PROCEEDINGS OF IV. INTERNATIONAL AGRICULTURAL, BIOLOGICAL , LIFE SCIENCE CONFERENCE AGBIOL 2022

29-31 AUGUST, 2022

EDIRNE, TURKEY

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Organized by
Trakya University

ISBN #:
978-605-73041-1-7

WELCOME NOTES

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

In September 2018, we organized the first AGBIOL Conference with more than 700 scientists and researchers from all over the world with over 800 scientific papers. Due to COVID-19 situation, II. AGBIOL 2020 has organized fully on-line event which was one of the biggest online conferences in recent years in the world with 499 papers and 1133 authors with 333 oral and 166 e-poster presentations from 55 countries. Due to COVID-19 situation, AGBIOL 2021 was organized on-line again**.** There is a worldwide participation from 44 countries with 422 papers by contributing 1066 authors with 288 oral, 134 e-poster presentations.

The AGBIOL 2022 is organized with normal participation in controlled conditions as well as with online participation in Trakya University Balkan Congress Center in Edirne, Turkey on August 28-31, 2022. There is a worldwide participation from 44 countries with 522 papers by contributing over 1300 authors.

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

Conference Topics:

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

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

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ABSTRACT

Maize is the 3rd most important cereal crop of Pakistan after wheat and rice. A field experiment was conducted at National Agricultural Research Centre, Islamabad Pakistan to examine the effect of organic and inorganic amendments on the growth of maize hybrids. The experiment was laid out in Randomized Complete Block Design, with three replications. Two maize hybrids (Pioneer-30K08 and Pioneer-3025W) were used in this experiment. Various organic and inorganic amendments i.e. T0 = control, T1 = compost, T2 = farm yard manure, T3 = poultry manure, T4 = biochar, T5 = biofertilizer, T6 = NPK, T7 = foliar application of moringa leaf extract, T8 = salicylic acid, T9 = indole acetic acid and T10 = indole butyric acid were applied on the maize hybrids. Data on, leaf area, plant height, chlorophyll content, relative water content, transpiration rate, stomatal conductance, photosynthetic rate, cob length, grains cob-1,1000-seed weight, biological and grain yield were measured. Performance of maize hybrid Pioneer-30K08 showed promising results regarding growth and yield. Application of farmyard manure also showed maximum results and improved growth and yield of maize hybrids.

Keywords: Farm yard manure; nitrogen; poultry manure; compost; biochar; maize.

THE REFLECTANCE INDEX AS INDICATORS OF DROUGHT TOLERANCE OF SOME DURUM WHEAT (*Triticum durum* DESF.) GENOTYPES GROWING UNDER SEMI-ARID CONDITIONS -SETIF- ALGERIA

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ABSTRACT

Water shortage stress and the associated challenges are a major set of abiotic factors damaging and constraining the international production of durum wheat. The objectives of this study are to evaluate the efficiency of using the RGB reflectance index and chlorophyll contents as best tools to select a high yielding of 15 durum wheat genotypes growing under semi-arid conditions. The number of days to heading, grain yield, thaousand kernels weight, number of spikes per meter square, and plant height were measured at maturity. RGB reflectance index by numerical images analysis and chlorophyll contents were estimated. ANOVA showed a significant effect of genotypes for all traits. The local landrace Boutaleb which was the best yielding genotype registered a low Red reflectance index. The correlations test revealed that the chlorophyll contents was significantly and negatively correlated ($P<0.01$) with reflectance index at red and blue. PCA showed that grain yield was affected by Number of spikes per mete square, the high values of RGB reflectance index contribute at the elevation of the weight of 1000 kernels and plant height, a negative relation was observed between chlorophyll contents and RGB reflectance index.

Keywords: Grain yield, Reflectance, RGB, chlorophyll, semi-arid, Algeria

PHENO-MORPHOLOGICAL STUDY BETWEEN FIVE VARIETIES OF QUINOA (*Chenopodium quinoa* WILLD.) IN SEMI ARID REGION OF ALGERIA

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ABSTRACT

Quinoa (*Chenopodium quinoa* Willd.) has been cultivated for several thousand years in South America, It is a highly nutritious food product, with a high mineral content. Quinoa is now considered an alternative to traditional crops in a climate change scenario, given it more stability to adapt to marginal soils, droughts and frosts. Despite the interesting agronomic and nutritional characteristics of this crop, quinoa is characterized by individual attempts to define its phenological stages. This work consists of evaluating the phenological, and morphological behavior of five quinoa varieties in arid region. The research demonstrated considerable variation across genotypes in a range of morphological characters, which are useful as indicators in characterizing quinoa plants, including height in (cm) and color of the stem, morphology of the leaves (size, serration), and color of the seeds. Genotypic differences were noted. The varieties have more favorable characteristics.

Keywords: Chenopodium quinoa Willd, Adaptation, Genetic diversity, Morphology, Phenological stages, Drylands.

THE POSITION OF ALGERIA IN THE WORLD OLIVE OIL MARKET

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ABSTRACT

Algeria has a great history and tradition in the cultivation of olive trees, "It is the fourth largest producer and third largest consumer of table olives in the world. And the ninth largest producer and consumer of olive oil in the world, during the 2021/2022 campaign (IOC, 2022). And it has a specific strategy for the development of the olive sector." Indeed, Algerian olive growing has undergone profound changes in recent decades, for its upgrading necessary for its integration into the world economy. In this work, we propose to evaluate the technical and social conditions of the link of production and processing and packaging of olive oil in Algeria, a very important segment of the downstream of this sector. Despite the fact that it has undergone reforms, all the actions of the State in this segment remain insufficient in relation to the production potential in quantity and quality, and in view of the results recorded in Tunisia, the main competitor on international markets, Which means that several technical and socio-economic constraints are at the origin of this situation, and also to adapt new measures to ensure their sustainability in the market.

Keywords: Olive sector, Market, Strategy actors, Algeria

THE OLIVE PRODUCTION IN THE ALGERIAN STEPPES

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ABSTRACT

Olive growing has a considerable place in the economy of Algeria. Moreover, a taking of awareness has been raised over the last decades on this subject to improve the management of the orchard olive oil, think about its extension on lands where the intensification of production is possible. The olive sector has opened up to news paces in recent years, particularly in the east, the highlands, steppe and in the south of the country, with a appreciable output. Indeed, thanks to the support policy since 2008, localities which, before, were completely indifferent lately show a significant interest in olive growing seen the increase in the consumption needs of olives and olive oil. This study aims to objective of analyzing the effects induced by the FNDA conducted since 2008, through a case study in the northern zone of the state of Djelfa. The results revealed that the farmers benefiting from the support in the sector, have benefited from an encouragement to extend the areas cultivated in olive trees and oil mills (processing unit), and an increase in the production of olives and olive oil. However, despite the low rateof financial profitability, eating habits have been modified and the consumption of olive oil has become more than essential. On the social level, this sector has offered employment and reduced the rural exodus and on the ecological level, this culture has helped to protect the soil and improve the plant cover.

Keywords: Sustainable development, FND, Olive productions, Djelfa, Opportunities

EFFECT OF SALICYLIC ACID ON GROWTH, NUTRIENT UPTAKE, ANTIOXIDANT ACTIVITIES AND STEVIOL GLYCOSIDES OF STEVIA REBAUDIANA BERTONI UNDER SALT STRESS CONDITION

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ABSTRACT

The use of saline water for plant irrigation in arid and semi-arid areas became a necessity because of water deficiency. However, the exposure of plants to salt stress can affect various plant physiological processes which result in a reduced biomass production. This adverse effect of salt stress appears on the whole plant level at almost all growth stages including germination, vegetative growth and reproductive stage. Applying compenents like salicylic acid can improve plant resistance against salt stress. The purpose of this study is to elucidate the effect of salicylic acid treatment (0mM, 0.1mM, and 0.5mM) on nutrient uptake, antioxidant activities, and steviol glycosides production of *Stevia rebaudiana* Bertoni under salt stress. A completely randomized design was applied with twelve replicates per treatment. The results showed that salt stress negatively affects all studied parameters. However, salicylic acid application significantly increases DPPH, ABTS, reducing power capacity, total phenolic content, total flavonoid content, total condensed tannins, stevioside (STV), rebaudioside A (Reb A), and total steviol glycosides (STV; Reb, A, B, C, D, and F; steviolbioside; rubudioside and dulcoside A) under saline condition. Moreover, salicylic acid mitigated the decrease of K, P, and Ca content induced by salt stress. In conclusion, the application of salicylic acid may be a promising strategy for improving stress resistance in Stevia.Analysis of all the results leads to the conclusion that saline stress at NaCl affects different physiological parameters of Stevia rebaudiana Bertoni, and that salicylic acid application in salinity conditions can reduce the harmful effects of the salt.

Keywords: Salicylic acid, salt stress, Stevia rebaudiana Bertoni, growth, nutrient uptake, antioxidant activities and steviol glycosides.

STATUS OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE IN BULGARIA: FROM GENOTYPE COLLECTING TO INFORMATION ACCESS

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ABSTRACT

One of the main priorities of the National Program of Plant Genetic Resources in Bulgaria is through international cooperation and establishment of collaborative networks to increase the utilization of conserved genotypes and scientific knowledge by free access and exchange of information. During the period 1982-2021 the fund of National Genebank in the Institute of Plant Genetic Resources – Sadovo is enriched with 53,648 accessions. The status of the stored in the genebank collection belongs to 122 botanical families and is characterized by 3,702 taxonomic descriptions. There are 36,754 accessions, introduced from foreign genebanks or botanical gardens by international free exchange. 10,817 accessions are acquisitioned through expeditions, conducted by national and international projects. A great diversity of cereal, grain legume and vegetable local varieties from home gardens and crop wild relatives from natural habitats are collected. 6,077 advanced cultivars and lines from breeding institutes in Bulgaria are preserved. The electronic register includes passport information according to FAO/Bioversity descriptor. The standard allows Bulgarian *ex situ* collection to be published on European Search Catalogue for Plant Genetic Resources – EURISCO. From 2020 intelligent documentation system with specialized software, functional ontologies for free access to plant genetic resources for all stakeholders and assured security of records through blockchain technologies starts to be established. The study aims to present the status and the free access to the Bulgarian genebank in connection with the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture. This work is supported by Bulgarian National Science Fund under the project BGPlantNet "Establishment of National Information Network GenBank – Plant genetic resources", and obtained results will be applied in the National Research Program "Smart Crop Production".

Keywords: plant diversity, genebank, ex situ collections, data base, international networks

PRELIMINARY SURVEY FOR MAPPING THE DISTRIBUTION OF LOCAL VARIETIES BY USING THE NATIONAL REGISTER OF PLANT GENETIC RESOURCES IN BULGARIA

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ABSTRACT

The intensive agriculture production and the climate changes continue to be the major factors affecting genetic erosion in rural areas. Collection of locally adapted traditional crop varieties is carried out by implementing the National Program of Plant Genetic Resources for conservation and management with the focus on their sustainable preservation and use. During the recent years expeditions in rural areas of Bulgaria were conducted. The exploration, inventorying and collecting local genetic resources in these areas was performed using a GPS system. The *ex situ* collection was enriched with 10,817 local accessions from cereals, vegetables, pulses, medicinal and aromatic plants. Collected materials are listed in the National register of Bulgaria, according to international descriptor of EURISCO. The accessions are stored in genebank and included in survey for characterization and evaluation. The purpose of the study is to determine the distribution of local varieties in Bulgaria based on information for agro-ecological origin of conserved accessions by collecting missions. The results from mapping show that the country is rich in genetic biodiversity of vegetable crops and pulses, which requires community support initiatives to preserve them also *in situ/on farm*, through the distribution of knowledge, publicity and cooperation. This work is supported by Bulgarian National Science Fund under the project BGPlantNet "Establishment of National Information Network GenBank – Plant genetic resources", and obtained results will be applied in the National Research Program "Smart Crop Production".

Keywords: plant genetic resources, local origin, expeditions, passport descriptor, documentation

HEALTH RISK FROM MICROCYSTIN-CONTAMINATED FRUIT CROPS: A CASE STUDY OF MARRAKESH CITY, MOROCCO

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ABSTRACT

Over the last few decades, toxic cyanobacterial blooms have been Maroct-occurring in freshwater ecosystems worldwide, in which bloom-forming cyanobacteria produce and release various variants of hepatotoxic and tumor-inducing peptides, called cyanotoxins (mainly microcystins (MCs)). MCs are water-soluble compounds that contaminate irrigation water and get accumulated into edible crops thereafter. This field study was about evaluating the sanitary hazard over the consumption of MCs-contaminated crops in Lalla Takerkoust agricultural area in Marrakesh city (Morocco). Therefore, fruit samples of main crops (apricot, peach, pomegranate, grapes and olive) were collected; and MCs within were extracted and quantified using enzyme-linked immunosorbent assay to assess the risk related to their ingestion (estimated daily intake (EDI) and risk quotient (RQ)). We found evidence that the risk level was high when consuming MCs-accumulating apricot, peach and pomegranate for both adults and children. The EDI exceeded the tolerable daily limit (TDL) set at 0.04 µg/kg of body weight per day by the Health World Organization. Moreover, RQ values revealed that MCs content in pomegranate exceeded the TDL of about 22 and 51 times for adult and children, respectively, representing a fruit crop of a very high sanitary risk in the area. This study highlights the health risk of MCs in the real cropland conditions in cyanobacterial blooms-infested areas, implying the urgent need of MCs-monitoring in agroecosystems and related agri-food.

Keywords: Cyanobacterial blooms, microcystins, fruit crops, health risk, estimated daily intake, Risk quotient.

MORPHO-BIOLOGICAL PROPERTIES OF SEMI-ORIENTAL TOBACCO VARIETIES

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ABSTRACT

In recent years, production of semi- oriental tobacco type is almost non-existent. The Department of genetics, selection and seed control at Scientific Tobacco Institute - Prilep has been working on maintenance of the existing collection of already created varieties and on creating new varieties. The newly created varieties with their qualitative and gvantitative properrties would be used in tobacco production. In 2019, the quantitative properties of three semi-oriental varieties were examined: O.9-18/2 chek, O. 110 and O. Zlatovrv. These varieties are creations of Scientific Tobacco Institute-Prilep. Seeding and field production of mentiooned varieties and lines was perfomed in the ehperimental field of STI-Prilep. The trial was set up using the method of randomized blocks in seven replications at a row spacingfrom stalk to 50 cm X 25 cm, area of calculated plot (3.25 m^2. The aim of the study was to show the quantitative properties (length of growing period, height of stalk, number of leaves, lenth and width of true middle and under top leaf) of the two newly recognized semi-oriental varieties of tobacco (O.110 and O. Zlatovrv) compared to the check variety O. 9-18/2. As a result of intensive breeding of this tobacco type, varieties O.110 and O. Zlatovrv have their own characteristic morpho - biological properties in comparison to check variety. These properties are characteristic for the semi - oriental tobacco type.

Keywords: tobacco, semi-oriental, morpho-bological, varieties.

INPUT USE AND SOIL PRODUCTIVITY IN ORGANIC AGRICULTURE

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ABSTRACT

The aim in organic agriculture, which has gained acceptance in the countries of the world, and through which a wide range of products is produced in our country, Turkey, is to re-establish ecological balance in nature, which was previously damaged or destroyed due to traditional agriculture, and to reveal the importance of using natural preparations instead of chemical fertilizers and pesticides which lead to the deterioration of this balance and are harmful to human health. The biochemical conversion of nitrogen, which is present free in the atmosphere, into organic form by microorganisms in the soil is called Biological Nitrogen Fixation in agriculture. In studies, it has been demonstrated that the best nitrogen fixation occurs in soils where leguminous plants are grown. Such fertilization performed with legume plants is called green fertilization. The use of farmyard manure in combination with green manure positively affects the structure of the soil, provides plants with nutrients they need, and positively affects the amount of product. Farmyard manure consists of the feces of bovine animals and sheep and goat and bedding laid under the animals in the barns. In addition, the content of farm fertilizers is rich in micronutrients, which indicates how essentiaş this material is in organic agriculture. One of the other most economical and easy ways to supply plant nutrients and organic matter to the soil in organic plant production is the application of animal and vegetable waste and residues formed in the farm to the soil by composting. One of the commonly used inputs in organic agriculture in recent years has been vermicompost. Live microorganisms that play a role in the uptake of some nutrients by plants from the soil, necessary for them, are also used as a fertilizer in agricultural production. These materials, called Microbiological Fertilizers, play a very significant role in organic agriculture as they directly affect soil fertility and plant development. A large part of the fertilizer needed in the organic farming system can be provided by the cycle of organic waste and residues. However, it is also possible to obtain commercially if there is a deficiency. Since organic materials to be purchased from outside are generally food- and agriculture-based industrial waste materials and residues, they also carry the risk of containing harmful chemicals. The origin and properties of such organic fertilizers should be known. Some commercial organic fertilizers are guano, nail and horn meal, algae, hair, wool and feather residues, agricultural industry wastes and residues. This review was prepared to address the issues of soil fertility and input use in order for organic agriculture, an agricultural model which has gained acceptance all over the world and for which the demand is increasing day by day, to be sustainable.

Keywords: Organic farming, plant nutrition, green fertilization, farmyard manure, compost

DYNAMICS OF PRODUCTION SYSTEMS AND THEIR ADAPTATION TO CLIMATIC UNCERTAINTIES IN THE SEMI-ARID ZONE OF SÉTIF (ALGERIA)

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ABSTRACT

The high cereal plains of Sétif (North East region of Algeria) were characterized by pastoral breeding and the cultivation of cereals for centuries; however, a system based on pastoral sheep farming associated with cyclical cereal farming, practiced on small areas and intended to cover the subsistence needs of a limited population (less than 3 million). This system has now undergone profound changes. It is changing from an extensive agro-pastoral form to a model in the process of intensification of polyculture-breeding. Farms have experienced a continuous decrease in their size expressed in hectares of agricultural area, due to the fragmentation of agricultural land following succession by inheritance. This aspect is combined with that of the reduced average size of the herd, the scarcity of water resources for irrigation, the irregularity and low rainfall as well as the effect of climate change, which constitute factors increasing the effects of risks and the vulnerability of agricultural enterprises. To remedy this situation, agro-pastoralists have developed strategies to improve their resilience to climate change and ensure their sustainability.

Keywords: Climate Change, Cereal cropping, Livestock, Strategies, Resilience.

A STUDY ON DETERMINATION THE CHEMICAL QUALITY OF SUNFLOWER MEALS PRODUCED IN TRAKYA REGION

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ABSTRACT

Sunflower is the most cultivated oilseed plant in Turkey. The Trakya Region, where a significant part of the sunflower agriculture and related to oil and meal production carried out has a special place in the production rate of our country. In this study, it is aimed to analyze the nutrient contents and to reveal the chemical quality of sunflower seed meal (SFM) produced in Trakya Region, which has an important place in oil industry for our country. For this purpose, a total of 60 SFM samples were obtained from 9 enterprises producing oil according to the pre-press solvent extraction method in Trakya Region, in Edirne, Kırklareli and Tekirdağ provinces. At the end of the study, the mean dry matter (DM) content of SFM samples analyzed was 90.43±1.34%, ash ratio was 5.74 ±0.30% and organic matter (OM) composition was 84.69 ±1.31%. The crude protein (CP) level of the meal samples produced in the region was 29.26±2.98%, and the ether extract (EE) content was determined as 0.62±0.30%. The compositions of crude fibre (CF), neutral detergent fiber (NDF) and acid detergent fiber (ADF) in SFM samples were found to be as 24.85±3.38%, 37.80±4.35% and 31.01±4.22%, respectively. The nitrogen free extract content of the samples was recorded as 29.97±1.75%. The results of the study showed that the nutrient composition of the sunflower meals produced in the region was within the previously reported standard nutrient values for sunflower meals. The prominence of sunflower agriculture in the region and the processing of seeds with modern techniques by the oil enterprises that have lead developed the quality of the nutrient in meals produced. However, determining the digestion rate is as important as the chemical quality in revealing the nutritive values of the feeds. These results need to be supported by in vivo and in vitro advanced digestion trials, in order to demonstrate the nutritional values of SFM produced in the region.

Keywords: Chemical Composition, Crude Protein, Sunflower Meal, Trakya Region

NONSPINY SAFFLOWER AS A POTENTIAL AGRICULTURAL INTERVENTION FOR SEMI-ARID AND ARID ENVIRONMENTS OF PUNJAB-PAKISTAN

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ABSTRACT

Safflower is xerophytic in nature and is conferred with unique features of salt and drought tolerance along with low nutritional requirements. Having such conspicuous growth characters of safflower, a multilocation study was opted to assess production potential of exotic safflower accessions under varying climates of Punjab Pakistan. Both spiny and nonspiny safflower advanced lines were experimented under randomized complete block design with split plot arrangement during 2nd week of November 2020. A total of 06 screened accessions obtained from United States Department of Agriculture (USDA) were employed with a history of 4 years of experimentation for their agronomic potential assessment. Kasur, Lyyah, Bahawalpur, and Chakwal were employed for local appraisal of these advanced safflower lines. Growth, yield and oil traits of safflower were recorded during the study. Data regarding days to emergence, plant height, number of heads per plant, number of flowers per plant, days to flowering, days to maturity, yield and oil were significantly affected by differential climatic regimes. It was concluded that Chakwal conditions considerably contributed to yield, yield components and oil content as well as quality of oil with edible perspective.

Key Words: Safflower, multilocation, oil, yield, quality

DETERMINING THE REACTIONS OF WHEAT CULTIVARS DEVELOPED BY THE TRAKYA AGRICULTURAL RESEARCH INSTITUTE AGAINST COMMON BUNT DISEASES (*Tilletia foetida* Wallr.)

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ABSTRACT

Tilletia spp. is one of the important biotic factors affecting wheat production in our country, as it is in many wheat-growing countries in the world. The most common of the bunt species is *Tilletia caries* Tul. and *Tilletia foetida* (Wallr.) Liro, which constitute the group of bunt disease called "common bunt". When the Southeastern Anatolia Region is excluded from the average, it is reported that 95.7% of common bunt is produced by *T. foetida* and 4.3% by *T. caries* in our country. In this study, the reactions of 19 bread wheat cultivars developed by Trakya Agricultural Research Institute (TARI) against wheat common bunt [*Tilletia foetida* (Wallr.) Liro] were determined. The experiment was established as a randomized complete block design with four replications in the TARI experimental field, during the 2019-2020 growing seasons. Each replication was planted in a row of 1 m long, 30 cm between rows. Bunt spore was used at a rate of 0.5% of the total weight of the seeds. Artificial inoculation was done by shaking the seeds and spores in the jar for 2 minutes before sowing. Disease assessments were made at the full maturity period of the wheat to determine the reactions of the cultivars to bunt. In the evaluation of the disease, the ratio of spikes showing signs of disease among all spike was examined. Accordingly, resistant; 0-5% infected spike, moderate resistant; 5-10% infected spike, Susceptible; 11% and above infected spike were evaluated. In the experiment, Anafarta bread wheat variety was found to be the most tolerant variety with 4.9% infected spike rate, followed by Pehlivan bread wheat variety with 8.1% infected spike rate. In the experiment, Abide bread wheat variety was found to be the most susceptible variety with 63.1% infected spike rate, followed by Tekirdağ bread wheat variety with 45% infected spike rate. A significant positive correlation (r=0.9837**) was found between the mean number of infected spikes and the mean rate of infected spikes. A significant negative correlation (r= -0.8209**) was found between the mean number of infected spikes and the mean number of healthy spikes. Chemical combat has disadvantages such as negative effects on the environment, increasing agricultural inputs at a certain rate and not being able to be used in organic product production. In order to eliminate these disadvantages, it is necessary to give more place to the studies on resistance breeding in bunt diseases.

Keywords: Bunt, Tilletia foetida, Bread wheat, Resistant, Susceptible

DETERMINING THE REACTIONS OF WHEAT AND BARLEY VARIETIES DEVELOPED BY TRAKYA AGRICULTURAL RESEARCH INSTITUTE TO LOOSE SMUT OF WHEAT AND BARLEY (*Ustilago nuda* f.sp. *tritici* and U. *nuda* f.sp. *hordei*) DISEASES

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ABSTRACT

In this study, the reactions of 16-bread wheat cultivars and 13-barley cv. developed by Trakya Agricultural Research Institute (TARI) against wheat loose smut [*Ustilago nuda f.sp. tritici*] and loose smut of barley [*Ustilago nuda f.sp. hordei]* were determined, respectively. In the reaction studies, flower inoculation was carried out in the in the TARI experimental field, during the 2019-2020 growing seasons. Each individual flower is inoculated with dry spores and inoculation was done in ten spikes for each cultivars. Smut spores of infected spike collected from the same area were used for inoculation. Seeds obtained from each varieties was planted in a row of 1 m long, 30 cm between rows in the next 2020-2021 growing season. Disease assessments were made at the flowering period of the wheat and barley to determine the reactions of the cultivars to loose smut. In the evaluation of the disease, the ratio of spikes showing signs of disease among all spike was examined. Accordingly, resistant; 0-5% infected spike, moderate resistant; 5-10% infected spike, Susceptible; 11% and above infected spike were evaluated. In the wheat experiment, in Kate A1 and Köprü bread wheat cultivars, the infected spike rate was zero and no disease development was observed. Anafarta bread wheat variety was found to be tolerant variety with 3% infected spike rate. Tekirdağ bread wheat variety was found to be the most susceptible variety with 81% infected spike rate, followed by Saban bread wheat variety with 51% infected spike rate. In the barley experiment, in Yaprak and Bolayır barley cultivars, the infected spike rate was zero. Hasat barley variety was found to be the most susceptible variety with 80% infected spike rate, followed by Harman barley variety with 76% infected spike rate. It has been observed that there is a wide variation in terms of disease resistance within both wheat and barley cultivars.

Keywords: Loose smut, Barley, Bread wheat, Resistant, Susceptible

MORPHOLOGICAL AND BIOCHEMICAL RESPONSES OF GRAND NAIN AND DWARF CAVENDISH (*Musa* SPP.) BANANA SEEDLINGS TO DROUGHT STRESS SIMULATED BY PEG-6000

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ABSTRACT

Banana (*Musa acuminata* L.), an indispensable fruit of countries with tropical and subtropical climates, has come face to face with the effects of global climate change. In the present study, water stress was stimulated by using polyethylene glycol (PEG-6000) *in vitro* conditions and tolerance levels of Grand Nain (GN) and Dwarf Cavendish (DC) banana cultivars were determined. Plantlets of the cultivars were placed in the MS nutrient medium combined with 5 mg L-1 BA, 1 mg L-1 NAA, 5%, 15%, 25%, and 35% PEG to be observed for forty-five days. In the study, cultivar, treatment, and treatment x cultivar interactions were significant in all parameters. Statistically, the worst affected plants in terms of plant height were 15% (DC), 25% (GN), 25% (DC), 35% (DC), and 35% (GN) treatments while 35% treatment had the most effect in terms of plant diameter with the GN cultivar (2.71 mm). As the treatment levels increased, the plant weights decreased and the GN (35%) had the lowest plant weight (1.63 g). Total chlorophyll content and SPAD values supported each other and GN (35%) had the lowest value in both parameters with 2.73 and 6.82 mg g-1 Fw, respectively. The highest MDA and proline content were also determined in the GN (35%) with 0.71 n mol g-1 and 17.71 n mol mg-1 Fw, respectively. The results showed that the DC variety which is grown mostly in open fields in Turkey will show higher tolerance than the GN cultivar in many respects when water stress occurs. Therefore, the DC cultivar has been shown to be a preferable cultivar under drought conditions.

Keywords: PEG, drought stress, plant height, MDA, proline

THE EFFECT OF DIFFERENT GIBBERELLIC ACID (GA3) DOSES ON SEED GERMINATION PROPERTIES OF SOME SOYBEAN [GLYCINE MAX (L.) MERR.] CULTIVARS

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ABSTRACT

In this study; The effects of different doses (0 (hydro-priming), 50, 100, 200 ppm) gibberellic acid (GA3) application on the germination properties of Arısoy (C1), Crawford (C2) and Samsoy (C3) soybean varieties were investigated. The experiments were factorial arranged in a completely randomized design with three replications. As a result of this study, seed germination rate (FGR), mean germination time (MGT), germination index (GI) value, germination energy (GE) value, vigor index (VI) value, seedling fresh weight (SFW), seedling dry weight (SDW) and seedling length (SL) were determined between 82-93%, 3-4.43 days, 27.8-37.3, 72-93%, 533-988, 0.57-0.71 g, 0.13-0.21 g, 6.5-10.6 cm, respectively. In terms of FGP, MGT, GI, GE, VI, SL, SDW properties, a significant difference ($P<0.01$) was determined between cultivars, GA3 applications and cultivar x GA3 applications. Among the GA3 dose applications, FGP, GE, VI values with 100 ppm GA3 application and MGT, GI, SL values with 150 ppm GA3 application reached the highest levels, but germination parameters were negatively affected with 200 ppm GA3 application. Responses of cultivars to GA3 doses were variable. In conclusion, seed priming with gibberellic acid (GA3) can be used in Arısoy, Crawford and Samsoy soybean varieties for increasing the final germination percentage (FGP) and shorten the mean germination time (MGT).

Keywords: Soybean, Cultivars, Germination, Gibberellic acid (GA3), Seed priming.

YIELD AND SOME PROPERTIES OF SILAGE CORN AS INFLUENCED BY NITROGEN AND VERMICOMPOST RATE

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ABSTRACT

Corn (*Zea mays* L.) is the most preferred and most suitable type for silage production all over the world. However, in order to obtain high yield from corn, it is necessary to use a large amount of nitrogen fertilizer. This can lead to environmental pollution and also to some nutritional disorders in animals. Therefore, techniques for reducing the use of chemical fertilizers in silage corn farming should be identified and implemented. The aim of this study was to determine the optimum combination of vermicompost and chemical nitrogen in silage corn production under the conditions of Erzurum. The study conducted according to the Randomized Complete Blocks experimental design, 5 doses of vermicompost (0, 2.500, 5.000, 7.500 and 10.000 kg ha-1) and 4 doses of chemical nitrogen (0, 50, 100 and 150 kg N ha-1) in combination with 3 replications was applied. The increase in silage yield was determined up to 100 kg ha-1 of nitrogen and 7.500 kg ha-1 of vermicompost. The highest silage yield (7.997,1 kg ha-1) were taken from 100 kg N + 10.000 kg ha-1 vermicompost application.

Keywords: Silage corn, vermicompost, nitrogen, silage yield

INFLUENCE OF DROUGHT STRESS ON MOLECULAR AND PHYSIOLOGICAL RESPONSES IN SUNFLOWER SEEDLINGS

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ABSTRACT

Drought is one of the major abiotic stresses affecting crop quality and yield, especially in the condition of actual climate changes. Although, due to its long and deep roots, sunflower is considered to be a drought-tolerant crop, severe water deficit causes the reduction or delay of seed germination, compromises seedlings establishment and their particularities. To characterize how sunflower seedlings respond to drought stress the physiological responses and drought-induced gene expression (DHNs) were analysed in a model system consisting of a drought-tolerant (1718R) and a drought-sensitive (413S) sunflower hybrids subjected to progressive hydric stress. Polyethylene glycol 6000 (PEG-6000) solution of 10% and 20% (osmotic potential −0.55 and −1.60 MPa, respectively) was used to induce stress. Germination rate (GR), promptness index (PI), germination stress tolerance index (GSTI), plant height stress index (PHSI), root length stress index (RLSI) and dry matter stress index (DMSI) were investigated to determine the physiological response to water stress. Total RNA was extracted from cotyledon and roots of 10-day old sunflower seedlings. Three genes (*Rab18-like, Xero1* and *COR47-like*) related to drought stress response were analyzed by quantitative Real-time PCR. A significant reduction of all analyzed physiological indices, except root length of 1718R hybrid, was observed with the increase of PEG concentration in both sunflower genotypes. In the case of hybrid 413S the most affected traits were root length, followed by plant height. In contrast, the effect of hydric stress on root elongation in drought tolerant hybrid 1718R was insignificant and greater values were observed in PEG treated samples as compared to control. The drought tolerant hybrid showed higher values of PI and GSTI for both levels of applied osmotic potential compared to sensible hybrid. All analyzed dehydrins changed their transcript content due to PEG treatment, both in the cotyledons and in the roots. However, there is a higher response reaction in the roots compared to cotyledons, especially in sensitive genotype. Also, it is obvious the trend of upregulation in dehydrin expression of *Rab18-like* in case of tolerant genotype and of *Xero1* in case of the sensitive one. A more contrasting response due to the induced stress is highlighted for expression of dehydrin *COR47-like* depending on all experimental factors (genotype, PEG concentration, tissues). Analysis of the relative gene expression ratio of control plants 1718R versus 413S revealed a higher concentration of *Rab18-like* (1.51-fold) and *COR47-like* transcripts in roots and of *Xero1* in cotyledons and roots. Quantitative variations of DHN transcripts (mostly upregulated than downregulated), in normal conditions and in hydric stress conditions, in a tissue-specific manner and depending on severity of stress were revealed.

Keywords: dehydrins, drought stress, gene expression, germination, PEG, seedlings, sunflower

ACKNOWLEDGMENTS:

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

EXPLORING STREPTOMYCES BIOAGENTS FOR THE MANAGEMENT OF BACTERIAL FIRE BLIGHT UNDER IN VITRO AND IN VIVO CONDITIONS

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ABSTRACT

Fruit growing is one of the leading branches of agriculture in Kyrgyzstan, where more than 70 species of apple and pear are grown. In recent years, fire blight has caused enormous damage to gardens, fruit cultivation and forestry. Due to the lack of adequate protective measures against the causative agent, *Erwinia amylovora*, farmers are forced to uproot diseased trees. However, using antagonistic bacteria to suppress *E. amylovora* on blossoms and shoots is being considered as a viable alternative for controlling fire blight. *Streptomyce*s bacteria are of increasing interest to researchers and fruit and vegetable growers because of their potential as natural biocontrol agents that could be used to produce high-quality healthy organic crops. Thus, we first performed an in vitro antibiosis test. Native *Streptomyces strains were screened for* antibiotic compounds active against *E. amylovora* isolates. The *Streptomyces* strains were cultured in media for 7 days until antibiotic substances were produced. *Then,* 48 h culture suspensions of *E. amylovora* samples isolated from an apple tree (*Malus domestica*) were sprayed onto the *Streptomyces colonies*. The antibacterial activity of the *Streptomyces* strains was tested over a further 96 h and was evaluated by the resultant antagonistic and hyper parasitic effects. The inhibition zones were determined. Secondary screening of the natural actinomyces isolates for antimicrobial activity was conducted in a liquid medium (Meat peptone brot). Both microorganisms—the bioagent and the pathogen—were co-cultured for 72 h, and the contents of each incubated tube observed under a microscope, followed by inoculation on MPA and SCN media. The result was considered positive for antimicrobial activity when the antagonistic microorganism completely suppressed the growth of the pathogen, when only the *Streptomyces* mycelium and no pathogen cells remained in the tube. It was found that two isolates (Tal-44-18 and Tal-44-21) were active against *E. amylovora*. Almost full-length fragments of the 16Sp RNA of the two active *Streptomyces* strains were amplified using the primers 16S-27F and 16S-907R. A comparison with existing sequences in the database showed that the sequences of the local strains were 99.9% identical with the registered strains *Streptomyces pratensis* (Tal-44.21) and *Streptomyces avidini (*Tal-44.18). The ability of the *Streptomyces* sp. to protect seedlings against fire blight was then assessed under in vivo conditions in a quarantine greenhouse. Two-year-old apple seedlings were planted in plastic pots and grown for 5–6 weeks to develop sufficient leaf biomass. Two experiments were then conducted at the same time. In the first experiment, which was designed to test the preventive effect of the *Streptomyces* sp., Red Chief (4 pieces) and Starkrimson (4 pieces) apple varieties and their leaves and shoots were abundantly sprayed with solutions containing 5.2 × 107 cells/mL of S*treptomyces* sp. strains. On Day 10, the treated seedlings were artificially infected with *E. amylovora* to determine whether the *Streptomyces* sp. had a prophylactic effect. In the second experiment, seedlings were artificially infected by cutting the leaf blade with scissors dipped in an *E. amylovora* suspension containing 1 × 109 cells/mL. Ten days later, the infected seedlings were sprayed with a *Streptomyces* solution to determine whether the *Streptomyces* sp. had a therapeutic effect. In both experiments, disease development was monitored for 30 days, and the size of the necrotic lesions on the leaves and shoots were measured every other day. Therefore, we identified two potential fire blight antagonists: *S. pratensis* (Tal-44.21) and *S.*

avidini (Tal-44.18). This can be considered a new finding on biological control research in Kyrgyzstan. The *Streptomyces bioproducts described here have potential as early-stage* fire blight inhibitors due to their demonstrated preventive and healing effects.

Keywords: Erwinia amylovora, antagonistic strains, biocontrol

IN VITRO AND IN VIVO SCREENING OF BEAUVERIA BASSIANA STRAINS FOR ENDOPHYTIC AND INSECTICIDE ACTIVITY

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ABSTRACT

The excessive use of chemical fertilisers has led to several ecological and environmental problems, such as soil pollution and degradation and reduction of beneficial soil organisms. *Beauveria bassiana* (Bb); (Ascomycota: Clavicipitaceae) is an entomopathogenic fungus that is used as an eco-friendly insecticide due to its ability to infect and kill arthropods. It causes mycosis in about 700 species of harmful insects from various orders, including Lepidoptera, Homoptera, Hymenoptera, Coleoptera and Diptera. Because of its ability to rapidly produce infectious conidia when incubated on inexpensive nutrient media, there is significant interest in the commercial mass production of highly effective bioproducts with broad ranges based on Bb. In addition, Bb reportedly possesses endophytic activity; that is, it may be able to contribute to plant growth. Endophytic Bb has been engineered, although its application as a bioinoculant in modern agricultural systems is relatively under-explored. The aim of this study was to evaluate the potential insecticidal and endophytic activities of local native Bb isolates. The larval and adult stages of the apple tree aphid (*Aphis pomi*) were used as the target in the bioinsecticidal experiments, and crops (i.e. beans, tomatoes and cucumbers) were used as the targets in the biostimulant experiments. The local native Bb strains tested were the Col-2, VT and 12K strains, isolated from dead insects. The first step involved developing a cheap nutrient media suitable for cultivating Bb isolates and obtaining a high biomass. The Col-2, VT and 12K strains were found to produce high-density mycelia and conidia on the surface of media consisting of wheat and barley groats. For the in vitro bioinsecticidal assays, fungal conidial suspensions were prepared in 0.02% Tween-80 and adjusted to 1 × 108 conidia/mL using a haemocytometer. The bioactive Bb products were found to have high insecticidal activity against aphids. After 3 days, the cuticle and outer covers of the larvae and adults were covered with fungal mycelium. After 5 days, the mortality rate resulting from treatment with the Col-2 and VT strains was 90 ± 1.27%; 89± 1.097%; and the mortality rate resulting from treatment with the 12K strain was 80 ± 1.23% ($P \leq 0.05$) in the tested pest population. The endophytic activity of the Bb strains was evaluated by bioinoculating crops in three ways: through the seeds (soaking vegetable seeds for 2 h in a 1 × 106 spores/mL suspension of Bb strains); through the soil (watering with a 1 × 106 spores/mL suspension of Bb around the root system); and through the leaves (spraying the surface of the leaves and stems with a 1 × 106 spores/mL suspension of Bb strains). The plants were bioinoculated and left for 15 days before the endophytic activity of the Bb strains was assessed. It was found that the growth-stimulating effect of the Bb strains on the different plants varied with the bioinoculation method. The best results were obtained for tomatoes and cucumbers using soil bioinoculation, whereas the best results for beans were obtained using all the tested types of bioinoculation. The ITS1 and ITS4 DNA fragments of select fungal isolates were amplified by PCR using the primer pairs ITS1 (CTTGGTCATTTAGAGGAAGTAA) and ITS4 (CAGGAGACTTGTACACGGTCCAG) and genomic DNA as the template. Based on their morphological characteristics, and molecular characteristics the isolates were identified as *B. bassiana* belonging to Clade E from Asia.

The findings of this study confirm the potential of these Bb strains as biological pest control agents and bioinoculants that increase the growth of plant seedlings. These findings can be used to develop bioagents that will reduce the indiscriminate use of chemical insecticides on crops and protect the environment from pesticide pollution.

Keywords: entomopathogenic fungus, bioinsecticide, bioinoculant

HARMFUL ENTOMOFAUNA BY CHICKPEAS - *Cicer arietinum* L.

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ABSTRACT

Chickpeas are attacked by determined circle pests, which have permanent character in individual years are multiply en masse and are able to compromise the harvest. In this regard clarifying the species composition of the most common pests, as well as its successful on time control of the struggle with them have importan meaning in its cultivation. The research was carried out in the area of the town of Rouen. For reporting density of insect pests use standard entomological methods. In fields with chickpeas settled down 21 pests, belonging to 10 families and 5 orders. From them of economic importance are: the cotton bollworm (*Helicoverpa armigera* Hub.) and the chickpea leaf miner (*Liriomyza cicerina* Rond.). Because higher temperatures in 2020 extend chickpea vegetation resulting in the species have multiplied en masse. In 2020 14.66% of damaged beans were reported of cotton bollworm and 24% damaged leaves from the chickpea leaf miner. In 2021, respectively, 15% damage was registered on beans and 7.33% on leaves.

Keywords: chickpeas, standard entomological methods, cotton bollworm (*Helicoverpa armigera* Hub.), chickpea leaf miner (*Liriomyza cicerina* Rond.)

COMPARATIVE TESTING OF FORAGE PEAS VARIETY "MIR" IN THE CONDITIONS OF ORGANIC AND CONVENTIONAL AGRICULTURE

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ABSTRACT

During the period 2019 - 2020 on the experimental field in Field Crops Institute (FCI) - Chirpan was conducted an experiment with winter forage peas variety Mir, grown in organic and conventional agriculture. The soil in the area is leached resin. Forage peas are sown after the predecessor durum wheat variety Progress. The following phenological observations were made: beginning of stem formation, beginning of flowering, duration of flowering, full maturity and the vegetation period of peas was traced. Biometric indicators are also taken into account: betting height of the first bean, number of beans per plant, number of seeds in one bean and seed weight per plant. The yield of green mass is reported in the phase of mass flowering - the beginning of fruiting. A comparison was made between the reported indicators of peas in organic and conventional cultivation systems. There is no difference in the occurrence and duration of the individual phenological phases. During the years of research, the yield of green mass in winter forage peas variety Mir, grown conventionally, averaged 4,785 t / da, while in the biological system of cultivation was 3,675 t / da.

Keywords: forage peas, organic farming, conventional agricultural, green mass yield

DETECTION OF *PECTOBACTERIUM* SPP. IN ASYMPTOMATIC SEED POTATO TUBERS FROM WAREHOUSES IN TURKEY

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ABSTRACT

Stored seed potato tubers were collected in 2019 and 2020 in Nevşehir province, where the seed sector ranks first and has the most potato storage facilities in Turkey. Ninety-eight stored potato containers were sampled in 32 different warehouses and 4-5 tubers were collected from each warehouse. Stolon end and periderm tissues of healthy looking tubers were cut into pieces and placed in petri dishes with humid conditions. The formation of soft rot symptoms was checked on the tuber pieces after 48 hours at 28°C. The soft-rotted tuber pieces were touched with a sterile loop and streaked on Crystal Violet Pectate (CVP) medium. Pectinolytic bacteria responsible for latent infections in tubers that formed cavities on CVP medium were transferred to Nutrient agar plates. All strains were gram-negative, oxidase-negative, catalase-positive, facultative anaerobic, nonfluorescent, macerated potato slices, and caused a hypersensitive reaction on tobacco. In the samples collected in 2019, soft rot symptoms were observed on tubers in 21 of 44 individual seed containers. No soft rot symptoms were observed in samples collected in 2020. PCR analysis with Y1/Y2 primers revealed that the pectinolytic strains responsible for latent infection of the collected tubers from 21 containers belonged to *Pectobacterium* spp. PCR analysis with ADE1/ADE2 primers specific for *Dickeya spp*. did not yield a PCR product.

Key words: Seed tuber, potato, storage, latent infection, bacterial pathogen

DETERMINING THE MOLECULAR REGULATION OF EXCESS BORON SEQUESTRATION WITH ANTHOCYANIN AND GLUTATHIONE INTO VACUOLE IN ARABIDOPSIS THALIANA

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ABSTRACT

Physio-biochemical basis of compartmentalization of boron into organelles such as vacuole, where it is less harmful for cellular processes, by forming glutathionyl–anthocyanin–boron was previously suggested as tolerance mechanism in plants. Associatively, we found the activation of glutathione-dependent detoxification pathways at the molecular levels under boron toxicity in plants. However, molecular mechanisms of sulfate uptake and transport required for glutathione biosynthesis and of anthocyanin biosynthesis and transport have not been satisfactorily elucidated in plants exposed to toxic boron. Therefore, transcriptional regulation of some of the phenylpropanoid and flavonoid pathway genes and transcription factors related to anthocyanin biosynthesis and transport and some sulfate transporters were determined in Arabidopsis thaliana under boron toxicity. Accordingly, 3 mM boron induced the expression levels of C4H, 4CL3, MYB75, MYB114, TT13 and TT19. SULTR1;3 expression was dramatically increased in shoots and roots under moderate and severe toxic boron conditions, suggesting source-to-sink sulfate translocation under boron toxicity. Stable expression levels of SULTR2;1, SULTR2;2 and low SULTR3;5 expression might restrict the sulfate movement into the xylem in the shoots. SULTR3;1, SULTR3;2, SULTR3;3, SULTR3;4, SULTR4;1 and SULTR4;2 were induced in root tissues under toxic boron, indicating an induction of root-to-shoot sulfate translocation. These results showed that boron toxicity might disrupt homogeneous distribution of sulfate and sulfur-containing compounds in both tissues. Also, we found the direct role of boron-anthocyanin complex without glutathione conjugation by using slim1 mutant because SLIM1 transcription factor activates sulfate acquisition for sulfur assimilation, which generates cysteine, the substrate for glutathione. Accordingly, slim1 had more anthocyanin accumulation than the wild-type unders toxic boron conditions. Finally, in-silico analysis of microarray experiments, we found a set of genes involved in sulfur metabolism co-expresses with sulfate transporters under boron toxicity. Taken together, our findings prove a strong tie between the secondary sulfur metabolism and boron toxicity tolerance.

Keywords: Arabidopsis thaliana, boron toxicity, gene expression, sulfate transporter

IDENTIFICATION AND EXPRESSION PROFILING OF TOXIC BORON-RESPONSIVE MICRORNAS AND THEIR TARGETS IN SENSITIVE AND TOLERANT WHEAT CULTIVARS

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ABSTRACT

Post transcriptional gene regulation in wheat cultivars caused by boron (B) toxicity has not been reported to date. In this study, two wheat cultivars Bolal-2973 (B-tolerant) and Atay-85 (B-sensitive) were compared with regard to the transcriptional regulation of miR319, miR172 and miR398 and their plausible target genes in order to address differences in their performances under high B levels. The expression levels of Cu/ZnSOD gene were found to be greater in Atay exposed to toxic B compared to Bolal, as verified by stable expression level of miR398. In wheat cultivars, both toxic B concentrations might cause an induction of leaf senescence mechanism due to stable level of JA and ethylene-related miRNAs, miR172 and miR319. miR172 targeting transcription factor TOE1 was only induced under B toxicity in sensitive cultivar Atay. However, MYB3 as target of miR319 was significantly upregulated under toxic B in both cultivars. Also, computational prediction of these miRNA targets in wheat was performed and their orthologs in Arabidopsis thaliana were determined. Functional protein association networks of proteins encoded by miRNA targets and gene ontology enrichment analyses of these genes were identified. We identified new sets of genes that are targets of miR172, miR319 and miR398 in T. aestivum. In addition, miR172, miR319 and miR398 are responsive to different nutrient deficiencies or toxicities such as Fe, P, B, S and Cu, suggesting crosstalk between the post-transcriptional regulatory mechanisms involving miRNAs in plants.

Keywords: Arabidopsis thaliana, boron toxicity, microRNA, Triticum aestivum, post-transcriptional regulation

EFFECT OF TREATMENT WITH HERBICIDES IN SUNFLOWER HYBRIDS ON WEED INFESTATION

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ABSTRACT

The investigations were carried out during 2018–2021 at Dobrudzha Agricultural Institute – General Toshevo (DAI). The aim of this investigation was to determine the effect of the treatment with herbicides in sunflower hybrids on weed infestation. The following herbicides combinations were used: dimetenamid-P (140 ml/da)+kletodim (160 ml/da); pendimetalin (400 ml/da) + tsikloksidim (200 ml/da);dimetenamid –P (140 ml/da)+ tsikloksidim (200 ml/da); imazamoks (160 ml/da) and imazamoks (200 ml/da) . The herbicides were applied at stage 01 (BBCH), and tsikloksidim (200 ml/da) and kletodim (160 ml) at stage 12-14 (BBCH) on three conventional sunflower hybrids, Vesi, Linzi and Deveda and Imazamox (160 ml/da and imazamoks 200 ml/da) on clearfield hybrids Enigma and Danaia.The herbicide effect was determined by the quantitative weight method and evaluated by the EWRS scale. Regardless of the used hybrid, the herbicide combinations dimetenamid-P+kletodim, pendimetalin + tsikloksidim and dimetenamid + tsikloksidim had highest efficiency (90-94%) on grassy weeds- *Setaria viridis* L. and *Echinochloa crus-galli* L. and lower effect on broadleaved *Sinapis arvensis* L., *Datura stramonium* L., *Xanthium strumarium* L., *Amaranths retroflexus* L., *Polygonum convolvulus* L., *Chenopodium album* L., *Polygonum hydropiper*, *Convolvulus arvensis* L., *Cirsium arvensis* (L.) Scop and *Canabis sativa* L. (82-90%). Imazamoks (160 ml/da and 200 ml/da) had highest efficiency (90-94%) on broadleaved weeds and lower effect on grassy weeds (82-90%).

Keywords: sunflower, herbicides, weeds, efficiency, selectivity

INVESTIGATION OF *Xylella Maroctidiosa* AND VECTOR INSECT SPECIES ON DIFFERENT HOSTS IN ANTALYA PROVINCE

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ABSTRACT

Xylella Maroctidiosa, a devastating xylem-limited bacterial quarantine organism in EU country and Turkey, which has a wide range of plants. Economically important plant species for our country such as vine, citrus fruits, almonds, stone fruits, olives plant species are among the hosts of the agent and can cause serious losses in these products. The aim of this study is to investigate the presence of *Xylella Maroctdiosa* in olive, vineyard, almond and citrus fruits, which are important host plant species in Antalya province; to determine whether the vectors exist in the region and to raise awareness on the subject. In order to achieve these goals, surveys were carried out in 24 olive, 17 vineyards, 5 almonds and 23 citrus orchards in Antalya between 2017 and 2019, 364 plant and vector insect samples were collected and analyzed by molecular (real time PCR) methods. The data obtained at the end of this study can be used in national risk assessment and in creating a national action plan for the prevention of *X. Maroctidiosa.* As a result of the survey studies and real time-PCR study, *Xylella Maroctidiosa* disease was not detected in the region. As a result of the diagnostic studies carried out on suspicious vector insects collected from the same orchards, it was determined that the vector insect has an active role in the transport and spread of this pathogen in the region.

Keywords: Xylella Maroctidiosa, citrus, olive, vineyard, almond, vector, Hemiptera

PHYTOSANITARY STATUS OF WHEAT CROPS IN NORTHEASTERN BULGARIA

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ABSTRACT

In the present work, the results of a survey of wheat crops in the area of the IASS "Obraztsov chiflik" - Ruse, at the Agricultural Academy - Sofia, are presented. The study was carried out during the period 2018-2021, in the Institute area, according to accepted methods for weed infestation, species composition of the entomofauna and economically important wheat diseases. The aim of the study is to determine the species composition of weeds, diseases and insect pest in wheat crops under the relevant agro-climatic conditions. Weed species composition differed by year, with a total of 15 weed species from 10 families recorded. *Veronica agrestis* L., *Lamium purpureum* L., *Anthemis arvensis* L., *Convolvulus arvensis* L. and *Cirsium arvense* L. are ubiquitous in all surveyed crops. Insects belonging to the orders Coleoptera, Diptera, Hemiptera, Homoptera, Hymenoptera, Lepidoptera, Neuroptera and Orthoptera were identified. The proportion of the orders to which the species belonged in the three years of the study differed in the culture. The total number of insects detected during the three years of the test varied on average (CV=15.63%) – 373 pcs. in 2019, 280 pcs. in 2020 and 372 pcs. in 2021 During the period, 3 fungal pathogens of the genera *Puccinia*, *Erysiphe* and *Septoria* were identified. The development of *Puccinia* and *Erysiphe* pathogens during the study period was within the acceptable limits according to the SEV scale (from 10% to 25%). A massive development of the pathogen *Septoria sp*. was observed, with the affected plant area reaching up to 65%, according to the SEV scale.

