppm, 35.6-84.2 ppm, 7.9 - 14.2 ppm and 3.4-8.3 ppm, respectively. It was found that the protein, total N, P, K, Ca, Mg, Fe, Mn, Zn and Cu contents of the grain samples of the barley varieties were 11.0 - 15.82.72 %, 1.88 - 2.72 %; 521 - 844 ppm, 3447 - 5276 ppm, 720 - 1581 ppm; 1473 - 2290 ppm; 5 - 96 ppm; 11.8 - 26.9 ppm; 11.9 - 76.4 ppm and 2.1-4.1 ppm, respectively.
As a result, it was determined that the leaf and and grain samples of the local barley varieties in Eastern and Southeastern Anatolia Region of Turkey were determined to vary in terms of plant nutrient content, and that it can be used as animal feed because it was rich in protein content.

Keywords: local, barley, genotype, macro, micro, nutrient.

EVALUATION OF SERUM BIOCHEMICAL PARAMETERS IN WISTAR RATS TREATED WITH AUEOUS EXTRACT OF DRIMIA MARITIMA (L) LEAVES.

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ABSTRACT

It is well recognized that the widespread use of synthetic products in agriculture has resulted in serious environmental pollution and health problems for animals and humans. To reduce these problems, recent interest has focused on the use of plant material derivatives as alternatives to control pest species. The objective of this study is to determine the direct effect of aqueous extract of leaves of this plant on some biochemical parameters of male wistar rat. In this work, we chose a Mediterranean plant; it is Drimia maritima, of the family Liliaceae very answered in the Algerian east, which is an original plant characterized by its analgesic power (anti-inflammatory, cardiotonic, antiasthmatic and diuretic). whereas its toxicological properties are still little studied. The study was carried out on male albino Wistar rats aged two to three months and weighing between (200-300g), 21 adult male rats were used and divided into 3 groups. The control group (G1) received distilled water; the other groups were treated by gavage at different doses for 28 days; the blood samples were analyzed in the laboratory. The results obtained show that treatment with aqueous extract of Drimia maritima induces a non-significant difference in lactate dehydrogenase levels and insignificant difference in blood glucose levels in the treated groups compared to the controls. We conclude that the components of this medicinal plant, at specific doses, do not cause a toxic effect on some biochemical parameters.

Keywords: Aqueous extract, Biochemical parameters, Lactate déhydrogenase, Drimia maritima, Wistar rat.

EFFECTS OF THE CAMELLLIA SINENSIS PLANT ON THE NEUROBEHAVIOURAL RESPONSES OF PREGNANT RATS UNDERGOING GESTATIONAL STRESS

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ABSTRACT

Restraint stress during gestation causes cognitive, physiological, and behavioral disturbances that persist over the long term. Oxidative imbalance may be one of the factors that trigger these deficits. The antioxidant supplementation present in Camellia sinensis green tea appears to have a protective effect. Green tea has a great antioxidant potential mainly due to the presence of catechins, many scientific research has shown that tea has a source of antioxidants that strengthen the natural defenses. Green tea could have a neuroprotective effect in many brains damage, such as stroke, Alzheimer's disease, and prevention of degenerative brain changes. Our study aims to assess the direct effects of prenatal exposure to green tea extract on the neurobehavioural aspects of wistar rats who have undergone prenatal stress. The behavioral study was carried out using the Open Field test in order to evaluate the anxious, locomotor and exploratory behavior of the rats of the three batches: control batch (T) did not undergo any treatment (n = 8), batch (L1) underwent restraint stress from the 11th to the 19th day of gestation (n = 8), and batch (L2) was exposed to green tea extract at a dose of 50g / 1000ml of water and followed by restraint stress from the 11th to the 19th day of gestation. The results indicate that prenatal exposure to green tea extract induces a decrease in anxious behavior accompanied by locomotor and exploratory hyperactivity in rats having undergone gestational restraint stress.

Keywords: Caméllia sinensis, green tea, anxiety, ratte wistar.

OXIDATIVE STRESS AND BIOCHEMICAL MODIFICATIONS INDUCED BY COPPER QUINOLATE IN LIVER OF WISTAR RATS.

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ABSTRACT

The use of pesticides for agriculture seems to be an effective method against pests. However, the massive application of these products can pose a great risk to human health. The World Health Organization (WHO) estimates that there are 3 million cases of pesticides poisoning each year and up to 220,000 deaths. Copper quinolate (CuQ) is a kind of organic copper fungicide, which can control most bacterial diseases and some fungal diseases and is widely used in the agricultural industry. The excessive application of this pesticide may result in a variety of adverse effects on non-target organisms, including humans. Thus, our study focused on the evaluation of the toxic effects of the oral administration of three doses of copper quinolate (low; middle and high dose) for 8 weeks on the evolution of body weight and hepatic function in the male Wistar rat for this purpose several biochemical assays were performed. Analysis of the results obtained showed that treatment with CuQ caused harmful effects on the body, resulting in a reduction in body mass in rats treated at high and medium doses. Compared to controls. The absolute and relative organ mass was impacted by the treatment revealing a liver mass, particularly in rats treated with (CuQ) at medium and high doses. The results of the biochemical assays revealed a significant increase in the activity of the hepatic enzymes ASAT, PAL and a decrease in the concentration of ALAT, especially in medium and high dose treated the pro-oxidant effect of copper quinolate induced an increase in tissue level of malondialdehyde (MDA). In addition, a decrease in the activity of glutathione peroxidase (GPx) and glutathione-S-transferase (GST) was recorded at high and medium doses. In summary, all the results clearly showed that exposure to pesticides, in particular copper quinolate, caused disturbances in the body, manifested by an alteration in parameters linked to Hepatic function. And alteration of the system pro-oxidant. From these results, it appears that the doses of copper quinolate tested the high and the medium dose; induce remarkable toxic effects on hepatic function.

Keywords: Copper quinolate, Liver , Biochemical parameters, oxidative stress; wistar rats.

LOW AND HIGH TEMPERATURE APPLICATIONS DURING THE EMBRYONAL PERIOD ON HATCHING RESULTS AND CHICK SEX RATIOS IN LAYER BREEDER'S EGGS

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ABSTRACT

The objective of this study was to evaluate the effects of different setter temperature applications between 3 & 6 and 16 & 18 days of incubation on hatchability (HOF), chick quality, and male-female chick ratio. A total of 1050 ATAK-S breeders hatching eggs were used in the study. The eggs were randomly divided into 5 groups as follow: Control eggs (CE) were incubated at an average temperature 37.6 °C (99.68F) and 55 % RH without any extra heat treatment during the first 18 d of incubation; all the treatment group eggs were incubated at the same setter out of treatment days. Two identical setters have been used during the study. The first setter was assigned for the standard incubation profile whereas the second one was created for the treatment applications adjusting it according to special study plan (day/time). After the heat treatment, the eggs have been returned to the same setter profile (setter 1); Early period low (EPL) temperature treatment group which consisted to incubate the eggs at 36.6°C (97.88 F) and then were intermittently increased to 36.8°C (98.24F) and 37°C (98.60 F) at 3 and 6 days of incubation during two hours and then returned to setter 1 for standard incubation profile; Early period high (EPH) which consisted to incubate the eggs at 38.1°C (100.58 F) and then were intermittent increased to 38.3°C (100.94 F) and 38.5°C (101.30 F) at 3 and 6 days of incubation during two hours and then returned to setter 1 for standard incubation profile; Late period low (LPL) which consisted to incubate the eggs at 36.6°C and then were intermittently increased to 36.8°C and 37°C at 16 and 18 days of incubation during two hours and then returned to setter 1 for standard incubation profile and the last group was the late period high (LPH) which consisted to incubate the eggs at 38.1°C (100.58 F) and then were intermittently increased to 38.3°C (100.94 F) and 38.5°C (101.30 F) at 16 and 18 days of incubation during two hours. The results showed that the embryos incubated at high or low temperatures at different periods during incubation affected significantly HOF and gender rates among treatment groups ($P<0.05$). The HOF was found in groups as 91.40%, 91.63%, 91.58%, 93.35% and 86.78% in CE, EPL, EPH, LPL and LPH respectively. Additionally, the female chick rates were obtained to be 41.06%, 61.51%, 47.87, 55.4% and 52.45% in CE, EPL, EPH, LPH and LPL respectively. The EPL group had the highest chick female/male rates (61.51% vs 38.49%) among the treatment groups. There was no significant difference for supply organ weights and Tona chick quality scores among treatment groups ($P>0.05$). The present study shows that during early period of incubation at 3 and 6 days of incubation exposed with low temperature might be an effective method to increase female chick rates at hatch. It can be important step for delaying or extending incubation period of male embryos and killing them before hatch. **Acknowledgement**: This project has been supported by Selcuk University BAP Office (Project No: 21201024).

Keywords: Gender, hatchability, chick quality, air temperature

CONTRIBUTION TO THE STUDY OF ECHINOBOTHRIIDAE INTESTINAL PARASITES OF SOME RAJIDAE FROM THE WESTERN MEDITERRANEAN

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ABSTRACT

A study of the biodiversity of intestinal mesoparasites of 5 species of Rajidae from the Algerian basin: *Raja miraletus* Linnaeus, 1758; *Raja undulata* Lacepède, 1802; *Raja asterias* Delaroche, 1809; *Raja radula* Delaroche, 1809 and *Raja brachyura* Lafont, 1873,has led us to identify 4 species belonging to the family of Echinobothriidae Perrier, 1897; it is: *Echinobothrium affine* Diesing, 1863; *Echinobothrium brachysoma* Pintner, 1889 and *Echinobothrium harfordi* Mc vicard, 1976, found in *Raja miraletus, Raja undulata, Raja asterias, Raja radula and* Raja brachyura and *Echinobothrium typus* Van Beneden, 1849 collected from *Raja miraletus* and *Raja asterias*. The ecological research conducted on this Echinobothriofauna in the Algerian basin reveals that the highest prevalence is that of *affine Echinobothrium*, recorded in *R. asterias* and *R. radula* respectively. The weakest is that of *Echinobothrium typus* in *R. asterias* and *R. miraletus.* This study has allowed to inventory for the first time the *Echinobothrium* parasites of Rajidae from Algeria and made it possible to assess the rate of infestation of these parasites in Elasmobranch's endemic in the Mediterranean basin.

Keywords: Cestoda, Echinobothriidae, Echinobothrium, prevalance, Mediterranean Sea, Algeria.

EFFECTS OF HEAT STRESS ON THE BEHAVIOR AND WELFARE OF CHICKENS

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ABSTRACT

The main aim of this study was to investigate the effects of heat stress on the daily behavior of chickens. 240 one-day-old chicks were randomly dispersed into severe heat stress (SHS) or persistent heat stress (PHS) groups. Each group was further divided into control (C), and three experimental subgroups (SHS at 1, 2, or 3 weeks of age). The results showed the duration, and frequency of drinking and lying-down behaviors of the SHS birds increased, whereas the duration of feeding and standing significantly decreased ($p<0.01$), and drinking was significantly longer ($p=0.05$). For the PHS group, the duration of lying down was longer compared with the control group. However, this behavior was significantly shorter than the control group when birds were three weeks old ($p<0.05$). These results indicate that heat stress significantly affects the daily behavior of broilers, including feeding, drinking, lying, standing, and walking.

Keywords: Heat Stress, chickens, daily behavior, welfare.

THE INFLUENCE OF THE COMPOUND FEED SUPLEMENTATION WITH FISHMEAL ON RAISING PERFORMANCES DURING THE AGE 1 - 42 DAYS OF BROWN JUMBO QUAILS

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ABSTRACT

In order to establish the effect of suplementation the compound feed with fishmeal on the raising performance of youth breeding brown Jumbo quail (especially on consumption of the compound feeds) in the period 1 - 42 days of age an experiment was established a total number of 300 quail chicks divided into two groups (150 chicks/group). At the age of 42 days the average weight of the chickens in the experimental group was 245.55 g/head while in the chickens of the control group it was 225.75 g/head. The average daily gain during the period 0-6 weeks of growth was 236.00 g/head in the experimental group and 215.90 g/head in the control group. The total consumption of compound feeds was 1150.50 g/head in the chickens of the experimental group compared to 1351.45 g/head in the control group. The specific consumption of the compound feed was lower by 32.17 % of 3.959 g/g gain in the experimental group, while in the control group it was of 5.837 g/g gain. Research has shown that the growth performances of the group that received compound feed with fishmeal suplement was superior to that of the control group.

Keywords: quail, meat, growth, compound feed, fishmeal.

MILK YIELD COMPOSITION AND MODELING OF LACTATION CURVES OF ARABIAN DONKEYS

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ABSTRACT

The present work was undertaken to evaluate milk yield composition and modeling of the lactation curve of Arabian donkeys. Three experiments were carried out in 4 Tunisian regions characterized by a large asin herd .In a total of 164 milk samples collected during three seasons. The chemical composition of donkey milk was carried out for dry matter, fat, crude protein and lactose. The chemical proprieties of milk were analyzed using ANOVA linear models to determine the influence of the lactation stage and the season on the milk yield. For four mathematical models of lactation, several criteria were established to choose the most reliable and representative lactation curve model. The results showed that the donkey milk composition was: dry matter 9.49%, fat 1.19%, lactose 5.89% and protein 1.48%, Besides, the results revealed that the season significantly affected the dry matter, the milk fat and protein contents. The wood model appears to be the most appropriate among the tested models and can be used to estimate the dairy potential of donkeys. Further research on milk production, milk functionality, and valorization, market development, and genetic selection will help to better preserve and use of donkeys.

Keywords: Milk, Composition, quality, lactation curve, donkeys.

TUNISIAN CAMELS MILK CHARACTERISTICS

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ABSTRACT

The present work was undertaken to study the physicochemical characteristics of dairy Tunisian camel's milk. Chemical composition of camel's milk was carried out for dry matter, fat, crude protein, pH, lactose and ash using an automated milk analyzer. The results showed that dairy tunisian camels milk composition was dry matter 10.86%, fat 3.6%, lactose 4.33% and protein 3.01%. respectively Further research on milk production, milk functionality, and valorization, market development, and genetic selection will help to better preserve and use of camels.

Keywords: Camel , milk , composition , Tunisian.

THE ANTIOXIDANT STATUS OF ERIPHIA VERRUCOSA FORSKAL (1775) IN THE ÇANAKKALE STRAIT

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ABSTRACT

The antioxidant enzymes are important in observing the species' physiological characteristics, defense system, and its responses to pollutants or other stressors. In this study, the current antioxidant status of warty crab (*Eriphia verrucosa*) samples distributed in the Çanakkale region as well as in Turkey was evaluated as a preliminary study. 24 samples were collected from the vicinity of Kilitbahir ferry port with the help of divers in July 2020. The samples were transported to the laboratory in the cold chain. Morphological measurements (carapace length and width) samples were taken, and their weights were determined. Afterwards, antioxidant system enzymes superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx) levels in hepatopancreas tissues were established. Whether the enzyme levels differed depending on gender was determined by one-way ANOVA test. Only the difference in SOD activity between male and female individuals was found to be statistically significant ($p<0.05$). By determining the enzyme levels, the relations of these levels with morphological measurements were revealed by correlation test. In particular, the correlation of SOD enzyme levels with morphological parameters was found to be strong and significant. Thus, this research is a preliminary study in terms of taking place in biomonitoring studies of crab species that feed on benthos and therefore we can easily observe their bioaccumulation and pollutant effects. We believe that the obtained results will pave the way for more comprehensive research on monitoring spatial and temporal pollution in the region.

Acknowledgements: This study was supported by Çanakkale Onsekiz Mart University, FHD-2021-3541 coded project.

Keywords: Eriphia verrucosa, antioxidant, Çanakkale Strait.

EVALUATING INFLUENCE OF ISOFLAVONES IN DIET OF LAYING HENS

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ABSTRACT

This review is focused on isoflavones, which are ranked among the most estrogenic compounds. The main dietary sources of isoflavones for laying hens are soybean and soybean products, which contain mainly daidzein and genistein. When they are consumed, they exert estrogenic and/or antiestrogenic effects. Isoflavones are considered chemoprotective and can be used as an alternative therapy for a wide range of hormonal disorders, including several cancer types, namely breast cancer and prostate cancer, cardiovascular diseases, osteoporosis, or menopausal symptoms. On the other hand, isoflavones may also be considered endocrine disruptors with possible negative influences on the state of health in a certain part of the population or on the environment. This review deals with isoflavone influence on metabolism, biological, and health effects on poultrys, and with their utilization and potential risks.

Keywords: isoflavone, metabolism, poultry.

FAECAL COMPOSITION OF LATVIAN DARK-HEAD LAMBS DEPENDING ON CONCENTRATE FEEDING METHOD

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ABSTRACT

The research was carried out on ram testing station of the association "Latvian Sheep Breeders Association" located in Latvia (57.849789, 25.327707). Research was aimed to study the changes in the composition of lamb manure and the efficiency of nutrient digestion, depending on the concentrate feeding method. During the research twenty-four purebred Latvian Dark-Head lambs (rams) were fattened using concentrate. Lambs were divided into three groups (ADL – *ad libitum* access to concentrate, 5TD – access to concentrate five times per day, 3TD - access to concentrate three times per day). Research was made in to two repetitions started in May and June 2020, respectively. All lambs used into research were born as twins or triplets. Average age of lambs at the beginning of the research were 90 days, average live weight – 25.24 kg. At the end of fattening average age of lambs were 151 days with an average live weight - 45.33 kg. Lambs were fed with concentrate and pea straw during the fattening. Dry matter content in the concentrate was 89.4%, crude protein 19.5%, crude fiber 15.4%, ash 7.3% and 12.7 MJ ME. Digestibility of dry matter (TDN/DDM) in the concentrate were 74.6%. During the research lambs were provided with freshwater *ad libitum*. The lambs were fattened for 63 days, divided into 3 fattening stages of 21 days each. During the last four days of each stage lambs were removed to cages with grid floor and data of forage intake, fecal and urine amount were collected. During first stage of fattening the daily concentrate intake per lamb in all groups was the same – 1.4 kg. In the third stage of fattening daily concentrate intake per lamb in ADL, 5TD and 3TD were 1.6 kg, 1.9 kg and 1.9 kg respectively. The highest average dry matter content in lamb manure was recorded in the first fattening stage for all groups of lambs and in ADL, 5TD and 3TD it was 39.3%, 37.2% un 41.4% respectively. During the second and third fattening stage dry matter content in lamb manure deceases gradually in 5TD and 3TD, but the lowest dry matter content in ADL lamb manure was during the second fattening stage (33.1%). The average ash content in dry matter of lamb manure was the highest in third fattening stage and for ADL, 5TD and 3TD it was 13.4%, 13.8% un 14.4% respectively. The highest fat content in dry matter of lamb manure was in first fattening stage for ADL and 5TD (2.1% and 2.5% respectively) and in third fattening stage for 3TD (3.4%). Nitrogen content (% in the natural sample) in lamb manure for 3TD was the highest in first fattening stage (1.1%) and for the ADL and 5TD it was the highest in third fattening stage (1.1% and 1.0% respectively).

Keywords: lamb manure content, concentrate intake, dry matter, digestibility.

GENETIC EVALUATION OF DAILY WEIGHT GAINS AND KLEIBER RATIO OF NOMADIC FAT TAILED LORI-BAKHTIARI LAMB BY BAYESIAN INFERENCE

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ABSTRACT

Kleiber ratio (KR) has been proposed as an efficient selection criterion for feed efficiency under low-input range conditions. Lori-Bakhtiari sheep is the main nomadic breed in south-west of Iran near Fertile Crescent, a major livestock domestication center. The aim of present study was to investigate the opportunity of using KR as a genetic selection criterion for this breed due to weak pasture in the aria. The first step was to estimate (Co)variance components and genetic parameters for average of daily gain and KR of the lambs. The (Co)variance components were estimated using Gibbs sampling in Bayesian method, fitting an animal model on 23 years records. Environmental factors such as birth year, sex of lamb, type of birth, and Mother's age at birth had significant effect on traits ($P<0.01$). The interactions between age of mother and sex of lamb, type of birth and sex of lamb, and age of mother and type of birth were significant for some traits ($P<0.01$). Direct heritability estimates for average daily gain from birth to yearling weight (Multi sections), were varied from 0.06±0.02 to 0.105±0.03 and for KR was 0.12±0.02. The maternal heritability of KR was 0.04±0.02. The overall results of heritability estimates indicated low possibility of direct response for the growth traits in Lori-Bakhtiari lamb, however they may be used as selection criteria, due to their economic significance in Iranian meat production industry. KR, for its important role in feed efficiency, can be proposed for electing animal as parent of next generation.

Keywords: Heritability; Average daily gain; Kleiber Ratio; Lori-Bakhtiari sheep; Bayesian inference.

TRANSFER LEARNING BASED DEEP NETWORKS FOR THE COVID-19 DIAGNOSIS

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ABSTRACT

This paper presents a transfer learning-based approach for the detection of COVID-19 and distinguishing it from normal and pneumonia cases in X-rays radiographs. The study involves the implementation of 3 different deep networks that use SVM classifier to classify x-ray images into COVID-19, Normal, and Viral Pneumonia. Experimentally, the deep networks were all trained and tested on x-rays dataset and the results showed that a VGG16 with SVM classifier can outperform other employed models in detection the COVID-19

Keywords: COVID-19, pneumonia, deep networks, VGG16, SVM.

BIOCHEMICAL ALTERATION IN GYNECOLOGIC CANCER

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ABSTRACT

The basic aspect of cancer treatment is prevention through early identification and diagnosis. Patient identification is done with laboratory tests specific to the type of cancer. The diagnosis is made based on the respective tumor markers. The aim of the study is to monitor the alteration of tumour markers after chemotherapy. This is a prospective study performed during the period 2014-2016 with 107 patients diagnosed with Ca mamal, uterus and ovaries in the hospital of Vlora district who also were treated with chemotherapy. The study included 107 patients with Ca, with a mean age of 57.1 (± 8.13) years and ranging from 38 to 70 years of age. By comparing the median values of hematobiokemic and tumor parameters after the 1st and 2nd cycle of chemotherapy, the statistically significant difference was found only for SGOT which showed decrease after the second cycle. Concerning the types of Ca, significant decrease of CA 15.3 was observed in all three types of Ca following the second cycle of chemotherapy. Significant decrease of CA 125 was observed in all three types of Ca following the second cycle of chemotherapy ($p < 0.01$). The values of the three tumor markers are higher in metastatic patients, with statistically significant change in metastasis-free patients ($p < 0.01$). The values of hematobiokimic parameters and tumor markers are important in identifying the course of therapy as well as predicting malignant conditions.

Keywords: cancer, hematobiochemical parameters, tumor markers.

CLINICAL UTILITY OF TUMOR MARKERS IN MANAGEMENT OF CANCER

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ABSTRACT

The basic aspect of cancer treatment is prevention through early identification and diagnosis. Patient identification is done with laboratory tests specific to the type of cancer. The diagnosis is made based on the respective tumor markers. The aim of the study is to monitor the alteration of tumour markers after chemotherapy. This is a prospective study performed during the period 2014-2016 with 107 patients diagnosed with Ca mamal, uterus and ovaries in the hospital of Vlora district who also were treated with chemotherapy. The study included 107 patients with Ca, with a mean age of 57.1 (± 8.13) years and ranging from 38 to 70 years of age. By comparing the median values of hematobiokemic and tumor parameters after the 1st and 2nd cycle of chemotherapy, the statistically significant difference was found only for SGOT which showed decrease after the second cycle. Concerning the types of Ca, significant decrease of CA 15.3 was observed in all three types of Ca following the second cycle of chemotherapy. Significant decrease of CA 125 was observed in all three types of Ca following the second cycle of chemotherapy ($p < 0.01$). The values of the three tumor markers are higher in metastatic patients, with statistically significant change in metastasis-free patients ($p < 0.01$). The values of hematobiochemical parameters and tumor markers are important in identifying the course of therapy as well as predicting malignant conditions.

Keywords: cancer, hematobiochemical parameters, tumor markers.

OPEN-SOURCE ROBOTIC MICROFLUIDIC BLOOD ANALYSIS USING RASPBERRY PI

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ABSTRACT

We describe a low cost (under £300), open-source, highly efficient and customizable robotic microfluidic device for use in microfluidic blood analysis. The system is framed by aluminium extrusions and consists of 3D parts, and a camera, a lightbox and a servo motor controlled by the Raspberry Pi. The dimensions of this rig are 350 x 415 x 288 mm, and this allows viewing of 12 "lab on sticks" devices. Dipping and lifting back of microfluidic devices in blood samples is controlled by Python scripts from a Raspberry Pi single-board computer. In addition, the mini computer allows taking time-lapse images of microfluidic devices with the Raspberry Pi camera. A significant advantage of the Imaging Rig is that it can be monitored and controlled via a computer, touchscreen, or phone, giving the researcher flexibility to view and record the experiment simultaneously (in images or video format). Capturing high quality and standard images allows analysis with the ImageJ software, which is routinely used in life science laboratories. This simple robotic system allows for a combination of mechanical, optical and result-data analysis. In this present study, there were four main objectives: a) optimizing and testing the system, b) obtaining kinetic data, c) testing different coloured biological fluids, and d) adding agonists before or during testing. The whole blood (WB) and platelet-rich plasma (PRP) experiment showed that different coloured biological fluids can be easily tested with the imaging rig system. As we expected, PRP rose faster in capillaries than WB since it does not contain red and white blood cells. This proves that the system is working properly. Platelet activation in well and micro-capillary film (MCF) strips experiment demonstrated that the capillary rise of biological samples responding to a stimulus that can be added in a well or loaded with MCF can be tested by using this system. In addition, different stimuli such as ADP and thrombin have been tested with the system, and the samples appear to respond differently to different stimuli in the capillaries. Thus, the stimulus added to blood that affects the capillary rise can be measured. Briefly, this system is a low-cost imaging rig that allows the recording of colorimetric-based biological experiments. Moreover, the simplicity of the design makes the system suitable for adapting to different experimental needs and its open-source-based allows it to be easily accessed by other researchers.

Keywords: Microfluidics, Raspberry Pi, blood analysis.

IS IT POSSIBLE TO LEARN NEW SKILLS UNDER TWO UNKNOWN DYNAMICS?

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ABSTRACT

Since birth, humans have been learning new skill sets to perform daily life activities. How do babies learn new skills through the interaction with their mother? Skill learning is the result of the interaction between the learner (e.g. baby) and the learning environment (e.g. mother or unknown environmental dynamics). Humans have a natural ability to interact with their environment by using auditory, visual, or haptic feedback. It is known that for skill learning it is important to adapt to changing conditions in the learning environment. However, there is still uncertainty, whether a human can distinguish that an action is based on own action or partner's action while performing a cooperative task through haptic interaction under unknown environmental dynamics. We hypothesized that paired subjects would separate their partner's dynamics from environmental dynamics in a cooperative task, which would facilitate skill learning through the interaction with someone under unknown environment. Thus, we examined skill learning through the adaptation to the partner's dynamics when the external force field on or off by employing a cooperative haptic motor task. In this study, we adopted a haptic-motor task: a joint cursor was connected to two cursors controlled by the paired subjects with virtual springs and subject to external force field. Experimental results suggest that if humans familiarize with their partner's dynamics first, they can learn environmental dynamics together. On the contrary, if humans expose to two unknown dynamics simultaneously, there is no learning.

Keywords: Human-Human Interaction, Skill Learning.

STUDY THE ANTILITHIATIC ACTIVITY OF AQUEOUS EXTRACT FROM PARONYCHIA CAPITATA L. PLANT IN VIVO

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ABSTRACT

Paronychia is a genus that represented by five species in the flora of Algeria. Like *Paronychia capitata L.* known under the name of (*Atai el Djebel*). It is used as cholagogue, dermatologic, anti-infective, lithotritic, diuretic, digestive and antihypertensive. The objective is studying the antilitholytic activity of the aqueous extract of the plant *Paronychia capitata L. in vivo.* Young male adult Wistar albino rats (150-200 g) were used in these experiments. The antilitholytic activity (preventive action), Nephrolithiasis was induced in male Wistar rats by adding ethylene glycol (0.75%) in drinking water for 28 days. Animals divided in six groups each containing six animals. Vehicle control, model control and *P. capitata* aqueous extract in dose of 500 mg/kg of b. w the rat. The animals were sacrificed under 10% chloral anesthesia at a dose of 3 mg / kg b w of the rat 24 hours after the last dose. After which different dosages were carried out: urinary volume of 24 hours, urinary pH and cristalluria. Antilithiasis activity the aqueous extract of *P. capitata L.* shows a significant decrease in number of urinary crystals was observed after treatment in the animals receiving the aqueous extract compared to the control groups. This extract showed an increase in urinary volume of 24 h compared to the control. Crystalluria was characterized by excretion of large calcium oxalate crystals in lithogenic group but smaller in drug treated group. The histology showed depositions of large number of calcium oxalate crystals in kidney in calculi induced group while in the treated group small and fewer deposits. The result indicates antiurolithiatic activity of *P. capitata* mediated possibly by calcium oxalate crystal inhibition and maintaining balance between stone promoters and inhibitors constituents and this study rationalized its medicinal use in urolithiasis. In perspective, further studies are needed to identify the anti-lithiasis component of this plant.

Keywords: Aqueous extracts, Paronychia capitata L. Nephrolithiasis, antilithiatic activity, Crystalluria.

COMPARATIVE STUDY OF CHEMICAL COMPOSITION, ANTI-INFLAMMATORY, ANTIDIABETIC, CYTOTOXIC, ANTIOXIDANT AND ANTIMIBROBIAL ACTIVITIES OF CITRUS AURANTIUM ESSENTIAL OILS EXTRACTED BY CONVENTIONAL HYDRODISTILLATION AND MICROWAVE-ASSISTED HYDRODISTILLATION

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ABSTRACT

Citrus peel essential oils have an impressive range of food and medicinal uses. In addition, *they* are valuable in the perfume, and beverage industries. We are interested in the study of the *Citrus aurantium* plant in Algeria, known for its richness in phytochemical compounds used by the local population in various therapies. The present study is devoted to evaluating *in vitro* the antidiabetic, anti-inflammatory, antibacterial, cytotoxic, antioxidant and antibacterial properties of essential oils extracted by two methods that are Conventional hydrodistillation (HD) and microwave-assisted hydrodistillation (MAHD) from the peels of this plant. The obtained oils were analyzed by GC and GC-MS. thirty-nine components were identified in the HD oil and *forty*-seven components in the MAHD oil. Despite the common main family and the two major constituents, limonene (80.09 and 72.39 %) followed by linalol (2.17 and 2.96 %) respectively for HD and MAHD . The extraction provided yields of 1.66% (HD) and 1.33% (MAHD). Anti-denaturation of bovine serum albumin method was used to evaluate the anti-inflammatory property and antidiabetic activity was evaluated by Glucose uptake by yeast cells of the essential oils of *C.aurantium.* The percentage of BSA protection against heat increased with increasing concentration. The obtained results indicated that essential oil extracted by MO showed the highest anti-inflammatory activity (94.32%), followed by essential oil extracted by MAHD (56.44%), at the concentration of 200 µg/mL. Also results of evaluation of antidiabetic activity indicated that the essential oil extracted by MO of *C.aurantum* peels (79.59 %) had greater efficiency in increasing the glucose uptake by yeast cells as compared to essential oil extracted by MAHD (39.45 %) in 5 mM Glucose concentration. All the different concentrations of essential oils of *Citrus aurantium* peels showed mortality of brine shrimp by *Artemia salina* lethality assay. The antioxidant potential of the essential oils was evaluated using two complementary techniques: the DPPH (*2,2-diphenyl-1-picrylhydrazyl*) free radical scavenging test and the β-carotene/linoleic acid test. The study focused on the antioxidant activity using DPPH, confirms that the essential oil extracted by HD presents a high antioxidant activity with an IC50 of 114.47±0.182 mg/mL against an IC50 value of 166.29±0. 652 obtained for the essential oil extracted by MAHD while BHT and Ascorbic Acid, have shown a very effective antiradical activity with IC50 of the order of (19.54±0.320 and 1.17±0.005 µg/mL respectively. According to the test of β-carotene/linoleic acid, the oxidation of β-carotene was effectively inhibited by the two essential oils of *Citrus aurantium* peel, the rate of inhibition of Eos extracted by HD and MAHD was 41.05%, 30.1% when compared with BHT and ascorbic acid. The evaluation of the antibacterial activity by the disc diffusion method in order to know the efficacy of these essential oils on certain bacterial strains such as *Listeria monocytogenes, Escherichia coli, Agrobaterium, Pseudomonas aeruginosa, Staphylococcus aureus* and *Bacillus subtilis*. Showed that both types of essential oils from *Citrus aurantium* bark inhibited the growth of the strains tested with an inhibition zone diameter between 10 and 75 mm except for the *Bacillus subtilis* strain, where no inhibition zone was found.

Keywords: Citrus aurantium, essential oils, anti-inflammatory activity, antidiabetic activity, cytotoxic activity, antioxidant activity, antibacterial activity.

EVALUATION OF CHEMICAL COMPOSITION, ANTIDIABETIC, ANTI-INFLAMMATORY, ANTIOXIDANT, ANTIMIBROBIAL AND CYTOTOXIC ACTIVITIES, OF ESSENTIAL OIL FROM FORTUNELLA MARGARITA FRUIT PEELS

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ABSTRACT

The Citrus genus belongs to the plant family Rutaceae. Fruits from *Fortunella margarita* species are called "kumquat". The aim of this study was to determine the main constituents of the essential oil extracted from *Fortunella margarita* peels by hydro-distillation, and to test *in vitro* the antioxidant, antidiabetic, anti-inflammatory, antibacterial cytotoxic activities. GC MS studies of essential oil revealed the presence of 39 compounds in essential oil of the fresh peels of *Fortunella margarita* was prepared by hydrodistillation method. The various compounds detected were limonene, Germacrene D, β-Myrcene, α-Pinene , Geraniolacetate and Elixene. The antioxidant potential of the essential oils was evaluated using three complementary techniques: the DPPH (*2,2-diphenyl-1-picrylhydrazyl*) free radical scavenging test, the reducing power and the β-carotene/linoleic acid tests, where the essential oils of *F.margarita* peels had much lower antioxidant activity in the DPPH assay and exhibited a substantial reducing power (EC50 = 3.73± 66.42 mg/mL). According to the test of β-carotene/linoleic acid, the oxidation of β-carotene was effectively inhibited by the essential oil of *F.margarita* peel (24.93%). Anti-denaturation of bovine serum albumin method was used to evaluate the anti-inflammatory property of the essential oil of *F. margarita.* The percentage of BSA protection against heat increased with increasing concentration, at the concentration of 400 µg/mL, showed a significant anti-inflammatory activity (34.82%). Also results of evaluation of antidiabetic activity by Glucose uptake by yeast cells indicated that *F. margarita* (38%) had greater efficiency in increasing the glucose uptake by yeast cells as compared to standard drug metronidazole (32%) in 5 mM Glucose concentration. The antimicrobial activities of *essential oil* from *F. margarita* peel was evaluated by using disk diffusion method. The results showed antibacterial activity against *Bacillus subtilis, E. coli* and *Staphylococcus aureus*. It was found to be active against all of the tested bacterial strains in the range of inhibition zones of 26.6-36 mm. All the different concentrations of essential oil of *Fortunella margarita* peels showed mortality of brine shrimp by Artemia *salina* lethality assay**.** These findings suggest that the *F. margarita* test may expedite toxicity experiments and decrease costs, and therefore, may be considered an alternative to the *in vitro* cell culture assay.

Keywords: *F. margarita*, essential oil, antioxidant activity, antibacterial activity, anti-inflammatory activity, antidiabetic activity, cytotoxic activity.

BIOCHEMICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF LEAF AND ROOT EXTRACTS FROM DATE PALM CULTIVARS (PHOENIX DACTYLIFERA L.) ENDEMIC TO THE LAGHOUAT REGION

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ABSTRACT

The date palm is the main phytogenetic resource of the Algerian Sahara. Considered as a tree of providence, its various parts have been used for centuries for various purposes, including traditional medicine. While the fruits have been the subject of many studies, the leaves and roots remain unexploited. In this study, we performed a biochemical characterization of leaves (l) and roots (r) of two cultivars from the Laghouat region: Taddala (TAD) and Tizzaouet (TIZ). A reflux apparatus performed the extraction of the total phenolic content. We used the colorimetric method of Singelton and Rossi for the determination of the total phenol content (TPC) and aluminum trichloride for the determination of the total flavonoid content (TFC). In addition, we tested the antioxidant activity of the extracts with the DPPH (2,2-diphenyl-1-picrylhydrazyl) test. The results showed very high levels of TPC in date palm leaves and roots with a predominance in leaves. It reached up to 619.99 (GAE)/100 g dry weight in DAT leaves. CFTs were also quite high, ranging from 11.24 to 70.41 (EQ) / 100 g dry weight and were significantly correlated with CPTs. The extracts showed significant antiradical efficacy compared to vitamin C. The results suggest that all parts of this plant are a good source of natural antioxidants and can be used as functional food ingredients.

Keywords: Phoenix dactylifera, date palm leaves and roots, total phenolic content, total flavonoid content, antioxidant activity, DPPH.

THE EFFECTS OF ADVANCED GLYCATION END PRODUCTS (AGES) DURING WOUND HEALING PROCESS

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ABSTRACT

The wound healing is a sensitive process that can be affected by various local and systemic factors. These factors can lead to healing impairment and the formation of non-healing wounds. One of these factors are advanced glycation end products (AGEs). AGEs are proteins or lipids that irreversible products derived from nonenzymatic glycation. The sources of AGEs can be either endogenous (via the Maillard reaction) or exogenous (dietary, such as foods, beverages, and cigarette smoke). The endogenous formation can be increased by diabetes, smoking and reactive oxygen species (ROS). AGEs can affect the function of organs in multiple ways. High AGE levels have been associated with impaired wound healing. Recent works have shown that AGEs not only alter the dermal structure (structural and functional protein changes and cellular dysfunction), but also cause oxidative stress and inflammation. This review summarizes AGE formation, the different ways in which AGEs affect wound healing process, abnormal apoptosis, and anti-AGE strategies.

Keywords: diabetes mellitus, advanced glycation end products, skin, wound healing.

α-AMYLASE / α-GLUCOSIDASE ENZYMES AND THEIR METABOLIC IMPORTANCE

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ABSTRACT

α-Glucosidases (E.C.3.2.1.20) play a key role during carbohydrate metabolism in animals, plants, and microorganisms. It is very common in microorganism cells and has been characterized by purifying intracellular, extracellular, or cell-bound forms from various yeasts, bacteria, and molds. α-Amylase (E.C.3.2.1.1) specifically cleaves the α-1,4-glycosidic bonds in short-chain maltooligosaccharides, which occurs with the catalysis of other glycosyl hydrolase enzymes acting on the starch molecule and forms α-D-glucose monomers. Therefore, α-glucosidase enzymes mostly have transglucosylation activity and their reactions are reversible. Diabetes mellitus (DM) is a chronic hyperglycemic group of metabolic diseases that cause disturbances in carbohydrate, protein and fat metabolism as a result of absolute or relative insufficiency of insulin hormone secretion and/or insulin action. α-Amylase and α-Glucosidase enzymes are among the enzymes involved in carbohydrate metabolism. Inhibition of these enzymes, which can hydrolyze polysaccharides into monosaccharide units, is most important for the treatment of DM. Controlling these 2 specific enzyme activities by inhibitors and controlling the blood sugar level is metabolically important.

Keywords: α-Amylase, α-Glucosidase, Enzyme, Diabetes mellitus, Inhibitors.

SYNTHESIS AND CHARACTERIZATION OF NEW SOMATOSTATINE ANALOGUES CONTAINING UNNATURAL AMINO ACID CITRULLINE

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ABSTRACT

Different types of cancer are one of the main reasons for mortality worldwide, with more than 10 million new cases worldwide each year. After cardiovascular diseases, malignancies are the second most important illness with about 3 million new cases and 1.7 million deaths annually in Europe. Somatostatine (SST) is a cyclic tetradecapeptide with different functions in the human organism. It can influence tumor cell proliferation due to inhibition of growth hormone. Unfortunately, SST did not found application in medicinal practice because of very short lifetime in the human-plasma. Octreotide and vapreotide are synthetic SST analogues. They are used for treatment of different tumors and flushing episodes associated with carcinoid syndrome as well as diarrhea in patients with vasoactive intestinal peptide-secreting tumors. Even they are more stable than somatostatine their clinical efficacy is limited due to poor bioavailability and unsatisfactory half-life in human plasma. This is a result of their fast hydrolysis and metabolism under the action of proteinase in human blood circulation. Many studies have been performed on SST analogues in order to obtain more stable and effective compounds and to establish useful structure-activity relationships. It has been revealing that the replacement of the C-terminal carboxyl group with an amide group often leads to molecules with higher biological activity. Herein, we report synthesis and characterization of new C-terminal amide analogues of cyclic SST analogues of octreotide and vapreotide by replacement of natural amino acid Lys with unnatural one citrulline in order to study influence of this substitution on the pharmacokinetic profile of the newly synthesized molecules. The aimed peptides were synthesized using SPPS, Fmoc/t-OBu strategy. The intramolecular cyclic disulfide bridge was formed directly on solid phase carrier using specific thallium (III) trifluoroacetate reagent.

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Keywords: peptides synthesis activity.

DETERMINATION OF ANTIOXIDANT POTENTIAL OF SOME MEDICINAL PLANTS FROM CENTER REGIONS OF ALGERIA

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ABSTRACT

Herbal plants are widely used in traditional medicine all over the world and they are becoming the natural alternatives to synthetic drugs, in this study, a comparative study was carried out to evaluate the influence of harvest region on the antioxidant capacity of two species of medicinal plants from *Bouira* and *M'sila* regions including *Rhamnus alaternus* and *Ruta graveolens* using two tests in vitro using decolorization of ABTS* free radical and total antioxidant activity using Phosphomolybdenum reagent. The dried powders of two medicinal plants were extracted using an ultrasound bath under the following conditions: 20 mL of 64 % of hydro-ethanolic was used as extraction solvent, 25 min of extraction time, and 60 °C of extraction temperature and 1/20 g/mL of solid to solvent ratio, the filtered extracts were lyophilized and used for different antioxidant assays. The results confirmed that *R. alaternus* and *R. graveolens* from the M'sila region showed higher antioxidant potentials than both plants of the *Bouira* region with an  = 0.442 ± 0.002 and 0.493 ± 0.014 mg/mL for ABTS scavenging activity, as well as the plants from M'sila showed a higher potential of antioxidant for Phosphomolybdenum assay, which, 1 mg/mL of lyophilized powder of *R. alaternus* and *R. graveolens* contain 173,880 ± 1,183, and 109,506 ± 1,027 mg AAE/g respectively. Thus, the region of harvest could be an important factor that affects the potential of the medicinal plants, as well as the two species, which could be used as a natural alternative to using for pharmaceutical purposes.

Keywords: ultrasound assisted extraction, Rhamnus alaternus, Ruta graaveolens, Antioxidant activity, harvest regions.

ANTIOXIDANT ACTIVITY OF EXTRACTS OF PHENOLIC COMPOUNDS ISOLATED FROM MEDICINAL PLANT IN VITRO

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ABSTRACT

Medicinal plants are still the reliable source of active principle known for their therapeutic properties. The majority of current drugs are concentrated copies of herbal remedies, especially polyphenols, which are the most interesting and most studied compounds today. In this context, this work relates to a phytochemical and antioxidant study of extracts from an endemic plant traditionally used to treat several diseases in Algeria. The various extracts obtained were analyzed quantitatively by spectrophotometerUV-visible, which allowed us to determine the content of total phenols, flavonoids The additional analyzes made it possible to highlight the antioxidant and anti-free radical capacities of these extracts according to the methods of DPPH •, FRAP. The results of this work have enabled us to confirm that all the extracts of the plant studied exhibit good antioxidant properties.

Keywords: Oxidative stress, Antioxidants, Phenolic compounds.

CHEMICAL AND BIOLOGICAL ACTIVITIES OF AQUEOUS AND ETHANOLIC EXTRACTS OF CARYA ILLINOINENSIS FLOWERS

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ABSTRACT

Antibiotic resistance, which has increased rapidly in recent years, has prompted researchers to search for active substances for new treatments. Plants, with their high content of active compounds, constitute the largest reservoirs of these studies. In our study, ethanol and water extracts of male flowers of pecan nut *Carya illinoinensis*, which has an important place in food and industry, whose cultivation has increased in recent years in our country, were screened in terms of a number of chemical and biological properties. The study takes its place in the literature as the first screening carried out with male flowers. Antimicrobial activity was performed by agar diffusion method using nine Gram (-), five Gram (+) bacteria and two yeasts. In recent years, it has been predicted that antibiotic-resistant pathogens can be controlled by inhibiting the Quorum Sensing mechanism. In the study, violacein inhibition of QS steps was tested using 2 *Chromobacterium violaceum*, anti-biofilm and anti swarming activity *Pseudomonas aeruginosa* PAOI. For antioxidant activity, total phenolic content (TP), total flavonoid content (TF), DPPH and FRAP analyzes were performed from the extracts prepared as aqueous and ethanolic. The results of the study determined that both EtOH and water extracts showed antimicrobial and antifungal activities, both extracts while in Mycobacterium smegmatis showed high inhibition. It was also found that both extracts suppressed violanin formation in C. violaceum strains. It was determined that while *C. illinoinensis* Etoh extract suppressed swarming formation in *P. aeruginosa* strain, the antibiofilm activity of the water extract was higher. When we look at the antioxidant properties, it has been seen that the aqueous extract has two times higher activity than the ethanolic extract. In line with these results, it is thought that the pecan nut promises potential for future studies.

Keywords: Pecan, Quorum sensing, Carya illinoensis, Biofilm, Antioxidant.

ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED BY AN ALGERIAN POPULATION: THERAPEUTIC PROPOSALS IN PHYTO-AROMATHERAPY TO FIGHT AGAINST COVID-19, IN EASTERN ALGERIA

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ABSTRACT

In December 2019, number of pneumonia cases associated with 2019 novel coronavirus occurred in Wuhan, China. Later the Wuhan local health commission was informed of an outbreak of pneumonia to OMS, and taxonomist name the virus Sars-CoV-2 and disease called Covid-19. For the valorization of some medicinal plants existing on the Algerian East, and in the context of the fight against the Covid-19 and the dengue particularly, we carried out an investigation on the use and the effectiveness of these traditional plants known by many of us. This retrospective study (descriptive and analytical) study included 222 surveyed of which 75 were affected by Covid-19 in the services of Covid-19 in the hospitals of Oum el Bouaghi (Algeria), from March to June 2021. To determine the use value of these plants and to evaluate the ethnobotanical knowledge of the study population, a quantitative analysis approach was used. The cohort had an average age of 40±11 years, and a sex ratio of 0.56 with a predominance of women. 24% of patients had chronic diseases, of which 78% (7+7/18) had diabetes and high blood pressure (HBP) disease. The most of our population was with phytotherapy uses, more than 82% of total cases, of which : 48% (36 recovering cases) used *thymus capitatus*, 36% (27 recovering cases) used *Verbena officinalis*, 34% (26 recovering cases for each plant) used *Menthe ivridis hort* or *Syzygium aromaticum*, 28% (21 recovering cases) used *Artemisia annua*, and 26% (20 recovering cases) used *Zingiber officinale* during hospitalization or confinement. The ethnobotanical and ethnopharmacological information collected in our study provides basic data on the medicinal plants that appears promising in the treatment and prevention of Covid-19.

Keywords: Covid-19, thymus capitatus, Verbena officinalis, Menthe ivridis hort, Syzygium aromaticum, Artemisia annua, Zingiber officinale, traditional medicine, East Algeria.

THE INVESTIGATION OF PROTECTIVE EFFECTS OF EPIGALLOCATECHIN-3-GALLATE AGAINST CISPLATIN INDUCED DAMAGE IN EYE TISSUE BY BIOLOGICAL ACTIVITIES

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ABSTRACT

Epigallocatechin 3-gallate (EGCG) is one of the most abundant polyphenolic catechins in green tea and has strong antioxidant and anti-cancer properties. Recent studies in the literature have been reviewed and it has been concluded that EGCG treatment is highly effective in the treatment of eye tissue damage. EGCG treatment of retinal ganglion cells has been identified that provide protection against macular degeneration. In this study, it is aimed to investigate the possible protective effects of epigallocatechin-3 gallate (EGCG) in rats with eye damage with cisplatin. The animal experiments part of this study was conducted in the F.U Experimental Animal Research Center (FUDAM) with the permission of the F.U Animal Experiments Ethics Committee dated 17.02.2021 and numbered 2021/03. In the study, 28 Wistar albino male rats (n = 28, 8 weeks old) were divided into 4 groups and each group included 7 rats. Groups: (i) Control Group: Standard diet, (ii) EGCG Group: Standard diet + EGCG (50 mg/kg CA, ip), (iii) Cisplatin (CP) Group: Standard diet + Cisplatin (CP) (7 mg/kg CA), (iv) Cisplatin (CP) + EGCG Group: Standard diet + and EGCG (50 mg/kg CA, ip) + Cisplatin (CP) (7 mg/kg CA) group. The rats were decapitated after 4 weeks, and their eye tissues were taken and examined. Lipid peroxidation in eye tissue MDA (malondialdehyde) analyzes, catalase activity (CAT) and GSH (glutathione) levels were determined by spectrophotometer. Compared to the malondialdehyde (MDA) level decreased, glutathione (GSH) level and catalase activity (CAT) were significantly increased in the groups EGCG + CP compared to the group CP. As a result of this study, the necessary information and documents were provided to explain the possible protective and therapeutic effects of EGCG treatment against eye damage, and new treatment methods against eye damage were provided. This work was supported by Firat University Scientific Research Projects Unit (FUBAP) with FF. 20.04 project number.

Keywords: Cisplatin, EGCG, Eye tissue, Glutathione, Oxidative damage.

THE EFFECT OF EPIGALLOCATECHIN-3-GALLATE ON SOME BIOCHEMICAL PARAMETERS IN RATS WITH BRAIN DAMAGE

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ABSTRACT

In recent studies, it has been stated that one of the substances that are naturally found in the structure of polyphenolic catechin in plants with antioxidant, anti-mutagenic, anti-carcinogenic and neuroprotective properties is Epigallocatechin-3-Gallate (EGCG). It has been shown that EGCG has a protective effect against lipid peroxidation with its super oxide anion and hydroxyl anion. In the light of this information, in this study, it is aimed to investigate the protective role of EGCG against damage in brain tissues damaged by cisplatin. In the study, 28 Wistar albino (n = 28, 8 weeks old) rats were used. The rats were divided into 4 groups and each group included 7 rats. Groups: (i) Control Group: Group fed with standard diet, (ii) EGCG Group: EGCG (50 mg/kg CA, ip) given group, (iii) Cisplatin Group: Cisplatin (7 mg/kg CA) given group, (iv) Cisplatin + EGCG Group: EGCG (50 mg/kg CA, ip) + Cisplatin (7 mg/kg CA) given group. The animal experiments part of our study was conducted in Fırat University Experimental Animal Research Center (FUDAM) with the permission of Fırat University Animal Experiments Ethics Committee dated 27.01.2021 and numbered 2021/02. Lipid peroxidation in heart tissue MDA (malondialdehyde) analyzes, catalase activity (CAT) and glutathion (GSH) levels were determined by spectrophotometer. According to our findings, an increase in GSH and CAT levels and a decrease in MDA levels were observed in the EGCG + Cisplatin group compared to the Cisplatin group. These results show we can say that EGCG reduces the rate of brain tissue damage and protects against oxidative damage in rats. This work was supported by the FUBAP FF.20.04 project.

Keywords: Cisplatin, Epigallocatechin-3-Gallate, MDA, Oxidative damage.

ENDOMETRIAL CANCER IN THE WESTERN REGION OF ALGERIA

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ABSTRACT

Introduction : Endometrial cancer is one of the most common gynecological cancers in the world. Its incidence is sharply increasing. In developing countries such as Africa, endometrial cancer is the third most common gynecological cancer. Objective: The aim of this study is to describe the epidemiological, anatomopathological and therapeutic profile of endometrial cancers in the region of Oran. Patients and methods: We conducted a retrospective study by exploring the medical files of 25 patients with endometrial cancer, consulting at the EHU's medical oncology department in Oran, during a period spanning from January 2015 to December 2019. For data collection, we used a structured exploitation sheet to obtain necessary information. Variables were analyzed using SPSS Software Version 20.0. Results: The median age was 59 years with extremes ranging from 42 to 83 years. More than 56% of our patients were over 50 years old, 40% of patients were nulliparous and 80% postmenopausal. The average age at menarche was 14,09 ± 1.44 years with extremes ranging from 12 to 17 years. The indication for pathological examination was dominated by metrorrhagia (80%). Histopathologically, endometrioid adenocarcinoma was the most common in 75% of cases. We also noted that 62,5% were classified in stage I and 37.5% in stage II. Myometrium infiltration was observed in 66,67% of cases. The basic treatment for endometrial cancer remains surgical. Conclusion: At the end of this work, we concluded that this pathology remains essentially that of postmenopausal women. Endometrioid adenocarcinoma was the most common histologic type. This study also revealed many risk factors for endometrial cancer such as advanced age, hypertension and nulliparity.

Keywords: Endometrium, Cancer, Epidemiology, Risk factors.

PHYTOCHEMICAL AND ANTIOXIDANT ACTIVITY ANALYSIS OF SIX GENISTA L. TAXA

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ABSTRACT

The genus *Genista* L. (brooms, Fabaceae), deciduous shrubs or small trees in the Mediterranean region and in Western Asia, possess various biologically active compounds. The objectives of this study were to quantify total phenolic, flavonoid, phenolic acids and alkaloid contents, and to assess antioxidant activities of six *Genista* taxa (*G. januensis*, *G. pilosa*, *G. radiata*, *G. sagittalis*, *G. sylvestris* ssp. *dalmatica*, and *G. tinctoria*). Stem and inflorescences were collected in the natural populations in Bosnia and Herzegovina. Methanol extracts of the studied *Genista* taxa were analyzed using UV-VIS spectrophotometer for mentioned phytochemicals. The antioxidant activity was estimate by 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and expressed as IC50 value. Data were analyzed by Student's t-test (IBM SPSS Statistics, version 20) using an one-way analysis of variance (ANOVA). Duncan's *post-hoc* test was used (at $p<0.05$) to determine the significant differences between groups. In analyzed extracts of stem (S) and inflorescences (I), *Genista pilosa* possessed the highest content of phenolics and phenolic acids (S: 58.027 and 51.031 mg GAE/g DW, I: 55.030 and 55.388 mg CAE/g DW, respectively), and *G. januensis* of flavonoids (S: 75.566 mg RE/g DW, I: 64.972 mg RE/g DW). The highest content of alkaloids was present in *G. radiata* (S: 0.788 mg AE/g DW, I: 0.239 mg AE/g DW). *Genista januensis* and *G. pilosa* had the highest DPPH scavenging activity, but taxa with the lowest number of phenolic compounds showed the least antioxidant activity (e.g. *G. radiata*) compared to others. The presence of significant differences both between analyzed polyphenolic compounds and DPPH ($p<0.05$), and between the majorities of samples (Duncan's test) was confirmed in the most cases. This study indicates the need for further research of *Genista*, in order to isolate and identify their active ingredients and assess their antibiotic activity.

Keywords: alkaloids, antioxidant activity, brooms, DPPH, Fabaceae, flavonoids, Genista, phenolic acids, total phenols.

GC-MS ANALYSIS AND ANTI-CANCER EFFECTS OF PALIURUS SPINA-CHRISTI MILL. EXTRACT IN HUMAN BREAST CANCER

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ABSTRACT

Paliurus spina-christi Mill. (PSC) is widely distributed in dry and rocky areas in the Mediterranean region and Asia. Its antioxidant, antifungal and antimicrobial properties are known however its effects

on cancer cells are not known. This study aimed to investigate the possible anti-cancer effects of the ethanolic extract of the PSC in human MCF-7 and MDA-MB-231 breast cancer cells. The leaf and flower extracts were prepared in ethanol and the phytoconstituents were identified by GC-MS technique. Cytotoxic effects of extracts were evaluated via MTT assay. Apoptotic effects were investigated using FITCH Annexin V Apoptosis Detection kit. Significant cytotoxic effects were observed after 72 h treatment of ethanolic leaf and flower extract in MCF-7 cells but not in MDA-MB-231 cells. It was shown that both leaf and flower extracts induced apoptotic cell death in MCF-7 cells. On phytochemical screening, it was shown that the leaf extract of PSC contains pyrrolidine, phytol, oleic acid, oleamide, squalene, and gamma sitosterol and the flower extract contains pyrrolidine, oleic acid, lupeol, and gamma sitosterol. These preliminary data suggest that PSC leaf and flower extracts have potential active substances that can be used in the treatment of MCF-7 breast cancer. Moreover, this study can be considered an in vitro background for further in vivo studies.

Keywords: Paliurus spina-christi, extract, MCF-7, anti-cancer, GC-MS.

EFFECT OF WALNUT (JUGLANS REGIA OLEUM) AND THYME (THYMUS VULGARIS) EXTRACTS ON MORTALITY AND EGG LAYING PHYSIOLOGY OF ACANTHOSCELIDES OBTECTUS (COLEOPTERA: BRUCHIDAE)

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ABSTRACT

In this study, the effects of Walnut and Thyme extracts on the mortality rate and the number of eggs laid by Acanthoscelides obtectus were evaluated. Solutions of 10% (in 95% ethanol) were prepared from each plant extract. Trials were carried out in two stages as contact effect and repellant effect. For contact effect trials, 1 µl of plant extract was applied to the abdomen of the insects with a micropipette. 10 insects were placed in petri dishes containing 10 beans. Insects that died at the end of 24, 48 and 72 hours after application were recorded. At the end of 72 hours, the eggs on the petri dish and on the beans were counted. In the repellant effect trials, the extracts were sprayed on 10 beans from a distance of 20 cm. The beans in the petri dishes were left to aerate for 1, 24 and 48 hours. 10 insects were left on these beans and procedure was applied above. The highest mortality rate was found in Walnut (86.6±4.2%) in contact effect trials, and in Thyme (80.0±10.0%) aerated for 1 hour in repellent effect trials. The number of eggs they laid was found the lowest in Walnut (6.5±1.5) in contact effect trials, and in Thyme (0.0±0.0) in the 1 hour aerated group in repellent effect trials. Considering that A. obtectus reproduces many times a year, it can be said that Walnut and Thyme extracts affect the egg laying physiology of the insect and have the potential to be used as a supplement in integratedcontrol methods.

Key words: *Acanthoscelides obtectus*, plant extract, biological activity, mortality

MICROPLASTICS IN FRESHWATER ECOSYSTEMS: BIODEGRADATION AS POTENTIAL SOLUTION

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ABSTRACT

Using plastics in our daily activities increases the accumulation of microplastics (MP) in the environment and become major pollutants due to their resistance to the environmental factors. All plastics with <5 mm in size is defined as MP. They are primary MP when they are manufactured within such size, and secondary microplastics when they are generated by the fragmentation of plastic under physical or other degradation ways. Their distribution over the environment has an impact on public health. They have been reported even in the placentas of some pregnant women. Even though their sources are still unclear, water consumption or a food chain system may be one such source. Freshwaters constitute an important key in human life. Because they are constituting sources of drinking waters and shelter different organisms consumed by human and which also contribute to different phenomena like climate change and the depollution of the environment. However, the presence of microplastics in lakes, rivers and other freshwater ecosystems has been reported with effects on the *in-situ* organisms. Through the food chain system or water consumption, organisms from other ecosystems, including humans, can also be affected. Furthermore, MP can act as vectors of pathogenic microorganisms or other parasites from freshwaters to other ecosystems (terrestrial and marine). In order to reduce these pollutants, their biodegradation can be a potential solution. In fact, this study will generate a discussion on the impacts of microplastics on freshwater ecosystems before elaborating in detail the question of their biodegradation, especially that ensured by micro-organisms (bacteria and fungi). With that, the study contributes to the evolution of research on the problem of microplastics in freshwater ecosystems for a rapid and potential solution to this major worldwide problem.

Keywords: Biodegradation, freshwater ecosystems, microplastics, primary MP, secondary MP.

HOW CAVE MICROBIAL DIVERSITY CAN CHANGE UNDER ANTHROPOGENIC IMPACTS?

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ABSTRACT

Caves are characterized as extreme ecosystems due to their extreme humidity, darkness and stable, often low temperatures. Cavers and scientists enter to caves for their explorations and investigations. In addition, tourists and nature lovers visit these fragile underground formations. Regardless of the objective, human entry into the cave and their activities affect the cave ecosystem. Caves are attractive

areas for microbiologists due to the possibility of finding new species of microorganisms and the potential to produce antimicrobial substances. In order to understand and to take advantages from caves, it is important that current cave research do not affect these environments. For the still unexplored caves, it is obvious to determine with emergency the damage that can be caused by the human entry into these ecosystems. This study aimed to evaluate the possible changes which can observed on the *in-situ* microbial diversity of cave ecosystems under human activities. For this purpose, sediment samples were taken from the camp area during the first exploration of Morca Cave in Turkey. Also, sediment samples were taken at the same camp area after one year, at both the starting and the end of the stored camp period (one month). DNA of the samples were isolated for metagenomic and bioinformatic analyses. In this study, the increasement of members of phylum Bacteroidetes and decrease of Proteobacteria were noted in this part of cave under human influence. While the class Bacteroidia shown an increase in its rate, Gamma-proteobacteria members especially Pseudomonodaceae family had importantly decreased. Belonging this family, the genus *Pseudomonas* shown also an important decrease in this same area. These results reflect how cave microbial diversity can respond to human activities inside the Morca Cave.

Keywords: Anthropogenic impacts, cave, microbial diversity.

EVALUATION OF THE CYTOTOXIC AND GENOTOXIC POTENTIAL OF SILVER LOADED TITANIUM NANOTUBES IN HUMAN COLORECTAL ADENOCARCINOMA CELL LINES HT-29

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ABSTRACT

Nanostructures of titanium dioxide (TiO2) have been increasingly studied for biomedical applications such as implants, biosensors, and drug delivery. Titanium dioxide nanotubes (TiO2) have unique physical and chemical properties, good biocompatibility, and their large surface area offers the possibility of being used as a vector for therapeutic molecules in medical research, including cancer therapy. Titanium dioxide (TiO2) nanotubes (TNT) doped with silver (Ag) (%10) were synthesized using the hydrothermal technique. In addition, the cytotoxic effects of different concentrations of silver doped titanium dioxide (TiO2) nanotubes (Ag-TNT) on human colorectal adenocarcinoma cells (HT-29) were investigated by XTT and Clonogenic assays. Analyses revealed that at a concentration of about 100 *µg/ml*, Ag-TNT nanotubes have a cytotoxic effect by causing a 50% decrease in the viability of human colon cancer cells. The Comet assays also showed that AgTNT nanotubes can cause DNA damage at a 100 *µg/ml* concentration or more on HT-29 cells, thus evidencing their genotoxic potential.

Keywords: Titanium dioxide nanotubes, Silver, Cytotoxicity, Genotoxicity, Colorectal adenocarcinoma cells.

