AGRIBALKAN 2023

V. BALKAN AGRICULTURAL CONGRESS

20-23 SEPTEMBER 2023,

EDİRNE, TURKEYV. BALKAN AGRICULTURAL CONGRESS

http://agribalkan.net/

20-23 SEPTEMBER 2023,

EDİRNE, TURKEY

In Trakya University Balkan Congress Center, Edirne, Turkey

Organized by Trakya University

with

Trakya Universities' Union, Balkan Universities' Union, Namik Kemal University, Onsekizmart University - Turkey, Uludag University, Turkey, Agriculture University of Plovdiv, Trakia University-Stara Zagora - Bulgaria, Democritus University of Thrace – Greece and with contribution of other Balkan Institution

Dear Colleagues,

You are welcome to our congress which will be organized by Trakya University supporting with Trakya Universities Union, Balkan Universities Association and together with other Balkan Universities and İnstitutions.

The aim of our international congress is to present the newest research results and research goals, analyze current conditions and perspectives in agriculture.

Conference activities;

Plenary sessions with oral and poster presentations are on 20-23 September 2023.

You are welcome to our congress and Edirne, TURKEY,

Yours sincerely,

Prof. Dr. Erhan TABAKOĞLU

Rector of Trakya University
Honorary Chair of Congress

Prof Dr Yalcin KAYA

Head of Organizing Committee

FOREWORD

Agriculture is such an important sector feeding all humankind, but it needs new developments and technologies to supply enough food for increasing world population year by year. Turkey is one leading agricultural economy in the world. The Balkan region is one the important agricultural areas of the world having rich soils producing vastly different crops and keeping enormous biodiversity for our future.

As there have been many different scientific meetings around the world, we intended to bring three communities together, namely science, research, and private investment, in a friendly environment of Edirne / Turkey to share what they have and get benefit from each other. Trakya University intended to aim that agricultural community in Balkan areas should come together in that important event. Our congress goal is the agricultural subjects should be kept broad to provide opportunities to the science community to present their work that can be of value for agriculture.

First Balkan Congress was organized by Trakya University in 2014 as the biggest agricultural congress in Turkey and Balkan region. In the first congress, over 700 participants were presented total 830 papers (650 poster and180 oral presentations) and invited speakers presented country reports from all Balkan countries. 2nd Balkan Agriculture Congress was organized by Tekirdağ Namik Kemal University in 2017. The 3rd Balkan Agriculture Congress was hosted again in Trakya University in Edirne, Turkey in 2021 due to 40th anniversary of Trakya University. There was worldwide participation from 41 countries with 406 papers contributed by 988 authors with 288 oral, 118 e-poster presentations. In 4th Agribalkan Congress, there was a worldwide participation from 41 countries with 388 papers contributed by 888 authors.

As fifth one, Trakya University will host you again in Edirne, Turkey in 2023. We would like to thank all participants for their great interest worldwide to our AGRIBALKAN 2023 congress. We got 488 papers from 25 countries contributing by 1144 authors with consisting of 288 oral and 180 poster papers.

We hope that this congress will help to solve our problems by establishing good network collaborations, joint projects, and better relationships among countries with sharing our knowledge and experiences together. We wish success for this meeting and hope for a great scientific achievement with your contributions.

Edirne is a very nice, lovely, and historical city just at the edge of Europe, but just right at the heart of the Balkan region and history endowed with monuments reminding of the imperial past. We are much pleased to host you all in Edirne and in Turkey. We would like to thank you for joining this congress and we would also like to give special thanks to our sponsors and collaborators for giving us big support to organize this event.

We wish you a nice stay in Edirne for truly rewarding days.

Prof. Dr. Erhan TABAKOGLU
Rector of Trakya University
Honorary Chair of Congress

Prof Dr Yalcin KAYA
Director of TU Plant Breed. Res. Center
Head of Organizing Committee

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ABSTRACT

The Geminiviridae family is a group of plant viruses that use a circular genome to encode their genetic material. They are the largest family of single stranded DNA viruses and are mainly represented by the Begomovirus genus causing significant harm to agriculture globally. Begomovirus can be monopartite or bipartite, with the DNA-B component encoding the nuclear shuttle protein (NSP). NSP aids in moving viral DNA from the nucleus to the cytoplasm, and it works with the movement protein (MP) to transfer viral DNA from infected to uninfected cells. In current examination, the NSP protein reference sequences (RefSeq) belonging to nine tomato virus species of Gemniviridae family were achieved from NCBI. Prediction of Primary and secondary structures of NSP protein were done using ProtParam and SOPMA, respectively. All the species had the range of 200 to 300 amino acids in length. The theoretical PI (isoelectric points) and molecular weight were estimated at a range of 9.65–9.95 and 29758.15–28770.97 kDa, respectively. High aliphatic index in NSP (ranged 66.60-80.35) indicated structural stability of this protein in tomato virus samples. The GRAVY values of this protein designated that as a hydrophilic protein in nature. Furthermore, the Instability index analysis of tomato viruses NSP revealed that one of the virus samples, Tomato golden mottle virus, were stable and the rest of them were unstable proteins. secondary structural analysis presented that the most plentiful structural elements of the secondary structure were extended strand and random coils, whereas beta turns and alpha helixes were occasionally distributed in the proteins.

Keywords: *Geminiviridae*, NSP, Protein structure, tomato, Viruse

BIOINFORMATICS ANALYSIS OF NUCLEAR SHUTTLE PROTEIN (NSP) IN SOME GEMINIVIRIDAE SPECIES

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ABSTRACT

Nuclear shuttle protein (NSP) is a type of protein that plays an important role in the protein import/export process in viruses. NSPs are found in many DNA and RNA viruses, including Herpesviruses, Papillomaviruses, and Adenoviruses, and are involved in transferring viral proteins and nucleic acids between the nucleus and the cytoplasm of host cells. Geminiviruses are single-stranded DNA viruses that infect a wide range of dicotyledonous and monocotyledonous plants. In this analysis, the NSP protein reference sequences (RefSeq) belonging to different viruses species of Gemniviridae family were downloaded from the National Center for Biotechnology Information (NCBI) in FASTA format. Three-dimensional modeling of ToMLCuV was predicted by Phyre2 as the model and compared with other NSP begomovirus samples.The presence and location of signal peptide cleavage sites in NSP sequences were predicted by the SignalP 4.1 server. TMHMM was used to identify transmembrane helices. The tertiary structure of ToMLCuV was predicted using the “c6f2sH” model (PDB accession code: 6f2s) as a suitable template, with 94.7% confidence, 61% coverage and 15% identity. Moreover, PHYRE2 prediction revealed that the tertiary structure of NSP viruses were very similar to each other which confirmed the structural stability of this protein. No signal peptide was observed in all protein samples based on SignalP analysis and it showed none of the samples were secretory proteins. Transmembrane proteins are a class of integral membrane proteins that span and are permanently associated with biological membranes.

Keywords: Bioinformatic,Geminiviridae, NSP, Protein structure, Virus

DESIGN AND IMPLEMENTATION OF AN OFF-GRID SOLAR BASED SEMI-AUTOMATIC DRIP IRRIGATION SYSTEM FOR OLIVE GROVES IN CANAKKALE

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ABSTRACT

Consumption of energy is increasing at a rate of roughly 1% per year, and at a rate of 5% per year in developing countries. At the present time, the increased energy demands, decreasing fossil fuels reserves, and escalating environmental issues such as greenhouse effect and global warming make necessary researchers to survey productive and alternative energy resources. Renewable energy resources play a crucial role in retainable development and environmentally friendly energy resources. Renewable energy resources include many types of energy resource such as hydropower, solar, wind, biomass, hydrogen, geothermal and wave and it is aimed to eliminate dependence on fossil-based fuels through these energy resources. Solar energy is the most conspicuous, free, available, and clean energy for the environment, among all renewable energy resources and has an important position in electricity production worldwide. Solar irradiation can be converted to direct current electricity in care of the use of photovoltaic (PV) technology. Türkiye has an abundant resource in solar energy due to lies in a sunny belt of the earth between and the 26th and 45th east meridians and 36th and 42nd northern parallels in regard of most of other countries. Solar water pumping systems are one of the most featured applications of solar energy systems and are required in recent years in various fields such as desert places, certain metropolitan areas, and especially rural areas. Irrigation is significant for agricultural productivity. To obtain high yield and quality products is possible with an adequate amount of irrigation. For agricultural irrigation, either gasoline-based water pumping systems or electrical water pumping systems are used. Electrical water pumping systems which are extensively seen on operation are single and multi-stage centrifugal pumps, surface pumps, and submersible pumps. Motor types used in mentioned water pumping system can be specified as AC induction motors, and permanent magnet brushed DC motors. Solar water pumping systems are required in rural areas due to the inability of consumers to connect to the utility grid. In this study, the setup of 340W off-grid solar based semi-automatic drip irrigation system necessary to accommodate the energy necessity of submersible pump to use in the irrigating almost 3 acres of olive grove located at Ezine, Çanakkale is fulfilled. The solar irrigation system, which was installed in the spring of 2022, basically consists of 2 PV panels (12 Volt, 340 Watt), 12 Volt DC submersible water pump, paco switch, and a digital timer. Solar irrigation system is planned without battery group since irrigation is programed between 9.00 and 18.00 hours during the day. Thus, installation cost of system is reduced. Also, the solar irrigation system can be repeatedly operating in 7 days in different time periods with a digital timer. Owing to the installed semi-automatic drip irrigation system, the water needs of the olive trees are met by manual or time adjusted. Therefore, the economical irrigation is realized while agricultural productivity is increased. In addition, the specified irrigation system can be applied in farms, various agricultural lands, parks, greenhouses, horticultural lands and wherever an efficient, eco-friendly, cost-effective, and sustainable irrigation system is needed.

Keywords: Semi-automatic drip irrigation, Off-grid solar system, Sustainable production, Renewable energy

MATHEMATICAL AND STATISTICAL INTERPRETATION OF PARAMETERS USED IN SOME BIOINFORMATICS DATABASES AND SOFTWARE TOOLS

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ABSTRACT

In recent years, precious research in the field of bioinformatics has revealed the importance of bioinformatics. Undoubtedly, there are many bioinformatics databases and software tools in accordance with the intended use. Which databases and software tools to use in which situations and the interpretation of the parameters encountered here in a mathematically and statistically meaningful way is very important and needs to be understood. The aim of this study is to explain the purpose of using some databases and software tools frequently used in bioinformatics analysis studies such as NCBI, BLAST, Expasy, ProtParam, PDB, UniProt, STRING, EMBL-EBI, DDBJ and to draw attention to the importance of correct interpretation of the parameters encountered during their use.

Keywords: Bioinformatics databases, Software tools, Parameters, Sequence alignment, 3D protein structure

THE EFFECT OF DIFFERENT SOWING TIMES ON SOME MORPHOLOGICAL AND AGRICULTURAL CHARACTERISTICS OF BUCKWHEAT (FAGOPYRUM ESCULENTUM)

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ABSTRACT

It was aimed to investigate the effect of different sowing times on some morphological and agricultural parameters of buckwheat (population) plant, which has different uses, in spring under Ankara ecological conditions and to determine the appropriate sowing time. The experiments were conducted in a randomised block design with five replications in 2017-2019 under natural conditions. According to the results of the research, buckwheat plants were damaged by low temperatures in late March and early April sowings and herbage yields decreased significantly. The lowest green herb yield was obtained in late March (40.73 kg da-1), the highest after mid-April (381.83 kg da-1). It is recommended to plant after mid-April in the region due to damage to the plant in early plantings.

Keywords: number of plants per square meter, stem length, stem thickness, green and dry herbage yields

EFFECTS OF SLOW-RELEASE NITROGEN FERTILIZERS AND REDUCED DOSES ON CORN YIELD AND QUALITY

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ABSTRACT

Nitrogen is an absolutely essential nutrient for the growth of the maize plant. Nitrogen element supplied to the soil by fertilization process may be lost due to processes such as leaching and denitrification. In order to reduce these losses, the effectiveness of applying slow-release nitrogen fertilizers and urea fertilizer at a depth of 15 cm was investigated. This study is based on field trials conducted over 2 years of growing maize crops. The trials consisted of the following groups: G1: mineral application, G2: urea fertilizer at 15 cm depth, G3: ammonium inhibitor fertilizer, G4: urease inhibitor fertilizer, G5: 25% reduced ammonium inhibitor fertilizer, G6: 25% reduced urease inhibitor fertilizer. As a result of the study, the highest yields were obtained from the G2 and G4 groups in the first year and only from the G2 group in the second year. Although the early application of ammonium inhibitor fertilizer (about one month after fertilization) increased the ammonium in the soil compared to the other groups, more inorganic nitrogen content was determined in the soils where deep fertilizer was applied in the later periods. The results obtained showed that the parameters related to nitrogen content in leaves and grain (chlorophyll content, nitrogen, protein) were more effective with urease inhibitor fertilizers and deep fertilization application. Deep fertilizer application gave more positive results in the experimental soil with a pH value above 8. However, according to the results of the economic analysis, mineral application was ahead of all slow-release nitrogen fertilizer applications. Deep fertilizer application seems to be the method that gives the best results in economic term.

Keywords: corn, nitrogen, slow-release nitrogen fertilizer

DETERMINATION OF STRESS TOLERANCE OF OAT PLANT (AVENA SATIVA L) ON APPLICATION SEED OF SALICYLIC ACID

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ABSTRACT

Every plant encounters abiotic stress during the vegetation period. As the severity and intensity of this stress increases, the rate of damage to plants increases. In this study, oat plants were grown in soil salinity conditions, which is one of the abiotic stresses that plants are most exposed to. The variation of stem length and stem diameter and total protein content from the growth characteristics of the plant were investigated. Within the scope of the study, 7 different soil salinities (S1: 0.5, S2: 1.0, S3: 2.0, S4: 3.0, S5: 5.0, S6: 7.0 and S7: 10.0 dS m-1) were created to provide stress conditions. However, 3 different seed pretreatment subjects (K: Control, SA1: 1 mM Salicylic Acid, SA2: 2 mM Salicylic Acid) were created to determine tolerance to stress. As a result of the study, both stem diameter and protein content were found to be 2.35 cm and 0.206 mg/ml, respectively, in the KS7 subject, and 5.19 cm and 0.743 mg/ml, respectively, in the SA1S4 subject. While trunk length reached the highest average in SA2 application, it decreased by approximately 4% in SA1 application and approximately 21% in K application. As a result, oat plant exposed to abiotic stress showed resistance to stress with SA application and increased growth characteristics. In addition, a similar change was observed in the protein content, and the stress was tolerated by seed application.

Keywords: Oat, Soil Salinity, Tolerance, Plant Growth, Protein

THE SIGNIFICANCE AND APPLICATION OF SINGLE CELL RNA SEQUENCING (SCRNA-SEQ) TECHNOLOGY IN PLANT BIOTECHNOLOGY

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ABSTRACT

Abiotic and biotic stress factors (such as nutrient and water resources, pathogens, natural disasters, and soil conditions) are important factors affecting plant growth and development, and it is not always possible to obtain high plant yields with only agricultural activities. The use of sequencing technologies to analyze genetic variation and metabolic regulation has an important role in improving knowledge of plant development processes and response to stimuli. Today, the use of high genomic technologies is widely adopted in plant breeding, conservation of biodiversity, and improvement of crops against stress factors. The emergence of transcriptomic, proteomic, or metabolomic approaches has made important contributions to the discovery of mechanisms in complex biological processes in plants. Single cell RNA sequencing (scRNA-seq) technology is the sequencing of a single genome for genomic or transcriptomic information that can reveal heterogeneity between cell populations. scRNA-seq methodologies overcome the challenges of mass gene expression of whole tissue, allowing high resolution identification of individual cells, discovery of new cells, and comparison of cell identity in plants. The scRNA-seq workflow includes the separation of target cells from tissue, isolation of cell, RNA extraction, cDNA synthesis, single-cell sequencing, expression profiling, and cell type identification. In recent years, scRNA-seq analysis has become an important technique in gene profiling studies under different environmental conditions, gaining importance in determining cell type-specific gene expression against various stress stimuli. In this study, the recent situation of scRNA-seq technology in plant breeding and the research carried out using scRNA-seq technology is presented.

Keywords: abiotic stress, biotic stress, genomics, single-cell RNA-sequencing

EFFECT OF THE MAIN AGRONOMY FACTORS ON THE ECONOMIC CHARACTERISTICS OF GRAIN IN SOME TRITICALE CULTIVARS

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ABSTRACT

During 2018 – 2021, the effect of the main agronomy factors on the economic characteristics of the grain from some triticale (*Triticosecale*) cultivars was studied. The experiment was carried out in the experimental field of Dobrudzha Agricultural Institute – General Toshevo on slightly leached chernozem soil (Haplic Chernozems). The cultivars (Kolorit, Akord and Dobrudzhanets) were grown after four previous crops (winter oilseed rape, spring pea, sunflower, and grain maize) and five levels of nutrition regime differentiated according to the nitrogen norms depending on the previous crop. After spring pea, 30 (T1), 60 (T2) and 90 (T3) kg N/ha were applied, and after the rest of the previous crops – 60 (T1), 120 (T2) and 180 (T3) kg N/ha. The experiment also included transition to organic production (TO) and a check variant (T0), which represented the natural soil fertility. All variants were with background fertilization of 60 kg P2O5/ha and 60 kg K2O/ha. The yield from triticale during the period of study was determined by the independent action of the factor *level of nutrition regime* with *48.34 % and its combined interaction with the year 10.52 %*. The roles of *the year (13.81 %),* and *the cultivar (31.22 %)* were decisive for the formation of test weight of grain. Thousand kernel weight was strongly influenced by the independent effect of the factors *year* (20.83 %), *cultivar* (19.01 %), *previous crop* (11.76 %) and the *combined interaction year * level of nutrition regime* (LNR). The obtained results showed that triticale was in a positive correlation with LNR – 0.614**. A significant positive correlation was found between the parameters characterizing the physical properties of grain (0.543**).

Keywords: fertilization, cultivar, previous crop, transition to organic production

AGRO-PHYSIOLOGICAL PARAMETER IN BARLEY (HORDEUM VULGARE L.) GENOTYPES UNDER RAINFED CONDITIONS

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ABSTRACT

Crop yield in barley is a complex character depending upon a large number of environmental, morphological and physiological characteristics. The experiment was carried out under rainfed conditions in the Trakia region in Edirne (Türkiye) location during the 2018-2019 cycles. The experiment was set up with 25 genotypes in a randomized complete block design (RCBD) with four replications. Grain yield (GY), chlorophyll content (SPAD), peduncle length (PL), spike length (SL), number of kernels per spike (KNS), spike weight (SW), days of heading (DH), plant height (PH) were investigated. The analysis of variance (ANOVA) revealed significant differences among genotypes for all parameters (P<0.01). Averaged the overall mean grain yield, genotypes G4 (8454 kg ha-1), and G18 had the highest grain yield. In genotypes, chlorophyll content was measured at the heading stage and ranged between 45.7 and 55.7, the lowest and highest. The longest peduncle was measured in G14 (33.7 cm), while the short peduncle was determined in G3 (25.6 cm). The study indicated that the longest spike was produced by G23 (9.43 cm). The short spike length was determined in genotype G17 (5.82 cm). Kernel number in spike varied from the lowest to 19.5 (G17) and the highest to 57.7 (G18). The highest spike weight was determined in G18 (2.63 g). Earliness is an important factor especially, in drought environment conditions, and the earliest genotype was G7 (99.5 days) while the latest heading was in G19 (117.3 days). Grain yield and spike length were positively correlated with plant height. Since the increase in spike weight would be associated with the rise in the number of grains per spike, it caused a decrease in the importance of 1000 grains and test weight in genotypes. Spike weight was also negatively correlated with grain uniformity (r=0.454*). Increasing the number of grains in the spike caused a decrease in TKW (r=-0.870**), TW (r=-0.744**), protein ratio (r=-0.475*) and grain uniformity (r=-0.687**). The increase in chlorophyll content increased the protein ratio in genotypes. Depending on the increase in grain weight in genotypes, significantly increased the protein ratio, 1000 kernel weight and grain uniformity. Higher protein content was determined in tall genotypes. Higher test weight was determined in homogeneous and large-grained genotypes.

Keywords: Barley, genotypes, grain yield, agronomic traits, physiological parameters

TEMPORAL CHANGES IN NDVI VALUES OF VINEYARDS IN TENEDOS (BOZCAADA) ISLAND, ÇANAKKALE, TURKEY

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ABSTRACT

Regularly monitoring of plant status may help to understand healthy and stress conditions during the production season. Present study is conducted in Tenedos (Bozcaada) Island of Çanakkale province, which is located on the Aegean Sea, is one of the most famous grape production areas in Turkey, and production areas of the island comprise 25% of the province's total production areas. Changes in Normalized Difference Vegetation Index (NDVI) values were monitored during two different years using available Sentinel-2 imageries with cloud cover under threshold value of 20%. In addition, averaged Sentinel-2 imageries of each year were classified to discriminate vineyards from other land use land cover (LULC) types in the area. Vineyards were extracted from LULC maps for assessing changes in NDVI values considering maximum, minimum and mean values obtained from isolated vineyards of LULC maps. Determination of seasonal changes believed to help managing strategies such as irrigation and fertilization practices in further steps, whereby analysis of soil and leaf samples would provide better understanding of correlations between NDVI and soil-related conditions.

Keywords: LULC, NDVI, Sentinel-2, Tenedos (Bozcaada) Island, Vineyard

USING SHAPE AND COLOR TO IDENTIFY WEEDS. A REVIEW FOR EASTERN AND CENTRAL EUROPE.

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ABSTRACT

One of the most important factors affecting crops in agriculture, are weeds. At present, many smart agriculture tasks, such as plant disease detection, crop yield prediction, species identification, weed detection, and water and soil conservation, are realized through computer vision technology. Many paper works propose precise variable spraying methods in order to prevent excess consuming and adverse problems caused by herbicides, or any other inputs. The first step in weed control is to separate the crops from the plants that does not interest us. This can be done extracting and discriminate crop vs weed from the acquired visuals, based on different shape and color. It is already literature addressing robot harvesting machines that achieve lower accuracy in spotting and picking crops due to occlusions caused by leaves and twigs. In this respect, in the following paper we will analyze methods for realizing field weed detection by using computer vision technology that mainly include traditional image processing and deep learning. Several reviews on the application of machine learning in agriculture and an overview of using deep learning methods to achieve agricultural tasks have been presented. They have either provided a comprehensive overview of the methods applied in the entire agricultural field or conducted the latest research on a certain type of technology for a specific task. This paper will provide certain reference to future research and will be addressed to the specific crops from Central and Eastern Europe, as wheat, maize and peas.

Keywords: smart agriculture, image recognition, weeds control, deep learning, machine learning

INTEGRATED SYSTEM FOR AUTOMATIZED CONTROL OF EXPERIMENTAL CROPS THROUGH AERIAL/GROUND REMOTE SENSING FOR PRECISION FARMING

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ABSTRACT

INSAC-AGRIS is a research project that develops an integrated system for the automated control of experimental crops through aerial and ground monitoring. Its goal is to obtain precise data about plants and soil using aerial imagery, sensors, and chemical analyses. By using correlation algorithms, the project aims to anticipate crop properties and enable differentiated application of agricultural inputs, as well as detect and control pests. INSAC-AGRIS has the potential to revolutionize precision farming, providing farmers with valuable tools and knowledge to achieve optimized yields. Precision agriculture represents an innovative approach in managing agricultural crops, utilizing advanced technologies to optimize yield and efficiency in agriculture. An integrated and automated system is essential for collecting and analyzing real-time data required for decision-making. This article introduces INSAC-AGRIS, a complex system for controlling experimental crops through the use of aerial and ground monitoring technologies. By combining aerial imagery, physicochemical analyses, and predictive technologies, INSAC-AGRIS provides detailed information to farmers for making better decisions regarding differential input application and irrigation. This research contributes to the development of precision agriculture and enhances sustainability in the agricultural sector.

Keywords: Precision agriculture, Monitoring, Aerial images, Crop control, Innovation

DETERMINATION OF RESISTANCE TO MEMBRANE DAMAGE BY APPLICATION OF SALICYLIC ACID IN CHARD PLANTS (BETA VULGARİS L.) UNDER DROUGHT CONDITIONS

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ABSTRACT

Drought is an important stress factor that is both common in agriculture and the most damaging to agricultural products. As a result of insufficient water in the soil, it is inevitable that plants will not be affected. One of the most important studies to minimize these effects is exogenous osmotic regulators. In this study, the change in cell membrane damage with the application of salicylic acid of the chard plant in different drought conditions was investigated. In addition, the relationship of this damage with total protein has been tried to be revealed. In the study, irrigation was carried out at 4 different levels (I1: 100%, I2: 75%, I3: 50% and I4: 25%) as full and deficit. Exogenous applications were applied at 4 different levels (SA1: 0mM, SA2: 1mM, SA3: 3mM and SA4: 7mM), one of which was control. In the results of the study, a decrease in the membrane stability index was observed with increasing drought. However, salicylic acid applications increased membrane stability in the plant. In addition, it was determined that the total protein amount changed almost exactly with the membrane stability. The highest membrane stability index was determined as 74.8% in the application of 3mM salicylic acid (I1SA3) belonging to the 100% irrigated. The lowest was observed in the control application (I4SA1) in the most intense drought condition and decreased by approximately 50%. Salicylic acid application in the chard plant exposed to drought conditions reduced the stress in the plant and helped to protect the plant from drought by minimizing membrane damage. However, it was determined that the total protein amount gave simultaneous results in the detection of membrane damage in the plant.

Keywords: Chard, Drought, membrane stability, exogenous application, salicylic acid

ASSESSMENT OF EVAPOTRANSPIRATION ACCURACY CALCULATED OF SOME VEGETABLES BY AERODYNAMIC RESISTANCE DETERMINED BASED ON WIND SPEED, PLANT HEIGHT, AND VEGETATION COVER UNDER GREENHOUSE CONDITIONS

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ABSTRACT

This study aimed to compare the evapotranspiration (ET) estimates obtained from lysimeters and the energy balance method for crops grown in greenhouses under Mediterranean conditions. The aerodynamic resistance (ra) in the energy balance equation was determined using the Brutsaert and Stricker and Perrier methods, specifically developed for field conditions. Lysimeters were used to measure the actual ET values, and these were compared with the ET estimates obtained using the energy balance method. This research focused on four greenhouse crops: tomatoes, eggplants, peppers, and cucumbers. The research was conducted in a randomized complete block design during the autumn of 2018 and the spring of 2019. The estimated ET with energy balance oscillated between -13555 (W m-2) and 148121 (W m-2), especially on days when the ventilation was closed. Therefore, these models were not suitable for Mediterranean type plastic greenhouses with natural ventilation. The Brutsaert and Stricker (1979) and Perrier (1975) methods were also not suitable for accurately predicting ET in the studied greenhouse crops. In particular, the aerodynamic resistance values calculated from the energy balance equation led to erroneous ET estimates under natural ventilation conditions.

Keywords: ET, Lysimeter, Mediterranean, ra

USE OF DECELLULARIZED PLANTS AS SUSTAINABLE MATERIALS IN BIOTECHNOLOGY

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ABSTRACT

The use of plants in the biotechnological field has been known for many years. There have been intense studies on the development of specialized biomaterials for potential applications in tissue engineering and regenerative medicine in line with biomedical advances. However, the use of plants for tissue scaffolding has brought a new perspective to this field in recent years. Plants have started to be tried as highly attractive candidates because they offer a ready-to-use three-dimensional scaffolding system for biomedical studies. Being eco-friendly and biocompatible platforms plants offer sustainable and also cost-effective scaffolds. Apple, celery, spinach, carrot, tobacco, as well as some ornamentals, have been used to create plant-based tissue scaffolds. The plant kingdom provides many structural possibilities for different biotechnological applications thanks to its diversity. Their architecture creates a suitable environment for mammalian cells after decellularization in the biomedical area, and once obtained, plant-based scaffolds may offer the opportunity to be used for different biotechnological applications. In addition to all their properties, plant-based scaffolds are accepted as biocompatible since they produced minimal immune response.

Keywords: Plant, decellularization, biotechnology, scaffold, biomedical

INDUSTRIAL AND BIOTECHNOLOGICAL USES OF B MANNANASE ENZYME

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ABSTRACT

Enzymes are organic molecules involved in the realization of chemical reactions in all living cells. The importance of enzymes, which are involved in almost every aspect of our lives, is increasing day by day. Enzymes are involved in almost all stages of the biosynthesis and biodegradation process (coding, folding, and functionality) faster than expected and with high precision. In every process from a single-celled organism to a complex living organism, protein enzymes produced by living cells are involved in the decomposition of organic and inorganic substances, as well as in the formation or destruction of biomass. Ecological and efficient alternatives to industrial processes increase interest in the use of microorganisms and enzymes as biocatalysts. In addition, enzymes are more environmentally friendly by reducing the use of other chemicals and have advantages such as higher product quality, energy saving, and biodiversity conservation, making their use indispensable in many areas of industry. Mannans are essential components of hemicellulosic fragments of softwoods such as chestnut, tulip poplar, and cypress and are found in plant tissue. The degradation of heteromannan polysaccharide, which is included in the structure of the plant cell wall, is carried out through synergistic activation of enzymes that hydrolyze mannans. There are two enzymes of major importance that degrade heteromannan polysaccharide. These enzymes are endo-β 1,4 Mannanase (EC.3.2.1.78) and exo-β 1,4 Mannosidase (EC.3.2.1.25). β Mannanase enzyme facilitates the digestion of plant material by breaking down the mannan in plant cell walls. In this way, the nutrients contained in plant-based foods are absorbed more effectively by the human or animal digestive system. β mannanases can be synthesized by actinomycetes, animals, plants, bacteria and fungi. Used as an industrial enzyme, mannanases are involved in many industrial fields because they are active in a wide pH and temperature range. The application areas of β-mannanases include animal feed, food, bio-refinery, textile, detergent, paper and pulp. The aim of this study is to provide information about the use of β-mannanase enzyme in industrial and biotechnology fields and to provide a resource for future studies.

Keywords: enzyme, β mannanases, mannans

FACTORS AFFECTING AERODYNAMIC SEPARATION AND MACHINES USED

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ABSTRACT

The physico-mechanical properties of agricultural products are important parameters for selecting methods to be used in cleaning the products and for designing product cleaning machines. These parameters are size, aerodynamics, surface, shape, flexibility, hardness, mechanical resistance, electrical and specific gravity properties. The most common usage area among the existing machines is those designed according to aerodynamic characteristics. Aerodynamic properties are explained by the material's behavior in the air stream. The critical velocity and the drag coefficient corresponding to this value are the basic parameters that reveal these behaviors. In the study, units and machines that clean products according to aerodynamic properties from past to present were compiled, and the effect of aerodynamic properties on cleaning efficiency was examined.

Keywords: Granular product, aerodynamic properties, separation, critical velocity, aerodynamic separation

IMPACT OF THE IRRIGATION BY FISH WATER ON SOIL ORGANIC MATTER AND SOME SOIL ANIMALS

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ABSTRACT

The abundance of animal populations in soil can be influenced by the quality of irrigation water. This survey consists to the assessment of the effect of irrigation by fish water, used in the setting of the integration of pisciculture to agriculture, on the abundance and biomass of earthworms and abundance of some groups of arthropods in soil. The study was achieved in full field. Experimental plot was divided into four subplots, two of them were cultivated by pea (*Pisum sativum* L.) and the two others were cultivated by faba bean (*Vicia faba* L.). For both cultures, one of the subplots was irrigated by fish water and the other was irrigated by water of borehole (control). To estimate the abundance and biomass of soil fauna populations, sampling was carried out before the implementation of the culture (before the irrigation) and at the approach of the harvest (to assess the effect of the irrigation). Appropriated methods of extraction were used for every group of animals. The results revealed that abundance and biomass of earthworms were positively affected by fish water in both crops. Concerning soil arthropods, the classes of Insects, Arachnids and Crustaceans (order: Isopoda) were inventoried and studied but the effect of fish water was significant, only, on three orders of insects: abundance of Diptera was positively affected in cultures of faba bean and pea, Hymenoptera seem to be negatively influenced in the two crops. Whereas some discordant results were gotten in the two cultures concerning the order of Collembola: the effect was positive in pea crop, however, negative in faba bean. This positive effect of fish water observed on some groups of soil animals would be due to their physico-chemical characteristics and their wealth in organic matter which could influence soil fertility. Indeed, the analysis of fish water revealed that it is richer in mineral elements compared to the water of boring. Also, the analysis of soil organic matter, achieved approaching the harvest, revealed that soil irrigated in water of borehole is fairly rich whereas soil irrigated by the fish water was rich.

Keywords: fish water, soil organic matter, soil animals, abundance, biomass

DETERMINATION OF IRRIGATION SCHEDULING AND CROP WATER CONSUMPTION OF PUMPKIN BY USING CROPWAT PROGRAMME IN NEVŞEHIR PROVINCE

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ABSTRACT

Approximately 35% of the cultivation of pumpkin is met from Nevşehir in Turkey. The widespread cultivation of pumpkin also reveals the necessity of irrigation scheduling in Nevşehir. On the other hand, the increase in population, the decrease in water resources day by day, and the large volume of water used in agricultural production, which is necessary for food supply, make it necessary to carry out irrigation scheduling in the cultivation of all plants. The aim of this study is to determine the plant water consumption and irrigation scheduling of the pumpkin cultivation by using Cropwat scheduling in Nevşehir. In this study, the irrigation amount and crop water consumption were determined for 5, 7, 14 and 21 days irrigation intervals of the pumpkin cultivation according to the climatic characteristics of Nevşehir with Cropwat scheduling. The irrigation amounts were 396 mm, 379.6 mm, 263.4 mm and 218.2 mm for 5, 7, 14 and 21 days, respectively. Crop water consumption were 464.9 mm, 446.2 mm, 355.4 mm and 287.6 mm when 5, 7, 14 and 21 days were selected, respectively. When the results obtained were compared with the other results in the literature, it was understood that the highest yield was obtained from the cultivation of pumpkin with 7 days irrigation interval. An average yield of 100 kg da-1 is obtained in irrigated pumpkin cultivation in Nevşehir. According to the data obtained from the results, it was suggested that irrigation every 21 days would be appropriate for producers with limited irrigation opportunities, and in other cases, irrigation at 7-day irrigation intervals was recommended.

Keywords: Pumpkin, Irrigation, Cropwat, Nevşehir

CATCH STRUCTURE AND CPUE OF THE MAIN FISH SPECIES CAUGHT IN OHRID LAKE

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ABSTRACT

The study aimed the evaluation of catch structure and catch effort of the most abundant fish species of Ohrid Lake. Evaluation of catch, gear used and effort were based on data provided from Fishery Management Organization of Ohrid Lake. The main fishing gear used by fishermen are hook lines and fishing nets. Fishing activity is mainly performed with 4.5-5.5 m length motor boats with engine power ranging 3.5 – 15 Hp equipped with fishing nets (length 500 – 1000 m, with mesh size 26-32 mm and 45-90 mm) and long lines with 150 hooks. The main fish species caught in the Lake are Ohrid trout (*Salmo letnica*), bleak (*Alburnus scoranza*), belushka (*Salmo ohridanus*), chub (*Squalius cephalus*), common carp (*Cyprinus carpio*) and eel (*Anguilla anguilla*). The catches of Ohrid trout made 57% of total catches followed by bleak and belushka with respectively 22% and 13%. The total CPUE for the data collected in the first half of 2023 was calculated 2.48 kg fish/day/boat. The CPUE value for Ohrid trout, bleak, belushka, chub, eel and common carp was respectively 2.2; 2.6; 0.5; 0.85; 0.6 and 0.4 kg fish/day/boat.

Keywords: Ohrid Lake, catch structure, CPUE

FISH STEM CELL TECHNOLOGY IN AQUACULTURE

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ABSTRACT

Stem cells are a class of undifferentiated cells, have the potential to reproduce themselves by mitotic cell division, generate progeny destined to differentiate into functional cell types, persist for a long time and its behavior is regulated by the micro environment. Aquaculture's primary goal is to produce fresh and marine fish species in order to supply world's protein needs. Because of global climate change, environmental pollutants, competition with agriculture and lack of fish meal and oil for use in fish feeds the production of aquaculture will not be sustainably in the future. These impacts can be avoided by using stem cell technologies such as; surrogate broodstock, endangered fish protection and production, fish meat production from stem cells, monosex fish production and gene transfer studies. This review aims to provide information regarding fish stem cells application technologies for sustainability of aquaculture.

Keywords: Cell tranplantation, Monosex population, Endangered fish, Surrogate broodstock, Gene transfer

THE ZEBRAFISH AS A MODEL FOR FISH BACTERIAL INFECTIONS

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ABSTRACT

Zebrafish (*Danio rerio*), a freshwater teleost from Cyprinidae family, has been widely used as a model organism in biological research in recent years. The zebrafish has some outstanding features among model organisms used to study certain biological processes. It has been used for many years to understand various disease mechanisms in humans and to identify new therapeutic strategies. Aquaculture is the fastest growing food-producing sector in the world. However, fish disease incidences cause high losses in production. Bacterial pathogens can cause high morbidity and mortality in hatchery and aquaculture production. For this reason, there is still a need for research on the prevention and treatment of bacterial fish diseases, which play an important role in economic losses in the aquaculture sector. This review aims to provide latest information on the bacterial infections in fish where zebrafish have been used as a model organism in order to increase fish health and welfare.

Keywords: Infection biology, bacterial pathogenesis, immunomodulators, prophylactic approaches, antimicrobial activity

EVALUATION OF ADVANCE WHEAT LINES FOR YIELD AND ASSOCIATED TRAITS UNDER RAINFED CONDITIONS

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ABSTRACT

Wheat is an important crop all over the world. Development of high yielding and drought tolerant genotypes is one of the prime objectives of wheat breeding programs. The aim of the study was to evaluate the advanced wheat lines for yield and associated traits under rainfed conditions. The experiment was carried out at Agriculture Research Station, Swabi during Rabi season 2021-22. Eighteen different wheat genotypes along with 2 check varieties (Swabi-1 and Gulzar-11) under rainfed conditions were studied. Data were recorded on days to heading, flag leaf area, plant height, days to maturity, spike weight, spike length, spikelets spike-1, 1000-grain weight, grains per spike and grain yield. All the plant attributes were significantly affected. Overall wheat genotypes MPT3 and MPT4 performed better than local check Swabi-1 and produced maximum grain yield. MPT3 and MPT4 had the genetic potential to produce high yield under rainfed environment.

Keywords: Wheat; rainfed; growth; yield

ARTIFICIAL NEURAL NETWORK ANALYSIS OF INTENSIVE VEGETABLE FARMING PRACTICES AND HUMAN HEALTH

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ABSTRACT

Intensive vegetable farming practices have been linked to various health concerns, including exposure to pesticides and heavy metals. In this study, we employed artificial neural networks (ANN) to model the complex relationships between intensive vegetable farming practices and human health. We considered several factors such as pesticide use, soil contamination, and farming practices. The results revealed a significant correlation between these factors and human health outcomes, particularly for neurological and developmental disorders. The ANN model provided insights into the nonlinear relationships between different factors and their relative contribution to health outcomes, which could aid in developing targeted interventions. The findings suggest the need for sustainable farming practices that minimize pesticide use and reduce soil contamination. Ultimately, the ANN-based analysis of intensive vegetable farming practices can provide valuable insights into the impact of these practices on human health, and guide evidence-based policy decisions to mitigate the associated health risks.

Keywords: Intensive vegetable farming, artificial neural networks, human health, pesticides, heavy metals, soil contamination.

EFFECT OF STARLING DROPPINGS ON THE DEVELOPMENT OF SOME SEEDLINGS

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ABSTRACT

The present study aims to determine the effect of starling droppings on the development of plants. It is conducted from November 2021 to February 2022 in the animal biology laboratory of the Higher national school of agronomy. For this purpose, pre-germinated lentil seeds are sown in 5 different batches. The first batch contained peat only, which was the control. The other batches contain peat mixed with droppings, either at 25%, 50%, 75% and 100%. Emergence was observed 10 days after sowing. No emergence was observed in the 75% and 100% manure batches. The seeds dug up were completely burnt. The 25% batch had a 100% emergence rate. This is followed by the control (0% droppings) with an emergence rate of 90%. The higher percentage of droppings in the batch, the lower the emergence rate of the seedlings. The highest plant height was recorded in the 25% batch (average maximum height 383.5 mm). The 2nd batch (0% droppings or control) had a lower maximum height (266 mm) followed by the 50% batch (180 mm). The highest number of leaves was recorded in the 25% batch (76 leaves) followed by the control batch with 53 leaves. The concentration of droppings at 25% seems to favour leafing but an excess can inhibit it and slow down leaf development. Similarly, in the control lot, the leaves have a wilted and yellowish appearance whereas those belonging to the 25% lot are green and present a healthier aspect. The leaves of the 50% batch also start to turn yellow. From these results it can be concluded that the effect of starling droppings on seedling development differs according to the concentration of the droppings in the soil. At high concentrations, the droppings can burn the vegetation and cause it to die back. At low concentrations, they can contribute to soil fertility by providing nitrogen.

Keywords: Sturnus vulgaris, emergence, droppings, batch, percentage, development

FOLLOWING THE DYNAMICS OF THE PHENOLOGICAL DEVELOPMENT AND FORMATION OF PRODUCTIVITY IN COMMON WINTER WHEAT USING PORTABLE PRECISE EQUIPMENT

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ABSTRACT

The development and introduction of high-yielding cultivars, which realize their quality potential under different climatic conditions, is a key factor for achieving strategic goals for higher stability and efficiency of grain production. The areas with cereal crops occupy the largest portion of the arable land in Bulgaria. Due to the difficult-to-foresee effects of the climate change, there are higher risks present, as we witness deteriorated environment, disturbed biodiversity, unstable yields, and fluctuating levels of the quality parameters. Precise agriculture is an opportunity to not only save resources but also to realize high added value. The fast development of digital equipment allowed the introduction of a large number of innovative products with a wide range of capabilities. The problem, however, is in the correct interpretation of the results and the accumulation of knowledge of how to utilize the obtained data. The aim of this investigation was to follow the dynamics of the phenological development and the formation of productivity in common winter wheat by using portable precise equipment. In two consecutive harvest years (2021-2022 and 2022-2023), in the trial field of Dobrudzha Agricultural Institute, experimental plots were allocated within a three-field crop rotation (sunflower – grain pea – wheat). An area of 30 da was divided into a network of 6 equal plots representing the replications of the experiment, each of 5 da. The soil type was leached chernozem (Haplic Chernozem). The wheat cultivar Enola was chosen, which is widely distributed in this region and its economic properties are well known. The sowing norm was in accordance with the varietal specificity and was 550 germinating seeds per м2. Pre-sowing fertilization with 7 kg active matter of P2O5 was done annually. Spring nutrition was applied at the resumed vegetative growth of the plants with 8 kg active matter of nitrogen. After emergence of the seedlings, plots of 1 м2 were marked in each replications, where filed observations and biometric analyses of the plants were done. From the end of tillering stage to physiological maturity (BBCH 30-90), additional investigations were carried out to assess the physiological status of the genotypes. Precise laboratory equipment was used to determine the leaf mass temperature (non-contact thermometer IR-G550), the relative humidity and temperature inside the crop (device for humidity and temperature measurement HTM-49), and the normalized difference vegetation index (NDVI) (GreenSeeker). The measurements were taken every 10 days within the same time interval (13:00 – 14:30 pm). As a result from the above activities, the dynamics of change of the main meteorological factors, which influenced the development of common winter wheat, was evaluated. The level and variation of the physiological parameters during the phenological development under the specific agronomy practices applied was identified. Their variation was registered as affected by the landscape, the quality of soil tillage, the use of main fertilizers and the distance from the forest shelter belts.

Keywords: common winter wheat, precise agriculture, efficient grain production

EVALUATION OF MASH BEAN GENOTYPES UNDER VARIOUS ECOLOGIES OF PAKISTAN

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ABSTRACT

Mash bean (*Vigna mungo* (L.) Hepper), black gram, is a legume of growing interest worldwide, and the third largest pulse crop in Pakistan. In this work, nine advanced breeding lines were compared with two commercial varieties, in order to investigate plant traits, yield potential and stability of the new lines prior to release as cultivated varieties. A field experiment was set up in three locations in Punjab, Pakistan (average latitude, 32° 56' N; elevation ranging from 198 to 525 m asl), during the kharif season of 2014. Developmental, morphological and yield traits included time to reach 50% flowering and 90% maturity, plant height and the number of primary branches, grain yield (GY) and its three components (pods per plant, seeds per pod and thousand seed weight). Several traits showed a sizeable variation among genotypes, as premise for significant improvements through selection. GY varied between 778 kg ha-1 (cv. Mash Arooj) and 1005 kg ha-1 (line 11CM-709) in the eleven genotypes, and between 438 and 1667 kg ha-1 in the three locations. The lowland location (Piplan) was the highest yielding, despite significant water deficit (precipitation – ET0 = -264 mm at harvest) potentially constraining plant growth. Plant height and the number of branches were significantly correlated with GY (r = 0.86** and 0.38*, respectively). The number of pods per plant and the thousand seed weight were more important yield components than seeds per pod (relative importance, 49%, 39% and 12% respectively). In each genotype average yield across the three locations, plotted against the regression slope of specific yield vs. average yield in each location, allowed yield potential and stability to be shown. As a result, five of the new breeding lines exhibited a remarkable yield potential in exchange for low stability, i.e. modest suitability for low yielding environments. The remaining new lines staged yield potential similar to the two commercial varieties associated to slightly higher stability, i.e. better adaptation to low yielding environments. In both cases there are good premises for mash bean higher profitability and, therefore, wider diffusion in the surveyed area.

Keywords: Mash bean; black gram; genotypes; plant traits; yield potential; yield stability.

THE SIMPLE AND SMALL-SCALE COMPOSTING PROCESS OF HOUSEHOLD KITCHEN WASTE FOR SUSTIANABLE AGRICULTURE

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ABSTRACT

The food waste is becoming a growing problem. For this reason household food-waste composting is an alternative for waste management and sustainable agrculture in the world. However, there are few studies regarding the implementation or management of this small-scale process. This study investigates the performance of food-waste composting using a simple and small-scale domestic container. The composting trial was conducted for 14 weeks by using kitchen waste and sawdust in a plastic container without any microbiological inoculation. The highest temperature did not exceed 42.9 °C throughout the process. However the temperatures did not reach the thermophilic phase but sufficient for nitrification. The total nitrogen (5.64 %), ammonium (0.20 %) and Electrical Conductivity (5.81 mS cm-1) contents can be considered in high level. Although the high total nitrogen level, the carbon-nitrogen ratio was determined nearly sufficient for food waste compost. Moisture, dry weight, ash, humic acid, rection (pH), organic carbon, germination index, seed germination, nitrate contents reveal that the compost is mature. The values of some total macro and micro nutrients such were in agreement with the values of similar studies. It can be concluded that the kitchen waste compost was successfully obtained and in general, meets the requirement standards for agricultural use.

Keywords: Food waste, Kitchen waste, Compost, Composting, Household, Process, Sustainable

EFFECTS OF POTASSIUM FERTILIZATION ON MATURATION TIME, RELATIVE WATER CONTENT, PLANT TEMPERATURE AND STOMATAL CONDUCTIVITY IN POTATO

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ABSTRACT

This study was conducted to investigate the effect of different potassium doses on the maturation time, relative water content, plant temperature and stomatal conductivity of Agria potato cultivar, which is commonly cultivated in Turkey, at Research and Experimental Farm of Faculty of Agricultural Sciences and Technologies, Nigde Omer Halisdemir University, Nigde in 2019. The field experiments were laid out in the randomized complete block design with four replication, six different levels of potassium (K) (K0: Control, K4: 4 kg K/da, K8: 8 kg K/da, K12: 12 kg K/da, K16: 16 kg K/da, K20: 20 kg K/da). In the study, potassium fertilizer was applied to the soil before planting. Maturation time, relative water content and stomatal conductivity was increased both levels of potassium. However, plant temperature decreased as potassium increased. As a result of this study, maturation time was founded between 91,0-97,7 day, relative water content was determined between 73,6-91,9 %, leaf temperature was measured between 26,3-26,1 oC, stomatal conductivity was changed between 0,089-0,236 mol H2O m-2 s-1. In conclusion, optimum and statistically significant dose was determined 12 kg/da of potassium fertilizer on the all parameters.

Keywords: Solanum tuberosum, potassium, fertilization

AEROBIC RICE CULTIVATION: A PROMISING STRATEGY FOR CLIMATE CHANGE MITIGATION

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ABSTRACT

Aerobic rice cultivation is a promising strategy for climate change mitigation in agriculture. This review paper assesses its potential, covering methane emissions reduction, water usage efficiency, soil health improvement, nutrient management, adaptability to climate change, and scalability. Aerobic rice practices reduce methane emissions by up to 50% compared to flooded systems. Water savings of 30-50% contribute to sustainable water management. Improved soil health increases nutrient availability and cycling, enhancing nutrient use efficiency by 20-30% and reducing nitrogen losses. Aerobic rice systems demonstrate heat tolerance, maintaining or improving crop productivity under elevated temperatures. Their flexibility allows for diversification and resilience in cropping systems. Adoption varies, with progress in China and India, but challenges remain, including technical knowledge gaps, economic considerations, and policy support. Recommendations include training programs, economic evaluation, and supportive policies to promote wider adoption.

Keywords: Aerobic rice, climate change, methane, emissions, mitigation

BIOFORTIFICATION IN WHEAT: ENHANCING CLIMATE RESILIENCE AND NUTRITION SECURITY

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ABSTRACT

Biofortification in wheat presents a dual solution to address the challenges of climate change and malnutrition. This review paper comprehensively assesses the potential of biofortified wheat varieties in enhancing climate resilience and improving nutrition security. By targeting essential micronutrients such as iron, zinc, and vitamin A, biofortified wheat offers a sustainable strategy to combat micronutrient deficiencies. Integrating biofortified wheat into agricultural systems has shown promising outcomes in improving health and reducing nutritional deficiencies. Furthermore, biofortified wheat exhibits enhanced adaptability to abiotic stresses associated with climate change, such as drought and heat, contributing to climate resilience. To fully exploit the potential of biofortification in wheat, continued research and investment are crucial. Future research efforts should prioritize the improvement of biofortification techniques, development of high-yielding and climate-resilient biofortified wheat varieties, and assessment of their long-term sustainability. Interdisciplinary collaborations involving researchers, breeders, policymakers, and stakeholders are essential for advancing biofortification initiatives and implementing evidence-based policies that promote the adoption and dissemination of biofortified wheat. Additionally, sustained policy support and investment are vital to create an enabling environment for widescale adoption, ensuring accessibility to nutrient-rich food for vulnerable populations.

Keywords: Biofortification, Wheat, Climate resilience, Nutrition security, Micronutrient deficiencies

EVALUATION AND STABILITY OF ECONOMIC TRAITS OF HUNGARIAN COMMON WINTER WHEAT VARIETIES IN THE REGION OF CENTRAL SOUTHERN BULGARIA

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ABSTRACT

The research was carried out during the period 2020-2021 in the experimental field and technological laboratory at IRGR "K. Malkov", town of Sadovo. Hungarian common winter wheat varieties were evaluated according to economic traits and their stability was determined. The Bulgarian variety Sadovo 1 was used as a standard. The traits grain yield (kg/da), absolute (g) and testweight (kg/hl) were studied. The results show that the highest average yield for the study period was reported for the Hungarian variety MV-Nemere. The Bulgarian varieties Sadovo 1 and Enola have the highest values for 1000 grain weight and test weight traits. A variance analysis was carried out, proving the influence of the genotype, growing conditions and their interaction on the observed traits. The stability of the studied traits was determined by the variances of stability (σi2 and Si2), equivalency (Wi), the criterion of phenotypic stability (Ysi), regression coefficient b_i and general adaptability. Wheat varieties MV-Kaplar, MV-Nador and Sadovo 1 can be singled out as the most valuable from a breeding point of view.

Keywords: common winter wheat, evaluation, economic traits, stability, adaptability, genotype x environment interaction

FLOUR QUALITY OF HUNGARIAN WINTER WHEAT VARIETIES GROWN IN CENTRAL SOUTHERN BULGARIA

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ABSTRACT

The research was conducted during the period 2020-2021 in the experimental field of the IRGR Sadovo and in the technological laboratories of the IRGR, UFT and IPFQ, Plovdiv. The flours of 7 varieties of common winter wheat were analyzed - five Hungarian and two Bulgarian varieties. The Bulgarian variety Sadovo 1 was used as a standard in the study. Basic technological parameters of the flour were determined in order to evaluate their technological quality. The ash content indicator of the flour was investigated. The granulometric composition of the flour from the investigated wheat varieties was determined by means of sieve analysis. The distribution of the size fractions in the flour from rec.2020 is uneven, left drawn, monomodal. The fractions in the flour region 0-100μm are presented with the highest mass fraction. In the 2021 harvest, a change in the distribution of fractions is reported exclusively in the case of variety MV-Kaplar, where in the area of the finest flour fractions. The color of the obtained flours was analyzed in the color space of the CIE Lab system. In terms of lightness (L), the lightest are flours from variety MV Menrod with 84.88 % and variety MV Mente with 84.69 %, and the darkest is the flour from variety Enola with 71.62 %. As a result of the research, the varieties with the highest technological quality stand out: Mente and Menrot.

Keywords: common winter wheat, flour, ash content, grain size composition, color

AGRO-HOMEOPATIC REMEDIES EFFECT OF BEAN (Phaseolus vulgaris L.) SEED INSECTS (BRUCHUS)

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ABSTRACT

It is a natural treatment method based on the principle of treatment homoeopathy. Homoeopathy was developed by the German doctor Hahnemann. The use of homoeopathic principles and remedies in controlling plant diseases, pests and damages is called agro-homoeopathy. Agrohomeopathy is a safe, chemical-free, permanent and effective treatment method in natural, organic, and biodynamic agriculture. Beans are an essential raw material of Turkish cuisine. Bean is a susceptible plant in the legume family in terms of both diseases and seed pests. Especially in dry grain cultivation, Bruchus (seed beetles) can cause very significant damage to the use of grain as food or seed. This study aimed to investigate the possibilities of controlling seed beetles with the agro-homoeopathy method in beans. For this reason, 2 different remedies (Bruchus-C30, Bruchus-D12) prepared from Bruchus collected from beans grown in Samsun conditions, 4 remedies, Sulfur-C200, All-C, and control plots, 5 treatments, 3 replications, were included in the study in a randomized block design. Zülbiye variety was used in the experiment and, each plot consisted of 4 rows planted on 13 May 2022 with 50 cm row spacing. Remedies were applied 3 times when the plants started to bloom. After the harvest and threshing in September, the samples taken from each parcel were stored in 2 different environments (glass jar and plastic bottle) for 6 months, closed for 3 months, the lids were opened and the tulle was placed on the cover of the container and they stored in room conditions. Insect observations in the samples were made when it was time to plant beans in 2023. According to the results of the analyses of the morphological characteristics of the plants (height, number of pods, biological yield, grain yield) were not find statistic differences. For insects stored in two different environments, the number of insect-bearing in a hundred seeds, the number of holes in the medium, the maximum number of holes in a single seed, and the percentage of perforated seeds in total were determined. It has been determined that there is a statistical difference between storages, and storage in plastic media gives fewer insect numbers. It has been determined that the percentage of insect grains varies between 4.6-29.3% and the maximum number of holes in a single grain varies between 1.6-9 in the remedies used. Interpretation and conclusion of all features together are not yet complete.

Keywords: AGRO-HOMOEPATHY, BEAN; BRUCHUS

RISKS RELATED TO PHYTOSANITARY PRACTICES OF APPLE GROWERS IN THE KHENCHELA REGION -ALGERIA

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ABSTRACT

The main objective of the agricultural spraying process is to ensure optimum biological efficacy of the phytosanitary treatment under the constraints of technical aspects and economic considerations. In this context, mastering the techniques for applying plant protection products can help reduce their undesirable impact on the environment and on health. This may justify a search for the best technical conditions applicable to local conditions, with the aim of optimizing and rationalizing phytosanitary treatments. Our survey-based study took place in 2019/2020 in the wilaya of Khenchela on 368 farmers spread over 08 communes belonging to 03 main daïra in agricultural activity. Our approach was to collect data on the phytosanitary practices of farmers in the region through a questionnaire used to estimate the risks associated with these practices. The questions asked concerned the operator's ability to characterize the product packaging, protective measures (PPE), preparation of the spray mixture, product storage, climatic preference for treatment, information on the sprayer, type of product, formulation, dose and frequency. The data collected was used to feed a mathematical model estimating farmers' exposure rates to plant protection products, and to assess the health risks associated with their practices. Most farmers neglect to wear PPE during spray preparation and crop treatment, which amplifies their exposure to the products and consequently increases the risk incurred. Indeed, the respondents declaring to have suffered at least one of the health problems are farmers who use their protective equipment little or poorly, or who do not respect product use instructions and directions for use, and mainly treatment doses.

Keywords: Phytosanitary practices, farmers, exposure, risk, PPE

EFFECT ON YIELD AND QUALITY OF BACTERIA AS PLANT GROWTH REGULATOR IN SUGAR BEET (BETA VULGARIS L)

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ABSTRACT

The effects of rhizobacteria on yield and quailty of sugar beet were investigated in this study. Sugar beet samples were collected in Kayseri, Sivas, Nevşehir and Yozgat in 2021. Rhizobacteria were isolated from sugar beet roots. 16S rRNA sequence analysis of 100 rhizobacteria isolates were performed and identifaceted. *Bacillus halotolerans, Bacillus licheniformis*, *Pseudiomonas seleniipraecipitans*, *Pantoea agglomerans* were used as material. The trial was set up in a split randomized blocks trial design with 3 replications in 2021 and 2022. In the experiment, 4 bacteria isolates were applicated from seed, soil, and foliar as sprayed. In the experiment, Irrigation of the experiment was done by sprinkler irrigation method. Root yield, sugar content, sugar yield, dry matter, ash, purity, amino nitrogen ratios were determined in sugar beet.

Acknowledgment: This research was supported by Erciyes University Scientific Research Projects Coordinatior Unit (BAP) with ID number 10472. We thank the BAP unit for their support.

Keywords: Sugar Beet, Rhizobacteria, Bacillus, Yield, Quality

EFFECTS OF PROLINE AND HUMIC ACID APPLICATIONS ON STRESS TOLERANCE INDICES OF WHEAT SEEDS UNDER DIFFERENT SOIL SALINITY LEVELS

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ABSTRACT

Salt stress is one of the most important environmental problems limiting plant development and productivity. In particular, exposure to salt stress during seedling developmental stages limits sustainable agricultural production. In this study, the effects of control (K), proline (P, 15 mM), humic acid (HA, 100 ppm), and proline + humic acid (P+HA) applications on seedling development characteristics of wheat seeds were investigated at four different soil salinity levels (0.28, 4.17, 9.33, and 15.23 dS m-1). The responses of wheat seedlings to soil salinity were evaluated using the parameters of proportional tolerance index (RTI), root/shoot ratio (RSR), shoot weight ratio (SWR), root weight ratio (RWR), stress tolerance index for plant height (PHSI), Shoot Fresh Weight Stress Tolerance Index (SFSI), Root Fresh Weight Stress Tolerance Index (RFSI), Shoot Dry Weight Stress Tolerance Index (SDSI), Root Dry Weight Stress Tolerance Index (RDSI), and Salt Tolerance Index (SSI) were evaluated. According to the results, PHST ranged from 51.6% to 113.5%, SFSI ranged from 22.3% to 116.4%, RFSI ranged from 13.6% to 168.5%, RDSI ranged from 12.7% to 136.4%, and RTI ranged from 37.3% to 157.0%. The highest seedling development traits in wheat seeds were observed in the order P+HA>P> HA compared to the control. In addition, the salt tolerance index of wheat seedlings decreased by 71.7%, 54.5%, 60.8% and 40.2%, respectively, when soil salinity increased from 0.25 dS m-1 to 15.23 dS m-1 in treatments K, P, HA and (P+HA). In agricultural production areas with high salinity, it is recommended that wheat seed be pretreated with 15 mM proline and 100 ppm humic acid be incorporated into the soil before sowing to ensure salt-tolerant and high-quality wheat seedling characteristics

Keywords: Seedling development, Stress tolerance index, Salinity

THE EFFECTS OF ORGANIC AND CHEMICAL FERTILIZER APPLICATIONS ON PLANT GROWTH OF ONION, WHICH IS A MODEL ORGANISM

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ABSTRACT

The aim of this study is to compare the effects of some organic and chemical fertilizer applications that can be used in onion (*Allium cepa* L.) as a model organism on plant nutrition and to show the usability of organic-sourced fertilizers for a sustainable environment. In the study, organic worm manure, liquid humic acid, NPK fertilizer (18-18-18+ME and 18-18-18 MgO+TE), and organic fertilizers containing amino acids were used at the doses indicated on them. Applications; It was done twice, one at planting time and the other after 15 days, and samples were taken at 15 and 30 days. According to the results obtained, the % increase in plant height was in the fertilizer application containing the most amino acids, and the 450% growth statistics after 30 days were significant. In terms of anthocyanin, the best yield was observed in the fertilizer containing humic acid and amino acid in the 15-day period, while the highest values were obtained from 18-18-18 MgO+TE and worm manure in the 30-day period. According to the 15-day analysis; The highest value for chlorophyll la was obtained from 209.2 µg/gFW with humic acid, for chlorophyll b with 59.0 µg/gFW with 18-18-18 MgO+TE, for total carotenoid with 235.3 µg/gFW with humic acid applications. In the 30-day results; For chlorophyll a and b, the highest data were obtained from the 18-18-18+ME application and there were statistical differences compared to the control groups, which were not applied in general fertilizer applications. Germination percentages of seeds obtained from onions were statistically different compared to control in all fertilizer groups except humic acid application. The weight of the emerging seeds is under control; while 28.2 g; It is 102.6 grams in vermicompost. While the highest data in terms of total plant and root weight were obtained from the application of fertilizer containing amino acids; The longest root data were encountered in 18-18-18 MgO+TE applications. As a result of the evaluations, it was concluded that the effects of fertilizer applications were positive compared to the control group and that natural fertilizers were as effective as chemical fertilizers.

Keywords: Onion, Fertilizer, Organic, Carotene

DRY SEED CHARACTERISTICS OF LOCAL PEA LINES SUITABLE FOR CENTRAL BLACK SEA REGION CONDITIONS

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ABSTRACT

Pea is a plant originating from the geography in which our country is located. It's widely cultivated and used in developed world countries but not attracting much attention in agricultural production in Turkiye. This study was carried out because we think it is necessary to develop local varieties of pea, which we consider an important plant, considering the compatibility of its ecological demands with the conditions of our region and the type of agricultural production. In the study, 30 lines and 6 control varieties, which we have selected from local materials for many years, were grown in 4 different locations (Amasya, Gelemen, Atakum, Tokat) and 2 sowing times (winter and early spring) in 8 experiments, in Augmented Design with 3 replications. Agro-morphological measurements were carried out at fresh pod and dry seed harvest times. However, only dry seed properties will be given in this article. As a result of the analysis of variance, it was determined that height, number of pods, dry seed yield and 100 seed weight were statistically affected by the genotype, location, sowing time and interactions of locationXgenotype, locationXgenotypeXtime. The average plant height of the control cultivars used ranged from 46.6-127.7 cm, and the genotypes ranged between 38.8-179 cm. While the number of pods was 22.4, the average of all trials, this value was higher (26.1) in the control cultivars. The average hundred seed weight was determined as 19.73 g in all lines and 20.98 g in control varieties. The average dry seed yield of the control cultivars used was 267.1 kg in all environments, and lines exceeding this value were found among the genotypes. In the evaluation of the dry seed characteristics, it was concluded that the B6, B40, B15, B18, B17, B32 lines came to the fore. It has been concluded that winter sowing is more appropriate in terms of both the data and early leaving the land and then allowing to sow the second crop in regional conditions.

Keywords: Pea, sowing time, genotype, dry yield

L-DOPA CONTENT OF BROAD BEAN (Vicia faba L.) GROWING IN DIFFERENT WEED DENSITY

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ABSTRACT

Due to plants cannot relocate, they adopt allelopathy as a survival strategy when environmental conditions are unfavourable. This ecological phenomenon consists of releasing chemical compounds into the environment that can positively or negatively affect the growth and development of neighbouring plants. One of these chemicals is L-Dopa (L-3,4-dihydroxyphenylalanine), which is not an amino acid and is mostly in mucuna and broad bean plants. Weeds are an important problem in regions like Samsun, where winters and springs are rainy and warm. However, the broad bean has less weed density than other plants. This study was planned to determine the relationship of this situation with the L-Dopa production feature of broad beans. In the experiment, Lara variety, 5 different treatments (weedless control, weed control, 1 time hoe, 2 times hoe, 3 times hoe) were used in a randomized block design with 3 replications. Sowing was done on November 3, 2022, with 50 cm row spacing. One week after the last hoeing (April 4, 2023), samples were taken from the roots and stem parts of the plants for L-Dopa analysis. Both fresh pod and dry seed observations were made in the plots. In the observations, weeds belonging to other families (*Veronica sp, Scandix pecten-veneris, Lupinus sp, Cirsium arvense, Fumaria officinalis* etc.) were more common than grasses. It has been determined that the plant height is 99-131 cm, and it is the longest in weed control. The fresh pod yield was between 5186-7504 kg per decare, and the highest was obtained from the weedless control, the dry seed yield was between 375.9-481.5 kg, and the highest in hoeing 3 times. L-Dopa analyses are not yet complete.

Keywords: Broad bean, weed density, L-Dopa

COMPARISON PROMISING COMMON BEAN LINES TO MODERN CULTIVARS IN TERMS OF AGRONOMIC TRAITS

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ABSTRACT

Common bean (*Phaseolus vulgaris* L.) is an important legume crop widely produced in many countries of the world. In this study, the five promising common bean lines having superior yield and yield components selected from previously conducted TÜBİTAK projects were compared to two modern cultivars under Bolu ecological conditions. The experiment was arranged in a Randomized Block Design with four replicates in the 2018 growing season on the experimental farm of Bolu Abant Izzet Baysal University, Bolu, Turkey. Days to flowering 50% (45.50-57.00 days), the number of branches per plant (4.27-5.47 branches), first pod height (13.85-19.67 cm), plant height (57.90-77.40 cm), the number of pods per plant (15.55-25.40 pods), seeds per single pod (4.15-4.80 seeds), 100 seed weight (28.07-61.96 g), days to maturity (90.00-108.00 days) and yield (164.18-282.07 kg/da) were determined according to Variety Registration and Seed Certification Center, Republic of Turkey Ministry of Agriculture and Forestry. As a result, it was decided to transfer promising lines to advanced regional yield trials for the official procedures of cultivar registration. This research was supported by the Research and Development Unit (BAP) of Bolu Abant Izzet Baysal University (Project Number: 2018.10.07.1319).

Keywords: Breeding, selection, yield

INVESTIGATION OF SOFT BREAD WHEAT (T. AESTIVUM L.) ADVANCED LINES IN TERMS OF GRAIN YIELD AND BISCUIT QUALITY CHARACTERISTICS

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ABSTRACT

The research was carried out with a total of 24 bread wheat genotypes, 20 advanced lines and 4 standard varieties, with a soft grain structure in the 2014-2015 growing season, according to the randomized blocks experimental design with 4 replications. As a result of the research, the differences between the genotype averages were statistically significant in terms of the properties examined except grain yield and protein ratio. The average yield of biscuit wheat genotypes varied between 4425 kg ha-1 and 2000 kg ha-1. BİS-3, BİS-9, BİS-18, BİS-21 and BİS-22 were the lines with the highest performance in terms of grain yield. According to the trial results, BTA (32.67 to 48.61 g), HA (82.40 to 75.25 kg hl-1), SKCS (17.08% to 39.68), ZSV (20.63 ml) Differences were noted between genotype averages for ash content (0.478% to 0.610%) and PO (11.75% to 12.70%). While BİS-3, BİS-9, BİS-18, BİS-21 and BİS-22 are the lines with the highest performance in terms of grain yield, BİS-1, BİS-3, BİS-9, BİS-11, BİS-12, BİS -19, BİS-21, BİS-22 and BİS-23 were the lines that were suitable in terms of the biscuit quality characteristics examined.

Keywords: Bread wheat, grain yield, biscuit quality, solvent holding capacity

EFFECT OF BACILLUS PUMILUS APPLICATION ON YIELD AND QALITY IN STEVIA (STEVIA REBAUDIANA L.)

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ABSTRACT

In this study, stevia (*Stevia rebaudiana* L.) seeds were germinated in tissue culture medium, their adaptation was completed and Bacillus pumilus bacteria were applied in greenhouse conditions and the effects on yield and quality on the plant were investigated. Tissue culture method was preferred to achieve faster and higher germination of Stevia seeds with a low germination rate. Since it is a study for germination only, hormone-free (MS0) environment was used with an economical study without using hormones. The average germination rate of the seeds, whose detailed sterilization process was completed, was 64.17% in the prepared medium. The plants that germinated and were kept in the environment for 2-3 weeks were then successfully adapted to external conditions within 4-5 days in total. Plants whose adaptation was completed were planted in pots under greenhouse conditions and *Bacillus pumilus* bacteria was applied. The yield and quality parameters of the plants were investigated in a total of 40 days at 10-day intervals and 4 time periods. These parameters are root length, root fresh weight, root dry weight, shoot length, shoot fresh weight, shoot dry weight, leaf fresh weight, leaf dry weight, leaf area index, chlorophyll pigment number, stoma number, stoma width, stoma length, rebaudioside and steviosite. According to the parameters examined, the highest mean values were respectively 19 cm, 6530.6 mg, 1101.9 mg, 12.4 mm, 677.8 mg, 84.9 mg, 825.1 mg, 107.1 mg, 27.60 cm², 38.8 units, 305.73 units, 24.12 µm, 39.76 µm, 1584.07 mg/ 100g and 3679.94mg/100g.

Keywords: Stevia, Bacillus pumilus, Tissue culture, Yield, Quality

EFFECTS OF MORINGA OLEIFERA ETHANOLIC EXTRACT ON GROWTH, VISCEROSOMATIC AND HEPATOSOMATIC INDICES OF NILE TILAPIA (OREOCHROMIS NILOTICUS)

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ABSTRACT

Natural plant dietary supplements in aquafeed are one of the effective ways for enhancing the growth performance and feed utilization of fish. *Moringa oleifera* is one of the medicinal plants that is highly nutritious and being utilized as dietary supplements in aquaculture. Therefore, the present study aimed to evaluate the effects of *M. Oleifera* ethanolic extract on growth, viscerosomatic index (VSI) and hepatosomatic index (HSI) of Nile tilapia (*Oreochromis niloticus*). A total of 120 juvenile tilapia weighing the average weight of 10.05 ± 0.87 g were distributed to aquariums. The fish were fed with the basal diet containing different levels of *Moringa oleifera* ethanolic extract: control (0), 1% (MO1), 2% (MO2), and 3% (MO3) for 75 days. Results revealed that the growth performance (initial weight, final weight, specific growth rate, weight gain, and condition factor) including the feed utilization (FCR) did not significantly different (P >0.05) of all the treatments after 75 of culture period. However, the highest Viscerosomatic index (19.27 ± 1.17%) and Hepatosomatic index (4.89 ± 0.6%) was recorded in fish fed on diets supplemented with 2% (MO2) compared with the control group and other treatments. Conversely, the lowest percentage of Viscerosomatic index (15.46 ± 0.76%) was obtained in Control group. While the lowest value of Hepatosomatic index (2.66 ± 0.56%) was recorded in MO1 treatment. This shows that there is a better utilization of *M. olefiera* in the diet of Nile tilapia. Moreover, the weight gain of the viscera and liver at 2% level of inclusion was significantly improved (P < 0.05). Therefore, the addition of *M. olefiera* extract is hereby recommended to be included in the diet of Nile tilapia.

Keywords: Growth performance, Hepatosomatic index, Moringa Oleifera, Viscerosomatic index

IMPACT OF AMPEP CONCENTRATION IN NUTRIENT MEDIUM ON THE GROWTH AND LIPID ACCUMULATION OF CHLORELLA SP. CULTURE

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ABSTRACT

Microalga of the genus *Chlorella* has developed a stable industry as dietary supplements for humans and animals based on their scientific and commercial interests. The growth of *Chlorella* sp. cultures has been enhanced by using a variety of nutrients to enhance pigmentation, lipid content, and growth. The use of Acadian Marine Plant Extract Powder (AMPEP) improves agricultural crops and macroalgae production, such as seaweeds. However, AMPEP has not yet been studied as a means of producing microalgae. Therefore, this study investigates microalgae production in a nutrient medium containing AMPEP. Three concentrations of AMPEP were prepared: group A (125 mg L-1 AMPEP), group B (625 mg L-1 AMPEP), and group C (0 mg L-1 AMPEP) as control. Experiments were conducted for each group for 21 days in triplicate. Results revealed that AMPEP concentration added to the nutrient medium provides higher cell densities in *Chlorella* sp. culture. Group A reached the highest cell density of 146 x 106 cell mL-1, while groups B and C obtained cell density of 73 x 106 cell mL-1 and 114 x 106 cell mL-1, respectively. Additionally, the dry weight of groups A, B, and C were calculated as 2.57 ± 0.12 g L-1, 1.37 ± 0.06 g L-1, and 1.58 ± 0.16 g L-1, respectively. The cell size of groups A, B, and C were 4.80 ± 1.32 µ, 5.20 ± 1.87 µ, and 3.80 ± 0.79 µ, respectively. Moreover, the highest level of lipid accumulation of chlorella culture was achieved by group B with a lipid content of 10.44 ± 1.28 %, followed by group A with a lipid content of 8.55 ± 0.80 %, which was higher than the control group (group C) with a lipid content of 7.04 ± 0.93 %. Hence, the present study shows that AMPEP used in microalgae production may improve growth and lipid accumulation.

Keywords: AMPEP, Chlorella sp., growth, lipid, nutrient medium

CURRENT STOCK STATUS OF MERLANGIUS MERLANGUS (LINNAEUS, 1758) IN THE SEA OF MARMARA

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ABSTRACT

This study indicates the distribution and abundance of *Merlangius merlangus* in the Sea of Marmara. *Merlangius merlangus* (Linnaeus, 1758), known as whiting, is a species of high economic value belonging to the Gadidae family. The species found in the Black Sea, Marmara and Aegean Seas in our country. Samplings were conducted by TAGEM (General Directorate of Agricultural Research and Policy of Turkey) project number TAGEM/HAYSÜD/2014/05/01. Samples were collected between March 2017 and December 2018 at 34 stations from three different depth contours (20-50, 50-100, 100-200) from trawl net from the Sea of Marmara. Samplings were conducted via bottom trawl according to Mediterraean International Bottom Surveys (MEDITS) standards, at average speed of 3 miles and 30 m duration. During the 2-year sampling period in the Sea of Marmara, the catch per unit effort (CPUE) of writing was calculated as 5.29 kg/h and the stock amount of per unit area was calculated as 72.87 kg/km2 in the whole area. It has been determined that the species is mostly found at depths of 20-50 m. According to the depth contours in the region, the CPUE and stock amounts are 16.03 kg/h, 220.80 kg/km2 at 20-50 m; 1.59 kg/h, 21.90 kg/km2 at 50-100 m; and 0.35 kg/h, 4.82 kg/km2 at 100-200 m, respectively. According to the CPUE datas in the stations, the species is the most dominant in the southern part of the Sea of Marmara. This is the first detailed study on the stock status of whiting in the Sea of Marmara.