Keywords: wheat, phytosanitary monitoring, weeds, diseases, pests.

INFLUENCE OF SYSTEMATIC MINERAL FERTILIZATION ON THE YIELD AND QUALITY OF MALTING BARLEY VARIETY "AHAT"

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ABSTRACT

The study was conducted in the period 2019-2021 with the malting barley variety "Ahat" in the experimental field of the IASS "Obratzov chiflik" - Ruse, Agricultural Academy - Sofia, on a soil type of highly leached chernozem in a long-standing stationary fertilizer experiment according to the eightfold scheme of Georges Villas in replications according to Rümker scheme. Fertilization options are the individual and combined application of the three macroelements – nitrogen, phosphorus, potassium and the non-fertilized control is used for comparison. The reported yield is highest with complete mineral fertilization (N10P12K7) - 519 kg da-1, followed by the variant with combined nitrogen-phosphorus fertilization (N10P12) - 498 kg da-1. The increase over control was 388% and 372% respectively. In the variants with the separate phosphorus and potassium fertilization and the combination between them, the yields obtained are close to those of the control or slightly exceed it. 2020 stands out as the most favorable weather-wise for malting barley. The indicators were monitored: mass of 1000 seeds (varies from 41.12 g in the control to 45.17 g in the triple combination), hectoliter mass (below the standard in all variants), evenness of the grain (above the standard requirements - 85% in all variants), germination and germinating power (above the standard in all variants).

Keywords: Malting barley, mineral fertilization, yield, yield components.

TECHNOLOGICAL CHARACTERISTIC OF CABERNET SAUVIGNON WINE PRODUCED FROM ORGANICALLY GROWN GRAPES

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ABSTRACT

The opportunities for organic growing of the Cabernet Sauvignon variety in the region of the town of Pleven, Central Northern Bulgaria, were studied during the period 2017-2020. Conventional and organic plant protection measures against the diseases downy mildew (*Plasmopara viticola*) and powdery mildew (*Oidium, tuckeri*) were undertaken in the experimental plantations. In the organic cultivation of the variety, the products Funguran OH 50 WP and Thiovit Jet 80 WG were used, with 7 treatments carried out annually. In the conventional cultivation, 5 or 6 combined treatments were applied. In the period of technological maturity, a minor attack of downy mildew and powdery mildew was found on the foliage and the clusters in both variants. The damage index from both diseases was higher in the organic production, but the differences found did not have a significant impact on the quantity and quality of the grape harvest. In the organic grape-growing, the amount of the input elemental Cu was strictly monitored. A technological characteristic of the Cabernet Sauvignon wines obtained from both growing variants was made. The difference in the main indicators of the grapes chemical composition was insignificant. The average rate of sugars, titratable acids and glucoacidimetric index was similar. No significant differences were observed in the ratios of most indicators of the wines' chemical composition. The content of alcohol, sugars, titratable acids and extract in the samples of both variants was identical. More differences stood out relating the total phenolic compounds, anthocyanins and colour intensity, as their rates were higher in the conventional wines. Due to their better taste and color features, these samples had higher tasting scores and were superior in their organoleptic qualities compared to the organic wines.

Keywords: Cabernet Sauvignon, organic prroduction, grapes, wine, chemical composition, tasting assessment

INFLUENCE OF THE OSMOTIC STRESS IN GROWTH OF YOUNG COTTON SEEDLINGS

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ABSTRACT

In this investigation are included 17 varieties cotton. Their relative resistance to dryness has been determined by detection of the germ reaction to osmotic stress with use of 1M solution of sucrose. Their genetic distance has also been determined by observation of characteristics revealed by simulated dry conditions. Based on data on the overall depression of growth of cotton seedlings grown in an osmotic environment, the Helius, Perla and Natalia varieties are determined as water-tolerant varieties and the most sensitive varieties FR-H-1001, Denitsa, FR-H- 1002 and Avangard-264.

Keywords: cotton, osmotic stress

DIRECTIONS AND ACHIEVEMENTS OF COTTON BREEDING IN BULGARIA

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ABSTRACT

The main goal of cotton breding in Bulgaria is to create new early and high-yielding varieties with improved fiber quality, resistant to abiotic and biotic stress factors of environment. In recent years, the new cotton varieties Pirin, Perun, Krystal, Aida, Anabel, Tiara and Melani have been created and approved (2019-2021). Pirin, Perun, Crystal and Annabelle varieties were obtained by inter-varietal crossing, Aida, Tiara and Melani varieties were created by interspecific hybridization and backcross technology. Pirin, Perun and Krystal varieties were new achievements in cotton breeding for earliness and productivity. In the State variety test, these varieties realized high yields, and exceeded the two standards and the average standard by 2.9% and 9.5%, respectively in fiber yield they exceeded it by 3.5% and 12%. Aida, Anabel and Melani varieties were new achievements in cotton breeding for fiber quality. These varieties had improved technological fiber properties and in some qualities they surpassed Avangard-264 variety - a standard for fiber quality, in others were equal to it. Egea and Nike varieties, confirmed in 2017, were another new achievement in the selection of colored (brown) cotton. The most valuable characteristic of these varieties was their longer fibre than that of Izabell variety approved as a standard for coloured cotton. In Upper Half Mean length Egea exceeded it by 1.13 mm, Nike - by 1.22 mm and had better spinning characteristics. Base on the obtained results of performed diallelic and line × tester crosses and analyses, the genetic control of sduded traits was established, the options for selection were clarified and the selection value of parental forms was determined. Genetic control of productivity and its elements was mainly non-additive. Additive and non-additive gene effects were important for the inheritance of fiber length and lint percentage; the non-additive gene effects were more important. In the interspecific crosses of *G. hirsutum* L. × *G. barbadense* L. traits were also more strongly affected by non-additive gene effects, except boll weight and lint percentage. Parental forms with positive and high GCA were identified for the studied characters, suitable for heterosis and synthetic selection. Different approaches have been developed and applied to overcome the incrossability and incompatibility of *G. hirsutum* L. and the wild cotton species. Different backcrossing approaches have been used.

Keywords: Cotton, New varieties, Diallel crosses, Line × tester crosses, Inheritance, Combinnig ability, Genetic control

INHERITANCE OF LINT PERCENTAGE IN F1 DIALLEL COTTON CROSSES (*Gossypium hirsutum* L.)

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ABSTRACT

Research on the genetic control of lint percentage in cotton is of great importance to improve this trait through selection. A higher lint percentage is important for increasing fiber yield per hectare. The aim of this research was to study the inheritance of lint percentage in two half diallel crosses, each one included six *G. hirsutum* L. varieties as parental forms differing in lint percentage. Each diallel cross was tested in two consecutive years. One set of F1 hybrids and their parental forms were studied. Genetic structure of trait, genetic components of variance, some genetic parameters and indexes of inheritance and the variability due to the year conditions, as well as general combining ability (GCA) and specific combining ability (SCA) of parental forms were studied. It was found that statistically significant were both additive and dominant gene effects. Dominant gene action was superior to additive one for both diallel crosses indicating the greater importance of dominant variance in the inheritance of lint percentage. The parental forms had different dominance (recessiveness) in the two years of exploration probably due to genotype-environment interaction. Because of high degree of dominance, weakly genetic variability and different expression of genes depending on environmental conditions, quick and successful selection can not be expected. Dorina and Barut 2005 (Turkish) varieties from the 1st diallel combination, Chirpan-539 and Helius from the 2nd diallel combination had both the highest values and the highest GCA for lint percentage. These varieties were the best general combinators for this trait.

Keywords: Cotton, *G. hirsutum* L., Diallel analysis, Lint percentage, Inheritance, combining ability

DEVELOPING ORGANIC AGRICULTURE PRODUCTION IN TUYEN QUANG PROVINCE, VIETNAM

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ABSTRACT

Organic agricultural production is a trend worldwide and in Vietnam to meet the needs of food safety, benefit human health and ensure sustainability for the natural environment. With favorable natural conditions and climate, Tuyen Quang, a mountainous province to the North of Vietnam, with great potential for developing organic agricultural production. Over the years, the locality has made many efforts to convert some crops to organic production, however it is still fragmented and has not achieved the expected results. By using descriptive statistics and consultation with experts, this study evaluated the current status of organic agricultural production and analyzed the advantages as well as difficulties in the process of converting production towards organic in Tuyen Quang province. Some solutions were proposed in order to develop local organic agricultural production in the coming time such as: enhance mechanisms and policies, planning specialized production areas, increasing technical training, raising awareness for people about organic agriculture.

Keywords: Organic agriculture production, agricultural production, conversion of organic agricultural production, Tuyen Quang, Vietnam

A NEW RESEARCH PROVIDES FOR ATTENTION TO PLANT VIRUSES CAUSING YELLOWING-TYPE SYMPTOMS ON CUCURBITS

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ABSTRACT

A single-stranded, positive-sense plant RNA virus called the *Cucurbit chlorotic yellows virus* (CCYV, Crinivirus, Closteroviridae) is comprised of RNA1 and RNA2. It is semipersistently transmitted by the whitefly *Bemisia tabaci* biotypes MEAM1 and MED. In 2004, CCYV was discovered on melon plants in Japan. Several other cucurbit species, as well as a range of non-species, were subsequently reported from countries such as Saudi Arabia, California, Israel, Taiwan, Sudan, Lebanon, Iran, Greece, Turkey, Egypt, Spain and China. Whitefly populations are frequently encountered in cucurbit cultivating areas. Virus plant diseases attributed to whiteflies are common in squash cultivation in the open field and greenhouses in Turkey, especially in cucumbers and squash. *Cucumber vein yellowing virus* (CVYV), *Cucurbit yellow stunting disorder virus* (CYSDV), *Tomato leaf curl New Delhi virus* (ToLCNDV), *Squash vein-yellowing virus* (SqVYV) are the leading virus diseases transmitted by *Bemisia tabaci*. Symptoms caused specifically by these viral diseases are of the yellowing type, although they differ as intervascular yellowing, yellowing of old or young leaves, and upward curling. Besides these viruses, CCYV, a problem in cucurbits, is carried by whitefly like others, causes yellowing type symptoms, and its first record in cucumber in Turkey was reported in 2017. However, this virus is ignored in the production of cucurbits, although it is a problem in production. In other words, while there are major viruses that cause similar symptoms, the presence of the *Cucumber chlorotic yellows virus* is overlooked in the symptomatological observation. In this study, we tried to reveal the difference of CCYV, which is encountered in cucurbit growing areas in Antalya and whose presence was detected by RT-PCR, from other viruses and emphasized its importance as a virus that should be considered in classical breeding studies.

Keywords: CCYV, cucurbits, plant viruses, yellowing-type symptoms

STUDY OF THE INFLUENCE OF BIOLOGICAL INPUTS OF VEGETAL ORIGIN ON TOMATO INSECT

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ABSTRACT

This study focused on the evaluation of two bio-fertilizers, compost, seaweed extract compared to mineral fertilization based on type fertilizers 15-15-15, urea on the availability and abundance of pests and auxiliaries on the tomato variety Alexandra F1 grown under greenhouse. The objective is to identify the most effective bio-fertilizer for the reduction of the main bioaggressors and the promotion of their auxiliaries. Our study, which took place over 4 months, made it possible to make 12 observations of the fauna caught by the use of yellow traps on tomato culture under greenhouse shelter of the faculty of nature sciences in Blida. The results of the bio-fertilizers show that the chemical fertilizer shows an important activity relative to the compost and the algasmar in relation to the relative abundance of the species. All the relative abundances of the pest taxa encountered exceed those of the witness. The highest relative abundance is for *Aleyrodidae, Aphididae, Cicadellidae, Gelechiidae, Noctuidae* and *Tephritidae* regardless of the fertiliser treatment performed. A small proportion of parasitoids including I*chneumonidae, Braconidae, Ceraphronidae, Platygastridae, Mymaridae* and *Scelionidae* were noted in the greenhouse while no phytosanitary treatment had been carried out. The Coccinellidae polyphage predators were caught with a very small number as well.

Keywords: Bio fertilizers, compost, tomato, pests, parasitoids .

VINEYARDS WATER STRESS ESTIMATION IN SOUTHERN ROMANIA TO INTEGRATE IRRIGATION MANAGEMENT STRATEGIES IN THE CONTEXT OF CLIMATE CHANGE

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ABSTRACT

Determining the timing of water stress in vineyards, at the plot level, is of significant importance for supporting crop management decisions and applying precision farming practices. In this study, we will present an overview of the main meteorological parameters, average values of temperature, precipitation, and potential evapotranspiration Penman-Monteith (Eto) from the last 42 years representing the normal or average multiannual state that will be compared with the climate diagram of the agricultural year 2021, in the area where the research was carried out, in southern Romania. Based on these indicators were determined both the pluviometrical deficit and the surplus during an agricultural year. CWSI was determined using an easy-to-use portable device, crop water stress. Our results show that, from a thermal point of view, the average temperature of the agricultural year was 11.6ºC, so 0.8ºC is higher than normal. By the largest deviations of the monthly average values from the normal one, the month of February stands out, which had 5.5ºC above the normal one, the situation being general for the whole country. According to this regression, the practical recommendation in irrigation scheduling is that CWSI values of 0.20 to 0.30 are suitable for the irrigation application of more than 250 to 500 m3 ha-1. CWSI 0 indicates that the plant has no water stress and a value of 1 represents the maximum water stress. The values of the plant's water stress index that signal the need for irrigation are crop-specific and should take into account factors such as the decrease in yield at the occurrence of water stress, probably the value of production, and the cost of irrigation water.

Keywords: climate change, drought, irrigation, crop water stress, Vitis Vinifera

CHEMICAL DEFOLIATION IN THE VINE NURSERY

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ABSTRACT

The trial was carried out in the period 2017-2020 in a vine nursery located on slightly leached chernozem. The objective of the study was to investigate the opportunities of applying the contact foliar herbicides Basta 15 SL (*150 g/l glufosinate-ammonium*) and Diqua 20 SL (*200 g/l diquat*) as defoliants, immediately before removing the vines from the nursery (the second half of October). Their effect on the above-ground vegetative mass of the grafted rooted vines of the varieties Muscat Plevenski, Bolgar, Naslada and Storgozia was established. The herbicides were applied in different doses, once and twice at the end of the growing season with work solution of 50 l/da. The strongest defoliating effect in all varieties was reported after treatment with Diqua 20 SL at a dose of 0.6 l/da and the combination of Basta + Diqua (0.3 + 0.33 l/da) with two applications, but in case it was not possible the second treatment to be performed, a satisfactory result might be achieved with a single application of the herbicides no later than 15 days before removing the vines from the nursery. To prove the vines' capacity for development during the next growing season, the status of their buds after the treatment with the tested herbicides was determined. No negative vines' response caused by this type of defoliation was found.

Keywords: vines, propagating material, nursery, defoliation, herbicides

DYNAMICS OF THE APHID POPULATION ON TOBACCO IN PRILEP REGION

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ABSTRACT

Leaf aphids are among the most important pests on tobacco. They directly affect tobacco yield and quality. Investigation was carried out in 2017-2021 on tobacco plants in Prilep, by application of Method of survey of 20 randomly selected tobacco stalks infested with aphids. During the summer 2017-2021, aphids developed many parthenogenic generations of apterous aphids on tobacco, which depends primarily on temperature fluctuations and precipitation, as well as on the physiological state of the plant and soil nitrogen fertilization. Aphid infestations are often found first along the field margins nearest the direction of prevailing winds. Aphid colonization begins with the movement of few winged females into tobacco fields that give birth to live nymphs. These offspring will become mature, wingless aphids that in turn will deposit more live nymphs and make collonies on top tobacco leaves and flowers. *M. persicae* was present on tobacco plants from the beginning of July until the end of October. Following the dynamics of the aphid population in Prilep region in 2017-2021, the most intensive attack of aphids on tobacco occurs in August. The maximum incidence of aphids was on the 10th of August 2017, on the 20th of August 2018-2020 and on the 1st of August 2021, when aphids form large, dense colonies at the growing points. On the examined stalks, in 2017 were observed 70.707 aphids, 48.527 in 2018, 54.036 in 2019, 59369 in 2020 and 20738 aphids in 2021.

Keywords: tobacco, Myzus persicae, dynamics

VARIATIONS IN PHYTOCHEMICAL COMPOSITION OF SCABIOSA ATROPURPUREA SUB. MARITIMA L. ACCORDING TO EXTRACTION METHOD AND PLANT PART

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ABSTRACT

Nowadays, replacing chemical products by natural one and exploitation of local medicinal plants for human and animal health is a big challenge for our society. Scabiosa Atropurpurea sub. Maritima L., plant of the family of Dipsacaceae, is used in traditional medicine for the treatment of certain skin diseases. The present study aimed to access the phytochemical compounds of scabiosa maritima (SM) extract i) vary with the plant part and ii) affected by the extraction method. The SM leaves stem, roots, inflorescence and fruits were randomly collected in if the north west of Tunisia and dried at room temperature then ground with a mill (0.5–1 mm). For each part the resulting powder was subjected to extraction with a 50% aqueous ethanol in a ratio of 1:20 using different extraction methods: ultrasonic, maceration and microwave. The content of SM total phenolic compounds, total flavonoids, flavonols and tannins were determined by spectrophotometry. Phytochemical compounds (phenolic, flavonoids, flavonol and tannin) of SM were different among plant parts and changed throughout the extraction method. Leaves and roots generally exhibited higher phytochemical content than other plant parts. Total phenol was 5.478 EAG g \ 100g DM±1.02, 3.543 g EAG/100g DM ±1.12 and 2.0912 g EAG/100g DM ±0,953 respectively for roots and leaves, inflorescence and fruits and stem. Total flavonoids were 2.3450 g EQ/100g DM ±0.802, 1.9977 g EQ/100g DM ±0.923 and 1.0516 g EQ/100g DM ±1,325 respectively for roots and leaves, inflorescence and fruits and stem. The assays showed that the highest total phenols (5.5063 g EAG/100g DM), flavonoids (2.855 g EQ/100g DM), flavonols (0.814/100g DM g EQ) and tannins (0.402g EAT\100g DM) were observed with the ultrasonic extraction method followed by the maceration then the microwave extraction methods respectively (p,lt;0.05). All SM part seems to be rich in phenolic compounds. In vitro and or in vivo trials using different SM extracts should be conducted to test their effect on some physiological aspects.

Key words: Scabiosa maritima, phytochemical, flavonoids, tanin, total phenol, extraction method, plant part.

ADVANTAGES OF USING HYBRID (SOLAR + WIND) ENERGY SYSTEMS IN RENEWABLE ENERGY PRODUCTION

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ABSTRACT

In many geographic regions, environmental conditions are favorable for solar energy installations at one time of the year, while wind potential increases at another time of the studied year. It is worth considering that the installation of hybrid systems in these areas may be the most economical technical solution. Of course, it is not a problem if both energy sources are available at the same time, because even in this case, the amount of energy that can be produced in the monitoring area increases. In those areas where the cloud cover increases significantly during the time of day or in certain seasons, we can expect less solar energy during this period, but at the same time, the wind potential usually increases in these areas during this period. Therefore, hybrid systems in these regions allow for much more efficient energy production than installing only solar or wind energy generating equipment. In slope areas, the so-called anabatic wind occurs on a daily basis, as a result of which we can count on the occurrence of anabatic clouds. Due to the favorable radiation exposure, solar energy can be efficiently produced during a certain period of the day, especially in the morning, but as the anabatic clouds thicken in the early afternoon, the conditions for wind energy production improve significantly. On the coastal areas of larger lakes and seas, the conditions are especially favorable for wind energy production, while the daytime hours, especially the morning hours, and provide favorable radiation for solar energy production equipment as well. Hybrid systems can be operated with better efficiency in these areas as well. In the installation of hybrid systems, the existence of complementary operation is particularly important. When one of the energy sources, such as solar energy, is not available, the other energy source, the wind, should provide an adequate amount of energy. Since the sun does not shine at night, an important question is whether a sufficient amount of wind energy can be produced at night. Since solar energy also plays a significant role in the generation of wind energy, it is not surprising that the amount of wind energy produced during the daytime hours exceeds the amount of wind energy that can be produced during the night hours. At the same time, our investigations also prove that during periods with lower sun position (during the period from September to April) the amount of wind energy that can be produced during the night hours exceeds the amount of solar energy that can be produced during the daytime hours in Hungary. This means that hybrid systems enable more efficient energy production than solar and wind energy utilization devices that operate separately. In many European countries, hybrid systems have already been used at the level of family farms and households, which provide effective help to reduce the energy costs.

Keywords: Solar energy, Wind energy, Hybrid system, Economical solution, Family farms

AMARANTH LEAVES AND SEEDS - AMINO ACID PROFILE AND CHEMICAL CHARACTERISTICS

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ABSTRACT

Amaranthus is distinguished by its high content of essential amino acids. High values were obtained for the content of essential amino acids lysine and methionine. In the leaf, the lysine content ranged from 3.9 (*A. caudatus* - 45/1) to 7.0 (*A. cruentus* 16) and (*A. moleros*) values 7.0. The content of lysine in the flower ranged from 4.2 (*A. caudatus* - 45/1) to 6.7 (*A. molleros* - 18). The methionine content ranged from 3.1 (*A. caudatus* - 45/1) to 7.4 (A. mantegazzianus - 14) in the leaf, that is 2.9 (*A. caudatus* - 45/1) to 6.7 (*A. mantegazzianus* - 14)) in flower. We also obtained high values of content for other essential amino acids. The obtained results show very high values of total proteins and essential amino acids for the examined genotypes. This means that we have a very good starting material, which provides us with an excellent starting point for further process and work on the selection of this new agricultural crop for us. Further, the aim of this study was to determine the nutritional value in four genotypes of amaranth: *A. molleros*, *A. caudatus*, *A. mantegazzianus* and *A. cruentus*. The heritability of the studied characters as protein and mineral content of seeds and leaves, and oil contents of seed were so high. Maximum values of protein content of seeds were 16.55% (*A. cruentus*), in leaves was 20.10% (*A. caudatus*), and the mineral of seeds was 2.73% (*A. moleros*), in leaves was 18.76% (*A. mantegazzianus*) and the oils content of seeds was 6.16% (A. moleros). Oil content of the seeds proportion of genetic variance to total phenotypic variance was 72%, and it has a significant impact of ecological factors. Seed and leaves of *Amaranthus* species can be used as sources of protein and rich amaranth leafy and gluten-free amaranth seeds production studies. This study has a contribution to plan for future activities related to Amaranth, an above all what separate divergent genotypes may serve as parents for further crossing.

Keywords: Amaranthus, amino acid, chemical characters, protein, leaves, seeds

WHEAT CHICKPEA INTERCROPPING FOR EFFICIENT USE OF PHOSPHORUS AND NITROGEN IN MEDITERRANEAN AGROECOSYSTEMS

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ABSTRACT

Complementarity in resources acquisition and facilitation effects are the main drivers of yield advantage in cereal-legumes based intercropping (IC) especially in low input farming. On the other hand, interactions between intercropped species depend on the spatial arrangement of plants and resources availability in the agroecosystems. In this study we emphasized the repartition of nitrogen (N) and phosphorus (P) between crops in wheat-chickpea IC grown in two cropping patterns namely strip (IC) (Sic) and Mixed (IC) (Mic) (the latter increases interactions between intercropped plants) by conducting a three years experiment in a major Algerian cereal production area. The gains in yield, N and P uptake were assessed by calculating the net effect (NE) of each IC pattern and explained by measuring the complementarity effects (CE) and competitive ability of each crop using the competitive ratio (CR) and Aggressivity (A) as indexes. Results indicate a positive net effect for yield (NEY > 0) in intercropping, this yield gain is linked to a positive NE for N uptake (NEN > 0). Moreover results indicate that the observed gains in yield were linked to positive CE in N acquisition (CEN > 0) between the two crops and to a higher competitiveness of chickpea for P uptake. Furthermore, results show that chickpea growth was significantly more impaired in Mic than wheat as indicated by an observed yield 7.23% lower on average in Mic than the expected yield and 29.12% lower than the average observed yield of Sic on the other hand wheat yield was always increased by IC (24.83% and 17.31% higher observed yield than the expected yield in Mic and Sic respectively). Finally, our findings indicate that designing efficient cropping systems requires a thorough understanding of species morphological traits and behavior variation in different IC patterns to maximize nutrients uptake and production.

Keywords: Intercropping, Chickpea, Wheat, Phosphorus, Nitrogen.

YIELD AND YIELD COMPONENT IN BARLEY (*Hordeum vulgare* L.) GENOTYPES UNDER RAINFED CONDITIONS

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ABSTRACT

Grain yield and yield components in barley is complex depending on the environmental effects and agronomical practices under rainfed conditions. This research was carried out in Trakia region in Edirne (Turkey) location during the 2017-2018 cycles. The experiment was set up with 25 genotypes in randomized complete block design (RCBD) with four replications. Grain yields (GY), plant height (PH), peduncle length (PL), spike length (SL), number of kernel per spike (KNS), spike weight (SW), spike number per square meter (SNM) and flag leaf area (FLA) were investigated. The combined analysis of variance (ANOVA) revealed significant differences among genotypes for all parameters (P<0.01) except spike length and spike number per square meter. Averaged the overall mean grain yield, genotypes G4 (8432 kg ha-1), and G21 (8119 kg ha-1) had the highest grain yield. Kernel number in spike varied from the lowest to 20.8 (G11) and the highest to 32.3 (G5) in 2-rowed genotypes. Kernel number per spike in 6-rowed genotypes varied between 32.3 and 49.2. In the study maximum spike weight (1.43 g) was recorded in G23. The longest peduncle (30.7 cm) was measured in G13. Genotypes G7 (8.46 cm) and G14 (8.23 cm) had the longest spike length. In the research significant (p<0.01) difference was observed in flag leaf area in barley genotypes. Genotype G23 had the largest flag leaf area (12.67 cm2) and followed by G11 (12.10 cm2). Grain yield was positively correlated with peduncle length (r=0.554**) and spike number per square meter (r=0.442*). Spike weight and kernel number per spike were positively and significantly correlated (r=0.666**). Flag leaf area positively affected and increased spike weight (r=0.572**) and kernel number per spike. These results showed that flag leaf area and spike weight of the genotypes had a slightly significant effect on grain yield in barley genotypes.

Keywords: Barley, yield, physiological traits, agronomic characters

GENOTYPE ENVIRONMENT INTERACTION OF BREAD WHEAT (*Triticum aestivum* L.) CULTIVARS ON YIELD AND QUALITY PARAMETERS

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ABSTRACT

The significant genotype (G) by environment (E) interaction is an essential issue for the breeder to develop new cultivars. The experiment was conducted during the 2010-2011 and 2016-2017 growing cycles in Edirne location in the Trakia region, Turkey. Each year was considered as a single environment. A total of 5 bread wheat cultivars were tested across seven environments. The experiment was laid out in a randomized complete block design (RCBD) with four replications. Grain yield (GY), days of heading (DH), plant height (PH), 1000-kernel weight (TKW), test weight (TW), protein ratio (PRT), wet gluten value (GLT), gluten index (IND), grain hardness (HARD) and sedimentation value (SED) were investigated. The combined analysis of variance (ANOVA) revealed significant differences (P<0.01 and P<0.05) among environments for all traits and there was a significant difference among genotypes except test weight and grain hardness. Cultivar Gelibolu had the highest grain yield with 7234 kg ha-1. The factors explained showed that grain yield was affected by environment (70.90%), genotype (3.46%) and GEI (11.35%). The environmental effect was responsible for the greatest part of the variation. Mean grain yield across seven environments varied from the highest 8158 kg ha-1 in environment E4 to the smallest 4454 kg ha-1 in E6. The fact that there was a 45.4% yield difference between the environments in the study showed the importance of the environmental impact. The highest protein ratio, wet gluten content, grain hardness and sedimentation were determined in E1. Results of the biplot analysis showed that Selimiye is a more ideal cultivar and E1 is a more ideal environment. With the longest vectors from the origin, environments E7 and E2 were the most discriminating, while E4 was the least discriminating. Cultivar Aldane was closely correlated with sedimentation value, protein ratio and wet gluten content. With a similar description, cultivar Pehlivan was closely correlated with test weight, 1000-kernel weight and grain hardness.

Keywords: Bread wheat, cultivar, environment, yield, quality, GGE biplot

PRELIMINARY RESULTS OF INFLUENCES OF SOME QUINCE ROOTSTOCKS ON YIELD AND FRUIT QUALITY IN LOQUAT

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ABSTRACT

The aim of this study was to investigate the effect of different quince clone rootstocks on yield, and fruit quality of loquat cv. 'Hafif Çukurgöbek(HÇG)'. In the trial, HÇG loquat cultivar grafted on Quince-A(MA), Quince-C(MC) and BA-29 rootstocks was used. In cultivar/rootstock combinations, yield and fruit pomological properties were determined. In order to determine the fruit quality, a total of 50 fruits were taken from each cultivar/rootstock combination and physical and chemical measurements and analyzes were carried out including fruit weight (g), fruit dimensions (mm), seed weight (g), flesh/seed ratio (%), total soluble solids (TSS) (%), titratable total acidity (TA) (%), pH. It was determined that the highest values in terms of fruit weight and fruit sizes were obtained from the plants of MC rootstock and followed by the plants of BA-29 rootstock; and the lowest values were obtained from the plants of MA rootstock. MC rootstock yielded higher values in terms of seed number, seed weight and flesh/seed ratio than the other two rootstocks. Differences between the rootstocks in terms of these characteristics were found to be statistically significant. BA-29 and MA rootstocks had similar values in terms of total soluble solids, while Quince-C rootstock had the lowest value. In terms of yield per plant, MC gave the highest value, followed by BA-29 rootstock. The lowest yield value was obtained from MA. These differences between rootstocks were found to be statistically significant at 1% level. The data obtained from this study show that it is possible to use quince rootstocks as dwarf rootstocks in loquat cultivation.

Keywords: Loquat, rootstock, dwarfing, fruit quality, yield

EFFECTS OF HAWTHORN (*Crategus spp)* ROOTSTOCK ON VEGETATIVE GROWTH IN LOQUAT *(Eriobotrya japonica* Lindl)

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ABSTRACT

The aim of this study is to investigate the effects of hawthorn rootstock on vegetative growth of 'Hafif Çukurgöbek (HCG)' loquat cultivar. In the study, loquat seedling rootstock was also used as a control. Vegetative growth parameters such as annual shoot length, trunk diameter of stock and scion and also structure canopy of the cultivar/rootstock combinations were investigated. Hawthorn rootstock gave significantly lower values than loquat seedling rootstock in terms of annual shoot length, scion and rootstock diameter. In terms of all other parameters examined, it was determined that hawthorn rootstock showed weaker vegetative growth than loquat seedlings. According to these first data obtained, hawthorn rootstock provides approximately 60% dwarfing in grafted scion compared to loquat seedling rootstock.

Keywords: Dwarf rootstock, *Eriobotriya japonica*, Flowering, Hawthorn

THE USE BEE VENOM IN AUTOIMMUNE NEUROLOGIC DISEASES

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ABSTRACT

Bees make honey in two different ways. One of them is nectar, the other is secretion. Pine honey is secretory honey. The Basra beetle (M. this parasite, called the hellenica louse) produces secretions. The Basra beetle is also popularly called the balsam beetle, the pine cotton Decoy. Its habitat is Turkey and the southwest of Greece. They are found in Aleppo pine, dogwood and pistachio pine. Clinging to the trees, these lice absorb the essence of the plant from the cracked places on the trees. This is how they defecate the essence they absorb. This is called hemorrhoids. These basuras hanging from trees attract bees thanks to their pleasant smell. Bees collect them from raw pine honey. As a result of the fires that occur in the forests, the forest ecology is destroyed and all living things living in the forest are also destroyed. In order for Turkish pine honey to be produced, we must take the necessary measures to protect pine forests.

Keywords: Honey bee, basra beetle, pine, pine honey

EFFECT OF THE MAIN AGRONOMY FACTORS ON THE PRODUCTIVITY AND THE PHYSICAL PROPERTIES OF COMMON WINTER WHEAT (*Triticum aestivum* L.) GROWN UNDER CONDITIONS OF CONVENTIONAL PRODUCTION AND UNDER TRANSITION TO ORGANIC PRODUCTION

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ABSTRACT

During 2018 – 2020, the effect of the main agronomy factors (year, cultivar and previous crop) was studied in contemporary common wheat cultivars (*Tr. aestivum* L.) grown under conventional way of production and under transition to organic production. The experiment was carried out in the trial field of Dobrudzha Agricultural Institute – General Toshevo on slightly leached chernozem soil (Haplic Chernozems). The cultivars (Dragana, Rada, Pchelina, Kosara and Kalina) were grown after four previous crops (winter oilseed rape, spring pea, sunflower and grain maize) and under five levels of nutrition regime differentiated according to the nitrogen norms depending on the previous crop. After spring pea, 3, 6 and 9 kg N/da were applied, and after the rest of the previous crops - 6, 12 and 18 kg N/da. The exceptions were the check variant and the transition to organic production, which reflected the natural fertility of the soil. All variants had background fertilization of 6 kg P2O5/da and 6 kg K2O/da. The period of study encompassed years of varied combinations of meteorological elements, but year 2018 was the most favorable for the transition to organic production, when the yield was with 8.75 % higher than the check variant in comparison to the other two years of the investigation. The fertilization variants increased the productivity with an average of 96%. Averaged for the period, the cultivars did not exhibit significant differences in yield due to the great similarity of their response. They reached their potential with the last fertilization norm, cultivar Rada being the leading one. Among the tested previous crops, oilseed rape was with the most evident unfavorable effect on productivity, but with higher values of the physical properties. It was found out that cultivar Kalina had grain with higher weight in comparison to the other cultivars. The fertilization variants caused negative correlation of yield with the physical properties of grain.

Keywords: common winter wheat, fertilization, previous crop, organic production, conventional production

ASSESSMENT OF YIELD AND ADAPTABILITY OF CAMELINA SATIVA VARIETIES IN THE SEMI-ARID REGION OF EAST ALGERIA

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ABSTRACT

Camelina [*Camelina sativa* (L.) Crantz], a member of *Brassicaceae* family, is a new oilseed crop in Algeria. It is a highly adaptable to a wide range of environment with low input, making it potentially suitable for growing in marginal lands or as a fallow replacement crop in winter wheat− fallow (W-F) crop rotation system. Within the framework of 4CE-MED project (PRIMA Programs), a field experiment was conducted to evaluate the seed yield and some agronomics traits of seven Camelina cultivars across two different locations (Setif region and BBA region) East Algeria. The study showed camelina could be cultivated successfully in a relatively short growth period of 120-140 days across a wide range of environmental conditions. Overall, camelina cv. 'CCE26' (V1), 'CCE44' (V5) and 'CCE42' (V3) displayed a satisfactory seed yield dry matter (d.m.) (mean: 623.28 kg ha−1, 533.78 kg ha−1 and 505.22 kg ha−1) Respectively. . This is the first study evaluating the agronomic performance of camelina in different growing environments in algeria and the relatively short growing cycle and high seed yield make camelina as a suitable oilseed crop in East Algeria.

Keywords: Camelina Sativa, Oil seed, semi-arid, sustainability

THE REFLECTANCE INDEX AS INDICATORS OF DROUGHT TOLERANCE OF SOME DURUM WHEAT (*Triticum durum* DESF.) GENOTYPES GROWING UNDER SEMI-ARID CONDITIONS -SETIF- ALGERIA

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ABSTRACT

Water shortage stress and the associated challenges are a major set of abiotic factors damaging and constraining the international production of durum wheat. The objectives of this study are to evaluate the efficiency of using the RGB reflectance index and chlorophyll contents as best tools to select a high yielding of 15 durum wheat genotypes growing under semi-arid conditions. The number of days to heading, grain yield, thaousand kernels weight, number of spikes per meter square, and plant height were measured at maturity. RGB reflectance index by numerical images analysis and chlorophyll contents were estimated. ANOVA showed a significant effect of genotypes for all traits. The local landrace Boutaleb which was the best yielding genotype registered a low Red reflectance index. The correlations test revealed that the chlorophyll contents was significantly and negatively correlated ($P<0.01$) with reflectance index at red and blue. PCA showed that grain yield was affected by Number of spikes per mete square, the high values of RGB reflectance index contribute at the elevation of the weight of 1000 kernels and plant height, a negative relation was observed between chlorophyll contents and RGB reflectance index.

Keywords: Grain yield, Reflectance, RGB, chlorophyll, semi-arid, Algeria

WEED MANAGEMENT PRACTICES OF THE BAYINDIR DISTRICT OUTDOOR ORNAMENTAL PLANTS' PRODUCERS

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ABSTRACT

Approximately 500 growers from the Bayındır District of the Izmir Province, Türkiye produce a quarter of outdoor ornamental plants produced in Türkiye. A weed in a pot which is used for outdoor plant production can affect growth of ornamental plant which ends up with income loss of growers. A face-to-face grower survey was carried out with 46 growers from Bayındır to find out weed problems and management practices of outdoor ornamental production in pots. Furthermore, two different production enterprises were observed for their management practices in 2020 and 2021. Growers are mostly 30-50 years old range and 65% of enterprises are family farms approximately one hectare in size. More than half of the growers has over 10 years of experience in outdoor plants production. The highest produced species are Cupressus macrocarpa, Cupressocyparis leylandii and Viburnum tinus out of over 30 species. Weeds and irrigation were considered as the fourth foremost problem following to production costs, selling prices, and marketing. Sprinkler irrigation is followed by drip irrigation and flood irrigation. One third of growers mentioned that weed control is a must while half of the growers it should be done if needed. Herbicide application can be 2 to 12 times in a season but mostly 5-7 times. Due to loss of herbicide efficiency, hand weeding and hoeing are followed the spraying. Tarping on soil is done by 19.6% of producers which helps the weed control. Tarping is considered mostly as an expensive method by farmers who do not apply. Glyphosate is the most common herbicide followed by pendimethalin. Experienced farmers thought weed control is done in all stages of production and showed tendency of using overdoses of herbicides comparing to less experienced ones. On the contrary, more less experienced farmers thought herbicides has lost their efficiency. Different weed species were recorded from observed enterprises and observations supported survey results. It is concluded that continues irrigation increases weeds that lead herbicide use often which ends up herbicide efficiency lost or herbicide resistance in weeds (that is not verified in this study) that causes use of overdoses and environmental pollution, increases costs and labors.

Keywords: growing in pot, tarping, herbicide, glyphosate, efficiency loss, experience

ATR-FTIR ANALYSIS TO ASSESS QUALITY OF SAFFRON (*Crocus sativus* L.) FROM DIFFERENT AREA OF MOROCCO

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ABSTRACT

Fourier transform infrared spectra of saffron (*Crocus sativus. L*) was acquired using attenuated total reflectance (ATR-FTIR). The main objective of the study was to determine and assess the chemical composition of samples of saffron acquired from farmers and cooperatives from different areas using the chemometric analysis of ATR-FTIR fingerprints, and identify the adulterated saffron among 3 samples bought from local market from different origins (Spain, Iran and Morocco). The results of ATR-FTIR showed vibration intensities of six fingerprint regions displaying statistically significant differences. The sample of Sous Massa Darâa region showed a typical vibration in 3000-2800cm-1 (the richest in carbohydrates, lipids and amino acids) and 1800 to 1725cm-1 region (the richest in carbonyl and ester groups). Then samples from Middle Atlas and Anti Atlas region were classified close to each other, which indicates the similarity in their vibration intensities mainly in the region of carbohydrates, lipids, amino acids and esters. The similarity in terms of proteins and hydroxyl group was revealed between the sample from Boulmane and Taliouine. Finally, the last sub-group contained samples from high Atlas, and another region, which showed low composition in all components.

Keywords: Saffron (*Crocus sativus* L), ATR-FT-IR, Purity.

PURIFICATION THE WATER FROM SOME TYPE OF PESTICIDE IN THE SOIL USING AVEN SATIVA

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ABSTRACT

The advancement of low-cost-effective sorbents to progress the removal of pesticides from water. In this study, distinctive sorbents such as Aven Sativa using to removal Chlorpyrifos (CPF). was examined for the primary time. Impact of temperatures (10-40 °C) influencing the adsorption preparation, such as concentration of CPF (2-30 ppm), sorbent dosage (0.05-0.4) g, arrangement pH (2-11), time (10-80) Minutes. The adsorption of CPF sorbents taken after the Freundlich demonstration is more appropriate than the Langmuir demonstration. The greatest assimilation capacities of Chlorpyrifos 48 mg/g were found. highest CPF removal rates (86%), by using Aven Sativa removal was achieved at pH 7 at introductory concentrations of CPF 20 ppm in a contact 30 minutes' period. The kinetic data fit well with the energy functions and linear models. Thermodynamic parameters reveal the spontaneous and endothermic nature of the CPF adsorption process. Sorbents can be introduced as an efficient and inexpensive alternative for removing CPF-contaminated water (ΔS0) and standard free energy (ΔG0), respectively. The adsorption was carried out by an endothermic process because the obtained (ΔH0) values for removal were less than 40 KJ/mol. Negative value Standard free energy values (ΔG0) indicate that the adsorption process is irreversible. Removal of (CPF) from contaminated water solution

Keywords: Water, Environmental health, pollution, pesticides, Palestine

ECHINOCHLOA SPP. IN RICE FIELDS IN GONEN, TURKEY

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ABSTRACT

Gönen Plain is among foremost rice growing areas of Turkey. Weeds have been one of the prominent problems in rice cultivation. *Echinochloa* spp. have become main weed in Gönen as it has been happening in many other rice production areas due to their high populations in rice fields, hybridization capacities, adaptive and competitive abilities, their herbicide resistant biotypes and morphological similarities to rice. Their effects on yield changes among species, even among lower taxons. Reactive measures have not solved the problem so far. There is a need for an approach based on biology and ecology of *Echinochloa* spp. For this aim, paddy fields have been visited randomly in Gönen plain in rice growing season of 2021 to identify species and find out their morphological characters in the context of maturation time. Several *Echinochloa* spp. identification keys appropriate with the region were selected from the local and global literature. Using these keys, 27 *Echinochloa crus-galli*, three *Echinochloa oryzoides* and two *Echinochloa oryzicola*, which are known to exist in the region, and five *Echinochloa colona*, a species whose existence was previously unknown in the rice fields of the region. In addition, few subspecies of *Echinochloa cruss galli* were identified, namely, 11 *E. crus-galli* var. *crus-galli*, one *E. crus-galli* var. *austrojaponensis* and two *E. crus-galli* var. *mitis.*

Keywords: Echinochloa crus-galli, Echinochla colona, Echinoloa oryzoides, Echinoloa oryzicola, Lower taxon, Morphotype

ACKNOWLEDGMENT:

This presentation is prepared from the master's thesis of İrem Eyşan SEZER. This presentation was supported by ÇOMÜ- BAP, Project No: 3968

SOYBEAN RESPONSE TO MICRO-RATES OF DICAMBA AND 2,4-D

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ABSTRACT

Off-target movement of dicamba and 2,4-D is a concern with introduction of dicamba-tolerant (DT) and 2,4-D-tolerant (Enlist) soybeans in North America (and elsewhere). Therefore, field studies were being conducted in Nebraska to evaluate glyphosate-tolerant (GT) soybean response to micro-rates (0, 1/1000th, 1/500th , 1/100th, 1/50th, 1/10th) of the label rates of dicamba (Xtendi-Max® @ 560 g ae ha-1) and 2,4-D (Enlist-One® @ 2,240 g ae ha-1) applied at V2, V7/R1, and R2 soybean growth stages. Both herbicides negatively influenced the growth parameters of GT soybeans including: visual injury, plant height reduction, delayed physiological maturity as well as yield and yield components. Visual injuries from dicamba were significantly higher than those from 2,4-D for the same rate. For example, when sprayed at V7/R1 stage, the 1/10th rate of 2,4-D caused 19% compared to 82% injury by dicamba; the 1/100th rate of 2,4-D caused 5% compared to 79% by dicamba and the 1/500th rate of 2,4-D caused 4% compared to 58% by dicamba. In general, soybean yield losses from dicamba were significantly higher compared to 2,4-D. The highest yield losses from 1/10th of the label rate were about 90% for dicamba and 25% from 2,4-D. More specifically, unsprayed soybean yielded 4909 kg/ha. However, when sprayed at V7/R1 stage, the 1/10 rate of 2,4-D soybean yielded 3698 kg/a compared to only 403kg/ha from dicamba; the 1/100 rate of 2,4-D soybean yielded 3953 kg/a compared to 3015kg from dicamba; the 1/1000 rate of 2,4-D soybean yielded 4556 kg/a compared to 3819 kg/ha from dicamba; These results showed clearly that potential drift from both dicamba and 2,4-D pose a risk to GT soybean (or any other types of soybean), therefore all possible measures must be taken to reduced drift of dicamba and 2,4-D.

Keywords: soybean, herbicide, dicamba, 2,4-D, yield

THE EFFECT OF SOME PESTICIDES ON THE ORIENTATION OF ENTOMOPATHOGENIC NEMATODES

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ABSTRACT

Entomopathogenic nematodes (EPN) are soil-dwelling microscopic roundworms. EPNs belong to the order Rhabditida of the Nemata phylum, they require a host insect to complete their life cycle and kill the host insect during their development. For this reason, they are used as a biological control agent against insects in agriculture. Although EPNs are mostly applied to insects under the soil, above-ground applications have also been made in recent years. EPNs are seen as an alternative to pesticides, however, they are often used together with pesticides in integrated control programs, due to their high product cost and inconsistent efficacy in field conditions. It is known that EPNs are applied simultaneously with pesticides in the same spraying or fertilization tank. For this reason, there are many studies on the compatibility of EPNs with pesticides. However, information on the effect of pesticides on EPN behavior is limited. In this study, the effects of 8 different common pesticides on the orientation behavior of three major EPN species under laboratory conditions were investigated. Unique epoxy plates were produced for the study, and at the 15th and 30th minutes, the position of the nematodes was recorded and their attractance or repellence behaviors were determined. According to the results of the experiment, there were significant differences in nematode orientations according to the pesticide type and nematode species. Since EPNs are applied underground with pesticides by drip irrigation, the effect of pesticides on EPN behavior gains importance. Although many pesticides do not have a negative effect on EPN viability, it has been determined that they have an attractive or repellent effect. This result showed that more care should be taken when applying EPNs together with pesticides.

Keywords: Heterorhabditis bacteriophora, deltamethrin, attractance, repellence

ASSESSING STAKEHOLDERS' SATISFACTION WITH THE TRANSFORMATION OF CONVENTIONAL AUCTION INTO AN E-AUCTION

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ABSTRACT

Sri Lankan tea is a world-renowned beverage of the highest quality. From its inception, the traditional tea auction was held to strengthen the interaction between different stakeholders. Due to the COVID-19 pandemic, conventional tea auction with physical gathering was transformed into virtual e-auction. However, no proper in-depth analysis was undertaken on the stakeholders' satisfaction with this transformation process and its pros and cons. This present study assesses the degree of satisfaction of stakeholders with this transformation and its pros and cons effects. A pretested survey instrument validated its internal consistency by obtaining a Cronbach alpha value of 0.955 by applying a reliability test to collect data on perceived ease of use, usefulness, usability, socio-economic factors, and industry-related factors. A 5-point Likert scale, a scoring system, and indexes were developed to measure the above criteria and explained the relationship between the degree of satisfaction in the transformation process, with the above independent variables using descriptive analysis and an ordinal logistic regression model. The results of the study reveal that the degree of stakeholders' satisfaction with the transformation process varied in the range of high, moderate, and low, with the values of 45.33%, 49.33%, and 5.33%, respectively. The overall model was significant at the 0.05 significant level and pseudo R2 was 0.6704 (prob > chi2 = 0.0000). The model results exhibited that stakeholder satisfaction was positively correlated with experience, age, perceived ease of use, and usefulness, whilst it was negatively correlated with education level, usability, and stakeholder type. The findings of this study provide sufficient evidence that there are both positive and negative effects of the newly implemented e-auction over a traditional auction. This study proved that the E-Auction process is more effective in all dimensions and needs appropriate stakeholder user-friendly improvements with the technological advancement of the ICT sector.

Keywords: Covid-19, Conventional, E-auction, Satisfaction, Stakeholders

THE EFFECTIVENESS OF THE FARMER FIELD SCHOOL EXTENSION APPROACH FOR TECHNOLOGY TRANSFERRING TO TEA SMALLHOLDERS IN SRI LANKA

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ABSTRACT

Although tea smallholders play a dominant role in the tea industry in Sri Lanka, they have faced many constraints such as lack of technology, scarcity of skilled labor and inputs, low productivity, high cost of production, etc. In searching viable mechanism to address the above issues, this study aims to assess the effectiveness of the Farmer Field School (FFS) extension approach to improve the adoption rate of cultural practices toward increasing tea smallholdings' land productivity and profitability. The stratified purposive sampling technique was performed to select 50 tea smallholders who participated in FFS programs and another 50 farmers who have not attended the same programs (NFFS Group) in four Grama Niladhari Divisions in the Kandy district in Sri Lanka. A cross-sectional field survey using a pretested survey instrument and validated its internal consistency by applying a reliability test (Cronbach alpha value of 0.742) was administrated to collect primary data. A scoring system, 5-point Likert scales, and indexes were developed to measure variables, and descriptive analysis, hypothesis testing, and ordered logistic regression model explained its relationship. The result shows there was a significant difference between FFS and NFFS tea smallholders in the adoption of agricultural practices ($t = 3.362$, $p < 0.001$), the productivity of land ($t = 1.991$, $p < 0.05$), and cost of production ($t = -3.976$, $p < 0.001$. The ordered logistic regression model is fitted significantly ($P < 0.05$). R square of the model expresses that 59.94% proportion of the variance in adoption level significantly improved the recommended cultural practices as explained by the above independent variables. This study proved that the FFS approach is an agricultural innovation and dissemination platform for improving farmers' knowledge and changing their attitude toward the adoption of cultivation practices towards improving tea smallholdings' land productivity and profitability in Sri Lanka and needed policymakers' attention to implement it over the sector.

Keywords: Adoption, Effectiveness, Farmer Field School, Kandy district, Tea smallholders

POSTHARVEST ULTRAVIOLET-B (UV-B) APPLICATIONS IN HORTICULTURAL CROPS AND THEIR EFFECTS ON QUALITY

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ABSTRACT

The interest in alternative chemical treatments has started to gain popularity to maintain and/or regulate the postharvest quality of horticultural crops. Among the alternatives, ultraviolet irradiation is prominent treatment to control decay and enhance biochemical properties such as increasing secondary metabolites, protecting color etc. Using UV-B irradiation has been increasing in recent years while UV-C has long been used to improve quality of crops as a postharvest treatment. The previous UV-B studies have accelerated after the increase in the amount of reaching UV-B irradiation to the earth's surface and these studies focused on its possible effects especially on plant production. On the other hand, UV-B can be used to increase the biochemical properties of fruits and vegetables. Based on the species and variety properties such as maturity stage and storage conditions, and method specifications, UV-B irradiation can enhance flavonoids, phenolics, antioxidant activity, anthocyanin, and trigger to defense mechanism while it decreases chlorophyll degradation and decay rate. This study summarizes the recent application of postharvest UV-B treatments in horticultural crops.

Keywords: Biochemical properties, postharvest, storage, UV-B illumination

EFFICACY OF VEGETATIVE FILTER STRIPS TO REDUCE RUNOFF CAUSED BY SUDDEN HEAVY RAINFALL

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ABSTRACT

Run-off is a phenomenon that commonly occurred in maize fields because of sudden heavy rainfalls. It may move soil particles and agricultural chemicals such as fertilizer, and herbicides from the fields to un-target fields especially surface water sources. To reduce runoff, although some treatments have been employed to protect the surface water sources since regular water inspection systems was started by environmental authorities, vegetative filter strips (VFS) have been considered as one of the most convenient techniques in the world. The aim of this study was to determine the efficacy of two VFS, *Festuca rubra* (40%) + *Bromus inermis* (60%) (FrBi) and *F. rubra* (40%) + *B. inermis* (60%) + IMI tolerant sunflower (FrBiIts), established different type of plants following runoff caused simulations under field conditions in Ankara, Turkey from 2016-2018. The experiments were carried out on the adjoining plots where sowed maize. The plot size was 4x22 m, and the width of VFS was 2 m. The simulations were performed using 4.8 t tap water equal to 50 mm rainfall. The results showed that the VFS effect of FrBi during first simulation on runoff losses were 72. 4, 87.9, and 79.2% in the first, second and third years, respectively, while this effect in FrBiIts was 66.7, 80.4, and 70.9% in the same time. The efficacy of FrBi VFS' during second simulation were found at 77.3% for the first year, 72.9% for the second years, and 79.1% for the last year, whereas impact of FrBiIts was 75.6, 66.2, and 70.1% during the same period. The barrier impact of VFS' on runoff increased after they established in the fields. Their impacts changed depending on the water content of soil, weather conditions, and VFS' structure. This research was supported by The Scientific and Technological Research Council of Turkey, project number: 115O331.