ANTIINFLAMMATORY AND ANTIHEMOLYTIC EFFECT OF METHANOL EXTRACT OF PEGANUM HARMALA

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ABSTRACT

Seeds part of *Peganum harmala* L. is widely used in Algeria as many pharmacological remedies. The aim of the present study was to investigate whether methanolic extract extracts, is responsible for the anti-inflammatory and antihemolytique activities of *Peganum harmala* seeds (PHE). The antihemolytic property of methanol extract was evaluated in erythrocytes exposed to oxidative stress induced by tert-butyl hydroperoxide (tBHP). The PMA-induced mice ear oedema test has been used as an experimental model for screening the anti-inflammatory activity of methanol extract. The Evaluation of the methanol extract capacity to inhibit the hemolysis of blood *in vivo* in the presence of (tBH), showed a very important antihemolytic activity with Half-Hemolysis Time (HT50) = 78.51 ± 11.32 min. The edema weight of the control group was 7.01 ± 0.6 mg, it was reduced by the diclofenac to 4.03 ± 0.5 mg and reduced by the Methanol extract (100 mg/Kg) to 6.3 ± 0.32 mg. Our results indicate that *Peganum harmala* possesses potent anti-inflammatory and antihemolytic properties and might be valuable natural source that could be applicable to the medical treatment.

Keywords: Peganum harmala, polyphenol, inflammation, hemolytic.

POPULATION DENSITY OF LACEWINGS (*NEUROPTERA: PLANIPENNIA*) IN THE CITRUS GARDENS IN HATAY PROVINCE

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ABSTRACT

In this study, insect samples belonging to Chrysopidae and Coniopterygidae families were collected from Altınözü, Belen, Dörtyol, and Hassa districts between May and September 2019-2020 from different locations in the citrus orchards of Hatay Province. As a result of the study, the population density of 6 species belonging to 2 families was investigated. Chrysoperla carnea from Chrysopidae family specimens, Ch. rufilabris**,** Chrysopa formosa, Chrysopa perla**,** Dichochrysa prasina, and Conwentzia hageni, Semidalis aleyrodiformis from Coniopterygidae family were determined. Obtained ecological data were compared with literature information.

Keywords: Chrysopidae, Coniopterygidae, population density, citrus, Hatay.

CHANGE OF NESTS OF MYRMELEON FORMICARIUS LINNAEUS, 1767 ACCORDING TO ALTITUDE IN ADANA, OSMANIYE AND KAHRAMANMARAŞ PROVINCES

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ABSTRACT

Antlions, which feed on many arthropod species, especially ants, through their conical nests on dune surfaces, have a unique place and importance in the Neuroptera Order. In this study, the variation of some *Myrmeleon formicarius* Linnaeus, 1767 nests according to altitude in Adana, Kahramanmaraş and Osmaniye provinces was investigated. The results obtained were compared with the literature information. Antlions, which have a unique hunting strategy, have been the focus of attention of modern entomologists. Within the scope of the study, dune nests in a total of 20 different altitude steps were examined between 2020-2021.

Keywords: Myrmeleon formicarius, conical trap, Neuroptera, altitude.

INVESTIGATION OF ANTIMICROBIAL ACTIVITIES ON SOME MACROFUNGI GROWING WIDELY IN KESTEL REGION (KADINHANI-KONYA)

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ABSTRACT

This study was carried out to determine the antimicrobial activities of some macrofungi that are widely grown in Kestel (Beykavağı- Kadınhanı-Konya) region. The necessary material for the study was obtained through field studies. The macroscopic and microscopic properties of the macrofungus samples brought to the laboratory were determined and their diagnosis was made with the help of the available literature. Macrofungi, which are commonly found and diagnosed, are used as material in antimicrobial activity studies; *Boletopsis leucomelaena* (Pers.) Fayod, *Clitocybe geotropa* (Bull.) Quel., *Lactarius sanguifluus* (Paulet) Fr., *Rhizopogon roseolus* (Corda) Th.Fr., *Russula delica* Fr. are examples of the species. The basidiocarps of the mushrooms were dried, then ground into powder. Methanol extracts were obtained from basidiocarps that were powdered as a whole by using a soxhlet device. Methanol extracts were prepared at a stock concentration of 25 mg/ml and tested against ten standard bacterial strains and one yeast strain. Agar Disk Diffusion and Liquid Microdilution methods were applied to determine the antimicrobial activity. Commercial gentamicin disc was used as positive control and DMSO was used as negative control in the study. According to the findings obtained from the study, *B. leucomelaena* extract did not show any antibacterial activity against only *Escherichia coli* strains in both methods, while it was effective against all bacterial strains used in the study at doses of 1.56 - 0.39 mg/ml in the microdilution method, and the highest activity was 0.39 mg/ml. dose was determined to be against *Staphylococcus aureus* strain. In the disc diffusion method, the highest activity was determined against *Staphylococcus aureus* and *Sarcina lutea* strains. Again, this fungus was found to have antifungal activity at a dose of 1.56 mg/ml against *Candida albicans* yeast strain by microdilution method. *Clitocybe geotropa* extract, on the other hand, was determined to have antibacterial activity at a dose of 1.56 mg/ml in the liquid microdilution method against only *Citrobacter freundii* strains among all strains used. *Rhizopogon roseolus* extract, on the other hand, showed antibacterial activity against *Citrobacter freundii*, *Enterococcus faecalis* and *Sarcina lutea* strains in the microdilution method at 1.56, 0.78 and 0.39 mg/ml doses, respectively, while *Staphylococcus aureus* was found to be the most effective strain with a dose of 0.19 mg/ml. Moreover, it was determined that this mushroom extract did not have antifungal activity in both methods. When *Russula delica* and *Lactarius sanguifulus* extracts were evaluated, it was observed that both methods did not have potential antimicrobial activity against all tested strains. As a result of the studies, it was concluded that the species with the highest antimicrobial activity was *Boletopsis leucomelaena*.

Keywords: Antimicrobial Activity, Agar Disc Diffusion, Liquid Microdilution, Macrofungus

INVESTIGATION OF POTENTIALS OF USING QUERCUS ACORNS IN THE MYCELIUM GROWTH OF PLEUROTUS OSTREATUS AND LENTINULA EDODES SPECIES

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ABSTRACT

In this study, the cultured mushroom *Pleurotus ostreatus* (Jacq.) P.Kumm. and *Lentinula edodes* (Berk.) Pegler, in pure mycelial development of the species, *Quercus robur* L. Supsp. *robur* seeds have been investigated whether they have the potential to be used. In the study, pure cultures of *P. ostreatus* and *L. edodes* species were produced in Selçuk University Mushroom Application and Research Center, as well as; collected from Selçuk University Alaaddin Keykubat Campus, *Q. robur* subsp. *robur* seeds were used, Malt Extract Agar (MEA) and Agar Agar (AA) were used as the medium. This study was carried out in the Mycelium Research Laboratory of the S.U. Mushroom Application and Research Center. *Q. robur* subsp. *robur* seeds were used in the form of flour to obtain pure culture. At the stage of obtaining pure culture of the study, AA and MEA media with 0%, 1%, 3%, 5% flour added were sterilized in an autoclave at 121 °C for 15 minutes. In the biosafety cabinet, the media were poured into sterilized Petri dishes in the Pasteur oven. After the media solidified, the pieces containing mycelium of a certain diameter were transferred from the media containing pure mycelium, which were obtained by tissue culture in the same cabinet, and inoculation was done. The inoculated Petri dishes were left for incubation in the oven. Later, mycelial developments were drawn spatially at regular intervals, and the drawings were transferred to the computer and converted into numerical data in a program called "Image J". According to the results obtained; *L. edodes* species grew in a shorter time in AA medium compared to MEA medium. It was sparse in the medium with 1% flour added-inanimate and filled the petri dish on the minimum 17-maximum 19 days. 3% dense -live, 17-24. days filled the petri dish. At the rate of 5% and very dense - it showed a lively growth and 14-24. days filled the petri dish. In MEA medium, on the other hand, growth took longer than Agar-Agar, but mycelial growth showed a very intense-vivid growth, 21-37 in days, in Petri dishes with 1% flour added. 28-38 at a rate of 3%. in days, at 5% it filled the petri dish 24-40. in days. In terms of time, the trials gave better results in AA medium compared to the control group, and no difference was observed in MEA medium with the control group. *P. ostreatus* in AA medium; It is sparsely inanimate in trials with 1% flour added, 14-17. days filled the petri dish. In the trials, in which 3% and 5% flour was added, the micelles were dense-live, filled the petri dish 17-19. in days. In MEA medium, on the other hand, the growth took longer than in AA medium, but mycelial growth showed very intense-vivid growth. In petri dishes with 1% flour added, it took a minimum of 17-maximum 19 days, 3% 21-24. day and 5% filled the petri surface in 26-28 days. In the control group, the fungus 12-24. days was showing a lifeless and sparse mycelium growth, filling the petri dish. When the results were evaluated, superficial and sparse mycelial growth was observed in the control group and petri dishes with 1% addition in *L. edodes* species AA medium with acorn flour. In other ratios and MEA medium, intense mycelial growth was observed. In *P. ostreatus* species, on the other hand, it showed a sparse and inanimate growth in AA medium at the rate of control and 1% flour, and intense and lively growth at other rates. As a result, it was concluded that acorn flour can be used in the production of pure micellar.

Keywords: Quercus, Mycelium, Pleurotus ostreatus, Lentinula edodes, Pure Culture, Acorn Flour.

EVALUATION OF THE IN VIVO ANTIOXIDANT ACTIVITY POTENTIAL OF PEGANUM HARMALA METHANOLIC SEED EXTRACT

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ABSTRACT

Peganum harmala L. (*P. harmala*) belongs to the family of Zygophyllaceae. It is a wild growing flowering plant; *P. harmala* shows different pharmacological activities like antioxidant. The present study aim to evaluate the effectiveness of an antioxidant treatment, the scavenger effect against DPPH radical and reducing power activity of plasma of mice; the obtained results showed that oral administration of methanol extract (100 mg) and Vit C leads to increased plasma antioxidant capacity by scavenging of DPPH radical with (32.70 ± 4,45 % and 33.55± 5.95 %, respectively). The results obtained in present study showed that the oral administration of MOHE did not show any significant changes in plasma antioxidant capacity compared with control group by reducing power activity assay.

Keywords: Peganum harmala, polyphenol, antioxidant, DPPH.

HPWMOV IS AN EMERGING CEREAL VIRUS IN UKRAINE

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ABSTRACT

Plant viral diseases can lead to significant decrease in crop yields, resulting in financial losses and threats to food security in certain regions. It is important to study the prevalence of emerging plant viruses and to predict the possible consequences of viral epiphytoses for agriculture. High Plains wheat mosaic virus (HPWMoV, *Emaravirus*) is the causative agent of the economically important High Plains disease, especially harmful in combination with wheat streak mosaic virus (WSMV, *Tritimovirus*). These viruses are transmitted by the wheat curl mite (*Aceria tosichella*) and characterized by a wide range of host plants, including wheat and maize. During 2018-2020, samples of wheat and corn with symptoms of viral disease were taken from different regions of Ukraine and tested by transmission electron microscopy (TEM), enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR), as well as phylogenetic analysis. Screening of wheat crops in 2018-2019 showed the presence of HPWMoV in 4 eastern regions of Ukraine (Dnipropetrovsk, Donetsk, Zaporizhia and Kharkiv) both in monoinfection and in co-infection with WSMV. In 2020, HPWMoV was identified in the Kyiv region. HPWMoV causes monoinfection on corn in Vinnytsia region. According to the TEM results, the presence of spherical virus-like particles with a diameter of ~ 140 nm, which are typical for the genus Emaravirus, was established in symptomatic plants. Pairwise comparison of the nucleotide sequences of Ukrainian HPWMoV isolates showed their highest identity (92%) with the isolates described in the United States. Thus, previously diagnosed only in the United States, Argentina, and Australia, HPWMoV has been found to be a common causative agent of epidemiological significance in Ukraine.

Keywords: High Plains wheat mosaic virus, Emaravirus, Ukraine.

IN VITRO ANTIOXIDANT AND OH° RADICAL SCAVENGING ACTIVITY OF DIFFERENT EXTRACT OF PEGANUM HARMALA SEEDS

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ABSTRACT

Antioxidants can scavenge free radicals and minimize their impact. Therefore, the search for naturally occurring antioxidants of plant origin is imperative. Here, we aimed to investigate the antioxidant and Hydroxyl radical scavenging properties of methanolic (CrE), chloroform (CHE) and ethyl acetate (EAE) extracts from *Peganum harmala L. seeds.* The antioxidant and free radical scavenging activity were determined by OH scavenging activity method using spectrophotomer. Total phenolic and flavonoid contents were estimated using Folin-Ciocalteu reagent and aluminium chloride colorimetric assay methods, respectively. Among the extracts, EAE showed the highest total phenolic and flavonoids compounds. Based on hydroxyl radical scavenging activity, EAE showed strong scavenging activity with IC50 of (0.634 ± 0.08 mg/ml) followed by CrE and CHE, respectively when compared with standard Ascorbic acid (IC50 of 0.214 ± 0.021 mg/mL). These results suggest that EAE had the highest radical scavenging activity among the extractives. A positive correlation ($p < 0.001$) was observed between phenolic content and free radical (OH **.**) scavenging efficiencies activity. Methanolic extract of Peganum harmala seeds is a potential source of natural antioxidants and serves as an effective free radical scavenger and/or inhibitor. Hence, *P. harmala* might be a good plant-based pharmaceutical product for several diseases caused by free radicals.

Keywords: Peganum harmala, hydroxyl radicals, Polyphenols, Antioxidant.

SYNERGISTIC EFFECT OF ANTIBIOTICS AND AN AQUEOUS EXTRACT OF A PLANT BELONGING TO THE AMARANTHACEAE FAMILY ON BACTERIA OF HEALTH INTEREST

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ABSTRACT

Resistance to multiple drugs in human pathogenic microorganisms has forced scientists to search for new antimicrobial substances from a variety of sources. Aromatic and medicinal plants possess very important biological properties which find numerous applications in various fields, namely medicine, pharmacy, cosmetology. Modern pharmacological studies have shown that Amaranthaceae plant extracts exhibit several biological activities. In this study, the antimicrobial activity of the aqueous extract of a plant belonging to the family Amaranthaceae was studied, in combination with the following antibiotics: Gentamycin, Amikacin, Ceftazidime, Penicillin G using the Mueller Hinton agar well method, against clinically important bacteria, namely E. coli, Citobacter, Serratia, klebsiella and Bacillus. The results showed a broad spectrum of antimicrobial activity on all micro-organisms for both antibiotics and the plant. The combination of the aqueous extract with the antibiotics showed an interesting synergistic effect; the diameters of the wells were between 27 and 62 mm. Moreover, these plant extracts were able to increase considerably the sensitivity of several resistant isolates.
Our results open interesting prospects for the expansion of therapeutic means to address multi-resistance problems, and thus, present an alternative to the use of conventional antibiotics that have become ineffective.

Keywords: Amaranthaceae, Synergie, antibiotic, Aqueous extracts.

AGRICULTURAL USE POTENTIALS OF ACTINOMYCETES

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ABSTRACT

Actinomycetes, belonging to class Actinobacteria and order Actinomycetales, are Gram-positive, aerobic, filamentous bacteria. Because of their morphology, they were previously thought to be fungus, and therefore the word "mykes", which means fungi in Latin, was used in naming. Actinomycetes can be isolated from various environments such as soil, sea, air, insect or marine macro-organisms, plants, and extreme environments. Actinomycetes produce important secondary metabolites. These bacteria are known for their synthesis of bioactive compounds like antibacterial, antiviral, antifungal, anticancer, antidiabetic, anti-inflammatory, herbicide, and insecticide. It was proven by studies that some of these bioactive compounds have important potentials in agriculture. Nowadays, high amounts of herbicides or insecticides are used to protect plants from pests, and these chemicals can cause different dangers in the long term. The chemicals used are not only biologically harmful but also dangerous in that the target organisms gain resistance to these chemicals over time. Therefore, there is a need for both new and natural herbicide and insecticidal compounds. Actinomycetes are known to synthesize bioactive compounds that have the potential to satisfy these needs. At the same time, secondary metabolites of actinomycetes can be effective against pathogens such as viruses and fungi that can cause product loss. These bacteria may also be responsible to produce important plant growth promoters such as indole acetic acid (IAA), siderophore production, phosphate dissolution, ammonia production, hydrogen cyanide production. Today, studies about using actinomycetes to both prevent pathogenic organisms from harming plants and to support plant growth, are increasing day by day. For this reason, we aimed to compile studies that reveal the potential of actinomycetes in the field of sustainable agriculture in plant development and protection.

Keywords: Actinomycetes, Agriculture, Bioactive compounds, Sustainable agriculture.

METHODS FOR DETERMINATION OF COLISTIN RESISTANCE IN DIFFERENT ENTEROBACTERIAL ISOLATES OF CLINICAL ORIGIN

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ABSTRACT

Colistin was originally isolated in 1947 from soil bacterium Paenibacillus polymyxa sub sp.colistinus and belongs to the polymixin E family. Fallen out of favorin humans use due its nephrotoxicity, while continuing to be used in veterinary medicine and remaining a drug of last resort in humans when faced with multi-resistant bacteria. Despite this, an emergence of different resistance mechanisms to colistin have been observed since 2015, creating doubts about its future use. In vitro comparison of two techniques for the determination of colistin resistance in enterobacteria. Our samples included 13 different bacterial isolates of clinical origin. After collection of the samples, different bacteriological analyses as well as complementary tests were carried outThen two in vitro antibiotic resistance tests were performed to determine colistin resistance. The CAT test (colistine agar test): based on the determination of colistine resistance in solid medium on a reduced range of concentration, by preparation of 3 Mueller Hinton boxes containing respectively a final concentration of colistine 1mg/l, 2mg/l, 4mg/l. And the minimum inhibitory concentration (MIC), performed in a Mueller Hinton broth microplate against a dilution range of colistin from 0.5 mg/l to 164 mg/l. The bacteriological analysis allowed us to categorise our isolates to the following bacterial species: *1 Klebsiella ornithinolytica*, *1 Proteus penneri 1 Citrobacter freundii 4 Enterobacter cloaceae*, *6 E. coli*. The CAT test is performed for all bacterial species. We observed the proliferation of all bacteria on the surface of Mueller Hinton agar with 4 mg/ml colistin. The MIC was achieved only for the following bacteria *Klebsiella ornithinolytica*, *Enterobacter cloaceae*, *Proteus penneri* and *2 E.coli*. We obtained inhibition of bacterial growth from 2mg/l, 8mg/l and 16mg/l depending on the different bacterial species. The two antibiotic resistance tests performed in vitro allowed us to a colistin resistance phenotype. The CAT test indicated bacterial proliferation at a single reduced concentration of antibiotic, while the MIC allowed us to evaluate the growth or inhibition of bacterial species over a range of increasing antibiotic concentration. Previous literature suggested that the diffusion disc method is not recommended because polymyxins diffuse poorly on agar and the zones of inhibition are highly dependent on inoculum sizes. We can conclude that the study of polymyxin sensitivity should be done either by agar dilution, or by MIC which is a more demanding technique but leads to a high reliability result.

Keywords: Antibiotic resistanc, MIC, Agar test, colistin, Enterobacteriaceae

THE EFFECT OF THE MIXTURE OF PESTICIDES ON REPRODUCTION IN MALE RAT

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ABSTRACT

This study aims to evaluate the toxic effects of three used pesticides as a mixture, Tebuconazole, Abamectin and Maneb from the triazole, avermectins and dithiocarbamates, families respectively, and to determine the toxic effect on the parameters of reproduction. 27 adult male rats were divided into 3 groups of 9 rats in each one. G1 is the control group, the other groups G2 .G3 were exposed respectively to mixtures of pesticides in the diet with doses respectively (1 / 30.1 / 60) of the LD 50 of each pesticide for 8 weeks. At the end of treatment period, animals were sacrificed. The blood was prevailed, and the testes and epididymis were excised and weighed. Sperm concentration and motility and vitality were evaluated using a bright field microscope and a computer-assisted semen analysis CASA. The analysis of the results obtained showed that the treatment with mixture pesticide causes disturbances in the organism resulting in a very highly significant decrease in the absolute mass of the testes and epididymis. In addition, the concentration, mobility and vitality of the spermatozoa have very highly significantly reduced in the treated groups compared to the control group. It concluded that the exposition to the mixture under our experimental conditions caused perturbations in the organism, manifested by an imbalance in the reproductive system

Keywords: abamectine, tebuconazole, manèbe, mixture of pesticides, reproduction parameters, rat.

EFFECT OF EPIGALLOCATECHIN-3-GALLATE ON OXIDATIVE DAMAGE IN RATS WITH HEART TİSSUE INJURY WITH CISPLATIN

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ABSTRACT

Cisplatin is a potent cellular toxin, and it causes tissue damage due to inflammation by increasing the expression of proinflammatory cytokines. Studies have shown that cisplatin causes auto-, neuro-, nephro-, gastrointestinal, hematological, hepato- and gonadal toxicity as well as cardiotoxicity. Epigallocatechin-3-gallate (EGCG) accounts for 50-80% of total green tea catechins. It has antioxidant, anti-inflammatory, anti-diabetic, anti-tumor and anti-cancer properties. Since EGCG is thought to have cardioprotective effects, it has possible beneficial effects in the prevention of cardiovascular diseases as a powerful antioxidant. In this study, in which it was investigated whether EGCG has a protective role against cardiac tissue damage induced by cisplatin in rats, 28 Wistar albino rats (n = 28, 8 weeks old) were used. The animal experiments part of our study was conducted in Fırat University Experimental Animal Research Center (FUDAM) with the permission of Fırat University Animal Experiments Ethics Committee dated 27.01.2021 and numbered 2021/02. Groups: (i) Control Group: Group fed with standard diet, (ii) EGCG Group: EGCG (50 mg/kg bw, ip) given group, (iii) Cisplatin Group: Cisplatin (7 mg/kg bw, ip) given group, (iv) Cisplatin + EGCG Group: EGCG (50 mg/kg bw, ip) + Cisplatin (7 mg/kg bw, ip) given group. The rats were decapitated after 4 weeks, and their heart tissues were removed. Lipid peroxidation in heart tissue MDA (malondialdehyde) analyzes, catalase activity (CAT) and glutathion (GSH) levels were determined by spectrophotometer. According to our findings, it was determined that GSH and CAT levels increased, and MDA levels decreased significantly in the Cisplatin + EGCG group compared to the Cisplatin group. These results show that EGCG reduces the rate of cardiac tissue damage in rats and EGCG can be used as a potential protective drug against heart damage in the future. This work was supported by the FUBAP FF.20.04 project.

Keywords: Epigallocatechin-3-gallate, Oxidative damage, Cisplatin.

LEPTIN AND OVARIAN FUNCTION IN FEMALE WISTAR RATS

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ABSTRACT

Leptin is an adipokine relating nutritional status to reproduction. This study aims to investigate the effect of leptin treatment on ovarian function in female Wistar rats during development. The experiments were carried out on 30 and 60-day-old females. Experimental treated females were administrated 8 µg/100 g body weight intraperitoneal leptin injections daily for 5 days, while controls received the same volume of NaCl solution. Rats were euthanized 24 hours after the last injection by decapitation. The ovaries were fixed in 10% formaldehyde for histological study. The recovered plasma was frozen for hormonal assays. Histological examination revealed a suspension of ovulation and an acceleration of the luteinization of granulosa cells in adult leptin-treated group in relation to the elevation of LH (Luteinizing Hormone) ($p < 0.05$*) and progesterone ($p > 0.05$). For FSH (Folliculo-Stimulating Hormone), the difference between controls and treated females was not significant in both ages ($p > 0.05$). Leptin seems to be involved in the regulation of the hypothalamic-pituitary-ovarian axis by modulating ovarian steroidogenesis *in vivo* in female Wistar rats. At supraphysiological level, it appears to alter folliculogenesis, the ovulation process and luteogenesis.

Keywords: Leptin, Ovarian function, Rats.

VIRAL DISEASES OF ALLIUM SPECIES IN UKRAINE

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ABSTRACT

Ukraine is one of the leading producers of garlic and onion which are affected by a narrow range of viruses capable, however, to significantly affect the quantitative and qualitative characteristics of the crops hence causing significant yield losses. The most dangerous viruses of these crops are leek yellow stripe virus, onion yellow dwarf virus (Potyvirus genus) and iris yellow spot orthotospovirus (*Orthotospovirus* genus), which are widespread and typical in the crops of Ukraine's neighbors: Poland and Hungary. Garlic and onion samples from different regions of Ukraine were selected for the study. Enzyme-linked immunosorbent assay and polymerase chain reaction were used to detect viruses. Also, bioassay and transmission electron microscopy were used to determine the composition of mixed infection. According to ELISA and RT-PCR, the most common virus among symptomatic plants in Ukraine was OYDV (30%), whereas co-infection of LYSV and OYDV was also common for infected plants (17%). According to the results of the work and judging by the symptoms and electron microscopy, iris yellow spot virus and carlaviruses may also add to the potyviruses in garlic and onion in Ukraine. Thus, number of symptomatic plant samples from different regions of Ukraine was studied using a range of methods confirming the occurrence of harmful viruses endangering representatives of *Allium* genera. Lack of attention to these viruses can lead to a significant reduction in yield of garlic and onions.

Keywords: LYSV, OYDV, Ukraine, onion, garlic.

A PRELIMINARY STUDY ON SEASONAL LANDSCAPE PLANT IRRIGATION WATER QUALITY OF EDIRNE PROVINCE PARKS AND GARDENS

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ABSTRACT

In this study, some physicochemical properties of the water used in the irrigation of seasonal plants used as landscape plants in parks and gardens located in Edirne city center were evaluated. Thus, pH, conductivity, salinity, chloride, calcium, magnesium, sodium, total hardness, phosphate, nitrite nitrogen, nitrate nitrogen, sulfate, and SAR (Sodium Absorption Rate) values were determined in water samples taken from 3 different sources used for irrigation of plants. In this study, it is planned that the analyzes made in the spring season will continue in the summer and autumn periods, and the species identification of the seasonal plants in the mentioned areas was also carried out. The data obtained were evaluated on the basis of the surface water resources control regulation and the quality rates determined for irrigation water, and suggestions were made by examining their effects on the development of plants.

Keywords: Landscape plant, irrigation water, water quality, nutrient salt.

COMPARATIVE ANTIMICROBIAL ACTIVITY OF BACILLUS SPP., ISOLATED FROM WASTEWATER TREATMENT PLANT AND SOIL SAMPLES

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ABSTRACT

The aim of the present study was to isolate *Bacillus* spp. from different geographical locations, capable of producing compounds with antimicrobial activity. Soil and water samples were collected from different areas under different climatic conditions. A total of 42 microorganisms were isolated from soil and wastewater samples, but five microorganisms from soil and six from wastewater samples were selected as the most active after the preliminary tests. The antimicrobial activity of the strains was determined against a great number of Gram-positive and Gram-negative bacteria, as well on fungi, using the agar well method. All of them were tested against sensitivity to the antimicrobial action of *Bacillus subtillis* ATCC 6633 for the very first time. Two strains, one from the soil sample and one from the wastewater sample exhibited very broad activities against both Gram-positive and Gram-negative microorganisms. The isolates from both samples showed inhibitory effect against *Escherichia coli* ATCC 8739 and *Bacillus subtillis* ATCC 6633. The isolates from the wastewater samples showed a larger zone of inhibition against the Gram-positive test microorganisms, compared with the isolates from the soil samples. All six isolates from the wastewater samples showed antifungal activity, while only two out of five isolates from the soil samples had inhibitory effect on the tested fungi. The results showed that wastewater and soil are a good source for isolation of microorganisms that produce secondary metabolites with antimicrobial activity.

K

eywords: Bacillus spp., antibacterial activity, antifungal activity, soil, wastewater.

EVALUATION OF CHLORPYRIFOS CYTOTOXICITY IN SERTOLI CELLS

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ABSTRACT

In general, pesticides are widely used in the control of weeds and various microorganisms that affect public health. Chlorpyrifos is an insecticide that humans are exposed to when used for agricultural and domestic purposes. Since it is found in high amounts in food products, its intake into the body becomes inevitable. Many studies have shown that chlorpyrifos has adverse effects on human health and causes toxicity on various cells and tissues. A limited number of studies of chlorpyrifos affecting the male reproductive system have shown a significant reduction in serum testosterone level, as well as in epididymal and testicular sperm count. In addition, studies have shown that chlorpyrifos also causes degeneration of the seminiferous tubules in male reproductive system. Moreover, various *in vitro* studies have revealed that chlorpyrifos disrupts signal transduction pathways, affects macromolecule synthesis adversely, and causes oxidative stress mediated by lipid peroxidation. Considering these effects of chlorpyrifos, it is important to reveal its mechanism of action and to investigate its effect on the male reproductive system in more detail. In this study, Sertoli cells were exposed to two concentrations of chlorpyrifos (100 and 500 μM) for 24 hours. After exposure chlorpyrifos, lipid peroxidation was determined by measuring malondialdehyde (MDA) content. The effects of chlorpyrifos on antioxidant system parameters were appointed by measuring antioxidant enzyme levels (SOD, CAT, and GPx). According to the findings, applied chlorpyrifos concentrations increased oxidative stress and decreased antioxidant enzyme levels in Sertoli cells. In addition, it was observed that the level of lipid peroxidation increased according to the MDA measurement result.

Keywords: Sertoli cells, chlorpyrifos, oxidative stress, cytotoxicity, antioxidant defense system.

POSSIBILITIES OF USE OF PESTICIDES IN MODEL ORGANISM GALERIA MELLONELLA L. (LEPIDOPTERA:PYRALIDAE)

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ABSTRACT

It is important to keep agricultural pests under control in order to effectively meet the nutritional needs of the increasing human population. Pesticides are preferred more in the fight against agricultural pests in terms of getting results in a short time and low costs. Any substance or mixture of substances that eliminates or somehow inhibits the development of agricultural pests is called a pesticide. The purpose of using pesticides is to destroy pests and other pests that damage nutrients.In addition to pesticides used in pest control methods, biocidal products are also used. Biocidals are disinfectants, wood preservatives, rodenticides, insecticides, and rot inhibitors. The range of possible target organisms of biocidals and pesticides is very wide. Pesticides also have effects on organisms classified as beneficial. Pesticides are classified as insecticides (insecticides), weed killers (herbicides), rodenticides (rodenticides) and fungicides and spores' killers (fungicides, fumigants) against the organism they affect. Pesticides cause chemical pollution in nature, remain intact for a long time in soil, water, fruits, vegetables and other nutrients, and can reach humans through the food chain. Pesticides cause allergic, carcinogenic, mutagenic, and teratogenic effects in humans. As a result of long-term use of chemicals, pests develop resistance to these chemicals and beneficial insect species are also adversely affected by this chemical control. Due to these effects of pesticides on the environment and living things; Biopesticides obtained from natural sources such as animals, plants, bacteria and minerals have gained importance. Biopesticides act directly on the target pest in small amounts and are easily degradable. In order to determine the mechanism of action of all natural or artificial pesticides, in vivo and in vitro experiments are carried out on model organisms. In the selection of model organism, ease of application, short life cycle, low physical needs, ease of maintenance, low maintenance costs, being able to be produced in a short time and in large numbers are taken into consideration. *Galleria mellonella* L. constitutes a very good physiological model for a better understanding of the effects of pesticides on living organisms in nature. Insects have developed central nervous systems, like those of mammals. In the same way, the peripheral nervous systems show similarity. For this reason, the toxic action mechanisms and target organs of insecticides are the same in all species. However, this toxic effect is related to the severe dose. Insecticides used against harmful insects have effects such as metabolic abnormalities, enzyme activity changes, behavioral disorders, reproductive abnormalities, parasitism, and parasite output abnormalities in insects. There are many studies on pesticides with Galleria mellonella. Our aim is to compile these studies and to reveal the mechanism of action of pesticides on harmful species.

Keywords: Pesticide, model organism, Galleria mellonella, insecticide.

CHLORPYRIFOS INDUCES CYTOTOXICITY AND GENOTOXICITY IN SERTOLI CELLS

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ABSTRACT

Pesticides, which are chemicals used to prevent insects, fungi and weeds, are used frequently in agriculture, settlements and industry. Organisms are being exposed to pesticides through air and contaminated water. Therefore, pesticides cause adverse effects on ecosystems and living things. Chlorpyrifos, a chemical belongs to the class of pesticides, is an organophosphate insecticide and is used frequently in agriculture to prevent insects or harmful organisms. Also, pesticides containing chlorpyrifos are frequently used at home. Recent studies demonstrated that the residues of chlorpyrifos are present in many agricultural food products. Therefore, the intake of chlorpyrifos into the body is inevitable. Also, recent studies indicated that chlorpyrifos causes acute toxicity at high concentrations. Previous studies demonstrated that chlorpyrifos increases the formation of reactive oxygen species in various cells. In addition, chlorpyrifos reduced the number and quality of sperm. In this study, two concentrations (100 μM and 500 μM) of chlorpyrifos were treated to Sertoli cells for 24 hours. Following the exposure time, cytotoxicity was determined by using the cell viability test (MTT assay). In addition, the genotoxic potential of chlorpyrifos and DNA damage were investigated by cytokinesis-block micronucleus cytome assay and Comet assay. The results indicated that cell viability and nuclear division index were decreased in concentration dependent manner, while micronucleus and Comet formation were increased. In conclusion, chlorpyrifos has cytotoxic and genotoxic effects on Sertoli cells, which are key cells of male reproductive system, by decreasing cell viability and inducing micronucleus and comet formation.

Keywords: Chlorpyrifos, Sertoli cells, cell viability, Comet assay, Micronucleus assay

DIVERSITY OF RHIZOBIA ASSOCIATED WITH THE ROOT-NODULES OF PHASEOLUS VULGARIS L. GROWN IN GIRESUN PROVINCE OF TURKEY

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ABSTRACT

In this study, the diversity of rhizobia which produces root-nodules on *Phaseolus vulgaris* L. grown in the Giresun province of Turkey was investigated. As a result of isolations, a total of 11 isolates were obtained from different districts of Giresun province. Ten of the isolates produced active nodules on *P. vulgaris* roots in authentication tests indicating that these isolates harbours appropriate symbiotic plasmids. The TP-RAPD analysis, performed for pre-grouping of isolates, revealed five distinct profiles that indicates different species or lineages within the isolate collection. From each TP-RAPD profile one representative isolate selected for further analysis. The phylogenetic analyses depending on *glnII* gene have assigned the isolates of TP-RAPD Profiles -I (*n:* 2) and -V (*n:* 2) to *Rhizobium leguminosarum* species complex genospecies-B (*Rlc* gs-B) and genospecies-E (*Rlc* gs-E), respectively. Isolates of TP-RAPD Profiles -II (*n:* 2), -III (*n:* 1) and -IV (*n:* 4), on the other hand assigned to *R. anhuiense*, *Agrobacterium radiobacter* and *R. giardinii*, respectively. The RFLP analysis of *nodC* gene (performed using restriction enzymes AvaII and RsaI), the most common nodulation gene used for characterisation of smbiotic plasmides in rhizobial studies, revealed one profile which indicates a single type of symbiotic plasmid within the isolate collection. As a result of phylogenetic analyses depending of the nucleotide sequences of *nodC* gene, *pSym* of the isolates in this study were associated with pRheCIAT894, pRetBra5b and pB (identified from *R. etli* isolates CIAT894, Brasil-5, CIAT 652). These symbiotic plasmids were all from Americas originated isolates which may also suggest the same origin for isolates obtained in this study. As conclusion, the most significant results in this study can be summarised as follows: (i) Concordant with the available literature a great species diversity has observed within rhizobia isolates nodulating *P. vulgaris*, (ii) *R. giardinii* was the most common species followed by *R. anhuiense*, *Rlc* gs-B and gs-E, (iii) a non-nodulating bacteria, *A. radiobacter*, was isolated from root nodules of *P. vulgaris*, (iv) A single type of symbiotic plasmid, phylogenetically related to *pSym* of Americas originated rhizobium isolates, was observed in all isolates obtained in this study.

Keywords: Rhizobium, Phylogeny, P. vulgaris

OPTIMIZATION AND CHARACTERIZATION OF POLYPHENOL OXIDASE ENZYME OF IPOMOEA PURPUREA PLANT GROWN IN VIVO AND IN VITRO.

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ABSTRACT

Ipomoea purpurea (I. purpurea) is widely used for ornamental and medicinal purposes. In medicine, the stems, seeds, roots and flowers of *I. purpurea* have been utilized in many treatments such as laxative, hallucinogen, purgative, syphilis, infertility, rheumatism, fungal infection, liver protection, acne, urinary infection, diarrhea and constipation. Although it has a wide use, studies on *I. purpurea* are quite limited. In this study, it was aimed to obtain polyphenol oxidase enzyme and compare its activities from Common-morning glory (*I. purpurea*) plants grown *in vivo* and *in vitro*. For this purpose, leaves obtained from local plants in Kocaeli region and from *in vitro* cultured plants were used to prepare crude extracts. Optimization, characterization, and activities of polyphenol oxidase enzyme from obtained crude extracts were compared. Among the plant crude extracts, it was determined that the leaves of the *in vitro* plant possessed higher polyphenol oxidase activity than local plant when catechol used as substrate.

Keywords: Enzyme characterization, Optimization, Ipomoea purpurea, Polyphenol oxidase, Polyvinylpolypyrrolidone.

THE EVOLUTION OF OROBANCHE CUMANA RACES IN SUNFLOWER CROP IN THE REPUBLIC OF MOLDOVA

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ABSTRACT

One of the most critical constraints for sunflower production in the majority of European countries, as well as in the Middle East and Asia is broomrape (*Orobanche cumana* Wallr.) – non-photosynthetic, obligatory, root parasitic plant. The continuous introduction of new resistant sunflower hybrids exerts a selection pressure on broomrape populations evolution and contribute to the development of new more virulent races that overcome sunflower genetic resistance. Thus, until now, eight races of *O. cumana*, A through H, have been identified. In this study, the chronology of broomrape races occurrence in sunflower crop in the Republic of Moldova was analysed. In Moldova sunflower broomrape was firstly attested at the end of the 19th century. In 1937 a more virulent race B was identified especially in the regions situated along the border with Romania. Later, at the beginning of 1970s, a new biotype that infested sunflower genotypes carrying genes of resistance to races A and B occurred. This new race was called the Moldovan race or race C and was found preferentially in the central part of the country. In early 2000s the presence of races D, E and F in Moldovan sunflower fields was reported. The most spread were the less virulent races A, B and D, which were found in all part of the country, followed by race E detected in the South and Centre and more virulent race F, which was identified only in the Central part. In few years, the study of racial status demonstrated the presence in the south of the country of a new highly virulent race G, which overcame all known genes of resistance. It has been established that the populations from the northern part of the Republic of Moldova belonged predominantly to race E, those from the central part of the republic – to race F and southern populations were attributed to the race G. Our greenhouse test carried out in 2014 revealed, for the first time, the presence in sunflower fields of the most aggressive race H. This pathotype was found especially in the south and centre and sporadically in the north. A research performed recently (2019-2020) showed the occurrence of new highly aggressive biotypes able to infest even the genotypes considered resistant to the most virulent race H. According to the results, in a short period of time new aggressive races of *O. cumana* occurred and spread rapidly over all Moldovan sunflower growing regions, the most virulent races G and H becoming dominant.

Keywords: Orobanche cumana, sunflower broomrape, races.

Acknowledgments: This study was supported by the national research project 20.80009.5107.01 „Genetico-molecular and biotechnological studies of the sunflower in the context of sustainable management of agricultural ecosystems", funded by the National Agency for Research and Development, Republic of Moldova.

MICROMORPHOLOGICAL, ANATOMICAL, PALYNOLOGICAL CHARACTERISTICS OF ENDEMIC COUSINIA DECOLORANS

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ABSTRACT

The genus *Cousinia* (Asteraceae, Cardueae) is known as the third largest genus in the Asteraceae family, which is represented by approximately 700 species in the world. It has the characteristics of the typical Irano-Turanian phytogeographic region and has a high endemism rate. The *Cousinia* is represented with 40 taxa, of which 28 (70%) endemics to Turkey. This study was carried out in order to contribute to the taxonomy of *Cousinia* by explaining the anatomical, palynological and micromorphological features of *C. decolorans* species. The plant samples of *C. aucheri* were collected from natural habitats in this study. The specimens have been kept in Selcuk University Herbarium (KNYA). For palynological studies, pollen material were obtained from herbarium specimens, the pollen slides were prepared according to Wodehouse (1935) method. For anatomical studies, living material was kept in 70% ethanol. The paraffin method was used for cross sections of stems, leaf, and midrib. The sections were taken by microtome and stained with safranin and fast-green (Johansen 1940). Transverse sections taken from the stem, epidermis is one layered, consists of oval or rectangular cells and covered by cuticle. The cortex is composed of 7–8 layers of oval, rectangular or orbicular parenchymatous cells. The phloem is encircled by sclerenchymatic cells. In the cross section of the leaf, the mesophyll consists of elongated palisade and spongy paranchyma cells. The midrib shape is almost triangular. There is three large vascular bundle in the center. The pollen grains of *C. decolorans* are radially symmetrical, isopolar and have a tricolporate aperture. The shape of pollen grains is oblate, medium size.

Acknowledgement: I would like to express our appreciation to the Selçuk University Scientific Research Project Commission, which supported this study (Project No: 20401134).

Keywords: Achene, Asteraceae, Cousinia, Endemic, Palynology.

THE EFFECTS OF SALICYLIC ACID ON SOME PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS OF BREAD WHEAT CULTIVAR BEZOSTAJA -1 (*TRITICUM AESTIVUM* L.)

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ABSTRACT

Wheat is one of the important industrial crops. Two wheat species bread wheat (*Triticum aestivum* L.) and durum wheat (*Triticum turgidum* L.) are mostly planting in the worldwide. While bread wheat is hexaploid (2N=6X=42 chromosome), durum wheat is tetraploid (2N=4X=28 chromosome). The aim of this study was to investigate the effects of different concentrations of salicylic acid (SA) on germination rate, some physiological parameters of shoot and root (length, fresh and dry weight, relative water content) and some biochemical parameters of shoot (proline, malondialdehyde, hydrogen peroxide and protein content, antioxidant enzymes (superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidase (APX)). Different concentrations of SA (10^{-2}M, 10^{-4}M, 10^{-6}M, 10^{-8}M, 10^{-10}M and 10^{-12}M) were prepared from 1M stock SA solution. Seeds were imbibed with distilled water (control) and different SA concentrations for 2 hours. After that, seeds were planted into plastic pots or planting tables. Wheat seedlings were harvested after 10 days. According to germination rate results, 10^{-2}M SA application inhibited germination of wheat seeds. On the other hand, 10^{-12}M SA significantly promoted germination rate. Root length was significantly affected by SA. 10^{-10}M SA application had the highest root length compare to other applications. While there was not any significant change in shoot fresh weight, 10^{-8}M SA caused significantly increase in root fresh weight according to control, 10^{-4}M, 10^{-6}M, and 10^{-10}M SA applications. There was no important difference on MDA and proline contents between SA applications and control. The highest hydrogen peroxide content was at 10^{-12}M SA application and significantly higher than 10^{-4}M, 10^{-6}M and 10^{-10}M SA. Seed imbibition with SA caused significantly increase in soluble protein content of bread wheat shoot tissue. The highest APX activity was at 10^{-10}M SA treatment however only importantly higher than 10^{-12}M SA treatment. SA-6 and SA-10 treatments had significantly more CAT activity than control.

Keywords: Salicylic acid, Bread wheat, Germination rate, Bezostaja-1.

Acknowledgement: This study was supported by Van Yüzüncü Yıl University Scientific Research Projects Department (Grant number FYL-2019-8007).

MOLLUSCS FROM SHALLOW COASTAL HABITATS OF SAZANI ISLAND, ALBANIA

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ABSTRACT

The coastal and marine area of Sazani Island is part of the Marine National Park Karaburun-Sazan, proclaimed as such in 2010. Existing data on benthos and especially molluscs of this area is very limited, mainly based on sporadic assessments, or short surveys during other assessments that have been carried out for Vlora Bay. This paper gives data on species composition of molluscs' community and a general assessment of its quantitative characteristics, seasonal variations and stability in the studied area. A total of 24 molluscs' species were recorded, of which 21 are gastropods, 2 are bivalves and 1 is polyplacophora. 9 species recorded in this study are in the existing Red List of Flora and Fauna of Albania, with different threat status. It's worthy to highlight the presence of the bivalve *Lithophaga lithophaga*, the date mussel, a species of international concern that is included in the lists of protected species of Bern Convention and CITES. Quantitate assessments revealed that seasonal variations were relatively high, in both species number and abundance. The presence of endangered species shows the importance of this area at national and regional level. Molluscs have important ecological roles, as well as economic importance in the region, but habitat degradation along with overexploitation may threaten natural resources in the Sazani Island marine and coastal area.

Keywords: gastropods, bivalves, rocky coast, MPA Karaburun-Sazan, Adriatic Sea, Albania.

ECOLOGICAL SURVEY OF MOST IMPORTANT BIOCENOSIS OF ALGAE AND SEAGRASSES OF SAZANI ISLAND, ALBANIA

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ABSTRACT

Marine and coastal habitats of Sazani Island are characterized by important communities and species, including rare and endangered species at national and international levels. The present paper reveals the results of a benthic survey on most important biocenosis of algae and seagrasses carried out along the coasts of Sazani Island. The presence of three species of regional and international importance, namely associations with the alga Lithophyllum byssoides, the seagrasses Posidonia oceanica and Zoostera noltei has been considered of a high relevance. Cover has been evaluated for algae and seagrasses, while for the meadow of Posidonia oceanica the upper and lower depth limits have also been recorded, as well as shoot density. Findings of this study highlight the urgent need for conservation measures to protect the area, to implement medium and long-term monitoring and to improve its conservation state.

Key words: Posidonia oceanica meadows, MPA Karaburun-Sazan, Adriatic Sea.

VARIATIONS OF ALLERGENIC AMBROSIA AND ARTEMISIA POLLEN IN THE BALIKESIR ATMOSPHERE, TURKEY

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ABSTRACT

Pollen grains of *Ambrosia* and *Artemisia* have a high allergenic effect on susceptible individuals. *Ambrosia* has about 40 taxa worldwide, and a total of three species are found in Turkey (*A. maritima* L., *A. artemisiifolia* L., *A. tenuifolia* Spreng.). *Ambrosia artemisiifolia*, a naturalized invasive species, is distributed mainly with small populations through North Anatolia. It has been reported that, the pollen grains of *Ambrosia* are listed among the most critical aeroallergens in the world. *Artemisia* includes more than 500 species in the world but in Turkey, they are represented by 27 taxa. This study aims to determine daily concentrations, Main Pollen Seasons (MPS), and durations for atmospheric *Ambrosia* and *Artemisia* pollen in the Balıkesir Atmosphere. An aerobiological study was performed in 2019 using a volumetric Hirst type sampler (Lanzoni VPPS 2000). Slides were examined daily, and pollen amounts were calculated as m3 air. The Main Pollen Seasons (MPS) and durations were analyzed according to the 95% method. During the sampling period, 393 pollen belonging to the *Ambrosia* and *Artemisia* genera were determined (*Ambrosia*: 283 pollen, *Artemisia*: 110 pollen) in Balıkesir atmosphere. The highest concentrations were found in August (*Ambrosia*: 172 pollen, *Artemisia*: 44 pollen). Looking at the MPS for each taxon; While MPS for *Ambrosia* was found between 31 July and 11 October, it was found between 23 July and 1 November for *Artemisia*. In comparison, The MPS duration of *Artemisia* was found longer than *Ambrosia* (102 days and 73 days). Although any plant belonging to the *Ambrosia* genus has not been seen or collected from Balıkesir province.The reason for the dominant observation of *Ambrosia* pollen in the atmosphere of Balıkesir may be due to the presence of the invasive *Ambrosia artemisiifolia* in the region or its pollen may be transported to Balıkesir by long-distance transport from Northern Turkey.

Keywords: Pollen monitoring, Main pollen season, Mugwort, Ragweed

EFFECTIVE CONCENTRATIONS OF CORAGEN® ON LARVAL STAGE OF ARCHIPS ROSANA (LINNAEUS, 1758) (LEPIDOPTERA: TORTRICIDAE)

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ABSTRACT

This study aims to determine the effects of the insecticide *Chlorantraniliprole* (trading name Coragen®) on larvae of the moth species *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae). *A. rosana,* known as the European leaf roller (ELR), is a nocturnal member of the Tortricidae family of Lepidoptera. It is a species that is native to the Palearctic region, but it is found all over the world, with the exception of the Far East and Siberia. *A. rosana* is of paramount importance in plant protection as it leads to great economic losses in various plant cultivations. Larvae were collected in the field from April to June 2020 from insecticide-free members of Rosaceae in Edirne province with minimum direct contact and brought to the laboratory. The larvae were exposed to agricultural application (recommended dose) and diluted doses (1.10-1, 1.10-2, 1.10-3 and 1.10-4) of Coragen® to determine the LC50 values. It was found that LC50 concentrations were 25,751 µg/ml (48h), 1,715 µg/ml (72 h), 0,499 µg/ml (96 h). This study was performed to determine the effects of various doses of Coragen®, an insecticide widely used in agricultural fields, on *A. rosana* larvae. Decreased insecticide applications mean decreased exposure to chemicals hazardous to environment and human health. This study, therefore, can provide contributive data to be used in Integrated Pest Management methods. The most important reason for selecting this topic is to minimize the excessive and unconscious use of insecticides against pests. In this sense, diluted application doses of the insecticide Coragen® are important in terms of environmental pollution and human health.

Keywords: Coragen®, insecticide, Archips rosana, LC50, larva.

THE EFFECT OF SAMBUCUS NIGRA EXTRACT ON GALLERIA MELLONELLA TOTAL HEMOCYTE COUNT

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ABSTRACT

European elder (*Sambucus nigra*) is distributed in Europe, Asia, and North Africa. It is used in traditional treatments as diaphoretic, diuretic, astringent, emollient, and emetic. At the same time, health support products containing *S. nigra* are offered for sale in pharmacies. Many studies have shown that the fruits of *S. nigra* are antioxidant and anticarcinogenic. Its effects on cardiovascular diseases and its anti-inflammatory properties have been demonstrated in clinical trials. The greater wax moth (*Galleria mellonella*) is a preferred model organism in immunity studies because its innate immunity characteristics have similarities with mammals. This invertebrate model organism is preferred for research with human pathogens because it survives at 37ºC and the data obtained from *G. mellonella* are comparable to mammalian models. This study was carried out to determine the effect of *S. nigra* on the total hemocyte count of the model organism *G. mellonella*. Dried *S. nigra* fruits taken from herbalists were extracted with 70% ethanol in a soxhlet device. The stock solution was prepared by dissolving the extract in distilled water (DW) at a rate of 500 mg mL-1. 500 to 5 mg mL-1 dilutions of this stock solution were determined as experimental doses. According to the results of our study, it was determined that S. nigra increased the hemocyte count significantly compared to the control and DW groups at doses of 25 mg mL-1 and above. Whether this increase in hemocyte count is due to a mutagenic effect or to stimulating immune responses should be clearly demonstrated. According to these data, the effects of *S. nigra* fruit extract, which causes an increase in hemocyte count at all doses, on immunity should be examined in more detail.

Keywords: Sambucus nigra, Galleria mellonella, Total Hemocyte Count, Innate Immunity.

EFFECTS OF MICROWAVE ENERGY ON GERMINATION, SOME PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS OF WHEAT

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ABSTRACT

This study was conducted using two wheat varieties (*Triticum aestivum* L. Elbistan Yazlığı and Kayseri Pınarbaşı population). Effects of middle level microwave energy on the germination of seeds, seedling growth, total protein, thiol, GST and chlorophyl content of seedlings were examined. A part of seeds were soaked in water for 12 hours, the other group were used as dry. Dry and soaked seeds were exposed to energy in a household microwave oven at middle level (460 W) for 30, 60 and 90 seconds. Neither water nor microwave treated seeds were used as control group. Seeds were observed in terms of germination for 3 days under controlled conditions (25 oC, 16/8 hour light/dark photoperiod) and percentage of germination was taken. At the end of 7 days following seeding, fresh weight, height of root and shoot, total protein, chlorophyl, thiol and GST content of seedlings were calculated. With prolonged microwave exposure, germination percentage of seeds decreased when compared to control group. No germination was observed in the soaked seeds with 90 seconds microwave exposure. Shoot and root lengths, fresh weight of seedlings grown up from dry seeds were not affected by negatively. On the other hand fresh weight of seedlings evolved from soaked seeds decreased gradually. Similarly chlorophyl content was lower with increasing duration of microwave energy. There was no significant effect of microwave on total protein content. Total GST activity and thiol ratio were rised in Kayseri-soaked, Kayseri-dry and Elbistan-dry samples depending on time, but just the opposite for Elbistan-soaked samples.

Keywords: Triticum aestivum L., microwave energy, germination, vegetative growth.

METABOLIC SYNDROME STUDY, AN ASSOCIATION BETWWEN DIABETES MELLITUS AND HTA DISEASE IN SHIJAK POPULATION. GLYCEMI, TRIGLYCERIDES AND HDL-CHOLESTEROL LEVELS STUDY

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ABSTRACT

The aim of the study is to determine the association between Diabetes Mellitus and HTA disease, and the risk of patients with diabertes mellitus to increase the probability for hypertension and coronary artery disease. In this study are evaluate the levels of triglycerides, glycemi and HDL- Cholesterol, the correlation between them, to explain the relation of these components and the affect that they have together for the metabolic syndrome risc, among 245 of the patients (108 male and 137 female), separated in I, II, III, IV, V, VI, VII age group, with 0- 15 years for I age group, and 10 years difference from each other in II, III, IV, V, VI, VII age group. The metabolic syndrome was defined by the presence of these components: abdominal obesity, hight blood pressure, hypertriglyceridemia, low HDL-Cholesterol, and hight fasting glucose. In the study population, patients with diabetes mellitus have 13 % prevalence for metabolic syndrome and the patients with HTA have 12 % prevalence for metabolic syndrome. Hight levels of glycemi and triglycerides increases with the age. Individs number with diabetes mellitus and HTA increase with the age. The highest value of glycemi in patients with diabetes mellitus is in the V- age group with average value of 214 mg/ dl. For triglycerides the highest value is in the VI- age group. with average value of 165 mg/ dl. Increasing of triglycerides and glycemi levels have positive correlation with each other, for each disease- diabetes mellitus (is clearly seen in V, VI, VII age group) and HTA (is clearly seen in IV, V, VI, VII age group). The knowledge for metabolic syndrome can prevent this metabolic abnormalities in early stages and help the patients for an exact diagnosis and to follow a regular llifestyle: a balanced diet, physical activity, avoiding sedentary living and a routine medical examination.

Keywords: Metabolic Syndrome, Diabetes Mellitus, HTA, Triglycerides, Glycemi

USING OF EXTERNAL SECRETIONS OF TRICHODERMA HARZIANUM AND T. VIRIDE AS ANTIFUNGALS TO DIFFERENT TYPES OF PATHOGENIC FUNGI

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ABSTRACT

The study aimed to assess growth inhibitory effect of *Trichoderma harzianum* and *Trichoderma viride* crude extracellular extract in a concentrations of (0.1, 0.5, 1, 2, and 3mg/ml) on common human and plant pathogenic fungi. The human pathogenic fungi (*Trichophyton equinum, Trichphyton simii, Microsporum audouinii, Microsporum boulardii, Microsporum gypseum*) were isolated from 50 patients with various ringworm infections attended the dermatology clinic at Al-Salam teaching hospital in Mosul between Sept. 2010 to Sept. 2011. The phytopathogenic fungi samples (*Alternaria sonchi, Aspergillus nigar, Aspergillus ustus, Cladosporium oxysporum,* and *Penicillium citrinum*) were gathered from black raisins purchased from the local market in Mosul city. The results show that dermatophyte growth rate inhibition began at a concentration of 1mg/ml and peaked at a concentration of 3mg/ml, almost equal to standard control antifungal drug (Ketoconazole). Plant pathogenic fungi was totally inhibited at lower concentration. In general, crude extract of *T.harzinum* is superior to *T. viride* at the same concentratin. In conclusion, crude extracellular extract of *T.harzianum* and *T.viride* inhibits growth rate of human and plant pathogenic fungi in vitro at concentrations ranging from 1-3 mg/ml. More research is required to establish the extract's safety and efficacy in vivo.

Keywords: *Trichoderma harzianum, Trichoderma viride*, crude extracellular extracts, Dermatophyte, plant pathogenic fungi.

RECENT DISSIPATIVE PARTICLE DYNAMICS PARAMETERIZATION MIMICS EXPERIMENTAL STRUCTURE AND PROPERTIES OF WATER AND ALCOHOLS

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ABSTRACT

Mimicking experimental properties of water and simple hydrogen bonding liquids (methanol, ethanol and n-propanol) via simulations has been one of the major challenges in the modeling community. So far, atomistic molecular dynamics simulations have been employed to study the structure and thermodynamic properties of such systems at their pure-liquid states or in liquid mixtures. Recently, attention has been given at the coarse-grained scale to characterize these properties due to the presence of water in complex environments such as physiological conditions and interacting with polymers. One of the challenges in parameterizing the coarse-grained interactions is the absence of atomistic detail, which leads to poor definition of interactions. Moreover, poorly defining interactions would possibly lead to unrealistic mesoscopic structure and properties. With this motivation, we aim at building a parameterization scheme for a coarse-grained method, namely dissipative particle dynamics (DPD) to achieve a realistic modeling of hydrogen bonding liquids. Our parameterization scheme involves the contribution of hydrogen bond interactions as computed from a statistical mechanics approach combined with a fine-tuning of interactions based on experimental radial distribution functions (RDF). The results describe the experimental RDF and some physical properties of water and low molecular weight alcohols (i.e., methanol, ethanol and 1-propanol) such as viscosity, angle distribution and isothermal compressibility reasonably well. With the proposed parameterization, we hope to extend the current parameterization practice of DPD to cover a wider range of applications, where hydrogen bonding interactions are dominant.

This work is supported by TUBITAK (project no. 119Z034).

Keywords: DPD, Simulations, Molecular Dynamics, Hydrogen Bonding.

INVESTIGATION OF THE BIOACTIVITY OF CENTELLOSIDE COMPOUNDS OF CENTELLA ASIATICA (L.) URBAN PLANT REGENERATED IN VITRO.

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ABSTRACT

Centella asiatica (L.) Urban has been used since ancient times for wound healing, diseases such as psoriasis and eczema. The main secondary metabolites of *C. asiatica*, known as centellosides, include asiaticoside, madecassoside and their aglycones, madecasic acid, asiatic acid. *C. asiatica* plant and its extracts are used for cosmetic products with anti-aging, anti-wrinkle, antioxidant, anti-microbial activities. In this study, callus and suspension cell lines was obtained from explants of *C. Asiatica* regenerated *in vitro*. Explants obtained from the *in vitro* plant were incubated in MS medium supplemented with different concentrations and combinations of Plant Growth Regulators. The most productive callus cell line was obtained in MS medium supplemented with 2,4-D and kinetin. The amounts of centellosides and other polyphenol compounds were analyzed by LC-MS/MS. The total amount of phenolic compounds was determined by the Folin-Ciocalteu reagent test and the antioxidant activity was determined by the DPPH free radical scavenging activity assay. Elicitor treatments are carried out to increase the production of centellosides and polyphenols.

Acknowledgments: This work was supported by the ACTV Biotechnology company.

Keywords: cell suspension culture, Centella asiatica, centellosides.

INCORPORATION OF FIBERS INTO A POLYVINYL CHLORIDE MATRIX

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ABSTRACT

The good compatibility interfacial adhesion in the composite materials makes the properties exciting such as lightweight, high strength, corrosion resistant, withstand high temperature, stiffness, and easily formed in the industrialization process than classical materials. Due to this, there is a great interest for around use of reinforcements and matrices obtained from renewable resource, such as natural fibres and biopolymers, thus perform to the development of new materials eco-friendly and more sustainable. In this study we focuses on the development of composite materials made of 75% Polyvinylchloride (PVC) matrix and with 25% a reinforcement of Date palm fibers (FDP). Fibre/matrix interaction can be give improved by chemically modifying the surface of the fibres to increase their compatibility with the matrix for that reason we treated the fibers with alkaline NaOH solution of 2% for 1 hour. The effect of the palm fibers treatment was evaluated by FTIR, is revealed a partial removal of lignin and hemicelluloses that make better the interfacial adhesion PVC/palm fiber [1]. The experiment results show that surface treatment of palm fibers could improve the mechanical and thermal properties of palm fiber and interface bonding strength of the PVC/palm fiber compared to those with untreated fibres [2].

Keywords: Interfacial adhesion, Polyvinylchloride, alkaline treatment, mechanical properties, thermal properties.

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ABSTRACT

The use of marine by-products has become one of the major challenges in recent years. There has been a need to modify these materials by using sterile, non-hazardous and ecological procedures. Biological by-products from marine organisms are known renewable as highly volatile materials which can be easily tunable in different composite substances production. The easily changeable properties of marine biomaterials have led to an increase in the usage of these materials n biomedical approaches. Chitosan from shellfish and gelatin or collagen from fish skin has gained importance over the recent years owing to their admirable benefits. With a better understanding of the importance of the usage of natural and tunable materials in bio-medical approaches, marine organism derived materials have started used commonly. The yields, shapes, sizes, and other physical-chemical characteristics of marine-derived by-products vary depending on the used species, extraction process and the target utilization procedure. The exhaustivity of manufactured marine by-products have capacitated future uses for biomedical applications such as tissue engineering and tissue regeneration. This study summarizes the existing approaches for the production of marine byproducts from plants, shellfish and fish species. The valorisation strategies of by-products, the differences of material biomass, biopolymers, and their stabilization capacities were compared. The current status and potential problems related to large-scale industrial-scale production. All the collection, processing of marine by-materials, production of biomaterials and utilization of these biomaterials in biomedical approaches have been highlighted. This work may investigate deeply several biomaterials from marine by-products for novel admirable sources for biomedical approaches.

Keywords: chitosan, gelatin, biomaterials, valorisation,marine animal,biomedical approaches

MISCONCEPTIONS IN BIOLOGY TEACHING AND THEIR REASONS

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ABSTRACT

The aim of this study is to determine the misconceptions in the basic subjects of biology and the reasons for these misconceptions. Misconceptions are an educational problem that can be encountered at every stage of life from a very young age. Studies have shown that even those who teach have misconceptions about the subjects they are expected to be experts in. Since the formation process of misconceptions spans a very large period of time, the reasons for their occurrence should be carefully examined, and measures should be taken to detect and eliminate them at every stage of education. In order to solve a problem completely, first of all, the sources of the problem should be investigated and learned. As long as the teaching techniques do not correct the misconceptions of the students, they cause new misconceptions to emerge. Therefore, misconceptions should be tried to be eliminated by using different teaching methods other than traditional methods. Studies conducted in our country in recent years show that concept maps and conceptual change methods are effective teaching methods in eliminating misconceptions. Research shows that children learn biology better with a constructivist approach.

Keywords: Biology Education, Student, Teacher, Misconceptions.