Keywords: CPUE, Marmara Sea, Whiting

EFFECT OF CLIMATE TRANSITION ON THE VEGETATIVE CYCLE OF CROPS IN SETIF REGION, ALGERIA

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ABSTRACT

The Setif high plains region is situated in the Northeast of Algeria. The region has a semi-arid climate and an annual mean rainfall of 400 mm. The dry-farming system is commonly used; it is based on cereal/sheep production. The analysis of climatic data show that under A2 scenario, the average model prediction of warming is 0, 97°C, 1,75°C and 2,88 °C in 2025, 2050 and 2075, respectively. The last ten years climate is characterized by a decrease in rainfall, more severe irregularity in their distribution, and higher temperatures. The objective of this study is to present the effects of this new climatic situation, which has disrupted the vegetative cycles of crops and the usual calendars of agricultural practices in the study area. The sowing of rainfed crops (wheat and barley), is delayed by lack of autumn precipitation, and their vegetative cycles are accelerated because of the increase in temperatures. Irrigated vegetable crops require more water because of increased evapotranspiration. This period of climate transition has had a direct effect on the drop in crop yields and requires a reflection on the implementation of a strategy of adaptation to the future climate by the choice of new crop techniques and adapted varieties. This new climate situation requires a new way of thinking agriculture.

Keywords: Climate transition, crops cycles, cereals, irrigated vegetable, Algeria

RESPONSE OF BREAD WHEAT TRITICUM AESTIVUM L. GROWN UNDER WATER STRESS CONDITION TO AN ANTITRANSPIRANT « GREEN MIRACLE » APPLICATION

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ABSTRACT

Water shortage is the most important component of life that limits plant growth and crop productivity particularly in arid regions. Antitranspirants are applied to plant foliage to curtail water loss. Keeping these points in view, an pot experiment was conducted to find out the effect of application of an antitranspirant « Green Miracle » on physiological parameters of a variety of bread wheat *Triticum aestivum* L. grown under water stress conditions. Green Miracle was used at the registered concentration and water stress was applied either during tillering stage, post-anther stage or during both stages (tillering and post-anther). By combining the "biostimulant" and "hydric stress" factors, 8 treatments were studied. Unstressed and untreated plants are considered as controls. The results showed that spraying antitranspirant Green Miracle significantly influenced the physiological parameters studied. Indeed, comparing the treated and untreated plants, it was noted that Green Miracle positively affected the synthesis of chlorophyll (a, b and a+b) even under water stress conditions. Concerning proline and soluble sugar contents which are known by their increase under drought stress to confer tolerance to plant, they were reduced in stressed plants treated with Green Miracle compared to plants stressed not treated with this antitranspirant. This result indicates that Green Miracle attenuated water stress in broad wheat plants. So, they did not need to increase their synthesis of these substances. Therefore, Green Miracle has been shown to be effective in reducing the effect of water stress on bread wheat. Thus, it can be used for improving the growth and yield of this crop.

Keywords: antitranspirant, broad wheat, water stress, physiological parameters

SURVEY ON THE USE OF PHYTOSANITARY PRODUCTS IN POTATO CULTIVATION IN THE WILAYA OF AIN DEFLA – ALGERIA

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ABSTRACT

Potato cultivation has developed considerably in recent years. More often it is grown in rotation with tomatoes or onions. This leads to the spread of diseases and pests similar to the crops. In the absence of biological means of protection and treatment, the most used intervention measures are generally pesticides (insecticides, and fungicides). The present work concerns a preliminary study on the use of phytosanitary products in potato crops in the wilaya of Ain Defla (Algeria). Through our different field surveys, we have underlined that, during the growth of the plants, diseases are strongly present, notably mildew and also pests such as aphids and mites. As a result, chemical treatments are highly valued by farmers in order to protect crops on the one hand and increase yields on the other. In addition, many pesticides are used without any precautionary measures or means to protect humans and their environment. Among the most used products, our results show that all pesticides are used in abundance, namely: fungicides (Maxile and Metalaxyle), insecticides (Metrixone and Agile 100 EC), herbicides (Prycale 480 EC and Mosplan). While nematicides (Mocap and Pointer Geo) are rarely used and also note the application of ground and foliar fertilizers. In general, potato growers use 2 to 3 kg/ h for fungicides, 1 or 2 l/ h for insecticides and 1 to 2 kg/ h for herbicides. On the other hand, farmers are dissatisfied with preparing low doses that they consider ineffective. Indeed, in the field, the danger is enormous, hence the need to call on the agricultural services concerned to intervene, with a view to rational use of pesticides and better protection of the land and its inhabitants.

Keywords: Surbey, Phytosanitaru Products, Potato, Ain Defla, Pest control

INFLUENCE OF DIFFERENT FOLIAR FERTILIZERS ON BIOACTIVE COMPOUNDS CONTENT IN WILD ROCKET- DIPLOTAXIS TENUIFOLIA (L.) DC.

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ABSTRACT

The wild rocket plant, scientifically known as *Diplotaxis tenuifolia* (L.) DC., is herbaceous member of the Brassicaceae family. It is mainly grown for its strong and pungent flavored leaves, extensively used in various culinary applications, particularly in salads and other gastronomic preparations. Rich in several health-promoting components, wild rocket leaves offer an abundance of nutrients and bioactive compounds. Among these are biogenic elements, vitamins (including C, A, and E), carotenoids, glucosinolates, phenolics (including flavonoids), all of which contribute to supporting overall health. In addition, some studies emphases antioxidant and anticancer activities of this perennial plant. The aim of this study was to determine total chlorophyll *a*, chlorophyll *b* and carotenoid content, total phenolic content (TPC), total flavonoid content (TFC) as well as content of total hydroxycinnamic derivative content (HCAs) in hybrid *Marte* F1 treated with potassium (*Wuxal K40*, Aglikon) and iron (*HaifaStim Wall-Up S*, Haifa) dominant foliar fertilizers, as well as natural biostimulator *Kelpak* (Kelp Products Ltd.). Furthermore, doses were evenly applied six times during the entire leaf rosette development phase. To establish a baseline for comparison, a control group of plants was formed, which did not receive any treatment. Upon harvest, the fresh plant material was extracted using 80% acetone, and subsequent assays were conducted. The spectrophotometric method results for selected pigments, TPC, TFC and HCAs were obtained, and statistical analysis was performed. The treatments with the application of iron achieved the highest values for the observed pigments. In the case of chlorophyll *a* and carotenoids, the values achieved in this treatment were statistically significantly different from the ones achieved in the other variants. However, in the case of chlorophyll *b*, there is no statistically significant difference between the values measured in the iron, potassium and Kelpak variables. Plants treated with *Kelpak* had the highest TPC (7.58±0.05 mg/g FAE fresh weight (fw)) and statistically significantly differed from control variant. However, there were no statistical differences observed among the other fertilized groups. Furthermore, TFC (2.48±0.20 mg/g QE fw) was found to be statistically significantly higher in wild rocket plants enriched with iron-dominant fertilizer compared to the other groups. As for HCAs, the greatest amount (0.58±0.05 mg/g CGAE fw) was obtained in variant treated with *Wuxal K40*. These results underscore the capacity of foliar fertilization to effectively influence the bioactive compound profiles of wild rocket for optimizing the plant's health-promoting properties.

Keywords: wild rocket, bioactive compounds, fertilization

EFFECT OF NUTRITION TREATMENTS ON PIGMENTS AND TOTAL PHENOLIC CONTENT IN BROCCOLI (BRASSICA OLERACEA VAR. ITALICA)

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ABSTRACT

Broccoli (*Brassica oleracea var. italica*) is an annual vegetable plant from the family Brassicaceae. The edible parts of broccoli are the fleshy stems and the compact inflorescences of green color. Broccoli is an economically and nutritionally important crop. The rich chemical composition of edible parts is reflected in the high content of vitamin C, dietary fiber, selenium and secondary metabolites (phenolics, flavonoids, glucosinolates, sulforaphane). Various researches, especially recent ones, point to out that broccoli has many health-promoting properties, such as antioxidant, anticancer and antimicrobial. The select broccoli hybrid *Parthenon* F1 (*Sakata Seed*) was produced during 2021, in open field conditions. Plants were treated with six different mineral starter fertilizer (*Super Star*, Elixir Zorka, Šabac) doses (0, 15, 20, 25, 30, 35 kg/ha) in combination with four treatments of biostimulator (*Kelpak*, Kelp Products Ltd.) - without, once, twice and three times, at different stages of plant development, in order to examine the impact of plant nutrition on the content of pigments (chlorophyll *a*, chlorophyll *b* and carotenoids) and total phenolics (TPC). Extraction and assays procedures were conducted according to procedures previously described by Gordanić et al. [1]. The obtained results for content ranges of chlorophylls *a*, *b*, total carotenoids and total phenolic content (TPC) are shown in Table 1.

Table 1. Ranges for pigments and total phenolic content in edible parts of broccoli

Hybrid	Biostimulator	Start fertilizer (kg/ha)	Chorophyll *a* µg/g FW	Chorophyll *b* µg/g FW	Carotenoids µg/g FW	TPC mg/g FAE
Parthenon F1	Control	0-35	59.96-132.66	27.79-61.68	30.59-61.96	0.93-1.20
	Once	0-35	71.77-102.70	28.04-50.71	34.83-50.27	0.89-1.26
	Twice	0-35	77.57-161.72	47.52-84.46	47.67-70.49	0.99-1.22
	Three time	0-35	93.94-140.99	38.47-57.64	45.87-61.98	0.87-1.23

*FW – Fresh weight; TPC – total phenolic content; FAE – Ferulic acid equivalents.

The obtained results indicated that, for all tested parameters, the highest values were recorded in the treatment in which biostimulator, in combination with start fertilizer, was applied twice. On the other side, in the case of pigments, the lowest values were recorded in the treatment were biostimulator was once applied, while in the case of TPC, the lowest values were measured in treatment in which biostimulator was applied three time. Further research should focus on finding a fertilizer dose that is economically and environmentally justified.

Keywords: broccoli, bioactive compounds, pigments, phenolic content

POTENTIAL OF NEW SUNFLOWER HYBRIDS DEVELOPED AT DAI - GENERAL TOSHEVO

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ABSTRACT

Sunflower is a main oil seed crop in Bulgaria. Apart from wheat, it is the second important field crop for the country. Annually, between 6 500 000 and 7 000 000 da of oil seed sunflower are being sown. Unfortunately, due to changes in the market structure during the last 15-20 years, sunflower is grown without observing proper crop rotation. Considering the tolerance of field crops, sunflower is an unstable crop with negative self-tolerance. The negative self-tolerance cannot be compensated by applying better agronomy practices since it is brought about primarily by phyto sanitary issues. The aim of this investigation was to demonstrate the level of the Bulgarian sunflower breeding and present the most recent sunflower hybrids and their potential with a view of their future use in practice. The investigation was carried out at DAI – General Toshevo during 2020 – 2022. It included 13 of the most recent sunflower hybrids of the institute. Five female lines and 11 fertility restorers were used to develop them. Some of the traits most important for a hybrid were followed: seed yield, oil content in seed, oil yield per da, plant height and vegetative growth period. Most promising were the hybrid combinations, which involved female lines 3607A and 813A. Their hybrids gave very good results according to the studied traits.

Keywords: sunflower, hybrids, lines, productivity

STUDY ON THE EFFECT OF IMPORTANT QUANTITATIVE TRAITS RELATED TO HIGHER SEED YIELD IN SUNFLOWER (HELIANTHUS ANNUUS L)

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ABSTRACT

The research was carried out during 2018 – 2021 at Dobrudzha Agricultural Institute – General Toshevo. The parameters plant height, head diameter, number of seeds per plant, 1000 kernel weight and leaf area are of primary importance with direct effect for the increase of the seed yield per unit area. The research included eight hybrid combinations and parental forms involved in the crosses. The inheritance of the resistance to the parasite *Orobanche* (race G) in the hybrid combinations was investigated. The parameters plant height, head diameter, number of seeds per plant, weight of seeds per plant and 1000 kernel weight had direct effect on most of the hybrid combinations toward higher seed yield. Lower was the effect of the leaf area on the seed yield. A moderate resistance (50-75%) to the parasite *Orobanche* (race G) was found in two hybrid combinations - 217A x 97R and 2008A x 99R. This moderate resistance to the parasite was due to the fact that the fertility restorer lines involved in hybridization (97R and 99R) demonstrated resistance of to the above race during the years of research (100% for 97R and 50-75% for 99R, respectively).

Keywords: sunflower, climatic conditions, quantitative traits, orobanche cumana

STUDY OF RESISTANCE RESPONSE TO DISEASES AND THE (OROBANCHE CUMANA WALLR.) IN SUNFLOWER (HELIANTHUS ANNUUS L.) DEPENDING ON THE CHANGE OF WHEATHER CONDITIONS IN PARENTAL LINES AND HYBRID COMBINATION

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ABSTRACT

The study was conducted in the period 2016-2019 in Dobrudzha Agricultural Institute - General Toshevo. The influence of wheather factors (precipitation and temperature) on resistance during the years of the study was studied in parental lines and hybrid combinations. The study examined 11 fertility restorer lines, 5 sterile lines and 26 hybrid combinations for resistance to downy mildew, phoma, phomopsis, Alternaria and orobanche cumana. The inheritance of the parasite blue wrist (race G) in the hybrid combinations was studied. The high resistance to race 731 of downy mildew in the two years 2018, 2019. from the study in the hybrid combinations: 813A x 84R, 813A x 85R, 813A x 87R, 813A x 88R, 813A x 98R, 813A x 99R and 813A x 138R. A sensitive type of response to orobanche cumana was found in 18 hybrid combinations in 2016, increasing to 26 crosses in 2019. Medium resistance to the pathogen Phomopsis was found in 2016 and 2019. from the study (21-26) hybrid combinations and (6-10) parental lines - 84R, 85R, 87R, 88R, 89R, 98R, 100R and RW666. Depending on the change in wheather conditions during the individual years of the study, the resistance to certain races of individual pathogens in the sunflower also changes.

Keywords: sunflower, wheather condition, disease, parental line, hybrid

BREEDING FOR CROP SPACING IS IMPERATIVE TO ADAPT SEED-PRODUCING CROPS TO CLIMATE CHANGE

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ABSTRACT

Natural selection favors the competitive ideotype, serving native plants' survival in the face of intense competition. The productive ideotype is the goal of artificial selection to achieve high crop yields via efficient use of resources in a self-competition regime. When breeding is established under inter-genotypic competition, the competitive ideotype dominates and may fictitiously become selectable. The productive ideotype becomes selectable at the nil-competition regime, where widely spaced individuals prevent plant-to-plant interference for any input. Principal reasons bring to the fore the productive ideotype that combines low competitiveness and improved plant yield efficiency. Crop spacing via the productive ideotype is mandating to: alleviate the varying optimum density and ensure efficient use of resources inter-seasonally, cope with intra-field variation and optimize resource use, compensate for missing plants and promote stability, counteract unpredictable stresses and offer a buffer against environmental diversity, and adopt low-input agriculture to conserve natural resources and the environment. For breeding towards the productive ideotype, nil-competition is the due condition to: overcome the confounding effects of competition, maximize phenotypic differentiation and facilitate selection from an early segregating generation, optimize heritability due to moderated environmental variance and experimental designs that sample spatial heterogeneity, apply high selection pressure focusing exclusively on the targeted genotype, and avoid the risk of bias selection or loss of desired genotypes due to proximity to empty hills. The view of a modern crop variety composed of genotype(s) belonging to the productive ideotype is a viable option to reach crop resilience serving sustainability in enormously fluctuating agroecosystems.

Keywords: Compensation, Density dependence, Honeycomb breeding, Intra-specific competition, Low-input agriculture, Optimum density, Plant yield efficiency, Resource use efficiency, Yield gap

TO COMPARE YIELD AN QUALİTY CHARACHTERS OF WINTER WHEAT IN RESPONSE TO DRONE SPRAYING PESTICIDE AND MANUEL SPRAYING PESTICIDE

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ABSTRACT

The monitoring of the crops and the need for spraying pesticides at the correct moment and at the exact location of plants is an important parameter to increase the productivity and quality of the wheats. Agricultural drones are one of the important innovations for increasing productivity of the crops. The aim of this study was to compare the successful drones usage pesticide spraying and non-using drones spraying pesticide in huge crop fileds and find out the effects of the yield components of wheat, such as plant height, spike length, number of spikelets per spike, number of grains per spike, grain weight per spike, 1000-grain weight, grain yield and wheat quality charachters such as protein contnent, gluten, zeleny sedimentation volume and hectoliter. The experiment was conducted in Kestel/Çataltepe region, in Bursa/Türkiye during 2022-23 crop season. Two seperated fields which one of is 250 decare huge. Winter wheat "Adana-99" used as the experimental material. As a result of the research, it was determined that the components that got from the field which is the successful drones usage pesticide spraying in spring (April) has significant differences among the components that got from the field which is the non-using drones and didn't had change to sprayin pesticide in springtime (because of heavy rainy weather conditions). The results showed that number of spikelets per spike, number of grains per spike, grain weight per spike, 1000-grain weight, grain yield protein content, zeleny sedimentation volume, hectoliter were observed the higher degrees and affected positively more by spraying pesticide in spring (April) than the others components. There is a considerable amount of variation in the some yield and quality components of wheat. This variation may be induced by environmental factors, but can also be attributed to the right time pesticide spraying programme by drones.

Keywords: Wheat (Triticum aestivum), Agricultre Drone, Drone Spraying

CHANGES IN THE RATE OF GROWTH AND ACCUMULATION OF DRY MATTER AND DIFFERENCES IN THE MICROCLIMATE OF WHEAT CROPS WITH A BALANCED MINERAL NUTRITION OF PLANTS

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ABSTRACT

In the period 2021-2023, a multifactor field experiment with wheat was conducted at the Institute of Agriculture - Karnobat, Bulgaria. The influence of plant mineral nutrition and the changes that occur in growth rate and dry matter accumulation, as well as differences in the microclimate of the Miryana wheat crop, were investigated. The experiments were carried out in four variants of mineral nutrition. In the variants, pre-sowing fertilization with Duofertil TOP 38, nitrogen fertilization with ammonium nitrate, foliar fertilization with Astellis biostimulator was performed. Duofertil TOP 38 and Astellis are products of Timak Agro Bulgaria, and the technological solutions are from the World Agro-Innovation Center of the Roulier Group in France. After seeding the trials in the pre-sowing variants with TOP-PHOS, it was found that the wheat plants grew faster than the control. In all variants in the brazing phase of wheat after pre-sowing fertilization with TOP-FOS, the fresh and dry weight of the leaves was greater than in the plants grown by traditional technology. Roots were significantly larger and had higher fresh and dry weight values. The cultivation technology used with the products of Timak Agro with different fertilizing options also led to an improvement of the microclimate in the crop. The surface air temperature of the wheat was changed, decreasing by 0.35 to 3.89 C compared to the control variants. Crop temperature was found to have decreased by a range of 0.50 to 8.20 C. At the same time, crop relative humidity increased, with the 2022–2023 average for wheat at 4.7%. The changes in growing conditions that occurred with the fertilization options prove that improved crop nutrition not only leads to rapid growth, but also changes the microclimate of the crop. The created conditions for combined balanced nutrition of the grain plants gave their result in the formation of the yield. On average for the period, yield growth of 19.18% was achieved, which represents a yield of 115 kg more grain.

Keywords: wheat, growth rate, microclimate, mineral nutrition

RHONEYCOMB: A STATISTICAL TOOL FOR THE CONTRACTION AND ANALYSIS OF HONEYCOMB SELECTION DESIGNS

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ABSTRACT

The Honeycomb Selection Design (HSD) is an advanced experimental method devised for plant breeding. By spacing individual plants widely apart, thus eliminating competition, the HSD enables the evaluation of a large number of progeny lines (entries) and allows for single-plant selection to be implemented from the early stages of genetic segregation. In order to effectively implement this method, a specialized software called 'rhoneycomb' was developed to address the specific entry arrangement and the complexity of statistical data analysis involved. This work offers a comprehensive introduction to the 'rhoneycomb' R package, which is a freely available and open-source tool designed for the construction, visualization, and analysis of HSDs.

Keywords: single-plant selection, systematic entry arrangement

EVALUATION OF DIFFERENT TOMATO CULTIVAR CANDIDATES IN TERMS OF SOME FRUIT QUALITY PARAMETERS

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ABSTRACT

Tomato is a plant of the Solanaceae family and included in the genus Lycopersicon is considered the most widely grown vegetable in the world. Tomatoes can be grown in almost every region of world. Although yield is the most important factor in tomato production, fruit quality parameters are very important in tomato production, marketing and consumption. Brix, pH, acidity, flesh firmness and color are important parameters especially in industrial tomato production. In this study, it was aimed to evaluate the tomato cultivar candidates resistant to some diseases and pests in terms of some quality parameters in the industrial tomato breeding program. In the study, fruit weight, Brix, pH, acidity, flesh firmness and color characteristics were determined in the fruits of 20 industrial tomato cultivar candidates. As the results of present study, fruit weight was 65-164 gr, Brix 4-6, L value 20-39, a value 24-41, b value 12-18, pH 4-5, acidity 0-1 and fruit firmness 1-3. The results can be used in the determination of industrial tomato cultivars.

Keywords: Tomato, cultivars, fruit quality parameters

DETERMINATION OF THE EFFECTS OF DIFFERENT SEED GERMINATION METHODS IN TOMATO

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ABSTRACT

Tomato is an annual herbaceous plant of the Solanaceae family and included in the genus Lycopersicon. Tomato with haploid chromosome number n=12 is considered the most widely grown vegetable in the world. Tomatoes can be grown in almost every region of World. There are many problems in commercial tomato production. The first of these is to obtain healthy and timely seedlings to be obtained from the seeds of the variety to be produced. However, when a problem is encountered in seed germination, it is not possible to obtain healthy and timely seedlings. As in other species, it is important to know the seed germination rate and duration in tomato seedling production. Different methods have used to determine seed germination, but the properties of the seed to be germinated affect seed germination. In this study, it was aimed to determine the effect of 2 different methods on the germination of industrial tomato variety. In the first application, the germination test was applied between the filter paper, in the second application, the germination test was carried out by sowing the viol containing a mixture of peat and perlite (3:1) and the germination rate, germination time and abnormal germination were determined in both applications. According to the findings obtained, the germination test was found to be more successful by sowing directly with violet containing a mixture of peat and perlite (3:1). The results of present study will be able to contribute to producers producing commercial seeds and companies producing seedlings.

Keywords: Tomato, seed germination. testing

IMPROVING ROOTING PERFORMANCE OF ANATOLIAN SAGE (SALVIA FRUTICOSA MILL.) CUTTINGS WITH MICROBIAL FERTILIZATION TREATMENT

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ABSTRACT

Anatolian sage (*Salvia fruticosa* Mill.) is a species distributed in different locations from the northwest to the southwest of Turkey with commercial significance. It can reproduce both generatively and vegetatively. The successful and desired condition of rooting in sage cuttings depends on various factors, such as the plant species, age of plant, timing for cutting, type of cuttings, used plant growth regulators, rooting media and environmental conditions. Microbial fertilizers or biofertilizers are substances containing live microorganisms that accelerate plant growth when applied to the soil and plant surfaces. This study aims to investigate the impact of different microbial fertilizer types and application doses on the rooting of Anatolian sage cuttings (*Salvia fruticosa* Mill.). The experiment is conducted in a randomized complete block design with four replications. The experiment consists of 2 microbial fertilizers x 5 applications x 4 replications. EM.1 and EM.5, commercial microbial fertilizers produced by EM Agriton BV are used in the study. Rooting ratio, number of roots, root length, root quality, fresh root weight and dry root weight are measured in the study. According to the results, EM.1 microbial fertilizer wtih 1.5 dose showed better results in terms of root development compared to other doses and microbial fertilizers.

Keywords: Salvia fruticosa Mill., Microbial fertilizer, Rooting, Cuttings

EFFECT OF HETEROSIS ON PLASTID PIGMENTS CONTENT AND PHOTOSYNTHETIC ACTIVITY OF MAIZE HYBRID KNEJA 435

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ABSTRACT

In competitive field trial the effect of heterosis on plastid pigments content (chlorophyll a, chlorophyll b, and carotenoids) and photosynthetic activity of maize hybrid Knezha 435 and its parent components was determined. Portable intelligent photosynthesis system LC pro T manufactured by ADC Bioscientific Ltd. was used for the photosynthetic activity measurement. Plastid pigments content (chlorophylls +carotenoids) was found the lowest for parental male inbred plants and the highest for the hybrid ones. The photosynthetic activity of the hybrid plants was found higher by 1,208 to 3,054 μmol m -2 s -1, respectively as compared to the parent components. The findings can be used for the future breeding programs in maize.

Keywords: maize, heterosis, plastid pigments, photosynthetic activity

THE EVALUATION OF YIELD AND SOME QUALITY PARAMETERS IN LAVANDULA ANGUSTIFOLIA MILL.

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ABSTRACT

Lavender (*Lavandula* sp.), which is native to the Mediterranean, Arabian Peninsula, Russia and Africa, has been used for both cosmetic and medicinal purposes throughout history. Today, lavender is grown worldwide and the essential oil obtained from the flower parts is used in food (bakery products, jellies and teas), cosmetics (perfume and massage oil) and cleaning (detergent, soap and shampoo) products, especially in aromatherapy. There are six lavender taxa, three species (*L. angustifolia* Mill., *L. pendunculata* (Mill.) Cav., and *L. stoechas* L.) and three subspecies (*L. angustifolia* subsp. *Angustifolia* Mill., *L. pendunculata* subsp. *Cariensis* (Boiss)) Upson & S. Andrews., and *L. stoechas* subsp. *stoechas*) in the Flora of Turkey. L. angustifolia, known as English Lavender, is the most common type of lavender used. The quality of essential oil in *L. angistofolia* is determined by the ratios of linalyl acetate and linalool, which are the main components of the essential oil. For the perfumery industry, these two components are required to be high in essential oil and camphor below 0.5%. In this study, yield and some quality parameters of *L. angustifolia* species grown in Yozgat Bozok University Application and Research area were evaluated. The first year of the research was made on 06.07.2022. In this harvest, plant height, habitus diameter, fresh herb yield, drug herb yield, flower stem length and flower cluster length were determined. The data obtained varied between 53-97 cm, 59-122 cm, 436.42-1212.54 g/plant, 178.80-496.78 g/plant, 18.61-32.04 cm and 5.12-12.02 cm, respectively. The second year, plant height, habitus diameter, fresh herb yield, flower stem length and flower cluster length were determined. The data obtained varied between 58-74 cm, 74-130 cm, 606.32-1851.82 g/plant, 28.55-34.69 cm and 9.14-13.26 cm, respectively. 1.065 % essential oil was obtained from the flower clusters by hydro distillation method. The essential oil harvested in 2023 will be analyzed using GC/MS to determine its chemical composition. With this study, basic information will be obtained about the yield and quality parameters of *L. angustifolia* grown in Yozgat ecological conditions, where semi-arid continental climate is dominant.

Keywords: lavender, flower yield, essential oil, linalool, linalyl acetate

EVALUATION OF MINERAL COMPOSITIONS OF SOME SAGE (SALVIA SP.) TAXA REGISTERED IN THE FLORA OF TÜRKIYE.

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ABSTRACT

Türkiye having a flora rich in plant diversity, is home to 11 707 plant taxa. Of these taxa, 3649 are endemic. This richness in the flora is also reflected in medicinal-aromatic plants. There are many plants that grow naturally in the Flora of Türkiye, exhibit therapeutic properties, have aromatic value or are evaluated as food. Sage is the general name of the species in the genus *Salvia* from the Lamiaceae (Labiatae, Ballıbabagiller) family. Most of these species are perennial. However, there are also biennial or annual species. It is reported that the number of species distributed in tropical and subtropical regions, around the Mediterranean and Central Europe is close to 1000. Türkiye is an important gene center of Salvia genus. There are 99 species of this genus, 51 of which are endemic, in the flora of Türkiye. Leaves, flowers and herbage (leaf + stem + flower) are used according to the characteristics of sage taxa. Some sage taxa, especially medicinal sage (*Salvia officinalis* L.), have regional use in the form of herbal tea. The high content of essential mineral substances of medicinal plants used as herbal tea is of great importance in terms of human health. In this study, the mineral matter (Ca, K, P, Fe, Mn, Zn, Cu, B and Na) contents of flowering aerial parts (herbage) of nine Salvia taxa, five of which are endemic (*) [*S. aethiopis* L.,*S. ekimiana* Celep & Doğan (*), *S. hypargeia* Fisch. & C.A.Mey. (*), *S. cyanescens* Boiss. & Balansa (*), *S. candidissima* subsp. *Occidentalis* Hedge, *S. virgata* Jacq.,*S. freyniana* Bornm. ex Freyn (*), *S. verticillata* subsp. *amasiaca* (Freyn & Bornm.) Bornm.ve *S. absconditiflora* (Montbret & Aucher ex Benth.) Greuter & Burdet (*)] distributed in the Flora of Türkiye, were determined by ICP-MS. The findings will be evaluated with the literature data.

Keywords: Salvia sp., nutrient element, ICP-MS, herbage

YIELD AND YIELD COMPONENTS OF CONFECTION SUNFLOWERS (HELIANTHUS ANNUUS L.) GENOTYPES AND RESPONSE OF YIELD COMPONENTS TO DIFFERENT NITROGEN DOSE FERTILIZATION

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ABSTRACT

Sunflower is recognized as one of the most important oil crops worldwide. Sunflower, which is largely used to meet the need for edible oil, is also produced as a snack sunflower. In this study, sunflower cultivars with different grain colors were compared in terms of yield and yield components under four different nitrogen doses (0, 6, 12, 18 kg/da). While this study aims to lead the knowledge to eliminate the lack of quality standards in our country, it also aimed to reveal the effect of nitrogen dose on the yield and yield elements of black and white confectionery sunflowers. Among the genotypes used in the study, Ahmetbey confectionery cultivar stood out in terms of yield items. The marginal benefit increased as the dose increased compared to the N doses we used. For further studies, it would be appropriate to try a higher dose of fertilization to find the peak point of the N dose. This study and the studies to be carried out will make significant contributions to the improvement of yield and the development of sunflower agriculture.

Keywords: Sunflower; Nitrogen

ALTERNATIVE OILSEED CROPS IN TURKEY

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ABSTRACT

Despite its sufficient production in many agricultural crops, our country has a large foreign trade deficit, especially in the production of oilseeds and edible oil. Alternative oilseeds are valuable crops that are grown in marginal areas in Turkey and have a crucial contribution to oil production. Alternative oilseed crops cultivated in our country are rapeseed (canola), safflower, sesame, linseed, camelina and cephalaria. While these oilseeds can be successfully grown in Turkey, the markets and supply chains some of them are not necessarily developed. Especially camelina and cephalaria production is too low to be recorded in the statistical database. In 2022, 150 000 tons of rapeseed, 30 000 tons of safflower, 17 366 tons of sesame and 8 tons of linseed were produced in our country. The production of these crops is highly low in Turkey where edible oil consumption is high. Although almost every region of our country is suitable for the production of major and alternative oilseed crops, the increasing vegetable oil deficit is a major problem. In this study, the availability, production and future of alternative oilseed crops in Turkey are considered as a whole.

Keywords: alternative oilseed crops, rapeseed, safflower, sesame, linseed, camelina

NODULE-FORMING ABILITY OF PEA AND VETCH IN MIXTURES WITH OAT

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ABSTRACT

The nodulation potential of legume components in annual grass-legume forage mixtures was investigated. Pea and vetch sown alone (100%), in double mixtures with oats in the legume:grass ratio (70:30%), and in triple mixtures in the legume: legume:grass ratio (35:35:30%) were tested in a pot trial under semi-controlled conditions. Spring forage pea variety Crystal and spring vetch variety Obrazets 666 were used. Based on plant morphometry - root mass, nodule characteristics, some biometric indicators of nodule formation were calculated. Pea plants (100%) showed greater specific nodule-forming ability compared to vetch (100%). The same tendency was found for the mixtures with oats (70:30%). In the triple mixtures (pea-vetch-oat - 35:35:30%), the specific nodule-forming ability of both leguminous crops decreased, weaker for pea (5.22%) versus vetch (13.66%).

Keywords: pea, vetch, nodulation, mixtures

NANOFARMING: A PROMISING APPROACH FOR SUSTAINABLE CROP PRODUCTION & FOOD SECURITY

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ABSTRACT

Nanofarming is an emerging concept in agriculture that holds promise for sustainable crop production and enhanced food security. It involves the application of nanotechnology in various aspects of farming, including plant growth, soil health, pest management, and nutrient delivery. The integration of nanotechnology into agriculture can lead to more efficient and targeted farming practices, ultimately contributing to increased yields, reduced resource usage, and improved food production. Key aspects of Nanofarming include: Precision Agriculture: Nanotechnology allows for precise monitoring and management of crops. Nanosensors can be used to detect changes in soil moisture, nutrient levels, and other environmental factors in real-time. This enables farmers to optimize irrigation, fertilization, and other inputs, resulting in better resource utilization and minimized environmental impact. Enhanced Nutrient Delivery: Nanoparticles can be engineered to encapsulate and release nutrients gradually over time, ensuring that plants receive the required nutrients in a controlled manner. This approach improves nutrient uptake by plants, reduces fertilizer wastage, and minimizes nutrient runoff, which can lead to water pollution. Pest and Disease Management: Nanotechnology offers novel methods for pest and disease control. Nanoparticles can be designed to deliver pesticides or antimicrobial agents directly to the target organisms while minimizing their impact on non-target organisms and the environment. This approach reduces the need for excessive pesticide application. Improved Soil Health: Nanomaterials can be used to improve soil structure, water-holding capacity, and nutrient retention. Nanoparticles can enhance the efficiency of soil amendments, such as organic matter and compost, leading to healthier soils that support robust plant growth. Nanomaterial-Enhanced Seeds: Nanocoatings on seeds can improve germination rates, enhance plant growth, and provide protection against environmental stressors. These coatings can also contain beneficial microorganisms to promote plant health. Water Management: Nanotechnology can be used to develop water purification and filtration systems that remove contaminants and pollutants from irrigation water, thus safeguarding both crops and the environment. Climate Resilience: Nanofarming techniques may help crops become more resilient to climate change-induced stresses, such as drought, extreme temperatures, and disease outbreaks. However, it's important to note that while nanofarming holds significant potential, there are also challenges and ethical considerations that need to be addressed. These include potential risks associated with the release of nanoparticles into the environment, the long-term effects of nanomaterials on soil and ecosystem health, and concerns related to the safety of nanoparticles in food products. In conclusion, nanofarming presents a promising approach for sustainable crop production and food security. Continued research, development, and careful implementation of nanotechnology in agriculture can lead to more efficient and environmentally friendly farming practices, contributing to global efforts to feed a growing population while minimizing the negative impacts of traditional agriculture.

Keywords: Precision Agriculture; Enhanced Nutrient Delivery; Pest and Disease; Management; Improved Soil Health; Nanomaterial-Enhanced Seeds; Water Management

ANTIFUNGAL POTENTIAL OF BACILLUS SPP. AGAINST STRAWBERRY GRAY MOLD CAUSED BY BOTRYTIS CINEREA

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ABSTRACT

Grey mold, caused by the fungus *Botrytis cinerea*, is one of the most devastating diseases of strawberry (*Fragaria ananassa*). The objective of this study, conducted at the laboratory of the protection unit within the Hassan II Agronomic and Veterinary Institute and the SABEMA farm in Allal Tazi (north western-Morocco), was to evaluate the antagonistic effect of five bacterial strains of the genus *Bacillus* spp. (*Bacillus amyloliquefeciens* strain S1, *Bacillus subtilis* strain S2, *Bacillus subtilli* strain S3, *Bacillus amyloliquefaciens* strain S4 and *Bacillus velezensis* strain O4) against *Botrytis cinerea*, tested in the laboratory and on fruit. The strains exhibited antifungal activity against *Botrytis cinerea* under in vitro conditions. Strain O4 was able to inhibit mycelial growth by 62.92% through direct confrontation and 64.58% by emission of volatile organic compounds. In addition, *Bacillus subtillis* strain S3 showed high inhibition (74.64%) compared to the control at 25% bacterial filtrate concentration. Treatment of fruit with cell culture and cell-free culture of the five studied strains controlled the development of gray mold in vivo and this was translated by low severity index in strawberries treated with strains I3 and S1 of *Bacillus amyloliquefaciens*, and *Bacillus subtillis* S3. The difference in efficacy of the different strains was dependent on the time of the treatment application; the preventive treatment was more effective compared to the curative treatment.

Keywords: Fragaria ananassa, Botrytis cinerea, antagonistic effect, Bacillus amyloliquefaciens, Bacillus subtilis, Bacillus velezensis

BIO-CONTROL OF CITRUS BLACK ROT CAUSED BY *ALTERNARIA ALTERNATA* (FR.) KEISSL.

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ABSTRACT

Citrus black rot is considered currently among the most serious fungal diseases in mandarin orchards, especially in susceptible varieties. In addition to its wide distribution, it has been becoming more severe in humid climate areas, where control is very difficult. The present study consists of the evaluation of the in vitro and in vivo antagonistic potential of three antagonistic bacteria strains of the genus *Bacillus* spp (O4, E7 and E10) against two strains of *Alternaria alternata* (Fr.) Keissl. causal agent of citrus black rot, in comparison with two chemical fungicides (imazalil and azoxystrobin). The results of the in vitro tests showed that the three strains of *Bacillus* spp. (O4, E7 and E10) generated an important inhibition of the radial growth of the two *A. alternata* strains in the order of 60% against the first strain compared to 25% for the second one, this can be explained by the difference of virulence. For the evaluation of the active substance, 5 concentrations were evaluated (0.01ppm; 0.05ppm, 0. 1ppm and 0.2ppm) for Imazalil with the inhibition of 7.84%; 44.11%; 48.03%; 59% after 7 days respectively, while the 5 azoxystrobin concentrations (0.001ppm; 0.01ppm; 1ppm, 10ppm and 100ppm) were evaluated with inhibition rates of 25.49%; 31.37%; 35.29%; 31.37%; 29.41% respectively. The results of the in vivo assays showed that the three *Bacillus* spp. strains inhibited the growth of both *A. alternata* strains. For strain 1, the analysis of variance showed that there was a high significant difference between treatments ($p=0.004$), the comparison of means showed that all bacterial treatments were significantly different to the control. Regarding strain 2, the analysis of variance showed a high significant difference ($p=0.003$) between treatments, and the comparison of means ($P \leq 5\%$) revealed 3 homogeneous groups (Control and strain E7, strain E10, strain O4) which are significantly different. O4 showed the highest inhibition rate in the order of 37% followed by E10 (21%) and E7 (7%). Concerning the chemical formulations, 3 concentrations were tested 250ppm, 450ppm and 1000ppm. The results were taken 10 days after inoculation. However, the 3 doses of azoxystrobin showed a highly significant inhibition (between 45% and 55%) compared to the control, while the tested doses of Imazalil showed no significant difference with the control.

Keywords: citrus, Alternaria alternata, antagonistic, *Bacillus* spp. , biocontrol

CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF SOME MEDICINAL PLANTS FROM MOROCCO

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ABSTRACT

Interest in the development of natural products as an alternative to chemical pesticides in plant protection has been growing rapidly. In this direction, essential oils extracted from plants hold promising future in biological control of various plant pathogens. This study aimed to investigate the antifungal activity of four essential oils (EOs) of medicinal plants (Origanum compactum, Thymus marrocanus, Thymus satureoidis and Thymus leptobotris) against five fungal strains (Alternaria solani, Stemphylium solani, Fusarium solani, Cladosporium cladosporioides and Verticilium dahliae). Based on the results, EOs content of the studied plants are 3.36% for Origanum compactum, 1,52% for Thymus marrocanus, 1,01% for Thymus satureoidis and 1,76% for Thymus leptobotris. Carvacrol was the dominant constituent with other notable identified compounds such as Thymol, p-Cymene, α-Terpinene and Borneol. All tested oils showed antifungal activity against all tested plant pathogens in the laboratory. Regarding Alternaria solani and Stemphylium solani, oreganum oil showed the most remarkable inhibitory effects. Thymus marrocanus oil showed the highest antifungal activity against Fusarium solani and Verticilium dahliae. Thymus satureoidis oil was found to be the strongest inhibitor of Cladosporium cladosporioides. These encouraging results indicate that essential oils seem to be a promising control agent for plant fungal diseases.

KEYWORDS: ESSENTIAL OILS, ANTIFUNGAL ACTIVITY, THYMUS, ORIGANUM COMPACTUM, PLANT PATHOGENS

MICRORNAS AND THEIR ROLES IN THE MANAGEMENT OF PLANT DISEASES

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ABSTRACT

Plants are constantly exposed to abiotic and biotic stress factors. They have been employed with various defense mechanisms such as RNA silencing to overcome these stresses. miRNAs, a class of non-coding RNAs, have sequence complementarity to mRNAs. miRNAs play important roles in the regulating of gene expression in several signaling pathways. In addition, miRNAs have gained importance in terms of response to stresses. There are some studies related with the use of RNAi based signaling pathways for the development of control strategies against plant pathogens. In this review, it was aimed to investigate reports which are dealing with the function of miRNAs and their targets during plant-pathogens interactions. One of these studies was conducted in tomato plants. The results showed that *Pseudomonas syringae* infection supressed miR482 expression and also regulated R genes, protecting tomato plants. In another study performed in maize plants, it was reported that expression of miR393 was increased in response to *Colletotrichum graminicola*. Similarly, miR160 upregulation was reported in *Magnaporthe oryzae*-infected rice plants. Moreover, it was also suggested that overexpression of miR160 improved resistance against the pathogen. In addion, miR2118 responds to fungal infections caused by *Phytophthora infestans* and *Fusarium oxysporum* in tomatoes by regulating the downstream target gene. Due to important roles of miRNAs in promoting resistance to biotic stress, the function of miRNAs between host and pathogen should be elucidated for modern plant protection strategies.

Keywords: non-coding RNAs, epigenetics, plant protection

LARVICIDAL ACTIVITIES OF THREE ESSENTIAL OILS AGAINST EUPHYLLURA OLIVINA COSTA (*HOMOPTERA: PSYLLIDAE*)

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ABSTRACT

The olive psylla *Euphyllura olivina* (Costa) is an economic olive pest in its native regions that attacks its various organs. In this study, we were carried out in order to determine the insecticidal potential of *Thymus vulgaris*, *Satureja calamintha nepeta*, and *Eucalyptus globulus* essential oils. The contact effect of the three essential oils against the 4th and 5th larval stage of the olive psylla was investigated. While the oils of *S. calamintha nepeta*, and *E. globulus* essential oils showed the same strong insecticidal activity against *E. olivina* (LD50 = 0.13% and 0.15%, respectively), the oil of *T. vulgaris* revealed poor activity against the insect (LD50 = 0.28%). The components of the essential oils were obtained and identified. Chromatographic analysis (GC-MS) of *S. calamintha nepeta* essential oil demonstrated that Pulegone (38.75%) is the main constituent. And as for the *E. globulus* the highest components were Alpha-pinene (22.76%). And the main components of the *T. vulgaris* essential oil were determined as Carvacrol (43.30%).

Keywords: Euphyllura olivina, Larvicidal activity, biocontrol, essential oil

ENTOMOFAUNAL DIVERSITY OF AN OLIVE ORCHARD IN EL ASNAM (BOUIRA, ALGERIA)

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ABSTRACT

The biodiversity of the entomofauna associated with the olive tree is studied in olive orchard located in El Asnam (Bouira, Algeria) during a period from the end of October 2021 until June 2022. To carry out this study, two types of traps were used, Barber pots and sticky plates. Thus, a total of 1300 individuals were trapped representing 84 taxa. This entomocenosis is divided into 10 orders and 48 families. The order of Hymenoptera is quantitatively the best represented with 36.90% or 31 taxa listed, it is followed by Coleoptera which total 17 species (20.24%). The study reveals that sticky pads attract the greatest number of insects with 50.92%. The results of the inventory indicate that quantitatively the ant *Tapinoma* sp., the Diptera Agromyziidae sp. and Phoridae sp. predominate in the orchard with respectively 219, 186,120 individuals. Among the 84 insect species listed, 28 taxa are parasites, i.e., 33.33% of the total number of entomofauna listed. They can play an important role in the biological control of various olive pests. Among the predators the families of Coccinellidae and Carabidae predominate with respectively 04 taxa each. The presence of the whitefly ladybird *Clitostethus arcuatus* may contribute to the regulation of populations of the olive whitefly *Aleurolobus olivinus*. The diversity according to trophic status shows that phytophagous species occupy the first place in number of species and in number of individuals, followed by predators and polyphagous. Phytophages include five main bio-aggressors of the olive tree, namely the olive fly *Bactrocera oleae*, the whitefly *Aleurolobus olivinus*, the olive psyllid *Euphyllura olivina*, the olive tree Trips *Liothrips oleae* and the Curculionid *Otiorhynchus cribricollis*. Finally, the study carried out gave an idea of the importance of the main bio-aggressors of the olive tree in the Bouira region.

Keywords: Bactrocera oleae, inventory, Entomofauna, olive tree, Bouira

SYNERGISM OF SELECTED PLANTS ESSENTIAL OILS WITH ALPHA CYPERMETHRIN AGAINST BACTROCERA ZONATA (*TEPHRITIDAE: DIPTERA*)

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ABSTRACT

Current studies were carried out to evaluate the synergistic effect of selected essential oils when combined together or mixed with alpha cypermethrin to reduce the insecticide dose as well increase the mixture efficacy in controlling adult *Bactrocera zonata.* Essential oil tested included *Parthenium hysterophorus* (PH), *Eucalyptus obliqua* (EO), *Cannabis sativa* (CS) each one used at five different concentrations selected as multiple (0.25, 0.5, 1, 2, 4) of their LC 50 values determined on the basis of preliminary trials. Constant ratio combination design was used for mixing the individual components. Different component mixtures included combinations of (PH + CS), (PH+EO), (EO+CS), (PH+CS+EO) each mixed at five concentration levels (same levels). Similarly, each of the essential oils was mixed with alpha Cypermethrin in combinations of multiple (0.25, 0.5, 1, 2, 4) of their LC 50 values. Toxicity of individual components as well as mixtures was determined by using dry film residue method. The response to Toxicity response exposure was estimated using the median-effect equation, as described by Chou and Talalay. Interactions of these mixtures were studied using the combination-index (CI) equation method using the software Compusyn that is based on general equation of dose and effect and its theorem of combination index developed by using the approach of merging the physicochemical principle of the mass-action law with the mathematical principle of induction and deduction. LC values of individual essentional oils as determined by the model were 0.55, 0.398 and 0.572 for *C. sativa, P. hysterophorus and E. obliqua* respectively. Cypermethrin exhibited LC50 value of 0.00353. When binary combination of cypermethrin and c. *sativa* were tested, the value of CI ranged between 0.53-1.74. (<1 being synergism) was observed only for the mixture combining 0.25(LC50) but the effect size was small (fa=0.6). All the binary combinations of cypermethrin alpha and *P. hysterophorous* showed antagonistic effect only. Cypermethrin when combined with *E. obliqua* indicated synergism at 0.25(LC50) and 4(LC50) with effect size of 0.68% and 0.9% respectively. In combination mixing all the three Eos with pyrethroids showed synergism only at highest concentration 4(LC50) with a very high effect size (fa=0.99). When Eos were mixed to see their synergistic effect, combination of *P. hysterophorous* with *E. obliqua*. Showed a moderate synergism (CI= 0.77) at the lowest concentration tested 0.25 (LC50) but the effect size was relatively smaller (fa=0.52). All the combination of *C. sativa* and *E. obliqua* showed antagonism (CI=1.26-2.09). In a binary combination of *P. hysterophrous* and *C. sativa* high level of synergism was observed at the highest concentration combination 4(LC50) with a very high effect size (fa=0.99). When all the three Eos were combined, Synergism was observed at 2(LC50) and 4(LC50) combinations with a high affect size (fa=>0.98).

Keywords: Synergism, Parthenium hysterophorus, Eucalyptus obliqua, Cannabis sativa, alpha cypermethrin, Adult Bactrocera zonata

PSEUDOMONAS CHLORORAPHIS SUBSP.AUREOFACIENS ACTIVITY AGAINST TELLURIC FUNGI.

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ABSTRACT

Phytopathogenic fungi like *Fusarium, Sclerotinia* and *Verticilium* are responsible for the spoilage of fruits and vegetables. The repeated application of chemical antifungals is partly responsible for pollution but also for human health problems. As an alternative to these phytosanitary products, the use of microorganisms for the control of such phytopathogens is increasingly used. This work focused on the in vitro inhibition of these pathogenic fungi by direct confrontation on PDA with an autochthonous strain of *P. chlororaphis* subsp. *aureofaciens*. Indeed, the antagonist bacterium had a significant effect on these pathogenic fungi where *Sclerotinia* was the most sensitive and *Verticillium* the most resistant. The inhibition rates were respectively 52.03%, 71.02% and 45.93% against *Fusarium, Sclerotinia* and *Verticilium*.

Keywords: phytopathogenic fungi, antagonistic activity, indigenous bacterium

CHARACTERIZATION OF NEW STRAINS BELONGING TO THE DEFOLIANT PATHOTYPE OF VERTICILLIUM DAHLIAE FROM THE CULTIVATED OLIVE TREE IN ALGERIA.

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ABSTRACT

In Algeria, olive growing is a strategic sector, since it plays a considerable economic and social role. Indeed, this sector supplies the local market with olive oil thus covering a high rate of national needs. With the development of horticultural techniques in the world, we are witnessing more and more intensification of olive growing in our country, which requires a large supply of plant material. Despite these advantages, the use of this material causes serious problems, including phytosanitary problems, including fungal diseases. The studies we carried out initially focused on the isolation and identification of Verticillium dahliae, a vascular verticillium wilt (Olea europea cv. europea). Surveys carried out during the 2014-2017 cruises in several olive groves located in the Boumerdes, Bouira and Tizi Ouzou regions have shown the presence of characteristic symptoms of vascular Verticillium wilt. Fifteen fungal strains are isolated and identified according to their phenotypic and cultural characteristics as Verticillium dahliae. The molecular identification of these strains allowed us to classify them into two broad groups according to their affinities to the specific DNA primers of each pathotype tested. The molecular analysis of all the fungal strains confirms their belongings to the V. dahalie species since they have the particularity to recombine and to be amplified with the specific primers of the latter. These strains were divided almost equally between pathotype D (7 strains) and pathotype ND (8 strains). It should be noted that the 3 species isolated from different regions of Boumerdes are representative of ND pathotype. On the other hand, the isolated strains of the wilaya of Tizi ouzou are presented by both pathotype D and ND, knowing that all the defoliating species are from the region of Makouda. For the wilaya of Bouira the strains isolated from the AlAsnam region are all of D pathotype, while for the other regions we have noted the presence of pathotype ND. Our results confirm the genetic diversity of V. dahlaie strains isolated from a few olive groves located in northern Algeria by the presence of two D and ND pathotypes characteristic of V. dahlaie isolates throughout the world. So new strains of V. dahlaie, belonging to the defoliant pathotype whose attacks are more serious and more severe on olive are to report in Algeria.

Keywords: Olive Trees, Verticillium dahlaie, Defoliating, pathotype, molecular caracterisation

POSSIBLE USE AS PLANTS PROTECTS OF ECBALLIUM ELATERIUM L. RICH., EXTRACTS, BY PHYTOCHEMICAL SCREENING AND BIOLOGICALS ACTIVITIES

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ABSTRACT

From the Cucurbitaceous family *Ecballium elaterium* (L.) A. Rich, known as squirting cucumber, is known for its medical benefits for humans also contain a cucurbitacins that are active against *Botrytis cinerea.* Leaf extracts exhibit a potent anti-insect activity, which can be the result of the internal defense mechanisms of the plant. The objective of this study is to use two methods of extraction (hydro-alcoholic and aqueous), of the root, stem and leaves. Methods used are quantification of polyphenols, flavonoids, and condensed tannin by colorimetric methods, and analysis of those extracts by HPLC-DAD to identify the compounds of each extract and evaluate the biological activities (antioxidant and antimicrobial). As a result, the yield of stem aqueous extract was higher than the hydroalcoholic extracts for the three parts used. For polyphenols compounds, the results indicate that leaves hydro methanolic extract content 54.17±0.19 mg GAE /g.d.e. as the higher level of polyphenol, and a higher level of flavonoid 6.01±0.1 mg QE /g.d.e. The operating conditions followed in this study to analyze the six extracts were not adequate to separate correctly the compounds and did not allow the identification of any compounds. Concerning biological activities, the DPPH scavenging activity was tested, and stem hydro methanolic extract, shows an EC50 (µg/ml) of 173,07±1,72 as the strong scavenging, the results of antibacterial activity obtained in this study was inferior compared to Levofloxacin, the results of antifungal was important where they were higher than of the nystatin as standard antifungal used. These results are related to the polyphenolics contents that correlated with the activities of the extracts. As conclusion This plant have shown the possibility of using the extracts of the plant to inhibit the germination of growth of some phytopathogens organisms.

Keywords: Hydroalcoholic and aqueous extractions, Ecballium elaterium (L.) A. Rich, HPLC-DAD analysis and biological activities

EVALUATION OF THE ANTIFUNGAL ACTIVITY OF THE VEGETABLE OIL OF PISTACIA LENTISCUS L. AGAINST TWO PHYTOPATHOGENIC FUNGI *FUSARIUM OXYSPORUM F. SP LYCOPERSICI* AND *PSEUDOCERCOSPORA CLADOSPOROIDES*

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ABSTRACT

Pistacia lentiscus L. (Anacardiaceae), locally called "ed'drew", is a perennial fruiting shrub containing a fixed oil when mature, used in traditional medicine, particularly in eastern North Africa (Algeria and Tunisia) for its therapeutic, antifungal and antiparasitic properties. Our work focuses on the study of the antifungal activity of vegetable oils from Tizi-ouzou and Béjaia from Pistacia lentiscus L., against two fungi of agricultural interest Fusarium oxysporum f. sp lycopersici and Pseudocercospora.cladosporoides, with the aim of researching new natural bioactive products.

Keywords: vegetable oil, *Pistacia lentiscus* L., *Fusarium oxysporum*, *Pseudocercospora cladosporoides*, antifungal activity

STUDYOF THE BEHAVIOUR OF COMMON WHEAT (AE. GENICULATA) SUBJECTED TO WATER STRESS BY ANALYSIS OF SOME MORPHO-PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS.

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ABSTRACT

Drought in Algeria and other Maghreb countries is widely recognized as the primary limiting factor in agricultural production and is a permanent constraint. The fight against this climatic factor must be considered through a multidisciplinary approach **(Monneuveux, 1991; Benlaribi and Monneuveux, 1988).** It is estimated that about 40% of the world's cultivated areas are subject to drought **(Lecoeur, 2007).** The study is carried out on eight genotypes of the species *Ae. geniculata* collected in several ecogeographic regions across northern Algeria. The study of the response to water stress in these eight genotypes and the control reveals the existence of a high variability for most of the parameters measured (morphological, physiological and biochemical). The results of morphological parameters show a marked decrease in plant height and leaf area in most genotypes with an increase in leaf specific weight of aerial and root parts. The results of physiological parameters show variability between genotypes and water situation. In most genotypes, there was a decrease in total chlorophyll levels and relative levels and an increase in the rate of water loss. The accumulation of osmoticums during a declaration of a water deficit remains a drought resistance parameter. Our results show that the water deficit is accompanied by a clear accumulation of soluble sugars in all genotypes especially G8 and control G9 (Wheat) but with a significant accumulation of proline in G8. In conclusion we can conclude that the eight genotypes studied showed the same mechanisms and strategies in response to water stress but with different degrees. The G8 genotype shows good resistance to water stress compared to the other genotypes studied.

Keywords: softbleach, drought, water stress

EFFECT OF SOME PSEUDOMONAS STRAINS AND AGAVE AMERICANA L. ON WHEAT GERMINATION UNDER SALT STRESS

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ABSTRACT

Currently, several efforts focus on remedying the problem of agricultural soil salinity using eco-friendly strategies. This study aimed particularly at the study of Triticum durum (durum wheat) seeds germination in the presence of Pseudomonas strains and hydro-alcoholic extract of Agave americana L. under saline stress conditions. The preliminary phytochemical screening of A. americana, phylogenetic identification and production of indole-3-acetic acid (IAA) by Pseudomonas strains, in vitro impact of hydro-alcoholic extract and Pseudomonas strains combination on salt stress resistance, preliminary effects of A. americana on Triticum durum germination and phytopathogenic fungi inhibition under salt stress were carried out using corresponding protocols. In in vitro trials, phytochemical screening revealed the richness of A. americana in polyphenols (1014.062±161.017 mM GA equivalent/g FW) and flavonoids (51.065±27.391 mg quercetin equivalent/g FW). The ability of Pseudomonas strains to produce the phytohormone indole-3-acetic acid (IAA) varied from 116.67±8.25 µg/ml to 857.14±80.50 µg/ml. The leaf extract of A. americana is an effective osmoprotectant that improves the resistance of the strain P1 Pseudomonas plecoglissicida to saline stress. In in vivo experiments, the extract of A. americana did not show any effect on the germination of wheat seeds. However, it effectively inhibited the contamination of seeds by phytopathogenic fungi during germination and saline conditions. Findings of the study revealed that Pseudomonas plecoglissicida and A. americana extract are very promising for the inhibition of phytopathogenic fungi and the alleviation of salt stress.

Keywords: Agave americana L, Pseudomonas sp, PGPR, salt stress, Triticum durum

DETERMINATION OF THE ANTIFUNGAL EFFECT OF SOME BORON, SODIUM AND POTASSIUM SALTS AGAINST CONIELLA GRANATI, WHICH CAUSES FRUIT AND CROWN ROT ON POMEGRANATE

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ABSTRACT

Pomegranate (*Punica granatum* L.) is one of the most important fruit species grown in Turkey. Fungal pathogens cause significant losses in quality and yield of pomegranate fruit in orchards and warehouses. Pomegranate fruit and crown rot, caused by *Coniella granati*, is one of the most serious diseases of pomegranate. No fungicides have been registered in Turkey to control this disease. In this study, the antifungal effect of Etidote-67, borax, boric acid, sodium benzoate, sodium nitrite, sodium carbonate and potassium sorbate on mycelial growth of *Coniella granati* was investigated *in vitro*. The antifungal effect of the salts on mycelial growth of the fungus was determined at concentrations of 0.01, 0.02, 0.03, 0.04, 0.05, 0.06 and 0.07 (w/v). Increased concentrations of Etidote-67, borax, boric acid, sodium benzoate, sodium nitrite, sodium carbonate, and potassium sorbate significantly inhibited mycelial growth of the fungus compared to the control. Significant differences were found between the efficacy of the treatments ($P<0.05$). The concentrations of 0.04% and 0.03% of Etidot-67 and borax salts, respectively, were determined to be the doses that completely inhibited mycelial growth of the fungus. Boric acid, sodium nitrite, sodium carbonate and potassium sorbate completely inhibited the fungal mycelial growth at a concentration of 0.05%, while sodium benzoate inhibited fungal mycelial growth at a relatively high concentration (0.07%). When comparing the effective concentrations (EC50) of the salts inhibiting mycelial growth by 50%, sodium benzoate showed a stronger inhibitory effect against the fungus. In conclusion, the results of this study show that boron, sodium, and potassium salts can be used as an alternative to synthetic fungicides to control fruit and crown rot disease caused by *C. granati* in pomegranate.

Keywords: Pomegranate, Coniella granati, sodium and potassium salts, Alternative control

BIFENAZATE AND ABAMECTIN RESISTANCE IN AN ARTIFICIALLY SELECTED POPULATION OF AMBLYSEIUS SWIRSKII AS BIOLOGICAL CONTROL AGENTS

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ABSTRACT

Some plant sucking mites and insects have been controlled practically by *Amblyseius swirskii Athias-Henriot* (Acari: Phytoseiidae). Since several pesticides used against the plant pests are highly toxic to the phytoseiid species, the use of the pesticide resistant predator strains could be cost effective tactic for biological control. As a matter of fact, numerous pesticide resistant strains in phytoseiids has been reported previously. The aim of this study was to artificially select a native population of the predatory mite, which was collected from Turkiye, with a widely used acaricide formulation that is a mixture of two active substances (125 g/L bifenazate + 7.5 g/L abamectin). For this purpose, after 4 consecutive generation selections with LC50 values of the formulation, the acute toxic effects of the formulation were determined on both native and selected populations of the *A. swirskii* under laboratory conditions. Compared with native populations, selection in the laboratory for 4 consecutive generations resulted in 11 and 28 folds bifenazate and abamectin resistance in females and juveniles of *A. swirskii*, respectively. Toxicological data shown that the recommended field concentration (0.1 ml/100 L water) of bifenazate and abamectin mixture formulation was found harmless for both females and juveniles for selected population of *A. swirskii* based on the side effect scale. Whereas, the concentration was moderately harmful and harmful in females and juveniles in the native field population, respectively. The findings obtained from this study shown that the resistant populations of *A. swirskii* will be a significant source for combined the biological and chemical control methods in Integrated Pest Management (IPM) Programs in the future. This study was funded by TUBİTAK ARDEB TOVAG with the grant number of 122R115.

Keywords: Acaricides, biological control, phytoseiids, resistance, selection, side effect

DETERMINATION OF IN VITRO BIOCONTROL POTENTIALS OF ANTAGONIST BACTERIAL ISOLATES AGAINST ONION BASAL AND ROOT ROT DISEASE AGENT FUSARIUM PROLIFERATUM

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ABSTRACT

Various Fusarium species cause significant yield and quality losses in onion (*Allium cepa* L.) plants. Onion basal and root rot, caused by *Fusarium proliferatum,* is an emerging postharvest disease that has resulted in severe economic losses. Although the disease has long been recognized as a major constraint to *Allium* spp., production, there is insufficient information to support disease management. In recent years, a need has arisen for environmentally friendly, innovative alternative methods to avoid the use of chemical pesticides in the control of diseases that are a problem in agriculture. In this study, the biocontrol efficiency of antagonistic bacterial isolates obtained from bulbs and leaves of healthy onion plant was investigated against *F. proliferatum in vitro*. The antagonistic activity of the bacterial isolates in inhibiting mycelial growth of the fungal agent was determined by the dual culture assay. The bacterial isolates were identified by morphological, biochemical and proteomic (MALDI-TOF MS) methods. A total of 18 putative bacterial isolates were obtained from the bulbs, roots and leaves of healthy onion plants on selective media. As a result of *in vitro* dual culture assays, only six bacterial isolates (*Bacillus cereus* MK2, *Enterobacter xiangfangensis* MK3, *Bacillus thuringiensis* MK8, *Alcaligenes faecalis* MK9, *Pseudomonas putida* MK16 and *Citrobacter freundii* MK17) significantly suppressed mycelial growth of disease agent (43.89-50.56%) and inhibition). *Bacillus cereus* MK2 was found to be the most effective bacterial isolate with 50.56% inhibition rate of mycelial growth. Overall, the results suggest that *Bacillus cereus* MK2 could be used as a potential biocontrol agent for a sustainable and environmentally friendly control strategy for onion fields affected by Fusarium basal and root rot disease. It is necessary to conduct further studies on the effects of the effective bacterial isolates against the pathogen *in vivo* and their mechanisms of action.

Keywords: Onion, Antagonist, Bacillus spp., biological control

TYPHA L. INVASION AND CONTROL IN CALIFORNIA RICE

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ABSTRACT

Typha L., cattail, grows up to three meters and naturally occurs at ditches, drainage and irrigation canals, lakes, marshes, ponds, rivers, and streams. Unlikely its natural habitat, *Typha* L. has recently begun to infest rice fields in California's Sacramento-San Joaquin Delta region. Florpyrauxifen-benzyl is a novel synthetic-auxin-type rice herbicide newly registered in California. This research aimed to study the potential of using florpyrauxifen-benzyl for *Typha* L. control. Two field research were conducted at McDonald Island of the Delta region during the 2022-2023 growing seasons. Treatments were florpyrauxifen-benzyl at 80 and 40 g ai/ha and florpyrauxifen-benzyl at 40 g ai/ha plus triclopyr at 420 g ae/ha use rates. Florpyrauxifen-benzyl was applied at zero to one m tall and one to two m tall plants. Methylated seed oil at 584 ml/ha was also added to all treatments. The study was a randomized complete block design with four replicates. Herbicides were applied on nine m2 plots to a range of *Typha* L. from two to three-leaf growth stages up to two-meter-tall growth stages. Visual injuries were rated at 7, 14, 21, 28, and 42 days after treatments (DAT) using a scale where 0 means no injury and 100 means plant kill. All florpyrauxifen-benzyl treatments achieved 100% control when *Typha* L. were up to one meter. When *Typha* L. were one to two meters, the efficacy was 96, 78, and 75% at 42 DAT for the listed treatments, respectively. This study showed a significant potential for foliar applications of florpyrauxifen-benzyl to control *Typha* L. up to one-meter-tall growth stages.

Keywords: California, Cattail, Rice, Typha

THE EFFECT OF BACTERIA OBTAINED FROM VERMICOMPOST AGAINST TOMATO BACTERIAL CANKER AND WILT DISEASE (CLAVIBACTER MICHIGANENSIS SUBSP. MICHIGANENSIS)

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ABSTRACT

Tomato bacterial canker and wilt disease, caused by *Clavibacter michiganensis* subsp. *Michiganensis* (*Cmm*), significantly limit tomato production. *Cmm* causes significant yield losses in tomato production. It is highly difficult to control the disease and thus, alternative methods are being searched for effective control of the disease. This study was conducted to investigate the effect of bacteria obtained vermicompost on *Cmm*. The vermicompost used in this study was supplied from a private company (Tokat). *Cmm* isolated from diseased tomato plants. The study was conducted *in vitro*. Firstly 10 g of vermicompost was weighed and put into the erlenmeyer with 90 ml of Nutrient Broth. The medium was shaken in a shaker, then dilution series were prepared and the solution was inoculated into the King B medium. After incubation, 18 bacteria were obtained from vermicompost. In the antagonistic effect study, bacteria were planted in three spots on the medium. The media were incubated at 27 °C during 24 hours, then *Cmm* suspension was sprayed on media. As a positive control, only *Cmm* was applied to the medium without bacteria. At the end of incubation period, zone values were formed around the isolated in medium. 12 of the bacteria were suppressed the growth of *Cmm* in the medium and formed a zone varying between 2.81-7.54 mm. As the result of hypersensitivity test in tobacco and soft rot test in potato, non-pathogenic 5 isolate were selected. It was diagnosed as *Bacillus megaterium* and *Stapylococcus equorum*. As a result, it is important to support of this study, which is carried out as a petri experiment, with seed application, greenhouse and field trails in terms of disease control.

Keywords: Tomato Bacterial Canker and Wilt Disease, Clavibacter michiganensis subsp. michiganensis, vermicompost, biological control, in vitro

LIGHT TRAP AS FRIENDLY TECHNQUE FOR CONTROLLING TUTA ABSOLUTA

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ABSTRACT

This study focuses on the control of *Tuta absoluta*, a devastating pest that affects tomato crops. The pest has rapidly spread throughout Europe and the Mediterranean basin since it was first documented in Spain in 2006. The study highlights the life cycle and behavior of *Tuta absoluta*, emphasizing its ability to cause significant damage to above-ground parts of tomato plants. To effectively control this pest, the integration of various control measures is necessary, including mass trapping techniques, light traps, insecticides, and biological insecticides. The use of synthetic pheromone lures coupled with Delta traps has been effective in monitoring and managing *Tuta absoluta* populations. The study also introduces Ferolite traps, which combine a water trap, a sex pheromone lure, and a specific light frequency to attract and trap both male and female adults of *Tuta absoluta*. The effectiveness of light traps in controlling *Tuta absoluta* is demonstrated through a three-year experiment, where the number of captured flies is monitored. The results show that light traps are highly effective in controlling *Tuta absoluta* and offer an environmentally-friendly alternative to chemical compounds. Overall, the study recommends the use of light traps for the successful control of this devastating tomato pest.

Keywords: Tuta absoluta, pest control, light traps, pheromone traps, integrated pest management, tomato crops

REVIEW OF INTEGRATED MANAGEMENT TOMATO MOTH (TUTA ABSOLUTA) USING MASS CAPTURE TECHNIQUE

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ABSTRACT

The tomato, scientifically known as *Lycopersicum esculentum* and belonging to the Solanaceae family, is a highly productive plant. In Albania, greenhouse tomatoes are commonly available in the market, with the peak production occurring during the summer months, reaching approximately 600-800 kilograms per hectare. The tomato moth, *Tuta absoluta*, is a type of butterfly originating from South America. In July 2009, the first infections of tomato moth were observed in field tomatoes in Levan (Fier) and Novosel (Vlore) regions of Albania. This experiment takes place in a low coastal zone, specifically in greenhouses covering an area of 2 hectares. The main objectives of this study are to identify the tomato moth, understand its population dynamics, and determine the appropriate timing for intervention using plant protection products. Due to the significant damage caused by *Tuta absoluta* during this year, it is crucial to implement new techniques to control this pest. So far, the use of chemical compounds has proven ineffective in controlling it. Instead, pheromone sexual attractants are being employed to determine the right time for intervention. The experiment is divided into four different variants. Another objective of this study is to explore the effectiveness of mass traps as alternative methods for controlling the tomato moth, *Tuta absoluta*.

Keywords: Tuta absoluta, pest control, greenhouse tomatoes, Intervention time

EFFECT OF VEGETATITIVE HERBICIDES ON THE WEED INFESTATION AND THE PRODUCTIVITY OF COMMON WINTER WHEAT

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ABSTRACT

The aim of this investigation was to determine the effect of the application of vegetative herbicides on the weed infestation and the productivity in cultivars common winter wheat. The investigations were carried out during 2018–2021 at Dobrudzha Agricultural Institute – General Toshevo (DAI). The following herbicides were used: Ergon WG (50 g/ha), Starane Gold (1800 ml/ha), Biatlon 4D+Desh (50g/ha+500ml/ha) and Korelo Duo+Das Oil (260.5 g/ha+500ml/ha) from the group of sulfunylureas with various mechanism of action. The preparations were applied at stage 29 and 37 (according to Zadoks) of three cultivars common winter wheat, Rada, Kosara and Pchelina. The herbicide effect was determined by the quantitative weight method and evaluated by the EWRS scale. Four-factor dispersion analysis was applied. The factors year conditions, cultivar, herbicide, and stage were followed. Regardless of the cultivars and the stage of treatment, Starane gold had highest efficiency (100%) against the following investigated weeds: *Sinapis arvensis* L., *Matricaria chamomilla* L., *Anthemis arvensis* L., *Galium tricorne (Stock.)*, *Consolida orientalis (J. Gay)* and *Cirsium arvensis* L. Ergon WG, Biatlon 4D+Desh and Korelo Duo+Das Oil had 100% efficiency against *Sinapis arvensis* L., *Matricaria chamomilla* L., *Anthemis arvensis* L. and *Cirsium arvensis* L. and lower effect (90-94%) on *Galium tricorne (Stock)*, *Consolida orientalis (J. Gay)*. The factors with highest strength of effect were the year conditions (60%) and the used cultivar (30%).

Keywords: Common winter wheat, Herbicides, Weed infestation, Efficiency, Selectivity, Productivity

EFFECT OF VEGETATIVE HERBICIDES ON THE STRUCTURE OF PRODUCTIVITY OF COMMON WINTER WHEAT

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ABSTRACT

The aim of this investigation was to determine the effect of the application of vegetative herbicides on the structure of productivity in common winter wheat (*Triticum aestivum* L.). The investigations were carried out during 2018 –2021 at Dobrudzha Agricultural Institute – General Toshevo (DAI). The following herbicides were used: Ergon WG (50 g/ha), Starane Gold (1800 ml/ha), Biatlon 4D+Desh (50g/ha+500ml/ha) and Korelo Duo+Das Oil (260.5 g/ha+500ml/ha) from the group of sulfunylureas with various mechanism of action. The preparations were applied at stage 29 and 37 (according to Zadoks) of three cultivars common winter wheat, Rada, Kosara and Pchelina. The herbicide effect was determined by the quantitative weight method and evaluated by the EWRS scale. These were the following structural elements of the productivity: length of spike (cm), number of spikelets per spike, number of grains per spike, weight of grain per spike (g) and weight of 1000 grains (g), hectoliter (kg). Correlation analysis was apllied. Strong positive and negative correlations were established between the investigation parameters at all cultivars.

Keywords: Common winter wheat, Cultivars, Herbicides, Weeds, Application stages, Structural elements of productivity

DETERMINATION OF CONTACT EFFECT OF ORANGE OIL AGAINST CRYPTOLAEMUS MONTROUZIERI (COLEOPTERA: COCCINELLIDAE)

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ABSTRACT

Cryptolaemus montrouzieri Mulsant (Coleoptera: Coccinellidae), commonly known as the predators of mealybugs, is a significant biocontrol agent widely used in integrated pest management strategies to control mealybug infestations. While conventional chemical insecticides have shown efficacy, the environmental concerns and potential harm to beneficial organisms necessitate the exploration of alternative approaches. This study aims to investigate the contact effect of orange oil on *C. montrouzieri*, with the objective of determining its potential as a safe and effective botanical insecticide. Insect materials (adults and larvae of *C. montrouzieri*) used in the study were obtained from the Bati Akdeniz Agricultural Research Institute (BATEM) where they were reared on the citrus mealybug on potato sprouts in climate conditions of 28 ± 1°C, 16: 8h (light : dark) and 60 ± 5% relative humidity. In the direct-contact bioassays conducted in this study, an orange oil-based product was administered using a spray-tower apparatus, targeting both the adult stage (3 to 4 day-old) and 4th stage larvae of *C. montrouzieri*. Following application, healthy and dead insects were meticulously counted at three-day, seven-day and ten-day intervals. A water-treated control group was included as a reference in all the experiments. Surprisingly, the results obtained from this study indicated that the orange oil-based product exhibited no direct-contact effect on either the adult or the larvae of *C. montrouzieri*. No mortality was observed among the tested insects throughout the duration of the study. These findings suggest that the orange oil-based product can be safely employed in citrus Integrated Pest Management (IPM) programs where *C. montrouzieri* is utilized, without causing adverse effects on the population of this beneficial coccinellid species.

Keywords: Orange oil, Cryptolaemus montrouzieri, contact effect, mortality

INVESTIGATION OF CONSCIOUSNESS LEVEL OF FARMERS TO ENVIRONMENTAL AND TOXICOLOGICAL RISK OF PESTICIDES IN ÇANAKKALE PROVINCE

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ABSTRACT

There is an increase in pest and the use of pesticide are increasing. Reducing the negative effects of pesticides is very important. The aim of this work is to investigate consciousness level of farmers to toxicological risk of pesticides in Çanakkale. The sample size was calculated by "Simple Random Sampling Based on Ratio Means" method. The survey was performed with 270 farmers. 25.55% of the farmers had 31-40 years of farming experience, 47.78% were primary school graduates and 35.55% were 55-65 years old. The farmers knowledge level was calculated by applying a four-point Likert Scale. The knowledge level was low, moderate high, and very high with the percentage of 1.85%, 25.18%, 66.29% and 6.67%, respectively. The Chi-Square test was used to investigate the relationship of farmer's knowledge level with education, age, farming experience, land size, and farming type. Only education was significant and coefficient contingency was 0.467. As education level increased, the knowledge level increased. With this result, the importance of the role of education, has once again emerged. 78.89% of the farmers change their clothes after spraying, 46.67% take cared information on the pesticide labels, 45.18% use protective equipment during spraying, 69.63% of the farmers cared about the PHI, 15,92% have knowledge about MRLs, 41.85% disposed remaining pesticide solutions to the edge of agricultural fields. 40.74% and 6.3% disposed empty pesticide bottles to garbage, and environment, respectively. Present findings revealed one more time the significance of public and private sector organizations in raising awareness among producers about pesticides.

Keywords: Pesticide, Likert Scale, Cronbach Alfa reliability, consciousness level, questionnaire

This study is a part of Umut TAŞKIR's (ÇOMÜ Graduate Education Institute-Plant Protection Department) master's thesis and was supported by Çanakkale Onsekiz Mart University Scientific Research Coordination Unit within the scope of the project numbered FYL-2022-4135.