Keywords: Festuca rubra, Bromus inermis, IMI tolerant sunflower, herbicide, fertilizer

EFFECT OF CROPPING SYSTEMS ON THE LEAF PIGMENTS CONTENT, PHOTOSYNTHETIC ACTIVITY AND GRAIN PRODUCTIVITY OF MAIZE

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ABSTRACT

The leaf pigments content, photosynthetic activity and grain productivity of maize under both conventional and extensive cultivation were determined. Field experiment in the Maize Research Institute, Knezha, Agricultural Academy, Bulgaria was performed. The hybrid variety Knezha 561 was used and the adopted growing technology was applied - wide-row sowing of 70 cm and sowing density of 6600 plants/da. Weed control using soil and vegetation herbicides, as well as N3P3K3 fertilization was applied under the conditions of conventional cropping. The case of extensive cropping was without weed control and fertilization, respectively. The content of chlorophyll "a", chlorophyll "b", carotenoids and total pigments in the ear leaf was determined. In the stage of tasseling and silking of the maize, the intercellular concentration of CO2 in the leaf and the photosynthetic rate were measured using portable intelligent photosynthesis system LCpro T. The chlorophyll "a", chlorophyll "b" and total pigments content in the leaves of plants grown under conventional conditions were found more than 60% higher than that under extensive. In addition, the carotenoids under conventional conditions were higher by 50% as compared to the extensive. Intercellular concentration of CO2 in the leaf for the conditions of extensive cultivation of maize was found 27% higher compared to the conventional one, as well the photosynthetic rate was lower by more than 30%. As a result of the more efficient photosynthetic rate, grain yield under conventional cultivation was more than twice as high.

Keywords: Maize, pigments, photosynthetic activity

EFFECTS OF VARIOUS CLIPPING FREQUENCY AND HEIGHTS ON THE HERBAGE YIELD AND ROOT DEVELOPMENT OF TUBEROUS CANARY GRASS (*Phalaris tuberosa* L.)

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ABSTRACT

Meadows and pastures not only provide food for animals, but also prevent water and wind erosion, keeping the soil in place and improving its physical and chemical structure. In addition to these benefits, it has important contributions to human beings in many ways such as being a water collection basin, being a gene source for cultivated plants, hosting wildlife, and storing carbon. Undoubtedly, the functions expected from the pastures whose vegetation is deteriorated are also decreasing. One of the most important tools in the protection and improvement of meadow and pasture conditions is to carry out grazing under controlled conditions and in a way that does not impair the yield and quality of the climax vegetation. Grazing should improve the pasture vegetation and increase its yield and quality. Mowing or grazing time, frequency and height affect the forage yield, quality and root development of pasture plants. Tuberous canary grass (Phalaris tuberosa L.) is a perennial, tall, rhizomous, Maroct-growing, upright growing grassy forage plant. It is a species recommended to be used in artificial pasture creation studies in our country. In this study, it is aimed to reveal the effect of overgrazing, which is important for the productivity and continuity of pasture plants, on tuberous stock. The study was carried out as a pot experiment in greenhouse conditions. The plants used as material were removed from the field and divided into similar sizes and then planted in pots. Plants were expected to grow up to 20 cm in a suitable greenhouse environment. Plants are grouped into 3 groups according to their development. The experiment was carried out in randomized blocks according to the factorial design with 3 replications. The first factor was “mowing height” (when the plants were 15, 20 and 25 cm tall), and the second factor was “mowing frequency” (2.5-5.0-7.5 and 10 cm height). 36 pots were used, excluding control plants. The green forage obtained from the mowing applications were immediately weighed and recorded. Cuttings were continued until control plants reached grazing maturity. At the end of this period, the remaining plant stubbles were cut and weighed. In order to determine root development, the fresh roots obtained by washing the soil in the pots were dried in a shaded environment in the greenhouse and weighed. The usable forage, total forage and root weights obtained from the mowings in each pot were analyzed using appropriate statistical methods. According to the results of the study, it was determined that mowing height and frequency were significantly effective on feed yield, number of forms and root growth in pasture barley.

Keywords: Cutting height, number of cutting, forage yield, root growth

DETERMINATION OF FORAGE YIELD QUALITY AND SOME CHARACTERİSTICS OF VEGETATION IN GÜNALAN VILLAGE PASTURE IN GÖLBAŞI DISTRICT OF ANKARA PROVINCE

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ABSTRACT

Meadows and pastures in Turkiye, which cover an area of 12.8 million Ha, have an important place in the feeding of livestock. However, due to the early and excessive grazing practices that have been going on for many years, the feed yields and quality of these feed sources have decreased a lot. Along with the deterioration of the vegetation cover, the pasture soil is also lost. In order to prevent these problems and to make the rangelands better and more productive, it is necessary to create improvement and management plans for these areas. Within the framework of the Pasture Law in force, rangeland improvement and management projects are carried out every year for implementation in a certain area. Before starting the improvement and management works in these areas, sufficient information should be obtained about the status of the pasture. In the light of this information, appropriate improvement and management programs related to that area are put into practice. In this study, some measurements and evaluations were made for the pasture survey in a village pasture selected from Ankara Province, which has an important pasture existence. The transect method which has been shown to be reliable for scientific studies in arid and semi-arid region pastures and is preferred in many studies, was used to reveal the status of the pasture and primarily to determine the structure and composition of the vegetation on the pasture. With this method, a pasture protected from grazing was selected on the pasture of Günalan Mahallesi, which is connected to the Göbaşı district of Ankara, and an area that is homogeneous in terms of vegetation was determined. On this area, which is homogeneous in terms of vegetation, 100 transect samples were taken at 3 different points by considering the vectors. In each sample, the 1 cm wide and 100 cm long area on the right side of the transect bar was examined and the area covered by each plant species was recorded. Later, by analyzing these records, different features of the cover such as planted area, bare area, botanical composition, recurrence rates of plant species were revealed. In addition, grass samples were taken from 3 different points on the pasture to determine the feed efficiency of the pasture. For this purpose, in 1 m2 areas, the vegetation was cut from the ground, the plant species and parts that animals could not eat were discarded, and the remaining specimens were separated according to their families and dried in an oven. The samples, which were dried at 70 degrees for 48 hours, were then weighed and the dry grass ratio was determined. Raw ash was determined after the obtained dry grass was ground in the mill. The results obtained were analyzed using appropriate statistical methods.

Keywords: Forage yield, vegetation, botanical composition, grazing capacity

THE MINISTRY OF AGRICULTURE AND FORESTRY OF REPUBLIC OF TÜRKİYE'S MEADOW AND PASTURE ACTIONS

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ABSTRACT

Republic of Turkey Ministry of Agriculture and Forestry is carried out for the determination, limitation and allocation of meadows and rangeland. In this context, in order to develop meadows and rangeland; it is envisaged to prepare the necessary programs and projects in order to take improvement measures and ensure the use in accordance with the relevant legislation. Meadow – rangeland activities and also; projects are carried out to increase the production of perennial forage crops in regions with suitable ecology and to grow forage crops in irrigated and dry agricultural areas. With these activities, it is envisaged to support the country' agriculture and animal husbandry in order to meet the need for quality roughage for livestock.

Keywords: Republic of Turkey Ministry of Agriculture and Forestry, meadow – rangeland activities, Rangeland Law, forage crops

PROSPECTS OF NON-EDIBLE OILSEED CROPS AND VEGETABLE OILS

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ABSTRACT

In general, the primary purpose of cultivating oilseeds is to use their oil. These oils have other uses in the food, medicine, and cosmetics industries. After the oil extraction operation, the pulp left from the oilseeds has a large amount of protein that can be used with the appropriate technology. Non-edible oils, like other fats, are composed of glycerin esters and mixtures of different fatty acids. These oils do not dissolve in water but are soluble in some organic solvents. Common non-edible oils are usually obtained from the seeds of the following plants: cotton, hemp, mustard, oily turnip seeds, rapeseed, sesame, sunflower, safflower, and grape seed. Other types of non-edible oils are almond oil, avocado oil, castor oil, coconut oil, hazelnut oil, olive oil, palm oil (derived from the fruit of the African palm tree), peanut oil, pumpkin oil, rice oil, jojoba, soybean oil, jatropha, and walnut oil.

Keywords: Inedible oil, Oilseed, Crop

GENOTYPE-SPECIFIC MORPHOLOGICAL, MOLECULAR AND EPIGENETIC CHANGES CONTRIBUTE TO WHEAT DROUGHT TOLERANCE

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ABSTRACT

Wheat production will face increasing challenges by more frequent and intense drought events. One of the economically viable and sustainable approaches to support wheat production in drought environments is the identification of drought-resistant local genotypes. In the framework of the Bulgarian National Science Program 'Environmental protection and reduction of risks of adverse events and natural disasters', we are evaluating different morphological, molecular and epigenetic traits in wheat genotypes with contrasting drought tolerance under dehydration. Drought tolerance of the genotypes studied was positively associated with a vigorous root system, an increased root to shoot ratio, higher trichome density and reduced stomatal frequency. Variable expression of the genes affecting root and shoot architecture, such as *TaZFP34*, *TaRR12*, *TaSHY2* and *TaCYCD2;1*, and the members of the *DEEPER ROOTING* (*DRO*) gene family, could contribute to wheat drought resistance. Lower transcript abundance of the negative root growth regulators *TaRR12* and *TaSHY2*, and higher expression of *TaZFP34* and *TaDRO1* were observed in the drought tolerant genotypes. Expression levels of the key DNA methyltransferases *TaMET1, TaMET2a, TaMET2b* и *TaMET3,* and the chromatin remodeler *TaDDM1* also changed in a genotype-dependent manner. Screening key parameters related to drought tolerance at the early developmental stages could provide important hints for adult growth stages associated with plant productivity.

Keywords: Wheat, drought resistance, genotype-specific responses, root morphology

ACKNOWLEDGEMENTS:

This work has been carried out in the framework of the National Science Program "Environmental Protection and Reduction of Risks of Adverse Events and Natural Disasters", approved by the Resolution of the Council of Ministers № 577/17.08.2018 and supported by the Ministry of Education and Science (MES) of Bulgaria (Agreement № Д01-279/03.12.2021).

SOIL BIODEGRADABLE PLASTIC MULCH FILMS FOR SUSTAINABLE AGRICULTURE

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ABSTRACT

The agricultural sector, that produces the nutritional needs, affects the health, development and economic life of the society due to its contribution to national income, employment and exports, is one of the only sectors. Fresh fruit and vegetable cultivation is one of the most important sub-sectors of the agricultural sector. In order to protect the quality of the product and increase the yield during the harvest, in fruit and vegetable cultivation, plastic covers such as black plastic mulch films, are widely applied to modern farming. Mulch film is a protective barrier, used to keep soil temperature under control, protect the soil moisture, prevent the growth of weeds and increase crop yield. Polyethylene (PE) or petroleum based plastic materials are widely used in fruit and vegetable growing, especially due to its ease of process, high performance in weeds control and low cost solution. Unfortunately, most plastics are not biodegradable and contamination of mulch films with soil and organic residues, pesticides limits recycling and recovery activities. In addition, post-harvest collection and transportation of non-biodegradable plastics bring high labor costs, and disposal of mulch films by burying or burning in the field causes serious environmental pollutions. Agricultural activities should be environmentally friendly and sustainable, including systems and practices that will improve the protection of the environment and natural agricultural resources. For this reason, using biodegradable plastic mulch films instead of non-biodegradable plastics is an useful solution to prevent plastic waste in agricultural fields. Bioplastic raw materials such as starch, poly (lactic acid) (PLA), poly(hydroxyalkanoates) (PHA), poly (butylene adipate-co-terephthalate) (PBAT), poly (butylene succinate) (PBS) etc. are widely used in the production of biodegradable and environmentally friendly plastic mulch films. These bioplastic raw materials or compounds keep all the performance properties expected from conventional plastics and are generally easily processed in existing equipment used in plastic film production. The European Standard EN 17033 “Plastics - Biodegradable mulch films for use agriculture and horticulture - Requirements and test methods” issued in 2018, is the first international standard to evaluate composition, biodegradability, and soil ecotoxicity for soil biodegradable mulch film. This international standard requires at least 90% biodegradation (conversion of amount of organic carbon in the plastic mulch film in to CO2) within a period of 24 months of being incorporated into soil in aerobic conditions at 20–28 °C for biodegradable mulch films. This standard also includes required tests for physical properties, heavy metals and ecotoxicity. The purpose of this study is to introduce the properties of environmentally friendly and sustainable mulch films, which are soil biodegradable as an alternative to traditional petrol based plastics that are used in fruit and vegetable growing and cause serious plastic waste generation. Expectations from soil biodegradable mulch films will be evaluated based on standards for certification and labeling.

Keywords: Mulch film, plastics, biodegradable plastic mulch, sustainable agriculture

RESPONSE OF DIFFERENT SUNFLOWER GENOTYPES TO PEG-MEDIATED WATER STRESS

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ABSTRACT

The response of five sunflower genotypes with different origins to drought stress at the germination and seedling stage was investigated using polyethylene glycol (PEG 6000) as a drought simulator under laboratory conditions. Standard treatment and two levels of osmotic stress were monitored. Germination percentage, root length, shoot length, root/shoot length ratio, and depression were determined for the studied genotypes, represented by three replications. The response of sunflower variety, cultivated hybrids, two interspecific hybrids, and accession of *H. argophyllus* under normal and simulated drought stress were evaluated. Plant height for all studied hybrids decreased with increasing water stress. Studied interspecific hybrids showed similar responses at osmotic potential of both -0,6 MPa and -1,62 MPa. The cultivated hybrid Kamelia showed medium tolerance and the variety Favorit - sensitive reaction. The variation among studied materials was found to be a reliable indicator to screen the drought tolerant materials at primary growth stage.

Keywords: interspecific hybrid, PEG, drought

DEGRADATION KINETIC MODELLING OF MOISTURE, COLOUR AND TEXTURAL PROPERTIES IN DABAI FRUIT (*Canarium odontophyllum* MİQ) DURING BLANCHING TREATMENT

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ABSTRACT

Dabai (*Canarium Oontophyllum* Miq.*)* are well-liked exotic (indigenous) fruits planted in Sarawak and have high demand among local consumer. Dabai blanching is a pre-treatment in hot water to soften the fruit flesh before consumption and to enhance the efficiency of flesh-nut separation for further processing. However, the effects of proper temperature and blanching time on the fruit quality are still limited in the literature. In this study, the effects of blanching treatment on moisture, colour and texture of dabai of variety Kapit were studied at five different time intervals (2, 4, 6, 8 and 10 minutes) and temperatures (60, 70, 80, 90 and 100 oC). Degradation was expected for all the quality parameters studied. The results show that reduction at significant different $p<0.05$ in moisture of approximately 7.5% whereas 24.0–74.0% for both color and texture during blanching. In terms of kinetic model, moisture content is expected to fit the Fick's law, where calculation of effective moisture diffusivity can be performed via the utilization of slope. Fractional-conversion order well described the changes of a*, b*, L, chroma and hue angle parameter. Meanwhile, the kinetic model of firmness changes is expected to obey the Arrhenius's law. Gathering the quantitative information on the changes of the quality during blanching of dabai fruit is vital in designing a proper pre-processing condition. In addition, the established models could provide guidelines to line operators to manipulate blancher conditions.

Keywords: Dabai, blanching, texture, colour, moisture, kinetics

THE EFFECT OF EXTERNALLY APPLIED SALICYLIC ACID ON SOME PHYSIOLOGICAL PROPERTIES OF LETTUCE (*Lactuca sativa* L.) UNDER DROUGHT STRESS CONDITIONS

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ABSTRACT

The most limiting factor for plant production is the lack of water in arid and semi-arid climates. Therefore, agricultural irrigation is inevitable for profitable crop production. However, in conditions where water is really limited, to develop drought resistance mechanisms in plants; are among the measures that can be taken against drought. It is possible to provide resistance to drought in plants with the use of various chemicals. Salicylic Acid, a plant growth regulator that increases drought tolerance, is used in many plants for this purpose. Within the scope of this research, the physiological responses of the plant were investigated by applying different doses of salicylic acid to the lettuce irrigated with different amounts of irrigation water. For this purpose, three different amounts of irrigation water and four different concentrations of salicylic acid were applied to the lettuce plant. In this research, three different amounts of irrigation water and four different concentrations of salicylic acid were applied to the lettuce plant. Despite the application of irrigation water in deficient conditions, the heaviest above-ground green parts were obtained from the subject to which salicylic acid was applied at a dose of 0.5 mM. Under the same under irrigation conditions and 0.5 mM Salicylic acid application, root wet weight was also higher when compared to full irrigation conditions. Considering the dry weights of the green parts and roots, the salicylic acid applied increased the weights despite the lack of irrigation conditions.Regardless of the amount of irrigation water applied, increasing salicylic acid doses also increased root lengths. When the root collar diameter values were examined, it was observed that the amount of irrigation water was applied completely and the increasing levels of salicylic doses gave the highest values. According to these results, increasing salicylic acid application doses had positive results in a sensitive plant such as lettuce in terms of drought tolerance.

Keywords: Lettuce, Drought Stress, Irrigation, Adaptation

ANTIFUNGAL, ANTIOXIDANT ACTIVITY AND CHARACTERİZATION OF VOLATILE COMPOUNDS OF THE BROWN ALGAE SACCORHIZA POLYSCHIDES

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ABSTRACT

The present study carried out to determine for the first time the antifungal activity of volatile compounds extracted from the brown seaweed *Saccorhiza polyschides*. After their analysis by GC- MS technique, the volatile composition contains more than 28 volatile compounds including 7 fatty acids, that are represented mainly by Palmitic acid (15.77%); Oleic Acid (7.61%) and Palmitoleic acid (3.30%). The evaluation of the antifungal activity against phytopathogens *Botrytis cinerea* and *Penicillium digitatum* for the first time, revealed growth inhibition diameters of 25.9±0.09 and 15.9±0.07 mm at the concentration of 3 mg/ml. The antioxidant activity was evaluated by two methods: Inhibition of the free radical of 2,2-diphenyl-1-picrylhydrazyl (DPPH), and the reducing power (FRAP). The antioxidant capacity of the volatile extract evaluated by DPPH and FRAP, showed an IC50 2.65 ± 0.02 and 1.70 ± 0.04, respectively. Since volatile compounds of *S. polyschides* is an inexpensive resource with strong antifungal and moderate antioxidant capacity, their use during postharvest opens a new way in the biological control.

Keywords: Sacchoriza polyschides, volatile compounds, antifungal activity, antioxidant activity, biological control

MECHANIZATION OF THE BERGAMOT HARVEST

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ABSTRACT

Bergamot (*Citrus bergamia* Risso , Poiteau) is a typical citrus fruit from the province of Reggio Calabria (Italy) which, due to its multifunctionality, is still being studied. Until the early years of the last century it was grown almost exclusively to extract the essential oil that is present in the pericarp of the fruit. This fact, due to its biochemical characteristics, is in great demand by the most prestigious companies of the world's top perfumery, but also by the cosmetic and pharmaceutical industry. Even the pulp of the fruit, more recently, has taken on increasing interest, in particular the juice, for its therapeutic and healthy value. The peel, which remains after the extraction of the essential oil, is also an excellent food for animals. The European Union, due to the specific characteristics of this particular citrus fruit, with the name of "Bergamot of Reggio Calabria...", has recognized the certification of the PDO (Protected Designation of Origin). Bergamot is grown mainly in the Ionian coast of the province of Reggio Calabria due to the better soil and climatic conditions. The area affected by this crop reached its maximum expansion in the 1960s (with almost 4000 ha) but, after alternating events related to market trends, it underwent a major downsizing in the course of just one decade reaching about 1000 ha. The sector is currently recovering but, in order to regain competitiveness, a profound restructuring of a large part of the production chain is necessary. A central role is certainly determined by the mechanization of cultivation operations, especially the most expensive. Suffice it to say that only the manual harvesting of bergamot can account for over 50% of the total production costs. For this purpose, mechanical harvesting tests were performed through the use of multidirectional shakers and fruit interception systems which showed a significant increase in labor productivity without significant damage and repercussions on the final product quality.

Keywords: Bergamot, Mechanical harvesting, Labour productivity.

ASSESSMENT OF WATER QUALITY BASED ON PHYSICO-CHEMICAL PARAMETERS AND MICROBIOLOGICAL IN LAKE BATLLAVA, CASE STUDY KOSOVO

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ABSTRACT

The purpose of this study is to determine the water quality in Lake Batllava through which a part of the population of the Prishtina region is supplied with drinking water. Lake Batllava is a lake built in the 1970s. This lake is located in the village of Btlava in the municipality of Podujeva, with coordinates 42°49′33″ V 21°18′25″ L, with an area of 3.07 km2. The operation of this lake with water is done by the river Brvenica. To take preventive measures and improve water quality, we have conducted monthly monitoring of water quality in Lake Batllava, through microbiological and physico-chemical indicators. Monitoring was conducted during the period December 2020-December 2021. Samples were taken at three sampling sites: at the lake entrance, in the middle and at the outflow, on two levels, the water surface and at a depth of 30 cm. The microbiological parameters analyzed are: total coliforms, fecal coliforms, fecal streptococci, aerobic mesophilic bacteria and actinomycetes. Within physico-chemical parameters: Dissolved oxygen, O2 saturation, water temperature, pH value, electrical conductivity, total soluble matter, total suspended matter, turbidity, chemical oxygen demand, biochemical oxygen demand, total organic carbon, nitrate, total hardness, hardness of calcium, calcium, magnesium, ammonium ion, chloride, sulfates, fluorine, M-alkalis, bicarbonates and heavy metals, such as: Fe, Pb, Mn, Cu, Cd. The results showed that most of the physico-chemical and microbiological parameters are within the limits allowed by WHO and EPA as well as local legislation, except in cases of months of heavy rainfall that has caused large inflows of water that has resulted in exceedances of some physico-chemical parameters. The purpose of this study is to determine the water quality in Lake Batllava through which a part of the population of the Prishtina region is supplied with drinking water. Lake Batllava is a lake built in the 1970s. This lake is located in the village of Btlava in the municipality of Podujeva, with coordinates 42°49′33″ V 21°18′25″ L, with an area of 3.07 km2. The operation of this lake with water is done by the river Brvenica. To take preventive measures and improve water quality, we have conducted monthly monitoring of water quality in Lake Batllava, through microbiological and physico-chemical indicators. Monitoring was conducted during the period December 2020-December 2021. Samples were taken at three sampling sites: at the lake entrance, in the middle and at the outflow, on two levels, the water surface and at a depth of 30 cm. The microbiological parameters analyzed are: total coliforms, fecal coliforms, fecal streptococci, aerobic mesophilic bacteria and actinomycetes. Within physico-chemical parameters: Dissolved oxygen, O2 saturation, water temperature, pH value, electrical conductivity, total soluble matter, total suspended matter, turbidity, chemical oxygen demand, biochemical oxygen demand, total organic carbon , nitrate, total hardness, hardness of calcium, calcium, magnesium, ammonium ion, chloride, sulfates, fluorine, M-alkalis, bicarbonates and heavy metals, such as: Fe, Pb, Mn, Cu, Cd. The results showed that most of the physico-chemical and microbiological parameters are within the limits allowed by WHO and EPA

aswell as local legislation, except in cases of months of heavy rainfall that has caused large inflows of water that has resulted in exceedances of some physico-chemical parameters.

Keywords: Batllava Lake, monitoring, physico-chemical, microbiological, heavy metals

POSSIBILITIES OF USING WIND TURBINE ENERGY SYSTEM IN VERMICOMPOST FERTILIZER PRODUCTION FACILITIES

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ABSTRACT

The shrinkage of agricultural areas in the world due to various reasons, the increase in population and the increase in people's living standards have increased the need for agricultural products. As a solution to this situation, studies are carried out to get more products per unit area in agriculture. The excessive use of agro-chemicals, which provide significant increases in plant production, quality and yield, has caused environmental and health problems in the following years. Achieving an increase in productivity in agricultural production is only possible with energy consumption. In the production of vermicompost, electrical energy obtained from fossil energy sources, whose price is constantly increasing, is used. The aim of this study is to show that wind energy, one of the renewable energy sources, can be used in vermicompost production facilities. This can only be feasible in regions with wind energy potential, such as the Marmara Region. The use of vermicompost (worm) fertilizer can be effective and beneficial in reducing the use of excessive inorganic fertilizers and pesticides in agriculture and in solving problems such as organic waste and residues. In a good vermicompost production facility, the highest energy required by the facility, where there are 4 of 15.9 m long fertilizer production units and a drying system of 200 m2, is 4.48 kWh. Since wind energy varies randomly depending on climatic conditions, a wind turbine system such as 6.0 kWh should be used, which is 25-30% higher than the required 4.48 kWh. The remaining electrical energy from the system is stored in batteries for later use or can be used in different places where it is needed in the production facility.

Keywords: Wind energy, Wind turbine, Electrical energy, Vermicompost, Vermicompost production facility

EFFECTS OF DIFFERENT DRIP IRRIGATION REGIMES ON POTATO TUBER MINERAL CONTENTS

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ABSTRACT

Potato is normally grown in soil under conditions using sprinkler and furrow irrigation methods during spring and fall seasons in order to respond to the high demand of potato on markets. Potato quality under irrigation applications is important to enhance water management in arid regions. A field experiment was conducted in 2021 spring growing seasons using potato (Solanum tuberosum) grown in Nigde region to evaluate potato response to different drip irrigation regimes. A Randomized Split-Plot Design with irrigation regimes randomly distributed. Each treatment was repeated four times. The total irrigation water applied 530.7, 632.6, 728.6 respectively S33, S66, S100. Potato tuber mineral contents were significantly affected by different irrigation application. The average content of N ranged from 1.729 to 1.971 % and the average content of P2O5 ranged from 0.590 to 0.683 %. The content of K2O was not significant. Irrigation treatment implicated in SO3 and MgO concentrations was significant. The average content of SO3 ranged from 0.408 to 0.457 % and the average content of MgO ranged from 0.500 to 0.531 %. CaO and Fe2O3 in the tuber were also affected by the change in irrigation amount. The average content of CaO ranged from 504.790 to 596.670 ppm and the average content of Fe2O3 ranged from 43.635 to 60.592 %. However, Zn, Mn and Cu concentrations did not show any significant changes under different irrigation application conditions.

Keywords: Potato, tuber quality, mineral contents, drip irrigation

INVESTIGATION OF THE RELATIONSHIP BETWEEN THE POD PROPERTIES AND QUALITY VALUES OF SOME BEAN PROPERTIES

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ABSTRACT

It is important to know the quality values of the products in terms of production and consumption of plant-based foods, and at the same time, it brings the examined product to the forefront in terms of production and consumption. For this reason, 11 commercial bean varieties were grown as the first crop in Kahramanmaraş ecological conditions in 2018, and in this study, it was aimed to examine the relationship between the pod characteristics and quality values of 11 commercial bean varieties. In the study, the correlations between bean cultivars' pod setting time, pod length, grain yield per plant, thousand-seed weight, pod ratio per plant, protein ratio, oil ratio and starch ratio, as well as all correlations between investigated characteristics were also investigated. It was determined that there were statistically significant ($p< 0.01$) differences between bean cultivars in terms of pod setting time, pod length, thousand-seed weight, pod ratio and protein content per plant, and significant ($p< 0.05$) differences in grain yield and oil content per plant. It was noted that there was no significant difference between bean varieties in terms of starch ratio.

Keywords: Bean Quality Values, Commercial Bean, Correlation Analyze, Phaseolus Vulgaris, Protein Ratio, Starch Ratio

EFFECTS OF SOME CHEMICAL TREATMENTS ON POLLEN GERMINATION AND POLLEN TUBE GROWTH IN RED LAKE AND ROSENTHAL CURRANT CULTIVARLL

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ABSTRACT

Fertilization biology is very important criteria for fruitful. Pollen germination and pollen tube growth are major components of fertilization success in fruit trees. A mature pollen is used for the germination of pollen *in vitro* and *in vivo* in its nutrient storage and nutrient content, just like the seed. However, the nutrients contained in the pollen are often not enough for the pollen tubes to reach the seed drafts. For this reason, the development of pollen tubes after a certain stage is realized through the use of nutrients in the stigma. In this study, pollens belonging to 'Red Lake' and Rosenthall varieties were used to examine the effects of certain growth regulators and mineral substances on pollen germination and pollen tube growth. "Agar in plate" method was used the for germination tests which was contain 0,5g agar-agar +15g sucrose + 5ppm boric acid, potassium nitrate (50 ppm), thioure (50 ppm), benzyladenine (5ppm), gibberellic acid (10 ppm) and indole butyric acid (10 ppm) solutions were added germination medium (0.5 g agar- agar +15g sucrose + 5ppm boric acid and incubated at 21 0C Pollen tube growth was measured by ocular micrometer after 24 hours later germination. Statistical analyses were performed by SPSS 22.0 version. The effects of chemicals on pollen germination and tube growth were found as statistically different. according to minerals and plant growth regulators. Potassium nitrate and gibberellic acid were determined as promoter while thioure and benzyladenine effected as inhibitory in pollen germination and tube growth.

Keywords: Blackcurrant, fertilization biology, pollen germination, plant growth regulator

BREAD WHEAT BREEDING PROGRAM AT TEKFEN AGRICULTURAL RESEARCH

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ABSTRACT

It is very important to ensure food security that will feed humanity in the face of global climate changes and the demands of the increasing world population. Therefore, the development of national wheat varieties using domestic gene resources is important for the food security of our country. In order to ensure the continuity of the food supply chain, it has been clearly understood that agricultural production should be domestic and sustainable, especially in pandemic situations such as coronavirus. Tekfen Agricultural Research who is aware of this conditions, implemented the university-industry cooperation model in 2010 and integrated biotechnological methods into the classical wheat breeding program. With the integration of modern biotechnological methods into classical Plant Breeding, both the marker-based selection method and the Speed Breeding greenhouse were used, which shortened the breeding process by 50% and contributed to the development of new varieties. Within the framework of our 'Domestic and National' breeding program, 13 bread wheat genotypes have been registered by Republıc of Turkey Ministry of Agrıculture and Forestry Variety Registration and Seed Certification Center in the last 12 years. There are 2 bread and 2 durum wheat genotypes that are currently being registered.

Keywords: Bread wheat, Durum wheat, Wheat Breeding, Speed Breeding, Marker Based Selection

INVESTIGATION OF THE EFFECT OF DIFFERENT PHOSPHORUS AND NITROGEN DOSES APPLIED TO BEAN (*Phaseolus vulgaris* L.) PLANT ON VEGETATIVE CHARACTERISTIC AND GRAIN YIELD

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ABSTRACT

This study was carried out in Kahramanmaraş conditions in 2020 in order to determine the effects of different phosphorus and nitrogen doses on the vegetative characteristics and grain yield of Göksun bean variety. Four different doses of nitrogen (0, 4 , 8, 12 kg da -1) and four different doses of phosphorus (0, 3, 6, 9 kg da -1) were used in the experiment. In the conducted research, flowering day duration, first pod height, plant height, number of branches, maturation day time and grain yield per decare of bean plant were investigated. According to the results of the analysis of variance, different phosphorus and nitrogen applications during the flowering day and the interactions of these applications with each other were found to be insignificant. As the nitrogen dose increased, the first pod height, plant height and number of branches increased, and the nitrogen dose was found to be important at the rate of 1% for these characteristics. Phosphorus doses applied for the same properties did not make a significant difference. It was determined that different doses of phosphorus and nitrogen applied to Göksun bean cultivar did not make a statistically significant difference on maturation day time. The lowest grain yield was obtained from the application of 171.561 kg da -1 to 0 kg da -1 nitrogen dose, the highest grain yield was obtained from the application of 254.025 kg -1 to 8 kg -1 nitrogen dose. Grain yields obtained from different doses of phosphorus (0, 3, 6, 9 kg da -1) varied between 191.682 – 237.641 kg da -1. Different phosphorus dosage applications did not make a statistical difference in terms of grain yield. In the study carried out, the highest grain yield was obtained as 288.124 kg da -1 from the interaction of 8 kg da -1 nitrogen application and 6 kg da -1 phosphorus application.

Keywords: Beans, vegetative characteristics, grain yield, phosphorus and nitrogen doses.

BIOLOGICAL CONTROL OF THE MITE VARROA DESTRUCTOR PARASITE OF THE HONEYBEE APIS MELLIFERA

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ABSTRACT

The honeybee, *Apis mellifera*, is one of the rare insects to be bred and domesticated as a production animal in order to benefit from its various products (honey pollen, royal jelly, propolis …). In addition, as pollinators of many cultivated and wild plants, the honey bee plays a key role in improving agricultural yields as well as maintaining the biodiversity of ecosystems. However, in recent years, the beekeeping industry has been faced with a general weakening of colonies leading to a sharp increase in bee mortality rates worldwide. Among the main causes of this phenomenon, the mite *Varroa destructor*, an ectoparasite that attacks bees at all stages of their development, the brood is essentially damaged and the infested bees show physiological and morphological deformities. To fight against this parasitosis, several chemical molecules have been widely used until the parasite becomes resistant to it as well as the appearance of residues of these molecules in the various hive products. As a result, orientation towards the various means of biological control is very important. Indeed, the biotechnical methods using mesh trays for the detection and harvesting of varroa mites and the trapping of the mite by the installation of pollen traps give satisfactory results and above all not expensive for the beekeeper. Various tests have also approved the acaricidal effectiveness of several essential oils (essential oils of Eucalyptus, rosemary, mastic tree, etc.) as well as ethanolic extracts of propolis and phenolic extracts of some plants. These biological methods can strongly play a role in the eradication of this parasite as well as safeguard the health of the bee which will give healthy products of any toxicity.

Keywords: Apis mellifera, Varroa destructor, parasite, biological control

PRINCIPLES OF TQM IN TOBACCO PRODUCTION IN R. NORTH MACEDONIA

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ABSTRACT

Introducing and use of total quality management in tobacco production is very current and a complex category which, in the future, will give an incentive of its implementation in order to achieve competitive advantage. The effects of total quality management are only an indicator of further studies. This study is focused on the analysis of a very important point of view in the process of implementing total quality management in tobacco production for gaining competitive advantage. By integrating the basic principles of total quality management, the tobacco producers themselves begin to experience the benefits and positive effects of utilizing it. The studies that were made will contribute to furthering the knowledge of this current global process and will stimulate tobacco producers to have a more scientific approach to the assesment of the benefits of total quality management in the future, and at the same time, to begin using total quality management in order to acquire competitive advantage.

Keywords: TQM, TQM principles, tobacco, tobacco production

MEDICINAL AND AROMATIC PLANT PRODUCTS AS A SUITABLE ALTERNATIVE FOR MODULATING AQUATIC ORGANISMS' HEALTH AND WELFARE AND IMPROVING AQUACULTURE INDUSTRY: A SURVEY STUDY

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ABSTRACT

Aquaculture is a booming sector of the future in Morocco and internationally, aiming to satisfy the growing demand for animal proteins of aquatic origin and to create employment. Indeed, this sector is facing multiple challenges, particularly the negative effects of unconditional stress episodes on the welfare of aquatic animals and thus on the production of the aquaculture farm and the sector in general. This survey was aimed at experts in the aquaculture sector from various positions and was shared for 3 months on various international aquaculture webinars as well as on all aquaculture-related social networks. Aquaculture Scientific Expert/International Aquaculture Consultant (21.5 %), Fish farmers (25 %), PhD (21.5 %) and master (14 %) student in aquaculture and aquaculture nutrition, veterinarians (7 %) and University professors (11 %) represent several African and Asiatic countries: Morocco (32 %), Egypt (25 %), Nigeria (14 %), Benin, Ghana, South Africa, Madagascar, Bangladesh, Philippines and Australia (3.5 % for each country). The results of this survey showed the importance of the in-situ or experimental use of products of different aromatic and medicinal plants (72% of the responses) - such as garlic, black seeds, oregano and thyme - in the form of powder (40%), essential oil (30%), aqueous extract (17%) and phytochemicals, typically as feed additives (72%) and dips (25%), for the health and welfare of aquatic organisms (fish, crabs and shrimps) exposed to abiotic environmental factors (39%), bacterial diseases (32%), aquaculture practices and farming conditions (29%), such as appetizing agent (15 %) and growth and survival modulators (30 %), immunostimulators and antibacterial agent (25 %), and antioxidant and anxiolytic agents (14%).

Keywords: Aquaculture, aromatic and medicinal plants products, stressors, stress responses, survey study.

EFFECT OF DIETARY SUPPLEMENTATION WITH PLANTS' ESSENTIAL OILS ON WELFARE OF SEA BASS "*Dicentrarchus labrax*" IN FARMING CONDITIONS

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ABSTRACT

European sea bass "*Dicentrarchus labrax*" is a main fish species for intensive marine fish farming in Morocco. However, some farming practices and environmental challenges could generate stressful responses to this sentient fish, that will be difficult to manage in floating cages in sea. Recently, the use of aromatic and medicinal plants is well developed for aquatic animals including fish, in order to improve their welfare and health and to promote aquaculture sector. The present study provides a synthesis of outputs of many experimental scientific studies that have highlighted the statistically significant potentiality of the dietary supplementation with essential oils of Oregano *"Origanum vulgare"*, Anise *"Pimpinella anisum"*, Citrus *"Citrus sinensis"*, Mint *"Labiatae"* and Garlic "*Allium sativum"*, as growth enhancers, antioxidants and immunocompetence stimulators and anxiety modulators of *D. labrax* in farming conditions. The findings of these studies showed that the essential oil used as feed additives increased the feed intake and appetite of *D. labrax* and positively influenced their weight gain, decreased the plasmatic cortisol levels, enhanced the leukocyte profile, and decreased the activity of antioxidants enzymes and the lipid peroxidation levels. To conclude, the prophylactic administration of feed additives based on these products constitutes an alternative approach promoting the sustainability of European sea bass intensive fish-farming in offshore.

Keywords: Sea bass farming, essential oil, stress responses, modulator, sea bass welfare.

GENETIC COMPOSITION OF MYTILUS SPECIES IN MUSSEL SETTLEMENTS FROM THE NORTH SEA

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ABSTRACT

In the North Atlantic, there are three sister species of morphologically similar but genetically distinct blue mussels – Mytilus edulis (Linnaeus, 1758), Mytilus trossulus (Gould, 1850), and Mytilus galloprovincialis (Lamarck, 1819). The distributions of these species often overlap, facilitating interbreeding and the formation of hybrid zones in areas of sympatric occurrence (Gosling, 1992; Hilbish et al., 2002; Crego-Prieto et al., 2015; Mathiesen et al., 2017; Vendrami et al., 2020). Taxonomic analysis of the genus Mytilus has been greatly simplified by the use of DNA markers (Larraín, 2019). The molecular marker Me 15-16 used in our study, which was developed by Inoue et al. (1995) to the non-repetitive region of the mussel adhesive protein gene clearly distinguishes three mussel species by the length of the amplification fragment: M. edulis (180 bp), M. trossulus (168 bp) and M. galloprovincialis (126 bp). Aim. To establish the species affiliation of mussel settlements from the North Sea using the molecular marker Me 15-16 and to compare them with the genetic composition of mussel settlements of the Black and Baltic Seas. Material and methods. The material for the scientific study was 20 mussels caught in the North Sea off the Belgian coast in 2021. Mussels from the North-Western region of the Black Sea and the Baltic Sea were used as a control. Genomic DNA was isolated from ctenidia and mantle of individual mussel individuals, which were preserved in 96% ethanol, modified by the CTAB method (Winnepenninckx et al., 1993). Mussels were identified by PCR using the molecular marker Me 15-16 (Inoue et al., 1995). The amplification fragments were fractionated by electrophoresis in 7% polyacrylamide gels (PAGE) and stained with silver nitrate, according to Promega (1999). The size of the amplification fragments was defined using the program GelAnalyzer (http://www.gelanalyzer.com) according to the marker pUC 19 / Msp I. Results. As a result of genotyping 20 individuals of mussels from the North Sea, 19 homozygous and one heterozygous genotypes were found. Among homozygous organisms, for 18 individuals a fragment of amplification 180 bp was detected, which is corresponding to the allele that characterized the species M. edulis and for one individual fragment amplification 126 bp that corresponds to the allele of the species M. galloprovincialis. The identified heterozygous organism was characterized by alleles – 126 bp and 180 bp and was identified as a hybrid of M. galloprovincialis×M. edulis. According to a previously conducted molecular genetic analysis (Chubyk et al., 2022), in the control samples of mussels from the northwestern region of the Black Sea in 6 investigated locations (171 individuals), only individuals of the species M. galloprovincialis, characterized by an allele of 126 bp length, were found. Among the control samples of mussels caught from the Baltic Sea (38 individuals), one individual of the M. trossulus species was found – it was characterized by an amplification fragment of 168 bp, 26 individuals of the M. edulis species – an amplification fragment of 180 bp was found for them and 11 M. trossulus×M. edulis hybrids – with amplification spectrum corresponds to the heterozygous genotype. Conclusions. In the sample of mussels from the North Sea, two types of mussels were found: M. edulis and M. galloprovincialis and their hybrid M. edulis×M. galloprovincialis. Among the genotyped samples, the 180 bp allele (M. edulis)

prevailed, as in the samples of mussels from the Baltic Sea. The species M. galloprovincialis identified in our experiment is the only species present among the Black Sea mussel settlements. The species M. trossulus was not detected in the studied samples. This species and its hybrids were present only among mussels from the Baltic Sea.

Keywords: Mytilus, genetic identification, Me 15-16, North Sea.

ANALYSIS OF GENETIC POLYMORPHISM OF *Atherina boyeri* GROUPS WITH USING THE IPBS-2080 MARKER

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ABSTRACT

The big-scale sand smelt, *Atherina boyeri* Risso, 1810 (Actinopterygii: Atherinidae) is one of three *Atherina* species common in European waters and one of two species registered in the Black Sea. This species has commercial importance, also serving as a dietary item for many valuable commercial fish species. The aim of the study was to analyse the genetic polymorphism of *Atherina boyeri* groups in the Black Sea region. To determine the level of genetic polymorphism of the fish groups, the iPBS molecular markers were used. The method is based on use of retroviruses and LTR-retrotransposons sequences as binding sites for primers. The iPBS markers are universal and have a number of advantages. In total of 51 individuals of the big-scale sand smelt, sampled in the Dnieper River, e.g. Dnipro Reservoir (11 ind.), and Kakhovka Reservoir (12 ind.), also in the Black Sea, e.g. Gulf of Odesa (9 ind.), Cape Adjiyask near-shores (10 ind.), andin the Danube Delta (9 ind.). The genomic DNA was extracted from the fins of fish individuals (preserved in 96% ethanol) due to the method of Sambrook , Russell (2001) using CTAB. The genotyping of the fish groups was performed using the PCR with the iPBS-2080 marker (Kalendar et al. 2010). The PCR amplification products were analysed in 7% polyacrylamide gel electrophoresis (Sambrook , Russell 2001). A total of 467 amplification fragments were identified in the studied samples of sand smelts with the iPBS-2080 marker, among which 314 were polymorphic. The sizes of the amplification fragments varied from 200 to 2500 bp. Usually, 9 fragments of amplification were detected in the spectrum of PCR products for one genotype of sand smelts. Comparing the genotypes based on the spectra of amplification fragments, it was taken into account that amplification fragments of the same size are produced in PCR from the same loci. In this way, a 1/0 binary matrix was constructed for 51 studied fish individuals according to the PCR analysis data with the iPBS-2080 marker. Percentage of polymorphic loci, Shannon information index, effective number of alleles, Nei genetic distance, Nei genetic identity were calculated using GenAIEx 6.5 (Peakall , Smouse 2012). A dendrogram for the studied genotypes was constructed using molecular evolutionary genetic analysis X (MEGA X) (Kumar et al. 2016). The genotypes of fish groups from the Dnipro Reservoir, Kakhovka Reservoir, Gulf of Odesa, and Danube Delta formed complex clusters on dendrogram that included individuals from each locality and did not differ significantly in terms of genetic distance. A separate cluster included genotypes that were caught near Cape Adjiyask. So, as a result of genotyping individuals of *Atherina boyeri* from different locations with the help of PCR using the iPBS-2080 marker and statistical processing of the obtained data, it can be concluded that the groups of *Atherina* from the locations of the Dnipro Reservoir, Kakhovka Reservoir, Gulf of Odesa and the Danube Delta are highly similar. It was determined that the group of *Atherina boyeri* from the location of Cape Adjiyask differs by genotypes revealed using the iPBS-2080 marker from other studied groups of *Atherina boyeri* and forms a separate cluster.

Keywords: *Atherina boyeri*; iPBS molecular markers; PCR.

SOME DATA OF THE TRUE BUGS MIRIDAE IN THE DIFFERENT ECOSYSTEMS IN KRUJA REGION

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ABSTRACT

This study aim to present a sysmtematic and ecological analysis to the family *Miridae* the true bugs, in the different ecosystems of Kruja region, Albania. The collection of biological material is performed during the period 2019- 2021. The study represents 19 genus and 26 species. By analyzing the collected material, the genera *Deraeocoris* is the most represented with 4 species and a frequency of 15.38%. Habitats of Mali Kruja station are represented by more species than the other stations, with 14 species and a frequency of 53.85%, with less species Boje station with 5 species and a frequency of 19.23%. Based on the "*Jaccard index of similarity coefficient*", Mali Kruje with Boje, have a higher similarity coefficient than the other stations, of 18.75%, with the lowest coefficient Droja and Boje with 7.69%, showing a similarity of the ecological factors between these stations, which means a similarity between these habitats.

Keywords: Hemiptera, Miridae, ekosystems, Kruja

SOME DATA OF SEED BUGS (LYGAEIDAE) IN ECOSYSTEMS OF KRUJA (ALBANIA)

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ABSTRACT

Study of the ecological and systematical aspects for the families *Lygaeidae* in ecosystems Kruja Region is presented in that paper. The biological material was collected during the period of time 2019-2021. The family *Lygaeidae* was presented by 11 generea and 15 species. The systematical analysis to the *Lygaeidae* resulted that the genera represented by the highest number of speies was *Lygaeus* by 3 species, and frecuency 20 %. By analyzing the material the station with more species, is Brret, with 9 species or frequency 60 %, while with less species, is Droja and Mali Kruje or 5 species or 33.33%.

Keywords: Hemiptera, Lygaeidae, ekosystems, Kruja

AGE AS ONLY PREDICTIVE FACTOR FOR SEXUAL PARAMETERS IN OULED DJELLAL RAM

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ABSTRACT

This study was conducted to determine the effect of age on semen production, testosterone serum concentration, body weight, and scrotal measurements, in rams living in a semi-arid region of eastern part of Algeria. Blood samples were taken monthly from ten Ouled Djellal rams, aged between 1 and 4 years, in the Artificial Insemination Centre located at Tebessa City (Algeria). Sperm were collected by an artificial vagina once a month for 1 year. The volume of ejaculate (1.23 ± 0.31 ml) was not influenced by age ($p>0.05$). The mass motility showed significant variation between age groups ($P<0.01$): 4.42 ± 0.14 for adults (2- 3- 4 Years group), and 3.80 ± 0.21 for youngs (1 year of age). The sperm concentration varied significantly with the age category ($p<0.01$): 4.25 ± 0.19 (adults) and 4.01 ± 0.27 spermatozoa × 10 9 / ml (youngs). Also the number of straws per ram was not significantly influenced by age ($p>0.05$): 12.4 ± 1.5 per week. Regarding the age effect on the evolution of weight and scrotal measurements, we find a variation ranging from very ($p<0.01$) to highly ($p<0.001$) significant between the groups of age (1 vs 2-3); (2-3 vs 4) and (1 vs 4 years). In young rams, Testosterone plasma concentration followed a seasonal pattern activity similar to mature rams, with 5.21±1.87 ng/mL and 2.69±2.03 ng/mL of testosterone in spring and autumn, respectively. We can conclude that the spawning rams bred Ouled Djellal presents a significant ability to produce good quality semen throughout the year and despite the higher sperm potential in adult, young ram's seminal characteristics are very acceptable.

Keywords: Age, breeding ram characterization, Ouled Djellal breed, semen.

FORAGE CHICORY-A VIABLE ALTERNATIVE IN CATTLE NUTRITION

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ABSTRACT

The aim of the current study was to test the viability of including chicory in cows' diet. A total of 2250 data were recorded from 150 Simmental cows related to 6 forage structures: alfalfa (αα), chicory (C), mixed alfalfa and chicory (αC), mixed gramineous (G), mixed gramineous and alfalfa (Gα), mixed gramineous and chicory (GC). Data aimed total daily duration of forage consumption (TDD), daily round frequency (DRF) and average consumption round (ACR) according to forage structures. The effects of chicory were assessed based on ANOVA protocol with categorical factor "chicory". Chicory significantly influenced ($p \leq 0.05$) TDD and ACR. No significant influence ($p > 0.05$) was recorded related to DRF. Chicory significantly increased TDD and DRF compared to G (4.9 *vs.* 3.18 h/day, 12.1 *vs.* 9.37 bouts/day, $p \leq 0.001$), being comparable with αα (4.4 h/day, 11.3 bouts/day, $p > 0.05$). Also, chicory improved the forage consumption in mixed GC compared to Gα (4.06 *vs.* 3.74 h/day, 10.1 *vs.* 9.8 bouts/day, $p \leq 0.01$). In mixed αC, chicory increased TDD and DRF compared to αα (4.73 *vs.* 4.4 h/day, 12.6 *vs.* 11.3 bouts/day, $p \leq 0.05$). In conclusion, the use of chicory in cows' diet could improve the feeding behavioural traits with economically benefits.

Keywords: chicory, feeding behavior, Simmental

METHANE PRODUCTION AND DIGESTIBILITY OF MEDITERRANEAN TREE AND SHRUB LEAVES CONSUMED BY GOATS

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ABSTRACT

Tree and shrub leaves play an important role in the nutrition of goats grazing Mediterranean woodland (Boubaker et al., 2005). However, these feed resources can be beneficial or detrimental depending on their concentration on secondary compounds particularly tannins. The objective of the study is to evaluate inhibitory effects of tannins on in vitro methane (CH4) production, organic matter digestibility (IVOMD), pH and ammoniacal nitrogen (NH3-N) concentration for some Mediterranean tree and shrub leaves incubated with or without Polyethylene glycol (PEG). Leaves from trees of *Quercus suber (Q. suber)* and *Olea europea (O. europea)* and shrubs of *Erica arborea (E. arborea), Phyllerea angustifolia (P. angustifolia.), Myrtus communis (M. communis), Pistacia lentiscus (P. lentiscus)* were collected in the northern Tunisia and used for *in vitro* fermentation (Menke and Steingass,1988) Wide variations were observed in the chemical composition of the investigated plant species. The highest total condensed tannins content was found in *E. arborea* (253 g/kg DM) while the lowest content was observed in *P. angustifolia* (10 g/kg DM*).* There were significant differences ($P < 0.05$) among plant species in methane and total gas production. The *O. europea* produced the highest while *E. arborea* sample produced the lowest gas production. The addition of PEG resulted in a significantly ($P < 0.05$) higher proportions of CH4 after 48 h incubation in *O. europea* and after 72 h in *P. angustifolia.* The IVOMD increased in *E. arborea* and *M. communis* while NH3-N concentration significantly increased in most of plant species.