PHOSPHATE REMOVAL FROM WATER USING ACTIVATED CARBON DERIVED FROM AMPELODESMOS MAURITANICUS STEMS

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ABSTRACT

In this paper, the synthesis and characterization of *Ampelodesmos mauritanicus* stems activated carbon (AMSAC) were studied. The produced activated carbon by phosphoric acid activation followed carbonisation was characterized by N2 adsorption-desorption isotherm, scanning electron microscopy (SEM), energy-dispersive X-ray (EDX) analysis, and Fourier transform infrared (FTIR) spectroscopy. Sorption potential of AMSAC for the removal of phosphate ions from water was investigated. The effects of contact time, initial pH and initial phosphate concentration on the sorption process were studied. The optimum contact time and pH for removal of phosphate ions was 75 min and pH 6-7. The experimental data found that AMSAC had high Brunauer-Emmett-Teller (BET) surface area of 1293 m2 /g and abundant pores with specific volume of 1.23 m3/g . FTIR analysis reveals various functional groups on the surface of AMSAC which can be play an important role for the adsorption process. Langmuir isotherm model fitted well the equilibrium data for the sorbent comparing to the Freundlich, Tempkin and Dubinin-Radushkevich isotherm models. The monolayer sorption capacity of AMSAC for PO4-3 ions was found to be 4.52 mg/g at 25 °C. Experimental data were also modelled using the sorption kinetic models. It was found the kinetic data were described better by the pseudo-second-order adsorption kinetic model.

Keywords: Ampelodesmos mauritanicus stems, Adsorption, Active carbon, phosphate, Eutrophisation.

INVESTIGATION OF IN-VITRO FLUORESCENT PROBE PROPERTIES OF A PYRAZOLINE DERIVED MOLECULE

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ABSTRACT

Chalcones are an important class of natural substances commonly found in vegetables, fruits, soy-based foods, spices, and tea, known as α, β unsaturated ketones. Chalcones are sub-classified as pyrimidines, pyrazolines, flavones, quinolines, and most of them show biologically active properties. In particular, many pyrazoline compounds have biological activities such as antimicrobial, antifungal, antidepressant, anticonvulsant. In addition, due to the high fluorescence characteristics of pyrazoline derivatives, there is a wide field of study, from bio-labeling to optoelectronics, from chemical sensors to non-linear optics, as luminescent materials. In this study, the ability of a hydrazined chalcone derivative pyrazoline isomer compound (4-(5-(pyridine-2-yl)-4,5-dihydro-1H-3-yl) phenol) to be a suitable fluorescent probe for biological systems was investigated. For this purpose, the molecule's behavior in different solvent environments and its interactions with Sodium Dodecyl Sulfate (SDS), which is accepted as an in-vitro model membrane system, were investigated using absorption and fluorescence spectroscopy techniques. Photophysical properties were determined with the spectral data obtained from these techniques. To determine the suitability of the molecule with fluorescent properties for biological system studies, its cytotoxicity was investigated by in-vitro cancer cell line studies, and it was determined that the molecule was not toxic. To determine whether this molecule can be used in cell imaging techniques, confocal microscope images were obtained by in-vitro cell application. As a result of this study, it was understood that the molecule stains both the nucleus and the cytoplasm of the cell; therefore, it can be used for fluorescent cell staining at 360 nm wavelength in cell imaging processes.

Keywords: Pyrazoline, cell-staining, confocal microscopy, fluorescent material.

WEB-BASED BIOINFORMATICS SEQUENCE ANALYSIS SOFTWARE APPLICATION

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ABSTRACT

At the present time, DNA, RNA and protein sequence analysis studies are carried out in several scientific fields such as biophysics and bioinformatics, and different sequence analysis software applications are used in these studies. Gene analysis software, protein-protein interactions analysis software, drug design software and simulation software can be given as example for these analysis software applications. In this study, a web-based software application that can be used within the Trakya University Medical Faculty Department of Biophysics have been developed and it is planned to be opened to the service of scientists. This web-based software application, transform operations in specified DNA, RNA or protein sequence and specified range in specified sequence direct, reverse or conjugate if the sequence is DNA. This software application is written using JavaScript, a programming language used for Web, and it is planned to work on many platforms such as desktop computers and mobile phones. In this study, it was seen that this sequence analysis software application runs as efficiently. It is consideration that by using this web-based software application, it will contribute to sequence analysis-based studies in biophysics, bioinformatics and other disciplines.

Keywords: biophysics, bioinformatics, sequence, analysis, software.

CHEMICAL COMPOSITION, ENANTIOMERIC DISTRIBUTION, ACUTE TOXICITY AND ANTIOXIDANT ACTIVITIES OF ARTEMISIA ARBORESCENS ESSENTIAL OILS FROM THE WESTERN ALGERIA

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ABSTRACT

The chemical composition of the essential oils (EOs) extracted by hydrodistillation from the aerial parts of *Artemisia arborescens*, collected from two regions of Algeria (Sidi Bel Abbes and Bechar), was studied by both gas chromatography (GC) equipped with an enantioselective capillary column and GC-mass spectrometry (GC/MS). The acute toxicity of the EOs was assessed using Lorke's approach. The antioxidant activity was tested using four methods (DPPH radical scavenging activity, ferrous ion chelating activity (FIC), ferric reducing antioxidant power (FRAP) and inhibition of β-carotene oxidation assay). By means of GC and GC/MS, 41 compounds were identified, accounting for 96.0-98.8% of the total EO. All EOs showed a similar terpene profile, which was rich in chamazulene, β-thujone and camphor. However, the concentration of such compounds varied among the EOs. The enantiomeric distribution of α-thujone, β-thujone, camphor, linalool and terpinen-4-ol was determined. The toxicity of Bechar's EO was higher than Sidi bel abbes's EO with LD50 of 1264.91 and 2154.07 mg/kg respectively. The FIC activity gave a result higher than 95% and the β-carotene oxidation was inhibited with a percentage higher than 50% for both samples.

Keywords: Enantiomeric distribution, acute toxicity, DPPH, FIC, FRAP, β-carotene.

IN SILICO ANALYSIS OF STRUCTURAL AND FUNCTIONAL CONSEQUENCES OF NON-SYNONYMOUS SNPS IN THE HSPA1A GENE IN CATTLE

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ABSTRACT

Climate change is considered to be the main problem for sustainable livestock production in tropical and subtropical regions of the world. The increase or decrease in the adapted ambient temperature causes heat stress. Heat stress causes a decrease in feed consumption, fertility, growth and milk yield in livestock. Therefore, determining the genetic mechanisms of stress tolerance is of great importance. Breeding programs using the right genetic markers can help to obtain a population of animals that can overcome the effects of heat stress. Heat Shock Protein Family A (HSP70) Member 1A (HSPA1A) has important cytoprotective effects and is involved in many regulatory pathways involved in cell stress response. Along with other heat shock proteins, HSPA1A plays a role in protecting cells from heat shock by protecting cellular proteins from denaturation. It also takes part in the modulation of the immune system by ensuring the proper folding of proteins and regulating apoptosis. HSPA1A variants are associated with thermo-tolerance and immune-modulation in livestock. The aim of this study evaluates the structural and functional effect of all non-synonymous SNPs (nsSNP) of the HSPA1A gene. In total, 79 nsSNPs were retrieved from the Ensembl Variation database. The functional impact of these variations was assessed using eight *in silico* programs (SIFT, PANTHER, PhD SNP, MAPP, PolyPhen-1, PolyPhen-2, PROVEAN, SNPs&GO) and a metaserver (PredictSNP). All bioinformatics tools predicted 18 variations as deleterious and these were subjected to further testing using Consurf, Mu-Pro, I-mutant, Swiss PDB Viewer. Consurf analysis was used to identify conserved amino acid residues and predict the structural-functional consequences of variations. Protein structural analysis was performed by using Mu-Pro, I-mutant, Swiss PDB Viewer. As a result of structural and molecular studies, 8 variants (T145P, R155G, G184R, G201R, G202E, V219G, G229C, K271T) in the ATP binding domain were predicted to be highly deleterious. These marker candidates for disease resistance and tolerance to heat stress in bovines need confirmation by laboratory research.

Keywords: Consurf, Swiss PDB viewer, I-mutant, Mu-Pro, PredictSNP.

THE C677T AND A1298C METHYLENETETRAHYDROFOLATE REDUCTASE GENE POLYMORPHISMS AND ALZHEIMER'S DISEASE IN AN ALGERIAN POPULATION

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ABSTRACT

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. 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. 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. Our results did not reveal an association between C677T and A1298C MTHFR polymorphisms and AD risk.

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

STUDY OF EFFECT OF VARIETAL PROFILE AND MANUFACTURING METHODS ON THE ANTIBACTERIAL ACTIVITY OF APPLE VINEGAR

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ABSTRACT

Apple vinegar is a natural product produced by double fermentation. The apple variety and production methods are two factors that play a major role in determining the quality of vinegar. Therefore, this study aims to determine the quality of apple vinegar samples from different varieties prepared by three methods, through determining the physicochemical properties and antibacterial activity of these samples. The antibacterial activity was studied against five pathogenic bacteria using two methods, the first is disk diffusion and the second is microdilution for determinate the Minimum Inhibitory Concentrations and Minimum Bactericidal Concentrations. The results of this study showed that the low pH value was 3.6 for S*tark delicious* obtained by liquid fermentation and the high acetic acid value was 4.7% and 4% for the vinegar of *Red delicious* and *Golden delicious* prepared by the solid fermentation, respectively. The results of the antibacterial activity showed considerable activity of apple vinegar on the tested strains. Generally, the *Staphylococcus aureus* strain appears less sensitive against all samples, while the other strains have distinct sensitivities depending on the variety studied and the method used. Higher antibacterial activity was found in apple vinegar of AP method and *Red delicious* variety. The MIC and MBC recorded was 1.95 mg/mL and 3.90 mg/mL, respectively. The choice of apple variety and production method is therefore an essential step in determining and aiming for the desired quality of apple vinegar.

Keywords: antibacterial activity; apple cider vinegar; dietary; the minimum lethal concentration; minimum inhibitory concentration, Morocco.

COMPOST AS AN ECO-FRIENDLY ALTERNATIVE TO MITIGATE SALT-INDUCED EFFECTS ON GROWTH, NUTRITIONAL, PHYSIOLOGICAL AND BIOCHEMICAL RESPONSES OF DATE PALM

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ABSTRACT

In this research, the impact of compost supplementation in alleviation of saline stress adverse effects on date palm seedlings development and growth was investigated. Date palm plants were prepared in a completely randomized design, with or without green waste compost application, and irrigated with two solutions (0 mM and 240 mM NaCl). Growth, mineral uptake, photosynthetic pigments, oxidative stress indicators accumulation and antioxidant system defense were assessed. Plants irrigated with saline solution recorded low values of growth traits while the application of compost increased these attributes under 240 mM NaCl. Salinity heightened sodium (Na+) and chlorine (Cl-) ions concentration and reduced phosphorus (P), nitrogen (N), potassium (K+) and calcium (Ca2+) uptake. The organic amendment lessened these effects by improving the concentrations of essential elements (P, K+, N and Ca2+) in both plants shoots and roots and by limiting salt ions (Na+ and Cl-) toxicity which induced higher K/Na and Ca/Na ratios. Furthermore, leaf water status, stomatal conductance and photosynthetic efficiency were increased and were coupled with high chlorophyll contents and protein concentrations in plants amended with compost under salt stress conditions. Otherwise, NaCl stress induced high lipid peroxidation and H2O2 accumulation; however, the application of the green waste compost lowered these two parameters in stressed plants through stimulation of the antioxidant enzymes activity and increasing soluble sugars and proline accumulation. Results suggest that the green waste compost application can boost the tolerance of date palm in salt-affected soil by alleviating the different adverse effects of salinity stress.

Keywords: salinity; compost; mineral uptake; antioxidant system; salt tolerance; date palm.

ENHANCED PRODUCTION OF SECONDARY METABOLITES BY RHIZOBIUM RHIZOGENE MEDIATED HAIRY ROOT INDUCTION IN MORINGA OLEIFERA

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ABSTRACT

Moringa oleifera known for its nutritional and medicinal properties belongs to family Moringaceae, contain valuable metabolites with multiple functional properties. In this study an in vitro technique was adopted to enhance metabolic properties of this plant. Hairy root culture is a biotechnological tool to increase yield of metabolite contents in transformed roots comparative to intact plant. *Rhizobium rhizogene* a soil borne bacterium caused hairy root formation at the site of infection, these roots have ability to proliferate in artificial media without any phytohormones. Segments of stems were used as explants and dipped into suspension of A 9402 on different infection time duration and co cultivation duration on different days. Results suggested that maximum induction was observed at 30 minutes of infection time while promising co cultivation period were observed on 3rd day. Molecular analysis showed successful integration of oncogenes *rol*B (670bp) and *rol*C (534bp) along with *aux*1 (350bp) and (*vir*D 438bp) which is confirmed by PCR. These transformed roots were further optimized on MS medium with varying sucrose concentrations for maximum growth. 10 folds increase in growth of transformed root mass was evident in liquid 1/2 MS medium supplemented with 30% sucrose after 42 days. Transformed hairy roots showed greater amounts of phenolic contents (44.87 mg g-1) and flavonoid contents (40.98 mg g-1) in comparison of non-transformed roots of *Moringa oleifera*. By this genetic manipulation, these transformed roots can be established and grown in liquid MS basal medium for maximum production of secondary metabolites.

Keywords: Hairy root induction, Rhizobium rhizogene, Secondary metabolites, Moringa.

ASSESSMENT OF ARBUSCULAR MYCORRHIZAL FUNGI INFECTIVITY UNDER ARID AND SEMI-ARID CLIMATE AND ITS EDAPHIC DETERMINANTS AS A KEY OF EFFICIENT PALM GROVES RESTORATION

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ABSTRACT

Oases in arid and semi-arid areas figure among the most affected and degraded ecosystems. An efficient restoration of these ecosystems requires involvement of their different components like arbuscular mycorrhizal fungi (AMF), which play a pivotal role in plant growth and resistance to biotic and abiotic stresses, soil structure and fertility improvement. To date, indigenous AMF remain poorly unexplored and underutilized but could be a potential resource for successful restoration programs. In this study, we evaluated the infectivity of AMF of five degraded oasis soils in Morocco (Marrakesh, Tafilalet, Draa, Tata-Guelmim and Figuig palm groves). Our data show that mycorrhizal status (AMF spore number, mycorrhizal infectious potential (MIP) and AMF infection), in the arid palm groves soils (Tafilalet, Draa, Tata-Guelmim and Figuig palm groves), was higher than in semi-arid ones (Marrakesh palm grove). Strong positive correlations ($r \geq 0.702$, $p < 0.001$) were recorded between the different mycorrhizal parameters. Principal component analysis (PCA) showed that the percentage of sand in the soil had a positive impact on AMF parameters ($r = 0.260$, $p < 0.01$), while soil available phosphorus, total nitrogen, electrical conductivity, organic matter, $CaCO_3$ content, C/N ratio and clay percentage had a negative impact on these parameters ($r \geq -0.176$, $p < 0.05$). Results of the present study demonstrate that the mycorrhizal status of these palm groves soils is closely linked to the edaphic parameters and suggest that autochthonous AMF can be used to restore the ecological function of degraded oases in arid and semi-arid area.

Keywords: Arbuscular mycorrhizal fungi; ecological restoration; palm groves; arid; semi-arid; edaphic parameters.

POLYPHENOLS EXTRACTION FROM VEGETABLE WASTES USING A GREEN AND SUSTAINABLE METHOD

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ABSTRACT

Following the circular economy model, valorisation of natural bioactive compounds from agro-industrial waste is a mandatory commitment for a sustainable future as it meets three fundamental demands for the sustainability of the future human society: more food, less waste and healthy people. Agri-food industry, in fact, produces a large amount of wastes and residues, derived from the cultivation and processing of several grains, fruits and vegetables, every year. This waste still represents an abundant, renewable and cheap sources of high added value, healthy and nutritional molecules such as polyphenols, saponins, peptides and carbohydrates, which have been proved to possess a variety of biological activities. Moreover, some of the plant residues and by-products, like those derived from Brassicaceae, contain bio-fumigants, natural formulations against insects and pathogenic fungi for fruit and vegetable crops. According to the sustainability principles, one of the main goals of our research is to investigate alternative solutions to the conventional extraction systems in order to eliminate or minimize the use of toxic organic solvents and reduce the energy cost. In this work, different vegetable wastes, generated throughout the agri-food industrial chain, from farmers to final consumers, were used to extract polyphenols and isothiocyanates, using an unconventional and sustainable extraction technique with low environmental impact, minimizing the use of toxic solvents. The procedure is based on a bacterial strain over-producing plant cell wall-degradative enzymes followed by a cyclically pressurized extraction process using only water as solvent. In most of the considered vegetable waste, the combined extraction technique allowed us to recover a great amount of polyphenols, as well as isothiocyanates from the Cruciferae waste.

Keywords: food system sustainability, food waste, food waste recycling, bioactive compounds, enzymatic extraction, polyphenols.

INVESTIGATION OF PROPOLIS AS A NATURAL ANTIBACTERIAL SUBSTANCE

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ABSTRACT

Propolis is a natural product that is collected from plants by honeybees and mixed with wax and used for many purposes in the hive. It has been shown by many scientific studies that propolis has been used in the treatment of various diseases in traditional medicine for many years and has biological activities such as antibacterial, antitumor, antioxidant and anti-inflammatory. Hence, the aim of the present study was to investigate the antibacterial activity of extracts and essential oils of propolis collected from various regions of Algeria against food-borne and clinically test microorganisms including *Micrococcus luteus* NRLL B-4375, *Enterecoccus faecalis* ATCC 29212, *Staphylacoccus epidermis* ATCC 11228 and *Bacillus megaterium* ATCC 11175. The antibacterial activity of the propolis extracts and essential oils were evaluated using disc diffusion method. The results showed that all propolis extracts and essential oils exhibited antibacterial activity against the tested microorganisms with inhibition zones varied from 6.41±0.20 mm to 21.66±0.57 mm. The minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) of the samples were determined by microdilution-broth method. The MIC and MBC values were in the range of 0.5-2 µg/µl and 0.5-8 µg/µl. Therefore, propolis extracts and essential oils from various regions of Algeria have potential to be used as a natural additive for food and pharmaceutical industries.

Keywords: Propolis, antibacterial, bactericidal, methanolic extract, essential oils.

INVESTIGATION OF BIOLOGICAL ACTIVITY AND SOLAR PROTECTION FACTOR OF ZIZIPHUS JUJUBA FRUIT AND BRANCH EXTRACTS

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ABSTRACT

Nowadays, it is of great importance to investigate the use of natural additives in the food, pharmaceutical and cosmetics sectors. *Ziziphus jujuba* (Hünnap), an herb widely used in Chinese folk medicine, is very popular due to its high nutritional value. In our study, *Z. jujuba* water fruit and branch extracts were prepared using sonicator device (SN) and hot water bath (HWB). Antibacterial and antifungal activities were investigated on food-borne test microorganisms (*Escherichia coli* O157:H7 and *Listeria monocytogenes* ATCC 7644), clinical test microorganisms (*Pseudomonas aeruginosa* ATCC 27853, *Candida glabrata* RSKK 04019 and *Candida albicans* ATCC 10231) and fish originated pathogens (*Aeromonas hydrophila*, *Vibrio anguillarum* M1, *Vibrio anguillarum* A4, *Lactococcus garvieae*, *Yersinia ruckeri*). The antimicrobial activity of the *Z. jujuba* water fruit and branch extracts was investigated by disc diffusion and micro-dilution assays. The disc diffusion assay results indicated that among the food and clinical test microorganisms, the highest antimicrobial activity was determined against *C.albicans* ATCC 10231 with 16.89 mm inhibition zone diameter in SN water fruit extract. Among fish pathogens, HWB water fruit extract showed the highest antibacterial activity against *V. anguillarum* A4 with 16.96 mm inhibition zone diameter. The lowest inhibition zone diameter of all the tested extracts was determined against *A. hydrophila* with 6.46 mm for the SN water branch extract. Minimal inhibition (MIC) and minimal bactericidal or fungicidal (MBC or MFC) concentrations of HWB and SN water fruit and branch extracts on all tested microorganisms were determined between 25 and 100 µg/µl. The solar protection factor (SPF) of *Z. jujuba* HWB and SN water fruit and branch extracts was determined by in-vitro assay. The SPF values of the *Z. jujuba* extracts were varied from 0.17 to 1.20. The highest SPF value was obtained from SN water branch extract (1.20). The results we obtained in our study suggest that *Z. jujuba* HWB-SN water fruit and branch extracts can be recommended as natural additives in various industrial areas such as food, pharmaceutical and cosmetics.

Keywords: Hünnap, Food pathogen, Clinical pathogen, Fish pathogen, Antimicrobial activity, Solar protection.

INVESTIGATION OF USAGE POTENTIAL OF KUMQUAT FRUIT AND LEAF METHANOL EXTRACTS FOR AQUACULTURE AND COSMETICS INDUSTRIES

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ABSTRACT

The adverse health effects of chemical additives used in many industrial sectors are widely known. Consumers have been recently looking for alternative natural additives due to the side effects of existing chemical additives. Various plants are the most important part of natural source. In the present study, the potential use of kumquat (*Fortunella margarita*) fruit and leaf methanol extracts in the fishery and cosmetic industries was investigated. The antimicrobial activity of the kumquat extracts on fish bacterial pathogens was tested to determine the potential usage of kumquat fruit and leaves as a natural antimicrobial additive in the feed industry for fish. The antimicrobial activity of the kumquat extracts against *Vibrio anguillarum* M1, *Vibrio anguillarum* A4 and *Vibrio alginolyticus* was investigated by disc diffusion and micro-dilution assays. Kumquat fruit and leaf methanol extracts had antimicrobial activity on the three microorganisms tested. The disc diffusion assay results indicated that the kumquat fruit extract showed the highest antibacterial activity on *V. alginolyticus* with 21.16 mm inhibition zone diameter. For the leaf methanol extract, the highest inhibition zone diameter was determined on *V. anguillarum* M1 (24.80 mm). Minimal inhibition (MIC) and minimal bactericidal (MBC) concentrations of kumquat fruit and leaf methanol extracts were determined between 25 and 100 µg/µl. Prolonged exposure to ultraviolet radiation (UV) from the solar can cause serious health problems. Plants have also been used in the cosmetic industry for centuries. The solar protection factor (SPF) of kumquat fruit and leaf methanol extracts was also determined. The kumquat leaf methanol extract presented a good SPF value with 26.09. SPF of the fruit methanol extract was recorded as 7.35. Therefore, the kumquat fruit and leaf methanol extracts can be used as natural additive for fisheries and cosmetic industries.

Keywords: Antimicrobial, Fish pathogen, Sun protection factor, Fortunella margarita.

SYNTHESIS OF PLANT-MEDIATED SILVER NANOPARTICLES USING MOMORDICA CHARANTIA EXTRACT: EVALUATION OF ANTIOXIDANT ACTIVITY AND SURVIVAL RATE ON FRUIT FLIES

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ABSTRACT

The nanoparticle synthesis by the biological method is starting a new era in nanotechnology research.Silver nanoparticles are generally synthesized by chemical and physical methods which are highly toxic and flammable in nature.This study related to an environmentally friendly process of biosynthesis of the silver nanoparticle using *Momordica charantia* fruit,and their innate antioxidant and catalytic activities. Characterization of the AgNPs was done by UV-Visible Spectroscopy (UV-VIS), Scanning Electron Microscopy (SEM), X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FT-IR).AgNO3 (5 mM) was allowed to react with an aqueous extract of *M. charantia* fruit.Antioxidant activity and survival rateassays were conducted by exposing *Drosophila melanogaster* larvae to particle concentrations at50, 100,and 150 ppm of AgNPs.UV-VIS spectra show an absorption peak between 420 and 430 nm.The SEM images showed the size distribution of the nanoparticles and the average size was found to be 11-18 nm. Results of these analyses confirmed the formation of silver nanoparticles. Upon exposure to silver nanoparticles sized 11-18 nm, fruit fly survival rate did not exhibit a statistically significant control. However, AgNPs treatment also produced a significant increase in total antioxidant status as compared to control ($p<0.05$). Results indicate a protective role of AgNPs for oxidative stress.Silver nanoparticles so synthesized in this study are a simple, easy, and effective technique of nanoparticle production and synthesis of plant-mediated silver nanoparticles using *M. charantia* fruit extract that provide AgNPs are not toxic to fruit flies.

Keywords: Green Synthesis, Silver Nanoparticles, Momordica charantia, Drosophila melanogaster, Antioxidant Activity, Survival Rate.

INVESTIGATING THE POTENTIAL USE OF Pistacia terebinthus FRUIT EXTRACTS TOGETHER WITH PROBIOTIC CANDIDATE LACTIC ACID BACTERIA

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ABSTRACT

The beneficial effects of probiotics on health have been known for many years. Lactic acid bacteria are the most commonly used probiotics. *Pistacia terebinthus* is a plant that has been used in traditional medicine since ancient times. In this study, it was aimed to determine the potential of the use of probiotic candidate various *Streptococcus thermophilus* strains belongs to lactic acid bacteria (LAB) together with the *P. terebinthus* extracts as a source of natural antimicrobial substances in various industry such as pharmaceutical and food. The antimicrobial effects of *P. terebinthus* fruit extracts prepared with different solvents (acetone, ethanol, methanol, dichloromethane (DCM), hexane, water) on 8 different *S. thermophilus* strains were investigated. Disc diffusion method was used to determine the antimicrobial activity of the extracts. The minimal inhibition concentration (MIC) and minimal bactericidal concentration (MBC) of the extracts were assayed using the micro-dilution method. In the current study, 3 different concentrations of the extracts (5 µl, 10 µl, 20 µl) were tested on 7 different human milk originated and one commercial strains of *S. thermophilus*. Among all concentrations studied, the water extract showed no inhibition zone on *S. thermophilus* MAS-1, MAS-2, MAS-4, MAS-5, MAS-7 and *S. thermophilus* RSKK 667. The highest inhibition zone for 5 µl, 10 µl and 20 µl concentrations of extracts was determined in the methanol extract on *S. thermophilus* MAS-8 as 25.04 mm, 26.03 mm and 29.46 mm, respectively. MIC and MBC values were in the range of 0.62-40 mg/ml. The results of the present study revealed the possible use of probiotic candidate lactic acid bacteria together with the plant extracts as effective natural preservatives in various industries.

Keywords: Terebinth, Antibacterial, Streptococcus thermophilus, Probiotic.

EFFECTS OF dam AND seqA GENE MUTATIONS ON BIOFILM PHENOTYPES, CELLULASE ENZYME PRODUCTION AND MOTILITY IN SALMONELLA TYPHIMURIUM

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ABSTRACT

Biofilms are microorganism communities consisting of single or multiple species, attached to a surface within a matrix structure, distinctly differentiated from planktonic forms in gene expression and physiological aspects. The fact that the members of these structures show a structure and task differentiation similar to multicellular organisms, increase in their virulence characteristics and contain high levels of resistance to adverse environmental conditions cause serious problems in food and health. In this study, biofilm formation, cellulose production is one of the main components affecting biofilm morphotypes. Accordingly, cellulase production, motility properties were investigated in mutants created by deletion of the *dam* and *seqA* genes homologous site recombination in *S.* Typhimurium strain. As a result of the studies, it was determined that biofilm production capacity, cellulose and cellulase enzyme production, and motility decreased significantly in both mutants. These data indicate that both genes are new genes effective on biofilm production in *S.* Typhimurium. In the light of these findings obtained from the study, the use of inhibitors of deoxy adenine methylase (Dam) and DNA sequestration A (SeqA) proteins encoded by these genes has emerged in the fight against *Salmonella* biofilms.

Keywords: S. Typhimurium, dam, seqA, cellulose, cellulase, motility.

INVESTIGATION OF THE USE OF FOOD GRADE SANITATION AGENTS IN PREVENTING THE FORMATION OF SALMONELLA TYPHIMURIUM BIOFILM STRUCTURES

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ABSTRACT

In this study, the effectiveness of sanitizing agents allowed to be used in food production processes at certain rates in preventing the formation of *Salmonella* biofilm structures, which are one of the main causes of infections on food production surfaces, especially skin-transmitted medical materials, have been determined. Preliminary studies were carried out to determine effective preparation formulations by examining whether these agents create a synergetic effect in their combined use and their capacity to prevent individual biofilms. Antimicrobial agents used in trials and their concentrations was chosen to be; nisin (1, 5 and 10 mg / mL), ciprofloxacin (0.25, 0.5 and 5 µg / mL), alpha-amylase (0.5, 1 and 5 mg / mL), proteinase K (0.2, 0.4 and 4 mg / mL), CTAB (05, 1 and 10 mg / mL) EDTA (1, 10, 50 mM), SDS (5, 10 and 100 mg / mL) and Tween 80 (5, 10 and 100 mg / ml). The combination prepared in the lowest concentrations of nisin and ciprofloxacin (nisin 10 mg / mL, and ciprofloxacin 5 µg / mL), which was more effective antibiofilm capacity than other antimicrobial agents with their individual use, was determined the most effective synergetic antibiofilm mixture. The possibilities of using this mixture with the food industry and medical fields will be determined by the preparation and testing of large-scale preparations of the combinations as mentioned above. For this reason, industrial-scale production and trial studies are planned for the continuation of the studies.

Keywords: S. Typhimurium, biofilm, nisin, ciprofloxacin.

BIOFILM REACTOR DESIGN AND OPTIMIZATION OF BIOFILM DIAGNOSTIC TEST METHOD ON IMPLANT SURFACE

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ABSTRACT

In this study, prototype production of a biofilm reactor that offers benefits such as flow system, controlled delivery of nutritional ingredients, and precise environmental temperature adjustment was realized. In vitro optimization analyses of biofilm diagnostic testing with a standard of microbial cultures for the cause of infection were tested on various material surfaces such as stainless steel, glass, and polystyrene. Besides, to determine microbial adhesion on the surfaces of medical implants and contribute positively to product/surface development, different sizes of implant surfaces and hydroxyapatite (HAP) and silver hydroxyapatite (Ag-HAP) coated titanium surfaces were tested with the strong biofilm producer *S.* Typhimurium strain. Our findings showed that the biofilm mass obtained by discrete systems (classical method) on different implant surfaces was approximately 2 to 8-fold less than the biomass achieved by the flow system. Our data confirm the necessity of working with biofilm structures to fight against diseases, and the test gives accurate data. In this direction, the trials carried out to diagnose bacterial biofilm structures on implant surfaces form the basis of a test criterion used in an industrial process.

Keywords: Biofilm, Biofilm Reactor, Implant, Implant, Polysystrene, Glass, Stainless-steel, Coupon.

INHIBITORY EFFICACY OF LACTIC ACID BACTERIA AGAINST BIOFILM PRODUCTION OF DELETION MUTANTS OF SALMONELLA TYPHIMURIUM 14028 STRAIN IN TERMS OF DAM AND SEQA GENES

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ABSTRACT

In this study, the effects of culture filtrates of lactic acid bacteria inhibit the growth of planktonic forms of *S.* Typhimurium 1408 wild-type strain on biofilm formation and eradication in mutants with deletion of a *dam*, and *seqA* genes of the said bacterium were investigated. As a result of the trials carried out on polystyrene microtitre plates, it was determined that 6 lactic acid bacteria (*Lactobacillus plantarum, Lactobacillus sake, Pediococcus acidilactici, Bifidobacterium longum, Bifidobacterium bifidum, and Pediococcus pentosaceous)* used in the trials completely inhibited biofilm formation in these mutants at optimum biofilm production times. In these experiments, culture filtrates were inoculated into biofilm-producing media together with the biofilm producer strain. In the eradication studies of biofilm structures, culture filtrates were added to the medium after the biofilm structures matured. In eradication studies carried out in this way, it was determined that the culture filtrates of lactic acid bacteria did not show any biofilm eradication efficiency.

Keywords: S. Typhimurium, dam, seqA, biofilm, lactic acid bacteria.

GASTROINTESTINAL HELMINTHS OF SHEEP BREED IN SPREAD BELGRADE AREA IN PERIOD 2018-2019

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ABSTRACT

During 2018-2019. we were examined parasitic fauna of sheep in spread Belgrade area (Serbia). Coprological, and post-mortem examination revealed the following helminth species: *Teladorsagia* (*Ostertagia*) *circumcincta* in 75,23%, *Ostertagia trifurcata* 71,53%, *O.ostertagi* 21.99%, *Trichostrongylus axei* 62,23%, *T.colubriformis* 69,57%, *T.vitrinus* 62,85%, *Nematodirus spathiger* 77,43%, *N,filicolis* 33,31%, *Haemonchus contortus* 58,95%, *Marshallagia marshalli* 27,77%, *Skrjabinema ovis* 11,31%, *Bunostomum trigonocephalum* 13,28%, *Chabertia ovina* 63.85%, *Oesophagostomum venulosum* 27.91%,*Cooperia curticei* 60.52%,*C.oncophora* 28,39% and *C.punctata* 13,28%. The obtain results was compares with the results of research from 2009-2010 and the impact of changes in microlimatic and environmental conditions on the biodiversity of GI heminate sheep in this area.

Keywords: sheep, gastrointestinal helminths, Belgrade.

DETERMINATION OF SUN PROTECTION FACTOR AND ANTIBACTERIAL ACTIVITY OF VARIOUS OLIVE EXTRACTS

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ABSTRACT

The globally accepted standard for evaluating Ultraviolet (UV) protection by a sunscreen formulation is the determination of Sun Protection Factor (SPF). In this study, the in vitro SPF values and antibacterial activity of olive fruit and leaf extracts prepared with different solvents (water, acetone and ethyl acetate) from Ayvalık Yağlık variety grown in Izmir were investigated. The SPF values of the extracts were measured spectrophotometrically at 290-320 nm wavelengths of UV-B ultraviolet rays reaching the earth. Antibacterial activity was investigated against food and clinical pathogens (*Salmonella enteritidis* RSKK 171, *Bacillus cereus* RSKK 863, *Staphylococcus aureus* ATCC 25923, *Pseudomonas aeruginosa* ATCC 27853). The antibacterial activity of olive fruit and leaf extracts were evaluated using disc diffusion assay. The minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) of the extracts were determined by micro-dilution method. The SPF values of the extracts were varied between 0.84 and 15.35. The highest SPF value determined (15.35) indicates 93% of the UV blocked percentage. The antimicrobial activity assay results showed that all olive fruit and leaf extracts exhibited antibacterial activity against the tested microorganisms with inhibition zones varied from 8.9±0.2 mm to 19.4±0.1 mm. The MIC and MBC values were in the range of 5-20 mg/ml and 5-80 mg/ml. Therefore, olive fruit and leaf have potential to be used as a natural additive for pharmaceutical and food industries.

Keywords: Ayvalık Yağlık, fruit, leaf, sun protection factor (SPF), bactericidal, extracts.

NOVEL, FAST AND CHEAP INDIVIDUAL BACTERIA AND BACTERIOPHAGE COUNTING AGAR-FREE METHOD USING MICROFLUIDIC DEVICE IN SIMPLE DARKFIELD IMAGING SYSTEM

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ABSTRACT

We develop a darkfield imaging system that can be used to count bacteria and bacteriophage concentrations within 5 hours with a simple, inexpensive, portable and agar-free method without the need laboratory equipment as in traditional methods. Accurate counting of bacteria is a fundamental analytical microbiology technique which underpins many areas from research to clinical diagnosis of infection. Viable bacterial cell counting is fundamental to analytical microbiology and agar plate colony counting. With the rise of antibiotic resistance, phages are possible alternative therapy. Phages are becoming popular in many areas. Research in phage use for vaccine development, phage therapy, biocontrol, food safety, drug development are increasing. Phage counting is fundamental to analytical microbiology and phage assay development. Agar plaque counting for both reasons remains common yet laborious and slow (48-72h). To tackle this, improved microfluidic systems offer faster, portable and rapid detection and quantitation of phages. Here, we demonstrate a method for counting bacteria and phage using commercially available microfluidic device, microcapillary film (MCF). The fluoropolymer MCF contains 10 parallel microfluidic channels. Using a 3D printed darkfield imaging system, bacteriophage plaques in liquid broth could be identified within the microcapillaries. The ability to use liquid broth is beneficial over agar/soft agar to reduce the equipment needed for phage counting assays. The bacterial light scattering was measured by darkfield imaging. Using low-cost electronics, a raspberryPi camera and LED light source, bacterial density can be detected down to 0.1 OD. Using a lytic phage and host cell mixed in a multiwell plate, the MCF test strip can be dipped in the mix and the sample drawn up by capillary action. Each capillary holds 1 µL sample volumes. After incubation 5h plaques can be counted and detected as low as 2.5 pfu/10µL. We showed that bacteriophage lysis plaques could be counted with either a low or high starting host cell inoculum. Starting with a high host inoculum density speeds up the time to plaque appearance in the microfluidic capillaries by rapidly observing a loss in bacterial light scatter and can be detected within 5h. We have also seen that it is possible to count individual bacterial colonies in MCF. The ability to use liquid broth is beneficial over agar/soft agar to reduce the equipment needed for counting assays. Using low-cost electronics, a raspberryPi camera and LED light source, bacterial density can be detected down to 2.5x102 cfu/mL. We show that for the first-time label-free accurate bacteria and phage counting is possible using simple and easy “dip-and-test” microcapillaries without requiring agar. We established darkfield imaging system that can be used to count bacteria and bacteriophage concentrations within 5h in a cheap and portable way without the need of lab equipment as in traditional methods.

Keywords: Label-free, Microfluidic, Cell counting, Bacteriophage, Phage counting.

INVESTIGATION OF THE USAGE POTENTIAL OF OLIVE AND JUJUBE EXTRACTS AS NATURAL ALTERNATIVES TO CHEMICAL CONTAINING SUN CREAM

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ABSTRACT

Artificial sunscreens are of interest to protect from photoaging, sun-induced skin burns and carcinogenic effects. However, the efficacy of the ingredients of chemical and artificial sunscreen creams is of concern due to their photostability, safety, toxicity, and also the damage they cause to marine ecosystems. Nowadays, many plant extracts used as UV blocking agents are used as alternatives due to the side effects of chemical additives. The fruits of *Olea europaea* L. (Olive) and *Ziziphus jujube* (Jujube) are used all over the world as both herbal medicine and food for their health benefits. In the study, sun protection factors (SPF) values of olive and jujube fruit were determined spectrophotometrically *in-vitro*. The extracts were prepared using hot water bath (HWB) and sonicator devices (SN). Olive extracts were obtained in ethyl acetate and acetone solvents using with HWB. The extracts of the jujube were obtained using two method with hexane solvent. The highest SPF value was determined as 17.53 in olive fruit acetone extract and the lowest SPF was recorded as 2.21 in the olive fruit ethyl acetate extract. It was recorded as 6.36 for the jujube fruit HWB hexane extract and 8.57 for the jujube fruit SN hexane extract. The results showed, it has been determined that olive and jujube fruit can be a safe alternative for chemical sunscreen creams.

Keywords: Olea europaea L, Ziziphus jujube, ultraviolet radiation, hot water bath, sonicator, solar protection factor (SPF).

EFFECT OF COAT COLOR AND PRODUCTION SYSTEM ON CARCASS AND MEAT QUALITY OF NORTHERN MOROCCAN KIDS

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ABSTRACT

The current study was carried out to evaluate the carcass and meat quality of northern Morocco goat kids who's reared extensively, comparing their nutritional and technological quality with carcass and meat of whom reared intensively, as well as to judge whether the "coat Color" factor influences the carcass and meat quality of this kids. Twenty-four extensively reared goat kids of Northern Morocco were sacrificed according to the Muslim rite. After slaughter, all the constituents of the animal were weighed and linear measurements were also performed. Different physicochemical analyses were carried out: dietary quality analyses and technological quality analyses. The sensory analysis was done using the shoulders of the goat carcasses. The coat color factor showed a significant effect on the % of crude protein, fat content, dry matter, cholesterol, mineral content, color, pH, CRE and tenderness. It also influenced the fatty acid composition, the mixed coat color had the highest value in C18:1n9 and consequently the highest percentage in MUFA. Regarding the production system, it had a significant effect on fat content, ash, dry matter, pH, cooking loss and water holding capacity value. The rearing system also influenced the composition and nature of fatty acids in the meat, extensively reared kids had a higher percentage of C18:2n6 and C22:1n9. Extensively reared kids had a high PUFA content with high percentages of omega 3 and 6 compared to intensively reared kids, as well as a better PUFA/SFA ratio. These results indicate that meat from extensively raised northern Moroccan kids can be recommended as a valuable food for a health-conscious consumer diet, since the parameters reported above are related to high nutritional value and are known to be indicative of beneficial effects on human health.

Keywords: Kids; Northern Morocco; Dietary Quality; Technological Quality; Meat; Lean; Protein; Tender; Fatty acid profile; UFA.

CALLUS INDUCTION FROM LEAF AND STEM EXPLANTS OF SELECTED TURKISH GENOTYPES OF COMMON BEAN

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ABSTRACT

Common bean (*Phaseolus vulgaris* L.), a species belonging to the family Fabaceae, is one of the most important legumes consumed and grown both globally and in Turkey. Common bean ranks first among grain legumes in terms of cultivation area and production in the world. However, the bean is recalcitrant, making obtaining this plant via in vitro culture techniques a challenge. Due to changing climatic factors and drought conditions that may be seen in the future, it is essential to produce plants that make up human food under in vitro conditions. With this goal, the effect of different concentrations of 2,4-D (2,4-dichlorophenoxyacetic acid) with Kinetin and their possible combinations on callus induction in leaf and stem explants of three-bean genotypes (Bitlis117, Göynük, and Önceler) was evaluated. It was aimed to determine the best medium that promotes callus formation in different bean genotypes and different tissue types. Callogenesis was successfully promoted from leaf and stem explants of all three genotypes tested. The highest callus ratio was obtained from stem explants of Bitlis117 cultured on the MS medium, including 2,4-D (0.5 mg L-1) and Kinetin (2.0 mg L-1).

Keywords: In vitro culture, leaf, Mersin, Phaseolus vulgaris L., stem.

IMPACT OF THE CLIMATIC CONDITIONS OF MERSIN PROVINCE ON THE CULTIVATION OF MUNG BEAN (Vigna radiata (L.) WILCZEK)

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ABSTRACT

Mung bean *Vigna radiata* (L.) Wilczek is an edible legume plant used as a grain in human nutrition and its green parts and straw in animal nutrition. Mung bean belongs to the family of Fabaceae and is a tropical legume species. It is widely cultivated in Asian countries, and its seeds are quite extensive in lysine and protein. In addition to its nutritional importance, this plant is also important with its drought resistance. This drought-resistant plant is not cultivated in cities with a hot climate like Mersin. In this study, Mung beans were successfully grown in Mersin. The total yield of the plant, the number of pods per plant, the number of seeds per pod, the grain yield per plant were analyzed. The data obtained were compared with Mung bean grown in other cities and countries which have warm climates. The research w

as carried out in the climatic conditions of Mersin province in 2021. In case of possible drought, this plant may need to be planted, and it is thought that the data obtained from this study will be necessary for this reason.

Keywords: Cultivation, Mersin, Mung bean, yield.

STUDY OF THE ANTIOXIDANT AND ANTI-INFLAMMATORY PROPERTIES OF THE ESSENTIAL OILS OF THE PEELS OF CITRUS SINENSIS EXTRACTED BY TWO METHODS: HYDRODISTILLATION HD AND MICROWAVEMO

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ABSTRACT

Essential oils are natural complexes of volatile and fragrant molecules, synthesized by aromatic plants. They have anti-infectious, antioxidant, anticancer properties. The present study is dedicated to evaluate in vitro the antioxidant and anti-inflammatory properties of essential oils extracted by hydrodistilation and microwave using a Clevenger type device adapted and analyzed by GC / MS from the peels of a plant used in traditional medicine in Algeria ***Citrus sinensis***. The extraction provided yields of 0.26% and 0.02% respectively. The analysis of essential oils of Citrus sinensis by GC and by GC-MS led to the identification and quantification of 67 compounds. The major constituents are mainly: Limonene (78.192%) and Linalool (3.26%) for oil extracted by HD ; Limonene (58.600%) and Nonanal (7.637%) for oil extracted by MO. The antioxidant potential of essential oils was evaluated using the DPPH free radical scavenging test where the results are remarkable in the two essential oils with a notable primacy of the essential oil extracted by hydrodistilation having presented an IC50 of 13.07 mg / ml, while BHT and ascorbic acid, showed a very potent and effective anti-free radical activity with IC50s of the order of 19.54 µg / mg and 1.17 µg / mg respectively. The in vitro inhibitory effect of the essential oil was determined using a protein denaturation method. Diclofenac sodium is an anti-inflammatory drug used as a benchmark anti-inflammatory. The results we obtained show that the essential oil of *Citrus sinensis* protected albumin against heat denaturation, the rate of inhibition is increasing in terms of concentrations with a maximum percentage of 82% at a concentration of 400µg / ml. Comparatively, the inhibition values for sodium diclofenac at the same concentration are very high with a percentage of 99.28%.

Keywords: Essential oils, yield, major constituents, GC-MS, antioxidant, DPPH, anti-inflammatory, Diclofenac sodium

DETERMINATION OF THE GENETIC DIVERSITY OF SELECTED SAFFLOWER (CARTHAMUS TINCTORIUS L.) GENOTYPES FOR HYBRIDIZATION BY USING SSR MARKERS

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ABSTRACT

The aim of this study was to investigated registered safflower cultivars of Turkey (4) and genotypes provided from USDA (10) for genetic variation using 10 simple sequence repeat (SSR) loci. Genetic diversity calculated registered cultivars and genotypes were as follows; mean number of alleles (4.17), expected heterozygosity (0.71), average effective number of alleles (3.29), and polymorphism information content (0.66). The dendogram analysis revealed two major clusters in the cultivars and genotypes. High level of genetic diversity explained between the populations and Fst calculate (0.60) suggested that the clusters were differentiated to each other. The registered safflower cultivars developed by the same institute were included in the same clusters (Dinçer and Balcı) and different ones were in the across clusters (Linas ans Olas). In addition, the dendogram based method analysis revealed two major clusters which corresponded to spiny and spineless safflower genotypes. It is suggested that the studied 6 out of 10 SSR markers could suitable for safflower breeding studies based on molecular analysis**.**

*This study is a part of Emrullah CULPAN's PhD thesis.

Keywords: Safflower, genetic diversity, SSR marker, oilseed, oil content.

DETERMINATION OF POTENTIAL OF UNIQUE AND INDIGENOUS PSEUDOMONAS ISOLATES AS PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR)

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ABSTRACT

The adverse effects exerted by chemicals used to increase agricultural productions on human health and environmental have increased the importance of using reliable microbial products. Due to their rapid growth with easy cultivation conditions, widespread availability and presence of biofertilizer as well as biocontrol properties, environmentally friendly, non-pathogenic *Pseudomonas* species are becoming commercial important microorganisms specifically in terms of contributing to organic and sustainable agriculture. In this study, 103 unique and indigenous *Pseudomonas* species were isolated from different compost and soil samples. It was determined by Dual culture test that 41 of 103 isolates had different levels of antagonistic activity against phytopathogens including *Botrytis cinerea*, *Fusarium solani* and *Rhizoctonia solani*. Production of siderophore, hydrogen cyanide (HCN) and indole acetic acid (IAA), and other plant growth promoting rhizobacteria (PGPR) properties such as nitrogen fixation and phosphate solubility were determined for these 41 isolates. It was also verified whether the isolates with PGPR properties were human/animal and plant pathogens. Qualitative analysis showed that 17 of the isolates with PGPR properties produced siderophores and 9 produced HCN. All 41 isolates were able to grow in the nitrogen free medium. Of these 37 isolates produced IAA and 29 were able to solubilise phosphate. A culture collection was prepared for 17 molecularly identified strains that showed best PGPR properties and commercial potential. This collection consists of different PGPR strains including *Pseudomonas* spp. (12 strains), *Stenotrophomonas* spp. (2 strains), *Alcaligenes* sp. (1 strain), *Achromobacter* sp. (1 strain), *Serratia* sp. (1 strain). Bacterial strains recovered in present study have efficient PGPR properties and the potential to be used as a biofertilizer and/or biological control agents as an alternative to agricultural chemicals.

Keywords: Pseudomonas, PGPR, biofertilizer, biocontrol agent.

MICROPROPAGATION OF ARONIA (*ARONIA MELANOCARPA SP.*)

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ABSTRACT

Aronia melanocarpa sp. (Aronia) is a berry-fruited plant that is highly nutritive with high amounts of phenolic compounds. It is widely used as a functional food, due to the rich chemical composition and nutritive properties of its fruits. However, tissue culture studies on the Aronia plant, whose cultivation has become widespread in our country lately, are quite limited. In this study, it is aimed to develop a highly efficient *in vitro* micropropagation protocol for two Aronia cultivars. This study was carried out in Tekirdağ Namık Kemal University, Faculty of Agriculture, Agricultural Biotechnology Research and Production Unit (ZİRAATBİYOTEK). Two different methods have been tried in the sterilization stage of the explants taken from the plants. Firstly, explants were washed with antibacterial soap, acetic acid, and tween 20 solution. After that, they were rinsed thoroughly under tap water. The explants were dipped into 70% ethanol and sterilized in a sterilization solution containing 4.28% NaOCl (50% and 75%). In the second sterilization process, 0.1% HgCl2 was used instead of NaOCl. In the rinsing phase, the explants were rinsed with sterile distilled water for 5 minutes and three times. Contamination conditions were observed for a week. Considering the contamination rate, it was determined that the lowest contamination was in the experiment with 0.1% HgCl2. It was determined that the highest explant viability was in the experiment with 50% NaOCl concentration, and the lowest explant viability was in the experiment with 0.1% HgCl2. In order to initiate plant regeneration 6-benzyl amino purine (BAP), Indole-3-butyric acid (IBA), and gibberellic acid (GA) combinations were used as growth regulators (1.0 mg GA, 1.5 mg BAP, 1.0 mg IBA + 0.5 mg GA and 0.5-1.0-1.5-2.0 mg BAP + 5.0 mg GA) The most successful result was obtained in 0 MS supplemented with 1.0 mg IBA + 0.5 mg GA. After three weeks, the length of each explant reached 3-5 cm. In order to increase shoot propagation, 0 MS supplemented with 3.0 mg BAP + 0.3 mg IBA + 0.5 mg GA plant growth regulators was used. As a rooting media 0 MS, 1.0 IBA, 2.0 IBA, 3.0, and 4.0 IBA were used, and rooting was observed in all media within a week. Rooted plants were taken to the greenhouse for acclimatization. As a result, it is determined that the protocol developed is an efficient in vitro micropropagation process for Aronia cultivars.

Keywords: Aronia melanocarpa sp. , Plant tissue culture, Micropropagation.

INVESTIGATION OF PHYSICOCHEMICAL AND BIOCHEMICAL PROPERTIES, ANTIOXIDANT POTENTIAL AND ANTIMICROBIAL ACTIVITY OF SOME VINEGAR COMMERCIALIZED IN MOROCCO

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ABSTRACT

Vinegar is a natural product widely used in food and traditional medicine as it contains many bioactive compounds. The raw material and production methods are two factors that play a major role in determining the quality of vinegar. Therefore, this study aims to determine the quality of commercialized vinegar samples purchased from local markets, through determining the physicochemical properties and antibacterial activity of these samples. The antibacterial activity was studied against four pathogenic bacteria and four yeast strains, using the disk diffusion method to determine and the microdilution for determinate the Minimum Inhibitory. The results of this study showed a higher acetic acid value (5.15 ± 0.20%) for the apple cider vinegar (V2) prepared by the industrial method. On the other hand, the TPC, TFC and CTC in our samples (V4, V9 and V10) was 1154.00 ± 99.68 µgGAE/mL, 244.53 ±11.32 µgQE/mL and 84.63±1.00 µgTAE/mL, respectively. The results of the antibacterial activity showed considerable activity of apple vinegar on the tested strains. Generally, the *C. albicans* strain appears higher sensitive against all samples, while the other strains have distinct sensitivities depending on the raw material and the method used. A lower MIC recorded in this study was against *S. aureus*. While for the fungal strain studied in this research showed resistance against all of our samples. The choice of apple variety and production method is, therefore, an essential step in determining and aiming for the desired quality of apple vinegar.

Keywords: polyphenols, antioxidant activity, vinegar, production methods, antimicrobial activity, Morocco.

EVALUATION OF THE EFFECT OF GREEN SYNTHESIS PARAMETERS ON THE ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES

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ABSTRACT

In recent years, the use of metal nanoparticles in industrial applications has become an important field of study. The results obtained from these studies reveal that metal nanoparticles have the potential to be used as antimicrobial agents in industrial products. Metal nanoparticles have been used as antimicrobial agents in many fields, especially in the coating, textile industry, water treatment and biomedical. The interest in the synthesis of silver nanoparticles (AgNPs) by using plant extract has been increasing recently since green synthesis is low-cost and environmentally friendly. It is known that the basic synthesis parameters required for the green synthesis of AgNPs can change the characteristic properties of nanoparticles. The aim of this study was to perform the green synthesis of AgNPs in an environmentally friendly way using *Hibiscus sabdariffa* L. extract and to determine the effect of synthesis parameters on antimicrobial activity of the nanoparticles. The aqueous plant extract was used as reducing agents in nanoparticle synthesis. The formation of AgNPs have been characterized by using several techniques, ultra-visible spectroscopy (UV–vis), X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM)-energy dispersive X-ray spectrometer (EDX), Fourier transmission infrared spectroscopy (FTIR), and dynamic light scattering (DLS). The effects of concentration of the bio-reducing agents, reaction time for synthesis and pH on nanoparticle synthesis and their antimicrobial activity were investigated in this study. We found that pH value greatly influences the size of the biologically synthesized nanoparticles. In summary, this study argued that green synthesis parameters for silver nanoparticles have important effect on antimicrobial activity of AgNPs. This provides a good starting point for further research.

Keywords: green synthesis, silver nanoparticles, synthesis parameters, antimicrobial activity.

GENETIC ANALYSES OF DUCKWEED BASED ON ISSR MARKERS

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ABSTRACT

The duckweed, which includes species belonging to the subfamily Lemnoideae, is the smallest group of flowering plants. Human consumption of duckweed is common in some parts of Asia as a vegetable. In this research, inter-simple sequence repeat (ISSR) markers were used to determine relationships among the Turkish duckweed genotypes. The techniques were used for inter-species and intra-species molecular characterization of 67 genotypes representing 5 different species of the Lemnoideae member (*Lemna minor*, *Lemna gibba*, *Lemna trisulca*, *Lemna turionifera* ve *Spirodela polyrhiza*). Seventeen ISSR primers produced a total of 141 fragments and all of them were polymorphic. Genetic similarity coefficients ranged between 0.45-0.96 on duckweed. The highest variation within the species was found among *S. polyrhiza*, and the lowest variation among *L. turionifera* genotypes. Subgroups were determined in the dendrogram based on the UPGMA analysis. Significant variation was determined in all duckweed genotypes. Structure analysis indicated that the number of subpopulations in duckweed was six. In the structural analyzes was determined that the most homogeneous and diverse populations belonged to the *L. minor* species. Principal component analysis indicated three subgroups among the genotypes studied. The information obtained as a result of principal component analysis explains that primarily species are effective in the distribution of genotypes included in the study. İt was determined that the geographical origins of the genotypes also constitute a source for grouping. In this study, the genetic structures of the genotypes of duckweed, which is an important source of protein and bioethanol, were determined. It can be concluded that Turkey was rich in duckweed genetic diversity.

Keywords: Lemnoideae, duckweed, ISSR, Genetic Characterization.

GENETIC DIVERSITY ANALYSIS OF WATERMELON GENOTYPES BY IPBS MARKERS

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ABSTRACT

Watermelon (*Citrullus lanatus*) is the most economically important vegetable worldwide and Turkey. Genetic studies of watermelons sampled from Turkey may provide valuable information for breeding and research programs. In this research, Inter-primer binding site (iPBS) markers were used to determine relationships among the Turkish watermelon accessions and some selected foreign cultivars and species. Total 96 watermelon genotypes were used for molecular characterization of watermelon plants. Thirty-six iPBS primers produced a total of 675 fragments and 669 of them were polymorphic. The mean polymorphism rate was % 99,1. The mean polymorphism information content (PIC) was 0.68. Watermelon genotypes had similarity coefficients of between 0.21-0.99. UPGMA (Unweighted Pair Group Method Arithmetic Average) analysis demonstrated that the accessions had a similarity range from 0,29 to 1,0. PCA (Principal component analysis) indicated four subgroups among the lines studied. The average number of effective alleles in iPBS analyzes was 1.706 and Shannon's information index was determined as 0.602 on average. Based structure analysis indicated that the number of subpopulations in watermelons was two. Among the 96 lines, 82 lines had 0.80 or greater membership coefficients to one subpopulation. It was observed that watermelon genotypes were clustered independently from geographical origins. This study indicated that the iPBS markers would be useful for clarifying genetic parameters such as population structure and relationships among watermelons. It was observed that watermelon genotypes exhibited a narrow diversity in genetic parameters.

Keywords: Watermelon, Citrullus lanatus, genetic diversity, iPBS.

PROTEOMIC AND TRANSCRIPTOMIC ANALYSIS OF OLIVE (OLEA EUROPAEA L.) IN THE RESPONSE TO DROUGHT STRESS AND RECOVERY

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ABSTRACT

Olive (*Olea europaea* L.) is one of the major crops in the Mediterranean region, traditionally grown under drought conditions. The slow-growing character of olive trees make field trials costly and time-consuming. Therefore, it is beneficial to take advantage of those morphological and physiological traits relevant to drought tolerance to facilitate the breeding and selection process. In this work, we aim to comprehensive characterization of the tolerance mechanism to drought stress of olive leaf tissues through RNA-Seq and proteomic analyses. Some physiological and biochemical responses to drought stress were evaluated under drought stress conditions in eight olive (*Olea europaea* L.) cultivars from Turkey Olive Gene Bank. Selected cultivars showing different response to drought stress (two tolerant- Çekişte, Memecik and 1 susceptible-Gemlik) were assessed for RNA-seq and proteomic experiments. RNA-seq and proteomic experiments have been performed for the selected cultivars showing different response to drought stress (two tolerant- Çekişte, Memecik and 1 susceptible-Gemlik). The obtained data under drought stress and following recovery from drought was compared in leaf tissues of tolerant and susceptible cultivars. RNA-seq generated an average of 8.276.678 base reads that were assembled into transcripts with a mean length of averaging between 70 and 100 bp. Liquid chromatography - mass spectrometry / mass (LC-MS/MS) was used to characterize the proteome of drought-susceptible and tolerant cultivars. By LC - MS / MS analysis, 3472 protein groups and 16603 peptide groups were detected after Sequest HT scanning using Proteome Discoverer Software. According to the results of analysis of the drought tolerant, and the non-tolerant, 66 proteins with a 2-fold or more increase were detected. For the validation with Real Time-qPCR., 37 genes were selected from the RNA-seq data, where differentially expressed genes has been determined between drought tolerant versus susceptible olive cultivars. Further investigations will reveal molecular and biochemical changes during drought and recovery periods to decipher the drought tolerance mechanisms in olive plants.

Keywords: Olive (Olea europaea L.), drought, RNA sequencing, Proteomics, transcriptomics

GENETIC DIVERSITY OF ARBUSCULAR MYCORRHIZAL FUNGI IN ALIABAD AND GLIDAGH REGIONS LOCATED IN GOLESTAN PROVINCE

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ABSTRACT

Arbuscular mycorrhizal fungi (AMF) are located in the Glomeromycota divisions and are the most abundant coexisting agents in soil; therefore, they are of great ecological and economic importance. These fungi are forced to coexist with plant roots and provide some of the nutrients they need through their hyphae; On the other hand, these fungi depend on the roots and cells of the host plant to grow and complete their life cycle. Studies show that about 80% of terrestrial and vascular plants are associated with this group of fungi. In the present study, AMF species coexisting with different plant roots in the Aliabad and Glidagh regions of Golestan province, which have more plant diversity than other regions of the province, were studied, and morphological and molecular methods based on ß-tubulin region sequence were used to identify fungi. Sampling was performed in the summer of 2019 and 2020 in the Aliabad and Glidagh regions of Golestan province. Sampling was done randomly from different parts of gardens, farms, and pastures of the two areas and from a depth of 5 to 30 cm in the rhizosphere of plants. In order to prepare each composite sample, five soil samples were collected from different parts of the field or garden and mixed. Finally, nine composite soil samples (1 kg) with thin roots were prepared and transferred to the laboratory after recording the characteristics. Samples were kept in a dry air stream for two weeks and then kept at 4 °C until spore separation. Corn (Zea mays) was used as a trap plant to sporulate and increase the population of healthy spores, and after five months, the roots were stained, and arbuscular mycorrhizal fungal organs were found within the roots was examined. Healthy spores in each soil sample were grouped and identified based on morphological characteristics and identified as belonging to five different species and the dominant species in each soil sample. The isolates studied in the present study were analyzed based on morphological and phylogenetic characteristics based on beta-botulinum gene, and based on it, five species, including Funneliformis mosseae, Funneliformis coronatum, Gigaspora gigantea, Scutellospora calospora and Septoglomus constricta were identified in Glucae genus. They belong to the order Glomerales and Diversisporales. In general, the results showed that the classification performed only based on ß-tubulin telogen of the studied samples could act as a classification system based on the phylogenetic relationships of several LSU-SSU-ITS genes; Among the existing limitations are the lack of data related to the ß-tubulin region in the gene bank and the incorrect naming and low quality of some of the registered sequences. It is expected that in the studies of identification of different species of arbuscular mycorrhiza in Iran, more definite and better results in the field of species identification will be obtained by studying the ß-tubulin gene along with other gene regions and also combining these molecular methods with morphological method.

Keywords: microbiology, coexistence, microbiome, Plant-microbe interactions

PHYTOTHERAPY AND DISEASES OF THE RESPIRATORY SYSTEM IN HIGH ATLAS CENTRAL OF MOROCCO

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ABSTRACT

This ethnobotanical and ethnopharmacological study was carried out between 2015 and 2017 in the High Atlas Central of Morocco. Its main objective was to assess the potential of this region in medicinal plants used specifically in the treatment of diseases of the respiratory system. In this region, 41 plants divided into 24 families and 38 genera were identified. The most represented families are: Lamiaceae (9 species), Apiaceae and Asteraceae (4 for each one). While the plants most used for the treatment of respiratory tract infections are Eucalyptus globulus Labill., Marrubium vulgare L. and Ficus carica L. the most commonly used method of preparation is decoction, while leaves are the most commonly used parts.

Keywords: Ethnobotanical, Ethnopharmacological, Medicinal plants, Morocco.

EFFECTS OF PENCANOZOLE TREATMENT ON CAPSICUM ANNUUM

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ABSTRACT

In agricultural areas, unconscious use of pesticides might cause harmful effects on growth and development of non-target crop plants and decreases yield and quality of the plants. Penconazole is a systemic fungucide that is used commonly in agricultural areas. Besides, it is known that use of penconazole at low concentration decreases negative effects of environmental stresses. In this study, it was examined that changes induced by penconazole application at different concentrations in pepper plants exposed to 0 and 200 mM NaCl treatment. For this purpose, different concentrations of penconazole treatment (15 mg/l, 25 mg/l, 50 mg/l ve 100mg/l) on pepper seedlings was conducted and leaves of the plants were harvested 10 days after the treatment. Total chlorophyll, carotenoids, malondialdehyde, ascorbate peroxidase, glutathione S-transferase and glutathione reductase analyses were performed in harvested leaves. It was determined that penconazole affected antioxidant defence responses, depending on the concentrations applied, of peppers that are both treated and not-treated with salt stress.