EVALUATING THE EFFECTS OF EUCALYPTUS CAMALDULENSIS LEAF EXTRACTS ON MELOIDOGYNE INCOGNITA: LABORATORY AND GREENHOUSE EVALUATIONS FOR NEMATODE CONTROL

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ABSTRACT

Root-knot nematodes are among the most damaging nematode groups to plants worldwide. While there are numerous species of nematodes belonging to the *Meloidogyne* genus, *Meloidogyne incognita* is one of the most common root-knot nematode species globally. Chemicals are commonly used to control root-knot nematodes. However, the tendency of environmentally friendly application methods that control nematodes increased in recent years. Nevertheless, the effects of *Eucalyptus camaldulensis* leaf extracts on root-knot nematodes have not been fully understood yet. Therefore, in this study, laboratory and greenhouse applications were conducted against the root-knot nematode *Meloidogyne incognita*, using the leaf extract of *Eucalyptus polybractea* diluted at 1%, 5%, 15%, 30%, 40%, Nematode+water, non-nematode (control), and Nematicide. The effects of *Eucalyptus camaldulensis* leaf extracts on nematode and plant parameters were determined under laboratory and greenhouse conditions. The results revealed that, following the nematicide application, the highest larval mortality of 70% was observed in the 40% diluted leaf extract. The final nematode number significantly decreased with the application of the 40% diluted leaf extract, similar to the nematicide treatment. Based on these results, although the application of *Eucalyptus camaldulensis* leaf extracts show promising results in controlling root-knot nematodes, the effectiveness can be better understood after field trials are conducted.

Keywords: Eucalyptus camaldulensis, Meloidogyne incognita, Leaf extract, nematode

OVERVIEW OF THE NEMATODE-BACTERIA-INSECT RELATIONSHIP: INSIGHTS FOR BIOLOGICAL PEST CONTROL STRATEGIES

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ABSTRACT

Insects, belonging to the class Insecta in the Arthropoda phylum, constitute over 60% of the total species on Earth, with numerous roles in the natural ecosystem. From an agricultural perspective, both harmful and beneficial insects play significant roles, with harmful insects particularly affecting agricultural productivity and causing yield losses. Various methods are applied to control these pests, with chemical control being the most commonly used approach by farmers. However, due to the environmental damage, residue concerns, and resistance issues associated with chemical pesticides, the importance of alternative pest management methods has increased. "Biological control" is an effective and environmentally friendly approach, utilizing parasitoids, predators, and entomopathogenic organisms. Among these, entomopathogenic nematodes hold a prominent position. Generally, entomopathogenic nematodes consist of species belonging to the genera *Steinernema* and *Heterorhabditis*. It has been reported by different researchers that *Heterorhabditis* and *Steinernema* species of entomopathogenic nematodes have the potential to kill specific insect hosts a few days after entering the insect's body. Researchers have noted that entomopathogenic nematodes live in symbiosis with bacteria such as *Xenorhabdus* spp. and *Photorhabdus* spp. Numerous studies conducted by different researchers in our country have reported the presence of various entomopathogenic nematode species. These entomopathogenic nematodes are used as entomopathogen for pest control. This overview summarizes the Nematode-Bacteria-Insect relationship based on previous studies conducted by different researchers. It is believed that this summary will provide insights for future studies in this field.

Keywords: Nematode, Bacteria, Insect, Entomopathogenic nematode, biological control

CURRENT STATUS OF INTERACTION BETWEEN LEPIDOPTERAN LARVAE AND ENTOMOPATHOGENIC NEMATODES FOR PEST MANAGEMENT STRATEGIES

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ABSTRACT

In agricultural fields, numerous damaging species belonging to various families within the Lepidoptera order can be found. These pests cause damage to various parts of plants such as leaves, stems, and fruits, resulting in crop losses and reduced yields. Lepidopteran pests primarily inflict damage during their larval stage, and chemical control programs are often designed to target this specific period. However, due to the negative impact of chemical control on natural balance and the problem of resistance, the importance of alternative pest management methods has been increasing. Specifically, entomopathogens are used as part of biological control programs against Lepidopteran larvae, and entomopathogenic nematodes are among the organisms utilized. There are numerous species of entomopathogenic nematodes belonging to two different genera, found both in our country and worldwide. Many researchers in our country have conducted studies on entomopathogenic nematodes, and some of these studies have focused on their effects on Lepidopteran larvae. This summary compiles and presents the interactions between larvae of different Lepidopteran species and various entomopathogenic nematode species, based on previous studies conducted by different researchers. By explaining the relationship between Lepidopteran larvae and entomopathogenic nematode species, this review is believed to contribute to the development of future pest management strategies and provide insights for new approaches to different insect species.

Keywords: Lepidopteran Larvae, Pest, Entomopathogenic Nematodes, Biological Control

THE NEW HOST OF TOMATO BROWN RUGOSE FRUIT VIRUS IS GERBERA

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ABSTRACT

Tomato Brown Rugose Fruit Virus (ToBRFV), in the *Tobamovirus* genus, poses a serious threat to the tomato industry. In 2014, the virus, which was first detected in Israel, affected tomato plants' fruit quality and yield, resulting in significant economic losses, especially in greenhouses. It has spread to new countries, including the United States, Europe, and various parts of the world. While tomato plants are most susceptible, ToBRFV can also infect other Solanaceous crops like peppers and eggplants. Some ornamental plants have even been found to host the virus. The virus can primarily be transmitted through direct contact with infected plants, mechanical transmission (through tools, clothing, or hands), and contaminated seeds. In Turkey, the virus was determined in samples from Demre district of Antalya Province in 2019. In this study, the isolate of ToBRFV isolated from tomato plants from the province of Tokat was mechanically inoculated to the test plants of tomato (*Lycopersicon esculentum)*, pepper *(Capsicum annuum*), tobacco (*Nicotiana glutinosa*), chenopodium (Chenopodium spp), geranium (Pelargonium spp.) and gerbera (*Gerbera jamesonii*) plants. After 20 days, we tested the plants for the presence of the virus using RT-PCR testing. We found that the ToBRFV virus had infected the tomato, pepper, tobacco, chenpodium and gerbera plants but not the geranium plants. This was the first time the gerbera plant was found to be a host for the ToBRFV virus. To slow the spread of the ToBRFV virus, growers must take preventative measures. This includes removing and destroying infected plants and debris, disinfecting seeds and tools, and properly sanitizing greenhouses. These steps are critical to containing the virus and minimizing its impact on tomato production and marketing.

Keywords: Ornamental plant, Virus, Tomato, Tobamovirus

ISOLATION OF BACTERIOPHAGES AGAINST XANTHOMONAS SPP. AND EVALUATION OF THEIR EFFICIENCY AGAINST BACTERIAL SPOT OF TOMATO AND PEPPER

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ABSTRACT

Bacterial spot is a devastating disease of tomato and pepper and caused by several species of the genus *Xanthomonas*. There is no effective control method against the disease hence studying alternative control methods would be a promising approach. Bacteriophages, the viruses that can specifically infect only target bacteria, have no negative effects on environment and human health are potential agents. The aim of this study, isolation of bacteriophage from foliar of pepper and tomato plants and soil against Xanthomonas members (*Xanthomonas vesicatoria* MGX-1, *Xanthomonas euvesicatoria* MGX-2 and *Xanthomonas perforans* MGX-3) and investigation of their biocontrol potential in controlling bacterial spot disease *in vitro* and *in vivo*. The performance of the bacteriophages was evaluated on the isolates of three different *Xanthomonas* species. The 19 phages obtained soil and leaves showed the effect in all isolates ve application of phage suspension led to a reduction in the severity of the disease. Also, it was compared the performance in controlling disease of the bacteriophages isolated from soil and leaf in the study, and there was no significant difference between the efficacy of the phages obtained from soil (73.3%) and the phages obtained from leaves (71,7%). These phages will be evaluated in future studies to assess their potential as biocontrol agents.

Keywords: Bacteriophage, Xanthomonas spp., Bacterial spot, biological control

WEED DIVERSITY AND ABUNDANCE IN HENNA CULTIVATION (LAWSONIA INERMIS) IN ARID REGION

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ABSTRACT

Henna (*Lawsonia inermis)* is one of the typical plantes in arid and desert areas, the The pedoclimatic conditions of these zones give it its superior tinctorial, aromatic and medicinal qualities. Zribet El Oued Regional Henna is known nationally for its tinctorial powder used in cosmetics, farmers in this region have experience in the practice of cultivation. However the weeds dispersal remain the major cause of yield loss in henna production and dry leaves quality, hence we choose to study weed abundance and diversity. We have established a set of 06 surveys in the Henna field at El-Oualadja in the south-east of Algeria, during the spring of 2022. From a taxonomic point of view, the total richness of the spontaneous flora is 07 species with Shannon's diversity index of 0.8 bits. Dicotyledons are dominant in thz feild of henna cultivation with a rate of 80% (05 species), including astraceae with a rate of 29% , represented by *Launaea Nudicaulis* L, *Artemisia annua*. Malvaceae with a rate of 14% represented by *Malva Sylvestris*. Monocotyledons (20%) are exclusively represented by the Poacea and the Chenopodiceae. The inventoried species are divided into 6 botanical families, represented respectively: the poaceae (4 individuals), Chenopodiaceae (3 individuals), Astraceae (3 individuals), Malvaceae (2 individuals), Cuscutaceae (2 individuals), Amaranthaceae (1 individuals). However, the most abundant species belongs to the family of Poacea *Cynodon dactylon* L. with an abundance of 26%.

Keywords: weed diversity, aridity, henna cutivation, weed abundance

DETERMINATION SOME PEST SPECIES ON TREES IN URBAN ECOSYSTEMS

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ABSTRACT

Pests are not only causing economic loss on crops but also causing important problems on trees in recreation areas in urban ecosystems. Especially, visual pollution on these plants is more problematic than yield loss in these ecosystems. In addition, chemical pesticides should not be used to suppress these pests because chemicals affect human and environmental health in urban areas. The aim of this study is to observe some pest species in recreational areas in urban ecosystems. Surveys were done and samples were collected from urban areas. According to the results of this study, some pest species belonging to different family and genus were determined during this study. As can be seen above results, different pest species may occur in urban ecosystems and the population dynamics and natural enemies of these pests should be studied and observed for determining appropriate control methods instead of chemical control in urban areas.

Keywords: Pest, Urban, Ecosytem, Recreational areas, Tree

RISK ASSESSMENT OF EXPOSURE TO PESTICIDES OF FARMERS IN AN ARID REGION OF ALGERIA

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ABSTRACT

The wilaya of El M'ghaier located in an arid region in the valley of Oued Righ between Biskra and the Souf. This valley is characterized by an oasis-type cropping system which, since antiquity, consists of an association of three plant strata. That of the palm tree, that of various fruit trees and that of annual crops. The objective of this work is the evaluation of the risk of exposure to pesticides of agriculture's according to their phytosanitary practices in the region of El M'ghaier. The methodological approach adopted is based on a survey carried out during the month of April, May 2023 on 35 farms. The first step consists of studying the cropping systems and phytosanitary practices of farmers, their effects and possible modes of exposure. The second step supports the assessment of farmers' risk of exposure to pesticides, using the survey data to feed the model for calculating potential exposure. The exposure values thus calculated are compared with the limit values permitted for the active materials used (AOEL: Acceptable Operator Exposure Level) to conclude on the acceptability of the risk. The results of the survey show a wide variety of crops on the farms studied. To meet market requirements, these farmers resort to the use of a fairly wide range of phytosanitary products. In general, the choice of pesticides is strongly linked to the type of crop and the pest to be controlled, to the price, to the formulation as well as to the availability on the market. In addition, herbicides are the most used (60%) with 8 active ingredients which can be explained by the aridity of the climate which does not favor the development of fungal diseases. The equipment used on the farms surveyed is represented (65%) by knapsack sprayers and manual preparation, in direct contact, which increases the risks of exposure. Farmers do not respect the recommended dosages. Protection and hygiene measures are also neglected by the majority of pesticide applicators. Indeed, even in the absence of training, some farmers are aware and convinced of the risks of pesticides. The potential exposure of farmers to the active ingredients used exceeds the AOELs of the latter. This exceeding of the exposure limit values is due to the overdose applied by the operators and the non-compliance with the application instructions. The irrational application and the wide range of phytosanitary products used during agricultural production cause an unacceptable risk to the health of farmers in this study region.

Keywords: pesticides, potential exposure, farmer, phytosanitary practices, risk, arid region

COMPARISON OF REACTIONS OF DOWNY MILDEW (PLASMOPARA VITICOLA) DISEASE ACCORDING TO THREE DIFFERENT METHODS

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ABSTRACT

Viticulture, which is one of the important agricultural activities in the world, has an economic value in Türkiye as well. Viticulture, which is an important production value, is faced with serious plant protection problems. One of these problems is the mildew disease caused by *Plasmopara viticola*, a fungal agent, which is common in the world and in our country. Downy Mildew is economically important as it is effective in all vegetative parts of the vine and directly affects the product. It can be seen almost everywhere in our country where viticulture is done. In its control, it is necessary to determine the spraying time well and during the production season in our country, a disease that requires too much spraying may occur. There is also the problem of resistance to some drugs. For this reason, an effective method in disease control is the use of resistant varieties when establishing vineyards. In studies on disease resistance, evaluations made under controlled conditions with natural conditions and artificial inoculation are seen. In this study, the relationship between the methods performed by artificial inoculation in natural and controlled conditions against the disease of some grape varieties was investigated. For inoculations, isolates collected from infected leaves in the vineyard under natural conditions were multiplied and developed. In this study, which included table, dried and wine varieties, differences were found between varieties in terms of disease severity on leaves under natural and artificial conditions. However, the disease severity determined in natural conditions was similar to artificial inoculation. The sensitive and resistant cultivars were seen as the same cultivars in all methods. Therefore, when the results obtained from this study were examined in terms of disease severity between the methods (natural and artificial conditions), it was seen that the data showed parallelism with each other. Artificial inoculation method can be used in studies that require rapid testing.

Keywords: Plasmopara viticola, Stability, Artificial Inoculation, Natural infection

EVALUATION OF USES OF SOME VEGETABLE OILS AND THEIR EFFECTS ON COCCINELLA SEPTEMPUNCTATA

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ABSTRACT

It is known that synthetic chemicals used to achieve high efficiency and quality in agricultural production have many negative effects on the nature as well as the benefits they provide. For this reason, scientists conduct new research inspired by nature itself. At this point, the determination of the effects of the compounds contained in the plants, which are among the alternative applications, on diseases and pests has emerged. It has been observed that many plants have special content (such as oils, acids) in order to protect themselves from diseases and pests. In this study, which was carried out in order to determine the effect of vegetable oils on beneficial organisms and to reveal the possibilities of use; The effects of thyme (*Thymus* sp.), rosemary (*Rosmarinus officinalis*), sage (*Salvia* spp.), peppermint (*Menta piperita* oleum) plants and olive leaf (*Olea europaea*) on *Coccinella septempunctata* (Coccinellidae; Coleoptera) were tested. For this purpose, sage and olive leaves were dried, ground and extracted in accordance with the method and added to the study. Oils of thyme, rosemary and mint plants were used in commercial preparations. The trial was carried out at 1%, 3%, 6% and 12% doses, and pure water was applied to the control. The control of the applications was made after 1, 24 and 36 hours, the data were recorded, and the oils were evaluated according to their beneficial effects.

Keywords: Coccinella septempunctata, Thymus sp., Rosmarinus officinalis, Salvia spp., Menta piperita oleum, Olea europaea

THE USE OF SULPHUR IN PLANT DISEASES

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ABSTRACT

One of the mineral originated inputs in agricultural production facilities is sulphur. The chemical is one of the oldest pesticides that is used in the plant both by increasing the resistance against diseases and directly in the combat against biotic disease factors. At the same time, it is a main element as a plant nutrient of producing crops. This valuable element has become even more important in recent years due to its natural origin, as organic agriculture, where there are not many options in the fight against diseases and pest, has gained importance. The sulphur usage alone or in combination with another active substances, is common, especially in powdery mildew besides rust, anthracnose, and mildew in horticultural and field crops. The agent is produced and used in WG, DP, and SC formulations, depending on the other active substances to which it is combined. In the review article, it is aimed to evaluate the studies that have achieved success in plant diseases with the use of sulphur and its compounds, in the last decades.

Keywords: Sulphur, Plant Protection, Pesticide, Plant Diseases

THE ROLE OF STERILE INSECT TECHNIQUE IN PEST MANAGEMENT

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ABSTRACT

Pests and diseases cause significant economic losses in crop production. Various pesticides are used to prevent these economic losses. These chemicals have many negative effects on the environment and human health. Due to these negative effects, new solutions are sought in agricultural control. Recently, genetic research has been emphasized among alternative control methods. The sterile insect technique is one of these alternative control methods. The sterile insect technique (SIT) is based on the sterilization of male individuals raised in laboratory conditions by radiation and mass release. This sterilization method does not change the mating behavior of the pest. Reproduction does not occur when female individuals in nature mate with sterilized male individuals released. Thus, the population of the target pest in the new generation is suppressed. One of the most important advantages of this technique is that the application is species-specific and no interaction with other species occurs. The steril insect technique is applied in many parts of the world, including our country, in the control of various pests. The first release application in our country was applied in 2019 against the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae), which is considered one of the most important agricultural pests in the world and has more than 250 hosts. It causes rotting, crushing and collapse in the fruit it hosts. The Mediterranean fruit fly is an important pest on the quarantine list of EPPO A2 (European and Mediterranean Plant Protection Organization), is a major pest that is invasive and intolerant. In this publication, information about the sterile insect technique against this pest is given and its application areas, advantages and disadvantages in Turkey are evaluated.

Keywords: Sterile insect technique (SIT), Ceratitis Capitata, Pest management

PHYSIOLOGICAL EFFECTS OF ENDOSYMBIOTIC BACTERIA ON APHIDS

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ABSTRACT

Insects are the largest class in the animal kingdom with 1.2 million species. About half of the insects are thought to harbor symbiotic bacteria. Symbiotic bacteria, which are widespread in insects, cause several behavioral, metabolic, and physiological changes such as providing amino acids and vitamins, increasing temperature tolerance, contributing to resistance formation, and developing defenses against natural enemies. Endosymbiotic bacteria are classified as primary and secondary according to their relationship with the host. Primary endosymbionts are usually found in insects that feed on plant sap, to supply nutrient deficiencies and to provide amino acids. The relationship between aphids and endosymbiotic bacteria is thought to date back 150-250 million years. Aphids are a group of insects that depend on the host plant to the extent that they can be considered specific "plant pests". Some proteins synthesized by symbiotic bacteria in aphids are thought to bind to some virus particles in insect body fluids and promote virus transport activity. *Buchnera aphidicola* is a member of Proteobacteria and is the primary endosymbiont of aphids. *Buchnera aphidicola* provides essential amino acids that aphids cannot obtain from host plant sap. This bacterium also helps to encode genes involved in riboflavin production. Besides primary endosymbionts, many secondary endosymbiotic bacteria are present in aphids. These include *Arsenophonus*-type, *Serratia, Rickettsia, Spiroplasma, Wolbachia, Hamiltonella defensa, and Regiella insecticola*. These secondary endosymbionts have many effects such as developing resistance to fungal entomopathogens and parasitoids in aphids, creating defense against natural enemies, increasing temperature tolerance, increasing virus-carrying capacity, and determining phylogenetic relationships. In recent years, molecular studies have played an important role in elucidating the relationships between insects and symbiotic bacteria. Determination of these relationships can contribute to the development of alternative control methods and help to eliminate the difficulties in taxonomic studies.

Keywords: Aphids, Endosymbiotic Bacteria, Buchnera

WHITE GRUBS (PHYLLOPHAGA SPP), DESCRIPTION, LIFE CYCLE, DISTRIBUTION IN TUNISIA AND CURRENT INSECTICIDE APPROACHES FOR WHITE GRUBS' CONTROL

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ABSTRACT

White grubs (Coleoptera, Melolonthidae) represent an increasing threat to several crops in northern Tunisia, especially Cereals and several industrial crops. In recent years, area losses have been steadily increasing in different regions of northwestern Tunisia, where yield reduction reaches 40%.After prospecting farms in North West of Tunisia in eight governorates in order to identify the species, we have been able to identify specific species in North Africa, which are Pseudoapterogyna dispar (27.3%), tusculus (60.7%), euphytus (9%), and tynetis (3%) illustrated in a map of distribution. Trials were conducted in the most level of damage zone, a trial of soil treatment (such as tefluthrine, phénamiphos and chlorpyriphos ethyl) at three sites, namely Beja, Thibar and el Montassar for two consecutive seasons (2017-2018 and 2018-19). Another trial of seed treatment was conducted in Jendouba in our innovative platform (Kaudia) for two consecutive seasons (2017-2018 and 2018-2019).

Keywords: White grubs, cereals, map of distribution, trials, treatment

INFECTION AND POPULATION DENSTY OF PLANT PARASITIC NEMATODES ASSOCIATED WITH TEA IN TURKIYE

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ABSTRACT

Tea (*Camellia sinensis*) is an evergreen tree plant from the family Theaceae and grows in important climates. There are plant parasitic nematodes that can cause serious losses in tea plantations. This study was carried out to determine the infestation status and population densities of the tea plantation soils with plant parasitic nematodes. Surveys were carried out on 91 different plantation areas in 5 provinces where tea is produced throughout Turkey. The nematodes were obtained from the soil samples taken by using the Cobb sieve method. The morphological and morphometric characters of the obtained nematodes were examined and their classification was carried out at the genus level. As a result of the study, 73.6% *Helicotylenchus* spp., 58% *Filenchus* spp., 53.8% *Pratylenchus*spp., 52.7% *Gracilacus* spp., 31.9% *Hemicriconemoides* spp., 30.8% *Crossonema* spp., 26.4 % *Paratylenchus* spp., 31.9% *Heterodera* spp., 6.6 % *Geocenamus* spp. and 1.1% were contaminated with *Pratylenchoides*, *Rotylenchus* and *Ditylenchus* genera. The obtained nematodes were detected at different densities. The highest population density of genus was *Gracilacus* spp. in the soil at a density of 4028 nematodes/100 cm3 in Giresun province, followed by 679 nematodes/100 cm3 *Hemicriconemoides* spp., 549 nematodes/100 cm3 and *Helicotylenchus* spp., 75 nematodes/100 cm3 *Pratylenchus* spp. in Rize province.

Keywords: Tea, Camellia sinesis, Turkey, plant parasitic nematodes

IMPACT OF EXPOSURE TO THE ESSENTIAL OIL OF THYMUS MUNBYANUS (BOISS & REUT.) ON FERTILITY AND SURVIVAL OF ADULT OFFSPRING AGAINST MEDITERRANEAN FLOUZELLERR MOTH, EPHESTIA KUEHNIELLA

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ABSTRACT

Insect pests, considered one of the major problems in agriculture, can also be vectors of pathogens and pose a threat to animals including humans. Thus, in the context of sustainable development, non-polluting pesticides have been marketed by pharmaceutical and phytosanitary companies. These molecules, alternatives to conventional pesticides, are represented by synthetic pesticides of the 3rd generation (growth regulators) or by pesticides of natural origin (biopesticides). The essential oil of *T. munbyanus* was tested in a pest of stored foodstuffs *Ephestia kuehniella* and then evaluated on adult fecundity and survival. HE was diluted in acetone and administered by topical application, on newly exuviated pupae at two doses (ID25: 15.38 µl/mL and ID50: 25.22 µl/mL) and the effects were observed on two successive generations, the parental generation (P) which was exposed to the treatment and the first generation (F1) not exposed. EO reduces, with a dose-response relationship, the fecundity of adults who survived the treatment, with a decrease in the number of eggs laid. HE also affects the survival of adults of both generations (P: exposed, F1: not exposed). The persistence of the effects observed during the two successive generations and likely to reinforce the insecticidal effect of the EO of *Thymus munbyanus.*

Keywords: Essential oils, Thymus munbyanus, Ephestia kuehniella, fecundity

CHARACTERIZATION AND PATHOGENICITY OF RHIZOCTONIA AG P CAUSING DAMPING-OFF ON TURFGRASS

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ABSTRACT

The genus *Rhizoctonia* consists of species that have one, two (binucleate) and multinucleate hyphae that are pathogenically, morphologically, and genetically different from each other. These species are named and divided into subgroups depending on the anastomosis reactions between their hyphae and show different pathogenic characteristics according to their hosts. Binucleate *Rhizoctonia* spp. generally live in soil and plant debris as saprophytes, but some forms are in parasitic relationships with plants. In this study, surveys were conducted in parks in Kocaeli province in 2022. As a result of isolations from 52 turfgrass plants, two binucleate *Rhizoctonia* AG P isolates were identified in accordance with the rDNA-ITS sequences analysis. The rDNA internal transcribed spacer (ITS) regions of the isolates were amplified by polymerase chain reaction (PCR) using universal fungal rDNA primer pair ITS1/ITS4. The ITS1-5.8S-ITS2 region of isolates were sequenced and performed BLAST analyzes. Pathogenicity tests were performed two times in pots using turfgrass seeds in greenhouse conditions. As a result of the pathogenicity tests, it was determined that both isolates cause damping-off on turfgrass.

Keywords: Rhizoctonia AG P, Turfgrass, ITS region

PHYTOCHEMICAL COMPOSITION AND IN VITRO ANTIOXIDANT ACTIVITIES OF ALBUCA AMOENA (BATT.) J.C. MANNING & GOLDBLATT (ASPARAGACEAE) EXTRACTS

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ABSTRACT

The rich Algerian flora offers a diverse range of medicinal plants, and their use is deeply rooted in the local ancestral knowledge of different ethnic groups living in specific areas of the country. Traditional medicinal knowledge, as well as modern scientific methods, are employed to identify and extract bioactive compounds from plant materials. *Albuca amoena* is an endemic medicinal plant with various medicinal uses. The aim of this study is to identify phytochemical compounds of the plant, and to evaluate its antioxidant activities. The whole plant was collected in the area of El Knadssa- Bechar, Algeria. The species was extracted using different solvents such as ethanol, *n*-butanol, ethyl acetate, chloroform and hexane. The antioxidant properties were evaluated using various tests including DPPH, ABTS+ and hydroxyl free radical scavenging, ferric reducing antioxidant power (FRAP), and phenanthroline assays. The phytochemical analysis revealed that *A. amoena* consists of a combination of various phytochemical compounds, including alkaloids, condensed tannins and polyphenols. The results of antioxidant activities showed that the ethyl acetate extract had the best effects with IC50 of 18.91; 05.19 and 150.61 µg/mL, and A0.5 of 74.75 and 12,52 µg/mL in the DPPH●, ABTS●+, OH●, FRAP and phenanthroline assays, respectively, compared to the antioxidant standards such as BHA, BHT and ascorbic acid. The study highlights the potential of *A. amoena* as an important source of natural antioxidants with different mechanisms, for application in food and pharmaceutical industries.

Keywords: Medicinal plants, Albuca amoena, antioxidant activities, solvent extraction, phenolic compounds

STUDY OF THE BEHAVIOUR OF COMMON WHEAT (AE. GENICULATA)SUBJECTED TO WATER STRESS BY THE ANALYSIS OF SOME MORPHO-PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS

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ABSTRACT

Drought in Algeria and other Maghreb countries is widely recognized as the primary limiting factor in agricultural production and is a permanent constraint. The fight against this climatic factor must be considered through a multidisciplinary approach **(Monneuveux, 1991; Benlaribi and Monneuveux, 1988).** It is estimated that about 40% of the world's cultivated areas are subject to drought **(Lecoeur, 2007).** The study is carried out on eight genotypes of the species *Ae. geniculata* collected in several ecogeographic regions across northern Algeria. The study of the response to water stress in these eight genotypes and the control reveals the existence of a high variability for most of the parameters measured (morphological, physiological and biochemical). The results of morphological parameters show a marked decrease in plant height and leaf area in most genotypes with an increase in leaf specific weight of aerial and root parts. The results of physiological parameters show variability between genotypes and water situation. In most genotypes, there was a decrease in total chlorophyll levels and relative levels and an increase in the rate of water loss. The accumulation of osmoticums during a declaration of a water deficit remains a drought resistance parameter. Our results show that the water deficit is accompanied by a clear accumulation of soluble sugars in all genotypes especially G8 and control G9 (Wheat) but with a significant accumulation of proline in G8. In conclusion we can conclude that the eight genotypes studied showed the same mechanisms and strategies in response to water stress but with different degrees. The G8 genotype shows good resistance to water stress compared to the other genotypes studied.

Keywords: Soft bleach, drought, water stress

EVALUATION OF THE ANTIFUNGAL POTENTIAL OF EUCALYPTUS GLOBULUS AND MENTHA PULEGIUM ESSENTIAL OILS IN THE BIOLOGICAL CONTROL OF THREE STRAINS OF FUSARIUM CULMORUM RESPONSIBLE OF FUSARIUM HEAD BLIGHT OF WHEAT

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ABSTRACT

With the aim of researching biological control methods against *Fusarium* fungi responsible for major losses in cereal crops. The antifungal activities of *Mentha pulegium* and *Eucalyptus globulus* essential oils were tested on three strains of *Fusarium culmorum* using the direct contact technique. The results obtained in this study showed a significant inhibition of the EOs on the growth of the strains tested. These results lead to the conclusion that essential oils from aromatic and medicinal plants can provide a valid alternative to antifungal agents in the fight against phytopathogenic fungi.

Keywords: essential oil, antifungal activity, Mentha pulegium, Eucalyptus globulus, Fusarium culmorum

PREFERENCE FOR STEM PART (UPPER, MIDDLE, BASAL) OF TUCKERELLA JAPONICA (ACARI: TUCKERELLIDAE) ON DIFFERENT TEA CLONES

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ABSTRACT

Tea, *Camellia* sinensis is a species of evergreen shrub or small tree in the family Theaceae. Its leaves and leaf buds are used to make a popular beverage tea. *Tuckerella japonica* (Trombidiformes: Tuckerellidae) is one of the harmful mite species on *C. sinensis*. It feeds on the exposed tissues of stems of *C. sinensis* which have longitudinal bark splitting. It may be able to devise more effective sampling and pest management plans for *T. japonica* by analyzing its preference for specific stem parts. So, this study aimed to determine the distribution of *T. japonica* on the tea plant's upper, middle and basal stems of lateral branches. The research was carried out on 8-year-old "Muradiye-10", "Samidori" and "Saekari" tea clones in Rize province (Black Sea Cost, Turkey) under open field conditions. Lateral branches of 15-20 cm in size were separately sampled from different parts of the tea bush canopy, i.e. upper, middle and basal canopy at 20-day intervals from March to November in 2022. Monthly shoot sampling was also made in the winter period (December-February 2022). A total of 2295 stems (765 upper, 765 middle and 765 basal) were observed during the study. The stems of sampled brunches from the different bush canopies were examined under a stereomicroscope. The egg and active stages of *T. japonica* (larvae, nymphs and adults) present on the stems were separately counted and recorded. As a result, active stages of *T. japonica* were generally found on the lower and middle stems of Saekari and Samidori clones, and the middle stems of Muradiye clone throughout the year. Additionally, it was observed that the eggs were mostly laid on the lower stems in all clones. On the other hand, the multifaceted influences of various variables on where arthropods choose to feed or lay eggs can take a while to manifest. So, only with long-term observation can we truly understand these intricate patterns.

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Keywords: Camellia sinensis, peacock mites, Muradiye-10, Saekari, Samidori, shoot

DETERMINATION OF SHIKIMIC ACID LEVEL IN SAFFLOWER VARIETIES FOLLOWING GLYPHOSATE APPLICATION USING SPECTROPHOTOMETRY

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ABSTRACT

Safflower is a promising alternative oilseed crop and can cultivates many regions of Turkey. The crop is grown adjacent to fallow fields used glyphosate to control weeds, and may exposure to glyphosate drift. Laboratory experiments were carried out to determinate response of thorny and thornless varieties of safflower (*Carthamus tinctorius* L. var. Remzibey-05 and Dinçer) to recommended rate (X), half of recommended rate and quarter of recommended rate of glyphosate. Glyphosate rates were applied at a spray volume of 192 L ha-1 to safflower seedlings at 2-4 true leaf stage using spray chamber. Limit of detection (LOD) and limit of quantification (LOQ) of shikimic acid in safflower were calculated as 0.66 and 2.19 ppm, respectively. Shikimic acid (SA) accumulation in the seedlings were (380 nm) determined by spectrophotometric method 1, 3, and 7 days after treatment (DAT). SA accumulation in the thorny variety was higher than thornless variety.

Keywords: Safflower, glyphosate, shikimic acid, spectrophotometry

THE PREVELING AND DETECTING OF ROOT AND CROWN ROT PATHOGENS FROM HORDEUM VULGARE AND AEGILOPS SPECIES IN CENRTRAL ANATOLIA REGION

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ABSTRACT

Barley (Hordeum vulgare L.) is one of the most common cereal grasses around the world as mainly animal feed, food product for human consumption and using a model plant for researches. However, a wide range of soilborne pathogens by individually or combined, such as Fusarium, Rhizoctonia, Bipolaris, Pythium, can be infected on plant roots and crowns, thus losses yield. Although there are various management practices against these soilborne fungi, the improving resistance plant genotypes to diseases is one of the most sustainable and effective strategy. Wild relatives such as Aegilops, are the best-known species as progenitor and genetic resources of cereals. In this study is aimed to screening of barley and Aegilops species collected from cereal fields and its near pastoral areas for causal agents of root and crown rot diseases to comparing of pathogenic species incidence on fungal flora. For this purpose, forty-six barley and twenty-six Aegilops spp. plant samples were collected from four different locations in Central Anatolia region of Türkiye. Plant materials were divided two parts as root with capillaries and crown included first internode and incubated on peptone-pentachloronitrobenzene agar medium at 23±2 oC, after surface sterilization by 1% hydrochloric acid solution. In conclusion, the number of pathogenic fungal isolates obtained from barley was founded more frequent than that in Aegilops at all locations. Twenty-four fungal genus was identified by morphologically in barley and twenty-seven in Aegilops while Fusarium was the most common fungal genus in root and crown parts of barley and Aegilops. Fusarium, Rhizoctonia, Bipolaris, Pythium, Sclerotinia and Gaeumannomyces graminis known as soilborne pathogens was isolated from barley tissues whereas fewer fungal genus was obtained from wild grass tissues. The results of prevalence of soilborne fungi in barley and wild grasses from adjacent areas were exhibited that wild species limited to growing of these pathogens in its tissue and, this result was revealed that wild species were a potential source for breeding of disease resistance.

Keywords: Fusarium, soilborne fungal pathogens, Aegilops, Türkiye, disease resistance

RICE PRODUCTION AND WEED MANAGEMENT AT IPSALA DISTRICT

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ABSTRACT

Rice, *Oryza sativa* L., is a stable crop globally. Ipsala is an important rice production region in Türkiye. Conventional rice planting is practiced drilled-seeded, water-seeded, or transplanted. Water-seeded rice paddies are drained ~6-10 days after planting for root establishment for about ~4-6 days. Primary weed species in the region are *Alisma lanceolatum*, *Cyperus difformis*, *Cyperus rotundus*, *Echinochloa* spp., *Leptochloa fusca*, and *Vicia* spp. Ipsala rice growers heavily rely on chemical weed management. In this study, herbicide applications were observed at three locations from 2018 to 2022 for five consecutive growing seasons. In 2018, oxadiazon at 455 g; cyhalofop-butyl at 800 g; imazamox at 62.5 g, plus bensulfuron-methyl at 36 g ai ha-1 were applied to first field. Oxadiazon at 300 g; cyhalofop-butyl at 750 g, plus quinclorac at 462.5 g, plus bensulfuron-methyl at 36 g; tembotrione at 52.8 g, plus bentazone at 666 g, plus dichlorprop-P at 466 g ai ha-1 were applied to second field. Oxadiazon at 375 g; cyhalofop-butyl at 860 g, plus quinclorac at 312.5 g, plus imazamox at 76 g, plus bensulfuron-methyl at 36 g; cyhalofop-butyl at 200 g, plus tembotrione at 28.6 g, plus bentazone at 624 g ai ha-1 were applied to third field. Precision timing is the key term for herbicide applications in Ipsala rice. To prepare the field, effective weed control must be done for the established weeds before rice is planted. A second herbicide application is usually done at ~10-15 days after planting. In most cases, a follow-up herbicide application at ~20-25 days after planting should be done to target the escaped individuals from previous applications. Consequently, weed control efficacy must be more than 80% for the desired grower standards, which requires increased rates of herbicides, time, and labor cost.

Keywords: Echinochloa spp., Alisma lanceolatum, Cyperus difformis, Leptochloa fusca herbicide

TOMATO RESISTANCE GENES MI AGAINST TO THE ROOT KNOT NEMATODE (MELOIDOGYNE SPP.) AND MOLECULAR APPROACHES.

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ABSTRACT

Meloidoyne spp. is a pest threatening the tomato production both in open fields and green houses worldwide. It was first detected in England but now it is a worldwide problem for tomato and other *Solanaceae* crop production. If appropriate control measures are not taken 15- 85 % yield losses can take place. Just as control measures including chemical spraying and use of biological agents are important, plants own tolerance is of great importance for prevention of damage. As expected, infestation severity is largely dependent on the plant defence response mechanisms. Tolerant tomato relatives are already known with reduced feeding and penetration of *Meloidogyne spp.* Understanding and engineering these gene mechanisms is of great importance for development of tolerant varieties against *Meloidogyne spp.*. Plant resistance (R) proteins recognize pathogen avirulence (Avr) determinants and trigger plant defence mechanism. Then carefully organized dynamic defence includes the control of expansive number of genes that regularly come out in as a Hypersensitive Response (HR), and programmed cell death. The programmed cell death prevents to the attack of the pathogen at the point of infiltration or stop the feeding of the pest and decrease the damage caused by the *Meloidogyne spp.* Going before the HR, series of metabolic changes is following the accumulation of reactive oxygen. As a result of these changes, new studies identified new components of Mi-1-mediated resistance to the nematodes. Intramolecular interaction of Mi-1 protein is important for regulation of HR signaling. In addition, Mi-1 binds and hydrolyzes ATP in cell. ATP hydrolysis assists in generating a conformational change in Mi-1, which triggers defense responses of tomato. In this study we review the molecular mechanisms of tolerance against *Meloidogyne spp*. in tomato.

Keywords: Meloidogyne spp., defence mechanisms, Solanum lycopersicum

EVALUATION OF A NEW FUSARIUM ACUMINATUM ISOLATE PATHOGENICITY ON THE DURUM WHEAT SEEDS AND SEEDLINGS

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ABSTRACT

Durum wheat is considered the most important source of food for all people worldwide, especially the Algerian people. Unfortunately, this latter is attacked by several soil-borne fungi that can cause severe diseases and important losses in yield. The present study aims to evaluate the pathogenicity of a new *Fusarium acuminatum* isolate (Fac 33), on three durum wheat varieties. the results showed that the "Fac 33" isolate affected both the rate of the germinated seeds and the coleoptile length negatively by a reduction percentages of 14.29% and 39.53% respectively. The obtained results also illustrate that the "Fac 33" isolate affected negatively the length and the fresh weight of the durum wheat seedlings by inhibition rates reached 20.24% and 69.77% respectively. Finally, the number of wheat seeds number and their weight were also reduced by the Fac 33 isolate, the percentages of reduction were 63,47% and 59,67% respectively.

Keywords: Durum wheat, Coleoptile, Fusarium acuminatum, Pathogenicity, Wheat seedlings

EFFECT OF TRIBOLIUM CONFUSUM'S TOXICATION INFESTATION ON AVENA SATIVA FOR HUMAN AND ANIMAL NUTRITION

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ABSTRACT

Avena sativa, commonly known as oats, is a cereal grain that belongs to the family Poaceae and is grown for its edible seeds. Oats are a popular food worldwide and are commonly consumed as oatmeal or used in baked goods, granola, and other foods. Oats are rich in nutrients such as fiber, protein, vitamins, and minerals. They are particularly high in beta-glucan, a type of soluble fiber that has been shown to lower cholesterol levels and improve heart health. Oats also contain antioxidants, which can help protect against chronic diseases. In addition to their nutritional value, oats have been used in traditional medicine for their various health benefits. They are believed to have anti-inflammatory and anti-itching properties and may help improve skin health. Oats are also used as a natural remedy for anxiety, depression, and insomnia, but plant breeders have been working hard to incorporate resistance. The devastation caused by any one disease will depend upon the susceptibility of the variety being grown and the environmental conditions during disease development. Serious diseases of Oats include powdery mildew caused by Flour beetle (*Tribolium confusum*). The presence and adverse effects of certain toxic compounds in flour as a result of insect pest infestation during storage has been of growing international concern. Previous studies have indicated that flour extracted from Oats that has suffered infestation by insect pests such as *Tribolium confusum* could be affected in its nutritional, chemical and rheological characteristics. Fifty bowls, 2 kilogram, of flour were used filled with wheat flour 85 % extraction. 40 larvae of *Tribolium confusum* were put into each bowl and 20 jars, for 2 months at 25 0C and 50% of relative humidity. At the end of this period, all samples were sieved to recover the insects and then analyzed. Mutagenic and Carcinogenic compounds, increased by the rate of 28831.187 and 28.82% compared to 1.4687 and 3.09% for the uninfected samples, respectively.

Keywords: Avena sativa, Insects' infestation, Flour beetles, Mutagenic and Carcinogenic

SECONDARY METABOLITES OF ACTINOMYCETES AND THEIR USES IN AGRICULTURE

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ABSTRACT

In recent years, due to the increase in agricultural production and the disadvantages of chemicals, alternative control studies have been focused on in agriculture. In this study, especially soil microorganisms *Actinomycetes* bacteria play an important role. Their multifunctional activities, including nutrient cycling, soil quality and crop productivity, as well as plant health, make them an environmentally friendly alternative not only for agriculture but also for humanity. Therefore, this study includes the importance of Actinobacteria as microbial biopesticides and biofertilizers and highlights the future needs of using these bacteria in sustainable agriculture. These bacteria are characterized as a unique group due to their similarity to fungi due to their morphological structure in the form of mycelium. However, they are closer to bacteria because they are unicellular and do not contain chitin and cellulose in their cell walls. Among the microbial secondary metabolites produced by Actinomycetes; antibiotics, vitamins, pigments, toxins and substances effective in symbiosis, Biosurfactants, enzymes (amylase, cellulase, chitinase, pectinase), pheromones (Streptomyces werraensis LD22), compounds that affect the immune system, receptor antagonists and agonists, pesticides, antitumor agents, and plant and animal growth regulators and hormones. These secondary metabolisms are generally controlled by a group of genes in DNA. Of over 23,000 known microbial secondary metabolites, 42 % are produced by actinomycetes, 42 % by fungi and 16 % by other bacteria. In this study, plant growth and yield promoting activities of *Actinomycetes* in important cultivated plants, their antifungal, antibacterial, herbicidal, insecticidal properties and their licensed preparations in the market are included. So future research should focus on number and quality of commercial products improvement. The lack awareness for farmers to use biopesticides and biofertilizers is a challenge to be taken up for an implementation for large scale of biopesticides and biofertilizers application in agriculture. Currently, the development of synthetic biology and nano-biotechnology advance provide opportunities to develop microbial and bioactive biofertilizers with a broad spectrum of application in different agro-systems. Therefore, research efforts should focus on these subjects.

Keywords: Actinobacteria, agriculture, biofertilizer, biopesticide, Streptomyces

MONITORING THE DISTRIBUTION AND DEVELOPMENT OF APPLE SCAB AND POWDERY MILDEW IN THE SOUTHERN AND SOUTHEAST KAZAKHSTAN

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ABSTRACT

The natural and climatic conditions of south and southeast Kazakhstan are suitable for growing high-quality fruits that can compete with foreign products. Apple scab (*Venturia inaequalis*) and powdery mildew (*Podosphaera leucotricha*) pathogen, causes significant damage to fruit production, lossing level of product quality and yield up to 70%. In order to determine the phytosanitary state and resistant varieties of apple, monitoring was carried out in three regions of Kazakhstan. Apple orchards of cultivars 'Golden Delicious', 'Star Crimson', 'Gala', 'Idared', 'Fuji', 'Red Delicious' and 'Samuret' on clonal rootstocks M9 and MM106 were examined. Phytosanitary monitoring for the spread and development of the scab and powdery mildew pathogen was carried out the main fruit tree-growing regions of Kazakhstan: Almaty (14 ha), Turkestan (288 ha) and Zhambyl (40 ha) in 2022. Furthermore, powdery mildew distribution was 18.05 % in the 'Idared' orchard, while its development was at a lower level of 3.06 % in the apple orchards where Tulkibas district of Turkestan region. Scab pathogen is present in all orchards of the studied regions. The pathogen *Venturia inaequalis* was spread at an average level with 23-31 % in 'Star Crimson', 'Golden Delicious'and 'Idared', while its development was at a low level with 1-2.84 % in the Almaty region. The disease distribution is with 30-37 % of orchards where 'Star Crimson', Golden Delicious and Red Delicious cultivars are grown in the Zhambyl region. As well as the development of the disease was 2-4.12 %. In the Turkestan region, in 'Samuret' and 'Star Crimson', scab distribution was at a low level with 3-3.71 %, while the development of the disease was with 0.50-0.81 %. In 'Idared' and 'Gala' the disease distribution in the range about 16-17 %, while the development developed at a lower level with 0.13- 1.25 %. The 'Fuji' was recognized as resistant variety to scab, for the reason of no disease symptoms.

KEYWORDS: APPLE, VENTURIA INAEQUALIS, PODOSPHAERA LEUCOTRICHA, PHYTOSANITARY MONITORING, ORCHARDS

USING HPLC–DAD AND GC–MS ANALYSIS ISOLATION AND IDENTIFICATION OF ANTIOXIDANT COMPOUNDS FROM BIDENS PILOSA

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ABSTRACT

Bidens pilosa is an important plant of family Asteraceae, that has been widely used in traditional medicine for treatment of a large number of ailments. In the present study Root, stem, leaves, fowers and achenes of this plant was evaluated for its antioxidant potential using three assays i.e. DPPH free redical assay, Reducing power assay and phosphomolybdenum assay. The results indicates that the hexane extract of Bidens pilosa flowers show a very high antioxidant activity and the compounds responsible for this activity were identified to be Tris (2, 4-di-tert-butylphenyl) phosphate and Linoleic acid. Upon further testing both compounds reveaed antioxidant activity of 82.45% and 95.26% against DPPH free radical. It can be concluded that promising antioxidant potential of these compounds can be further evaluated on cell lines and animal models. It will help to established their safe use in pharmaceutical industry for the treatment of neurodegenerative and heart diseases/chronic ailments.

Keywords: Bidens pilosa; roots; flowers; antioxidant potential.

EXTRACTION AND EVALUATION OF THE ANTIMICROBIAL ACTIVITY OF ESSENTIAL OIL OF SALVIA OFFICINALIS L.

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ABSTRACT

The study that we conducted aims at the extraction and valorization of the antimicrobial activity of the sage *Salvia officinallis*, harvested in the province of Ain Defla. *S. officinalis* is a sub-shrub belonging to the family Lamiaceae. This plant is considered as the plant of all the virtues. The method of extraction of the essential oil from the leaves (fresh material) of *S. officinalis* is by hydrodistillation. The evaluation of the antimicrobial activity of essential oil from the leaves of *S. officinalis* is determined by the agar diffusion method using five pathogenic strains. The bacteria tested are Escherichia coli, *Pseudomonas aerugenosa*, *Bacillus subtilis* and *Staphylococcus aureus*, while for the yeasts we tested *Candida albicans*. The extraction of the essential oil from the sage allowed us to calculate the yield. Our results indicate that the yield of essential oil is 0.83% with a moisture content of 19.2%. Regarding the antimicrobial activity, we recorded a mild inhibitory activity with inhibition diameter between 10mm >ZI< 16mm against *Candida albicans*, *Escherichia coli* and *Bacillus subtilis* (12.5mm, 13.5mm and 15.5mm), respectively. Moderate activity was recorded on the bacterial strain *Staphylococcus aureus* (20mm). We also recorded that the essential oil of *Salvia officinallis* does not present any antimicrobial activity against *Pseudomonas aeruginosa* whose inhibition diameter is 9 mm.

Keywords: Ain Defla, Salvia officinalis, essential oil, antimicrobial activity, pathogenic strains

PHYTOCHEMICAL TESTS AND EVALUATION OF THE ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF THE METHANOLIC EXTRACT OF MORINGA OLEIFERA

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ABSTRACT

The traditional medicine remains very wide-spread in developing countries and its use is increasing in developed countries. In order to valorise a medicinal plant cultivated in the Meniaa region, we were interested in the identification of phenolic compounds as well as in the evaluation of biological activities characteristic of *Moringa oleifera* leaves. Preliminary phytochemical tests carried out on different extracts as well as on the plant powder revealed the richness of the leaves in secondary metabolites. The moisture content and the purity of the plant drug were evaluated; they are respectively 7.6% and 1.8%. The best extraction yield was for the methanolic extract by soxhlet with 5.7% against 3.2% for the methanolic extract by sonication. Quantitative determination by UV-Vis spectrophotometer of the methanolic extracts by soxhlet and by sonication expressed various contents of polyphenols. These contents are respectively (19.2mg EqAG/g plant material) for the methanolic extract obtained by soxhlet and (74.5mg EqAG/g plant material) for the methanolic extract obtained by sonication. A considerable antioxidant activity of Moringa oleifera leaf organic extracts was revealed; the most pronounced is obtained from the methanolic extract by Soxhlet, which expressed an IC50 value of about 0.009 mg/ml. This represents a significant antioxidant power, which is however less pronounced than that of the reference antioxidant ascorbic acid, with an IC50 of around 0.003mg/ml. The antimicrobial activity was evaluated by the disc method. The results obtained allowed us to note that the antibacterial activity of the methanolic extract obtained by sonication was more important than that of the methanolic extract obtained by sonication in regard to *Pseudomonas aeruginosa*, *Escherichia coli*, *Candida albicans and Bacillus subtilis*, whereas the methanolic extract obtained by Soxhlet.

Keywords: Antioxidant, antimicrobial activity, methanolic extract, Moringa oleifera

MICROENCAPSULATION OF INDIVIDUAL AND COMBINED MOROCCAN LAVENDER ESSENTIAL OILS: DEVELOPMENT, CHARACTERIZATION, AND ANTIBACTERIAL ACTIVITY

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ABSTRACT

This study aimed to evaluate the antibacterial activity of two Moroccan lavender (*Lavandula stoechas* L. and *Lavandula tenuisecta* Coss.) essential oils encapsulated individually or in combination against some pathogenic resistant bacteria. The essential oils were microencapsulated in maltodextrin using spray drying method and the antibacterial effect was determined through determination of minimum inhibitory (MIC) and minimum bactericidal concentrations (MBC), using microdilution method. The microencapsulation yields were 66.66 %, 66.00 and 77.32% and encapsulation efficiency values were 80.66%, 81.34% and 80.23%, for *L. stoechas, L. tenuisecta* and their combination, respectively. Essential oil microcapsules had average diameters varying from 5.00 to 9.83 µm, with spherical external structures without cracks and apparent pores. In terms of antibacterial effects, microcapsules prepared by essential oils individually and their combination possess interesting inhibitory effect against *Listeria monocytogenes*, *Salmonella enterica* and *Klebsiella pneumoniae* with MIC and MBC values ranging from 0.31 to 1.00 mg/mL, and moderate activity against *P. aeruginosa*, *Staphylococcus aureus* and *Escherichia coli* with MICs and MBCs varying from 1.00 to 4.00 mg/mL. Overall, this finding encourages further research and provide perspectives for the development of phytotherapeutic product which could be exploited as potential antibacterial agent.

KEYWORDS: ENCAPSULATION; CHARACTERIZATION; MOROCCAN LAVENDER; COMBINATION; ANTIBACTERIAL ACTIVITY.

THE HUMAN ANIMAL RELATIONSHIP IN DAIRY FARMING

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ABSTRACT

This study was carried out in dairy farms in two different areas on a number of breeds (Holstein and Montbeliarde) at different ages (< 1 year and > 1 year). Where the total size of the first farm was 34 individuals, the latter is located in the village of Sidi Omar Al –Abadia d'Ain defla city. The total number of the second farm was 36 individuals, this farm is located in EL hamoul communal of the village of Rouina, Ain Defla city. The objective of this study is based on the evaluation of the human-animal relationship in cattle farming, using the avoidance test. The results showed that the avoidance test in first farm and the second farm was (12.02-70.30) cm respectively with a $p<0.05$, which proves that the farmer on Farm 1 has a good relationship with his flock compared to the farmer on Farm 2. The young cattle showed a distance of avoidance shorter than the adults at the value of (1.68-132.27) cm respectively with a $p<0.05$, and this is due to the adaptation of the young to man, It was also noted that the Montbeliarde and Holstein cows had a leakage distance of (119.5-81.92) respectively with a $p<0.05$. In conclusion, this study showed that cattle's behaviour towards humans is directly related to age, race,how the breeder treats them, and the welfare conditions they provide.

Keywords: human-animal relationship, avoidance distance, welfare, behaviour.

ASCOPHYLLUM NODOSUM EXTRACT ROLE AS NATURAL DEFENSE STIMULATOR FOR PHASUOLUS VULGARIS GROWTH UNDER SALT STRESS

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ABSTRACT

Biostimulants use in agriculture is a promising solution to effectively combat biotic and abiotic stresses. This research aims to estimate the use of commercial brown algae extract *Ascophyllumnodosum* to mitigate the depressive effects of salt stress on green beans (Phaseolus vulgaris).El Djadida variety. An experimental test is established where seeds are pre-germinated then grown and at the 3-leaf stage saline stress is applied with 4 concentrations of NaCl (0g / l , 2g / l, 4g / l, 6g / l) with or without brown algae liquid extract foliar spraying at 0.1%, 0.5% and 1%. The main results show that almost all the parameters studied (height, fresh weight, dry weight) are negatively influenced by saline stress and the use of the biostimulant improves the NaCl tolerance of *P.vulgaris* characterized as salt-sensitive species. This improvement is expressed by an increase in the stems and roots tolerance index when the extract is used at 1% under 6g / l of salt. Same advice for stems and roots length and fresh and dry biomass the case of the roots mainly. Thus, *A nodosum* commercial extract (phylgreen)foliar application can be considered as a means likely to improve El djadida cultivar salt stress tolerance

Keywords: Ascophyllum nodosum; Biostimulant; Phaseolus vulgaris; Salt stress, Tolerance

NITRIC OXIDE SCAVENGING AND IN VIVO ANTI-INFLAMMATORY ACTIVITY OF AMMODAUCUS LEUCOTRICHUS SEEDS' EXTRACTS

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ABSTRACT

Elevation of intracellular reactive oxygen and nitrogen species (ROS, RNS) levels can cause damages of cellular macromolecules as well as genetic material. Some plants' bioactive compounds revealed specific secondary metabolites that possess significant pharmacological activity in inhibition of these free radicals. In the present study, we investigated whether the methanolic extract and its different fractions of *Ammodaucus leucotrichus* seeds are able to deal with free radicals and affect different processes involved in inflammation development. Results indicated that total polyphenols and flavonoids were highest in crud extract (CrE). However, the nitric oxide scavenging activity of Ethyl acetat extract (EAE) was higher than the other extracts with an IC50 value of 0.186 ± 0.007 mg/ml. *In vivo* anti-inflammatory effect of *A. leucotrichus* showed that CrE at the dose 400 mg/kg exhibited a strong activity shown as inhibition of croton oil-induced ear edema in mice (71.27 % ± 3.7). At dose 200 mg/Kg, CrE reduced the amount of nitrite formed in inflamed ear tissue homogenates. The elevated levels of lipid peroxidation indicator, malondialdehyde (MDA), were decreased by a dose dependent manner in ear tissue homogenates. It could be concluded that total phenolics in *A. leucotrichus* provide substantial antioxidant and anti-inflammatory activities and these results support the validity of the use of this plant in traditional medicine purposes.

Keywords: Ammodaucus leucotrichus, oxidative stress, phenolics, scavenging, inflammation

EXPERIMENTAL ASSESSMENT OF CERTAIN MEDICINAL HERBS AT THE UNIVERSITY OF CONSTANTINE

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ABSTRACT

The plant-based drug is widely used in developing countries to treat different health problems, they are also used in industrialized countries primarily for self-medication. These natural products used in traditional medicine present many advantages such as their safety and effectiveness. Scientific studies have investigated different plant products. The search and discovery of new active molecules, by pharmaceutical and academic. Laboratories have allowed to explain the healing mechanism of many of these natural products, and thus, approving their traditional uses. Burns are one of the most common conditions encountered during emergencies. It may be life-threatening. Although there are many conventional treatments with established effectiveness, Numerous studies worldwide have tested the curative effect of new products derived from traditional medicine. This article reviews seven experiments carried out at the University of Constantine (Algeria): Each study has investigated the burn healing effect of a plant used in Algerian Traditional medicine, which are: *Linum usitatissimum*, *Argania spinoza*, *Pistacia lentiscus*, *Lawsonia inermis*, *Inula viscosa*, *Opuntia ficus indica*, *Juniperus oxycedrus.* Results show promising healing effect of these natural products, may be used as an alternative to traditional medications to treat burns.

Keywords: Healing, Burns, medicinal herbs, experimental testing

BRINE SHRIMP LETHALITY BIOASSAY OF ESSENTIAL OIL EXTRACTED FROM CITRUS SINENSIS

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ABSTRACT

Medicinal plants are currently arousing major and growing interest given their great wealth in bioactive molecules that they contain. The economic importance of citrus fruits lies in their health benefits, probably attributed to the presence of the phenolic compounds, vitamin C and carotenoids.Also, Many natural products could serve as the starting point in the development of modern medicines because of their numerous biological and pharmacological activities. However, some of them are known to carry toxicological properties as well. The evaluation of the cytotoxicity of the of essential oils extracted by hydrodistillation (HD) and by microwave (MAHD) from the peels of *Citrus sinensis* by the method of Brine shrimp lethality shows that the two essential oils tested exhibit very good cytotoxic activity because no nauplii was observed alive. Calculation of the LC50 from the regression equation demonstrated an LC50 greater than or equal to 100µg / ml respectively for this oil.

Keywords: Citrus sinensis, Hydrodistillation, Microwave-assisted hydrodistillation, essential oil , cytotoxicity Saccharomyces cerevisiae

IN VITRO EXPLORATION OF THE BIOLOGICAL ACTIVITIES OF TWO GRAPE VARIETIES (VITIS VINIFERA) GROWN IN THE SIDI-BEL-ABBÈS REGION, ALGERIA

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ABSTRACT

Objective: This study investigated the biological activities of the leaves and seeds of two varieties of the *Vitis vinifera L*. species, Muscat (a group of white grape varieties) and cinsault (French black grape variety). **Materials and methods**: Extracts are prepared by methanolic decoction from the leaves and seeds of the two varieties Muscat and Cinsault. A qualitative and quantitative phytochemical analysis was performed. *In vitro* biological activities were assessed by measuring antioxidant capacity using two methods: the DPPH free radical scavenging method and total antioxidant capacity (TAC). The anti-inflammatory mechanism was assessed by two different techniques: inhibition of protein denaturation and anti-hemolytic activity (hemolysis by hydrogen peroxide). While anti-diabetic activity was monitored by studying the inhibitory power of the two enzymes α amylase and glucosidase. **Results**: Phytochemical screening of methanolic extracts revealed the presence of total tannins, terpenoids, flavonoids and cardenolides. However, anthocyanins, coumarins and sterols were totally absent in the leaves and seeds of both varieties (Muscat and Cinsault). In terms of quantitative analysis, the methanolic extract of cinsault leaves contained the highest levels of polyphenols and tannins (269.56 ± 13.33 mg EAG/g) and (46.26 ± 2.01 mg EC/g) respectively. Cinsault seeds contain the highest levels of flavonoids (194.87 ± 0.62 mg EQ/g). Extracts from cinsault seeds and leaves and muscatel seeds demonstrated powerful DPPH-reducing powers, reaching (97.86 ± 0.58%), (95 ± 0.5%) and (93.06 ± 2.28%) respectively, with IC50s of (0.023), (0.021) and (0.028) mg/ml respectively at a concentration of 1000 µg/ml. An increase in TAC was noted with seeds (330.19±0.8 mg EAA/g) and leaves (324.03±3.38 mg EAA/g) of the black variety (Cinsault). The seeds and leaves of the Cinsault variety showed very high inhibition of bovine serum albumin denaturation (90.56 ± 0.28%)

and (91.23 ± 0.21%) respectively. On the other hand, muscatel seeds and leaves showed low anti-haemolytic activity (61.7 ± 0.45%) and (63.83 ± 1.66%) respectively. On the other hand, cinsault seeds and leaves show high anti-hemolytic capacity (83.03 ± 1.36%) and (90.27 ± 0.13%) respectively. Cinsault leaves show high α-amylase inhibition capacity (93.5 ± 0.25%). Similarly, muscat leaves show high α-glucosidase inhibitory power (90.93 ± 0.31%). **Conclusion**: These results show that, *Vitis vinifera* leaves and seeds from the black grape variety (cinsault) have remarkable antioxidant, anti-inflammatory and anti-diabetic properties, reflecting their wealth of biologically active metabolites. Results indicate that cinsault leaves and seeds can be valued as a promising therapeutic agent.

Keywords: Antioxidant potential, anti-inflammatory, anti-diabetes activity , Vitis vinifera, Cinsault, Muscat

ANTISTAPHYLOCOCCAL STUDY OF THE ESSENTIAL OIL OF EUCALYPTUS GLOBULUS L. (EL-TAREF -ALGERIA)

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ABSTRACT

Antimicrobial resistance is a huge threat against the public health sphere and is a major cause of global mortality and morbidity. Antibiotic misuse and overuse have led to the development of many resistant bacterial strains. One particular bacterium of concern is methicillin-resistant *Staphylococcus aureus* (MRSA), which is the most common resistant bacteria in humans. Antibiotic development has been unable to keep up with the rapid evolution of antibiotic-resistant organisms, and there is an urgent need to identify alternative agents to combat this problem. Antimicrobial properties of plant essential oils (EO) have been investigated through several observations and clinical studies which purpose them as potential tools to overcome the microbial drug resistance (MDR) problem. *Eucalyptus globulus* L. commonly called in eastern Algeria (Kalitous) is a medicinal plant belonging to the Myrtaceae family, widely used by the population, especially for respiratory disorders. The aim of this research was to study the antibacterial effect of a traditional plant EO, *Eucalyptus globulus* L., against clinical isolates of methicillin resistant *Staphylococcus aureus* (MRSA) through disk diffusion method. The EO showed very effective bactericidal activity towards the majority of the tested bacterial strains with inhibition zone diameters in the range of 13.57-18.63mm. These results suggest that the essential oil of *Eucalyptus globulus* L. may be a useful alternative to antibiotics for the control of the infections caused by *Staphylococcus aureus.*

Keywords: Eucalyptus globulus L., Essential oil, Antibacterial activity, Staphylococcus aureus MRSA

EFFECT OF METHYL PARATHIONON ADAPTIVE CAPACITIES IN MALE RATS WISTAR

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ABSTRACT

Objectives: Organophosphorus compounds (OPCs) are an important class of organic chemical substances, they have in common a certain fat solubility and their mode of action on the nervous system as irreversible inhibitors of acetylcholinesterase, which makes them very toxic. Despite bans or restrictions on use and the low persistence of these COPs, they are detected in soils, surface waters and in living organisms in all countries of the world. Among the organophosphates, we were interested in the methyl parathion "organophosphate insecticide" which is widely studied for its neurotoxic properties in mammals and fish. Methods: This work consists in highlighting on the one hand, the inhibiting effect of organophosphates (methyl parathion) on the levels of hepatic glutathione GSH and enzymatic activity GST. On the other hand, to study the effect of the antioxidant taurine associated with MPT on GSH and GST in male Wistar rats. Results & discussion: The results obtained show that the organophosphorus insecticide applied by force-feeding induces modifications in the levels of hepatic glutathione GSH and of the enzymatic activity GST. Treatment of force-fed rats (MPT) with taurine restored basal values. Conclusion: MPT treatment exhibits increased GST activity concurrent with decreases in liver GSH content. GSH plays an important role in the detoxification of electrophiles and the prevention of cellular oxidative stress. The correlation between changes in GST activity and GSH levels is implied.

Keywords: MPT, Taurine, GSH, GST, male rat

ANTI-INFLAMMATORY AND ANALGESIC ACTIVITIES OF ETHANOLIC EXTRACT OF INULA VISCOSA

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ABSTRACT

The objective of the present study was to evaluate the anti-inflammatory and the analgesic effects activity of aqueous extract of *Inula viscosa* leaves in mice. The leaves are used as traditional folk medicine in north of Algeria, to treat inflammatory and painful diseases. Anti-inflammatory activity was evaluated by using the xylene-induced ear edema, whereas acetic acid-induced abdominal constrictions licking and biting were used to determine anti nociceptive effects. The aqueous extract of *Inula viscosa* (150 and 300 mg/kg) produced a significant inhibition of ear edema and produced a significant reduction of the number of writhes with a percentage inhibition of 48.82% for the 150mg/kg dose and 79.92% for the 300mg/kg dose. These findings suggest the aerial parts of *Inula viscosa* exhibits potent anti-inflammatory and analgesic activities on chemical behavioral models of nociception and inflammation in mice.The objective of the present study was to evaluate the anti-inflammatory and the analgesic effects activity of aqueous extract of *Inula viscosa* leaves in mice. The leaves are used as traditional folk medicine in north of Algeria, to treat inflammatory and painful diseases. Anti-inflammatory activity was evaluated by using the xylene-induced ear edema, whereas acetic acid-induced abdominal constrictions licking and biting were used to determine anti nociceptive effects. The aqueous extract of *Inula viscosa* (150 and 300 mg/kg) produced a significant inhibition of ear edema and produced a significant reduction of the number of writhes with a percentage inhibition of 48.82% for the 150mg/kg dose and 79.92% for the 300mg/kg dose. These findings suggest the aerial parts of *Inula viscosa* exhibit potent anti-inflammatory and analgesic activities on chemical behavioral models of nociception and inflammation in mice.

Keywords: Inula viscose, inflammatory activity, analgesic effect, Xylene

OPTIMIZATION OF THE HERBICIDAL ACTIVITY AGAINST AMARANTHUS RETROFLEXUS BY MIXTURE DESIGN OF THREE ESSENTIAL OILS

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ABSTRACT

The purpose of the present study was to investigate the combined herbicidal effect of three essential oils extracted from *Satureja alpina* (L.), *Thymus satureioides* Coss and *Myrtus communis* (L.), and to develop an effective formulation by combining them against the weed species *Amaranthus retroflexus* (L.). GC-MS analysis showed that pulegone, carvacrol, and myrtenyl acetate were the major components of *S. alpina T. satureioides* and *M. communis* EOs, respectively. In allelopathic tests, all EOs tested individually and in different combinations exhibited a significant inhibition of seed germination in a dose response manner, with IC50 values ranged from 1.40 to 2.18 µL/mL. A significant reduction in length of the seedling and seedling vigor was observed. The mixture design analysis demonstrated synergistic interactions between EOs, and the optimal EO mixture predicted corresponded to 55% of *T. satureioides*, 23 % of *S. alpina* a and 22% of *M. communis*. Interestingly, the predicted and validated data showed a significant reduction in IC50 values (1.28 µL/mL), compared to those of EOs tested individually and the conventional herbicide 2,4-dichlorophenoxyacetic acid (2.4-D). Our results indicate that the developed EO mixture is valuable in terms of further development as a bioherbicide.

Keywords: Amaranthus retroflexus (L.), Essential oils, herbicidal activity, mixture, optimization

SUSCEPTIBILITY OF SALMONELLA DISEASE TO PRERATS

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ABSTRACT

Salmonella, is considered a very important national disease in the world, which is spread in less developed countries. *Salmonella* is a bacterial disease, which is located in the inner part of the intestine. According to the structure, the bacteria is referred as the representative of *Enterobacteriaceae*. *Salmolnella's* structure changes according to the resistance of the organism and the ability to resist the immune system. It is mainly observed with the *Salmonella* food poisoning, which is met with indicators like diarrhea, and sometimes shows as a heavier menengit. In case of microorganism, it is important to fall into the human body, the digitality is more likely to be recorded in people with a certain weakness in the immune system. Because of the development of ready food sectors, in last 6 years the number of infectious recording by *Salmonella* has been increased. After a patient's contracted diagnosis, it is considered as the most basic for treatment of his disease. Thus, the main tissue of salmonella is carried out by the feces analysis of the disease. During the examination of the sample, the detection of leukocyte and erythrocytes also observe electrolytic changes during long-term diarrheas is considered possible. For the exact results, it is recommended to augment the number of factors that found in it. The most common types in analysed samples are *S. enteridisis* and *S. tifmirium.* Therapy is carried out by certain factors. So, because of the bacteraemic risk in small children, the use of antibiotics in the treatment of Salmonella is not recommended in the first. Initial step is considered the restoration of water- salt balance. Then, etiotropic treatment continues with the use of antibiotics, even more precisely, ampicillin, sulfometaxosol-trimetoprim, III generation cephalosprines. Salmonella types have a lot of drug resistance and can resist the antibacterial drugs on various names. The main mechanisms of the drug resistance are reduction of the permeability of external membrane, change of lactamase and penicillin connecting proteins, activation and production of fluid pumps. In recent years, wide spectrum-resistant Salmonella tifmurium bacteria have been increasing because of widely used of antibacterial drugs. Besides the effect of plasmid, the development of the drug resistance depends on the type of chromosom gene and stamp gene. The data shows that *Salmonella* tifmurium forms have still pathogenicity and the articles from other sources shows Salmonella tifmurium L forms have cell wall defects, so they are more resistant to cephalosporins than *Salmonella tifmurium* original bacteria. Only cephalosporins can push the production of bacterial L form, but joint use of antibiotics that affecting ribosom or nucleic acids can prevent the extension of the disease that occurs as a result of the production of other forms. Therefore, correct combination of antimicrobial agents is an effective method to reduce all the types of *Salmonella and* other *Salmonella* species and reducing their production of species. So, the use of III generation of cephalosporins is considered more effective method against *Salmonella*, due to its sensitivity of genus to this drugs.

Keywords: Salmonella, S. enteridisis, S. tifmirium

SUSCEPTIBILITY OF SALMONELLA DISEASE TO PRERATS

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ABSTRACT

Salmonella, is considered a very important national disease in the world, which is spread in less developed countries. *Salmonella* is a bacterial disease, which is located in the inner part of the intestine. According to the structure, the bacteria is referred as the representative of *Enterobacteriaceae*. *Salmolnella's* structure changes according to the resistance of the organism and the ability to resist the immune system. It is mainly observed with the *Salmonella* food poisoning, which is met with indicators like diarrhea, and sometimes shows as a heavier menengit. In case of microorganism, it is important to fall into the human body, the digitality is more likely to be recorded in people with a certain weakness in the immune system. Because of the development of ready food sectors, in last 6 years the number of infectious recording by *Salmonella* has been increased. After a patient's contracted diagnosis, it is considered as the most basic for treatment of his disease. Thus, the main tissue of salmonella is carried out by the feces analysis of the disease. During the examination of the sample, the detection of leukocyte and erythrocytes also observe electrolytic changes during long-term diarrheas is considered possible. For the exact results, it is recommended to augment the number of factors that found in it. The most common types in analysed samples are *S. enteridisis* and *S. tifmirium.* Therapy is carried out by certain factors. So, because of the bacteraemic risk in small children, the use of antibiotics in the treatment of Salmonella is not recommended in the first. Initial step is considered the restoration of water- salt balance. Then, etiotropic treatment continues with the use of antibiotics, even more precisely, ampicillin, sulfometaxosol-trimetoprim, III generation cephalosprines. Salmonella types have a lot of drug resistance and can resist the antibacterial drugs on various names. The main mechanisms of the drug resistance are reduction of the permeability of external membrane, change of lactamase and penicillin connecting proteins, activation and production of fluid pumps. In recent years, wide spectrum-resistant Salmonella tifmurium bacteria have been increasing because of widely used of antibacterial drugs. Besides the effect of plasmid, the development of the drug resistance depends on the type of chromosom gene and stamp gene. The data shows that *Salmonella* tifmurium forms have still pathogenicity and the articles from other sources shows Salmonella tifmurium L forms have cell wall defects, so they are more resistant to cephalosporins than *Salmonella tifmurium* original bacteria. Only cephalosporins can push the production of bacterial L form, but joint use of antibiotics that affecting ribosom or nucleic acids can prevent the extension of the disease that occurs as a result of the production of other forms. Therefore, correct combination of antimicrobial agents is an effective method to reduce all the types of *Salmonella and* other *Salmonella* species and reducing their production of species. So, the use of III generation of cephalosporins is considered more effective method against *Salmonella*, due to its sensitivity of genus to this drugs.

Keywords: Salmonella, S. enteridisis, S. tifmirium

ETHANOL TREATMENT ALLEVIATES ADVERSE EFFECTS OF DARKNESS STRESS IN PEPPER

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ABSTRACT

Light is both the main energy source for plants and an essential regulator throughout the plant's life cycle. Plants are photosynthetic organisms. For this reason, more or less lighting affects many metabolic and physiological processes, especially photosynthesis. Absence of light or darkness stress can cause morphological, physiological and biochemical response on plants. In this study, the changes in plant growth parameters, pigment and total phenolic contents of pepper seedlings exposed to darkness stress and the effects of exogenous ethanol application on these changes were investigated. According to our findings, extended darkness stress (5 days) caused a decrease in number of leaves, fresh and dry weights of plant, as well as carotenoid content in plants. 20 mM ethanol pre-treatment alleviated the negative effects of darkness stress on these parameters.

Keywords: Pepper, Darkness, Ethanol, Plant Growth Parameters, Chlorophyll, Carotenoids, Total Phenolic Compounds

ISOLATION AND PROPERTIES OF ANTIMICROBIAL SUBSTANCE PRODUCED BY ENSIFER MELILOTI FROM ROOT NODULES OF MEDICAGO SATIVA

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ABSTRACT

The legume-Rhizobium symbiosis is the most promising plant bacterial association for increasing the yield of forage and food legumes through biological nitrogen fixation. Rhizobium sp. have the ability to colonize root nodules of legumes and are commonly used as biofertilizers. The competitiveness of the introduced strains is a very important factor in the performance of an inoculum which is based on the use of rhizobial strains producing antimicrobial substances (bacteriocins). In the present work, we were interested in the production of antimicrobial substances (bacteriocins) by rhizobia. In this study, 30 rhizobial strains were isolated from Medicago sativa nodules collected from the saline soil of the Oran-Misserghin sabkha (western Algeria). The thirty isolates show a morphology comparable to that of known rhizobia. The in vitro nodulation test under controlled conditions confirmed the infectivity of the isolates towards their host plant (*M. sativa*). The twenty most efficient isolates were selected for physiological, biochemical and antagonistic tests. The isolated strains are distinguished by their tolerance to salinity ranging from 100 Mm to 1000 Mm, to pH ranging from 5 to 12 and to temperature extremes ranging from 10°C to 45°C. The utilization of the different carbon substrates by the isolates shows a very broad assimilation profile. The capacity of the strains to solubilize phosphorus is determined only by strain SW16, while two strains have the capacity to produce the equivalent of Indole Acetic Acid (SW9 and SW15). The isolated rhizobia were resistant to many of the antibiotics used. The search for inhibitions allowed to select two strongly inhibiting strains SW15 and SW16 and an indicator strain SW10 for the production of inhibiting substance (bacteriocin). Molecular identification by PCR amplification of the rDNA of strains SW15 and SW16 revealed their belonging to the genus *Ensifer*. After their concentration, these inhibiting substances express a bacteriostatic effect, as for their maximum activities against the strain SW10 is estimated at 1800 AU/ml for the strain SW16 and 2500 AU/ml for the strain SW15. Their production is linked to bacterial growth and follows a pattern of primary metabolite production. Both antimicrobial substances (fraction 1) are sensitive to proteases, thermostable, resistant to a wide pH range and insensitive to chemical agents. Their activities are higher in the culture supernatant, partially purified: 50000 AU/ml for the inhibitor substance SW15 and 3600 AU/ml for the inhibitor agent SW16. Their molecular weights indicate that strain SW15 has two bands of different molecular weights between 25 and 45 KDa, while strain SW16 shows a single band of about 24 KDa.