Keywords: Methane, Shrubs, Digestibility, Goats

CHARACTERİZATION OF RABBIT PRODUCTION SYSTEMS IN TUNISIA

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ABSTRACT

The study aimed to determinate the breeding practices of rabbit production systems in Tunisia. A survey was carried out to collect data from a sample of rabbit breeding (n=60). The breeders were chosen randomly from the North Est, the Center Est-West and South West of Tunisia. The survey was interested to identify the practices of housing and reproduction in rabbit rearing to characterize the production systems. Then, the breeding were classified into the different production systems according to the number of does in production and the reproduction techniques. Preliminary results showed that rabbit rearing belongs to 2 production system classes: traditional (35%) and industrial (65%) systems. The latter is composed of the conventional industrial system (33%) using the natural mate and the modern industrial system (32%) using the artificial insemination. The traditional system is characterized of small farms with a number of does <50. The industrial system is characterized by large farms with a number of does >50. Besides, the rabbit rearing is considered as a principle activity in 53% of breeders. However, 47% of breeders practice others types of rearing than the rabbit one. Multiple activities of livestock are noted in most farmers of the traditional system due to the few numbers of does. The livestock housing deferred according to the systems. In fact, the average area of the rearing building was 55m2 in the traditional system, 236m2 in conventional industrial system and 425m2 in the modern industrial system. The breeding in the traditional system is carried out outdoor or in and old and not converted building. However, the ones of the conventional and modern industrial systems were carried out in converted building with a separation between the mother and fattening cells using airlocks. In this system, the management of the breeding is based on the concept «all in all out». The environmental conditions are not respected in the traditional system. The farrowing rate varied between the traditional and the industrial systems ($p<0.05$). However, reproduction technique didn't affect the farrowing rate in the systems. Regarding rabbit's growth, the average daily gain varied between the systems ($p<0.05$). The results showed that 20% of breeders are about to abandon their rearing because of constraints of health (36%), feed supply (23%), commercialization (23%) and covid-19 situation (18%). The survey suggests that most of breeding belongs the industrial rabbit production system. This one provides a sustainable productivity for farmers. Nevertheless, the sustainability of rabbit's breeding is threatened by constraints including feed supply, covid-19 situation, commercialization and health.

Keywords: rabbit, production system, practices, sustainable, productivity

INFLUENCE OF THE STALLION'S ORIGIN ON SPERM MOBILITY AND MORPHOLOGICAL ABNORMALITIES IN THAWED SEMEN

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ABSTRACT

The objective of the study was to evaluate the post-thawed semen quality of oriental and occidental Arabian stallions raised in Tunisia. A total of 11 Arabian stallions were assigned into 2 groups according to their origin (5 oriental and 6 occidental). Semen from those stallions was collected and frozen in the centre of equine semen production of the National Foundation for the Improvement of the Horse Breed (2 ejaculates /stallion, n=22). A sample of 4 straws per ejaculate was chosen randomly to study the quality of semen after thawing. For this purpose, the percentages of mobile and abnormal spermatozoa were determined. ANOVA was carried out using the software SAS (SAS Institute *Inc.*®). Results showed that the percentage of mobile spermatozoa in thawed semen was higher in occidental stallions compared to oriental ones (64% *vs* 40%, $p<0.05$). However, the percentage of abnormal spermatozoa was higher in oriental stallions compared to occidental ones (27% *vs*15%, $p<0.05$). Moreover, the percentages of mobile and abnormal spermatozoa also varied according to stallions ($p<0.05$). But, statistical analysis didn't show any variation between ejaculates from the same stallion and even between straws from the same ejaculate ($p>0.05$). In conclusion, our results suggest that the quality of thawed semen is better in the occidental stallions. Based on these findings, it seems that the semen of occidental Arabian stallions endures the effects of the freezing – thawing process.

Keywords: thawed semen, mobile spermatozoa, abnormal spermatozoa, origin, Arabian stallions

CD73+/CD44+/CD90+ CELLS POPULATION IN LIVER OF DIETHYLNITROSAMINE-TREATED MALE RATS AND THERAPEUTIC POTENTIALS OF BIOLOGICALLY SYNTHESIZED SILVER NANOPARTICLES

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ABSTRACT

The role of cancer stem cells (CSCs) is crucial in the initiation of a variety of cancers. CSCs are considered as pluripotent cells which replicate via asymmetric cell division and cause heterogeneity within the tumor tissue. Therefore, it is important to uncover the carcinogens that may cause cancer via increasing the CSCs population in a target tissue. The present study was designed to evaluate the population of CSCs like cells (CD73+, CD44+, and CD90+ cells) in the liver tissue of a diethylnitrosamine (DEN)-treated male rats and the possible therapeutic effects of biologically synthesized silver nanoparticles (AgNPs). Four groups; Control, DEN-treated, DEN+AgNPs, and AgNPs-treated, with 5 animals (bodyweight ~200g) were made. DEN (90mg/kg) and AgNPs (100mg/kg) were administered intraperitoneally and by oral gavage, respectively. After 5 weeks, animals were dissected and liver tissues were fixed in 10% buffered formalin and processed through the standard procedure of microtomy. 3-5µm thick sections were stained with hematoxylin and eosin and variations in morphological and histological features were observed under the microscope. CSCs population was analyzed by fluorescence-activated cell sorting (FACS) for the cell surface markers (CD73+, CD44+, and CD90+) in the single-cell suspension of liver tissues. RT-qPCR was performed for relative expression of mRNA of CD73, CD44, and CD90 genes after isolating total RNA from frozen tissues. Abnormalities were observed in the cellular growth of the DEN-treated group as compared to the control. Disrupted tissue architecture, enlargement of cells with mild pleomorphism, and expansion in the central vein of liver tissues were revealed by the histopathological studies of DEN-treated animals. However, a moderate inflammatory response was observed in the DEN+AgNPs treated group. The CD73+, CD44+, and CD90+ cells population were significantly increased in the DEN-treated group, however, the same cells population was decreased with AgNPs treatment. Elevated CD73+, CD44+, and CD90+ indicated that tumors contain stem cell-like cells which are bearing the stem cell properties i.e., proliferation and self-renewal. Furthermore, the relative mRNA expression levels of CD73, CD44, and CD90 genes were significantly up-regulated in the DEN-treated group as compared to the control group. The expression of targeted genes was decreased in the DEN+AgNPs-treated group compared to the DEN-treated group. Furthermore, gene expression analysis supported the results of flow cytometry and showed a positive correlation between the synthesis of mRNA and the target molecules. Altogether, it was concluded that DEN has the potentials to cause the liver carcinogenesis via increasing the CSCs like cells population and AgNPs attenuated the hazardous effects of DEN.

Keywords: Diethylnitrosamine, Liver cancer stem cells, Flowcytometery, RT-qPCR, Silver nanoparticles

EFFECT OF THREE COMMERCIAL FEEDS ON GROWTH PERFORMANCE, CARCASS YIELD AND INTESTINAL HISTOMETRY IN SYNTHETIC RABBITS LINE

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ABSTRACT

The objective of this study was to evaluate the effect of three commercial feeds on growth performances, carcass yield and intestinal histometry in synthetic rabbits' line. The animals were fed *ad libitum* with three commercial diets: SIM-SANDERS (S), BERBAS (B) and TELEMCEN (T), from 42 to 84 days of age. Sixty-three (63) rabbits weaned at 35 days of age were allotted at 42 days of age in three groups (S, B, and T), 21 rabbits per treatment. Measurements were: the physicochemical and microbiological analysis of the feed, zootechnical performances, yield of carcass components and histometry of intestinal villi. The results of the physicochemical analysis showed that the feeds are in accordance with the standards recommendations. The zootechnical performances were not affected, except for the daily intake and feed conversion respectively which were significantly lower in animals of group B compared to those of S and T (110g/d *vs*. 135g/d and 136g/d; $P<0.05$ and 2.92 *vs*. 3.54 and 3.4; $P<0.05$). The components of carcass yield were similar except for the weight of cold carcass, which was higher in animals belong to the T group compared to the S group (1703g *vs.* 1598g; $P<0.05$). Finally, the surface absorption area of the jejunum was similar between the three groups. In conclusion, the commercial feeds tested provide favourable weight and weight gain in the synthetic rabbit line.

Keywords: growth, carcass yield, intestinal villi, synthetic rabbits line

DETECTION OF QUORUM-SENSING SUPERVISOR RHIR GENE IN PSEUDOMONAS AERUGINOSA ISOLATES OF DAIRY ANIMALS IN INDIA AND IN-SILICO IDENTIFICATION OF RHLI/RHLR AI-2 GENE TRANSLATIONAL PROTEIN INHIBITORY PHYTOCONSTITUENTS

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ABSTRACT

Pseudomonas aeruginosa are the major pathogens imposing health threat to humanity and enlisted in the list of bacteria and fungi in 2019 Antimicrobial Resistance Threat Report (2019 AR Threats Report) published by US CDC. These are zoonotic pathogens causing severe illness in both human and animals and transmitted from human to animals and vice versa. These bacteria communicate autoinducers (AIs) and AIs act as signaling molecules and diffuse through membrane to increasing its level with growth and the process is known as 'quorum sensing'. *Pseudomonas aeruginosa* has two major pair of quorum sensing: *lasI/lasR* and the *rhlI/rhlR* system. The *rhlI/rhlR* and the *lasI/lasR* systems are associated and *las* system engage a positive regulator over the *rhl* system, energizing both *rhlI* and *rhlR* transcription. Consequently, the inhibition of these systems hampers the pathogenicity of *Pseudomonas aeruginosa*, and it is utilized for the behaviour or anticipation of infections caused by *Pseudomonas aeruginosa*. A set of primers was designed to detect the presence of *rhlI/rhlR* AI-2 genes. The primers were validated through *in silico* PCR. Pseudomonas isolates isolated from the different clinical cases of mastitis, diarrhea and wounds of cattle were included in the study. The antibiotic sensitivity assay revealed 10% prevalence of multi drug resistance (MDR) *Pseudomonas aeruginosa*. The molecular confirmation by using gene-specific PCR for *rhlI/rhlR* AI-2 primers revealed presence of *rhlI/rhlR* AI-2 genes in 60% isolates with an amplification product of 395bp. It shows the high prevalence of *rhlI/rhlR* AI-2 gene in MDR *Pseudomonas aeruginosa*. The phylogenetic analysis based on the representative sequences obtained for *rhlI/rhlR* AI-2 genes aligned with the isolates of USA, France and China in comparison to other Indian isolates. The matrix analysis of *rhlI/rhlR* AI-2 gene clearly showed more than 96% identity with the sequences of Indian and other country isolates. PDB format of *rhlI/rhlR* AI-2 gene translational protein was subjected to docking with reported 10 antibacterial phytoconstituents of *Ocimum sanctum.* The docking scores for autoinducer-2 translational protein of *Pseudomonas aeruginosa* appeared to have significant interaction and binding affinity suggesting potential inhibitory effect against *rhlI/rhlR* AI-2 gene translational proteins of *Pseudomonas aeruginosa.* However, further investigations are recommended for the validation of *in-silico* findings.

Keywords: Quorum-sensing, rhIR gene, Pseudomonas aeruginosa, dairy animals, In-silico, Phytoconstituents

ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF CHESTNUT (*Castanea sativa*) FLOWER EXTRACT AND ITS POTENCY AS POULTRY FEED ADDITIVES

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ABSTRACT

Antimicrobial misuse due to overuse or lack of dosage in animal production and healthcare practices is the main factor contributing to the Antimicrobial Resistance (AMR) problem. Plant bioactive compounds have been reported extensively to be a feasible substitute with equivalent efficacy to antibiotic growth promoters. Therefore, this review aimed to discuss the antimicrobial properties of chestnut flower extract and the ability of its bioactive compound as a poultry feed additive. The potential of chestnut flowers is high since Turkey is the world's third-largest producer of chestnuts with 72.655 tons produced in 2019. *In vitro* studies have reported that extracts of chestnut flowers contain high levels of antioxidants and antimicrobial compounds such as hydrolyzable tannins (gallic and ellagic acid), and flavonoids (catechin, myricetin, and kaempferol). The antimicrobial characteristics of the chestnut flower extract are excellent for both gram-positive and gram-negative such as *E. coli, E. cloacae, S. typhimurium,* and *B. cereus*. Although the information is very limited regarding *in vivo* studies of chestnut flower extracts in poultry, several studies regarding the effect of chestnut hydrolyzable tannin (HCT) extracts from chestnut wood have been carried out. HCT reduced the number of coliform bacteria and *E. coli* and increased the largest population of *Lactobacillus* in the small intestine. HCT significantly increased final weight, body weight gain, and feed efficiency, and reduced blood and egg cholesterol. Chestnut flower extract may have potential as a poultry feed additive since it contains polyphenols similar to its wood extract which have been evaluated to have a positive impact on broilers and laying hens, therefore further *in vivo* study on poultry is needed

Keywords: Antioxidant, Antimicrobial, Chestnut Flower, Extract, Tannin

POTENTIAL DEVELOPMENT OF COW HAIR WASTE AS ALTERNATIVE FEED PROTEIN SOURCE FOR POULTRY IN SOUTH SULAWESI PROVINCE, INDONESIA

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ABSTRACT

Cow hair waste (CHW) is one of the wastes produced by the cowhide cracker processing industry. In South Sulawesi Province, every year, approximately 55.6 tons of CHW produced from this industry. The problem, the digestibility of CHW is very low so that the process requires certain technologies. The low of digestibility caused by the presence of disulfide bonds (S-S) in the protein component (keratin). The application of CHW as a protein source feed affects the productivity and quality of poultry meat. The study was aims to evaluate the productivity and quality of poultry meat (quail) which was added with CHW meal at various levels. A total of 4 levels of CHW meal (0% (control); 2%, 4% and 6%)(w/w) were applied to the composition of the quail (*Coturnix-coturnix*) feed rations that were kept in cages for 45 days. The results showed a significant effect ($p<0,05$) increase in body weight and carcass weight with increasing levels of CHW meal administration. The treatment also affects the quality of the meat (water holding capacity (WHC), cooking loss (CL) and meat shear force (MSF) of quail meat). In general, it can be concluded that CHW can be applied in the composition of poultry feed up to a level of 6% (w/w).Cow hair waste (CHW) is one of the wastes produced by the cowhide cracker processing industry. In South Sulawesi Province, every year, approximately 55.6 tons of CHW produced from this industry. The problem, the digestibility of CHW is very low so that the process requires certain technologies. The low of digestibility caused by the presence of disulfide bonds (S-S) in the protein component (keratin). The application of CHW as a protein source feed affects the productivity and quality of poultry meat. The study was aims to evaluate the productivity and quality of poultry meat (quail) which was added with CHW meal at various levels. A total of 4 levels of CHW meal (0% (control); 2%, 4% and 6%)(w/w) were applied to the composition of the quail (*Coturnix-coturnix*) feed rations that were kept in cages for 45 days. The results showed a significant effect ($p<0,05$) increase in body weight and carcass weight with increasing levels of CHW meal administration. The treatment also affects the quality of the meat (water holding capacity (WHC), cooking loss (CL) and meat shear force (MSF) of quail meat). In general, it can be concluded that CHW can be applied in the composition of poultry feed up to a level of 6% (w/w).

Keywords: cow hide waste; feed; poultry; protein; meat

PRELIMINARY STUDY ON SOURCES AND CAUSES OF MILK LOSSES IN DAIRY FARMS IN NORTH OF TUNISIA (BIZERTE)

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ABSTRACT

Food waste is a growing global issue, posing a challenge to food security, nutrition and environmental sustainability. In MENA region, most of food waste take place at early stages of the food value chain. For instance, Tunisian dairy value chain is characterized by loss rates averaging 9% in Bizerte and 6.5% in Mahdia, according to Food and Agriculture Organization (FAO) in 2017. The present study aimed to investigate the association between raw milk loss in primary production and on-farm management practices, as well as farmers' characteristics. A survey was conducted in 25 dairy farms in the region of Bizerte, (North of Tunisia), through face-to-face interviews to farmers, during two months. Information about socio-demographic characteristics of the farmers, general farm demographics and management, on-farm milk loss, as well as milking procedures and storage, were collected. Pareto analysis was performed and for all contributing causes, 80:20 rule was applied. Respondents' farming systems were characterized mainly by integrated production systems (92%). Only 35% of respondents used milking parlors and 32% had refrigerated milk tanks. About 60% of respondents declared to have milk losses. Self reported milk losses were estimated to 573 L/year/farmer, representing an average loss of about 176 euros/year/farmer. On a nutritional point of view, this represented per year and per farmer, about 36 000 Calories and 19 Kg of proteins, not available for human consumption. Interestingly these losses were significantly associated with socio-demographic characteristics of the farmers and farms: significant negative effects in milk losses were observed within non-educated and older farmers (above 50 years old), as well as in small sizes (less than 20 lactating cows) and low efficiency (14-17L/cow) of the dairy farms. Milking management practices also influenced self-reported milk losses: the use of milking parlor and refrigerated milk tanks significantly decreased the level of milk losses by respectively –86% and –86%. Moreover, Pareto chart analysis has revealed five main causes responsible of 80% milk losses : in descending order of critically, poor milking conditions (hygiene, equipments), poor quality of milk, poor technical support, long time between milking and collecting, and presence of antibiotic residues. The present study indicated a significant milk loss in primary production in Bizerte region: reducing loss of nutritious foods such as milk can help not only fight hunger and malnutrition, but also strengthen economies and protect the environment. Measures and actions to reduce these losses should strengthen, especially to improve hygiene, infrastructure and training.

Key words: Milk loss reduction, refrigerated milk tank, farmers, SDG12, Pareto diagram

DETERMINATION OF CHANGES IN SOME NUTRIENT CONTENT OF *Agaricus bisporus* CAP PART FERMENTED WITH RUMEN LIQUID IN DIFFERENT ENVIRONMENTAL CONDITIONS

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ABSTRACT

In this study, the changes in nutrient composition were investigated by fermenting *Agaricus bisporus* cap part with liquid rumen study was carried out on a total of 36 samples, with three different fermentation times (3, 5, and 7 days), two different initial pH (6 and 7), and two different inoculation (Yes or no) in a 3x2x2 factorial experiment design and three replications in each group. The cap and stem part of the mushrooms brought to the laboratory were separated, and the cap part was sliced into small pieces for fermentation. The rumen content used in fermentation was obtained from Bafra sheep on a farm in Samsun. The rumen liquid brought to the laboratory was centrifuged at 1000 rpm for 10 minutes in pre-sterilized falcon tubes. Then it was made ready for inoculation. The fermentation medium was decontaminated by the autoclave method before adding rumen liquid, and then 1000 µl of rumen liquid was added to each medium. Fermentation was carried out in incubators set at 37 °C. The samples, which completed the fermentation period, were dried and analyzed for crude protein, cellulose, ash, acid detergent fiber, and neutral detergent fiber. At the end of the research, it was determined that the *A. bisporus* cap part fermented with rumen liquid positively affects the nutrient content. According to the results obtained, the most effective fermentation time was seven days, regardless of the initial pH value.

Keywords: Fermentation, rumen liquid, nutrient composition, Agaricus bisporus.

PHYSICO-CHEMICAL CHARACTERIZATION OF ARGAN OIL AND PROTECTIVE EFFECTS AGAINST OXIDATIVE STRESS IN MOUSE

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ABSTRACT

Oxidative stress is defined as an imbalance between the production of oxygen reactive species (ROS) and the antioxidant potential of the cell. Excess iron can be, one of the main mechanisms linked to the genesis of free radicals and subsequently causes several pathological mechanisms. When ROS begin to accumulate in the cell, they can be neutralized by so-called antioxidant defense molecules, for this the use of natural molecules with an antioxidant and/or iron chelating properties could be an effective approach to protect against iron toxicity. In this approach, we focused on the evaluation of the protective effects of argan oil (Arganiaspinosa) on iron induced toxicity in vivo. We rely on argan oil, to respond to our approach, because of its particular composition and its therapeutic effects. The characterization and evaluation of antioxidant activity has shown that argan and olive oil contain chlorophylls, carotenoids and polyphenols to varying degrees. These promote antioxidant and chelating properties of iron to the oils tested. This effect is confirmed by three chemical tests: FRAP, DPPH and ABTS. In the animal model (mouse), measurement of oxidative stress parameters, showed that both oils are capable of moderating oxidative stress. All the results from the chemical part and the in vivo part provide encouraging data on the effects of argan and olive oil on oxidative stress.

Keywords: Mouse, argan oil, protective effects, oxidative stress

PHENOLIC COMPOUNDS, IN VIVO ANTI-INFLAMMATORY, ANALGESIC AND ANTIPYRETIC ACTIVITIES OF THE ETHANOLIC EXTRACT FROM AERIAL PART OF *Ammodaucus leucotrichus* L.

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ABSTRACT

Ammodaucus leucotrichus L. (Apiaceae) is a cultivated medicinal plant used in the treatment of various diseases including inflammatory diseases. The aim of this work was to evaluate the anti-inflammatory, analgesic and antipyretic activities of a hydroalcoholic extract of the aerial part of *A. leucotrichus*, in order to valorise its use in traditional medicine. At doses of 30, 50 and 70 mg/kg b.w., the ethanolic extract significantly reduced egg albumin-induced oedema and central pain inhibition time in the mouse hot plate test. Brewer's yeast-induced hyperthermia in mice was reduced by ethanolic extract of *A. leucotrichus*. Phytochemical screening of ethanolic extract identified flavonoids, tannins, terpenoids, saponins and steroids, which may be responsible for pharmacological properties of this plant.

Keywords: Ammodaucus leucotrichus L., polyphenols, anti-inflammatory activity, analgesic activity, antipyretic activity.

THE EFFECT OF DIFFERENT CONDITIONS ON THE DEVELOPMENT OF *GALLERIA MELLONELLA* LARVAE USED AS EXPERIMENTAL ANIMALS IN INFECTION MODELS

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ABSTRACT

Model insects are used as an alternative experimental model to vertebrate experimental animals in many fields such as medicine, pharmacy and veterinary medicine, due to their low production cost, ethical problems and easy culture in laboratory conditions. Nutrition is especially important for *Galleria mellonella* insects, which are of great importance to be grown in laboratory conditions. Within the scope of the study, nutrient media containing different components were used. In addition, the effect of different temperatures and humidity on the larvae was tested. Studies with foods containing different components show that especially glycerin and pollen are of great importance in the development of larvae. Although the larvae are fed with honeycombs under normal conditions, it has been observed that feeding with honeycombs for a long time under laboratory conditions retards the development of the larvae. In addition, it was determined that the temperature tolerance of the larvae was high. The results of the study show that it is necessary to pay attention to the content of the medium when breeding *G. mellonella* as an experimental animal. Study results show that moisture is important for larvae.

Keywords: *Galleria mellonella*, Infection model, Experimental animal, Nutrient

ANTI-PROLIFERATIVE, ANTI-MICROBIAL AND ANTI-QUORUM SENSING ACTIVITIES OF *APIUM* SP., *MYOSOTIS* SP., *VERONICA* SP.

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ABSTRACT

In this study, antimicrobial, anti-quorum sensing and anti-proliferative potentials of methanol and ethyl acetate extracts obtained from the flowers of *Veronica* sp., *Apium* sp., *Myosotis* sp. grown in Rize and its environs were investigated. Anti-proliferative effects of extracts against ARPE-19, HT-29, A-549, CRL-2923, HeLa cells were investigated by MTT (3-(4,5 Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide) method. Anti-microbial effects against various Gram positive and Gram negative bacteria groups and *Candida albicans* were studied by the agar well method. Anti-quorum sensing effects against *Chromobacterium violaceum* ATCC 12472, *Chromobacterium violaceum* VIR07, *Chromobacterium violaceum* CV026, *Chromobacterium violaceum* ATCC 31532 strains were determined soft agar method. In addition, pyocyanin pigment inhibition was tested using *Pseudomonas aeruginosa* PAO1 strain. According to the results obtained, *Veronica* sp. and *Apium* sp. Were determined that methanol and ethyl acetate extracts showed antibacterial activity at various rates. Anti-bacterial activity was detected in methanol extracts of *Myosotis* sp. at various rates, while antibacterial activity was not observed in ethyl acetate extracts. It was determined that the extracts did not show anti-fungal and anti-quorum sensing activity. According to the antiproliferation results of the extracts on the cells, it was found that 600 µl/ml ethyl acetate extract showed selective cytotoxic effect in HT-29 cells (p ,lt; 0.05). In line with these results, *Apium* sp. and *Myosotis* sp. It has been observed that the plants do not contain much potential in terms of antibiotic active substance. It was determined that the efficacy potential of *Veronica* sp. was higher. According to the results of the study, it is seen that the plants need more detailed scanning.

Keywords: Anticancer, Antiquorum sensing, *Veronica* sp., *Apium* sp., *Myosotis* sp.

FIRST REPORT OF BRUCELLA ABORTUS 2308 ISOLATION AND ITS COMPLETE GENOME SEQUENCE FROM INDIA

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ABSTRACT

The present report communicates the first report of isolation of Brucella abortus strain 2308 from India and its complete genome sequence. *Brucella abortus* 2308 strain was isolated from an abortion storm in a dairy farm located at Kanpur, Uttar Pradesh in India. It caused the last trimester abortions of 32 animals out of 100 cows in a dairy over a period of 60 days. The bacteria were isolated in pure culture from the placenta of aborted cows. The genome sequence length of isolated bacteria is 3,285,606 bp with a 57. 25% GC content, an N50 value of 296,426, L50 value of 4 containing 3,119 coding DNA sequences (CDSs), 49 tRNAs, 1 transfer messenger RNA (tmRNA), and 3 rRNA genes. It is the first report of *Brucella abortus* 2308 isolation from India subcontinent. *Brucella abortus* 2308 is the most pathogenic strain to cause human Brucellosis. The isolation and its complete genome sequence will be useful to assess the challenge impose and to develop strategies to prevent its human transmission as well as to eradicate Brucellosis from India.

Keywords: Brucella abortus, Complete genome Sequence, Dairy Cow, India

THE INVESTIGATION OF BVDV, BOHV-1, AND BOHV-4 INFECTIONS ABORTION CASES IN CATTLE IN THE VAN REGION OF TURKEY

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ABSTRACT

The primary aim of animal breeding is production of high meat and milk and to obtain healthy calves due to increase the sustainable profitability of the enterprise. At the beginning of the reproductive problems in cattle coming; abortions, fetal mumification, anomaly calves and infertility problems. Viruses are important among the causes of these cases. In cattle known as primary abortion agents and the most common of these agents in our country and in the world are Bovine Viral Diarrhea Virus (BVDV), Bovine Herpes Virus-1 (BoHV-1), and Bovine Herpes Virus-4 (BoHV-4) infections. The objective of this research is the determining of possible role of viral abortion agents and to evaluate the prevention measures and vaccination programs. In this study, for first time, a total of 115 field specimens (blood, serum, vaginal swab, vaginal fluid discharge, nasal swab and abortion material) from 100 abortion, early embryonic deaths, anomaly and fertility problems cases in cattle over the age of 2-5 years old, and also samples from animal hospital of YYU, Faculty of Veterinary Medicine were tested by Polymerase Chain Reaction (PCR) technique using specific primers encoding *Panpesti 5'-UTR*, *Glycoprotein C* (gC) and *Glycoprotein B* (gB) gene respectively, and resulting out of %41.73 were detected as positive for BVDV and all samples were negative for BoHV-1 and BHV-4 nucleic acid. As a result, the presence of BVDV infection in cattle in the Van region and its role in the occurrence of abortion cases emphasis for the first time; attention to the viral abortions the determining the etiology of abortion cases and genital system problems, it needs to focus on the detection of persistent infected animals and most effective way about vaccination of susceptible population for prevention and control of infection.

Keywords: BVDV, BoHV-1, BoHV-4, Abortion, PCR, Van

ANIMAL FARMING AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

This is also true for livestock farms that make a lot of use of biodiversity. Animals are important to achieving sustainable development goals. Although they are not much highlighted in the proposed agenda for sustainable development adopted by United Nations, the recent reports call on international policymakers to integrate principles of animal welfare and wildlife conservation in all efforts to achieve the United Nations Sustainable Development Goals. The question may arise what are some of the main contributions of animals to sustainable development goals. Well, first of all, the contribution of animal husbandry to the economy is undeniable. Take for example sheep and goats as small ruminants. The importance of raising small ruminants in different parts of the world is well recognized which sustainably creates economic growth—focused on productive, inclusive, and decent work for all. Adding to that, sheep and goats are considered to be very important for contributing to the development of rural zones.

Keywords: Animal Farming, Sheep, Goat, Sustainable Development

THE IMPORTANCE OF MOLECULAR METHODS USED IN DETERMINING HERITAGE DISEASES IN CATTLE

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ABSTRACT

Hereditary diseases in cattle are a very important group of diseases that cause significant yield and economic losses and hereditary diseases are mostly caused by autosomal recessively inherited alleles. Disorders (physiological and morphological) in the genetic material transferred to the offspring by heredity, diseases that negatively affect the health and yield of the animal or that reduce fertility by causing embryonic death are defined as hereditary diseases. Hereditary diseases cause the cessation of protein synthesis by changing the genetic codes as a result of mutations in the transferred genes spontaneously or due to environmental effects. Understanding the molecular mechanisms of hereditary diseases and diagnosing them with molecular techniques at the gene level is a cheap, practical, Maroct and precise method. It is very important in reducing economic losses, removing diseases from the herd and detecting hereditary disease carriers in the herd in the breeding programs to be applied. Determination of carrier individuals in terms of hereditary diseases is a very important step for the genetic improvement of production in cattle breeding in Turkey. In particular, it should be checked whether the breeds are free from important hereditary diseases. It should be considered that mutant alleles causing hereditary diseases known to be breed-specific, such as Bovine Leukocyte Binding Deficiency (BLAD), Factor XI deficiency (FXID), Spinal musculer atrofi (SMA), Limber legs, *Brachyspina* syndrome (BS), Uridine monophosphate synthetase deficiency (DUMBS), Mule foot (Syndactyly) and Complex vertebral malformation (CVM), can also be spread to other cattle breeds by crossbreeding.

Keywords: Bovine, hereditary disease, molecular method, mutation

EFFECTS OF SYNERGISTIS EFFECTS OF POMEGRANATE PEEL EXTRACT AND PREBIOTIC ON FATTENING PERFORMANCE AND SOME BLOOD PARAMETERS IN QUAILS

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ABSTRACT

This study aimed to investigate the effects of the synergistic effects of pomegranate peel extract and prebiotic on fattening performance and some blood parameters in quails. The research was carried out in the quail unit in Bursa Uludağ University Faculty of Veterinary Medicine Application and Research Farm. In the study, 240 female quails, which were supplied from a commercial enterprise and in the spawning period, were used. The study consisted of a control and 6 experimental groups and each experimental group was designed with 5 replications. Groups; control (C), prebiotic (Pre), low-dose pomegranate peel extract (NKT) (7.5 ppm), low-dose NKT (7.5 ppm) + prebiotic, high-dose NKT (15 ppm), and high- dose NKT (15 ppm) ppm) + prebiotic. Animals were weighed on days 1, 8, 15, 22, 29, and 36 of the study and the study was terminated on day 45. At the end of the study, necessary samples were taken from 60 quails, 10 from each group, and evaluated in terms of parameters. During the experiment, the rate of feed consumption was higher in the control and prebiotic groups. No difference was observed between groups in body weight gain. Feed conversion ratio, low dose NKT, low dose NKT+Pre, high dose NKT and high dose NKT+ Pre. higher in the control and prebiotic groups than in the control and prebiotic groups. No difference was observed between the groups in hot and cold carcass, pH and L,a*,b* values. Total antioxidant capacity (TAC) values of high-dose NKT and high-dose NKT+ Pre. groups were significantly (p,lt;0.05) higher than the other groups. Superoxide dismutase (SOD) enzyme values high dose NKT+ Pre. group was found to be statistically significant (p,lt; 0.05) higher than the other groups. The results of the study show that pomegranate peel extract (NKT) and prebiotic can have a positive effect on fattening performance, live weight gain, feed consumption and feed efficiency, and antioxidant values in the blood in quails.

Keyword: Pomegranate peel extract, prebiyotic, equail, feed conversion ratio, live weight gain

EFFECTS OF FERMENTED OLIVE LEAF AND ITS WASTEWATER ON PERFORMANCE PARAMETERS OF BROILER CHICKEN

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ABSTRACT

The present study was conducted to determine the effects of olive leaf fermented with sheep rumen liquid and its wastewater on the performance parameters in broilers. In fermentation, 500 g of olive leaves, 400 ml of distilled water, and 8.4 g of urea (46%) as a nitrogen source was used. Fermentation starting pH value was arranged with 1N HCl. Then sterilization was applied at 120 ºC for 15 minutes, and the inoculation (%2) was done in a sterile cabin using microorganisms from the rumen liquid (OD=0,8). Fermentation was carried out in an oxygen-free environment and at 38 ºC temperature. For the animal experiment, there were four treatment groups (five replications, seven birds in each replication), and a total of 140 one-d-old Ross 308 male broiler chickens were used. Birds were fed with a control diet (without olive leaf and wastewater) (**CON**), non-fermented olive leaf (**OL**) (7.5 g/kg feed), fermented olive leaf (7.5 g/kg feed) (**FOL**), and leaf wastewater (7.5 ml /kg feed) (**FW**) at 42 days. Diets were presented to birds as *ad-libitum*. At the end of the study, there were no differences in the final weight (FW), weight gain (WG), feed conversion ratio (FCR), and feed intake (FI) between treatment at 42 days ($P>0.05$). In the finishing period (24-42 d), olive leaf wastewater had a negative effect on WG compared to the other groups, and the difference between the other groups was statistically significant ($P<0.05$). In conclusion, the diets fed with olive leaves and wastewater fermented with rumen liquid could not negatively affect broiler performance.

Keywords: Olive leaves, Fermentation, Rumen liquid, Broiler, Performance

EFFECT OF LIQUID STATE FERMENTATION USING *Lactobacillus spp*. ON THE NUTRITIONAL COMPOSITION OF THE STALK PARTS OF *Agaricus bisporus* IN DIFFERENT PH LEVELS

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ABSTRACT

This study was investigated to determine the effect of the liquid state fermentation using *Lactobacillus* spp. on the nutritional composition of the stalk parts of *Agaricus bisporus* at different pH levels. Fresh *A. bisporus* was obtained, and the stalk parts were separated from the cap parts. After cutting into small pieces, each 100 gram of mushroom stalk was mixed with 400 ml of distilled water in the fermentation flasks. The mixture was enriched with 8.4 g urea (46% N) as a nitrogen source. The fermentation flasks were allocated to two pH groups (6 and 7), and the pH of the fermentation media was adjusted to 6 and 7 by using 1 N HCl and 1 N NaOH. Mushroom stalks were sterilized at 121 °C for 15 min by autoclave and then inoculated with 1 ml *Lactobacillus* spp. (108 CFU/ml). One uninoculated flask was also separated as a positive control for each inoculated flask. The inoculated mushrooms were incubated at 30 °C for 48 hours. At the end of the fermentation, raw, fermented, and uninoculated mushroom stalks were analyzed to determine the *Lactobacillus* spp. count, pH value, crude protein, and ash content. *Lactobacillus* spp. decreased ($P<0.001$) the crude protein content of the mushroom stalk in both pH level compared with the uninoculated mushroom stalk. However, the lowest crude protein content was observed in the pH 7 group among the fermented stalks. The ash content of the mushroom stalk was also decreased ($P<0.001$) after liquid fermentation in both pH level. Afterall, there was no difference in ash content between the fermented stalks. Lactobacillus spp. decreased the pH level of mushroom and liquid in both initial pH levels compared with the uninoculated mushroom stalks. *Lactobacillus* spp. count tended to be higher ($P=0.078$) in the pH 6 group than in the pH 7 group. The fermentation conditions need to be studied to investigate the usability of the liquid state fermentation for improving the nutritional composition of mushroom stalk.

Keywords: Agaricus bisporus stalk, mushroom, Lactobacillus spp. liquid state fermentation

Bacillus subtilis IMPROVES THE NUTRITIONAL VALUE OF GRAPE SEEDS THROUGH SOLID-STATE FERMENTATION

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ABSTRACT

Solid-state fermentation has been used to improve the nutritional values of agricultural by-products. In this study, the effect of solid-state fermentation using *Bacillus subtilis* on the nutritional composition of grape seeds was investigated. Grape seeds were fermented by *B. subtilis* (ATCC 21556) for 48 hours in solid-state conditions. The unfermented and fermented grape seeds were analyzed for determination of the crude protein (CP), ether extract (EE), ash, crude fiber (CF), neutral detergent fiber (NDF), and acid detergent fiber (ADF) content. Fermented grape seeds had higher CP ($P<0.001$), EE ($P<0.05$), and ash ($P<0.001$) content than unfermented grape seeds. However, CF, NDF, ADF, and nitrogen-free extract were lower ($P<0.001$) in fermented grape seeds compared to unfermented grape seeds. *Bacillus subtilis* can be used to improve the nutritional composition of grape seeds.

Keywords: grape seed, Bacillus subtilis, solid-state fermentation, nutritional value

A RESEARCH ON DETERMINATION OF FASN GENE POLYMORPHISMS IN TURKISH HOLSTEIN BULLS

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ABSTRACT

Meat is the most important nutrient in human nutrition in terms of proteins, fats, vitamins, and minerals. Meat, which has an important place in nutrition with its high biological value and satiety, contains essential amino acids required for metabolism. There are many factors that affect the quality of meat. One of these factors is the marbling score of the fat accumulated between the muscle fibers of the meat. However, the marbling score alone is not effective on meat quality. The fatty acid composition that forms the marbling score has an effect on both the meat quality and the flavor of the meat. For this reason, the fatty acid composition of the intramuscular tissue of red meat has an important place in the red meat industry. In recent years, researchers have been studying the genetic effects of animal species and breeds on the fatty acid compositions in meats, as well as the effects of the ration contents used in animal nutrition to manage the fatty acid composition in meat and meat products. In particular, studies have focused on the SNPs of genes such as CAST, CALP, LEP, SCD, FABP4 and FASN, which are associated with meat quality and fat content. The fatty acid synthase gene (FASN) is a multifunctional enzyme complex that regulates the de novo biosynthesis of long-chain fatty acids. FASN is an important candidate gene influencing the fatty acid composition of meat due to its role in de novo lipogenesis in mammals. The beef of Turkish Holstein Bulls (THB) is the most consumed beef in the Marmara region of Turkey. In our study, sample meats collected from the Logissimus muscal dorsi (MLD) muscle of 90 male THBs of 17 months old were studied. The aim of the current research is to contribute to the improvement and standardization of the beef quality of THBs before slaughter. It is desired that THBs will contribute to the production of better quality and healthy meat products for those who will be used in butchery production. In the FASN gene of THBs, exons 34, 35 and 36, and introns 34 and 35 were completely sequenced, and introns 33 and 36 were partially sequenced (Beckman Coulter GenomeLab GeXP). The 839 bp (the between 50791309th and 50792147th position) on bovine chromosome 19 (19q22) has been sequenced. As a result of DNA sequencing, 2 single nucleotide polymorphisms (SNPs) (rs208645216 G>A and rs209734560 C>T) were determined in our samples. Bioedit and Chromas programs were used. It was observed that both loci of SNPs identified in the FASN gene of THBs were polymorphic. It has been determined that THBs have a potential in determining the relationships between FASN gene variants and fatty acid composition. Whether it has potential as a genetic marker in marker assisted selection studies should be evaluated with new studies.

Keywords: Bovine, FASN gene, SNP, Fatty acid composition

ACKNOWLEDGMENT:
This research study was supported by Trakya University Scientific Research Council (TÜBAP Project No: 2022/02).

DETERMINATION OF SPIDER SPECIES DISTRIBUTED IN KONYA PROVINCE, SELÇUKLU DISTRICT AND SURROUNDINGS

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ABSTRACT

Turkey is the habitat of the most common species in the world. In Konya province, 18 kinds of spider species from 11 families were determined. In this study, spider samples were collected from Aydınlık, Cumhuriyet, Beyhekim, Yazır and Ardıçlı districts of Selçuklu district of Konya province between 2014-2018. The distribution of these samples is 118, A total of 30 adult specimens were collected, 24 juveniles and 64 under-adults. 24 of them are juveniles and 94 adults consist of 33 male and 61 female individuals. A list of studied taxa with localities and dates of collecting is given below; In the samples consisting of 18 different spider species belonging to 11 families, *Agelenidae, Gnaphosidae, Lycosidae, Thomisidae, Theridiidae, Philodromidae, Amaurobiidae, Pholcidae, Clubionidae,* Salticidae and Titanoecidae, the most common species are respectively; *Maimuna vestita, Pardosa proxima, Nomisia exornata, Steatoda albomaculata, Textrix maimuna, Pholcus phalangioides, Pseudeuophrys obsoleta* and *Steatoda paykulliana* (Walckenaer, 1806), which is one of the most common poisonous spiders in hobby and site gardens, were identified. This poisonous species was first detected in Kırıkkale in 2006 in our country. This species was also found in Konya province in this study. This study is of great importance in terms of shedding light on future systematic studies and determining the spider fauna.

Keywords: Araneae, fauna, systematic, Konya, Turkey,

COMPARATIVE EVALUATION OF FERTILITY PARAMETERS IN SAANEN GOATS WITH BORDER DISEASE

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ABSTRACT

In small ruminants, abortions may occur due to infectious and non-infectious causes. Infectious abortions are caused by bacteriological, virological, protozoal, or fungal factors. Infectious factors cause many different negative effects at the herd health level but also cause significant decreases in fertility characteristics. The present study aimed at evaluating the fertility, birth, and newborn findings of a goat flock that was synchronized with intravaginal sponge application and was found to be infected with Border Disease Virus (BDV). Medroxyprogesterone acetate-impregnated intravaginal sponge (Esponjavet, Hipra, Spain) and 500 IU PMSG (Oviser, Hipra, Spain) were applied to 192 goats in a Saanen goat flock farm with 340 broodstock to control the reproductive activities during nonbreeding season. After removal of the sponge, 150 goats (78%) had estrus response and mated with fertile bucks. A total of 115 goats (60%) became pregnant. Pregnancy diagnosis was performed by transrectal ultrasonography within 30-45 days after mating. Regarding re-control of pregnancies on the 90th day, 80 goats (42%) were determined to be pregnant. Some congenital deformities (brachygnathism, joint bletures, hair disorders, small and weak kids), abortions (8), stillbirths (8), and embryonic deaths (34) were also detected in the herd. BDV antibody and antigen tests were positive in serological tests of kids with clinical findings. This result was compatible with the findings of kids and pregnant goats. This study clearly demonstrated that it is beneficial to search for factors in terms of BDV in enterprises with fertility problems. Effective herd health programs are essential in rearing management and disease control in livestock. In dairy goat farms, these programs are intended to monitor, treat and prevent health problems as well as ensure animal welfare and they are prerequisites for providing sustainable and profitable dairy goat farms.

Keywords: Saanen, Border Disease, fertility, herd health

TESTING MICROSATELLITE LOCI IN CAUCASIAN PARSLEY FROG (*Pelodytes caucasicus*)

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ABSTRACT

The members of the *Pelodytes* genus consist of five species (*P. atlanticus, P. caucasicus, P. hespericus, P. ibericus*, and *P. punctatus*) and one of them (*P. caucasicus*) is distributed wide apart from the other four Parsley frogs. *Pelodytes caucasicus* is endemic to Caucasus Region. This species is listed in different conservation conventions and Red Data Books because its populations tend to decline, and its populations were cataloged as Near Threatened (NT) by the International Union for Conservation of Nature (IUCN). The assessment of the genetic diversity of populations is important for planning conservation strategies for threatened species. A microsatellite marker is an ideal neutral molecular marker for determining the genetic structure of inter-population differences in threatened species. Here we provide the first testing of 15 different microsatellite locus (*Ppu1, Ppu2, Ppu3, Ppu4, Ppu5, Ppu6, Ppu7, Ppu8, Ppu9, Ppu10, Ppu11, Ppu12, Ppu15*, PPU5, PPU10) in *P. caucasicus* which those loci previously developed for *P. punctatus*. Although, two of them (PPU5 and PPU10) were previously tested in *P. caucasicus* the rest of them were not amplified in *P. caucasicus*. We obtained amplification success for eleven (*Ppu1*, *Ppu3*, *Ppu4*, *Ppu5*, *Ppu6*, *Ppu7*, *Ppu8*, *Ppu9*, *Ppu11*, PPU5, PPU10) markers. Markers choice first and vital step for population genetic analysis using microsatellite markers. In this study, we here present the research for useable microsatellite markers for *P. caucasicus* for population genetic studies.

Keywords: Parsley frog, population genetic, microsatellite, Caucasia

ACKNOWLEDGEMENT:

This research is financially supported by by The Scientific and Technological Research Council of Turkey (TÜBİTAK) with a research Grand ID: 121Z897

A SKELETOCHRONOLOGICAL ESTİMATION OF AGE STRUCTURE IN TWO POPULATIONS OF THE CAUCASIAN PARSLEY FROG: PELODYTES CAUCASICUS, FROM TURKEY

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ABSTRACT

The Caucasian Parsley frog is one of the members of the Pelodytidae family. The Pelodytidae family comprises five species and four of them are inhabited in the Iberian peninsula. *Pelodytes caucasicus* is the single representative of Pelodytidae distributed in Caucasia. This species inhabited high mountains of Caucasians and its populations were cataloged as Near Threatened (NT) by the International Union for Conservation of Nature (IUCN). It is important to know the demographic parameters of threatened species. Despite that, there is little information that existed in the literature about the demography of *P. caucasicus*. The most common methodology for determining the age structure is skeletochronology. We are here to present the comparative age structure and morphological parameters of two populations (Çat; Rize and Karagöl; Artvin) of *P. caucasicus* from Turkey. We studied a total of 40 individuals (Çat; Rize: 21 male, 1 female, and Karagöl; Artvin: 15 male, 3 female) for using the skeletochronological analysis and the demographic structure of populations was revealed. We also measured six different morphological characters (SVL, HL, HW, NL, FL, and TL) in the field. Because limited individuals existed in females, we pooled our data in the analysis. While HL, HW, FL, and TL were distributed normally, the age, SVL and NL were not distributed normally according to the Shapiro Wilk test. Population differentiation for age, SVL, and NL were calculated by Mann Whitney U test and we used the Student t-test for HL, HW, FL, and TL. The mean ages of the frogs collected from Çat (Rize) and Karagöl (Artvin) were 3.73 ±0.88 and 4.33 ±1.03 years, respectively. According the to Mann-Whitney U test, Çat (Rize) and Karagöl (Artvin) were differentiated from each other with SVL and NL (SVL; $U = 54$, and NL; $U = 90$ $p < 0.05$) but we found no significant differentiation according to the age structure ($p > 0.05$). Significant differentiation was found between populations for FL and TL (FL; $F_{2,38}=4.03$, TL; $F_{2,38}=8.09$ $p<0.05$). But we found differentiation according to HL and HW ($p > 0.05$) For Çat (Rize), and Karagöl (Artvin), the survival rates were calculated as 0.30, 0.31 respectively. We found a significant correlation between age and SVL in Karagöl (Artvin) and Çat (Rize) ($r = 0.49$, $r = 0.69$, respectively; $p < 0.05$). The current study provides important data for population monitoring of *P. caucasicus* populations.

Keywords: Pelodytes, skeletochronology, age, morphology, Turkey

EFFECTS OF A SELECTIVE ESTROGEN RECEPTOR MODULATOR ON LEFT VENTRICULAR WALL HISTOPATHOLOGY AND REDOX STATUS

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ABSTRACT

The aim of this study is to evaluate the effect of Tamoxifen, a selective estrogen receptor modulator (SERM), on left ventricular wall histopathology and redox status in male adult's mice. The experiment is carried out on a batch of 16 male mice including 8 controls (CON) and 8 experimental (TAM), receiving Tamoxifen in drinking water at 0.25 mg/ kg body weight for 5 weeks. The cardiac fragments obtained are used (i) for the histopathological study of the left ventricular wall using topographic staining with hematoxylin eosin and histochemical staining with Sirius red and (ii) the assay of redox status markers. Our results show wavy and damaged cardiomyocytes associated with perivascular and interstitial fibrosis in the left ventricular wall of TAM compared to CON mice, a significant increase in GSH (188,85±17,097 *vs* 139,16± 11,34, $p<0.05$) and MDA (158,24±18,54 *vs* 223,10±30,65, $p<0.05$)) in TAM mice compared to CON, respectively. TAM has both beneficial and detrimental effects on cardiovascular risk markers in males. Further studies are needed to better manage the cardiovascular risk associated with the use of tamoxifen in the treatment of breast cancer.

Keywords: Tamoxifen, estrogen, left ventricular wall, fibrosis, redox status, male mice.

EFFECTS OF TESTOSTERONE DEPRIVATION ON AORTIC MEDIA TUNICA HISTOPATHOLOGY AND PLASMATIC REDOX STATUS

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ABSTRACT

Sexual hormones are determinant players in cardiovascular diseases. The aim of this study is to investigate the effects of testosterone deficiency, induced by castration, on oxidative status and the histopathology of the aortic media tunica. The experiments were undertaken on a batch of 30 *Wistar* males' rats randomised into 3 groups, 10 control (Con), 10 castrated (Cas) and 10 castrated then supplemented with testosterone (Cas-T). Our results showed that testosterone deficiency induces a significant decrease in myeloperoxidase activity (19,95 ± 1, 79 *vs* 34,86 ± 1,13, p<0,0001), this was maintained even after testosterone replacement. Furthermore, testosterone deficiency decreased the antioxidant capacity by reducing GSH in plasma (0,118 ± 0,003 *vs* 0,15 ± 0,011, p<0,05). Our results indicate also that testosterone supplementation leads to a significant increase in ceruloplasmin levels (62,37 ± 15,89 *vs* 148,12 ± 27,77, *p* <0.05). The histomorphometric examination of the aortic tunica media in castrated rats showed a significant decrease of media thickness (274,7 ± 2,96 *vs* 317,6 ± 5,19, *p* <0.0001) and VSMC count (108,1 ± 6,47 *vs* 130 ± 6,147, p < 0.05) associated with damaged and broken elastic lamina. Testosterone supplementation restores the media thickness and the count of VSMC. Our findings demonstrate that testosterone deficiency leads to a decrease in the count of VSMC and a rupture of elastic lamina. Testosterone altered the plasma oxidative status through actions on GSH, MPO and ceruloplasmin.

Keywords: Testosterone, oxidative stress, media tunica, vascular smooth muscle cells, aorta.

DETERMINATION OF ANTIOXIDANT ACTIVITY OF LEAVES AND FLOWERS OF *Vicia faba* L.

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ABSTRACT

Today, medicinal plants used in folk medicine are increasingly being researched and used in pharmaceutical, nutraceutical fields, and food. Despite its nutritional and medicinal properties, *Vicia faba* is a legume whose value is not fully understood. More research is needed on its multiple biological effects, such as antioxidant activity and other aspects. The aim of this study is to determine the antioxidant activity of extracts obtained from *Vicia faba* leaves and flowers. For this purpose, leaf and flower samples, which were dried in the open air and ground into fine powder, were extracted by steeping in boiling water for ten minutes. The total phenolic content (TPC), total flavonoid content (TFC), and antioxidant capacity of the extracts were analyzed using spectrophotometric techniques. In addition, organic acid and phenolic compound contents were determined by high performance liquid chromatography technique. It was determined that the total phenolic, total flavonoid and antioxidant contents of *Vicia faba* flowers were higher than the leaves. The main phenolic compound in flowers and leaves is ellagic acid. In addition, cytotoxic effects of leaf and flower extracts were investigated by colorimetric test using CCK-8 (Cell Counting Kit-8) kit. No cytotoxic effects were observed. *Vicia faba* L. is a good source of natural antioxidants and can be used to prevent harmful effects caused by free radicals.