Keywords: penconazole, oxidative stress, pepper.

A RAPID SCREENING THE DROUGHT TOLERANCE LEVELS OF SOYBEAN CULTIVARS (GLYCINE MAX L.)

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ABSTRACT

Plants are often exposed to severe water regimes, i.e. flooding or drought, because of global climate change worldwide. These water extremes limit crop production as well as plant growth and development. The present study was carried out to assess the drought tolerance capacity of 15 soybeans (*Glycine max* L.) cultivars at the early seedling stage using the growth behaviours, water status (relative water content, RWC) and photosynthetic efficiency [performance index (PIABS)]. The seedlings of soybean were exposed to polyethylene glycol (PEG 6000) mediated drought stress [PEG was added to full strength Hoagland solution to obtain solutions of control (no PEG), -0.1, -0.3, -0.6 and -1.2 MPa] for 5 days, following 5 days of germination in the growth chamber at 25 ± 1 °C, 200 µmol m−2 s−1 light intensity, 8/16 hrs dark/light photoperiod, and 40 ±5% humidity. Photosynthetic performances of soybean cultivars which was measured by chlorophyll a fluorescence kinetics, were generally decreased in all cultivars with increasing drought stress levels. Besides, the length and fresh biomass of seedlings were significantly decreased with increasing drought, whereas dry biomass of cultivars was decreased in only Ataem, Cinsoy, Lider and SA-88 at elevated PEG levels. The RWC of tissues (cotyledon, hypocotyl and root) was significantly decreased with the increase of PEG level, and the highest decline in RWC was determined in the roots. In addition to that, the stress factor indexes (SFI) was calculated for all parameters measured in the study. According to total SFI values, soybean cultivars may be grouped as drought tolerant (Umut 2002, Mersoy, Lider, Soy Anam, SA 88), moderately tolerant (ANP-2018, Cinsoy, Asya, Ataem-7, Pınar) and susceptible (Traksoy, Yeşilsoy, Yemsoy, Türksoy, Bravo).

Keywords: Soybean (Glycine max L.), drought stress, chlorophyll a fluorescence, screening for drought tolerance.

BIOECOLOGICAL FEATURES OF THE GENUS GENTIANA L.

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ABSTRACT

The genus *Gentiana* L. is widespread in the flora of Azerbaijan as a plant of decorative and medicinal importance. Although the taxonomic composition of the plant has been studied by world scientists, we aimed at studying the systematics and bioecological features of the species distributed on the territory of Azerbaijan. For this purpose, the morphological features of gentian species common in Azerbaijan were studied and the role of these features in the systematics of the genus was determined. Diagnostic features of taxonomic importance in the structure of vegetative and generative organs have been studied. As we know, bioecological research is important in the formation of species and the solution of a number of controversial issues in plant systematics. We consider an important issue to research the bioecological features of the species of genus *Gentiana* in the flora of Azerbaijan. In order to carry out the research various sources of literature used in the flora of Azerbaijan, Caucasus and the world were studied to study the bioecological and geographical features of the genus. The herbarium materials stored in the Herbarium fund of the Institute of Botany of ANAS and collected by us were also used during the research. The genus *Gentiana*, which is a monoecious, dicotyledonous and perennial plant, was grouped according to the systems "Life Forms" of I.G. Serebryakov and C.R. Raunkiaer. The distribution of species in altitude zones, attitude to climatic factors, phenology and ecological groups were determined. Our research has been conducted on naturally growing species with different habitats and adapted to environmental conditions. The species are distributed in all botanical and geographical regions of Azerbaijan, in the middle and high mountain belts, areas with different soils, wide ecological amplitudes, phytocoenoses found in well-developed vegetation. Analysis of the life forms of the genus *Gentiana* in Azerbaijan shows the predominance of therophytes and hemicryptophytes. There are 9 species and 1 subspecies of the genus in the flora of Azerbaijan, which are also collected in the following sections: some species included in the sections *Pneumonanthe, Aptera, Cyclostigma* live in shady places, forest edges and meadows; species included in the *Xondriofil* and *Eugentina* sections have adapted to the xerophilous ecosystem. When studying the ecological characteristics of *Gentiana* species, it is necessary to take into account the influence of various environmental factors. Light is one of the main vital factors for plants. Plants are exposed to different light in nature, and their need for light is different. Gentians are divided into three ecological groups in relation to light: *Heliophytes* (L.max.) - Sun-loving species that grow mainly in areas exposed to sunlight - *G.septemfida, G.cruciata.* The flowers of this group are especially common in the plains. *Heliocitsiophytes* (L.opt.) – shadow tolerant species, they grow at shiny places but they develop better at shadowy places - G.blepharophora, G. gelida. *Sciophytes* (L.min) shade-loving- *G. nivalis, G. verna* etc. According to the flowering time, Gentiana species are divided into the following groups: early summer (Gentiana aquatica, G.verna subsp.pontica, G. nivalis, G. pyrenaica, etc.) and summer-autumn (G.septemflda, G. asclepiadea, etc.). Flowering of gentian species is observed from June to the second ten days of August, ends in the first ten days of September, fruits and seeds ripen in the first ten days of October. **Keywords**: Caucasus, Azerbaijan, gentiana, heliophytes, heliocitsiophytes, sciophytes.

ROCKET (ERUCA SATIVA L.): A MULTIFUNCTIONAL MEDICINAL PLANT WITH HEALTH PROMOTING ANTIOXIDANT PROPERTIES

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ABSTRACT

Rocket (*Eruca sativa* L.) is an annual herb (Brassicaceae), and a green leafy vegetable with significant levels of bioactive components which contains a wide range of nutraceutical characteristics. It is used as food and consumed due to its medicinal properties, traditionally. It contains various phytochemicals such as flavonoids, phenolic acids, and other secondary metabolites. Medicinally, the plant has antiscorbutic, diuretic, antiulcer, and antioxidant activities. In this study, rocket leaves were detected for contents of total phenolics, peroxidase enzyme activity, and DPPH activity. Due to its high antioxidant and radical scavenger properties, *Eruca* is considered as capable resource for the production of low-molecular weight antioxidants, and is used in wound-healing, as analgesic, antimicrobial, muscle-relaxant, anti-inflammatory agent. As a result, *Eruca* can be suggested as a health promoting multifunctional medicinal plant, as well as, main potent sources of natural antioxidants preventing the deleterious consequences of oxidative stress.

Keywords: : Rocket, multifunctional, phenolics, antioxidant, medicinal.

ANTHOCYANIN CONTENT AND LOCALIZATION IN DIFFERENT PARTS OF MAIZE PLANT TREATED WITH EXCESS COPPER

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ABSTRACT

Copper (Cu) is an essential microelement for growth and development of plants, however, at high concentrations, it is also regarded as a major toxicant to plant cells due to its potential inhibitory effects against many biochemical and structural processes. Anthocyanins are plant pigments having important roles in many ecological functions; that are controlled by numerous regulatory factors. In the current study, anthocyanin content and morpho-anatomical changes of maize under copper stress were investigated in different parts of maize (*Zea mays* L.) plants treated with increasing concentrations of Cu (50, 100, 250, 500, 1000, 1500 µM CuSO4.5H2O) solutions at 25 oC in both dark and light. Accumulation of anthocyanins in various parts of maize were detected above 100 µM of Cu triggered by copper stress, significantly. 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 content due to 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.

Keywords: Copper, anthocyanin, anatomy, accumulation, maize.

DETERMINING ALL POPULATIONS OF THE TROJAN SNOWDROP (GALANTHUS TROJANUS A.P. DAVIS & ÖZHATAY) IN THE ÇANAKKALE PROVINCE AND ITS IUCN THREAT STATUS

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ABSTRACT

The Trojan Snowdrop (*Galanthus trojanus* A.P. Davis & Özhatay), a bulbous plant with elegant flowers, belongs to the Amaryllidaceae family. A locally endemic species, it is in the Critically Endangered (CR) category according to the IUCN threat criteria, and in the Annex-II list according to the CITES Convention. The plant is only found in Çanakkale. Prior to this study, it had been observed in only two locations at altitudes between 400-600 m. Furthermore, Yüzbaşıoğlu (2010), in his doctoral thesis study, reported that almost half of one of the two known locations of *G. trojanus* was destroyed during the road widening work. This study aims to determine all habitats of the *G. trojanus* species within the borders of the Çanakkale Province using field studies. Also, it aims to update the literature data on the distribution areas and current conditions of the species in field studies, determine the population status of the species, and monitor the habitats and dynamic structure of the species with the indicators to be determined. Within the scope of the research, field studies were carried out within the borders of the Çanakkale Province in 2018 in order to determine the current populations of the species, which were previously reported at two locations at altitudes of 400-600 m, and as a result, it was determined that the species was distributed in six different polygons varying between 250-800 m in altitude. Based on these findings, the Extent of Occurrence (EOO) of the species was calculated as approximately 50 km2 (less than 100 km2) and its Area of Occupancy (AOO) as approximately 0.093 km2 (less than 10 km2). In the homogeneous sample plots taken in the polygons, the number of individuals per square meter of the species was measured and a total of approximately 950-1320 individuals were determined in six polygons. In 2019 and 2020, observations made on populations in various field studies showed that the current situation [JET1] was preserved. Based on these findings, it is recommended that *G. trojanus* "CR (Critically Endangered)" according to IUCN (2012) criteria. The Trojan Snowdrop is a sensitive species with a very limited distribution and its habitats are vulnerable to anthropogenic effects. Therefore, this species is at risk of extinction. As a result of the literature and field studies, the most important factor threatening the species and its habitats was determined as the road / expansion work (threat level: critical). Other threats are; mining activities (threat level: high), grazing activities (threat level: medium), and deforestation (threat level: unknown). Counter measures and monitoring plans against these threats have been proposed. This study was carried out within the scope of the "The Trojan Snowdrop (Galanthus trojanus A.P. Davis & Özhatay) Species Action Plan" project of the Ministry of Agriculture and Forestry, Nature Conservation and National Parks Çanakkale Provincial Directorate. We would like to thank the management and employees of the institution for their close attention and assistance throughout the study.

Keywords: Galanthus trojanus, Trojan Snowdrop, endemic, Çanakkale, Turkey, IUCN

THE EFFECT OF THIOUREA APPLICATION ON ECOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS OF Cicer arietinum L. GROWN AT DIFFERENT TEMPERATURES

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ABSTRACT

One of the most important abiotic stresses affecting the whole world today is global warming and changes in temperatures. Changing climatic conditions affect the physiological and metabolic events of plants and significantly reduce yield and product quality. One of the physiological events most affected by heat stress is nitrogen metabolism. Because heat stress directly affects NO3- and NH4+ uptake by plants. To cope with this situation, plants use antioxidative defense systems, including enzymes such as SOD, CAT, APX, as in other abiotic stresses. In addition, the first visible effects of stress occur in the phenological characteristics of plants. In this study, 5 and 10 mM thiourea was applied to chickpea plant grown at 15, 25 and 35 °C and it was aimed to determine how the plant can cope with heat stress with nitrogen supplementation. Root-stem lengths, root-stem fresh and dry weights, chlorophyll a, b and total chlorophyll content and changes in SOD, CAT, APX, NR and GS enzyme activities were investigated of plant samples. It was determined that the root length decreased significantly at all three temperatures depending on the increasing thiourea concentration, while the shoot length increased at 15 and 35°C compared to the control. There was a decrease in root wet weight in all three experimental groups due to increasing thiourea concentrations. Only at 5 mM at 15°C was a highly significant increase seen over the control. A significant increase in shoot fresh weight was determined in the application of 5 mM thiourea at 15 and 35°C compared to the control. When the experimental groups at all temperatures were compared, the highest chlorophyll a, b and total chlorophyll values were found at 35°C. It was determined that SOD activity decreased at all temperatures, and this decrease was significant in both thiourea applications at 25 and 35 °C, and in 5 mM thiourea at 15 °C. It was determined that CAT and APX activity increased at all three temperatures compared to the control, and this increase was especially important in the application of 10 mM thiourea. A significant increase in NR and GS activity was determined in both thiourea applications at 25 and 35 °C compared to the control. Unlike GS, a decrease was detected in NR due to increasing thiourea concentration at 15 °C. As a result, it was determined that 5 mM thiourea application at low temperature promoted plant growth, while at high temperature it only had a positive effect on stem growth.

Keywords: Chickpeas, Heat stress, Phenological characteristics, Antioxidant enzymes, Nitrogen metabolism.

This study was supported by Bilecik Şeyh Edebali University Scientific Research Projects Coordinatorship with the project number 2019-01.BŞEÜ.25-01.

AIRBORNE ALLERGENIC URTICACEAE POLLEN IN DIFFERENT REGIONS OF TURKEY

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ABSTRACT

Pollen is known as a male gametophyte and pollen grains of Urticaceae members, especially *Urtica* and *Parietaria* genera, have a high allergenic effect on susceptible individuals. The concentration of atmospheric pollen may vary according to geographic, ecological, climatic factors, and the floristic structure of the region. Urticaceae is the most abundant atmospheric pollen in many areas of Turkey. This study determines daily concentrations, Main Pollen Seasons (MPS), and durations for atmospheric Urticaceae pollen in four cities from different geographical regions of Turkey; Bingöl, Bolu, Kilis, and Mersin. An aerobiological study was performed for two years using a volumetric Hirst type sampler (Lanzoni VPPS 2000). Slides were examined daily, and pollen amounts were calculated as m3 air. The MPS and durations were analyzed according to the 95% method. During the sampling periods, 2876 pollen grains belonging to the Urticaceae family were identified in four cities (Bingöl; 221, Bolu; 1264, Kilis; 482, Mersin; 909). The highest concentration of Urticaceae pollen was found in the Bolu (Northwest Turkey) atmosphere, while the lowest concentration was in the atmosphere of Bingöl (Eastern Turkey). Urticaceae pollen was found for more or less for all months in Bolu and Mersin (except for September in Mersin). However, Urticaceae pollen was not found in November, December, and January in the Bingöl atmosphere, and in October, November, December in Kilis during the sampling years. Urticaceae pollen reached the highest concentration in winter and early spring periods in Mersin's atmosphere and has the most extended MPS durations (December – August max. 232 days) compared to other provinces. In Bolu and Bingöl, the MPS and durations (March- October max. 183 and 159 days) were found shorter than Mersin and Kilis. Urticaceae pollen peak was observed in both Bolu and Bingöl during the summer months.

Keywords: Pollen monitoring, Flowering, Main pollen season, Turkey.

This study was financially supported by TUBİTAK-117Z252 Project.

ANTIOXIDANT ACTIVITIES AND ANALYSIS OF THE MAJOR CHIRAL COMPOUNDS OF ARTEMISIA HERBA ALBA ESSENTIAL OILS USING VIBRATIONAL CIRCULAR DICHROISM (VCD)

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ABSTRACT

The spectroscopic vibrational circular dichroism (VCD) chiral signatures of essential oils (EOs) were used to obtain the absolute configuration and the relative percentage of the major chiral compounds. For this purpose, a method was developed based on the use of VCD spectra of pure enantiomers, VCD spectra of EOs and a mathematical model (least square estimation). In order to validate the method, the chemical compositions of *Artemisia herba alba* EOs, grown in two regions of Algeria (Sidi Bel Abbes and Bechar), were determined by gas chromatography-mass spectrometry. The antioxidant activity was tested using four methods (DPPH radical scavenging activity, ferrous ion chelating activity (FIC), ferric reducing antioxidant power (FRAP) and inhibition of β-carotene oxidation assay). The major chiral compounds in the EOs were α-thujone, β-thujone and camphor. The VCD spectra of pure (-)-α-thujone, (+)-β-thujone and (-)-camphor and crude EOs were acquired to build the model. To obtain the configuration and relative percentage of the major chiral compounds, the VCD spectra of EOs were modelized as a linear weighted combination of the individual spectra of pure enantiomers. The value of each weighting gives the relative percentage of the chiral compounds while the signs address the correctness of the enantiomer employed for the model. The results of the FIC activity gave a result higher than 87% and the β-carotene oxidation was inhibited with a percentage higher than 45%.

Keywords: Essential oil, vibrational circular dichroism, absolute configuration, antioxidant activity.

DOCKING STUDIES ON THE EFFECTS OF SOME BIOACTIVE COMPOUNDS FROM PISTACIA ATLANTICA DESF. AGAINST MAIN PROTEASE SARS-COV2

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ABSTRACT

Novel coronavirus which was named later as SARS-CoV2 appeared in Wuhan, China, in the end of December 2019. Actually, no precise drugs are existed and research concerning SARS-CoV2 treatment is deficient. SARS-CoV2 main protease (Mpro) was crystallized by Liu et al. (2020) and represented a crucial drug target. The present work aimed to evaluate some bioactive compounds from *Pistacia atlantica* as possible SARS-CoV2 Mpro inhibitors, based on molecular docking approach. Molecular docking was carried out using AutoDock Vina software. The results indicated that Beta-Eudesmol, Elemol, Verbenol, Pinocarvone, Myrtenal, Myrtenol and Trans-Carveol have a potential inhibitor activity of SARS-CoV2 Mpro. Nevertheless, further investigations are required to develop and optimize drug process to combat SARS-CoV2.

Keywords: SARS-CoV2, molecular docking, Pistacia atlantica.

ANTI-INFLAMMATORY ACTIVITY OF HYBRIDE SPECIES OF THE GENUS CRATAEGUS

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ABSTRACT

Inflammation is the body's response to deactivate or destroy invading organisms in order to remove irritating substances and create conditions for tissue regeneration. Inflammation is triggered by the release of chemical mediators from damaged tissue and migrating cells. The aim of this study was to analyze the anti-inflammatory and antioxydnt activity of plant extracts of hybrid species of the genus *Crataegus*. The procedure for assessing the anti - inflammatory was done by the protein denaturation test. Protein denaturation is considered to be the cause of inflammatory conditions. It is believed that the prevention of protein denaturation can prevent inflammatory processes. Compounds that can prevent protein denaturation may be useful for the development of anti-inflammatory drugs. Hybride species of genus *Crataegus* that were used for anti-inflamatoriy analysis were hybride of *C.laevigata x C.rhipidophylla,* hybride of *C.rhipidophylla x C.monogyna*, and hybride of *C.rhipidophylla x C.microphylla*. Selected samples were were prepared by hot and cold extraction using water as solvent. The protein denaturation test showed that the hybrid *C.laevigata x C.rhipidophylla* prepared with cold extraction had the best anti-inflammatory activity(IC50 = 8.2 mg/mL), and the hybrid *C.rhipidophylla x C.microphylla* prepared via hot extraction showed the lowest anti-inflammatory activity (IC50 = 32.27 mg/mL). All prepared samples showed that they possess a minimum of 20% anti-inflammatory activity which is one of the criteria that a plant could be considered to possess anti-inflammatory property.

Keywords: Crataegus, anti-inflamatory activity, hybride.

METHODOLOGY FOR THE ALTERATION OF HAZARDOUS SOLVENTS IN DRUG SYNTHESIS

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ABSTRACT

Hazardous solvents have a high potential for causing acute health risks, including serious health problems such as cancer. They should be avoided or limited in pharmaceutical and chemical synthesis owing to the health hazards and safety issues. A method of amide coupling reaction was developed employing the recommended solvents to replace the hazardous solvents. The reactions were observed using the RP-HPLC method to detect reaction rate of aniline and benzoic acid to produce N-phenyl benzamide. 68.33%, 79.25% and 89.81% yields were synthesized using the solvents: acetone (Ace), dimethyl sulfoxide (DMSO), and ethanol (EtOH) respectively while 87.60% was produced by hazardous solvent: N, N-dimethyl formamide (DMF). Using this approach, adjusting the pH10 of the organic solvent increases reaction yield up to 34.67%, 4.65%, and 3.84% for Ace, DMSO, and EtOH, respectively. In drug synthesis, the proposed method can be applied in wide range to get the protection from the risks of hazardous solvents. The method can be anticipated in future to be an exciting basic method in synthetic chemistry.

Keywords: N-phenyl benzamide, Hazardous solvent, amide coupling reaction, Reaction yield, RP-HPLC method.

PHOTOCATALYTIC DEGRADATION OF THIAZINE AND ANTHRAQUINONE DYES IN AQUEOUS SUSPENSION OF MGO

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ABSTRACT

The removal of organic dyes from aqueous media is a significant effort for environmental protection. Among various treatment methods, heterogeneous photocatalysis is a promising advanced oxidation process to eliminate the organic effluent dyes. This method is based on the usage of UV-A light and a semiconductor simultaneously. MgO is a favourable photocatalyst due to its advantages such as being environmentally friendly, cost-effective, and having high chemical stability. The present work was focused on the determination of photocatalytic degradation of two different dyes categorized according to their chromophores under UV light. Methylene blue (MB) and Reactive Blue 19 (RB-19) were used as thiazine and anthraquinone model dye compounds, respectively. The structural changes in the functional groups of dyes with the presence of MgO involved in the photocatalytic process have been assessed by using ATR-FTIR. The photocatalytic degradation kinetics of dyes were also followed by UV–vis spectroscopy. A higher removal efficiency was obtained for the degradation of MB dye compared to RB-19. Moreover, the effects of operational parameters such as initial dye concentration and catalyst dose on the degradation of dyes were studied.

Keywords: Heterogeneous photocatalysis, methylene blue, MgO, Reactive Blue 19.

STUDY OF MODEL TRANSFORMATION REACTIONS IN LIQUID PHASE WITH FT-IR

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ABSTRACT

The determination of the exact mechanism, speed and dynamics of one chemical reaction is extremely important for achieving good yields and purity of the final products. It is also important to ensure the overall course of the transformation reaction, while minimizing the loss of time as these factors directly affect the yield of the final product . The transformation process of a substrate into a final product can go through various stages, some of which are speed-determining, while others require specific conditions as pressure, temperature, presence of a catalyst etc. A number of studies have focused on the kinetic behavior of model substrate systems. The most commonly used approach in these studies is to monitor the dynamics of ongoing transformations in solution using UV-spectrophotometry. The aim of the present study is to apply the ability of IR spectroscopy to monitor the dynamics of various chemical transformations in solution. At the beginning several model reactions were defined for monitoring the dynamic of transformation. Further, the kinetic of model reactions of transformation were monitored by means of IR spectroscopy. The following two reactions were chosen: synthesis of 1,8-naphthalimide derivatives with amino acids Gly which further to be used as a building blocks in biologically active peptides and the second one was the synthesis of paracetamol by an acylation reaction of 4-aminophenol in an aqueous solution. The dynamic of both reactions and obtained IR data will be discussed.

Keywords: FT-IR , IR spectroscopy , 1,8-naphthalimide derivatives , Paracetamol synthesis.

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SYNTHESIS AND CHARACTERIZATION OF POLYTHIOPHENE / POLY (ACRYLIC ACID) / BENTONITE COMPOSITES

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ABSTRACT

Clay-based hydrogel composites are considered super adsorbents because both clays and polymers are biodegradable, biocompatible, abundant, and have high specificity. Superabsorbent polymers (SAPs), which are pliable and special soft polymeric materials, have found wide applications as sanitary napkins, drug delivery systems and disposable diapers due to their ability to absorb large amounts of saline, water or physiological solutions [1-3]. In this study, natural bentonite as Ca-bentonite (CaB) was converted to Sodium bentonite (NaB) by various processes. Then, poly(acrylic acid)/bentonite composite was synthesized by in situ polymerization. Polythiophene was also synthesized and polythiophene/poly(acrylic acid)/bentonite composites were obtained by using different ratios of polythiophene. The water absorption capacity of the obtained composites was examined. As the polythiophene ratio increased, the water absorbency decreased. Composites were characterized by FTIR and XRD, and their morphology was examined by SEM.

Keywords: Hydrogel; polythiophene; clay.

SYNTHESIS AND CHARACTERIZATION OF POLY (SULFONIC ACID DIPHENYL ANILINE) / POLY (ACRYLIC ACID) / BENTONITE HYDROGEL COMPOSITE

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ABSTRACT

Polymer hydrogels, a type of uniquely soft material, are gaining more and more attention due to their special applications and academic importance. Superabsorbent polymers (SAPs), which are pliable and special soft polymeric materials, have found wide applications as sanitary napkins, drug delivery systems and disposable diapers due to their ability to absorb large amounts of saline, water or physiological solutions [1]. In recent years, conductive polymers (CPs) have gained popularity as components of complex systems designed to electrically communicate with biological environments. However, fabrication of CP-based electroconductive hydrogels is difficult. CPs exhibit (i) high stiffness due to their naturally rigid backbone containing conjugated double bonds, (ii) a hydrophobic nature due to aromatic rings in the backbone, and (iii) undesirable crosslinking induced by π−π stacking of chains. Poly(sulfonic acid diphenyl aniline) that is a water-soluble, processable conjugated polymer was synthesized without sacrificing its electronic properties [2]. Here, a novel poly(sulfonic acid diphenyl aniline)/poly(acrylic acid)/bentonite hydrogel composite is reported that overcomes the mentioned difficulties of CP based hydrogels by improving its mechanical and thermal properties with its clay additive. Hydrogel composites containing different proportions of poly(sulfonic acid diphenyl aniline) were characterized by FTIR, XRD and SEM. It was observed that water absorbency and water retention increased with the increase of poly(sulfonic acid diphenyl aniline) ratio of hydrogel composites.

Keywords: Electroconductive hydrogels; poly(sulfonic acid diphenyl aniline); bentonite.

WHEY/POLYSACCHARIDE/PLA-BASED HYDROGEL WITH BORIC ACID FOR SOIL QUALITY IMPROVEMENT

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ABSTRACT

This work describes a new type of eco-friendly biopolymeric composite material based on acid whey and derivatives of cellulose (carboxymethylcellulose sodium salt and hydroxyethylcellulose) crosslinked with citric acid as a soil conditioner for sustainable agricultural applications. In this study, untreated acid whey was used as a main component of hydrogel to replace the water commonly used for the hydrogel synthesis. This could solve the problem of overproduction of dairy by-products, thereby reduce the associated pollution. In addition, acid whey may enrich the soil with nutrients beneficial to plant growth. However, whey is highly perishable material, resulting in faster degradation of hydrogel in the soil environment. Therefore, boric acid was added to the hydrogel as a preservative agent of the material. The final hydrogel composite was blended by low molecular weight poly(lactic acid) in order to maintain its water holding capacity with gradual release of nutrients for longer time. Investigation was made into the impact of PLA content on hydrogel swelling properties and its biodegradability in the soil. To assess the suitability of the hydrogel in agriculture, a plant growth test of *Raphanus sativus* and *Lepidium sativum* and elemental analysis of the soil after hydrogel amendment were performed. The novel hydrogel demonstrates high water absorption capacity with swelling ratio 450-600% and considerable biodegradability in the soil (40 days for control sample). The decomposition time was extended by 25% after the addition of 20% w/w PLA which makes the hydrogel material more stable in soil and accessible to plants for longer time. A preservative effect of boric acid was demonstrated at 3% w/w. The plant tests suggest that whey/polysaccharide-based hydrogel with boric acid has beneficial effect for their growth. The results indicate that acid whey may be used for development of eco-friendly soil conditioners for soil quality improvement.

Acknowledgements: This work was funded by the Ministry of Agriculture of the Czech Republic (Project No. QK1910392), and the Ministry of Education, Youth and Sports of the Czech Republic (Grant No. RP/CPS/2020/002).

Keywords: biodegradable hydrogel, acid whey, poly(lactic acid), boric acid, soil improvement.

ULTRASOUND-ASSISTED ISOLATION AND CHARACTERIZATION OF ISOFLAVONES FROM MEDICINAL PLANTS USING NATURAL DEEP EUTECTIC SOLVENTS

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ABSTRACT

Botanicals, being safe because of their natural origin are associated with potential health benefits due to their isoflavones-rich content. Isoflavones as plant-generated secondary metabolites are basically synthesized in order to defend against environmental stress such as UV radiation, mechanical damage, or any other attack from the surroundings. Soy (*Glycine max*), kudzu (*Pueraria* species), and red clover (*Trifolium pratense*) are of significant importance in the medical field. These isoflavones were reported to exhibit a variety of biological functions e.g., antidiabetic, antiaging, anticancer, and microbiome modulations. This study focuses attention on the extraction and quantification of isoflavones in kudzu roots (KR), kudzu flowers (KF), red clover (RC), and soy molasses (SM) using HPLC-DAD system, and determining their antioxidant activities (AOA), total polyphenols (TPC), and total flavonoids contents (TFC). Novel green ultrasound-assisted extraction (UAE) technology was developed to extract and quantify the isoflavones using deep eutectic solvents (DESs). The results showed the quantity of isoflavones in KR, KF, RC and SM to be 1.01%, 2.9%, 1.5%, 0.70 % in the dry matter of KR, KF, RC, and SM, respectively. HPLC-DAD results revealed that the four different types of extracts comprise puerarin, daidzein and genistein, formononetin, and biochanin A as main ingredients. The fractionation using ethyl acetate (EA) improved the yield to be 1.48%, 2.5%, 1.3% and 0.89% in the KR, KF, RC, and SM extract fractions, respectively. The AOA, TPC, and TFC exhibited higher results in KF > RC > KR > SM. These findings eventually demonstrated that our green UAE methodology using DESs was a safe and efficient method to recover isoflavones from SM, KR and RC. Overall, the total isoflavone contents in the dry matter in all extracts were recorded as follows: KF > RC > KR > SM which were correlated to the AOA, TPC and TPC. We concluded that these botanicals are a potential pharmaceutical source of isoflavones that exhibit strong antioxidant properties.

Keywords: Pueraria species, glycine max, trifolium pretense, isoflavones, deep eutectic solvent, HPLC-DAD.

Acknowledgments: We acknowledge the financial support of the Russian Science Foundation, Grant No.20-66-47017.

MICROWAVE-ASSISTED SYNTHESIS AND ANTICANCER ACTIVITY OF TI(IV) COMPLEXES WITH PYRIMIDINE DERIVATIVES

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ABSTRACT

The article deals with a study of synthesis Ti(IV) complexes with pyrimidine derivatives, they were synthesized by microwave method. Microwave-assisted synthesis is a branch of green chemistry. The advantages of the microwave method compared to the conventional method are shorter reactions times, simple reaction conditions and enhancements in yields. The ligands and their Ti(IV) metal complexes have been characterized by (FT-IR, UV-Vis, 13C-NMR, 1H-NMR, Mass) spectra and elemental analysis, meltin point, molar conductivity. Pyrimidine derivatives and their complexes with transition metal have great importance. They show the immense commercial aplications in medicine, antioxidant, antibacterial, anticancer, antifungal, antiviral and antitumor active agent, and in other fields. We also tested Ti(IV) complexes for anticancer activity. The results showed that the Ti(IV) complexes have much higher anticancer activity compare to the parent ligands.

Keywords: Ti(IV) complexes, pyrimidine derivatives, anticancer activity.

SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY OF NI(II) COMPLXES WITH PYRIMIDINE BASED LIGAND DERIVATIVE

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ABSTRACT

The article deals with a series of complexes containing Ni(II) with pyrimidine based ligand derivatives. The ligands and their Ni(II) metal complexes have been characterized by IR, 13C-NMR, 1H-NMR, Mass spectra and elemental analysis. Anyibacterial activities of the ligand and their complexes have also been tested. The results show that Ni(II) complexes possess higher antibacterial activities than ligands towards the bacterial species.

Keywords: Ni(II) complexes, pyrimidine derivatives, antibacterial activity.

EVALUATING COMMERCIAL BERRY JAMS FOR THE PRESENCE OF POLYPHENOLS IN SAMSUN AREA

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ABSTRACT

Biologically active components such as polyphenols are becoming an area of interest in the research of many scientists. Furthermore, polyphenols have a very important role as functional foods in our nutrition having many effects on prevention and protection from several specific diseases i.e. certain polyphenols can stop several diseases' development via certain mechanisms. Berries are rich in the content of polyphenols. Due to the stated facts, berries are recommended for regular consumption. At the same time, fresh berries are subject to rapid deterioration and, consequently, they are generally processed into different kinds of products to extend their shelf-life and made easily accessible all year round. Customers are more likely to buy commercial fruit products than to make them at home, so the purpose of this paper was to estimate the amount of polyphenolic content in four different kinds of jams of fruit. In respect of this, the aim of this study was to explore the polyphenols profile of berry fruit products from locations 'Samsun', Blacksea region Turkey. Individual polyphenols were detected and quantified by Ultra-Fast Liquid Chromatography (UFLC) technique. Most of the analyzed polyphenol compounds were detected in the bilberry jam sample.

Keywords: jams, berries, biologically active components, polyphenols.

A NEW CARBON DOT SYNTHESIS FROM KUMQUAT AND ION SENSOR APPLICATION

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ABSTRACT

Novel carbon dot structures (CDs) was synthesized from kumquat by hydrothermal method. and these structures were characterized structurally and optically. The ion sensor application of these new CDs was studied using 20 different metals. Among all metal ions studied, CDs were found to be highly selective and sensitive only to Fe3+ ions, with a detection limit of 0.70 μM. Interference studies showed that the selectivity of CDs towards Fe3+ ions was not affected by the presence of any other ions. The usability of CDs to detection Fe3+ ions in real samples was investigated in tap water samples. We suggested that this new CDs, obtained from kumquat fruit without using chemical agents in one-pot simple and economical process, can be used as a fluorometric sensor for Fe3+ ions.

Keywords: Kumquat; Carbon dots (CDs); Turn off; Fe3+.

EXTRACTION OF POLYPHENOLS FROM CORNELIAN CHERRY (CORNUS MAS. L.) FRUITS BY PRESSURIZED LIQUID EXTRACTION TECHNIQUE

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ABSTRACT

In this study, it was aimed to determine the optimum extraction conditions for the extraction of phenolic compounds from cornelian cherry (*Cornus mas* L.) fruits by pressurized liquid extraction (PLE) technique. In extraction optimization, solvent/solvent mixture, temperature, time, and pressure parameters were studied. Total phenolic content (TPC) analysis was carried out the determine the optimum value for each changing parameter. After the optimum extraction conditions were determined, the individual phenolic compounds of the extracts were studied by the HPLC-DAD system, the TPC, total anthocyanin, and antioxidant capacity determinations were studied by spectrophotometric method. A solvent mixture including methanol, water, and HCl (70:29.9:0.1), 25°C temperature, 60 minutes, and 1500 psi pressure were optimized and found as optimum extraction parameters for PLE in the determination of the phenolic compounds. The phenolic compounds detected in the extract of cornelian cherry fruits were gallic acid, catechin, epicatechin, epigallocatechin gallate, and rutin. As the solvent composition affects the amount of extractable phenolic compounds, similar results were obtained in other parameters too.

Keywords: Phenolic compounds, Pressurized Liquid Extraction, Cornelian cherry, Antioxidant capacity.

PHYTOCHEMICAL SCREENING, AND THE EVALUATIONS OF THE ANTIOXIDANT ACTIVITY FOR FLOWERS AND STEMS AND THE ANTIBACTERIAL ACTIVITY OF LEAVES AND ROOTS OF A SPECIE FROM THE ASTERACEAE FAMILY

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ABSTRACT

First, the phytochemical screening of both organs of this specie allowed the detection of several chemical groups such as alkaloids, flavonoids, tannins etc., The evaluation of the total phenolic and flavonoid contents revealed that both extracts (EtOAc, n-BuOH) of leaves and roots are rich in phenolic and flavonoid compounds. These results led us to conclude that this plant contains a considerable amount of polyphenols and flavonoids. Next, the results of the antioxidant activity showed a significant antioxidant effect especially of the flowers n-Butanol extract. Finally, the diffusion method in agar medium was used to test the antibacterial activity of the chloroform extract of leaves and Roots on three bacteria (ATCC) , which are reference strains involved in several human infections. However, the results showed that the chloroform extract exerted a moderate activity against these bacteria. The studied plant is characterized by a fairly large reservoir of secondary metabolites with specific therapeutic and pharmacological characteristics. The phytochemical screening reveals that flowers are richer in various secondary metabolites than the stims. The estimation of total polyphenol and flavonoid contents in both extracts confirms the presence of these metabolites in considerable quantities in the flowers, based on the results of antioxidant activity, the n-Butanol extract reveals a good antiradical effect. The evaluation of antibacterial activity of the CHCl3 extract from leaves and roots shows average activity on the strains tested (ATCC), these results remain low activity compared to reference substances (antibiotics).

Keywords: medicinal plants, phytochemical screening, polyphenols and flavonoids, antioxidant activity, DPPD, ABTS, antibacterial activity.

THE EVALUATION OF HEAVY METAL POLLUTION IN FRESHWATER SEDIMENTS COLLECTED FROM THE DAM LAKES IN TEKIRDAG PROVINCE

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ABSTRACT

The purpose of this study was to determine the heavy metal contents in the surface sediments collected from 4 stations and 8 different points, including Naipköy Dam lake, Türkmenli Pond, Yazır Pond and Şarköy Pond that supply drinking and utility water to Tekirdağ Province and to decide their impact on the ecosystem. The amount of Hg in the samples was measured by using direct mercury analyzer and other metals were analyzed by inductively coupled plasma mass spectrometry (ICP-MS). The samples were taken from the relevant dam lake and ponds on 8-10 October 2020 using a 0.1 m2 Van Veen sediment grab ladle held from the Zodiac boat. In the risk assessment, enrichment factor (EF), contamination factor (CF), contamination degree (CD), pollution load index (PLI), geoaccumulation index (Igeo), potential ecological risk index for single heavy metal (PERI) and sediment quality guidelines (SQGs) statistical approaches were used to determine the pollution scale in the sediments of the dam lake and ponds. In addition, the heavy metal results in the study were compared with the results obtained in some lakes and rivers in the world and Turkey. The heavy metal concentration ranges are for Ag 0.122-0.271 mg/kg, for Al 19471-62360 mg/kg, for As 5.421-21.07 mg/kg, for Ca 15500-60129 mg/kg, for Cd 0.139-1.758 mg/kg, for Co 12.74–29.23 mg/kg, for Cr 94.34- 231.9 mg/kg, for Cu 33.24-86.01 mg/kg, for Fe 24705- 58014 mg/kg, for Li 21.14-43.71 mg/kg, for Mg 6234-16717 mg/kg, for Mn 871.2-946.5 mg/kg, for Ni 94.01- 270.9 mg/kg, for Pb 12.64-42.68 mg/kg, for V 72.54-173.2 mg/kg, for Zn 71.16-119.3 mg/kg and for Hg 0.013-0.041 mg/kg. The order of average metal amounts in freshwater sediments are as follows: Al>Ca>Fe>Mg>Mn>Ni>Cr>Zn>V>Cu>Li>Pb>Co>As>Cd>Ag>Hg. The CD values were classified low degree of contamination to moderately degree of contamination expect except T1 (Naipköy Dam) sampling point. The Igeo and CF values indicated uncontaminated to moderately contaminated with a few exceptions such as Cd amount for T1 and Ni amounts for T6, T7. The PLI values demonstrated uncontaminated to slightly contaminated. The EF results showed minor enrichment to moderately severe enrichment (Ni concentrations for T6-T8). The PERI values of Cu, Pb, Zn, Ni, Cr and Hg in almost all sampling points demonstrated to low and moderate risk while the PERI values of As for T6, T7 and Cd for T1, T3-T7 were indicated to high risk in all surface sediments. According to the evaluation of effects range low and effects range median (ERL-ERM), As, Cd, Pb, Zn and in almost all sampling points were below ERL values. Cr and Cu were found between ERL and ERM values. Ni concentrations were above the ERM values in all sediment samples. Based on these results, it was concluded that Cr, Cu and Ni elements may be toxic effects on the sediment ecosystems in Tekirdağ and the pollution of Hg can be evaluated as reflecting the influence of the anthropogenic inputs.

Keywords: Freshwater sediments, heavy metal, sediment quality, dam lakes, Tekirdağ.

APPLICATIONS OF X-RAY FLUORESCENCE SPECTROMETRY TO THE ANALYSIS OF HEAVY METALS (CU, ZN, PB, CR, NI) IN THE SOILS OF SKIKDA

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ABSTRACT

The objective of this study is to determine the content of Cu, Zn, Pb, Cr, Ni metal elements in the soil of Skikda. The use of X-ray fluorescence spectroscopy allowed us to identify the following constituents in the samples taken: Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn Fe, Ni, Cu, Zn, Ga, As, Se, Br, Rb, Sr, Y, Zr, Ba, Pb.The quantitative and qualitative analysis of samples taken from the soil of the city of Skikda by an X-ray fluorescence spectrometer showed that they are characterized by contamination in zinc, lead, nickel and chromium, copper. These heavy metals can result from contamination of human origin related mainly to agricultural and industrial activities and heavy traffic. On the other hand, natural contamination

Keywords: heavy metals, soil, contamination, XRF.

ELIMINATION OF METHANOL AND AND ETHANOL BY SYNTHETIC ZEOLITES

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ABSTRACT

The waters from discharges of industrial units often contain amounts of various organic compounds (Methanol, Ethanol, Phenol, Hydrocarbures, etc). The use of organic compounds is essential in many branches and applications of industry. This practice poses a problem because of their sometimes high toxicity for the man and the environment, of the extremely strict limits must be fixed and respected as for the concentrations of organic compounds in polluted water. Zeolites constitute a big family of mineral compounds; they present an effect of remarkable molecular sieve, thanks to regular dimension their pores which thus exclude any molecule whose diameter is higher than that of the pores. The objective of this work is the recovery of a molecular sieve (zeolites 4A) previously used for the ends of drying, for a valorization of an industrial waste and the report of the behavior of the adsorption of the organic compounds (methanol and ethanol). An experimental study was performed for the removal of methanol and éthenol often present in the industrial wastes by this recovered molecular sieve (powder and grain). The experiments are carried out in discontinuous system (batch). The influence of several parameters such as the contact time, the granulometry and the mass of the adsorbent on the adsorption rate will be presented.

Keywords: Depollution, molecular Sieve, Zeolite, Organic Compounds.

LA-PROMOTED TUNGSTATED ZICRONIA CATALYST FOR N-BUTANE ISOMERIZATION

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ABSTRACT

Promoted tungstated zirconia (WZ) catalysts are active and selective for isomerization of light alkanes, offering good prospects for industrial application. This account is an abbreviated summary of what these catalysts are and how they work.La-promoted Tungstated zicronia (LWZ) was prepared by a slurry impregnation method. The textural properties as well as the acidities of the La-promoted catalysts were characterized by X-ray powder diffraction (XRD), N2 adsorption, NH3 temperature-programmed desorption (NH3 TPD) and Thermogravimetric Analysis (TGA). The catalytic behavior of LWZ for n-butane Isomerization was rtudied in the presence of hydrogen at 300°C, WHSV=0.47h-1 and nC4/H2=6. In comparaison to Tungstated zicronia (WZ), the catalytic activity of the La-promoted catalyst was greatly improved

Keywords: Tungstated zicronia, lanthanum, nbutan Isomerization, acid site.

INVESTIGATION OF EFFECT OF PUMICE-SUPPORTED NICKEL ON BIOGAS PRODUCTION FROM POULTRY MANURE WITH A STATISTICAL OPTIMIZATION APPROACH

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ABSTRACT

Growing economies and populations have created some problems including depletion of natural resources, energy requirement, and production of huge amounts of waste. Accordingly, the world is faced with environmental pollution and energy shortage. The large amount of wastes released into the environment from various sources such as industrial waste, animal manure, and agriculture residues can pose a serious threat to the environment and human health if not disposed of efficiently and economically. Anaerobic digestion (AD) is one of promising environmental technologies to convert the organic matters into biogas and decrease the waste volume. Thus, the AD of poultry manure was investigated to improve biogas production with the addition of trace element in this study. For this propose, pumice supported nickel (Ni@TP) as trace element additive was synthesized by using the NaBH4 reduction method. The effects of some variables affected biogas production (total solid amount of substrate (TS%), Ni ratio loaded on pumice (%), and Ni@TP added to the AD system (mg/L)) were optimized via response surface methodology (RSM). Cumulative biogas production (mL), removal performance of chemical oxygen demand (%RCOD), and methane content in biogas (CH4%) were selected as responses on the AD performance of poultry manure. The optimum points that maximize the selected responses were found by numerical analysis method in RSM. At the obtained optimal conditions, the maximum responses were determined as 7862.75 mL for cumulative biogas production, 60.43% for %RCOD, and 63.49% for CH4%. The results indicated Ni@TP additive has significantly improved biogas production compared to control.

Keywords: Anaerobic digestion, biogas, nickel, pumice, response surface methodology.

Acknowledgements: The present work was supported by Scientific Research Projects Coordination Unit (BAP), Van Yuzuncu Yil University, Turkey with Grant #FDK-2018-7578.

POLYMER BRUSH-GRAFTED BENTONITE FOR THE EFFICIENT REMOVAL OF MERCURY AS A TOXIC METAL: A STATISTICAL APPROACH

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ABSTRACT

Contamination of aqueous environments with toxic metals has created a significant environmental concern owing to rapid industrialization. Mercury (Hg (II)) as a toxic metal is one of potential carcinogenic metals. This heavy metal is released to environment from various industries effluents such as mining activities, paint manufacture, battery manufacture, and electroplating. Considering its accumulative properties in living organisms, the presence of Hg(II) ions in aqueous media has cause various diseases including psychological impairment, central nervous system and sensory disorders. Therefore, it is necessary to economically and effectively remove Hg(II) ions from the aqueous media. In current work, the clay-polymer brush hybrid material (Bentonite grafted with poly(N-acryloylglycineamide), PNAGA@B) was synthesized to remove Hg(II) from aquatic environments. The removal performance of Hg(II) with PNAGA@B was statistically model and optimize by response surface methodology (RSM). The influences of the experimental parameters (pH, Hg(II) ion concentration (Co), adsorbent dosage, and contact time) were studied by central composite design (CCD) under RSM. The ANOVA results indicated that the quadratic model equation (*R2* 0.99) and model terms ($p < 0.001$) was statically importance. The selected adsorption parameters were numerically optimized by using Design-Expert 7.0 program (trial version). The optimal experimental conditions were pH of 6.54, Co of 24.46 mg/L, adsorbent dosage of 23.98 mg, and contact time 106.83 min. Under these points, the maximum Hg(II) removal efficiency was found as 98.58%. The results conducted that the synthesized hybrid material has excellent potential for the removal of heavy metal ions like Hg(II) from aqueous environments.

Acknowledgements: This study was supported by the Scientific and Technological Research Council of Turkey with Grant #218M785.

Keywords: Adsorption, bentonite, mercury, polymeric brush, response surface methodology.

INVESTIGATION EUCALYPTUS EXTRACTION AS GREEN CORROSION INHIBITOR IN CRUDE OIL PIPELINE

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ABSTRACT

This study investigate the internal corrosion of low carbon steel (API 5L X52) pipelines in the crude oil, as well as prepare and use natural and locally available plant (the bark of eucalyptus tree) as a natural corrosion inhibitor, The eucalyptus bark extraction achieved by two types of solvents in order to show the solvent effect on inhibition process, the first being distilled water and the second is diethyl ether, the two types of the new inhibitor compared with a chemical inhibitor which used by Missan Oil Company (MOC) in terms of the cost, toxicity, availability and performance. FT-IR spectra and using a chemical reagents achieved to detection the presence of many active groups and the presence of tannins, phenols and alkaloids in the Eucalyptus Bark (EB). Some experiments were achieved to estimate the performance of a new inhibitor, one of these tests include corrosion measurement by simple immersion in crude oil within and without of inhibitors which added in different amounts 30, 40, 50, and 60 ppm at two temperature 300 and 323k, where the best inhibition efficiencies which get when added the inhibitors in a critical amounts or closest to it, since for the aqueous extract (EB-A) the inhibition efficiency reached (94.4) and (86.71)% at 300 and 323K respectively, and for diethyl ether extract (EB-D) reached (82.87) and (84.6)% at 300 and 323K respectively, while the chemical inhibitor (CRW) which used by MOC reach to (84.21) and (88.73)% at 300 and 323K respectively

Keywords: Keywords: corrosion inhibitor, crude oil pipeline, API 5L X52 , simple immersion, weight loss.

DETERMINATION OF ADSORPTION KINETICS OF PYRONIN DYES ON CARBOXYLIC ACID FUNCTIONALIZED MULTIWALLED CARBON NANOTUBES AND BIOSENSOR STUDIES

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ABSTRACT

It was aimed to determine the kinetics of the adsorption of dye compounds with known properties on modified carbon nanotubes. Biosensor studies were carried out for one of the protein-based drugs. Concentration studies were performed for Pyronin B (PyB) and Pyronine Y (PyY) dye compounds in pH 7 medium. After the concentrations were determined, the adsorption process was carried out. The adsorption process of dyes, on carboxylic acid functionalized multiwalled carbon nanotubes (COO—MWCNT) was followed by UV-VIS absorbance spectroscopy. Adsorption kinetics of dyes were determined using decreasing absorbance intensity. Individually, PyB, PyY and Protamine were found to be rapidly adsorbed on the surface. Conventional Langmuir adsorption isotherms were compatible and high linearity was achieved. It was determined that protamine adsorption was more effective. The competitive adsorption provided by protamine enabled the sensor properties to be studied. We propose that the bioanalytes can be used for the development of sensitive and selective biosensors with efficient and strong competitive adsorption on the PyB-COO—MWCNT and PyY-COO—MWCNT complex.

Keywords: Pyronin dyes, Uv-vis absorption spectroscopy, Langmuir isotherm, Biosensor.

NETWORK FORMATION AND INTERFACE BEHAVIOR OF PU COATINGS WITH DUAL HYDROPHILIC/HYDROPHOBIC DANGLING CHAINS

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ABSTRACT

Materials science is constantly evolving to satisfy the changing demands and expectations of high-tech societies in everyday life and industry. As materials advance, new requirements are realized such as effective surface protection, long durability periods, and the capacity to display desirable surface functions based on environmental conditions. Surface coatings that meet these criteria are made from industrially produced synthetic polymers and are utilized for protection and form a long-lasting film on the surface in touch with the outside. The functionality and lifetime of the coating are reduced because of its exposure to diverse environmental conditions throughout time. Therefore, polymer coatings that have a variety of applications, including biomedical, aviation, and maritime, are required to develop new surface functionalities that are appropriate for their respective area of use. Designing polymer coatings that adjust surface properties autonomously in response to environmental conditions should enable specific surface properties such as, preventing biological material from accumulating on the surface of a biomedical device, controlling surface wettability, protecting the surface in extreme environmental conditions, or healing a damage. Surface modifications, such as incorporating functional dangling chains into the structure of polymer coatings can achieve the properties. Moreover, retaining bulk character while modifying the surface properties of polymeric materials to make them superhydrophobic or superhydrophilic is crucial. Protection from sticky biological elements is commonly achieved in marine and biomedical device applications by adding biocompatible, hydrophilic polyethylene glycol (PEG) chains into the coating. Although hydrophilic modification applications with dangling chains to the hydrophobic coating are common in the literature, surfaces with amphiphilic chains in a single system and selective functionality with hydrophobic or hydrophilic chains depending on the environment are not yet common in the literature, both experimentally and computationally. The dual structure of dangling chains allows the coatings to respond intelligently to environmental polarity. This research will pave the way for the development of surface functional polyurethane coatings for e.g., anti-biofouling applications. In comparison to experimental processes, the coarse-grained Dissipative Particle Dynamics (DPD) technique is very useful for examining the behavior of functional polymer surfaces to various environmental factors and their functional stability over time. It allows understanding the data to be studied more easily and in a short time. The findings of a coarse-grained (CG) simulation analysis on a PU coating with dual hydrophobic/hydrophilic dangling chains are presented in this work. * This research is financially supported by TUBITAK under 2535 TUBITAK-MSRT program (project no: 119N750).

Keywords: Functional polymer coatings, Smart coatings, Smart polyurethane, Dissipative Particle Dynamics (DPD).

SEASONAL CHANGES IN AN ECOLOGICALLY IMPORTANT WETLAND, IMBROS LAGOON BETWEEN 2016 AND 2020: EVIDENCE FROM HIGH RESOLUTION SATELLITE IMAGERIES*

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ABSTRACT

The Imbros Lagoon is known to be one of the tree coastal salty lagoons in Turkey. Due to its geographic location, vegetation and water related properties, the lagoon serves as a precise zone especially for migrative bird species, in different times of the year. Increasing of evaporation in summer season manipulates the status of this specific zone and as result of the process the salt became visible whereas it becomes a hotspot for tourism activities in dry season. However, environmental issues that threat the wetland are reported whereby the most highlighted one is the impacts of climate change which would affect not only water but also biodiversity in return. In this context the study aimed to investigate the alternations in surface water area of the lagoon in respect to different seasons between 2016 and 2020 using Sentinel 2 imageries. Different water related indices and their combinations were used to identify the most discriminative one. Findings revealed that there are obvious changes in water area of the lagoon in all seasons in coherency with meteorological data.

Keywords: Ecology, High Resolution Satellite, Imbros Lagoon, Seasonal change, Wetland.

ESTABLISHMENT OF RAIN GARDENS IN TRAKYA UNIVERSITY CAMPUSES

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ABSTRACT

Water is a limited and strategic natural resource. Efficient and economical use of water, detection and prevention of threats to water, protection of water and water-dependent ecosystems, and in this context, ensuring sustainable water resources management. Many concepts have emerged within the scope of sustainable water management systems in the world. One of these concepts, green infrastructure systems, uses vegetation and soil to manage rainwater where it falls, thereby improving urban air quality, providing infiltration and helping prevent floods. Rain gardens, which are among the green infrastructure techniques, in other words, bioretention areas are defined as superficial areas where rainwater is directly directed without any treatment and native native plant species are planted on it. Bioretention; It is a set of biological, chemical and physical processes that use soil, microorganisms and plants to remove pollutants, reduce surface runoff, and control water quality and quantity. Rain gardens reduce the water and pollutant load (suspended solids, total nitrogen, total phosphorus, heavy metals, oil and grease, and pathogenic bacteria) of the rainwater canal system. In this study, the installation stages of rain gardens established in Trakya University campuses are presented. During the location of the rain gardens, the soil structure and the rainwater flow area were determined by field observations. Rainwater catchment basins, water flow directions were observed, field measurements were made from photographs and maps, and the amount of rainwater collected was determined with meteorological data. Gardens were established by choosing plants suitable for the calculated amount of rainwater and soil mixture, climate.

Keywords: Rain Garden, Bioretention, Green Infrastructure, Sustainable Water Management.

BIOGAS PRODUCTION FROM BLACK CUMIN WASTE

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ABSTRACT

The aim of this study is to reduce the use of non-renewable energy sources as a result of the increase in energy need arising with the increasing population. It is aimed to contribute to both sustainability and renewable energy types in the energy production we realize using black seed waste, and to produce environmentally friendly energy at no cost. An anaerobic system was established with the black seed waste we obtained from the bazaar in Tukey and the bacteria in the waste water we obtained from the factory. Dark fermentation took place in two different environments: mesophilic and thermophilic. In the thermophilic environment, a rapid increase was observed in the first five days, then the increase slowed down and stabilized after the 24th day. In the mesophilic environment, rapid increases were observed in the first two days, and then slow and close increases were observed. After the 23rd day, the amount was fixed. Gas output was measured at the level of mL and according to the data, the total amount of biogas emitted for 4.14 grams was 95.22 mL in mesophilic and 162.29 mL in thermophilic. When the total gas amount of the gases collected from the system is measured with a portable gas measuring device, the percentage of methane in thermophilic is 61.1%, the amount of carbon dioxide is 38%, and the other gases are 0.9%; 59.2% in mesophilia; the amount of carbon dioxide was 39.7%, while other gases were 1.1%. The electricity equivalent of the biogas energy we produce has been calculated. According to our calculations, the energy obtained from 100 kg of black seed waste in thermophilic conditions is large enough to meet the energy amount of a house in Gebze for an hour. In biogas experiments with black seed waste, it is thought that increasing the temperature further, testing with pre-treatments such as different pH and temperature, or mixing it with organic wastes with biogas potential such as high-energy plant waste or fertilizer will be increased the biogas amount.

Keywords: biogas, black cumin, waste, energy.

USE OF LICHENS AND THE PHYTOSOCIOLOGICAL APPROACH TO ASSESS AIR POLLUTION IN AN INDUSTRIAL CITY IN MOROCCO

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ABSTRACT

Biomonitoring includes four concepts: the use of biomarkers, bioindication, biointegration and bioaccumulation. Few of the biomonitoring studies have used biointegration although phytosociological disturbances in lichen populations are a good biological indicator. In fact, lichens integrate the effects of various ecological factors over the long term, and a phytosociological analysis of their communities will allow the identification of their biotope disturbance levels. To assess air quality, we propose to study the phytosociological and dynamic aspect of a lichenic association of Safi city: Ramalinetum lacerae on a surface of 30 km length and a width of 4 to 6 km. The data collected and statistically processed allowed calculating analytical phytosociological parameters: The cover (R) and the frequency (F) and synthetic parameters: The global average cover (GAC) and The dominance according to the cover (DC). Ramalinetum lacerae species have relative values for the poleotolerance index and eutrophication index that express their ecological amplitude to withstand toxicity and nitrogen deposition. The variations of the statistical and biological parameters observed in the structure of the association Ramalinetum lacerae can be explained by the impact of the atmospheric pollution which limits its development in the center and the south of Safi city, leads to a decrease of its biodiversity and a decrease of its characteristic species cover, which will be compensated by the proliferation of opportunistic species. In the horizon, this kind of study will constitute a complement to the physico-chemical measurements tools used by the urban policy and a promotion to the environmental education.

Keywords: Biointegration, lichens, phytosociology, bioindicators, ecological disturbances.

ISOTOPIC APPROACH OF PB AND ENRICHMENT IN METALLIC TRACE ELEMENTS IN THE LICHEN RAMALINA POLLINARIA TO ASSESS THE AIR POLLUTION OF AN INDUSTRIAL CITY IN MOROCCO.

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ABSTRACT

The aim of this study was to improve our understanding to trace possible sources of air pollution in Safi city (Morocco). For this purpose, the isotope ratio 206Pb/207Pb and 208Pb/207Pb and the concentrations of metallic trace elements are analysed using inductively coupled plasma-mass spectrometry (ICP-MS) in the lichen Ramalina pollinaria. The means concentrations, the enrichment factors (EF, normalized in Al) and the elemental ratios Zn/Cu, Zn/Pb in Ramalina pollinaria show a spatial variation. The variations are dominated by enrichment in Pb, Cu and Zn. The interpretation allows to rule out gasoline as a source of lead contamination and to focus the phosphate industry, waste incineration, artisan pottery activity, particles emitted by the wear of tires and brakes, and the use of phosphate fertilizers as a source of trace metal elements accumulated. Air contaminants in Safi appear to be exported, out of their sources, by air mass movements driven by the regional wind profile.

Keywords: Lichens, metallic trace elements, Pb isotopic composition, tracing pollution sources, enrichment factors.

IDENTIFICATION OF STINK BUGS INSECTS (PENTATOMIDAE) IN ECOSYSTEMS OF CENTRAL MOUNTAIN RANGE IN ALBANIA

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ABSTRACT

This study aims to present a identification to the stink bugs insect *Pentatomidae* family (Hemiptera), in the different ecosystems in central mountain range. The collection of biological material is performed during the period 2018- 2019 in hilly habitats. The study analyzed 121 individuals, which represented 19 genus and 27 species. The collected biological material revealed the genera *Carpocoris*, *Holcostethus* and *Stagonomus* are more represented, with 3 species and a frequency of 11.11%. Habitats of Iba station were represented by more species compared to other stations, 14 species and frequency of 51.85%. While with less represented species was Ndroqi station with 9 species and a frequency of 33.33%. Based on the "*Jaccard index*", Dajti with Farka and Iba with Ndroqi stations, present higher coefficient of similarity compared to other stations, 27.77%, which mean a similarity between these habitats. Zoogeographic Mediterranean regions represent most of the species, with 9 species and frequency 33.33%.

Keywords: Stink Bugs, Pentatomidae, Ecosystem, Zoogeographic regions, Carpocoris.

MICROBIAL BIOREMEDIATION OF PESTICIDES FROM CONTAMINATED ENVIRONMENTS

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ABSTRACT

With the increase in population all over the world, the need for all foodstuffs, especially plant-based, has increased day by day, and this has brought along the intensive use of pesticides in today's modern agriculture. Due to all these reasons, this increase in the use of pesticides has reached levels that will adversely affect the environment and human health. While receiving environments such as air, soil and water are polluted, pesticides accumulate as a result of their vital activities and the effect of the food chain in living things these environments. These pesticides, which accumulate in living things, become threatening the living elements of the ecosystem over time, as they reach concentrations that will create toxic effects. Regarding this situation, if necessary precautions are not taken, serious ecological crises in many ecosystems will become inevitable. Today, the use of some pesticides is prohibited, while the use of others is restricted. However, this is insufficient and the necessary action plans should be determined and put into practice urgently. Today, many physical and chemical processes are already used for the removal of pesticides. However, such methods have many disadvantages due to their high cost and the possibility of creating secondary pollutants in the environment. Biological processes, especially improvement studies carried out using microorganisms, have many advantages in terms of both cost and environmental friendliness. Considering the negative environmental effects of pesticides, it is of great importance to improve the environments contaminated with these pollutants with appropriate and effective methods. This study aimed to compile recent scientific studies on the microbial bioremediation of pesticides.

Keywords: Pesticide, microorganism, bioremediation.

APPLICATION OF NUTRIENT POLLUTION INDEX AND WATER POLLUTION INDEX TO EVALUATE THE DRINKING WATER QUALITY OF THE VILLAGES LOCATED IN EDIRNE, TURKEY

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ABSTRACT

This study was carried out to evaluate the drinking water qualities of 51 villages located in Edirne Province of Turkey by using Nutrient Pollution Index (NPI) and Water Quality Index (WQI). For ths purpose, drinking water samples were collected from villages of İpsala, Keşan, Uzunköprü and Meriç Districts in autumn season of 2017. Some physical and chemical water quality parameters including electrical conductivity (EC), total dissolved solids (TDS), turbidity, nitrate (NO3), nitrite (NO2), phosphate (PO4) and cyanide (CN) were determined and NPI and WQI were applied to experimental data in order to evaluate the drinking water qualities. Geographic Information System (GIS) was also used to make a visual explanation by presenting distribution maps of recorded NPI and WQI scores. According to the results of applied ecological indicators, although the intense agricultural activities carried out in the basin, it has been determined that the drinking water of the region has quite high quality and all the investigated locations have been found as having "Excellent – A Grade" water quality in terms of WQI and "No pollution" water quality in terms of NPI, in general.

Keywords: Edirne villages, Drinking water quality, Nutrient Pollution Index, Water Quality Index, Geographic Information System.