Keywords: Bacteriocin-Inhibition-Antimicrobial substance-Ensifer meliloti SW15-Ensifer meliloti SW16-Activity spectrum-Competition

IMPACT OF JUGLANS REGIA L LEAVES EXTRACT ON REGULATION OF DIABET IN RATS: HISTOPATHOLOGICAL APPROACH

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ABSTRACT

Diabetes is a long-lasting metabolic disorder that causes a several damages to the organism. Due to the related consequences, it was regarded as one of the major causes of mortality worldwide. The miraculous plant *Juglans regia* L., which belongs to the *Juglandaceae* family, is used in Algerian medicine for its many nutritional and bioactive components from which the leaves are used for the treatment of diabetes. The aim of this study is the investigation of the anti-diabetic activity of *J.regia* L. leaves aqueous extract by evaluating its effects on blood glucose, triglycerides levels and the histopathological scale of pancreatic tissue in alloxan-induced diabetic rats. *Juglans regia* L. leaves extract showed a potent presence of the main chemical classes (Alcaloids, flavonoids, tannins) responsibles for the biological activities. Furthermore, the extract exhibited a significant decrease in blood glucose as well as triglyceride levels which reacht a normal level 0.860 ± 0.14g/l 0.906 ± 0.49 g/l respectively at the end of the study. The pancreatic tissue showed that intraperitoneal injection of alloxan at the dose of 150 mg/kg resulted in total destruction of the β-cell of Langerhans' islets, however rats treated by the *J.regia* leaves extract showed a regeneration of the pancreatic tissue. Based on its strong antidiabetic activity, *Juglans regia* L. leaves extract appears to be a potential herb for the treatment of diabetes and can be further explored to be a natural alternative drug for the treatment of diabet-mellitus.

Keywords: Juglans regia L., bioactive compounds, diabet mellitus, *in vivo*

INVENTORY OF FORAGING INSECTS AND DETERMINATION OF THEIR POLLINATION EFFICIENCY

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ABSTRACT

The present work consists in determining the insect pollinators of the Pear tree Pyrus communis in Sétif region, estimates their density and measures their pollinating efficiency. For two years, observations were made on this fruit tree. Field trips were carried out in Ain Roua region (wilaya of Sétif) during the flowering period (March/April 2020) and in the region of Ain Messaoud (Wilaya de Sétif) (March/April 2021). A transect (300 m) was delimited within the orchard and divided into partial strips (rows of trees) at a rate of 10 trees visited. Two parameters were measured: the number of flowers visited per tree and the movements of the most abundant foragers between rows. The results showed that insects pollinators and foragers are mainly apoid hymenopterans, including the honeybee of which the honeybee Apis mellifera is the most abundant. Observations have shown that the presence of honeybees on Pear tree flowers between 11 a.m. and 1 p.m. and that 90% of visits were made to collect pollen. Regarding the effect of cross-pollination on plant yield, we found that the percentage of fruit that the percentage of fruit formed is significantly higher in the presence than in the absence of insects.

Keywords: Apoids, pollinators, pollination efficiency, yield, Pear

MEDICINAL PLANTS USED FOR THE TREATMENT OF COVID 19 IN EASTERN ALGERIA

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ABSTRACT

The present work is an ethnobotanical survey which aims to highlight the role of phytotherapy in the treatment of Covid-19 in the Algerian population, and to identify the different medicinal plants and products used, preventive or curative. by the Algerian population. The questionnaire affected about 1008 people over the age of 18. In terms of results, our work has enabled us to identify 12 botanical families, the most represented of which is the "Mytraceae" (33.5%). Although the use of natural therapeutic methods means underdevelopment and lack of culture. Nevertheless the results obtained show that the majority of the participants are university graduates and people with secondary education with 43.85% and 26.75% with a total of 70.60% of the total number of 1008 people. The leaf is the most used part with a frequency of 55%. The most used method of preparation is the decoction (43%). We also noted that the duration of treatment for the majority is 2 weeks (38%): the opinion of a health professional before taking plants is exceptionally requested by the population, thus neglecting all the potential risks. The majority of people questioned had recourse to herbal medicine before any conventional treatment by referring to the family circle or to general culture and the media. The most cited reasons are, rightly or wrongly, the safety and efficacy of plants compared to chemical drugs. This misconception is widespread in society on the total safety of plants is seen through their use in self-medication, almost without any medical advice, even in subjects with chronic diseases for which we have identified some potential interactions between their drug treatments and the plants associated with them.

Keywords: Corona Virus, herbal medicine, Mytraceae, risk and plants

EFFECTS OF THE PLANT-GROWTH-PROMOTING RHIZOBACTERIA (PGPRS) ON EXPRESSION OF SALT STRESS RELATED GENES IN TOMATO PLANTS UNDER DROUGHT STRESS CONDITIONS

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ABSTRACT

Climate change, hunger, and food insecurity are among the issues that the agriculture sector is dealing with today. During the critical stages of flowering and seed development, tomato plants are vulnerable to drought stress, and elevated carbon levels also result in yield losses. A decline in tomato productivity, an increase in disease, and a fall in fruit quality will all result from the drought. As a result, emerging biotechnological interventions should focus on enhancing plant yield and stress tolerance. The importance of *NAC* and *NHX* genes and the benefits of plant growth–promoting rhizobacteria (PGPR) in improving abiotic stress resistance is widely understood. The potential of a group of *SINAC* and *SINHX* genes in the control of drought stress tolerance in the presence of a bacterial strain (113-*Bacillusis megaterium*) in *Solanum lycopersicum* is the subject of the present study. In this study, the expression level of 46 *SINAC* genes and 4 *SINHX* genes was assessed using the real-time PCR technique. In general, in all the studied genes, *SINAC* and *SINHX* in both root and leaf tissues, expression increased at different levels and times of drought stress compared to the control sample. Also, the inoculation of *B. megaterium* in the leaf tissue has caused an increase in the relative expression of both genes compared to the control samples and also compared to the samples that were only exposed to drought stress. The results indicated that the transcript accumulation of mentioned genes has been regulated under different levels of drought stress. Once naturally tolerant candidate *SINAC* and *SINHX* genes have been discovered and the nature of their correlation with drought stress has been known, transgenic technology can be used to build inherent tolerance in future crops.

Keywords: NAC transcription factor, NHX family genes, real-time PCR, gene expression, tomato, drought stress

RETRO-PROSPECTIVE STUDY OF ACUTE DRUG POISONING IN WEST ALGERIA

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ABSTRACT

Drug poisoning is one of the most frequently encountered cases in emergency and intensive care units. According to data from the Poison Control Center of Algiers (Algeria), it may be voluntary poisoning, accidental poisoning or poisoning as a result of self-medication (causing overdose).The purpose of the retrospective study is to assess the extent and frequency of acute drug poisoning by blood or urine assay using the FPIA technique, based on the principle of polarization by immunofluorescence or the KIMS technique, based on the kinetic interaction of microparticles in solution, the variations of the light signal of which are measured in 30 poisoned patients admitted mainly to the level of medical and surgical emergencies as well as the medical services of the Regional Military University Hospital of Oran. Thus, this study aims to determine the epidemiological and clinical characteristics of acute drug poisoning in Oran in order to reduce the morbidity and mortality related to this problem. The results of this survey show that 80% of patients are poisoned by psychotropic drugs and 50% of patients are admitted to medical and surgical emergencies. Behavioral disorders and seizures are the most frequent clinical signs. Raising awareness by health professionals is more than necessary.

Keywords: Acute drug intoxication, Antipoison, FPIA, KIMS, Psychotropes

THE EFFECT OF THE BIOACTIVE COMPOUND 'RUTIN' ON LIPIDIC PROFILE IN ALUMINUM-INTOXICATED RATS

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ABSTRACT

Phenolic compounds, in particular “Rutin”, have demonstrated high bioactivity and possess a wide array of biological properties such as antioxidant, anti-inflammatory, and antimicrobial effects. It’s a glycoside of quercetin found in many plants, citrus fruits and vegetables. This study was conducted to investigate the beneficial effect of the bioactive compound (rutin) on the lipid profile in aluminum-induced hepatotoxicity. For our experiment, 18 female Wistar rats were divided into 3 groups: the first group served as the Control group, the second group was the Aluminum-intoxicated group, receiving intraperitoneal doses of 60mg/ml of AlCl3 (3 times a week for 45 days). However, animals in the third group received an intraperitoneal dose of aluminum at 60mg/kg and were simultaneously treated with oral administration (gavage) of rutin at a dose of 30mg/kg (5 times a week for a duration of 45 days). Exposure to aluminum chloride (AlCl3) for 6 weeks induced a highly significant increase ($p \leq 0.001$) in cholesterol (CT) and triglyceride (TG) levels in the rats of the group intoxicated with aluminum compared to the control group. While oral treatment with rutin has led to a decrease significantly ($p \leq 0.001$) the level of these parameters (CT and TG). Through this study, we can conclude that the bioactive compound “Rutin” possesses hepatoprotective activity by correcting the levels of biomarker parameters of the lipidic profile.

Keywords: Rutine, Aluminium, lipidic profile, hepatotoxicity, Rats

COMARATIVE STUDY OF THE EFFECT OF THE EXTRACT OF GARLIC AND THE CHEMICAL FUNGICIDE AZOXYSTROBIN ON HEPATIC ACTIVITY IN MALE WISTAR RAT

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ABSTRACT

The aim of this study is to compare the toxic effects of natural biofungicide extract from garlic Allium sativum and synthetic chemical fungicide, Azoxystrobin on hepatic function in male rats Wistar. After adaptation period, 40 rats were divided in 5 groups, 8 rats in each one. The control group (G1), the two groups G2, G3 were treated with garlic extract and the other groups G4 and G5 were treated with Azoxystrobin in the diet respectively at doses (1/15, 1/30) of the DL 50 of each product for 6 weeks of treatment. At the end of the treatment period, animals were sacrificed. The liver excised and weighed; the parameters of the liver activity were evaluated. The obtained results showed that the treatment with used chemical pesticide, Azoxystrobin caused a significant increase in the absolute weight of the liver as compared to the control. In addition, the enzymatic activities of ASAT, ALAT and phosphatase alkaline PAL were significantly increased specially in the groups treated with a significant decrease of Albumin concentration in rats which treated with Azoxystrobin as compared to the control group. Thus, we concluded that the fungicide Azoxystrobin under our used experimental conditions, is more toxic on the hepatic function then extract from garlic Allium sativum in the male rat *Wistar*.

Keywords: Allium sativum, Azoxystrobin, pesticides, liver parameters, liver, rats

DETECTION AND DIVERSITY OF HEPATITIS E VIRUS GENOTYPE 3 IN PATIENTS WITH ACUTE VIRAL HEPATITIS E FROM BULGARIA

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ABSTRACT

Introduction: Hepatitis E virus (HEV) is a single-stranded RNA virus that belongs to the species *Paslahepevirus balayani*, genus *Paslahepevirus*, family *Hepeviridae*. The species is subdivided into several genotypes, four of which are considered the most important for the human population (HEV1-4). While genotypes 1 and 2 are pathogenic only for humans, HEV3 and 4 circulate in different animal reservoirs and can infect humans. Zoonotic HEV genotypes are endemic in Europe as HEV3 is the most prevalent one. Hepatitis E virus genotype 3 is characterized by considerable diversity and has been classified into subtypes.
Aim: The aim of the present study is to determine the genotypes and sub-genotypes of HEV isolates from patients with AVH-E in Bulgaria
Materials and methods: During a 5-year period (2018-2022), 543 serum samples from patients with suspected AVH-E were tested for antibodies against HEV in the National Reference Laboratory for Hepatitis viruses at the National Center of Infectious and Parasitic Diseases, Bulgaria. The positive samples were subjected to quantitative real-time RT-PCR. Eight HEV RNA-positive samples with a viral load > 150 000 IU/ml were further sequenced following the Sanger method. The obtained sequences were analysed by online alignment search tools: NCBI Genbank and Hepatitis E Virus Genotyping Tool Version 0.1.
Results: All sequences found belong to the species *Paslahepevirus balayani*, HEV genotype 3. Four of the sequences (4/8; 50%) were assigned to the HEV3e subtype; one (1/8; 12.5%) to HEV3m; two to HEV3f (2/8; 25%) and one sequence (1/8; 12.5%) was outside of all lastly updated HEV-3 subtypes.
Conclusion: HEV genotype 3 is the main causative agent of AVH-E in Bulgaria with the main prevalence of the HEV 3e subtype.

Keywords: Hepatitis E virus, AVH, subtype

THE ANTIOXIDANT ACTION OF TURMERIC (CURCUMA LONGA) AGAINST CADMIUM-INDUCED OXIDATIVE STRESS IN RATS

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ABSTRACT

Cadmium (Cd) is a toxic heavy metal that can induce serious health problems in humans and is possibly implicated in several human diseases related to oxidative stress. This study was designed to evaluate the antioxidant action of turmeric (*Curcuma longa*) against cadmium-induced oxidative stress in the rat. Forty male *Albino wistar* rats were divided into four groups. They underwent oral treatment for 30 days with cadmium chloride (CdCl2) and/or a diet containing 2% turmeric. Group (0-0) served as a control and received a normal diet; group (0-C) received an experimental diet with 2% turmeric; the group (Cd-0) received an oral dose of cadmium (5 mg/kg) with a normal diet; the (Cd-C) group received an oral dose of cadmium (5 mg/kg) with an experimental diet containing 5% turmeric. Cadmium has a pro-oxidant effect expressed by a significant decrease ($p \leq 0.001$) in the level of tissue GSH, the enzymatic activity of GPx in both hepatic and renal tissues. This pro-oxidant action was also shown by a significant increase ($p \leq 0.001$) in the enzymatic activity of GST in these two organs. The addition of turmeric in the food of the rats revealed a reduction in the toxic effect of cadmium by improving all the oxidative stress markers studied compared to controls. These results suggest that turmeric has a powerful antioxidant activity which can attenuate the intensity of oxidative stress induced by cadmium.

Keywords: Toxicity, Oxidative stress, Cadmium chloride, Curcuma longa, Oxidative stress markers, Rats

SOYBEAN AND FLAX GROWN IN THE CHORNOBYL EXCLUSION ZONE PRODUCE FERTILE SEEDS THAT HAVE AN INCREASED PRION-LIKE PROTEIN AND AMYLOID CONTENT

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ABSTRACT

Introduction and purpose*:* As known, chronic ionizing radiation in Chornobyl Exclusion Zone is a genotoxic anthropogenic stressor. It can cause heritable changes in the plant genomes, which could be either adaptive or detrimental. There is still considerable uncertainty about the effects of chronic low-intensity doses since earlier studies reported sometimes contradictory conclusions. Our recent studies reveal that under the influence of severe stress factors, plant cells synthesize additional prion-like proteins, which could start the process of amyloidogenesis (D. Gábrišová et al., 2016). Our investigation aims to shed light on the increased synthesis of prion-like proteins and amyloids in plant tissues under the influence of chronic ionizing radiation in the Chornobyl Exclusion Zone. Our project was focused on seed recovery from the multiyear chronic ionizing radiation stress. Soybean (Glycine max) and flax (Linum usitatissimum L.) were grown in field plots located at the Chornobyl exclusion zone for several generations. We profiled the proteome of mature seeds by two-dimensional gel electrophoresis. A summary of comparative proteomic studies on soybean and flax seeds harvested from radio-contaminated Chornobyl areas during several successive generations was presented in our previous publication (N. Rashydov et al., 2015). A lot of differentially abundant protein spots were identified in the radionuclide-contaminated field (Chystogalovka village) in several generations. Those proteins primarily belong to storage proteins, disease/defense, and metabolism categories. Data suggested that during multigenerational growth in a contaminated environment, detrimental heritable changes were accumulated. Chlorophyll fluorescence parameters were measured in the late vegetative stage, pointing to partial recovery of photosynthesis from stress imposed by contaminating radionuclides. A plausible explanation for the observed phenomena is insufficient provisioning of seeds by lower quality resources due to harmful radiation influence, causing a persistent effect in the offspring generation. A protein-activated expression that influences the synthesis and packing of proteins (calreticulin and other chaperones), as well as redirection of the primary metabolism through multifunctional glycolytic enzymes for the synthesis of glycine betaine, phytochelatins, and dehydrins, are universal reactions (http://www.chernobylproteomics.sav.sk). The analysis of the ATR-FTIR spectrograms of soybean and flax seeds powder shows that in 3d, 5th, and 8th generations of growing on a radiation-contaminated area, the amount of β-conformational proteins (cupin super-family, conglycinin, glycinin, valosin-containing proteins, etc.) gradually increased. These proteins are characterized as prion-like amyloidogenic. We interpret this fact as a manifestation of plant radioadaptation, stimulating the activity of genes involved in the initial stage of the

storage proteins synthesis, which is revealed by several morphometric, genetic, and biochemical parameters of plant productivity and yield.

Acknowledgment. This work was supported by the project the National Research Foundation of Ukraine 2020.02/0316.

Keywords: soybean, flax, prion-like proteins, proteome, Chornobyl zone

INVESTIGATION OF CYTOTOXICITY AND ANTIVIRAL ACTIVITY OF *ELAEAGNUS UMBELLATA* METHANOL EXTRACT

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ABSTRACT

Elaeagnus umbellata (also referred to as Autumn Olive) exhibits high medicinal value because of the phytochemicals it includes. Studies have revealed that it has antibacterial, antiproliferative, antioxidant, and phytotoxic effects. In current study, it was aimed to investigate cytotoxicity and antiviral activity of *Elaeagnus umbellata* extract prepared by %70 methanol. The cytotoxic effect of methanol extract prepared from the *Elaeagnus umbellata* on Vero, A549, and MDA-MB-231 cell lines was investigated by MTT method. Cells were treated with 3.12-400 µg/mL concentrations of the extract. Three wells were used for each concentration. It was observed that the extract had a slight cytotoxic effect on Vero cells at concentrations of 100 µg/mL and above, but had no effect on A549 and MDA-MB-231 cells. The antiviral effect of the extract on HSV-1 was investigated by MTT method. After Vero cells were infected with virus at a concentration of 1 $TCID_{50}$, extract was added to wells. Three wells were used for each concentration. 12.5-50 µg/mL concentrations of the extract that did not affect Vero cells were included in the study. Acyclovir was used as a positive control, and wells containing virus-infected cells were used as negative control. It was observed that the extract did not have antiviral activity. It was determined that *Elaeagnus umbellata* methanol extract had no significant cytotoxic effect against the cells participating in the study and no antiviral activity against HSV-1. The potential of the plant in developing anticancer and antiviral products was thought to be low.

Key words: Cytotoxicity, HSV-1, MTT.

MONKEYPOX VIRUS DETECTION - LABORATORY DIAGNOSTIC APPROACH

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ABSTRACT

Human monkeypox virus (MPOX) is a doublestranded DNA virus of the Orthopoxvirus (OPXV) genus of the Poxviridae family. Since May 2022, an outbreak of MPOX has been registered in non-endemic countries, including Europe and the United States.
The study **aimed** to optimize the protocols for MPOX detection, included differential diagnostic aproach to laboratory study of all possible cases of MPOX and OPXV in Bulgaria.
Material and Methods: In the study were included the total 81 clinical materials from 20 patients with possible MPOX infections. The tested clinical materials were: samples of vesicle contents, pustules, nasal swabs, urine and ejaculate and were taken in the first days of onset of clinical symptoms. Molecular genetic methods to detection of G2R (TNF receptor gene) region of the MPXV genome and rpo18 gene of the OPXV genome were used.
Results: From the total 81 tested in 20 clinical materials were both proven MPOX and OPXV DNA - 6 vesicle contents, 4 pustules, 6 nasal swabs, 2 urine and 2 ejaculates, respectively. The MPOX and OPXV DNA were demonstrated in at least two different clinical specimens from each patient. The infected were men who have sex with men between 29 and 44 years of age.
Conclusion: The unusually rapid human-to-human transmission of the virus and an exponential increase in the number of infected since May 2022, classify MPXV as a pathogen of "global health concern". The laboratory and epidemiological surveillance of cases is critical to contain the outbreak and to knowing the new fast transmission of virus.
Acknowledgments: The study was financed by the National Science Fund, research project: " Monkeypox in Bulgaria – clinical manifestation, transmission, virological and molecular genetic analysis" (Contract No. КП-06-Н63/13 dated 03.07.2023).

Keywords: monkeypox, orthopoxvirus, RT-PCR

MUMPS VIRUS DETECTION AND MOLECULAR EPIDEMIOLOGY IN BULGARIA

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ABSTRACT

Mumps is a vaccine-preventable disease caused by an RNA virus (MuV) of the family Paramyxoviridae. The clinical manifestations and aetiological laboratory confirmation of MuV infection is necessary in medical practice. The study aimed to detection of MuV circulated in Bulgaria by RT-PCR assay. Material and Methods: The total 102 oral fuides from patients with possible MuV infection were tested. Molecular methods with a target amplifying the highly variable small hydrophobic (SH) gene of the MV genome by a real time RT-PCR were used. Sequencing and phylogenetic analysis was performed using software programs - SeqScape v2.7, BioEdit v7.1 and MEGA v. 11. Results: In 55 (54%) positive MuV SH signals were found. The tested samples were positive from Ct 25 to Ct34. The infected are mainly children aged 5 to 9 years (39/55, 71%). The resulting parotitis symptoms were quickly resolved and the outcome of the disease was good. Sequence analysis shows a dominant circulating mumps genotype G in Bulgaria. Conclusions: The RT-PCR assay is sensitive and specific. In addition, it is significantly less expensive and labor-intensive, making it ideal for mumps diagnosis. Since mumps outbreaks have been documented worldwide, the real time RT-PCR validated can be used for monitoring of infection. Acknowledgment: This work was funded by the European Fund for Regional Development through Operational Program Science and Education for Smart Growth 2014 - 2020, Grant BG05M2OP001-1.002-0001-C04 “Fundamental Translational and Clinical Investigations on Infections and Immunity”.

Keywords: mumps virus, RT-PCR, RNA

IN VITRO STUDY ABOUT STIMULATING EFFECT OF THE CUPRESSUS SEMPERVIRENS MAJOR ALLERGEN (CUP S1) ON BRONCHIAL EPITHELIAL CELLS (BEAS -2B)

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ABSTRACT

Allergic diseases have a central place in chronic pathologies. For over 20 years, their frequency has been increasing. Allergies to pollen, at present, are a major public health problem because of pollen diversity. However, all the pollens are not allergenic, their nature and quantity vary significantly depending on the region and climatic conditions. *Cupressus sempervirens* is one of the most widespread species in Algeria with very high allergenic capacity. The aim of this work is to evaluate the stimulatory effect of the major allergen of this species. The present study was carried out on human bronchial epithelial cells (BEAS-2B) transformed by an adenovirus 12 SV40 hybrid. In this context we are interested in the stimulation, in vitro, of those cells by different doses of the major allergen Cup s1 to test the viability and the release of IL-8 and IL-6. After a series of culture, the cells were exposed for 24 hours at a concentration of 0.02µg/µl, 0.06µg/µl, 0.1 µg/µl, 0.3 µg/µl and 0.9µg/µl of allergen Cup s1. The viability was assessed by the MTS assay and the assay of cytokine was carried out in the supernatant using the technology Luminex100. The MTS test showed that cells exposed to different doses were all viable. The release of IL-8 by the cells exposed to different concentrations of Cup s1 showed a highly significant increase with cells exposed to 0.1 µg/µl, 0.3µg/µl and 0.9µg/µl of the major allergen. However, cell culture with 0.1 µg/µl, 0.3 µg/µl and 0.9µg/µl stimulated significant release of IL-6. Our experiments showed that the allergen Cup s1 represents no risk vitality of the cells and had the potential to stimulate the release of IL-8 and IL-6 in a dose-dependent manner.

Keywords: Allergy, Pollen, Cupressus sempervirens, BEAS-2B, IL-8, IL-6

MODELLING RISK IN SMALL FARMING

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ABSTRACT

This study focuses on predicting the financial distress of farms in the Iberian Peninsula, with a particular emphasis on small-scale agriculture, which constitutes most of the agricultural business sector. The sample consists of 9,891 firms. Six logistic regression models are estimated based on subsamples of firms with different economic sizes, using the insolvency and interest coverage ratios to determine financial health. The accuracy of the models is evaluated using ROC curves, and all models demonstrate excellent predictive and separation capabilities, making them valuable tools for predicting the financial health of agricultural firms. The study also identifies a significant association between financial distress and firm size, with a higher proportion of smaller firms experiencing financial difficulties than larger firms. Furthermore, the study shows that firm size, as measured by assets, is only statistically significant when analyzing the full sample of firms. However, when categorizing the size of firms by revenues, the variable size measured by assets loses significance. These results highlight the importance of considering firm size as a covariate in models that rely on full samples, although its significance is neglected in models that subsample across different firm size classes.

Keywords: agriculture, farm size, financial distress, prediction models, small farming

CAMEL BREEDING SYSTEMS IN ALGERIA: IMPACT OF ECOLOGICAL AND SOCIO-CULTURAL CHANGES ON LOCAL FARMERS

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ABSTRACT

Algerian camel breeding plays an economic, social and cultural role and is part of the development of a policy in the animal production in the country. Dromedary represents an invaluable animal resource for the local population; it is a source of noble proteins found in milk and meat. The total number of camels tripled in 20 years reaching 416,519 head in 2019. This work is a study of the camel field, the first part concerns the breeding practices: type of breeding, size, structure and breeds of the herd. The second part concerns the milk productivity and finally the last part will deal with the difficulties encountered by the breeders in the Algerian south and the impact of climatic and socio-cultural changes on the breeders. The results obtained show the predominance of semi-nomadic livestock in the wilaya of Ghardaïa (65, 95%), nomadic livestock is almost non-existent (2.12%). On the opposit, in the wilaya of Tamanrasset nomadic livestock and semi-nomadic livestock 43%are in prodominance with 43.1% each, while sedentary livestock represents 13.8% only.The livestock system is mostly a free system. Half of the breeders have herds with less than 50 heads. The camel breeders are also breeders of goats and sheep. The Chaambi breed in Ghardaïa and the Targui breed in Tamanrasset are predominant. The milk productivity is quite low (2 to 6l/milking), with very little surplus milk production. This surplus is essentially used for self-consumption either in the form of milk, fermented milk or transformed into traditional cheese (Takammart). Different problems are reported by farmers; especially those related to animal feeding. Indeed, the prolonged drought of recent decades had not allowed the regeneration of pastures. Moreover, no governmental aids had taken over pastoral administration. The insufficient sanitary coverage and the lack of veterinarians specialized in camel pathology are also recurring problems in the region. The production of camel meat and milk remains insufficient especially with the development of an increased demand for these products. Milk and meat are the pillar of sustainable development of the region and nomadic populations.

Keywords: Camel breeding in Algeria, Climate and socio-cultural changes, milk and meat production

EXAMINATION OF ENTREPRENEURSHIP TENDENCIES AND BRAIN DOMINANCE OF AGRICULTURAL ASSOCIATE DEGREE STUDENTS

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ABSTRACT

Entrepreneurial tendencies are the willingness or ability of a person to have entrepreneurial characteristics such as generating innovative ideas, taking risks, managing resources, starting and developing a business. Ned Herrmann claims that within the framework of holistic brain technology, brain hemispheres differ in the distribution of occupations. The left brain has the ability to perform sequential tasks more effectively, while the right brain has the capacity to multitask simultaneously. Therefore, promoting entrepreneurship and evaluating the dominant hemisphere through brain dominance analysis is of great importance for Turkey and other developing countries. The aim of this research is to examine the relationship between entrepreneurial tendencies and brain dominance of students studying at Bursa Uludağ University Technical Sciences Vocational School Agriculture departments. In this direction, it is aimed to reveal the relationship between the entrepreneurial characteristics of the students and the dominant side in their brains by using the questionnaire technique, which is one of the quantitative research methods. 79 students studying in Meat, Dairy, Food Technologies, Agricultural Machinery and Parks and Gardens programs participated in the research. The survey consists of three parts. In the first part, there are 6 questions about the gender, career goals and entrepreneurial background of the participants. In the second part, there is the "University Students Entrepreneurship Scale", which was developed by Yılmaz and Sünbül (2009) and consists of 36 questions. For the third part of the questionnaire, the 14-question "Hermann Brain Dominance Analysis Form" developed by Ned Herrmann and translated into Turkish by Interconsult Management Consulting Firm was used. The 50 questions in the second and third sections of the questionnaire are answered on a 5-point Likert scale as "Strongly Disagree", "Disagree", "Undecided", "Agree" and "Strongly Agree". This scale aims to evaluate participants' thoughts and brain dominance profiles. According to the results of this research, it has been observed that there is a significant relationship between the entrepreneurial background of the students studying in agriculture departments and both their entrepreneurial tendencies and brain functions, but there is no significant difference according to their career goals. However, it was concluded that the entrepreneurial tendencies of the students differ according to gender. It has been observed that there is a high positive correlation between entrepreneurial tendencies and right and left brain functions. At the same time, it has been determined that the relationship between entrepreneurial tendencies and right and left brain functions has a similar effect.

Keywords: entrepreneurship, entrepreneurial tendencies, brain dominance analysis

ECONOMIC ANALYSIS OF 340 W SOLAR BASED DRIP IRRIGATION SYSTEM AND COMPARISON WITH ITS GASOLINE-BASED EQUIVALENT IN TURKIYE

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ABSTRACT

Nowadays, with a growing environmental pollution and an increasing energy demand, it demonstrates that energy is one of the most fundamental factors in defining the level of development of countries. Particularly, over the course of the pandemic period, energy needs in every aspect of daily life and the escalating in the usage of technological tools have once again shown the significance of energy resources and the process of energy generation. Accordingly, the use of alternative energy resources in the generation of electricity is swiftly increasing in the world. Generally, the most known and preferred renewable energy resources are hydropower, wind and solar but also biomass, geothermal, hydrogen and wave are other renewable energy resources. Solar energy, one of the recognized renewable energy resources, has a significant position in the generation of electricity worldwide. Türkiye is situated at the sunny belt of the world and is located between the 36th and 42nd northern parallels and the 26th and 45th east meridians. Hence, Türkiye has a high solar energy potential. Solar energy systems are consistently finding various application areas and a solar based agricultural irrigation is one of them. Water pumping systems are ordinarily affiliated to conventional electricity, gasoline generated electricity or gasoline-based engines. Solar water pumping systems are to reduce the use of fossil fuel-based electrical energy and consumption of fossil fuel. The usage of a gasoline-based water pumping systems requires not only costly fuels, but also create environmental negative impact such as rumble and atmospheric pollution. The gasoline-based water pumping system is more expensive than the solar water pumping system since has additional costs such as operating and maintenance costs apart from the cost of installation. Eco-friendly solar water pumping systems need less maintenance cost without fuel cost. This sustainable photovoltaic (PV) technology is similar to different conventional water pumping systems except that the source of power is solar energy. An incident solar radiation and the size of PV array determine the flow rate of pumped water. Solar water pumping systems gains significance lately on the score of unavailableness of electricity and increase in gasoline prices. An appropriately intended solar water pumping system concludes notable long-term cost savings as compared to conventional water pumping systems. In this study, the installation of 340 W off-grid solar system required to meet the energy requirement of 12 Volt DC submersible water pump used in the drip irrigating almost 3 acres of agricultural estate where irrigation was previously done with the gasoline-based pump located at Ezine, Çanakkale is performed. Solar irrigation system that was installed in April 2022, was used until November 2022. During this period, the operating time of the solar irrigation system was daily recorded. Also, the fuel cost was calculated with considering the daily gasoline prices as if the gasoline-based irrigation system was used. As a result of this study, the solar irrigation system amortized the installation cost within the mentioned period. In addition, the data obtained from this study and considering the lifetime of solar systems are observed that the specified off-grid solar drip irrigation system is an efficient, eco-friendly, and economical irrigation method rather than the gasoline-based irrigation system. Thus, the

proposed solar irrigation system will constantly support the development of the agricultural sector.

Keywords: Agricultural irrigation, Economic analysis, Off-grid solar system, Renewable energy, Photovoltaic system

THERAPEUTIC BENEFITS OF ALGERIAN PROPOLIS

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ABSTRACT

Apitherapy is one of the fastest growing areas of interest by using honey bee hive products such as beeswax, honey, pollen, propolis, royal jelly and venom. In recent years, medical problems such as pathogen resistance to antibiotics have caused a renewed interest in the medicinal use of hive products allowing them to take their place among the modern armoury of drugs. The aims of this study were to evaluate the antimicrobial and the anti-free radical activities, and to determine the phenolic compound contents of ethanolic extract of propolis (EEP) obtained by the ultrasound-assisted extraction method. In vitro inhibitory activity of propolis was investigated by the disc diffusion method against gram positive and gram negative bacteria and the anti free radical activity was assessed colorimetrically using the DPPH test. Total polyphenols and flavonoids were determined spectrophotometrically using colorimetric method. Results showed that all tested bacteria were susceptible to propolis and the EEP exhibited significant free radical scavenging activity, with an IC50 value closer to the control value. A positive correlation between antibacterial activity, free radical scavenging activity and phenolic compound content was observed, showing that polyphenol and total flavonoid content are involved in this activity. Due to increasing development of resistance by microorganisms, this natural product is a good alternative source of antimicrobial agents. These data will contribute to the growing knowledge concerning propolis and conservation measures will be needed to prevent the loss of the native honey bees and to preserve their hive products.

Keywords: Honey bees, Propolis, Antimicrobial activity, Polyphenols, Flavonoids

FARMERS WHO ARE PARTNERS IN THE AGRICULTURAL IRRIGATION COOPERATIVE IN ANTALYA PROVINCE REVIEW OF IRRIGATION PRACTICES

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ABSTRACT

In arid countries, irrigation is the most important factor in increasing productivity in agriculture. In these countries, the construction of an irrigation facility involving a single enterprise (drilling a well, installing a water pump or motor) can be done by a private firm or a multi-purpose cooperative. In this case, the job of the firm or the cooperative ends after the facility is completed and the cost is paid. If the irrigation facility requires that many farmers benefit from the same water source (river, pond, canal, artesian, well, etc.), then there is a need to establish an irrigation cooperative in order to regulate both the amount of water each farmer will use and the order of water intake. If these issues are not regulated through cooperatives, it will lead to constant and inexhaustible fights, especially in arid countries where water is scarce and vital. Cooperative is the gathering of economic forces of individuals by means of solidarity in order to do the things that they cannot do alone or that are beneficial for them to do together, in the best way and at a cost price. In this study, it is aimed to reveal the practices and thoughts of the farmers who are partners in the agricultural irrigation cooperative. In the study, a questionnaire was applied to the farmers in order to determine the common cooperative relations in terms of irrigation management and the data obtained were evaluated in the SPSS package program. The number of partners to be surveyed was determined by using the current information in the irrigation cooperatives in the research area. In the research, a questionnaire was applied to 61 farmers who are partners in the agricultural irrigation cooperative; 43% of this is made up of the farmers in Dosemealti and 57% in Korkuteli district. The survey application was carried out in December 2021. The data obtained from the survey application are summarized in the charts as scale, ratio and percentage values.

Keywords: Cooperative, Irrigation, Soil analysis, Antalya

INPUT USE AND TECHNICAL EFFICIENCY ANALYSIS IN RICE PRODUCTION IN TURKEY: CASE OF EDIRNE PROVINCE

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ABSTRACT

In this study, input use in rice cultivation in Edirne province, which is located in the Thrace Region and where rice production is intensive, was determined and technical efficiency analysis was carried out for input use. In the study, a face-to-face survey was conducted with 52 producers in Edirne province and the data belong to the production period of 2021. In the analysis of the data, firstly the socio-economic characteristics of the enterprises were examined, then the input use in rice production was determined and input use efficiency in rice production was determined by Data Envelopment Analysis (DEA). Since producers tend to control their inputs rather than outputs, input-oriented efficiency measures were used in this study. In the study, rice yield per decare (kg) was considered as output and seed amount (kg), nitrogen amount (kg), phosphorus amount (kg), pesticide cost (TL), fuel amount (l), water cost (TL) and other costs (TL) were considered as basic inputs. It was determined that an average enterprise obtained a yield of 727.12 kg da-1 from rice production activity, used 21.27 kg da-1 seed, 24 kg da-1 nitrogen, 5.73 kg da-1 phosphorus, 24.33 l da-1 fuel, 160.05 TL da-1 pesticide, 473.87 TL da-1 water and 440.38 TL da-1 other expenses. The coefficient of technical efficiency (pure technical efficiency) with variable returns to scale varied between 0.589 and 1, and the average was found as 0.908. This value shows that inefficient enterprises can reduce their inputs by 9.2% without a decrease in outputs. It was determined that 41.67% of the enterprises had a value lower than the calculated average technical efficiency. It was determined that 46.15% of the enterprises were technically fully efficient. In addition, 7.69% of the enterprises were found to be efficient, 3.85% were found to be less efficient and 42.31% were found to be technically inefficient. With constant returns to scale, technical efficiency coefficient was found as 0.833 and scale efficiency was found as 0.912. Scale efficiency shows whether the enterprises are at the optimal scale. It was determined that 30.77% of the enterprises had a value lower than the calculated average scale efficiency value. It was determined that 34.62% of the enterprises had constant returns to scale, 59.62% had increasing returns to scale and 5.77% had decreasing returns to scale. In the research area, it was observed that farmers generally used fertilizers and pesticides according to their own experiences. In addition to the amount of input used in fertilizer and pesticide applications, factors such as application time and application method are also very important. It is thought that some problems may have been encountered in the application of inputs when different amounts of products are obtained with the same inputs, and extension organizations can be effective in reducing such waste in input use.

Keywords: Data Envelopment Analysis, Efficiency, Input Use, Rice

SCENARIOS FOR THE DEVELOPMENT OF AGRICULTURE AND RURAL AREAS IN BULGARIA THROUGH THE CONTEXT OF THE GREEN DEAL

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ABSTRACT

The challenges facing the development of agriculture and rural areas in Bulgaria during the CAP program period 2023-2027 are related to the renewal of production potential and the modernization of activities to improve competitiveness, added value, and well-being in rural areas. The enhanced environmental requirements laid down in the new CAP resulting from the "Green Deal" and the "Farm to Fork" strategy define the need to accelerate the pace of modernization of farm operations and improve the viability of rural areas. Closer linking of the Green Deal targets with economic, social, and environmental goals, as well as the mechanisms to achieve them, will define the future of the industry and rural areas in the coming decades. The purpose of this study is to forecast the main trends in the development of agriculture and rural areas in Bulgaria until 2027 in the context of the Green Deal. A linear scenario model is applied and the sensitivity of selected indicators is identified under certain assumptions in the independent variables. In crop production and specifically in the viticulture sector, efforts to close the production cycle must continue, while at the same time working in the direction of the possibilities for the realization of the final product - wine, increasing its competitiveness and using the potential of diversifying activities, such as wine tourism. The scenario approach is widely used in assessing the impact of climate changes on the future development of the viticulture sector in Bulgaria. According to the proposed scenarios for the selected indicators in rural areas, it can be assumed that the negative trend of depopulation in rural areas will continue, but at a slower pace than before, without a sharp deterioration in demographic indicators.

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Keywords: scenario approach, agriculture, rural areas, Green Deal, Bulgaria

THE EFFECT OF GEOTHERMALS ON FARMERS PREFERENCE FOR ALTERNATIVE CROPS

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ABSTRACT

The use of geothermal energy sources in agricultural production areas, in addition to providing the temperature required by the plant, allows production to be carried out uninterruptedly throughout the year, except for extremely hot periods. Geothermal resources are important in terms of agricultural production as well as other areas of use and some of the benefits they provide. The use of geothermal energy in agricultural production and greenhouse heating allows producers to produce continuously. The aim of this study is to investigate the effect of geothermal energy resources on farmers' alternative crop preference in Aydin province. The data of the study consist of survey data obtained from the owners of agricultural enterprises in Germencik county of Aydin province. Statistical analyses were used to determine the effect of geothermal in the region on farmers' alternative product preference. According to the data obtained as a result of statistical analysis, the majority of the producers in the region stated that they want to produce alternative products with high added value, but they do not want to utilize geothermal energy resources too much for agricultural production. The reason why the majority of producers do not want to utilize geothermal energy sources is that geothermal energy sources dry the trees of certain crops such as figs and olives and pollute the environment. Approximately 60% of the producers stated that the establishment of geothermal power plants in the region directed producers to alternative products. 76.7% of the producers stated that they would like to receive support from the government or municipality to produce alternative products. Supporting and encouraging producers to produce alternative products with natural and clean energy sources by policy makers, sectoral organizations and universities can make positive contributions to sustainable agriculture.

Keywords: Energy of Geothermal, Alternative Product, Agricultural Production, Aydin Province

THE IMPACT OF GEOTHERMAL ON LAND PRICES IN THE REGION

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ABSTRACT

Geothermal energy resources have positive effects on land purchase and sale criteria and agricultural land prices. The aim of this research is to investigate the effects of geothermal energy on land prices in Germencik county of Aydın province. The data of the research consist of face-to-face survey data obtained from producers who continue their agricultural activities in the region subject to the study. Descriptive statistical analyses were used to analyse the data obtained in accordance with the purpose of the study. According to the findings obtained as a result of the analysis of the data, more than 50% of the farmers stated that they have agricultural lands close to geothermal resources and that geothermal resources positively affect the economy in the region. 85% of the farmers stated that the economic value of the lands close to geothermal energy sources is high and that these agricultural lands are very valuable. The majority of the producers in the region subject to the research stated that geothermal energy plants affect the prices of fruit, vegetable, field and vineyard lands, facilitate irrigation in agriculture and increase productivity in agriculture. As a result; it was determined that geothermal energy resources have positive effects on agricultural land prices. While the decrease in energy costs increases the profitability of agricultural activities, it increases the potential of agriculture with special applications.

Keywords: Geothermal, Land Prices, Agriculture

ASSESSING THE TRANSFORMATIVE IMPACT OF NUCLEUS ALBANIA'S INNOVATIVE APPROACH IN THE AGRICULTURAL SECTOR: A SURVEY BASED ANALYSIS

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ABSTRACT

The objective of this research is to assesses the impact of Nucleus Albania's innovative approach in the agricultural sector. Nucleus Albania, an organisation at the forefront of innovation, provides collaborative platforms and introduces the nucleus approach to support the growth of agricultural businesses and foster sustainability in the sector. For an accurate assessment, a mixed-methods research design is employed, primarily relying on survey data collected through a structured questionnaire administered to participants across all nuclei (all participants have been part of the survey in two consecutive years). Literature review, secondary data analysis and the data collected from participants within the nuclei provide a comprehensive overview and information to assess the impact of the NA innovative approach on agricultural business development, production, diversified product supply, access to finance, investments, employment, and overall business performance. Finding suggest for an overall positive impact of the NA innovative approach in various aspects of the agricultural businesses. By harnessing the power of collaboration, businesses experience accelerated growth and heightened productivity, propelling them towards sustainable development. The nucleus approach has proven instrumental in fostering a culture of innovation and knowledge-sharing, empowering farmers, and agribusiness owners to adopt state-of-the-art practices and advanced techniques, thereby significantly contributing to overall sectoral development. This validation highlights the approach's robustness and effectiveness in addressing the sector's challenges, thereby offering valuable insights for stakeholders, policymakers, and other organizations seeking to foster sustainable growth in agriculture.

Keywords: agriculture, nuclei approach, innovation, business models, Albania

CONTRACT FARMING IN BUCKWHEAT CULTIVATION

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ABSTRACT

Characteristically, contract farming is a deal between a producer and a buyer regarding cultivation of an agricultural product. In reality, terms and conditions of these contracts can alter dramatically. It can refer to those arrangements involving public firms, government organisations or NGOs and can also refer to private schemes. In this study, we only focus on contract farming on arrangements between farmers and private actors. In recent years, buckwheat has gained increasing notice as a promising functional food, owing to its several human health issues and lack of gluten. This paper examines buckwheat farmer's involvement in contract farming in counties of Gümüşhane province which is in the northeast of Turkey. An empirical analysis of the contract farming regarding the buckwheat farmers and postharvest practice has been provided. The survey was conducted in Kelkit, Köse and Şiran counties as only production places of the buckwheat in the province. Data collected from 30 farmers who are engaged in contract farming model. According to data, issues of the contract farming, marketing channels of the buckwheat and perspectives of the farmers for the buckwheat production with contract farming are addressed. The findings of this study reveal that the contract farming model, mostly eliminates the marketing-related concerns of the farmers in the region. The fact that the buckwheat farmers strongly agree with the proposals such as the contract buyer compliance with the commitments to purchase the entire product, the market guarantee, the buyer's compliance with the contract terms, the buyer's purchase of the buckwheat at the agreed price and the buyer's timely payment proves this. As a result we could say that contracting could also improve access to related market.

Keywords: Buckwheat, contract farming, buckwheat farmers, Gümüşhane

A GENERAL EVALUATION ON THE MARKET PRICE EFFECT OF GEO-LABELLED PRODUCTS IN TURKEY

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ABSTRACT

Geographical indications (GIs) received by public authorities or NGOs are important tools used to create added value for local values and increase their trade. The GI labelled product market in the world has reached 200 billion dollars annually. The largest share in this market is the European Union (EU) countries, and 17% of the union's food exports consist of GI labelled products. Although there is a wide variety of local products in Turkey, GI registered local values are brought into the economy has been later. The total number of patents registered by the Turkish Patent and Trademark Office in Turkey in 2023 has reached 1341. Initiatives made through e-commerce, which is the marketing channel with the highest growth, in order to increase the competition in the market and the commercial volume of GI registered local products indicate that this market will grow even more in Turkey. In this study, bakery and pastry products, processed or unprocessed fruits and vegetables and cheese groups, which are registered with GI in Turkey, are discussed. After the GI registration of these products, the price effects in the market were examined and evaluations were made.

Keywords: Geographical Indication, price, local products, Türkiye

ANALYSIS OF THE STRUCTURES AND MANAGER'S PROFILES OF AGRICULTURAL DEVELOPMENT COOPERATIVES IN ÇANAKAKLE

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ABSTRACT

Cooperatives are essential tools in providing rural development. The role of cooperatives is also essential in strengthening the agricultural sector. The characteristics of the cooperative manager are effective in the success of a cooperative. On the other hand, the structure of the cooperatives is essential. This study was carried out specifically for agricultural development cooperatives in the province of Çanakkale. The institutional structures of the cooperatives in the area were examined. In addition, the socio-economic characteristics of cooperative managers and the problems of cooperatives were investigated. According to the results, cooperatives have been operating for an average of 28 years. The average number of members of the cooperatives was determined as 91. 15.54% of the cooperatives have businesses, and 43.6% have financial difficulties. Cooperative managers are, on average, 49 years old, and their management experience is an average of 10 years. 78.1% of the managers attend meetings related to agriculture, and only 54.5% of them have received training on cooperatives.

Keywords: Agricultural development cooperatives, Manager, Cooperative assets

ANALYSIS OF THE LIVESTOCK FARM'S STRUCTURE AND THE PROFILE OF FARMERS IN ÇANAKKALE

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ABSTRACT

The agricultural sector consists of plant and animal production sectors. Each sector of production has its unique structure and problems. Animal production is an essential sub-sector of agriculture, considering its contribution to human nutrition, supply of raw materials to industry, and employment. First, in identifying the sector's problems, the analysis of the current situation is essential. This study aims to reveal the structure of enterprises and farmers engaged in livestock activities in Çanakkale. For this purpose, a survey study was conducted with 146 farmers in Örtülüce village, which is the village with the highest number of livestock farms in Çanakkale. According to the results, the average age of the farmers is 44 years. 49.3% of the farmers are primary school graduates. Farmers have an average of 24 years of agricultural experience. The average land size of the farms is 63.6 decare. The average number of cattle in the farms is 19 heads. According to this, it can be said that the farms in the village where animal husbandry is most intense in the province of Çanakkale are medium-sized.

Keywords: Farmer, livestock, farm structure, socioeconomic characteristics

DETERMINING THE APPROACH AND EXPECTATIONS ACCORDING TO THE PROFILE OF OPERATORS IN RURAL DEVELOPMENT SUPPORT: THE EXAMPLE OF THE WEST MEDITERRANEAN

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ABSTRACT

The phenomenon of development is the common goal of both developed and developing countries and can be defined as the advancement of human life in the economic and social field and the increase of welfare by changing the economic, social and political structures of the countries. The phenomenon of development should be achieved through social cohesion. While the development initiatives, which started with industrialization, manifested themselves in urban areas, rural areas were ignored. However, rural areas should not be excluded from the development initiative. This situation, which is seen as social development, has been prevented by industrialization. However, rural development initiatives that started in the 1960s are steps towards the integration of rural areas with urban areas and their inclusion in social development. Rural development initiatives that started in these years found their reflection in Turkey as well as in other countries of the world. The support given to rural areas has been the main basis for this. These supports to the rural areas were primarily applied on a regional basis, but they did not receive sufficient response due to the differences between the regions and the practices were not suitable for the local area. One of the most important supports to rural development initiatives implemented in Turkey is the Rural Development Investments Support Program (RDISP). Within the scope of this program, it is aimed to increase the income level in rural areas, to improve infrastructure, to ensure the integration of agricultural production and agro-industry, to strengthen food security, to create alternative income sources in rural areas, to increase the effectiveness of rural development activities, to increase the level of basic public services, to increase access to services and to create a certain capacity in rural society, taking into account the protection of natural resources. Although these applications are province-based, they were also applied in the provinces of Antalya, Burdur and Isparta, which are the Western Mediterranean Region. In this study, it is aimed to divide the enterprises benefiting from KKYDP in the Western Mediterranean Region into groups, to reveal the profile of each group and to examine the benefits of support elements according to the characteristics of these groups.

Keywords: Rural area, Rural Development, Support, Western Mediterranean

DETERMINING THE SUPPORT PREFERENCES OF OPERATORS IN SUPPORT POLICIES FOR RURAL DEVELOPMENT BY CONJOINT ANALYSIS

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ABSTRACT

Countries attach importance to development for the continuity and sustainability of societies. Economic, social, political, etc. of development It is expected that it will change in areas and this will be reflected in society. Development starts with economic indicators and can be achieved with improvement in social indicators. Changes in economic indicators around the world have gained rapid momentum mainly in industry and service sectors. The change in the industrial sector, which started especially in the urban area, caused the rural area to remain in the background. Elimination of the separation of urban and rural areas, which is necessary for social development, has begun to be achieved by supporting rural development studies. Different models have also been used in rural development studies, and they have changed due to the general characteristics of the rural area. Various studies have been made and are being carried out for the development of rural areas in Turkey. In recent years, various programs have been implemented to support rural development studies. The main purpose of these programs is to increase the income level in rural areas, to improve the infrastructure, to ensure the integration of agricultural production and agro-industry, to strengthen food security, to create alternative income sources in rural areas, and to increase the effectiveness of the rural development studies, taking into account the protection of natural resources. The most important of these programs is the Rural Development Investment Support Program (KKYDP). In the program, which includes the support given on a provincial basis, it is aimed to process and evaluate agricultural products, and to ensure the integration of agriculture and industry in rural areas. However, within the scope of the support, the preferences of the operators in rural development supports were not taken into account. Support preferences of entrepreneurs are important in terms of entrepreneurial activity. Support elements and types are a situation that encourages entrepreneurs to start businesses. This study, it is aimed to determine the support preferences of the operators benefiting from KKYDP in the agricultural policy and rural development policy in the Western Mediterranean Region, which includes the provinces of Antalya, Burdur, and Isparta, by using conjoint analysis. Thus, it is aimed to determine the degree of influence of the policy set that maximizes the utility of the operators and the characteristics of the manufacturer in this policy preference.

Keywords: Rural development, Support policies, Conjoint analysis

THE ROLE OF COVID-19 AND THE RUSSIA-UKRAINE WAR IN VEGETABLE PRICE VOLATILITY IN TURKEY

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ABSTRACT

The turbulence in food prices and the complex factors fueling these fluctuations have ignited a fervent inquiry within the realm of agricultural economics. Inflation, relentlessly surging due to skyrocketing energy (petrol) prices, compounded further by the disruptive upheavals in supply chains during the COVID-19 pandemic, has thrust the dynamics of food prices into the forefront of scholarly scrutiny. This groundbreaking study delves deep into multiple price series, leaving no stone unturned, to unravel the profound effects on vegetable prices in the bustling markets of Turkey. Drawing on extensive price records spanning from April 2006 to February 2023, this study deploys a battery of rigorous tests and selects the formidable VAR(1)–asymmetric BEKK multivariate GARCH model for its empirical prowess. All eyes are fixated on the captivating Izmir wholesale market, where the relentless volatility transmissions between energy prices and fruit-vegetable prices come under intense scrutiny. The focal point remains resolutely fixed on the harrowing food price crisis that surged amidst the pandemic, alongside the perplexing price fluctuations triggered by diverse forces. As such, the study has catalyzed an insatiable quest to decipher the enigmatic reasons and ramifications of food price volatility both in global food markets and emerging economies. This trailblazing article unfurls a tapestry of volatility patterns and trends, meticulously woven using the rich tapestry of the Izmir database. It gifts the world with a crystal ball, enabling astute forecasts of Turkey's critical fruit and vegetable prices. However, lurking beneath the surface, there lies an unsettling truth the bedrock of fruit and vegetable prices in Turkey is progressively succumbing to an unnerving state of volatility. The tumultuous global food crisis, spurred by the pandemic and the relentless Russia-Ukraine conflict, casts an ominous shadow. The verdict is undeniable the conditional variances of yield series sway significantly, responding not only to sudden short-term shocks but also to the enduring tremors of long-term yield fluctuations. Regrettably, the tempestuous turbulence in vegetable prices leaves vulnerable consumers in Turkey at the mercy of unpredictable access to nourishment, exacerbating the plight of already struggling communities. This trailblazing research sounds like a clarion call, demanding an unwavering pursuit of effective cost-control measures and streamlined accessibility to vegetable products, as the vanguards in the battle to safeguard food security in Turkey. As we stand at the precipice, the clarion call to forge a path toward a more stable and equitable food economy resonates with utmost urgency. An indomitable spirit of action and enduring commitment is the currency that will fuel the pursuit of a hunger-free nation.

Keywords: food security; Covid-19; vegetable price; exchange rate; Russia-Ukraine War ; volatility; VAR-Asymmetric BEKK-GARCH ;Turkey

EXAMINATION OF PRODUCER SATISFACTION TOWARDS RICE SUPPORT POLICIES IN EDİRNE PROVINCE

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ABSTRACT

Paddy is an important foodstuff growing in every continent of the world. China, India, Indonesia, and Bangladesh are the leading countries in paddy production in the world. In Türkiye, although paddy is grown in all regions, more than half of Türkiye's production is taken place in Edirne. İpsala town of Edirne province is one of the important paddy production centers of Türkiye. However, although paddy production is widespread in Türkiye, the current supply cannot meet the demand. Therefore, it is important to encourage paddy support policies to establish the supply and demand balance in the market and to reduce the foreign exchange flow abroad. In this research, face-to-face surveys were conducted by selecting 100 producers producing rice from 17 villages of İpsala town of Edirne province. Survey results were interpreted with descriptive statistics and Logistic Regression analysis. According to the research findings, almost all paddy producers benefit from the existing support policies and almost all of them state that they are satisfied with the existing policies. However, most of the producers state that policies do not affect their production decisions. In the light of the findings obtained from the research, the producers do not see the supports as money going directly into their pockets, and it is necessary to raise their awareness on increasing paddy production. Within the scope of this research, it can be suggested to policy makers to determine policy tools that will reduce paddy imports, increase producer profits, and reduce production costs.

Keywords: Paddy, Agricultural Subsidies, Producer Satisfaction, Edirne

INTERDISCIPLINARY STUDY TENDENCIES IN AGRICULTURAL RESEARCH: THE CASE OF ÇANAKKALE ONEKİZ MART UNIVERSITY

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ABSTRACT

Interdisciplinary study is the combination of different scientific disciplines and establishment of a link between the subjects for the solution of a problem in all scientific researches and projects. Interdisciplinary research makes it possible to approach the problem from different perspectives in the solution of the problems experienced and facilitates the solution of complex problems. Considering the role of agriculture in nutrition, its contribution to employment, its share in National Income and its role in the balance of payments, agriculture is a sector maintaining its importance. Given the marketing problems encountered after agricultural production, the obstacles encountered in foreign trade, business management, organization and extension activities, the studies focused on production and efficiency alone are not sufficient. Therefore, cooperation between agricultural disciplines and other disciplines will increase both the quality of research and the chance of the application of scientific findings in practice. The purpose of this research is to determine the interdisciplinary study approaches of academicians studying in fields related to agriculture at Çanakkale Onsekiz Mart University (ÇOMU). In the research, data were compiled by the full census method from 148 academicians working at various departments related to agriculture. The obtained data were evaluated by various statistical methods. According to the results obtained from the research findings, it has been determined that the academicians studying on agricultural issues at ÇOMÜ are prone to interdisciplinary work on current issues, they cooperate with relevant stakeholders on these issues, and some problems are encountered in interdisciplinary studies.

Keywords: Agriculture, Interdisciplinary Study, Çanakkale Onsekiz Mart University

THE HISTORICAL PROCESS OF AGRICULTURAL TRADE IN THE BALKAN COUNTRIES AND RECOMMENDATIONS FOR THE DEVELOPMENT

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ABSTRACT

Since the day when mankind was created, food has been able to maintain its importance and priority all over the world. However, both during the first and second world wars, and especially in recent years, the importance of food has been felt differently. In these cases, production has gained a priority role. The Balkan countries are located in a very critical geography, in the west of Türkiye and in the southeast of Europe. This means that if there will be any problems in the BALKANS, it will directly affect Türkiye and the EU. From this point of view, we need to concentrate on the Balkan region. It is necessary to examine the foreign trade between Türkiye and 11 Balkan countries. Because, both in terms of population and area, Türkiye is the largest and the biggest country of the Balkan area. In this study, all the figures of all agricultural and agro-industrial products foreign trade between Türkiye and 11 Balkan counturies are given since 2000 with five-year decrements. On the other hand we will check the first three important items on both importation and exportation bases.

Keywords: Foreign Trade, First Three Important Items, Why Food, Food Security, Life Security

EVALUATION OF TEKIRDAG PROVINCE IN TERMS OF AGRICULTURAL STRUCTURE AND AGRICULTURAL SUPPORTS

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ABSTRACT

Since this effect does not affect Turkey, the accommodation structure and orientations of Tekirdag Province, which has a significant share of field effects, were analyzed and evaluated. Fields are grown on a total area of 3,827,333 decares in Tekirdağ. In this area, approximately 1,966.333 decares of wheat and 1,424.669 decares of sunflower are cultivated. According to the provisions of 2021, Tekirdağ Province, which is in the 1st place with the country average of 399,531 kg, is also in the 2nd place in wheat agriculture with 1,026,211 kg. As of 2021, Tekirdağ realizes approximately 6% of Turkey's total wheat production and 18% of sunflower production. While the total payment received from the inspections of the province, which ranks high in terms of production in these two strategic products, was 2.4% at the end of 2010, it is seen that this payment decreased to 1.9% as of 2020. It is seen that the share received by the province for diesel-fertilizer support from Turkey's estimated area-based supports followed a consulting course of 2.8%, and its share from premium-based supports is 4.6%.

Keywords: Agriculture, Agricultural structure, Agricultural support, Tekirdag province

THE TOBACCO INDUSTRY IN NORTH MACEDONIA

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ABSTRACT

Agriculture is a vital sector of the North Macedonian economy, employing approximately 11% of the workforce and contributing 7.5% to GDP in 2022. Tobacco is one of the most important agricultural industries in the country. North Macedonia is a leading tobacco producer in Southeastern Europe. In 2019, the country produced 26,234 tons of tobacco, accounting for 0.4% of global production and 13.9% of European production. This makes North Macedonia one of the top 30 tobacco-producing countries in the world and one of the top 20 exporters of raw tobacco. This research article examines the economic dimensions of the tobacco industry in North Macedonia. The article uses a methodological framework that integrates quantitative analysis and statistical tools. Drawing from official economic data, the study evaluates the industry's contribution to the national economy, including its impact on GDP and employment trends. The research also employs statistical methods to analyse trade dynamics and economic interdependencies related to tobacco production and consumption. Through this economic lens, the article sheds light on the industry's pivotal role in shaping the country's economic landscape. The insights gained from this research are significant for policymakers, economists, and stakeholders. They provide informed perspectives that can be used to make sound decisions about tobacco-related policies and their far-reaching implications for sustained economic development. This research not only enhances understanding of the industry's impact, but it also contributes to informed policy discussions about economic diversification and public health considerations.

Keywords: Agriculture, Economy, Tobacco, North Macedonia

DETERMINATION OF EFFECT OF SEED PRIMING WITH POLYETHYLENE GLYCOL (PEG) AND SORBITOL ON LENTIL NODULE MICROBIOTA BY AMPLICON-BASED METAGENOMICS APPROACH

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ABSTRACT

Studies have shown that priming with Polyethylene glycol (PEG), water, NaCl and Mannitol has positive effects on germination and nitrogen fixation (nodulation) in legumes. Nitrogen fixation by rhizobial endosymbionts in leguminous plants takes place in structures called "nodules". Due to their importance in agricultural studies, many methods have been developed to culture and isolate rhizobial endosymbionts. In recent years, interest in metagenomic studies has increased due to the ability to reveal the entire microbial population in the sample, and amplicon-based 16S rDNA analyses have shown that nodules harbour more bacterial populations than thought. In this study, lentil seeds were primed with Polyethylene glycol (PEG) (15%) and Sorbitol (6%) and no treatment was applied to the control treatment. Lentils were sown in the field and later on, nodules were collected from the upper and lower parts of the plant roots. Also, soil samples were collected from the rhizosphere. After DNA isolation, the V3-V4 region of the 16s rRNA gene was amplified with universal primer sequences. Nodule and soil bacterial diversity was determined with Illumina Miseq platform. With the help of bioinformatics analysis tools (EzBioCoud 16S database version PKSSU4.0), bacteria prophile, alpha and beta diversity indices were determined and PCoA analysis was performed. A similarity tree was drawn using the Jensen-Shannon, Unweighted Pair Group Method with Arithmetic mean (UPGMA) hierarchical clustering method. As a result of the analyses, *Rhizobium* sp. was detected in samples. The percentages of *Rhizobium* sp. were found as 1.21% in control bottom, 2% in control top, 11.35% in sorbitol top, 4.61% in sorbitol bottom, 9.65% in PEG top, 4.52% in PEG bottom. *Rhizobium leguminosarum* was found to be 3.44% in sorbitol top and 4.03% in PEG top. Sorbitol top was separated from other samples in PCoA analysis. As a result, it was observed that sorbitol had a more favourable effect on *Rhizobium* sp. This study was approved by Baskent University Institutional Review Board (Project no: 21/07) and supported by Baskent University Research Fund.

Keywords: Priming, nodule microbiota, amplicon-based metagenome

VASCULAR PLANT SPECIES RICHNESS AND COMPOSITION IN JUNIPERUS DRUPACEA LABILL. FOREST ECOSYSTEM IN MT PARNONAS, GREECE

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ABSTRACT

Juniperus drupacea Labill. is a plant species with ecological, medicinal and economic value. In Europe, it is native only to southern Greece and is listed as endangered. Vascular plants are the dominant primary producers of forest ecosystems and are quite accurate indicators of the abiotic environment in which they grow. The study aimed to investigate the vascular plant species richness and composition in *Juniperus drupacea* forest openings of Mt Parnonas in Greece. The herbaceous plant species were sampled in 10 sampling sites (S1-S10) of 100m2 of the forest openings in the spring season (2021 and 2022). The plant species richness and composition in a sampling plot of 1m2 were recorded in each sampling site. In the study area, 63 plant species with high ecological value were identified that participate in the mountain flora and represent 20 families. The most numerous families were Asteraceae (with the participation of 20.63%) and Poaceae (19.05%), and then Fabaceae (9.52%), which reflects the prevailing situation in the Greek area, as these families are among the three most populous families in Greece and the Mediterranean. The highest species richness of plants is found in the E1 (21 plant species), E2 (23), E3 (23), and E4 (19) sites, while the lowest species richness is found in the E10 (10). Also, 88.89% of plant species are native/non-range restricted, and 11.11% are native/range restricted. The life form spectra of the vegetation indicated that therophytes (40.32%) had the highest contribution in the study area of the total recorded species, followed by hemicryptophytes (37.09%), while phanerophytes were the lowest with a total relative value of 1.61%. The chorological spectrum of the recorded species showed that Mediterranean species constituted 18.33% of the total flora. They are followed by Paleotemperate species (13.33%). Furthermore, European-SW Asian species (11.66%) and Mediterranean-SW Asian (11.66%) were well represented. Other phytogeographical types, such as Cosmopolitan, European and Balkan-Italy species (1.66%, respectively), were less represented. Hence, the present study pointed out the vascular plant diversity of forest openings, which could be utilized in decision-making for conservation and sustainable use of forest biodiversity and ecosystem services in Mt Parnonas.

Keywords: Biodiversity; Juniperus drupacea; forest; Greece

THE COMMUNITY STRUCTURE OF THE MACROFAUNA IN A DEGRADED LACUSTRINE ENVIRONMENT (WETLAND OF RÉGHAIA-ALGERIA)

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ABSTRACT

The Réghaïa wetland is an ecological site and is included in the Ramsar list of wetlands of international importance. However, this wetland is subject to pollution risks, which threaten its terrestrial and aquatic biota. Until now, there has been no study analysing the environment-macro fauna interaction. Therefore, in order to characterise the state of this area, which is heavily affected by intense physical and chemical pollution of anthropic origin, we studied the quality of its water and its biological communities in order to consider possible consequences and dangers. The results obtained correspond to excessive pollution of the environment as well as communities of macoinvertebrate individuals affected by the number and distribution mainly of insects (18 taxa). The Diptera constitute the richest faunal group in terms of taxa, with 10 families (45%); within the Diptera, which are qualified as tolerant taxa, the Chironomidae were the best represented family and resistant to changes in the state of the environment with 52% of the total abundance. The present study constitutes a first step for future research on the environmental and spatio-temporal impact of water quality on the aquatic fauna of the Réghaïa wetland, for which urgent management decisions are needed to preserve its biodiversity value.

Keywords: Réghaïa lake, water quality, pollution, macroinvertebrate

FLORESTIC INVOTORY OF THE MEDICINAL PLANTS IN GOURAYA NATIONAL PARK "BEJAIA" ALGERIA

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ABSTRACT

Since ancient times, man has always used natural resources to feed, heal, cover and even shelter himself. In Algeria, phytotherapy has always been appreciated by farmers; but today everyone is turning to this therapy, which is known for its effectiveness, longevity and availability. At present, there is no exhaustive list of all Algerian aromatic and medicinal plants. Our aim is to draw up a local scientific reference based on scientific data and information received from traditional practitioners, natives and connoisseurs. In this perspective, our research focus is the development, production, exploitation and rational use of Algerian medicinal plants with therapeutic powers. To this end, an ethnobotanical survey of the indigenous people was carried out in the PNF, with the aim of making an inventory of the main medicinal plants used by this population. This survey provided information on the use of medicinal plants and the interest of the indigenous people in traditional medicine. The study revealed that almost half of the respondents had no formal education; 44% had not attended school and only 2% had a university degree. The extent of the use of traditional medicine against digestive and diabetic diseases seems to be the most appreciated means by the population of the park. The Lamiaceae is the family most appreciated by the natives, while the olive tree 'Olea europeae', the emblem of the Amazigh, is the plant most used by this population. More than the majority of respondents practice the use of ancestral remedies (64%), as they believe that the plants have beneficial effects and are not toxic.

Keywords: Florestic Invotory, Medicinal plants, Gouraya National Park, Lamiaceae, Olea europeae

THE INFLUENCE OF CLIMATIC FACTORS ON THE BIO-ECOLOGY OF THE HYBRID SPARROW (PASSER DOMESTICUS X P. HISPANIOLENSIS)IN THE REGION OF BOUIRA

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ABSTRACT

The present work is a contribution to the study of sparrows in Algeria by providing more elements concerning the bio-ecology of the species, with the aim of finding a certain balance between the maintenance of the biodiversity of the area and the protection. cultures. Monitoring the behavior of sparrows in different localities in Bouira between 2020 and 2021 shows the dominance of global perching with rates between 56.32% and 63.93%, followed by foraging with 28.67% and 36.97% . Flight is in third position (5.19% to 7.88%). For the influence of climatic factors, significant correlations are recorded between the search for drinking water, grooming and average temperatures with $P<0.001$, for the other activities no significant correlation with climatic factors is noted. The study also reveals a significant difference in the behavior of the Hybrid Passer depending on the locality. The results obtained allow us to say that the behavior of the sparrows is variable according to the months of the year or the seasons, thus defining two periods: a period of intense activity in autumn and a second delimited in spring-summer, coinciding with the breeding period. The period of low activity characterizes the winter and summer period. Two effects of climatic factors on the behavior of sparrows are recorded; a perceptible direct effect and an indirect effect affecting either environmental conditions (food abundance) and species phenology. To this can be added other factors encountered such as the human presence (anthropic action), the geographical position of the locality (altitude), and the nature of the open, semi-open or closed environment which can in their turn influence the behavior of sparrow species by controlling their numbers in the area.

Keywords: Hybrid sparrows, behavior, activity, climatic factors and Bouira

ENTOMOFAUNA SUBSERVIENT TO CITRUS IN BOUFARIK (ALGERIA)

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ABSTRACT

A clementine orchard in Boufarik (Central Mitidja) is chosen for the study of entomofauna associated with citrus. For two plots, one treated and the other untreated, designated for the experiment, which runs from march 2021 to may 2021. The sampling method used is that of yellow sticky patches. The results express a significant diversity of insects, 8,699 insect items representing 64 taxa divided into 9 orders and 38 families in the untreated plot against 8 orders in the treated one). The Coccinellidae family is the most important and includes 10 taxa, i.e. 15.63% of the total number of which 9 taxa (14.75%) are captured in untreated plot and 5 taxa (10.87%) in the treated plot. The species *Clitostethus arcuatus* is the most active in the orchard. In the treated plot, 12 species have a frequency of occurrence equal to 100%. They are considered to be ubiquitous and more particularly include the citrus pests *Scirtothrips citri*, *Aleurodidae sp* and *Aphis citricola*. In the untreated plot, 8 species are considered to be ubiquitous, including the citrus pests *Aleurodidae sp* and *Aphis citricola*. The order Hymenoptera is the richest in species with respectively 18 species in the treated plot and 20 others in the untreated one followed by beetles (17 taxa in the untreated plot and 8 taxa in the treated plot). In the treated plot, Diptera came second with 9 species. It emerges from the results obtained that the insects show uninterrupted activity in the orchard. Four trophic groups are identified: phytophages, predators, parasites and pollinators. Thus, phytophages form the largest group with 28 species, or 43.75% of the total population. A large predatory parasite complex composed of 17 taxa for each is identified. The present study shows an abundance of insects and more precisely the auxiliaries in the untreated plot. This useful entomofauna diversity can certainly ensure a certain biological balance in the orchard.

Keywords: Entomofauna, citrus, Boufarik, pests, auxiliaries, yellow sticky patches

COMPARING THE HEALING EFFECT OF ARGAN OIL AND FLAXSEED

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ABSTRACT

In folk medicine, however, there are plants, used with good reputation in the healing process and which needed to be scientifically evaluated. The study of wound healing, which is a dynamic and interactive biological process, can be done either by studying lesions from different sources, or through monitoring of induced experimental lesions in healthy test animals. Dealing with the action of Argania Spinoza and Linum usitatissimum with the phenomenon of epithelial regeneration is the aim of this preclinical test. The procedure to remember is to apply oil and other substances (tested separately for comparison) Treat burns to laboratory animals each day. The healing effect is studied by a daily monitoring of the development of bun contraction surfaces. Our results reveal that during the first week, the average surface area the most reduced is recorded with wounds treated with argan oil HA (J2: 268.08 mm², J6: 215.64 mm²). Regarding the rate of contraction; wounds treated with the mixture of the two oils (M) and argan oil (HA) scored better; to J12 (64.39%), (58.54%) and to J16 (85.76%), (82.63%), respectively. On Day 20, the highest rate of contraction is for wounds treated with the mixture (99.08%), at day 24, the injuries were treated with flaxseed oil (HL) and the mixture became similar (100%) and (99.89%) respectively. However, that of argan oil and sulfadiazine (S), show a complete cure (100%) on Day 30. It can be concluded that argan oil combined with flaxseed oil gives a better healing effect, in contrast, the non-adjuvanted argan oil lags slightly behind the other products tested. Nevertheless, other tests must be scientifically evaluated to certify the therapeutic activity of argan oil and our ancestral heritage.

Keywords: Argan oil, Linseed oil, Healing, Burns

DETERMINATION OF CARBON SEQUESTRATION IN BIOMASS ACCORDING TO THE PHENOLOGICAL PERIODS OF SOME C3,C4 PLANTS OF CLIMATE CHANGE (AGROPYRON CRISTATUM (L.) GAERTN. SUBSP. ARTEMISIA SCOPARIA WALDST. & KIT., BASSIA SCOPARIA (L.) A.J.SCOTT)

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ABSTRACT

The impact of climate change is focused on carbon emission and sink area projections. In recent years, out of control carbon emission forces human beings to develop ecological approaches together with technological studies. only industry and in some industries, reduction studies are no longer sufficient. Today, the scientific world has turned to technology-supported projections by examining the components of ecology. This study investigated the carbon sink and haze potential of three plants with C3 and C4 photosynthesis pathways under climate change conditions. Three species found in natural vegetation in this study: Agropyron cristatum (L.), Gaertn. subsp. Artemisia scoparia Waldst. & Kit. and Bassia scoparia (L.) A.J. Scott. Selected species have been monitored in Konya Karapınar General Directorate of Combating Desertification and Erosion Protection Area for four years. The detected features are associated with changing climatic conditions. Flower-maturity-seed periods of each species were monitored. Separate biomass carbon sequestrations were determined in the above-ground and underground parts of these periods. Agropyron cristatum (L.), Gaertn. subsp. Artemisia scoparia Waldst. & Kit. and Bassia scoparia (L.) A.J.Scott plants were recorded for the first time with this study. The monthly, daily, hourly and annual highest, lowest and average values were taken into account while determining the climate demands and carbon sequestrations of the plant. Air temperature, precipitation, surface temperature, soil depth profile temperatures, wind and relative humidity are the climatic parameters taken into consideration.

Keywords: climate change, biomass carbon, carbon sequestration, Agropyron cristatum, Artemisia scoparia, Bassia scoparia

DEVELOPMENT OF A PEDIGREE DIAGNOSTIC METHOD FOR THE TUNISIAN ARABIAN PUREBRED HORSE BREED

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ABSTRACT

The aims of this study were to assess the degree of inbreeding among Arabian horses in Tunisia, analyze breeders' understanding of inbreeding, and develop a breeding strategy to effectively manage genetic diversity. The first of the study involved conducting a genealogical analysis, which included calculating inbreeding coefficients and Kinship links. This analysis was performed using two software programs, namely Pedigree Viewer (Version 6.5f) and SAS (Version 9.1). The pedigree file provided information on 1526 horses, 462 sires, and 879 dams. The second phase will focus on surveying 22 breeders and discussing the implementation of a mating plan aimed at mitigating the rise of inbreeding. The mean inbreeding coefficient among Arab horses was determined to be 4.8% with a standard deviation of 4%. A total of 574 horses were identified as being inbred. Among these individuals, 210 horses were classified as highly inbred, with inbreeding coefficients ranging from 6% to 25%. When considering the inbreeding coefficient by gender, the calculations revealed an average of 1.6% with a standard deviation of 3% for females, and an average of 2.1% with a standard deviation of 4% for males. The analysis revealed a 3.8% increase in inbreeding between the first and fifth generations. Furthermore, the survey analysis highlighted the significant role played by the breeder in the mating process, as the selection of mating partners depends on their decisions. According to the survey findings, a majority of breeders expressed their interest in producing horses with good conformation (25%), improved racing performance (42%), and non-inbred offspring (33.33%). A notable 77.8% of the breeders demonstrated awareness of the risks associated with inbreeding. As a result of this study, a relationship matrix was constructed for stallions and mares, aiming to mitigate population uniformity and preserve genetic variability. Each breeder will receive a table that categorizes stallions based on their relationship with the mare, providing them with a valuable resource for making informed breeding decisions.

Keywords: Arab Horse, Inbreeding, Pedigree, Relationship, Genetic Variability

ANTISTAPHYLOCOCCAL ACTIVITY OF THE ESSENTIAL OIL OF MENTHA PULEGIUM L.