Keywords: *Vicia faba* L. Antioxidant activity, phenolic, flavonoid compounds

PHYTOCHEMICAL COMPOSITION AND BIOACTIVITIES OF *Anacyclus maroccanus* BALL. AND *Anacyclus radıatus* LOISEL AERIAL PARTS

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ABSTRACT

The peculiar ecological conditions of Morocco provide a huge and varied plant biodiversity, among which there are species with potential medical interest. Moroccan medicinal plants have received a great deal of attention in the field of ethnopharmacology, being exploited as inexpensive and available sources of drugs by the local population, especially in rural areas, for primary health care. However, the pharmacological basis and phytochemical requirements for the bioactivities remain to be defined. This strengthens the importance of studying Moroccan medicinal plants, not only to valorize their biodiversity and support further developments in pharmaceutical, nutraceutical, and cosmetic fields, but also to give a scientific basis to ethnobotanical traditions, which can lead to their rational and safe use by local people. Among endemic species, aerial parts of *Anacyclus* species (Asteraceae), especially *A. perythrum*, have been used traditionally to treat different ailments, such as digestive disorders, pain, and infections, due to the anti-inflammatory, analgesic, and antimicrobial properties. However, few studies have characterized their pharmacological power and the bioactive compounds. In this present work, two ecotypes of the Anacyclus genus including *A. maroccanus* (AM) and *A. radiatus* (AR) were investigated for their bioactivities and the phytochemical composition to highlight a pharmacological interest, and enabling successful development. To this end, a methanolic and an ethyl acetate extracts were prepared for each ecotype. The phytochemical analysis of the studied extracts was conducted by spectrophotometric and chromatographic analysis. We have considered performing an assay of total phenols, flavonoids and tannins of the extracts. In order to evaluate the antioxidant activity DPPH- and ABTS-radical scavenging and Iron Chelating activities were evaluated. Inhibition of Advanced Glycation End-Product (AGE) and In Vitro Metabolic Enzyme Inhibition (α-amylase and α-glucosidase enzymes) were performed. Phytochemical analysis revealed high amounts of polyphenols, tannins and flavonoids in all samples studied, especially in AR extracts; moreover, quercetin, syringic acid, coumaric acid, and 3-hydroxyflavone were the major identified compounds by HPLC analysis. Under our experimental conditions, ethyl acetate extracts were usually the most effective in scavenging DPPH and ABTS radicals, chelating ferrous ions, and inhibiting AGE formation and α-glucosidase enzyme; conversely, AM extracts potently inhibited α-amylase enzymes, despite slight effects of AR samples. Present results provide more scientific basis to the ethnopharmacological uses of *Anacyclus* spp. and suggest a further interest in AM and AR ecotypes as natural sources of bioactive compounds and/or phytocomplexes for possible pharmaceutical and nutraceutical developments.

Keywords: α-amylase; α-glucosidase; antiglycation activity; chelating activity; advanced glycation end products.

ANTIOXIDANT, ANTIMICROBIAL AND CHEMICAL COMPOSITION OF *Anacyclus maroccanus* BALL. AND *Anacyclus radiatus* LOISEL ESSENTIAL OILS

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ABSTRACT

Present study was aimed at characterizing the phytochemical composition and the antioxidant and antimicrobial power of the essential oils from the Moroccan *A. maroccanus* and *A. radiatus* ecotypes. . The chemical composition of EOs was analyzed by means of Gas Chromatography-Mass Spectroscopy analysis (GC-MS); moreover, 1-picrylhydrazyl (DPPH), crocin bleaching and reducing power assays ware made to evaluate the antioxidant activity. At last, disk diffusion method, Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were employed to evaluate the antimicrobial activities against some resistant and pathogenic microorganisms. Results showed that the *A. maroccanus* and *A. radiatus* EOs were characterized by high amounts of oxygenated monoterpenes and sesquiterpenes, along with radical scavenging and reducing properties. Furthermore, EOs exhibited marked antimicrobial effects against all the tested bacterial and fungal strains. Present findings suggest that that EOs from *A. maroccanus* and *A. radiates* Moroccan ecotypes is an interesting source of natural antioxidant which could be exploited in pharmaceutical field, particularly against emerging drug resistant microbial strains.

Keywords: Anacyclus maroccanus, Anacyclus radiatus, Antimicrobial Activity, Antioxidant activity, Chemical Composition, GC-MS.

EFFECT OF ORGANOPHOSPHATE COMPOUNDS ON ACETYLCHOLINESTERASE ENZYME

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ABSTRACT

Pesticides are chemical compounds used to control harmful species in plants. They can be classified in many different ways according to their physical or chemical structures and formulations. Insecticides, fungicides and herbicides are included in these classifications. Organophosphates (OPs) are used as an insecticide in agriculture. OPs are easily absorbed by inhalation, transdermal and gastrointestinal routes. During the application of organophosphate (OP), intoxication is encountered in the society due to reasons such as not using protective clothing and masks, incorrect storage and unconscious use. As a result of this intoxication, acetylcholinesterase (AChE) enzyme is inhibited. AChE hydrolyzes acetylcholine (ACh) to choline and acetic acid. The role of ACh is to carry nerve impulses. Inhibition of AChE causes accumulation of ACh in synapses. This accumulation delays the response of muscles to nerves. When the concentration of ACh increases, cholinergic syndrome is observed and its most important effects usually on gastrointestinal, cardiovascular and neuromuscular systems. The initial symptoms of this syndrome are tachycardia, headaches, cramps, hypotension or hypertension, diarrhea, behavioral and mental disorders. The aim of this study to summarizes the literature data which includes organophosphates, their general properties and the effect of compounds on acetylcholinesterase enzyme.

Keywords: Acetylcholinesterase, organophosphate, pesticide, acetylcholine, neurotoxic effect, cholinergic syndrome

THE EFFECTS OF PESTICIDES ON SECONDARY METABOLITES OF BEAN PLANTS (*Phaseolus vulgaris* L.)

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ABSTRACT

The objective of this work is to study the toxic effect of two pesticides widely used in the field of agriculture, evaluating their impact on secondary metabolites in a Phaseolus vulgaris plant. These plants were treated with different pesticides. The harvested fruits were used for the determination of secondary metabolites. The results obtained showed that the treatment of the plants with these two pesticides caused an increase in polyphenols in the plants that were treated with Mancozebe. While the lowest concentration was observed in the plants treated with the two pesticides Mancozebe in combination with Emamectin benzoate. However, the highest flavonoid content was observed in plants treated with Emamectin benzoate. The results showed the relation between the variations of secondary metabolites and the type of pesticides used. This probably explains the role of secondary metabolites in the detoxification of toxic pesticide metabolites and thus leads to the protection of the plant.

Key words: Secondary metabolites, pesticides, Phaseolus vulgaris.

PARTICIPATION OF SALICYLIC ACID (SA) AND ABSCISIC ACID (ABA) IN THE DEFENSIVE RESPONSE OF LUPINE TO THE FUNGAL PATHOGEN COLLETOTRICHUM GLOEOSPORIOIDES - THE CAUSATIVE AGENT OF ANTHRACNOSE

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ABSTRACT

Legumes are an important part of both conventional and organic farming. In Poland, three species of lupins are of economic importance: narrow-leaved lupine (*L. angustifolius*), yellow lupine (*L. luteus*) and white lupine (*L. albus*). Among the lupins, the narrow-leaved lupine is characterized by the lowest susceptibility to anthracnose in comparison to the other species (yellow and white lupins) and this feature determines its greater acreage. Pathogens, including *Colletotrichum gloeosporioides*, causing anthracnose, are the main reasons for the reduction in the yield of green mass and seeds in lupine cultivation. As part of the research objective to determine the level and period generating signaling molecules, i.e. SA and ABA in yellow and narrow-leaved lupins infected with *C. gloeosporioides* was developed. The aim of the research was to describe differences between species in the above mentioned scope, taking into account the antagonistic or synergistic interactions between the studied molecules. In the published literature, there are many reports on the pabtained results showed that in infected *C. gloeosporioides* leaves of yellow lupine and narrow-leaved lupine seedlings, the accumulation of ABA during 24 to 96 h was significantly higher than in control leaves. The infection caused the highest accumulation of ABA in the tissues in 72h in both tested lupine species. Analyzes of the level of salicylic acid (SA), a signaling molecule that plays a key role in plant defense responses to biotrophic and hemibiotrophic pathogens, showed that in infected *C. gloeosporioides* leaves of yellow lupine seedlings, the level of this molecule increased significantly in 24 and 48 hours. The obtained results indicate the participation of the studied signaling molecules in the defense response of lupine to *C. gloeosporioides*

Keywords: salicylic acid, abscisic acid, Colletotrichum gloeosporioides, anthracnose

COMPARISON OF THE FRUIT OF *Momordıca charantıa* L. AND THE AMOUNT OF ELEMENTS IN THE FRUIT PEEL OF *bacon* AND *fuerte* VARIETY *Persea americana* BY DETERMINING THE ICP-MS ANALYSIS

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ABSTRACT

The fruit samples of *Momordica charantia L.* (Qudret pomegranate), which were taken from the market in Balikesir province in September-October 2021, were dried in an oven and then ground. The other analyzed plant is the fruit peels of the *Bacon* and *Ettinger* variety *Persea americana*. In September-December 2021, avocado fruit obtained from different markets in Konya was used. The sub-species of avocados of this fruit were determined morphologically. The peels of these fruits were dried according to their types. *Momordica charantia L*. (power pomegranate) plant, which was analyzed at Selcuk University Advanced Technology Research and Application Center (SELÇUK-ILTEK), has 10 different elements (elements other than heavy metals and heavy metals); amounts were determined by Inductively Coupled Plasma-Mass Spectrometer (ICP-MS). Thermo brand X series 2 model ICP-MS device was used for this analysis. Before giving the samples to the ICP-MS device, drying-grinding was done as a preliminary preparation, then content analysis was performed as a result of the ICP-MS microwave solving process. In Aksaray University Scientific and Technological Application and Research Center, fruit peels of *Bacon* and *Ettinger* variety *Persea americana* plant were read using ICP-MS device. When these two varieties were compared, it was seen that the Ni ratio was the lowest in both, while the other elements had different values. The results of the analysis will show us whether these plants are safe for health. It will be determined whether it is suitable for consumption as a medicine and for use as a raw material for medicine.

Keywords: *Momordica charantia* L., Ni, Heavy Metal. Bacon, Fuerte, Persea americana,

ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITIES OF METHANOLIC EXTRACT FROM THE MOROCCAN ENDEMIC PLANT ANDRYALA PINNATIFIDA SUBSP MOGADORENSIS

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ABSTRACT

As they are implied in virtually all human and animal diseases, inflammation and pain have become the major focus of global scientific research. Inflammation is a complex pathophysiological process mediated by a variety of signaling molecules produced by leucocytes, macrophages and mast cells undergoing various cellular responses. Due to the adverse effects of non-steroidal anti-inflammatory drugs (NSAIDs) and opioids, there is a high demand for the search of new drugs with lesser or no side effects. In the context, current trend of research has shifted towards medicinal plants because of their affordability and accessibility with lesser side effects. *Andryala pinnatifida* is a plant endemic to Morocco, widely used in the Moroccan pharmacopoeia. Even though, the resin of this plant is traditionally used in treatment of inflammation, there is no scientific data avalable on its traditional use. Therefore, on the basis of the above evidences, present study was designed to scientifically validate anti-inflammatory and anti-oxidant activities of methanolic extract from aerial parts of *A. pinnatifida*. To evaluate the anti-inflammatory activity of the methanolic extract, from the aerial parts of *A. pinnatifida* subsp *mogadorensis*, two experimental models of acute inflammation induced in mice by xylene and carrageenan were selected. The demonstration of the antioxidant activity was determined via three complementary tests: the reduction of the free radical DPPH, the reducing power on ferricyanide of potassium and the test of the discoloration of β-carotene. The results obtained showed that our sample has a very interesting antioxidant power, showing highly significant differences ($P < 0.001$) with reference antioxidants (BHT and Quercetin). Phytochemical screening was used to characterize the main chemical groups that could be responsible for the biological properties of *Andryala pinnatifida*. The chemical compounds highlighted are flavonoids, saponins, coumarins, tannins, triterpenes and sterols. Furthermore, the oral pretreatment of mice with methanolic extract at doses of 100 mg/kg, 200 mg/kg and 300 mg/kg inhibited significantly the edema induced in mice, these results prove that the methanolic extract has a very potent, and statistically significant, anti-inflammatory activity compared to the positive control (Diclofenac).

Keywords: *Andryala pinnatifida subsp mogadorensis*, methanolic extract, phytochemical screening, anti-inflammatory, antioxidant

PHYTOCHEMICAL COMPOSITION AND ANTIOXIDANT AND ANTI-INFLAMMATORY EFFECTS OF *Crocus sativus* TEPALS FROM MOROCCO

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ABSTRACT

Saffron which corresponds to *Crocus sativus* L. stigmas (Iridaceae), is the most expensive spice in the world. Known as red gold, it requires harvesting 200,000 to 300,000 flowers for one kg of saffron. The flowers are manually handled to gently remove the three precious stigmas that make up saffron. Therefore, considering the huge number of flowers used to obtain a desired amount of saffron, we deduce that a large amount of tepals is discarded as they are considered waste. In this study, we aim to valorize saffron tepals considered as waste through the evaluation of their antioxidant and anti-inflammatory activities and the characterization of their chemical profile. To achieve our objective, a quantitative analysis of the phenolic compounds of *Crocus sativus* tepals extract (CSTE) was carried out using colorimetric methods. In vivo bioassays were performed to explore the potential anti-inflammatory efficacy of CSTE by using xylene–induced ear edema and carrageenan-induced mice paw edema. In addition, the in vitro antioxidant activity of CSTE was determined by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method, ferric reducing power and b-carotene-linoleic acid assay systems. The results showed that a single oral administration of CSTE to mice produced a significant dose-dependent reduction in xylene-induced ear edema (400 mg/kg, p.o, 52%), and a significant reduction of the edema induced by the injection of carrageenan in mice paw (31%). Additionally, a significant scavenging activity, iron chelating power and lipo-protection activity were exhibited by CSTE. The present study suggests that CSTE possesses promising anti-inflammatory and antioxidant activities which could be related to the presence of flavonoids, phenols and carotenoids in the plant. Therefore, CSTE may be beneficial in treating inflammatory diseases.

Keywords: Saffron, Crocus sativus, tepals, anti-inflammatory, antioxidant

ATTENUATION OF ANXIETY AND MEMORY LOSS BY SEEDS ETHANOLIC EXTRACT OF *Cuminum cyminum* IN SWISS MICE

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ABSTRACT

According to the WHO, global life expectancy is increasing and the number of elderly people is expected to double by 2050. Dementia also increases sharply with age. It is estimated that 25-30% of people aged 85 or over suffer from dementia. Biologically, aging results from the impact of the accumulation of a wide variety of molecular and cellular damage over time, leading to a gradual cognitive and physical decline. Anxiety is one of the most common disorders in the world. It occurs frequently and has a negative impact on the quality of people's lives. *Cuminum cyminum* L., or cumin, belongs to the Apiaceae family. It is the second most popular spice in the world after black pepper. In traditional medicine, cumin seeds have been widely used for the treatment of gastrointestinal pain, stomach aches, ear infections, low blood pressure, indigestion, cold, fever, lung disease, labor pain, anorexia, heart disease, *Cuminum cyminum* seeds are used as well for the treatment of different illness of the nervous system. The aim of our study was to evaluate the potential effect of *Cuminum cyminum* seeds ethanolic extract (CCEE) on anxiety and memory loss in mice. The acute toxicity of CCEE was studied on Swiss albino mice using the limit dose test in order to further assess CCEE pharmacological activity at doses without toxic symptoms. Scopolamine-induced memory loss model was further used. Thein vivo study was performed on mice subdivided into eight groups namely Nacl treated mice, 5 days Scopolamine treated mice (1mg/Kg/day), 5 days CCEE-treated and CCEE co-treated with scopolamine mice (100, 200, 400 mg/kg/day). Learning, memory and anxiety performances were evaluated using Open field and Novel Object Recognition test. The results showed that CCEE administered orally to mice was not toxic with no mortality recorded or changes in mice body weight. The level of anxiety was significantly reduced by CCEE in mice co-treated with scopolamine in the open field test. In Novel Object Recognition test, CCEE significantly reduced the memory deficit observed in mice treated with Scopolamine. Cumin seeds extract improved anxiety rate and showed a potential memory enhancement of Scopolamine-induced amnesia in Swiss mice. Therefore, CCEE could be a promising treatment against anxiety and memory loss.

Keywords: Cuminum cyminum, Cumin, memory decline, anxiety, scopolamine, novel object recognition test, open field.

OPTIMIZATION OF THE ANTIBACTERIAL EFFECTS BY ESSENTIAL OILS MIXTURE OF *Ammodaucus leucotrichus* COSSON, *Lavandula maroccana* (MURB.) AND *Thymus vulgaris* L. USING A DESIGNED MIXTURES APPROACH

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ABSTRACT

Combining essential oils (EOs) has been developed as a new strategy to increase their potential use in controlling foodborne and resistant pathogenic strains. For this, a mixture design of the antibacterial effects of *Ammodaucus leucotrichus* Cosson, *Thymus vulgaris* L. and *Lavandula maroccana* (Murb.) were performed using augmented simplex-centroid to produce an optimised EOs mixture providing the optimal activity against three multi-drug resistant bacteria. GC-MS analysis showed that *A. leucotrichus* EO was characterized by the abundance of L-perillaldehyde, D-limonene and bornyl angelate. *T. vulgaris* EO was dominated by thymol, β-cymene, and γ-terpinene, while carvacrol was the main component of EO extracted from *L. maroccana*. Regarding antibacterial results, EOs alone displayed moderate antibacterial activity with minimum innhibitory (MIC) and minimum bactericidal (MBC) concentrantions ranging from 0.06 % to 5.00 %, while the coefficient terms of the different tested combinations revealed synergistic interactions. The results of predicted optimization showed that the optimal EO mixture contain 55% of *T. vulgaris*, 41% of *L. maroccana* and 4% of *A. leucotrichus* significantly decreased the MICs against *S. aureus* (0.0225%), *E. coli* (0.05%) and *P. aeruginosa* (0.688%). Moreover, the optimal mixture displayed a significant decrease in the MIC values of gentamicin (4-fold) and amoxicillin (2-to 64-fold), essentially against *S. aureus*. Overall, these findings showed that the mixture design may constitute suitable tool to produce an optimized EOs mixture providing additional synergistic effects with antibiotics against drug-resistant bacteria.

Keywords: Antibacterial activity, Antibiotic-resistant bacteria, Optimization, Simplex-centroid design, Synergistic effect.

PREDICTION OF SLMLO1 PROTEIN PARALOGS IN *Solanum* L. SPP. USING PARTIALLY ASSEMBLED GENOMIC DAT

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ABSTRACT

MLO is a family of seven-transmembrane proteins playing important role in a range of signal pathways in plants. A recognition of particular MLO proteins was hypothesized to be a universal mechanism of the initiation of the infection by fungi of Erysiphaceae family, the causal agents of powdery mildew. The natural or induced loss-of-function mutations in the corresponding *Mlo* genes prevent, consequently, plant infection with powdery mildew. In tomato *Solanum lycopersicum* L. *SlMlo1* gene was identified as the primary contributor to the susceptibility to powdery mildew. To date the protein sequences homologous to SlMLO1 were predicted from the whole genome assemblies of several *Solanum* species: wild tomatoes *S. pennellii* and *S. chilense,* potato *S. tuberosum* and eggplant *S. melongena.* In the present work we used avaialable partial assemblies to discover SlMLO1 protein homologs in a wider range of *Solanum* species. The annotated transcript sequence corresponding to SlMLO1 protein (Solyc04g049090; the tomato genome assembly SL2.50, Sol Genomics Network) was used as a query for BLAST search against the NCBI database of whole-genome shotgun contigs, with the selection of *Solanum* genus. The matching sequence fragments were processed using combination of scripting tools and manual refinement to merge coding sequences. Finally, open reading frames were identified and translated to protein sequences, and the known *Solanum* proteins were used as references to check the merge. As a result, 22 protein sequences were identified, including 18 new sequences. The assembly of previously known proteins supported the correctness of the prediction. Although some identified sequences had long gaps of the absent data, the overall length of predicted potein sequences could be sufficient for further studies on the SlMLO1 homologs in *Solanum,* and the tested approach may be further used to characterize the whole MLO protein family in a range of *Solanum* and other Solanaceae species.

Keywords: MLO, protein prediction, wild tomato, wild potato

ACUTE AND SUBACUTE (28 DAYS) ORAL TOXICITY ASSESSMENT OF *Crocus sativus* TEPALS IN SWISS ALBINO FEMALE MICE

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ABSTRACT

The dried stigmas of *Crocus sativus* flower are considered the most commercially valuable part of the flower. However, the stigmas, called saffron, represent only 7.4 % of the flower biomass. Therefore, large amounts of floral bio-residue, such as tepals, are generated and wasted in saffron production. The objective of this study was to evaluate the acute and subacute toxicity of the hydroethanolic extract of *Crocus sativus* tepals (CSTE) in mice in order to assess its safety profile for subsequent pharmacological valuation. For acute toxicity study, single dose of CSTE (2000 mg/kg) was administered by gavage in female mice. For subacute toxicity study, the extract was daily administered to the animals, for 28 days, by gavage at doses of 400, 800 and 1000 mg/kg. The animals were daily observed and their bodyweight, food intake and behavioral recorded. In the acute toxicity study no mortality or behavioral changes were observed in mice treated with 2000 mg/kg, indicating that the LD50 is higher than this dose. In the subacute toxicity test, the tested doses produced no significant changes in hematological, biochemical or histopathological parameters in the animals exposed. These results demonstrate the absence of acute and subacute toxicity after oral exposure to CSTE. However, further studies evaluating long-term effects are needed in order to have sufficient safety evidence for its use in humans.

Keywords: *Crocus sativus*, Tepals, Acute toxicity, Subacute toxicity.

DETECTION OF RASPBERRY VIRUSES SPREADING IN KAZAKHSTAN

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ABSTRACT

Raspberry is a berry crop widely cultivated in many countries of the world. *Raspberry ringspot virus* (RpRSV), *Raspberry leaf mottle virus* (RLMV), *Raspberry leaf blotch virus* (RLBV) and *Raspberry bushy dwarf virus* (RBDV) are globally widespread viruses and can lead to crop yield losses by 20-50%. In Kazakhstan raspberry planting material is mainly imported from Russia and European countries, thus there is an urgent need in detection of viral pathogens to prevent spreading of new species, strains and isolates. In the present work, the sets of primers for multiplex RT-PCR detection of RpRSV, RLMV, RLBV and RBDV were developed. The plant material of cultivated raspberry was collected in the Pomological Garden (Almaty) and in private farms and included 187 leaf samples. Additionally, 35 wild raspberry samples were obtained in mountains of the Trans-Ile Alatau. The specific primers for RpRSV, RLMV, RLBV and RBDV were targeted to the coat or nucleocapsid protein genes. As a results, seven samples of the cultivated raspberry were positive for RLMV and 58 samples for RBDV. Among the wild raspberry samples, 15 samples were infected by RBDV, and two single samples were positive for RLMV and RLBV. RpRSV is a quarantine virus in Kazakhstan and has not been identified in the analyzed samples. In the present work it was revealed for the first time that raspberry viruses have been widely spread both in fields and in wild environment in the country. The viral infections spread in raspberry fields probably with an infected planting material or common plant hosts including weeds. Thus, the monitoring of the imported plant material and raspberry plants in field using Maroct and sensitive molecular methods is important to control the potential spread of the viruses.

Keywords: Raspberry viruses, multiplex RT-PCR

DETECTION AND GENETIC INVESTIGATION OF POTATO LEAFROLL VIRUS IN KAZAKHSTAN

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ABSTRACT

Potato is one of the most important agricultural crops grown worldwide. *Potato leafroll virus* (PLRV) causing leafroll disease is one of the most dangerous viral pathogens of potato. Therefore, the study and detection of viral diseases play important role in maintaining the quality and quantity of the yield. Previously, *potato virus X, potato virus M, potato virus Y* and *potato virus S* were detected in different regions of Kazakhstan. In the present work, the identification and genetic study of PLRV were performed for the first time in the South and North of Kazakhstan. Between 2021 and 2022, a total of 117 samples were collected from potato growing areas in south and north Kazakhstan followed by RT-PCR testing for PLRV presence. For detection and investigation of PLRV, sets of specific primers were developed for capsid protein (CP) gene of PLRV. The primers for virus detection were located in the gene regions highly conserved across the different strains and isolates of PLRV. The genetic analysis of complete CP of PLRV was performed corresponding targeted coding sequence of gene. The primers for CP sequencing also included the sites for restriction endonucleases *Nde*I and *Xho*I for further cloning and investigation of biological activities of capsid proteins. In the present study, 51 samples of potato were positive for PLRV. Six and 55 viral isolates were obtained from northern and southern Kazakhstan, respectively. Phylogenetic analysis has revealed that isolates from South Kazakhstan were closely related to the isolates from South Asia (especially Pakistan and India), whereas isolates from northern Kazakhstan formed the clade with isolates from Pakistan and Serbia. Based on the data of phylogenetic analysis, it can be assumed that viruses could be transmitted between mentioned countries with seed potatoes.

Keywords: Potato leafroll virus (PLRV), capsid protein (CP) gene, RT-PCR

96-HOUR ACUTE TOXICITY (LC50) OF AMMONIUM NITRATE IN MOSQUITO FISH (GAMBUSIA HOLBROOKI)

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ABSTRACT

There is a very close relationship between the water quality of aquatic ecosystems and their water basin. Especially all agricultural chemicals used in agricultural water basins are concentrated by being carried by rivers. Artificial fertilizers (for example, ammonium nitrate) is a common and frequently used agricultural chemical in Turkey as well as all over the world. The consumption of chemical fertilizers in our country is 5-6 million tons (through 30-40% of imports). The ratio of nitrogenous fertilizers in our artificial fertilizer consumption, which has the highest rate among agricultural chemicals, reaches 65%. Like all agricultural chemicals, excessive and incorrect use enters the aquatic ecosystem; It diffuses in the aquatic ecosystem as ammonium and nitrite. The toxic effect due to artificial fertilizers is observed as eutrophication, which is common in coastal areas all over the world, with little or no oxygen in the water (hypoxia) or absence (anoxia). In addition, the H+ ion given to the environment during the conversion of ammonium to nitrite and nitrate causes an increase in acidity and has a toxic effect.The mosquito fish, which has a wide distribution in the Thrace region, is standing in slow flowing small waters; The most common herb is often found in ponds and lakes, stagnant waters and quiet stream ponds and paddy fields.These agricultural fertilizers are the main source of nitrogen pollution in aquatic environments. Due to these human-based pollution events, nitrate concentrations in aquatic habitats vary between 1 and 100 mg/L.Compared to ammonium and nitrate, nitrite ions are found in lower concentrations in surface waters. The reason for this is that nitrite is an intermediate product of reduction and oxidation reactions with respect to the medium. Thus, nitrite is either oxidized to nitrate or reduced to ammonia. However, if the wastewater that has not been sufficiently nitrified is given to the receiving environment, it is possible to encounter very high nitrite values in these environments. In such cases, additional toxic effects are observed for the creatures in these waters. The rapid dissolution of ammonium nitrate in the soil, especially during precipitation, causes rapid toxic effects in the aquatic ecosystem in a short time. In order to reduce the use of artificial fertilizers in agricultural areas; soil analysis and determination of the fertilizer dose according to the plant need, increasing the soil organic matter, pressurized irrigation methods, and the irrigation program prepared by taking into account the plant root zone and field capacity, the application of fertilizer together with the irrigation water, taking into account the plant development periods, where the rainfall is sufficient, where the plant can use it. Effective agricultural management such as fertilizer application by division rather than all at once, preference of slow-release fertilizers, weed control, preference of varieties with high nitrogen uptake efficiency, alternation of legumes and deep-rooted plants, appropriate tillage and planting time, optimum plant density can be applied. Reducing the use of ammonium nitrate helps to reduce the negative effects that may occur in the aquatic ecosystem. In this study, the acute toxicity (LC50) of ammonium nitrate fertilizer of mosquitofish (*Gambusia holbrooki*), which is common in the Thrace region, was evaluated. In the 96-hour experiment (18°C, 7.5 pH and 800 µS), the LC50 value of ammonium nitrate in mosquito fish (*Gambusia holbrooki)* for 96 hours was determined as 176,493 ppm (158,896-196,040).

Keywords: Acute Toxicity, LC50, Ammonium Nitrate

AN INVESTIGATION ON BIRDS OF HISARLI MOUNTAIN (ENEZ/EDIRNE)

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ABSTRACT

This study was performed in Hisarlı Mountain located in Enez city of Edirne province in southern Thrace Region. A total 38 days' field observations in the mountain from March 2016 to February 2017 revealed presence of 110 bird species. Migration patterns were followed during autumn and spring and 18 species were determined to use the region for migration in spring and 20 species in autumn. 52 species were found to breed in the region. Regional status (resident, migotory), conversation status (IUCN, CITES, BERN, MAK), populationdensities, breeding determination type and autumn and spring migrations of the determined 110 species were presented as a data table. In addition, threats on birds and on the study area and solution offers for these threats were discussed.

Keywords: Birds, Migration, Hisarlı Mountain, Edirne.

ANALYSIS OF PHENYLPROPANOIDS AND EXPRESSION OF BIOSYNTHESIS-LINKED GENES IN BASIL TRANSFORMED WITH AGROBACTERIUM RHIZOGENES

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ABSTRACT

Plants have the ability to synthesize various secondary metabolites and their quantity varies under biotic and abiotic factors. Efforts continue to enrich plant secondary metabolites with various biotechnological applications. Studies on plant tissue culture studies and plant biotechnology methods by generating genetic differences in the secondary metabolic pathway are continuing to obtain appropriate amounts of secondary metabolites. In the current study, analysis of phenolic compounds with HPLC equipment and the mRNA expression levels of biosynthesis-related genes using specific primers by RT-qPCR were investigated in the leaves of basil (*Ocimum basilicum*) transformed with different *Agrobacterium rhizogenes* strains. PCR analysis was performed to verify the integration of the *rol B* gene from the basil inoculated with *A. rhizogenes* strains. It was determined that the transcripts expression level of the studied genes related to biosynthesis pathways has higher in transformed basil leaves. The inoculation of *A. rhizogenes* 39207 strain led to higher transcript expression of *C4H*, *CAD*, *FLS*, *EGS*, *HPPR*, *PAL*, *TAT*, and *RAS* genes than in other strain applications. It was found that *A. rhizogenes*-mediated inoculation raised the level of chicoric acid, rosmarinic acid, eugenol, and rutin in the leaves of basils transformed with the ATCC 43057 strain. In addition, it was seen that the content of benzoic acid increased only in plants inoculated with the ATCC 15834 bacterial strain. However, the transformation of the *rol B* gene did not lead to a change in the level of cinnamic acid, quercetin, chlorogenic acid, caffeic acid, methyl chavicol, and vanillic acid. While the total phenolic content increased in treatment plants inoculated with ATCC 39207 and ATCC 43057 strains, bacterial inoculation did not cause a significant change in the total flavonoid content. As a result, it might be stated that *A. rhizogenes*-inoculated *O. basilicum* plants could be successful in terms of primary metabolites, and especially the ATCC 43057 strain has the potential to increase the phenolic content.

Keywords: *Agrobacterium rhizogenes*, basil, chicoric acid, eugenol, gene expression, phenolic compound, rosmarinic acid, rutin

ACKNOWLEDGMENTS

The present work has been supported by The Scientific and Technological Research Council of Turkey (TÜBİTAK) with a research Grand ID: 120Z668 and Bartin University Scientific Research Projects Coordination Unit under grant number 2020-FEN-A-016.

DIFERENT BIOINDICATORS AND BIOMARKERS REVEAL THE TOXIC EFFECTS OF CHLORPYRIFOS

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ABSTRACT

Chlorpyrifos (CPF) is an organophosphate pesticide with a broad spectrum of action, defined as a priority pollutant according to EU Directive 2013/39/EU. It is recognized as a reason for honey bee colony losses in some regions in Bulgaria which intensify the need for more detailed studies of its toxicity. Biomarkers are responses to any exposure evidenced in the organism by different modification, which are early warning signals of the potential toxic presence. Different biological markers and approaches could be used in environmental pollution monitoring. The aim of the present study was to characterize the CPF toxic potential through the use of different bioindicators and biomarkers. *Apis mellifera* and *Cyprinis carpio* were studied as bioindicators and the honey bee colony losses in areas treated with CPF, DNA damages and micronuclei in erythrocytes and histopathological changes in common carp gills and liver were used as biomarkers for toxicity in lab conditions. On population level, samples of bee hive food stocks – honey, wax and pollen were collected on signals for high mortality bee colonies in some regions of Bulgaria. The pesticide was found in amount 0.010 – 0.030 mg/kg in samples collected from Sliven, where during 2021 the honey bee colony losses were more than 90%. By using *Cyprinis carpio* as a bioindicator, it was established increasing in the frequency of total nuclear abnormalities proportional to dose and time, decreasing in polychromatic erythrocyte frequencies and DNA damage detected by comet assay. In the gills, mainly intense proliferative and, to a lesser extent, degenerative changes and alterations in the circulatory system were found. In the liver, degenerative lesions, circulatory disturbances and inflammation were observed. Based on the results achieved it could be concluded that CPF is toxic on molecular, cellular, histological and population level. These findings could be applied to different environmental risk assessment programs.

Keywords: pollution, pesticides, toxicity, bioindicators, biomarkers

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (*Apis mellifera* L.) in Bulgaria".

DIFFERENT BIOINDICATORS AND BIOMARKERS REVEAL THE TOXIC EFFECTS OF CHLORPYRIFOS

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ABSTRACT

This study was to perform histological analysis of the process of gametogenesis of the round-scaled barbel *Barbus cyclolepis,* from the middle course of the Maritza River (Bulgaria). 183 specimens were sampled monthly by electrofishing from March to November. The ovaries and testes of the mature individuals undergo a regular annual cycle, divided into six stages. The ovulation period started in early May, continues until July, and in early August was already terminated. All mature females showed characteristics of batch spawning reproduction type. A single case of ovotestis was established in a male fish (3.8 g and 65 mm) caught in April. The ovotestis did not differ from the testis macroscopically, but the histological examination revealed previtellogenic oocytes, positioned in groups or separately among the testicular lobules. The possible reasons for the appearance of this abnormal development in the gonads of the male barbel are discussed.

Keywords: Barbus cyclolepis, ovaries, testis, ovotestis, sexual maturity

SUSTAINABLE WASTE MANAGEMENT SYSTEM IN THE TOURISM SECTOR: CASE STUDY OF WASTE SORTING AND RECYCLING IN MOROCCO

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ABSTRACT

The management of marine plastic pollution worldwide is a major concern for the coastal and marine environment. Every year, 100 millions of living species in the marine environment are affected by ocean pollution. The reduction of marine plastic pollution remains a challenge due the high production of plastic waste in life activities particularly in tourism sector. The lake of plastic waste management worsens the situation even more in developing countries. The aim of this study is to diagnose baseline of current state of plastic pollution in touristic cities in Morocco tightly linked to tourism activities. A survey based questionnaire with hotels regarding plastic pollution in the 6 pilot areas. Including Casablanca, Safi, Essaouira, Tanger, Tetouane Al Hoceima, showed that the typology of the analyzed waste is mostly dominated by organic fraction with 40% and the plastic with 30%. However, the other fractions, presented with low rate of about 15% for paper; 5% of glass; 5% of metal and 5% of other. Results showed that Essaouira city adopt a steadily sorting system, is given that it is ranked among the cleanest touristic cities. 36% of hotels employ selective waste sorting compared to Al Hoceima with only 7% The outcomes of this study will contribute to the implementation of sustainable waste management solutions.

Keywords: Plastic waste, Marine Pollution, Solid waste, Marine litter, Tourism sector

BLINDNESS AND VISUAL IMPAIRMENT AMONG CHİLDREN IN MARRAKECH-SAFI: INCIDENCE AND RISK FACTORS

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ABSTRACT

Visual impairment in children is a real problem that needs to be addressed. Its occurrence causes a disruption throughout the child's life. Glaucoma, congenital cataract, and many other diseases cause mild visual impairment or blindness in children due to delayed or inadequate treatment. In Morocco, little research has been done on this subject and epidemiological data are scarce. Our research falls within this framework and plans to analyze the extent of this problem at the local level. It also proposes to identify its risk factors in order to contribute to the implementation of support programs allowing to treat in time and in the standards the causes of a visual deficiency especially the one that can be avoided. Our preliminary data were collected over a period of four months, using a prospective epidemiological survey that is still in progress. This study, subject to the standard WHO/PBL protocol, targeted children under 15 years of age, suffering from visual impairment or blindness. The data collection was carried out at the pediatric ophthalmology department and diagnostic center at the Mohammed VI University Hospital in Marrakech. The data showed us that 92% of children have visual impairment and only 8% suffer from blindness. Moreover, the occurrence of visual impairment is practically related to congenital diseases with a high rate of cataract followed by glaucoma. Also, the hereditary factor takes an important place among the risk factors, of which 20% of the cases have a family history, especially that of 2nd degree, and 17% of the cases have relatives of the same family. These results allowed us to have a first vision on the epidemiological state of the problem in our region.

Keywords: Visual impairment, child, epidemiology, Marrakech-Safi

INVESTIGATION OF TEMPORARY WATER ZOOPLANKTON COMMUNITY FORMED IN DRIED UP SHORES OF BURDUR LAKE

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ABSTRACT

Temporary waters are ecosystems that dry up at least once a year, and their formation and characteristics vary depending on geological, geographical, topographic and climatological conditions, while the most important factors that determine the life of temporary waters are precipitation and air temperature. As a result of global climate change, temporary waters tend to decrease significantly both spatially and temporally. For this reason, the zooplankton community, which constitutes an important part of the biotic components of temporary waters, emerges as a feature that needs to be investigated. Unlike permanent waters, the zooplankton of temporary waters consists of species that have adapted to extreme conditions. In the dried parts of Burdur Lake, which has lost about 46% of its surface area since the 1970s, temporary pools with salty-alkaline characteristics are formed, usually in the March-June period, with the effect of winter precipitation. In this study, it was aimed to determine the zooplankton fauna of the alkaline-salty temporary pools, formed by precipitation waters in winter, in the drying parts of Burdur Lake. The study was carried out in the spring-summer period of 2021-2022 at three different sampling stations determined in the relevant area. According to our findings, the highest water temperature was 29.8 °C, salinity was 3.9-16.7 ppt and the lowest dissolved oxygen was 0.36 mg/l. Representing zooplankton, a total of 16 taxa were identified 9 from Rotifera, 3 from cladocera and 3 from copepoda. Of these *Brachionus plicatilis*, *Macrothrix hirsuticornis*, *Moina brachiata* and *Thermocyclops* sp. were the most frequent and abundant species. It is considered important for the continuation of biological diversity that the species identified here are eurybiont species with high ecological tolerance to salinity and temperature changes, that is, they are resistant to extreme conditions. In addition, the species that have adapted to these extreme conditions have a very high potential to be produced as a live feed source for aquaculture.

Keywords: Lake Burdur, Brackish water, Temporary water, Zooplankton, Limnology

MORPHOLOGICAL AND MOLECULAR IDENTIFICATION OF *APHANIUS SP.*: A PRELIMINARY STUDY FROM THE THERMAL SPRING (CANAKKALE/TURKIYE)

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ABSTRACT

The inland waters of Türkiye have a rich fauna in terms of fish biodiversity. It is also known that Türkiye is home to a number of endemic species, mostly from its inland waters and the Anatolian plateau. Fish of the genus *Aphanius* are small freshwater fishes living in extremely salty waters around the Mediterranean and Red Seas and extending eastward to Pakistan and southward to Somalia along the coasts of the Indian Ocean. Because of their small size, low dispersal ability, isolation of populations, and narrow habitats, *Aphanius* evolved into highly localized endemics. However, a few species of the *Aphanius* (e.g., *Aphanius Marocciatus*), mainly coastal species, have a wider range of distribution. A number of studies have been conducted on the life history, ecology, and genetics of local *Aphanius* populations, but comprehensive studies have yet to be completed. The increasing number of studies on the genus may reveal that several possible species are probably mixed under the name *A. Marocciatus*. This preliminary study focuses on how to make the morphological and molecular identification of *Aphanius sp.* living in extreme conditions (at 35-40°C) in the thermal spring of Tuzla Village (Çanakkale/Türkiye).

Keywords: Freshwater fish, species determination, taxonomy, biodiversity

ZINC AND VITAMIN C CAN PREVENT OXIDATIVE STRESS INDUCED BY LEAD NITRATE IN MOUSE LEYDIG CELLS

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ABSTRACT

Lead and lead compounds, known to be serious environmental pollutants, are abundant in the earth's crust. Water-soluble lead nitrate, one of the most common inorganic lead compounds, is taken into the body through the mouth and skin. It has been shown in studies that lead nitrate, which is known to have various toxic effects on humans and animals, causes Leydig cell damage, a decrease in sperm motility and sperm count, and disorders in testosterone hormone levels and sperm quality in the male reproductive system. Leydig cells were exposed to lead nitrate (lead) at a concentration of 300 µM and vitamin C (VitC) and/or zinc (Zn) at a concentration of 50 µM for 24 h. Cell viability, lipid peroxidation, and levels of antioxidant enzymes (superoxide dismutase, catalase, glutathione peroxidase) were analyzed in the samples obtained when the experiment period was completed. The results showed that lead decreased cell viability and antioxidant enzyme activity and increased lipid peroxidation in Leydig cells. Furthermore, it was determined that VitC and Zn supplementation prevented oxidative damage and improved the activity of decreased enzymatic antioxidants in Leydig cells exposed to lead. In conclusion, it was found in this study that vitamin C and zinc may have a preventive effect against lead nitrate toxicity on TM3 Leydig cells due to their anti-oxidative abilities.

Keywords: Lead nitrate, Leydig cells, Zinc, Vitamin C, Oxidative damage

COMPARATIVE INVESTIGATION OF ENDEMIC ANATOLICHTHYS MAEANDRICUS (PISCES: APHANIIDAE) SPECIES, IŞIKLI LAKE AND IŞIKLI SPRING (DENIZLI-TURKEY) POPULATIONS

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ABSTRACT

In this study, it was aimed to determine the bio-ecological characteristics of the Işıklı Lake and Işıklı Spring (Denizli-Türkiye) populations of *Anatolichthys maeandricus* Akşiray, 1948, which have not been studied before and endemic to the Büyük Menderes River basin. Sampling was carried out seasonally (August 2021, October 2021, February 2022 and April 2022) in a 1-year period, with a total of 8 samples from Işıklı Spring (main source) and Işıklı Lake (Beydilli locality) with 5 and 15 mm mesh apertures in coastal friction, nets (grabbing) and scoops with 5 mm mesh. As a result of the study, 49.68% of individuals in Işıklı Lake population of *A. maeandricus* species were male and 50.32% were female; On the other hand, the population of Işıklı Spring consists of 43.78% male and 56.22% female individuals. Von Bertalanffy growth equations of endemic *A. maeandricus* populations in Işıklı Lake and Işıklı Spring, respectively; It was calculated as Lt=22.58(1-e-0.0408(t+-0.303)) and Lt = 27.60 (1-e -0.0304 (t+0.554)). The b and regression coefficient (R2) value of the total length-weight relationship was calculated as 3.2194, 0.9938 in the population of Işıklı Lake and 3.3567, 0.9917 in the population of Işıklı Spring. *Gammarus* sp and Chironomid organisms were dominant in the digestive tract of both habitat populations. Although the growth parameters appear to be positive, drought and habitat destruction are thought to endanger the species in the near future. For this reason, the species and the habitats it spreads should be taken under immediate protection.

Keywords: Anatolia, Büyük Menderes Basin, Killifish, endemic, growth

EFFECTS OF VITAMIN C AND ZINC ON FURAN INDUCED TOXICITY IN TM4 SERTOLI CELLS

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ABSTRACT

Furan or furfuran is a colorless, volatile heterocyclic aromatic organic compound formed during heat treatment and storage techniques of food products. Furan is also used industrially as an intermediate in the production of certain compounds such as resins, varnishes, pesticides, and drugs. It has been determined that furan, which is inevitably taken into the body, negatively affects human health and causes toxicity. Furan has potential harmful effects on the skin, liver, kidney, immune system, nervous system and adipose tissue. In addition to its effects that disrupt the endocrine system, it also affects the reproductive system and causes infertility. However, there are not enough studies on the toxicological effects of furan on the male reproductive system especially Sertoli cells. Free radicals damage the cell and the organism by entering into rapid oxidation reactions with food components. Vitamin C and zinc contribute to minimizing the effect of free radicals and protects the cell from oxidative damage. In this study, furan at a concentration of 3 mM and in addition to furan, 50 µM vitamin C and 50 µM zinc were applied to TM4 Sertoli cells for 24 hours. After the applications, cell viability, lipid peroxidation amount, antioxidant enzyme activities such as superoxide dismutase, catalase, glutathione peroxidase and apoptotic cell ratios were examined in Sertoli cells. The findings revealed that furan decreased cell viability and antioxidant enzyme activities, while increasing lipid peroxidation and apoptotic cell rates. In addition to furan, it has been determined that vitamin C and zinc applications minimize this damage caused by furan in conditions where vitamin C and zinc are applied together. These findings revealed the toxicity of furan on the TM4 Sertoli cell, which plays an important role in the male reproductive system, and the protective role of antioxidant vitamin C and zinc against this toxicity.

Keywords: Furan, Sertoli cells, Zinc, Vitamin C, Oxidative damage, Apoptosis

INVESTIGATION OF THE CYTOTOXIC AND GENOTOXIC EFFECTS OF YTTERBIUM OXIDE (Yb^2O^3) NANOPARTICLES ON HUMAN DERMAL FIBROBLAST CELLS

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ABSTRACT

Nanoparticles, which gained importance in parallel with the development of nanotechnology, appear in all areas of our lives today. Many different nanoparticles are synthesized for different purposes and are used in countless fields from medicine to textile, from cosmetics to defense industry. One of these nanoparticles is ytterbium oxide (Yb2O3). Although products using ytterbium oxide nanoparticles have taken their place in the market, information and literature about their biological effects are quite limited. The use of ytterbium oxide nanoparticles in many fields, including medicine and biomedicine, and the envisioning of a number of applications in the near future, require investigation of the possible effects of these nanoparticles on human health. For this purpose, possible *in vitro* cytotoxic and genotoxic effects of Yb2O3 nanoparticles on normal human dermal fibroblast (NHDF) cells were investigated. Cytotoxicity was evaluated using the xCELLigence real-time cell analysis system, while genotoxicity was evaluated using a single cell gel electrophoresis (comet) test and cytokinesis-block micronucleus test. Cells were exposed to Yb2O3 nanoparticle concentrations (0.1, 10, 50 and 100 µg/mL) for 3 and 24 hours while evaluating the genotoxic effect. The findings showed that Yb2O3 nanoparticles increased the genetic damage index and the percentage of damaged cells in NHDF cells. A significant increase was observed, especially at doses of 50 µg/mL ($p<0,05$) and 100 µg/mL ($p<0,001$) compared to the negative control. Similarly, the micronucleus ratio increased with increasing dose, the increase occurred at 100 µg/mL ($p<0,001$) dose was higher than 10 µg/mL and 50 µg/mL ($p<0,05$) dose. As a result, it can be said that Yb2O3 nanoparticles have dose and time dependent cytotoxic and genotoxic effects on NHDF cells.

Keywords: ytterbium oxide nanoparticles, dermal fibroblast cells, nanotoxicology, cytotoxicity, DNA damage, genotoxicity, comet assay, micronucleus assay.

EVALUATION OF THE ACUTE TOXICITY OF THE HYDROETHANOLIC EXTRACT OF CROCUS SATIVUS STIGMA IN SWISS ALBINO FEMALE MICE

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ABSTRACT

Saffron is a well-known spice obtained from the dried stigma of *Crocus sativus* L. flowers. it is considered not only as a food spice but also as a potent natural agent with a wide range of beneficial effects. The objective of this study was to evaluate the acute toxicity of the hydroethanolic extract of *Crocus sativus* stigma (CSSE) in mice in order to assess its safety profile for subsequent pharmacological valorization. In order to achieve the objective of this study, the limit dose test was performed according to the FDA and OCDE guidelines. A dose of CSSE (2000 mg/kg) was administered by gavage in female mice. The animals were daily observed and their bodyweight, food intake and behavioral recorded. At the end of the observation period, blood was collected for biochemical and hematological analysis. Then the animals were sacrificed, and the organs were removed, weighed, and stored in the formaldehyde solution for histopathological analysis. In this study no mortality or behavioral changes were observed in mice treated with 2000 mg/kg, indicating that the LD50 is higher than this dose. The dose tested did not produce any significant changes in hematological, biochemical or histopathological parameters in exposed animals. These results demonstrate the absence of acute toxicity after oral exposure to CSSE. However, further studies evaluating long-term effects are needed in order to have sufficient safety evidence for its use in humans.

Keywords: *Crocus sativus*, stigma, acute toxicity

DETERMINATION OF DYE REMOVE CAPABILITIES OF BACTERIAL ISOLATE

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ABSTRACT

Difficulties are encountered in the treatment of dyestuff-containing wastewater from the textile and dyestuff production industries, due to the synthetic origin and aromatic molecular structure of dyestuffs. Recent studies have shown that biological methods used in the removal of dyestuffs are the most advantageous and economical methods. For this purpose, it was aimed to remove dyestuff by using alternative bacterial isolates in this study. Bacterial isolates used in the study were isolated from plant roots of *Alyssum pinifolium* (Nyar, T.R. Dudley) growing on the serpentine slopes 6 km north of Ezine district of Çanakkale province and were identified by 16S rDNA analysis. As a result of the 16S rDNA analysis, it was determined that 5 isolates belonged to the genus *Bacillus* and the removal abilities of the isolates against Orange G and Methylene Blue dyestuffs were investigated. Samples taken from dyestuff and bacteria mixtures at certain periods (1./24./96./120./144./168. hours) were measured at the maximum absorbance values of dyestuffs using a spectrophotometer device. When the results obtained are evaluated, the percentage of dyestuff removal varies between 8.05% and 84.18% for Orange G dyestuff, and between 0.40% and 60.14% for Methylene Blue dyestuff. The period in which the maximum removal was observed for both dyestuffs was determined as the 120th hour. *Bacillus toyonensis* NMCC-157 bacteria with the code of 1N13 for Orange G dyestuff was determined as the bacteria with the highest removal rate, while *Bacillus toyonensis* NMCC-157 bacteria with the code of 1TB14 for Methylene Blue dyestuff was determined. In the light of the findings obtained in the study, the high removal values of Orange G and Methylene Blue dyestuffs of *Bacillus* genus bacteria used in dye removal experiments indicate that these microorganisms can be used in industrial applications. In this context, we think that our study will lead to elucidation of the mechanisms related to the removal abilities of *Bacillus* species and various dyes.

Keywords: Dyestuff removal, decolorization, textile dyes, industrial waste, Bacillus sp.

EFFECT OF ER STRESS ON VARIOUS MIRNA EXPRESSIONS IN TOMAT

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ABSTRACT

Stress conditions which affect protein folding cause Endoplasmic Reticulum (ER) stress. This will be transferred to the nucleus by Unfolded Protein Response (UPR), which is a cellular homeostatic response against ER stress. Diversity of ER-stress associated genes, which were elucidated by genome sequencing studies of various plants, proved that plants use ER stress responses to better adapt to their environment more than animals. Tunicamycin, as an N-linked glycosylation inhibitor, is a widely known and used chemical to induce ER stress. In this study, tunicamycin was used to induce ER stress in tomato plants. Total RNA was isolated from plant leaves to perform miRNA expression analysis in stress-induced plants. The miRNAs selected for this study were studied in various plants under various stress conditions, and they were proven to show changing expression rates. It is important to reveal the relationship between ER stress and expression profiles of these miRNAs, which were studied under different stress conditions, by evaluating the data obtained in this study. Expression changes of these miRNAs, which are known to be associated with stress responses and are observed to change under many stress conditions in tomato, were investigated by qRT-PCR method under ER stress. It is anticipated that the obtained data will contribute to the elucidation of key miRNAs involved in ER stress response mechanisms.

Keywords: miRNA, ER stress, tomato, qRT-P

METAGENOMIC ANALYSIS OF SEASONAL BIODIVERSITY OF THE CYANOBACTERIAL COMMUNITY IN BALIK LAKE (19 MAYIS, SAMSUN)

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ABSTRACT

Biodiversity of the cyanobacterial community in Balık Lake (19 Mayıs, Samsun) was seasonally analized with a metagenomic approach. A part of cyanobacterial 16S rRNA gene comprising V2-V4 region was amplified by using the environmental DNAs isolated from surface and 2 m dept water samples as templete and a cyanobacteria specific primer pair. Amplicons were obtained from the environmental DNAs from both the depts and from all the seasons, indicating that cyanobacterial community were represented in the lake through the year. The amplicons obtained from subsurface DNAs of four seasons were cloned randomly and individual fragments were isolated for determination of the idetity of represented individuals and for analysis of their phylogenetic relationships. For each season 20 of numerous clones were selected randomly and their nucleotide sequences were determined. Homology of these sequences were found by comparing with the sequences of cyanobacterial 16s rRNA genes previously deposited in databases. Of the 60 in a total of 64 sequenced fragments were obtained to be included in the subsection I and subsection IV. The subsection III was represented with a single fragment only in autumn. According to the results the autumn was concluded as the season with the richest biodiversity. Subsection IV was predominat in the winter while subsection I became dominant in the spring and in the autumn. The sequences of the same subsection were largely clustered together in the phylogenetic tree. However, some sequences of subsection I were observed to cluster more closely to the members of subsection IV as often seen in cyanobacterial phylogenetic trees.