GROUNDWATER QUALITY ASSESSMENT FOR IRRIGATION PURPOSES IN THE VILLAGES OF A SIGNIFICANT AGRICULTURAL AND INDUSTRIAL REGION IN TURKEY

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ABSTRACT

Meriç – Ergene River Basin is the most significant lotic habitat and the main freshwater resource of Thrace Region. Despite its grate importance for the region in terms of especially irrigation purposes, it is also known as one of the most polluted watersheds in Turkey. The aim of this study was to assess the groundwater quality of Meriç – Ergene River Basin in terms of irrigation water supply. For this purpose, groundwater samples were collected from 30 selected villages located in the watershed in summer season of 2018 and Na, K, Mg and Ca levels were determined by using an ICP-MS. Sodium Adsorption Rate (SAR), Sodium Percentage (Na%), Magnesium Rate (MR) and Kelly Index (KI) were applied to detected data in order to evaluate the groundwater quality in terms of irrigation. According to the results of this research, groundwater quality of Meriç – Ergene River Basin was found as in quite low level in terms of use in irrigation purposes, in general. As a result of applied irrigation water quality assessment indices, 6.67% of total locations were recorded as "Not applicable" in terms of SAR; 36.67% of total locations were recorded as "Not applicable" in terms of Na%; 10% of total locations were recorded as "Not suitable" in terms of MR; and 60% of total locations were recorded as "Not suitable" in terms of KI.

Keywords: Meriç – Ergene River Basin, Groundwater, Irrigation Water Quality.

GIS SUPPORTED LANDSCAPE INVENTORY AND CHARACTER ANALYSIS STUDY IN SEYDISUYU BASIN

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ABSTRACT

In terms of the rapidly increasing world population, basins play an important role in terms of water and basic food resources. At the same time, basins have had significant place in shaping landscapes for centuries, thanks to their rich natural and cultural factors. Therefore, determination and analysis of these factors that both create and change the landscapes, with the utilization of appropriate methods is an essential process which also affects the landscape planning and design. Turkey has rich natural resources and a wide variety of landscape values. Within this context, it is of great importance to fulfil the requirements of the European Landscape Convention (APS) for the protection and transfer of the landscape values to the future generations. In this paper, it is aimed to determine the hydrolytic basin boundaries, define and map the geographical and topographic values of the landscape characters of the Seydisuyu Basin, which is a sub-basin of the Sakarya Basin, determined as the study area, with the support of Geographical Information Systems (GIS).For this purpose, Landscape Character Analysis (LCA) method, which has been used in Europe for about 50 years and has become widespread in Turkey in recent years, was used.In this method, data such as Digital Elevation Model (DEM), geology, geomorphology, current land use capability, land use capability were used.These data were analyzed, classified and mapped using the Parametric Method. As a result of the analysis, 452 Landscape Character Types (LCT) and 5 different Landscape Character Areas (LCA) with 5 different characteristics (geology, geomorphology, land use capability, current land use, large soil groups) have emerged. With the obtained results, in Turkey, rural development, agriculture, issues such as ecology, future app basin has revealed significant gold and data sources that can be used in the management and development.

Keywords: Geographical Information Systems, Landscape, Landscape Character Analysis, Landscape Planning, Seydisuyu Basin.

USE OF OXIDATIVE BIOMARKERS IN THE EVALUATION OF BIOREMEDIATION EFFICIENCY

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ABSTRACT

Bioremediation of pesticide contaminated sites with bacteria that are adapted to these pesticides or genetically engineered for biodegradation of persistent organic pollutants are a study area that is currently being expored as an alternative remediation technique. Biomarkers have been developed to track the survival and efficiency of specific agricultural soil bacteria that are used as inocula for bioremediation of pesticide contaminated agricultural fields. Examples of biomarkers like Catalase (CAT), glutathione S-transferase. (GST), cytochrome P4501A1 (CYP1A1) activities in *Gammarus Pulex* can be useful for these kind of studies. Other biomarkers can also be used for monitoring of microbial inocula used for bioaugmentation or bioremediation of pesticide contaminated receiving environments. The choice of biomarker and monitoring system depends on the particular site, bacterial strain and sensitivity and specificity of detection required. According to the results of the most studies, CYP1A1, CAT, and GST activities in *G. pulex* sanctioned the capability of soil *bacteria* in bioremediation of pesticides. Isolated and enriched bacteria and microbial concortia can be helpfull for decrease of the chemical oxygen demand (COD) and biochemical oxygen demand (BOD5), pH and dissolved oxygen parameters of the pesticide contaminated aquatic environments. This means tehse parameters can give an usefull alternative opinion for screeing the active material of the pesticide. As we know, monitoring the active material of the pesricides with chromotographic methods and using these devices are very expensive. At the final phase of the bioremediation step, it was determined that these bacteria have efficient bioremediation properties at a rate of up to 80%. According to recent studies soil bacteria can be used for bioremediate the receiving environments that are polluted by pesticides. The treatment efficiency of these bacteria can be determined by monitoring changes in some biochemical biomarkers in *G. pulex*.

Keywords: Bioremediation, pesticide, Gammarus pulex, chemical oxygen demand.

ELUCIDATING THE EFFECTIVENESS OF NANOSTRUCTURES FOR THE CONTROL OF AEDES AEGYPTI LARVAE

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ABSTRACT

Mosquito cause millions of infections and thousands of deaths every year globally. Conventional approaches such as biological, chemical and physical methods have been applied for mosquito control. However, these approaches have a lot of limitations. In this study we have utilized Nanobiotechnology to control *Aedes aegypti* which is a cost effective and sustainable approach. Pure colonies of *Aedes aegypti* were developed by identification through microscopy and molecular techniques and fourth instar larvae were exposed to different concentrations of metallic, Food grade Nanoparticles and Commercially available Pesticides. Zinc Oxide Nanoparticles were most effective (LC50s at 24 h 2.75 ppm) of all the Nanoparticles, while among Food grade Nanoparticles CUR-E-1 were the most effective (LC50s at 24 h 3.02 ppm). However, commercially available pesticides were highly toxic as compared to Nanoparticles used in the study. Our results suggested that Food Grade NPs such as CUR-E-I can be a safe and environment friendly alternative of pesticides for mosquito control.

Keywords: Aedes aegypti, curcumin, food grade nanoparticles, larvicidal activity, molecular identification, mortality.

EVALUATION OF THE PROTECTIVE EFFECT OF SALVIA OFFICINALIS VIA TOXICITY OF CYPERMETHRIN ON SOME BIOCHEMICAL PARAMETERS IN MALE RATS

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ABSTRACT

Phytotherapy has existed since the dawn of time, where man has used plants for food and also for healing. Medicinal plants have very interesting biological properties that are beneficial to human and animal health. This work aims to evaluate the protective effect of the aqueous extract of Salvia officinalis leaves against the toxicity induced by cypermethrin. 30 male wistar rats weighing 240 g were divided into six groups; the control received tap water, the positive control received the aqueous extract of sage leaves ES (0.5g/kg bw), the group treated with cypermethrin I1 (8.33 mg / kg bw) and I2 (25 mg / kg bw), and the group treated with cypermethrin combined with aqueous extract of sage ESI1 (0.5g / kg bw + 8.33 mg / kg bw) and ESI2 (0.5g / kg bw + 25 mg / kg bw) for a period of four weeks. The obtained results show a significant decrease in glucose and cholesterol levels, with a significant increase in the triglycerides concentration in the group treated with cypermethrin compared to the control. However, these biochemical parameters of ESI1 and ESI2were almost close to the control. It can be concluded that S. officinalis was able to reduce the cypermethrin –induced disturbances in male rats.

Keywords: Cypermethrin, Salvia officinalis, toxicity, rats, biochemical parameters.

GIS CONTRIBUTION IN NITRIC POLLUTION ASSESSMENT OF GROUNDWATER: CASE OF SKHIRAT COASTAL REGION.

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ABSTRACT

Pollution from agricultural sources reduces good quality water resources and also poses a health risk for the rural population. Its control requires continuous monitoring to ensure their preservation. For this reason, this study is carried out in the perimeter of Skhirat, Morocco. The objective consists of a hydrodynamic and qualitative study of groundwater water in terms of nitric pollution of this irrigated agricultural perimeter. In order to characterize the state of the aquifer contamination and to identify the areas affected by this scourge on a regional scale. The methodology adopted consists of carrying out a sampling campaign for groundwaters using a network of 83 water points.The monitoring parameters are the nitrate content of the water and the piezometric level. The spatial distribution of nitrates and bathymetry are carried out using the geographic information system (GIS).The main results show that the depth of the water table varies between 2 and 45 m with an average of 16.52 and a coefficient of variation of 63%.the bathymetric analysis shows that the water table is closer of the surface in the South-West zones and the North-East part. At the level of the central part and the south-eastern part the waters are deeper. The nitrate contents of the samples vary between 0 and 250.7 mg/l. showing deterioration in water quality. The thematic map of the spatial distribution of nitrates shows an important source of pollution located especially in the downstream part of the region to the NE and NW and also in the SW zone with values exceeding 100 mg / l. The central part remains generally less polluted. In conclusion, this study has enabled us to confirm a very alarming degradation of groundwater in the Skhirat area.

Keywords: Groundwater, Nitrate, Quality, GIS, Pollution, Skhirat region, Morocco.

IDENTIFYING THE TOXIC EFFECTS OF CAR TIRE RUBBER LEACHATES ON ZEBRAFISH (DANIO RERIO) LARVAE AND DAPHNIA MAGNA

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ABSTRACT

Progressive fragmentation and weathering processes of synthetic polymer-based plastics found in the aquatic ecosystem result in leaching of additive chemicals. It is thought that these leaching of may lead to toxic impact in aquatic organisms. This research investigates the toxic effects of leachates car tire rubber on *Danio rerio* embryos and *Daphnia magna. In* this study, the toxic effects of 24, 48, 72 and 96 hours leachates of rubber at 7.5 mg/L concentration on *D. rerio* and *D. magna* were determined. While no mortality was observed in the 24th and 48th hour leachates process, mortality (41.7% and 20.8% respectively) was observed in the 72nd and 96th hour leachates process in *D. rerio*. Mortality rates were determined as 54.3%, 62.9%, 94.3% and 97.1 respectively at 24, 48th, 72nd and 96th hours of leachates application in *D. magna.* In the study, growth retardation was observed in both *D. rerio* embryos and *D. magna* exposed to the test solution. In addition, various malformations and heart rate decreased were observed in *D. rerio* embryos. According to the results of the study, *D. magna* was more sensitive to rubber leachates than *D. rerio* larvae.

Keywords: Rubber, Danio rerio, Daphnia magna.

THE EFFECTS OF THE PESTICIDES TO AQUATIC ECOSYSTEM

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ABSTRACT

Pesticides are substances or mixtures of substances used to prevent, control or reduce harmful organisms. Pesticides cause undesirable effects on aquatic organisms. A wide variety of acute and chronic effects, especially death, can be observed in aquatic organisms exposed to pesticides. In this study, it is aimed to summarize the effect of pesticides on aquatic ecosystem.

Keywords: Pesticides, effect, aquatic organisms.

GERMINATION AND SEEDLING GROWTH OF BITTER VETCH SUBJECTED TO SALT AND OSMOTIC STRESS

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ABSTRACT

Bitter vetch (*Vicia Ervilia* L. Willd.) is an annual crop of the Fabaceae family, well adapted to dry climate and distributed mainly in southern Europe, North Africa, Western and Central Asia. This crop has been used in the past for food, nowadays mainly for feed and as a fortifying additive. Recently the attention toward this species has been increased in view of its potential medical applications as well as alternative crop in face of the future climate changes. However, little is known about the mechanisms of bitter vetch stress adaptability and the research in this area is focused mainly on salt stress. In this comparative study seeds of bitter vetch (the Bulgarian variety "Rodopi") were germinated in a range of NaCl or PEG 6000 concentrations with increasing osmotic strenght (0, -0.3 MPa, -0.6 MPa, -0.9 MPa) on a filter paper in Petri dishes (25 seeds per dish) at 24oC and key germination parameters were followed for 5 days. Plantlet fresh weight, root and shoot length were registered at the end of the treatments. The applied stress affected germination speed and percentage as well as seedling vigor. Bitter vetch did not germinate at -0.9 MPa NaCl, contrary to PEG 6000 treatment at -0.9 MPa. Salt stress reduced both shoot and root growth proportionally to stress intensity, whereas under -0.6 MPa PEG 6000 treatment (moderate osmotic stress) growing roots became significantly thinner and longer. Osmotic stress of intensity -0.6 MPa (NaCl or PEG 6000) was also applied at seedling stage on 10 days-old plants grown in perlite, supplied with half strength Hoagland nutrient solution, which was supplemented with NaCl or PEG 6000, in a growth chamber under controlled conditions for a period of two weeks. The two kinds of stress induced similar water deficit in leaves (31% for NaCl, 34% for PEG 6000 without significant difference between stresses) and inhibited plant growth at the same extent. However, salt stress reduced more the root growth than PEG 6000 and strongly diminished leaf chlorophyll content. Salt stress is more complex in nature and contain both osmotic and ion toxicity components. In conclusion, a reason for the superior resistance of bitter vetch to water stress compared to salt stress could be the observed fast root elongation and maintenance of leaf chlorophyll content.

Acknowledgement. Research was supported by the National Science Fund, Bulgaria (Project КП-06-Н36-2/2020 "Leguminous crops in Bulgaria - a source of useful additional proteinaceous substances")

Keywords: Vicia Ervilia, germination, osmotic stress, salt stress, stress tolerance.

POSSIBLE EFFECTS OF GLOBAL CLIMATE CHANGE ON TURKEY

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ABSTRACT

Conditions such as the use of fossil fuels, deforestation and agricultural activities have led to a significant increase in the emissions of natural greenhouse gases such as methane and carbon dioxide, especially with the industrial revolution. This increase in greenhouse gas emissions in the atmosphere has caused and continues to cause the deterioration of the natural greenhouse effect and warming of the atmosphere. The negative effects of this situation on the environment by disrupting the climate balance within the cause-effect relationship are quite large. With the effect of possible threats brought by its geography, Turkey may face problems arising from climate change in the near future. The potential effects of global climate change, which are known to have some global and regional effects; It focuses on clean water resources, agriculture, forest, sea level, energy, tourism, human health and biodiversity. It is estimated that Turkey is among the risk group countries in terms of the possible effects of global climate change, and that especially the Mediterranean and Central Anatolian Regions will be more affected by climate change in the future. In this study, the problems that may be encountered due to climate change in Turkey have been examined in general.

Keywords: Ecosystem, Greenhouse Effect, Climate Change, Turkey.

DETECTION OF ROAD POLLUTION BY USING OF A BIOACCUMULATIVE PLANT FOR THE EVALUATION OF HEAVY METAL CONCENTRATIONS IN WESTERN ALGERIA

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ABSTRACT

The present work consists in showing the interest of using a bio-accumulating plant species of Aleppo pine to observe the aerial contamination of heavy metals and to see the relations that could exist with certain sources related to road traffic. Analyses of heavy metals in the needles and litter of Aleppo pine *(Pinus halepensis*) revealed seven heavy metals "Cd, Cr, Cu, Fe, Ni, Pb and Zn" at two study sites (an urban site "Bosquet forest" and a rural site located in a "Telagh" gas station). Each of them is divided into three sampling areas in the Sidi-Bel-Abbes in Algeria. The urban site is less polluted than the rural site. The areas exposed to road traffic in each of the two sites have a higher degree of heavy metal contamination than the other sampling areas. The pine litter accumulates more heavy metals than pine needles. The high concentrations of heavy metals recorded at the two sampling sites show that traffic and road infrastructure are a major source of heavy metals that are toxic to the environment. Lead, iron and zinc, the main metallic pollutants come from exhaust fumes, wear of brake linings, tires and corrosion of guardrails, are present in high concentrations in both study sites.

Keywords: Aleppo pine, bioaccumulation, heavy metals, road traffic pollution, Western Algeria.

EVALUATION OF THE STABILITY OF SLUDGE FROM WASTEWATER FROM THE TREATMENT PLANT-MILA

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ABSTRACT

The objective of this work is to evaluate the stability of sludge compositions of the city of Mila by a bibliometric study of the site for a period of time and to have a better knowledge of the material to consider an adequate treatment. The in-depth characterization of the sludge makes it possible to identify a suitable recovery route. The evaluation of most of the elements present in the sludge was carried out by X-ray fluorescence spectroscopy. It is a widely used qualitative and quantitative analysis technique. It is based on the emission of characteristic radiation by atoms after ionization. The qualitative analysis of the sludge indicates the presence of the following elements: : Ca, Si, Fe, Al, P, S, K, Mg, Ti, Cl, Zn, Sr, Ba, Zr, C, Cu, Mn, Pb, Cr, As, Ni, V, Br, Rb, Y, N, Se, Ga. The spectral study of the sludge taken from the Mila wastewater treatment plant is based firstly on X-ray diffraction which identifies the different crystallized solid phases and by infrared which determines the chemical functions, mainly organic and poorly crystallized elements. Analysis of the X-ray spectrum shows the presence of the following phases: calcite CaCO3, Silicone oxide (Quartz) SiO2, Tetracalcium dialuminium dodecahydroxide hemicarbonate hydroxide n-hydrate Ca12 Al6 O55.2 C2.4, Sillimanite Al2 Si O5, Portlantide Ca(OH)2. The interpretation of the infrared spectrum is complex because of the mixture of organic matter and mineral matter that goes into the composition of the sludge.

Keywords: Sludge, X-ray fluorescence, X-ray diffraction, infrared, crystalline phase, wastewater treatment plant.

AESTHETIC PROPERTIES OF SOME WOODY PLANT TAXONS THAT CAN BE USED IN URBAN ROAD AFFORESTATIONS

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ABSTRACT

One of the most important elements of urban landscape is urban roads. These roads, which constitute the most important transportation networks of cities, have also seen as light green locations that enrich value to the city. The afforestation for urban roads and streets should be designed to provide beautiful views to the travelers and pedestrians along the road. Woody plant taxa to be used in road afforestation have an effective appearance with their form, color and sizes. In this research, the some woody plant taxa used in urban afforestation of urban roads which have become the focal points of the city due to diversification of transportation networks have been studied. The aesthetic properties of the woody plant taxa were evaluated and recommendations were developed.

Keywords: Urban Road Afforestatıons, Woody Landscape Plants, Planting Design.

DIAGNOSTIC OF ALEPPO PINE IN EL HAMIMET FOREST (NORTHEASTERN ALGERIA)

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ABSTRACT

The aime of this work is to make a diagnosis of the current state of Aleppo pine plots of El hamimet forest (Algeria). The importance of evnirenemental conditions (climate and altitude) is considered. The methodology adopted is based in tree measurement, Dieback and dendroetic parameters (height, diameter, circumference and basal area) are analyzed in four stations. There are significant differences between stations on survival and the dendrometric paramtertes. With and average diameter between 15.31 and 29.88 cm, these stands are in the state of young forest. The total density of Aleppo pine trees with a diameter at mans height greater than 5 cm varies from 78 to 489 trees per hectare. The youngest of all is the one in plot 1 with average DBH of 15.31 cm. The highest density and basal area are obtained in station 4 (489 trees / ha) and station 2 (33.01 cm3) respectively. the total decline affected 1 tree and 10 others are affected by a partial decline. The decline rate is low and indicates that the environmental conditions of this forest are more or less favorable for Aleppo pine. The Aleppo pine is chosen as having the best performance for future reforestation programmes.

Keywords: Tree diagnosis, Aleppo pine, decline, reforestation.

GENOTOXIC EFFECT AND HEAVY METAL ACCUMULATION OF LONG-TERM WASTEWATER IRRIGATED PERI-URBAN FARMS

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ABSTRACT

Treated wastewater irrigation considered as the only reliable and valuable option to alleviate water scarcity in Mediterranean developing countries. However, long-term use of wastewater in agricultural sector poses serious challenges to human and environmental health. This study investigates the accumulation and depth distribution of total and exchangeable (available fraction) heavy metals (Cr, Pb, Cu, Zn, Co and Cd) in eight sites of peri-urban farms under long-term wastewater irrigation and evaluates the correlation between heavy metal contents, physicochemical parameters and genotoxic effect using the micronucleus test of Vicia faba. Long-term irrigation with wastewater resulted in a significant increase of electrical conductivity, organic matter, calcium carbonate equivalent, nutrient availability and intense organic matte decomposition. ANOVA analysis showed a significant increase in all metal elements either total or the exchangeable fraction in treated wastewater irrigated soils compared to the corresponding values of natural water irrigated soil in the order of Zn > Pb > Cu > Cr > Cd > Co and Cu > Zn > Pb > Co > Cd > Cr, respectively for total and exchangeable concentration, with slight variation with depth. All measured elements do not exceed the permissible range, except for the total concentration of Cd. The enrichment factor and the degree of contamination classify soils from very high to moderately contaminated. The high contamination degree of wastewater irrigated soils generates a significant genotoxic effect on Vicia faba roots, lead to a significant increase of micronucleus frequency reaches 41.25 ‰, 35.48 ‰, 21.66 ‰, 16.23 ‰ and 13.62 ‰ respectively for P1, P2, P3, P4 and P7 which are higher than negative control (0 ‰) and natural water irrigated soil (3.29 ‰) and higher than the positive control (24.69 ‰) at P1 and P2. This micronucleus induction is significantly and positively correlated with the high available fraction of Co, Cd, and Zn at P1, P2 and P7. Soils of P3, P4 and P5 generate a moderate genotoxic effect, where the bioavailability of metals are less important, which may be due to the effect of alkaline pH on these metals and the high content of sand which promotes leaching in deep soil layers. Evaluation of the distribution and genotoxic effect of other contaminants in wastewater irrigated soils such as antibiotics, steroid hormones and personal care products is recommended for future management strategies.

Keywords: Long-Term Wastewater Irrigation, Heavy Metal, Available Fraction, Genotoxic Effect, Soil Pollution Scales.

NEW MATHEMATIC MODELS FOR THE EFFECTIVE MG DYE ADSORPTION

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ABSTRACT

The technology of encapsulation in alginate gels has been successfully implemented to immobilize the adsorbent powders of zeolites, activated carbons, natural or modified clays in spherical beads easily separable in aqueous solution. The great interest in natural or modified clays as adsorbents materials is mainly related to the large specific areas associated with their layered structure. Pillared clays are obtained from clays by introducing large polyoxycations into the interlayer region in order to obtain a microporous material with increased interlamellar spaces and pore volumes. The main objective of our study is to develop a new mathematic model for kinetic and isotherm adsorption of MG dye by hydrophobic stable spherical gelled beads en discontinuous system. This new adsorbent-gelled bead is synthesized based on Fe-pillared clay (Fe-Mt) and sodium alginate (SA). The equilibrium adsorption quantity Qe (mg g-1) of this new biocomposite bead is 165 mg g-1 for initial pollutant concentration equal to 100 mg L-1. Furthermore, the pH solution in the range (3-9) had negligible effect when MG dye was adsorbed on biocomposite beads. Several adsorption kinetic models (pseudo-first-order, pseudo-second-order, proposed empiric model and interparticle diffusion) were tested against the experimental results. The calculation of the corresponding parameters shows that results are best fitted with the empiric proposed model with a determination coefficient close to 1 and a relatively small root mean square error. Among the available mathematical models used to describe the isotherms experimental results (Langmuir, Freundlich, Sips and seven proposed models with many parameters). The model with 5 parameters that is proposed show a better performance than freundlich and Langmuir and Sips. The calculation of the parameters of the different adsorption models was performed on MATLAB using generic algorithms

Keywords: Adsorption, modeling, alginate, clay, matlab.

EVALUATION OF KING GRASS BIOCHAR BLENDED WITH BIOGAS DIGESTATE AS SOIL IMPROVER ON MAIZE GROWTH

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ABSTRACT

This study aims to investigate the effect of biochar applied with biogas digestate on the cultivation of maize (Zea mays) as an energy crop and soil nutrient. In this study, soils were amended with biochar produced from king grass (at 0, 2.5, 5, 10, and 20 t/ha) - biogas digestate (at 4 t/ha), and maize (Zea mays) seeds were employed for the study. In each pot, twenty maize (Zea mays) seeds were seeded in greenhouse conditions. Soil samples were analyzed for soil organic carbon (SOC) content, elemental analysis, pH, cation exchange capacity, bulk density, water-holding capacity, aggregate size class distribution. Moreover, leaf area, total chlorophyll content, root dry weight, and yield were carried out for plant samples. Chlorophyll content (SPAD) and stomatal resistance were determined from the same fresh plant leaves. These findings demonstrate that the biogas digestate and biochar application ensured combined benefits concerned with the development of the circular rural economy with waste minimization, renewable energy production, nutrient recycling, and soil and water contamination control in agricultural land.

Keywords: Zea mays, corn, pyrolysis, anaerobic digestion, energy crops.

INVESTIGATING SPECTRAL CHARACTERISTICS OF MUCILAGE THROUGH HYPERSPECTRAL REMOTE SENSING METHODS

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ABSTRACT

Mucilage is known to be an organic matter produced by different kinds of microorganisms whereas it became a significant issue for maintenance of not only marine ecosystems, but also public health around Marmara and North-Aegean regions. The process has anticipated to be come into the frame as result of various climatic, ecologic and human-induced factor interactions. There is an urgent need for determination of its formation mechanism, underlying or accelerating factors, disposal methods and usability potentials in appropriate areas. Moreover, monitoring of mucilage covered area in different time periods provides precious information on its horizontal change in terms of amounts and directions. The study focused on evaluation of spectral characteristics of mucilage samples that were collected from the same coordinates in North-Aegean coast of Canakkale, Turkey, in different time periods. A hand-held spectroradiometer with a 325-1075 nm wavelength range, 1.5 nm sampling (bandwidth), 3.5 nm resolution was used to monitor the change in spectral reflectance patterns. The research enabled derivation of Mucilage index (MI), which is likely to be a valuable for UAV and satellite-based monitoring of mucilage.

Keywords: Hyperspectral Data, Mucilage, Remote Sensing, Spectral Characteristics

ASSESSMENT AND MAPPING OF ENVIRONMENTAL POLLUTION HIT AREAS OF MADINAH TOWN, FAISALABAD PAKISTAN

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ABSTRACT

Atmospheric pollution is a worldwide problem. Industrial revolution is one of the main cause of it. Faisalabad is the 3rd largest city of Pakistan and major industrial hub. To measure the extent of air pollution in Faisalabad, this study was conducted in one of the major towns of Faisalabad, i.e. Madinah town. The purpose of this study was to measure and compare the air pollution and noise levels with local (Pak-EPA) and international (WHO) organizations. The concentrations of PM2.5 and PM10, smoke and noise pollution levels were measured at different intervals of daytime (morning, afternoon and evening). Micro dust pro, opacity meter and sound level meter were used for particulate matter (PM), smoke opacity and noise levels measurement, respectively. Total 21 different sites in Madinah Town, Faisalabad were identified and selected for air and noise sampling. Three replications of each samples were collected and analyzed as mean, maximum, minimum, standard error and deviation (summary statistics). The maximum concentration of PM2.5 was recorded at Chughtai Lab Susan Road and minimum concentration was recorded in front of Mujahid Hospital. The concentration of 15 sites were exceeding from their permissible level. The maximum concentration of PM10 was recorded at WASA office and minimum concentration was recorded at front of Chughtai Lab. Susan Road. The maximum concentration of smoke was calculated at police station Madina Town and minimum concentration was calculated at front of Sitara studio. The concentration of 3 sites were exceeding from their permissible level.Atmospheric pollution is a worldwide problem. Industrial revolution is one of the main cause of it. Faisalabad is the 3rd largest city of Pakistan and major industrial hub. Atmospheric pollution, especially particulate matter (PM), smoke and noise have become alarming problems due to their severe and long-lasting human health impacts in urban areas. To measure the extent of air pollution in Faisalabad, this study was conducted in one of the major towns of Faisalabad, i.e. Madinah town. The purpose of this study was to measure and compare the air pollution and noise levels with local (Pak-EPA) and international (WHO) organizations. The concentrations of PM2.5 and PM10, smoke and noise pollution levels were measured at different intervals of daytime (morning, afternoon and evening). Total 21 different sites in Madinah Town, Faisalabad were identified and selected for air and noise sampling. Three replications of each samples were collected and analyzed as mean, maximum, minimum, standard error and deviation (summary statistics). The maximum concentration of PM2.5 was recorded at Chughtai Lab Susan Road and minimum concentration was recorded in front of Mujahid Hospital. The concentration of 15 sites were exceeding from their permissible level. The maximum concentration of PM10 was recorded at WASA office and minimum concentration was recorded at front of Chughtai Lab. Susan Road. All sites concentration were below permissible limits. The maximum noise level was recorded at Chughtai Lab. and minimum concentration was recorded at Zong head office. All sites concentration were below permissible level. The maximum concentration of smoke was calculated at police station Madina Town and minimum concentration was calculated at front of Sitara studio. The concentration of 3 sites were exceeding from their permissible level.

Keywords: noise pollution, particulate matter, mapping.

IDENTIFICATION OF TRANSPORT PATHWAYS AND POTENTIAL SOURCE AREAS OF PM10 AND SO2 DURING WINTER SEASON IN KIRKLARELI (TURKEY)

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ABSTRACT

In this study, the variation in daily PM10 and SO2 concentrations during the winter season in Kirklareli city center were investigated. It was observed that PM10 concentrations had the lowest concentration values in January, SO2 concentrations had the lowest concentration values in February, and PM10 and SO2 concentrations had the highest concentrations in December. During the study period, air masses backward trajectories obtained using the Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) Model were run and clustering analysis was performed. Backward trajectories are clustered in five major clusters. Cluster 1 was determined to represent the highest percentage of all backward trajectories. Potential source areas of PM10 and SO2 were determined by the Potential Source Contribution Function (PSCF) and Concentration Weighted Trajectory (CWT) models.

Keywords: PM10, SO2, Cluster analysis, PSCF, CWT.

DATE SEEDS AND THEIR USE AS COSMETIC INGREDIENTS

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ABSTRACT

Date processing industries produce enormous quantity of date seeds, which poses a difficulty for manufacturing enterprises Sugar, vitamins, fiber, minerals, and phenolic compounds with antioxidant and anti-inflammatory properties are abundant in date seeds. Their chemical composition allows them to be transformed into useful products and a variety of other applications that benefit human health. Date seeds are high in bioactive chemicals and essential oils, making them suitable for usage in a variety of foods, medicines, and cosmetics. Oil is one of the most interesting parts of the date seeds; it contains both saturated and unsaturated fatty acids, with lauric and oleic being the most prominent. Date seeds oil also present a significant number of phytochemicals that could be used for many applications, such as cosmetics, and pharmaceuticals. This work explains how to extract date seeds oil and it's chemical composition, as well as how to use it in cosmetics. With a safe, high-quality, cruelty-free bioproduct, the extracted date seed oil aid to reduce melanin, eczema, acne, and dry spots while enhancing skin moisture and suppleness.

Keywords: date seed; cosmetic, oil extraction, chemical composition, phytochemicals.

DETERMINATION OF THE PROTECTIVE EFFECT OF (HORDEUM VULGARE L.) ON FERTILITY AND SOME BIOCHIMICAL PARAMETERS IN MALES WISTAR RATS EXPOSED TO LEAD

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ABSTRACT

Lead is an environmental contaminant, characterized by its toxicity causing various disorders to various organs. This study is mainly interested in finding an effective treatment to eliminate the toxicity of lead. We have used a very well-known plant: barley grass (*Hordeum vulgare L.*). The study was carried out on 28 male *Wistar* rats which are divided into four groups: the control group received a healthy diet, the positive control group treated with barley grass (2.5 g of barley grass / rat), group treated with lead alone (600 mg of lead / kg of food) and a group treated with lead combined with barley grass (600mg of lead/kg of food combined with 2.5g barley grass). The biochemical parameter results (TGO, Urea, and Creatinine) show no significant modification between the 4 groups. The level of TGP indicates an increase in the lead group by contribution to the positive control group. The testosterone level shows a very highly significant decrease in the lead group compared with the control and positive control groups. A significant increase for the (lead+Barley) group compared to the lead group. The microscopic study of the testes indicates that the diameter of the seminiferous tubes has decreased. However, the interstitial space widens in the lead group. This distance causes an imbalance and disturbance in the overall function of this tissue compared to the control and positive control groups. On the other hand the (lead+Barley) group shows that a return to the normal state and an improvement of this tissue by contribution to the lead group.

Keywords: Barley grass, histological sections (testis), biochimical parameters, lead, rats, testosterone.

EVALUATION OF THE PROTECTIVE EFFECT OF (TRITICUM AESTIVUM L.) ON SOME HAEMATOLOGICAL PARAMETERS IN THE WISTAR RATS EXPOSED TO LEAD ACETATE

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ABSTRACT

Lead is a widespread pollutant in the environment. This study focuses on finding an effective treatment to reduce or even eliminate the toxicity of lead. We have used a plant: wheatgrass *(Triticum aestivum L.)*. The study was performed on 28 *Wistar* rats in four groups: the control group received a healthy diet, the positive control group treated with wheatgrass (2.5 g of wheatgrass / rat), group treated with lead alone at a dose of (600 mg lead / kg food) and a group treated with lead combined with wheatgrass (Pb+Wheat) (600 mg lead / kg food combined with 2.5 g wheatgrass). The results of the haematological parameters do not show any significant difference in the level of hemoglobin, hematocrit, CCMH between the different treatment groups.On the other hand, the statistical analyzes indicated a significant decrease in the number of red blood cells in the Pb group compared to the control group. A significant increase in mean blood volume in the Pb group compared to the positive control group. A significant increase in the number of white blood cells, lymphocytes, monocytes, eosinophils and blood platelets in the Pb group compared to the groups: control and positive control, while a significant decrease in the Pb+Wheat group compared to the Pb group

Keywords: Lead, wheatgrass, rats, hematological parameter.

ASSESSMENT OF CO2 EMISSIONS IN A NATURAL GAS LIQUEFACTION PROCESS IN WESTERN ALGERIA, AND THEIR IMPACT ON CLIMATE CHANGE

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ABSTRACT

Some greenhouse gases occur naturally in the atmosphere and represent a kind of blanket that insulates the Earth and makes it hospitable. However the growth of gas emitting anthropogenic activities contributes to increase their concentration. that entails a temperature rise, thus the Earth warms. This could be the cause of climate change worldwide. One of the relevant industrial activities, liquefaction of natural gas. This study, explicit method for liquefaction of natural gas within the GL I /Z of Sonatrach in Arzew complex and quantification of emissions of CO2 and NO2, based, according to the source of emission, material balances or one-off measures.

Keywords: greenhouse gases- climate change - CO2 - material balance - liquefaction - air pollution - Sonatrach.

A COMPARATIVE STUDY IN DRY PERIOD AND WET PERIOD OF A WELL IN THE GHIS NEKOR AQUIFER

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ABSTRACT

This study was conducted on the GHIS-NEKOR aquifer which is located in North of Morocco. The objective of this work is to compare the quality of groundwater in dry period and wet period of a point in the region of Al Hoceima for human consumption, and its physico-chemical and bacteriological characterization. As well as the determination of the main sources of contamination for its protection and preservation according to the Moroccan law on water, especially since this water is very requested by the inhabitants of the region. Main water analyses carried out: i) Physico-chemical analyses of drinking water (Conductivity, Hardness and alkalinity of water, Metals, Nitrites/nitrates, pH, turbidity, color, Calcium, Magnesium, Chloride), ii) Bacteriological analyses (Coliforms, Coliforms (E. Coli), and enterococci). The analysis of the overall quality of water revealed that the result of physicochemical analysis of this point is of good quality. And for the bacteriological results of this point is of average to good quality.

Keywords: Aquifer,GHIS-NEKOR, Groundwater, Water quality, Physico-chemical parameters, Bacteriological.

EFFECT OF LAMBDA CYHALOTHRIN AND SPINOSAD ON THE RECRUITMENT OF POLLINATOR POPULATIONS IN FIELD TOMATO CROPS

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ABSTRACT

The use of insecticides is a factor that sometimes seriously disturbs pollinating insects, which are insufficiently protected despite their status as agricultural auxiliaries and their beneficial action in maintaining the diversity of spontaneous and cultivated flora. Phytosanitary risks for auxiliary insects are evaluated by the mortality measured after exposure of the insects in the laboratory. However, there is a significant difference between this and the risks of exposure under natural conditions, where there are refuge zones and where the product can evolve rapidly. The presented study was carried out under field conditions with two insecticidal treatments based on lamda cypermethrin and spinosad (Tracer Spinosad 45 % SC - 75 ml) at the recommanded and half dose. The objective of this trial is to investigate whether the biological insecticide Spinosad has an effect on the abundance of pollinator species and their recruitment in vegetable plots after short-term exposure compared to a an untreated control and a treatment with lamda cyhalothrin. The abundance of Apoidea populations, parasitoids and other pollinators coming from outside that visited a tomato plot was recorded for two weeks period. The numbers of the different taxa were counted every two days through captures in four yellow water traps set up in the experimental units, each comprising thirty flowering tomato plants. The comparative study of both insecticides effect at the approved dose on the residual bee populations over a period of 16 days shows that Lambda-cyhalothrin has a toxic effect over 11 days after application of the treatments, and a moderately toxic effect during the last four days. The effect of Spinosad was toxic on the first 8 days, moderately toxic on the 9th day, and neutral from the 10th day after treatment. The comparison of the residual bee populations exposed to the doses and active ingredients shows a very highly significant difference between the effect of half-dose Spinosad and half-dose Lambda-cyhalothrin, a highly significant effect between half-dose Spinosad and half-dose Lambda-cyhalothrin. However, there were no significant difference between the dose and half-dose of Lambda-cyhalothrin, the half-dose of Lambda-cyhalothrin and the dose of Spinosad. Globally, Lambda-cyhalothrin showed a toxic effect on bee populations at both the recommanded dose and half dose, while Spinosad showed a toxic effect at the registered dose and a neutral effect at the half dose. Toxicity was clearly visible during the first week for the two active ingredients and the half-dose of Lambda-cyhalothrin. However, the second week was characterized by an increase of the individual's number, but this recovery seemed weaker for the dose of Lambda-cyhalothrin.

The other pollinators remained sensitive to lambda-cyhalothrin at the registered dose. Compared to untreated tomato plots, they showed very low numbers on day 16 of exposure (29.41% for pollinators and 17.39% for parasitoids). The most sensitive species were Tachinidae, *Andrena* sp, *Lasioglossum* sp, Halictidae, Bethylidae, *Aphidius* sp, and *Oxytelus*. While with the half-dose of Spinosad, the abundances of pollinators and parasitoids were higher compared to those of the other treatments but appeared lower compared to the untreated units. The abundance percentages with a value of 4.61% for the first two days, increased to 50% in 16 days. From the similarity analysis of the respective taxa abundances that were exposed to the treatments within the 16 days period, it was noticed that the taxa reacted in a different way when exposed to the dose and half dose of Lambda-cyhalothrin and Spinosad respectively. This variation seems to be due to the variation in the species sensibility towards the active ingredients as well as to the administred dose, the time of exposure, the range of activity and the chemicals remanence.

Keywords: bopesticides, pollinators, sustainable protection, biology conservation, toxicity.

BETA-GLUCAN CONTENT AND TOTAL ANTIOXIDANT ACTIVITY IN WHOLE GRAINS AND PEARLED BARLEY FLOUR GROWN IN TUNISIA

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ABSTRACT

Twenty-one Tunisian cultivars, seventeen native barley and four official varieties grown in different locations, were pearled at 20% (w/w) of their total grain weight corresponding to the outer layers, and the residues (80%, w/w) which correspond to the internal fractions, were analyzed for their beta-glucan content by Megazyme (Megazyme International Ireland Ltd, Wicklow, Ireland) and antioxidant properties by using the 2, 2-diphenyl-1-picrylhydrazyl (DPPH) test. Results suggest that high levels of beta-glucans (> 3.48% db) exhibiting strong antioxidant activities were found before and after the pearling process of barley grains. Results suggest that total antioxidant activities (TAA) decreased after the pearling process, while β-glucans dietary fibers showed an inverse trend in all cultivars. Native barley showed higher TAA and better beta-glucan content than official varieties. Considering the distribution of antioxidants and dietary fibers in barley kernels, pearling process may be employed as an effective way to select the internal fractions rich in bioactive compounds that could be used for the development of β-glucans enhanced ingredients and new food products.

Keywords: Barley, pearling process, beta-glucan, total antioxidant activity.

SEPARATION OF LYSOZYME FROM LIQUID EGG WHITE BY MEMBRANE FILTRATION

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ABSTRACT

Hen egg white contains several bioactive compounds such as lysozyme that can be used in food and pharmaceutical applications due to various biological activities. In this research, we investigated the effect of varying membrane filtration elements (5 kDa and 10k Da ultrafiltration-UF membrane) in separation of commercial lysozyme enzyme from natural liquid egg white (LEW). The lysozyme enzyme assay-activity, turbidity, and rheological analysis (stress relaxation under static state, frequency scanning change, flow state, dynamic viscoelasticity, temperature flow ramp and dynamic oscillation) were characterized to evaluate the effect of membrane type on separation efficiency. Also the dynamic storage modulus, loss modulus and complex viscosity with angular frequency were measured in the study. The Viscoelastic properties of liquid lysozyme samples were determined by performing dynamic sweep test in the linear viscoelastic region in a rheometer. According to the results of the study, while a partial increase in the turbidity value was recorded with the increase in the ultrafiltration cut-off value, it was determined that the resulting increase was statistically different from the control sample. Turbidity was found to be lower in lysozyme separation performed with a membrane with a 5 kDa cut-off value. Our results also showed that, the lysozyme enzyme activity at 5 Dka was higher in terms of statistical significance compared to 10 Dka. It has been realized that lysozyme separation. The Herschel-Bulkley model was better to describe the fluidity-flow behavior of ultrafiltration treated LEW. It has been determined that the elastic modulus (G') increases with the increase in frequency in all samples, while loss modulus (G'') was higher than G' in all liquid lysozyme samples and exhibited a liquid-like structure (G''>G') with viscoelastic behavior. This research points out the efficacy of 5 kDa UF membrane was higher and can be performed to obtain clear-pure lysozyme in the permeate part.

Keywords: Lysozyme, Separation, Ultrafiltration, Protein Rheology.

INVESTIGATION OF PHYSICOCHEMICAL, TECHNOLOGICAL AND BIOACTIVE PROPERTIES OF IMMATURE AND MATURE WHOLE EINKORN WHEAT

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ABSTRACT

Einkorn (2n = 2x = 14) is a 14-chromosome wheat variety and is one of the most ancient crops of agriculture. In this study, physicochemical, technological and bioactive properties of immature and ripe einkorn wheat grains grown by local farmers in Kastamonu Devrakani region were investigated. The aim of this work was identify and theoretically justify the features of the chemical composition in immature einkorn grain. All the obtained products were harvested from the same field at different times. Immature einkorn wheat was harvested at the beginning of the milk ripening period, and the ripe wheat was harvested during the physiological maturity period. The harvested, dried, and cleaned einkorn grains were ground into whole wheat flour and the studies were made on whole wheat flour. Moisture content of both immature and mature whole einkorn flours was 13.0%. Thousand kernel weight was 23.25±1.06 g for immature einkorn wheat and 32.29±1.58 g for mature einkorn wheat. Hectoliter weight of immature einkorn wheat was 72.32±3.08 kg/hL and it was 79.11±4.09 kg/hL for mature einkorn wheat. The ash content of immature and mature whole einkorn wheat flour was determined as 2.53% and 2.04% on dry matter basis, respectively. While the protein content of immature whole einkorn flour was 10.04±0.18% the protein content of mature whole einkorn flour was 11.31±0.35% on dry matter basis. The sedimentation value was determined as 18 mL for immature whole einkorn flour and as 15 mL for mature whole einkorn flour. The falling number value was determined as 312±12 seconds for unripe whole einkorn flour and 341±13 seconds for mature whole einkorn flour. Total phenolic contents of immature and mature einkorn whole flours were 1165.24±13.24 and 947.86±11.63, mg GAE/kg dm respectively. As in total phenolic analysis results, immature einkorn flour has higher results than mature einkorn flour in antioxidant analysis; with 10.11±0.11 and 4.40±0.33 umol TE/g dm values for DPPH and 28.32±1.30 and 22.38±0.99 umol TE/g dm for Cuprac analysis.

Keywords: Einkorn wheat, mature and immature einkorn wheat flours, physicochemical, technological, bioactive properties.

ANTIDIABETIC ACTIVITY OF PHENOLIC FRACTIONS OBTAINED FROM FICUS CARICA DRIED FRUIT AND EXTRA VIRGIN OLIVE OIL IN STREPTOZOTOCIN-INDUCED DIABETIC RATS

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ABSTRACT

Dried Fig (Ficus carica L.) fruit is an important part of traditional Mediterranean Algerian diet since antiquity and widely consumed with extra virgin olive oil because of their nutritional importance along with their medicinal value. The present study aimed to investigate the possible antidiabetic effect of the Ficus carica dried fruits, extra virgin olive oil and their phenolic fractions in in streptozotocin-induced diabetic rats. Administration of extra virgin olive oil (EVOO) (3.0 g/kg/day) per oral (p.o.) and their methanol extract (MEEVOO) (2.1mg/kg/day) intravenously (i.v.) 7 days significantly caused significant reduction in blood glucose levels in all the models. The methanol dried fig extract (MEDF) (38.07 mg/kg/day/i.v.) was found to be more antidiabetic than the dried figs (DF) (4g/kg/day/p.o.). Administration of MEEVOO with the MEDF was significant reduction in the levels of glucose serum triglyceride and total cholesterol. The antidiabetic effect of Ficus carica dried fruits, extra virgin olive oil and their phenolic fractions was compared with glibenclamide, a well-known hypoglycemic drug. Obtained results suggest a synergistic functionality of dried figs and extra virgin olive oil extracts. The observed antidiabetic effect is believed to occur due to antioxidant properties of the contents of extra virgin olive oil and dried figs extract, which may provide a new drug to be used for prophylaxis and it validates its folkloric use by Algerian people.

Keywords: Extra virgin oilve oil, dried figs, antidiabetic effect, Ficus carica, streptozotocin.

ANTIBACTERIAL ACTIVITY OF ALGERIAN POMEGRANATE (PUNICA GRANATUM L.) EXTRACTS (PEEL, JUICE, AND SEED) AGAINST MULTIDRUG RESISTANT BACTERIA

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ABSTRACT

Punica granatum L. (pomegranate) is known popularly by its nutritional values and healthy benefits. The present study deals with the evaluation of antibacterial effects of Punica granatum fruit extracts that cultivated in Algeria against environmental and clinical isolates of β-lactamase producing methicillin resistant Staphylococcus aureus (MRSA) and extended-spectrum beta-lactamase ESBL-producing Enterobacteriaceae by using agar diffusion methods and minimum inhibitory concentration (MIC)-determination. Moreover, the extracts were investigated for their phenolic content by the Folin-Ciocalteu method. The quantitative assays of total polyphenols revealed a richness of the different pomegranate extract in polyphenols, peel and seed ethanol extracts contain the highest values (880.06 ± 11.2 mg GAE/100 g and 1160.1 ± 45.20 mg GAE/100 g, respectively). Flavonoid contents were high in both of acetone, ethanol extracts of peel, followed by ethanol, and acetone extracts of juice. According to the results of the aromatogramme, all of phenolic extracts showed antibacterial effect against all extended-spectrum beta-lactamase ESBL-producing Enterobacteriaceae with a strong inhibitor with MIC <512 µg/mL power. This effect is especially exhibited by the pericarp extract against Escherichia coli, Citrobacter freundii and Klebseilla pneumoniae . On the other hand, the extract Punica granatum (pericarp and juice) showed a broad-spectrum of antibacterial activity with an inhibition zone size of 11 ± 0.9 mm to 29 ± 1.12 mm, against β-lactamase producing methicillin resistant Staphylococcus aureus strains. These results were similar in both of agar diffusion and MIC methods. From the above study, it can be concluded that Algerian pomegranate extracts possess remarkable antibacterial activity. This result could be related to the presence of bioactive metabolites in this fruit. Therefore, intensive future studies should be performed to characterize the antibacterial components that are behind for this biological property.

Keywords: Punica granatum, phenolic compounds, flavonoids, SARM, ESBL, antibacterial activity.

A BIOACTIVE COMPOUND: RELATIONSHIP BETWEEN GAMMA AMINOBUTYRIC ACID (GABA) AND MONOSODIUM GLUTAMATE

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ABSTRACT

Relationship between Monosodium glutamate (MSG) and Gamma aminobutyric acid (GABA); MSG is a food additive created by fermenting of the starch, corn sugar or molasses from sugar beet or sugar beet and its chemical name is monosodium L-glutamate monohydrate. (C5H8NNaO4.H2O). It is the most common amino acid found in nature. It is not only found as free glutamate, but also bound to other peptides and proteins. It is among the properties of MSG that are known to increase the purity and flavor of foods. It has been emphasized that it produces a flavor that other foods cannot provide. It has been stated that glutamate is produced naturally in the human body and is found in most of the foods we eat. Glutamate metabolism includes gamma-aminobutyrate (GABA) decarboxylation and glutamine amidation. It has been emphasized that GABA is an important inhibitory neurotransmitter of the central nervous system in vertebrates. It is ubiquitous in plants and microorganisms. It is mainly synthesized from glutamic acid by the enzyme decarboxylase via glutamate. It has been stated in studies that GABA has various physiological functions, is a bioactive component used in the prevention and treatment of serious diseases and has attracted great interest recently as an antidepressant due to its induction of hypotension and its cholesterol-lowering effect and has increased its potential for use everywhere in recent years.

Keywords: MSG, Bioactive components, GABA.

DETERMINATION OF ANTIOXIDANT POTENTIAL OF AGARICUS MACROSPORUS AND RUSSULA VESCA MUSHROOM EXTRACTS

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ABSTRACT

The aim of this research was to determine the content of bioactive compounds phenols and flavonoids in two extracts (aqueous and ethanolic) of two wild mushroom species: *Agaricus macrosporus* and *Russula vesca* collected from the Republic of North Macedonia. Moreover, their antioxidant potential was determine through the ability to capture free DPPH radicals, as well as chelating iron ions. Generally, aqueous extracts showed slightly higher, statistically significant ($p<0.05$) antioxidant activity, compared to the ethanolic extract. Aqueous extract of *Agaricus macrosporus* was characterised with statistically significant ($p<0.05$) higher content of phenols, compared to the same extract of *Russula vesca*. On the other hand, both tested extracts of *Russula vesca* had statistically significant ($p<0.05$) higher content of flavonoids, compared to those of *Agaricus macrosporus*. Therefore, it can be concluded that the aqueous extracts of both tested mushrooms showed good antioxidant properties that can be a substitute for some of the synthetic antioxidants used for industrial purposes. According to that, this study can be a novel starting point for future research in which mushroom extracts can be used in various fields such as food industry, pharmaceutics, medicine or cosmetics.

Keywords: Wild mushrooms, extracts, antioxidant potential.

STRATEGIES TO ACHIEVE SUSTAINABLE DIET: WHAT DO YOUNG CONSUMERS THINK?

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ABSTRACT

Whole world population is esteemed to reach 10 billion by 2050. Consequently, significant efforts are needed to achieve food security. Scarcity of natural resources and climate changes would make intensification of production systems challenging. In this context, adoption of sustainable diet, ie "*diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations*" should be encouraged as a potential alternative. The objective of this research was to investigate attitudes and behaviors of young consumers toward sustainable diet. A sample of 309 Tunisian consumers aged between 20-30 years old was surveyed online, in April 2021. Respondents were asked about their demographic characteristics, their diet, their concerns about environment, and their definition of sustainable diet. They were given several options to achieve sustainable diet (eating more legumes, eating products of season, avoiding food waste, using organic food, encouraging local producers and fair trade). Results showed that 91.6% of respondents expressed their interest to environmental issues. Sustainable eating was defined as reducing food wastage (for 75% respondents) and eating more seasonal (61% respondents), fair trade (59% respondents) and organic (58% respondents) foods, and foods from local producers (60% respondents). About 57% considered themselves eating sustainably whenever it is possible. Interestingly, 49% of panelists affirmed that eating sustainably does not cost more if habits are changed (buy seasonal and local products, waste less). Most of respondents also approved suggested options related to sustainability. These findings reflect awareness and knowledge of young consumers about the importance of sustainable diet. However there is still a need for communication to explain some concepts and spread this awareness among all consumers.

Keywords: sustainable diet, environment, survey, young consumers, knowledge.

FOOD LABELS: AN INSIGHT INTO TUNISIAN CONSUMER KNOWLEDGE AND ATTITUDES

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ABSTRACT

Food labels play a key role in food purchasing and consumption. In fact, they play an informative role (composition, nutrients amount, presence of specific ingredients…). Consequently, food labels could be considered as indicators of the product's overall quality and might influence consumer behaviour. Recognizing the consumers' perception, knowledge, and understanding of the information provided on food labeling would be useful for food operators, and food market actors. The aim of this research was to assess Tunisian consumers' behaviours and attitude toward food labels. An online survey was conducted with 295 respondents, who were asked about their demographic characteristics, food labels and claims reading and their understanding for these labels. Results showed that most of the respondents paid great attention to food labels as s 61% check them always and 35% often. Particularly, 45% of respondents reported that they pay often attention to the ingredient list on food packaging while 29% do it always. Interestingly, results showed that Tunisian consumers understand fully (53%) and at least partially (45%) food labels. Although results showed that Tunisian consumers have incorporated the labelling information into their food purchase habits, less than half of respondents declared not or partially understanding all the information included in food labelling. Moreover, their judgment in discarding a food product was based mostly on food storage considerations than the use of date labels. These findings indicate the need of *strategies and* more effective communication *with clearer messages through food labels as consumers are not efficiently using date labels, in some cases they are even misunderstanding them which may enhance food waste, and potentially food insecurity.*

Keywords: Food label, survey, Tunisian consumer, knowledge, food waste.

EFFECT OF EINKORN AND EMMER WHEAT FLOUR ON PHYSICAL AND SENSORY PROPERTIES OF GEVREK

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ABSTRACT

In this study, einkorn and emmer flour were used in yağlı gevrek- widely consumed delicious snack product in Konya, to improve some physical, textural and sensory properties of yağlı gevrek. For this purpose different level (0, 25, 50, 75 and 100%) of einkorn and emmer whole wheat flour were replaced with wheat flour in gevrek formulation. Some physical, textural and sensory properties of those gevreks were determined and compared with control gevrek which prepared with wheat flour. The *L**, *a** and *b** value of the gevreks changed between 63.54 and 50.94, 7.28 and 9.71, 29.16 and 25.84, respectively. Usage of einkorn and emmer flour had a significant effect on *L**,*a* b** and Hue values of gevreks. According to sensory analysis results, the taste, brittleness and overall acceptability properties of the gevrek samples improved with einkorn flour at all utilization levels.Among gevrek samples prepared with emmer flour the highest color, appearance, taste and overall acceptability scores were obtained with the 25% substitution level of emmer.

Keywords: Ancient wheat, gevrek, einkorn, emmer, snack food.

A NEW FUNCTIONAL FOOD IMPORTANT IN THE COVID-19 PANDEMIC PROCESS: NATURAL BEEF SUCUK WITH PROPOLIS

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ABSTRACT

During the Covid-19 pandemic process, which has affected the whole world, the popularity of functional foods has increased recently in strengthening immunity and improving the disease process. It has been proven by studies that bee products have an important place among functional foods. Propolis is commonly known as "bee glue", which resembles the resinous substance deposited by bees from different plant species. Propolis contains a high amount of bioactive substances. Since meat, which has a very important place in human nutrition, is a perishable product, human beings have used methods such as fermentation, salting and drying since ancient times in order to increase the durability of meat and to give meat different sensory properties. Sucuk is an important product produced by these methods, known since ancient times and consumed by the public. Deterioration etc. Curing process is applied to remove the negative effects and to give a characteristic flavor to meat products. Among the most commonly used additives in meat products, the use of nitrate and nitrite is one of the most important factors that pose a risk to human health. Within the scope of this study, it was aimed to increase the shelf life and changes in some quality characteristics by adding propolis, an alternative natural preservative, to fermented Turkish Sucuk. In the first analysis, it was found that the ratio of moisture content to total meat protein was below 2.5, the ratio of fat to total meat protein was below 2.5, total meat protein value was at least 16% by mass and pH was lower than 5.6. According to the results of this analysis, the product complies with the "Turkish Food Codex Communique on Meat and Meat Products". In addition, shelf life and other analyses will be carried out soon.

Keywords: Functional food, Covid-19, propolis, Turkish sucuk, shelf life.

HONEYBEE PRODUCTS AND COVID-19

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ABSTRACT

With the development of living standards in recent years, people have become more conscious and have begun to be more careful in food consumption. Consumers want the food they buy to have a positive effect on health as well as its nutritional qualities. With the increase in the resistance of pathogens and diseases, the restrictions on the use of antibiotics have led to studies on the production of other alternatives. The coronavirus (Covid-19) disease, which emerged in December 2019, has now spread to all continents and country borders around the world. Some experts in the world state that one of the strongest measures against the disease is to keep the immune system strong. For this reason, people have directed their search for solutions to natural products and functional foods, and recently, the interest in the consumption of these products has increased. Bee products are at the forefront of these natural product preferences. The effects of bee products on human metabolism, their therapeutic properties and their importance in nutrition have been known for years and are supported by various scientific studies. Due to the Covid-19 coronavirus epidemic that the world is fighting, the importance of using bee products to strengthen the immune system has emerged once again. There are studies on the role of bioactive compounds of bee products in Covid-19. Researchers have stated that bee products can be against Covid-19 infection and have potential effects for the prevention and treatment of its infection. However based on theoretical studies supported by in vitro studies, further and more detailed in vivo studies are needed to evaluate the effect of bee products against Covid-19. Thus, further studies are needed to investigate the potential beneficial use of bee products.

Keywords: Functional food, Covid-19, immune system, bee products.

DEVELOPMENT OF INNOVATIVE BEE BREAD

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ABSTRACT

Bee bread (perga) is a bee product produced by bees. Bee bread is made from fermented bee pollen for feeding the young bees. When bee bread is consumed by humans, it shows probiotic, prebiotic, anti-inflammatory, antioxidant and antimicrobial effects and shows many therapeutic activities, especially supporting the immune system. Although bee bread has similar biochemical content with pollen as it is formed by the fermentation of pollen. When bee bread used as a nutritional supplement, it is more nutritious than pollen because the minerals, oligoelements, amino acids and antioxidant substances contained in it are more bioaccessible. However, it cannot be produced efficiently because its production is seen as costly and difficult by beekeepers. In this study, the production of bee bread in a laboratory environment that can simulate natural fermentation and the methodology that can be used for this will be tried to be revealed.

Keywords: bee bread, fermentation, bee pollen, lactic acid bacteria.

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CHANGES OF NUTRITIONAL CHARACTERISTICS OF WHEY FERMENTED WITH KEFIR GRAINS- A PRELIMINARY RESULTS

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ABSTRACT

Whey as a major by-product of cheese production is a subject of survey in the past decade because of its nutritional value and the possibilities to make dietetic beverages with good qualities. Because the whey is produced in high amounts and contains organic matter in high quantity its disposal can cause serious environmental pollution. Instead the whey can be used as a raw material to produce beverages which can be classified as a healthy or as a functional food with added value. This is especially important for the countries with poorly economic development where with single technological process all potential of whey as a raw material can be utilized. The aim of the present study was to evaluate the whey nutritional value and the possible changes as a result of whey fermentation using kefir grains. The samples of unpasteurized cow's whey were collected from a small farm where cheese was produced on a traditional way. After milk curdling with commercial enzymatic rennet the whey was collected and inoculated with kefir grains. The fermentation was carried out at a room temperature (25℃) in time of 24 hours. The inoculation of the whey was performed with different quantities of kefir grains (5% and 10%). The examined phisico-chemical characteristics of whey were not significantly changed. The presence of lactose is exception. The microbiological examination showed tendency of decreasing in the number of total aerobic bacteria, *E.coli* and *Staphylococcus aureus.* As it was expected the number of yeasts and *Lactobacillus* sp. increases. Additional inoculation of fermented whey with strain cultures of *E.coli* ATCC 8739 and coagulase positive *Staphylococcus aureus* ATCC9610 was performed. After 24 hours incubation at 37℃, no strains of *E.coli* ATCC 8739 and coagulase positive *Staphylococcus aureus* ATCC 9610 were recorded. These results indicated the bactericide effects of kefir grains over the used bacterial strains but additional investigations are required.

Keywords: whey, kefir grains, microbiological characteristics, physico-chemical characteristics.

INVESTIGATION OF THE EFFECT OF GERMINATION AND FERMENTATION PROCESS APPLIED TO CEREAL AND LEGUME GRAINS ON MICROBIAL FLORA.

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ABSTRACT

Grains, classified as legumes and cereals, are global food sources that have been consumed since the beginning of humanity and create significant health benefits. Recently, especially in this period when the interest in functional foods is increasing, people want to provide health benefits while providing their nutritional needs. The interest in these grains, which have high nutritional values, is increasing day by day. Being an alternative to protein sources of animal origin makes them valuable in terms of environmental sustainability, while reducing the risk of being affected by cardiovascular diseases, they are also a good source of dietary fiber and antioxidant phytochemicals. However, the digestibility and bioavailability of these grains are limited due to some antinutrient components they contain, and their usability can be limited in some cases technologically compared to their counterparts and cannot satisfy the desired quality criteria. In order to eliminate these disadvantages, some pre-treatments such as heat treatment, germination, fermentation are applied to cereals and legumes and their technological and nutritional values are increased. Microorganisms involved in the fermentation process can break down the anti-nutritional substances in the grains with the enzymes they produce, and can provide higher digestibility, richer nutritional, sensory, and technological profiles and improve antioxidant properties. Although the germination of legumes and cereal is an old and well-known method, it has recently become the focus of attention, especially because it significantly increases the nutritional and bioactive content and also improves the flavor. The germination process triggers the enzymatic activity in the grain and provides the breakdown of starch and non-starch polysaccharides and proteins, while increasing the amount of reducing sugar content, soluble dietary fibers, peptides, and amino acids, and can provide the release of the insoluble phenolic compounds covalently bound to cell wall polysaccharides. This changing nutritional profile can also conduce changes in the microbial flora, and it is important to investigate the microflora formed especially in systems where fermentation and germination processes are used in combination. It is thought that these environments may be rich in lactic acid bacteria, which can enable the development of functional products with various techno-functional properties.

Keywords: Lactic acid bacteria, Legumes, Cereals, Germination, Fermentation, Functional Foods.

FOOD PATHOGEN OF BROILER CHICKEN MEAT *CAMPYLOBACTER SPP.* AND ANTIBIOTIC RESISTANCE

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ABSTRACT

Campylobacter spp. are the most common microbiological food contaminants. Consumption of such foods, most commonly chicken meat, causes disease in humans, and the species most common are *C. jejuni* and *C. coli*. Campylobacteriosis most often manifests itself in the form of gastroenterocolitis. The chronic form can result in more serious complications in the form of *Guillain-Barré syndrome* (GBS) and *Miller Fisher syndrome* (MFS) which cause partial or complete paralysis, chronic diseases and a decline in intestinal tract immunity. Another important aspect of the presence of *Campylobacter* spp. in food, in addition to the possible disease of consumers, there is antibiotic resistance (ABR), which consequently significantly reduces the available therapeutic options. Recent research detects resistant isolates from broiler production and carcasses, with the presence of resistance to certain antibiotics (AB) showing a certain regional specificity, as well as a growing prevalence of fluoroquinolones, which may have a significant implication on human health. *Campylobacter* spp. have the ability to accumulate resistance genes that are most commonly transmitted by horizontal plasmid transfer between competent bacteria. The most problematic biochemical mechanism of resistance in *C. jejuni* and *C. coli* is active efflux which confers resistance to various antibiotics. In order to prevent the spread of campylobacteriosis, it is important to apply the *Hazard Analysis Critical Control Point* (HACCP) concept in food production, which is enabled by *Good Manufacturing Practice* (GMP) and *Good Hygiene Practice* (GHP). In order to prevent the spread of ABR, it is necessary to rationalize the consumption of AB, especially in veterinary medicine. Monitoring is an important assumption that increases the awareness of participants in production and ensures the quality and safety of food.