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ABSTRACT

Staphylococcus aureus, an important pathogen in human, causes serious infections. This bacterium is known as one of the most resistible agent against typical antibiotics. It also causes plenty of problems in hospitals and society. Therefore finding of new and effective antimicrobial agents derived from new resources for such resistant bacteria is of an over riding importance. Essential oils (EOs) from medicinal and aromatic plants are of major interest due to their rich bioactive compounds and potent antimicrobial activity. *Mentha pulegium* L. is well known for is medicinal properties against respiratory diseases and headaches. It was largely used for culinary purposes. It is a wild aromatic plant with a wide range of biological properties such as antioxidant, anti-inflammatory and antimicrobial. The present study aims to evaluate the antistaphylococcal activity of the essential oil of *Mentha pulegium* L. from the production unit (Florest). In this study, the antibacterial effect of a traditional plant EO, *Mentha pulegium* L., against clinical isolates of methicillin resistant *Staphylococcus aureus* (MRSA) through disk diffusion method. The EO showed very effective bactericidal activity towards the majority of the tested bacterial strains with inhibition zone diameters in the range of 17.06-24.50 mm. These results suggest that the essential oil of *Mentha pulegium* L. may be a useful alternative to antibiotics and might be useful in controlling MRSA infections. Further research is required to evaluate the practical values of therapeutic applications.

Keywords: Mentha pulegium L., Essential oil, Antibacterial activity, Staphylococcus aureus MRSA

STUDY OF BIOLOGICAL ACTIVITIES OF THE SEEDS OF THE CERATONIA SILIQUA L. HARVESTED IN THE REGION OF BEJAIA

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ABSTRACT

Introduction: The carob tree (*Ceratonia siliqua.L*) has been the subject of much scientific research for several decades and is a natural remedy that is effective in the fight against cholesterol, acute childhood diarrhea and pulmonary tuberculosis. The pulp is the main constituent of the carob pod (90%).
Objectives: It is based on the valorisation of *Ceratonia siliqua L*. encompassing phytochemical screening and evaluation of their biological activities of the aqueous and methanoic extracts of seeds.
Material and methods: study of the anti-inflammatory effect by measuring the volume of the oedema of the leg. Study of antioxidant activity and antibacterial activity based on the method of diffusion.
Results and discussions: The assay of polyphenols reveals the richness of methanolic extracts in polyphenols, i.e., 30 mg of gallic acid/g of extract. The aqueous and methanolic extracts could reduce the stable free radical 2.2 diphenyl-1-picrylhydrazyl to diphenylpicrylhydrazine with respective IC50s of 0.7mg/ml and 0.2mg/ml. The extracts are capable of reducing oedema by up to 81.89%. The methanoic extracts of the seeds have a moderate antibacterial action against *E.coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. On the other hand, the aqueous extracts have a weak antibacterial action against the same bacteria. However, the aqueous extracts show a very strong inhibitory action against *Candida albicans* and are similar to that of the antifungal antibiotic Econazole (1%).
Conclusion: both extracts from seeds and pods are endowed with an important anti-radical and antioxidant potential. The aqueous extracts of the seeds have shown a very important inhibitory action against *candida albicans L.*

Keywords*:* antimicrobial activity, antioxidant activity, Ceratonia siliqua L.

PLANT BIODIVERSITY AND PHYTOTHERAPY IN ALGERIA

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ABSTRACT

The review of several recent works on medicinal plants in Algeria has shed light on a set of very diverse results depending on the plants, regions, populations studied and objectives. However, the finding of this review highlights a set of points, among others:
1. Algeria has a very important taxonomic richness which includes not only animals but also plants, the latter play an essential role within the trophic chains, according to DUPONT and GUIGNARD, (2015).
2. Unlike other Maghreb countries, Algeria imports almost all of its aromatic and medicinal plant needs (SAHI, 2016). This, despite the productive potential which represents about 600 species of PAM according to MOKADDEM (1999). Algeria ranks 74th in the world for imports of aromatic and medicinal plants and 44th in the world for imports of essential oils (MENDACI, 2017).
3. Natural risk continues to represent a very real threat, particularly in countries where traditional culture is still alive, a threat that is all the more significant since learning to live in these changing societies no longer takes place , obligatorily, by the school of nature.
4. The importance of floristic and ethnobotanical studies. These studies are more than necessary and indispensable for a better knowledge of plants on the morphological, physiological and anatomical level as well as on the photochemical level.
5. The development of a detailed guide on poisonous plants is of great importance. Indeed, this guide provides guidance by sparing users from undesirable, sometimes harmful and toxic effects.
6. The regulation of the profession of herbalist must absolutely be based on legal texts which prohibit herbalists from selling any poisonous or toxic plant.

Keywords: Poisonous plants, Aromatic plants, medicinal plants, Ethnobotany

DIVERSITY OF COLEOPTERA IN THE DECOMPOSITION OF WILD BOAR (SUS SCROFA) CARCASSES AND THEIR ROLE IN RECYCLING ORGANIC MATTER IN THE SOIL AROUND THE ZÉRALDA HUNTING RESERVE IN ALGERIA

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ABSTRACT

Two sampling methods are used to study the successions of necrophagous species on wild boar corpses. The work was carried out for two seasons over a period from December 2017 to May 2018. During the bioecological study, necrophagous insects in the Zéralda Hunting Reserve were captured. The results show that the insect fauna of corpses evolves in successive waves. Three orders of insects dominated these trials. These were Diptera, Coleoptera and Hymenoptera. The inventory carried out using Barber jars revealed 4348 individuals belonging to 22 orders, 78 families and 158 species. This inventory is represented by 6 classes. The Insecta class is strongly represented with 3635 individuals. Diptera dominate with 2445 individuals, Coleoptera are in second position with 998 individuals. Collembola is represented by 296 individuals. The Hymenoptera were recorded with 172 individuals. The other orders are poorly represented. The inventory carried out using coloured plates revealed 17484 individuals belonging to 5 classes, 15 orders, 110 families and 251 species. The Insecta class is strongly represented with 16327 individuals, of which 8 orders, including the Diptera, occupy 1st place with 12571 individuals for a total of 90 species (A.R.% = 71.90%). Coleoptera occupy 2nd place with 2336. All the work carried out on the decomposition of carrion focuses on necrophagous Diptera. However, there are at least as many species of necrophagous Coleoptera as there are necrophagous Diptera. Their impact and their role as natural entomological scavengers in the cadaver ecosystem deserve particular attention. The decomposition of cadavers attracted 1007 individuals of Coleoptera belonging to 65 species and 19 families using Barber jars. Several families of this order were recorded, the most important of which were the Staphylinidae, the Nitidulidae, followed by the Ptiliidae, and to a lesser degree the Cleridae, the Trogidae, the Carabidae and the Aphodiidae. In winter, the decomposition of *Sus scrofa*, installed in an open environment, revealed two dominant families, the Staphylinidae with *Creophilus maxillosus* (A.R.% = 19.90 %) and the Nitidulidae with *Nitidula flavomaculata* (A.R.% = 17.96 %). On the other hand, during the spring period, when the climate is warmer, the most common families of beetles are always the Staphylinidae with *Creophilus maxillosus* (A.R.% = 23.97 %) and the Dermestidae with *Dermestes frischi* (A.R.% = 13.61 %).

Keywords: Insecta, Beetles, cadaver, Staphylinids, Zéralda

ASSESSMENT OF PLANT BIODIVERSITY IN "AMPHIAREION" ARCHAEOLOGICAL SITE OF GREECE

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ABSTRACT

The Mediterranean region consists of archaeological sites usually located within unique natural landscapes. Plant biodiversity data is crucial for sustainable development and making decisions regarding natural resources and their conservation. Greece's archaeological sites provide suitable habitats for plants linked with the history of destinations, rituals and mythology, and play an important role in nature conservation. This study aimed to investigate the vascular plant species richness and composition of the archaeological site of "Amphiareion" in Oropos (38°17'27.56"B, 23°50'42.48"E) studied using both archival and in situ research in the spring season, 2023. The Greek Archaeological Society excavated the site between 1884-1930, uncovering monumental buildings, such as a temple, a stoa, a theatre, altars and baths, and numerous small finds, among which about 500 inscriptions. Their study indicated the identification of the renowned sanctuary of the Hero-Healer Amphiaraos, well-documented in ancient literary sources. This sanctuary dates from the late 5th century BCE to the early 4th century CE. The site's substantial resources and its marginal location on the border of Attica and Boeotia, two distinct political regions vying for control of the sanctuary, imbued it with significance not only in terms of religion but also economically and geopolitically. The archaeological and the epigraphical data in particular reveal that both the site itself and the broader area of Oropos were rich in timber and testify to viticulture's activity. To record the vascular plant species on the free surfaces of the archaeological site, samples were taken in the form of a quadrat. In each quadrat, the cover and abundance of each species were assessed using the Braun-Blanquet scale. In the studied area, 53 plant species belonging to 51 genera that comprise the flora of archaeological site and represent 22 families were identified. The most numerous families were Poaceae (22.64%), Asteraceae (16.98%) and Fabaceae (15.09%). According to the life form spectrum of the vegetation, hemicryptophytes (33.96%) contributed the most to the total number of recorded species in the study area, followed by therophytes (30.18%) and phanerophytes (15.09%). The dominant plant species recorded in the archaeological site were *Cercis siliquastrum* L., *Psoralea bituminosa* (L.) C. H. Stirt., *Reichardia picroides* L., *Sanguisorba minor* Scop., *Satureja thymbra* L. and *Smilax aspera* L. This is attributed to the Mediterranean climatic conditions and the vegetation form and composition of this site responds to its ecological conditions. Finally, plant species tended to characterize the archaeological site in which they were found, a feature that could be used to enhance the significance of an archaeological site.

Keywords: Vascular plants; Diversity; Historical Monuments; Greece

MODELING AND PREDICTION OF PESTICIDES TOXICITY ON RATS

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ABSTRACT

The purpose of this study was to predict the acute oral toxicity of pesticides on rats using machine learning models {Adaboost (AB), Artificial Neural Networks (ANN), Support Vector Machines (SVM), Random Forest (RF), and Linear Regression (LR)}. The data set of 330 pesticides was retrieved from Pesticide Properties DataBase (PPDB). Models were trained using 259 pesticides and tested using 71 pesticides. the best set of 20 descriptors was selected using GA-algorithm. The accuracy of each model was evaluated using two metrics the determination coefficient (R2) and the root mean squared error (RMSE). The found value of these metrics demonstrate the capability of the obtained SVM to predict the acute oral toxicity of new pesticides on rats.

Keywords: Acute oral toxicity, Pesticides, QSAR, MRL, Prediction, External validation

REMOVAL OF CIBACRON BLUE ON UNTREATED WASTE (UPS) - KINETIC AND THERMODYNAMIC STUDY

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ABSTRACT

Pollution of water caused by different contaminants is a serious and challenging problem. Various toxins are discharged into water bodies from various industries and other sources. When these chemicals are discharged into water, they can cause pollution. Because of their hazardous nature, excessive usage of textile dyes is a major environmental concern. The aim of this study was to evaluate the adsorption of Reactive Blue 49 (RB) dye onto untreated Peanut Schell (UPS) from aqueous solutions was realized in a batch system. However, Several important factors like initial solution pH (2-12), contact time (0-60 min), adsorbent dosage (1-10 g/L), RB concentrations (10-40 mg/L) and temperature (25-45 oC) effect on the adsorption efficiency of UPS were investigated. The UPS was characterized by BET surface area measurement (Sarea= 30.05 m2/g), Point of Zero Charge (pHpzc = 6), FTIR spectroscopy and scanning electron microscopy MEB. Batch studies were conducted in order to determine the optimal parameters required to reach the adsorption equilibrium. The maximum adsorption capacity of the UPS for RB at 298 K was determined to be (qmax = 30.30 mg/g). The adsorption kinetic data were analyzed employing pseudo-first order and pseudo-Second order. It was established that the adsorption process obeyed the pseudo-second-order kinetic model with a determination coefficient (R2) equal to 0.999. The evaluation of thermodynamics parameters such as the Gibbs free energy ΔGo (0.999, - 4.45 and -9.82 kJ/mol), negative enthalpy ΔHo (-172.2 kJ/mol) and the change of entropy (-0.544 J/mol.K) indicated a spontaneous and exodothermic nature of the reaction with a physisorption process. Comparative tests by the heterogeneous photocatalysis of RB in the presence of a semiconductor will be the subject of the rest of this study.

Keywords: Kinetics, removal, Cibacron blue, modeling, thermodynamic

MACRO ELEMENT ACCUMULATIONS AND AGRO – ECOLOGICAL WATER QUALITY ASSESSMENT OF FLUVIAL HABITATS IN BIGA PENINSULA (TÜRKIYE)

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ABSTRACT

Freshwater pollution is a serious environmental issue that affects the quality of water in fluvial and lacustrine habitats. Agricultural water supply that is the water used for irrigation and other agricultural purposes is a significant topic for the productivity of farmlands and for the healthy crops. The Biga Peninsula, which has a great agricultural and touristic potential, is a peninsula located in the northwest part of the Anatolia, Türkiye. In this research, accumulations of 4 macro elements including calcium (Ca), magnesium (Mg), sodium (Na) and potassium (K) were investigated in the water of 5 significant fluvial habitats located in the Biga Peninsula. Sodium Absorption Rate (SAR), Magnesium Rate (MR), Kelly Index (KI) and Sodium Percentage (Na%) were used to evaluate the water qualities in terms of irrigation water supply. According to detected data, the average order of investigated macro element levels in water of the investigated riverine ecosystems were as follows: K < Ca < Mg < Na. As a result of applied irrigation water quality assessment indices, all the investigated streams in terms of MR, 80% of them in terms of KI, 40% of them in terms of Na% and 20% of them in terms of SAR were found as not suitable for irrigation.

Keywords: Biga Peninsula, Fluvial habitats, Macro elements, Agro – ecological evaluation

AGRICULTURAL WATER QUALITY RISK ASSESSMENT OF MACRO ELEMENTS IN WATER OF LOTIC ECOSYSTEMS LOCATED IN GELIBOLU PENINSULA, TÜRKIYE

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ABSTRACT

Freshwater contamination is a significant environmental issue that affects the quality of water in lotic and lentic ecosystems. Agricultural water supply is known as the water used for irrigation and other agricultural purposes and it is certainly a significant topic for the productivity of farmlands and for the healthy crops. The Gelibolu Peninsula that is located in the northwest part of the Anatolia has a great agricultural and touristic potential. In this research, accumulations of 4 macro elements including calcium (Ca), magnesium (Mg), sodium (Na) and potassium (K) were investigated in the water of 3 significant fluvial habitats located in the Gelibolu Peninsula. Sodium Absorption Rate (SAR), Magnesium Rate (MR), Kelly Index (KI) and Sodium Percentage (Na%) were used to evaluate the water qualities in terms of irrigation water supply. According to detected data, the average order of investigated macro element levels in water of the investigated lotic habitats were as follows: Ca < K < Mg < Na. As a result of applied irrigation water quality assessment indices, it has been revealed that the water qualities of riverine ecosystems of Gelibolu Peninsula are quite low in terms of irrigation water supply.

Keywords: Gelibolu Peninsula, Lotic ecosystems, Macro elements, Irrigation water supply

MINERAL AND HORMONAL COMPOSITION EFFECTS ON ATRIPLEX HALIMUS MICROPROPAGATION

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ABSTRACT

Thanks to their morphology and physiology, Atriplex species are a very effective way to rehabilitate degraded soil by salinity and increased forage production in arid and semi-arid regions. However, Atriplex multiplication by the natural way remains insufficient for degraded vegetation cover reconstruction. This involved biotechnological techniques use which are a very effective tool for Atriplex multiplication. Atriplex halimus micropropagation is performed during this work. Two types of explants (apex and node) are tested and cultured on different growing media. These media differ in macroelements nature and concentration (MS and B5) and in the added hormonal balance (2,4-D, KIN, BAP and TDZ). Cultures are kept in a culture chamber under a 16h light photoperiod and a temperature of 25 2°C. The results show several shoot neoformation from apex and node explants obtained on free-hormone media and TDZ-enriched media at different concentrations. Regeneration rate and neoformed shoots number depend on culture medium, hormonal balance and explant type. The best micropropagation levels (100% neoformed shoots) are obtained from apex explants especially on MS medium containing 0.5 mg/l of TDZ. While, MS free-hormones medium allows to induce a significant microprapagation (90%) in nodal explants case. Direct organogenesis is obtained by the addition of TDZ alone. This hormone allows a very important regeneration from apex explants accompanied in majority cases by an excised extremity callogenesis. Callus fragmentation and subcultring induces indirect organogenesis (caulogenesis and rhizogenesis) especially on B5 medium.

Keywords: in vitro, explant, apex , biotechnology, micropropagation, Atriplex halimus

STUDY OF THE INSECTICIDAL ACTIVITY OF THE ESSENTIAL OIL OF ORIGANUM FLORIBUNDUM ON A PEST OF STORED FOODSTUFFS "TRIBOLIUM CASTANEUM"

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ABSTRACT

During the storage period, cereals undergo various abiotic and biotic alterations resulting in significant losses. Insects are the main biological agents responsible for these losses. The *Tribolium cataneum* species is an important insect pest of stored cereals. Currently, chemical control is the means most used to control insect pests. However, the untimely use of chemical insecticides is responsible for the chronic intoxication of consumers, the emergence of resistance phenomena among pests and environmental pollution. Bio-pesticides of plant origin can represent an effective alternative to synthetic chemical molecules. The objective of this work is to evaluate the insecticidal effect of the essential oil of a medicinal plant "*Origanum floribundum*" on the pest of stored foodstuffs *Tribolium castaneum*. The essential oil is extracted by hydro-distillation. Four doses were tested to evaluate the toxicity of the plant on adults of *T. castaneum*. The evaluation of the toxicity of the essential oil was done by inhalation-contact. 100% mortality was recorded after 8 hours of exposure to essential oil at a concentration of 200µl/ml. *Origanum floribundum* essential oil could be used as a natural biopesticide.

Keywords: Key words: insecticidal activity, Origanum floribundum, Tribolium castaneum, essential oil

USE OF HYDROALCOHOLIC EXTRACTS OF CHROZOPHORA BROCCHIANA, AND THEIR INSECTICIDAL EFFECT ON THE TOMATO LEAFMINER TUTA ABSOLUTA (GELECHIIDAE, LEPIDOPTERA)

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ABSTRACT

In 2008, Algeria experienced devastating damage caused by a new pest: “The tomato lifeminer” *Tuta absoluta*. The insect spread rapidly throughout the country's tomato-growing regions, causing substantial production losses. This study aims to propose alternative solutions based on the use of natural "bio-insecticide" products to fight the larvae population of the pest *Tuta absoluta*, against this background we have evaluated the insecticidal effect of the hydro-alcoholic extract of *Chrozophora brocchiana* which grows on sandy soils in arid regions and produces new shoots throughout the dry season. It was selected for its therapeutic properties and its bio-pesticidal effect. Three doses were tested to estimate larval mortality: Three replicates were carried out for each treatment, with the controls receiving sterilised distilled water (containing no additives). -1st dose (D1 =100%) (pure dose: stock solution), treated directly with the stock solution of the extract (100mg/ml) -2nd dose (D2 =50%), obtained by diluting the stock solution to 50% (5ml) of the pure extract and adding 50% (5ml) of distilled water, the dose used is (50mg/ml). -3rd dose (D3 = 25%), obtained by diluting the stock solution to 25% (2.5 ml) of the pure extract with 75% (7.5 ml) of distilled water, the dose used is (25 mg/ml) Analysis of the results shows that the plant has a high toxicity against *Tuta absoluta* 96% mortality of larvae treated with *C. brocchiana* was observed after 5 days of treatment.

Keywords: bio insecticides; hydro-alcoholic extract; C. brocchiana; mortality

ASSESSMENT OF GENOTOXIC IMPACT OF FUNGICIDES ON POPULATION OF MOSQUITOFISH GAMBUSIA AFFINIS USING MICRONUCLEUS TEST

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ABSTRACT

Micronucleus assays with fish have been shown to be useful in vivo techniques for genotoxicity testing, and show potential for in situ monitoring of impact of pesticides on freshwater fishes and water quality. Over the last 30 years, there have been mass declines in freshwater fish populations. We undertook work to examine the possible effects of an agent of stress; a systemic fungicide widely used to combat cereals parasites on the freshwater fishes *Gambusia affinis*. We centered our study on the study of certain physical parameters in artificial medium creates in laboratory (pH and T°) and biometric (Weight measurement, linear evolution and coefficient of condition).In this study genotoxic potential of this fungicide, was evaluated using a test of genotoxicity the MNT (micronucleus test). The fishes were exposed to different concentrations (50, 75, 100,150µl/L) of the fungicide and (methyl methane sulfonate) was used as a positive control at a concentration of 1,56mg/L Our results highlight a reduction at the same time weight and size of *Gambusia affinis* exposed to a range of concentrations of fungicide, as well as the index of condition which reveals a delay of growth which can affect the sexual maturation of the treated animals . The results of toxic conditions showed high mitotic indices in erythrocytes and few cells with nuclear morphological aberrations, like binucleated cells. About micronucleus frequencies, there were significant differences between the positive control (MMS) and the groups treated with fungicide concentrations, whatever the time of exposure. Results suggested the suitability of the test used as tools in environmental monitoring programs of risk assessment. Our results revealed genotoxic effects of the fungicide on *Gambusia affinis* only at the highest concentrations and the longest time exposure (12days).

Keywords: Genotoxicity, Micronuleus, test,Fishes, Fungicides, Gambusia affinis, Growth parameters

OXIDATIVE STRESS AND AMPHIBIAN DECLINE:POLLUTION CAUSED BY FUNGIDE RECENTLY INTRODUCED IN ALGERIA

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ABSTRACT

The problem of phytosanitary products, through their persistence in the natural environment and their potential impact, is one of today's major environmental preoccupations. All over the world, amphibian populations are disappearing due to the effects of these agrochemicals. Water in particular is a major vector for all these contaminants. In this study, the toxicity of a systemic fungicide (Propiconazole), recently introduced in Algeria to combat cereal pests, was assessed in terms of metabolites (proteins, lipids, carbohydrates) and glutathione (GSH) content, as well as acetylcholinesterase (AchE) and glutathione S-transferase (GSTs) activity. We demonstrated that the metabolism of the tadpoles was affected by disturbances in protein, lipid and carbohydrate content, as well as glutathione (GSH) levels in the whole body of the tadpoles. The results showed that the fungicide used increased GSTs activity in tadpoles treated with the selected concentration range (25, 50, 75 and 100µL) as compared with controls. At the same time, there was a progressive decrease in AchE activity, indicating a neurotoxic effect on treated tadpoles. Acetylcholinesterase and Glutathione S-transferase activities can be considered as biomarkers of fungicide toxicity in *R. Saharica tadpoles.*

Keywords: Oxidative stress, Biomarkers, GSH, GST, AchE, Fungicide, Amphibian, Rana saharica, Tadpoles

EVALUATION OF PROTECTIVE EFFECT OF (OLEA EUROPEA) ON SOME PHYSIOLOGICAL MARKERS, OXIDATIVE STRESS AND FERTILITY IN WISTAR RATS EXPOSED TO CADMIUM

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ABSTRACT

The objective of this research is to test the effectiveness of adding olive leaves Olea europa to attenuate cadmium toxicity in male wistar rats. The study was carried out on 80 male rats, divided into 8 groups. The control group received a standard diet, the 3 groups positive controls (FO1, FO2 and FO3) were treated with olive leaves extract at three different doses (0.25g/Kg bw, 0.5g/Kg bw and 1g/Kg bw), the cadmium chloride CdCl2 group (40mg/Kg bw) and three other groups were received a combination of Cd and FO (Cd+FO1, Cd+FO2, Cd+FO3). The administration of cadmium and olive leaves extracts was by gavage for 30 days. The extraction and determination of phenolic compounds from olive leaves' extracts, in addition to biochemical, reproductive and oxidative stress markers were evaluated. Results demonstrated the presence of various classes of phenolic compounds (total soluble phenols, flavonoids, and condensed tannins) in the aqueous extract of olive leaves. A significant rise in the activities of alanine aminotransferase, aspartate aminotransferase, and alkaline phosphatase and in the concentration of total bilirubin, total cholesterol, triglycerides, urea and creatinine was observed in the Cd-exposed rats compared to all controls, but the level of albumin and total proteins manifested significant decrease. Concerning fertility, a significant decline in the concentration, mobility of spz, level of testosterone and LH was seen. Results indicated a significant raise in the MDA level of the Cd group compared with the 4 control groups, but a significant decrease was noted in the groups of Cd+OL1, Cd+OL2 and Cd+OL3 compared to the Cd group. For the GSH, the Cd group showed a significant decrease compared to all control groups. In conclusion, the supplementation of olive leaves extracts revealed attenuation in Cd toxicity with different degrees.

Keywords: Cd, olive leaves, oxidative stress, reproduction, rats, toxicity

PROTECTIVE EFFECT OF OLIVE LEAVES ON HISTOPATHOLOGY OF SOME ORGANS AND HEAMATOLOGICAL PARAMETERS AGAINST CADMIUM TOXICITY IN WISTAR RATS

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ABSTRACT

This study focuses on the search for a natural treatment to reduce lead toxicity in male Wistar rat by using the aquous extract of olive leaves (Olea europea L). The study was carried out on 80 male rats, divided into 8 groups. The control group received a standard diet, the 3 groups positive controls (FO1, FO2 and FO3) were treated with olive leaves extract at three different doses (0.25g/Kg bw, 0.5g/Kg bw and 1g/Kg bw), the cadmium chloride CdCl2 group (40mg/Kg bw) and three other groups were received a combination of Cd and FO (Cd+FO1, Cd+FO2, Cd+FO3). The extraction and determination of phenolic compounds from olive leaves' extracts, the hematological, biochemical and histological were evaluated. Results demonstrated the presence of various classes of phenolic compounds (total soluble phenols, flavonoids, and condensed tannins) in the aqueous extract of olive leaves. A significant decrease in RBC count, the level of HCT, HGB, MCV, MCH, MCHC and PLT was observed in cadmium group compared to the control and the positive controls. However, significant increase in, WBC and LYMP counts was recorded in the Cd group compared to the control, the positive controls and the combined doses. Biochemical parameters showed a decrease in the concentration of the hormone triiodothyronin (T3) and thyreostimulin (TSH) in the Cd group compared to the (control and Cd + FO groups). These results are confirmed by the study of histological sections. A morphological change represented by volume shrinkage of the vesicles. A return to the normal structure of follicles was observed in Cd + FO groups (positif groups). Histology study of the kidney and testis showed no change in (Cd +FO groups) compared to the control. Containement in the group exposed to (Cd) the parenchyma of the kidney shows dilated distal and proximal tubules causing renal tubular damage. The testis marked destruction and degeneration of germ cells and the light of some seminiferous tubules are empty.

Keywords: cadmium, hematological parameters, histopathology organs, olive leaves, rat

TOXICITY OF A NOVEL PHOSPHORAMIDATE ON GROWTH INHIBITION AND OXIDATIVE STRESS STATUS IN THE FRESHWATER CILIATE: PARAMECIUM AURELIA

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ABSTRACT

The toxicological impacts of the increasing number of organophosphorus insecticides present in the aquatic environment are assessed predominantly in laboratory studies where test organisms are exposed to a range of compounds. In recent years, the development of methods for testing environmental samples (particularly rapid tests) has been increasing. This work aims to investigate the inhibitory effect of a synthetic phosphoramidate derivative at different concentrations (2, 4 and 8 µM) on pure culture of *Paramecium aurelia* during 72 hours affecting its growth (proliferation) in concentration-dependent manner. The lower levels of glutathione and increased of catalase and glutathione S-transferase activity recorded in the presence of various synthetic phosphoramidate concentrations involved the activation of detoxification system.

Keywords: phosphoramidate PA-B, Paramecium aurelia, oxidative stress, detoxification

CAPTURE OF FERROUS IONS (FE2+) DURING THE INCORPORATION OF VERMICULITE IN AGRICULTURAL SOIL

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ABSTRACT

Vermiculite is rich in mineral salts such as calcium, potassium, and magnesium. It helps improve the availability of these nutrients in the soil, thereby promoting the health and productivity of crops. Vermiculite is a material that exhibits great environmental inertness and is commonly added to improve soil structure and enhance water retention. When mixed into the soil, vermiculite contributes to enhancing texture by increasing soil porosity. This allows for better circulation of air, nutrients, and water in the soil, thus facilitating the development of plant roots. However, the addition of vermiculite to agricultural soils is not without consequences. An ion exchange occurs between vermiculite and the soil, where the nutrients brought by vermiculite are exchanged with an equivalent amount of other elements present in the soil. This process can lead to enrichment of certain elements and depletion of others. The objective of this study is precisely to explore these effects. To initiate our study, we conducted the washing and grinding of vermiculite, which allowed us to obtain three distinct fractions through sieving: unground vermiculite, the D1 fraction consisting of particles ranging in size from 160 to 80 micrometers, and the D2 fraction composed of particles with sizes between 80 and 25 micrometers. To determine the equilibrium time, we conducted a kinetic study of capturing Fe2+ ions by unground vermiculite in an aqueous solution under agitation at 300 revolutions per minute and a temperature of 25°C. After three hours, we reached equilibrium and observed that the reaction followed second-order kinetics. Next, we developed adsorption isotherms of ferrous ions on the three aforementioned fractions. These isotherms were conducted at a temperature of 25°C, with an agitation speed of 300 revolutions per minute for a duration of 18 hours. The isotherm obtained for the unground vermiculite followed the Langmuir model, exhibiting a maximum adsorption capacity of 22.95 mg/g. Similarly, the isotherm obtained for the D1 fraction of vermiculite also followed the Langmuir model, with a maximum adsorption capacity of 28.88 mg/g, corresponding to a value of 5.20 meq/L. We observed a correlation between the evolution of sulfate ion concentration in the solution and the uptake of ferrous ions by vermiculite. The maximum amount of sulfate ions captured by vermiculite was found to be 4.34 meq/L. Finally, the adsorption isotherm of ferrous ions on the D2 fraction of vermiculite also followed the Langmuir model, with a maximum adsorption capacity of 34.90 meq/g.

Keywords: Vermiculite, adsorption, ferrous ions, ionic exchange

CONSEQUENCE OF ADDING VERMICULITE TO AGRICULTURAL LAND ON THE DEPLETION OF BARIUM

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ABSTRACT

Vermiculite is a natural material that is often used as an amendment to improve soil structure and enhance water retention. When mixed into the soil, vermiculite helps improve texture by increasing soil porosity. This allows for better circulation of air, nutrients, and water in the soil, promoting healthy root development in plants. Vermiculite is also rich in minerals such as magnesium, potassium, and calcium, which can be beneficial for plants. It can help improve the availability of these nutrients in the soil, thereby enhancing the health and productivity of crops. However, it is important to note that the addition of vermiculite to agricultural soils should be done with caution and based on the specific needs of each crop. It is recommended to conduct soil tests to determine the appropriate quantity to use and the best way to incorporate it into the soil. Adding vermiculite to soil involves an ion exchange between the vermiculite and the soil. The nutrients brought by the vermiculite are exchanged with an equivalent amount of other elements present in the soil. This process can lead to enrichment in certain elements and depletion in others. Therefore, it is important to carefully select the type of vermiculite to use based on the nature of the soil. The Point of Zero Charge (PZC) of vermiculite, which corresponds to the pH at which its surface charge is zero, can have a significant effect on its adsorption process. When the pH of the solution in contact with vermiculite is below its PZC, the vermiculite surface is primarily positively charged. This favors the adsorption of negatively charged ions or molecules in the solution, as they are attracted to the positively charged surface of the vermiculite. Conversely, when the pH of the solution is above the PZC of vermiculite, its surface is primarily negatively charged. This promotes the adsorption of positively charged ions or molecules in the solution, as they are attracted to the negatively charged surface of the vermiculite. The objective of this study is to analyze the behavior of vermiculite and evaluate the impact of grain size when added to a soil containing barium. Prior to its use, we performed the steps of washing and grinding the vermiculite. Subsequently, the ground material was sieved, resulting in three distinct fractions. The first fraction, referred to as D1, consists of vermiculite grains ranging in size from 25 to 80 micrometers. The second fraction, D2, comprises vermiculite grains with sizes between 100 and 500 micrometers, while the third fraction, D3, consists of grains larger than 1000 micrometers. We conducted the determination of the baryum adsorption isotherm in an aqueous solution at a temperature of 25°C, using the D1 fraction of vermiculite. The experiment was conducted with an agitation speed of 300 revolutions per minute for a period of 18 hours. The isotherm follows the Langmuir model and exhibits a maximum adsorption capacity of 36.50 mg/g. Similarly, for the D2 fraction, the adsorption isotherm under the same conditions also follows the Langmuir model, with a maximum adsorption capacity of 35.42 mg/g. As for the D3 fraction, the isotherm is also of Langmuir type, with a maximum adsorption capacity of 28.61 mg/g. The PZC was also determined for the three grain size

fractions, D1, D2, and D3. It is 3.65 for the D1 fraction, 2.65 for the D2 fraction, and 2.49 for the D3 fraction.

Keywords: Adsorption; Vermiculite; Barium; Point of Zero Charge

MORPHO-BIOCHEMICAL COMPARISON OF SOME OLIVE VARIETIES GROWN IN SEMI-ARID REGION - TIARET REGION – ALGERIA

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ABSTRACT

The objective of this study is to characterize some varieties of olive trees grown in the same region in western Algeria, which have been tested by ITAFV in the steppe zone. of the commune of Rechaiga Wilaya of Tiaret. To do this study was carried out in two stages, a first on site and another in the laboratory. Indeed, after visiting the site, we chose five (5) varieties of olive tree "Rougette, Gordale, Tablout, Agrarez and Mission" and we proceeded to the morphological measurements of the trees; these last concerned, the height of the plant, the height of the trunk and the circumference of the foliage followed by the sampling of the leaves in small labeled bags, in order to measure the biochemical parameters (content of chlorophyll a, content of chlorophyll b, carotenoid content) and physiological parameters (relative water content, wax content). The results showed that the varieties studied, present small differences in behavior, which could be attributed largely to the controlled conditions but their existence is due to the genetic variability of the olive tree.

Keywords: olive growing; olive tree, cultivar, morphology, semi-arid region

INFLUENCE OF ECOLOGICAL FACTORS TO SEASON DYNAMIC OF GASTROINTESTINAL STRNOGYLIDAE OF SMALL RUMINANTS

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ABSTRACT

The grazing method of breeding enables small ruminants to have constant contact with transitional hosts (oribatids, molluscs, etc.) and eggs and larval forms of parasites, so that there is no sheep that is not infected with at least one parasitic species. Based on research in the world and in our country, diseases of parasitic etiology dominate in sheep and goats both in terms of prevalence and incidence, accompanied by significant morbidity and moderate mortality.There are many factors that contribute to the appearance, maintenance and spread of parasitosis. Among the many factors that influence the spread and maintenance of parasitic infections, there is a major influence of environmental factors on the seasonal dynamics of gastrointestinal strongylids of small ruminants. For these reasons, the aim of our work is to review the influence of abiotic factors on the epidemiology of parasitic infections of small ruminants.

Keywords: small ruminants, helminths, climate condition, ecology

THE PHOTOCATALYTIC DEGRADATION OF A THIAZINE DYE VIA CUO NANOPARTICLES

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ABSTRACT

Water pollution containing dyes is a serious concern for human health and the environment. Photocatalysis is a wastewater treatment process that can be carried out to remove these dyes from water. Photocatalysts play a key role in this environmentally friendly and cost-effective technique. CuO is a p-type metal oxide that has attracted great interest during the past years since it is non-toxic, easy-handle, and has high optical absorption. This study was focused on evaluating the efficiency of methylene blue (MB) upon using CuO photocatalyst under UV light irradiation. MB was selected as a model of a thiazine cationic dye. Besides, CuO nanoparticles were characterized by FT-IR, XRD, SEM, and Raman spectroscopy. The morphology of CuO photocatalyst consisted of various-shaped polyhedral particles. The XRD diffractogram of CuO revealed the characteristic monoclinic structure of the CuO phase. The present study could provide a promising transition metal-based catalyst for the degradation of wastewater containing thiazine dyes that were released from different industries.

Keywords: CuO, decolorization, heterogeneous photocatalysis, methylene blue, thiazine dye

RECENT ADVANCES IN THE POTENTIAL APPLICATIONS OF WATER TREATMENT FOR THE REMOVAL OF EMERGING CONTAMINANTS

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ABSTRACT

The rapid increase in industrialization has caused the generation of more compounds that have potential risks resulting in serious water pollution issues for living beings and the environment. In this regard, the presence of emerging contaminants (ECs) in water supplies mainly sources from pharmaceutical products, cosmetics, pesticides, and dyes are rising global concern today. The removal of these effluents with high toxicity levels, persistence, and bioaccumulation are not completely succeeding via using conventional methods. Biological treatment technologies are insufficient for non-biodegradable organic micropollutants. Hence, advanced oxidation processes (AOPs) including ozonation, Fenton, sonochemical, and heterogeneous photocatalysis methods have been applied to the removal of ECs as an alternative method. Reactive radical species, in particular hydroxyl radicals, are formed, and these radicals are responsible for organic degradation. Among the AOPs, heterogeneous photocatalysis has gained great concern due to its effectiveness and versatility. Since these treatment methods have certain disadvantages, a combination of hybrid technologies can also be integrated to ensure efficient ECs removal from water.

Keywords: Advanced oxidation processes, emerging contaminants, heterogeneous photocatalysis, water treatment

DROUGHT-TOLERANT ORNAMENTAL PLANTS USING FOR LANDSCAPE

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ABSTRACT

Drought is a widespread phenomenon, causing crop failures, water shortages, and economic losses across the world. Drought-tolerant plants are the solution to this problem. These plants can survive extended periods of drought and low water availability. In this study 20 drought-tolerant ornamental plants are given with their uses and general views. Drought-tolerant plants play an important role in landscapes and ecosystems where water is scarce. They can prevent soil erosion, maintain soil health and structure, provide food and shelter for wildlife, and even improve air quality. They can reduce water consumption, lower maintenance costs, and add aesthetic value to gardens and other outdoor spaces. Because of these properties we must know drought-tolerant plants for our future.

Keywords: Drought-tolerant, landscape, ornamental plant

DETERMINATION OF PADDY RICE USING LANDSAT-BASED LULC AND LST IMAGERIES IN KUMKALE PLAIN OF ÇANAKKALE PROVINCE, TURKEY

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ABSTRACT

Determination of paddy rice production areas and estimation of potential production presents great importance and may help decision makers to foresee the need for import amount. Using remote sensing technologies provides rapid and relatively economic detection of paddy rice. Present study conducted in Kumkale plane located around Troy National Park of Çanakkale province. Landsat OLI imageries of production season of 2022 were used to produce land use and land cover (LULC) maps and land surface temperature (LST) for discrimination of paddy rice from other agricultural products. The LSTs were calculated through single-channel algorithm considering twelve Landsat imageries individually, which were acquired between April and October. In addition, LULC maps of the same imageries were obtained using random forest (RF) algorithm. Paddy rice fields, other agricultural fields, natural vegetation, water and settled areas considered as the main LULC classes in the area. Accordingly, the LST values of LULC classes were compared to each other. Findings designated that LST can be used for discrimination of paddy rice fields from other LULC types in similar areas with comparable soil, terrain and climate conditions.

Keywords: Çanakkale, Landsat, LST, LULC, Paddy rice

DESIGN OF A MODEL ECOLOGICAL FARM AND ANALYSIS OF RAIN WATER HARVEST POTENTIAL

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ABSTRACT

Ecotourism known to be one of the important tourism models that focuses on environmental sustainability and maintenance of natural resources. Water, one of the most important components of various ecosystems and presents the most important element of public health, need to be well managed and preserved in the context of ecotourism. One of the most widely used methods for conserving water resources is known to be rain water harvest (RWH), since collection of rain water may provide water for many domestic or recreational purposes in the ecotourism centers. On the other hand, there is lack of knowledge on the initiatives for RWH use in the individual establishments. Çanakkale province has great potential for ecotourism activities due to its abundance in terms of agricultural production, natural resources and cultural heritage. Present study aimed to design of an ecologic farm and analysis of potential RWH use in the designed establishment in Kemallı village of the province. The study believed to present a model for RWH researchers and have potential to reduce excessive water use in similar individual enterprises.

Keywords: Çanakkale, Design, Ecologic farm, Ecotourism, Rain water harvest

THE INFLUENCE OF SOIL TEMPERATURE ON THE UPTAKE OF CR3+ IONS BY VERMICULITE.

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ABSTRACT

Vermiculite is a natural material rich in minerals such as calcium, potassium, and magnesium, which is used to enhance soil structure and improve water retention, thereby promoting the health and productivity of crops. However, its addition to agricultural soils can lead to ion exchange with the soil, resulting in the enrichment of certain elements and the depletion of others. Therefore, it is essential to use it with caution, taking into account the specific requirements of each crop and soil type. Conducting soil tests is recommended to determine the appropriate quantity and the best method of incorporation. Soil temperature is not constant. The objective of this study is to investigate the influence of soil temperature on the adsorption of elements from the soil by vermiculite. To achieve this, we conducted an experiment focusing on the adsorption of a model element, chromium (III), on crushed vermiculite. Prior to use, the vermiculite was washed three times with distilled water, followed by grinding and sieving. We selected the fraction with grain sizes between 80 and 160 micrometers for our investigation. During our experiments, we added 0.05 g of vermiculite to several tightly sealed tubes filled with chrome (III) solutions at different concentrations, each containing 10 ml of solution. Subsequently, we placed the tubes in a thermostat bath set at two different temperatures: 25°C and 45°C. The tubes were agitated at 500 rpm using an agitator for a duration of 18 hours. After this period, we measured the remaining concentrations of chromium (III) after separating the vermiculite from the solutions. The results revealed three distinct regions. In the first region, which ranged from an initial concentration of Cr3+ ions of 0 mg/L to approximately 80 mg/L, the temperature had no significant effect, and all Cr3+ ions were adsorbed by the soil. In the second region, spanning from 80 mg/L to 100 mg/L, the temperature effect was moderate, and only a fraction of the chromium was adsorbed. The third region began after approximately 100 mg/L, where the temperature effect became noticeable, and the vermiculite became saturated, no longer absorbing Cr3+ ions. The saturation level depended on the temperature. In this region, the amount of Cr3+ ions adsorbed by vermiculite was 17.53 mg/g at 25°C and 18.55 mg/g at 45°C.

Keywords: Vermiculite, Soil temperature, Captation/adsorption, Cr3+ ions, Agricultural soils

THE DETERMINATION OF SOME CHARACTERISTICS OF FLOUR

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ABSTRACT

Food based on cereals, particularly flour as an end product, has been consumed widely across the world. Different types of commercially available flour, including wheat, oat, corn, rye, and integral rye flour, were examined for a number of characteristics, including magnetic and microscopic properties, the presence of gluten, pH value, moisture content, foam capacity, flour color analysis, and FT-IR analysis. The structural characteristics of each variety of flour were revealed by microscopic examination under an optical microscope. The findings demonstrate that color indices with values of L*, a*, and b* exhibited strong connection in the assessment of milling accuracy and flour grading (the maximum value for L* for wheat flour was 86.921). The primary peaks in the area of the C-H, N-H, and C-N bonds were seen in the FT-IR study. The suggested techniques are simple to use for quickly determining a number of flour properties, including as pH value, moisture content, and gluten content, which are factors directly related to storage quality. Application of existing, less expensive ways for calculating specific requirements were for the usage of wheat products safely.

Keywords: FT-IR spectroscopy, Colorimetry, pH value

CORRELATION BETWEEN CHEMICAL STRUCTURE OF PHENOLIC COMPOUNDS, AND HEPATOPROTECTIVE ACTIVITY AGAINST DRUG-INDUCED TOXICITY IN ANIMAL MODELS

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ABSTRACT

The liver is a target for many toxins because of its high blood flow, it is the frequent target of physical injury. Phenolic compounds are endowed with an important therapeutic activity, due to their structural diversities. The sites and number of hydroxyl groups on phenolic constituents are assumed to be related to their antioxidant activity towards toxic targets. In this study, we will try to present an exclusive study on the structure-activity relationship (QSAR) of phenolic compounds on complications associated with the liver induced by drug use. The study base consists of a series of 250 molecules with different experimental values in GO and GPT in male Wistar rats, and various molecular descriptors were then obtained, involving different structural, physical and chemical properties. The selection of the best descriptors is done by the genetic algorithm with an optimal identification rate. The best model selected indicates that the number of hydroxyl groups, the electronic density around the groups (OH), aromaticity, intra- and intermolecular bonds between groups and lipophilicity are most responsible for hepatoprotective activity in vitro. The resulting model defined a theoretical chemical space for reliable predictions of new phenolic compounds with very excellent activity against drug hepatotoxicity.

Keywords: Hepatotoxicity, phenolic compounds, Structure, GOT, GPT, Prediction, Model

EFFECTS OF COLD STORAGE ON THE EVOLUTION OF SOME BIOCHEMICAL PARAMETERS AND ACRYLAMIDE FORMATION IN POTATO (SOLANUM TUBEROSUM) TUBERS IN THE DEPARTMENT OF AIN DEFLA, ALGERIA

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ABSTRACT

Potato (Solanum tuberosum) is one of the most important food crops in the world and ranks third after rice and wheat in terms of human consumption. Globally, approximately 368.247 million tonnes of potatoes are produced (Sawicka et al. 2018). Known for its high potential for potato production, the wilaya of Ain Defla has deserved to be in the first order following the material and human efforts made to improve the quantity and quality of this speculation. However, many challenges have to be overcome to accomplish this task, among others, the deterioration of the biochemical and organoleptic quality post-harvest and during storage of potato tubers. A huge cold storage infrastructure is implemented to protect the growing production. During its life, the potato tuber undergoes various evolutionary processes, the most important of which are respiration, transpiration and finally physiological aging (accumulation of reducing sugars). A study was carried out in this context for two years, with the objective of determining the degree of physiological evolution of the tubers of four varieties of potatoes (potato with red skin; Kondor and Bartina; potato with white skin ; Spunta and Atlas) through biochemical indicators, such as, pH, acidity, reducing sugars (Glucose and fructose), starch and dry matter, during cold storage at temperatures ranging from 4°C at 8°C. A qualitative analysis of the formation of acrylamide under the effect of the content of reducing sugars, the temperature and the cooking time was carried out. Kondor revealed the highest pH value before and during storage. A gradual decrease in dry matter as a function of storage time was detected for all the varieties studied. A notable decrease in the starch content in the 3rd month of storage for all the varieties, in particular Kondor and Bartina. The Spunta variety showed significant amounts of reducing sugars from the 2nd month of storage. The formation of acrylamide was intense at 160°C for 4 minutes of frying in the Spunta and Kondor varieties. However, Kondor showed some resistance to the appearance of enzymatic browning (acrylamide) than Spunta under the same empirical conditions.

Keywords: Potato, storage, quality, biochemical indicators, acrylamide

FUNCTIONAL PROPERTIES OF STARCH EXTRACTED FROM LANDRACES OF ALGERIAN PEARL MILLET USING VARIOUS TECHNIQUES, INCLUDING WET MILLING AND ULTRASOUND

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ABSTRACT

The millets are the sixth highest-value crop in the world; they are extremely nutritious and can survive challenging environmental circumstances (very low rainfall and saline soils). The goal of the current study was to characterize the starches of seven landraces of pearl millet (Pennisetum glaucum (L.) R. Br) from south Algeria, adding value through two processes: conventional wet milling with sodium azide added as a microbial growth inhibitor and a new green technology called ultrasound-assisted isolation. SPSS software, version 23 was used to conduct the data analysis and test for statistical significance. The impact of the starch isolation method on several functional parameters of the isolated starches were examined in terms of swelling power and water solubility index. The evaluated characteristics increased after heat treatment, especially as the temperature approached that of gelatinization [70–80 °C]. We concluded that the majority of the studied starches that received ultrasonic pre-treatment during their isolation showed a lower absorbency and a lower degree of solubility in water compared to starches isolated by traditional wet milling isolation methods. This is attributed to the pre-treatment of the isolated starches (steeping solution type and nature). Thus, the effectiveness of ultrasound-assisted isolation was assessed. The results were clear, and the isolation of pearl millet starch appeared to have good potential.

Keywords: isolation; pearl millet ; isolation ; starch ; ultrasound ; wet milling

VALORIZATION OF WILD BLACKBERRY (RUBUS FRUTICOSUS L.) TO FOOD TABLETS

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ABSTRACT

To start with, lyophilized powder from Algerian wild blackberry (*Rubus fruticosus* L.), is obtained. The main objective of the present work is to evaluate the dissolution (releasing) properties of new food tablets in distilled water at different temperatures. Proprieties of powder and then tablets from lyophilized blackberry in terms of hardness, disintegration time, erosion are investigated. Taking into account its high content in vitamin C, this powder can be employed as other natural ingredient enhancing the nutritional value of tablets, as well as their stability. The hardness and friability of obtained lyyophilised berry tablets met the minimum requirement to be within the Pharmacopoeial limits, confirming the ability of powder for withstanding the mechanical shocks during their handling and transport. Also, the final product acquired an appetizing flavor which is of a particular interest. Also, the fast dissolution of the blackberry powder, thanks to the presence of natural simple sugars, makes the obtained tablets very convenient for some patients. Taking into account the nutritional and physiological potentials of the basic components of the analyzed powder, the obtained tablets may be used as dietary supplement and/or as excipient in the pharmaceutical industry.

Keywords: Keywords: Blackberry (Rubus fruticosus L.), dissolution, tablet, natural ingredient, excipient

EFFECT OF DIFFERENT DRYING TECHNIQUES ON THE TECHNO-FUNCTIONAL AND STRUCTURAL PROPERTIES OF SESAME PROTEIN ISOLATE

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ABSTRACT

Sesame protein, one of the plant-derived proteins, has an important potential in terms of use as functional food additives and dietary supplements. In order to preserve the physicochemical and functional properties of the plant-derived protein, to increase its shelf life and to facilitate its use as an additive, it must be converted into powder form on an industrial scale. For this purpose, different drying techniques are used, which have various effects on the protein properties. In this study, the effects of different drying techniques, namely freeze-drying, spray-drying and oven-drying, on the structural, chemical and techno-functional properties of sesame protein isolate to convert it into powder form were investigated. The drying process was carried out after the preparation of protein solution (pH 7.0) about 10% (w/v) total solids in distilled water. The moisture and protein contents of the samples varied from 97.61 to 98.49% and 90.52 to 91.34%, respectively. The lowest particle size was detected in the oven-dried protein powder, while the highest protein solubility (72.62%) was measured in the spray dried powders. The spray-dried sesame protein isolate showed the highest emulsion activity and stability index and foaming properties. The spray-dried protein also had significantly higher water and oil holding capacities than freeze- and oven-dried protein samples. While the highest free –SH value was obtained for the freeze-dried sample with a mean of 5.44 μmol/g protein, there was no significant difference in total –SH values among all the drying techniques. The SDS-PAGE results indicated that the molecular weights of protein samples did not change. Based on the FTIR analysis, partial change was determined in secondary structure of proteins evaluating by α-helix, β-sheet, β-turn and random coil peaks. The present study concluded that the drying techniques used in the conversion of sesame protein solution into powder form had a significant effect on the physicochemical and techno-functional properties of the protein.

Keywords: Sesame protein, drying techniques, structural properties, techno-functional properties

PERIPHERAL INDICATORS OF ACIDOSIS IN DAIRY COW

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ABSTRACT

Milk production will be important if rumen is healthy. Rumen acidosis is a permanent threat, especially to cows with high dairy potential. The most dangerous form is the acute form while the chronic or latent form is the most difficult to identify because no sign at the clinical examination is specific. Our aim has been to establish a method for diagnosing chronic acidosis without causing animal ill-being based on peripheral acidosis indicators and to study the therapeutic effect of bentonite. The study was conducted on 20 Holstein and Montbeliard dairy cows at the farm level of Sidi Mhamed Benali, Relizane city. The parameters recorded are the rumen filling score, the chewing index, the evaluation of the dung by determining its consistency, the measurement of the undigested food quantity and the determination of the pH of the dung. A diet containing (5 Kg of Miscellaneous Concentrate, 7 Kg of alfalfa hay (Sec), 17 Kg of Sorghum green) was distributed to both lot and we added to lot 2 (1.5% bentonite or 250g/cow/day). The results obtained showed that there is a significant difference between the dung pH, dung consistency and the chewing index of our cow sample compared to the usual values of (6.42, 2.78, 55.53) respectively ($p<0.05$) and the lot 2 who received bentonite showed an improvement in dung pH and chewing index compared to the lot 1 by (6.55, 6.29); (61.5, 49.74) respectively ($p<0.05$). In conclusion, diagnosis of chronic acidosis by peripheral indicators was established and the use of bentonite has prevented this pathology.

Keywords: animal welfare, dairy production, bentonite, acidosis, food management

EVOLUTION OF BIOCHEMICAL PARAMETERS IN POST PARTUM COWS AFFECTED WITH BRUCELLA, IN THE WILAYA OF RELIZANE

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ABSTRACT

This study was conducted to determine the biochemical parameters of brucella cows during the four months post-partum at some farms in Sidi Mhamed Benali (Algeria). We followed and analyzed the blood biochemical profile of 77 dairy cows. One farm had 26 brucella cows. During the four months, we observed that the cows had brucella serum cholesterol, serum calcium, phosphorus and a normal creatinine at a rate of 1.09 to 1.33 g/l, 87.05 to 94.52 mg/l, 58.52 to 65.57 mg/l and 9.60 to 10.99 g/l, respectively. However, these cows showed hypertriglyceridemia in parallel during the four months of the study and ranged on average between 0.71 and 0.92 g/l. Regarding blood glucose we observed hyperglycemia around calving at a rate of 0.79 g/l, which stabilized during the four months after calving. In conclusion, hypertriglyceridemia is common in brucellosis. These results could eventually be used for more extensive studies in this area.

Keywords: Dairy cow, biochemical profile, brucellosis

TRADITIONAL ALGERIAN BARLEY CULINARY PREPARATIONS

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ABSTRACT

The aim of this work is to highlight the traditional preparation diagram for a product derived from immature barley grains called "Lmermez" and the culinary preparations derived from this product in different regions of Algeria. To this end, a survey was carried out and, based on the data collected, a preparation diagram for "Lmermez" was drawn up, along with those for two traditional culinary preparations, "Boutchich" and "Lbakhboukh". The laboratory-scale products were characterized in terms of their physicochemical, technological and sensory properties. The results of the survey indicate that immature "lmermez" barley grains are scalded, roasted and ground, after which several sieving operations are carried out to extract semolina of different sizes, flour and bran. Fine and coarse semolinas are used in the preparation of "bakhboukh" and "boudchich", respectively. These two types of semolina have protein contents of 12.95% and 11.61%, lipid contents of 2.53% and 1.71% and ash contents of 1.79% and 2.01%, a degree of delitescence of 124.24 and 44.26% and swelling indices at 100°C of 125% and 120%, respectively. "Bakhboukh" is prepared by mixing fine "lmermez" semolina with fermented "l'ben" milk (ratio: 0.5/3, w/v). The mixture is left to stand for several hours until the semolina becomes soft before being eaten. To prepare "boutchich", the coarse semolina extracted from "lmermez" is steamed, topped up with a red sauce and cooked again over low heat. The dish is eaten with lime. "bakhboukh" has a sandy-yellow color, a granular, semi-liquid texture and a torrified, lactic, vegetable odor. "Boutchich" has a sandy yellow color, granular texture, semi-liquid and gelatinous, vegetable odor, and torrifaction.

Keywords: Keywords: immature barley, barley semolina, culinary preparation, Algerian traditions

BARLEY-BASED YOGHURT-LIKE FOOD PREPARATIONS

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ABSTRACT

The aim of the present work is to contribute to the diversification of barley consumption patterns by studying the feasibility of elaborating new food preparations from this cereal. Two products were elaborated : a yoghurt-like fermented product and a yoghurt enriched with β-glucan extract from barley. These products were characterized from a physicochemical and sensory stand point. To elaborate the yoghurt-like fermented product, a 10% solution of barley flour in water heated to 80°C is clarified by filtration. A quantity of whole milk powder (4%, w/v) is added to this solution. To elaborate β-glucan-enriched yogurt, a 10% solution of barley flour in water is prepared and heated for 3h (45-55°C) to promote β-glucan solubilization. The solution is then centrifuged, and the recovered supernatant (with a β-glucan content of 4.25% and a protein content of 1.6%) is mixed with whole milk powder (12 g/100 ml extract). Both preparations are inoculated with thermophilic lactic ferments 0.08% (v/w) and fermented for 6h (40-45°). The pH and acidity of the yoghurt-like fermented products elaborated from barley are 4.3, 4.64 and 60.93 and 86.61, respectively. The pH values are comparable to those of the plain yoghurt control, but the acidity is lower. Sensory evaluation showed that yogurt enriched with β-glucan extract was the closest to the control, notably in texture, flavor and color. For the barley-based yoghurt-like product, significant differences were noted, for the majority of criteria (and more specifically consistency and flavor). With regard to the organoleptic quality of the prepared products, the results show that the yoghurt enriched with β-glucan extract is more acceptable to tasters than the control.

Keywords: Barley, β-glucans, barley-based products, sensory characterization

ESSENTIAL OIL OF ANISE SEEDS (PIMPINELLA ANISUM) BIO-PROTECTIVE EFFECT ON YOGHURT SHELF LIFE

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ABSTRACT

The antioxidant and antibacterial activities of the essential oil extracted from *Pimpinella anisum* and the impact of its incorporation on the quality and shelf life of yoghurt were assessed in this study. The essential oil extracted by the hydrodistillation presented a yield of 2. 54±0.04%. The antibacterial activity of EO was tested on seven strains. The results showed that only *Pseudomonas aerugenosa*, *Streptococcus mutans* were able to resist the antimicrobial activity of the piminella anisum essential oil. The evaluation of the in vitro antioxidant activity of the essential oil extracted from green aniseeds was assessed by two different methods. The DPPH- reduction method and the β-carotene bleaching method. antioxidant activity showed an inhibition rate of 35.38%. The enrichment of the yoghurt by PAEO, did not affect the physico-chemical properties of yoghurt and decreased the rate of the syneresis with the increase of the concentration of EO incorporated in the yogurt. The textural properties of the yoghurt were not affected by the incorporation of PAEO, while the taste and aroma were slightly modified with the appearance of a slight bitterness and astringent taste for high level of incorporated EO. The incorporation of EO in the yogurt improves yoghurt shelf life, reduces significantly the load of contaminating flora (coliforms) during storage and does not effect on the load of lactic acid bacteria.

Keywords: Essential oil, Pimpinella anisum, antioxidant activity, antibacterial activity, yoghurt, shelf life

FORMULATION AND IMPROVEMENT OF A GLUTEN-FREE INFANT BISCUIT BASED ON MAIZE-CHICKPEA

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ABSTRACT

The replacement of gluten presents a major technological challenge, as it is an essential structure-building protein in flour, which is responsible for the viscoelastic characteristics of dough, and contributes to the appearance and structure of many cereal-based baked products. In this study, a composite flour of maize-chick pea (M-CP) was used to develop a nutritionally enriched biscuit as complementary food for celiac children. Response surface methodology (RSM) was used to optimize the levels of xanthan and water added to the gluten-free formula. The analysis was based on the rheological characteristics of the dough and final quality of the baked biscuit compared with control wheat flour (WF). Results showed that the gluten-free biscuit with the best specific volume (Vsp) (1.88 cm3/g) corresponds to an optimum of xanthan-water of 0.4 g and 28 ml respectively. This Vsp remains lower than that of the WF (2.51 cm3/g). The optimum gluten-free biscuit corresponds to a dough with a consistency closer to that of the WF. This biscuit has a final humidity (7.67%) higher than that of the WF (6.89%).

Keywords: infant, gluten-free, biscuit, maize-chick pea, xanthan

DETERMINATION OF SOME PHYSICAL AND CHEMICAL QUALITY CHARACTERISTICS OF BREAD WHEAT VARIETIES CULTIVATED IN EDIRNE PROVINCE

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ABSTRACT

In this study, it was aimed to determine some physical, chemical and technological quality characteristics of six different bread wheat varieties widely grown in the geographical conditions of Edirne Province, located in Thrace Region, which is an important wheat production area of our country. For this purpose, hectoliter weight, moisture content, crude protein (CP), ash, ether extract (EE), crude fiber (CF) and starch contents were determined in a total of 50 samples of bread wheat of six registered varieties (Rumeli, Experia, Masaccio, Maden, Glosa and Delebrad). In addition, gluten ratio, gluten index and Zeleny sedimentation value and delayed Zeleny sedimentation values were determined in flour obtained from wheat varieties and bread quality was investigated. At the end of the study, hectoliter weights of wheat varieties were determined between 76.93-79.16 kghl-1, and moisture contents were found between 10.68-12.41%. CP contents, which is one of the chemical properties that is primarily taken into account for bread quality of wheat, were recorded as 12.94 % to 14.47 %, with an average of 13.63% among varieties. Starch contents in analyzed sample were 57.24-58.24%, ash amounts were; 1.30-1.44%, EE ratios were; 1.18-1.77% and CF levels were determined between the values of 2.25-2.56 %. Gluten ratios and gluten indexes, which of the important indicators of bread quality in wheat, were analyzed as 27.65-35.30 % and 66.20-97.20 %, respectively. Zeleny sedimentation values were found between 42.5-62.25-ml and delayed Zeleny sedimentation values were determined between 49.0-69.0 ml. Gluten/CP (G/CP) ratio was calculated as 2.06-2.52. The results obtained from the present study showed that bread wheat varieties grown widely in Edirne Province have differences among themselves in terms of some characteristics, but these varieties are in the highest classification in terms of quality criteria. Considering that environmental conditions play an important role in the emergence of these qualitative characteristics of wheat, it can be concluded that wheat varieties grown throughout the province is high varieties has adapted to soil and climatic conditions of the region and good growing conditions are applied.

Keywords: Wheat, Gluten, Crude Protein, Chemical Composition, Bread Quality, Edirne Province

PREVALENCE AND ANTIBIORESISTANCE PROFILE OF FOODBORNE STAPHYLOCOCCUS AUREUS

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ABSTRACT

Staphylococcus aureus is the most pathogenic species within the Staphylococcus genus, ranking third in food-borne diseases worldwide. The aim of this study was to investigate the prevalence and assess the resistance profile of *S.aureus* isolated from several food products widely marketed in the Oran region, Algeria. 350 samples of various raw and processed food matrices were randomly purchased from various outlets and screened for *S.aureus* between July 2021 and September 2022. Isolation and phenotypic identification of strains were carried out using conventional cultures and biochemical tests. The overall prevalence of *S.aureus* determined among the collecteded samples was 31.14% (109/350), where, Pastry and confectionery products harbored the highest contamination rate of 43.59%, whereas prepared meals harbored the lowest contamination rate of 18.18%. The strains presented a high level of resistance 58.71-39.44% for gentamycin and oxacilin respectively, moreover the lowest level of resistance was observed against erythromycin 16.51% and about 83% of strains presented multi-drug resistance. Our study reveals a high prevalence of *S.aureus* contamination in highly consumed foodstuffs in Algeria, which is considered a potential public health risk. Consequently, to reduce and prevent the spread of S. aureus, particularly resistant strains, good hygiene practices at the point of sale and constant monitoring of antibiotic use must be put in place.

Keywords: Staphylococcus aureus, Prevalence, Resistance, food, antibiotics

THE IMPORTANCE OF HONEY BEE PRODUCTS AND ITS PRESERVATION

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ABSTRACT

Honey bee pollination is essential for the production of seeds and vegetables and bees contribute to one-third of the products consumed by humans, and pollinate 84% of the plants necessary for life. Honey bees have been used for the production of honey, beeswax, royal jelly, propolis and pollen. These products have medicinal properties, and the role of bees as pollinators makes them vital for food supplies. Propolis are particularly well known as food supplements thanks to their nutritional and therapeutic properties. Honey has energetic, nutritional and antibacterial properties. Royal jelly has stimulating, antibacterial and nutritive actions. Pollen also has energy and nutritional properties. Propolis, antiviral, antibacterial, antifungal, anti-inflammatory is rather used in the therapeutic field. These products have an interesting potential in human therapy fields including dermatology, otolaryngology, bronchopulmonary, stomatology, oncology and can also be beneficial for athletes. The results of our research concerning honey, propolis and royal jelly showed that their chemical compositions varies according to the phytogeographical regions and to several factors, as well as their bacteriostatic activity. These products, especially propolis, are rich in phenolic compounds and exhibit biological, antioxidant, anti-inflammatory and anti-cancer activities. Bees are important in terms of food, ecology and health and it is imperative to protect because the loss of bees would affect the biodiversity and also world food security.

Keywords: Honey bee, honey, Royal jelly, Propolis, Food supplements

DIETARY SUPPLEMENTS AND CANCER: WHET IS THE DANGER FOR THESES PATIENTS?

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ABSTRACT

A dietary supplement (DS) is a preparation intended to supplement the normal diet, providing nutrients or substances with a nutritional or physiological effect (vitamins, plant extracts, probiotics...etc). Cancer patients suffer not only from the disease, but also from the therapeutic side effects, they resort to anything that can relieve their suffering and strengthen their immunity and improve their health (such as antioxidants and probiotics ... etc). Our work was conducted with the aim of highlighting the food additives in the formulation of food supplements most consumed by these patients. We collected 181 local and imported supplements that we divided into 7 classes according to their uses. The results of this screening reveal the incorporation of numerous additives such as: E422, E330, E202, E420i, E322, E460, E441... etc, with varying degrees of toxicity ranging from allergies to genotoxicities. In conclusion, cancer patients are a very sensitive category, it is important that they are monitored regularly to minimize the risks and maximize the benefits of treatment. Therefore, it is necessary to consult an oncologist or nutritionist before taking any type of supplement.

Keywords: Dietary supplements, cancer patients, food additives, toxicity, investigation

IMPACT OF NUTRITIONAL COUNSELLING ON FOOD BEHAVIOR OF WOMEN IN MENOPAUSAL TRANSITION IN WESTERN ALGERIA

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ABSTRACT

Introduction and objective of the study: The menopausal transition is characterized by a decrease in estrogen levels and an increase in androgen levels, which can generate weight gain, particularly abdominal obesity, these changes are directly related to bad lifestyle habits and can have direct consequences on women's health leading to metabolic disturbance and cardiovascular risk. The aim of the study was to evaluate the impact of nutritional counselling on food habits of women on menopausal transition in western Algeria.
Subject and methods: The study was conducted on 20 women on menopausal transition, aged of (47±2 years), with a body mass index (BMI) of (31±5), waist circumference (WC; 104±11 cm), as well as a hip circumference (HC; 108±12 cm). All enrolled women received dietary advices based on the principles of the Mediterranean diet and were asked to practice a regular physical activity during 60 days. The total energy intake (TEI) was analyzed at the begining of intervention (D0) and day 60 (D60) after the start of the nutritional intervention. The food consumption was estimated using the 24-hour recall method (Recall and Record), and daily energy expenditure (DEE) was assessed using an adapted questionnaire.
Results and interpretation: The women enrolled during the perimenopausal period had a positive energy balance (TEI > DEE). Indeed, the total energy intake (TEI) was (9.2±1.4 MJ) while the DEE was (10.7±1.8 MJ). The TEI was higher compared to the recommended intake of the Mediterranean diet (MD, 8 MJ/day). After 60 days of nutritional follow-up, a significant decrease in TEI (-12.9%; $P < 0.05$) and a significant increase in DEE (4.8%; $P < 0.001$) were observed. The distribution of TEI between different meals of the day showed an imbalance: (17.7%) at breakfast, (31.5%) at lunch, (17.1%) at snack time, (31.4%) at dinner, and (2.6%) from nibbling. A significant reduction in energy intake at snack (-16.8%; $P < 0.05$) and dinner (-21.1%; $P <0.001$) was noted after the nutritional intervention (D60). The quantitative distribution of macronutrients showed that proteins represented (13.9%), carbohydrates (60.7%), and lipids (28.04%) of TEI. The qualitative analysis expressed as a percentage of the total nutrient intake showed that animal proteins contributed (21.6%), vegetable proteins (80.5%), simple carbohydrates (26.1%), complex carbohydrates (74.2%), polyunsaturated fatty acids (PUFA, 27.3%), saturated fatty acids (SFA, 34.6%), and monounsaturated fatty acids (MUFA, 30.9%). After 60 days of nutritional follow-up, a significant decrease in the consumption of sugary products (-11.3%; $p < 0.05$) and fats (-13.7%; $p < 0.01$) was observed, and a significant increase was noted in the consumption of fruits and vegetables (30.4%; $p < 0.005$) and MUFA (8.4%; $p < 0.005$) after the 60-day nutritional intervention.

Conclusion: The adoption of a healthy Mediterranean-style diet, rich in olive oil, plant foods and whole grains, combined with regular physical activity constitutes a means of preventing cardiovascular and metabolic risk in women during the perimenopausal period.

Keywords: Nutritional counselling, Food behavior, Menopausal transition, Energy expenditure

DETERMINATION OF ANTIMICROBIAL POTENTIAL OF CAROTENOID EXTRACTS FROM PEACH POMACE

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ABSTRACT

The industrial processing of fruits generates by-products. A considerable part of harvested peaches is processed to obtain juice, resulting in large volumes of residues. Although typically considered as waste, these remaining materials are commonly rich in valuable compounds, such as polyphenols, vitamins, or carotenoids. Due to the concentration of phenolic compounds in the peels, peach pomace (PP) retains a substantial amount of these compounds, which further enhances its appeal as a highly promising ingredient for diverse applications. It is recognized as a valuable natural resource for obtaining carotenoids. The aim of this study is to determine the minimum inhibitory concentrations (MICs) of carotenoid extracts obtained with ultrasound-assisted enzymatic extraction (UAEE) as an eco-friendly method and traditional enzymatic extraction from PP on *Listeria monocytogenes, Staphylococcus aureus, Salmonella* Typhimurium *and Escherichia coli.* The PP used in the study was obtained from a company which produces peach juice. UAEE was carried out using an ultrasound bath operating at 37 kHz frequency with pectin lyase. The carotenoid extraction conditions of the samples were optimized using the Response Surface Method using the Box-Behnken design. Antimicrobial effects carotenoid extract on *Listeria monocytogenes, Staphylococcus aureus, Salmonella* Typhimurium and *Escherichia coli* were investigated and the MIC values ranged from 1:1 (100%) to 1:512 (0.098%). MIC of polyphenol-rich carotenoid extracts to inhibit for all bacteria groups ranged between 1:1 (100%) – 1:50 (50%). While no inhibitory effect of PP was detected on the pathogenic microorganisms, it was determined that the extract obtained by UAEE exhibited an inhibitory effect against all pathogenic test microorganisms at a ratio of 1:1 (100%). The highest MIC value of the carotenoid extract obtained through conventional extraction was found to be 1:2 (50%) for *Staphylococcus aureus* and *Salmonella* Typhimurium while this value was determined as 1:1 (100%) for other pathogenic test microorganisms.

Keywords: Peach pomace, carotenoid extraction, ultrasound, antimicrobial effect, MIC

THE EFFECT OF CAROTENOID EXTRACT ADDITION ON THE MICROBIAL QUALİTY OF LEMONADE

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ABSTRACT

Bioactive products are extra nutritional constituents that typically occur in small quantities in food and are considered crucial substances for enhancing human health. Conversely, during food processing, a significant number of by-products is generated, which are widely acknowledged as natural reservoirs of bioactive compounds. The reutilization of these agri-food wastes for the recovery of bioactive compounds is efficient in reducing the disposal of organic waste from food processing. In this sense, the possibilities of using carotenoid extracts obtained from peach pomace as a natural antimicrobial agent in the production of industrial lemonade were investigated and the effect of the extract addition on the microbial quality of lemonade was determined in this study. Lemonade was prepared with 300 mL of lemon juice, 30 g of sugar, and 670 mL of distilled water, resulting in a total volume of 1 L. The prepared lemonade was then treated to heat treatment in a hot water bath at 95°C for 5 minutes. Four samples from each group were formed by adding carotenoid extracts at certain concentrations (0.1%; 0.2%; 0.3%; 0.4%) and enumeration of total mesophilic aerobic bacteria (TMAB) and total yeasts & molds (Y&M) were performed. Heat treated and untreated lemonade samples without extract were determined as the control group. While microbial growth for TMAB was not observed in samples using 0.3% and higher extract concentrations, no growth was observed in control group-not heat treated (3.86 log CFU/mL) and in samples using 0.1 % (3.11 log CFU/mL) and 0.2% (4.18 log CFU/mL). The Y&M counts of lemonade samples with added extract were remained below the limit of detection (< 1 log CFU/mL). Considering that microbial growth is observed in lemonade samples without added extract, it is thought that the utilization of carotenoid extracts obtained in food formulations would enhance the microbial quality of the product.

Keywords: Peach, pomace, carotenoid, lemonade, microbial quality

PESTICIDE RESIDUE CHANGES AND PROCESSING FACTORS DURING STORAGE, PREPARATION AND PROCESSING OF PICKLES

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ABSTRACT

Pesticide use is generally inevitable during agricultural practices for the prevention of the disease and pest factors development. These chemicals are considered as safe for human and environment if they are applied at the recommended field doses and the agricultural products are harvested when the pre-harvest interval (PHI) of each compound is completed. Nevertheless, excessive or over use of these chemicals and harvesting before PHI is completed, generally lead to residue problems on the agricultural products. Additionally, type of processing method is effective on the final residue levels of the consumer products. The effect of processing on the residue level is expressed as processing factor and calculated as the ratio of residue levels of processed product and the relevant unprocessed product. Pickling is a common processing technique used for the long term preservation of foodstuffs under acidic conditions without refrigeration. Pickles are widely consumed and produced either at home scale or industrial level. They are mainly produced as ***canned*** and ***fermented*** depending on the type of processing. In this study, different insecticides and fungicides were applied to raw materials during growing in experimental level. The changes in their residues were monitored and the related processing factors were calculated through the each step of storage, preparation and pickling. Reductions were detected in the residue levels of limited pesticides with washing whereas the others remained unchanged. The effects of storage and pickling processing methods on the residue levels were also variable depending on the chemical structure of the active compound. This study was founded by TUBITAK BIDEB with the Grant No. 122C344 and Bursa Uludag University Scientific Research Projects Fund Grant No. 1494.

Keywords: pesticide, residue, pickle, processing factor

TOXICOLOGICAL ASSESSMENT OF SILICA NANOPARTICLES

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ABSTRACT

Silica (SiO2) nanoparticles (NPs) have found numerous applications in various fields, including biomedicine, the food industry (thickening agents, food additives), cosmetology (sun lotions), electronics, the textile industry and industrial chemistry. In this work, we investigated the toxicity of silica nanoparticles on the snail Helix aspersa (bioaccumulative organism and bioindicator of pollution). Bioassays were carried out on four batches: a control batch and three batches treated with increasing doses of fumed silica nanoparticles: 250, 500 and 750 µg/g of food (wheat flour) for four weeks. First, several parameters were tested, including morphological parameters: consumption rate, as well as the fresh weight of the shell of the soft mass of the hepatopancreas and kidney. An assessment of oxidative stress by monitoring the activity of certain biochemical and enzymatic biomarkers (Proteins, GSH, GST, GPX and CAT); we also looked at the histopathology of the hepatopancreas. The results show that the presence of silica nanoparticles induces changes in morphological parameters, reflected in a disturbance in the fresh weight of the hepatopancreas and kidney, an increase in the fresh weight of the soft mass, and a decrease in the fresh weight of the shell. The study of biomarkers shows a state of oxidative stress in Helix aspersa. Our results reveal a decrease in the levels of : GSH, catalase and GPx, while at the same time there was an increase in GST levels. of GST was noted in the hepatopancreas. Histo-pathological examination also clearly showed very significant tissue alterations in the treated batches, confirming the results obtained with the stress parameters.