Keywords: Cyanobacteria, metagenome, 16S rRNA gene, biodiversity, Balık Lake

EFFECTS OF CSGD, FLIZ, STJC, YAIC AND RMBA GENES ON BIOFILM STRUCTURES FORMED AT SOLID-AIR AND LIQUID-AIR INTERFACES IN SALMONELLA TYPHIMURIUM 14028 STRAIN

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ABSTRACT

In this study, comparative phenotypic analyzes were performed using *S.* Typhimurium 14028 strain and its mutants of *csgD, fliZ, stjC, yaiC* and *rmbA* genes deleted by homologous site recombination technique. As a result of the analyzes carried out, it was determined that the biofilms formed in both solid-air and liquid-air phases in all mutant strains were statistically significantly reduced compared to the wild type strain. The gene with the highest effect on biofilm structures was determined as *csgD* gene. Because, in the mutant in which this gene is deleted, biofilm formation decreased by 97-99%. Biofilm morphotyping studies; It has been determined that the morphotype (saw) that cannot produce biofilm due to the blockage of cellulose and curli fimbriae production in the *csgD* gene mutant, and intermediate morphotypes that differ from the wild type strain due to the decrease in the production of cellulose and curli fimbriae in other mutants. Planktonic motility (swimming) and community motility (swarming) were decreased at the highest level in *csgD* mutant especially due to the abolition of cellulose production. Since cellulose production continued, albeit at a reduced rate, in other mutants, significant reductions were observed in both movements compared to the wild type strain.

Keywords: S. Typhimurium, csgD, fliZ, stjC, yaiC, rmbA, biofilm

RELATIONSHIP BETWEEN SRNA AND BIOFILM FORMATION

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ABSTRACT

Biofilm is described as a multicellular microorganism community which binds the surfaces such as substrate, interfaces and each other with an extracellular matrix produced by themselves. Biofilms are regulated by various factors such as genetic elements, signal molecules and environmental factors. One of these genetic factors is the small RNAs (sRNAs). sRNAs play an important role in accelerating the biofilm formation process. Bacteria use a range of RNA regulators which are named as sRNAs that aid to respond to the environmental alterations. This review gives an overview on the association between sRNA and biofilm formation and regulation along with its importance for the bacterial virulence.

Keywords: sRNA, Biofilm, Virulence, Salmonella, Escherichia coli

EFFECT OF AQUEOUS AND HYDROMETHANOLIC EXTRACTS OF ACHILLEA ODORATA, AREAL PARTS ON GASTROINTESTINAL MOTILITY IN MICE

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ABSTRACT

Achillea odorata, an endemic spontaneous plant of North Africa belongs to the family of Asteraceae, In Algeria, it is used to treat gastrointestinal disorders. The aim of the present study was to investigate the effect of *Achillea odorata* on gastric emptying of red phenol meal and intestinal transit in mice. Aqueous extract (AQE) was obtained by boiling 20 g of the dried powder of the plant in 200 ml of distilled water for 10 min and the filtrate was dried. Hydro-methanolic extract (AME) was prepared by maceration of 20 g of ground material in 100 ml of 50% methanol for 72 h, then the filtrate was evaporated to dryness using a rotary evaporator at 45°C. The effect of aqueous extract on the gastrointestinal tract motility was evaluated using red phenol meal model in mice. The rate of intestinal transit was expressed as the ratio between the distance travelled by the test meal and the total length of the small intestine. Both AQE and AME extracts lowered significantly and dose dependently the transit of phenol red through the small intestine (28-41%, 41-51%), respectively compared to the vehicle (62%), whereas, Atropine (Positive control at 1 mg/kg) significantly decreased the intestinal transit (26,98%). Furthermore, both plant extracts exerted a dose dependent reduction in the gastric emptying of the test meal (AAQ:42-55%, AME:48-65%) compared to the vehicle (81,77%). Discussion: *T*he lowering effect of *Achillea odorata* extracts on both intestinal transit and gastric emptying may be due to its polyphenol contents. Conclusion: *Achillea odorata* may help in the remedy of gastrointestinal disorders, which may justify its use in Algerian traditional medicine in gastrointestinal ailments.

Keywords: Achillea odorata, extracts, gastric emptying, intestinal transit, red phenol

PSEUDOMONAS FLUORESCENS PFX STARTER STRAIN: ISOLATION AND IDENTIFICATION AS A BIOCONTROL AGENT FROM AGRICULTURAL FIELDS

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ABSTRACT

Pseudomonas fluorescens includes plant-associated bacteria with potential biotechnological applications in agriculture and environmental protection. *P. fluorescens* can promote plant growth through different means, such as changing plant hormonal balance and biocontrol. It also controls fungal pathogens through the production of antifungal metabolites. Today, as it gains importance, the consumption of organic farming and organic farming products, the use of natural pesticides and bio-pesticides instead of synthetic pesticides has become widespread. In this study, it was aimed to isolate, identify, and charactize *P. fluorescens* strains from soil taken from agricultural areas. *Pseudomonas fluorescens* has several promising properties that make it a better biocontrol agent. In this study, rhizosphere soil collected from different agricultural lands of Tekirdag promise was evaluated for the presence of *P. fluorescens* using King's B medium. Phylogenetic analysis based on Sanger sequence typing showed that the bacterium was affiliated with strains of Pseudomonas fluorescens. Results of polymerase chain reaction (PCR) amplification and nucleotide sequence analysis using BLAST demonstrated that the *P. fluorescens* PFX isolate was genetically different from the *P. fluorescens* isolates in the National Centre for Biotechnology Information (NCBI). At the end of the bacterial identification, it was observed that the starter strain that could be used as the most effective biocontrol agent among the isolates in the biocontrol tests could be Pseudomonas fluorescens PFX.

Keywords: Pseudomonas fluorescens, Biocontrol agent, Inoculation, Antifunga

DETERMINATION OF EUTROPHICATION LEVELS IN WATER BODIES OF ESKISEHIR PROVINCE

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ABSTRACT

Eutrophication is a leading cause of impairment of many freshwater ecosystems in the World wide with dramatic consequences for drinking water sources, fisheries, and recreational water bodies. It is caused by increasing nutrient loading associated to urban, industrial and agricultural activities through both point-source discharges and non-point loadings of limiting nutrients into aquatic ecosystems. Water samples were randomly collected from a total of 56 study sites including 35 streams and 21 dam and ponds in Eskişehir province, in 11-17 July 2020. Some environmental variables pH, Dissolved oxygen, Water temperature, Electrical conductivity and salinity were measured in the field by in situ. Nitrate Nitrogen (NO3-N), Nitrite Nitrogen (NO2-N), Total Nitrogen (TN), Kjeldahl Nitrogen (TKN), Phosphate Phosphorus (PO4-P), and Total Phosphorus (TP) analyzes were carried out according to standard methods. When the lentic and lotic sampling points were compared in terms of environmental variables, no significant difference was found as a result of the Mann-Whitney-U test except water temperature (Z: -4.858, $p<0.001$) and salinity (Z: -2.006, $p<0.05$). TN was detected in the range of 3.326-54.243 mg/L in all water bodies. TP was found in the range of 0.021 – 5.436 mg/L. Charlson Trophic State Index based on TN values showed that all sampling sites were hypereutrophic Charlson Trophic State Index according to TP values, 7 water bodies in lentic habitats and 3 water bodies in lotic habitats were detected as eutrophic, while all other water bodies were in hypereutrophic character. When evaluated according to Surface Water Quality Legislation, among the 47 of 56 sampling sites can be regarded as class 1 quality in terms of NO3-N values (<3.00 mg/L) while TKN values showed that all sampling sites except one, regarded as class 3 quality (<1.50 mg/L). Dissolved oxygen was detected in the range of 0.69 -12.6 mg/L (mean: 5.716±0.266), while electrical conductivity was determined in the range of 189.3 -20460 (mean: 1357.07 ± 362.31) µS/cm. Findings suggest that eutrophication is high in the water bodies in the borders of Eskişehir province. We concluded that agricultural and domestic pollution as well as industrial pollutants are the main source of the eutrophication.

Key words: Water quality, dissolved oxygen, eutrophication, Eskişehir province

A NEW GUIDE FOR PREPARING ACTION PLANS FOR ENDANGERED SPECIES IN TURKEY

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ABSTRACT

Species action plans, which are an important element of the strategies used to protect endangered species, are among the methods / conservation tools frequently used in conservation studies both inTürkiye and in the world. Species action plans are strategic plans that describe actions needed to minimize or eliminate threats to the species, improve the quality of the habitats, and organize conservation activities. Very few of the action plans prepared in Türkiye have been successful, many of them failed to reach the set targets, and some failed to protect species and biodiversity. With the Species Action Plan Preparation Guide, which was prepared in this study within the scope of the EU-IPA Project, all the plans to be prepared and implemented from now on should be prepared following the standardized methodology presented in this guide. This study has been prepared to share the Species Action Plan Preparation Guide, which has been prepared within the scope of a new methodology, and the methods it contains with scientists working in related fields. As a general rule, the Species Action Plan consists of different phases: namely, the threat analysis, stakeholder analysis, problem tree, determination of conservation targets and activities, monitoring and evaluation, respectively. The threat analysis has been adapted for Türkiye by utilizing the threat analysis methods developed by the International Union for Conservation of Nature (IUCN). Threat analysis offers two semi-quantitative assessment methods that allow calculating the impact of threats affecting the species: rating and ranking methods. Afterwards, a stakeholder analysis is carried out to determine all stakeholders associated with the species and their impact on species. After these stages have been developed, conservation actions are defined. At this stage, the goals for conservation are defined and the activities required to achieve these goals are planned. The methods used at this stage are situation analysis, strategic analysis, result chain approach, definition of activities, preparation of action plans and creation of action plan charts, respectively. The last stage, monitoring and evaluation, is the evaluation carried out to understand the progress and achievement of the goals of a plan in progress, and to determine the status of reaching the goals of the plan, the effectiveness level of planning and implementation, and the effect of its results on the target species. The methods used at this stage are the monitoring plan and the activity priority index. In addition to presenting new methodologies, the Guide for Preparation of Species Action Plans also presents new terminology produced specifically for species action plans for the first time for Türkiye.

Keywords: Species Action Plan, Endangered Species, Conservation Biology, Species Conservation

ACKNOWLEDGEMENT:

This ongoing study is co-financed by the Republic of Türkiye and the European Union under the Instrument for Pre-Accession Assistance (IPA) as an activity of the "*Preparation, Implementation and Monitoring of Species Action Plans for Endangered Species in Turkey within the Concept of a New Methodology*" Project, which was prepared by the General Directorate of Nature Conservation and National Parks and carried out in cooperation with the Ministry of Environment, Urbanization and Climate Change, the Ministry of Agriculture and Forestry and the AGRECO Consortium.

ROSEMARY AQUEOUS EXTRACT PROTECTS AGAINST ALUMINUM-INDUCED OXIDATIVE STRESS IN THE LIVER OF WISTAR RATS

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ABSTRACT

Aluminum (Al) is a metal that is widely abundant in nature and widely used because of its excellent properties. But its toxicity to humans and animals is well documented. This metal accumulates in various tissues inducing cardiotoxicity, nephrotoxicity, neurotoxicity and hepatotoxicity. The present study aims to determine the effect of a freeze-dried aqueous extract of Rosemary "Rosmarinus officinalis" (RAS) on oxidative stress in the liver of young rats. A total of twenty-four male wistar rats weighing (60±10) g were used in this study. The animals were divided into three groups: Control group; Intoxicated group by intraperitoneal injection of 60mg/kg Al once/week and Intoxicated and Treated group [60mg/kg/S (Al) and a dose of 150mg/kg/ml/D RAE by daily gavage], At the end of the experimental period, the animals were sacrificed and the livers were collected and then homogenized in ten volumes of phosphate buffer (0.1 mol/L, pH 7.4). The homogenates were then used for the estimation of antioxidant parameters [Markers of lipid peroxidation (TBARS), catalase (CAT), glutathione (GSH), glutathione S-transferase (GST), superoxide dismutase (SOD)]. Chronic exposure of young rats to Al resulted in a marked decrease in the activity of antioxidant enzymes (glutathione S-transferase and superoxide dismutase) and glutathione, and a significant increase in the levels of lipid peroxidation (TBARS) and hepatic catalase. However, treatment with RGE effectively protects the liver function of intoxicated rats by significantly increasing antioxidant levels and decreasing the production of thiobarbituric acid reactive substances. This study has strongly demonstrated that the aqueous extract of Rosemary could modulate the harmful effects of Aluminum and protect the hepatic function against radical aggressions.

Keywords: Aluminum, Rosmarinus officinalis, the liver, oxidative status

FIPRONIL SULFONE-INDUCED CELLULAR EFFECTS ON CYTOSKELETAL AND CELL JUNCTIONAL PROTEINS IN SERW3 CELL

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ABSTRACT

Fipronil is a widely used pesticide in the agriculture of the sunflower, corn, and grain which are the main food sources globally, and caused serious risks to human health and the environment. Fipronil sulfone is the main metabolite of fipronil which belongs to the phenyl pyrazole family. Recently, it was shown that male fertility was affected adversely by fipronil exposure by DNA damage and apoptosis in spermatozoa. However, there is lacking information about fipronil sulfone which is more toxic than the main compound fipronil in male reproduction. For this reason, our study aimed to exert the cellular effects on cytoskeletal and several junctional proteins in SerW3 cells line representing *in vitro* Sertoli cell model. Briefly, SerW3 cells were exposed to 0-40 μM fipronil sulfone for 24 hours. The cells were stained with the immunofluorescence method for phallotoxin, N-cadherin, β-catenin, and zonula occludens-1 proteins, and images were taken by fluorescence microscope. The results of the experiments revealed that fipronil sulfone caused decreases in expressions of the junctional proteins and cytoskeletal proteins were damaged in response to fipronil sulfone exposure.

Keywords: Fipronil sulfone, SerW3 cells, phallotoxin, cell junction proteins

ACKNOWLEDGMENT:

This study was supported by the Scientific and Technical Research Council of Turkiye (Project No: 219S895).

DETERMINATION OF NUCLEAR DNA CONTENTS OF DIFFERENT POA SPECIES BY USING FLOW CYTOMETER

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ABSTRACT

Poa L. is the largest genus of grasses with approximately 575 members. But, information on *Poa* genomes are quite limited, although the genus includes some economically important forage and turf species. Nuclear DNA content is one of the most important characteristics of the genomes. However this essential information is missing for many of the *Poa* species. The objective of this study was to determine the nuclear DNA content of 15 accessions of 11 different *Poa* species. The samples were prepared by using the Partec commercial kit (Cystain PI Absolute P) and analyzed using a CyFlow space flow cytometer (Partec CyFlowR Space). *Vicia sativa* (2C = 3.65 pg) and *Hordeum vulgareae* (2C = 10.65 pg) were used as internal standards. Based on the results of the study, the mean 2C DNA content of the *Poa* species varied between 2.18 pg (±0.07) in *P. pseudobulbosa* and 9.26 pg (±0.21) in *P. glauca*. The nuclear genome size of species; *P. striaca* 6.24±0.08, *P. liguata* 7.10±0.78, *P. urssulensis* 4.31±0.08, *P. sterilis* 8.75±0.18, *P. bactriana* 7.62±0.27, *P. pseudobulbosa* 2.18±0.07, *P. sinaica* 4.63±0.03, two different accessions of *P. longifolia* 3.17±0.02 – 5.42±0.17, two different accessions of *P. versicolor* 6.38±0.17- 5.19±0.10, two different accessions of *P. glauca* 7.27±0.15 – 9.26±0.21, two different accessions of *P. diversifolia* 2.39±0.03 – 3.22±0.08. In conclusion, there is a wide variation among *Poa* species for nuclear DNA content. Majority of the species had unique nuclear DNA content and therefore they were distiguishable from the others based on only their nuclear DNA content. The differences among genomes and poliploidy can be considered as the source of this large variation.

Keywords: Poa species, flow cytometry, nuclear DNA content

ACKNOWLEDGMENT:

This study was funded by The Scientific and Technological Research Council of Turkey (212T113 project number)

INVESTIGATION OF PALM OIL GENOTOXICITY IN *DROSOPHILA MELANOGASTER*

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ABSTRACT

The relationship between dietary fats and cardiovascular diseases has led to increased interest in the palm oil, which is the second largest vegetable oil consumed in the world. Palm oil is efficient in production and included in many products in food industry. Frequent consumption of the products containing palm oil increases the exposure to it. In this study, we determine the genotoxic effect of the palm oil (1, 2, 5 and 10%) using the somatic mutation and recombination test (SMART) in Drosophila melanogaster. For this test, eggs that are trans-heterozygous for multiple wing hairs (mwh, 3–0.3) and flare (flr3, 3–38.8) genes, which are recessive on the third chromosome, were fed with different doses of palm oil until pupa formation. Although the data obtained caused an increase in clone frequencies depending on the dose, it was determined that it did not cause a genotoxic effect as a result.

Keywords: Drosophila, palm oil, genotoxicity

ANTI-ULCER AND ANTIOXIDANT ACTIVITIES OF AQUEOUS EXTRACT FROM ACHILLEA ODORATA AREAL PARTS

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ABSTRACT

Achillea odorata, an endemic spontaneous plant of North Africa belongs to the family of Asteraceae, t is widely used as a natural remedy in Algeria. Peptic Ulcer Disease, among the main problems of the gastrointestinal tract which have a potentially serious complication. Phytotherapy marks a broad spectrum in ulcer healing. In this context, our study is focused on the antigastric ulcer effect of a medicinal plant and its anti-antioxidant potentials. The ground areal part of the plant in the study was subjected to a decoction to obtain an aqueous extract. Two complementary assays were used including the ABTS scavenging and Phenantroline assay. *In vivo* study was evaluated using the antiulcer activity. The test consisted of verifying the protective action of the extracts against ulcer caused in animals by the administration of an ulcerogenic agent (ethanol), The antioxidant capacity of the extract was estimated using ABTS, where the 50% inhibitory concentration (IC50) of this free radical was estimated at 19,3±0,52 µg/ml in comparison with BHA as antioxidant standard (IC50=8,1±0.41 µg/ml). The present study also assessed the Redox potential activity using Phenantroline method and the results showed that aqueous extract has good Redox potential activity (A0.50= 9,14±0,07 µg/ml). Oral treatment of rats with the plant extracts at a dose of 100, 200 and 400 mg /kg reduced the ulcerogenic effect of ethanol on the gastric wall with a percentage of protection of 95%, 98% and 99% respectively. The present results revealed that the aqueous and hydro-methanolic extracts of *Achillea odorata,* contain important amounts of polyphenols and flavonoids, and possess significant antioxidant and antiulcer activities.

Keywords: *Achillea odorata*, Antiulcer activity, Antioxidant capacity.

PALYNOLOGICAL, ANATOMICAL AND MICROMORPHOLOGICAL FEATURES OF ENDEMIC COUSINIA WORONOWII

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ABSTRACT

The *Cousinia* (Asteraceae) is the third largest genus in the Asteraceae family. It contains approximately 700 species currently accepted in Southwest and Central Asia. The genus *Cousinia* has the characteristics of the typical Irano-Turanian phytogeographic region and has a high endemism rate. The *Cousinia* is represented with 40 taxa, of which 28 (70%) endemic to Turkey. The main purpose of this study is to investigate the palynological, anatomical, and achene micromorphological features of *Cousinia woronowii* to contribute to the systematics of *Cousinia*. In this study, the plant specimens were collected from their natural distribution areas. Pollen slides were prepared according to the methods described by Wodehouse (1935) and then examined under the Leica DM750 light microscope. For anatomical studies, plant specimens were preserved in bottles containing 70% alcohol. The paraffin method was used for cross sections of stems, leaf and midrib. The sections were taken by microtome and stained with safranin and Maroct-green (Johansen 1940). For micromorphological investigations, mature achene collected from natural populations of plants were used. In the transverse sections of the stem, as a protective tissue, the epiderm which has 1 layer was located in the outermost layer. The cortex parenchyma has rectangular-oval-shaped cells of 7-11 rows. Phloem is surrounded by sclerenchymatic cells. The mesophyll consists of elongated palisade and spongy paranchyma cells in the cross section of the leaf. The midrib shape is circular. The pollen grains of *Cousinia woronowii* are radially symmetrical, isopolar and have a tricolporate aperture. Their shape is prolate, large size.

Keywords: Asteraceae, Cardueae, Cousinia, Endemic, Micromorphology.

CAROTENOID-PRODUCING YEAST: ISOLATION OF B-CAROTENE

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ABSTRACT

Carotenoids, as one of the most common pigments found in nature with a wide range of biological properties, are widely used in chemical, pharmaceutical, cosmetic, food, and feed industries, as well as in phytomedicine. In addition to their more known use as coloring agents, they have antioxidant and anticancerogenic activity and pro-vitamin A function. Due to carotenoids' significance for human health, their global market is continuously growing which puts the focus off traditional, limited, and high-cost production and more on modern, eco-friendly biotechnological production. Therefore, this research showcases a type of microbial production and isolation of targeted β-carotene using *Rhodotorula mucilaginosa* strain isolated from a Jerusalem artichoke sample. This study is focused on isolating microbial β-carotene and investigating differences in obtained β-carotene yield depending on the use of different variations of cell disruption methods and extraction methods (conventional, ultrasound, and their combination), with ethanol as a solvent. Firstly, the *Rhothorula mucilaginosa* yeast culture was incubated for 5 days on Sobouraud Maltose Agar at 30 °C. Collected biomass was then resuspended in phosphate buffer, centrifuged, and dried to the constant mass using the method of lyophilization. Chemical treatment, ultrasound, and osmotic shock were used as three different cell disruption methods performed on dried yeast biomass. According to the obtained results, the extraction method itself has a crucial role in the β-carotene yield. In short, the best extraction method involves a two-step process including vortex and ultrasound treatment during contact with ethanol, while the best cell disruption method was an osmotic shock. To sum up, *Rhodotorula mucilaginosa* can be considered a good source of β-carotene, but the obtained yield strongly depends on extraction methodology.

Keywords: Carotenoid, *Rhodotorula mucilaginosa*, extractions, cell disruption

DEVELOPMENT OF NASAL MUCOADHESIVE IN SITU GEL SPRAY FORMULATIONS FOR ANTIVIRAL PURPOSE

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ABSTRACT

The respiratory system is in dynamic contact with the atmosphere until the person's last breath (1). Viral agents commonly enter the body through the respiratory tract and cause infections. In studies on respiratory tract infections; influenza A, influenza B, rhinovirus (RV), respiratory syncytial virus (RSV), coronaviruses are among the viruses that are frequently encountered as viral agents (2). In this study, it was aimed to develop antiviral in situ mucoadhesive spray formulations with protective activity to prevent viruses from causing disease in the body by settling in the respiratory system through the nasal route. For this purpose, the broad spectrum potent antiviral "18β-Glycyrrhetinic acid (GA)", which is the main active ingredient of licorice root extract, was used in formulations. Various formulations have been prepared using gellan gum (DGG) which provides in situ gelling, and different mucoadhesive polymers such as hydroxypropyl methyl cellulose (HPMC), sodium carboxymethyl cellulose (Na-CMC), xanthan gum, Carbopol® 974P NF with biodegradability, good solubility in water and good release properties. In order to determine the proper in situ gel formulation; rheological properties, mechanical properties and mucoadhesive strength of the formulations were investigated. In addition; *in vitro* gelling capacity, *ex vivo* mucoadhesion strength, water holding capacity, sprayability, and *in vitro* cytotoxicity were also studied. As a result, it was concluded that the formulation containing 0.5% DGG and 0.5% CMC polymers showed optimum properties. This in situ gel formulation has a clear appearance with uniform sprayability. When it was mixed with simulated nasal fluid at 34°C, its viscosity increased significantly to form a clear gel. According to the data of texture profile analysis, it was determined that it had higher adhesiveness (0.560 mJ) compared to other formulations. Similarly, in the rheological synergism study performed with mucin solution, the mucoadhesive strength (9.53 Pa) was found to be higher. In the *ex vivo* mucoadhesion test, it has the highest mucoadhesion strength (19.67 g) after the formulation containing 0.7% CMC. The formulation containing 0.7% CMC was eliminated due to improper sprayability pattern. Considering all the criteria, it was decided to continue further studies with the formulation containing 0.5% DGG + 0.5% CMC which has the desired properties. According to the results of *in vitro* cytotoxicity study with the active substance, it didn't cause any significant decrease in cell viability at concentrations between 4 and 80 µg/ml. No reduction in cell viability was observed at all tested concentrations between 4 and 60 µg/ml. Concentration of 80 µg/ml ($p < 0.05$) slightly reduced cell viability to 87.90% which is evaluated as non-toxic according to ISO 10993-5:2009 standard. It is considered that the developed mucoadhesive in situ gel can provide a great benefit in protecting individuals from viral infections and can also be a potential product to meet the need for protection against viral agents. Thus, it will be easier to control the spread rate of viral infections and contribute to reducing the negative impact.

Keywords: 18β-Glycyrrhetinic acid, Licorice, Antiviral, Nasal, Mucoadhesion, Spray

OPTIMIZATION STUDIES ON THE EPOXIDATION REACTION PARAMETERS OF SUNFLOWER OIL USİNG RESPONSE SURFACE METHODOLOGY

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ABSTRACT

The epoxidation of vegetable oils has drawn great attraction of the chemical industry for many years. Epoxidized vegetable oils are frequently preferred as plasticizers and renewable raw material sources for the production of biopolyols and several complex compounds with excellent antioxidant and antifriction properties. In this research, sunflower oil was chosen as a feedstock due to its ease of access, relatively inexpensive, having high unsaturation degree, being a good substrate for the further derivative products, and its similarity to soya oil, which is used in the production of PVC as a plasticizer. The production of epoxidized vegetable oils requires the optimization of process conditions to maximize the epoxy content. Up to date, the traditional approach of "one-variable-at-a-time" has been used to examine the process parameters of epoxidation of sunflower oil; however, in the present study, the reaction parameters such as reaction temperature, reaction time, and hydrogen peroxide-to-oil unsaturation molar ratio were investigated using Central Composite Design (CCD) of Response Surface Methodology (RSM) to optimize the epoxy content of sunflower oil. The effects of temperature (40-80°C), hydrogen peroxide-to-oil unsaturation mole ratio (1.25-2.00), and reaction time (3-7 h) on the epoxy yield were studied. The produced model was highly significant with an adjusted R2 of 98.32% and a predicted R2 of 94.09. The optimum conditions of the epoxidation reaction of sunflower oil, confirmed by validation experiment, were a reaction temperature of 60°C, a reaction time 4.3 h, and a hydrogen peroxide-to-oil unsaturation mole ratio 2, resulting in an oxirane oxygen content of 5.95±0.08%.

Keywords: Sunflower oil, Epoxidation, Optimization, Response surface design

ACKNOWLEDGEMENT:

This study was supported by Eskişehir Technical University Scientific Research Projects Commission under the grant no: 20DRP063

CHEMICAL AND STRUCTURAL CHARACTERIZATION OF A (1,6) DEXTRAN PRODUCED BY LEUCONOSTOC MESENTEROIDES SUBSP MESENTEROIDES LGM5 FOR FOOD PURPOSES

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ABSTRACT

Polysaccharides aroused great interest among scientists over the past thirty years. These macromolecules from renewable and abundant sources such as plants (cellulose, starch, alginate...) animals (chitin, hyalauronique acid...), microorganisms (pullulan, dextran produced by Leuconostoc mesenteroides...), and these polysaccharides have taken an important place in the world of polymers as evidenced by the recent studies on them affecting the increasingly diverse applications in the food industry , cosmetics but also in paints and textiles due to their gelling properties , thickening , emulsifying moisturizer (especially sought food : cream, ice vinegar ..). For this purpose, a production of exopolysaccharide by *Leuconostoc mesenteroides subsp mesenteroides* LGM5 strain isolated from Algerian animal's samples was investigated. The EPS was composed exclusively of glucose based on componential analysis of this hydrolysis biopolymer by thin layer chromatography. Moreover, investigations carried out on the structural characterization of this polysaccharide by FTIR and NMR (H1 and C13) analysis confirmed that it is an α (1,6) dextran with 11.03 % of α (1,3) branching. New potential applications of polysaccharides yet emerge, especially in an area at the interface between the pharmaceutical and food world, such as prebiotics.

Keywords: Leuconostoc mesementeroides subsp mesenteroides, exopolysaccharides, prebiotics, food.

EVALUATION OF IN VITRO GENOTOXIC POTENTIAL OF NATURAL BIOSTIMULANTS IN A MODEL SYSTEM OF BALB/C 3T3 FIBROBLASTS

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ABSTRACT

Plant-derived protein hydrolysates are increasingly applied in agriculture biostimulant products with a potential to increase the germination, quality and quantity of a wide range of valuable agronomic crops. The impact of the plant biofertilizers on human health and their exposure effects at cellular and molecular level have not yet been studied in details. The objective of the present study was to assess the possible genotoxic potential of the biostimulants Naturamin-WSP and Kaishi on mouse fibroblast cell line BALB/c 3T3 through DNA fragmentation assay for analysis of genomic integrity and alkaline comet assay by determination of the percentage of DNA migrated from the comet head to the tail. The obtained results showed absence of DNA fragmentation after a 24-hour treatment period with Naturamin-WSP and Kaishi and a considerably increased percentage DNA in comet tail in comparison to the untreated controls was detected only after treatment with Naturamin-WSP in a concentration of 5%, a dose significantly higher than those applied in agriculture. Further analysis will be focused on examination of molecular targets of action of studied biofertilizers.

Keywords: Biostimulant, in vitro safety assessment, genotoxicity, BALB/3T3

TARGETING ALLATOSTATIN TYPE-C RECEPTOR OF THAUMETOPOEA PITYOCAMPA FOR NOVEL AGONISTS AS NEXT-GENERATION PESTICIDES

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ABSTRACT

G-protein coupled receptors (GPCRs) are the most prominent receptor family of the cell membrane, and they have diverse roles in various signaling pathways. Due to their significant roles, GPCRs are popular drug targets and suitable candidates for next-generation pesticides. Allatostatin receptor type-c (AstR-C) is a class A GPCR responsible for the regulation of Juvenile Hormone (JH) secretion in insects. JH is vital for growth, development, metamorphoses, and reproduction. Only AST-C peptide has been identified for the receptor as a natural ligand. Therefore, AstR-C represents a potential pesticide target against *Thaumetopoea pityocampa,* which is the main factor that limits the growth and survival of the Mediterranean pine forests. The study aims to provide novel potent agonists of AstR-C for next-generation pesticide design. Virtual screening performed on previously described orthosteric pocket against ChemDiv libraries to discover potential AstR-C agonists. Molecular dynamics (MD) simulations and MM-GBSA calculations were applied to hit molecules. Biological evaluation of the agonist candidates was performed through TGF-a shedding assay and *in vivo* lethality tests on larvae. Docking and MD simulations revealed the interactions in the orthosteric pocket, especially in between the ECL-2 residues and compounds. The *in silico* investigations presented ten agonist candidates, and 4 of them were purchased for biological tests. Lethality tests on larvae with promising candidates showed activity with LC50 values ranging from 406.121 to 1000 mg/L. A combination of *in silico* and biological methods was conducted to identify new agonists of AstR-C, and four novel agonists of AstR-C have been discovered. Their activity against the receptor has been observed through different methodologies, and these molecules represent next-generation pesticides against *Thaumetopoea pityocampa*.

Keywords: GPCRs, drug discovery, next-generation pesticides, allatostatin

PHYTOCHEMICAL AND ANTIOXIDANT ANALYSIS OF CHLOROFORMED EXTRACTS OF MEDICINAL PLANT LEAVES GROWN IN THE ALGERIAN *Sara* SAHAR

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ABSTRACT

The Algerian Sahara has a rich heritage of medicinal plants. The Saharan population uses these medicinal plants as an essential source of traditional remedies for disease prevention due to their content of various bioactive compounds. They are increasingly used in pharmaceutical, food, and cosmetic products and can be used instead of synthetic antioxidants. In this context, the objective of our work was to study the phenolic components and the antioxidant activity of a chloroform extract of leaf powder of the Matricaria genus from the Algerian desert. For this proposal, the chloroform extract of the leaf was prepared by the Soxhlet method. The resulting filtered extract was evaporated through a rotary evaporator before being used for phytochemical analysis via a microplate reader. The colorimetric technique determined the total polyphenol content and the total flavonoid content (TFC). Simultaneously, antioxidant activity was determined using DPPH radical scavenging capacity and phenanthroline test. According to our findings, chloroformic extract of Matricaria leaf powder has a significant concentration of total polyphenols (33,346±0.101 mg gallic acid equivalent/100 g dry matter) and flavonoids. Furthermore, it has vigorous antioxidant activity with a phenanthroline A0,5 of 8.612±0.394 µg/ml. Based on this research, we concluded that the high concentration of bioactive compounds in Matricaria leaf powder allows it to be used in various agro-food and medicinal applications.

Keywords: Matricaria genus, Chloroformic extract, Bioactive molecules, Total polyphenols, Antioxidant activity.

EVALUATION OF ULTRAVIOLET (UV) ABSORPTION ABILITY OF MENENGİÇ AND OLIVE OILS FROM TURKEY

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ABSTRACT

Ultraviolet (UV) rays from the sun cause negative effects on humans and protective products should be used to protect against harmful rays. People prefer to use natural preservatives instead of chemical containing preservatives. Oily substances are very effective in forming a long-lasting sunscreen film on the skin. In addition, the emollient properties of oily substances protect the skin from drying effects such as wind and sun exposure. In our study, the sun protection factor (SPF) of Menengiç and olive oils from Turkey was investigated to obtain usage potential as natural additive in cosmetic industry. SPF values of oil samples were measured spectrophotometrically at the wavelength of UV-B light (290-320 nm) in vitro. SPF values of Menengic and olive oils were determined as 1.11 and 3.12. The percentage of UV blocked was found to be 27% for menengiç oil and 65% for olive oil. Menengiç and olive oils have the potential to be used as herbal sunscreen agents in cosmetic industry as natural additives.

Keywords: Menengiç oil, olive oil, sun protection factor (SPF), Ultraviolet (UV) rays

INVESTIGATION OF OLIVE AS AN ALTERNATIVE TO SYNTHETIC FOOD PRESERVATIVES

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ABSTRACT

Olive (Olea europaea L.) and olive extracts have been used as a natural medicine from past to present. Olive extracts have many biological activities, especially antimicrobial effect. Today, the trend towards natural foods has increased and synthetic food preservatives are being replaced by herbal products. In our study, the antimicrobial activity of olive fruit water extract from Ayvalık Yağlık Olive was investigated against food-borne and clinical pathogens (Salmonella enteriditis ATCC 171, Bacillus cereus RSKK 863, Staphylococcus aureus ATCC 25923, Escherichia coli ATCC 11229, Pseudomonas aeraginosa ATCC 27853 and Candida glabrata RSKK 04019) to determine its potential use as a natural resource. The disc diffusion assay was used to obtain the antimicrobial activity. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of the extract were also determined. The olive water extract showed the highest inhibition effect (19.46 mm) against E. coli ATCC 11229. The inhibition zone diameters ranged from 19.46 mm to 12.35 mm. The extract has the lowest MIC and MBC values (10 mg/ml) against S. aureus ATCC 25923. MIC and MBC values of the extract against the tested microorganisms varied from 10 mg/ml to 80 mg/ml. Ayvalık Yağlık olive water extract with good bioactivity can be used as a natural substance in the food and pharmaceutical industries alternative to chemical preservatives. The extract also may extend the shelf life of foods.

Keywords: Antimicrobial; extract; natural product, Ayvalık Yağlık.

QPCR AND TROUBLESHOOTING: FROM DEVELOPMENT TO VALIDATION APPROACH

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ABSTRACT

The quantitative polymerase chain reaction is powerful tool usually employed in medical and agri-food laboratories. *Campylobacter* is recognized as leaders of intestinal and extra-intestinal foodborne illnesses in humans. *Campylobacter jejuni* and *Campylobacter coli* are the main species that can infect humans from the consumption of contaminated animal meat and/or their products. The aim of this poster is to report the critical checkpoint in case of genes real time amplification problems. To achieve this, scientific search engines including PubMed, ScienceDirect, Web of Science, Scopus, Wiley Online, and Google Scholar were consulted to collect data. It is worthy to mention that there is a scarcity of available studies about quantitative PCR troubleshooting. The main found contributions of this interest were firstly analyzed qPCR procedure to check the protocol and then repeat the experiment (operator error). Secondly, if case of problem persistence, a checkerboard technique remains necessary to be investigated in order to determine the convenient master mix compounds concentration, including dNTP, buffer, MgCl2 and *Taq polymerase*. The most important reagent are oligonucleotides sequences of primers and probes. Furthermore, others steps should be checked such as amplification program, instruments failure, template, etc. In conclusion, the qPCR troubleshooting is a logical problem that can be improved with practice and experience.

Keywords: Campylobacter, qPCR, Troubleshooting, Development and Validation.

EVALUATION OF CELLULASE ACTIVITY OF bcsE MUTANT SALMONELLA STRAINS

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ABSTRACT

Salmonella infections lead to serious public health problems worldwide. They also cause major economic losses, especially in the food industry. *Salmonella* strains have an elasticity in their genetic structure that occurs in response to a variety of situations and environments, including human, animal, and non-animal hosts. One of the most typical mechanisms of this adaptation and persistent infectivity of these bacteria is their ability to form biofilms on biotic and abiotic surfaces. Since the pathogenicity of *Salmonella* is not clearly understood, the control of infections caused by these bacteria is challenging. In this study, the effects of BcsE, the c-di-GMP-binding protein expressed by the *bcsE* gene, on the cellulase activity of *Salmonella* Typhimurium (DMC4) and *Salmonella* Group C1 (DMC2) strains were investigated. Compared to wild-type strains, a significant decrease in cellulase activity was observed in the *bcsE* mutant strains on agar media. While no cellulase activity was observed in the *bcsE* mutant strains, cellulase activity was 1,28 cm in the ΔDMC2 strain and 1,68 cm in the ΔDMC4 strain. These results indicate that the *bcsE* gene is essential for *Salmonella* physiology and adaptation to its environment.

Keywords: Salmonella, biofilm, cellulase, bcsE

RECOVERY OF RARE SOIL ELEMENTS FROM INDUSTRIAL WASTE

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ABSTRACT

The use of rare earth elements in industrial products has increased worldwide. Advanced industrial wastes have led researchers to focus on REE recovery. Recent advances in bioprocess technology have created viable avenues for REE recovery from waste materials. In this study, the recovery of REE resources from industrial wastes was investigated. As a result of the analyzes it is suitable to obtain REE biological recovery from waste materials. Available literature includes REE contaminated soils near REE mines, coal mines, heavy traffic roads and agricultural soils (due to REE incorporation with phosphate fertilizers). First, the traditional separation methods used in the mining industry and their main methods of removing/precipitating REE are described. Then, soil improvement techniques used to improve REE are highlighted. Soil remediation techniques that enable REE extraction are one step cloNEr to resource recovery, which contributes to the cyclicality of REE. Techniques such as phytoremediation, soil washing, and electrokinetic treatment show promising extraction results.

Keywords: rare earth elements, bioprocess, biological recovery, remediation techniques

WHITE PITAHAYA IN AQUACULTURE: INVESTIGATION OF THE POTENTIAL USAGE OF FRUIT AND PEEL

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ABSTRACT

Fish and seafood are widely consumed as protein sources that are valuable for balanced nutrition and health. One of the problems of fish farms is infectious diseases. These problems cause serious economic losses to the manufacturer. Plants have the potential to be used in the treatment of diseases in animals. The white pitahaya fruit has recently become a fruit of interest. In the present study, antimicrobial activity of methanol extracts of fruit and peel of white pitahaya was determined by disc diffusion and micro-dilution assays. The results of the disc diffusion test indicated that the highest inhibition zone diameter was found to be 12.93 mm in peel methanol extract and 11.54 mm in fruit methanol extract against *Aeromonas hydrophila* ATCC 19570. MIC value was found to be 40 mg/ml in fruit and peel methanol extracts against the microorganisms of *A. hydrophila* ATCC 19570, *Lactococcus garvieae* and *Yersinia ruckeri*. The lowest MBC value was determined as 40 mg/ml against *A. hydrophila* ATCC 19570, *L. garvieae in* fruit extract, against *A. hydrophila* and *Y. ruckeri* in peel extract. MIC and MBC values of white pitahaya extracts were determined as 80 mg / ml against *Vibrio anguillarum* A4. As a result of our study, it was reported that white pitahaya extracts have the potential to be used as a feed additives or natural antimicrobial substances in aquaculture.

Keywords: White pitahaya, extract, antimicrobial activity, fish pathogens

DETERMINATION OF USEGA POTENTIAL OF RED PITAHAYA EXTRACTS AGAINST *Escherichia coli* AND *Listeria monocytogenes* FOR THE FOOD INDUSTRY

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ABSTRACT

The increasing population of the world also increases the need in the food industry. The preservation and prolongation of the shelf life of foods provides advantages in the food industry. Food-borne pathogens can be controlled with synthetic and natural protective substances. Pitahaya has started to gain popularity in Turkey as well as in all countries. It is known as a fruit that provides benefits in many areas thanks to its rich bioactive compounds. In the current study, antimicrobial activity of methanol and water extracts from Red Pitahaya fruit and its peel prepared by using sonication device against food-borne pathogens was determined. Disc diffusion and micro-dilution assays were used to obtain antimicrobial activity. The highest inhibition zone diameter was determined as 10.62 mm in fruit methanol extract against *Listeria monocytogenes.* The lowest MIC value was determined as 10 µg/µl against *Escherichia coli* O157:H7 in fruit water extract. The MBC value was determined as 80 µg/µl for all extracts in *E. coli* O157:H7. The results of the study indicated that Red Pitahaya extracts can be used as a natural protective substance in the food industry.

Keywords: Red Pitahaya, food-borne pathogens, natural food protective, antimicrobial activity

CRISPR/CAS TECHNOLOGY FOR WHEAT BREEDING

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ABSTRACT

The rapid growth of the world population and the current climate change show that genome technologies with the potential to accelerate crop breeding are in an important position. Genetic engineering techniques have various applications in agricultural crops. Advances in genome sequencing and genome editing technology have enabled more effective application of molecular breeding studies on agriculturally important characters in plants. ZFN (Zinc Finger Nucleases), TALEN (Transcription Activator-Like Effector Nuclease), and clustered regulatory interspaced short palindromic repeats associated protein 9 (CRISPR/Cas9) are significant genome editing technologies. CRISPR/Cas9 allows improvement of important agronomic traits related to crop quality, yield, nutritional value, and biotic-abiotic stress tolerance. Wheat, the basic source of cereal-based processed products, is one of the most widely produced cereals in the world. CRISPR/Cas-mediated genome editing technology was used for various purposes such as knockout of genes, base editing, prime editing, homology-directed repair (HDR) to improve wheat yields and quality. In this study, recent situation of CRISPR/Cas-mediated genome editing technology in wheat breeding and the research carried out using CRISPR/Cas technology in wheat is presented.

Keywords: Abiotic stress, Biotic stress, CRISPR/Cas9, Genome Editing, Wheat

ANTIOXIDANT AND ANTIFUNGAL ACTIVITIES OF JUNIPERUS PHOENICEA AND SALVIA OFFICINALIS ESSENTIAL OILS

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ABSTRACT

This work was carried out in order to evaluate the chemical profile, antioxidant and antifungal activities of *Juniperus phoenicea* and *Salvia officinalis* essential oils (Eos). The chemical composition was determined using Gas Chromatography-Mass spectrometry (GC/MS). Chromatographic identification of *S. officinalis* Eo revealed cis-chrysanthenyl acetate (64.82%), and α-thujene (14.7%) as major components. The composition of *J. phoenicea* oil was strongly dominated by α-Pinene (64.4%) and δ-3-Carene (7.02%). The antifungal activity was tested against *Aspergillus flavus, Aspergillus parasiticus, Aspergillus fumigatus, Aspergillus carbonarius* and *Penicillium* sp. by the poisoned food method on Czapek Yeast Agar (CYA) medium. The two essential oils exhibited an antifungal activity, with *S. officinalis* oil being the most potent one (8-82% of inhibition). The antioxidant activity was characterized by the DPPH free radical scavenging method. According to our results, *J. phoenicea* and *S. officinalis* Eos had both a moderate antioxidant effect with IC50 values of 271.2 µg/mL and 311.4 µg/mL, respectively. Additionally, an antagonistic effect was observed between the Eos when used in combination with an IC50 of 435 µg/mL. The overall results suggest that these essential oils have a potential as antifungal agents and could be used to control postharvest fungal pathogens. Regarding the antioxidant activity, *J. phoenicea* and *S. officinalis* are recommended to be used alone.

Keywords: essential oils, Juniperus phoenicea, Salvia officinalis, antifungal, antioxidant

THE CHARACTERIZATION AND BIOTECHNOLOGICAL APPLICATION OF THERMOPHILIC ALPHA-L-ARABINOFURANOSIDASE FROM GEOBACILLUS SPECIES

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ABSTRACT

Industrial processes usually take place at high temperatures since high temperatures are important to solve contamination problems and provide soluble substrate. For this reason, the use of thermophilic enzymes, which have high stability at high temperatures, is generally preferred in industrial processes. Microorganisms of the genus *Geobacillus* are important microbial sources used for thermophilic enzymes and they live in regions with very high temperatures such as geothermal waters and hot springs. The genus *Geobacillus* includes 16 species that have been systematically made today. Recently, Geobacillus species are of great attraction because they are important sources of thermophilic enzymes such as hemicellulases, proteases, amylases, lipases and pullanases. Among these enzymes, hemicellulases are a group of enzymes, which can degrade the lignocellulosic material, the most abundant undiscovered carbon source in nature. Alpha-L-arabinofuranosidase (Abf), a type of hemicellulase enzyme, catalyzes the hydrolysis of terminal and non-reducing α-1,2-, α-1,3- and/or α-1,5-L-arabinofuranoside by breaking down the side chains of the polymer called xylan, which is in the main structure of hemicellulose. Abf enzymes synergistically play a role with other glycoside hydrolases such as arabinanases and xylanases in a variety of agro-industrial processes, including improving animal feed digestibility, delignification of paper pulp, enhancing flavor during winemaking, and clarification of juices. Due to the wide range of industrial use of abf enzymes, they have been the subject of many researches. In this study, characterization and biotechnological applications of Abf enzymes from thermophilic *Geobacillus* have been considered.

Keywords: Geobacillus, Alpha-L-arabinofuranosidase, thermophilic enzyme

ANTIMICROBIAL WOUND DRESSING MATERIALS

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ABSTRACT

Wound management consists of a process that includes several factors, and different procedures and can lead to complex clinical problems. Determining an efficient approach to enhance the healing process is necessary using certain materials and methods. One of these approaches is using wound dressing materials. The purpose of wound dressings is to support the local wound environment and absorb moisture in order to facilitate wound healing. Recently, thanks to development achieved in biotechnology and nanotechnology, especially advanced wound dressing materials with different structures and forms have attracted attention and have been researched because of Maroccinating functions such as enhanced mechanical strength, antimicrobial activity, high surface area to volume ratio, and special functionalities shown in the wound surface triggered by the nanoscale dimensions. Here in, focused on reviewing various antimicrobial agents, biomaterials, and their recent advances used in designing wound dressing. Moreover, wound dressing materials synthesized by using green chemistry, nanomaterials, and antimicrobial activity, their future perspective, main strategies, and challenges were emphasized.

Keywords: Nanotechnology; nanoparticles; wound healing; wound dressing; antimicrobial activity

PHYTOCHEMICAL INVESTIGATION AND IN VITRO ANTIOXIDANT ACTIVITY OF THE POLAR EXTRACTS OF *Perralderia coronopifolia*

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ABSTRACT

Plants have a real advantage in being more accessible to humans. They are an interesting source of molecules that can show strong biological activities. From a biological potential point of view, Algeria has a rich and undervalued flora. It is from this perspective that our work is based on the study of the species *Perralderia coronopifolia* of the Asteraceae family. The aim of this study is to carry out a phytochemical and biological investigation of the butanol extract of the leaves and flowers of a species belonging to the *Perralderia* genus. Qualitative analysis by phytochemical screening showed a significant presence of cathechic tannins and flavonoids in both plant organs, an average presence of coumarins, and an absence of anthocyanins. The analysis of the chemical composition using HPLC revealed the presence of quercetin in the butanol leaf extract and citric acid in the butanol flower extract. Moreover, the study of the antioxidant activity of two extracts was tested by two methods (DPPH and ABTS). The results confirmed good antioxidant potency for both organs. The ABTS test showed a good antioxidant effect for the butanol extract leaves with an IC50 = 0.09 ± 0.11 mg/mL compared to ascorbic acid (IC50 = 0.03 ± 0.01 mg/mL). In addition, both extracts showed a particular richness in total polyphenols and total flavonoids, which supports the strong antioxidant activity observed. To the best of our knowledge, this work has never been studied previously.

Keywords: Perralderia coronopifolia, HPLC analysis, antioxidant activity

IN-VITRO ANTIBACTERIAL AND ANTIFUNGAL EFFECTS OF *Physalis acutifolia* L. RECENTLY DISCOVERED IN ALGERIA

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ABSTRACT

Natural products from medicinal plants are known for their ability to promote biological activities. This work is devoted to the phytochemical and biological study of a species belonging to the *Physalis* L. genus, which is endemic to Algeria and has never been, studied before. The phytochemical investigation of the ethanol extract of the species of the genus *Physalis* allowed the isolation of 2 compounds, which have been identified as a mixture of stigmasterol **(1)** and *β*-sitosterol **(2)**. The structural elucidation of the isolated compounds was carried out using 1H NMR, as well as by comparison of the results with literature data. Evaluation of the antibacterial activity of ethanol and *n*-butanol extracts from fruits, leaves, and stems of *Physalis* using the disk diffusion method showed a modest effect against four bacterial strains (*Bacillus cereus, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus*), while *Klebsiella pneumoniae* was resistant to all tested extracts. Concerning the antifungal effect, evaluated by the well diffusion method, only the ethanol extract showed a significant antifungal effect against *Aspergillus Niger*, whereas *Fusarium oxysporum* was resistant to all tested extracts.

Keywords: Physalis L., stigmasterol and β-sitosterol, antibacterial activity, antifungal effect.

SUN PROTECTION FACTORS OF COMMERCIAL OILS

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ABSTRACT

Oils are used in the cosmetic industry for skin care and protection from the harmful effects of the sun. The possibilities of using commercially available (rosemary (*Rosmarinus officinalis*), tea tree (*Melaleuca alternifolia*), St. john's wort (*Hypericum perforatum*), ant egg, garlic (*Allium sativum*), almond (*Prunus amygdalus dulcis*) and peppermint (*Mentha piperita*)) oils in the cosmetic industry have been determined as in-vitro. Sun protection factor (SPF) of oils and commercially cream and oil mixtures were determined by spectrophotometric measurements between 290-320 nm wavelength. SPF values of oils varied between 0.21 and 3.15. The highest SPF value determined (3.15) has St. john's wort oil and its UV blocking percentage is over 50%. SPF values of commercial oils and cream mixtures were investigated at 2.5 ml, 5 ml, and 10 ml concentrations. SPF value of cream-oil mixtures in 10 ml concentration is between 4.41 and 24.20. Almond oil has the highest SPF value (24.20) of cream and oil mixtures, and its UV blocking percentage is over 96%. Commercially available oils and cream oil mixtures have potential to be used as natural ingredients for sunscreen in the cosmetic industry.

Keywords: Sun Protection Factor, Rosemary Oil, Tea Tree Oil, St. John's Wort Oil, Ant Egg Oil, Garlic Oil, Almond Oil, Peppermint Oil

DETERMINATION OF THE POTENTIAL FOR USE IN THE COSMETIC INDUSTRY OF *Ziziphus jujuba* BRANCH WATER EXTRACTS

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ABSTRACT

Sunscreens are a cosmetic product that is widely used in many areas of our lives. It is used to protect from harmful ultraviolet (UV) rays of the sun, especially in summer. Sunscreens come into direct contact with our skin, so it is of great importance that the product used is reliable. However, chemical additives can cause side effects on our skin. Nowadays, studies on the search for natural additives are gaining importance in order to minimize the use of chemical additives in many industrial areas. *Ziziphus jujuba* is a fruit widely grown in our country. It is very popular lately due to its high nutritional content and health-enhancing effects. In the study, the solar protection factor (SPF) of *Z. jujuba*, hot (HWB) and cold (SN) branch water extracts and commercial cream mixture was investigated. The *Z. jujuba* branch extracts presented good SPF values with 25.32 for HWB extract and 25.67 for branch SN extract at a concentration of 10 ml. *Z. jujuba* branch extracts may have the potential to be used as a natural additive in the cosmetic industry.