Keywords: Campylobacter spp., broiler meat production, sanitation efficacy, antibiotic resistance.

REVIEW OF *ESCHERICHIA COLI* PATHOGENS AND FOOD-BORNE ANTIBIOTIC RESISTANCE TO PREVENTION

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ABSTRACT

Escherichia coli (E. coli) is part of the intestinal microbiota of all mammals and in this regard it is not surprising that it is widespread in the environment, and is one of the most common food pathogens. In animals, it is the cause of colibacillosis and colisepticemia, and in humans, alimentary intoxications and food poisoning are also significant. The foodborne pathogen *E. coli* most commonly causes gastroenteritis in humans. It is always native to the intestines of mammals, and the primary transmission is through food. A special strain is the enterotoxinogen E. coli (ETEC), and the most dangerous serovor is 0157: H7, the cause of hemorrhagic colitis or hemolytic-uremic syndrome in humans. In addition to the disease of consumers, another problem is antibiotic resistance (ABR), which reduces therapeutic options. Recent research detects resistant isolates, with the presence of ABR showing regional specificity and a growing prevalence of fluoroquinolones, which may have implications for human health. In order to prevent the spread of alimentary intoxications, it is important to apply the HACCP concept in food production, which is made possible by Good Manufacturing Practice (GMP) and Good Hygiene Practice (GHP). In order to prevent the spread of ABR, it is necessary to rationalize the consumption of antibiotics (AB) in agriculture, veterinary medicine and medicine. Monitoring is an important prerequisite for the adoption of appropriate measures and control, all in order to prevent the spread of ABR.

Keywords: *Escherichia coli*, human and animal pathogen, foodborne pathogens, epidemiology, antibiotic resistance, prevention.

INHIBITION OF *CLOSTRIDIUM* SPECIES BY PROTECTIVE LACTIC ACID BACTERIA IN DAIRY INDUSTRY

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ABSTRACT

Clostridium spp. induce late blowing in cheese; irregular cracks are one of texture and flavor problems, including putrid taste. Thermal inactivation, centrifugation, increased salt concentration, storing at low temperatures, microfiltration or bactofugation of milk, and nitrate or lysozyme addition are all suggested solutions for the late blowing problem that arises during the in storage. Alternative and effective applications are needed to prevent the formation of *Clostridium* spp. in cheese, as current ideas are both legal limitations and their efficacy is insufficient. With the use of metabolites produced by LAB or bacteriocin-producing microorganism as a starter culture, the importance of inactivating pathogenic or spoilage microorganisms is increasing day by day. The accumulation of acidic end products such as lactic acid, volatile organic acids, and ethanol, along with hydrogen peroxide, has a significant inhibitory effect on gram-positive and gram-negative bacteria in fermentation conditions where lactic acid bacteria are the prevalent flora. At pH 5, lactic acid play a part as an effective inhibitor of spore-forming bacteria. Lactic acid is used to prevent microorganism growth in fermented and pickled foods. It is most commonly used in the food industry. In previous studies, it was determined that lactic acid bacteria showed bioprotective properties against *clostridium* species.

Keywords: Late blowing, Clostridium spp., Lactic Acid Bacteria, biocontrol, cheese.

APPLICATION OF FAILURE MODE AND EFFECT ANALYSIS (FMEA) AND CAUSE AND EFFECT ANALYSIS FOR HONEY PRODUCTION: A CASE STUDY

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ABSTRACT

In Tunisia, apiculture represents a growing agricultural sector. In fact, honey production increased from 220 tons in 1970 to 2500 tons in 2020. However, this sector still suffers, as everywhere in the world, from a lack of traceability and a risk of fraud which can impact its quality. To guarantee food safety, farmers and food processors need to base their efforts on risk analysis. Failure mode and effect analysis (FEMA) is a safety and reliability analysis tool that allows the identification of failures that could happen on a system and gives their effects and consequences. Conducting risk analysis during honey production would reduce incidents, contribute to risk management associated with the honey human consumption, save costs and improve competitiveness in the market. This research was conducted with a beekeeper in Nabeul governorate (north-east of Tunisia). FMEA model was applied in conjunction with cause-and-effect analysis for the risk assessment of honey production. Potential failure modes and effects as well as their possible causes were identified in the honey process flow. Criticality of each failure was calculated taking into account risk, frequency and gravity. Qualitative diagnosis during honey process flow revealed 56% of nonconformities, based mainly on failures of implementation of good hygiene and good farming practices. Moreover, highest criticality was attributed to presence of humid honey frames, honey rehumidification, microbiological contamination, fermentation and ineffectiveness of cleaning. Based on the FMEA analysis, an improvement plan for all stages was suggested with an emphasis on rising employees' awareness and training.

Keywords: Honey, Quality, Safety, Risk analysis, FEMA, Cause-and-effect diagram.

FOOD WASTE VOLUME, ORIGIN AND CAUSES: CASE STUDY IN A TUNISIAN UNIVERSITY CANTEEN

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ABSTRACT

Food waste reduction strategy involves as a first step, to quantify food waste generation. This work aimed at evaluating the volume and the type of food waste and to identify its maincauses in a university canteen (INAT, Tunis, Tunisia). Based on a direct method, wasted food was weighed with an electronic scale, during 23 working days. Three main food groups were quantified: prepared food (PF), plate waste (PW), which is the amount of food rejected by students and left on their plates, and non-served food (NS), which is the amount of food not distributed to diners and remaining in the serving bowls. Direct quantification has revealed that average meals served was 209 kg/day, whereas as average food daily waste was 15.90 % of PF, 0.074 kg per student and 13.4% of PF were non-served. The average index of waste/consumption was approximately 17 %, and classified as bad, and the per capita plate was 29.3 g. The daily quantities of food waste varied from 0 to 15 kg. The most rejected foodstuffs were stews (25.3%), pasta and cereal products (20.7%), and especially bread with a waste percentage of 43%. Cause and effect diagram coupled with interviews and survey allowed identifying principal causes for the food waste generation: perceived sensory quality, poor food presentation, poor menu planning and poor management of the fluctuation of the students' number (the quantities served were not adjusted) as well as customers' behaviours and habits. The cost of this food waste was estimated to 15.2% of the canteen annual budget. In conclusion, the present study has pointed out a significant amount of food waste in the university canteen and constitutes the first step for implementing of adequate waste prevention measures to decrease it.

Keywords: Sustainable Development Goal (SDG) 12, Food Waste reduction, Direct Quantification, Cause and Effect Analysis, Students.

STUDY OF THE EFFET OF PH ON THE PRODUCTION OF EXOPOLYSACCHARIDES (EPS) BY LACTIC ACID BACTERIA ISOLATED FROM GOAT MILK

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ABSTRACT

The food industry seeks to improve the structure and texture of food, to optimize the quality of the product to be manufactured. In addition, the consumer tends to choose products with fewer calories and fat as well as those with minimal additives. The industry must therefore find other options in order to provide consumers with quality products. In recent years, increasing attention has been focused on polysaccharides produced by strains of lactic acid bacteria. To meet this challenge and meet consumer expectations, lactic acid bacteria producing EPS are an alternative of choice to reduce the ingredients used. In fact, dairy products made with EPS as natural stabilizing agents are considering GRAS (generally recognized as safe). In addition, a better knowledge of the factors involved in the biosynthesis of EPS in lactic acid bacteria used by the dairy industry for the production of fermented products is also desirable. This is the framework for this work, which aims to select strains of lactic acid bacteria isolated from goat's milk that are able to produce exopolysaccharides and to study the effect of pH on their production. The isolation of lactic acid bacteria from raw goat's milk allowed us to obtain eight strains (Gram positive, catalase negative) which were purified and preserved. After their morphological, biochemical and physiological identifications by basic classical techniques (fermentation type, growth in the presence of NaCl: 2.5%, 4% and 6.5%, growth at pH: 4 and 9, growth test of different temperatures: 4 ° C, 30 ° C, 37 ° C and 45 ° C), these strains are selected to study their capacities to produce exopolysaccharides. In the eight strains tested, this production was detected by: (i) The direct detection of EPS by the chine anchor staining technique, (ii) The culture of bacteria in solid hypersaccharose MRS medium and (iii) The culture of bacteria in a liquid hypersaccharose MRS medium which allowed their quantification using the phenol-sulfuric acid method. The detection of EPS production showed that all eight strains were productive. The determination by the Phenol-Sulfuric Acid method revealed that the production of these polymers is variable from one strain to another with a best production of 0.62g / ml for the Lcc5 isolate. After comparing of the quantification of EPS in three lactic acid strains (Lcc3, Lcc5, Lbc2) in the presence of different pH values (4, 6.5 which is considered a control and 9), it appears that the increasing pH values stimulate the production of EPS proportionally up to the value 9 where we note a maximum production of EPS in strains Lcc3 (0.39g / ml), Lcc5 (0.68g / ml) and Lbc2 (0.66g / ml), on the other hand, the production at pH 4 is reduced compared to the control. Therefore, the results show that pH 9 promotes the production of EPS by the strains studied.

Keywords: lactic acid bacteria, exopolysaccharides, optimization, goat milk, pH, MRS.

COLD ATMOSPHERIC PLASMA TREATMENT: A NOVEL TECHNOLOGY FOR MICROBIAL INACTIVATION AND ENHANCEMENT OF FOOD SAFETY

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ABSTRACT

Cold atmospheric plasma is a novel nonthermal technology with the potential for use in food processing. Cold atmospheric plasmas are produced by the excitation of gas with electrical discharges at room temperature and atmospheric pressure. It is a highly efficient method for microbial inactivation and can therefore be applied in surface pathogen decontamination of food materials and food packaging. In recent times cold atmospheric plasma technology is being explored as a nonthermal intervention for decontamination and shelf-life extension of foods. Even though thermal processing technologies have been extensively used to ensure food safety and extended shelf-life, thermal-based methods are known to contribute to undesirable changes in the sensorial, nutritional, and functional characteristics of foods. Therefore, in order to develop appropriate sterilization methods without adverse changes to food qualities, researchers have increasingly focused on the development of nonthermal alternative technologies. Among recently developed non-thermal treatments, the use of cold atmospheric pressure plasmas has garnered much attention. For sterilization of heat sensible materials, plasma is formed in a processing system with discharged gas which is close to ambient temperature and under atmospheric pressure. Different types of non-thermal plasmas have been used for the decontamination of foodborne pathogens in various food products. The type of reactor design strongly influences the inactivation of microorganisms by cold atmospheric plasma. Cold atmospheric plasma can inactivate microorganisms by various mechanisms that are likely to act synergistically. One of these mechanisms is UV radiation in the 200–300 nm wavelength range, which causes damage to DNA by inducing the formation of thymine dimers. The other mechanism is the diffusion of reactive species through the bacterial cell membranes which can also cause severe local damage by reacting with macromolecules such as membrane lipids, proteins and nucleic acids. Although there are a number of different mechanisms, both physical and chemical mechanisms have been implicated in causing damage to the cell membrane. Consequently, cold atmospheric plasma is a highly efficient method for microbial inactivation and therefore cold atmospheric plasma applications have a potential to satisfy consumer demands.

Keywords: cold atmospheric plasma treatment, food safety, nonthermal technology, microbial inactivation.

BROMINATED FLAME RETARDANTS IN SEAFOOD FROM MEDITERRANEAN SEA: RISK CHARACTERIZATION AND BENEFIT–RISK ASSESSMENT FOR POPULATION OF CENTRAL ITALY

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ABSTRACT

Brominated flame retardants (BFRs) are a large group of different substances utilized in several products to prevent or limit flames. Among BFRs, polybrominateddiphenyl ethers (PBDEs) and hexabromocyclododecanes (HBCDs) have been the most used in the past decades worldwide. PBDEs are 209 possible congeners mainly applied in plastics, textiles and electronic circuitry. HBCDs are additive flame retardants primarily used in expanded and extruded polystyrene applied as construction and packing materials. HBCD consist of five stereoisomers although technical mixtures include predominantly α-, β- and γ-HBCD. BFRs and HBCDs and are not chemically bonded to polymers and they can easily leach from the products into the environment and bioaccumulate. As a consequence these toxic compounds are ubiquitously present in the environment as well in biota and therefore in feed and food. Food consumption is the major source of exposure to flame retardants for humans, especially through fish and fish products. In the present study, the occurrence of 15 PBDE congeners and α-, β- and γ-HBCDs in six marine fish species (tuna fish, sole, grey mullet, red mullet, Atlantic horse mackerel, anchovy) and mussels, caught in the Mediterranean sea (FAO zone 37), was assessed according to monitoring plans recommended by European competent authorities. Seafood samples were analyzed by means of gas and liquid chromatography associated with triple quadrupole mass spectroscopy. The dietary exposure to such molecules was calculated for four age subgroups of the central Italian population, for average and high consumption levels. In order to estimate the severity of potential adverse health effects in the given population, the risk characterization of PBDEs and HBCDs was performed by means of the Margin of Exposure (MOE) applying the body burden in relation to neurodevelopmental effects on behavior as the critical endpoint. The MOE approach provides an indication of the level of health concern about a substance's presence in food with the risk decreasing as the MOE increases, although is not a precise quantification. Furthermore, aiming to weigh the benefits and the risks occurring simultaneously in the targeted seafood, the benefit–risk assessment were also performed using the and the benefit–risk quotient. The benefits consisted on the intake of omega-3 fatty acids trough the targeted seafood identified as active factors in cardiovascular diseases prevention, while risk factors were attributed as mentioned to the ingestion of PBDEs and HBCDs, which have been proved to be severely toxic to humans. The 100% of samples were found positive for at least one of the analyte; the most frequently detected molecules were BDE-47 followed by -100. Data on dietary exposure revealed that children are the consumers group more exposed to these contaminants. Overall, exposure to ∑PBDE ranged from 0.235 to 1.491 ng/kg body weight/day and from 0.034 to 0.216 ng/kg body weight/day for fishes and mussels, respectively; while that of ∑HBCD ranged from 0.055 to 0.348 ng/kg body weight/day and from 0.137 to 0.872 ng/kg body weight/day for fishes and mussels, respectively. MOE values were within the safe levels for all population groups although with lower level for high consuming children with

values of 39 and 58 for fish and mussels respectively. The benefit–risk assessment revealed that health benefits overcome the potential health risks for the central Italian population consuming marine fish products and mussels from the Mediterranean Sea.

Keywords: exposure assessment, Margin of Exposure, fish products, benefit-risk, seafood.

PHOSPHOMOLIBDATE METHOD FOR DETERMINATION OF ANTIOXIDANT ACTIVITY IN MILK EXTRACTS

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ABSTRACT

Antioxidants are mainly non-nutrient compounds in both human and animal feed, but have the antioxidant capacity in vitro to provide an artificial power index in preventing the destruction of cells and tissue potential by inhibiting nutrient oxidation. Milk contains lipophilic and hydrophilic antioxidants, which play a key role in maintaining. The efficiency of extraction for determining the antioxidant activity of milk corresponds to the method used for plant extraction and it is in a strong linear positive correlation. For this purpose, the phosphor molybdenum method used, based on the reduction of Mo (VI) in Mo (B), in samples of milk. Extracts obtained with methanol + ethanol (0.6M H2SO4, 28mM Na2PO4 and 4M (NH4)2MoO4, Soxlet method: Green complexes formed at acidic pH value are spectrophotometric in the UV range at wavelength λ = 695 nm. The values of milk primers are compared with respect to the calibration curve of IUPAC (3,4,5-Trihydroxybenzoic acid) or gallic acid, measuring range (0.00 to 14.00 μg / ml, y = 0.0344 + 0.0519, R2 = 0.9709). Milk samples tested for antioxidant activity. 10 measurements of absorptions were made on each of the 4 samples of milk extracts and statistics in Excel. The results concentration, c = 3, 80; 2.35; 3.78; 4.85 / (μg / ml). The highest value of antioxidant activity in packs milk, which has 3.2% fat, also affects the fat and the presence of vitamin E, which found in fat droplets and has a synergistic effect with vitamin C. It concluded that the highest value of the total antioxidant activity in animal feed and milk obtained from the first sample due to the use of several types of food - alfalfa, two types of concentrated and straw, which proves the dependence of antioxidant activity on the impact of nutrients, that is, of their type and quantities.

Keywords: Keywords: antioxidants, antioxidant activity, vitamins, cow milk.

PLASMA ACTIVATED WATER (PAW) AND AGRICULTURAL APPLICATIONS

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ABSTRACT

Cold atmospheric plasma (CAP) application stands out as one of the new, non-thermal, chemical-free and environmentally friendly technologies used in research in recent years. When the matter is energized, for example when heated, it changes from solid to liquid, from liquid to gas, and from gas to plasma. Plasma, which is expressed as the 4th state of matter; It can be created by different energy transfers such as temperature, pressure, thermal, nuclear radiant energy, electric current. In phase transitions that occur as a result of energy transfer, the intermolecular interaction relaxes until it is completely broken. Plasma is a mixture of excited atoms and molecules, ionic and radical species, reactive species, electrons, positive and negative ions, free radicals, gas atoms, UV radiation and visible light. In most of the studies on plasma, the method of applying gas plasma directly to the material has been used. However, few researchers have reported that after this treatment applied to the surface, there are some negative effects such as damage to bioactive compounds and related color loss, change in surface topography. In order to overcome these problems, the application of plasma active water (PAW), also called plasma acid, plasma active liquid, nutrient water, stands out as an alternative method. PAW is obtained by applying plasma to water. Reactive oxygen and reactive nitrogen species formed in PAW cause changes in the redox potential and conductivity of water. PAW containing reactive species can be an alternative method for disinfection of foods. Some studies have focused on the use of PAW to control bacterial inactivation and microbial growth. The advantage of PAW is that it is easy to apply instead of traditional disinfectant solutions applied for disinfections. However, more work will be required before this technology can be applied on an industrial scale. Agriculture is another industry that PAW is promising. Many application areas of PAW in agriculture are waiting to be investigated. PAW application has been reported to increase seed germination. Also, nitrate production in PAW can be achieved by evacuating the plasma, which can serve as an alternative source of nitrogen for plant growth. It has been proven by many studies that PAW is also effective on the growth and yield of different plant species. Apart from these, PAW can be used against various diseases and for different purposes such as removing pesticide residues.

Keywords: Cold plasma, plasma activated water, agriculture.

VALORIZATION OF WHEY BY SUBSTITUTING EGGS IN THE PRODUCTION OF "MADELEINE" TYPE CAKES

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ABSTRACT

Whey is one of the major byproducts of the dairy industry all over the world. Previous research has shown that it is no longer considered a waste product, but a nutritionally and techno-functionally rich protein treasure. This study was conducted by replacing the egg protein with whey protein. The objective of our work is to study the feasibility of making a type of traditional Spanish cake "Madeleine" by substituting eggs with variable quantities of whey powder (25%, 50%, 75%, and 100%) and to study the substitution effect on the techno-functional and sensory quality of the Madeleines obtained. The results of this study first found that substitution at rates of 25 and 50 percent results in a decrease in Madeleine dough density of 1,127 ± 0,001ab and 1,118 ± 0,003ab g/cm3. However, rehydration and homogenization of the whey powder before use had beneficial effects. In addition, the specific volume is inversely proportional to the incorporation rate of the whey powder, Indeed, the incorporation caused an increase in the total number of alveoli for Madeleine samples to 25%, 50%, and 100% improved and a decrease in the average surface area of the alveoli, which is inversely proportional to the number of alveoli. Sensory analysis revealed that Madeleine type 25% received good appearance scores comparable to the control. While the 100% improved Madeleine received a little satisfactory appreciation. No significant difference was observed between the 25%, 50% Madeleines, and the control concerning odor, taste, and appearance of internal texture, which were received a good appreciation. In the end, the adhesiveness of all the Madeleines was considered acceptable.

Keywords: Keywords: Valorization, Whey proteins, Egg proteins, Substitution, Madeleine.

COVID 19 AND FOOD SAFETY

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ABSTRACT

Todays, human society has encountered a COVID-19 type epidemic for the first time in theirs life cycle. This epidemic forced people to live under quarantine to change the whole world order. The mandatory quarantine process resulting from the occurrence of fatal cases has limited all kinds of activities, especially national and international trade. Even if every activity in the world stops, it is not possible to stop the nutritional activity, which is the most basic need of people. For this reason, countries around the world have given a very important examination in this period and the real powers of self-sufficient countries like our country have emerged. However, besides the access to food, the issue of access to reliable food attracted the attention of every individual and reliability in food production and consumption has become an important issue.

Keywords: Covid 19, Food Safety, Food Security, Consumers, food industry during pandemic.

EUSTRONGYLIDES SPP. PREVALENCE IN COMMERCIAL VALUABLE FRESHWATER FISHES FROM TRASIMENO LAKE (ITALY): A SMALL-SCALE FISH PRODUCTION CHAIN SCENARIO

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ABSTRACT

Nematodes of genus *Eustrongylides* belonging to the Dioctophymatidae family are able to infect numerous freshwater fish species. The complex life cycle of *Eustrongylides* spp. is characterized by five stages. The first stage develops within the egg and is shed in the feces by the infected birds, then is ingested by aquatic oligochaetes, which are the first intermediate hosts in which the parasite develops into the second and third larval stages. The second intermediate hosts are planktivorous and benthivorous fishes in which the larvae moult into the fourth larval stage and remain in the fish, mainly in the muscles, to be ingested by wading birds such as cormorant, the definite hosts. Predatory fishes, such as perch, can serve as paratenic hosts and are able to infect humans through the consumption of raw or undercooked freshwater fish. Due to the infectious potential towards humans and its worldwide presence in fish, *Eustrongylides* spp. has been recognized in 1982 by CDC (Center for Disease Control) as zoonotic agent, that may pose a public health risk to consumers. In Italy *Eustrongylides* spp. occurrence in different fish species inhabiting several freshwater ecosystems was referred since 2015, nevertheless, to date no human infection case has been reported. The level of infection of *Eustrongylides* spp. in nine commercially important fishes of Trasimeno lake (central Italy) was investigated. The survey was carried out in a small processing plant where the presence of the parasite was determined by visual inspection by Food Business Operator in: Perch (*Perca fluviatilis*, Linnaeus), Largemouth black bass *(Micropterus salmoides*, Lacépède), Big scale sand smelt (*Atherina boyeri*, Risso), Eel (*Anguilla anguilla*, L), Black bullhead (*Ictalurus melas*, R), Carp (*Cyprinus carpio*), Tench (*Tinca tinca*, Linnaeus), Goldfish (*Carassius auratus*, Linnaeus) and Pumpkinseed sunfish (*Lepomis gibbosus*, L.). The targeted fishes were caught during fishing season by local fishermen. The fishes after capture were transferred in the processing plant where they were processed and subjected to a visual inspection according to a sampling plan defined by Food Business Operator following the regulation in force. The highest level of infection was detected in Pumpkinseed sunfish (100%) followed by Perch (70%) and Big scale sand smelt (40%). No parasite was detected in Goldfish while all the other species showed a negligible prevalence always below 1%. Furthermore in Perch and Pumpkinseed sunfish was also registered a higher abundance of parasite in fish flesh (8 and 4 in Perch and Pumpkinseed sunfish, respectively). Data on fish from Europe confirm that Pumpkinseed sunfish, Perch and Big scale sand smelt are the species most frequently infected by this nematode. EU regulation states that food shall not be placed on the market if it is unsafe and obviously contaminated but it lacks of clear definition of the concepts allowing each operator to establish its own criteria. The zoonotic potential of *Eustrongylides* spp. is questionable however its peculiar characteristics (typically very long, coiled, and red), make it clearly evident even to a common consumer making the fish repugnant and subsequently causing substantial economic loss for the fish industry. An harmonized approach is needed to control this parasite diffusion acting

both in its life cycle and after fish capture to assure the quality of food product and preserving the food chain profitability.

Keywords: Nematode, Freshwater fishes, fish industry, montoring plan, visual inspection.

MEANS OF ACQUIRING NATURAL COLORING AGENT FROM Vitis labrusca L.

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ABSTRACT

Color, which is among the appearance features of food, comes forth as a substantial factor determining the preferences of the consumers. Artificial and natural coloring are utilized to ensure the stability of the color of the food. Anthocyanins refer to natural coloring agents commonly used in foods. Apart from adding color, anthocyanins increase the oxidative stability of the foods containing them to due to their antioxidant properties. In this study, anthocyanin-based extracts of *Vitis labrusca* L. fruit have been prepared, commonly named as the fox grape growing naturally in the Black Sea Region of Turkey by utilizing two different solutions (distilled water and acidized ethanol) and two different extraction method (conventional and ultrasonic). Certain physical and chemical properties, chemical compound and mineral substance profile of the prepared extracts have been determined. As a result of the analysis, vitamin C revealed an increase in extracts compared to fruit, while total phenolic content increased in other extracts except for the extract acquired by using the water solution with the conventional extraction. While total monomeric anthocyanin indicates a decrease in the water extracts, an increase has been revealed in the acetic acid extracts. As a result of the statistical evaluation performed, it was identified that the effect of extraction method and solvent type on the amount of vitamin C, total phenolic content and total monomeric anthocyanin were very significant ($p<0.01$). The method had a significant effect ($p<0.01$) on the antioxidant properties. A total of 46 compounds have been identified in the fruit and the extracts there of. 1-isobutyl-7,7-dimethyl-octahydro-isobenzofuran-3α-ol, the compound found with the highest rate (20.97%) has been identified in the extract acquired by using the water solution with the conventional extraction. A total of 16 elements have been identified in the mineral composition analysis. Potassium mineral with the highest amount has been identified in both fruit and extracts thereof. While a decrease has been observed in the extracts in comparison with the fruit in the entire minerals identified, the amount of potassium mineral revealed an increase only in the extract acquired with water applying the conventional method.

Keywords: Vitis labrusca L., Anthocyanin-based extract, Ultrasonic extraction, Conventional extraction.

THE INVESTIGATION OF DIFFERENT FORMULATED FISH SOUP AND FISH SAUCE ON PROXIMATE COMPOSITION

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ABSTRACT

Instant foods have becoming very popular food products that are prepared easily and quickly within globalized world. Soup categorized as a liquid and heterogeneous food prepared from fish or meat vegetables, and other indigents using with water, juice or stock. Using different type of protein source for soup production is a novel approach for increasing nutritional value of instant soup. Owing to it contains important vitamins, minerals, species-specific essential amino acids and fatty acids, fish meat used very commonly in the human diet. Instant soup has some advantages such as being almost ready to consume and taking less time to prepare. In the global market, there has been a big demand of dry soup mixes prepared with animal protein source. With better understanding of the importance of protein based food items in human diet; instant soup industry contained fish meat has started to used frequently like other industry. Fish based ready to eat products became popular because of their low price, easily prepared, besides being characterized by a high protein and omega 3 concentration, which attend the demand of consumers for healthier food. The aim of the present study was to investigate the using of rainbow trout (Oncorhynchus mykiss) in different ready-to-eat fish soup and fish sauce production and to determine nutritional components in different fish soup and fish sauce group. Rainbow trout (Oncorhynchus mykiss), vegetables, spices and other additives obtained from a local firm in Adana. Fish was individually headed, gutted, filleted and washed after appearing on the laboratory. Then the fillets divided into nine groups that five different fish soup (fish meatball soup, vermicelli fish soup, zucchini - dill fish soup, lemon fish soup, mushrooms fish soup) and four fish sauce formulations (tomato fish sauce, pepper fish sauce, potatoes fish sauce, zucchini dill fish sauce) obtained. After production of fish-based sauce and soup, products freeze- dried and pulverized. At the end of study; in soup groups, the highest and lowest protein content obtained in fish meatball soup and in lemon fish soup, respectively. Compared in terms of content and the lowest and highest lipid content of the fish sauce was seen in tomato and zucchini-dill fish soup and found values, respectively, 3.12% and 7.12%.In fish sauce group, the highest protein content was obtained from in potatoes fish sauce group as 37.98 %. Lipid rate varied from 13.42% to 18.49 % in fish sauce group. At the end of study, based on the nutritional composition of vegetables and additive elements content varies; in the types of products it is observed that the increasing use of fish meat nutritional quality fish soup fish ball soup, vermicelli fish soup, lemonade fish soup, mushroom fish soup.

Keywords: fish soup, fish sauce, formulation, lemon sauce, fish meat, proximate composition.

ROYAL JELLY AND ITS FUNCTIONAL FEATURES

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ABSTRACT

The use of honey and other bee products (pollen, propolis, royal jelly, perga, hive air, bee venom, beeswax, apilarnil, queen larvae and bee brain) backs to ancient times both nutritional and healing purposes. In recent years, with the investigation of the active ingredients in bee products, both drug and complementary medical product developers (support, supplement, and functional food) have attracted more attention to such products. Honey, pollen, and propolis are the most well-known bee products. Royal jelly is another bee product with different valuable bioactive components, quantity, and usefulness compared to honey, pollen, and propolis. Because royal jelly is obtained by the presence and combination of biochemical reactions of several bee products such as honey (or nectar), perga, and/or pollen royal jelly is considered to be an advantageous product in terms of bioavailability. Anti-aging, anti-ulcer, antidiabetes, antioxidant, antimicrobial, and preventing skin diseases properties are emphasized functional features of royal jelly. In addition, royal jelly contains significant levels of protein, peptides, free amino acids, minerals, essential fatty acids, organic acids, enzymes, vitamins, and other secondary components. These properties have contributed to royal jelly being a functional food. This study examines royal jelly's synthesis, its function in the hive, its methods of obtaining, its components, its functionality and its use in supplementary foods as a functional food ingredient. In addition, adulteration in commercially sold royal jelly is also studied in this study.

Keywords: Royal jelly, functional food, bioactive ingredient.

BIOACTIVE PROPERTIES OF APILARNIL AND USAGE IN FUNCTIONAL FOODS

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ABSTRACT

Hunger and hidden hunger remain as one of the most significant public health problems. Food manufacturers and scientists have been attempting to solve this problem by looking for new food and alternative food sources. The use of bee products other than honey in functional foods can be presented as a manifestation of this search. Due to the division of labor in honeybee colonies (Apis mellifera) the task of drones (male honeybees) is to fertilize the queen that has just emerged from the pupa. However, in modern beekeeping, queen bee production and insemination are carried out in unique techniques and hives. Due to these modern queen breeding techniques, the existence of drones is not necessary and even harms the hives in terms of productivity. Considering the ineffectiveness of drones in modern beehives and their rich nutrient and bioactive component profile, the harvest and collection of drones during the larval stage is a strategic approach to produce a new functional food and increase the productivity of the hives, which will lead to an increase of efficiency in other bee products in the hive. Apilarnil is a recently preferred functional food due to its protein-peptide-amino acid, mineral, vitamin, and other bioactive components. In alternative and complementary medicine, it has been reported that apilarnial has effects such as contributing to growth and development of the individuals, curing degenerative diseases, and increasing reproductive physiology. This study explores, the role of drones in the hive, the collection of their larvae (apilarnil), its components, functionality, and possibilities of use as a functional food ingredient.

Keywords: Apilarnil, functional foods, bioactive component.

COMMON NETTLE (URTICA DIOICA L.) AS A FUNCTIONAL FOOD ADDITIVE

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ABSTRACT

Common nettle (Urtica dioica L.) has been used since the dawn of history as a remedy in folk medicine. Currently, it is used all over the world as an additive in the pharmaceutical and cosmetic industries, but also in the textile and food industries. Few studies indicate the use of various forms of nettle as a functional additive to dairy products. Nettle leaves are a valuable source of nutrients, i.e. protein, fatty acids, carbohydrates, minerals (calcium, iron, magnesium and phosphorus) and vitamins (groups C, B and K). What's more, it contains a number of amino acids, incl. tryptophan, methionine, lysine and leucine play a key role in human health. It is worth adding that each part of the plant (stem, flowers, leaves, roots and seeds) contains a number of bioactive compounds with antioxidant properties (carotenoids, phytosterols, polyphenols or pigments, i.e. chlorophyll). Consumers' demand for food products beneficial to health is growing steadily, which is why in recent years manufacturers have increasingly used plant additives, including nettle as a health-promoting additive to functional foods, dietary supplements and nutraceuticals. Nettle herb has strong antimicrobial properties, including antiviral and anticancer. In traditional medicine, nettle was mainly used as a remedy for stomach ulcers, anemia, burns, kidney stones and rashes. The analgesic effect was also appreciated. In Western countries, it was used as a treatment for allergic rhinitis. Current research indicates that nettle tea inhibits the growth of acute myeloid leukemia cells in vitro by promoting apoptosis. In addition, leaf extract is likely to limit the growth and proliferation of prostate cancer neoplastic cells, and in vitro antitumor activity on cell lines has also been attributed to breast and lung cancer. The addition of nettle to food products, including yoghurt, promotes the development of probiotic bacteria, increases their antioxidant capacity and the overall content of polyphenols, thus contributing to an increase in the overall content of bioactive compounds. It was shown that the addition of nettle extract to yogurt had a positive effect on the physicochemical parameters of the product, and the combination of nettle extract with yogurt containing the Bifidobacterium strain showed the ability to inhibit H. pylori bacteria. In conclusion, nettle is one of the herbs that has phytotherapeutic properties and should therefore be widely used as a functional food additive, including dairy products.

Keywords: common nettle, yoghurt, plant additive.

CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF Prunus spinosa L. FRUIT EXTRACT

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ABSTRACT

Prunus spinosa is known as Blackthorn from the Rosaceae family. It is a thorny shrub that grows wild in uncultivated areas of Europe, Western Asia, and the Mediterranean. In medicinal use, the flowers show anti-inflammatory, diuretic, vasoprotective, detoxifying (blood-purifying) effects. Blackthorn has traditionally been applied not only in the treatment of intestinal and respiratory ailments, but also in the treatment of various heart ailments such as myocarditis, cardiac neurosis and atherosclerosis. *Prunus spinosa* L. dried fruit methanol extract was evaluated for their antimicrobial activity against nine bacterial ATCC strains. In addition, the phenolic profile was also investigated and the results are indicative of an intense accumulation of anthocyanins, which may be responsible for the antioxidant properties revealed by the DPPH and Total phenolic substance analysis. A specific inhibitory effect was observed against the tested Gram-negative or Gram-positive bacteria. Among Gram-positive bacteria, the highest effect was observed against the pathogen *Bacillus cereus* (18.5 mm), while the highest effect was observed against the pathogen *Klebsiella pneumoniae* (12.5 mm) among Gram-negative bacteria. Finally, *Prunus spinosa* fruit extract can be used as a complementary source of functional additives and can be a promising antimicrobial compound of natural origin to be used to combat microbial resistance.

Keywords: Prunus spinosa, Antimicrobial activity, Antioxidant.

THE EFFECT OF HERBAL MIXTURE ADDITION IN THE FEEDING OF COWS ON THE PHYSICOCHEMICAL PROPERTIES AND ANTIOXIDANT POTENCIAL OF MILK AND PRODUCED YOGHURTS

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ABSTRACT

Nowadays, there is a growing interest in natural feed additives in animal nutrition. The most common additives are herbs because their multidirectional action has been confirmed many times by researchers. In dairy cows, these additives can affect increasing milk yield, and also improve the physicochemical properties and technological usefulness of milk. The aim of the research was to evaluate the effect of herbal mixture addition in the nutrition of cows on selected physicochemical properties and antioxidant status of milk and yoghurts produced on its basis. The research was carried out on a farm specializing in dairy cattle breeding. The study included 30 Holstein-Friesian cows being in 3 lactation (15 cows-control group; 15 cows-experimental group). The cows were fed in the TMR system. The basis of balanced ration was bulky feed including silage from sugar beet pulp, maize silage, grass haylage, wheat straw, and concentrate mixture, including farm crushed cereal meal, extracted rapeseed meal and commercial complementary mash. The experimental factor was the addition of standardized mixture of dried herbs, consisting of oregano-25%, thyme-25%, cinnamon-15%, and echinacea-35%. Herbs were served in the form of a powder as a component of concentrated mixture in the amount of 3% of dry matter of the dose/day/head up to the 60th day of lactation. The control group consisted of the cows that received only bulky feed and concentrate mixture. Milk samples were taken triplicate during the course of the experiment. The milk was heated at 85°C for 30 minutes in a water bath. Then it was cooled to 43°C and inoculated with bacterial cultures dedicated to the production of yoghurts in the amount of 0.15 g/l (the thermophilic yoghurt cultures YC-X11 Yo-Flex (Chr. Hansen, Denmark), containing *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp. Bulgaricus*). Then, all yoghurts were incubated at 43°C until the pH was approximately 4.6. The basic chemical composition, i.e., crude protein, fat and lactose, were determined with Infrared Milk Analyzer (Bentley Instruments, USA) and casein content according to AOAC (2000). The somatic cell count (SCC) was determined by flow cytometry (Somacount 150, Bentley Instruments, USA), as well as the total microbial count (TMC) in CFU/mL by the plate method, using deep inculation (Bentley BactoCount IBCm, USA). The content of biologically active ingredients, i.e., selected whey proteins (α-lactalbumin, β-lactoglobulin, lactoferrin and serum albumin) and fat-soluble vitamins (A, D3 and E) were determined in the milk samples by RP-HPLC method. In all yoghurt samples the

pH value was determined using a pH meter (Elmetron CP-401, Poland), potential acidity by titration method, dry matter by drying method, protein by Kjeldahl method, fat by Gerber method and water activity by HygroLab C1 (Rotronic). Total antioxidant status (TAS) was also determined in milk and yoghurt samples using dedicated Randox tests and UV-Vis spectrophotometer (Varian). The obtained results were statistically analysed using the Statistica ver. 13.1 program (Statsoft Inc., 2016) based on one-way analysis of variance. It has been shown that milk from cows that received the feed containing mixture of dried herbs were characterised by a higher content of crude protein and casein compared to the control raw material. Additionally, milk from the cows that received the herbal mixture was distinguished by a higher level of TAS. However, yoghurts produced on the basis of experimental milk were characterised by a higher antioxidant activity in comparison with the yoghurts based on the control milk. They also had a higher nutritional value.

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Keywords: cow, herbal mixture, milk, feeding, antioxidant potencial, yoghurts.

INVESTIGATION OF PROBIOTIC POTENTIAL OF BACILLUS SPP. ISOLATED FROM THE SOIL AND DIGESTIVE TRACT OF FISH

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ABSTRACT

Bacillus species are gram-positive, aerobic, rod-shaped and endospore-forming organisms. An important group among *Bacillus* species is probiotics (e.g *B. subtilis* and *B.clausii)* which have beneficial effects on health. Especially in extreme environmental conditions, spores produced as a long-term survival tool have enabled the evaluation of *Bacillus* as probiotics. The aim of this study is to identify *Bacillus* species isolated from various sources to determine their properties and to evaluate their probiotic properties. For this purpose, firstly, Polymerase chain reaction (PCR) test was applied to *Bacillus* isolates and identification process was carried out through 16S rRNA genes. To determine the technological properties of isolates belonging to the genus *Bacillus*, their growth at different temperatures, different salt concentrations and different pH degrees were examined, and esculin hydrolysis, starch hydrolysis, nitrate reduction, gas formation from glucose tests were also carried out. For the probiotic potential of *Bacillus* isolates; in vitro tests such as bile tolerance, cell surface hydrophobicity assay, antibiotic susceptibility test, hemolysis and lecithinase detection were conducted. The findings showed that various *Bacillus* species isolated showed good growth at 30 and 40°C. Growth at 10% salt concentration also showed that these species can tolerate high salt concentrations. The isolates showed the best growth between pH 6 and pH 8. It was found that the isolates do not produce gas from glucose but all the bacterial strains could hydrolyze esculin and starch and utilize catalase. While all *B. subtilis* isolates were able to reduce nitrate, *B. coagulans* isolates were generally unable to reduce nitrate to nitrite. It is observed that the best developments in bile salts of *Bacillus* strains are in media containing 0.3% and 0.5% bile salts. Although the antibiotic susceptibility of the obtained isolates varies according to the types, when examined in general, it was observed that the strains were found to be susceptible and they were more sensitive especially to tetracycline and amoxicillin.

Keywords: Bacillus, probiotic, biochemical, PCR, antibiotic susceptibility.

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EXTRACTION OF PHENOLIC COMPOUNDS FROM FENUGREEK SEEDS USING DIFFERENT EXTRACTION TECHNIQUES

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ABSTRACT

Food materials having biomaterials such as polyphenols and flavonoids have great importance for both food industry and consumers. *Trigonella-foenum graecum* (fenugreek) is a plant known with its medicinal properties. Fenugreek seeds are the most used parts of the plant having high amount of phenolic compounds. Thus, in this study, extracts rich in phenolic compounds were obtained from fenugreek seeds using different extraction techniques such as Soxhlet, maceration and ultrasonic-assisted extraction. Moreover, the effects of the different solvents such as ethanol, methanol, ethyl acetate, hexane and distilled water or their mixtures and fenugreek seed:solvent ratios on total phenolic compounds, total flavonoids and antioxidant activity of the extracts were investigated. Results showed that the highest antioxidant activity was obtained with 50% mixture of ethanol and distilled water for the maceration, whereas the extracts obtained using hexane and ethyl acetate had the lowest antioxidant activity values. Among all extraction techniques, ultrasonic-assisted extraction gave the best results. 16.96 mg gallic acid/g dry sample of total phenolic compounds, 11.82 mg quercetin /g dry sample of total flavonoids and 5.52 mg Trolox/g dry sample of antioxidant activity were achieved at the conditions of 55% ultrasonic amplitude, 60 minutes of extraction time and 50% solvent mixture of ethanol-distilled water.

Keywords: Fenugreek seeds, ultrasonic-assisted extraction, ultrasonic amplitude, phenolics, antioxidant activity.

EXTRACTION OF INULIN FROM TOPINAMBUR AND COLOR IMPROVEMENT IN INULIN WITH ION EXCHANGE RESINS

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ABSTRACT

Today, the increasing trend towards natural foods and consumers' expectations that foods are both nutritious and beneficial for health have given the food industry a new direction. Due to the prospect of consumers, the use of natural additives in the food sector has gained importance in recent days. The most commonly used additives in the food and supplement industry are sweeteners (Carocho, M., 2017). Inulin, known for natural sweetener, is a functional ingredient with nutritional values and technological benefits in food combinations. Inulin is found in many fruits and vegetables. Thanks to its similarity to the technical features of sugar and glucose syrup used in the food industry, inulin improves organoleptic properties and aftertaste (Franck, A.,2002). At the same time, many studies have been carried out on inulin recently. Although it is known as a sweetener, its use in the pharmaceutical industry has gained importance as it has been reported to increase prebiotic activity in recent studies (Kolida, S. et.al., 2002). Franck, A., (2002) study mentions that it is possible to obtain inulin from Jerusalem artichoke in an industrial sense (Franck, A.,2002). Jerusalem artichoke contains between 18% and 27.2% dry matter and total sugar between 68.6% and 82% by dry matter. Inulin constitutes a large amount of this sugar content, at the same time, other sugars in its content are sucrose, fructose, and glucose, according to their amount. Another significant component of Jerusalem artichoke is the glycine amino acid. There is an average of 322 mg of glycine amino acids in 100 g of jerusalem artichoke (Wang, Y et al., 2020). Studies on the extraction of pure inulin from Jerusalem artichoke with differences in extraction methods are continuing. This study aims to extract inulin from Jerusalem artichoke and improve the color of the obtained inulin. In the study, LSF904 (sunresin) and deionization systems were used in the purification and separation stages. According to the results, 169% improvement was achieved in the deionization method compared to the use of LSF 904 system in inulin extract color. At the same time, 3% inulin losses were observed in the deionization system compared to the use of the LSF 904 system. When the color results and the amount of inulin are evaluated, the color improvement has been achieved and it is thought that the 3% loss in the use of the deionization system can be ignored.

Keywords: Jerusalem Artichoke, Topinambur, Inulin, Purification, Color Improvement.

EVALUATION OF QUALITY OF BUTTER PRODUCED FROM CREAM AND YOGURT DURING STORAGE

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ABSTRACT

Butter samples produced from cream (industrial) or yogurt (traditional) were evaluated for fatty acid (C4 – C18:3) composition focusing on the *trans* isomer. Samples were evaluated over 1st and 30 d of storage by moisture, total acidity (lactic acid), peroxide value and total lipid. The lactic acid content varied from 0.17 to 0.18 g.100 g–1 for industrial and 0.02 to 0.12 g.100 g–1 for traditional butter samples. The peroxides value levels varied from 0.90 for industrial to 1.44 meq.kg–1 for traditional in 30 d of storage. The moisture content varied from 16.21 to 13.19 and 13.83 to 13.57 g.100 g–1 and the total lipid content varied from 77.5 to 79.5 and 83.0 to 83.5 g.100 g–1 for industrial and traditional butter samples, respectively. The levels of saturated, monounsaturated, polyunsaturated fatty acids and total *trans* isomer varied from 62.81 to 69.99, from 3.50 to 3.57, from 2.44 to 2.81 g.100 g–1 and from 1.21 to 1.08 g.100 g–1for traditional and industrial butter samples, respectively.

Keywords: yogurt butter, cream butter, peroxide value, fatty acids, storage.

SENSORY CHARACTERIZATION OF BUTTER AS AFFECTED BY PRODUCTION TECHNOLOGY

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ABSTRACT

Butter samples produced from cream (industrial) or yogurt (traditional) were evaluated for sensory properties focusing on the instrumental color assessment. Samples were evaluated over 1st and 30 d of storage appearance, aroma, consistency, texture and taste. The *L, a, b* values were significantly ($P<0.05$) influenced by the technological process. These values for industrial butter varied from 56.55 to 58.67; 1.28 to -0.06; 34.87 to 36.15 and for traditional from 75.87 to 65.83; -10.24 to -6.78; 42.34 to 39.01, respectively. The appearance value levels varied for industrial varied from 4.17 to 3.67 and for traditional the value from 5 was the same during storage. The other sensory properties were also significantly differ depending from the production technology processes. The results showed that the use of traditional manufacturing process of butter from yogurt, which affected the sensory properties and instrumental color values. The highest overall acceptability scores were given to the traditional butter samples at the end of storage.

Keywords: yogurt butter, cream butter, instrumental color values, sensory properties, storage.

THE EFFECT OF ADDITION ARTICHOKE BRACT POWDER ON THE PHYSICAL AND RHEOLOGICAL PROPERTIES OF WHEAT FLOUR

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ABSTRACT

Evaluation of nutritionally and functionally valuable by-products is important in terms of both food enrichment and economic gains. The stem and bract parts make up about approximately 60% of the total weight of the artichoke plant (*Cynara scolymus L.*). These parts are discarded and not used in the food industry. In this study, artichoke bracts were dried and ground as powder and added to the wheat flour at various rates (0 - 2.5 - 5 - 7.5 - 10%) to improve and enrich some nutritional and rheological properties of wheat flour. In the study, the addition of artichoke bract powder to wheat flour increased the ash content of the flour mixtures and decreased the Zeleny sedimentation and falling number values. It was observed that addition of artichoke bract powder significantly decreased the L* (lightness) color value compared to wheat flour and increased the b* (yellowness) value significantly ($p<0.01$). The addition of artichoke bract powder to wheat flour increased the water absorption capacity and dough development time of doughs. While the addition of artichoke bract powder significantly ($p<0.01$) increased the stability time of the dough compared to wheat flour; this value decreased as the amount of added artichoke bract powder increased. While the addition of artichoke bract powder increases the resistance of the dough; it significantly ($p<0.01$) decreased its extensibility and elasticity. As a result, it was determined that the energy values of the doughs also decreased. At the end of the study, it was determined that the addition of artichoke bract powder affected and improved various physical and rheological properties of wheat flour. The addition of artichoke bract powder up to 5% was found acceptable in terms of the rheological properties of the dough.

Keywords: Artichoke bract powder, Food by-products, Fortification.

STATISTICAL ANALYSIS ON THE PHYTOTOXIC EFFECTS OF NONIONIC SURFACTANTS (BRIJ-35, BRIJ-76, TRITON-X-405) ON WHEAT (TRITICUM AESTIVUM L. CV. PEHLIVAN)

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ABSTRACT

In this study aimed to investigate the phytotoxic effects of different solutions of three nonionic surfactants. These were polyoxyethylene (23) lauryl ether (C12E23) (Brij 35) and polyoxyethylene (10) stearyl ether (C18E10) (Brij 76) and the octylphenol (OP)-type surfactant 2-[4-(2,4,4-trimethylpentan-2-yl)phenoxy]ethanol (Triton X-405). The effects of these surfactants on the root elongation of wheat (Triticum aestivum L. cv. Pehlivan) have never been examined before. We tested them at concentration ranges of 1.00, 0.50, 0.25, and 0.12 g/L (w/v). ANOVA principal component analysis (PCA) was done, and SPSS-20 and XLSTAT software were used to evaluate the data. The ANOVA analysis revealed a significant difference between germinated seeds of wheat treated with Triton-X-405, Brij-35 and Brj-76 solutions in terms of root elongation ($p<0.05$). We also found a significant difference between the wheat seeds treated with different surfactants at the same dose for 1%, 0.5% and 0.12% in terms of root elongation ($p<0.05$). The PCA revealed that the most effective factor on root elongation explained 22.17% of the total variance. Brij-35(1%), Brij-76(1%) and Brij-76(0.50%) doses were found to have moderate positive load values, while Brij-35(0.50%) was found to have moderate negative load values. Brij-35(0.12%) was found to have weak positive load values. As surfactants have both positive and negative effects, it is key to choose the suitable surfactant with the maximum benefits and minimal toxicity for the purpose of use.

Keywords: Nonionic surfactant; phytotoxic effect; root; stimulatory effect; Triticum aestivum; wheat.

INVESTIGATION OF ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES IN SUNFLOWER SEEDS

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ABSTRACT

Oil varieties of sunflower (*Helianthus annuus* L.) are widely grown in the world and in our country. In some countries, it is known that in addition to oily species, varieties rich in nutrients are also grown as food additives and as snacks. In our country, studies on sunflower seeds in the agricultural, industrial and scientific framework have generally focused on oily varieties. In this study, the population of the confectionery wild and hybrid species grown in our country were analyzed in terms of antioxidant and antimicrobial potentials, and it was determined that the nutritional quality did not decrease in hybrid cultivars with increased agricultural yield. The analyzes of the samples were made separately in the kernel and shell parts, and the potential of bioactive components in the confectionary sunflower seed was revealed. Considering the agricultural potential in our country and the increasing importance of sunflower seeds in nutrition, health and diet, it is thought that the development of varieties that emphasize quality criteria related to nutrition along with agricultural yield criteria will be beneficial in all aspects.

Keywords: Confectionary sunflower seed, Antioxidant, Antimicrobial, Bioactive potential.

DETERMINATION OF PHYSICO-CHEMICAL AND SENSORIAL PROPERTIES OF FUNCTIONAL KAVILCA FLOUR YOGURT

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ABSTRACT

It was aimed to examine the production and acceptability of yoghurts enriched with Kavılca flour in this study. For this purpose, yoghurts were produced using different concentrations of [1.5% (A1), 3% (A2) and 4.5% (A3)] kavılca flour-milk compositions and stored at 4°C for 21 days. The pH, titration acidity, serum separation, viscosity, colour values and sensory properties of yoghurt samples on the 1st, 7th, 14th and 21st days of storage were investigated. It was found that the pH values of yoghurt samples decreased and acidity values of samples increased with the addition of kavılca flour. As the content of Kavılca flour increased, there was a decrease in serum separation. Serum separation values of yoghurt containing 4.5% Kavılca flour during storage were lower than the control sample ($p<0.05$). Viscosity (20 rpm) values were affected by both the addition of kavılca flour and storage period. In this study, the effect of adding kavılca flour to yoghurt samples on colour values (L*, a*, b*) was found to be statistically significant ($p<0.01$). Kavılca flour additive the determined L* value, caused a decrease in the whiteness value. In addition, the value of a* was found to be positive on the 14th and 21st days of storage in the samples with the addition of Kavılca flour. As the amount of kavılca flour added to the yoghurts increased, b* value increased regularly. There was a decrease in the appearance scores of the samples, on the other hand when the general acceptability scores were examined, it was determined that the panellists received high scores. In the light of the data obtained from the study results, it was concluded that by adding kavılca flour to yoghurt, it can be given a functional feature, and considering the sensory properties, it can be recommended to use kavılca flour in yoghurt production.

Keywords: Kavılca flour, functional food, yoghurt.

QUANTITATIVE TRAIT AND QUALITATIVE TRAIT-A SMALL COMPARISON

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ABSTRACT

DNA extraction is important for finding quantitative traits. It is major concern for finding genes of our generation. So, that we are interlinked with past, present and future (D. Falconer, 2006). Quantitative traits are more interlinked than qualtitative traits. Qualitative traits are representing simple traits like colour, luster, nodes, internodes etc. that is visisble by eyes only (Ph. D. Thesis Dipika, 2017). The correlation amongst the volume attributes indicates that plant height and number of branches were in positive direction and they were helpful and advantageous for improvement in volume. Path analysis indicated the importance of volume contributing characters like plant height followed by girth, leaf area, dry weight of leaves and number of branches which had directly and indirectly influenced all the correlations of volume with its components. Thus it is concluded that selection pressure can be exercised on the genotypes possessing more plant height and more number of branches that would be useful in identifying the genotypes as parents for further improvement in teak. Hence these characters may be given consideration while making selections for the improvement of teak (Dipika *et al.* 2014.).

Keywords: DNA extraction,teak, quantitative trait, quality trait.

THE RISKS AND THREATS FOR THE BENI SALAH FOREST IN EL TARF STATE (NORTH-EAST ALGERIA), IN THE ABSENCE OF SUSTAINABLE DEVELOPMENT MECHANISMS

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ABSTRACT

Source of remarkable biodiversity, forests are an important environment that harbors various living beings, food and economic resources for human populations, which was affirmed by the New York Declaration in 2014 and the United Nations Program for the development in its 15th protection objective. Our study aimed to establish an ecology diagnosis of the Béni Salah forest (wilaya of El Tarf - Algeria) through the analysis of field information and statistics gathered from concerned institutions. Thus, the data collected revealed that this forest, whose area exceeds 17,000 hectares, covers 9,188.13 ha of woods and 798.68 ha of agricultural land. Despite all forms of protection and development projects, it is in a state of degradation which threatens its ecological equilibrium, its biological diversity and its economic value, especially for the production of cork which changed from 5,307 quintals in 2009 to around 476 quintals in 2019, due to fires and overgrazing. A strategy of protection and sustainable development should be put in place in view of the countless inventoried wealth such as medicinal and aromatic plants in an investable area of over 2,750 hectares, not forgetting the ecological and cultural tourism that this forest conceals through the many existing archaeological sites and monuments.

Keywords: Béni Salah; Forest; El Tarf; Risks; Sustainable development.

TRADITIONAL SHAPING AND POLLARDING GRAZING IMPACT ON SOIL FERTILITY OF DIMORPHIC ASH TREE (FRAXINUS DIMORPHA)

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ABSTRACT

This study targeted valuating the impact of shaping and pollarding grazing as two traditional ecological knowledge practices used by indigenous inhabitants of Ait Mhamd region, Azilal, Morocco, on the dimorphic ash tree (*Fraxinus dimorpha*) soil qualities. These practices increase *F. dimorpha* growth, strength and production. For this, abiotic and mycorrhizal variables of four soil types from the study region were evaluated and compared. Three rhizospheric soils (Rs) of three *F. dimorpha* morphotypes were collected: shaped with anastomosis (An), multi-stemmed (Na), multi-stemmed located in a public forest under national forestry service management (Fo). The fourth soil was a non Rs that represented the control (Nr). Statistical analyses ANOVA, correlation and PCA were performed to check for variances difference, linear relationship and to emphasize variation. Results showed an important and significant difference between 'An' soil properties from the other soil types. 'An' had significantly higher phosphorus, nitrogen and carbon levels, and higher mycorrhizal status than the other soil types. 'An' had x6 phosphorus (P), x5 total nitrogen (TKN), x2 total carbon (TOC) and x6 spores density of 'Nr', and showed 37% more mycorrhization intensity than 'Fo'. 'Na' had x3 P, x3 TKN, 65% more TOC and x3 spores density of 'Nr' and showed 12% more mycorrhization intensity than 'Fo'. 'Fo' had x2 P, x3 TKN and 58% more TOC contents and x2 spores density of 'Nr'. It was concluded that shaping had a positive impact on the soil characteristics of the studied species.

Keywords: Fraxinus dimorpha, soil chemical characteristics, mycorrhizal variables, Traditional Ecological Knowledge, anastomosis, grazing, forest.

ENDEMIC AND RARE FLORA IN THE CHREA NATIONA PARK IN NORTHERN ALGERIA

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ABSTRACT

In Algeria, cork aok (*Quercus suber* L.) ecosystem houses characteristic plant groups and species of great heritage value. The objective of the present work is to analyse the diversity of endemic and rare flora in the cork aok woods of the Chrea National Park. This study was based on collections and field visits (2015–2016), with an analysis of its composition and species diversity. The research was also guided by the bibliographical data to find the endemic and rare plant cited for the region. The floristic analysis allows compiling a list of 213 plant taxa belonging to 50 families. Biogeographical analysis shows that Mediterranean taxa represent 66%, followed by European 17%, widely distributed taxa 10%, and 7% Endemic. This last category is represented by 14 species, of which 4 are endemic to Algeria, 3 of Algeria-Tunisia, and 7 of North Africa. The study also identified 7 rare taxa, and 2 threatended (protected) taxa. In the face of growing threats, especially wildfire and overgrassing, it is urgent to reinforce national policies of conservation of endemic and rare flora in the cork aok ecosystem of Algeria.

Keywords: endemic taxa, rare taxa, cork aok, conservation, Algeria.

A FOREST POLICY EVALUATION OF MEETING THE RAW MATERIAL DEMAND IN FOREST PRODUCTS INDUSTRY FROM NATURAL FORESTS

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ABSTRACT

After the 1970s, the energy demand for wood has increased, all over the world. After the 1990s, with the effect of increasing population, sustainability of forest resources has become crucial. According to The State of the World Forests Report by FAO and UNEP (2020) the world's forests have decreased 4.74 million hectares in the last 10 years. The aim of this study is to evaluate the effect of meeting the raw material demand for wood from our natural forest resources in Turkey. Today, 11.8 million m3 of raw material is needed for the 21 Particle and Fibre Board enterprises in Turkey. The country has 22.9 million hectares, 1.7 billion m3 of forest assets. Raw material demand for wood is met by two different methods: importation or production. Although the need for raw materials is increasing day by day, it is seen that the import value has decreased from 1.5 billion dollars to 440 million dollars in the last 7 years, while the export value has increased by 250 million dollars. In the same period, the amount of industrial wood, produced by Turkey by using local resources, has increased by 11 million m3. In order to meet this demand, our state forests are seen as the first choice due to the high costs of import. Having this policy has two possible consequences. It causes a decrease in the number of species in mixed forests. The fact that the wood production capability of Turkey's forests is not sufficient to meet all the needs causes the future of our forest assets to be endangered.

Keywords: wooden raw material, forest policy, forest resources management, forest industry.

VERTICAL LINKAGE IN TIMBER PRODUCTION: A CASE STUDY IN TUYEN QUANG PROVINCE, VIETNAM

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ABSTRACT

Vertical linkage between woodworking companies and local forest plantation communities is the best development direction for wood processing industry. Timber production has been significantly contributed to the poverty reduction and rural livelihoods at Tuyen Quang Province, Vietnam in recent years. By using descriptive analysis to explore the role of vertical linkage in timber production to the rural development in Tuyen Quang, the results have shown that vertical linkage both helped wood enterprises to ensure input resources for producing in a long-term and provides growers with better market information concerning timber demand, reduce risks and gain higher income from forest. This linkage model should be replicated in the forest plantation community because it not only brings benefits to the parties but also improves the local ecological environment protection.

Keywords: Forestry, Rural Development, Timber Processing Company, Timber Grower, Vertical Linkage.

SEASONAL EFFECT OF THE NORMALIZED DIFFERENCE VEGETATION INDEX OF CHETTABA FOREST (CONSTANTINE).

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ABSTRACT

A remote sensing approach is increasingly used by scientists in the study and monitoring of vegetation changes. The normalized difference vegetation index (NDVI) has been used extensively to do this. In this study, we have tried to characterize the NDVI vegetation index of 24 points of holm oak forest Chettaba, which is located southwest of Constantine (Algeria) from Landsat 8 satellite image data for each month of two seasons (winter and summer). The objective is to try to discriminate the seasonal variations of the year 2019-2020 on the behavior of holm oak. The comparison of the values of the Normalized Difference Vegetation Index (NDVI) in holm oak was carried out using the analysis of variance with a fixed criterion. The statistical results obtained from the NDVI of the 24 points indicate that the maximum value is recorded in winter in the month of December, while The lowest values are observed in summer in the month of June when the species studied is exposed to periods of high temperature, sunshine and lack of rain. Thus, the holm oaks undergo a thermal stress in summer, which causes the yellowing of their leaves and therefore a decrease in the normalized difference vegetation index.

Keywords: holm oak, NDVI, Landsat 8, seasonal behavior.

DEMOGRAPHIC STRUCTURE AND SPATIAL DISTRIBUTION OF OAK TREES IN THE OULED BECHIH FOREST (EAST ALGERIA)

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ABSTRACT

The establishment and interpretation of diameter and height structures are essential for forest management decisions. The objective of this study is to describe the effect of altitude on the diameter structure, height structure and spacing factor of *Q. suber* and *Q. canariensis* populations in the Ouled Bechih state forest (Eastern Algeria). Dendrometric parameters such as diameter at 1.30m from the ground and total height of cork oak and zeen oak individuals were measured on 4 plots of 900m2 (30m×30m). The diameter and height structures were fitted to the theoretical Weibull distribution. According to the Weibull fit test, the Ouled Bechih forest is characterized by a stand dominated by large-diameter individuals, which translates into low regeneration of the species. Small diameter individuals are almost absent in the different stands studied; thus, the silvicultural analysis provided knowledge on the spacing between trees which is high and marked by the high intensity of a thinning. Finally, this state will constitute a reference for future monitoring results and decisions for foresters in the framework of management.

Keywords: Diametric structure, spatial structure, demographic structure.