Keywords: Helix aspersa, nanosilica, Histopathology, oxidative stress

CONVENTIONAL AND NOVEL METHODS FOR MILK AUTHENTICATION

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ABSTRACT

Nowadays, the consumption preference of milk and products changes from bovine to non-bovine, due to the high nutritional value and fewer allergic reactions. The non-bovine dairy products are usually costly and seasonal, which could be a reason for adulteration with bovine milk that is cheaper, prevalent, and available through all seasons. That possibility of adulteration causes few issues like the undesirable sensory and physicochemical properties of dairy products, moreover health problems of people with protein allergies. Therefore, detection of adulteration is significant for consumers for the protection from fraud and mislabeling, but also for producers from unfair competition. This review focuses on the advantages and disadvantages of the conventional methods, and the novel identification methods for milk authentication.

Keywords: Milk, bovine, non-bovine, adulteration, authentication

RECENT ADVANCES IN ANTIMICROBIAL FOOD PACKAGING FOR CHEESE PRESERVATION

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ABSTRACT

Cheese is a very suitable growth medium for microorganisms, which can cause food spoilage and health problems. Packaging plays a significant role in the protection of the food products and improves the shelf life by preventing contamination. Particularly, antimicrobial packaging has come to the fore in recent years. Antimicrobial compounds are involved in a synthetic or natural polymer substrate, thus forming an antimicrobial film for the improvement of microbial safety and quality of the product. Polysaccharides, proteins and lipids have been mostly used as biopolymers for the formation of antimicrobial films, together with antimicrobial compounds like titanium oxide nanoparticles, plant essential oils and extracts as antimicrobial compounds. This review focuses on the recent advances in antimicrobial food packaging for cheese preservation.

Keywords: Antimicrobial, packaging, biopolymer, film, cheese

THE EFFECT OF AQUEOUS EXTRACT OF THE GARLIC AND THE INSECTICIDE IMIDACLOPRID ON REPRODUCTION PARAMETERS IN MALE WISTAR RAT

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ABSTRACT

The present study aims to evaluate the effects of the extract aqueous of garlic and one of the most used insecticide in east of Algeria, Imadoclopride on reproduction parameters. 40 adult male rats *Wistar* were divided into 5 groups of 8 rats in each one. G1 is the control group, the groups G2, G3 and G4 and G5 were exposed to with the 1/30 and 1/15 of LD 50 respectively to the insecticide Imidaclopride and aqueous of garlic in the diet for 6 weeks. At the end of the treatment period, animals were sacrificed. The right testis and epididymis excised and weighed. Sperm was collected from the cauda epididymis for the assessment of the sperm concentration, vitality and mobility of spermatozoa, which carried out by Computer-Assisted Semen Analysis (CASA). The results were compared between different treatment groups; by one way by the *t*-student test, to compare each treated group to the control. The results demonstrate a significant reduction in weight of testis and epididymis in treated groups with the chemical insecticide Imidaclopride. A significant reduction in the sperm concentration, motility, and viability of the spermatozoa were observed in the treated groups with Imadoclopride compared to the control group. No significant change was observed in the groups treated with the aqueous extract of garlic. Thus, we concluded that the chemical insecticide Imidoclopride causes more damages then the natural product, extract of garlic on the male reproductive parameters in the rat.

Keywords: Imidacloprid, extract aqueus of garlic, reproduction parameters, rats

BLACK CARROT EXTRACT LOADED POLYVINYL ALCOHOL-BASED NANOFIBERS: CHARACTERIZATION AND DETERMINATION OF TOTAL OXIDANT-ANTIOXIDANT CAPACITY

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ABSTRACT

In this study three different electrospun nanofiber samples polyvinly alcohol (PVA), polyvinly alcohol +black carrot extract (PVAB) and polyvinly alcohol+black carrot+tin dioxide (PVABT) was produced successfully using the electrospinning method, characterizated. In order to compare how nanofiber coating of plant extracts effect on Total Oxidant Level (TOL) – Total Antioxidant Level (TAL) compared. While the antioxidant level of the black carrot extract covered wiht nanofiber was twice as high as the extract without nanofiber, it was determined that the metal complex added to the nanofiber was higher than the other two samples. In addition, no oxidant was detected in any of the samples. Scanning electron microscopy (SEM) images showed that PVA nanofibers were continuous and they preserved their uniform structure and average diameters were measured as 215.76±75.47. With the addition of black carrot diameters increased to 637.97±91.85 nm. On the other hand for PVABT acumulation of new structures observed and diameter thickness increased to 658.66±101.5 nm respectively. Energy Dispersive X-ray Spectroscopy elemental mapping results of PVABT sample proved the binding and integration of the tin dioxide to the surface of the electrospun nanofibers. Overall, it has been concluded that nanofibers can be fabricated in combination with plant extract and metallic nanomaterials and addition of these materials have ability to affect characteristic properties and antioxidant properties. Therefore, metal oxides and plant extracts have the potential to be used as an active food packaging ingredients for further applications in food industry. In the future, it will be important to determine other properties such as thermal stability, mechanical properties, or water vapor permeabilities of these nanomaterials.

Keywords: black carrot, electrospinning, nanofiber, TAL, TOL

USAGE AREAS OF ULTRASOUND-ASSISTED EXTRACTION IN THE RECOVERY OF BIOACTIVE SUBSTANCES FROM FOOD BY-PRODUCTS AND WASTE

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ABSTRACT

With the increasing population in the world, food production and consumption are increasing rapidly. It is reported that about 39% of organic by-products and waste are generated during the processing of agricultural products. While most of these wastes are disposed, the rest is generally used as animal feed, fuel raw material or fertilizer. In recent years, researchers have been working on developing new and green methods in order to protect the environment, reduce food waste, find new usage area for by-products, and transform these products into high value-added products, within the framework of the understanding of "sustainable agriculture and food". Ultrasound Assisted Extraction (UAE) is emerging as a method of increasing use in obtaining bioactive components from food by-products and waste due to its advantages such as less solvent usage, low temperature operation and environmentally friendly end products. As a result of some studies, it was revealed that UAE method extracts more components in a shorter time compared to traditional extraction methods and the structural and molecular properties of the components are preserved due to the moderate temperature used in the extraction. The aim of this study is to compile and reveal the usage potential of the UDE method in the light of the researches, by considering the usage areas of the UDE method and the factors affecting the extraction in obtaining bioactive components from the by-products and wastes in the food industry.

Keywords: Waste, by-product, bioactive substances, ultrasound assisted extraction, valorization

INVESTIGATION OF ANTIOXIDANT AND ANTICHOLINESTERASE ACTIVITIES OF SOME ERICA SPECIES GROWN IN TURKEY

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ABSTRACT

Plants have been used by people as both therapeutic and protective against various diseases from past to present. In recent studies, plants have been a natural source for the production of many drugs with the revealing of their protective and therapeutic properties against various diseases. In addition to the fact that more than 50% of today's drugs are of natural origin when artificial ones are taken into account, this rate seems to exceed 75%. Turkey has vast plant biodiversity due to its geographical location and climatic characteristics. *Erica* species belonging to Ericaceae family, which is popularly known as "heather", "puren" or "broom bush", spreading in Turkey as a medicinal plant, is used as an infusion and tea for diabetes, hypertension, kidney disorders in folk medicine. Moreover, tea prepared from the aerial parts of these species is preferred as a urinary tract antiseptic, diuretic and constipation reliever, and tea prepared from the leaves is preferred because of its weakening effect. Also, it is used in stomach disorders such as reflux, gastritis, ulcer, and wound treatment as a hemostatic and antinociceptive. In this study, a total of 24 different extracts were obtained from the leaves, flowers and aerial parts of *Erica arborea* and *Erica manipuliflora* by extraction with solvents of increasing polarity, such as n-hexane, dichloromethane, methanol and hot water. The antioxidant and anticholinesterase activities of the different extracts obtained were investigated. The antioxidant activities of the extracts were determined using four different methods: DPPH free radical scavenging, ABTS cation radical scavenging, CUPRAC reducing power and metal chelating activity. Inhibition activities of acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) enzymes, which are closely related to Alzheimer's disease, were studied spectroscopically using the in vitro Ellman method. According to the data obtained from the study, the aerial parts water extract of *E. arborea* has the highest free radical scavenging activity (IC50:7.55±0.31µg/mL) while the methanol extract of *E. manipuliflora* (IC50:9.95±0.30 µg/mL) has the highest DPPH radical scavenging activity. In addition, both methanol and water extracts from the aerial parts of both plants have higher activity in terms of ABTS (IC50: 12.39±1.02 µg/mL, 6.15±0.45 µg/mL; 7.80±0.38 µg/mL, 10.24±0.26 µg/mL) and reducing power capacity (A0.50: 29.71±0.87, µg/mL, 14.93±0.76 µg/mL; 18.51±0.81, 24.47±0.68 µg/mL) than α-tocopherol (IC50: 38.15±0.45 µg/mL) and BHA (A0.50: 25.50±0.43 µg/mL) which are used as standard antioxidants. When evaluated on anticholinesterase activity, it was determined that the acetylcholinesterase enzyme activity of water and methanol extracts obtained from all drugs of both *Erica* species was moderate (≥ 35%). Especially, it was found that methanol extracts obtained from flowers of both species were much more effective than the others on AChE inhibition activity (55.38±0.63%, 58.54±0.95%, respectively). The results show that these species, which have been used for thousands of years among the public, are an important source of antioxidants and have remarkable activity in terms of anticholinesterase.

Keywords: Erica arborea, Erica manipuliflora, antioxidant, anticholinesterase, radical scavenging

COMPARATIVE STUDY OF THE PHYSICOCHEMICAL QUALITY OF PASTA ACCORDING TO THE CHARACTERISTICS OF WHEAT

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ABSTRACT

A study was conducted on El-Baraka Elbow 6 type pasta, made from two varieties of durum wheat (imported and local) to determine the effect of the physicochemical characteristics of wheat as a raw material and semolina as an intermediate material on the physico-chemical properties, organoleptic and culinary aspects of the finished product. The results of the physico-chemical analyzes of the wheat of the two varieties, as well as the semolina from their milling, showed that they complied with Algerian standards with a superior quality in favor of imported wheat. Organoleptic analyzes have proven the importance of wheat purity and the absence of impurities in the appearance of the elbow 6 product. While the gluten content is a critical factor in evaluating the culinary quality of the product. The specific weight of imported and local wheat comply with Algerian standards. On the other hand, the weight of a thousand grains of local wheat is close to that of imported wheat and both are located in the interval recommended by Algerian standards. The moisture content of imported wheat and that of local wheat also comply with Algerian standards. Wheat grading results showed that imported wheat is purer than local wheat. This purity of the wheat is in direct correlation with the brown index of the semolina and elbow 6 as well as the presence or absence of alterations in the appearance of the finished products. For the intermediate product, the semolina of imported wheat and that of local wheat recorded respective water contents of (14.09% ± 0.33) and (13.47% ± 0.45) compliant with and lower than the maximum values required by the Official Journal of the Algerian Republic decree n°80 of December 26, 2007 (14.5%). The ash content of imported wheat semolina (0.89% ± 0.02) and that of local wheat semolina (0.94% ± 0.02) are also compliant and prove to be well within the recommended range by the Official Journal of the Algerian Republic Decree No. 80 of December 26, 2007 (< 1.0%). The ash content is in direct correlation with the brown index (a*) which is equal to (-2.23 ± 0.2) for imported wheat semolina and (-2.14 ± 0.15) for local wheat semolina. Imported wheat semolina is more yellow (38.02 ± 0.61) than that of local wheat (32.37 ± 0.65). These results are acceptable by the quality control department of the EL-BARAKA group. Gluten analyzes showed the richness of imported wheat semolina in this important substance (39.88% ± 2.46) wet gluten, (14.38% ± 0.71) dry gluten and (80.09% ± 4.06) gluten index, compared to semolina local wheat ((33.92% ± 4.53) wet gluten, (12.10% ± 1.69) dry gluten and (67.80% ± 4.51) gluten index. With regard to the finished product, Elbow 6 pasta, the water content of the Elbow 6 finished product made from imported wheat equal to (11.79% ± 0.31) and that of the same product made from local wheat (11.51% ± 0.31) comply with the Algerian standard N.A. 6396, which requires a humidity level between 11.5% and 12.5%. The color of the finished product Elbow 6 made from wheat recorded b* (45.73 ± 1.13) and a* (3.42 ± 0.42) values, while the Elbow 6 made from local wheat recorded values of b* (40.41 ± 1.08) and a* (4.2 ± 0.34) values. These results are also acceptable by the quality control department of the EL-BARAKA group. Regarding appearance, the Coude 6

product made from imported wheat is a quality product without alterations compared to that made from local wheat which has an altered appearance with black pitting and white spots.

Keywords: local wheat, imported wheat, semolina, pasta, physicochemical properties, organoleptic properties, culinary properties, quality

PLANT SEED MUCILAGE BASED BIODEGRADABLE AND EDIBLE PACKAGING MATERIALS

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ABSTRACT

Most food packaging materials are made from petroleum, a non-degradable material that can cause serious "white pollution" and release toxic chemicals, posing a serious risk to food and environmental safety. For this reason, studies on edible coatings with eco-friendly, sustainable and various functional properties have gained momentum in the food packaging industry. It is also known that edible packaging offers additional benefits, such as protection against mechanical and microbial damage, aesthetic appearance, and prevention of loss of desired flavour components. Various seeds/kernels that are by-products in the food industry produce mucilage with different properties that can be used for this purpose. The mucilages obtained from different parts of plants have their own unique composition and properties. Their unique colloidal properties, low production cost, and easy of extraction make them attractive as potential packaging materials. They are often used to reduce moisture and flavor loss and have good gas and water vapor barrier properties. The use of mucilage, a plant hydrocolloid, in edible films can maintain good physicochemical and barrier properties by ensuring food stability. Edible packaging materials with superior functional properties can be obtained with additional components to the mucilage extracted from these seeds, which are used according to the zero-waste principle. These edible films interact positively with food and the environment, reducing the rate of spoilage reactions, extending food shelf life and meeting consumer demands.

Keywords: Seed mucilage, edible packaging, eco-friendly packaging

EFFECT OF HIGH-PRESSURE HOMOGENIZATION ON ACID GELATION OF SESAME PROTEIN ISOLATE

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ABSTRACT

Protein gelation is a functional property that plays an important role in many situations, from living organisms to food preparation, and is used in many industrial applications. In this study, high-pressure homogenized (HPH) sesame protein solutions were acidified with glucono-δ-lactone (GDL), and acidification kinetics, intermolecular force, physicochemical, and functional properties were investigated. Sesame protein solution at 8% (8 g 100 mL-1) concentration was treated with homogenization pressures of 0, 25, 50, 100, and 150 MPa and then mixed with GDL (2 g 100 mL-1). The acidification kinetic parameters, such as *Vmax*, *T5*, and *T4.5*, were affected slightly by increasing homogenization treatment. The maximum *Vmax* recorded was 0.062 pH units/min at 100 MPa. Moreover, *T5*, and *T4.5* were decreased with higher homogenization pressure. The particle size decreases as the applied homogenization pressure increases, specifically before gelation, which also showed a significant increment in particle size after gelation. Higher HPH treatment also increased the water holding capacity, where the highest value was detected as 69.02% at 100 MPa pressure. The whiteness index (WI) of gels was increased with increased homogenization pressure up to 100 MPa, and the highest color difference (ΔE) was obtained from gels produced with the homogenized sample at 50 MPa. The gel network was dominated by hydrophobic interactions for intermolecular forces between protein molecules for all samples, with 100 MPa as the highest at 8.28 mg/mL. This study proved that the GDL-induced sesame protein gel functionality and acidification could be improved with increasing homogenization pressure, with 100 MPa emerging as the best treatment.

Keywords: Sesame protein, high-pressure homogenization, glucono-δ-lactone, acidification kinetics, cold-set gelation, intermolecular forces

THE EFFECT OF VACUUM STORAGE ON THE SENSORY QUALITY OF GLUTEN-FREE BAGUETTE BREAD

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ABSTRACT

The purpose of this study was to verify the effectiveness during 7 days storage in stabilization of the gluten-free bread quality (GFB). The bread was stored for 7 days at 4°C, in vacuum-sealed bags vacuum. Sensory analysis was performed with a group of semi-trained panellists, none of them having celiac disease. The hedonic test allowed to evaluate the breads studied according to descriptors of color, appearance, crumb structure, crumb moisture, elasticity, crispiness, acidity, smell and taste. A scale of 0 to 9 is given to highlight the level of appreciation of the tasters for each descriptor. The Friedman rank test allowed to rank the different breads presented according to the overall appreciation of the tasters and according to each descriptor. The taste, color, and smell of the GFB were all rated higher than the vacuum-preserved bread, and the GFB storage under vacuum was also found to be moister. On the other hand, the texture of the bread, including the alveoli and crust thickness, showed no significant difference between gluten-free bread and vacuum-preserved bread. This means that both types of bread had a similar overall texture, with neither being significantly softer or harder than the other. The results of the study showed that the vacuum-preserved bread had significantly lower sensory quality than the non-vacuum bread. The vacuum-preserved bread had a fresher taste, a softer texture, and a longer shelf life, even though the tasting panel ranked GFB as their top choice, with vacuum-preserved bread coming in second.

Keywords: sensory quality; vacuum storage; gluten free bread, taste; color, moister; texture

INFLUENCE OF VACUUM ON THE MICROBIOLOGICAL STABILITY OF GLUTEN-FREE BAGUETTE BREAD

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ABSTRACT

Maintaining the freshness and good quality of gluten-free bread (GFB) is still a challenge. In order to reduce staling and increase shelf life, vacuum storage was performed on GFB in this study. To evaluate the quality of breads, technological (water, loss during baking, specific volume, color, texture, microstructure) and microbiological analysis were performed. The GFB was stored for 21 days (analysis at 7, 14, and 21 days). During storage, GFB retains significantly more water than bread without storage. This shows that the storage of the bread under vacuum preserves its water content, so the biggest issue was increasing moisture content regardless of the packaging method, which may affect the microbiological stability. For specific volume, results show that there is a stability between the 7th day (1,08±0,10e cm3 /g) and 21st day of storage (1,00±0,08e cm3 /g). The appearance of GFB was more red and yellow, with a significant increase in the color comparing with bread vacuum storage. In terms of texture, the number of alveoli and their average size were significantly lower ($p<0.05$) for the GFB, with rounder and circular alveoli. No significant difference in crust thickness was observed. Microbiological analysis confirmed the good stability and quality of GFB. Yeast and mold contamination appeared after the 21st day of vacuum storage so vacuum storage helped to prevent the growth of bacteria and mold, which can also contribute to staleness. In addition, the vacuum-preserved bread had a longer shelf life than the non-vacuum-preserved bread. This study shows that the packaging system with under vacuum was a key element to prolong the shelf life of GFB and provide stability as a result.

Keywords: under vacuum; stalling; microbiological quality; texture; color

DETERMINATION OF ANTHOCYANIN CONTENT AND SOME PHYSICOCHEMICAL PROPERTIES OF REYHAN DRINK OBTAINED BY DIFFERENT METHODS

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ABSTRACT

Ocimum basilicum L., traditionally grown around the world and known as purple basil or Reyhan in Turkish, is a medicinal and aromatic plant. It is widely consumed in the dried or fresh form to increase the sensorial complexity of many foods such as salads, pasta, sauces, chips, crackers, vegetables, pizzas, soups, seafood, and confectionery, with its unique and strong aroma. At the same time, Reyhan has been the subject of many studies due to its richness in bioactive components. In recent years, consumers are getting more conscious about nutrition, and their interest in healthy nutrition is increasing day by day. Additionally, during the Covid-19 period, keeping the immune system strong has become a compulsory necessity, and thus, the need for vitamins, minerals, and bioactive components has increased more than before. Furthermore, studies show that homemade meals have become more popular as the time spent at home increases. In this regard, taking into consideration the effect of obtaining bioactive compounds from natural sources on the final chemical composition and sensorial characteristics of functional foods, this study aims to produce a purple basil drink and compare different production methods via characterization of the bioactive content of the final products. Within the scope of this study, the total phenolic contents, the total anthocyanin contents, the anthocyanin degradation products, and the antioxidant activities of purple basil samples which were heat treated (80-81°C, 18 min), infused (80°C, 1 hour) and microwaved (2450 MHz, 900 W, 5 min.) were determined. When the results were evaluated, the total phenolic content values, the antioxidant activity values, and the total anthocyanin amounts of the samples produced by the three methods were found in the range of 137.51-247.96 mg GAE/1000 mL, 72.04%-91.19%, and 3.91-7.23 mg/L respectively. The results of the study show that the microwave-applied purple basil beverage has the best bioactive properties among the samples of heat treatment, infusion, and microwave methods. Short-time heat treatment has provided more effective results for the preservation of phenolic compounds.

Keywords: reyhan, purple basil, bioactive component, phenolic component, microwave

THE EFFECT OF DIFFERENT BAKING METHODS ON PHYSICAL AND CHEMICAL PROPERTIES OF BLACKBERRY FORTIFIED BISCUITS

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ABSTRACT

Biscuit has a special role in bakery products, and it is preferable for its long shelf life, availability, and suitability to produce new functional products. However, biscuits are considered as an unhealthy product due to its high calorific value with carbohydrate and oil-rich content as well as the limited presence of bioactive compounds in its composition. Regardless of its nutritional value and effects on health, biscuit is a popular snack with diverse formulations and flavors for many consumer groups. The demand in the market has resulted in an increasing need for new production trends and healthier products. Although there are numerous studies in the literature on the fortification of sweet or salty biscuits with bioactive compounds (probiotics, prebiotics, vitamins, minerals, polyphenols, antioxidants, essential fatty acids, etc.). Another important issue about fortification of biscuits, which are baked at high temperature, still remains unsaturated. Investigation of the stability of bioactive compounds under different process conditions is crucial since most of them are known to be sensitive to heat, moisture, pH, and oxygen. Many food components, especially phenolic compounds, are highly affected by cooking temperature, processing time, and rate of air circulation. Airfryers, which work by circulating hot air in a relatively small volume, have become popular recently, due to reducing cooking time and energy consumption. This research aims to fortify and functionalize biscuits by adding blackberry into the formulation and investigating the effects of different baking methods on the phenolic and antioxidant properties with physical properties. As a result, it was observed that baking with conventional oven provided higher total phenolic content. While the amount of phenolic substance in the biscuits baked in the conventional baking was found to be between 28.43 - 87.43 mg GAE /100 g dry matter, the results obtained from air fryer were between 23.10- 51.52 mg GAE/100 g dry matter. Additionally, using air fryer had no significant effect on the color properties (L*, a*, b*) of the samples, while adding blackberry had a decreasing effect on the brightness and the yellowness values. It was found that neither blackberry fortification nor cooking method did any significant effect on diameter, thickness, and spreading rate of biscuit samples. Briefly, the data obtained from this research suggests that baking method might have an impact on the nutritional value, the bioactive composition, and some physical properties of the fortified biscuit products.

Keywords: biscuit, blackberry, phenolic, texture, air fryer

FLAVONOID AND PHENOLIC AMOUNTS OF FIR CONE SYRUP AND MOLASSES

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ABSTRACT

With the increase in the world population, consumption is also increasing. This situation paves the way for the inactive products to be converted into value-added products and brought into production. Today, the importance given to nutritional supplements and functional foods has increased in the concept of nutrition in the field of health. In this context, cone syrup is also included in the classification of foods containing functional components. Nowadays, pine cone syrup is preferred as a functional food, especially in diseases such as asthma and bronchitis. The gum and resin of the Göknar tree is a species that is traditionally used in the field of health among the people. In addition to these, syrups and molasses obtained from cones have gained importance recently. In our study, total phenolic acid determination and total flavonoid substance determination of syrup and molasses prepared from cones collected from Göknar (Abies ssp.) tree were made. Determination of total phenolic substance was determined by calculating gallic acid equivalence by Folin-Ciocalteu method. Total flavonoid substance determination was calculated with quercetin equivalence by colorimetric method using AlCl3. Analyzes were made with Shimadzu UV 1800 Spectrophotometer using photometric method. The phenolic acid values obtained from syrup and molasses were 384.27 mg GAE/g, respectively; Calculating as 304.74 mg GAE/ L; total flavonoid values were 48.99 mg CE/g, respectively; It was calculated as 43.74 mg CE/L. When the data obtained were examined, it was observed that two functional products were rich in phenolic substances.

Keywords: Göknar, Phenolic substance, Flavonoid substance, Molasses, Syrup

EFFECTS OF HIGH-PRESSURE AND HIGH-SHEAR HOMOGENIZATION PRETREATMENTS ON THE MICROBIOLOGICAL, PHYSICOCHEMICAL PROPERTIES AND POWDER FLOW BEHAVIOR OF KEFIR POWDER

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ABSTRACT

Recently, the use of emerging processing technologies has gained importance in order to improve various properties of milk and milk products. In particular, studies on improving the quality properties of powders such as powder flow properties and wettability and solubility have gained momentum. In this study, the effect of high-pressure and high-shear homogenization pretreatments prior to drying of kefir on the microbiological, physicochemical properties and powder flow behavior of kefir powder was determined. For this purpose, kefir was homogenized at different pressures (50 and 100 MPa) and shears (2500 and 5000 rpm) and then dried using a freeze-dryer. The higher pressure and shear employed, the highest loss of viability and the lowest average particle size of kefir were obtained. After drying, the highest number of viable cells (lactobacilli, lactococci and total bacteria were present at levels of 9.43, 9.37 and 9.81 log cfu/g, respectively) in kefir powder was determined in the sample with 100 MPa pressure. The applied homogenization pretreatments caused a partial increase in the L^* value and solubility of kefir powder, while it led to a significant improvement in the wettability. Depending on the applied homogenization process, the decrease in particle size caused an increase in bulk and tapped densities. Additionally, angle of repose (AOR) value of kefir powders decreased from 37.48o to 29.44o depending on the applied homogenization pretreatment, indicating that homogenization pretreatment significantly improved the powder flow properties. It was concluded that homogenization pretreatment to kefir could improve the microbiological and powder properties of kefir powders.

Keywords: Kefir, kefir powder, high-pressure homogenization, high-shear homogenization, powder properties

OPTIMIZATION OF FLUIDIZED BED AGGLOMERATION PROCESS CONDITIONS TO OBTAIN INSTANT BOZA POWDER

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ABSTRACT

Boza, which is a traditional Turkish non-alcoholic fermented grain beverage, is mostly produced and consumed during the winter months. It can be also consumed in summer, but high temperature causes yeast and lactic acid bacteria to multiply rapidly, thus causing the boza to turn sour in a short time and deteriorate its sensory properties. Different methods are being tried to make boza can be consumed in all seasons of the year. In this study, it is aimed to transform the spray-dried boza powder into instant powder form by using fluidized bed agglomerator, thus enabling the reconstitution and consumption of boza powder at any time of the year. Boza samples were spray-dried under optimized spray drying conditions and then transformed into instant form in a fluidized bed agglomerator using sucrose binder solution. For this purpose, a 20–point experimental plan was created in which the inlet air temperature (50–80 °C) and the amount of binder solution (15–25 mL), and atomization pressure (0.5–1.5 bar) were selected as independent variables. The effects of process conditions on viable lactic acid bacteria count, moisture content, average particle size (D50, µm), solubility, wettability, porosity, and flowability were determined and process conditions were optimized by considering these properties. In general, significant models were created to explain the effects of independent variables on these properties ($P<0.05$). To obtain samples with minimum moisture content, wettability time, angle of repose values and maximum LAB number, particle size, solubility, and porosity, desirability function was used and the optimum points were determined as 73.92 °C inlet air temperature, 0.7 bar atomization pressure and 22.67 mL binder amount with desirability of 0.87. These results suggest that, the agglomerated boza powder presented better flow and instantaneous properties than the control sample obtained by spray drying.

Acknowledgement: This study was supported by the Scientific and Technological Research Council of Turkey (TOVAG 120O909).

Keywords: Boza powder, fluidized bed agglomeration, wettability, reconstitution, surface modification

INVESTIGATION OF BIOLOGICAL PROPERTIES OF GERANIUM SP.

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ABSTRACT

Antibiotic resistance, which has increased rapidly in recent years, is one of the leading public health threats. Studies indicate that this resistance problem, which is expressed in frightening numbers, will cause great loss of life, especially in the 2050s. Alternative methods are being investigated for effective antibiotics in the fight against resistance. *Geranium* belongs to the *Geraniaceae* family and contains about 800 species belonging to 6 genera on earth. *Geranium* species are popularly used for astringent, constipation, diuretic, fortifying, digestive disorders and diabetes. Within the scope of the study, methanol, ethyl acetate, ethanol and hexane extracts of *Geranium* plant belonging to Rize province were prepared and their antimicrobial activities were investigated by agar well method against various Gram negative, Gram positive bacteria and two fungal species. Antiquorum sensing activity was determined using *Chromobacterium violaceum* strains and antibiofilm and antiswarming activity tested with *Pseudomonas aeruginosa* PAO1. According to the results of the study, it was determined that the methanol etil acetate and ethanol extracts of *Geranium sp.* had antimicrobial activity. Additionally *Geranium* sp. had violacein inhibition activity. Thus, it was concluded that the active compound potential of the plant is high and more detailed studies should be done.

Keywords: Violacein, Quorum sensing, Geranium, Swarming

PROBIOTIC PROPERTIES OF LACTOBACILLUS FERMENTUM AND PEDIOCOCCUS PENTOSACEUS ENCAPSULATED WITH OR WITHOUT HYDROGEL OF CELLULOSE MICROFIBER FROM OIL PALM LEAVES

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ABSTRACT

Probiotics have gained significant attention in recent years because they can improve gut health, boost the immune system, and provide other positive effects on human well-being. This study aimed at an *in vitro* characterization of the probiotic properties of *Lactobacillus fermentum* InaCC B1295 (LFB1295) and *Pediococcus pentosaceus* strain 2397 (PP2397) encapsulated with or without hydrogel cellulose microfiber (CMFH) from oil palm leaves (OPL). The experimental design used in this research was an *in vitro* study. The safety of LFB1295 and PP2397 encapsulated with or without HCMF from OPL was assessed, along with the probiotic qualities of autoaggregation, co-aggregation, and hydrophobicity. Hemolytic activity, biogenic amines, cytolysin, gelatinase production, and antioxidant activities (hydroxyl radical-scavenging and DPPH radical-scavenging abilities) were also assessed. The results showed that *in vitro* safety tests showed that PP2397 and LFB1295 cells encapsulated with or without CMFH did not have hemolytic activity and did not produce biogenic amines, cytolysin, or gelatinase. LFB1295 and PP2397, enclosed in CMFH from OPL, compared to free cells, showed higher antioxidant activity. Compared to free cells, LFB1295 and PP2397 encapsulated in CMFH from OPL showed higher antioxidant and autoaggregation capabilities. LFB1295 free cells, however, exhibited the highest hydrophobicity score. Compared to free cells and cells enclosed in these two LABs, LFB1295 and PP2397 exhibited a higher rate of coaggregation with the harmful bacteria *S. aureus* and *E. coli*. The present finding showed that CMFH-encapsulated LFB1295 and (PP2397 were safe probiotics with outstanding antioxidant activity, autoaggregation, coaggregation, and hydrophobicity.

Keywords: Probiotics, Lactobacillus fermentum, Pediococcus pentosaceus, Cellulose Microfiber, Oil Palm Leaves

GOLDEN OIL UNVEILED: ELEVATING OLIVE OIL THROUGH ACIDITY, PEROXIDE VALUE, SPECIFIC EXTINCTION AND OXIDATIVE STABILITY

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ABSTRACT

Algerian olive cultivation holds excellent economic and social importance. In the Setif region, the olive oil sector remains predominantly artisanal and poorly organized. In this study, we conducted physicochemical evaluations of monovarietal oils from four varieties (Chemlel Tefehi, Aghenfes, Agenaou), representing over 50% of the national olive groves. The optimal harvesting period was determined based on the maturity index, and the oils were obtained using an oil dispenser. Various physicochemical analyses were performed to characterize olive oil, including free acidity, peroxide value, and UV absorption standard values. The results indicate that the analyzed oils meet the physicochemical characteristics of extra virgin olive oil, according to the commercial standards set by the International Olive Council.

Keywords: Olive oil, Quality, Physicochemical characterization, Extra virgin

PROBIOTIC PROPERTIES OF LACTOBACILLUS FERMENTUM AND PEDIOCOCCUS PENTOSACEUS ENCAPSULATED WITH OR WITHOUT HYDROGEL OF CELLULOSE MICROFIBER FROM OIL PALM LEAVES

Usman Pato [1], Yusmarini Yusuf [1], Emma Riftyan [1], Evy Rossi [1], Agrina Syahrul [2], Faizan Muhammad [1], Chiara Aliya Ramadhana [1], Lula Mutia Lestari [1] & Swiji Paluvi Lasari [1]*

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ABSTRACT

Probiotics have gained significant attention in recent years because they can improve gut health, boost the immune system, and provide other positive effects on human well-being. This study aimed at an *in vitro* characterization of the probiotic properties of *Lactobacillus fermentum* InaCC B1295 (LFB1295) and *Pediococcus pentosaceus* strain 2397 (PP2397) encapsulated with or without cellulose microfiber hydrogel (CMFH) from oil palm leaves (OPL). The experimental design used in this research was an *in vitro* study. The safety of LFB1295 and PP2397 encapsulated with or without CMFH from OPL was assessed, along with the probiotic qualities of auto-aggregation, co-aggregation, and hydrophobicity. Hemolytic activity, biogenic amines, cytolysin, gelatinase production, and antioxidant activities (hydroxyl radical-scavenging and DPPH radical-scavenging abilities) were also assessed. The results showed that *in vitro* safety tests showed that PP2397 and LFB1295 cells encapsulated with or without HMCF did not have hemolytic activity and did not produce biogenic amines, cytolysin, or gelatinase. LFB1295 and PP2397, enclosed in CMFH from OPL, compared to free cells, showed higher antioxidant activity. Compared to free cells, LFB1295 and PP2397 encapsulated in CMFH from OPL showed higher antioxidant and auto-aggregation capabilities. LFB1295 free cells, however, exhibited the highest hydrophobicity score. Compared to free cells and cells enclosed in these two LABs, LFB1295 and PP2397 exhibited a higher rate of coaggregation with the harmful bacteria *S. aureus* and *E. coli*. The present finding showed that CMFH-encapsulated LFB1295 and (PP2397 were safe probiotics with outstanding antioxidant activity, autoaggregation, coaggregation, and hydrophobicity.

Keywords: Probiotics, Lactobacillus fermentum, Pediococcus pentosaceus, Cellulose Microfiber, Oil Palm Leaves

PRESENT APPROACHES TO REDUCE THE PESTICIDE RESIDUES IN FOODS

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ABSTRACT

Pesticides are chemical compounds which are used to control pests on crops. The pesticide residuals can be harmful to both the environment and consumers' health. Pesticide residues in food products are a significant concern among consumers worldwide. Establishing regulations for pesticide use is the first step in addressing concerns about their harmful effects. While many unit operations include washing, peeling, and blanching to eliminate residuals, the application of these operations depends on the food product which may not require any of them. Novel technologies are employed to remove pesticide residuals from food products while offering usefulness, environmental friendliness and less adverse effects. Emerging technologies including cold plasma, ozone, pulsed electric field, irradiation, high pressure and ultrasonication have been used for the removal of pesticides. Although traditional methods have their limitations, innovative techniques like cold plasma offer the potential for efficiently decreasing pesticides without compromising quality. Moreover, the combination of novel technologies with conventional operations like washing with ozonated water may be considered an effective elimination method for pesticides. Closing the divide between research and real-world implementation holds significance. As the accumulation of pesticide in foods are considered, essential steps involve understanding the toxicity of intermediate byproducts and investigating economical options, which can ultimately provide advantages for both producers and consumers.

Keywords: pesticides, emerging technologies, cold plasma, ozon

UREASE ENZYME INHIBITION ACTIVITIES OF PHENOLIC COMPOUNDS ISOLATED FROM LIQUIDAMBAR ORIENTALIS LEAVES

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ABSTRACT

Turkey has a rich flora, and medicinal plants include a significant part of this flora. *Liquidambar orientalis* is an endemic species that grows in the Southwest of Turkey. *L.orientalis*, popularly known as "Sığla" or "Günlük", is widely used in phytotherapy in Anatolia due to its medicinal and cosmetic properties. The urease enzyme plays a crucial role in developing intestinal-type gastric cancer in diseases such as gastritis and ulcer caused by *Helicobacter pylori*, a carcinogenic bacterium. The damage caused by *H. pylori* in the stomach is due to the increase in the urease enzyme, which is the basis for the emergence of cancer. Urease enzyme inhibition is recognized as a treatment for infections caused by urease-producing bacteria. With this approach, interest in using urease enzyme inhibitors in treating chronic stomach disorders has increased in recent years. In this study, *L. orientalis* leaves, which have been used externally and internally for many disease treatments for thousands of years, especially for gastrointestinal disorders, were extracted with solvents with increasing polarity. The in vitro urease enzyme inhibition activities of the extracts were determined. The methanol extract with the highest activity was isolated under appropriate chromatographic conditions under urease enzyme inhibition activity guidance. The structures of the purified compounds were elucidated using NMR, FTIR, and mass spectrum methods. Accordingly, quercetin, quercitrin, myricetin, myricitrin, methyl gallate, and cinnamic acid were obtained from the leaves of *L. orientalis.* Urease enzyme inhibition activity of these compounds was determined in vitro by comparison with the reference substance, thiourea. Consequently, it was concluded that all of the compounds have higher activity than the reference substance, thiourea, and especially myricetin (IC50: 11.80±0.51µg/ml) and quercetin (IC50: 20.93±0.31µg/ml) can be good urease inhibitors. While these results confirm the rationale for the use of *L. orientalis*, which has been used among people in digestive system disorders for thousands of years, it shows that *L. orientalis* can be a natural source in terms of urease enzyme inhibition activity. The results obtained have been determined in vitro and need to be confirmed by animal experiments.

Keywords: Liquidambar orientalis, urease enzyme inhibition, quercetin, myrcetin, cinnamic acid

SILVER FIR (ABIES ALBA MILL.) SEEDLING RESPONSE TO ABIOTIC STRESS CAUSED BY LOW TEMPERATURES

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ABSTRACT

Scientists and society have become increasingly concerned about climate change in recent years. Numerous abiotic stressors, such as soil salinity and drought, influence plant and agricultural growth, as well as the distribution of wild species in the natural environment. Furthermore, temperature stress limits seedlings' growth, especially in the early stages of plant development. Coniferous forests are susceptible ecosystems to the effects of climate change. Silver fir (*Abies alba*) is one of the most important forest trees in Central Europe, particularly in mountainous terrain and in the continent's southern and eastern regions. The current study adds new data regarding the variability of the species and contributes to the finding of possible genetic resources with an adequate response to the activity of various abiotic stressors. Some parameters of importance for *A. alba* afforestation and reforestation operations were investigated using biological material from seven different Romanian provenances. Data on seedlings' growth was linked to soil moisture and electroconductivity, and the results revealed significant differences between provenances. The electrical conductivity of the soil decreased as the temperature dropped, although the humidity increased considerably. Cold stress exposure at various low temperatures revealed no differences between seedlings from different geographic origins at -20 °C, a finding explained by temperatures in the Romanian fir-growing regions. Seedlings exposed to -40 °C were compromised within all provenances investigated. The study highlighted correlations between the effects of cold and soil on the growth of silver fir seedlings and highlighted some valuable sources for future strategies of species breeding and capitalize on forest genetic resources.

Keywords: abiotic stress, climate change; coniferous; silver fir

APPLICATION OF MOBILE FLUORESCENCE SPECTROSCOPY AS A METHOD IN THE DETERMINATION OF VARIETAL DIFFERENCES IN RADISH (RAPHANUS SATIVUS) SEEDS

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ABSTRACT

Standard methods used for the quality of seed are relatively slow and require expensive consumables. A fiber-optic mobile installation for the investigation of radish (Raphanus sativus) seeds has been successfully adjusted and tested. The proposed method includes studies of radish seeds from standard varieties and those from first generation hybrids by dint of fluorescence spectroscopy. The spectral distributions are unique to the seeds of a specific variety or hybrid. This fact gives reason for the use of the installation in recognizing available radish seeds of unknown origin in a non-invasive way with high accuracy. The stability of a breeding line and its common blacks with an established variety of the same species can be monitored by monitoring the signal intensity. The stability and signal intensity level of the hybrid significantly differ from those of the standard varieties. Spectral distribution with reflected emission wavelengths of the studied radish seeds of the standard variety and first-generation hybrids show a clear deviation of the hybrid from the characteristic distribution of the standard varieties.

Keywords: fluorescence spectroscopy, radish seeds, standard varieties, first generation hybrid

EFFECT OF CHANGE CLIMATE ON VINE BUDBURST AND FLOWERINGDATES IN TWO CONTRASTING REGIONS OF ALGERIA, ONE MOUNTAINOUS AND THE OTHER PLAIN

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ABSTRACT

Global warming is a reality that has been strongly felt in recent years in Algeria. Fruit growing is exposed to the impacts of this warming, especially the vine. The effect of climatic variability on the behaviour of this species, Muscat Italia variety, was studied through a comparative analysis between a time series of daily temperatures, from 1980 to 2016, and a series of phenological observations (budburst and flowering), from 2000 to 2016, and from 1988 to 2016 in two regions with contrasting climates, in the North of Algeria, Benchicao (1133m), department of Médéa and Boumedfaa (260m), department of Ain Defla. Three approaches were undertaken: statistical, biological and modelling. The statistical approach was carried out on the climatic data of the two regions with contrasting climates. The biological approach consisted in determining the major periods of accumulation of the cold and heat unit requirements coinciding with the beginning of bud break and the beginning of flowering for the species studied. Climatic and phenological data were used in the modelling to predict future budbreak and flowering dates by the phenological platform, PMP5.5. Contrasting trends according to site and period were demonstrated: a significant warming was observed at the Boumedfaa (BM) site (0.50***), with a highly significant increase in mean annual maximum temperatures (0.56***). A trend towards earlier bud break dates for the grape variety 'Muscat Italia' was reported at Boumedfaa. No average warming was observed in Benchicao. However, late bud break was observed in the vineyard, as the continuous drop in temperature during the period February to March seems to have hindered the lifting of the dormancy of the buds. The failure to meet the cold unit requirements at the Boumedfaa site strongly affected the fitting efficiencies of the classical phenology models. Two models gave acceptable efficiencies when modelling flowering dates at Benchicao and Boumedfaa, Parabolic and Smoothed Utah respectively. Nevertheless, the parameters of these two functions are inconsistent with the physiology of the vine, especially the T0, indirectly confirming the existence of the failure of these models to take into account more complex physiological processes that occur in borderline areas like Boumedfaa.

Keywords: Global warming, vine, budburst, flowering, modelling

PEPPER SEEDLING DEVELOPMENT AFTER APPLICATION OF LEAF FERTILIZER PROTIFERT LN 6.5

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ABSTRACT

The main goal of the present study was to establish the effect of different ways for the application of the leaf fertilizer Protifert LN 6.5 on the development of pepper seedlings. The experiments were carried out in the Experimental field of the Department of Horticulture at the Agricultural University-Plovdiv, Bulgaria, with pricked-out seedlings of two pepper varieties Kurtovska kapia 1619 and Bulgarski rotund. In the stage of four leaves the leaf fertilizer Protifert LN 6.5 was used in two ways- as foliar and as a growing media application in three concentrations - 1.0%, 2.0%, and 3.0%. Twenty days after application the morphological development was established. Following parameters: weight and volume of roots, weight, high, and diameter of the stem, as well as weight, number, and area of leaves, were established. Dry vegetative weight, number of flower buds, and content of total chlorophyll were determined. The ratio between individual organs to the formation of total vegetative weight and Index of development were calculated. A strong positive correlation between high and weight of the stem as well as between the number and weight of leaves were established. Polynomial regression between concentration and total vegetative weight with high determination coefficients R2=0.84 and R2=0.88 was determined. The best development of the pepper seedlings was observed in foliar treatment of 2.0% Protifert LN 6.5, which can recommend for practice application.

Keywords: morphology, vegetation, fertilization, leaf area, vegetative ratio

STUDY ON THE STORABILITY OF CAPE GOOSEBERRY (PHYSALIS PERUVIANA L.) SEEDS

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ABSTRACT

The goal of this study was to establish the duration of the storage in which the seed of cape gooseberry keeps high sowing and viability qualities. The objects of this investigation were the cape gooseberry seed stored in the laboratory, non-controlled conditions in paper pouches. The seed was produced in 2016 year in the Experimental field of the Agricultural University-Plovdiv, Bulgaria, and sowing qualities were tested annually to the seventh year. The seeds from Plovdiv and Obrazec 1 varieties were harvested in botanical maturity. Several parameters of the germination status and vigor, as well as morphological behaviors of the seedlings and some germination index, were established. Preservation of high sown qualities was reported until the 6th year with germination higher than 80%, but in the 7th year the vitality dropped sharply and this indicator had zero values. The seedling fresh weight depends strongly on the length of hypocotyls and embryo root which is also proven by the established high correlation dependencies with coefficients r=0.7 and r=0.90. Already in the second year, the deviation of seedling development was observed. The relationship between storage period and germination rates and vigor index is described very well by the established linear regression with determination coefficients of R2=0.89 and R2=0.96, respectively. The variety response of different sowing and quality parameters towards storage was established.

Keywords: germination, vigour index, ageing, deterioration, viability

POSSIBILITIES OF MONITORING THE GROWTH AND DEVELOPMENT OF VEGETABLE PLANTS BY VEGETATION INDICES

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ABSTRACT

Remote sensing technology is based on obtaining information about specific properties of plants without directly coming into contact with them. The use of remote sensing technology to monitor cultivated crops provides an effective tool for extracting information about their growth and development. The biophysical properties of vegetable plants can be characterized by spectral images in the form of vegetation indices. Vegetation indices provide information on the biochemical composition and structure of the leaves and the general state of the photosynthetic apparatus. The information obtained is correlated with a database of analytical measurements (in situ) and supports the design of agronomic treatments. The main aim of this paper is to review vegetation indices from remote sensing and identify those that can be used to monitoring the growth and development of vegetable crops.

Keywords: vegetable crop production, remote sensing, monitoring of plans

ASSESSMENT OF THE ECOPHYSIOLOGICAL STATUS AND PRODUCTIVITY OF TOMATOES - EARLY FIELD PRODUCTION IN THE AREA OF SAEDINENIE VILLAGE, BULGARIA

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ABSTRACT

Tomato plants are influenced by a number of environmental factors in their growth and development. Agro-climatic conditions are the basis of their physiological status, which influences their overall productivity and yield. The main aim of this paper is to estimate the ecophysiological status and productivity of tomato plants grown under open field conditions by analyzing the main agro-climatic factors, soil characteristics, photosynthesis and transpiration parameters, biomass accumulation and yield.

Keywords: tomato, Solanum lycopersicon, photosynthesis and transpiration parameters, productivity of plants

REMOTE SENSING IN HORTICULTURE - SCIENTIFIC INFORMATION AND PRACTICAL IMPLEMENTATION: CASE OF BULGARIA

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ABSTRACT

Vegetable production as a basic element of horticulture is well established in Bulgaria. The modernization of technologies, the introduction of new varieties and the optimization of growing conditions require the search for new methods to monitoring and assessing the status of vegetable crops. There is a need for permanent observation, almost in real time, to obtain information quickly when environmental conditions change, diseases appear, pests attack or the ecophysiological status of the plants changes. In response to these high requirements of modern vegetable production, the use of remote sensing methods is more and more relevant. The aim of this paper is to review the scientific information on remote sensing in horticulture and to identify opportunities for its use in Bulgaria.

Keywords: vegetable crop production, remote sensing, productivity of plants, vegetation indices

DETERMINATION OF VEGETATION INDICES BY REMOTE SENSING TECHNIQUES OF PEPPER (CAPSICUM ANNUUM) GROWN IN OPEN FIELD

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ABSTRACT

The vegetation indices acquired by various remote sensing techniques are simple and effective tools for quantitative and qualitative assessment of growth and development of vegetable plants. Different methods - ground, airborne and satellite - are used to generate them. Unmanned aerial vehicles (UAV) are also widely used. At present, no universal mathematical formulas have been developed to determine all vegetation indices. Specific algorithms are being developed depending on the object of the monitoring and the conditions for acquisition of image data. The main objective of this study is to determine and compare the vegetation indices (NDVI, SAVI), obtained through remote sensing techniques such as satellites with different spatial resolution and UAV for pepper grown in open field. The studies were conducted in the land of the village of Katunitsa, region Plovdiv, on a cultivated crop field in 2021.

Keywords: Vegetation indices, NDVI, remote sensing, vegetable crop production

STUDY OF THE POSSIBILITY FOR PROPAGATION OF FICUS SPECIES BY CUTTINGS

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ABSTRACT

The main aim of this study was to establish the possibilities for Ficus sp. propagation by different type of cuttings and application of Indole acetic acid (3-IAA). Experiments were carried out in Experimental fields and Scientific laboratories of the Department of Horticulure at the Agriculturae Univesrity – Plovdiv, Bulgaria with following Ficus species: Ficus benjamina f. exotica, Ficus benjamin f. Danielle, Ficus bejamina f. Anastasia as well as Ficus alli. From these species the leaf and top cuttings were taken and dip of lukewarm water for 20 seconds. After that the cuttings were dipped in powder of 3-IAA and immediately were put perlite. As control was used the same cuttings without teratment in this plant growth regulator. Periodically the rooting was tested and it mass appearing of roots was established at 60 days and the plants were transplanting in pots and each necessary agriculture practices especially watering and water spraying was applied. The percentage of rooting was determined. The length, number of main branches, volume and weight of the roots were analyzed. In top cuttings the number of new developed leaf was also observed. It was established that in both types of cuttings of Ficus bejamina f. Anastasia each plants were perished while in Ficus benjamina f. Danielle 20% of the plants were survived. In other two species regardless of type of cuttings the bigger part, around 90% of the new plants were survived. More survived and good development was observed in top cuttings of Ficus benjamina f. exotica. It can be recommend that for Ficus propagation is better touse the top cuttings and treatment with 3-IAA.

Keywords: cutting, 3-IAA, rooting, Ficus benjamina, Ficus alli, survival

STUDY OF THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF WINE GRAPE CLONES FETEASCA NEAGRA 9 Mf AND BABEASCA NEAGRA 4 Mf IN THE CONDITIONS OF THE MURFATLAR VINEYARD

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ABSTRACT

The ecopedoclimatic conditions of the Murfatlar vineyard are among the most favorable for the cultivation of grapevines, especially in relation to the quality of the production. These allow the accumulation of high concentrations of sugars in the must (often over 200 g/l), with the possibility of producing a wide range of white, rose or red wines, from dry to natural sweet wines. In the past decade the amelioration work carried out at the research center Murfatlar was concentrated on to select the most valuable biotypes from the Romanian cultivars populations. As a valuable results, in 2009 year was registered the Feteasca neagra 9Mf clone and in 2019 year was registered the Babeasca neagra 4Mf clone. Taking into account the actual climatic changes, it is very important to test and to prove the both new clones adaptability at the Murfatlar conditions. At Research Center Murfatlar, in the 2020 - 2022 period, a study of the adaptability for the Murfatlar viticultural ecosystem of these two clones was carried out. Climatic data for the three years of study were recorded and interpreted, and observations and determinations were made regarding the agrobiological and technological characteristics of the two clones grown in the own experimental fields, on a cambic chernozem soil, with an average humus content, the used trellis being the Guyot system on the half-trunk with planting distances of 1.1 X 2.2 m. In the climatic conditions of the three years, the studied varieties are characterized by a medium fertility for Babeasca neagra 4 Mf - 70% and a good one for Feteasca neagra 9 Mf - 82%. Babeasca neagra 4 Mf proved to be a clone with moderate resistance to drought, diseases and pests, constantly ensuring high productions of 14-15 t/ha. The grapes accumulate around 200 g of sugars/liter, the wines obtained are dry, red or rose in color, the alcohol content being moderate but supported by a high acidity that gives it freshness. Feteasca negra 9 Mf is a clone with good resistance to drought, manna and slightly sensitive to oidium. The grapes reach over 210 g, ensuring productions of 8-10 t/ha. It accumulates over 220 g/l of sugars in the must, the acidity being lower. The wines have an intense, red-violet color, well structured, with a harmonious taste, with hints of berries and dried plums. During the three years of study, both clones proved a good behavior in the conditions of the Murfatlar vineyard.

Keywords: grapevine, local cultivars, climate, suitability, wine quality

STUDIES REGARDING THE RECOVERY OF PHENOLIC COMPOUNDS FROM GRAPE POMACE OBTAINED FOLLOWING THE PROCESS OF RED WINES VINIFICATION THROUGH CLASSIC EXTRACTION METHODS

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ABSTRACT

Grape pomace is characterized by a high content of phenolic compounds as a result of their incomplete extraction during the winemaking process. Phenolic compounds are secondary metabolites of plants with beneficial effects on human health as a result of their antioxidant activity, as well as their antimicrobial, antiviral and anti-inflammatory properties. The objective of the present study was the research on the recovery of phenolic compounds from grape pomace by classical extraction methods using hydroalcoholic solutions of different concentrations (0%, 25%, 50%, 75%, 96%). The study were performed in a vineyard belonging to the Research and Development Station Murfatlar, on the grape pomace produced in two consecutive years (2020 and 2021) following the vinification process of three cultivars (*Vitis Vinifera*) for red wines authorized for Designation of Controlled Origin - DOC Murfatlar, namely: two international varieties very well adapted to the conditions of the Romanian wine terroir, Pinot noir and Cabernet Sauvignon, and a autochthonous Romanian cultivar, very widespread in the country, Feteasca neagra. For the determination of the phenolic compounds of interest (total polyphenols and anthocyanins), spectrophotometric methods were used. The obtained results showed significant differences in phenolic compounds and total anthocyanins, both by the utilised hydroalcoholic concentration solution and by the studied cultivars. The highest content of total phenolic compounds was registered for the 50% hydroalcoholic solution, the value being 4295 GAE mg/l, and regarding the cultivar, the best results were obtained for Cabernet Sauvignon (5967 GAE mg /l), followed by Feteasca neagra (3682 GAE mg/l) and Pinot noir (3239 GAE mg/l). The valorization of grape pomace by recovering the phenolic compounds is an efficient, profitable and ecological alternative for the by-products resulting from the winemaking process.

Keywords: Red grapes, Secondary products, Bioactive composition, Hydroalcoholic solutions

PRODUCTIVITY OF CAPSICUM ANNUUM UNDER REGULATED WATER DEFICIT CONDITIONS

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ABSTRACT

A field experiment was conducted in the experimental base of Agricultural University-Plovdiv, with the aim of establishing the influence of a regulated water regime on the productivity of pepper (*Capsicum annuum)*. The study was conducted with the pepper cultivar "*Ivaylovska Kapia*" variety. The experiment was conducted in the period 2021-2022, according to the method of long plots. The following variants were tested: 1) optimal irrigation (100 % m); 2) irrigation with 75% m; 3) irrigation with 50% m; 4) 50% m, supplied through row 100% m; 5) 25% m, supplied through row 50% m. All variants are irrigated simultaneously through a drip system, with the corresponding correction of the size of the irrigation rate. With optimal irrigation, an average yield of 5.6 t/da was realized. It was established that the pepper reacts favourably to a moderate water deficit. Depending on the year, when the irrigation rate is reduced by 25%, the yield is in the range of 71 - 97.9% or an average of 4.7 t/da. When realizing 50% of the irrigation water, the yield is on average 3.9 t/da or 58-81% of the maximum. Good results were obtained with the realization of 100% m per row - 3.8 t/da. The application of 25% m significantly reduced the yield, being only 16.5% of the maximum in dry years. The productivity of the irrigation rate at optimal irrigation is 8.1 kg/da/m3, increasing to 10.8 kg/da/m3 when 50% of the irrigation rate is implemented.

Keywords: pepper, water deficit, yield, productivity

EVAPOTRANSPIRATION IN PEPPER (CAPSICUM ANNUM) UNDER CONDITIONS OF REGULATED WATER REGIME

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ABSTRACT

A field experiment was carried out at the Agricultural University of Plovdiv, to establish the evapotranspiration in pepper depending on the applied water regime. The experiment was conducted in the period 2021-2022, using the method of long plots in four repetitions. The variants of the experiment are: 1) optimal irrigation (100% m); 2) irrigation with 75% m; 3) irrigation with 50% m. All variants are irrigated simultaneously through a drip system. The size of the irrigation rate in the optimal variant is calculated for an active soil layer of 0-40 cm and pre-irrigation humidity 80% of FC. The corresponding correction has been estimated for the other variants. With optimal irrigation, the water consumption is on average 803 mm for the 0-40 cm layer. Reduced irrigation rates reduce total evapotranspiration from 19% to 37% on average. Maximum values of the average day-night evapotranspiration, recorded during the first ten days of August, are in the range of 5.2 mm/day when implementing ½ of the irrigation rate to an average of 8.3 mm/day with optimal irrigation. When reducing the size of the irrigation rate by 25%, the average daily water consumption reaches an average of 6.8 mm/day. Evapotranspiration in pepper, irrigated optimally, is formed by the annual irrigation rate - on average 85.9%, vegetation precipitation - 12.8% and only 1.4% of the accumulated water reserve in the soil. The reduction of the irrigation rate by 50% leads to a change in the share of its constituent components, as follows: 71.1% - annual irrigation rate; 22% - precipitations and 7% - water reserve.

Keywords: papper, evapotranspiration, water deficit, water use

CHARACTER PROJECTIONS IN PEACH VARIETY DEVELOPMENT

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ABSTRACT

Peach (*Prunus persica* L.) is the third most produced temperate climate fruit species after apple and pear in the world. *Prunus persica* is a diploid species and, unlike other Prunus species, is naturally self-fertility. For this reason, it has an extensive breeding history. It has spread from the gene center to temperate and sub-tropical regions of the world in the last few thousand years. Early breeders worked to improve the commercial properties of fruit such as fruit color, flesh firmness and attractiveness. In the last 30 years, breeders have aimed for new characters such as food quality and biochemical contents that are of interest to producers and consumers. In the development of peach varieties, consumer demand plays an important role, fruit quality characteristics are at the forefront. Characteristics such as tree habitus, adaptation to different climatic conditions, resistance to diseases and pests are added to this. However, new breeding targets are emerging due to global climate change. Depending on this; sustainability of breeding programs is of great importance in order to obtain new varieties that are suitable for climatic and soil conditions, resistant to biotic and abiotic stress conditions, high yield and quality, suitable for different consuming methods, maturation times (very early, early, mid-term, late, very late). Perhaps in the coming years, breeding characters that will adapt to global climate change will be much more important for the sustainability of production, rather than yield and quality. In this study, prominent characters and future projection in peach cultivar development from past to present are revealed.

Keywords: Prunus persica L., variety, breeding, climate change

POMOLOGICAL CHARACTERISTICS OF KABAK APPLE GENOTYPES GROWN IN ORDU

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ABSTRACT

This study was carried out to determine some pomological characteristics of Kabak apple genotypes grown in Ordu province. In the fruit samples taken from 14 genotypes determined within the scope of the research, fruit weight, fruit width, fruit length, stalk cavity width, stalk cavity depth, calyx basin width, calyx basin depth, seed cavity width, seed cavity length, firmness, soluble solids content (SSC), and titratable acidity (TA) properties were investigated. According to the research findings, fruit weight was between 169.71 g (K-5) and 282.71 (K-1) g, fruit width was between 70.45 mm (K-3) and 82.93 mm (K-1), fruit length was between 53.65 mm (K-3) and 72.08 mm (K-7), stalk cavity width was between 16.59 mm (K-9) and 27.43 mm (K-1), stalk cavity depth was between 5.58 mm (K-9) and 8.82 mm (K-14), calyx basin width was between 12.55 mm (K-9) and 25.06 mm (K-1), calyx basin depth was between 3.21 mm (K-14) and 11.94 mm (K-5), seed cavity width was between 31.39 mm (K-10) and 42.88 mm (K-1), seed cavity length was between 25.13 mm (K-3) and 35.31 mm (K-1), firmness was between 5.07 kg cm-2 (K-1)-6.62 kg cm-2 (K-6), SSC was between 6.80% (K-10) and 9.10% (K-13, K-14), TA was between 0.37% (K-12) and 0.64% (K-7), and pH was between 2.94 (K-6) and 3.17 (K-3). As a result of the study, some examined apple genotypes can be recommended as breeding material for future studies.

Keywords: Firmness, fruit weight, genetic resources, SSC, TA

PHENOLOGICAL DEVELOPMENTAL STAGES AND FRUIT QUALITY PROPERTIES OF DIFFERENT BLUEBERRY CULTIVARS GROWN UNDER SOILLESS CONDITIONS

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ABSTRACT

Blueberry is a type of berry fruit that stands out with its antioxidant properties and that production and consumption is increasing rapidly in the world. Soilless blueberry growing provides high unit area yield compared to soil cultivation. In addition, yield and fruit quality increase with a controlled cultivation process made in computer-controlled automation systems. Furthermore, the use of less water and fertilizer compared to soil-based agriculture ensures sustainability in production. The most important factors affecting success in soilless blueberry growing are cultivar, system planning and plant nutrition management and all these factors should be planned according to the ecology. Highbush blueberry cultivars (southern and northern) are popular in our country. It is necessary to reveal the adaptations of the cultivars according to the regions both in open air and under greenhouse conditions. In this study, some plant growth parameters and fruit quality properties of three different southern highbush blueberry cultivars were investigated in soilless cultivation in Antalya ecological conditions. 'Misty', 'Biloxi' and 'Star' cultivars were used in the study. In the study, acidic cocopite was used as growing medium. The nutrient solution was applied at pH=4.5, EC=0.8 dS/m throughout the vegetation and irrigation schedule was applied according to solar radiation. Morphological and phenological properties (leaf width, length, flowering and first harvest date) and pomological properties (fruit width, length, weight, total soluble solid content, color L, a*, b*, C° and h* values) were recorded. As a result of the study, it was observed that 'Misty' was the earliest cultivar in terms of both flowering and harvest date. This cultivar was followed by 'Biloxi' and 'Star' cultivars. The highest fruit weight and soluble solid content were determined in 'Star' cultivar, while the lowest was determined in 'Misty' cultivar.

Keywords: Southern highbush blueberry, subtropical conditions, earliness, fruit quality

POMOLOGICAL PROPERTIES OF SOME CORNELIAN CHERRY (CORNUS MAS L.) GENOTYPES

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ABSTRACT

Cornelian cherry (*Cornus mas* L.), a fruit-bearing shrub or small tree, has been traditionally appreciated for its culinary uses and medicinal properties. In the present study, phenotypic variation of 10 seedlings originated accessions of cornelian cherry was investigated to select the superior trees. The highest values in terms of pomological characteristics; fruit width 17,22 mm, fruit length 23,28 mm, seed width 6.84 mm, seed length 14.92 mm, fruit weight 5,28 g, fruit flesh weight 4.81 g, seed weight 0.59 g genotypes were determined to have. TSS is between 8.75% and 18.66%, titratable acidity is between 1.74% and 3.82%, pH 2.96 and 3.48.

Keywords: Breeding, Fruit quality, Cornelian cherry, Physical properties

EFFECTS OF COPPER NANOPARTICLES AND SUCROSE-DEPENDENT EVALUATION OF BIOMASS AND TOTAL PHENOL-ANTIOXIDANT CONTENTS IN ADVENTITIOUS ROOT CULTURES OF RAPHANUS SATIVUS (L.)

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ABSTRACT

Radish (*Raphanus sativus* L.) is one of the important vegetables of the *Cruciferae* family due to its healing properties in terms of health. *In vitro* adventitious root culture provides a preferred alternative method to produce valuable bioactive compounds. In the current study, hypocotyls obtained after germination of red and black radish seeds were used as starting material, the effect of different amounts of sucrose (20, 30, 40 and 50 mg L-1) and the effect of copper nanoparticles on adventitious root formation was evaluated in terms of biomass formation, total phenol and total antioxidants. When the results obtained from the study are evaluated, it is thought that radish adventitious root cultures can be used effectively on obtaining bioactive compounds in large-scales for industries.

Keywords: Biocompounds, in vitro, root culture, medium strength

POSTHARVEST APPLICATION OF OXALIC ACID ENHANCES ANTIOXIDANT ENZYMATIC ACTIVITY OF PEACH FRUIT DURING STORAGE

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ABSTRACT

The highly perishable postharvest life of peach fruit is a major hindrance in its production enhancement. Surface treatments are necessary to delay physiological and prevent degrading processes that curb the quality of the product. Treatments with different chemicals are beneficial because the enzymes and substrates released from injured cells are rinsed from the product surface. In the present study the effect of oxalic acid (OA) treatments, applied as postharvest dips to peach fruit cv. 'Flordaking' on fruit quality attributes, bioactive compounds, antioxidant activity, ethylene biosynthesis and the antioxidant enzymes during long term cold storage was investigated. During storage, fruit firmness, total acidity, total antioxidants and antioxidant enzymes activity was higher in treated fruits as compared to the untreated ones. In addition, the activity of catalase, peroxidase and superoxide dismutase was also enhanced significantly by the treatments applied as postharvest dips. Furthermore, fruit weight loss, changes in fruit color and ethylene climacteric peak were lowered significantly by postharvest treatments of oxalic acid. Thus, postharvest treatment with oxalic acid could be a safe, eco-friendly and new tool to maintain the quality attributes and especially the contents of antioxidant compounds, with an additional effect on delaying the postharvest ripening through increasing the levels of antioxidant compounds and the activity of the antioxidant enzymes.

Keywords: Oxalic acid; antioxidant activity; postharvest; peach

STUDIES ON THE DISTRIBUTION OF STOMATA IN VINE AND THE IMPORTANCE OF STOMATA

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ABSTRACT

It is very important to increase the high quality and yield level in viticulture and to determine the plant-water level for successful cultivation. In addition to having a vital effect on the physiology, adaptation, and productivity of plants, stomata are also of indispensable importance for the survival of plants. There is a large number of stomata on the vine that carry out the passage of gases necessary for photosynthesis on the lower surfaces of the leaves and water loss by evaporation. Even in vine species or varieties that are morphologically similar to each other, serious differences are observed in the number of stomata, size, and leaf blade distributions. Apart from morphological differences, different factors also have a significant effect on the number and density of stomata. These factors include carbonization (C02), the water content of the leaf, temperature, light, air, and soil moisture, wind, cultural practices, internal growth agents, enzymes, and vitamins. In the beginning, the most important features of stomata are the changes in the stoma character that occur under stress conditions. Many studies conducted in the field of viticulture have also shown that stomata protect the plant against drought stress by reducing the rate of transpiration and photosynthesis under dehydrated conditions. In a similar way, it has been found that they have fewer stomata in varieties where cold resistance has been determined to be high compared to sensitive varieties. For this reason, determining the number and distribution of stomata, as well as their structural characteristics, will make a great contribution to the development of viticulture, which is negatively affected by climate change.

Keywords: stomata, grape, draught, stress factors

INFLUENCES OF DIFFERENT POTASSIUM FERTILIZERS AND DOSES ON FRUIT QUALITY TRAITS OF OKITSU WASE SATSUMA MANDARIN (CITRUS UNSHIU M.) UNDER ADANA ECOLOGICAL CONDITIONS

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ABSTRACT

Fruit size has gained a great attention as one of the most important fruit quality traits in the world citrus market. Together with fruit size, also a ripening index, seedlessness and peel color affect the market value of most of the mandarin varieties supplied in the markets. Okitsu Wase variety is an early ripening variety from Satsuma group. On the other hand, early harvest of this variety under Adana ecological conditions results several problems such as fruit weight and acidic fruit formation which reduce the opportunities related to marketing of this variety. In this study, the influences of different potassium doses and fertilizer applications on fruit quality traits of 'Okitsu Wase' mandarin variety harvested at three different date were investigated. Trees were treated with foliar potassium sulfate (2%, 4%, 6%, 8% K2SO4), potassium oxide (K2O), potassium nitrate (22.0.46) and water as control treatment. Fruit weight (g), fruit height (mm), fruit diameter (mm), fruit shape index, rind thickness (mm), Total soluble solids (%), total acidity (%), ripening index (TSS/TA) and juice content (%) were investigated as fruit quality variables on fruit samples from various potassium treatments at three different harvest time (15 days consecutively from the beginning of September). In terms of fruit size, fruits sampled from trees treated with 2% K2SO4 had higher fruit weight and diameter in comparison to other treatments in all three-harvest date. Besides, the highest fruit diameters were determined from foliar spray of 2% K2SO4 K (63.71 mm) on leaves in first sample date. However, considering total soluble solids and total acidity, potassium oxide positively affected the ripening index of the Okitsu Wase Satsuma mandarin variety.

Keywords: Citrus, fruit quality, foliar spray, harvest time

DETERMINATION OF CHILLING INJURY OF SOME AVOCADO CULTIVARS GROWN UNDER SUBTROPICAL CONDITIONS

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ABSTRACT

Climate change threatens agricultural lands and causes losses in agricultural production due to sudden heat and cold air waves. Severe frosts occurred in Adana-Türkiye in March 2022, and subtropical climate plants grown in the region were affected by this frost damage. Avocado is a plant species grown in semitropical-tropical climates and can be grown in the subtropical zone with the selection of more cold-tolerant varieties. In the ecological conditions of Adana, planting areas have remarkably increased in recent years. Determination of the chilling injury of the varieties is necessary in order to have some predictions related to the plant recovery after frost damages. In this study, frost damage observations were recorded after the March 2022 frost of Novels, Bacon, Zutano and Fuerte avocado varities grown under Adana ecological conditions. Also, leaf Nitrogen (N) concentrations, leaf chlorophyll concentrations and PSII efficiency of the avocado varieties were examined one year after the frost. Considering the chilling injury and frost damage, the highest survival rate was recorded in Bacon variety (88.4%). On the contrary, Fuerte was the highly affected avocado variety and had the lowest survival rate (32%) Leaves collected from Novels had the highest N concentration after the frost damage whereas it was lowest in the leaves sampled from Bacon and Zutano varieties. In terms of leaf chlorophyll concentration, Zutano variety had the lowest SPAD values in comparison to other avocado varieties after frost damage.

Keywords: Avocado, chilling injury, frost damage, leaf chlorophyll concentration

CHANGE OF SOME BIOACTIVE COMPOUNDS DURING COLD STORAGE OF OWARI SATSUMA MANDARIN VARIETY

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ABSTRACT

In this study, changes in some bioactive compounds during cold storage of 'Owari Satsuma' mandarin variety were determined. 'Owari Satsuma' mandarin variety fruits, which were harvested when the optimum 75% of the fruit peel turned yellow-orange, samples were stored at 4 (±0.5) °C and 85-90% relative humidity for 75 days and were analyzed every 15 days during storage. Total antioxidant, total phenol, total flavonoid, total anthocyanin and vitamin C analyzes were made in fruit samples. According to the findings, an increase in total antioxidant, total phenol, total anthocyanin and vitamin C, while decreases in total flavonoid amount were detected during storage.

Keywords: Mandarin, Owari Satsuma, cold storage, bioactive compounds

THE CHARACTERISTICS OF THE FOX GRAPE (VITIS LABRUSCA L.) AND ITS PLACE IN THE VITICULTURE OF THE BLACK SEA REGION

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ABSTRACT

Vitis labrusca L. has a homeland that extends from Southeastern Canada, the Northeastern and Eastern United States to Georgia (Caucasus) and also takes in Western India. It is distinguished from other types of *Vitis* by its intermittent tendril structure, which is one of its most distinctive features. Another trait of labrusca that aids ampelographers in identification of vines and hybrid varieties descended from the species is the large, thick leaves of the vines that have a hairy underside with dense brown or white hairs. Vines belonging to this species have strong development, can reach up to the highest points of their trees. It is more resistant to diseases and damages against the fragrant grape than the varieties included in the vinifera type. In general, it is large, black, blue-black, pink, copper red and white in color, thick-shelled and fragrant. In addition, the fruit flesh can be easily separated from the skin. Varieties belonging to this species are used commercially for the production of fruit juice, selective, jelly and wine. There are many varieties of Catawba, Concord, Delaware, Kyoho, Niagara, Steuben, Cayuga White in different parts of the world, especially in America. Turkey has a large number of grape varieties and types due to the ecological conditions it has. Viticulture in the Black Sea region, which ranks last in terms of grape production, is intensively carried out with varieties of the *Vitis vinifera* species in the provinces of Kastamonu, Zonguldak and Tokat. However, since the coastal areas of the Black Sea Region contain high humidity, the cultivation of varieties consumed as table food and included in the Vitis vinifera L species is not easy due to fungal diseases (powdery mildew and mildew). There are foxy grape types that have adapted well to these conditions and grow naturally in the region. Along the coastline from Artvin to Sinop, *Vitis labrusca* L. species with a foxy (strawberry) aroma naturally hybridized are high-quality and productive types. Five grape varieties with excellent properties that grow easily in the humid, rainy climate of the Black Sea Region, do not get sick even if not sprayed, have a thick crust and a floral smell taste (foxy), have been registered and included in the National Variety list with the names Rizessi, Celiksu, Ülkemiz, Rizellim and Rizpem. With the introduction of these varieties to our country, the way for commercial grape cultivation has now been opened in the coastal parts of the Black Sea Region.

Keywords: Fox grape, Vitis labrusca L., Black Sea Region, viticulture

DETERMINING THE PHYSICOCHEMICAL AND BIOACTIVE PROPERTIES OF SPECIFIC MELON VARIETIES AND INVESTIGATING INTERRELATIONSHIPS

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ABSTRACT

Melon is an important commercially grown species from the cucurbit family. For this study, 22 different melon varieties were used. The experiment was conducted in the research and development field of Verim Seed Company Co. in Adana province, Türkiye. The trial was designed using a randomized block design with two replications, and each replication consisted of 10 plants. In the study, various fruit characteristics were examined, including fruit weight (g), fruit length (cm), fruit diameter (cm), fruit flesh thickness in longitudinal section (cm), Hue* and C*, TSS (Total Soluble Solids), titration acidity, TSS/acidity (TS/TA ratio), ascorbic acid, pH, seed number, seed weight, seed width, seed length, as well as fructose, glucose, and sucrose contents. Statistical analysis was performed using the Tukey test in the JMP 7.0 software package to identify significant differences between the melon varieties in terms of each characteristic at a significance level of 0.05. Additionally, the relationships between these 18 characteristics were examined using correlation matrix and UPGMA methods with the NTSYS 2.1 software package

Keywords: Melon, variety, fruit characteristics, physicochemical properties, bioactive properties

SCREENING OF SOME CHEMICAL DISINFECTANTS FOR EXPLANT STERILIZATION DURING IN VITRO MICROPROPAGATION OF UCB- 1 (P. ATLANTICA X P. INTEGERRIMA)

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ABSTRACT

UCB-1 rootstock is an important clonally propagated Pistacia rootstock. The rootstock is stronger than other Pistacia rootstocks and high yield is obtained by using this rootstock. Although generative or various vegetative propagation methods are used in the propagation of Pistacia rootstocks, with the use of plant tissue culture methods, which is one of the vegetative propagation methods, area can be saved by producing clean plant material free from diseases and pests, high reproduction coefficient, production without depending on the vegetation period and producing thousands of plants in a small area. With the use of plant tissue culture methods, it is possible to reproduce plant species that are difficult to reproduce with appropriate media and sterilization. Sterilization is one of the important stages that affect the success of plant tissue culture method. With sterilization in plant tissue culture, fungi and bacteria on the plant surface are destroyed. However, if the sterilization period is not sufficient or the appropriate sterilization product is not used, fungi and bacteria develop rapidly in the culture medium. As a result, contamination occurs in the culture medium, preventing the development of the plantlet and causing its death. Various chemicals are used in the sterilization stage. In this study, three different sterilization products, namely Hygo, Crystalin and Sodium hypochlorite (NaOCI) were used on the UCB-1 rootstock. During the sterilization stage, fresh shoots of the UCB-1 rootstock were taken and the shoots were prepared as micro cuttings in the laboratory environment. The micro steels, which were first kept in 70% ethanol for 2 minutes in a sterile cabinet, were then sterilized at 5%and 10% levels for 10 minutes. At the end of the 4th week from the plantlets transferred to the culture medium at the end of the sterilization process, the parameters of the number of shoots, the number of leaves, shoot quality and the number of contaminated plants were examined. The highest spreading rate was observed in 5% domestos application.