Keywords: Jujube, sun cream, natural additive, solar protection factor

DE NOVO ASSEMBLY AND ANNOTATION OF THE *Actınıdıa kolomıkta* CV. 'DR SZYMANOWSKI' CHLOROPLAST GENOME AND COMPARATIVE ANALYSIS WITH OTHER ACTINIDIA SPECIES AND CULTIVAR

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ABSTRACT

Actinidia is a genus of plants, the most famous species of which is *Actinidia chinensis* var. *deliciosa*, or kiwi. However, there are also less popular representatives of this genus, which differ from kiwi in morphoanatomical parameters and have not yet been widely known by consumers. Nevertheless, the fruits of these species have high nutritional value and can be introduced into the international food market. In order to conduct an initial analysis of the collection of *Actinidia* cultivars from the nursery, we selected several cultivars of interest, including a self-fertile *Actinidia kolomikta* cv. 'Dr Szymanowski'. DNA was isolated from young leaves by a modified phenol-chloroform extraction method with CTAB-buffer and used to prepare libraries for further sequencing using Oxford Nanopore technology. For the de novo assembly, long readings obtained on the GridION Oxford Nanopore sequencer were used. Using long reads, genomic contigs were assembled using the *de novo* assembler Canu. All circular contigs were analyzed using the BLAST program using other plant plastid genomes as references. After the resulting genome sequence was assembled and annotated, we compared it with other plastid genomes to determine phylogenetic relationships among the *Actinidia* genus and the *Actinidia kolomikta* species. The obtained results are the first step towards the characterization of the *Actinidia* cultivars of Russian nurseries. Our data also determine the relationships between *Actinidia kolomikta* cv. 'Dr Szymanowski' and other *Actinidia* species and cultivars. The work was financially supported by Russian Science Foundation (grant № 22-16-00074).

Keywords: Kiwifruit, chloroplast genome, plant genome, comparative genomics, genome assembly

PRODUCTION OF FISH PROTEIN HYDROLYSATES THROUGH SOLID STATE FERMENTATION FROM *ONCORHYNCHUS MYKISS* WASTE

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ABSTRACT

Aquaculture is the Maroctest-growing animal food production worldwide and is becoming the primary source of aquatic animal food for human consumption. Consequently, large quantities of fish waste are also obtained from beneficiation units, which may cause environmental pollution if improperly disposed-off in the environment. To make more effective use of available marine resources, and to reduce the environmental effects of industrial fish waste; fish protein hydrolysates (FPH)were extracted by solid-state fermentation (SSF) of fish waste. Dead and sterile trout Oncorhynchus mykiss was valorized through SSF for obtaining FPH. The technological approach proposes the production and optimization of hydrolytic enzymes (proteases) and their use for fish waste hydrolysis in the same reactor unit at two different temperatures (30ºC and 37ºC). The first experiments tested the usefulness of Bacillus cereus inoculum to produce protease activity. Moreover, *O. mykiss* waste was fermented without any external inoculum, where microbial activity was related to autochthonous microbiota present in trout. The results suggest that fermentation at 30°C without any external inoculum is the more efficient for enzyme production in solid state hydrolysis (728U/gDM at 120h). Based on these results, current work is focused on scaling up the experiment to produce hydrolytic enzymes and FPH in the same reactor based on dynamic temperature and without any external inoculum.

Keywords: Fish waste, solid state fermentation, fish protein hydrolysates

EXTRACTION COLLAGEN FROM PARAPENAEUS LONGIROSTRIS THROUGH SUBMERGED LIQUID FERMENTATION

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ABSTRACT

Collagen extracted from fish skin by using porcine-derived pepsin is not accepted by a large number of people due to religious constrains. The aim of this study was to explore and select non pathogenic bacterial collagenolytic proteases to extract collagen from shrimp byproducts. Determination of collagenolytic activity was carried out through specific medium. Formation of clear zones around colonies indicate that bacteria have collagenolytic activity. Five lactic bacteria strains L8, L24, L36, L46 and L60 were selected and was measured for their specific activity and for protein concentration that was measured as dissolved protein. Crude extract of protease from the five strains showed that L24 have the highest activity with 7,01; L46=6,61; L60=6,36; L36=5,77 and L8 was the lowest with 4,5 U/mg. Furthermore, the five strains L24, L46, L60, L36 and L8 successively have produced protein with concentration of 0,42;0,38;0,27;0,2;0,15 mg/g. In order to enhance collagen production, protein concentration was measured forprotease mixture of L24+L60; L46+60 and L24+L46, successively proteins concentration was 0,4; 0,46 and 0,63 mg/g. Therefore, the mixture L24+L46 have been selected for shrimp byproducts for collagen extraction.

Keywords: Collagen, Submerged liquid fermentation, Parapenaeus longirostris

ARTIFICIAL MEAT OR IN VITRO MEAT

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ABSTRACT

Depending on the population growth rate, the food consumption rate also shows parallelism. If the amount of production is not enough to meet the consumption need, the increasing population will face many threats. Causes such as excessive resource consumption, climate changes, environmental pollution and misapplications are already damaging the food and water resources of the future. We need to reduce the risks posed by human beings, bring them within safe limits, ensure sustainability in food, and strengthen our social and physical infrastructure in the face of changes in the climate. In particular, studies that will protect water resources and meet the food demand in sufficient quantities have increased considerably today. At the beginning of the studies, artificial meat (*in vitro*) studies come to the fore in order to produce alternative protein sources, as animal husbandry causes rapid consumption of scarce resources. The meat that is prepared by culturing tissues and cells with various methods in the laboratory environment is called artificial meat. Artificial meat has been identified as an alternative protein source of the future. Artificial meat production is in the form of cell and tissue culture. The cell culture-based method is also known as the scaffold method. Embryonic myoblastin is isolated from the embryo of a farm animal such as cattle or sheep, or adult skeletal muscle cells are isolated from muscle biopsy of the animal and attached to a scaffold or a carrier such as a collagen mesh in the bioreactor, where it is proliferated by dividing over weeks or months in a plant-derived growth medium. For this study, a source of cells that can proliferate and differentiate functional skeletal muscle tissue is required. In the tissue culture-based method, artificial meats can be produced in very small sizes; however, since small biopsies would not be of practical importance, the use of tissue engineering for commercial production on a large scale has been suggested. In this review, the historical process, production methods, advantages and disadvantages of artificial meat, which is an alternative protein source, were evaluated, and the perspective of consumers on in vitro meat was revealed with the questionnaire sent via Google Form to support the study.

Keywords: In vitro meat, Food, Cell culture, Survey

GENE EXPRESSION PATTERNS AND ACTIVITIES OF ANTIOXIDANT ENZYMES IN OLIVE LEAVES IN RESPONSE TO DROUGHT STRESS AND RECOVERY

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ABSTRACT

The change in antioxidant metabolism is one of the main metabolic processes that can affect drought tolerance. Plants have evolved both enzymatic and non-enzymatic defense systems for scavenging and detoxifying Reactive Oxygen Species (ROS). When plants are exposed to stressful environmental conditions, the production of ROS increases, and can cause significant damage to the cells. Ascorbate peroxidase (APX), catalase (CAT), superoxide dismutase (SOD), peroxidase (PRX) and glutathione peroxidase (GPX) represent the principal ROS scavengers in plants. In the present study, we aimed to investigate a comprehensive characterization of the antioxidant mechanisms to drought stress and recovery from drought in eight olive cultivars from Olive Gene Bank, Turkey. The highest lipid peroxidation levels were obtained in the susceptible Gemlik variety. Therefore, Gemlik was exposed to the greatest damage due to drought stress. The fact that the lipid peroxidation rate increase of 17% was observed in Memecik shows that this variety is least damaged by drought stress. The lowest decrease in CAT activity due to stress was found in the tolerant variety Memecik and Çekişte. Therefore, it was observed that CAT played an important role in the inhibition of stress-induced ROS increase in these two cultivars among the other cultivars. The enhancement of CAT activity may be the reason why H2O2 production in Memecik and Çekiçte under stress is more reduced than in other cultivars. The highest POX activity was observed in tolerant variety Memecik. On the other hand, the lowest POX activity was obtained from the Gemlik variety. Similar to CAT, the highest activity of POX, another H2O2 scavenger, was obtained in Memecik and Çekiçte. Similar to CAT, the lowest POX activity was observed in Gemlik. The APX activity of olive varieties decreased under drought stress, except Memecik. It suggests that Memecik variety uses not only CAT and POX but also APX as H2O2 scavengers under drought stress conditions. On the other hand, the lack of three enzymes, which scavenge H2O2 under stress, is remarkable in Gemlik variety. For gene expression profiling, 5 (*OeAPX*, *OeCAT*, *OeCu/ZnSOD*, *PRX*12 and *GPX*) genes with a 2-fold or more differentially expressed which represent the principal ROS scavengers were selected from our olive RNA-seq data. According to the Real Time-qPCR results, expression levels of *APX* and *CAT* up-regulated in the tolerant variety compared to the susceptible cultivar under drought stress. However, *CAT* expression

levels were significantly down-regulated in the susceptible cultivar. *PRX* gene expression was up-regulated on both olive cultivars under drought stress. The expression level of *APX* gene increased by 5.5-fold, while the *GPX* gene increased by 1.2-fold in tolerant cultivar under drought stress. The differential responses of antioxidant enzyme activities and gene expression between the drought tolerant and susceptible varieties to drought stress and recovery periods suggested different antioxidant metabolisms in strategic plant olive.

Keywords: Olive (*Olea europaea* L.), Drought, Antioxidant Activity, Real Time-qPCR, Gene Expression

SCREENING OF AHL LACTONASE PRODUCER BACTERIA FROM AGRICULTURAL LANDS

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ABSTRACT

Quorum sensing is a density-dependent mechanism. This system regulates many virulence factors. Inhibition of this system can be used to block the virulence factors of pathogens. Quorum quenching (QQ) defines the inactivation or degradation of quorum sensing signal molecules. AHL-Lactonase is a degradation enzyme in the quorum quenching system. QQ could be considered an alternative way of fighting against pathogens and may play an important part in the battle for disease. In this study, we aimed to determine AHL-lactonase producer bacteria and their effects on *Pseudomonas aeruginosa* PA01(PA01) and *Chromobacterium violaceum* CV026(CV026). Three agricultural fields in Turkey/Ankara were sampled for AHL-lactonase-producing bacteria. All soil samples were treated with Tryptic soy broth (TSB) and incubated for 24 hours at 28°C. Each sample was inoculated into 3 mL of C6-HSL-containing TSB medium and incubated at 28 °C. After 48 hours, 10% (v/v) of the cultured broth was transferred to a fresh TSB medium with C6-HSL. The transfer method was repeated to enrich for C6-HSL-metabolizing bacteria. Following the enrichment cycle, a diluted solution of the culture broth was plated onto LB agar and incubated at 28 °C. To obtain a pure culture, each colony was inoculated on LB agar. The agar overlay test with CV026 was used to degrade AHL. In addition, swarming and swimming motility assays were conducted with PAO1. As a result of this study, AHL-lactonase producer bacteria were isolated. Their effects on PA01 and CV026 quorum sensing systems were measured as highly remarkable. Based on our results, it would be considered that enzyme-based supporters may fight the pathogenicity of bacteria.

Keywords: AHL, Lactonase, Quorum quenching, Quorum sensing

CRISPR/Cas9 GENOME EDITING TECHNIQUE FOR ABIOTIC STRESS RESPONSES IN HORTICULTURE

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ABSTRACT

Factors such as the pressure of world population growth on ecology and climate change negatively affect the sustainability of agriculture. Improvement in yield and quality, as well as resistance and tolerance to stress factors, are among the breeding goals in agricultural production. Garden plant species such as fruit, vegetables and ornamental plants are the first group to be affected by adverse conditions in plant cultivation. There has been an increase in cultivar development studies for horticultural plant species that are tolerant to abiotic stress factors such as high temperature, drought, salinity and heavy metals. With the developed genome editing technologies, tolerance to abiotic stress conditions controlled by multiple genes makes an important contribution to breeding studies. Different tools such as TALEN, ZFN, CRISPR have been used for many years in genome editing studies. TALEN and ZFN techniques have found limited use due to some disadvantages. CRISPR-Cas9, which is a newer technique than others, has been developed as a method with higher efficiency and more accurate results. The CRISPR/Cas editing module can be used efficiently to target complex quantitative genes that are directly or indirectly linked to stress abiotic stress factors. Successful studies have been carried out in some horticultural plant species against some abiotic stress factors: high temperature (tomato, lettuce) low temperature (tomato), drought (tomato), salt (tomato), herbicide (tomato, watermelon, lettuce). As a result, it has been evaluated that genome editing tools can be significantly effective in developing abiotic stress-tolerant varieties in horticultural plant species.

Keywords: Horticulture, Abiotic stress, Gene Editing, CRISPR-Cas9

DETERMINATION OF CORRELATION VARIATION OF MORPHOLOGICAL AND SOME MOLECULAR MARKER TECHNIQUES IN WATERMELON

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ABSTRACT

Different marker techniques are used for molecular marker assisted selection. It is important to identify molecular marker techniques that are highly correlated with morphological data. The correlation between the clustering results obtained using morphological and genetic data and the distance matrix can be determined. In this study, correlation coefficient values between morphological data of different watermelon genotypes and data of different molecular marker techniques (SSR, ISSR and iPBS) were obtained. It was determined that ISSR and SSR values were more correlated with morphological data than iPBS data. This indicates that iPBS primers are more distantly related to morphological data. Correlation coefficients of 0.44-0.71 were determined between three different molecular marker techniques. The lowest correlation was found between iPBS and ISSR (0.44), and the highest correlation between ISSR and SSR techniques (0.71). As a result, it was determined that the codominant SSR and dominant ISSR markers showed more similar results than the retrotransposon marker technique, iPBS. It can be concluded that the reason for the difference is the differences in the number of loci obtained from different techniques.

Keywords: Watermelon, *Citrullus lanatus*, Variation

SEED GERMINATION TEST OF *Maerua siamensis* (Kurz) Pax

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ABSTRACT

Maerua siamensis (Kurz) Pax belongs to *Capparaceae* distributed in mainland southeast Asia. Its populations have been threatened by forest destruction and over collecting for garden landscape use. To conserve this species, the reproductive biology study is crucially needed. The propagation via seeds is one of the productivity protocols for population conservation. This study was conducted to test the germination rate of *M. siamensis* and find out the suitable method for species conservation. Five pretreatments including control were designed which are (1) untreated seeds as control, (2) soaking in water 24 hours, (3) soaking in hot water 80oC for 5 mins, (4) soaking in 98% sulfuric acid for 5 mins, and (5) scarification with nail clip. The experiment was conducted in Completely Randomized Design (CRD) with 3 replicates containing 90 seeds in each treatment. The results showed that the mechanical scarification with nail clip gave the highest germination rate. However, untreated seeds treatment is an option for producing seedlings due to cost saving. This species is non-dormant seeds due to germination occurs within few days after sowing. The fruit ripening time fit with the beginning of the rainy season. It seems to be an orthodox seed because seeds kept in refrigerator for 1 year gave high germination rate. This species can be applied to seed banking, but it needs to monitor long term survival rate after seed banking.

Keywords: Pretreatment, seed germination, *Maerua siamensis*, Cappa

INFORMATION UPDATE ON *Pancratium maritimum* L. KILYOS (ISTANBUL) POPULATION AND THREAT RISKS

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ABSTRACT

Turkey has rich biodiversity hotspots for conservation priorities and is a significant centre worldwide due to the phytogeographical region. Coastal dunes have importance, especially because seas surround Türkiye. The habitats of coastal dunes are different because of special ecological aspects. These significant ecosystems are under pressure from various anthropogenic factors, especially tourism. One of the crucial coastal areas in Türkiye is the Kilyos coast in İstanbul. This area is home to some globally endangered endemic species. In the past, Kilyos coasts have been lost greatly because a lignite quarry was operated in this region. After that, unsuitable afforestation was made in this region. These reasons have damaged the habitat in the Kilyos coast. In this study, the Kilyos population of *Pancratium maritimum* L., an essential plant for coastal vegetation, was observed. *P. maritimum* is a perennial geophyte plant belonging to the *Amaryllidaceae* family, naturally spread on the Aegean, Mediterranean and Black Sea coasts in Türkiye. *P. maritimum*, as a medicinal plant, is very important for its pharmacological effects and Türkiye's biodiversity. For this reason, *P. maritimum* should be protected within its distribution area and not be damaged. In this context the study aimed to determine the total number of individuals and threat factors especially the vegetation period of the species between June to October (2021) in the study area. According to the results, mass housing construction, campus, recreational facilities and sports fields construction, camp fields, tourism, anthropogenic effects, and use of off-road vehicles, removing the bulb unconsciously were determined and photographed as severe threats to the distribution of the *P. maritimum.*

Keywords: *Pancratium maritimum* L., Kilyos, Coastal dunes, Threat risks, Conservation biology

ACKNOWLEDGEMENT:

This research is financially supported by TUBITAK under the 2209-A program (project application number: 1919B012006286).

COMPARISON OF DROUGHT TOLERANCE OF SOME WHEAT VARIETIES GROWN IN TURKEY

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ABSTRACT

The effect of drought stress on 21 wheat (*Triticum aestivum* L.) varieties was determined at the germination stage. Varieties were screened for drought tolerance. Four levels of osmotic stress were assessed by applying different concentrations of polyethylene glycol (PEG-6000; 0%, 10%, 15% and 20% (w/v)). Germination rate, root-shoot length, total chlorophyll amount (SPAD), specific leaf area (SLA), relative water content (RWC), superoxide anion (O^{2-}) and hydrogen peroxide (H^2O^2) accumulation were determined on the 8 th day after sowing. The increased osmotic stress, significantly reduced germination rate, root-shoot length, SLA, chlorophyll amount and RWC in Kate-A1, Gelibolu and Hamitbey varieties. Pehlivan, Karahan-99 and Tekirdağ varieties were less affected by osmotic stress and these varieties were determined as drought-resistant varieties than other varieties.

Keywords: Drought Tolerance, Wheat, Germination, Osmotic Stress.

DETERMINATION OF SALT TOLERANCE OF SOME BARLEY VARIETIES BASED ON PHYSIOLOGICAL AND BIOCHEMICAL PROPERTIES

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ABSTRACT

Salt stress is one of the important environmental factors limiting the growth and productivity of barley (Hordeum vulgare L.) worldwide. Increasing salt stress negatively affects plant growth and development, posing a threat to global food security. In this study, some physiological and biochemical effects of salt stress at different concentrations (0, 50, 100, 200 mM NaCl) on 8 barley varieties (Kıral-97, Harman, Yaprak, Yaba, Larende, Cumhuriyet-50, Kalayacı-97, Çıldır-02) grown in Turkey were determined. For this purpose, the effects of salt stress on root-shoot length, biomass, pigment content, specific leaf area (SLA), relative water content (RWC), lipid peroxidation amount (TBARS) and H 2 O 2 amount (spectrophotometric and histochemical staining) were determined in 21-day-old seedlings. Our results showed that increased salt stress decreased the root-shoot lengths, biomass, SLA, and pigment contents in Cumhuriyet-50 and Çıldır-02 varieties, while increasing the amount of TBARs and H 2 O 2 . It was determined that Yaprak and Yaba varieties were less affected by salt stress and were more resistant to salinity compared to other varieties.

Keywords: *Hordeum vulgare* L., Salt Stress, Growth, NaCl, Hydrogen peroxide.

THE CONTRIBUTION OF THE ITS2 BARCODE REGION TO THE ONOSMA PHYLOGENY

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ABSTRACT

Onosma, which is in the Boraginaceae family, one of the largest family in Turkey, has many systematic problems. In order to solve the problems in the taxonomy of *Onosma*, the studies have been commonly based on morphological, anatomical and palynological data and molecular information is quite scarce. For this reason, DNA barcoding method was used to solve systematic problems in *Onosma* genus. ITS2 barcode region, one of the nuclear barcode regions, was used and 24 *Onosma* problematic taxa were included in the study, the nuclear ITS2 barcode region were amplified in *Onosma* taxa using the primers that have been published in the previous studies. Successfully amplified DNA fragments were commercially sequenced. The partial ITS2 sequence were submitted to the NCBI database. Sequence data of ITS2 regions were used to construct a phylogenetic tree. Phylogenetic trees were created by using Maximum Parsimony, Maximum Similarity, UPGMA (Unweighted Pair Group Method Using Average), Neighbor-Joining (NJ–Neighbor Joining Method), Minimum Evolution analysis methods in Mega7 program. It has been determined that the phylogenetic tree created by the Maximum Likelyhood method deciphers the relationship between *Onosma* taxa by explaining them in the most accurate way.

Keywords: Onosma, Phylogeny, DNA Barcoding, ITS2

CHECK-LIST OF THE GENUS ALLIUM IN ŞANLIURFA AND CONTRIBUTIONS TO THE MORPHOLOGY OF LOCAL ENDEMIC *Allium ekerii* AND *A. Variegatum*

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ABSTRACT

This study was conducted between 2018-2022. According to the Flora of Turkey, there are 5 *Allium* taxa in Şanlıurfa. Floristic studies carried out after the 2000s have shown that the number of *Allium* species in Şanlıurfa has increased to 23. In this study, the current species list of *Allium* species distributed in Şanlıurfa is given. The diagnosis was disseminated by making detailed morphological studies on the local endemic *Allium ekerii* E. Kaya , Koçyigit and *Allium variegatum* Boiss. species collected from the field. Photographs of the samples were taken during the study. Detailed morphological measurements of *A. ekerii* and *A. variegatum* were made and detailed description, habitat, IUCN extinction risk status were given. In addition, photographs and distribution maps of *Allium* taxa distributed in Şanlıurfa are given.

Keywords: Allium ekerii, Allium variegatum, local endemic, Şanlıurfa

A SURVEY ON COSMETIC PLANTS USING IN COSMETIC INDUSTRY

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ABSTRACT

In many cultures across the world, flowers are one of the most sought after natural remedies for a variety of ailments from headaches and digestive problems to anxiety and fatigueand are often used as essential oils, carrier oils. Essential oils when incorporated into finished products impart many benefits such as a pleasant aroma in perfumery, shine orconditioning effects in hair care products, emolliency and improving the elasticity of the skin. In this study the flowers of 12 plants are given which are using for cosmetic studies. These are *Rose* x *damasceana* Mill, *Passiflora incartana, Helianthus annuus* L, *Tagetes erecta* L., *Matricaria chamomille, Hibiscus sabdariffa* L., *Nymphaea nouchali, Lavandula angustifolia* Mill., *Calendula officinalis* L., *Jasminum officinale, Sambucus canadensis, Echinacea angustifolia* DC. In the part of the study chemical ingredients of all of these mentioned plants and how they use in cosmetic products are given. In the future, it is possible that many new plants, extracts and oils of commercial significance will be identified, and many ethnobotanical uses and claims of manywidespread herbs will be proven. This study is a contribution for them.

Keywords: Cosmetic, plants, essential oil

INSIGHTS ON THE PHYLOGENETIC UTILITY OF RPD2 GENE: A CASE STUDY OF *Silene* L. (*CARYOPHYLLACEAE*)

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ABSTRACT

Increasing availability of DNA sequence data have led to better understanding of the phylogenetic relationships in many difficult organismal groups more than ever. Genome scale data are now accessible on affordable cost, however due to the various limitations of the analyzing tools, genome based phylogenetic inference is challenging. Low-copy nuclear genes have been successively used for phylogenetic reconstruction in complex groups such as genus *Silene* L., where evolutionary events (e.g., incomplete lineage sorting, gene duplications etc.) lead to reticulate interspecific relationships. Nevertheless, there is not only a shortage of low-copy nuclear markers but also, the phylogenetic usefulness of such markers is an issue. In this study, using sequence data of RPD2 region from the samples representing some major lineages of genus *Silene* we have attempted to evaluate phylogenetic usefulness of this marker. Our results are in agreement with the studies indicate duplicate copies of RPD2 locus in *Silene*.

Keywords: Paralogues, Phylogenetics, Polymerases, *Silene*, Species complex.

DEVELOPMENT AND VALIDATION OF ANALYTICAL METHODS FOR QUANTIFICATION OF L-DOPA; APPLICATION TO PLANT MATERIALS

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ABSTRACT

L-dopa, a precursor of dopamine, is an important neurotransmitter used in the treatment of nervous disorders such as Parkinson's disease. In this study, user-friendly, simple, Maroct and economical chromatographic and spectrophotometric methods have been developed to determine the amount of L-dopa in plant materials. High-performance liquid chromatography and spectrophotometry methods were developed using standard instrumental parameters. These analytical techniques were validated for linearity, accuracy, precision, and robustness according to ICH guidelines. An Agilent Extend C18 (250×4.6 mm, 5 µm) column was used in the chromatographic method. 0.1% TFA solution and acetonitrile (92/8, v/v) were used as mobile phase. It was run in isocrotic mode and the flow rate was 1 mL min-1. The retention time of L-dopa was determined as 3.85 minutes. L-dopa was determined by spectrophotometric technique by measuring the absorbance of the solutions at a wavelength of 280 nm. In spectrophotometric analysis, ultra-pure water as a solvent gave sufficient molar absorptivity at a λmax of 280 nm. The results showed that spectrophotometric and chromatographic methods were linear, accurate, precise, robust, and the percent recovery was within standard limits. It was determined that there was no statistically significant difference between the methods in the 95% confidence interval ($p<0.05$). The developed methods have been found to be highly effective and can be used for the quantification of L-dopa in plant materials for routine analysis.

Keywords: L-dopa, quantification, chromatography, spectrophotometry, validation.

PHYTOCHEMICAL INVESTIGATION AND EVALUATION OF THE PHENOLIC AND FLAVONIC CONTENTS OF LEAVES FROM A SPECIES OF THE ASTERACEAE FAMILY AND THE RESEARCH OF ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES

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ABSTRACT

The present work concerns the phytochemical and biological studies of the leaves of an Algerian plant belonging to the Asteraceae family. Leaves of this species were submitted to a phytochemical study, which revealed the presence of several secondary metabolites, such as alkaloids, flavonoids, tannins and others. Soxhlet extraction in three solvents of increasing polarity made it possible to obtain three extracts CHCl3, AcOEt and n-BuOH. The above extracts where analyzed for their total phenolic and flavonoid contents using the Folin-Ciocalteu reagent and Aluminum tri-chloride respectively. The results reveal that the n-BuOH of leavs extract is the richest in total polyphenols and flavonoids with values of 122,22±0,629 mg EAG/g and 109,8±1,804 mg EQ/g respectively. The evaluation of the antioxidant activity using two methods (DPPH, ABTS) of the AcOEt and n-BuOH extracts from the leaves of the plant, revealed that the n-BuOH extract had a higher antioxidant activity than the other. The diffusion method in agar medium was used to test the antibacterial activity of the chloroform extract on three bacteria, which are reference strains involved in several human infections. However, the results showed that the chloroform extract exerted a moderate activity against these bacteria.

Keywords: Medicinal plant, phytochemical screening, polyphenols and flavonoid contents, antioxidant activity, antibacterial activity.

□-AMYLASE, GC AND GC-MS ANALYSIS OF VOLATILE COMPOUNDS FROM AN ASPHODELUS SPECIES COLLECTED IN CONSTANTINE, (EASTHERN ALGERIA)

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ABSTRACT

In the present study, the chemical composition of the essential oil obtained from the aerial parts of *Asphodelus species* collected in Constantine was evaluated by gas chromatography (GC) and GC-mass spectrometry. The main components of the oil were α-phellandrene (15.18%), α-pinene (14.27%), sabinen (13.81%), β-Ocimene (Z) (12.69%), Neo allo ocimene (4.88%) and Germacra-1(10),4(15),5-triene (3.34%). Cluster analysis of the essential oil compositions of all the taxa belonging to *Asphodelus* group was performed. The of a-amylase test shows that our essential oil has a dose-dependent ant diabetic activity. It is presented an inhibitory activity detectable against the enzyme responsible for the disease of diabetes.

Keywords: *Asphodelus, Liliaceae*, essential oil, α-phellandrene, α-pinene, □-amylase

METHODS OF MECHANOCHEMICAL ACTIVATION OF INDUSTRIAL CATALYSTS OF CARBON OXIDES HYDROGENATION

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ABSTRACT

Nowadays, one of the promising areas is the chemical utilization of carbon oxides in chemicals and fuels. This direction is extremely attractive because it not only reduces global warming caused by increasing atmospheric CO2 concentrations but also offers solutions to replace exhaustible fossil fuels. However, it is well known that carbon oxides are fairly stable molecules. This is the biggest obstacle to the implementation of industrial processes with their use, as the transformation of carbon oxides requires a significant amount of energy. Hydrogen is a material with a relatively sufficient energy reserve. It is the main reagent in the conversion of carbon oxides. The development of an efficient method of extracting hydrogen from renewable sources, the conversion of a mixture of CO and CO2 can open a key approach to the accumulation and conservation of energy in the form of chemicals and fuels. The effectiveness of mechanical flow during the hydrogenation process has been repeatedly proven. This is due to the local release of significant energy sufficient for the hydrogenation process in softened conditions at the point of contact of two catalytically active surfaces. Improving existing industrial catalysts in this way will increase the overall efficiency and cost-effectiveness of hydrogenation processes in general. A laboratory installation was developed and installed to study the process of hydrogenation of carbon oxides using both classical granular and mechanoactivated catalysts before the process or *in situ*. The reaction device is designed in such a way that it is possible to activate the catalyst mechanically - the creation of elastic-deformation oscillations at the points of contact of the active surfaces of the granules. Preliminary mechanical activation of industrial catalysts was carried out and their physicochemical characteristics were investigated by various methods: XRD, XRF, FTIR-ATR, SEM, AFM, TGA, DSC.

Keywords: Mechanochemical activation, Hydrogenation, Catalyst, Optimization, Carbon oxides

COMPARATIVE STUDY OF THREE EXTRACTION METHODS OF TOTAL POLYPHENOLS AND FLAVONOIDS AND ANTOIXYDANT ACTIVITIES FROM AERIAL PART OF FERULA GENUS

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ABSTRACT

Extraction is a very important step in the isolation and recovery of copounds of interest. It is influeced by several factors including the method used and the presence of interfering substances. The aim of this study is to compare three methods of extraction by assessing total polyphenols and flavnoids contents and antioxidant activities aerial part of Ferula species. The extraction rates are detrmined from three extraction methods, namely maceration, infusion and decoction. The total flavonoid contents of the extracts obtained were detrmined using two methods the DPPH and ABTS The best extraction yiedlds are recorded by maceration with 15.815%. Moreover, maceration seems the best method for the extraction of total flavonoids (31.79 mg QE/g) and polyphenols (60.99 mg GAE/g). Concerning antioxidant activity, extracts obtained by decoction present the most important antioxidant activity independently of the studied plants. This study shows that extraction by decoction and maceration are the best method to extract flavonoids and obtain the highest antioxidant capacity of the extracts studied.

Keywords: extraction methods, DPPH, ABTS, Flavonoids, polyphenols

SYNTHESIS AND CHARACTERIZATION OF POLY (P-PHENYLENE DIAMINE) IN THE PRESENCE OF 2-(ALLYLAMINO)-3-CHLORONAPHTHALENE-1,4-DIONE

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ABSTRACT

Poly(p-phenylenediamine) (PpPD) is a typical conductive polymer with many advantages. It is of great interest to researchers due to its diverse structure, high thermal and environmental stability, ability to absorb heavy metal ions, and attractive applications in technology [1]. Quinones have a redox active structure and, thanks to these properties, they are seen in electron transfer events in biological systems. Quinones act as catalysts for some biochemical reactions occurring in living cells and exhibit biological activities such as fungicidal, algicidal, herbicidal, and bacterial [2]. Quinone-derived compounds are also used in photography, liquid crystals, dyestuffs in textile dyeing, and as analytical reagents [3-5]. It has been reported that quinone derivatives used as dopant in the synthesis of conductive polymers increase the specific capacitance in conductive polymer composites [6]. In this study, it was aimed to synthesize new high performance supercapacitor candidates with high specific capacity. Firstly, 2-(allylamino)-3-chloronaphthalene-1,4-dione was synthesized and the synthesis was confirmed by 1H NMR. Then, PpPD was synthesized by chemical oxidative polymerization in the presence of different ratios of 2-(allylamino)-3-chloronaphthalene-1,4-dione. The synthesized PpPDs were characterized by FTIR and UV-vis. spectroscopy. Their morphology was examined with SEM.

Keywords: Poly(p-phenylenediamine), quinones, specific capasitance

ELECTROCHEMICAL PROPERTIES OF ELECTRO-SYNTHESIZED POLY(3,4-ETHYLENEDIOXYTHIOPHENE) IN BORON TRIFLUORIDE DIETHYL ETHERATE-ACETONITRILE

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ABSTRACT

Electropolymerization is a method in which polymer films of a certain thickness are obtained by controlling the number of cycles or the current applied to the electrode. Many conjugated monomers can be oxidized electrochemically. The preparation of the electrochemical polymerization of heterocyclic monomers depends on the oxidation potential of the monomers [1]. The interaction between boron trifluoride diethyl etherate (BFEE), a medium-strong Lewis acid, and aromatic monomers decreases their oxidation potential [2,3]. The catalytic effect of BFEE facilitates the formation of high quality free-standing polymer films. In electropolymerization, BFEE serves both as a solvent and as a supporting electrolyte and no other supporting electrolyte is needed. BFEE electrolytes mixed with strong acid or other organic solvents can also be used to further improve the properties of electro-synthesized conductive polymer films. In this study, Poly(3,4-ethylenedioxythiophene) (PEDOT) was obtained by electropolymerization, which is known for its excellent conductivity, optical transparency, high thermal stability, low band gap and low redox potential compared to thiophene on Pt plate electrode. Electrolytic solution prepared with BFEE and acetonitrile was used in the synthesis of PEDOT. BFEE decreased the oxidation potential of 3,4-ethylenedioxythiophene. PEDOT coated electrodes were also characterized by electrochemical impedance spectroscopy.

Keywords: Poly(3,4-ethylenedioxythiophene), boron trifluoride diethyl etherate, electropolymerization

DRUG POISONING: REVIEW AND FINDINGS

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ABSTRACT

Chemical safety is about ensuring the protection of human health and the environment in all activities involving the use of chemical substances. It covers all chemical substances, natural or artificial, and the full range of situations where exposure to these substances may occur (presence in the environment in its natural state, extraction, synthesis, industrial production, transport, use and disposal). Drug poisoning is common reason for emergency visits. The main objective of this work is to review the epidemiology, typology and evolution of drug poisoning through the analysis and synthesis of some recent work after giving the basic notions of drug poisoning. At the end of this review, a set of current data on the theme is informed and conclusions are sometimes drawn. Thus, a summary in the form of conclusion and observation is written. This study makes it possible to describe the typology of drug poisoning very often consulted in the emergency department of hospitals, as well as the evolution and their severity over time. This updated toxicological knowledge is essential to the practice of emergency physicians, in order to guide them as best as possible in their care.

Keywords: Emergency, Drug poisoning, Incidence, Chemical safety, chemical substances

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

FACILE SYNTHESIS OF TIN DIOXIDE NANOPARICLES FOR PHOTOCATALYTIC DECOLORIZATION OF AZO DYE SOLUTION

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ABSTRACT

Azo dyes constitute one of the largest groups of synthetic colorants due to their ease of application, brilliant colors, and high adsorption affinity properties. These dyes are widely used in various industries, including textiles, paper, and leather. Improper discharge of effluents containing azo dyes leads to severe environmental problems. Consequently, dye removal from water and wastewater is a significant concern worldwide. Among advanced oxidation processes, heterogeneous photocatalysis is a favorable treatment method using a semiconductor and UV light simultaneously. SnO^2 is an n-type semiconductor that has high chemical stability and is environmentally friendly and inexpensive. The present work was focused on the preparation of SnO^2 nanoparticles with a precipitation method. The structural, morphological, and elemental analysis of SnO^2 nanoparticles were performed by XRD, FTIR, SEM-EDAX, and Raman spectroscopy. The obtained results stated that SnO^2 nanoparticles consisted of agglomerated particles. Further, the photocatalytic activity of SnO^2 nanoparticles was tested in the degradation of Reactive Red 194 (RR-194) under UV irradiation. RR-194 was used as a mono azo model dye compound. A pseudo-first order kinetics model was used to describe the photocatalytic degradation kinetics of RR-194. Moreover, the influence of initial RR-194 concentration and SnO^2 dose on photocatalytic decolorization was assessed.

Keywords: Azo dye, decolorization, heterogeneous photocatalysis, Reactive Red 194, tin dioxide.

THE USES OF THE ELECTROPOLYMERIZED FILMS AS IMMOBILIZATION MEDIUM FOR CHOLESTROL BIOSENSOR DESIGN

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ABSTRACT

In this work, we aimed at using the different electropolymerized films for the cholesterol biosensor design. Blood cholesterol levels were measured by chemical and enzymatic methods. In enzymatic methods, hydrogen peroxide is formed because of the enzymatic reaction between cholesterol and cholesterol oxidase, which is measured at 0.7 V vs. Ag/AgCl. In this work, cholesterol oxidase has been immobilized in different polymeric materials such as polyindoline, poly(*o*-toluidine), poly(4-methoxyphenol) prepared electrochemically. Some parameters affecting enzyme immobilization have been examined. As a result, it has been claimed that the mentioned polymers could be used as immobilization medium for cholesterol oxidase.

Keywords: Enzyme immobilization, cholesterol oxidase, polymer matrix, biosensor.

THE USE OF TITANIUM DIOXIDE NANOTUBE AS A NEW CLEAN-UP REAGENT FOR THE DETERMINATION OF SOME PESTICIDES COMMONLY FOUND IN PEACH IN GC-MS/MS AND LC-MS/MS

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ABSTRACT

One of the most important problems of the rapidly increasing world population today is nutrition. The food products grown must be harvested from the field with a high yield. Pesticides are one of the tools used to achieve this high yield. It is well known today that high losses occur if pesticides are not used. Despite these well-known benefits, pesticides also have harmful effects. It is extremely important to know the residual amounts of pesticides in foods. The difficulty of pesticide residue analysis; arises from the necessity of simultaneous analysis of hundreds of active substances with very different Physico-chemical properties in different matrices. Therefore; It is extremely important to develop reliable, robust, Maroct, sensitive, and cost-effective methods. The most widely used extraction method in pesticide analysis is the "QuEChERS" method. It has been defined as a Quick, Easy, Cheap, Effective, Rugged, and Safe extraction method that allows the analysis of a high number of pesticides with different structures in different matrices in fruits and vegetables. One of the methods used to increase the recovery rate of the QuEChERS Method is the use of alternative adsorbents in dispersive solid phase extraction. In this study, titanium nanotube (TNT) was compared with the current method for the detection of Cypermethrin, Lambda-cyhalothrin, and Malathion pesticides in peach as an alternative adsorbent. The recovery values for Cypermethrin, Lambda-cyhalothrin, and Malathion were determined as 88.75%, 90.28%, and 90.29%, respectively, with the TNT sample synthesized by the hydrothermal method at 150 °C and 24 hours. The recovery values obtained by the standard method were determined as 80.75%, 79.75%, and 79.25% for the same pesticides, respectively. On the other hand, the recovery using TNT for acetamipride, boscalid, and pyriproxyfen determined by LC-MS/MS is 109.53%, 92.2%, and 119.52%, respectively. The recovery values achieved by the standard method are 108.35%, 90.2%, and 108.69%, respectively. This study was financially supported by the Republic of Türkiye Ministry of Agriculture and Forestry Bursa Central Research Institute of Food and Feed Control.

Keywords: Titanium Diokside Nanotube; Quechers, pesticides

MOLECULAR DOCKING OF THE BIOLOGICAL ACTIVITY OF CERTAIN MOLECULES DERIVED FROM CHAMOMILE (*Matricaria chamomilla*)

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ABSTRACT

Molecular docking is an in silico method aimed at predicting the structure of a molecular complex from isolated molecules, which is considerably easier to implement, cheaper and Marocter than using one of the mentioned experimental methods. The scientific and economic interest of natural essences also lies in the fact that the systematic investigation of aromatic plants often provides new molecules, which serve as models for the industrial synthesis of structural analogues. In this work, we focused on extracting essential oil from chamomile flowers (*Matricaria chamomilla*), using hydrodistillation extraction methods, followed by gas chromatography coupled with mass spectrometry (CPG-SM), for example, we supplemented our work with a molecular modelling study using quantum mechanics (DFT) methods to calculate several parameters such as boundary orbitals, the dipolar moment in order to predict the reactivity of the majority compounds. In addition, we focused on the identification of the active site of a protein of known three-dimensional structure that can provide important clues for the application of molecular Dooking, this part of work aims at inhibition for the treatment of eczema. The results obtained in our study showed the therapeutic effect of our formulation as well as the efficacy of the compounds of essential oil on the effect of inhibition, these results have made it possible to highlight the therapeutic potential of essential oils and hydrolats of plants of chamomile, and pave the way for future studies in the field of pharmaceutical and drug design.

Keywords: Molecular dooking, DFT, inhibition, eczema, Matricaria chamomilla.

MODELING OF THE POTENTIAL DISTRIBUTION OF *Laurus nobilis* IN ANATOLIA FROM THE LAST GLACIAL MAXIMUM TO THE FUTURE

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ABSTRACT

The aim of this study is to predict the temporal and spatial distributions of the responses of *Laurus nobilis* to the Last Glacial Maximum (LGM), mid Holocene, present and future climate changes in Anatolia. For this purpose, fossil pollen data taken from the Neotoma Paleoecology database, occurrence data from Global Biodiversity Information Facility (GBIF) database, literature and field work and 19 bioclimatic variable data obtained from WorldClim were used. LGM, mid Holocene and future climate data from WorldClim is based on Community Climate System Model (CCSM4) and Representative Concentration Pathway (RCP) 2.6-4.5-8.5 scenarios was assumed for future projections. Principal Component Analysis (PCA) method was applied to these variables, and 7 variables (BIO2-BIO3-BIO8-BIO13-BIO14-BIO15-BIO19) were determined for Species Distribution Models. Models were produced with MaxEnt 3.4.1, and ArcGIS 10.5. The accuracy of the models was measured as 0.91 (standard deviation: ±0.020) with the AUC test value. Among the 7 bioclimatic variables, the variables that contributed the most to the models were BIO19 (50.3%), BIO8 (17.8%), and BIO2 (17.5%). According to the obtained results, *Laurus nobilis* found suitable distribution areas around the Mediterranean at the Last Glacial Maximum. From Holocene it reached today's borders. In the future, although the Mediterranean still has suitable habitat for *Laurus nobilis*, the distribution of *Laurus nobilis* may shift to the Black Sea region according to RCP scenarios. Therefore, the results of the model may be contributed to the improvement of conservation plans of *Laurus nobilis* and considering biodiversity, and model results will make an important contribution to the future distribution of species.

Keywords: Climate change, Species distribution modelling, *Laurus nobilis*, Anatolia

EFFECTIVENESS OF ALOE VERA LEAF EXTRACT AS A BIO-COAGULANT FOR THE TREATMENT OF INDUSTRIAL EFFLUENT BY COAGULATION-FLOCCULATION

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ABSTRACT

The substantial amounts of industrial wastewater involving organic contaminants are generated worldwide depending on the population and the development of industry. Due to these activities, water pollution is becoming a serious environmental problem as it can harm ecosystem, humankind and other living organism's life. The contaminants such as heavy metals, dyes, pesticides, and pharmaceutical products in the wastewater have been a major environmental issue owing to their toxicity, carcinogenic and non-biodegradability. Consequently, the physicochemical technologies must be advanced for the influential treatment of wastewaters. Coagulation-flocculation is one of the conventional wastewater treatment utilized to uptake contaminants from aqueous media. This technology is regarded an economical and practical process for removing pollutants from wastewater. The present work focused on a green coagulant of *Aloe vera* leaf extract for treat organic pollutants from water bodies. *Aloe vera* leaf extract was obtained using distilled water at feed-to-solvent ratio of 1:5. The experiments were performed at various pHs (2–8), coagulant dosages (1–7 mL/L), and organic pollutant concentrations (50–110 mg/L). The highest treatment was obtained at pH of 6, coagulant dosage of 3 mL/L, and concentration of 50 mg/L. The results indicate about 80% of removal of organic contaminants existing in wastewater by coagulation-flocculation.

Keywords: Aloe vera leaf, bio-coagulant, coagulation-flocculation, extract, water treatment.

PROBABLE HEALTH RISK ASSESSMENT OF ESSENTIAL ELEMENTS IN WATER OF NATURAL – DAM LAKES OF THRACE REGION (TURKEY)

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ABSTRACT

The aim of this research was to determine the boron, selenium and manganese accumulations in water of natural – dam lakes located in the Thrace Region of Türkiye and to assess the non-carcinogenic health risks of these elements via daily human intake. 13 stagnant water bodies were selected in the region and water samples were collected during the dry season of 2020 (summer). The element levels were measured by using an ICP-MS device and Estimated Daily Intake (EDI) and Hazard Quotient (HQ) of boron, selenium and manganese were calculated seperately. Boron concentrations were varied from 291.084 – 322.599 ppb for the natural lakes and 3.063 – 287.241 ppb for the reservoirs; selenium concentrations were varied from 0.704 – 0.932 ppb for the natural lakes and 0.067 – 1.291 ppb for the reservoirs; and manganese concentrations were varied from 5.990 – 2652.970 ppb for the natural lakes and 0.214 – 48.440 ppb for the reservoirs. All the calculated HQ values in all the investigated locations in terms of all the investigated age groups were recorded as less than the critical limit of 1.

Keywords: Thrace Region, Natural – dam lakes, Boron, Selenium, Manganese, Health risk assessment

BORON AND SELENIUM ACCUMULATIONS IN DRINKING WATER OF IPSLALA DISTRICT (EDIRNE, TURKEY)

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ABSTRACT

The aim of this research was to determine the boron and selenium accumulations in drinking water of İpsla District located in the west of Thrace Region and to assess the non-carcinogenic health risks of these elements via daily human intake. Drinking water samples were taken during the summer season of 2020 from İpsala District and 22 villages. The element levels were measured by using an ICP-MS device and Estimated Daily Intake (EDI) and Hazard Quotient (HQ) of boron and selenium were calculated for all the investigated locations. Boron concentrations were varied from 3.539 – 25.366 ppb and selenium concentrations were varied from 0.080 – 0.805 ppb. All the calculated HQ values for all the investigated locations in terms of both boron and selenium for all the investigated age groups were recorded as less than the critical limit of 1.

Keywords: İpsala District, Boron, Selenium, Health risk assessment

THE INTREST OF THE SPONTANEOUS LOCAL PLANT SALVIA OFFICINALIS ON THYROID ACTIVITY IN THE ATTENUATION OF CYPERMETHRIN INTOXICATION IN RATS

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ABSTRACT

This study aims to evaluate on the one hand the toxicity of cypermethrin (Cyp) on the thyroid gland and some biochemical indicators and on the other hand the preventive effect of *Salvia officinalis* leaves aqueous extract (SO) against this toxicity. Thirty male rats were divided into 6 groups; the control group (C), which received tap water, the positive control group received the aqueous extract of SO (0,5g/kg bw), the group treated with cypermethrin Cyp1 (8,33mg/kg bw), Cyp2 (25mg/kg bw), and the groups treated with cypermethrin combined with the aqueous extract of sage Cyp1-SO (0.5g/kg bw+8.33mg/kg bw) and Cyp2-SO (0.5g/kg bw+25mg/kg bw) by gavage. After four weeks, serum lipid serum was evaluated. Results showed that cyermethrin caused a significant decrease in the body weight and in the thyroid weight as well as in glucose and Cholesterol levels compared to the control. However, the above-mentioned parameters were maintained almost at normal levels in the groups that received the aqueous extract of SO with both doses of cypermethrin. In conclusion, results revealed that SO aqueous extract has protected lipid parameters from Cyo toxicity. This study aims to evaluate on the one hand the toxicity of cypermethrin (Cyp) on the thyroid gland and some biochemical indicators and on the other hand the preventive effect of *Salvia officinalis* leaves aqueous extract (SO) against this toxicity. Thirty male rats were divided into 6 groups; the control group (C), which received tap water, the positive control group received the aqueous extract of SO (0,5g/kg bw), the group treated with cypermethrin Cyp1 (8,33mg/kg bw), Cyp2 (25mg/kg bw), and the groups treated with cypermethrin combined with the aqueous extract of sage Cyp1-SO (0.5g/kg bw+8.33mg/kg bw) and Cyp2-SO (0.5g/kg bw+25mg/kg bw) by gavage. After four weeks, serum lipid serum was evaluated. Results showed that cyermethrin caused a significant decrease in the body weight and in the thyroid weight as well as in glucose and Cholesterol levels compared to the control. However, the above-mentioned parameters were maintained almost at normal levels in the groups that received the aqueous extract of SO with both doses of cypermethrin. In conclusion, results revealed that SO aqueous extract has protected lipid parameters from Cyo toxicity.

Keywords: *Salvia officinalis*, cypermethrin, lipid profile, toxicity, rat.

ASSESSMENT OF THE MOROCCAN COASTAL ECOSYSTEM HEALTH IN THREE CITIES (ELJADIDA, SAFI AND ESSAOUIRA) USING SEAWEEDS AS A TOOL IN THE BIOMONITORING

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ABSTRACT

The aim of this survey is to evaluate the ecological status of the Atlantic coast of Morocco using seaweeds as a tool in the biomonitoring. It was conducted in three coastal cities and their suburbs: Eljadida (S1 and S2), Safi (S3, S4 and S5) and Essaouira (S6, S7and S8) with polluted and unpolluted ones from 2017 to 2019. The study of seaweed biodiversity, physicochemical parameters, analysis of toxic metals, as well as the physiological parameters of some algal species were analyzed in order to assess the pollution degree in the study areas. The results of the specific richness showed that in the unpolluted sites (S1, S3 and S6), the algal biodiversity vary between 164 and 323 species. However, in the polluted ones (S2, S4, S5, S7 and S8), the specific richness decrease by more than 50% in most of these sites. In addition, the distribution of the most sensitive genera Cystoseira showed that Ericaria selaginoides, Cystoseira humilis, Cystoseira humilis var. myriophylloides, Cystoseira mediterranea, Ericaria brachycarpa, Cystoseira compressa and Gongolaria baccata are present in S1. However, most of them disappear, especially in the polluted stations. The physico-chemical parameters did not clarify clearly the pollution degree of the studied stations. However, through the study of heavy metals and physiological parameters in some seaweeds Ericaria selaginoides, Saccorhiza polyschides and Ellisolandia elongata it was possible to evaluate the pollution degree of the study sites: S1, S3 and S6 are not polluted; S7 and S8 are moderatly polluted and finnaly S2, S4 and S5 are highly polluted. The toxic metal contents of Ericaria selaginoides and Saccorhiza polyschides are correlated with stress physiological parameters. It shows that while these brown algae exist in the less polluted areas, their physiology is significantly affected. However, in the highly polluted areas, this brown seaweed disappears. Additionally, the study conducted on the physiological parameters of the red algae Ellisolandia elongata showed that this species produced high levels of polyphenols, proline and glycine betaine at station S7 than at S8. While high values of morphometry, chlorophyll a and carotenoids were recorded at S6. It was demonstrated through this work that the brown seaweeds (Ericaria selaginoides, Saccorhiza polyschides) and the red one (Ellisolandia elongata) could be used to monitor coastal areas in Morocco because they respond well to the environmental stress.