SANITARY DIAGNOSIS OF ALEPPO PINE TREES USING THE ARCHI METHOD IN CHETTABA FOREST (ALGERIA)

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ABSTRACT

The study presented aims to establish the state of the forest of Chettaba by a diagnosis on 4 forest plots. A first assessment of the health of the crowns is carried out by the ARCHI method, this method is based on a morphological analysis of all the aerial part from the observation. The main objective of this work is to know the health status of the Chettaba forest massif (located in the North-East of Algeria). Knowledge of the architecture of trees of a large number of species has enabled the transposition of these notions to forestry technicians and has led to the implementation of observation protocols to establish a diagnosis of the architecture giving indications on the level of stress suffered by the tree, to establish its reactivity and therefore to propose a prediction of the evolution of its architecture. The keys integrate three series of observations: the sequential structure established during growth, which provides information on the development stage of the tree, the symptoms of degradation, the architecture of the tree crown (mortality, depletion of the branching) and finally the processes of restoration of the crown resulting essentially from the development of epicormic twigs. The results obtained indicate that the two dominant ARCHI types are ARCHI I and ARCHI S. The nominal values were observed in the ARCHI I and ARCHI S types, then the minimum values are recorded in the ARCHI R and ARCHI D types. The highest value is recorded to ARCHI I and ARCHI S with percentages of 42.12 and 41.04% respectively while the healthy ARCHI type is low with the value of 23.76%. These results contribute to the improvement of knowledge on current condition indicators of natural *Pinus halpensis* stands that can be used as a basis in the management of Chettaba forest. The diagnostic results show that the majority of trees are subject to climatic, pedological and anthropogenic stresses and their health status is quite low.

Keywords: Tree diagnosis, Aleppo pine, ARCHI, decline.

SANITARY SITUATION OF THE MACHROUHA FOREST (ALGERIA)

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ABSTRACT

The Machrouha forest (Algeria) is used for forestry and ecotourism. This forest is made up of several silvicultural species (*Quercus suber* and *Quercus canariensi*s) spanning an area of 16.448 ha. This work aims to assess the current state of health of this forest. 4 plots were chosen at random for this study. The dendrometric data measured on the sample trees are used to characterize the structure of this forest; thus, information collected on the same samples is analyzed using ARCHI methods which are based on a reading of the architecture of the trees. The diagnostic results show that the majority of the trees in these plots are currently in a healthy state, a minority are stressed or resilient by various natural and anthropogenic factors and an average biodiversity. Therefore, the health of the forest is good and is classified as a viable ecosystem. But these potentialities are insufficient: pressures must be reduced and better conservation of the ecosystem is ensured. To this end, the present study suggests development primarily through silvicultural interventions promoting the regeneration of these two species and including a permanent ecological monitoring system. The latter makes it possible to frame all the interventions.

Keywords: Quercus suber, Quercus canariensis, structure, ARCHI.

STRUCTURAL CHARACTERIZATION OF THE MACHROUHA FOREST (EAST-ALGERIA)

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ABSTRACT

The objective of our study is to collect data concerning the current ecological state of the Machrouha forest (East-Algerian) and the woody resources in order to establish a forest reference state. The methodology adopted allows the knowledge of quantitative data relating to these resources from the dendrometric parameters collected on 4 plots of cork oak (Quercus suber). The various analyzes carried out indicate an average level of viability for this species. This level of viability is related to the quality of the stands which are moderately stable; the mortality and regeneration rates are low. The relative density of the stand is too high in plot P1 with 256 trees / ha and on the other hand, plot P3 has a very low abundance with 22 trees / ha. The basal areas of cork oak are significantly different at the plot level; plot P4 has the highest average, which is 50.40 m2 / ha. The average slenderness ratio is 21.95 in the 4 plots. The variation of H/D is irregular; this finding suggests that the slenderness ratio is a function of the average diameter and therefore the age of the stand. Indeed, this work constitutes a database for the forest but it represents only one of the facets to be taken into consideration in order to protect and restore it.

Keywords: *Quercus suber*, dendrometric parameters, slenderness ratio, viability, ARCHI.

EFFECT OF HIGH TEMPERATURES ON THE ADAPTATION CEDRUS ATLANTICA

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ABSTRACT

Climate change in the Mediterranean region is the cause of physiognomic variations in forest ecosystems. This pathology manifests itself in the form of the thermal constraints that trees undergo in their natural range, affecting their growth and productivity. The most disastrous consequences are the risk of displacement of their biogeographical ranges. This work focuses on the adaptation capacities of Atlas cedar (*Cedrus atlantica*) to thermal variability using biochemical markers (proline, soluble sugars and chlorophyll). Seedlings, raised in a nursery, were subjected to a short-term stress of 3 hours at a temperature range between 35°C and 50°C. Soluble sugars are closely related, with a decrease in their content in stressed seedlings. Proline accumulation is positively correlated with warm temperatures and reaches its maximum at 50°C. High temperatures induce an increase in chlorophyll (a) at 40°C (25%), while a decrease from 45°C onwards of 21.66% is obtained. The most accumulative organs are the roots for proline and the leaves for sugars. The accumulated quantities could be linked to the level of tolerance to thermal stress, contributing to the maintenance of cell turgidity, created by the osmotic adjustment for which proline and sugars are responsible.

Keywords: Keywords: Cedrus atlantica, high temperatures, proline, soluble sugars, chlorophyll.

EVALUATION OF ECOSYSTEM SERVICES OF A PERI-URBAN FOREST IN THE CITY OF ALGIERS

EVALUATION OF ECOSYSTEM SERVICES OF A PERI-URBAN FOREST IN THE CITY OF ALGIERS

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ABSTRACT

Forests provide a significant number of ecosystem services, related to economic, ecological, and social domains as well. The present work aims at evaluating the ecosystem services of the peri-urban forest of Bainem which belongs to the coastal sub-sector. Located at 15 km west of the downtown, the Bainem forest represents the largest green space in the Algiers city .However, throughout its history, it has suffered various anthropic and climatic aggressions resulting in continuous changes of its vegetation cover and land use, which in turn have repercussions on the quality of the services provided by these various components. The objective of this study is to determine the ecosystem services provided by this forest and to map their spatial distribution to enhance better values and to develop them. For that purpose, we conducted phytoecological surveys taking into consideration the ecological diversity of this area. This study was completed by surveys with a questionnaire to scientists and nature managers as a working tool. The results show that this forest contains more than 150 species represented by 50 families including 84 species of known medicinal interest, 29 aromatic and medicinal species, 94 melliferous species, and 29 edible species including 4 mushrooms. In terms of regulation, and lying on relief, this forest protects the whole city located at bottom, against natural hazards such as floods, landslides, erosion, and runoff that can cause material and human damage. In addition, it contributes to climate regulation by reducing greenhouse gas emissions, by absorbing carbon dioxide. With an area of 504 ha composed by different forest ecosystems, this forest can absorb more than 2.2 million kg of total carbon. The full expansion and transformation of Algiers into a large metropolis has an interest in conserving and enhancing of the peri-urban forest of Bainem. Keywords: Ecosystem services, peri-urban forest, aromatic and medicinal plants, carbon sequestration, Baïnem forest.

Keywords: Ecosystem services, peri-urban forest, aromatic and medicinal plants, carbon sequestration, Baïnem forest.

TYPOLOGY AND PRODUCTIVITY OF SOME ATLAS CEDAR STATIONS, CEDRUS ALTLANTICA (MANETTI) IN THE BELEZMA MASSIF (BATNA-ALGERIA)

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ABSTRACT

The productivity of forest stations depends on several general ecological factors, in particular the climate (microclimate), the types of stands and the soils via their humus as well as the silvicultural techniques practiced. Can the influence of the types of forest stations on the productivity of cedar groves constitute a major problem? What would be its relative importance in the functioning of the various forest ecosystems? Methodologically, this study, which required the analysis of dendrometric and pedological parameters, revealed the existence of four types of cedar groves: a calcareous cedar grove, a calcareous cedar -oak grove, a calcicole cedar grove, a calcicole cedar - oak grove. Regarding the influence of site type on the dendrometric characteristics of cedar, it was found that limestone cedar wood exerted the best effect on mean diameter, basal area and volume, whereas the calcicole cedar seems to exert the weakest influence on these same parameters. However, the actions of the calcareous cedar-oak grove and the calcicole cedar seem intermediate. This may mean that the cedars find, under the action of this mixed site, the best conditions for their growth and development. Thus, the humus which results from the evolution of organic matter (litter, pluvio-leachate, root debris) and the pre-existing limestone in the source rocks (dolomite, limestone, sandstone) have formed a very stable and very favorable to the growth of cedar stands; However, it is reported that no cedar station has a particular effect on the height; there is no noticeable difference between the heights of the trees in the different cedar stations, moreover, it is the cedar-oak grove that has the best density of stands; it is possible that the mix of cedar groves has endowed the soils with good organic reserves, satisfactory useful water reserves and thickness which would promote greater plant density. On the sylvo-productive level, the classification of the stations has been established as follows: The calcareous cedar grove> the calcareous cedar -oak grove> the calcicole cedar grove > the calcicole cedar - oak grove.

Keywords: Typology of stations, dendrometric characteristics, a calcareous cedar grove, a calcareous cedar -oak grove, a calcicole cedar grove , a calcicole cedar - oak grove.

ASSOCIATION OF XENOBIOTIC-METABOLIZING GENES POLYMORPHISMS WITH CERVICAL CANCER RISK IN TUNISIAN POPULATION

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ABSTRACT

Host genetic characteristics and environmental factors may play a role in cervical carcinogenesis. The main of the study was to evaluate the association of four xenobiotic-metabolizing genes polymorphisms (*AhR*, *CYP1A1*, *GSTM1* and *GSTT1*) with cervical cancer risk in Tunisian women. The polymorphisms were analyzed in 171 individuals (71 with cervical cancer and 100 healthy controls). We genotyped for the polymorphism in the *AhR* gene by conventional tetra-primer amplification refractory mutation system PCR (ARMS-PCR) and for the *CYP1A1* polymorphism though the conventional PCR-restriction fragment length polymorphism. A multiplex ligation-dependent polymerase chain reaction approach was applied for the examination of the *GSTM1* and *GSTT1* polymorphisms. An association with cervical cancer and xenobiotic-metabolizing genes polymorphisms was found for the homozygous AA genotype in *AhR* (rs2066853; OR = 3.39), for the heterozygous TC genotype in *CYP1A1* (*CYP1A1-MspI*; OR = 3.2). Odds ratios were also significantly elevated for *GSTM1* null genotype and *GSTT1* null genotype (OR = 1.89 and OR = 2.65; respectively). We followed the hypothesis that genes interact to confer genomic-based susceptibility to cervical cancer, and our results showed that for the remaining interactive effect of two gene polymorphisms we noted a significant higher association with cancer risk for individuals with at least one high-risk genotype compared to reference. About the joint effect of three high-risk genotypes, the presence of one or/and two putative genotypes showed a significantly increased risk of developing cervical cancer, and individuals with two high-risk genotypes constantly showed the highest risk of developing cervical cancer using low risk-genotypes as reference. This case-controls study showed that the individuals and combined effects of xenobiotic-metabolizing genes polymorphisms (*AhR*, *CYP1A1-MspI*, *GSTM1* and *GSTT1*) show a considerable association with increased cervical cancer risk.

Keywords: Cervical cancer, Xenobiotic-metabolizing genes, AhR, CYP1A1, GSTM1, and GSTT1.

STUDY OF THE GENETIC PREDISPOSITION TO NASOPHARYNGEAL CANCER IN ALGERIA

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ABSTRACT

Nasopharyngeal cancer (NPC) is a highly invasive and metastatic cancer, and although it is relatively rare in the world, it is particularly prevalent in Southeast Asia and to a lesser extent in Middle East and North Africa countries. NPC has been strongly associated with Epstein Barr Virus (EBV). However, the ubiquity of this virus in the world does not explain the differences in its geographical distribution. Thus, other risk factors have been identified: exogenous (such as dietary nitrosamine intake, occupational exposure to wood or wood waste and tobacco) and host susceptibility factors. The SNP approach is important for understanding susceptibility to disease and pathogenesis, as well as for guiding the choice of treatment and individual treatment. Several studies on the genetic predisposition to NCP have been conducted, focusing for the most part on SNPs located on the HLA system, tumor suppressor genes, the genes of certain metabolic enzymes and DNA repair gene and the genes involved in the immune response. In Algeria, studies on the genetic predisposition to NPC are limited to few studies with small samples of Algerian patients that are merged with other populations. The objective of this study is therefore to provide, in our population, a better knowledge on the genetic polymorphism of genes previously involved in the occurrence of NPC.

Keywords: Nasopharyngeal cancer, Single nucleotide polymorphism, Genetic predisposition.

A SIMULATION STUDY ON THE EFFECT OF LINKAGE DISEQUILIBRIUM ON GENOTYPIC VARIANCE AND ITS ELEMENTS: II- EFFECT OF LINKAGE DISEQUILIBRIUM ON POPULATION PARAMETERS IN A MODEL THAT DOMINANCE AT ONE LOCUS AND ADDITIVE GENE EFFECT AT OTHER LOCUS

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ABSTRACT

In the first part of this study, to numerically demonstrate the effect of linkage disequilibrium on genetic variance and its components one in equilibrium and the other in disequilibrium 2 population were defined for the 2 gene effect models. So, 2*2=4 populations in total are defined and their parameters were calculated analytically using the MINITAB statistical package program. Accordingly, in the case of linkage disequilibrium, dominance deviation are observed at the three allelic locus with additive effects. At the second locus with two alleles, one allele is fully dominant over the other. Accordingly, it can be said that there may be a kind of quasi dominance caused by the linkage disequilibrium. Besides, it is understood that a covariance caused by linkage disequilibrium is effective in genetic variance and its components. In this second part of the study, it was clearly shown that the parameters were affected by the linkage disequilibrium in the population with linkage disequilibrium and full dominance at one locus and additive effect at the other. In the case of linkage disequilibrium, the dominance deviation in the additive locus appears, and the effect of the covariance term on the genetic variance and its components resulting from the linkage disequilibrium was calculated and revealed numerically. In the next studies it is intended to emphasize the sampling distribution of the genetic variance and its components in the samples produced by simulation in the case of linkage disequilibrium.

Keywords: Linkage Disequilibrium, Genetic Variance, Genetic Covariance.

TECHNOLOGICAL CHARACTERS VARIABILITY IN SOME AMARANTHUS SPECIES LEAVES AND SEEDS AND THEIRS HERITABILITY

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ABSTRACT

The genus *Amaranthus* has about 60 species most of which are wild forms, while only a small numbers have been using as ornamental, and forage crops, health care and by which have the basic components of proteins and exceptional nutritional value of both seeds and leaves have been using as vegetable crops, and this genus has potential for daily diet diversification basically an alternative food for Celiac disease. This paper therefore reviews existing literatures on the use of Amaranthus species as sources of food and medicine and nutraceutical properties. In this study four genotypes of amaranth as *A. molleros, A. caudatus, A. mantegazzianus and A. cruentus* were searched and the nutrition value was determined so high; as maximum values the protein content of seeds was 16.55% (*A. cruentus*), in leaves was 20.10% (*A. caudatus*), and the mineral of seeds was 2.73% (*A. moleros*), in leaves was 18.76% (*A. mantegazzianus*) and the oils content of seeds was 6.16% (*A. moleros*). The heritability of the studied characters as protein and mineral content of seeds and leaves, and oil contents of seed were so high. The oil content of the seeds proportion of genetic variance to total phenotypic variance was 72%, and it has significantly impact of ecological factors. Both seed and leaves of *Amaranthus* species can use for sources of protein rich amaranth leafy and gluten-free amaranth seed production studies. And this study may help in further work on *Amaranthus*; separate divergent genotypes may serve as parents for further crossing. Amaranthus can help for vegetable diversification policy for market development.

Keywords: Amaranthus, technological characters, variance, protein, heritability.

MAIN PSYCHOSOCIAL FEATURES IN THE COVID-19 PANDEMIC FROM THE PERSPECTIVE OF PREMENOPOSAL AND POSTMENOPOSAL WOMEN

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ABSTRACT

The peri and postmenopausal period has long been an important requirement in the health sector for the protection and promotion of women's health. Menopause is a transitional period characterized by fluctuating physiological changes that affect the quality of life of many women in the short term, along with long-term changes such as vasomotor symptoms, sleep and mood disturbances, as well as genitourinary symptoms and decreased bone density. Women older than 45 years of age who experience vasomotor symptoms with irregular menses are presumed to be in perimenopause, and those who have not menstruated for more than twelve consecutive months are menopausal. The perimenopausal period includes challenging experiences for women. The pandemic period carries potential concerns. The aim of the study is the Covid-19 pandemic process; evaluation of its effects on women in this period; It was desired to evaluate the necessity of conducting studies in clinical areas to develop basic public health support skills. Our study was carried out with women aged 50 – 65 years who came to Trakya University Hospital Gynecology outpatient clinic between August 2020 and July 2021 for routine control. After evaluating their sociodemographic characteristics; Solution-oriented inventory (DOE) was used. This scale was developed by Grant, Cavanagh, Kleitman, Spence, Lakota, and Yu (2012). The scale consists of 12 items and is filled by the client himself.It is a 6-point Likert type scale (1= strongly disagree, 6= strongly agree). The sub-dimensions of solution-oriented inventory are: Separation from problem 1: 1.,2.,4.,5. Substances, Orientation to the 2nd target: 9.,10.,11.,12. Substances, 3rd. mobilize resources: 3.,6.,7. and 8. 1,2,4,5. Items are reverse scored. It has been found that the scale is a reliable and valid measure of solution-oriented thinking and is associated with perspective-taking capacity, flexibility, and psychological well-being. Examples of items include “setbacks are a real opportunity to turn challenge into success,” “There are always enough resources to solve a problem if you know where to look,” and “Every problem always has a solution.” have such definitions. In our study, it was observed that perimenopausal women avoided coming to health institutions. Vasomotor symptoms were among the complaints that most decreased their quality of life for women, but it was observed that they took a place in the back ranks among the reasons for applying to the hospital. During the pandemic period, it was observed that they had more difficulties in coping with menopausal problems. As the age progressed, the spectrum of finding solutions widened. Health care of perimenopausal women should be kept in mind, as menopause can pose a long-term risk to health. For this reason, healthcare professionals concerned should pay attention to how to create better care for the health of this important part of our population in the midst of the pandemic. For good public health, both in-depth studies in the field of medicine are needed. In addition, the experience of experts with great clinical experience should be examined. On the other hand, it should not be forgotten that perimenopausal and menopausal symptomatic women may delay seeking health care during the pandemic period. It is important to emphasize that this can lead to worsening of pre-existing diseases. Strategies to minimize these problems should be adopted and women should be provided with appropriate guidance to better manage their health.
Keywords: menopause, perimenopause, women's health, elderly health, Covid-19 pandemic.

AN EVALUATION OF YOUNG WOMEN IN THE PERIOD OF PANDEMIC WITH THE BREAST-FEEDING KNOWLEDGE QUESTIONNAIRE; EDIRNE PROVINCE

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ABSTRACT

For women's health, breastfeeding has extraordinary benefits. Breast milk has a high impact on the healthy nutrition and development of children. WHO (2011) reports that "breastfeeding is a unique way of providing ideal food for healthy growth and healthy growth. In addition to having important effects for the development of babies, it is an integral part of the healthy life process. It provides the baby with the necessary vitamins and minerals.It supports the child's immune system.The act of breastfeeding stimulates the proper growth of the baby. Breastfeeding leads to positive reflections for both mother and baby in terms of behavior, speech, and well-being. Studies have shown that; It reduces the risk of chronic diseases such as obesity, high cholesterol, diabetes mellitus, childhood asthma in children. Our study aimed to examine the knowledge and attitudes of young mothers towards breastfeeding. During the Covid-19 pandemic process, breastfeeding and barriers to breastfeeding were examined. Participants consisted of women between the ages of 18 and 38. Those with at least 1 living child who applied to the Trakya University hospital gynecology outpatient clinic were included in the study. Those who were pregnant or suspected of pregnancy were excluded from the study. Face-to-face interviews were conducted with mothers who agreed to participate in the study. The Breast Feeding Knowledge Questionnaire is a scale developed based on WHO and UNICEF breastfeeding recommendations for optimal infant feeding as well as previous research with similar aims used. The validity and reliability of the scale has been proven (Saied[1], Mohamed[1], Suliman, & Al Anazi, 2013). The Breast Feeding Knowledge Questionnaire consisted of 15 items on the benefits of breastfeeding for both babies and mothers. Responses to knowledge questions were categorized as true or false. 1 point was awarded for each correct answer. The total score was calculated by summing the individual scores of 15 knowledge questions ranging from 1 to 15, the higher the score, the higher the knowledge. The study showed that; participants had a good knowledge of the benefits of breastfeeding for infant and maternal health. The outcome of this study was twofold; Breastfeeding attitudes and knowledge among young women were evaluated and the barriers to breastfeeding during the pandemic were tried to be determined. The most women; She had a positive attitude towards breastfeeding. However, there were many obstacles to breastfeeding during the pandemic period. The first of these is when there is a problem with breastfeeding, when they have mastitis or when they want to get milk increasing support; They were afraid to go to the hospitals. Apart from this, their motivation for breastfeeding was low, since they stayed outside for a long time and their participation in social activities was minimized. Another issue was nutrition. During the pandemic period; stated that their fluid consumption decreased as their mobilization decreased. As they were worried about weight gain during their stay at home, they also limited their nutrition. Health professionals must actively work with women to overcome these barriers. It is important to run an awareness campaign to make women aware of the importance of breastfeeding. Studies should be developed on how to overcome breastfeeding and barriers to breastfeeding during the pandemic.

Keywords: Breastfeeding information questionnaire, Women's health, Lactation, Breast milk, Breastfeeding knowledge level, Breastfeeding attitude.

THE USE OF BEE VENOM IN AUTOIMMUNE NEUROLOGIC DISEASES

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ABSTRACT

The body's switch to defense against building blocks found in its structure, as if there were an external attack, causes autoimmune neurological disorders. Alternative medicine methods have been devastated among physicians in contemporary medicine because to a lack of evidence-based data, despite the fact that they have been utilized worldwide for disease prevention and treatment from the past to the present. Apitherapy, which has been widely discussed in the last decade as an alternative medicine application, not only relieves pain, but also strengthens the immune system with its composition. Apitherapy, which has been widely discussed in the last decade as an alternative medicine application, not only relieves pain, but also strengthens the immune system with its composition. In addition, apitherapy can be used as a complementary treatment for diseases related to both the immune system and the neurological system. Although it was first used in chronic degenerative diseases such as Parkinson's and Alzheimer's, it has been widely tested in autoimmune diseases that have become much more common in recent years, and reviews describing its effectiveness have been published. While bee venom isn't the only treatment option for these ailments, research has shown that decoction can help boost the immune system and relieve some symptoms. Studies have shown that inflammatory, a type of germ-free decontamination of inflammation, is one of the main modes of action of bee venom. This action is considered to be beneficial in the treatment of neurological disorders caused by inflammation, such as MS, Adam, and Lyme disease. There hasn't been a comprehensive study or Cochrane review that shows bee venom's decontamination efficacy in neurology practice. In this study, we present a review that explores the indications for bee venom injection in the field of Neurology, as well as perspectives on evidence-based medical data.

Keywords: Bee venom, Parkinson, Alzheimer, MS, Adam, Lyme.

LEVEL OF KNOWLEDGE AND AWARENESS OF UNIVERSITY STUDENTS ABOUT THE CORONAVIRUS PANDEMIC (COVID-19); AN ASSESSMENT FROM EDİRNE PROVINCE

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ABSTRACT

During the pandemic, stress is caused by the imbalance between the individual's perception and external environmental demands. Studies have shown that psychological stress is closely related to anxiety, depression, and physical conditions such as cardiovascular diseases and cancer. Psychological stress reflects a subjective assessment of one's ability to cope with demands. People experience stress when they perceive that their resources are insufficient to cope with a situation. Students at universities face many stressors, including the volatile environment, lifestyle changes, academic burdens and interpersonal relationships, all of which can lead to significant psychological dysfunction. In particular, they are vulnerable to the stress that most university students in developing countries have to cope with, for themselves and their families, to fight the Covid-19 infection. Indeed, studies in developing countries; It has been shown that university students have high levels of stress and depression due to the Corona pandemic. Permission for the study was obtained from the Scientific Research Platform of the Ministry of Health of the Republic of Turkey. The sample of this descriptive cross-sectional study consisted of 141 undergraduate health science students from Trakya University in the north west region of Turkey. The study was conducted April 2021 to July 2021. The age range of the students was 18-28 years. University students were selected for this study because they constitute a well-educated sector of society. Acceptance or understanding the importance of Covid-19 is easier for educated individuals. The sociodemographic characteristics of the university students were evaluated. Health sciences university students, from the perspective of the Turkish cultural context; we identified the stress levels that have been elevated due to Covid-19. In addition, from the high perceived stress levels due to Covid-19, which is associated with anxiety and depression; We have seen that school success is negatively affected in university students. Many issues related to health science students have been discussed many times in the literature. However, our current research in a goal-oriented context; "students who will work with infections and may even encounter new pandemics"; self-regulation and an approach that jointly develops the solution.

Keywords: developing country, Coronovirus pandemic (COVID-19), university students.

PROSPECTIVE EVALUATION OF FACTORS ASSOCIATED WITH ARTERIOVENOUS FISTULA PRIMARY FAILURE AND COMPLICATIONS IN HEMODIALYSIS PATIENTS: A SINGLE CENTER-STUDY

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ABSTRACT

Aim: The objective of this study was to analysis factors affecting arteriovenous fistula patency, to improve access outcome.Methods& Patients: Patients (n=290) were enrolled in our prospective observational study. Demographic, clinical, and operative variables were compared between those with and without NAVF function loss. In addition, we evaluated the distribution and complication of NAVF and its association with different factors. All statistical analyses were performed with the use of appropriate SPSS software package, version 24.0.Results: We found 96.5% (n=280) of patients had NAVFs, among them 67.9% (190/280) of patients had upper NAVFs, followed by lower NAVFs 32.1% (90/280), while 3.4% (10/290) of patients had depended on a cuff catheter. The most frequent complication post NAVF creation was thrombosis (11.4%), followed by noninfectious fluid collections (9.3%), infection (6.4%), Limp edema (4.3%), Aneurysmal degeneration (3.2%), arterial steal syndrome (2.5%) and venous hypertension (1.8%). History of dialysis catheter used AVF location and absent intraoperative thrill were independently associated with loss of NAVF primary patency. There was a statistically significant increase in the number of steal syndrome in patients who had diabetes mellitus (P value= 0.021) and in patients who had age >65 years (P value 0.002), while female gender was not (P value= 0.122). History of catheter used (P = 0.02), previous AVF procedure (P= 0.01), and present of non-infection fluid (P = 0.00) were found significantly increase the infection rate of NAVF.Conclusions: Identifying risk factors affecting AVF patency is crucial. Early and timely treating complications post AVF is essential for proper management and maturation.

Keywords: Hemodialysis access, Native arteriovenous fistula, Complication, Risk factors.

MECHANICAL PROPERTIES OF BORON REINFORCED TEXTILE COMPOSITE

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ABSTRACT

Thanks to the developing technology, composite materials and their usage areas have made a great progress. Besides, in this study, usage areas of composite materials are tried to be associated with the materials esed. Composite materials which are evaluated advenced technology materials have been being used in so many different fields. They have such features as high strenght, high elasticity module, low density, high fatigue strenghty, thermal conductance, electrical conductivity, aesthetic appearance, lightness and corrosion resistance. While there are too many searches related to composite materials, it is an undeniable fact that the number of searches related to boron reinforced textile composite materials are highly limited. Therefore, in this work, general information has been presented on composites and composite textiles and mechanical properties of boron reinforced textile composites have been emphasised.

Keywords: Key Words: Composite, Boron Reinforced Textiles, Composites, Boron Reinforced Textile Composite Materials, Mechanical Properties.

SYNERGISTIC INTERACTIONS BETWEEN ANTIBIOTICS AND SILVER NANOPARTICLES BIOSYNTHESIZED FROM VACCINIUM MYRTILLUS

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ABSTRACT

The main aim of the study is to reveal the antimicrobial activity of silver nanoparticles obtained from the fruits of the *Vaccinium myrtillus* plant, which is popularly known as 'blueberry' and used in cancer treatments, in combination with ampicillin and gentamicin. Silver nanoparticles synthesized from *V. mrytillus* and 10% infusion of *V. mrytillus* were combined with ampicillin and gentamicin to reveal their antimicrobial effect against Streptococcus pneumoniae using the minimum inhibition concentration method. The bactericidal effect of silver nanoparticles and antibiotic is dynamically demonstrated depending on the time and antibiotic intensity with the time kill method. At 24 hours post-treatment, detection of synergy, reduction in viable bacterial cell count was observed when the drug combination was compared with only 10% infusion therapy. The combined use of silver nanoparticles with ampicillin and gentamicin has been found to have a synergistic effect on *S. pneumoniae*. According to the results of the study, it was concluded that the combined use of ampicillin and gentamicin with silver nanoparticles against Streptococcus pneumoniae increased the antibiotic effectiveness and that the combined use of silver nanoparticles with antibiotics has a potential as a therapeutic agent in the treatment of infectious diseases caused by bacteria.

Keywords: Vaccinium myrtillus, ampicillin, gentamicin, synergism.

PHYTOCHEMICAL ANALYSIS AND IN VIVO ASSESSMENT OF ANTIHYPERGLYCEMIC EFFECT OF ALGERIAN DATE SEED EXTRACT (PHOENIX DACTYLIFERA L.)

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ABSTRACT

The date fruit represents a national heritage of Algeria, by its taste and nutritional qualities, but not only, because of its richness in active phytochemical compounds, it could be considered as a new therapeutic potential. The aim of this study was to investigate *in vivo* antidiabetic activity of Algerian date seed in streptozotocine induced experimental diabetes. Qualitative and quantitative phytochemical analysis were carried out in order to highlight some secondary metabolites in studied extract. Aqueous date seed extract as natural treatment was intragastrically administrated to STZ (60 mg/kg b.w) induced diabetic rats at doses of 150 mg/kg b.w (ASD1) and 300 mg/kg b.w (ASD2) for 4 weeks. The phytochemical screening showed that the aqueous date seed extract contains flavonoids, tannins, coumarins, terpenoids and alkaloids. This extract also has the highest values of total phenolic, flavonoids and condensed tannins. Blood glucose results revealed significantly decreased values in rats treated with aqueous seed extract (ASD1, ASD2) compared to diabetic control group (DC) during treatment. Significant decrease in plasma fasting blood glucose was also observed after administration of ASD1 in diabetic groups compared with diabetic control group (DC). Furthermore, a significant attenuation in serum lipid profile (TC and LDL) was observed in rats treated with ASD2. The treatment with AS extract at 150 and 300mg/kg b.w. reduced DM induced changes in the pancreatic islets. This study demonstrated the potential antihyperglycemic and antihyperlipidemic effects of the date seed extract (Phoenix dactylifera L.), which could possibly be exploited in the development of new phytotherapeutic formulations against diabetes.

Keywords: Phoenix dactylifera L., antidiabetic activity, blood glucose, histology, rats.

INVESTIGATION OF BIOLOGICAL ACTIVITY OF THYMUS KOTSCHYANUS AND THYMUS KOTSCHYANUS VAR. GLABRESCENS AND QUANTITATIVE DETERMINATION OF ACTIVE COMPOUNDS BY HPLC-DAD

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ABSTRACT

Thymus species from the Lamiaceae family to treat dyspepsia and other gastrointestinal diseases , as well as colds, bronchitis, and whooping cough . It is also used as a mouthwash to treat laryngitis and tonsillitis. Thymus kotschyanus and Thymus kotschyanus var. glabrescens plants included in our study are used both as spices and medicinally by the public due to the components they contain in their essential oils. Therefore, the goal of this work is to investigate the biological activities (antioxidant, antimicrobial, anti-urease, anticholinesterase and calcium oxalate anticrystallization) of various extracts produced from these Thymus species, as well as to quantify the phenolic components of the active extracts using HPLC-DAD. The methanol extracts of both plants had the strongest antioxidant, anticholinesterase, and antiurease properties, as well as the biggest quantity of phenolic compounds, according to the data. Furthermore, the ethyl acetate extract obtained from these plants was found to have potent antibacterial activity. When the biological activities of both Thymus species were compared, it was shown that T. kotschyanus var. glabrescens had strong biological activity potential than the other species. The methanol extracts of plants were shown to have no calcium oxalate crystallization inhibitory action at concentrations of 30-5 mg/mL in this research. Because both plants' methanol extracts exhibit high biological activity, the phytochemical content of both extracts was determined using HPLC-DAD. Both plants included rutin, chlorogenic acid, and rosmarinic acid, according to the findings of the study, which were evaluated qualitatively and quantitatively. It was determined that chlorogenic and rosmarinic acid were in close amounts in both plants, but rutin compound was found in higher amounts in T. kotschyanus. These findings point to the possibility of using methanol and ethyl acetate extracts from these two species as antioxidants, anticholinesterase, antibacterial, and antiurease agents in the future.

Keywords: Thymus species, biological activity, HPLC-DAD.

EFFECTS OF ACHILLEA SIPIKORENSIS EXTRACT -LOADED NANOPARTICLES ON MCF-7 AND HT-29 CELL LINES

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ABSTRACT

The present study aimed to prepare *A. sipikorensis* chloroform extract and evaluate cytotoxic effects. Then, the nanoparticles (NPs) were synthesized on the most efficient extracts and the cytotoxic activity of the free forms of the extracts were compared with the NPs forms. The cytotoxic activities of 9 extracts obtained by column chromatography were evaluated on MCF-7 and HT-29 cell lines using XTT cell viability assay. Chitosan-tripolyphosphate (TPP) NPs were formed using the ionic gelation method of D extracts, which show the most active properties because of cytotoxic activitiy. The cytotoxic activitiy of the characterized NPs were also evaluated. Results showed that particular size of nanoparticle (325.64 ± 2.9) containing *A. sipikorensis* extract were greater than empty nanoparticle (267.56 ± 3.6). It was observed that the viability of the MCF-7 cells was between 35.62 ± 0.77 % and 63.17 ± 0.41 % when only D sample was applied to the cells at the determined concentrations. In addition, the viability of the MCF-7 cells was between 30.45 ± 0.77 % and 52.32 ±0.54 % when D sample loaded nanoparticles was treated to the cells at the determined concentrations. Cell viability of HT-29 cells was ranged from 43.22 ± 0.32 % (100 µg/mL) to 68.06 ± 0.49 % (12.5 µg/mL) when cells treated with only D extract. In addition, cells were treated with nanoparticles containing D extract, the cell viability was between 41.45± 0.60 % (100 µg/mL) and 63.32 ± 0.47 % (12.5 µg/mL). According to the findings, extract made from *A. sipikorensis* has antiproliferative properties in both cancer cell lines. The anticancer activity of nanoparticles containing D extract was shown to be higher than that of the extract.

Keywords: A. sipikorensis, nanoparticles, cytotoxic activity.

INVESTIGATION OF BIOLOGICAL ACTIVITIES OF *HYPERICUM TRIQUETRIFOLIUM* AND QUALITATIVE ANALYSIS OF MAJOR PHYTOCHEMİCALS BY HPLC-DAD

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ABSTRACT

Hypericum species (Hypericaceae) have been widely used for years as a medicinal plant in the treatment of wounds, burns and eczema in folk and modern medicine. The aim of this study is to examine the biological activities (antioxidant, anti-urease, anticolinesterase, cytotoxic, anti-crystallization) of different extracts obtained from *Hypericum triquetrifolium* by maceration method and then to analyze the active major phenolic compounds qualitatively using HPLC. The methanol extract of *H. triquetrifolium* showed the strongest DPPH(IC_{50}: 0.0158±0.008 mg/mL), FRAP(34.432±0.726 mM $FeSO_4$/mg extract) and CUPRAC (91.7035±0. 296 mM trolox equivalent/mg extract) antioxidant activity. In addition, methanol extract (0.0906±0.00110 mg GAE/mg extract**)** were found to contain higher amounts of phenolic compounds compared to other extracts. The methanol extract exhibited the strongest anticholinesterase and anti-crystallization activity. The petroleum ether extract showed the strong anti-urease activity than other extracts. It was determined that all extracts from plant did not show cytotoxic activity in L-929 (ATCC CCl-1) mouse adipose healthy fibroblast cell lines. Rutin, chlorogenic acid and 8-oh salvigenin compounds were found in the plant's methanol extract, which demonstrated the most biological activity, according to HPLC analysis. As a consequence, it's considered that this plant has significant antioxidant, antiurease, and anticholinesterase properties, and that with more toxicity testing, it might be employed as a natural source of antioxidant, anti-urease, and anticholinesterase in the future.

Keywords: *Hypericum triquetrifolium***,** biological activity, HPLC-DAD

ANTIHYPERGLYCEMIC EFFECT OF PUERARIA LOBATA ROOTS AND FLOWERS EXTRACTS ON ALLOXAN-INDUCED DIABETIC RATS

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ABSTRACT

Diabetes mellitus **(**DM) is a serious and life-threatening metabolic disorder that affects over 400 million around the world (WHO). Previous literature has, to some extent, associated DM complications with oxidative stress and the release of reactive oxygen species (ROS). Therefore, there is an urgent need to develop a novel and safe plant-derived therapy which can scavenge ROS and alleviate the symptoms of DM. Pueraria lobata (*PL*) is a worthwhile medicinal plant that makes a substantial contribution to prevent DM which is likely due to its antioxidant activities. Owing to their structural similarity to 17-β estradiol, isoflavones exhibit a broad range of therapeutic activities such as antihyperglycemic and antioxidant. The aim of the present study is to investigate the influence of *PL*-extracts supplementation on anti-diabetic efficacy in alloxan-diabetic female rats. *PL* roots (*PLR*) and flowers (*PLF*) were extracted using a novel green technology using deep eutectic solvent (DES) and subsequently quantified by HPLC-DAD system. The DPPH antioxidant activity (AOA), total polyphenols (TPC) and total flavonoids contents (TFC) of both extracts were also determined. Induction of DM in experimental animals was carried out by intraperitoneal administration of alloxan monohydrate (170 mg/kg) after fasting for 16 h. The control and diabetic animals were treated with 200 mg/kg of *PLR*-and *PLF-DES* extracts trice weekly for 28 days and compared with normal control and diabetic control animals which received only distilled water. After animal sacrificing, changes in body weight, biochemical parameters, oral glucose tolerance test (OGGT), and glycohaemoglobin level were evaluated. Changes in histopathological parameters and immunohistochemical characteristics were also investigated. HPLC results showered that 3 and 4% were the extract total isoflavones concentration for *PLR*-and *PLF-DES* extracts, respectively, comprising puerarin, daidzein and genistein. The selected dose of 200 mg/kg of *PLF* extract significantly increased body weight decreased blood glucose, OGGT, glycated hemoglobin than that of *PLR* extract. At the same time, AOA, TPC and TFC were demonstrated higher in *PLF* than *PLR* extract. These results suggest that the *PLR*-and *PLF-DES* extracts may counter the hyperglycemia and scavenge ROS noticed in alloxan-diabetic rats. Similarly, isoflavones-rich extracts alleviated the liver and kidney injuries/damage associated with diabetes pathogenesis. In conclusion, *TP-DES* extract treatment attenuates hyperglycemia in alloxan-induced DM which may be linked to promoting islet β-cell regeneration. The effect observed may be due to the presence of high content of isoflavones which may act synergistically as antioxidants. These findings promoted the development of *PLR*-and *PLF-DES* extracts that could be a significant step towards the prevention of oxidative stress and further complications of diabetes.

Keywords: *Pueraria lobata*, isoflavones, anti-diabetic, oxidative stress, hypoglycemia

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INVESTIGATION OF BIOLOGICAL ACTIVITIES OF ABELMOSCHUS ESCULENTUS (MALVACEAE) SEMEN

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ABSTRACT

Abelmoschus esculentus (Malvaceae) semen have been widely used by the public as a medicinal preparation in the anti-diabetes, protective against cancer, immune system booster, anti-aging, rheumatic diseases and vitamin mineral support. The aim of this study is to examine the biological activities (antioxidant, anti-urease, anticolinesterase, cytotoxic) of different extracts obtained from Abelmoschus esculentus (Malvaceae) semen by maceration method. The water extract of Abelmoschus esculentus semen showed the strongest DPPH (IC50: 0,3127±0,0496 mg/mL), FRAP(7,775±1,164 mM FeSO4/mg extract) and ethanol extract showed the strongest CUPRAC (1,9863±0,2977 mM trolox equivalent/mg extract) antioxidant activity. In addition, the ethanol extract exhibited the strongest anticholinesterase activity. The water extract showed the strong anti-urease activity than other extracts. It was determined that all extracts from plant did not show cytotoxic activity in L-929 (ATCC CCl1) mouse adipose healthy fibroblast cell lines. As a consequence, it was determined that the extracts obtained showed low biological activity than standart compounds.

Keywords: Abelmoschus esculentus, biological activity, antioxidant, anti-urease, anticolinesterase, cytotoxic.

CELL PROLIFERATION RATES AND RESPONSE TO THE THERAPY WITH NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IN HUMAN LYMPHOBLASTOID CELL LINES DERIVED FROM HEALTHY INDIVIDUALS

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ABSTRACT

Chronic pain affects around 27% of the adult European population. Non-steroidal anti-inflammatory drugs (NSAIDs) are one of the most frequently prescribed analgesics, and the most used over-the-counter drug group. The analgesic response to NSAIDs has long been known to have significant inter-individual heterogeneity. Almost 50% of all patients experience poor pain relief and serious adverse effects. Precision medicine approaches to pain therapy personalization promise to improve treatment outcomes for individual patients. These molecular processes can be identified and verified using the Lymphoblastoid Cell Line (LCL) model of phenotypically well-characterized healthy individuals. In this study, the effects of NSAIDs on cell proliferation in LCLs derived from 12 healthy individuals were evaluated. Cell proliferation was characterized by 2,3-bis(2-methoxy-4-nitro- 5-sulfophenly)-5-([phenylamino] carbonyl)- 2H-tetrazolium hydroxide (XTT) assay after treatment with aspirin (0.5 mM), ibuprofen (0.3 mM) and indomethacin (0.2 mM). According to the results, rates of cell growth were reduced in LCLs treated with indomethacin. Besides, proliferation rates were found higher in LCLs treated with aspirin and ibuprofen, compared with indomethacin treatment. Inter-individual variability was greater in ibuprofen treated LCLs ($p<0.01$) than the variability between aspirin and indomethacin treated LCLs. Variability in baseline cellular phenotypes not only gives an insight into the cellular mechanisms but also improves on limited individualized therapy options with NSAIDs.

Keywords: non-steroidal anti-inflammatory drugs; lymphoblastoid cell line; cell proliferation; precision medicine.

A NEW APPROACH FOR NANOTECHNOLOGY: GREEN SYNTHESIS OF NANOPARTICLES

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ABSTRACT

Nanoparticles (NPs) are composed of materials which include particulate substances less than 100 nm. NPs are classified according to their features such as morphology, size and chemical properties. NPs could be classified as carbon-based, metal, ceramics, semiconductor, polymeric and lipid-based NPs. Some of NPs application fields are cosmetic, electronic, medicine, food, construction and renewable energy. Recently, the biological synthesis of NPs has become popular. Our aim was to review recent developments of green synthesis of NPs. Biological synthesis of NPs involves the use of prokaryotic/eukaryotic cells or biomolecules found in those cells by acting as reducing and capping agents. The characterization of NPs plays a key role because it gives an information about the synthesis, shape, size and structural components of NPs. Synthesized NPs are characterized using different techniques including atomic force microscopy, Fourier transform infrared spectroscopy, dynamic light scattering, fluorescence correlation spectroscopy, mass spectroscopy, nuclear magnetic resonance, scanning electron microscopy, X-Ray diffraction and X-ray photoelectron spectroscopy. In order to determine surface characteristics, material properties, chemical compositions, shape, size, microscopic structure, thermal analysis, orientation and functional groups regarding NPs, Raman scattering, transmission electron microscopy and zeta potential are used. Metallic NPs have characteristic ʎmax, therefore to confirm synthesis of NPs, a scan of ʎmax in the range of 300-800 nm should be done. The most synthesized metal NPs are gold, silver, iron, lead, cadmium, copper, zinc, and palladium. Green metal NPs are used as antimicrobial agent, catalyst, sensor and also for the remediation of environmental pollutant and cellular imaging. Green NPs synthesized with phytosynthesis will be more attractive field of nanotechnology in the near future.

Keywords: Nanoparticles, Phytosynthesis, Extract, Antimicrobial activity.

STUDY OF NEW DRUG CANDIDATES DERIVED FROM PLECONARILE INHIBITING COXSACKIEVIRUS B3 (CVB3) BY MOLECULAR DOCKING, ADMET, AND RETROSYNTHESIS

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ABSTRACT

In light of their serious diseases, there is an urgent and inescapable need to hunt for antiviral medications for Coxsackievirus B3 (CVB3). The current study looked at four drug candidates (P1-P4) derived from pleconaril, which has antiviral activity against CVB3. According to Lipinski's guidelines, two candidates P3 and P4 can be medications based on the results obtained after evaluating physicochemical and ADMET properties. The high antiviral activity of these two candidates (pIC50=11.063 for P3 and pIC50=9.580 for P4), when compared to a reference compound (MA: pIC50=8.523), was explained by the different parameters generated after optimizing their geometries employing Gaussian09 program suit with the hybrid density functional B3LYP and 6-31G(d,p) basis sets, and the molecular docking analysis (ΔG (Gibbs energy), FF(Full fitness) and bonding modes) using the SwissDock server. The principle of retrosynthesis allowed us to draw a path for the synthesis of drug candidates. This study may add more valuable and useful information to optimize further new Pleconaril derivatives.

Keywords: Molecular Docking, ADMET, Retrosynthesis, Isoxazole, Coxakievirus B3, Pleconaril, Antiviral.

ELECTROCHEMICAL DETECTION OF CAFFEINE MOLECULES USING REDUCED GRAPHENE OXIDE/SILVER COMPOSITE MODIFIED CARBON PASTE ELECTRODE (CPE)

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ABSTRACT

A novel composite was fabricated by reduced grapheme oxide/silver composite (RGO/Ag) in the presence of Rosmarinus officinalis plant aqueous extract at room temperature [1]. The RGO/Ag was used as catalysts to modify carbon paste electrode (CPE) in the study of the electrocatalytic detection of caffeine (CA) by using cyclic voltammetry technique. The RGO/Ag/CPE electrode exhibited appreciable electrocatalytic effect for the detection of lower concentrations of the CA (0.1-5µM). The detection limit was 13,68 µM for CA. The RGO/Ag/CPE electrode was stable for at least 4 months and detection of the paracetamol was not affected by common interferents like oxalic acide, Glucose, Ascorbic acide.

Keywords: composite; cyclic voltammetry; caffeine ; graphene oxide ; carbon past electrode.

ELECTROCHEMICAL DETECTION OF PARACETAMOL MOLECULES USING REDUCED GRAPHEME OXIDE/SILVER COMPOSITE MODIFIED CARBON PASTE ELECTRODE (CPE)

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ABSTRACT

A novel composite was fabricated by reduced grapheme oxide/silver composite (RGO/Ag) in the presence of Rosmarinus officinalis plant aqueous extract at room temperature [1]. The RGO/Ag was used as catalysts to modify carbon paste electrode (CPE) in the study of the electrocatalytic detection of paracetamol (PCM) by using cyclic voltammetry technique. The RGO/Ag/CPE electrode exhibited appreciable electrocatalytic effect for the detection of lower concentrations of the PCM (0.001-1µM). The detection limit was 0,0006 µM for PCM. The RGO/Ag/CPE electrode was stable for at least 4 months and detection of the paracetamol was not affected by common interferents like uric acide, Glucose, Ascorbic acide.

Keywords: composite; cyclic voltammetry; paracetamol ; graphene oxide ; carbon past electrode.

FEATURES OF SOME DIELECTRIC PROPERTIES THIN-FILM NANOCOMPOSITES BASED ON SEMICONDUCTOR SOLID SOLUTIONS (BI1.3SB0.7TE3)0.99(INTE)0.01 AND POLYVINYLIDENE FLUORIDE POLYMER

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ABSTRACT

Thin-film nanocomposites are obtained from a (Bi1.3Sb0.7Te3)0.99(InTe)0.01 solid solution powder and polyvinylidene fluoride (PVDF) by hot pressing at ~473 K and a pressure of 15 MPa, and the temperature dependences some of their dielectric parameters are investigated. The thickness of the nanocomposite samples, depending on the volumetric amount of the filler, was in the range of 100-120 μm. The temperature dependences of the dielectric constant (e) and the dielectric loss tangent (tand) of four samples containing respectively 20, 40, 60, 80% of solid solution and 80, 60, 40, 20% of PVDF were measured in the range (293÷353) K. The temperature dependences of e show an increase with increasing temperature. Such an increase in tand is observed at relatively low temperatures up to 353 K. It is assumed that during the formation of a nanocomposite by a polymer matrix and the surface of a nanoparticles of a solid solution (Bi1.3Sb0.7Te3)0.99(InTe)0.01, the process of crosslinking of polymer units leads to a decrease in the mobility of dipoles. Despite this, bulk carriers can form in the matrix and filler, which, in turn, can enhance polarization. At low filler contents, no significant change was observed in the dependences of the loss tangent, which is apparently associated with the thickness of the polymer layers located between the nanoparticles of the solid solution. In this case, an important role is played by the high resistance of the created nanocomposites. Changes in the tand~f(T) dependences are more noticeable in nanocomposites with a relatively large amount of filler. It is assumed that with an increase in the amount of filler, agglomerates formed from nanoparticles and the concentration of contacts between nanoparticles increases, which leads to an increase in the conductivity and loss tangent of the composites. It can also be concluded that the size of nanoparticles of solid solutions in the resulting nanocomposites also makes a significant contribution to the temperature dependences of dielectric properties and to the dependences of dielectric properties on the composition of the nanocomposite.

Keywords: polymer matrix, filler, dielectric constant, dielectric loss tangent.

SEASONAL VARIATION OF MYCORRHIZAL VARIABLES, RHIZOSPHERIC PHOSPHORUS AND NITROGEN OF JUNIPERUS PHOENICEA AND RETAMA MONOSPERMA IN A COASTAL SAND DUNES ECOSYSTEM

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ABSTRACT

Seasonal variation of mycorrhization parameters of a degraded ecosystem seems to be key information in conceiving a rehabilitation program that uses mycorrhized plantations specific to that ecosystem. In order to record the seasonal variation of arbuscular mycorrhizal fungi in a stabilized sand dunes ecosystem, mycorrhizal colonization and spores densities of two plant species; *Juniperus phoenicea* and *Retama monosperma*, endemic to Essaouira sand dunes ecosystem, were followed through three years. In addition, rhizospheric phosphorus and nitrogen were also recorded. The findings were tested for statistical significance and correlated among each and to some meteorologic parameters. Results showed that both mycorrhization frequencies and spores densities have their peak at late winter-early spring and their low at summer for both plant species. Phosphorus changes significantly following seasons while nitrogen seasonality is not significant. Most mycorrhizal parameters for both plant species changes according to seasons. Significant negative correlation was found between phosphorus evolution and mycorrhizal parameters variations for both plant species. Nitrogen was correlated positively and significantly though weakly for *R. monosperma.* The correlations between these parameters and the meteorologic variables is also discussed.

Keywords: Seasonal variation, Juniperus phoenicea, Retama monosperma, arbuscular mycorrhizae, Nitrogen, Phosphorus.

SOIL CONTAMINATION AND HEALTH RISK ASSESSMENT OF HEAVY METAL IN ESKIŞEHIR-SEYITGAZI DISTRICT

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ABSTRACT

Soil is the basic component of the biosphere and is exposed to many contaminants, including heavy metals. Heavy metals accumulate mostly in soil in nature and heavy metal pollution is becoming a serious concern. This study aimed to determine the pollution level and possible sources of heavy metals in the agricultural areas in Seyitgazi district of Eskişehir, where worldwide significant a boron mine is located, and to evaluate its effects on human health. 94 soil samples were taken from Seyitgazi district of Eskişehir Province in 2014 and Cr, Fe, Ni, Cu, Zn, Cd, and Pb analyzed. Enrichment Factor (Ef), Geoaccumalation Index (Igeo), Contamination Factor (Cf) and Ecological Risk Factor (Er) were used to determine heavy metal pollution, and the effects on human health were determined by the hazard quotient (HQ) and hazard index (HI). In this study, due to background values are not available, the continental upper crust values were used as background values for calculation of pollution indices. The pollution indices (Ef, Igeo, Cf and Er) used showed that the study area was moderately polluted and signicantly enrichment by Cd. According to Pearson correlation analysis and principal component analysis, the source of Cd in the study area is anthropogenic. However, there is no non-carcinogenic health risks have been identified for children (HI: 0.56) and adults (HI: 0.002).

Keywords: Pollution index, Pearson Correlation Analysis, Principal Companent Analysis, Multivariate Statistical Analysis.

APPLICATION OF ARBUSCULAR MYCORRHIZAL FUNGI ISOLATES FROM SEMI-ARID MEDITERRANEAN ECOSYSTEMS AS BIOFERTILIZERS IN CAROUB TREE DEVELOPMENT

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ABSTRACT

The carob tree (*Ceratonia siliqua* L.) is an important component in semi-arid Mediterranean ecosystems, particularly in Morocco where it plays a considerable socio-economic role. This species is widely used in the reforestation programmes and in the rehabilitation of degraded soils serving both environmental and socio-economic objectives. In spite of these assets, this species suffers the particular climatic conditions, rare and irregular rains, long hot and dry summers, and anthropic pressure, generally, leading to desertification processes. To withstand these contrasting conditions, selected arbuscular mycorrhizal fungi (AMF) were tested for their contribution to the growth, nutrient uptake and photosynthesis improvement of the carob tree *Ceratonia siliqua* under nursery conditions. The objective of this study was, to evaluate the effects of some arbuscular mycorrhizal fungi complexes isolated in different Mediterranean ecosystems compared to single-species isolates selected using morphological tools on the growth, mineral nutrition, and chlorophyll content of *Ceratonia siliqua* seedlings. The results indicate that all the used AMF *inocul*a stimulated significantly the height of *C. siliqua* seedlings after eight months under nursery conditions. An increase in plant height between 33% and 70% compared to a control without inoculation was recorded. Similarly, the aerial dry weight recorded an increase of 62% to 124% comparing inoculated and non-inoculated seedlings. The root dry weight had shown an increase rate of 24% to 86% compared to the control. The analysis of mineral contents in plants tissues, showed a highly significant increase in P. N. K. Ca and Mg levels of the aerial parts compared to the control. The chlorophyll contents were analysed and a significant increase in chlorophyll content was noticed when inoculated seedlings were compared to non-inoculated ones. This study had confirmed the importance of AMF improving the growth of *Ceratonia siliqua* seedlings; the AMF complexes remain to have the important growth and mineral nutrition responses. However some single- species had shown similar magnitude to the complexes for all analysed parameters. A large biofertilizer potential of the single-species isolates in the inoculation of *Ceratonia siliqua* is demonstrated for the first time.

Keywords: Arbuscular mycorrhizal fungi; Complexe; Single-species; Ceratonia siliqua Biofertilizer; reforestation.

EFFECTS OF RHIZOBACTERIA WITH MULTIPLE PLANT GROWTH-PROMOTING TRAITS (PGP) INOCULATION ON ALFALFA (MEDICAGO SATIVA L.) GROWTH UNDER LEAD STRESS

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ABSTRACT

Heavy metals pollution poses major environmental problem, it has a negative impact on agriculture and human health. The contamination of soils by toxic heavy metals has accelerated significantly since the beginning of the industrial revolution as a result of human activities. Unfortunately, heavy metals cannot be biologically degraded, the remediation of the contaminated soils is more difficult. Recently, phytoremediation strategies, with appropriate heavy metal-adapted rhizobacteria have received more and more attention. In this context, the aim of this work is to evaluate the potential of lead-tolerant rhizobacteria with multiple plant growth promoting traits (PGP) to ameliorate the growth and the resistance of *Medicago sativa* under lead stress conditions in order to be used in remediation of lead-contaminated soils. In the first place, we isolated 86 strains from the rhizospheric soil of *Astragalus armatus* in a mining site in Morocco, 47% had the ability to tolerate lead at 1700ppm. The isolates with solubilization diameter of tricalcium phosphate higher than 0.5 cm on PVK solid mediums were maintained for the rest of tests. The concentrations of solubilized P on PVK liquid medium were between 186,43 and 109,03 mg/L; this solubilization was accompanied by a pH decrease from 6.8 to 3.2. All the selected strains were positive for the production of ammonia, amylase and cellulase, 30% were able to produce indoleacetic acid and 40% produced hydrogen cyanide. The percentages of produced siderophores ranged from 6,77 to 66,42. Two rhizobacterial strains with the best PGP traits were maintained. Under lead treatment, the double inoculation of *M. sativa* plants with the rhizobacteria AaR114 and AaR72, improves significantly plant tolerance and increases aerial and root biomass and reduces the negative effects of the metal on the plants. The increase in the dry weight of the aerial part and the root part is 29 and 64%. The rhizobacterial strains selected in this study had the potential to be used as efficient bioinoculants in phytoremediation of soils contaminated with lead.

Keywords: Medicago sativa, Lead, Heavy metals, Rhizobacteria, PGP, phytoremediation.

EFFECT OF BIOCHAR AND MANURE ON SOIL QUALITY INDICATORS OF FLUVISOL

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ABSTRACT

The effect of separate and combined application of manure (4 t ha-1) and biochar produced by maize cobs (500 and 750 kg ha-1) on soil quality indicators was studied within the field experiment on sandy loam Fluvisol with growing of broad bean (*Vicia Faba, L.*). The studied indicators were physicochemical properties, soil organic carbon content, water retention and adsorption characteristics, bulk density, total porosity, aeration capacity, water stability of soil aggregates and soil thermal conductivity. The applied amendments did not influence the physicochemical characteristics of the topsoil. An increase of the soil organic carbon was observed only in the variants with the combined application of manure and biochar. In these variants it was observed higher content of water retained at matric potential -1500 kPa (wilting point) than in the control. As the rate of increase of water retained at potential -33 kPa (field capacity) was lower, there was no or even negative effect on plant available water. The soil bulk density at 0-5 cm depth was higher and respectively the total porosity was lower in treated variants than in the control, but at depth 10-15 cm the tendency was the opposite. A decrease of aeration capacity at 0-10 cm depth was observed in all amended variants and it was critically low (7.2%vol.) when only manure was applied. Water stability of aggregates in all variants was low, but in the amended variants the water stability of aggregates fraction of 1-3 mm size slightly increased in comparison to the control. The relative field capacity increased in all treated variants which can be considered as a positive water retention effect of the applied manure and biochar. The soil thermal conductivity measured at 10-15 cm depth in the field with KD2pro device was the highest 1.506 W m-1K-1 in the control variant in comparison with the variant with manure 1.268 W m-1K-1, biochar 1.489 W m-1K-1 and combined manure + biochar 1.372 W m-1K-1.

Acknowledgements: The authors acknowledge funding of research activities received from the Bulgarian National Science Fund under grant agreement DN 16/11 (project "Thermal properties of soils at different land use and melioration").

Keywords: soil hydraulic properties, soil thermal conductivity, water stability of soil aggregates, biochar, manure, broad bean.

CONTRIBUTION TO THE SOIL CHARACTERIZATION OF THE SERAIDI FOREST (NORTHEAST ALGERIA)

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ABSTRACT

The aim of this work relates to the physicochemical diversity and the characterization of the different types of soils of the seraidi forest (Northeast of Algeria), and to the evaluation and characterization of the existing organic matter as well as to the evolution. and the dynamics of the latter, also on its influence on changes in the physical properties of soils. In order to know the soil properties of seraidi forest, we established a stratified sampling plan. The results obtained show that we are in the presence of a great diversity of soils such as neutral to alkaline, whose adsorbent complex is sufficiently saturated. Also the presence of limestone offers the soil a fairly significant buffering capacity. In our study region, the texture of the soils is varied between clayey and silty where it offers medium porosity, there is a strong accumulation of organic matter, therefore soils rich in organic matter. The fractionation of the organic matter of the soils allowed to obtain a very high rate of humification. The soil characteristics of the seraidi forest (North East of Algeria) are controlled by the contribution of organic matter which presents a dynamic and an important evolution and which varies with the climatic conditions and the nature and the type of plant formation, and these the latter have a capital and important role in the rate of mineralization of organic matter.

Keywords: Seraidi, soil, organic matter, plant formation, humification.

THE EFFECTS OF DIFFERENT SULFUR FORMS AND BIOCHAR APPLICATIONS ON THE DEVELOPMENT OF RADISH (RAPHANUS SATIVUS) IN CALCAREOUS SOILS

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ABSTRACT

Sulfur(S) has an important place in meeting the nutritional needs of radish and obtaining high quality products. Biochar applications affect soil quality and plant growth positively. The study was carried out to determine the S fertilizer demand of the radish plant grown in Konya, which has an important agricultural potential, in the calcareous soils of the region, to determine the interaction between S * biochar and to determine the appropriate sulfur doses. In the study, Elemental-S (0- 200-400 mg/kg), SO4-2-S (0-25 -50 mg/kg) and three doses of biochar (0- 1%-2%) were applied to the cultivation soil. The variety of 8TR-17 hazelnut radish (*Raphanus sativus* var.) was used as plant material. According to the results obtained, leaf chlorophyll SPAD values, plant height, tuber weight, the S (mg/kg) concentration remaining in the soil at the end of the experiment were showed significant differences with increasing S doses compared to the control ($P< 0.05$, $P<0.01$). Leaf chlorophyll SPAD values, plant height, stem diameter, tuber weight and the S (mg/kg) concentration remaining in the soil showed significant differences compared to the control ($P<0.05$ and $P<0.01$) in the interaction between biochar doses and S forms. Biochar treatments increased tuber weight compared to control. These increases are especially important in the application of SO4-2-S. The S concentrations remaining in the soil were a significant difference between S applications, S doses, biochar and the interaction values of these applications ($P<0.05$, $P<0.01$) and decreased in elemental-S with increasing doses of the biochar compared to the control. This decrease was higher in S applications in SO4-2-S. As a result, it is thought that good plant growth and tuber formation will be achieved with the application of 2% biochar in the radish cultivation activities, when the sand content is low and partially clayey loam soil will be used.

Keywords: Sulfur, biochar, radish, calcareous soil.

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DOUBLE-INOCULATION EFFECT OF ENDOPHYTIC PSEUDOMEUNAS WITH RHIZOBIUM SULLAE ON THE GROWTH OF LEGUME SULLA FLEXUOSA

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ABSTRACT

Legumes establish symbiotic relationships with different microorganisms, notably endophytes that live inside different plant tissues without harming their host. Nowadays, the use of plant growth-promoting endophytes is considered one of the significant approaches for stable production of crops which ensures sustainable agriculture. Our strategy focuses on isolating and screening beneficial endophytic bacteria based on their ability to promote plant growth while enhancing use of mineral nutrients. 35 endophytes isolated from surface sterilized nodules of *Sulla pallida* grown Touissit, Oujda region. 15 bacteria were able to solubilize tricalcium phosphate (TCP) and the solubilization halos were between 0.1 and 0.7 cm. According to ERIC-PCR analysis, the selected strains grouped into 6 groups, the representative strains were identified based on 16S rRNA sequences analysis as *Pseudomonas* and *Enterobacter* genera. the 6 phosphate solubilizing bacteria (PSB) were checked for their plant growth promoting (PGP) abilities under *in vitro* conditions. The results showed that 4 of the selected bacteria were able to produce HCN, while the amounts of IAA produced by these bacteria were between 1.23 mg L-1 and 3.43 mg L-1. In addition, 3 isolates were positive for the production of ACC deaminase. Most of our isolates were capable of producing siderophores. A quantitative assay of TCP solubilization was conducted too, and solubilized P concentrations were between 20.99 mg L-1 and 137.39 mg L-1, accompanied by a decrease in the pH of the media. Furthermore, an abiotic stress was conducted, only 2 isolates HP2 and HP24 were able to grow at salt concentrations up to 7.5% and in the presence of PEG (20%). These two strains of *Pseudomonas* were chosen to test their ability to enhance the growth of *Sulla flexuosa* in the presence of strain *R. sullae* KS6 under culture chamber conditions. The results indicate that double-inoculation (HP2+HP24) with *R. sullae* significantly increased shoot and root length as well as in dry weight. In the present study, the obtained data suggest that the application of PGPBs could be a promising strategy for enhancing the legumes production.