Keywords: In vitro, rootstock, micropropagation, sterilization, UCB-1

THE COMBINING ABILITY EFFECTS BY LINE X TESTER ANALYSIS METHOD IN SUNFLOWER (HELIANTHUS ANNUUS L.)

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ABSTRACT

In order to analyze general and specific combining abilities and the genetic implications regarding yield and yield related components (plant height, head diameter, number of leaf, number of branching, stem thickness, 1000-seed weight and seed yield/plant) in oil seed sunflower (*Helianthus annuus* L.), 4 CMS lines and 5 restorer lines (tester) were crossed in a line × tester programme. The field experiments were conducted in a randomized complete block design with three replications in the Agricultural Research Station, Bursa Uludağ University located southern Marmara region of Turkey in 2019 and 2020 growing seasons. General and specific combining ability, broad and narrow sense of heritability of parents and crosses were calculated with line X tester method. The significant differences among the parents, crosses and parents versus crosses mainly observed within examined characters. Combining abilities of the parents gave positive and/or significant results for all characters examined. Two-year results revealed that the male parent RHA-7 and the female parent CMS-3 considered as good general combiners for seed yield per head and 1000 seed weight. Specific combining abilities of hybrids changed differently within two years. Hybrid combinations, 4x9 (head diameter), 2X7 (number of leaf), 1X5 and 4X9 (1000 seed weight), 2X9 (stem thickness), 2x5 and 3X7 (seed yield/head) released positive and/or significant specific combining ability values, were promising hybrids. The fact that the heritability in the broad sense is higher than the degree of heritability in the narrow sense in both years shows that the genetic factors as well as the environment have a great effect on the all of the examined characters. Therefore, it is appropriate to start the selection in the F3 generation. Additive gene effects for plant height and seed yield per plant and non-additive gene effects for head diameter, number of leaf, number of branching and 1000 seed weight were obtained for the genetic materials studied.

Keywords: sunflower, Helianthus annuus L., hybrid breeding, genetics, general combining ability (GCA), specific combining ability (SCA), broad sense and narrow sense heritability

DETERMINATION OF HYBRIDIZATION PERFORMANCE BETWEEN CULTIVATED SUNFLOWER AND SOME WILD SUNFLOWER SPECIES

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ABSTRACT

Interspecific hybridization was carried out between cultivated sunflower lines and wild *Helianthus annuus* accession 9, 17 and *H. argophyllus* from collection of USDA, America. The 4 CMS lines and 4 wild sunflower genotypes were crossed to obtain 16 combinations in the field conditions of Agriculture Research Station, Bursa Uludağ University located southern Marmara region, Turkey in 2019. Hybrid plants were produced using classical breeding and immature embryo methods. The degree of crossability performance of genotypes were determined. The F1 progenies were characterized from morphological and phenological point of view. As a result of hybridizations, the filled seed ratio values varied between 0% and 68.7% in the field conditions. The highest number of filled seeds was obtained from the combination of 2517-A x *H. annuus* (17) (68.7%). No seed was obtained from combinations of 2517-A x *H. annuus* (9), 6388-A x *H. argophyllus* (34), 6388-A x *H. argophyllus* (35), 9661-A x *H. annuus* (9), 9661-A x *H. annuus* (17) (%0). While significant differences were observed in most of the morphological characters among F1 plants, there were generally no major differences in terms of phenological characters.

Keywords: sunflower, Helianthus annuus L., Interspecific hybridization, Sunflower, Helianthus argophyllus, Embryo rescue

RETROTRANSPOSON-BASED MOLECULAR MARKERS: AN EFFICIENT TOOL FOR GENETIC DIVERSITY ASSESSMENT IN CROP PLANTS

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ABSTRACT

Plant genetic diversity is the main resource of agricultural breeding. Genetic diversity enables plants to adapt to environmental changes and increase their resilience. To cope with the effects of factors such as climate change, it is important to obtain plants with high genetic diversity. Genetic diversity also increases the ability of plants to fight new diseases and pests. Retrotransposons are mobile elements in the genome and cause genetic variation. Therefore, retrotransposon-based molecular markers are powerful and widely used tools to better understand plant genetic variation. These markers are used to analyze genetic differences between plant species, subspecies, and populations by detecting variations in specific regions of retrotransposons. The use of retrotransposon-based molecular markers offers important applications in many areas such as plant breeding studies, conservation of species, management of genetic resources, and monitoring of ecosystems. Inter-primer binding sequence (IPBS), sequence-specific amplified polymorphism (SSAP), retrotransposon-based insertion polymorphism (RBIP), inter retrotransposon amplified polymorphism (IRAP), and retrotransposon-microsatellite amplified polymorphism (REMAP) are the commonly used retrotransposon-based molecular markers. This study focuses on the use of retrotransposon-based molecular markers that reveals the genetic diversity of crop plants.

Keywords: Breeding, Genetic Diversity, iPBS, Molecular Markers

TURKEY GRAPE FRUIT GENE SOURCES AND MOLECULAR MARKERS AND GENETIC CHARACTERIZATIONS

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ABSTRACT

Turkey has an important place in terms of gene center. Turkey is a country with a very high plant species diversity due to its location, climate and geological differences. Plant gene resources are of great importance for the development of new varieties in order to meet the needs of the increasing population in the world. Our country is quite developed in terms of fruit growing. One of these fruit groups is the berry, which has recently come to the fore with its health benefits, and we have come across a large number of wild fruits in addition to a wide distribution area in our country. Grape fruits are loved and consumed in countries around the world and these fruits, which are evaluated in various ways, are among the fruits of important horticultural crops, the production of which is gradually increasing in Turkey. Until now, breeding has been done by looking at the morphological characteristics in new cultivar development studies in fruits. However, faster and more reliable methods are needed because morphological features are affected by environmental factors. With the use of molecular markers, it is possible to shorten the time in fruit breeding studies that take a long time. At the same time, molecular markers are used to determine, record and protect our gene resources. In this study, the aim is to give information about the berry fruits grown in our country and to examine the characterization studies with molecular markers related to berry fruits that contribute to production.

Keywords: Genetic Characterization, Fruit Gene Resources, Molecular Markers, Berry Fruits

THE EPIGENETIC FACTOR IN THE COMPLEX SCENARIO OF PERENNIAL PLANT ADAPTATION TO RAPID CLIMATIC CHANGE

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ABSTRACT

A multitude of contemporary data indicate that evolution is not only a historical process, but it can also be seen "in the making". The shift from the "neutral" to the "nearly neutral" model of molecular evolution provides additional support to this notion. However, rapid evolution, especially rapid adaptation as an evolutionary result, relies on a combination of life history characteristics, particularly generation length, and turnover. In this framework, the question for sessile perennial plant species is if the rate of adaption would at least match the rate of contemporary environmental change, allowing their populations to persist. The epigenetics framework can provide a catalyst for this direction. There is accumulating evidence for epigenetics-related adaptation to numerous stress conditions linked (directly or indirectly) to climatic change, such as cold, day length, drought, heat, soil oligotrophy, radiation, and UV stress. More importantly, epigenetic mechanisms appear to affect ecologically important traits and adaptation, even in the absence of genetic variation or change. Relevant facets of modern evolutionary theory will be highlighted and the results of some recent case studies will be discussed, in order to illustrate the thesis presented above.

Keywords: epigenetics, evolution, adaptation, climatic change

VARIATION OF AGRONOMIC TRAITS OF TWO-ROWED GENOTYPES OF WINTER BARLEY

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ABSTRACT

The aim of the present study was to evaluate the variation in the agronomic traits of barley varieties and advanced lines and to select genotypes for inclusion in the winter barley breeding program of the Institute of Agriculture – Karnobat. In this study, 20 varieties and advanced lines of two-rowed winter barley, along with local standard variety Emon were studied. Genotypes were evaluated in block design with four replications at the Institute of Agriculture – Karnobat, Southeastern Bulgaria in three growing seasons (2020 - 2022). The studied traits included number of spikes per m2, plant height (cm), spike length (cm), grain number per spike, grain weight per spike (g), grain weight per plant (g), 1000 grains weight (g), and grain yield t/ha). Significant differences between tested genotypes for all studied traits were found. Mean grain yield ranged from 5.62 t/ha in Kt 330 to 6.08 t/ha in Ermelina had the highest but relatively unstable grain yield. Varieties Кт 337, A 9/14 and Elizaria also showed above mean grain yield but it was relatively stable. Cluster analysis for agronomic traits showed important information about genetic diversity among barley varieties and lines. Genotypes with the combination of desirable agronomic traits can be used in the breeding program for the development of new high-yielding winter barley varieties.

Keywords: winter barley, grain yield, agronomic traits

MORPHOLOGICAL MARKERS FOR IDENTIFICATION OF WINTER BARLEY (HORDEUM VULGARE L.) CULTIVARS WITH VARIATION ANALYSIS AND HOMOGENEITY TEST

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ABSTRACT

In the period 2020-2022, in the experimental field of the Institute of Agriculture - Karnobat, Bulgaria, a study was conducted to establish morphological markers for the identification of winter two-row barley varieties. A comparative testing of progenies of 8 varieties was carried out - Odyssey, Saira, Devinia, Daria, Lardea, Orpheus, Elezaria and Ermelina. It was found that the progeny of the cultivars was homogeneous and the parameters studied ranged from low to medium. During the three years of study, spike length, number of grains per spike, and number of productive brothers per plant were the least variable parameters and can be considered good morphological markers for cultivar identification. The effect of year was strongest for the parameters plant height and grain weight by grade. The role of the genotype was greatest in terms of spike length and number of grains in the spike.

Keywords: two-row winter barley, morphological markers, homogeneity genotype, influence, year

EFFECT OF GROWING CONDITIONS ON STRUCTURAL ELEMENTS AND YIELD IN WINTER BARLEY GENOTYPES

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ABSTRACT

The aim of the present study is to determine the influence of growing conditions on structural elements and yield in winter barley genotypes. In the period 2019-2021, two varieties of two-row barley and two varieties of six-row barley were studied in a multifactorial field experiment with three sowing rates and four fertilization options. The experiment was carried out at the experimental field of the Institute of Agriculture - Karnobat, Bulgaria. It is clear from the data that the highest average yield for the period at the different levels of fertilization was obtained with fertilization with N16 and a sowing rate of 250 germinated seeds. It was established that the year and fertilization have the greatest role in shaping the grain yield. The analysis of variance performed for the structural elements shows that the year and the genotype exert the strongest influence on the studied traits.

Keywords: Genotype, Barley, Conditions, Structural Elements, Yield

EFFECT OF GROWING CONDITIONS ON GRAIN YIELD AND SEED YIELD OF WINTER BARLEY GENOTYPES

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ABSTRACT

The aim of the present study is to determine the influence of growing conditions on the formation of grain and seed yield in barley genotypes. The research was conducted in field and laboratory experiments at the Institute of Agriculture - Karnobat, Bulgaria in the period 2019-2021 in a multifactorial field experiment with four fertilization options (N0:N8:N12:N16) and three sowing rates (250, 350 and 450 germinating seeds). It was found that there were demonstrable differences in the studied genotypes. It is clear from the data that the grain yield is highest in the variants with a seeding rate of 250 germinated seeds and N12 and N16 in the two-row Kuber and Sayra varieties. In the case of the six-row varieties Zemela and Bozhin, the highest grain yield is in the variants with a sowing rate of 350 and 450 germinated seeds and fertilization with N8, N12 and N16. Averaged over the years of the study, seed yield was highest in 2019 in the no-fertilization and N8-fertilized options at all seeding rates. From the analysis of variance, it can be seen that the conditions of the year and fertilization exert the greatest influence on the yield of grain and seeds. The interaction between the two factors also has a large effect on grain yield.

Keywords: Genotype, Barley, Conditions, Grain Yield, Seed Yield

GENETIC VARIABILITY ASSESSMENT IN MUTANT LINES OF WINTER BARLEY USING PREDICTED GENOTYPIC VALUES

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ABSTRACT

The research aimed to assess genetic variability in mutant lines of winter barley by utilizing predicted genotypic values. The study focused on identifying mutants with agronomic potential in multiple traits to facilitate selection activities and crosses in the breeding program. Various traits, including spike length, spikelet number in spike, grain number in spike, grain weight per spike, 1000-grain weight, and grain yield, were evaluated at the Institute of Agriculture - Karnobat, Bulgaria. The experiment followed a Full Block Design with 4 replications, involving 35 genotypes, comprising 32 mutant lines, the parent variety, and 2 checks. The estimation of variance components and genetic parameters was performed. The genotypic values were determined using the REML/BLUP mixed model and further analyzed through heat map clustering, pairwise distances, and constellation plots. The results revealed significant genetic variability for all the studied traits among the mutant lines. By exploiting the predicted genotypic values, this analysis facilitated the identification of mutant lines with promising agronomic potential in multiple traits, thus facilitating targeted selection activities and suitable crosses in the breeding program.

Keywords: barley, genetic variability, REML/BLUP

ASSESSMENT OF GRAIN QUALITY TRAITS IN MUTANT LINES OF WINTER BARLEY

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ABSTRACT

Thirty mutant lines, selected based on their high grain yield, were evaluated in field trials at the Institute of Agriculture - Karnobat over a period of three growing years. Seven characteristics related to the grain quality of feed barley were measured. Significant variations were observed among the barley mutant lines for all traits studied. Mutant lines demonstrating improved grain quality compared to the check variety Veslets were identified. The results highlight the effectiveness of sodium azide treatment in inducing diverse changes in grain characteristics. This study establishes a foundation for further research on the utilization of mutant lines in breeding feed barley varieties. The findings present promising prospects for barley breeders, offering new opportunities for development of high-quality feed barley.

Keywords: feed barley, sodium azide mutagenesis, feed quality traits

CHANGES IN THE RATE OF GROWTH AND ACCUMULATION OF DRY MATTER AND DIFFERENCES IN THE MICROCLIMATE OF WHEAT CROPS WITH A BALANCED MINERAL NUTRITION OF PLANTS

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ABSTRACT

In the period 2021-2023, a multifactor field experiment with wheat was conducted at the Institute of Agriculture - Karnobat, Bulgaria. The influence of plant mineral nutrition and the changest hat occuring row thrate and dry matter accumulation, aswellas differences in the microclimate of the Miryana wheat crop, were investigated. The experiments were carried out in four variants of mineral nutrition. In the variants, pre-sowing fertilization with Duofertil TOP 38, nitrogen fertilization with ammonium nitrate, foliarfertilization with Astellis biostimulator was performed. Duo fertil TOP 38 and Astellis are products of Timak Agro Bulgaria, and the technological solutions are from the World Agro-Innovation Center of the Roulier Group in France. After seeding the trials in the pre-sowing variants with TOP-PHOS, it was found that the wheat plants grew faster than the control. In all variants in the brazing phase of wheat after pre-sowing fertilization with TOP-FOS, the fresh and dry weight of the leaves was greater than in the plants grown by traditional technology. Roots were significantly larger and had higher fresh and dry weight values. The cultivation technology used with the products of Timak Agro with different fertilizing options also led to an improvement of the microclimate in the crop. The surface air temperature of the wheat was changed, decreasing by 0.35 to 3.89 C compared to the control variants. Crop temperature was found to have decreased by a range of 0.50 to 8.20 C. At the same time, crop relative humidity in creased, with the 2022–2023 average for wheat at 4.7%. The changes in growing conditions that occurred with the fertilization options prove that improved crop nutrition not only leads to rapid growth, but also changes the microclimate of the crop. The created conditions for combined balanced nutrition of the grain plants gave the irresult in the formation of the yield. On average for the period, yield growth of 19.18% was achieved, which represents a yield of 115 kg more grain.

Keywords: wheat, growth rate, microclimate, mineral nutrition

SELECTION RAPESEED GENOTYPES USING MULTIVARIATE ANALYSIS AND SIIG METHODOLOGY

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ABSTRACT

Considering the effects of climate change, especially in warm and dry regions, it is necessary to identify and introduce new adaptable spring rapeseed lines with the characteristics of high-yielding and early maturity for regions such as Sistan. In this research (03-03-0304-155-991248), the number of 10 promising spring rapeseed lines which selected from the preliminary tests in the warm climate of the north and south of Iran, were evaluated under the conditions of the Sistan region, along with the three check varieties including Dalgan, Saffar and RGS003 during two cropping seasons. The characteristics of days to the beginning of flowering, days to the end of flowering, length of the flowering period, days to maturity, height (cm), number of branches per plant, number of pods per plant and number of seeds per pod were evaluated from the cultivated lines. After harvesting, the characteristics of grain yield (kg/hectare) and one-thousand seed weight (grams) were recorded. Analysis of composite variance showed that genotype effect was significant for all evaluated traits. Comparison of the mean yield of investigated lines showed that lines number 9, 10 and 7 are the three most promising lines with a mean yield of 3137, 3105 and 3096, respectively, and with a higher mean yield than the check cultivars. Additionally, lines number 9 and 10, in addition to high-yielding characteristics, showed favorable early maturity and no significant difference with the very early maturing Saffar variety. The results of the correlation between the investigated quantitative traits showed that grain yield has a positive and significant correlation with the traits of plant height, number of grains per pod, number of pods per plant, and number of branches per plant. Ranking of investigated lines and cultivars using the SIIG indicated promising lines 10, 9, 7, 1 and 8 as the best ones with the least distance from the ideal genotype and the greatest distance from the non-ideal genotype. Furthermore, the biplot of the first two components resulting from PCA also defined three promising lines 9, 10 and 7 as the best lines. Therefore, these three identified promising lines with high yield, early maturity and favorable agronomic characteristics are introduced as adaptable lines with the Sistan region.

Keywords: Oilseed rape, Promising lines, Sistan region, Yield

PHENOLOGICAL CHARACTERIZATION WITHIN THE GENUS TILIA FROM THE ASPECT OF LEAFING AND FLOWERING OF LINDEN IN BOSNIA AND HERZEGOVINA

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ABSTRACT

Linden is an important type of forest tree from the aspect of protecting the local climate from the harmful effects of climatic oscillations. In Europe, many habitats of forest tree species are affected by extremely strong, long-lasting and/or short-lasting droughts, and linden has a significant potential to mitigate the consequences of atmospheric and soil warming at the local level by planting this species. Linden has significant potential for scientific research from the aspect of phenology, leafing and blooming, because it is an interesting forest species due to its resistance to drying and the development of dangerous diseases associated with the length of the growing season and the increase in average air and soil temperatures. As part of the scientific project to study the morphological, phenological, ecological and genetic characterization of linden in Bosnia and Herzegovina, it is planned to monitor the leafing and flowering phenology of 216 small-leaved (*Tilia cordata* Mill.), large-leaved (*Tilia platyphyllos* Scop.) and silver-leaved (*Tilia tomentosa* Moench.) linden trees, as well as bastards of these species. The duration of the scientific project is undetermined, but the general research period is rounded to 5 years, i.e. to the time interval 2019-2023 year (five different annual vegetation periods). Linden trees were sampled in eight wide localities in Bosnia and Herzegovina, which were established with certainty to be trees of seed origin, and which grow naturally (they are not planted). These 216 linden trees were sampled in fragmented linden habitats, in eight populations (metapopulations): 1) "Sarajevo" metapopulation, with a total of 17 trees from different hilly and mountainous parts of the city; 2) "Tomislavgrad" metapopulation, which is joined by eight specific trees from Capljina and one huge *Tilia tomentosa* tree from the municipality of Ljubinje (37 trees in total); 3) "Mostar" population, with a total of 30 trees sampled on the banks of the Neretva River; 4) population "Kakanj", with 30 trees sampled in Ribnica and in the wider area of Sumarska kuca; 5) population "Cajnice", with a total of 32 trees, locality Ivsar-Kasarne; 6) metapopulation "Srebrenik" (30 trees) and 8) population "Gorazde" (8 trees). The parameters that were measured within the research are: 1) Start of leafing; 2) Estimated time of full leaf formation; 3) Beginning of blooming and 4) Estimated retention time of the flowers on the trees. The results obtained from the research indicate that the linden trees in the Herzegovinian populations / metapopulations "Mostar" and "Tomislavgrad" bloom the earliest, while the linden trees in the central Bosnian metapopulations / populations "Sarajevo" and "Kakanj" and the trees from the population "Cajnice" bloom the latest. The flowers on the linden trees last the longest in the "Tomislavgrad" metapopulation, while the longest time for the formation of the full leaf shape was observed in the mountain linden habitats, in the "Sarajevo" metapopulation, in the "Cajnice" population, but also in the "Kakanj" population. Considering the long-term retention of flowers on linden trees in all the researched locations, and especially in the Herzegovinian forest tree habitats affected by droughts, the importance of planting and growing linden trees, both in forests and in urban

areas (parks and alleys), can be seen from the aspect of protection of insect populations that feed on the nectar of linden flowers, then in the protection of bird populations, but also the protection of the microclimate and other types of forest vegetation, as well as human health.

Keywords: Tilia, Phenology, Leafing, Blooming, leaf formation

DEVELOPMENT OF PINK-FRUITED TOMATO RESISTANT TO TOMATO SPOTTED WILT VIRUS AND TOMATO YELLOW LEAF CURL VIRUS BY MARKER ASSISTED INTROGRESSION

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ABSTRACT

Modern cultivated tomato (*Solanum lycopersicum*) is considered as one of the irreplaceable parts of the human diet not only because of its vital role on proper physiological and cognitive development but also an inverse relationship between mortality or morbidity rate caused by cancer and tomato consumption. However, sustainable tomato supply has been threatened by viral diseases such as tomato spotted wilt virus (TSWV) and tomato yellow leaf curl virus (TYLCV). Therefore, development of the resistant varieties against TSWV and TYLCV is required to secure sustainable tomato production by eliminating yield and quality losses caused by virus infections. In addition to the demand for the development of virus-resistant tomato varieties, tomato market analysis reveals that there has been increasing customer demand for pink tomatoes around the world, particularly in Asia. To meet tomato market demand, tomato breeding lines having resistant genes namely *Sw-5* and *Ty-3* which confer resistance against TSWV and TYLCV were identified by molecular markers, respectively. 243 breeding lines belonging to ARGETO tomato breeding program were screened by NC-Sw-011 and P6-25 primers for TSWV and TYLCV resistance according to presence or absence of *Sw-5* and *Ty-3* genes until obtaining F8 generation. While, 4 out of 243 tomato breeding lines had a resistance gene against TSWV, 15 breeding lines were defined as a resistant to TYLCV. Further, two separate F8 generation was crossed to obtain TSWV and TYLCV resistant pink-fruited tomato. In this way, to eliminate reduction of tomato production due viral diseases, we developed hybrid pink-fruited tomato resistant to TSWV and TYLCV.

Keywords: Pink Tomato Breeding, MAS, TSWV, TYLCV

INCREASING THE EFFICIENCY OF VEGETABLE CROP IMPROVEMENT PROGRAMS FOR DEVELOPING HIGH-YIELDING VEGETABLE VARIETIES RESISTANT TO PLANT DISEASES: SIMULTANEOUS UTILIZATION OF TRADITIONAL AND MODERN PLANT BREEDING TECHNIQUES

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ABSTRACT

Since the vegetable-based diet has started to get more attention from society because of its health benefits, the consumption rate of vegetables has been getting higher and higher day by day. However, current vegetable varieties are not sufficient sources to meet vegetable demand due to their susceptibility against emerging plant pathogens which caused serious yield and quality losses. For instance, future projections showed that climate change will adversely affect vegetable production by increasing the number of plant diseases. Under these circumstances, sustainable vegetable production relies on the rapid development and release of new varieties which have resistance to newly emerging plant pathogens into the market. To achieve this; landrace germplasm, wild relatives, and progenitor species of modern vegetable crops need to be carefully monitored for identifying valuable traits. Monitoring of the candidate genetic resources might be achieved by using genomic-assisted breeding (GAB) techniques such as pan-genomics, genome-wide association studies (GWAS), next-generation sequencing (NGS), high-throughput genotyping (single-nucleotide polymorphism (SNP) etc.,), and usage of machine learning to interpret omics data. Genotypes which have important quantitative and qualitative traits that are identified by genomic-assisted breeding methods might be introduced to the vegetable breeding program by introgressive hybridization. In this way, duration of the vegetable seed improvement programs might be shortened. Thus, the vegetable breeding programs of ARGETO have been focused on the simultaneous utilization of traditional and modern plant breeding techniques in watermelon, melon, cucumber, tomato, eggplant, and other economically important vegetables. In summary, we are aiming to explain the importance of coutilization of modern and traditional plant breeding techniques with a real-life example based on the research which is carried out in ARGETO research and development (R&D) facilities.

Keywords: Genomic-assisted breeding, Machine learning, Introgressive hybridization, Vegetable breeding, Next generation sequencing

APPLICATION OF PERIODIC SELECTION IN MID-EARLY SYNTHETIC MAIZE POPULATION II. RESULTS FROM THE SECOND CYCLE IMPLEMENTATION IN SYNTHETIC "1/2014" AND SELECTION IMPACT

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ABSTRACT

It evaluated the general and the specific combining ability of middle early mutant maize lines for grain yield and length of the ear using the mathematical method of Savchenko (1973). The lines are tested in the top-cross scheme by three testers. Their hybrid combinations are examined at field experiments using accepted for the region agro technique. As a result of the study, lines with a high general combining ability for grain yield and c length of ear can be used as components of new synthetic populations for their respective characteristics. Lines of high general and specific combinative ability on both traits can be successfully used in both breeding directions.

Keywords: Corn, Hybrid Breeding, Selection, Synthetic

COMPARATIVE ANALYSIS OF CORRELATION-REGRESSION RELATION BETWEEN SOME CHARACTERISTICS OF MAIZE HYBRID KNEJA 517 IN NORMAL AND MALE STERILITY CYTOPLASM

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ABSTRACT

The correlation-regression relation between grain yield, the yield's element and some biometrics parameters of maize hybrid Kneja 517 in normal and male sterility cytoplasm (type "C") was tested. Both the variants of the hybrid Kneja 517 display strong positive correlations between the grain yield and the indications such as height of the ear location, height till the base of tassel and percent of grain in ear; mid-strong correlation between the yield and the height of the plants, MVK, and number of leafs and area of ear leaf. A distinctive mark of the research is the strong positive correlation between the yield of the sterile hybrid Kneja 517C and the number of the primary branches of the tassel (r=0.758 and t=13.8), while in Kneja 517F this correlation is weak and mathematically unproved (r=0.257 and t=2.12). There is also a difference in the correlation between grain yield and length of ear. For the fertile hybrid the correlation is positive and mid-strong (r=0.460 and t=4.51), while for the sterile hybrid Kneja 517C (r= -0.151 and t=1.2) it is low, negative and mathematically unproved.

Keywords: maize, hybrid, sterility and fertility cytoplasm, correlation and regression relation

APPLICATION OF PERIODIC SELECTION IN MID-EARLY SYNTHETIC MAIZE POPULATION II. RESULTS FROM THE SECOND CYCLE IMPLEMENTATION IN SYNTHETIC "1/2014" AND SELECTION IMPACT

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ABSTRACT

The current research shows the results of two completed recurrent selection cycles in a mid-early synthetic maize population "1/2014" where in the first cycle as recurrent parents the inbred lines K 4652 and N 192 have been used and in the second one PHK 42, respectively. During the period 2017-2019, 55 test crosses in the synthetic from the second breeding cycle are obtained and tested. After analyzing the results, 30 inbred lines have been combined showing the best results compared to the test standards. In 2020 they will be cross-pollinated with an equal number of seeds on isolation test plots in order to form a new and improved synthetic population. The genetic variability in the synthetic has been preserved as the selected progenies represent 55% of the initially selected ones. The variation coefficient after the cycle was increased by 12%, which allows effective work in the subsequent cycle of breeding and continuous screening in the synthetic. The effect of breeding of the two completed cycles in the synthetic population has been evaluated. As a direct outcome of the research and the second cycle of breeding, the additive genetic variances have been increased, and a yield increase in C2 compared to C1 with 15 % recorded. Subsequently, 30 perspective crosses have been pointed out. They exceed grain yield the standard in the maturity group with 24.5%. Their testing will be resumed in competitive and ecological varietal trials. This improvement selection aims to obtain inbred lines from this synthetic with increased combining ability to be used as parental components to receive high-yield maize hybrids from this maturity group.

Keywords: Maize, Hybrid Breeding, Selection, Synthetic, combining ability

SEEDS QUALITY CHARACTERISTICS OF SOME MEDICINAL PLANTS FROM LAMIACEAE FAMILY USING FLUORESCENCE SPECTROSCOPY

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ABSTRACT

Plants are an important source of medicinal substances and play a key role in human health. The increasing human population, insufficient supply of drugs the extremely high cost of treatment, the negative side effects, caused by the synthetic drugs and development of resistance towards many infectious diseases have led to increased use of plant materials as a source of a wide variety of drugs. Seed quality is an important factor for the successful cultivation of medicinal plants and herbs. Optoelectronic methods allow non-invasive analysis and treatment, in a short time, with high sensitivity, without disturbing the integrity of the biological object. These methods for assessment the quality of plant seeds are non-contact, fast-acting, selective and do not violate the integrity of the examined sample. As a result of the conducted research, a non-invasive method was developed to determine the quality of seeds of some medicinal plants from Lamiaceae family by applying a fiber-optical schematic configuration and their ability to fluoresce in laboratory conditions was evaluated.

Keywords: Seeds quality, medical plants, fluorescence spectroscopy

BREEDING STUDIES IN VITICULTURE

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ABSTRACT

The grapevine is one of the oldest species cultivated by humans, and throughout history, it has been an important source of nutrition with various evaluations. Globally, grapes are produced on 6.93 million hectares, yielding 73.5 million tons of grapes. Despite the decreasing agricultural land, the world's population is increasing day by day. Therefore, the aim is to achieve higher yields and better quality products per unit area in plant production. Market demands for grapes vary according to different consumption purposes, and efforts to develop new grape varieties continue in this direction. To meet these demands, vine breeding programs are being carried out in various fields worldwide. The first breeding studies in viticulture began with the spread of phylloxera and later fungal diseases in vineyards. The initial work on grapevine breeding started in the early 19th century with wine grape cultivation and continued in the late 19th century with table grape cultivation and rootstock breeding programs. The oldest breeding varieties emerged from crossbreeding different species between 1819 and 1849. Today, efforts to develop varieties resistant or tolerant to abiotic and biotic stresses are ongoing. Additionally, there is increasing interest in seedless, large, firm-textured, and colorful grape varieties to meet consumer expectations. Developing resistant varieties, especially against diseases, is crucial for reducing the use of fungicides and preserving the environment and human health.

Keywords: breeding, viticulture, seedless grape, fungal diseases, rootstock breeding

NEW HIGH-QUALITY VARIETY OF WINTER SOFT WHEAT VEK

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ABSTRACT

In 2020, the year of the celebration of the 100th anniversary of scientific wheat breeding at the National Grain Center. P.P. Lukyanenko" to the State variety testing, a new high-quality variety of winter soft wheat Vek (Century). Variety Vek is short-stemmed. Height plants 90-100 cm Variety lutescens. Belongs to mid-season group. Differs in high frost resistance, it is drought-resistant. On artificial infectious background, the Vek variety is characterized by high resistance to powdery mildew, resistance to yellow and brown rust, septoria. On average for 5 years of study in competitive variety testing (CVT) the yield of Vek variety was 95.3 c/ha, which is 5.2 c/ha higher than that of standard variety Bezostaya 100. The highest yield of variety Vek 113.1 centners of grain per 1 ha was recorded in 2017 in the CVT according to predecessor corn for grain. The protein content in the grain variety Vek very high, the average for 2018-2022 was 15.9%, up 1.4% higher than that of the standard variety Bezostaya 100. Gluten content in averaged 33.1%, 6.3% more than that of the Bezostaya 100 variety. The highest protein content in the grain of the Vek variety was recorded at level 16.3%, gluten 34.7%. The grain of the Vek variety is large, weight 1000 on average 49.5 g. Variety Vek characterized by excellent baking qualities, the volume of bread out of 100 grams of flour on average 851 cm3, overall baking score 4.4 points. The main advantage of the Vek variety is a harmonious combination high productivity and quality of grain against the background of high resistance to types of rust and leaf spots. Tolerance to Fusarium ears and high frost resistance will make it possible to recommend sowing this cultivar across a wide range of row crop predecessors, including corn for grain in a wide geographical area.

Keywords: Winter wheat, high productivity, high grain quality, selection, variety

DETERMINATION OF SOME MORPHOLOGICAL CHARACTERISTICS OF HERBICIDE-RESISTANT M3 MUTANT QUINOA (Chenopodium quinoa Willd) LINES

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ABSTRACT

Quinoa (*Chenopodium quinoa* Willd) is an important crop that is resistant to salinity, can adapt to harsh climatic conditions, is gluten-free and has seeds rich in nutrients. It has a high adaptability. It has been cultivated in South America for a very long time but has recently become widespread due to its designation as astronaut food by NASA. The plant contains high quality amino acids and protein. It can be used in human and animal nutrition. Since there is no selective herbicide for quinoa cultivation, it is necessary to develop herbicide-resistant quinoa lines. This study was carried out to determine some morphological characteristics of herbicide resistant mutant M3 generation quinoa lines under greenhouse conditions. In the study, 4 mutant lines and control plants were planted in pots according to a completely randomized experimental design. When the plants matured, some morphological characteristics such as plant height, stem thickness and number of branches were determined. According to these results, the highest average plant height was 71 cm and the highest average stem thickness was 6.04 mm in the control plants and the highest number of branches was 17 in the EM-6 line.

Keywords: Quinoa, mutation, improvement, line, plant characteristics

TRANSFER OF GC GENE TRANSLOCATION WITH CUCKOO EFFECT IN THE ADAPTED GENE POOL OF THE NORTH CAUCASIAN ECOTYPE

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ABSTRACT

Many agronomically important traits, including resistance to fungal diseases, soft wheat has acquired through distant hybridization from different Aegilops species. In 1983-1988, as a result of crossing soft wheat with Ae.speltoides and subsequent backcrosses, VIR I.G. Odintsova created hexaploid lines carrying a translocation that includes genes for resistance to leaf and stem rust. In the same translocation there is a gametocidal gene "cuckoo"(Gc), the function of which is to eliminate gametes carrying susceptibility alleles. The linked inheritance of resistance to two harmful pathogens and the genetic mechanism of selection for resistance have generated widespread interest in cuckoo lines. Since 2004, work with "cuckoo genes" has been carried out at the "National Grain Center named after P.P. Lukyanenko" in Krasnodar. Translocation "cuckoo", along with stability and prolonged work of green canopy, transmits coupled wild type of ear and poor grain threshability. Several stages of convergent crosses, intermittent backcrosses allowed to "break" the negative clutch. It was possible to accelerate the selection of economically valuable genotypes with translocation using markers created at the All-Russian Research Institute of Plant Protection, St. Petersburg. In 2022, the yield of the most promising line with "cuckoo" averaged 10.93t/ha on four predecessors. Crude protein and gluten content were 14.9% and 27.3%, respectively, grain natura was 811 g/l. On artificial background, this material showed resistance to brown rust, viruses, and fusarium ear blight. The emergence of commercial varieties with the participation of "cuckoo" type lines expands the possibilities of using in breeding the block of resistance genes transferred from wild relatives.

Keywords: Winter wheat, gene, resistance, transgression, breeding line

APPLICATION OF NORMALIZED DIFFERENCE VEGETATION INDEX TO DIFFERENTIATE BETWEEN GENOTYPES OF COMMON WINTER WHEAT

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ABSTRACT

The aim of this study is the application of multispectral remote sensing to discriminate between different plant varieties. The effectiveness of multispectral data to characterize the differences generated from wheat genotypes was investigated. The field plot trial was carried out at the experimental field of the Agricultural University - Plovdiv. Analyses of growth stages, stress tolerance and morphological elements of the productivity of breeding lines and standard varieties of common winter wheat (*Triticum aestivum*) have been made during the vegetation period of 2022 - 2023. The remote sensing experiments were carried out using *Survey3W Camera Red+Green+NIR*, which can record images at Green (550 nm), Red (660 nm) and Near Infrared (850 nm) mounted on a drone *DJI Mavic Air* from 30 m height. This study validated the applicability of the normalized difference vegetation index (NDVI) to discriminate between different accessions of *Triticum aestivum*. The results show a significant difference in the NDVI for different breeding lines of common winter wheat. Thus, the aerial multispectral remote sensing proves to be a useful method for discriminating wheat genotypes.

Keywords: breeding lines, common wheat, multispectral remote sensing, normalized difference vegetation index

PLANT PHENOMICS AS TOOL FOR PRECISION BREEDING

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ABSTRACT

Plant phenomics is an innovative approach accelerating phenotyping by high-throughput not-invasive imaging technology and computer calculations. Phenotyping trough phenomics tools can contribute for improving selection intensity, selection accuracy, and even identifying new genetic variation. We will present the results of the remote sensing field phenotyping of a large number of cereals genotypes and increasing the efficiency of the selection on important agronomic traits, obtained within the National Research Program "Smart Crop Production" funded by the Bulgarian Ministry of Education and Science. The advantages of image-based phenotyping are related to the high spatial and temporal resolution of the retrieved data and the non-destructive and rapid method of data acquisition. In our interdisciplinary investigations the remotely sensed phenotypic traits (RSPTs) – biophysical variables (leaf area index – LAI; fraction of absorbed photosynthetically active radiation – fAPAR; fraction vegetation cover – fCover; leaf chlorophyll content - LCC and canopy chlorophyll content - CCC) and remote sensing data along with traditional phenotypic traits (plant height, yield, and tillering) are analysed for detection of genetic diversity, proximity, and similarity in the studied durum wheat and barley genotypes. A significant effect of the genotype was found for all studied traits - remotely sensed phenotypic traits (RSPTs) and for the traditional phenotypic traits. The potential of parametric and nonparametric regression modeling utilizing multispectral data from two different unoccupied aerial vehicles (UAVs) as a tool for the prediction and indirect selection of grain yield (GY) are tested. The coefficient of determination (R2) of the nonparametric models for GY prediction on test date, not used for training, ranged between 0.33 and 0.61 depending on the UAV, flight date and culture/location. The highest value of R2 was achieved with the DJI Phantom4 Multispectral (P4M) image in milk ripening phases in barley genotypes. Combining data from several time points, or different treatments, during the vegetation period may improve modeling results. The modeled biophysical variables are used as RSPTs for the analysis of broad-sense heritability in barley breeding trials. Higher heritability estimates were found for the LAI, fAPAR, fCover, and LCC than ground-measured NDVI. RSPTs traits had generally higher heritability than grain yield but lower efficiency over the direct selection for grain yield. The moderate to strong genetic correlation of the RSPTs to GY was determined in experiments, which indicates their potential utility as an indirect selection approach to identify high-yield genotypes. Regardless of the positive initial results further robust interdisciplinary research related to routine applying of image-based phenotyping in crop improvements programs are needed.

Keywords: plant phenomics, field phenotyping, remotely sensed phenotipic traits, unmanned aerial vehicles, yield prediction, machine learning, cereals

DETERMINATION OF THE EFFECT OF DONORS ON SUCCESS OF HAPLOID IN IN VIVO MATERNAL HAPLOID TECHNIQUE

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ABSTRACT

Maize is an important plant that is grown for grain and silage, used in human nutrition and animal nutrition. In classical maize breeding studies, inbred line development studies that have stopped require at least 7 generations, it is possible to develop 100% homozygous lines in a short period of 2 years with the in vivo maternal haploid technique. In the in vivo maternal haploid technique, inducer lines are used as the male and donor materials are used as the female in the hybridization process. The choice of donor or source material to be used for haploid induction depends on the purpose of the breeding program. Generally, breeders use F1 or F2 populations as source material for haploid induction. In this study, The 40 F1 genotypes and their F2 were crossed with the inducer line. In the seeds obtained, selection was made by considering the R1-nj color marker Haploid seed number (H), diploid seed (F1), diploid endosperm seed number (DE), out-cross seed number (OC), endosperm-free seed, embryo-free seed number and rates were determined. The significance of the difference between the haploid induction rates obtained from F1 and F2 were determined by the comparative test method. The effect of the generations of the donor genotypes on the haploid induction rate has been demonstrated.

Keywords: maize, maternal haploid, haploid induction ratio, inducer line, donor

OBTAINING DOUBLED HAPLOID LINES BY ANTHER CULTURE TECHNIQUE IN CANOLA

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ABSTRACT

Canola is an important oil plant that is widely planted in the world as it closes the vegetable oil deficit of our country, improves the structure of the soil in terms of organic matter, contains 38-40% protein in its pulp, and provides abundant nectar to bees and beekeepers in early spring. Canola varieties cultivated in the world and in Turkey are generally open pollinated standard varieties developed by selection and hybridization breeding methods. However, the use of hybrid (F1) varieties has been spreading rapidly recently. Hybrid varieties provide higher rate and quality of oil and grain yield, thanks to their ability to adapt well to climate, soil and growing conditions, not to shed seeds, not to contain glucosinolate and erucic acid, and to resist diseases. Most of the canola varieties registered in our country belong to the private sector with foreign capital. Considering the oil deficit in our country and the feature of being a plant used as a renewable energy source, more importance should be given to canola agriculture. In breeding studies for the development of domestic hybrid canola varieties, haploid techniques can be used to shorten the time and increase the efficiency of breeding. In the project prepared for this purpose, the effectiveness of the method was investigated in the development of canola lines using anther culture technique. This trial; It was carried out with 3 replications on two different nutrient media using anthers taken from winter hybrid canola variety. 4-5 mm long buds were removed from the terminal and upper two axillary inflorescences of the donor plants and transferred to the nutrient medium. After the callus formation, it was taken into the regeneration medium and grown in the climate chamber under controlled conditions. In the study, the parameters of the number of callus obtained from anthers transferred to the nutrient medium, the number of plantlets obtained from the callus transferred to the regenerated medium and the number of plants that were transferred to the soil and remained alive were measured.

Keywords: canola, anther culture, medium, regeneration, spontaneous haploid

MOLECULAR CHARACTERIZATION OF BROWN RUST (PUCCINIA RECONDITA F. SP. TRITICI) RESISTANCE IN BREAD WHEAT (TRITICUM AESTIVUM L.) GENOTYPES

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ABSTRACT

The research was carried out according to the randomized blocks experimental design in the Field Crops Experiment Area of the Faculty of Agriculture of Namık Kemal University in the 2016-2017 growing season. Wheat genotypes of Pehlivan, Sana, Tina, Tekirdağ, Gelibolu, Nina, Flamura-85, Saban, Kate, which were planted in 2016, contain Lr 9, Lr 14, Lr 19, Lr 22, Lr 24, Lr 34 brown rust resistance genes. Crossing was done by using isogenic lines as sire. In the study, bread wheat genotypes, isogenic lines containing Lr genes and F2 populations obtained as a result of their hybridization were planted in the experimental area with 3 repetitions, 2 rows for each genotype, in 5-meter rows. During sowing, the Morocco genotype sensitive to brown rust was planted at the beginning, end and every 10 rows of the experiment. According to the results of SSR analysis performed in cross populations between Flamura-85, Pehlivan, Saban bread wheat genotypes and isogenic lines carrying 6 different brown rust resistance genes, it was determined that all individuals carried Lr 9 and Lr 19 genes. It was determined that the Lr 22 gene was transferred at different rates in F2 plants. Lr 24 gene was transferred in all crosses made with Flamura 85 variety and 33% in Saban hybrids. The Lr 34 gene was found at different rates in hybrid populations compared to the crossed wheat genotype. The data obtained show that especially the Lr 9 and Lr 24 resistance genes are important selection criteria for the Thrace Region. The absence of Lr 22 gene in hybrid combinations between bread wheat cultivars and isogenic line with Lr 22 gene reveals that more detailed studies should be done in terms of this gene. Despite the presence of Lr 14, Lr 19 and Lr 34 brown rust resistance genes in hybrid populations, the high incidence of disease shows that it is not important in terms of disease races in the Thrace Region.

Keywords: Bread wheat, brown rust, Lr gene, isogenic line, population

SUNFLOWER HYBRIDS WITH HIGH SEED YIELD POTENTIAL AND HIGH OIL QUALITY FOR THE HUMAN HEALTH AND FOOD SECURITY

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ABSTRACT

Sunflower (*Helianthus annuus* L.) crop is grown for its edible oil but also for its achenes (confectionery types), both commonly used in human food. After being obtained first sunflower hybrids with high oil content, area cultivated with sunflower crop has increased over the world Sunflower is an important source of oil and protein necessary for development of healthy humans. By producing sunflower the main gains a possibility to use oil and proteins in different forms With ongoing climate change, sunflower, as a spring crop, could be more exposed to the direct effect of heat stress and to different drought scenarios, resulting in severe yield losses, oil content decrease and alteration of fatty acids composition The oil concentration in sunflower (whether linoleic or oleic varieties) is valued above the contribution of genotype, of environment but also of the crop management By using a very various and valuable germplasm, there have been obtained valuable inbred lines, having very good characteristics. It has been obtained an important genetic progress, regarding the productivity, also different agronomic and physiological traits and adaptation to the biotic and abiotic factors. In our study, with different sunflower hybrids, experimented in different conditions of the environment, we obtained results on oil content and fatty acids composition. The unsaturated fatty acids of sunflower oil are much more affected by genotype and environment than the saturated ones. There have been studied some new sunflower hybrids – contribution of genetic diversity for increasing of productivity.

Keywords: sunflower; productivity; quality; fatty acids; protein

PROTEOMIC EVALUATION OF MULTIPLE ABIOTIC STRESS TOLERANT SOYBEAN MUTANTS

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ABSTRACT

Soybean (*Glycine max* (L.) Merr) is an important nutrition for human diet due to its high protein and oil content. Due to its high oil content as palmitic acid, stearic acid, oleic acid, linoleic acid and linolenic acid, it is defined as an oil seed plant. It is also used as raw material to animal feed industry. Plants are subjected to various biotic and abiotic stress factors constantly due to their sessile nature. As they are subjected to these abiotic stress factors as drought, salinity, heavy metals, intensive light, high and low temperatures, inadequate nutrition, they alter their metabolic processes as a response. In plant science, there are two basic approaches described as forward and reverse genetics which are utilized in different ways to understand molecular mechanism of stress tolerance. Forward genetics approach aims to identify genomic and proteomic differences underlying specific traits in selected mutant plants. In these studies, original varieties are present and comparison of original species against deliberately induced mutants or spontaneous mutations reveals proteomic and sequence changes behind the particular phenotype. Reverse genetics approach targets known sequence(s) and utilize silencing techniques to gain insight into the underlying function(s). In the present study, we investigated the two-dimensional protein expression profiles in salinity and drought tolerant mutant plants derived from S04-05 soybean variety by Cs-137 gamma radiation source induced mutations. Differentially expressed protein alterations related to salinity and drought tolerance were identified by two-dimensional electrophoresis and MALDI-TOF-MS. Total protein extractions were performed by trichloroacetic acid (TCA)/acetone method. Samples were purified by using Bio-Rad ReadyPrep 2-D CleanUp Kit under manufacturer's instructions. Protein samples were quantified by the Lowry method with Nano Drop 1000 (Thermo Scientific) instrument. Protein sppots were separated in 17 cm Bio-Rad ReadyStrip™ IPG Strips (pH 3-10). Isoelectric focusing (IEF) conditions were as follows: 1st step; 250 V for 20 min. in linear slope, 2nd step; 10000 V for 150 min. in linear slope, 3rd step; 10000 V for until 40000 voltage-hour was completed. A total of 50000 voltage-hour was applied approximately in 420 minutes. Proteins which presented statistically significant alterations were cut from gels by automated EXQuest Spot Cutter (Bio-Rad, USA). Selected protein spots were digested in 96-well plate by tryptic digestion method. Carbonic anhydrase, glyceraldehyde-3-phosphate dehydrogenase and phosphoribulokinase, proteins which were found differentially expressed and salt induced were related to regulation of photosynthesis process UniProt protein database analysis of detected proteins determined their localization in plant cells. Proteins were also categorized by their functions in plant cells. Protein-protein interaction network was constructed considering significantly altered proteins by STRING analysis software. Two of these biological processes, photosynthesis, and carbohydrate metabolism, were found significantly altered by KEGG analysis. Our results contributed proteomic data to salinity and drought tolerance of our soybean mutants which originated from mildly salinity and drought susceptible S04-05 variety.

Keywords: Abiotic stress tolerance; mutation breeding; 2D Proteomic; Soybean; MALDI-TOF-MS

IMPACTS OF CLIMATE CHANGE ON EVAPOTRANSPIRATION IN THE CENTRAL ANATOLIA REGION OF TÜRKIYE: (KONYA)

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ABSTRACT

Climate change is a critical global issue with significant impacts on various sectors, and among others, the agricultural sector stands out as one of the most sensitive. Evapotranspiration, a key process in agricultural production, plays a crucial role in mediating the effects of climate change on crop water requirements. In this sense, this study aims to analyze the potential impacts of climate change on evapotranspiration, a vital parameter for the agricultural sector, in the Konya Basin, located in the Central Anatolia region of Turkey, which is projected to be significantly affected by climate change. To achieve this objective, the study utilized five widely adopted methods to calculate the past and future conditions of reference evapotranspiration. Future projections were made until the year 2099 using output data from the HadGEM2-ES and MPI-ESM-MR models, according to the RCP4.5 and RCP8.5 emission scenarios. These projections were then compared to historical datasets to assess the potential changes in evapotranspiration for the future period. The findings of the study revealed a consistent increase in evapotranspiration across the five employed methods for the future period. This finding indicates that evapotranspiration is anticipated to escalate within the Konya Basin as a response to climate change.

Keywords: Climate change, Evapotranspiration, Agriculture, Climate change impact, Konya Region

EFFECT OF DIFFERENT FLIGHT PARAMETERS ON SPRAYING EFFICACY IN PESTICIDE APPLICATIONS WITH UNMANNED AERIAL VEHICLE IN SUNFLOWER

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ABSTRACT

The use of unmanned aerial vehicles in pesticide applications has increased rapidly in Turkey and the world in recent years. The biggest problem experienced in pesticide applications with unmanned aerial vehicles is low uniformity of distribution and penetration due to low volume application. In this study, unmanned aerial vehicle (UAV) spraying was applied with different flight parameters during the sunflower flowering period, and the parameters with the best uniformity of droplet distribution were tried to be determined. The flight parameters were determined as 2 different heights (2 m and 1.5 m from the top of the plant), 2 different spraying rates (10 l/ha and 20 l/ha) and 2 different travel speeds (11.2 km/h and 19 km/h), and a total of 8 flights were made combining them with each other. Wind speeds, temperature and relative humidity values were recorded during the flight and throughout the trial. In each experiment, 6 sunflower plants on the flight route of the unmanned aerial vehicle were randomly selected and water-sensitive paper was placed on these plants in 4 different areas: behind the head, inside the head, middle leaf, and lower leaves. Tap water was used as a spraying liquid. The papers were scanned and transferred to a computer environment, and droplet analyses were performed with DepositScan software. In droplet analyses, the average droplet diameter (Dv0.5), number of droplets per unit area (droplets/cm2), and the percentage coverage (% area) were calculated. Results show that, average droplet diameter was between 250-300 µm. The least accumulation was observed on the front of the head and on the lower leaves and the highest on the papers behind the head. The accumulation of droplets increased as the spray rate increased, while the accumulation of droplets decreased as the flight height increased. According to the results of the experiment, the application with a spray rate of 20 l/ha, flight speed of 11.2 km/h, and the height of 2 meters gave the most successful results in terms of droplet distribution and droplet penetration.

Keywords: unmanned aerial vehicle, sprayer, sunflower, pesticide, drone spraying, droplet

CHANGE ON WHEAT YIELD, ORGANIC CARBON AND SOIL MICROBIAL BIOMASS CARBON AFTER THREE YEARS THE ADOPTION OF NO-TILLAGE SYSTEM IN SEMI-ARID ALGERIAN ENVIRONMENT

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ABSTRACT

No tillage (NT) is considered an alternative cropping system to the conventional tillage system (CT). It is widely practiced to improve crop yield and soil quality, especially in semi-arid regions. This research was conducted to assess the change in soil organic carbon, microbial biomass carbon and wheat yield after 03 years of the adoption NT system in semi-arid Algerian environment. The treatments were; conventional tillage (CT); no-till (NT) and minimum tillage (MT) arranged in a randomized full-block design with three replicates. Soil organic carbon in NT increased by 53% and 17% at the surface horizon and decreased by 28% at the subsurface horizon, compared to CT and MT. Compared to CT and MT, NT increased soil microbial biomass carbon by 44% and 14% at the surface horizon and decreased by 34% at the subsurface horizon. After three years, NT had an average grain yield 27% higher than CT and similar to MT. In this region, the integration of direct seeding is recommended for the improvement of soil quality, environmental quality and sustainable agricultural production.

Keywords: No tillage, Crop productivity, soil organic matter, Microbial biomass

THE GHOST OF SOIL DEGRADATION LOOMS OVER FARMLAND IN THE SÉTIF REGION

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ABSTRACT

The biological quality of soils refers to the abundance, diversity and activity of living organisms involved in soil functioning. In this respect, screening of the fungal microflora of several agricultural soils in the Sétif region revealed a significant predominance of fungi of the fusarium genus in all the studied samples. This genus is considered to be one of the most destructive phytopathogenic fungi responsible for fusariosis. In addition to this predominance, the fungi collected showed high resistance to four classes of fungicides used by farmers (Propicone, Vapcotop, Curitine V and Kazir). This resistance was also found in other genera that are normally saprophytic (Didymabotrym sp., Chalara sp., Helicomyces sp., Dothichiza, Leptostroma sp.and Biloparis stemphylium). On the other hand, the study showed that these soils were highly receptive to fusaria. This receptivity could be explained by the soil's acidity, where the pH of one of the soils studied was 6.46. This drop in pH is most likely due to the reduction in organic matter as a result of intensive farming, which leads to acidification and therefore reduces bacterial biodiversity and favors the growth of fungi. Or the gradual accumulation of antifungal agents and pesticides, which in the long term will lead to a loss of soil fertility and increase the risk of soil degradation. The latter is often irreversible.

Keywords: Fusarium, acidity, soil degradation, fungicides

CONTENT OF WATER SOLUBLE SODIUM IN URBAN SOILS OF SKOPJE CITY AREA

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ABSTRACT

In winter, due to low temperatures, there is an ice on the roads. For safety, a large quantities of salt (sodium chloride NaCl) are deposited on the roads. About 300-400 tons of salt are deposited on the streets of Skopje during this period. In this research, the content of water soluble sodium in the urban soil of Skopje city area was examined. Therefore, 4 sample points were defined near the main boulevards. From both sides of the road at various distances (0.5, 1, and 2 m), the top soil samples were collected for further analysis. For comparison sake, samples were also collected from the urban soils away from the main boulevards. The content of water soluble sodium in soil was calculated, according to the concentration of water soluble Na2O, which was determined with flame photometer. The determined contents of sodium are within the limited values. The contents are various, influenced by the distance from the boulevards. The soil samples examined away from the main boulevards, have a relevantly lower content of water soluble sodium. The deposited quantities of salt have a negative impact, yet no relevant effect undergoes on the properties of the soil.

Keywords: salt, sodium, water soluble, soil, Skopje

STUDY OF THE EFFECT AND AFTER-EFFECT OF LEGUMES ON SOIL BIOLOGY USING A BIO-INDICATOR: NEMATODES

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ABSTRACT

This study was carried out at the technical institute for field crops (ITGC) of Sétif, ALGERIA during the 2020/2021 crop year. Knowing and valorizing the effect of agricultural practices on soil biology, is a promising way forward towards more sustainable cropping systems. This study was conducted to gain a better understanding of the effect of legumes on soil biology. Its aim is to determine whether the presence of legumes has a specific effect on soil biology, by assessing it with a bio-indicator: the soil nematofauna. To achieve this objective, we tested four plots, including three of them with legumes as a crop precedent effect and after-effect (TNLt1C, TLt0PC, and TLT0V) and one control plot (TT) with a non-leguminous crop precedent. Soil samples were taken from these plots for physico-chemical analysis (N, P, CE, C/N...). The results thus obtained, revealed significant differences in soil biological activity between legumes and non-legumes, where the control (TT) showed a population of 389.74 NN/100ml, followed by the TLT0V field with a population of 265.81 NN/100ml, TNLt1C with 205.13 NN/ml and TLT0PC with 185.47 NN/100ml. Variations of nematodes abundance in soil under different crops, are the result of biotic interactions between roots and litter inputs and direct and indirect effects of plants on soil.

Keywords: legumes, non-legumes, bio-indicator, nematodes, biology of soil

DETERMINATION OF THE EFFECT OF HYPERACCUMULATOR PLANTS GROWN ON SOIL CONTAMINATED WITH ZINC ON THE BIOLOGICAL PROPERTIES OF SOILS

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ABSTRACT

Soil pollution caused by heavy metals has emerged as one of the most significant environmental problems in the world. In soils, specific plant species are able to grow, adapt and absorb heavy metals. Phytoremediation is an emerging technology in which higher plants are used to reclaim the contaminated environment. It is important to strongly emphasize that the ultimate goal of heavy metal remediation process must be not only to remove the heavy metals from the soil (or instead of this to reduce their bioavailability and mobility) but also to improve soil quality. In this study, it was aimed to determine the effect of some hyperaccumulator plants such as *Brassica juncea, Raphanus sativus* and *Silene vulgaris* grown in zinc contaminated soils on the biological properties of soils. Changes in microbial properties such as microbial biomass carbon (Cmic), soil respiration (SR), urease (UA) and β-glycosidase (β-GA) activities in soils taken at harvest were evaluated. It has been determined that there are significant improvements in the biological properties of the soils in the removal of Zn pollution using phytoremediation technology, but the biological properties are far from reaching to the initial level in the case of 1-year hyperaccumulator plant cultivation. While it was determined that the negative effect of Zn contamination was partially eliminated in the case of growing hyperaccumulator plants from some of their biological properties (SR, DHA, UA, β-GA and Cmic /Corg ratio), the negative effect on Cmic continued.

Keywords: phytoremediation, Brassica juncea, Raphanus sativus, Silene vulgaris, biological properties

THE EFFECTS OF DIFFERENT IRRIGATION SYSTEMS ON THE MECHANICAL PROPERTIES OF A SOIL AT THE END OF 5 YEARS

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ABSTRACT

Structural degradation of soils due to excessive use of lands has negatively affected agricultural sustainability in recent years. One of the most important causes of this degradation is the mechanical over-processing of the soils. However, the only factor in land degradation is not the cultivation of the soil, but the fact that the correct irrigation system is not chosen has an important effect on the structure of the soil. Therefore, in this study, degraded and undisturbed soil samples were taken from a depth of 0-30 cm from an area where wheat is grown and has 4 different irrigation systems (Non-Irrigation (NI), Linear Pivot (LP), Subsurface drip (SD) ve Sprinkler (SI)). Mean weight diameter (MWD), water resistant aggregates (WSA), field capacity (FC), wilting point (WP), available water capacity (AWC), modulus of rupture (MR), consistency limits (CL), hydraulic conductivity (HC) and permeability (P) in the samples taken analyzed. While the WSA was the lowest 7.76% in the NI, this result increased by 150.64% and found 19.45% in the SD. Although significant differences were obtained with the change of irrigation methods in FC and PWP, no significant difference could be obtained in PAWC. While the MR was found to be 151.56 kPA in the NI, it was found 154.4, 44.78 and 154.2 kPA in the LP, SD and SI areas, respectively. It was found that CL were not affected by irrigation systems, and the difference between areas was statistically insignificant ($p>0.05$). In the HC and P results, the highest value was obtained in the NI. When the results were examined, it was found that irrigation systems caused changes in the aggregate structures of the soils but did not affect the mechanical properties. In this direction, the necessity of monitoring the results for many years and examining them in different soil types has emerged.

Keywords: Soil Aggregation, Soil Mechanics, İrrigation, Soil consistency limits

VARIATION OF SOIL SEED BANK, CHEMICAL AND BIOLOGICAL CHARACTERISTICS UNDER DIFFERENT SPECIES OF SHRUBS

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ABSTRACT

Little information is available about the effects of different species of shrubs on soil parameters such as seed bank composition, chemical and biological properties and how the soil seed bank (SSB) buried under the shrub canopies and other soil parameters could contribute to restoration of degraded grasslands. We determined the role of three different shrubs on soil characteristics and evaluated the SSB potential for their possible use in rangeland restoration projects. Ten sites, each containing three shrub species (*Onobrychis cornuta*: cushion and deciduous, *Berberis integerrima*: open canopy and deciduous and *Juniperus sabina*: procumbent and evergreen) and a herbaceous patch (control) in close proximity, were sampled and their SSB characteristics (density and richness), chemical (total organic carbon and total nitrogen) and biological (basal and substrate-induced respirations) were determined. The results showed that SSB density was lowest under *J. sabina* and highest under herbaceous control, but did not differ between *B. integerrima* and *O. cornuta*. Species richness of SSB was not significantly different between the three shrubs. Topsoil total organic carbon content was significantly highest under *J. sabina* and *B. integerrima* (3.30% and 3.07% respectively) and lowest under *O. cornuta* and herbaceous vegetation (2.61% and 2.23%, respectively). This study revealed that the extent to which vegetation affected soil characteristics depended on the species of shrub in the grasslands. We conclude that *B. integerrima* is a priority species in restoration projects due to its significant positive influences on SSB density

Keywords: shrub Canopy architecture, Basal soil respiration, Substrate-induced soil respiration, Shrub patches, Iran

PATCH EFFECTS ON SUB-CANOPY SOIL AND VEGETATION PARAMETERS IN SEMIARID REGIONS

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ABSTRACT

Shrubs are important components in at least 9 of 11 global biomes, forming much of the vegetation in tropical savannas, polar and high mountain tundras, Mediterranean ecosystems, and arid and semi-arid regions. In arid and semi-arid regions, the study on the effects of shrubs on their sub-canopy soil and vegetation characteristics is important for shrublands management and shrubs (or/and plants) restoration while the studies are scare. This study was conducted to quantify the potential of different species of shrubs to enhance the soil seed bank, vegetation and soil quality associated with them and thus their potential use for restoration. The study was conducted in the semi-arid rangelands of Chenarnaz, Yazd province, Iran. Therefore, three dominant shrubs were selected with different features and architectures in the canopy (*Amygdalus scoparia*, *Ebenus stellate* and Daphne *mezereum*. Soil physico-chemical, seed bank and aboveground vegetation under the canopies were measured. The results showed that in general, shrubs enhance soil quality properties, seed bank density and diversity and plant density, diversity and production. These enhancements were pronounced higher under *A. scoparia* compare with two other shrub species. This study revealed that he extent to which shrubs affect soil and vegetation characteristics is dependent on the species of shrubs in the area. Thus, different functions of various species of native shrubs on soil and vegetation should be considered in the restoration projects of degraded rangelands using native species.

Keywords: Facilitation, Fertile islands, Scrub, Soil

DETERMINATION OF MAIN PRODUCTIVITY PARAMETERS OF AGRICULTURAL SOILS IN ISTANBUL PROVINCE

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ABSTRACT

In addition to its geopolitical importance and industrialization, Istanbul province has a traditional agricultural production system which is carried out intensively especially in Silivri and Çatalca districts, and sunflower and wheat agriculture is carried out in alternations under waterless conditions thanks to sufficient rainfall. With this study, some physical and chemical properties of the soils of agricultural areas where the same agricultural production method has been applied for many years have been determined in terms of sustainable agriculture. Surface soil sampling (0-20 cm) was done according to 2,5x2,5 grid system by containing all of the agricultural areas and the field study was completed by obtaining total of 196 samples. Distribution maps of each parameter were composed by using Geographical Information System (GIS). According to the research results, it was concluded that agricultural soils of İstanbul province were generally medium heavy and heavy structured, had middle alkaline and neutral pH, did not have salinity problem and besides, it was determined that these soils were limeless soils in the ratio of 50% and the rest of these soils were limy soils in variable ratios. It was found that 11% of these soils had a high lime content and this generated from Rendzina big soil group which occurred on the marn main material. Also, it was determined that 59% and 26% of these soils were in little and medium classes in terms of organic matter, respectively, 55% of these soils were high and very high class in terms of available phosphorus and 79% of these soils were in rich and very rich class in terms of extractable potassium.

Keywords: Istanbul soils, agriculture, fertility

EFFECT OF WASTE COMPOST ON AGGREGATE STABILITY OF DIFFERENT TEXTURED SOILS

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ABSTRACT

Sustainable agricultural practices require the preservation and improvement of the physical properties of soils. In this context, waste composts obtained from municipal solid wastes are used as organic soil conditioner in agricultural fields in many countries. In this study, the effect of waste compost on aggregate stability properties of soils with different textures (SCL, CL, C) was investigated. The research was conducted by establishing a pot experiment with 3 replications. Compost was applied to the pots at the rates of 0, 5, 10, 15 t da-1 by dry weight. According to the results of the study, compost applications significantly increased the aggregate stability values in all three soil types. Especially at higher doses, aggregate stability values of soils showed a more significant increase. Compost application showed the highest effect on the soil with sandy clay loam texture due to its coarse structure. In the study, the effects of waste compost applications on regulating aggregation and increasing stabilization in soil were observed. These findings revealed that waste compost has a positive effect on aggregation in soils with different textures, but its effect varies depending on the texture.

Keywords: waste compost, soil, texture, aggregate stability

MICRONUTRIENT CONTENTS OF AGRICULTURAL SOILS IN EDIRNE PROVINCE

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ABSTRACT

This study was carried out to determine the soil properties and to evaluate the micronutrient content of agricultural lands in Edirne province. Edirne province has large paddy production areas and rich agricultural production potential. Agricultural areas constitute approximately 60% of its surface area. In order to evaluate the agricultural areas, soil sampling was carried out systematically. Surface soil sampling (0-20 cm) was carried out with a grid system (2.5 km x 2.5 km) and a total of 712 soil samples were taken. When the DTPA extractable iron contents of the agricultural soils of Edirne province were analyzed; it was determined that 13% were low, 9% were medium and 78% were sufficient. The distribution of extractable copper content is 82% medium and 18% high. The distribution of extractable zinc was determined as 13% very low, 51% low, 30% medium and 6% high. The distribution of extractable manganese was 14% sufficient and 86% high.

Keywords: Edirne, soil, micronutrient

ECOLOGICAL CHARACTERIZATION WITHIN THE GENUS TILIA IN BOSNIA AND HERZEGOVINA - CASE STUDY: THE INFLUENCE OF THE PARENT SOIL SUBSTRATE ON THE APPEARANCE OF FUNGI IN LINDEN

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ABSTRACT

The parent soil on which a certain type of tree grows has great importance for the yield and development of the tree in general. In Bosnia and Herzegovina there are several noble species of trees, such as linden and maple, of which three main types of linden stand out in particular: *Tilia cordata* Mill., better known as small-leaved linden, *Tilia platyphyllos* Scop., better known as large-leaved linden and *Tilia tomentosa* Moench., better known as silver-leaved linden. There is almost no type of tree in the forest ecosystems, which in times of intensified climate change was not attacked by at least one type of pathogen or did not show at least one symptom of drying of certain parts of the plant's above-ground organs. The mortality of forest trees is relatively high within the genus *Picea*, *Abies*, *Pinus*, *Quercus* and *Fagus*, and the main causes of drying and dying of trees are forest fires, extremely high temperatures, the appearance of harmful insects and fungi, as well as the appearance of various plant viruses and bacteria. However, despite the strong impact of climate change on forest ecosystems, some types of trees still show high resistance to pathogens or show signs of fighting pathogens very well and managing to function normally despite their presence. As part of the scientific project related to the morphological, phenological, ecological and genetic characterization of linden trees in Bosnia and Herzegovina, it is planned to investigate the influence of soil type and rock type on the appearance of various pathogens on linden trees. The research includes 216 trees of *Tilia cordata* Mill., *Tilia platyphyllos* Scop. and *Tilia tomentosa* Moench., as well as natural linden hybrids. Measurements during five vegetation periods, from 2019 to 2023, were included. Linden trees were sampled at eight localities in the country, in habitats that are believed to be fragmented linden habitats, and the names of the populations/metapopulations are as follows: 1) metapopulation "Sarajevo", with 17 trees from different hilly-mountainous parts of the city; 2) metapopulation "Tomislavgrad", with eight trees from Capljina and one huge tree of silver-leaved linden from Ljubinje (37 trees in total); 3) "Mostar" population, with 30 trees; 4) population "Kakanj", with 30 trees; 5) "Cajnice population, with a total of 32 trees; 6) metapopulation "Bosanska Krajina", with a total of 31 trees from Bosanski Petrovac, Sanski Most and Bihac; 7) population "Srebrenik" (30 trees) and 8) population "Gorazde" (8 trees). As part of the research, an analysis of the type of parent soil substrate on which the sampled trees grow was performed, by direct identification of the types of rocks, i.e. the type of soil in the field. The results of the research indicate that two main pathogens (fungi) occur in linden trees in Bosnia and Herzegovina: *Microspaerella* and *Stigmina carpohila*. Identification of these two pathogens is possible on the basis of macroscopic identification directly in the field. Through macroscopic identification, it was directly established that the most common geological substrate on which certain types of soil develop, and on which linden grows by nature in Bosnia and Herzegovina in fragmented habitats, is limestone. Linden occurs on diverse types of land in Bosnia and Herzegovina. The mentioned two pathogens occur almost equally on all evidenced geological

substrates, in all three basic linden species in the country. What is interesting is that the fewest trees infected with fungi are located on the banks of rivers (sandbanks), which is why it is necessary to investigate in the future other factors that affect infection with pathogens in linden trees. Not a single tree from Capljina is infected with fungi.

Keywords: Tilia, Soil, Microsoaerella, Stigmina carpophila, limestone

EFFECTS OF MANURE ON HYDRAULIC PROPERTIES OF A LOAMY SAND

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ABSTRACT

Effects of manure (M), on field capacity (FC), permanent wilting point (PWP), available water content (AWC) and initial infiltration rate (IR) were determined in a loamy sand field after 7 months of agricultural wastes were incorporated within 0-15 cm soil depth at four different doses (0, 36, 67 and 100 ton ha-1) in a randomized plot design with three replicates. Manure application generally increased organic carbon (OC), aggregate stability (AS), FC, AWC and IR, decreased bulk density (BD). The lowest FC (10.91%), AWC (4.76%), IR (48.86 cm/h) values were determined in the control application. Mean AWC value of M (6.13%) was higher than that of the control (4.77%). Mean initial infiltration ratio increased from control (48.86 cm/h) to M (128.01 cm/h) application. Manure application decreased BD and increased I ratios and AWC of the soil compared with the control.

Keywords: Manure, field capacity, available water capacity, infiltration, loamy sand

EFFECT OF SELENIUM AGAINST SALT STRESS ON PLANT NUTRIENT CONTENTS IN RUBYGEM STRAWBERRY VARIETY (Fragaria x ananassa Duch var. Rubygem)

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ABSTRACT

This study was carried out to investigate the effect of selenium doses on the nutrient content of the plant with the application of selenium against the adverse developments caused by salinity stress in the growing environment of Rubygem strawberry cultivar (Fragaria x ananassa Duch var. Rubygem). In the study, control (O NaCl), 100 mmol/l NaCl, 1 µM SeO2 + 100 mmol/l NaCl 5 µM SeO2 + 100 mmol/l NaCl, 10 µM SeO2 + 100 mmol/l NaCl and 30 µM SeO2 + 100 mmol /l doses were used. It was determined that the nutrient contents of strawberry plants exposed to salt stress differed compared to the control group plants against the applied 1, 5, 10 and 30 µM SeO2 doses. According to the selenium dose applied to the plants under salt stress, nitrogen, calcium, magnesium and sodium were found to be statistically significant terms of the macro element amounts while the manganese amount was found to be statistically significant in terms of the micro element amount. Salt accumulation in plants increased as the selenium dose increased in plants treated with salt + SeO2. While Na accumulated as 0.7 percent in control group plants, the lowest Na accumulation was 0.13 percent in plants treated with 5 µM SeO2.The highest Na accumulation was detected in plants treated with 10 µM SeO2 at a rate of 2.93 % . In plants treated with 30 µM SeO2, Na accumulated as 2.24%, while the highest N (3.39%), P (0.64%), K (3.42%), Mg (0.41%), B in these plants (891 ppm) was accumulated. In the study, it was determined that the plants applied 30 µM SeO2 as a result of specific ion toxicity, excessive intake of sodium and other ions compared to the control group plants, stressed earlier and plant death occurred within a week after salt and selenium applications. The closest macro and micronutrient content values to the control group were obtained in plants treated with 5 µM SeO2.

Keywords: Selenium, sodium, stress, salinity

EFFECTS OF DIFFERENT ORGANIC MATERIALS ON SOME YIELD COMPONENTS AND NUTRIENT CONTENT OF BEAN CROPS

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ABSTRACT

The use of organic materials in agriculture plays an important role in recycling plant nutrients and protecting soil health. Organic materials have a positive effect on the physical, chemical, and biological properties of the soil, as well as promoting plant growth and crop yields. For this purpose, the study was carried out under greenhouse conditions according to a randomized experimental design with three replications to determine the effects of different organic materials and doses (0, 1.5 and 3 t/ha) on the growth and nutrient content of bean plants. To achieve this objective, some growth parameters (fresh and dry weight of the upper part of the plant, fresh and dry weight of the root) and nutrient concentrations in the upper part of the plant (P, K, Ca, Mg, Fe, Zn, Mn, Cu and B) were determined in bean plants. According to the results of the study, the effect of different organic materials and doses on some yield components and nutrient contents of the bean plant was found to be statistically significant ($p<0.01$). In comparison with the control crop, farmyard manure applied at 1.5 t/da was effective on the fresh weight of the upper part of the plant, while farmyard manure applied at 3 t/da was effective on the dry weight of the upper part of the plant. In addition, sewage sludge applied at 3 t/da was found to be effective on the fresh and dry root weights of bean plants. Furthermore, it was found that sewage sludge applied at 3 t/ha was effective on the fresh and dry root weights of bean plants. On the other hand, the highest phosphorus, calcium, and magnesium contents of bean plants were found in plants treated with 1.5 t/da sewage sludge. It was observed that farmyard manure application was generally effective on plant microelement content. In general, the highest values of yield components and nutrients were obtained from farmyard manure and sewage sludge applications.

Keywords: Bean, Nutrients, Organic material, Yield components

THE EFFECT OF SOIL AND FOLIAR APPLICATION OF MACRO-ALGAE AT İNCREASING DOSES ON THE NUTRIENT CONTENT OF THE ALFALFA PLANTS

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ABSTRACT

Algae are considered fertilizer in many countries because they aerate the soil, maintain moisture, are as rich in nitrogen as farmyard manure, and contain trace elements. Today, seaweed fertilizers are used in many countries, either as a liquid extract or mixed directly into the soil. Therefore, the study was conducted to determine the effects of increasing doses (0, 0.1, 0.2, 0.3, 0.4 and 0.5%) of seaweed extract (seaweed fertilizer) on the nutrient content of alfalfa plants under controlled greenhouse conditions according to a randomized experimental design with 4 replicates. For this reason, some nutrients (P, K, Ca, Mg, Fe, Cu, Mn, Zn and B) were determined in Alfalfa plants. According to the results of the study, the effects of increasing doses of soil and foliar application of seaweed extract on the nutrient content of alfalfa plants were found to be statistically significant ($p<0.01$). The highest phosphorus and potassium contents of alfalfa plants were found in plants treated with 0.4% seaweed fertilizer. The highest calcium and magnesium contents were determined in the plants treated with 0.4% algal extract from the leaves compared to the control treatments. It was observed that the foliar application of seaweed fertilizer generally affected plant microelement content.