Keywords: Abiotic stress, Bio-inoculant, Co-inoculation, Endophytes, Legumes, Pseudomonas, Rhizobium sullae.

EVALUATION OF SOME PHYSICOCHEMICAL PROPERTIES OF SOILS UNDER DIFFERENT PLANTS IN ÇAĞLAYANCERIT

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ABSTRACT

In this study, some physical and chemical properties of agricultural soils where different plants are grown in Çağlayancerit were determined and their distributions were investigated. For this purpose, soil samples from a depth of 0-20 cm were taken from 20 different lands that were farmed according to the grid method with a distance of 2500 m within the district boundaries of Çağlayancerit in Kahramanmaraş province. For the purpose of the research, some physical (texture, saturation) and chemical (pH, EC, CaCO3, organic matter, available P, K, Ca, Mg, Fe, Mn, Cu, Zn and B) properties of the soils were determined. According to the results of the research, the majority of the soils on which different plants are grown have a clay texture and the saturation values are found between 41% and 81%. Most of the soils have neutral reaction (60%), very slightly saline (55%), contain varying amounts of calcareous, and the amount of organic matter has been determined at a low level. It has been determined that 80% of the available phosphorus amount of the soils is insufficient, the potassium level is very high (75%), calcium is good (100%), and magnesium is sufficient (55%). 90% of the iron content of the soils was good, amounts of manganese and copper was sufficient (100%), and 70% of the zinc and boron concentrations were found to be low. As a result, it was determined that the amounts of organic matter, available phosphorus, zinc and boron were insufficient in the soils of the study area.

Keywords: Agricultural soils, Concentration, Çağlayancerit, Distribution, Physicochemical.

INOCULATION EFFECTS OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) ON THE GROWTH OF THE PEANUT KT-22 VARIETY IN MOROCCO

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ABSTRACT

In order to improve peanut yields in the northwestern region of Morocco, plant growth promoting rhizobacteria (PGPR) have been emerged as a potential biotechnological tool for achieving this goal. to select a suitable bio-inoculant for peanut growth, 40 out of 300 strains isolated from the rhizosphere of three varieties of peanut (KT-22, KP-29 and Beldi), were found to be able to solubilize tricalcium phosphate (TCP) on Pikovskaya (PVK) agar medium with a solubilization diameters ≥4cm. Furthermore, the rhizospheric isolates were evaluated for the production of indole acetic acid (IAA), siderophores, hydrogen cyanide (HCN) and lytic enzymes; such as amylase, cellulase, lipase and urease. The phenotypic results have been converted into a dendrogram, 13 groups are appeared with 50% of similarity, one strain from each group was taken to quantify the P-solubilization on PVK liquid medium, the highest concentration was obtained by JR39 190 ± 0.67 mg /L. Only 7 PSB were found positive for the production of ACC deaminase. In addition, the antagonistic test has been conducted *in vitro*. The results showed the ability of three bacteria (BP46, JR30 and JR49) to inhibit the growth of phytopathogenic fungus *Fusarium oxysporum.* Based on their plant growth promoting (PGP) traits activities, three PSB (BP49, JR30 and JR39) were selected to evaluate their effects on peanut growth seeds of variety KT-22 under culture chamber conditions. The highest values in terms of length, fresh and dry weight of the aerial and root parts, number of nodules were recorded in the plants inoculated with the two bacterial strains BP49 and JR39. The results indicate that inoculation with BP49 and JR39 has a favorable effect on peanut growth. These bacteria can be suggested to farmers in order to reduce the amount of fertilizer used to improve peanut yields in Morocco.

Keywords: Fusarium oxysporum, Inoculation, KT-22, Peanut, PGP.

EFFECT OF SOIL STRUCTURE DETERIORATION ON WATER RETENTION OF CAMBISOLS

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ABSTRACT

Soil structure deterioration is the most widespread consequence of the long-term cultivation of soil. The soil susceptibility to this form of soil physical degradation depends on genetic features of soil. The aim of this study was to characterize the soil structure and its effect on water retention of Haplic Cambisols under long-term potato cultivation and adjacent grassland in the region of the Samokov hollow, southeast Bulgaria. The top soil layers were analyzed for determination of soil texture, soil organic carbon, pH, soil bulk density, total porosity, aggregate size distribution, water stability of soil aggregates, and soil water retention curve (SWRC). The water retentions at low suctions (pF 0.4-2.5) were determined on undisturbed sample in the process of draining by suction type apparatus and on disturbed soil samples by TDR/MUX/mpts device during air drying. It was found that the deterioration of soil structure as result of long-term potato cultivation was well expressed by the lower values of water stability of soil aggregates, field capacity and plant available water capacity in comparison to grassland. Another indictor for structureless of the cultivated soil was the similarity of SWRC obtained in case of the intact soil cores and of the disturbed soil. The obtained results showed that the long-term use of Haplic Cambisols for potato cultivation lead to significant soil structure deterioration in this relatively cool and humid region.

Acknowledgements: The author acknowledges funding of research activities received from the Bulgarian National Science Fund under grant agreement DN 16/11 (project "Thermal properties of soils at different land use and melioration").

Keywords: soil aggregation, water stability of soil aggregates, soil water retention curve, suction plate apparatus, TDR/MUX/mpts device.

EVALUATION OF THE EFFECTS OF HEAVY METAL POLLUTION ON SOIL FERTILITY AND CROP PRODUCTION

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ABSTRACT

Contamination of soils with heavy metals as a result of agronomic activities seems to be one of the important ecological problems. However, this situation creates a chaos that threatens not only soil and water pollution, but also the entire ecosystem, especially human and animal health. Since the soil polluted with heavy metals gradually loses its fertility, the yield and quality of the plants grown in this soil are also low. For this reason, in addition to ecological problems, especially economic losses put plant production in a vicious circle that is difficult to get out of. While plants take water and plant nutrients from the soil, whether they need it or not, they also take the heavy metals accumulated in the soil at certain rates depending on the physical and chemical conditions of the environment. Toxicity occurs as a result of heavy metals taken from the soil accumulating in the plant and exceeding the limit values. The plant tries to survive by giving some metabolic responses to combat the toxicity it is exposed to. As a result of this process, although the plant survives, the yield and quality decrease due to the disruption in the functioning of physiological events. Heavy metals accumulated in the plant are consumed by other living things, and heavy metals participate in the nutrient cycle. The tolerance of plants to heavy metal toxicity varies depending on the plant species, element type, exposure time to toxicity. In addition, knowing the type of heavy metal and its concentration in the soil is extremely important in terms of not interrupting plant production. As a matter of fact, it has become very important to maintain a residue-free and sustainable production as well as maintaining soil fertility in crop production.

Keywords: Plant metabolism, residue-free production, sustainability, soil quality.

IMPUTATION OF GREEN HOUSE ENVIRONMENT DATA USING SARIMAX MODEL

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ABSTRACT

The purpose of this paper is to present an efficient way of handling missing data in a greenhouse environmental database. Modeling of natural phenomena that represent a seasonality requires a complete database that covers all seasons. The presence of missing values restricts their use for constructing an appropriate model. In our database, the missing values are due to power outages on the greenhouse lead to a loss of all information about the internal environment of the greenhouse.To fill the leaks in the database, we first obtained an external meteorological database provided by the weather station of ALMERIA to use as exogenous data. The proposed method is based on a seasonal autoregressive integrated moving average process (SARIMAX). We first use the principal component analysis method to analyze the correlation between exogenous and endogenous variables and then to reduce the dimensions of the exogenous database. Moreover, obtained results show that the imputation of missing values based on the SARIMAX model while doing the best choice of train set, presents a relevant solution for completion of the greenhouse's database.

Keywords: Data imputation, SARIMAX model, Green house.

DESIGN AND IMPLEMENTATION OF A SENSOR NODE WITH ITS POWER CONSUMPTION ANALYSIS

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ABSTRACT

In this study, A sensor node used in the cloud-based monitoring system designed and manufactured for collecting and recording of temperature and humidity data in destructive and nondestructive test laboratories are presented. The sensor node work as a slave structure and waits in sleep mode to save power until the requirement of a master receiver/transmitter module. When the requirement comes to the slave sensor node, the node wakes up and obtains the data from the temperature and humidity sensors and transmits them to the master receiver/transmitter module via Bluetooth. The power of a sensor nodes is supplied by a battery. The components of the sensor node including the Arduino Pro Mini module and the HM-11 Bluetooth module was configurated to operate with low power consumption because power consumption is important for self-powered structures. A detailed analysis of power consumption of the sensor node is given in the study. A special measurement method based on relation between capacitance and charge of capacitor is used to determine the battery life of the sensor node. Besides, battery life of the sensor node depending on the configuration preferences is presented.

Keywords: Bluetooth Low Energy(BLE) , Environment monitoring, Wireless sensor network.

THE EFFECT OF SALICYLIC ACID ON CERTAIN BIOCHEMICAL PARAMETERS IN VIGNA MUNGO AND VIGNA UNGUICULATA L. SPECIES UNDER SALT STRESS CONDITIONS

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ABSTRACT

This study focuses on the effect of 0.05 mM Salicylic Acid (SA) on two species of *Vigna*: *Vigna mungo* L. and *Vigna unguiculata* L. under NaCl stress conditions at 150 and 300 mM. Salicylic acid is a key endogenous signal that mediates defence gene expression and disease resistance in a wide range of species. The aim of this study was to determine the role played by exogenous salicylic acid in reducing the sensitivity of two species of Vigna plants to salt stress. The content in proteins, Hydrogen Peroxide (H2O2) and polyphenols as the biochemical parameters were studied in plants aged three months, stressed for two weeks, on two organs: leaves and roots. In the presence of SA, a reduction in protein content was noted in both *Vigna mungo* L. and *Vigna unguiculata* L., and more or less significant accumulation of hydrogen peroxide were observed in the leaves of *Vigna mungo* L. and *Vigna unguiculata* L. and an increase was determined in polyphenol content in *Vigna unguiculata* L. species. This increase was proportional to the degree of stress induced in the two species.

Keywords: NaCl, Vigna , Salicylic acid, proteins, polyphenols, water.

REPTILE BIODIVERSITY IN SOUSS-MASSA NATIONAL PARK, MOROCCO

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ABSTRACT

Souss-Massa National Park (SMNP) is Morocco's first coastal national park, created to preserve the high diversity of its continental and marine environments. Reptiles play an essential role in balancing SMNP ecosystems, yet little work has been done to study this fauna. The present work aims at providing the first reptile inventory of SMNP since its establishment in 1991. During the period 2019 to 2020, several field surveys were carried out at 30 sites using the time-constrained visual encounter surveys (TCVES), with a total sampling effort of 300 person-hours. A checklist of 23 reptile species (including four endemic species) was obtained by combining TCVES results with additional data recorded during random encounters or provided by SMNP researchers. Based on TCVES data (22 observed species), both sampling effort and inventory completeness were evaluated by constructing sample-based accumulation curves and calculating the non-parametric estimators. These latter predicted a total species richness of 23 ± 1.82 (Chao1 ± SD), 22.74 ± 1.4 (Chao2 ± SD), 24.94 ± 1.66 (Jackknife 1 ± SD) and 25 species (Jackknife 2, no SD available). This indicates that only 3.26 to 12% more species are expected to be recorded using TCVES to achieve the asymptote and completeness of the current inventory. Despite its small surface area, SMNP contains nearly 20% of all known Moroccan reptile species and constitutes an important biodiversity hotspot for herpetofauna in the Mediterranean region. In terms of reptile conservation concern, five species in SMNP are classified as "vulnerable", while two species are classified as "near threatened" on the IUCN Red List, underscoring the importance of protected areas for those species.

Keywords: Souss-Massa National Park, reptiles, inventory, time-constrained visual encounter surveys, biodiversity.

VENOMOUS AND NON-VENOMOUS SNAKES OF MOROCCO

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ABSTRACT

Morocco possesses the richest and most varied herpetofauna in the Maghreb and the western Mediterranean. Its reptilian fauna is represented by 116 species, among which 27 species belong to the suborder Ophidia (snakes). The present work provides a list of the Moroccan venomous and non-venomous snakes. Most of snake species found in Morocco are aglyphous snakes, as they have no specialized teeth and are therefore considered non-venomous. Seven opisthoglyphous species are present in Morocco, they possess venom injected by a pair of enlarged teeth at the back of the maxillae, which normally angle backward and are grooved to channel venom into the puncture. The venom of the Moroccan opisthoglyphous snakes is too weak to harm humans. Unlike opisthoglyphous snakes, proteroglyphous snakes have shortened maxillae bearing few teeth except for a substantially enlarged fang pointing downwards and completely folded around the venom channel. Proteroglyphous snakes have venoms most of which consist in neurotoxin, and are amongst the most venomous of all vertebrates. In Morocco the only representative of this group is Naja haje. The last group contains solenoglyphous snakes and it is represented in Morocco by six species, this group has the most advanced venom delivery method. Each maxilla is reduced to a nub supporting a single hollow fang tooth. The fangs folded against the roof of the mouth, pointing posteriorly. This allows vipers to penetrate their fangs deeper into their prey and inject large quantities of venom, which can be lethal. Snakes play an important role in the balance of ecosystems regarding food chains, controlling rodents and as ecological indicators. However, due to human activities, some snakes are considered to be threatened and their population size is declining.

Keywords: herpetofauna, Morocco, snakes, venom.

NEURAMINIDASE-GENE MOLECULAR ANALYSIS OF H9N2 AVIAN INFLUENZA VIRUS ISOLATED IN FOUKA REGION-ALGERIA IN 2017

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ABSTRACT

The H9N2 is the most prevalent subtype of avian influenza, which is endemic in Asia, Middle East and North Africa. In order to analyze virulence and pathogenicity determinants in Algerian H9N2 isolates. This study focused on sequence analysis of Neuraminidase gene of H9N2 strains isolated from broiler flocks showing high mortality rates in Fouka region at the north-center of Algeria in 2017. Nucleotide sequences were retrieved from GenBank database and aligned with representative H9N2 prototypes, WHO candidate vaccine viruses and recent human-cases isolated strains, using Bio Edit software10.0.4. Potential N glycosylation sites on HA and NA gene sequences were predicted under the NXT / S motif (where X can be any amino acid except proline) using the NetNGlyc 1.0 server. The NA hemadsorption site (HBS) showed S370L, S400N, I402N, and Q432R substitutions, these residues interact directly with sialic acid and their modification may affect the function of the protein. The R403W and S372A substitutions associated with adaptation to mammals were detected in our isolates as well as in strains recently transmitted to humans in Bangladesh, Oman and Hong Kong. No NA stalk deletion was found, longer stalk length of NA enhances virus replication as concluded previously. Six potential glycosylation sites were found, with two additional sites at positions 44 and 329 and one lost site at position 86. On the active sites of neuraminidase inhibitors, no resistance mutation was observed. These results would testify to a potential of adaptation of the avian virus to mammals and therefore a possible transmission to humans, which raises the alarm about the need of monitoring the evolution and circulation of this virus in Algeria.

Keywords: Avian influenza; H9N2; Algeria; neuraminidase gene.

ISOLATION OF FUSICLADIUM OLEAGINEUM STRAINS FROM ALGERIA

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ABSTRACT

Fusicladium oleagineum (FO) causes olive scab, commonly called "peacock eye" disease. This olive tree (*Olea europaea*) disease is among the most recurrent. Symptoms appear on leaves as blackish circular spots, becoming yellow. Reached leaves drop prematurely causing foliar volume drop and threes weakness which leads to severe harvest reduction. Olive fruits are also targeted and fall. Current intensive olive groves expansion and climate change provide excellent conditions for the FO development, making it a major concern for farmers. More than their limited effectiveness, available chemical pesticides are ecosystems polluter. Biotrofic FO has been poorly studied since *in vitro* cultures were not obtained. This work exposes isolation technics of FO mono-spore indigenous strains. This would allow a better understanding of the FO biology for new cure pathway perspectives.

Keywords: Olive fruit, Fusicladium oleagineum, scab, spore isolation.

BACTERIOCIN PRODUCTION AND INHIBITORY ACTIVITY OF LACTIC ACID BACTERIA STRAINS

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ABSTRACT

Bacteriocins from lactic acid bacteria (LAB) are potential candidates to use as bio-preservatives of food and as antibiotic alternatives, since there antimicrobial activities against pathogenic and spoilage bacteria. In this work, we studied three LAB identified strains as *Enterococcus* sp CM9, *Enterococcus* sp CM18 and *Enterococcus* sp H3, that produce bacteriocins, named respectively enterocins CM9, enterocins CM18 and enterocins H3. Antimicrobial activity was carried out by the spot agar and well diffusion methods, against fifteen pathogenic bacterial strains. Then, effects of pH variation, heat and chemical agents on enterocins bioactivity were realized by well diffusion assay. The studied bacteriocins showed an inhibitory action against all pathogenic bacteria tested. The supernatant harvested from the liquid cultures of the three LAB strains exhibited an inhibitory activity only on three pathogenic bacteria (*L. monocytogenes*, *E. coli* and S. *typhimirium)*. Enterocins bioactivity of these strains seems stable in acidic and basic medium and also after heat treatment. Excepting with Triton X100, bacteriocin's bioactivity persisted after tested chemical agent's treatment (Tween 20, Tween 80, NaCl, SDS, urea and EDTA).

Keywords: Lactic acid bacteria, bacteriocins, pathogenic bacteria, bioactivity, stability.

HONEY BEE PRODUCTS AND COVID-19

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ABSTRACT

With the development of living standards in recent years, people have become more conscious and have begun to be more careful in food consumption. Consumers want the food they buy to have a positive effect on health as well as its nutritional qualities. With the increase in the resistance of pathogens and diseases, the restrictions on the use of antibiotics have led to studies on the production of other alternatives. The coronavirus (Covid-19) disease, which emerged in December 2019, has now spread to all continents and country borders around the world. Some experts in the world state that one of the strongest measures against the disease is to keep the immune system strong. For this reason, people have directed their search for solutions to natural products and functional foods, and recently, the interest in the consumption of these products has increased. Bee products are at the forefront of these natural product preferences. The effects of bee products on human metabolism, their therapeutic properties and their importance in nutrition have been known for years and are supported by various scientific studies. Due to the Covid-19 coronavirus epidemic that the world is fighting, the importance of using bee products to strengthen the immune system has emerged once again. There are studies on the role of bioactive compounds of bee products in Covid-19. Researchers have stated that bee products can be against Covid-19 infection and have potential effects for the prevention and treatment of its infection. However based on theoretical studies supported by in vitro studies, further and more detailed in vivo studies are needed to evaluate the effect of bee products against Covid-19. Thus, further studies are needed to investigate the potential beneficial use of bee products.

Keywords: Functional food, Covid-19, immune system, bee products

DIVERSITY AND MORPHOMETRICS OF SHRIMPS IN REHABILITATED TIN MINING PONDS OF KAMPAR, PERAK, MALAYSIA

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ABSTRACT

Shrimp species from four sampling sites located within three rehabilitated ex-tin mining ponds surrounding the Universiti Tunku Abdul Rahman, Kampar campus in Perak were surveyed with the aim to investigate their diversity and developmental morphometrics. Shrimp samples were collected using scoop nets over a period of four months. Water samples were collected for pH, dissolved oxygen, temperature, nitrate, nitrite, ammonium, phosphate, turbidity, suspended solids, salinity and water hardness measurements in the laboratory. A total of 3002 shrimp individuals comprising three species of *Macrobrachium* shrimp from the Palaemonidae family were recorded. Of the total samples, 1930 were identified as *Macrobrachium lanchesteri*, 1063 were *Macrobrachium sintangense* and 9 were *Macrobrachium nipponense*. Morphometric data (total length, TL; carapace length, CL; wet weight; WW) were estimated and analysed using SPSS. The assumption of normality was evaluated using Kolmogorov-Smirnov and Shapiro-Wilks *W* tests. All the comparisons made showed significant difference from each other using the Kruskal-Wallis H-test, except for the comparison between CL for individuals of *M. lanchesteri* within sampling site 3 using Kruskal-Wallis H-test and comparison of TL, CL and WW among the individuals of *M. nipponense* between sampling sites using ANOVA. The length-weight relationships (LWR) and length-length relationships (LLR) of the shrimps collected were determined by linear regression. The coefficient of determination (R2) and coefficient of correction (R) indicated that the TL-WW, CL-WW and TL-WW showed significant relationship. The water quality of sampling sites was found to be under Class IIA based on the Interim National Water Quality Standards for Malaysia, which is appropriate for the growth and survival of sensitive aquatic species such as shrimps.

Keywords: Tin mining ponds, Macrobrachium, diversity, morphometrics, water quality.

MERIONES DAHLI IS NOT A SPECIES BASED ON CYTOCHROME B AND IRBP SEQUENCES

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ABSTRACT

Dahl's jird, Meriones dahli, is a member of the Genus Meriones and is distributed in Armenia and Turkey. Armenian distributions are not precise in recent years. Meriones dahli was previously considered a subspecies of M. meridianus in morphological studies. However, the taxonomic status of M. dahli has never been evaluated by molecular studies. In this study, we first determined the phylogenetically taxonomic status of Dahl's jird using two gene regions, one mitochondrial (cytochrome b) and the other nuclear (Inter retinoid-binding protein). Phylogenetic trees and median joining networks revealed that Dahl's jird and M. meridianus were the closest populations. The evolutionary divergence time between these populations was 750 Kya, suggesting that these populations diverged very recently in the middle Pleistocene. The genetic distance between Dahl's jird and M. meridianus was 4% for Cytb; 0.6% for the IRBP and both gene regions to reduce the likelihood of them being separate species. In this study, we found that the genetic differentiation between these two taxa was low compared to other species inferred from both IRBP and cytochrome b sequences (0.6% and 4%, respectively Table 2). Although it is insufficient to use only molecular markers to determine species status, genetic distance values above 10% between populations may indicate different species. The Cytb genetic distance values between Meriones species vary between 12.3% and 20.5%. The genetic distance values within the Meriones subspecies were as follows: 8.6% in M. meridianus, ranges from 2.5% to 9.6% in M. persicus and ranges from 8.6% to 8.9% in M. libycus. Thus our results indicated that Turkish population of M. dahli should be evaluated as a subspecies of M. meridianus supporting morphological data. In conclusion, we characterized genetic distance using molecular methods and propose elevation to subspecies status as *M. m. dahli*.

Keywords: Dahl’s jird, Meriones meridianus dahli, Turkey, Phylogeny.

ISOLATION, IDENTIFICATION AND CHARACTERIZATION OF URINARY TRACT INFECTIOUS BACTERIA AND THE EFFECT OF DIFFERENT ANTIBIOTICS

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ABSTRACT

A urinary tract infection (UTI) is caused when an otherwise sterile urinary tract is infiltrated by microorganism, mostly bacteria. UTIs are one of the most frequently occurring bacterial infection worldwide. Etiological pattern of uropathogens is different in different regions due to continuous evolution and antibiotics sensitivity pattern and misuse and overuse of antibiotics. To warrant suitable therapy, it is important to gain insights into current knowledge of the causative organisms of UTI and their antibiotic is susceptibility. This study was conducted to determine the prevalence of uropathogens as well as the antimicrobial sensitivity pattern of isolated uropathogens from Kohat region. In this study 100 samples were collected from both male and female of all ages in which 67 samples contained microbes and in 24 samples found no microbial growth considered negative culture. Percentage of positive culture from both male and female were 57% and 43% respectively. The most affected age group was 61-70 years old followed by 51-60 years old. Both Gram positive and Gram negative bacteria were found in UTI but *E.coli* (34.21%) was predominant followed by *K. pneumoniae* (10.52%), *P. aeruginosa* (9.21%), *K. oxytoca* (6.57%), *C. albicans* (5.26%), *E. faecium* (5.26%), *E. faecalis* (3.94%), *S. aureus* (3.94%), *E. cloacea* (2.63%), *C. freundii* (2.63%), *P. mirabalis* (2.63%) and *A. baumannii* (1.31%). Many of the isolates showed resistance to commonly used antibiotics. The sensitivity percentage of different commonly used antibiotics against both Gram-positive and Gram-negative bacteria were Ampicillin 13%, Ceftriaxone 25%, Amikacin 77%, Gentamicin 41%, Augmentin 44.77%, Fosfomycin 64%, Cotrimoxazole 36%, Nitrofurantoin 68%, Ciprofloxacin 37%, Imipenem 78%, Meropenem 67%, Cefepime 25% and Tetracycline 40%. The most effective antibiotics against both Gram-positive and Gram-negative bacteria were Fosfomycin, Imipenem, Meropenem Amikacin and Nitrofurantoin. In light of findings of this study, it is strongly recommended to discover new antimicrobial compounds and evaluate the resistant pattern at genomic and proteomics level to discover the genes which are responsible for antibiotics resistant pattern.

Keywords: Bacteria, Antibiotics, Urinary Tract Infectious.

VIRTUAL SCREENING FOR IDENTIFICATION OF PHARMACOLOGICAL CHAPERONES FOR ACID BETA-GLUCOSIDASE

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ABSTRACT

Several sporadic and genetic diseases are caused by protein misfolding. Gaucher Disease (GD) is a lysosomal storage disease caused by mutations in the gene *GBA* encoding acid β-glucosidase (GCase) that cause the protein not to fold into the stable form. The disease manifests itself with symptoms like enlarged spleen and liver, liver failure, skeletal and bone disorders, anemia and in severe cases central nervous system (CNS) involvement. Mutations in GCase disrupt the degradation of glucosylceramide into glucose and ceramide resulting in accumulation of glucosylceramide in the lysosomes, and thus causing Gaucher Disease. Even though there are over 250 mutations related to *GBA*, the disease provoking mutations are a few prominent ones. Small molecules that bind to misfolded proteins and guide them to correct folding by stabilizing the native state of these mutant proteins are called "pharmacological chaperons" and they have been proposed as new methods for treatment of GD and other protein-misfolding diseases. In case of GCase, these molecules are competitive inhibitors of the protein and bind to the mutant GCase in the ER, allowing it to avoid ERAD and to be trafficked to the lysosome where the original substrate replaces the chaperone. Molecules like N-nonyl-deoxynojirimycin, N-octyl-β-valienamine, the iminosugar isofagomine and ambroxol have been shown to increase lysosomal GCase activity. The concept of pharmacological chaperoning makes it possible that orally administered small molecules may take over intravenous enzyme replacement therapy as the standard treatment for GD and other lysosomal storage diseases. Virtual screening is a method to scan and prioritize large and chemically diverse compound libraries computationally to see whether they bind to the protein and function in the desired manner and to identify a subset of compounds for experimental testing. Depending on the knowledge about the target protein and/or known binders, ligand-based or receptor-based techniques can be employed for virtual screening studies. Receptor-based approaches are responsible for evaluating the complementarities and predicting the possible binding modes and affinities between small molecules and their macromolecular receptors. Having a well-defined binding site and known active binders makes GCase a fitting target for virtual screening. In this study, a virtual screening procedure that integrates ligand-based and receptor-based methodologies was applied to scan a library of around two million molecules. 3D flexible pharmacophore filters derived from both the target protein and the known ligand were applied to the small molecule library, giving the procedure both ligand-based and receptor-based properties. Whereas, high-throughput molecular docking experiments of the filtered library correspond to a receptor-based procedure. In this study, large-scale molecular dynamics simulations were also carried out to calculate and analyze binding free energies with linear interaction energy (LIE) method for the docked molecules selected with consensus scoring. A computational workflow for virtual screening was developed and applied to find candidate ligands for GCase. The workflow includes i) pharmacophore creation from either the target protein or the known active ligand or from both, ii) pharmacophore filtering to reduce the size of the library, iii) molecular docking of the filtered compounds to the target's binding site, iv) scoring the bound poses with different scoring functions, and v) running two sets of molecular dynamics simulations on a smaller selected subset of compounds to predict their binding free

energy to the target protein by LIE method. To enhance the hit variety, two different pharmacophore filters were created—one with the information from both the binding site and the known inhibitor and one with the information only from the known inhibitor—and 3 different docking runs were applied—two with AutoDock Vina and one with Surflex-Dock (Version 2.4)—to the hitlists generated by these pharmacophore filters.

Keywords: computer-aided drug design, docking, pharmacophore, bioinformatics, Gaucher Disease.

PHYLOGENETIC ANALYSIS OF HEMAGGLUTININ GENE OF OF H9N2 AVIAN INFLUENZA VIRUS ISOLATED IN FOUKA REGION-ALGERIA IN 2017

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ABSTRACT

The H9N2 is the most prevalent subtype of avian influenza virus (AIV), which is endemic in Asia, Middle East and North Africa. In order to determine the genetic relationships of H9N2 viruses circulating in Algeria, this study focused on phylogenetic analysis of hemagglutinin gene (HA) of H9N2 strains isolated from broiler flocks showing high mortality rates in Fouka region at the north-center of Algeria in 2017. Nucleotide sequences of H9N2 HA gene were aligned with homologous sequences retrieved from BLAST program, along with representative H9N2 prototypes and recent human-cases isolated strains, using MUSCLE alignment in MEGA software version 10.0.4. A percent identity matrix was generated with Clustal 2.1 module in BioEdit then visualized in a heat-map generated with Matrix2png server. The phylogenetic tree was constructed with the neighbor joining method under the Kimura 2 parameter model with 1000 bootstrap replicates using MEGA software.All Algerian strains shared a nucleotide sequence identity of 99 to 100 % and formed a monophyletic cluster. They descended from the Eurasian G1 sub-lineage and grouped within Mideast-group-B clade represented by A/chicken/Iran/B102/2005. The Algerian H9N2 were closely related to other strains isolated in the east of Algeria at the same period (2017) as well as strains from Morocco (2016) Burkina Faso(2017-2018) and Dubai (2015) suggesting a common middle-eastern origin of the virus in the region. Our isolates clustered with high similarity percentages with H9N2 strains isolated recently from human cases in Oman and Senegal (2019), which may indicate a possible adaptation of avian strains to humans. These results highlight the need for continual monitoring and surveillance of the genetic and the evolution of this virus in the region, and the implementation of biosecurity measures to limit its circulation.

Keywords: Avian influenza; H9N2; Algeria; hemagglutinin gene.

ANALYSIS OF A 25KW PHOTOVOLTAIC SYSTEM IN İSKENDER VILLAGE, EDIRNE WITH PV*SOL PROGRAM, IN CASE OF GRID CONNECTED AND OFF GRID INSTALLATION

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ABSTRACT

The correct use of renewable energy sources has gained great importance in meeting the increasing energy demand due to the high use of fossil fuels, the decrease in reserves, negative effects on the environment and climate change. Nowadays, renewable energy sources are preferred in many countries because they are clean and cheap. Although there are many types of renewable energy, the most preferred is solar and wind energy. In recent years, it has been observed that there has been a great increase in photovoltaic installations used to generate electricity from solar energy in Turkey. Although the solar energy potential is quite high throughout the country, the conversion efficiency in electricity generation from solar energy varies depending on the climatic conditions. In the selection of renewable energy sources, it is of great importance that the investments are made correctly, since the energy unit cost also changes according to the amount of energy produced.In this study, the installation features, investment cost and economic analysis of the 25 KW Solar Energy system, which will be installed in a farm in the İskender village area of Edirne, in case of being connected to the on grid and off grid were aimed. According to the results of the analysis using the PV*SOL program; It has been understood that the initial investment cost of the on grid-connected photovoltaic system is economical and the payback period will be much shorter.

Keywords: Solar energy, on-grid system, off-grid system, PV Sol program, economic analysis.

ECONOMIC ANALYSIS OF SOLAR AND WIND ENERGY SYSTEMS ACCORDING TO THE INSTALLATION LOCATION (TRAKYA UNİVERSİTY CAMPUS) WITH RETSCREEN PROGRAM

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ABSTRACT

With the growth of the world economy day by day, the need for energy and new resources is also increasing. Fossil fuels, oil and its derivatives are used as the main energy source in many countries. With the increasing population, these resources are depleted and cause more environmental problems. The importance of renewable energy sources is increasing day by day because they are sustainable, clean in terms of environment and reduce external dependency. The most widely used renewable energy types are solar and wind energy. Our country is more advantageous in terms of obtaining renewable energy compared to many countries due to its geographical location. Especially the southeastern Anatolian region and the Mediterranean region are the regions that receive the most sunshine in our country. Similarly, when the Turkish Wind Energy Atlas is examined, it is seen that the wind potential is high in the Aegean, Marmara and eastern Mediterranean regions. For this reason, it is of great importance to make economic analyzes of the region according to climate data in solar or wind power plant installations. In this study, the cost and depreciation period of the systems for solar/wind energy of 100 kW that will be installed on the campus of Trakya University Engineering Faculty were analyzed. Retscreen analysis program was used to determine the installation cost and the amortization period. Depending on the results of the analysis, it has been concluded that the cost and amortization period of the solar energy system is more advantageous than the wind energy if the solar energy system is installed in the existing location.

Keywords: Solar energy, wind energy, power, retscreen analysis program.

TENSILE TEST AND SIMULATION STUDY OF WOVEN HYBRID COMPOSITE

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ABSTRACT

In this study, experimental and numerical simulation results of Woven hybrid composite tensile test were compared. Woven hybrid composites were fabricated by vacuum infusion method. Epoxy which is the matrix material was filled with SiC (Silicon Carbide) in 3 different weight fraction percentages respectively %5, %10 and %15 and carbon woven fabric was used as fiber material. Specimens were tested and dimensioned by ASTM D3039 standart. Woven composites were modelled in ANSYS ACP(Pre) and simulated Explicit Dynamics. The experimental and simulation tensile strength of the material were compared. Good similarity between the results is observed. The maximum and minimum differences between experimental results and simulation results are %-3.16 and %-8.32 respectively.

Keywords: Woven Hybrid Composite, Tensile Test, Simulation, Finite Element Analysis.

COMMUNICATION AND NAVIGATION OF AN AMPHIBIOUS DRONE

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ABSTRACT

In our lives, the role of drones are increasing day by day. The reason for this is that they are faster, environmentally friendly and ergonomic than other vehicles when doing the same job. With the development of communication and navigation technologies, we will not only see drones in the air. Thanks to the drones that can work in two different areas such as air-water and air-land, their usage areas will expand and they will be more beneficial for us human beings. In this study, it is mentioned how the communication and navigation system of an amphibious drone that can operate both in the air and in the water can work. A buoy system that can send and receive radio and acoustic signals will be used to operate the communication and navigation system of the amphibious drone. In this way, the drone will be able to complete its operation under water with the help of a buoy.

Keywords: Amphibious drone, underwater communication systems, underwater navigation, UAV.

ASSESSMENT OF RICE WASTE FOR THE PRODUCTION OF SUSTAINABLE NATURAL TEXTILE DYE AND CHEMICALS

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ABSTRACT

Wheat, sunflower (*Helianthus annuus* L.) and rice (*Oryza sativa*) are the leading products cultivated in Thrace. The use of agricultural wastes as natural dyestuff and finishing chemicals in textile production can be a good alternative for environmental protection and human health due to their high environmental compatibility, biodegradability and non-toxic nature. In this study, it was aimed to use the extracts obtained from rice husk, one of the agricultural wastes, in textile production by investigating the antimicrobial and dyeing capacities of wool yarns, and thus to bring the rice waste into economy economically. As a mordant material, instead of metal mordants, dyeing was done by using natural mordants such as chitosan, acorn (*Quercus hartwissiana*), thuja (*Thuja orientalis*) cone that will not cause environmental pollution. When the colors and K/S yield values obtained on the wool yarns were examined, it was concluded that the paddy husk extracts could color the wool yarns with a good color yield. The extracts were resistant to 6 different microorganisms (Gram (-) *Escherichia coli* ATCC 25922, Gram (+) *Staphylococcus aureus* ATCC 25923, Gram (+) *Bacillus cereus* ATCC 11778, *Listeria monocytogenes* ATCC 19115, *Salmonella typhi* ATCC 14028 bacteria and its antimicrobial activity against the yeast *Candida albicans* ATCC 10231. It has been observed that it has antimicrobial effect against *S. aureus*, *B. cereus* bacteria and yeast fungus *C. albicans*. It has been determined that the antimicrobial effect varies with the concentration and duration of action.

Keywords: Rice Husk, wool yarn, antimicrobial, biomaterial.

OPTIMIZING THE NODULATION OF CHICKPEA FOR NITROGEN FIXATION AND HIGH YIELD IN LOW INPUT FARMS OF ALGERIA

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ABSTRACT

Chickpea (*Cicer arietinum* L.) is a major crop in low input Algerian semiarid agrosystems. It is generally grown under rainfed conditions in rotation with cereals. The success of chickpea cultivation in matter of yield and as positive part of the cropping system is subjected to numerous factors including optimal nodulation as a major one since chickpea mainly relies on symbiotic nitrogen fixation (SNF) for N nutrition. The main objective of this work is to assess the levels of nodulation of chickpea in the region of Chlef, one of the largest chickpea producing areas of Algeria. Nodulation and growth were measured at full flowering stage in 24 representative sites of the region by carefully digging 30 cm in depth around the root system of 20 plants per site. Shoot and nodule were separated at cotyledonary node and oven dried before weighting. The results indicate a large spatial variation of nodulation in the area ranging from 0 to 0.375 g nodule biomass (NDW) plant-1. Our results also showed that shoot biomass (SDW) is highly correlated with NDW ($R2 = 0.81$, $P < 0.001$) in the study area although the loess curve between NDW and SDW indicates the existence of a low nodulation threshold of 0.1g NDW plant-1 bellow which the contribution of nodulation to the host plant growth was not significant and an high threshold above which the NDW increase is not linked with an increase in shoot biomass. Thus, the significant regression of shoot growth as a function of nodulation ranged from 0.10 to 0.35 g NDW plant-1 ($R2 = 0.54$, $P < 0.001$). Utterly our result provided insights on what could be considered an adequate nodulation in the study area.

Keywords: Legume; Chickpea ; Nodulation; Symbiotic nitrogen fixation.

STRATEGY FOR THE USE OF TRIAZINE HERBICIDES IN TRIAZINE TOLERANT (TT) CANOLA HYOLA® 559TT

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ABSTRACT

Canola is an important rotation crop for the winter season, and the use of atrazine-resistant hybrids can lead to an increase in yield. Field experiments were conducted in Golestan provinces to evaluate Atrazine herbicide efficiency for weed control in Hyola® 559TT (*Brassica napus* L.) in 2020. There were four replications at each site, and treatments were arranged in a randomized complete block design. Maximum weed biomass reduction by 91, 88, and 84 percent was achieved for a week before sowing application of Atrazine (2 l/ha), pre-emergence application of Atrazine (1.5 l/ha), post-emergence application of Atrazine (1.2 l/ha), and respectively. Atrazine in all manner of application (pre-plant incorporation, pre-emergence, and post-emergence) did not have unacceptable phytotoxic effects on Hyola® 559TT. Post-emergence application of Atrazine have excellent potential as a weed control tool in Hyola® 559TT. Atrazine in all manner of application have excellent potential as weed control tool in Hyola® 559TT. Although Atrazine did not provide the best weed control, regarding the restriction of herbicides available for broadleaf weed control in Hyola, it is essential to consider the registration of this herbicide. However, to be identified as having utility for adequately weed control, more investigation about the effects of Atrazine on prevalent weed species is a necessity.

Keywords: Tolerance, plant species, biomass.

ALTERNATIVE PEST MANAGEMENT IN CITRUS: BETWEEN THE POSSIBILITY OF IMPLEMENTING CONSERVATION BIOLOGICAL CONTROL AND THE IMPLICATION OF PHYTOSANITARY PERFORMANCE INDICATORS.

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ABSTRACT

The management of agrosystems has a considerable influence on the natural enemies populations and beneficials of crop pests. In citrus, there are multiple problems due to potential arthropod pests with invasive character for some species, which requires a specialized range of bioregulatory natural enemies for effective control. Indeed, main insect pest populations such as whiteflies, aphids, mealybugs and the Mediterranean fruit fly can cause considerable damage including the appearance of viral diseases leading to yield losses. The abundance of beneficial species in citrus ecosystems is still influenced by changes and disturbances during the season due to management strategies, including conventional phytosanitary practices in the field that may affect prey availability and preferences of the predatory and parasitoid natural enemies for different prey. In particular, chemical pesticides are used in Algerian citrus orchards by nearly 82% of farmers who apply up to 10 active ingredients during a citrus season and up to three times for some insecticides in a short period. The reduction of these toxic products use for the environment conservation and for human and animal health preservation is nowadays a social demand. Literature reports on using indicators of plant protection products pressure as a way to measure the intensity of pesticides usage according to crop systems and their deleterious effects on non-target fauna. On the one hand, farmers and producers should implement strategies to increase the diversity, fecundity and longevity of natural enemies and to promote their earlier colonization in citrus plots. On the other hand, measuring the performance of more sustainable citrus farms through a better reduction of risks due to chemical pesticides would represent a relevant solution. In this study, a review on survey data from citrus farmers and compiled results from studies conducted in citrus orchards on the effects of phytosanitary treatment frequencies on natural enemy availability including the indicators of pesticides treatments indicators is analyzed.

Keywords: citrus, sustainable farming, phytosanitary treatments, indicators, biological control.

EVALUATION OF PHYSICO-CHEMICAL PARAMETERS OF BERRY FRUITS MARKETED IN ALBANIA

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ABSTRACT

Berry fruits are considered essential components of a healthy diet, playing an important role in human nutrition, and recently the interest on them by food scientist and consumers is growing. This study undertake to evaluate physico-chemical parameters of berry fruits blueberry (*Vaccinium spp.),* blackberry *(Rubus spp.),* raspberry *(Rubus idaeus)* and strawberry (*Fragaria ananassa*), which were marketed in Albania. Fruits were collected randomly in Tirana markets, and were evaluated for fruits dimensions, total dry matter (D.M.), total soluble solids (TSS), total titratable acidity (TTA), pH, total ash, vitamin C, and colour for L*, a* and b*. Determined parameters resulted: fruit length 10.80-45.92 mm and width 13.03-35.38, D.M. 20.27-43.4 g/100 g f.w., g/100 g f.w., TSS 9-15 ^{o}Brix, TTA 3.74-6.73 g/100 g of sample fresh weight (f.w.), pH 3.1-3.7, total ash 0.31-0.71 g/100 g f.w., L* 17.05-30.26, a* 1.58-18.93, and b* from -4.01 to 6.49, vitamin C ranged 10.6-48.8 mg/100 g f.w. From comparison between fruits blackberry resulted with the highest content of D.M., ash, pH, and with the lowest TTA, strawberry resulted with the highest vitamin C content and blueberry with the highest TSS, whereas L* value was higher in blueberry and lower in blackberry, had the highest a* and b* values in raspberry, and the lowest in blueberry. Variation were noted for TTA, TSS and vitamin C, whereas no significant differences were noted for other determined physico-chemical parameters. Future studies may be focused on investigation of total polyphenol content and antioxidant potential of these fruits.

Key words: blueberry; blackberry; raspberry; strawberry; physico-chemical parameters.

THE QUALITY CHARACTERISTICS OF DRIED RED CAPIA PEPPER

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ABSTRACT

Convective drying (CVD) at 50, 60 and 70 ºC was applied to obtain dried red capia peppers. The effects of CVD on color values (L^*, a^*, b^*), rehydration capacity, and selected chemical properties including dry matter, pH and titratable acidity of seven dried red capia peppers were compared. In addition, the effects of the cutting types (ring and cube) on the final quality of pepper samples were determined at room temperature. The samples dried at 60 ºC and cut in ring forms (6-R samples) resulted with high-quality dried peppers. 6-R samples showed the highest dry matter, pH, titratable acidity and rehydration capacity (87.06%, 5.69, 807.15 mg citric acid/100 g, 6.72%, respectively). The closest L^*, a^*, b^* values to the fresh pepper samples were achieved for 6-R samples (L^*: 29.87, a^*: 12.83, and b^*: 17.03). In overall, dried red capia peppers in ring forms at 60 ºC can be used to acquire a high-quality food material along with an enhanced color, physical and chemical properties.

Keywords: Color, Convective drying, Red capia pepper, Rehydration capacity, Titratable acidity

EFFECTS OF ACHILLEA SPIKORENSIS EXTRACT -LOADED NANOPARTICLES ON MCF-7 AND HT-29 CELL LINES

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ABSTRACT

The present study aimed to prepare *A. sipikorensis* chloroform extract and evaluate cytotoxic effects. Then, the nanoparticles (NPs) were synthesized on the most efficient extracts and the cytotoxic activity of the free forms of the extracts were compared with the NPs forms. The cytotoxic activities of 9 extracts obtained by column chromatography were evaluated on MCF-7 and HT-29 cell lines using XTT cell viability assay. Chitosan-tripolyphosphate (TPP) NPs were formed using the ionic gelation method of D extracts, which show the most active properties because of cytotoxic activitiy. The cytotoxic activitiy of the characterized NPs were also evaluated. Results showed that particular size of nanoparticle (325.64 ± 2.9) containing *A. sipikorensis* extract were greater than empty nanoparticle (267.56 ± 3.6). It was observed that the viability of the MCF-7 cells was between 35.62 ± 0.77 % and 63.17 ± 0.41 % when only D sample was applied to the cells at the determined concentrations. In addition, the viability of the MCF-7 cells was between 30.45 ± 0.77 % and 52.32 ±0.54 % when D sample loaded nanoparticles was treated to the cells at the determined concentrations. Cell viability of HT-29 cells was ranged from 43.22 ± 0.32 % (100 µg/mL) to 68.06 ± 0.49 % (12.5 µg/mL) when cells treated with only D extract. In addition, cells were treated with nanoparticles containing D extract, the cell viability was between 41.45± 0.60 % (100 µg/mL) and 63.32 ± 0.47 % (12.5 µg/mL). According to the findings, extract made from *A. sipikorensis* has antiproliferative properties in both cancer cell lines. The anticancer activity of nanoparticles containing D extract was shown to be higher than that of the extract.

Keywords: A. sipikorensis, nanoparticles, cytotoxic activity

DRUG REPURPOSING STUDIES WİTH PHARMACOPHORE MODELLING AND DOCKINGFOR SARS-COV2 PROPROTEIN CONVERTASE FURIN

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ABSTRACT

COVID-19 (Severe acute respiratory syndrome), a contagious respiratory disease, threatens public health worldwide. The virus has caused an epidemic all over the world, causing a global pandemic. Till August 2021, worldwide more than 209 million people have been affected by the (COVID 19) Sars CoV-2 virus, while more than 4 million deaths have been recorded. In our country, 6 million confirmed cases and 53 thousand deaths have been recorded and the numbers are increasing rapidly. There are a number of vaccines approved to prevent the disease, but there is no specific drug for its treatment. Drugs are generally put on the market if they are found successful after in vivo and in vitro experiments and clinial trials, this process takes 10 years on average and costs approximately 2.6 billion USD. Being complementary to these methods, up to 30% cost and time savings can be achieved with computer aided drug design (CADD) performed in silico. CADD methods can increase the possibilities of recognizing compounds with desired properties, speed up the hit identification process of targeted precursor molecules, and increase the likelihood of obtaining compounds that can overcome many of the hurdles of preclinical testing. In this study, possible drug molecules that might be effective against Sars CoV-2 were studied using CADD methods. There are four structural proteins in this virus family. One of these, the 'Spike' protein, has a role in the binding of the virus to the host cell receptor ACE2, especially to epithelial cells in the lung alveolar. The spike protein of Sars CoV-2 virus has a furin-like cleavage site and it is degraded by proteases upon entry into target cells. Furin protease is common in human respiratory system cells. In SARS-CoV-2, there is a region that needs to be cut like scissors by furin for the virus to be activated. The aim of this study is to find already existing drug molecules that may bind to the proprotein convertase furin for drug repurposing. Docking simulations on Gentamicin, Valganciclovir, Tobramicin, Netilmicin, Metacycline molecules, which came out in pharmacophore searches conducted for this purpose, have shown that these molecules can bind with proprotein convertase furin. However only Valganciclovir and Metacycline ligands among them can be considered suitable for use by Lipinski standards. In the study, Pharmit was used to model the pharmacophore model, Chimera was used for the docking process, and SwissAdme was used for the investigation of the suitability of the possible drug molecules found.

Keywords: Sars CoV-2, Pharmacophore Modelling, Docking, Computer Aided Drug Design, Spike Protein, ACE2 receptor, proprotein convertase furin.

DRUG REPURPOSING STUDY FOR MAIN PROTEASE OF SARS-COV-2

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ABSTRACT

The outbreak of Covid-19, which emerged in December 2019 and spread rapidly, caused by a new Coronavirus (SARS-CoV-2), was declared a pandemic by the World Health Organization (WHO) in March 2020. Shortly after the emergence of the SARS-CoV-2 virus, many drug and vaccine development studies started with the analysis of its structure. To inactivate the SARS-CoV-2 virus, one of the most promising drug targets is the main protease (Mpro), which performs basic biological functions of the virus and plays an important role in disease spread. Computer Aided Drug Design, a product of evolving science and technology, is a quick and low-cost system based on the discovery of information about the relationships in the disease-protein-ligand triangle and the use of the obtained data in the design studies of new drug active compounds. As a result, it has been widely used in the drug discovery process for the treatment of the SARS-Cov-2 epidemic. A drug repurposing research for Sars-Cov-2 main protease with the PDB code 6W63 was carried out in this work. Chimera software was used to examine the connections between the main protease and its ligand, X77. First the water molecules in the original structure were removed. Then, the X77 ligand bound to the main protease was isolated and main protease and X77 were stored as distinct files**.** The main protease and X77 were re-docked using AutoDock software, and a pharmacophore model was constructed by analyzing the complex using Pharmit. The generated pharmacophore model was used to search in the Drugbank library by Pharmit website. PyRx software was used to perform multi-ligand docking for the five compounds that passed the pharmacophore filter: Dicumarol, Phenyl Aminosalicylate, Sulfisoxazole Acetyl, Sulfalene and Sulfadoxine. The Dicumarol which produced the best results, was then evaluated using DrugBank, Swiss ADME, and Swiss-Target Prediction tools.

Keywords: SARS-CoV-2 Main Protease, 6W63, X77, Ligand, Docking, Computer Aided Drug Design.

THE RECENT DEVELOPMENTS IN DOWNY MILDEW RESISTANCE IN SUNFLOWER

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ABSTRACT

Sunflower (*Helianthus annuus* L.) is one the most planted oil crops in the world and it grows mainly in rain fed regions. Biotic stress factors such as downy mildew (*Plasmopara halstedii* (Farlow) Berlese) and broomrape parasite as well as abiotic stress factors like drought, higher temperatures during growing period are main factors reducing seed and oil yield in sunflower production. Therefore, so sunflower breeders are trying to develop broomrape downy mildew as well as IMI herbicide resistant sunflower hybrids in their programs. Downy mildew could be easily recognized by phenotypic symptoms such as severe damaged dwarf plants, chlorotic infected leaves and white layers of sporangia under lower leaf surface. There is almost identified 50 pathotypes with total of 22 resistance genes (*Pl1–Pl22*, *PlArg*). Single zoosporangia or single zoospore isolates could be advised for precise race determination. However, recent studies indicated that with the uses of molecular markers together with the genome sequences of resistance genes, bioassay-based pathotyping could be replaced by a faster, cheaper and more precise virulence classification. Furthermore, wild *Helianthus* species, especially wild *H. annuus* has broad spectrum downy mildew resistance genes providing durable resistance. Until today many genes have been identified from wild sources such as *Pl8, PlArg, Pl15, Pl17* and *Pl18* genes. For screening genotypes in the sunflower breeding programs, two differential sets accepted internationally were determined and new genes are adding after discovered year by year. However, for effective disease management using genetic resistance, it needs is relevant and timely virulence data then pathogen virulence is determined frequently and by using genetic lines containing resistance genes actively incorporated into commercial cultivars. Furthermore, sunflower hybrids having multiple effective resistance genes as gene pyramiding also increase the longevity of resistance genes and provide more durable resistance than single gene resistance. Therefore, updated virulence, continual evolution of differentials and the relevant resistance genes being incorporated into commercial hybrids give the most efficient and effective manner to control downy mildew. As results, resistance genes will facilitate marker-assisted selection (MAS) and gene pyramiding, and will further help for identifying genes responsible for downy mildew resistance.

Keywords: Sunflower, *Helianthus, Plasmopara halstedii*, resistance, Pl genes, DNA markers,

SOME YIELD AND PERFORMANCE PARAMETERS OF KIRKLARELI BEE (APIS MELLIFERA L.) IN ISOLATED AREA OF KIRKLARELI PROVINCE.

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ABSTRACT

Anatolia is a region that has 5-6 of the 27 bee subspecies in the world, that is, 22-23% of the world's bee genetic diversity. In this sense, it is defined as a unique place in the world. As a result of this genetic richness, which is the result of an advantage provided by the ecological structure and integrated with the agricultural culture, the number of approximately 8 million colonies in our country ranks 2nd in the world, and it ranks 4th in the world with honey production of around 105 thousand tons. However, due to uncontrolled nomadic beekeepers, colonies, and queen bees entering the regions where the breeds are distributed for a long time, the breeds have lost their purity at a significant level and this loss rate is increasing day by day. This negativity also poses a significant threat to environmental sustainability. In addition, while the world colony honey yield is 21 kg on average, this amount has remained at the level of 15-16 kg in Turkey, and in the last 20 years, this yield level has not been increased despite all efforts, on the contrary, it has decreased. Realizing this, the breeder started a search and turned to the use of queen bees that were smuggled out of abroad. The Ministry of Food, Agriculture and Livestock has supported a significant number of projects for breeding purposes due to the importance of the subject, but the private sector has not been able to achieve results due to the complex hereditary structure of the honey bee, the difficulties in protecting the living material, the long years of breeding work, and the practices that require expert team and patient work. and non-governmental organizations (unions), it is seen that it is necessary to work together. For this purpose, in this study, which was carried out within the scope of conservation and improvement studies of the original breeds in their distribution regions, breeding studies were started in 5 provinces throughout Turkey. In this study, the performance data of the breeding candidate colonies selected in the isolated region within the scope of the breeding studies of the Kırklareli bee taken under protection in Kırklareli province were examined. The study was carried out on 200 colonies and honey yields, agressive levels, colony development and hygienic behaviors of the colonies were examined. As a result of the study, the average number of bee frames of the colonies included in the study was determined as 9.47±2.59 kg, the hygienic behavior was 97.18±1.77%, the aggressive behavior was 1.01±0.10 and the honey yield was 11.19±4.81 kg.

Keywords: Kırklareli bee, performance values, honey yield, agression, hygienic behavior

SOME YIELD AND PERFORMANCE PARAMETERS OF GÖKÇEADA BEE (APIS MELLIFERA L.)

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ABSTRACT

In Turkey, the Caucasus (A. m. caucasica G.), Anatolia (A. m. anatoliaca M.), Syria (A. m. Syriaca), Iran (A. m. meda) and Carniolan (A. m. meda) adapted to different geographical regions. . m. carnica) has important bee breeds. Thanks to this genetic richness, Anatolia is defined as a unique place, while it is considered as the agricultural beekeeping center of the future in the world due to this natural wealth integrated with the agricultural culture of our people. Due to the richness of its flora (74% of the species and varieties in the world), as well as its geographical structure, the nectar flow spreads over a long period of 6-7 months in a year, unlike anywhere else in the world, and this structure has provided the formation of an economic aquaculture system such as nomadic beekeeping. It is the country with the second largest potential in the world after China, with 8 million colonies in one hundred and sixty thousand enterprises and honey production around 105 thousand tons. However, due to uncontrolled nomadic beekeepers, colonies, and queen bees entering the regions where the breeds are distributed for a long time, the breeds have lost their purity at a significant level and this loss rate is increasing day by day. This negativity also poses a significant threat to environmental sustainability. In addition, while the world colony honey yield is 21 kg on average, this amount has remained at the level of 15-16 kg in Turkey, and in the last 20 years, this yield level has not been increased despite all efforts, on the contrary, it has decreased. Realizing this, the breeder started a search and turned to the use of queen bees that were smuggled out of abroad. The Ministry of Food, Agriculture and Livestock has supported a significant number of projects for breeding purposes due to the importance of the subject, but the private sector has not been able to achieve results due to the complex hereditary structure of the honey bee, the difficulties in protecting the living material, the long years of breeding work, and the practices that require expert team and patient work. and non-governmental organizations (unions), it is seen that it is necessary to work together. For this purpose, in this study, which was carried out within the scope of conservation and improvement studies of the original breeds in their distribution regions, breeding studies were started in 5 provinces throughout Turkey. In this study, yield and performance data of breeding candidate colonies selected within the scope of breeding studies of Gökçeada bee, which is located in a natural isolated area in Çanakkale province Gökçeada, were examined. The study was carried out on 200 colonies and honey yields, agressive behaviour levels, colony development and hygienic behaviors of the colonies were examined. As a result of the study, the average number of bee frames of the colonies included in the study was determined as 5.51±1.72 kg, hygiene behavior 95.21±1.32, aggression behavior 0.98±0.65 and honey yield 8.24±2.54 kg during the period.

Keywords: Gökçeada bee, performance data, honey yield, irritability, hygienic behavior

MOLECULAR PHYLOGENETIC ANALYSIS AND GENETIC CHARACTERIZATION OF WILD SPECIES IN SUNFLOWER (*Helianthus spp*.)

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ABSTRACT

Sunflower (*Helianthus spp.*) is a family of *Asteraceae* family. Most wild species are of North American origin. This plant, which has a very beautiful appearance, was known as an ornamental plant in Europe before, but it was started to be used to increase the oil rate in Russia in the 18th century. There are many wild varieties of this plant, which originated in ancient times. The most common and important is *Helianthus annuus*. Wild sunflower species each have their own characteristics; they are adapted to a wide variety of habitats. They have genetic diversity that can be a sufficient source of allele for the continuous improvement of cultivated sunflower. They are very useful in terms of increasing hybrid plant production today. Wild *Helianthus* species are potential sources of genetic variability. They have provided many genetic resources in production for increased quality and yield, such as drought resistance, disease resistance, soil salinity resistance, resistance to biotic and abiotic stress sources, adaptation to weak soils. These beneficial genes from wild species have expanded the narrow genetic basis of the cultivated sunflower, to provide a permanent source of the desired agronomic properties, to develop the cultivated sunflower. Useful genes that play a role in the higher efficiency and better quality performance of hybrids obtained by expanding the genetic material capacity, increasing the heterology, durability and cross-species hybridization should definitely be utilized. They are very necessary in line with increasing needs. To develop new sunflowers, germplasms must be preserved and preserved. Because they are accepted as a model organism for cultivated sunflower. A phylogeny dissolved in the genus is essential for your studies in this area. Molecular phylogenetic studies have contributed significantly to our understanding of *Helianthus'* phylogenetic relationships.

Keywords: *Helianthus*, wild species, phylogeny, Molecular markers

THE GENETIC CHARACTERIZATION OF WILD SUNFLOWER SPECES (*HELIANTHUS SPP*) AND INTERSPECIFIC HYBRIDS BASED ON BROOMRAPE RESISTANCE

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ABSTRACT

Sunflower is known as an important oilseed crop and is also consumed as roasted nuts and bird feed. The plant has been treated by plant growers and researchers, which has led to the yellow revolution in many countries. Russian plant growers have improved the oil content of sunflower seed, which transforms this crop from a roadside plant to a world-famous oilseed crop. Cultivated germplasma preserves 50% of the genetic diversity found in wild relatives. There is a need to use existing genetic diversity within cultured and wild gene sources to develop pre-cultivation lines and elite cultivation material with good coupling quality. Sunflower breeding; hybrid breeding includes the development of appropriate breeding lines for diseases, abiotic stress and herbicide resistance. These lines are created by crossing wild species with cultured sunflowers, crossing wild species with other wild species, or hybrid cultivating with other species as a result of crossbreeding. The biggest problem in cytoplasmic male infertility, diseases, abiotic and especially sunflower is Orobanche spp. wide crosses were made to find solutions to their resistance. These goals are fulfilled through repeated choices to improve the population. But choosing phenotypically durable lines is time consuming and not very reliable. Thanks to the molecular markers, durable breeds are detected in a short time and the time to obtain hybrid varieties is shortened and accurate, reliable results are obtained. Thus, a high increase in efficiency will be observed by providing a permanent endurance.

Keywords: Sunflower, Wild species, *Helianthus*, Orobanche parasite, Resistance, Genetic characterization

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IN VITRO CULTIVATION OF SAFFRON (CROCUS SATIVUS L.) AND ASSESSMENT OF GENETIC HOMOGENEITY USING IPBS MARKERS

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ABSTRACT

This research was an attempt to develop a protocol for most optimal *in vitro* cultivation of saffron (*Crocus sativus* L.). The dried stigmas of the plant as known as spice imparting colour, flavour and aroma to foods and beverages. The appropriate disinfection procedure to introduce corm explants into *in vitro* culture was established. The optimum corm formation and corm growth (mean number of 3.6 per explant) was achieved on Murashige and Skoog (MS) medium containing 5 mg/l 6-benzylaminopurine (BAP) and 1 mg/l indole-3-acetic acid (IAA), while MS supplemented with 1 mg/l indole-3-butyric acid (IBA) was the best medium for root development. The fingerprinting profiles of the field saffron and the *in vitro* cultures assessed by iPBS markers were found identical which implies that no genetic alterations have occurred in response to *in vitro* cultivation.

Keywords: corm, tissue culture, *in vitro*, organogenesis, surface sterilization, molecular markers

PERFORMANCE OF *PI40*, A RICE BLAST DURABLE RESISTANT GENE, AND PI40 GENE INTROGRESSED ADVANCED LINES AT FIELD CONDITIONS

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ABSTRACT

This study aimed to determine the reaction of the durable resistant *Pi40* gene against rice blast fungus (*Magnaporthe grisea*) races at different stages of plant development in field conditions in Turkey, and to transfer the *Pi40* gene to high-yielding Kiziltan rice cultivar progenies between 2011 and 2015. *Pi40*-harboring donor lines were introduced from the International Rice Research Institute (IRRI). *Pi40*-harboring material, local varieties, and Kiziltan progenies obtained by crossing Kiziltan and *Pi40*-harboring lines were used as materials in this study. The results of the experiment showed that the *Pi40* gene was field resistant to blast races in all experimental locations. Crosses were created between Kiziltan and *Pi40* gene donor lines, and by using a CAPs marker specifically designed for the *Pi40* gene, the advanced lines of the transferred *Pi40* gene were selected using marker-assisted selection (MAS) for selfing. In this study, high yielding blast-resistant *Pi40* genes were transferred, and promising lines were obtained; these lines were tested in a blast nursery and yield trial in 2015.

Key words: Marker assisted selection, *Pi40* gene, rice blast, *Magnaporthe grisea*

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