Keywords: Alfalfa, Algae extract, Nutrients, Leaf, Soil

THE EFFECT OF SOIL AND FOLIAR APPLICATION OF ALGAE EXTRACT ON SOME GROWTH PARAMETERS OF ALFALFA PLANTS

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ABSTRACT

Algae extract is used in many regions to increase yield and quality in sustainable agriculture, particularly in organic farming, by regulating plant growth, increasing resistance to disease and pests, and improving the reclamation of soil. For this purpose, the study was carried out to determine the effects of increasing doses (0, 0.1, 0.2, 0.3, 0.4 and 0.5%) of soil and foliar applications of algae extracts on some yield components of alfalfa plants under controlled greenhouse conditions according to a randomized experimental design with four replications. For this reason, some yield components (upper part of the plant and root length, fresh and dry weight of the upper part of the plant, fresh and dry weight of the root) were determined in alfalfa plants. According to the results of the study, the effects of increasing doses of soil and foliar applications of algae extracts on some yield components of alfalfa plants were found to be statistically significant ($p<0.01$). The highest effect on the length of the upper part of the alfalfa plant was observed with the application of 0.1% algae extract from the leaf. However, the best effect on root length was found in plants treated with 0.5% algae extract from the soil. In general, applications of algae extract from the soil resulted in higher fresh and dry weights of the upper parts of alfalfa plants. It was found that the fresh and dry weight of the root of the plant was more effective when 0.1% algae extract was applied from the soil. Generally, the lowest alfalfa yield component values were obtained in the control treatments.

Keywords: Alfalfa, Algae extract, Leaf, Soil, Yield components.

VALORIZATION OF OPUNTIA MEAL IN ANIMAL PRODUCTION

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ABSTRACT

The composition of additives of vegetable origin is characterized by a great variety according to their transformation and their chemical description, it also depends on their botanical origin. Some cakes are used in animal feed, they constitute the 2nd most important class of food after cereals. The objective of our work is to evaluate the effect of the addition of Opuntia cakes in the diet at different percentages on zootechnical parameters in broilers. At the end of this study, we can consider that the birds belonging to the experimental batches show a higher growth than that of the control batch. The food intake and the consumption index are in favor of the experimental batches, which testifies to a good food conversion; the yield of the carcasses before and after evisceration was recorded at the level of the batches supplemented with opuntia meal. Finally, the mortality rate remained low throughout the trial period. The histological sections of the liver and kidneys revealed an overall preserved structure and morphology, which testifies to the functional and histological integrity of these two filter organs.

Keywords: Meal, Food, Poultry, Yield, Safety

EVALUATION OF THE LESION PICTURE IN SHEEP AND GOATS WITH ENTEROTOXEMIA

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ABSTRACT

Enterotoxemia is a serious condition favored by feeding errors which results in sudden death of animals. It is characterized by an enzootic or even sporadic toxi-infection common to many animal species; cattle, goats and more particularly sheep. This acute intoxination results from the resorption through the blood of toxins produced in the intestine during the multiplication of commensal bacteria of the Clostridium genus, which is considered to be the main etiological agent of this disease. The diagnosis is not always easy to highlight because the cadaverous alteration of the subjects complicates and masks the lesions at the level of the organs. Our study focused on autopsies carried out on a few subjects of sheep and goats in the region of eastern Algeria, the aim of our study is to evaluate the lesion picture observed on the affected organs. From our results, we note the predominance of congestion and intestinal bleeding, followed by renal involvement with degeneration of the parenchyma, splenomegaly and hepatomegaly with hypertrophy of the gallbladder finally pericarditis was observed.

Keywords: Enterotoxemia, Sheep, Goats, Autopsies, Lesions

PARASITOLOGICAL ASPECT AND HISTOLOGICAL STUDY OF DIGESTIVE TRACT OF THE DOMESTIC QUAIL COTURNIX JAPONICA IN ALGERIA

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ABSTRACT

The Japanese quail (*Coturnix japonica*) is a small, hardy bird characterized by rapid growth, early sexual maturity, a short generation interval, high egg-laying capacity and lower requirements (in terms of feed and space) than other poultry species. Indeed, one of the factors that has determined their success as pets is the fact that quails are resistant to disease. This organic resistance does not exempt the breeder from certain care requirements, without which the birds will easily fall victim to disease. On the other hand, other authors point out that quails are susceptible to most pathogens, including bacteria and viruses. In particular, coccidiosis is a parasitic disease that primarily affects galliforms and can cause major losses on farms. In the case of quail, it is caused by coccidia of the Eimeria genus. For this reason, one of the aims of the present study is to identify parasites on Japanese quail farms. Sampling was carried out on 20 breeding birds, including 10 females and 10 males, where blood smears were taken to detect hemoparasites. The parasitological approach continued with an analysis of intestinal contents; the various compartments of the digestive tract sampled from 5 females and 3 males were examined using the histological technique. The results revealed the presence of an endoparasite of the Eimeria genus in a small number of animals. Histological analysis of the digestive tract revealed lesions in certain compartments of both sexes, with varying prevalence. These included the proventriculus, with an overall prevalence of 62.5%; the same value was reported for the small intestine. The oesophagus and gizzard also show lesions, with values of 12.5% and 50% respectively. The various histological lesions observed are represented by ulceration of the glandular epithelium of the mucosa, necrosis and degeneration of the glandular lobules of the submucosa, and lymphocytic infiltration detected in the connective tissue of the chorion. Lesions characterized by oedema with lymphocytic infiltration and sometimes with partial degeneration are also observed. Necrotic enteritis has been reported in the small intestine.

Keywords: Coturnix japonica, Parasites, Blood, Digestive tract, Histology

COMPARATIVE STUDY ON THE DAILY EVOLUTION OF THE COCCIDIA EIMERIA KOFOIDI AND EIMERIA PROCERA IN GAMBRA AND CHUKAR PARTRIDGES IN SEMI-CAPTIVE ENVIRONMENT IN ALGERIA

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ABSTRACT

This work consists of tracking the daily evolution of coccidia of the genus *Eimeria* in gambra partridge (*Alectoris barbara)* and chukar partridge (*Alectoris chukar)* through coprology. However, the chicks' droppings are collected daily from the 8th day of age until the adult stage. We have identiified two species of coccidia, *Eimeria kofoidi* and *Eimeria procera*. The prevalence of *E. procera* was highest in partridges, at 61.29% (P. gambra) and 58.75% (P. chukar). The Mac Master method shows us that the highest average number of oocysts per gram of droppings is 76300 o.p.g.. This rate was recorded for chukar partridges at 45 days of age. The Student Fisher test shows that oocyst excretion is similar in the two species of partridge, with the same degree of sensitivity. Despite preventive sanitary measures and anticoccidial treatment, oocysts developed, forming peaks and causing significant mortality in chicks, particularly in gambra partridges, with a rate of 52%.

Keywords: Daily evolution of coccidia, Eimeria kofoidi, Eimeria procera, Student Fisher test, Mortality, Alectoris barbara and chukar

SEROLOGICAL EVIDENCE FOR THE CIRCULATION OF RIFT VALEY FEVER VIRUS IN SEVERAL DOMESTIC ANIMALS IN ALBANIA

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ABSTRACT

Rift Valley Fever (RVF) is a mosquito-borne viral disease that causes high mortality rates in newborn ruminants, especially sheep and goats, and abortion in pregnant animals. RVF virus may be transmitted to humans by mosquito vectors, mainly *Aedes* and *Culex* spp., but mostly through direct contact with blood, abortion products, or any other infected biological material during the viraemia. RVF is endemic in Africa and Middle East, with severe hemorrhagic fever cases reported in humans and animals. Up to date, no outbreaks have been reported in Europe. Little is known about epidemiology of RVF virus in Albania. This study aimed to determine the presence of RVF virus in several domestic animals collected rural, in small farms, in rural areas. During September 2022 till June 2023, a total of 440 animals of several species like horse, sheep, goats, cattle, dogs, and cats were analyzed, from 175 herds. Blood samples were tested by Competition ELISA (ID Screen® Rift Valley Fever Competition Multi-species) for anti RVFV nucleoprotein antibodies, and by a real-time reverse transcription PCR (RRT PCR) for detection of RVF virus. From a total of 440 samples in 6 different animal species, the overall sero-positivity for individual livestock was 1.33%, and 3.42% for the livestock herd. Seroprevalence was higher in dogs 10% positivity (3 out of 30), compared with 1.56% in cattle and 1.08% in horses. RVFV IgG reacting antibodies were not detected in sheep, goats and cats. No RVFV RNA was detected in the animal plasmas. This is the first serological survey of Rift Valley Fever in animals in Albania. The detection of specific antibodies in several domestic animals is an important indicator for virus circulation. The results highlight the risk of RVF for human rural population living in contact with these animals. Other surveillance studies are needed to collect more data, and to better evaluate the threat posed by this zoonotic disease.

Keywords: RVF virus, multi-specie, ELISA, RRT PCR, seroprevalence, Albania

IDENTIFICATION OF PREGNANCY-ASSOCIATED GLYCOPROTEINS AS USEFUL BIOMARKER IN EARLY PREGNANCY DETECTION FOR DAIRY CATTLE

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ABSTRACT

Early pregnancy diagnosis is an important aspect for optimizing dairy production by reduces the calving interval and interbreeding, allowing earlier resynchronization and rebreeding. This could also offer farmers the opportunity to reduce the economic damage caused by pregnancy loss, and predict early pregnancy failures. Pregnancy-associated glycoproteins (PAGs) are secretory products from mono and binucleated trophoblastic cells in bovine placentomes, and serve as an important tool for early detection of pregnancy. Identification of PAGs as a marker has significant differential expression during pregnancy. This work aimed identification of PAGs in serum of dairy cattle from different Albania's farm, and to compare the accuracy of blood tests in predicting pregnancy loss. Time of testing is at earlier stages of pregnancy, 28- 40 days following insemination in cows and heifers, and blood samples were collected at this time. An enzyme-linked immunoassay test was used (IDEXX ELISA Bovine Pregnancy) which helps to determine earlier, and with certainty, whether an animal is open or not. Test results assessed prospectively the pregnancy, non-pregnancy and embryo death values. From a total of 342 blood samples, 33.04% resulted non-pregnancy cows, 63.15% were pregnancy cows, and 3.8% death embryo. Our results suggested that PAGs have been useful for identifying the presence of vital embryos and for pregnancy follow-up monitoring.
Early measurement of PAGs in serum is a cost effective, reliable and noninvasive method for pregnancy diagnosis. It is prerequisite for efficient reproductive management in cattle. It is suggested that farmers can use it normally in other dairy livestock such as small ruminants.

Keywords: ELISA PAGs, cattle, pregnancy diagnosis, reproductive management

CONTRIBUTION TO THE BIOLOGICAL STUDY OF MUSCA DOMESTICA AND STOMOXYS CALCITRANS (L.1758) (ARTHROPODA, MUSCIDAE) IN CATTLE ON FARMS IN EASTERN ALGERIA

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ABSTRACT

The presence of flies on cattle leads to a disruption of zootechnical performances, such as a significant decrease in milk production, slowed growth of young cattle, and the transmission of pathogens from sick to healthy animals. Our study demonstrated the presence of Musca domestica and Stomoxys calcitrans flies by collecting specimens from five farms located in three regions: Ferdjioua (Yiahia beni guecha), El Khroub, and Ouled Arama. Musca domestica was the most dominant species, with a population of 776 individuals, followed by Stomoxys calcitrans with a population of 113 individuals. The investigation of the sex ratio revealed a predominance of females for both fly species compared to males. The ecological analysis showed the following results: both fly species were absent in farm 04 in Ferdjioua and present in the other farms, with a high abundance of both species in farm 02 in El Khroub. Our study also revealed, for the first time, the presence of mites from the Macrocheldae family on the bodies of both fly species. Further research is required to supplement our knowledge regarding these mites. Ultimately, we recommend combating flies by focusing on farm hygiene, including regular cleaning and the replacement of cattle bedding.

Keywords: Musca domestica, Stomoxys calcitrans, cattle, farms, mites

THE ROLE OF DNA METHYLATION IN SHEEP EMBRYONIC DEVELOPMENT

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ABSTRACT

DNA methylation is one of the epigenetic modifications of the genome, the essence of which is the attachment of a methyl group to nitrogenous bases. They are assumed to CpG islands play an important role in the regulation of gene expression in sheep, coming to regulatory elements of genes. The interest are processes of methylation and demethylation. The methylation process always depends on the work of enzymatic complexes and is very precisely regulated. The methylation process largely depends on the functioning of enzymes. On other hand, demethylation can be performed not only by enzymatic complexes, but also during DNA replication. So, the maintenance of DNA methylation is more important. Changes in methylation patterns are linked with gene expression and observed during embryonic development.

Keywords: methylation, sheep, gene expression embryogenesis

INVESTIGATION OF THE FACTORS LIMITING THE SUCCESS OF ARTIFICIAL INSEMINATION IN CATTLE

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ABSTRACT

The aim of our work is the study of certain risk factors for infertility in dairy cows. The first part looks at establishing the link between repeated failures of artificial insemination and certain blood metabolites. Blood samples were taken shortly before artificial insemination for the determination of progesterone and certain metabolites: Glucose, cholesterol, beta-hydroxy-butyrate (BHB), non-esterified fatty acids (AGNE), urea, albumin, cortisol, aspartate aminotransferase (AST) and C-Reactive Protein (CRP). The descriptive analysis of the data revealed high frequencies of cows inseminated in luteal phase (28.89%), in negative energy balance (17.78%) and of stressed cows (46.67%), which had levels in elevated cortisol (22.96ng / ml). The metabolite concentrations in pregnant cows were within the limits of the reference values, on the other hand we recorded an increase in the non-pregnant ones. The relational study by principal component analysis (PCA), demonstrated that the increase in the concentrations of certain metabolites and the decrease in certain others, were associated with a failure of artificial insemination. correlations, positive correlations on the one hand, very highly significant between BHB and AGNE (r = 0.70), as well as between glycemia and cortisolemia (r = 0.58); on the other hand highly significant between BHB and AST (r = 0.38). Significant positive correlations were observed between BHB contents and cholesterolemia (r = 0.30), cholesterolemia and cortisolemia (r = 0.29), AST and CRP (r = 0.36), AST and albuminemia (r = 0.36), AST and P4 (r = 0.36) and finally between P4 and albuminemia (r = 0.31). In addition, there is a highly significant negative correlation between the success of artificial insemination (gestation) and the levels of progesterone (r = - 0.33), cortisol (r = 0.38) and BHB (r = 0 , 39). These results confirm that infertility is characterized by the multiplicity of factors involved.

Keywords: cow, fertility, fercudity, energy balance, artificial insemination, heat

ESTABLISHMENT OF THE LINK BETWEEN CERTAIN METABOLITES, BODY CONDITION SCORE AND REPRODUCTIVE PERFORMANCE IN DAIRY COWS

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ABSTRACT

The objectives were to assess post-partum blood non-esterified fatty acids (NEFA) and β hydroxybutyrate (BHBA), considered either together or separately, relative to plasma metabolites, body condition score (BCS), estrus cyclicity and first service pregnancyin. 50 dairy cows sampled from 15 to 52 days in milk (DIM). The thresholds for high NEFA and BHBA were ≥0.70 Mm and ≥ 0.96mM at DIM 30, respectively. Cows with simultaneously high BHBA and NEFA have different plasma metabolite profile compared to cows with low BHBA or NEFA and, to a lesser extent, compared to cows with high NEFA only. The change in BCS from calving to DIM 52 showed a similar pattern, with a more intensive BCS decrease in cases of high BHBA and NEFA, although the difference from cows with high NEFA only was not significant. Compared to cows with low BHBA and low NEFA, the odds of estrus cyclicity at DIM 52 was 85% lower in cases of high NEFA, and the odds of PRAI1 was 87% and 92.6% lower in cases of high BHBA or high NEFA, respectively. In conclusion, the present work demonstrates the added value of simultaneously measuring BHBA and NEFA, but new investigations are needed to explain the clinical outcomes linked to subclinical ketosis.

Keywords: BHB; NEAF; Plasma metabolites; BCS; Reproductive performance; Dairy cows

DIFFERENT PHOSPHORUS SOURCES IN BROILERS DIET - UTILIZATION AND ENVIRONMENTAL POLLUTION

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ABSTRACT

The current study was conducted to evaluate the digestibility of phosphorus from monocalcium phosphate (MCP), as an inorganic P source in broilers diet, and to determine the faecal P output. A total of 200 1-day-old (Cobb 500) broilers, both sexes, obtained from the local hatchery, were included in the trial and divided in two groups, by one hundred birds each. During the 42 experimental days, broilers were fed a diets which differed only in MCP origin. Cr2O3 was added to the diets at a 0.5% level as an indigestible marker. By 10 birds from each group were placed into individual balance cages, at day 11 and day 25, in order to provide the collection of faeces during 5 consecutive days. Daily phosphorus intake, fecal P output and percentage of apparent and true total tract digestibility of P were measured, in two ages of broilers. Determined differences have shown the influence of inorganic source on P utilization ($P<0.05$). It was concluded that the P utilization was not significantly affected by the age of broilers. Tested parameter may be used in estimation of level of P that in this way merged into the environment. Additionally, this is valuable information for optimization of complete feed mixture for broilers regarding P needs, which is one of the most important ways of dealing with phosphorus pollution.

Keywords: Phosphorus, Broilers, Feed, Pollution

VACCINATION OF BABESIOSIS; SCOPE, CHALLENGES AND PITFALLS

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ABSTRACT

Babesiosis, also known as tick fever or red water disease, is economically the most important tick-borne disease caused by protozoa *Babesia*. Almost 111 species of *Babesia* exist, but in cattle mostly 3 species (*Babesia bovis, Babesia bigemina, Babesia divergens)* are causing the effects of bovine babesiosis. *Babesia bovis* has badly been effecting the development of livestock sector over several years' even decades. The morbidity and mortality of babesiosis are very high and its prevalence in Pakistan is up to 29%. The mining of available parasite genomes is continuously enlarging the array of potential vaccine candidates and, additionally, the recent development of a transfection tool for *Babesia* can significantly contribute to vaccine design. However, the complication and high cost of vaccination trials hinder the *Babesia* vaccine research. Furthermore, the adverse vaccine reactions, incorrect handling or storage of the vaccine, concurrent disease, stress and immunity, vaccination following the use of chemotherapeutic agents, high cost in maintaining cold chain for live vaccine, are the major challenges in the progress of vaccine usage. Moreover, the use of live, blood-derived vaccines entails some problems, including: (i) the possible spread of silent pathogens such as bovine leukemia virus (ii) difficulties in standardizing the vaccine dose (iii) the risk of reversion of virulence (iv) maintenance of carrier animals, which might serve as reservoirs for tick transmission (v) quality control of vaccine production, maintenance and transportation to the end user, including the necessity for a cold chain. Other factors contributing to the lack of progress in vaccine development such as the small size of the market and the inability or unwillingness of a farmer to pay a proper price for the vaccine could mean that, in certain situations, there is insufficient economic incentive for a manufacturer to produce, register and distribute a vaccine. Certain vaccines have a short shelf-life and a cold-chain is often needed for distribution, which could affect the cost–benefit balance negatively. The sentiment that the current anti-parasitic drugs are good enough for most purposes, are cheap to produce and show broad-spectrum efficacy could suggest that the need for parasitic vaccines is rather low. Prophylactic therapy is accepted as necessary and, with the high efficacies achieved by drugs in the past, there will be a problem to persuade the user that a vaccine that is 100% effective can control the disease.

Keywords: Vaccination, Babesiosis, Scope, Challenges, Pitfalls, Tick-borne diseases

BIOCHEMICAL EFFECTS OF LIVE FISH TRANSFERS IN TURKISH SALMON FARMING AND IMPROVEMENT OF TRANSFER CONDITIONS

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ABSTRACT

In order to meet the food needs of the increasing world population, aquaculture is one of the most suitable and environmentally friendly methods preferred to obtain low emission and quality protein. Live fish transfers are made in order to increase efficiency by using water resources in the most effective way. However, transfer processes are one of the stress sources that cause death in fish. It is possible to reduce the harmful effects of stress by providing optimum living conditions during the transfer. Correct practices during this process are essential to ensure the health, welfare and success of the transfer operation of the fish. There are some factors to be considered for successful live fish transfers. These factors, which are vital for fish, are; fish health, dissolved oxygen and carbon dioxide levels in the water, pH, water temperature, fish density and metabolic wastes such as ammonia cause changes in fish biochemistry during transportation. In this review, the effects of transfer on salmon candidate trout transferred from dam water to the sea in Turkish salmon farming are discussed.

Keywords: Transportation of live fish, biochemistry, water quality, aquaculture, Turkish Salmon

THE ROLE OF DNA METHYLATION IN SHEEP' EMBRYONIC DEVELOPMENT

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ABSTRACT

DNA methylation is one of the epigenetic modifications of the genome, the essence of which is the attachment of a methyl group to nitrogenous bases. They are assumed to CpG islands play an important role in the regulation of gene expression in sheep, coming to regulatory elements of genes. The interest are processes of methylation and demethylation. The methylation process always depends on the work of enzymatic complexes and is very precisely regulated. The methylation process largely depends on the functioning of enzymes. On other hand, demethylation can be performed not only by enzymatic complexes, but also during DNA replication. So, the maintenance of DNA methylation is more important. Changes in methylation patterns are linked with gene expression and observed during embryonic development.

Keywords: methylation, sheep, gene expression embryogenesis

EVALUATING MICROBIAL LOAD OF OUED BOUSSELAM RIVER AND WASTE WATER TREATMENT USING DAPHNIA MAGNA

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ABSTRACT

Physico-chemical and microbiological analyzes are necessary to avoid the risks of wastewater on human health. The evaluation of enterobacteria in 6 sites of Oued Bousselam is carried out during three months: January, February and March, using filtration and culture on chromocult. Also purifying power of *Daphnia magna was evaluated* in 5 different wastewater samples. First the results revealed the presence of pathogenic bacteria such as: *Citrobacter*, *Shigella* and *Pseudomonas*, the physico-chemical parameters as pH and temperature have a significant influence on the prevalence of these bacteria. Almost all of the results obtained after *Daphnia* treatment show that there is a reduction in the turbidity of the water up to 0.005 for some samples, accompanied by a reduction in the studied bacteria. This was the case of *Clostridium* in the lifting station where the number of spores has decreased halved to 13.10-2 CFU / ml.

Keywords: Daphnia, wastewater, biological treatment

GOVERNING OF RESOURCES BASED ON COLLABORATIVE NETWORKS IN RANGELANDS: WHAT IS THE EFFECT OF THE STRENGTH OF RELATIONSHIPS?

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ABSTRACT

The purpose of this study was to answer this question: what is the effect of the strength of relationships in social-ecological governance? This paper intends to design and facilitate strategic networks to strengthen inter-local and regional links and provide policies that develop collective communication to solve various issues of land governance. According to this issue, this study used social network analysis, while modeling the network relationships of various actors present in rangelands of Kerman province in southwest of Iran, to identify structural gaps that lead to the weakness of collaborative conservation of pastures. Quantitative and qualitative information necessary for the study were collected through interviews and questionnaires of network analysis. Results indicated the existence of relatively suitable of collaboration in between different active communities in the study area. Evaluation showed that the density index in network of collaboration was weak, indicating poor social cohesion and reduced resilience of livestock beneficiaries when facing with environmental stresses. The analysis of the index of reciprocity index indicated high interaction that has led to the connection of the entire network. However, the most important problem is the lack of diversity among effective actors in cooperative conservation so that diverse powers can act more successfully in the realization of a multi-centered governance system.

Keywords: Stakeholders Analysis, Social capital, Rangeland Governance, Policy

AN INVESTIGATION INTO PARTICLE FILTRATION BY POZZOLAN FOR WASTEWATER IRRIGATION

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ABSTRACT

In response to the escalating problem of water shortage all over the world, treated wastewater is nowadays widely reused and is generally considered as a reliable alternative water source. Although the reuse practice is accompanied by a number of benefits relating to the enhancement of water balances and soil nutrition by the elements existing in the treated flows. However, it is now known that the effluents' remaining organic matter after conventional treatment consists of a number of recalcitrant organic compounds. The fact that the currently applied treatment processes for urban wastewater abatement fail to remove completely such contaminants leading to their subsequent release in the terrestrial and aquatic environment through disposal and reuse applications is widely accepted. Clogging of emitters in drip (trickle) irrigation sytems using treated wastewater effluents is primarily attributable to suspended matter in the water. Granular bed filtration is a means of major importance for the removal of suspended matter to cope with these problems. The purpose of this work was to study the filterability properties of secondary effluents used for irrigation. The filtration was direct and without chemical pretreatment, as is commonly practiced in agriculture. Pilot experiments with both granular and screen filters of pozzolan were carried out in the laboratory with secondary effluents. Emphasis was placed on particle size distribution measurements and analysis for better evaluation of the results. The removal ratio for all particles measured increases with grain size and with bed depth, and decreases with filtration velocity, affecting the lower particle size range more. Both turbidity and TSS are inferior to particle size distribution measurements for filterability evaluation of wastewater effluents.

Keywords: Secondary wastewater; Drip irrigation; Clogging; Suspended matter; Pozzolan

WASTEWATER REUSE IN ALGERIA

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ABSTRACT

The reuse of treated wastewater is a specific and planned action that aims at producing additional quantities of water for different uses. Today the strategy of sustainable development in Algeria is materialized particularly through a program that brings together three dimensions namely: Social, Economic and Environmental. Agriculture is the biggest consumer of water resources, given the decrease in water supply observed over the last few decades. Farmers, especially those in arid and semi-arid regions, are interested in wastewater reuse as a sustainable source of water and a substitute for chemical fertilizers for soil improvement. The objective of this paper is to present a general overview on the management of treated wastewater in Algeria with a specific emphasis on irrigation water supply for agriculture. Currently, rainfall, water from dams and water from boreholes cannot meet the irrigation needs, which leads the Algerian government to treat billions of cubic meters of wastewater for the irrigation of 2 106hectares by 2023. For the moment in Algeria, the volume of treated wastewater is approximately 5.6 109 m^3; where 65% is devoted to irrigate fruit trees and horticulture. The reuse of treated wastewater for irrigation should concern as a priority the areas lacking in conventional water. Algeria has built 56 wastewater treatment plants spread over the 48 wilayas (departments) and few of them have tertiary treatment facilities for the reuse of treated wastewater in agriculture. At the end of the last year, the volume reused has been estimated at 1010 m3/year to irrigate more than 1.5 106hectares of agricultural lands. The potential for reuse of treated wastewater for agricultural purposes will increase significantly from every year, and the number of wastewater treatment plants concerned by irrigation is in growth. The future projects for the reuse of treated wastewater under study or construction are about 12, for the irrigation of more than 2.2 106hectares hectares of agricultural fields.

Keywords: Wastewater reuse; tertiary treatment; wastewater management; cicular economy; sustainable development

STUDY OF DIFFERENT ALTERNATIVE COST-EFFICIENT WELL WATER PRE TREATMENT TECHNIQUES USED IN FOOD INDUSTRY

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ABSTRACT

Food industry is one of the main water consuming sectors. It is one of the most important raw materials but is also used for steam production, heat exchangers and cooling towers. However, it should fulfill some critical quality requirements in order to guarantee an optimal performance. The most effective method for well water treatment is reverse osmosis technique but this method seems not to be so cost effective being a very expensive treatment method considering the high quantity of water used in a technologic process. Well waters are rich on minerals but they are relatively free from suspended solids, as they are filtered as they move through the soil layers. This natural filtration also removes most of the biological contamination. However, some pretreatment processes should be carried out in order to improve water characteristics according to its industrial use. Pretreatment method is a function of water parameters and the final objective for water application. In this paper we have recommended some alternative techniques for water pretreatment of Kashar Municipality water basin located in the industrial region between Tirana and Durres. Depending of the intended use, almost all the industrial activities of this region use well water which is pretreated by different techniques in order to improve filtration efficiency, minimizing corrosion and precipitation phenomena. In this paper we have studied reaction of well water with limestone, lime and sodium bicarbonate. Lime or lime/sodium carbonate softening is an effective treatment method and can be implemented easily in industrial scale. Lime or lime/sodium carbonate softening dosage is a critical process being a function of well water parameters, lime suspension and temperature. All these parameters are evaluated in order to determine the optimal condition for well water pretreatment efficiently and at a low cost.

Keywords: well water, pre treatment, cost efficiency, reverse osmosis, lime softening

ESTIMATION OF PLANT WATER CONSUMPTION OF TOMATO PLANT WITH HYDRUS 1-D PROGRAM BY USING IRRIGATION WATERS IN DIFFERENT SALINITY LEVELS IN GREENHOUSE CONDITIONS

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ABSTRACT

This study was carried out in order to estimate the plant water consumption of tomato plant with HYDRUS 1-D model by using irrigation waters in different salinity levels in greenhouse conditions in Kırklareli. Three different irrigation waters (S1=%70, S2=%100, S3=%130) and salinity levels (T1=0.38dSm-1; T2 =2.5dSm-1; T3=5.0dSm-1) were used. Plant water consumptions were followed by the humidity sensors by ignoring the runoffs and outflow losses according to water balance equation in 60 cm soil profile which was accepted as effective stem depth in tomato plant. When 30% of usable moisture capacity was consumed, irrigation was done in the amounts of 70%, 100% and 130% of field capacity. Meteorological parameters, evapotranspiration, soil profile depths, bulk density and texture, field capacity, wilting point, EC, SAR and pH values were entered to the program. When the model was run, volumetric water contents were compared with the measured values according to the obtained profile values. Regression analysis was applied for the determination of the relationship between the obtained values and the measured values as a result of the simulation. Root mean square error (RMSE), mean absolute deviation (MAE) and relative error (RE) were calculated and the accuracy of the results was tested. As a result of regression analysis, RMSE values were found to be higher than MAE values. When the (RE) values were examined, they were found as S1T1=0.224 (adequate), S1T2=0.331 (inadequate) and S1T3=0.329 (inadequate). The model was at the inadequate level in the estimation of plant water consumption on the subjects in which the irrigation water amount decreased and the salinity amount increased. Relative error values were found as 0.258 (adequate), 0.149 (good) and 0.135 (good) in S2T1, S2T2 and S2T3 subjects, respectively. The model was at the adequate and good levels in the estimation of plant water consumption on the subjects in which the irrigation water amount was 100% and the salinity amount increased. (RE) values were found as 0.171 (good), 0.195 (good) and 0.175 (good) in S3T1, S3T2 and S3T3 subjects, respectively. The model was at the good level in the estimation of plant water consumption on the subjects in which the irrigation water amount was 130% and the salinity amount increased. It was concluded that Hydrus 1-D model could be used for the estimation of plant water consumption in tomato plant cultivation in the greenhouse conditions in different salinity level waters when the water constraint was not applied.

Keywords: HYDRUS-1D, evapotranspiration, tomato, salinity, modelling

ASSESSMENT OF WATER STRESS IN STEVIA USING HYPERSPECTRAL DATA BEFORE AND AFTER IRRIGATION

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ABSTRACT

This study aimed to determine the changes in reflectance in stevia at different irrigation levels using hyperspectral measurements. For this purpose, hyperspectral measurements were taken consecutively for 15 days from stevia at six different irrigation levels. The collected data were classified before and after irrigation and statistical analyses were performed. This study was conducted in the research field of Akdeniz University using a randomized block design. Measurements before or after irrigation did not create significant differences in reflectance in the visible wavelength range of the electromagnetic spectrum, but after irrigation, measurements showed higher values in the NIR, R900, and R970 wavelengths. Significant increases in reflectance were observed in the visible wavelength range owing to the increased water stress, whereas no significant differences were observed in the NIR, R900, and R970 wavelengths. The WI/NDVI ratio among the vegetation indices increased depending on water stress, whereas the VI, NDVI, DVI, and WI indices decreased. The results indicated that the DVI and WI indices could be used to determine irrigation scheduling compared to other vegetation indices. Furthermore, the NIR wavelength range, R900, and R970 wavelengths were more effective in determining the water stress in stevia than in the visible wavelength region. Overall, the findings suggest that hyperspectral measurements can be useful in assessing the effects of irrigation levels on stevia and in selecting appropriate vegetation indices to evaluate water stress conditions in these plants.

Keywords: Deficit irrigation, NIR, vegetation indices, visible wavelength

LEGUME GRAINS A PROMISING ALTERNATIVE TO THE SOYA BEAN MEAL IN SMALL RUMINANT DIETS

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ABSTRACT

Actually, Tunisia, suffer from a forage deficit and a nutritional imbalance. Thus, raw materials especially soybean meal characterized by fluctuations in their prices are imported. Several attempts to replace these foods, including soybean meal, have been considered by researchers. Local legumes (Lupine, vetch and faba beans) are the better alternative. However, despite their good nutritional quality, the use of lupine and vetch in animal nutrition is limited. The tackled objective is the evaluation of the substitution effect of soybean meal by sweet lupine and vetch on the intake, digestiblity, growth and meat quality in sheep. In the first study, we replaced 50 and 100 % of soybean meal by Narbon vetch in term of protein in concentrate of Barbarine rams. Results showed that the partial or total replacement of soybean meal by vetch seeds has no effect on the diet intake and digestibility. In the second experiment, soybean meal were totally replaced by sweet lupine in lamb's diet based on oat hay. Three types of concentrates were formulated: CC1 containing 75% barley, 22.5% soybean meal and 2.5%MVS; CC2 containing lupine as a substitute for soybeans; and CC3 containing only barley and CMV. CC1 and CC2 were iso-nitrogenous. Animals assigned to the first and the second group received daily CC1 and CC2, respectively. The third group received alternately CC2 (day1) and CC3 (day2). Experiment lasted 110 days (growth and digestible periods). At the end, animals were slaughtered to study meat quality. Results showed that intakes, average daily gain (ADG), diet digestibility and microbial synthesis were not affected (P> 0.05). Animals showed different retained nitrogen level (P <0.05). Fermentation parameters and meat parameters (yield and fatty acids profile) were not affected. It can be concluded that sweet lupine and Narbon vetch grains can substitute safely soybean meal and reduce consequently the production cost.

Keywords: Soybean, sweet, lupine, vetch, intake, lamb-ADG, meat quality

POSSIBILITY OF USING FACTORY BLACK TEA WASTE IN ANIMAL FEED

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ABSTRACT

Tea (*Camellia sinensis*) is the most consumed beverage in the world after water. Tea leaves are usually collected from the end of March and the beginning of April to July each year. Tea can be classified as black, green and oolong tea according to the processing procedures. Percentage of each type of tea produced and consumed in the world: 78% black, 20% green and 2% oolong tea. The chemical composition of tea is quite complex as it has different classes of chemical compounds, including polyphenols, alkaloids, amino acids, proteins, minerals, vitamins and carbohydrates. Catechins found in tea leaf polyphenols are components with high antioxidant activity. These are respectively; It is classified as (±)-catechin C, (-)-epigallocatechin EC, (+)-gallocatechin GC, (-)-epigallocatechin EGC, (-)-epigallocatechin gallate ECG, and (-)-epigallocatechin gallate EGCG. Epigallocatechin gallate is the most abundant catechin in green tea, accounting for 50% of total catechins. Catechins act as antioxidants by sequestering metal ions, scavenging free radicals that can damage DNA and contribute to cancer, metabolic dysfunctions, coagulation, atherosclerosis. The reason why tea is the second most consumed beverage in the world is that it has such high antioxidant activity. However, with this much production, tea production wastes occur as fabrication waste. Black tea waste, which is formed as a by-product during the production of black tea from tea leafs, is not used in any way other than being used as fuel and compost and is thrown into the nature in an uncontrolled way, causing a great environmental pollution, that is, ecological and economic damage. In this review, research results on the possibilities of using factory black tea waste in animal nutrition as an alternative source were evaluated.

Keywords: Tea production, factory black tea waste, animal feeding, roughage

THE EFFECT OF POTASSIUM HUMATE ON THE PRODUCTIVITY AND REPRODUCTIVE CAPACITY OF DAIRY COWS

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ABSTRACT

The genetic potential of animals, high productivity, milk quality and good reproductive performance can be realised through balanced diet ratios, therefore, the options to use effective biologically active feed additives of natural origin are being sought in the area of animal nutrition, with maximum respect for the conditions of a healthy rumen environment, combined with an environmentally friendly and economically viable production process. The objective of the study: to investigate the effect of potassium humate, a new biologically active feed ingredient from Latvian black peat, on the productivity and reproduction capacity of dairy cows. The study was conducted at "Dukāti" farm of Vītiņi Rural Territory, Auce Municipality. The study was conducted between October 2020 and August 2021. Two analogous groups (in terms of milk yield, lactation and lactation phase) of Holstein Friesian cows were created for the trial, 15 animals per each group. The study included 2nd lactation cows with an average milk yield of 40.3 kg/day, fat content of 3.47%, protein content of 3.44%, and average live weight of 700 kg. The average milk yield was 0.20 kg/day to 5.19 kg/day higher in the experimental group of the study, compared to the control group. Furthermore, the difference in milk yields demonstrated an increasing trend in favour of the experimental group, but there were no statistically significant differences between the average daily milk yields between the two groups ($p<0.05$). The service period in the experimental group was longer by two days, compared to the control group ($p<0.05$). The results of the study demonstrated that feeding potassium humate to dairy cows had a positive effect on the inseminations index and the number of pregnant cows from the first insemination. The inseminations index was optimum within the recommended limits (<1.8) but by 0.1 less in the experimental group. The number of pregnant cows from the first insemination in the experimental group was 4.0% higher than in the control group ($p<0.05$).

ACKNOWLEDGMENTS

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Keywords: Dairy cows, Potassium humate, milk, Reproductive abilities

THE OCCURRENCE OF T-2 AND HT-2 TOXINS IN WHEAT HARVESTED IN ALBANIA DURING 2022*

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ABSTRACT

Cereals are often contaminated by mycotoxins T-2 toxin and its main metabolite, the HT-2 toxin, produced mainly by *Fusarium langsethiae*, but also by *Fusarium poae* and *Fusarium sporotrichioides*, under very different weather (e.g. -2 to 35 °C; water activity above 0.88) and production conditions. T-2 and HT-2 toxins content were investigated in 20 unprocessed wheat samples cultivated in Albania, collected from the farms of two regions, namely Myzeqeja (Lower Albania) and Fusha e Korces (Southeast Albania). The sum concentrations of T-2/HT-2 toxin were determined by the ELISA, while LC-MS/MS was used as a confirmatory method for both mycotoxins in positive samples (>LOD). The crude nutrient content was also determined using the NIRS method. The combined T-2/HT-2 concentrations in all wheat samples were < 5,0 µg/kg wheat, i.e. very far below the indicative values set by the EC. The not so large weather differences between the two regions of the country where the samples were taken do not seem to be large enough to lead to significant differences in the toxin levels of the wheat grown in these regions. Although the T2/HT2 concentration is far below the limit, it should be taken into account that this is the first survey in Albania on T2/HT2 in cereals, the samples were taken only in one year and their number is not large.
**This research project was funded by the National Agency for Scientific Research and Innovation (NASRI), Albania*

Keywords: Fusarium mycotoxins; T-2 toxin; HT-2 toxin; occurrence; wheat

PREVALENCE OF SUBCLINICAL MASTITIS IN SMALL DAIRY FARMS IN ALBANIA

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ABSTRACT

In Albania, the agricultural sector accounts for more than 18% of GDP and employs a substantial number of people. More than half of its contribution comes from livestock, with the cattle industry having the greatest impact. The majority of cattle are dairy cattle, with beef cattle accounting for a tiny percentage. However, the bulk of dairy herds are small, with 1-5 milking cows per herd. Aside from recognized and emergent infectious diseases, endemic diseases such as mastitis are common and have a negative impact on profitability and competition. Subclinical mastitis does not manifest clinical signs or milk abnormalities. Detection of subclinical mastitis and identification of bacterial pathogens are critical in determining the prevalence of mastitis and establishing an adequate control program. In this study, we used the California Mastitis evaluate to evaluate 135 nursing cows from 42 small dairy herds. Subclinical mastitis was found in 74.8% of animals and 78.6% of herds, respectively. Only 39 of 135 studied animals were CMT negative, but 58.6% of CMT positive animals have one to three afflicted quarters. *Staphylococcus aureus* and *Escherichia coli* were isolated and identified from patients of severe subclinical mastitis. Conclusions: Subclinical mastitis is common in small dairy herds. The recent initiative by the national veterinary agency for assessing the frequency of mastitis in dairy cattle may have a favourable impact on herd health and profitability in Albanian dairy herds.

Keywords: Subclinical mastitis, small dairy farms, mastitis control program, Staphylococcus aureus and Escherichia coli

SUSTAINABILITY ASSESSMENT OF DAIRY FARMING SYSTEMS IN ALGERIA: THE CASE OF THE TIZI-OUZOU REGION

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ABSTRACT

Sustainable development is now an inescapable concept in Algeria, and livestock breeding research projects need to integrate environmental and social aspects, as the future of the dairy industry, highly dependent on world markets for milk powder, has become uncertain. Faced with the novelty of this concept in Algeria, we used an exotic method: Indicators of Farm Sustainability (IDEA), to assess the sustainability of our dairy farming systems. A retrospective study (2005-2019) was carried out on 49 dairy cattle farms in the Tizi-Ouzou region. The first long-term finding was the disappearance of 20.4% of farms. The dynamics of the "production diversity" indicators revealed that they are mostly moving in the same direction, both within the same farm and between farms. According to Briquel et al (2011), such a situation is observed when the indicators taken into consideration in a method are too numerous. In such cases, there is a risk of redundancy and confusion, as well as of weakening the message they convey. No discrimination in terms of agro-ecological sustainability was detected in our study, whether between small, medium-sized or large farms. However, according to Vilain (2000), IDEA is sufficiently sensitive to highlight significant differences, between farmers in the same small agricultural region, with the same production system. Thus, IDEA is not adapted to the Algerian context. According to Auberger and *al* (2016), the tools, depending on the type of aggregation method, do not allow the list of basic indicators or the weightings to be modified, which rules out any attempt to adapt IDEA indicators to the Algerian context. Hence the need to agree on indicators to be designed within an Algerian conceptual framework.

Keywords: Algeria, cattle, sustainability, breeding, milk, IDEA

EFFECT OF USING BUCKWHEAT IN QUAIL DIETS ON PERFORMANCE AND EGGSHELL STRENGTH

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ABSTRACT

This study was carried out to determine the effect of using buckwheat at the levels of 0, 15 and 30% in the diet on the performance and eggshell breaking strength of laying quails. For this purpose, 48 female quails of 10 weeks old were randomly distributed into 3 groups with 4 replicates. As a result of the study, the use of buckwheat in the diet linearly decreased the egg weight. Eggshell breaking strength was quadratically affected by the dietary buckwheat and improved at 15% of buckwheat, but it was minimum at 30% (Q=0.011). Egg production, feed intake, and feed efficiency were not affected using buckwheat in the diet. According to the results of this research, it was determined that the use of buckwheat at 30% in laying quail dies reduces egg weight and eggshell breaking strength and can be used up to 15% in the diet.

Keywords: Quail, buckwheat, eggshell breaking strength, performance

THE EFFECT OF ADDITION OF GRAPEFRUIT OIL TO THE DIET ON PERFORMANCE AND EGG QUALITY IN AGED QUAILS

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ABSTRACT

The aim of this study was to determine the effects of supplementation of different levels of grapefruit oil (0, 250, 500 and 750 mg/kg) to laying aged quail diets on performance and egg external and internal quality. In the ten-week trial, a total of 96 female Japanese quails, 32 weeks aged, were distributed to 4 trial groups with 6 replications each containing 4 quails. The addition of grapefruit oil to the diet did not statistically affect performance parameters except for feed intake ($P>0.05$). Compared to the control group, the addition of 750 mg/kg grapefruit oil to the diet significantly reduced the feed intake of quails ($P<0.05$). Yolk a* value decreased statistically ($P<0.01$), but other egg quality parameters were not affected in laying quails ($P>0.05$) with the addition of 500 and 750 mg/kg grapefruit oil to the diet. According to these results, it was determined that the addition of 500 mg/kg grapefruit oil to the diet did not affect the performance in laying quails and reduced the yolk a* value, but feed intake decreased with the addition of higher grapefruit oil.

Keywords: Quail, grapefruit, performance, egg quality

SEQUENCE ANALYSIS OF HYDROLYTIC ENZYMES SYNTHESISED BY RUMEN MICROORGANISMS

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ABSTRACT

Ruminants have been serving humans in almost every geography of the world with their various productivity characteristics for thousands of years. Rumen microorganisms, which are in a symbiotic relationship in the digestive system of ruminant animals, provide a great benefit in the digestion and utilisation of roughage sources with high cellulose content by ruminant animals. For this reason, it is of great importance to investigate both rumen microorganisms and enzymes, vitamins, metabolites and similar products produced by these organisms in order to benefit from ruminant animals at maximum level. Today, when we live in the period of molecular genetics, studies on the identification of these microorganisms and the enzymes they produce at molecular level have accelerated. Analysing the data obtained from these studies with bioinformatics tools and modelling the relationships between them in detail provides additional contributions to molecular genetic studies. In this study, in silico analyses of rumen microorganisms and hydrolytic enzymes such as cellulase and xylanase produced by these microorganisms were performed with some bioinformatic tools.

Keywords: Rumen microorganisms, Hydrolytic enzymes, Bioinformatics, In silico analysis

THE EFFECT OF HEATING PROCESS OF HEMP SEED CAKE AND PHYTASE ENZYMES ADDITION IN BROILER DIET ON CARCASS AND INTERNAL ORGANS WEIGHT

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ABSTRACT

The escalating demand for soybean meal and its inevitable utilization has compelled the feed industry to investigate alternative plant-derived protein feed ingredients actively. This study aimed to evaluate the effect of the utilization of hemp seed cake in the broiler diet on carcass weight and internal organs. A total of 210 unsexed Ross 308-Day-Old-Chick were randomized into 7 treatments with 6 repetitions. Treatments were T1= Soybean meal-based diet, T2= Diet with 15% hemp seed cake, T3=T2+ phytase enzyme (1000 FTU/kg), T4= Diet with 15% autoclaved hemp seed cake (120 0C,10 minutes), T5= T4+phytase enzyme (1000 FTU/kg), T6= Diet with 15% roasted hemp seed cake (120 0C,20 minutes), T7= T6+ phytase enzyme (1000 FTU/kg). Including hemp seed cake in the broiler diet did not impact carcass weight, abdominal fat, or liver weight proportions. Dietary roasted hemp seed cake (T6) and its combination with phytase enzyme (T7), without heating process (T2) and only adding phytase enzyme (T3) increased heart weight percentage ($P<0.05$), while T2 significantly increased the percentage of gizzard ($P<0.05$), spleen ($P<0.05$) and relative length and weight of the jejunum ($P< 0.05$) compared to the soybean meal-based diet (T0). Except for T4, the utilization of hemp seed cake in the treatment exhibited a significant increase in cecal length ($P<0.05$) compared to the soybean meal-based diet (T0). T3 increased the weight of the duodenum, while T5, T6, and T7 increased the weight of the jejunum and ileum ($P<0.05$) compared to the soybean meal-based diet (T0). It is concluded that 15% of autoclaved hemp seed cake can replace soybean meal without affecting internal organs' size. The utilization of hemp seed cake up to 15% without the heating process, roasted hemp seed cake, and their combination with phytase enzyme increase internal organ weights (gizzard, spleen, jejunum, ileum), jejunum length, and cecum length.

Keywords: Cannabis sativa L, broiler chicken, hemp seed, small intestine, giblets

THE POTENTIAL OF HEMP SEED CAKE FOR THE BROILER CHICKEN DIET

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ABSTRACT

The increasing demand for plant protein-based feed ingredients has encouraged the feed industry to explore non-conventional feed ingredients. This review was intended to discuss the nutritional content of hemp seed and also emphasizes the application of hemp seed cake as a broiler diet. *Cannabis sativa* L., commonly grown for the fiber industry, has been legalized by many European countries because of its low Tetrahydrocannabinol (THC) content (<0.3%). Hemp seed contained 30-35% oil and 30%-40% crude protein which is dominated by methionine, leucine, isoleucine, phenylalanine, and glutamic acid. In addition, hemp seed also contained 75-80% polyunsaturated fatty acids (PUFA), especially Omega-3 and Omega-6. Its application in broiler chicken diets improved productive performances, but at high levels of dietary hemp seed cake decreased body weight and feed efficiency. Dietary hempseed cake had been shown to reduce total cholesterol, *low-density* lipoprotein (LDL), and triglycerides, and increased serum *high-density lipoprotein (HDL).* The current review suggested that hemp seed cake has the potential to be an alternative plant protein source for broiler diets. However, the content of THC and its antinutritional compounds, especially phytic acid, tannins, cyanogenic glycosides, and trypsin inhibitors may limit its use.

Keywords: anti-nutrient, broiler chicken, Cannabis sativa L, performances

EFFECTS OF SUNFLOWER MEAL FERMENTED WITH RUMEN LIQUID ON NUTRIENT COMPOSITION

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ABSTRACT

In this study, it was aimed to improve the nutritional composition of sunflower meal by fermenting it at different fermentation times with the solid state fermentation method. The study was divided into five groups (Control, 1, 3, 5 and 7 days of fermentation) and a total of 15 samples, three replicates in each group, were used. The sunflower meal was ground to a size of 1 mm, and then nutritional salt was added and sterilized after adjusting 80% ambient humidity. Rumen liquid was collected from 2-year-old cattle and prepared for inoculation in a sterile laboratory environment. 1 *N* HCl was used to maintain a pH of 6.0 in the fermentation medium. Fermentation was carried out at 38 °C. After the fermentation period was completed, the pH of the samples was measured and then dried at 60 °C and prepared for analysis. Samples were analyzed for dry matter, ash, crude protein, ether extract, and crude fiber content. Results indicated that fermentation had a positive impact on the nutrient composition of sunflower meal. The highest crude protein and ash were found on the first day ($P<0.001$), the highest ether extract was found on the fifth day ($P<0.001$), and the lowest crude fiber was found on the first day ($P<0.001$) among the fermented groups, and the difference was significant. Based on these findings, it can be concluded that a one-day solid-state fermentation of sunflower meal using rumen liquid is the most effective time.

Keywords: Solid-state fermentation, rumen liquid, nutrient composition, sunflower meal

INVESTIGATING THE CHANGES IN THE NUTRIENT COMPOSITION OF BROKEN RICE THROUGH SOLID STATE FERMENTATION USING RUMEN LIQUID

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ABSTRACT

In this study, we investigated the effects of solid-state fermentation using rumen liquid as an inoculant on the nutrient composition of broken rice. The study was conducted on 15 samples, including a non-fermented group and four different fermentation times (1, 3, 5, and 7 days), with three replicates in each group. Broken rice was used as the substrate for fermentation and was ground to 1 mm in the laboratory before being prepared for analysis. Rumen liquid was obtained from 2-year-old cattle fed a roughage-based diet. For inoculation, 1 ml of rumen liquid was used for every 100 g of broken rice. Fermentation was carried out at 38 °C, and the pH was measured in samples that completed the fermentation period. At the end of the study, pH values were found to be low in all fermentation periods except for the first day. Fermentation for three, five, and seven days decreased the pH value significantly compared to the first day ($P<0.001$). Fermentation positively affected the nutrient composition of broken rice. The highest crude protein and ash levels and the lowest crude fiber level were found on the fifth day, and the difference was significant ($P<0.001$). The highest ether extract level was detected on the first day, and the difference was significant ($P<0.001$). In conclusion, fermenting broken rice using rumen liquid in solid culture fermentation improves its nutrient composition. The increased crude protein level and decreased crude fiber resulted in a more nutritious feedstuff. The most effective fermentation period was determined to be five days.

Keywords: Rumen liquid, solid-state fermentation, broken rice, nutrient composition.

EFFECT OF PREBIOTICS SUPPLEMENTED BARLEY-CONTAINING DIETS ON PERFORMANCE AND SLAUGHTERING CHARACTERISTICS OF BROILERS

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ABSTRACT

This study was carried out to determine the effects of diets containing 1 g/kg prebiotics and 20 or 30% barley on the performance, carcass characteristics and visceral weight of broilers. In the study, a totaşl of 120 male Ross 308 broiler chicks at the day-old were randomly allocated to 3 treatment groups with 4 replicates of 10 chicks each. Treatment groups were formed from diets containing barley without prebiotics (Barley0), containing 20% barley and 1 g/kg prebiotics (Barley20), and containing 30% barley and 1 g/kg prebiotics (Barley30). Performance parameters were determined on the 10th, 25th and 42nd days, and carcass and visceral weights were determined at the end of the study (42nd day). With the use of prebiotics added barley in the diet, the 25th day body weight and 11-25th days body weight gain decreased significantly ($P<0.05$). Feed intake of male broilers decreased considerably with the use of prebiotics and barley in the diet, except for 0-10th days ($P<0.05$). In the 11-25th days period of study, the feed efficiency of broilers improved with the addition of prebiotics to the barley-containing diet ($P<0.05$). Treatment diets had no effect on carcass and visceral weights of male broilers ($P>0.05$). According to the results of the study, it was determined that the addition of prebiotics to the male broiler diets containing up to 30% barley decreased the feed intake without affecting the slaughtering weight and characteristics.

Keywords: Barley, prebiotics, broiler, performance, carcass

AGRICULTURE OF THE FUTURE: AGRICULTURAL TRANSFORMATION WITH UNMANNED AERIAL VEHICLES

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ABSTRACT

The agriculture and livestock sector is developing more and more every day with technological innovations. One of these innovations is unmanned aerial vehicles (UAV) technology. Unmanned aerial vehicles are used to facilitate agriculture and livestock activities, increase productivity and provide more control to farmers. In the agricultural sector, UAVs are used in many areas such as monitoring agricultural areas, controlling plant health, and application of pesticides. By scanning the vegetation in agricultural lands, UAVs detect plant diseases or harmful insects, thus providing early warning to farmers. Agricultural pesticides can also be applied more effectively with UAVs. UAVs make the spraying process more efficient by providing controlled spraying of the drug towards the target. In addition, UAVs can determine the irrigation needs of agricultural areas. By measuring the humidity level of the agricultural area, it determines the water need and optimizes the irrigation processes. In this way, water resources are used more efficiently and water savings are achieved. In the livestock sector, UAVs provide many benefits. It is used especially in large farms for the control, counting and health monitoring of animals. UAVs can detect animals in large areas, count and check the status of animals. Besides, it can track the location of animals and help them find them back in case of loss. The use of UAVs in the agriculture and livestock sector is especially important for saving manpower. The difficult and dangerous labor that people have to do can be done more safely and quickly with UAVs. In addition, UAVs provide more efficient management of agricultural and livestock activities. Thanks to UAVs, it is possible to access more accurate and timely information. However, there are some difficulties with the use of UAVs. The use of UAVs without the rules and permits governing their flight can lead to various security risks. In addition, the cost of UAVs is a factor limiting their use. The cost of UAVs can be quite high, which may limit the use of drones for small family farms. With regulatory regulations and affordability, UAVs can become an integral part of the agriculture and livestock industry in the future.

Keywords: Unmanned aerial vehicle, agriculture, livestock

MANAGING DAIRY CATTLE IN THE SEMI-ARID CONDITIONS OF ALGERIA

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ABSTRACT

The Souk Ahars region in Algeria has been recognized for its significant dairy production potential, ranking as the main dairy basin in the eastern part of the country for several years. Despite this potential, there exists a considerable supply-demand imbalance, especially in the semi-arid southern areas. To address this, we conducted a participative survey in 61 dairy farms within the semi-arid region of Souk Ahars, focusing on reproductive performance and milk production. The average herd size was 11.5±5 heads, comprising crossbred, purebred, and autochthonous cattle, with respective rates of 70.75%, 18%, and 16.3%. Additionally, 65.6% of the interviewed breeders also raised small ruminants alongside dairy cattle. The total number of dairy cows varied from 1 to 30, with an average of 7 ± 3.5 cows, and 36% of the farms had fewer than 5 dairy cows. Natural mating was the primary breeding method in 95.2% of the studied farms, with 65.3% using their own bull, and only 8.2% resorting to artificial insemination during natural estrus. The average inter-calving interval (ICI) was 400 ± 34.3 days, and 60.7% of dairy cows had an ICI of <365 days. Additionally, 57.4% of the dairy farms had a calving-first insemination interval (C-AI1) of >60 days. Regarding fertility, 88% of cows required 1-2 inseminations to conceive. Daily milk yield ranged from 5 to 30 liters, with a total average of 14.87 ± 4.4 liters. Most farms (65.6%) had a productive period of less than 305 days, and the practiced dry period typically lasted between 45 to 60 days. Late weaning (>3 months) was prevalent in 85.2% of the studied herds. Based on these findings, it is essential to raise awareness among livestock breeders in the region to improve practices and fully harness the dairy potential of the Souk Ahars region.

Keywords: Semi-arid zone, cattle husbandry

ADDITIONS OF SUCROSE IN THE FEED WITHDRAWAL PERIOD OF BROILER CHICKENS

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ABSTRACT

Poultry production facilities turn to thinking throughout the production period in order to obtain healthy products that are profitable and appealing to user preferences. One of these processes is the practice of taking feed between 8 and 12 hours before slaughter. The purpose of this application is to get rid of microbial contamination caused by the separation channel by emptying the separation channel in broilers, to obtain renewable internal organs with better quality and high efficiency carcass. This short-range extension can lead to wasted body reserve reserves and increase the likelihood of exit rupture. Depending on many factors such as age, general health status and nutrient content of the diet, feed feedback can also cause carcass service and meat preservation, as well as reduction and body weight. In order to dispose of these containers, the researchers added sucrose to their drinking water during the feed holding period, which is used as a feed additive. It is aimed to preserve the lost energy consumption, to prevent possible carcass losses and to preserve the renewable internal organs and carcass color. The effects of sucrose addition on carcass weight and quality and increased color in these broilers were studied.

Keywords: Broiler, meat color, internal organs, sucrose

ORGANIC ACID PRACTICES IN THE PRE-SLAUGHTER PERIOD OF BROILER CHICKENS

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ABSTRACT

After the prohibition of antibiotics as feed additives in animal nutrition, organic acid supplements have been used extensively to combat pathogens. Organic acids used as feed additives create an acid environment by lowering the pH in the digestive tract. With the use of organic acids as feed additives, the balance of the microbiota in the digestive tract is turned in favor of beneficial microorganisms, thus preventing the growth of pathogenic microorganisms. The number of microorganisms that may infect the carcass during slaughter can also be reduced. In addition, possible feed spoilage can be prevented by adding organic acids to the feed. For this purpose, organic acid additions to be made especially in the pre-slaughter period and during forage withdrawal are of great importance. In this study, the effects of adding organic acids to broiler rations or drinking water on performance and other parameters were investigated.

Keywords: Organic acids additives, poultry feed, pre-slaughter

USES OF GENETICALLY MODIFIED MICROORGANISMS IN ANIMAL BREEDING

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ABSTRACT

In today's world where molecular biotechnology is used in almost every field, especially agriculture and health are the sectors that benefit from this branch of science in the most efficient way and where usable products are obtained as a result of the studies. Among agricultural production activities, animal production is carried out using both intensive and extensive production models in order to meet the need for animal protein and its importance is increasing day by day. Molecular biotechnology provides important contributions in many fields such as yield increase, product quality improvement, improvement of feed utilization, production of therapeutic proteins (bio-fermenters), resistance to disease agents, comprehensive genome analysis, discovery of genes related to yield, reorganization of genomes and determination of breeders by considering genetic structure. In this review study, molecular biotechnology studies using microorganisms associated with livestock as materials and their contributions to animal production were examined.

Keywords: Recombinant microorganisms, Animal production, Genetic modification

HONEYBEES (APIS MELLIFERA L.,) IN TURKEY AND THEİR DİSEASES, A REVIEW PAPER

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ABSTRACT

Honeybees, scientifically known as *Apis mellifera* L., are currently facing significant challenges in Turkey as a result of various factors, including the proliferation of diseases. Various diseases are impacting the honeybee populations in Turkey, and this study examines their prevalence, intensity, and methods of management. This report underscores the importance of disease prevention, early detection, and efficient control methods through an examination of the current state of knowledge regarding honeybee diseases. This study also examines the impact of honeybee diseases on beekeeping practices, the provision of pollination services, and the overall health of honeybee populations in Turkey. In summary, this review serves as a valuable resource for researchers, beekeepers, and policymakers in Turkey who are interested in the well-being of honeybees.

Keywords: Honeybees, Apis mellifera L., Varroa mite, Bacterial, viral, fungal diseases, Integrated disease management, Beekeeping, Conservation, Sustainability

CLONING AND EXPRESSION OF BACILLUS AMYLOLIQUEFACIENS BIFUNCTIONAL CELLULASE-LICHENASE GENE IN ESCHERICHIA COLI

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ABSTRACT

Farm animals have been contributing significantly to humans with different productive characteristics since their initial domestication approximately 10,000 years ago. Particularly in the last century, animal husbandry has evolved from extensive to intensive production, following a greater understanding of the importance of animal protein for human health. With the introduction of scientific research outcomes, more efficient production methods have been implemented. However, as the world population continues to increase rapidly, the current level of production is no longer sufficient, and many people cannot consume an adequate amount of animal protein to meet their needs. Therefore, efforts to increase animal productivity and feed efficiency per animal are crucial to achieve a level of animal production that can meet the growing demand. For sustainable livestock farming, forage sources play a significant role. Forages with a high content of beta-glucans are digested by the rumen microbiological activities in ruminants and contribute to animal productivity. However, poultry, being devoid of these microbial activities, cannot fully benefit from forages. The treatment of forages with certain enzymes enhances their digestibility and consequently improves feed efficiency. Microbial-origin beta-glucanases are preferred for increasing the digestibility of feeds due to their various advantages. In this study, a bifunctional gene with cellulase and lichenase enzyme activities, isolated from *Bacillus amyloliquefaciens*, was amplified from its genome and cloned into *Escherichia coli* bacteria to produce it extracellularly, aiming to optimize the digestibility of feeds to an optimum level.

Keywords: Cloning, Cellulase, Lichenase, Bacillus amyloliquefaciens, Escherichia coli

EFFECTS OF ACTIVATED BENTONITE ON THE PERFORMANCE OF BROILER BROILERS

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ABSTRACT

One of the most important problems caused by the storage of poultry feeds and feed raw materials under inappropriate conditions is the toxicity caused by mycotoxins produced by moulds growing in them. Aflatoxins (AF), one of the toxic metabolites produced by moulds of the genus Aspergillus, are the most frequently isolated mycotoxins in the field and are the most harmful to both human and animal health. Low levels to be found in feeds The level of AF residues is extremely important for broiler and poultry farms. Organic acids, organic dyes, chemical compounds such as copper sulphate and ammonia, mould inhibitors and adsorbents are used in the detoxification of feeds contaminated with mycotoxins. One of the most remarkable compounds among these adsorbents is bentonite, which is in the aluminosilicate group preferred for many sectors. Bentonite improves the performance of broiler chickens (live weight gain, feed consumption, feed conversion ratio), binds toxins of fungal or bacterial origin in the feed of animals and prevents them from being absorbed from the intestinal system, thus increasing the quantity and quality of the yield obtained from animals and reducing the cost of animal products. In this study, the effects of using activated bentonite in broiler diets on performance were investigated.

Keywords: Broiler, feed additive, performance, bentonite

EFFECTS OF BENTONITE ADDITIVE ON BLOOD BIOCHEMISTRY PARAMETERS AND LIPID PEROXIDATION IN BROILER RATIONS

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ABSTRACT

Removal of aflatoxins from contaminated feed is an important problem in poultry feeding and effective, cheap and practical decontamination methods are needed. In order to detoxify and reduce the toxic effect of mycotoxins, it is aimed to add various inert sorbent substances to the diets and to prevent the absorption of mycotoxins in the gastrointestinal tract and to excrete them out of the body. In order to reduce the absorption of aflatoxins from the digestive system, some non-nutritive compounds and adsorbents are used in the ration. One of the most remarkable compounds among these adsorbents is bentonite, which has physical and chemical properties preferred for many sectors. In this study, the effects of bentonite known as aluminosilicates on blood biochemistry parameters and lipid peroxidation in broiler chickens were investigated.

Keywords: Broiler, feed additive, bentonite, biochemistry, lipid peroxidation

EVALUATION OF PHYSIOGRAPHY IN CONVENTIONAL SOIL MAP AND DIGITAL SATELLITE IMAGE

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ABSTRACT

Traditional soil surveys follow a specific methodology to identify, characterize, and fit mapping units in a classification system and to specialize them in order to produce soil maps. Following the developments in satellite technology, traditional land evaluations can be carried out with digital image interpretation, although not completely. In these traditional methods, physiography are generally determined by field observations. Gökhöyük state farm is one of the studies whose soil map was completed using traditional methods in 1984. This also constitutes the study area of our research. The physiography defined and mapped in 1984 and the elevation profile obtained from current Google Earth satellite data were transferred to the digital environment. In this study, it was aimed to investigate whether the physiography defined and mapped by the traditional method in 1984 in the study area is compatible with the physiographic section (elevation profile) obtained from current satellite data. As a result, it was determined that the physiographic unit map created according to the soil series map prepared by the traditional method completely overlaps with the elevation profile created using the Google Earth satellite image.

Keywords: Soil map, Physiography, Satellite imagery, Elevation profile.

QUANTITATIVE AND QUALITATIVE ASPECTS OF THE MILK OF SYNTHESIS STRAIN RABBITS DOES REARED DURING LACTATION PERIOD

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ABSTRACT

The aim of our study was to define milk production characteristics and evaluate milk composition in relation to blood cholesterol and triglyceride levels in synthetic-strain rabbits aged 4.5 months during the lactation period. A total of 30 nulliparous rabbits were studied and monitored from parturition to the end of lactation. The rabbits were placed in individual cages, fed ad libitum with a breeder-type pellet. Rabbit and litter weights were measured throughout the trial period (farrowing - 21 days of lactation), as well as the average number of offspring present under the mother. Daily food and water consumption were measured, as well as the average quantity of milk produced (0-21 days) by the doe (determined by weighing the doe before and after the single 3 to 5-minute daily feed) and ingested by the litter. Milk samples were taken every other day throughout the lactation period (21 days), by manual milking (without oxytocin injection) after stimulation of the teats of these rabbits under restraint. Physicochemical analyses of the milk were carried out at the laboratory of the "Le Fermier" dairy. Blood samples were taken to determine the biochemical profile of the rabbits during this phase. All data were subjected to an analysis of variance, taking into account the lactation week effect. The results showed that the quantity and composition of the rabbits' milk varied over the three weeks of lactation. The plasma profile also showed variations in relation to the composition of the milk produced. Analysis of plasma metabolite concentrations is a useful tool for understanding physiological mechanisms and managing the energy and protein balance of lactating rabbits. This study has enabled us to complete the characterization of rabbits of this new genetic type developed in our country. It should be noted that this study was carried out on rabbits of the synthetic strain, and to better understand the changes that characterize this lactation, which also conditions litter growth.

Keywords: Key words: Rabbit, Synthetic strain, Milk quantity, Milk composition, Plasma parameters

INFLUENCE OF ENVIRONMENTAL CONDITIONS ON THE DAIRY APTITUDES OF KABYLIAN GOATS IN ALGERIA

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ABSTRACT

The aim of our study is to analyse the influence of environmental variations on the dairy aptitudes of Kabylian goats (indigenous animals), raised on natural pasture in the coastal and mountainous regions of Kabylia. The experimentation took place in Tizi-Ouzou (36° 53′ 20″ N 5° 7′ 30″ E, Northern Algeria) a locality characterized by a Mediterranean climate. The experimentation took place in Tizi-Ouzou (36° 53′ 20″ N 5° 7′ 30″ E, Northern Algeria) a locality characterized by a Mediterranean climate. Milk quantity and quality were evaluated on 10 (5 coastal and 5 in mountainous regions) grazing sites comprising exclusively traditional goat farms (60 farms).1200 milk samples were collected from 420 Kabylian goats at two lactation periods.All recorded data were analyzed using a two-factor analysis of variance model with R software. Goats grazing in mountainous areas produced less milk (630 ml/day) than goats grazing in coastal areas (845 ml/day). However, biochemical analyses revealed a very high TP (62.82 ± 0.09 g/l) and TB (50.61 ± 0.11 g/l) in milk samples collected in mountainous regions. This particular composition may be linked to the rearing conditions (natural grazing) and forage quality (dry matter content) characteristic of this ecosystem. The reaction of the animals to the conditions in the region is also a determining factor.In the light of the results recorded and compared with the data in the bibliography, the milk of Kabylian goat presents a very interesting composition (nutritional and dietary aspects) despite low quantitative production. It therefore deserves to be developed and exploited to the same extent as bovine milk, in order to contribute to the economic development of rural areas.

Keywords: Algeria, Goat, Kabylia, Milk, Quantity, Quality

CURRENT APPLICATIONS IN ANTHURIUM TISSUE CULTURE PROPAGATION

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ABSTRACT

Anthurium is a monocotyledonous herbaceous perennial of the areceae family. It has been an ornamental plant of interest to growers since its discovery in the Andes Mountains. Anthurium is used as a potted ornamental plant, cut flower and cut foliage. Anthurium is propagated by cuttings, seeds and tissue culture. Seed propagation is not commercially preferred due to the genetic heterozygosity of the seed, low plant yield from seed and prolonged plant formation. Although cuttings and division methods are sufficient for hobby cultivation, they are not considered sufficient for commercial production. Therefore, in vitro methods are used for disease and pest-free production, clonal and mass production. Many studies have been conducted by different researchers to optimize the mass propagation protocol of anthurium, a plant of great commercial importance. The aim of this review is to compile and discuss the existing in vitro studies on anthurium and to help new researches.

Keywords: Anthurium, Tissue Culture, In vitro, Micropropagation, Aracea

BIOTECHNOLOGICAL APPROACHES IN THE FICUS SPP.

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ABSTRACT

The genus *Ficus* is a genus of the family *Moraceae*, consisting of approximately 850 trees, shrubs, vines and epiphytes commonly found in tropical and subtropical countries. This genus includes species that are widely grown and have economic value throughout the world. The aim of this review is to summarize biotechnological developments on the *Ficus* plant and present important findings in the current research field.

Biotechnological advances in *Ficus* plants also serve as an important model system for plant biology and genetics research. Many *Ficus* species are difficult to preserve or slow to propagate using traditional methods. Therefore, in vitro culture techniques play an important role in the protection and rapid propagation of *Ficus* plants. These studies also contribute to plant breeding, ecology and conservation studies by increasing our general knowledge in the field of plant biotechnology.

The results of this review highlight the potential of biotechnological studies on the *Ficus* plant. Techniques such as genetic transformation and tissue culture can increase the usability of *Ficus* plants in genetic improvement programs, providing positive effects in terms of disease-free, rapid reproduction and agricultural productivity.

Keywords: *Ficus*, biyotechnology, *ın vitro*, micropropagation, tissue culture, molecular characterization

PLANT TISSUE CULTURE STUDIES ON MONSTERA PLANT

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ABSTRACT

Monstera is a plant belonging to the Monsteroideae subfamily of the Aracea family. Monstera is an evergreen, broad-leaved, semi-woody tropical forest plant that can climb very high with support. It has become a preferred ornamental plant thanks to its huge and fascinatingly beautiful leaves. Monstera plant has taken its place in both potted ornamental plants and tropical outdoor ornamental plants sectors.

Monstera plant is usually propagated by seeds or cuttings. However, these production methods are insufficient to meet the demand in commercial cultivation. For this reason, *in vitro* tissue culture techniques are used for disease and pest-free, clonal and mass production. Plant tissue culture is defined as the propagation of plant cells, tissues or organs in artificial media, under sterile and controlled conditions. Within the scope of this study, it is among the plant tissue culture studies performed on the Monstera plant. It is aimed to discuss and evaluate the units built together.

Keywords: *Araceae*, biyotechnology, *İn Vitro*, Micropropagation, *Monstera*, Plant Tissue Culture,

BOOSTING SUSTAINABILITY OF ORGANIC FARMING BY INTERCROPPING CAMELINA AND PROTEIN CROPS

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ABSTRACT

Sustainability of the agricultural sector is a serious challenge in unpredictable environmental conditions and market demands. Diversifying the crop production could be a solution for farmers. Contemporary trends for increase of the certified organic farming are even more demanding in terms of conservation and amelioration of the natural resources. Therefore, our scientific researches are focused on multilayer approach for assessment of the biodiversity below and above ground in sole crop and intercropping systems of various crops. Here we present a case study of an alternative oil crop as camelina (Camelina sativa). It originates from Europe and has very good tolerance to stresses as cold and drought. The modest requirements to the nutrition regime and soil conditions permits it cultivation even on marginal areas, where it does not compel with other food crops. Intercropping with a protein crop stimulates better nitrogen nutrition and results and higher grain yields in both crops. Vegetation period, stress response, phenotypic characteristic and grain yield and qualities of different varieties from Europe and a local Bulgarian landrace has been evaluated on certified organic farm of AUP in 2022 and 2023. The local genotype has shorter vegetation, better cold and drought tolerance, and higher grain yields than the introduced ones in all variants of crop mixture and fertilization regime.

MICROPROPAGATION OF MYROBOLAN AND GARNEM ROOTSTOCKS WITH PLANTFORM TEMPORARY IMMERSION BIOREACTOR SYSTEM

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ABSTRACT

In the study, the possibilities of micropropagation and rooting of Myrobolan and Garnem Prunus rootstocks were compared using the Plantform Temporary Immersion Bioreactor System and the classical solid culture method *in vitro* conditions. In the micropropagation stage MS nutrient medium containing 1 mg/l BA was used, while in the rooting stage, MS nutrient medium containing 1 mg/l IBA was used. The immersion time in the Plantform bioreactor system was set at 10 minutes every 4 hours, and the aeration time was set at 15 minutes every 4 hours. In the micropropagation stage, 32% increase in the multiplication rate parameter was achieved in the Myrobolan rootstock and 25% increase was observed in the Garnem rootstock when using the Plantform system. More efficient results were obtained in other important parameters with the Plantform system. In the rooting stage, significant increases in plant height, root length, root number, fresh weight, and dry weight parameters were achieved when using the Plantform system. It was determined that the Plantform Temporary Immersion Bioreactor System is an important alternative for *in vitro* micropropagation of Myrobolan and Garnem Prunus rootstocks.

Keywords: Plantform temporary immersion bioreactor system, Myrobolan, Garnem, micropropagation, rooting

RECENT APPLICATIONS OF PLANT CELL AND TISSUE CULTURE TECHNOLOGY

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ABSTRACT

Plants are the primary source of food, can feed world's exploding population by correct management of plant agriculture. Agriculture contributes over 20 percent of gross national product. Nearly 30% of the global population equivalent to 2.4 billion people did not have constant access to food. World hunger levels increases every year. Due to the increasing need for nutrients and decreasing natural resources. we need better and more effective methods for food production. Plant Biotechnology is use of tissue culture and genetic engineering techniques to produce genetically modified plants that exhibit new or improved desirable characteristics The culture of plant seeds, organs, explants, tissues, cells, or protoplasts for regeneration of functional plants on nutrient media under sterile conditions called as plant tissue culture. The four main sectors in which plant tissue culture finds application. These are; Agriculture, Food Colorants and Healthy Food Ingredients, Environmental and Waste Management Technology and Health. Tissue culture techniques, which provided the tools for the introduction of genetic information into plant cells is important for plant biotechnology. One of the most promising methods of producing proteins and other medicinal substances, such as antibodies and vaccines, is the use of transgenic plant. Transgenic plants represent an economical alternative to fermentation-based production systems. Plant-made vaccines or antibodies re especially striking, as plants are free of human diseases, thus reducing screening costs for viruses and bacterial toxins.

Keywords: Plant biotechnology, genetic engineering, plant cell and tissue culture, applications of plant tissue culture

CRITERIA IN SUNFLOWER SEED SELECTION AND SUPPLY AND RESULTS ON PRODUCTIVITY: EDIRNE APPLICATION

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ABSTRACT

Increasing food demand due to today's population growth and the resulting demand for sunflower oil are increasing day by day. Sunflower oil, like other edible oils, has become more important both in the professional catering industry and for frying, salad dressing, cooking oil at homes. Sunflower is the most cultivated oil crop in Turkey and the most planted areas exists in Trakya region. Edirne is one of the most planted sunflower provinces in Turkey. Seed is the most important issue for earning higher income from agriculture both in crop production and also in sunflower Farmers use mostly hybrid seeds and has higher mechanization rates for cultivating theirs lands. In our study, the criteria and results used by farmers operating in Edirne in sunflower seed selection were evaluated. Based on the results, the farmers considered mostly seed yield, oil content, broomrape and herbicide tolerance, subsequently.

Keywords: Sunflower, Seed, Seed preference, Trakya Region, Edirne

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