Keywords: Seaweeds, ecological status, environmental pollution, heavy metals, physicochemical parameters, algal physiology, bioindicator

THE EVALUATION OF ORGANOTIN POLLUTION IN SURFACE SEDIMENTS OF IZNIK LAKE (BURSA, TURKEY)

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ABSTRACT

Iznik lake, which is the largest lake in the Marmara Region and the fifth largest in Türkiye with its 313 km2 area and tectonic structure, has a history of approximately 50 years in terms of fishing activities. It is also fed by rivers such as Olukdere, Karadere, Kocadere, Kırandere and Karsak Stream, in addition to the karst springs and rainwaters at the bottom of the lake. The lake, which was declared a protected area in 1990, is surrounded by various industrial facilities, agricultural areas, olive groves, and urbanization. Among these industrial facilities, there are important sectors such as steel, plastics, paints, agriculture, fertilizer, and automotive. Agriculture, olive groves, urbanization, and industrial activities around the lake also bring environmental problems. Organotin compounds are substances of great concern for human health and the environment due to their high toxicity, persistence. Some organotins, such as tributyltin and triphenyltin, are used from the past to the present to prevent aquatic organisms from settling and growing on hip hulls, fishing nets or cages, oil rig support, and different types of equipment used in water. The toxic and mutagenic effects of these compounds on aquatic life have been demonstrated by many studies in the literature. This study presents environmental levels and distribution of organotins (n-butyltin, dibutyltin, tributyltin, tetrabutyltin and triphenyltin) in surface sediments collected from Iznik lake, Bursa, Türkiye in January 21-22, 2021. The surface sediments were collected from the top layer (approximately 5 cm) of the dam sediment surface with the help of 0.1 m2 Van Veen sediment grab ladle held from the Zodiac boat. They were transferred to a 250 mL glass jar and were stored frozen in a cold box. Before the analysis of organotins in these sediments, they have been subjected to sample preparation, which includes several steps. Firstly, the water content of the surface sediment samples was removed by using Teknosem brand lyophilizer. Then, 5 g of dried sediment samples were extracted with acetic acid/methanol/tropolone (75 ml/25 ml/100mg) (100 ml) mixture by using ultrasonic bath for 30 min. Centrifugations were done at 3000 rpm for 10 min to remove the extracts from the samples pH adjustment with pH buffer and ammonia solution and derivatization with NaEt4B were performed. Consequently, the organic phase was collected with hexane and evaporates under the nitrogen flow. The concentration of each organotins was determined with an Agilent 7890B gas chromatography coupled with a 7000D triple quadrupole detector (GC-MS/MS). Tri-n-propyltin (1 µg/ml) was used as an internal standard in the measurements. The values of correlation coefficients (r2) in the linearity graphs ranging from 1.00 to 100.0 µg/L concentrations were higher than 0.9983 for all organotins. The results showed that total organotin concentrations were detected between <1.0 to 25.95 ng dw in a total of ten samples, including six samples in the lake (between IZ-1 to IZ-6) and one sample each from the Olukdere, Karadere, Kırandere and Karsak streams flowing into the lake (between IZ-7 and IZ-10). The highest concentrations were n-butyltin with 11.45 ng/g dw and dibutyltin with 25.95 ng/g dw in IZ-8 sediment (in Karadere). Since there is no Turkish legislation regulating organotin contamination of sediment quality, a comparison was made according to legislation/guidelines used in some northern European countries such as Norway. The sediment quality of Iznik lake has low contamination in terms of organotin. The organotin results in this

study can be contributed significantly to the studies for future water supply area research in Türkiye.

Keywords: Iznik lake, Organotin, Sediment contamination, GC/MSMS

FOOD WASTAGE IN A TUNISIAN UNIVERSITY CANTEEN: IMPACT OF AN EDUCATION AND AWARENESS CAMPAIGN ON STUDENTS' ATTITUDES AND BEHAVIORS

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ABSTRACT

Food wastage has tremendous negative consequences on food security and nutrition, as well as on environment and economy. Because of the changes in food consumption patterns, collective caterings such as University canteens and restaurants are becoming a significant source of losses and waste. Thus, implementing intervention strategies become urgent. Such strategy could be reached through a combination of educational, technical and administrative measures. This study aimed at evaluating the impact of an *online* and *onsite* education and awareness campaign about food wastage on students 'attitudes and behaviors. The study was undertaken in a University canteen "Les Jardins" (University of Carthage, National Institute of Agronomy of Tunisia, Tunisia). An awareness and education raising campaign named "*Allech Hakka"* ("*Why like this*") was designed, launched online on social media (Facebook/Meta© and Instagram©) and onsite, through a Day of Awareness of Food Loss and Waste. Posters were posted online weekly for two months. The Day consisted on three conferences and a discussion on food wastage and 3R (reduce, reuse, recycle) strategies. After interventions, face to face interviews based on a structured questionnaire, were conducted on 143 student respondents (mean age 23 years old, 60.4% women, 70.3% regular canteen users) during two weeks. Survey respondents admitted to always (6.3%) or regularly (42.3%) discard food products. They estimated their level of wastage to be less (40.5%) or similar (52.2%) to those of other students. However, they affirmed to be shocked (72.1%) by the canteen food wastage level, presented in one post. About the online campaign, 65.8% of respondents have followed it, on social media. Most of respondents (73.8%) have appreciated it (mean score 3.94/5), in particular its information clarity (82%, mean score 4.08/5) and its graphic design (76.5%, mean score 4.08/5). About 73.9% have "liked", and 26.1% have "shared" posts. However, a small minority have attended to the awareness raising day, indicating a higher adherence of youngsters of actual communication channels, namely the Internet and possibilities offered by smartphones. Interestingly, most of respondents affirmed that the campaign "*Allech Hakka"* would led to change surely (28.8%) or probably (67.6%) their behaviors toward food wastage. A majority affirmed they would reduce (64%) or even stop (26.1%) their food waste. Main reasons were ethical (77.5%), economical (71.2%), religious (63.1%), and environmental

(54.1%). Our study has shown that launching a simple and inexpensive information and education campaign about reducing food waste has increased students' awareness and improved their attitudes. It also pointed out the importance of the target-oriented choice of communication channels. This campaign should be duplicated across other Tunisian universities. The outcome of these studies would help organizations and policymakers design better targeted actions and measures for food waste reduction.

Keywords: Food waste, awareness campaign, students, online and onsite education.

FIRST REPORT ON MICROALGAE CULTIVATION IN FLAT-PLATE PHOTOBIOREACTORS UNDER THE ARID CLIMATE OF MOROCCO: EVALUATION OF THE EFFECT OF LİGHT-TEMPERATURE ON THE GROWTH AND PHYSIOLOGY OF CHLORELLA SOROKINIANA UCA001

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ABSTRACT

Combining groundwater use with outdoor microalgae cultivation in natural sunlight is an efficient way to lower the cost of microalgae biomass production. Its compelling characteristics included the recycling of nutrients and harvesting of valuable biomass. However; seasonal changes in the environmental conditions for algal production, such as temperature and light, significantly influenced their biomass production. Variations in these factors alter microalgal growth kinetics, as well as their physiological parameters, including those related to stress. It will determine the algae's adaptation mechanisms to environmental factors changing. In Marrakech, a city located in an arid area south of Morocco, the air temperature varies mainly, between 11 and 40°C. There are also wide variations in light intensity, with values of over 1500 µmol.m-2s-1 in the hot season. A study of the effects of these fluctuations is essential for large-scale outdoor production systems, accordingly. The objective of this work is to study the impact of temperature and light intensity variations encountered in Marrakech on the *Chlorella sorokiniana* UCA 001 strain, which was selected for its suitability for outdoor cultivation. By doing so, *C. sorokiniana* was cultivated in 2 outdoor flat plate photobioreactors (PBRs) with a capacity of 30 L each, scaled-up for the first time at the Faculty of Sciences Semlalia (Marrakech, Morocco). Groundwater was used as a culture medium with no limiting nutrient concentrations (10 and 100 mgL-1 of additional phosphorus and nitrates, respectively). The characteristics of temperature, light intensity, algal growth, and biomass productivity were examined daily. Simultaneously, some physiological parameters (proline, glycine-betaine, and catalase) were measured every 4 days in order to evaluate the algal stress degree. Results showed that higher biomass productivity of 30 mg L-1 day-1 with a specific growth rate of 0.73 day-1 was achieved during the spring season for the main day temperature and light of 24.6 °C and 768.6 µmol.m-2s-1, respectively. Except, for catalase, the other stress parameters show that *C. sorokiniana* is less stressed during this season. However, no growth was noticed during the summer period when temperatures inside the PBRs reached more than 45°C and the light intensity was about 1700 µmol.m-2s-1. This study demonstrated that the green strain could be cultivated under the wide seasonal fluctuations in light and temperature (9 months) in arid areas. This was demonstrated through its ability to change its physiology in response to different environmental conditions.

Keywords: *Chlorella sorokiniana*, Photobioreactor, light, temperature, growth, physiology, arid climate,

THE DISTRIBUTIONAL DATA OF LARVAL AQUATIC DIPTERA IN YEŞİLIRMAK RIVER BASIN (TURKEY)

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ABSTRACT

Yeşilırmak River is one of the largest running water ecosystems in Turkey but it is mainly threatened by domestic, industrial, and agricultural pollution. Benthic macroinvertebrates are among the organisms affected by these threats. Diptera larvae constitute an important part of the benthic macroinvertebrate fauna in aquatic ecosystems. In this research, the distribution of larval aquatic Diptera was investigated in the Yeşilırmak River and its tributaries. Nineteen (19) sites were sampled from Yeşilırmak River and its tributaries in July 2008 and June 2009. A total of four thousand six hundred forty-one (4641) individuals belonging to 12 families (Athericidae, Chironomidae, Blephariceridae, Dolicopodidae, Empididae, Limoniidae, Muscidae, Pediciidae, Simuliidae, Stratiomyidae, Tabanidae, Tipulidae) were identified in 19 studied sites. The most frequent and the most abundant families were Chironomidae and Simuliidae in the study area. The increasing anthropogenic activities in the region negatively affect the larvae of the aquatic Diptera community. This study will make an important contribution to understanding the change in Diptera composition in biological monitoring studies to be carried out in the region.

Keywords: Diptera, habitat degradation, water pollution, Yeşilırmak River Basin

THE FACTORS THAT EFFECTS MICROORGANISMS IN THE RECOVERY OF RARE EARTH ELEMENTS

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ABSTRACT

Rare earth elements (REEs) are found in nature as compounds, especially as oxides. REEs are also referred to as rare earth metals “REM” or “rare earth oxides, REO.” Wastes that serve as potential sources of REEs can be classified into three main categories: industrial waste, mining waste, and electronic waste. Common industrial wastes used include mineral processing wastes (phosphogypsum, red mud) and coal processing wastes (fly ash).In the biological recovery of REEs, microorganisms are affected by species as well as by physical and chemical factors.Physical factors include aeration, temperature and pulp density, chemical factors include pH, redox potential and metal toxicity.All these factors can work separately or simultaneously to affect the entire REE biological recovery process.In this study, some basic physical and chemical factors affecting the microorganisms involved in the recovery of REEs.

Keywords: rare earth elements, NTE extraction, redox potantial, metal tokxixity, pulp density

THE METALLOTHIONEIN AND GLUTATHIONE LEVELS OF MEDITERRANEAN MUSSEL (*Mytilus galloprovincialis*) IN THE CANAKKALE STRAIT

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ABSTRACT

Parameters considered as biomarkers are especially useful in detecting and evaluating the possible effects of various pollutants that aquatic organisms may be exposed to. In this study, total glutathione (GSH) and metallothionein (MT) levels, which are used as biomarkers, were evaluated in Mediterranean mussel (*Mytilus galloprovincialis*) samples at different points of the Çanakkale Strait, which are under the influence of different pollutants. In October 2020, sampling was made in 3 different regions of the Dardanelles Strait (Yenikordon-Station 1, Kepez Harbour-Station 2, Çardak Lagoon-Station 3), and a total of 30 mussels (10 samples per station) were collected. The samples were transported to the laboratory in the cold chain. The size of the samples was measured by the digital callipers for the length, height, and width. The MT level was determined in the digestive gland, while the GSH level was measured in both the gill and digestive gland tissues. Whether the levels differed depending on stations was determined by one-way ANOVA test. MT mean values were measured as 20.75±5.1 mg. g-1 at Station 1, 29.25±4.3 mg. g-1 at Station 2, and 45.13±5.6 mg. g-1 at Station 3. The differences between the MT levels measured at the stations were also statistically significant ($p<0.05$). Higher levels of GSH were found in digestive gland tissue at Station 1, while higher levels were recorded in gill tissue at Station 2. In Station 3, the highest GSH levels were measured in the digestive gland tissue (1.23 μmol.mg-1). This difference in tissues was not statistically significant ($p>0.05$); however, variations based on stations were statistically significant ($p<0.05$). This research is a preliminary study designed to reveal the pollutant effects on Mediterranean mussels, which use this region as a habitat, which is under the influence of various pollutants. With the results obtained, it was aimed to pave the way for more comprehensive research in the context of monitoring spatial and temporal pollution in the region.

Keywords: Mediterranean mussel, biomarker, Çanakkale Strait

CURRENT APPROACHES TO BIOREMEDIATION OF LANDFILL LEACHATE

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ABSTRACT

The main source of leachate is water formed as a result of organic degradation. Dissolved organic carbons, which can be formed wherever anaerobic decomposition process takes place, also consist of organic wastes in landfills. Since leachate affects the aquatic ecosystem and human health, it must be kept in the landfill or treated before being released into the aquatic ecosystem. The methods developed for the treatment of leachate are physical, chemical, biological and advanced treatment methods, and it is difficult to obtain high treatment efficiency and effluent quality by using any of these methods alone. Chemical methods used in the treatment of leachate are coagulation-flocculation, chemical precipitation and chemical-electrochemical oxidation. Biological methods are a combination of aerobic, anaerobic and anoxic processes. Physico-chemical methods are also often used in conjunction with biological methods to remove non-biodegradable substances from leachate. The aim of this review study is to present the current methods used in the improvement of leachate with biological methods.

Keywords: Bioremediation, landfill, leachate, environmental pollution

PRODUCTION OF BIODIESEL FROM WASTE VEGETABLE OILS

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ABSTRACT

In Turkey, 1,500,000 tons of vegetable oil is used annually for food purposes. Approximately 350,000 tons of waste oil is produced from these oils. Since these wastes are recycled and used in the production of vegetable oil and/or mixed with animal feed, they pose a danger to the environment and public health and adversely affect the food chain. Biodiesel production for the recovery of used vegetable oil is very important for this waste assessment and is more environmentally friendly than petroleum diesel, which is an alternative to the collected product. Today, only 9% of our country's oil needs are met from domestic sources. This situation forces our country to seek alternative energy sources. For this reason, biodiesel is becoming more and more important for the present and future of our country, which was dependent on oil in the past, oil and natural gas today, and natural gas in the future. In addition, air pollution in some big cities has made the use of fuels with biodiesel additives mandatory.

Keywords: Biodiesel, waste vegetable oil, energy source

FOREST, FORESTS FIRES AND ECOSYSTEM

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ABSTRACT

The ability of forests to perform their duties is ensured by protecting them from abiotic and biotic damages. The most important abiotic factor that damages forests is fire. If fires, which are important in the evolution of natural systems, occur at certain intervals and degrees within the regeneration limits of forests, they provide a new beginning opportunity and cause biodiversity and rejuvenation. When it comes to fire damage, the first thing that comes to mind is the damage caused by the fire to the trees in the forest. However, forest fires affect the entire forest ecosystem as well as the trees. Apart from the increase in the number of insectivorous birds and predatory species after the fire, wildlife is adversely affected. The way in which wildlife is affected by fire varies considerably according to the animal species and the nature of the fire. Abiotic (nesting, hiding and wintering places, etc.) and biotic factors (food sources, predators, disease factors, etc.) that reoccur in the region after the fire are important for the fauna. Large forest fires are rare, but are of devastating importance to living things in the affected area. The aim of this study is to emphasize the importance of forest fires, which increase with global climate change and human factor, especially in summer, on the ecosystem.

Keywords: Forest, Forests fires, Ecosystem, Abiotic and biotic factors, Biodiversity

A COMPARISON OF ENERGY USE IN CONVENTIONAL AND ORGANIC OLIVE PRODUCTION IN KAZ MOUNTAINS, CANAKKALE, TURKEY

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ABSTRACT

Agriculture is one of the biggest sectors and energy consumption during agricultural production causes a global release of 11 % of greenhouse gasses leading to climate change. Since after industrialization of agriculture, farming systems shifted towards high-intensity farming, yet in Turkey, traditional farming methods still continue. In this study we compare the energy efficiency of organic vs. conventional olive groves in Kaz Mountains, Turkey. 71 farmers were interviewed face-to-face in two subsequent years and the energy efficiency of the olive production process was calculated as the ratio of the energy spent during farming to the energy content of the fruit. Fuel use was calculated under the direct energy input, whereas production processes of fertilizer, agricultural machinery, maintenance and repair, human and animal labor were calculated under indirect energy inputs. Here we show that conventional olive production was less energy efficient due to the high indirect energy input during the production of synthetic fertilizers. There was no relationship between the energy input and yield, showing that production of olives is possible with less energy input. This study shows that by improving energy efficiency, the technical performance of agricultural systems can be increased and their negative impact on the environment can be reduced.

Keywords: Olive, Energy Use, Energy Efficiency, Organic Production, Conventional Production

EVALUATION OF POLLUTION STATUS OF STREAMS IN THRACE REGION

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ABSTRACT

Thrace region is a region where environmental pollution is intense due to industrialization. The most important environmental problem of the Thrace region, especially in terms of agricultural land, is that it is close to the Ergene River and has a negative impact on it. As a result of the growth and decentralization of industrialization in Istanbul that started after the 1980s, the Thrace Region was faced with intense industrialization. Previously, there was an economy dependent on agriculture and industrial facilities using agricultural inputs such as factories producing flour, dairy products, vegetable oil and feed in the region. Afterwards, industrial establishments such as textile, leather, metal goods and chemistry, which did not use local resources, came to the region quickly with the incentives. Thanks to this process, today's social, economic and ecological picture has emerged. The waters in the Ergene Basin, which was a region rich in groundwater and surface waters in the past, were polluted by domestic, industrial and agricultural pollution, and water withdrawals from unauthorized wells caused an extreme decrease in groundwater amounts. Groundwater and surface waters are polluted, especially as a result of untreated domestic and industrial wastewater, unconscious agricultural spraying and fertilization. The issue of protection of water basins, which is important around the world, is very critical for the Ergene River. Although the rapid industrialization in the region contributes a lot to employment, the economy of the region and the country, it should be sustainable and care should be taken not to create pressure on natural resources. The concept of environmental protection and environmental right is a problem of democracy and democratic participation in the realization of human rights. No economy or economic system can be considered successful if the level of civilization and achievements that humanity has reached today have been created at the expense of future generations and the number of poor people has gradually increased. In this study, it is aimed to deal with the pollution status of water resources in the Thrace region, located on the European side of Turkey, and the problems experienced in the use of water in the region.

Keywords: Thrace Region, Ergene Basin, Water pollution, Agricultural situation

PESTICIDES FOUND IN SAMPLES OF HONEY BEES AND FOOD STOCKS IN THE HIVES ARE IN RELATION WITH THE HONEY BEE COLONY LOSSES IN BULGARIA

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ABSTRACT

Honey bees are insects with enormous biological, ecological, agricultural and economic significance. They are producers of various products – honey, wax, pollen, propolis, royal jelly and bee venom, used for food and treatment. *Apis mellifera* species is characterized by high environmental pollution sensitivity and is therefore used for biomonitoring studies in many regions of the world. This study presents information concerning the presence of pesticide residues in honey bee bodies and food stocks in the honey bee colony – honey, wax and pollen. The samples have been collected from different locations in Bulgaria during 2021 on signals for high mortality and severe loss of bee colonies, reaching up to 90% in some of the apiaries. To determine the pesticide residues in the collected samples the chemical chromatographic analysis (via RESID 19/04 LC-MS/MS methods) have been applyed in the Central Laboratory for Chemical Testing and Control at the Bulgarian Food Safety Agency (Sofia, Bulgaria) and in an independed certified international laboratory (PRIMORIS, Belgium). A total of 27 pesticides, including insecticides, fungicides, acaricides, herbicides and growth regulators have been detected in the studied samples. The agrochemicals such as Thiophanate-methyl, Coumaphos, Cyhalothrin, Flumetralin have been found with higher concentrations than the other pesticides. Neonicotinoids such as Clothianidin and Imidacloprid have been detected also in the tested samples. These findings are a signal for the objective danger of a high mortality and severe weakening of the honey bee colonies in some areas in Bulgaria. The results of the present study reveal the need for future detailed studies of the risk factors for the health and viability of honey bees, among which are the diverse chemical nature and action mechanisms of the agrochemicals, as well as the effects of synergism between them.

Keywords: Pesticides, honey bee mortality, bee colony losses

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (*Apis mellifera* L.) in Bulgaria".

HONEY BEE COLONY LOSSES IN BULGARIA DURING THE PERIOD 2017 – 2022

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ABSTRACT

Honey bees are of great biological, ecological and economic importance. They have high sensitivity to environmental pollution and are successfully used for biomonitoring studies. In the past years the condition of Bulgarian beekeeping is under great danger. The main reasons for that are: 1) the uncontrolled imports of honey bee queens with foreign origin, although the Bulgarian law forbids it and 2) the usage of different pesticides in the agricultural activities which seem to be in relation to the reported high mortality rate of bee colonies in some regions in Bulgaria. The objective of this study was to analyze the increasing rate of the honey bee colony losses in Bulgaria and and to consider the potential relationship between this circumstance and the pesticides found in the samples of honey bee bodies and in the bee colony food stocks. The investigation was provided during the period 2017 – 2022. The rate and the reasons for honey bee colony losses were investigated among all regions of Bulgaria by the standardized international COLOSS questionnaire. The pesticides presence in the samples, collected from locations by signals of high honey bee mortality was investigated by a chromatographic analysis. The study results showed that the honey bee colony losses in Bulgaria have been increased for the investigated period from 2.04% to over 19%. The highest percentage of losses over the years was due to the "death or reducing in number to a few hundred bees". The chemical analyses indicated the presence of a total of 27 pesticides in the tested samples from the locations with high level of honey bee mortality. Among the group of the pesticides detected were insecticides (including acaricides), fungicides, herbicides and growth regulators. The presented and analyzed data should be considered when developing activities to protect the honey bee health status in Bulgaria.

Keywords: Apis mellifera, honey bee colony losses, pesticides role

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (*Apis mellifera* L.) in Bulgaria".

VARIATION OF BIOAEROSOL CONCENTRATIONS DURING THE WILDFIRES BROKE OUT IN TURKEY IN 2021

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ABSTRACT

Over two hundred wildfires burnt more than 1,500 square kilometres of forest area in Turkey between July 28 and August 12, 2021. This period was recorded as the worst-ever wildfire season of the country history, and therefore poor air quality was observed over the southwestern regions. It is possible that bioaerosols could be transported tens or hundreds of kilometres in the smoke of large fires. This study investigated the temporal variation of outdoor airborne mold and bacteria concentrations during the wildfire period in the atmosphere of Izmir city, which is the third most populated city of Turkey and located a couple of hundred kilometres away from the northwest of the wildfire region. In this study, 44 airborne mold and 7 bacteria samples were collected with Anderson single-stage sampler between July 23 and August 20, 2021. Enumeration and genus-based identification was done for airborne mold samples collected on two culture media simultaneously during wildfires, namely Potato Dextrose Agar (PDA) and Malt-Extract Agar (MEA). Besides, bacterial samples were collected on Columbia blood agar (CBA) a week before the start of the fires, during the fires, and a week after the fire extinguishment was completed. Some meteorological parameters such as air temperature, and humidity as well as particulate matter (PM10) concentrations was recorded during the study period. The smoke mainly concentrated around the Aegean Region between August 5 and 7 and thus more frequent samples were collected in those days in Izmir. The airborne mold concentrations on PDA and MEA ranged from 63 to 742 CFU/m3 and from 56 to 798 CFU/m3, respectively. The peak airborne mold level was observed on August 8 at 15:30. Additionally, the airborne bacteria concentrations ranged from 112 to 5376 CFU/m3 and the peak level was observed on August 7, during the fires occurred simultaneously in multiple locations around Antalya-Manavgat, Isparta, Muğla-Yatağan, Aydın-Nebiler. The peak value was 48 times greater than the previous week's mean (112 CFU/m3) on the sampling station. A significant correlation was found between total airborne mold concentrations ($p<0.001$) and PM10 concentrations obsered in the city during the wildfires. Consequently, this study demonstrated the significance of considering wildfire influences when conducting bioaerosol monitoring.

Keywords: Bioaerosol monitoring, wildfire, airborne mold, fire ecology

MICROPLASTICS IN AGRICULTURAL SOIL: OCCURRENCE AND CHARACTERIZATION

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ABSTRACT

Microplastics are increasingly emerging as a new and highly problematic source of pollution. Microplastics are widely distributed, affecting various components of the environment. Several researches have been done on microplastic pollution in the marine environment but studies in the terrestrial environment especially agricultural soils are very limited. In order to understand microplastics behavior and their impacts on agricultural soil, the aim of this study was to investigate the occurrence and characteristics of microplastics in agricultural soil with plastic mulching in a nearby area in Marrakech and their vertical distribution. Physico-chemical analysis of sixteen soil samples showed that these soils present a pH ranging from 7.78 to 8.54, organic matter about 2.64%, 10.5 of C/N, humidity rate of about 1.5%, total limestone content of 2.75%, 2.047 mg/g of humic substances. The soil granulometry has revealed a loamy-sandy texture. Microplastics counting and classification was carried out using the magnifying glass after density separation and filtration. Results indicate that the abundance of microplastics in mulching areas is more important on average than the one in non-mulching areas with 7933 items kg−1 and 3200 items kg−1, respectively. It should be noted that the number of microplastic pieces decreases with 72 %, which was positively correlated with the depth in the different areas. Fibers were the dominant form of observed microplastics with 84 %. The study would contribute as well to the research of potential solution to mitigate soil microplastics.

Keywords: Bioremediation, Pollution, Agricultural soil, Microplastics, Plastic mulching

EVALUATION OF THE PROTECTIVE EFFECT OF (*Triticum aestivum* L.) ON SOME HAEMATOLOGICAL PARAMETERS Wistar RATS EXPOSED TO LEAD ACETATE

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ABSTRACT

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

Keywords: Lead, wheathgrass, heamatological parameters

THE PERIODIC STRUCTURAL RELATIONSHIP OF THE NORTH ATLANTIC OSCILLATION WITH THE OXFORD TEMPERATURE

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ABSTRACT

The North Atlantic oscillation (NAO), which is one of the large-scale oscillations affecting the world climate in wide geographical areas, has an impact on climate variables. The North Atlantic Oscillation index (NAOI) is defined as the difference between the normalized anomalies of sea level pressure in the low pressure system around Iceland and the normalized anomalies of sea level pressure in the high pressure system around the Azores. In this study, it is aimed to determine the temporal and periodic structure of NAOI and Oxford temperature and investigate their relationship with each other by applying the recently developed wavelet transform approach to NAOI and Oxford temperature data located near this pressure center. The investigation of the periodic components of these two variables was carried out by continuous wavelet transform and global wavelet spectrum. The temporal variation of the found periodicities is also revealed. The North Atlantic Oscillation index and the period of rainfall analysis; monthly, expressed as a winter December-January-February (DJF) have been made to the data sets created in the form. Strong short-term monthly periods below one year in monthly NAOI and temperature predominate in both variables, while long-term dominant annual periods above ten years have been determined in the index data of winter forms. Global spectra of winter months were found to be correlated with a correlation value of 0.70 between both variables. Time scale analysis has shown that the main periodicity of the NAOI-related temperature series are events of less than 10 years. It is thought that, when the NAOI is cyclically examined, the determined periodic structure is expected to be important for academic studies on climate. The results of this study are consistent with previous studies of NAO and climate variables. The reasons for the different periodic structures of the monthly NAOI and the annual NAOI of the winter season can be further studied by making more specific analyzes in the future.

Keywords: North Atlantic Oscillation, wavelet transform, periodical analysis, global wavelet spectrum

EVALUATION OF DEVELOPMENTAL TOXICITY OF EVERZOL BLUE EDG ON ZEBRAFISH (DANIO RERIO) EMBRYOS

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ABSTRACT

Textile manufacturing is one of the most polluting industrial sectors due to the release of potentially toxic compounds such as synthetic dyes into the environment. The most widely used group of these synthetic dyes is azo dyes. The aim of this study was to evaluate the toxic effects of Everzol Blue EDG (EB EDG) in zebrafish embryos. Embryos were exposed to 19.51-750 mg L-1 EB EDG for 96 hours and the survival rates, heart rates and embryonic growth rates of these individuals were determined. According to the results of the study, the 96-hour LC50 value of the textile dye was determined as 604.7 (423.2-1069.3) mg L-1. Heart rates of *Danio rerio* embryos exposed to the dye were significantly reduced at concentrations of 220-750 mg L-1. In addition, EB EDG at a concentration of 750 mg L-1 caused significant inhibition of embryonic growth in *D. rerio* embryos.

Keywords: Synthetic dye, zebrafish, Everzol Blue EDG, embryotoxicity

EVALUATION OF ECOTOXICITY, ACIDIFICATION AND EUTROPHICATION POTENTIAL OF FERTILIZERS APPLIED IN SUGAR BEET PRODUCTION

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ABSTRACT

The use of fertilizers, especially synthetic fertilizers, has become an indispensable part of today's agriculture. Sugar beet is a product in which synthetic fertilizers are mostly preferred during the production phase. However, the use of fertilizers is known to cause a variety of environmental problems. This study aims to measure the environmental impacts of the fertilizer use during sugar beet production. Life cycle assessment was selected as the method for assessing the impacts. Nine sugar beet producers from Kayseri contributed to this study with their data and all agricultural inputs and outputs were entered into Sima Pro software. Environmental impact calculations were made using the Ecoinvent database, using the ReCiPe 2016 midpoint (H) approach. Among these environmental effects, the most prominent ones appear as acidification, eutrophication and ecotoxicity. In this paper, the effects of fertilizer on environment will be discussed and suggestions to reduce these effects will be presented.

Keywords: Sugar beet, life cycle assessment, fertilizer, ecotoxicity, acidification, eutrophication, environmental impacts

ACKNOWLEDGEMENT:

The authors gratefully acknowledge the Erciyes University Scientific Research Project Unit (BAP) for the financial support (Project No: FKA-2020-10068)

CONTRIBUTION TO THE DIACHRONIC STUDY OF THE SPATIOTEMPORAL EVOLUTION OF THE VEGETATION COVER OF BELEZMA NATIONAL PARK (BATNA, ALGERIA)

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ABSTRACT

Monitoring the intensity of photosynthetic activity in the Belezma National Park (BNP) is necessary to preserve a better knowledge of the distribution and spatio-temporal dynamics of vegetation. This allows, through the interpretation of remote sensing data and the use of GIS, to detect changes in the state of the cover. For monitoring on a regional scale, spatial remote sensing is required. In this work, we analysed the diachronic evolution of the vegetation cover from the Normalized Difference Vegetation Index (NDVI) data for a period of thirty-four years from 1987 to 2021. However, there is still no consensus on the most effective method for such monitoring. The method implemented is based on twenty Landsat satellite images (TM and OLI/TIRS), forming five study scenes "1987-2021", these are essentially visual analysis of images, after eliminating those containing a high rate of cloud cover. This diachronic analysis revealed that the forest ecosystems of the Belezma National Park have undergone changes that provide information on the different mutations that this region has experienced.

Keywords: BNP, Remote Sensing, GIS, NDVI, diachronic analysis.

PHYSICO-CHEMICAL AND BACTERIOLOGICAL PARAMETERS OF DAYAT MORSLI LAKE WATER IN ALGERIA

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ABSTRACT

Water is a vital substance for man and all creatures, its use requires a high level of physico-chemical and microbiological quality. This study focuses on the evaluation of the quality of lake water (Dayat Morsli) through the analysis of the following parameters: hydrogen potential (pH), conductivity, color, chloride, ammonium, Chemical Oxygen Demand (COD), total phosphorus, sulphate, nitrate and odor for the physico-chemical parameters and research of total coliforms and *Escherichia coli* for the bacteriological parameters. The results of the analysis of the physicochemical parameters show that all the parameters studied are outside Algerian potability standards. Similarly, the results of the analysis of the microbiological parameters show a very high bacterial load in total coliforms and *Escherichia coli* which leads to the appearance of microbial mats. These values obtained from the two types of parameters shows clearly the pollution of the waters of Lake Dayat Morsli in Oran.

Keywords: Pollution, Lake Dayat Morsli, physico-chemical analyses, coliforms, E. coli

HEALTH RISK ASSESSMENT OF NITRATE IN DRINKING WATER OF IPSALA DISTRICT (THRACE REGION OF TURKEY)

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ABSTRACT

In this study, nitrate accumulations in drinking water of İpsala District and connected villages, an important agricultural stressed area, were investigated in a 2-year period (2021 – 2022). The potential health hazards due to nitrate intake through drinking water were also assessed for all the investigated villages by calculating Chronic Daily Intake (CDI) and Hazard Quotient (HQ). As a result of this research, nitrate concentrations in drinking water samples were ranged from 1.31 ppm to 26.70 ppm (with mean of 12.43 ppm) in 2021 and from 1.80 ppm to 53.10 ppm (with mean of 12.67 ppm) in 2022. According to the results of non – carcinogenic health risk assessment of nitrate, although the HQ values in drinking water of all the investigated villages of İpsala District were found as below the limit coefficient of 1 both for adults and children in general, the HQ values calculated for nitrate were found above 1 in the drinking water of Pazardere and Hacıköy Villages in 2022.

Keywords: İpsala District, Drinking water quality, Health Risk Assessment

MONITORING OF URBAN AREA AND AGRICULTURAL LAND CHANGES AFTER GOLCUK EARTHQUAKE (17 AUGUST, 1999)

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ABSTRACT

Earthquakes cause irreversible consequences, especially damaging the residential areas. During the reconstruction process, agricultural lands around the existing residential areas are dramatically under pressure of change. Present study focused on investigation of reconstruction process impacts on agricultural lands after earthquake eventuated in 17 August, 1999, Golcuk, Turkey, using remote sensing techniques. Pre- (1999) and post-disaster (1999, 2000, 2005, 2010, 2015, and 2020) land use land cover (LULC) statuses of the area was evaluated through Landsat TM and OLI imageries with 30 m spatial resolution, which were sharpened with a 15 m resolution pan- image. The LULC maps were generated using Landsat TM and Landsat OLI pan sharpened images with total of 6 bands of visible (3 bands), near infrared (1) and mid infrared bands (2). In addition, Normalized Vegetation Difference Index (NDVI) was calculated from these images for each date. Then NDVI bands were added to the 6-band images, and 7-band images were obtained. The study area clipped from both 6- and 7-band images and classified into six main LULC classes, namely, built-up area, road, greenhouse area, open agricultural field, forest, and water surface via supervised classification algorithym. Accuracy assessments showed that addition of NDVI band improved overall accuracies except the most recent post-disaster imagery date (September, 1999). The results revealed that there were great changes in all classes except water surface between the dates before and after the 1999 disaster, whereas the built-up class decreased due to changes in spectral reflectance of collapsed buildings (September, 1999). As a conclusion, while there were gradual increases in residential area throughout the five-year periods between 2000 and 2020, it was observed that agricultural lands decreased due to the development in the residential area.

Keywords: Agricultural land, Earthquake, Golcuk, Landsat, Urban area.

DETERMINATION OF LAND USE AND LAND COVER CHANGES USING REMOTE SENSING: GEBZE-IZMIR HIGHWAY KARACABEY ROUTE

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ABSTRACT

National wide development projects known to have apparent impacts on land use land cover (LULC) status. It is important to foreseen the probable effects on natural and agricultural lands within the planning step of such projects for sustainable agricultural activities. In Turkey, these effects can be seen partially around the highway lines which provide transportation networks between metropolitan cities. In present study, it was aimed to determine the LULC changes occured due to Karacabey route of Gebze-Izmir highway project, a hotspot that presents an important location for remote sensing researches, for further synthesis using remote sensing. The construction process of the route has started in 2015 and has completed in 2018 by transferring the responsibility for operation and maintenance. Landsat TM (1999 and 2013) and Landsat OLI (2021) imageries with 30 m spatial resolution were pan-sharpened to 15 m prior to the analysis, and then clipped using 2 km width buffer zone along the route to obtain the study area. Subsequently, study area was classified into seven classes including built-up area, bare area, water surface, olive orchard, agricultural field, highway, and forest area using maximum likelihood algorithym. Accuracies of each classification were determined via 200 stratified randomized control points using Google Earth and CORINE maps considering the closest date, and overall accuracies were over 80%. The changes between classes were determined and interpreted for the study years. Findings revealed that most obvious changes were the decreases in agricultural fields in both years whereby there were considerable increases in transportation network and built-up class areas. The study presents preliminary work of ongoing research.

Keywords: Change detection, Highway, Karacabey, LULC, Remote sensing.

EVALUATION OF SPIREA VANHOUTTEI TO AIR POLLUTION IN URBAN CONDITIONS

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ABSTRACT

Due to the significant deterioration of air quality in recent years, urban vegetation is increasingly exposed to the harmful effects of various pollutants that can interfere with many physiological processes and cause changes in plant morphology. It is the means of transport that mainly emit many dangerous compounds, including heavy metals, nitrogen oxides, and particulate matter. The research includes issues concerning tolerance mechanisms of *Spirea vanhouttei* shrubs to air pollution. The study was conducted on plants growing close to public transport in the Polish city (Poznań) at the end of the growing season. The accumulation of micro-dust impurities on leaf blades was measured. It turned out that the shrubs effectively kept the dust between the hairs. The epicuticular wax layer enhanced their deposition. The response of plants to air pollutants was assessed by the air pollution tolerance index (APTI), described by cell sap pH, total chlorophyll content, ascorbic acid content, and relative water content. This index's value determines plants' tolerance to pollutants because individual biochemical and physiological parameters determine the plant's adaptation to the environment and thus determine the sensitivity or resistance of a given species to environmental stress factors. Based on the obtained results, the tested shrubs can certainly be recommended for urban plantings to reduce air pollution.

Keywords: *Spirea vanhouttei* shrubs, Micro-dust impurities, Air pollution tolerance index (APTI)

ARE WE AWARE OF DEEP CLIMATE CHANGE IMPACTS AND READY FOR ACCEPTING SUSTAINABLE SOLUTIONS?

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ABSTRACT

Climate change is one of the most important issues that threaten the existence and future of the whole ecosystem. Therefore, numeorus projects are carried out to mitigate the impacts of climate change. No matter how much work is done by different parties all over the world, still much more effort is needed in order to increase individual awareness and readiness for what to do against climate change. Undoubtedly, climate change will enforce individuals to alter their life styles drastically, such as sharing their energy, recyling their wastes, reusing of water. The present study aims to understand the awareness leveltowards real climate change impacts and readiness level of indivuduals for accepting sustainable solutions in their daily lives. After a literature review and analyzing different studies, the research utilized a qualitative method based on interviews with ecologists, sociologist, academicians and relevant experts. After evaluating all data, it was concluded that climate change has been seen a major issue of the society, but deep prospective impacts are not adequately perceived. It is thought that governments should implement the precautions. Nonetheless, individual effort and changes in life style has been underestimated. The study highlighted the promotion ways of raising awareness towards future life with efforts to mitigate climate change impacts. In addition, the paper emphasizes the importance of individual effort complying with public precautions.

Keywords: climate change, sustainable solutions, global warming

FUNCTIONAL FOOD - PRODUCTS FROM TOMATO WITH LYCOPENE IN PREVENTION OF CARDIOVASCULAR DISEASES

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ABSTRACT

Tomato, as a functional food product, includes a source of lycopene that serves to prevent cardiovascular disease. This study aims to perform a comparative analysis of the microbiological and chemical characteristics of different tomato products available to buy in the area of Mostar, Bosnia and Herzegovina. Tomato products for analysis were randomly sampled and bought from shopping centres in the Mostar area from three different producers: Sample no. 1: "Passata" - sterilized tomato paste, producer "Podravka d.d." Country of origin: Croatia, Sample no. 2: "Russo" - tomato paste, producer "AR Industire Alimentari S.p.A", country of origin: Italy and Sample no. 3: "Sava Semberija" - tomato juice producer "Sava Bijeljina" country of origin: Bosnia and Herzegovina. The following parameters were included in the microbiological analysis: Salmonella, Koagul.poz.staphilococae, Sulph.red. clostridiae, Proteus species, Escherichia coli and total bacterial count. Chemical analyses were based on the determination of lycopene content and artificial colours. The results were compared with the provisions of the Rulebook on the conditions regarding chemical and microbiological safety, which must be met by food products in transport, Official Gazette of the Republic of BiH 2/92, Rulebook on microbiological criteria for food (Official Gazette of BiH No. 11/13), as well as with literature sources. The obtained results indicate the significant nutritional value of the samples in our diet, especially from the aspect of human health and the prevention of cardiovascular diseases. For instance, lycopene is an antioxidant that cannot be created naturally by the human body, as it is exclusively of plant origin.

Keywords: Tomato, lycopene, cardiovascular disease, prevention

BACTERIAL EXOTOXINS IN FOOD AS CAUSES OF ALIMENTARY INTOXICATIONS OF HUMANS AND UTILIZATION OF EXOTOXINS

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ABSTRACT

Narrative review paper describes *Clostridium tetani*, *Clostridium botulinum*, *Vibrio cholerae*, *Escherichia coli*, *Campylobacter jejuni*, *Corynebacterium diphteriae*, *Shigella dysenteriae*, *Streptococcus pyogenes*, *Clostridium perfringens*, *Staphylococcus aureus* and bacteriotoxins. Bacterial toxins in humans can cause food intoxication. Symptoms range from mild gastrointestinal to life-threatening symptoms. Bacteria secrete exotoxins during life and endotoxins after death. The purpose of this paper is to point out the danger posed by food contaminated with bacteria that produce exotoxins causing food poisoning in humans, but also to point out the possibility of using bacterial toxins for medical purposes. Alimentary intoxications in humans are most often caused by consuming food contaminated with toxin-producing bacteria, and exotoxins that act as superantigens can also cause autoimmune diseases. Some toxins can be used as preservatives in vaccines, and some toxins can also be used in the treatment of neoplasms.

Keywords: food bacteria, exotoxins, alimentary intoxications, utilization of bacterial toxins

ASSOCIATION OF DIET WITH THE OCCURRENCE OF TYPE 2 DIABETES, POLYCYSTIC OVARY SYNDROME, VAGINAL TRACT DYSBIOSIS AND NEOPLASTIC DISEASES IN WOMEN AND CARNIVORES

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ABSTRACT

Improper diet causes hyperglycemia, which leads to hyperstimulation of the pancreas, which secretes insulin in large quantities, causing hyperstimulation of the ovaries, which leads to polycystic ovary syndrome in women. Hyperproduction of androgens and estrogens is one of the risk factors for the development of neoplastic diseases of the reproductive tract in women. The end result is insulin resistance and type 2 diabetes. Carnivorous females are naturally insulin resistant. In carnivores of reproductive age, polycystic ovary syndrome and reproductive tract cancer are rare. They occur in the generative age, which can be related to the exclusively meat diet of carnivores, which results in a large consumption of anticancer trypsin, which is used to denature meat proteins. The purpose of this paper is to point out the importance of a balanced diet in women that can prevent type 2 diabetes, improve reproductive health, maintain a healthy genital microbiota and to some extent prevent neoplastic diseases of the reproductive tract. A balanced diet improves reproductive health, and intravaginal administration of lactobacilli prevents and treats recurrent and resistant vaginosis and vaginal dysbiosis in women.

Keywords: Nutrition, type 2 diabetes, polycystic ovary syndrome, neoplastic diseases of the reproductive tract, lactobacilli

QUALITY AND CONSUMERS ACCEPTABILITY OF TRADITIONAL PASTA ENRICHED WITH WHEAT BRAN

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ABSTRACT

The increase of non communicable diseases has led consumers to their diets. Therefore, the agri food industries have to adapt the food products formula by increasing the nutritional value of their products, without compromising consumers 'acceptability, in addition to using local resources. The aim of this study was to develop enriched traditional pasta and to characterize its quality and consumers 'acceptability. Traditional pasta *nwassers* were prepared by incorporating of 0 (control), 3 and 6 % of wheat bran containing 41% of fibers. Proximate composition, CIE Lab color, and techno-functional properties were determined by standard methods. Consumers 'acceptability was assessed by an *online* survey through a questionnaire on 172 respondents (67% women; 83.4% under 40 years old; 99% pasta consumers). Survey results indicated that 76% of respondents are aware of health benefits of wheat bran, and most claimed to accept consumption of wheat bran enriched pasta *nwassers* (96% of respondents). Potential consumption drivers were health benefits for 59% of respondents, and taste for 30%. On the other hand, formulation assays have shown that addition of wheat bran at a dose of 3% or 6% into pasta *nwassers* resulted in a significant increase in lipids and ashes contents, as well as in total fibers. Pasta aspect and color of enriched pasta were modified, when compared to controls. CIE L*, and b* values decreased whereas a* value increased with wheat bran incorporation, indicating a color change toward brownish color. Moreover, water holding capacity and optimal cooking time of enriched pasta *Nwassers* were significantly decreased when compared to control, improving home pasta preparation. No significant changes were observed for pasta oil holding capacity and swelling index. Our findings clearly showed that incorporation of 3% or 6% of wheat bran into pasta *nwassers* has improved product quality and led to a high consumers' acceptability.

Keywords: traditional pasta, fibers, nutrition, consumers, local resources

ACKNOWLEDGMENT:

This work is a part of the Tunisian National VRR Program (Ministry of Higher Education and Scientific Research, 2020-2023): BD-VAL

TRENDS IN HONEY PURCHASE AND CONSUMPTION IN THE GREAT TUNIS REGION (TUNISIA)

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ABSTRACT

Honey consumption has increased these past years, not only for its sensory attributes, but also for its nutritional and health benefits. Authentication of honey through its physicochemical composition has become an issue to protect quality honeys from adulteration and thus, to build consumers trusts. The present study aimed in identifying the determinant factors for purchasing and consuming honey in a developing country study case: Tunisia. A survey was conducted in the region of Great Tunis (Tunisia) during January-March 2022, through face-to-face interviewing and an online questionnaire. It collected information on demographic data, honey consumption, behaviors and attitudes for honey consumption, sensory attributes. This study included 502 respondents (66.1% women; 33.9% men). The data obtained were analyzed using descriptive analysis. Most of respondents (93 %) are honey consumers. A slight majority of respondents claim to consume honey on a regular basis about 2-3 times/week (31.8%), or on a daily basis (13.1%) whereas 26.2 % are occasional consumers with 2-3 times/month, or rarely (28.8%). The most popular type of honey is from Mountain (48.4%), followed by honeys from Eucalyptus (31.3%), Thyme (24.9%), Orange blossom (21.3%), and Rosemary (20.3%). Main reasons for honey consumption are: health benefits (68.7%), prevention/treatment of chronic diseases (43.6%), and to a lesser extent, its use in a recipe as an ingredient (18.1%) and taste (3.2%). Survey respondents did not show particular preferences for honey color (light for 47.6 %, dark for 44.8) or texture (creamy for 45.6%, liquid for 37.8%). Interestingly a majority prefers to consume local products (83.3%). Furthermore, regarding location of honey purchase, 75.5% of respondents prefer to buy from local producers. Respondents also claim to purchase honey in hypermarkets or supermarkets (11.2%), local markets (8.6%), fairs and exhibitions [8.2%), specialized shops (5.2%), and on line (2.4%). Most of respondents do not purchase honey regularly: once a year (34.9%), every 6 months (28.3%) or every 3 months (28.3%), whereas only 15.9% of respondents buy it often, once a month. The most important drivers for honey purchase are the intrinsic quality attributes (70.6%), as well as the providers' notoriety (18.7%) and the price (7.3%). The study can be useful for the development and the promotion of Honey value chain and for communicating to consumers the quality attributes of honey and its nutritional advantages. It also indicates that tools to ensure food traceability and authenticity, need to be developed in order to empower consumers to guarantee their purchase for honey, and thus its health benefits.

Keywords: Honey, consumers, shopping behaviors, attitudes, consumption drivers

ACKNOWLEDGMENTS:
This work is part of PRIMA-MEDIFIT project (2020-2023): Development of digital solutions to ensure traceability and authenticity of Mediterranean Food Products.

EVALUATION OF HEAVY METALS CONCENTRATION IN RED MULLET (*Mullus barbatus*)

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ABSTRACT

The purpose of this research was to evaluate the concentration levels of Mercury, Lead, Cadmium and Chrome in muscle tissue of Red Mullet (*Mullus barbatus*). A total of 44 samples fish samples with different size were purchased regularly from the main fish market of Tirana. Atomic absorption spectrophotometer (AAS) was employed muscle tissue utilized was to estimate the level of Hg, Pb, Cd and Cr. Based to the collected data concentration level of Hg, Pb and Cr measured in muscle samples tissue of both fish size resulted to be within the permitted levels for human consumption set by EC legislation. Nevertheless, concentration levels of cadmium in large fish size (0.062 mg/kg ww), was higher the maximum permitted level for human consumption. The results of the study indicate that cadmium ($p=0.006$) and lead concentration levels ($p=0.017$) varied significantly between fish sample size of Red Mullet. Further research is required especially in large Red mullet fish species in order to observe the level of heavy metals contamination to ensure consumers health.

Keywords: Heavy metals, cadmium, muscle tissue, Red Mullet

EVALUATION OF ANTIMICROBIAL ACTIVITY OF ACETIC AND CITRIC ACIDS AGAINST *Salmonella thyphimurium* IN CHICKS FEED

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ABSTRACT

Today, the general public has become increasingly aware of salmonellosis problems. Organic acids are known by their antimicrobial potential and commonly used for improving the quality of poultry feed. In this context, the present work evaluated the inhibitory effect of two organic acids namely; acetic acid and citric acid at different levels of contamination by *Salmonella* Thyphimurium. The neutralization of these organic acids *in vitro* and in one-day chick's organs was also investigated during the search for *Salmonella* serovars in birds as described in the Moroccan standard "NM 08.0.550". The effect of two organic acids on *Salmonella* Thyphimurium were tested *in vitro* and in the presence of chick's organs at different concentrations set of strain and organic acids tested. The MIC results demonstrated that citric and acetic acid inhibited *Salmonella* Thyphimurium at concentrations of 0.625%, and 0.512 % for the three levels of strain concentrations: 10, 100, 103 CFU/mL, respectively. The concentration of 0.04M of Na2HPO4 solution has proved, *in vitro,* in caecums and organs of chicks (in presence of organic acids) that strain introduced, even at low concentrations can be recovered. The use of additives has beneficial effects in *Salmonella* control program. However, the present results recommend the amendment of *Salmonella* research standard, taking into account the probable presence of organic acids in digestive content of one day old chicks.

Keywords: MIC; Moroccan standard "NM 08.0.550"; One day old chicks; Organic acids; Salmonella Thyphimurium

ANALYSIS OF BEEKEEPERS' BEHAVIOUR OF PRODUCTION DOCUMENTING DURING ESTABLISHMENT OF HONEY TRACEABILITY SYSTEM: STUDY CASE OF TUNISIA

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ABSTRACT

Honey consumption has increased these past years, not only for its sensory and nutritional properties, but also for its health benefits. Therefore, honey is one of the most adulterated food products in the world, through fraudulent production practices, directly (by adding adulterants), or indirectly (bee extra-feeding). Besides the negative economical consequences, this food fraud impairs food safety, food authenticity and quality. Given these concerns, food traceability systems have been developed and promoted. Production history tracing is based on record-keeping and documentation or data collection. However, little is known about the beekeepers' adoption behaviors. The aim of the present study was to assess the attitude and behavior of beekeepers' production documentation in a developing country study case: Tunisia. A survey was conducted in main Tunisian regions producing honey in 80 beekeeping units during the period between March and December 2021, through face-to-face interviews. It collected information on demographic data, production systems and traceability management practices (transhumance, honey production, identification and registration of hives, labeling).The data obtained were analyzed using descriptive analysis. Only 56.6% of survey respondents declared to produce documentation for traceability. Factors that negatively influenced beekeepers' production documentation included beekeeping experience, education level, and unit size. All beekeeping activity information was recorded by manual handwriting for the traceability system. This documentation included the breeding register (56.6%), the honey book (55.3%) and registration of hives (9.2%). About 76.3% of respondents declared to identify their hives. Information collected in breeding registers concerned veterinary treatments (88.6% of respondents), feeding (86.4%), transhumance (86.4%), and to a lesser extent, rushers (20.5%), queen presence (20.5%), and stock evaluation (15.9%). Records collected in honey book were mainly mining dates (92.9%), quantities extracted (90.5%), harvest dates (83.3%), types of extracted honeys (78.6%), cleaning (66.7%) and potting operations (45.2%), and batch number (11.9%). Surprisingly, only 43.8% of respondents claimed to sell their pre-packed production with a label. This could be probably related to the fact that all the honey production was sold in the local market, through direct sales and short circuits (94.9%). In Tunisia, traceability systems are concentrated in export markets for products, and are not compulsory for local honey. In addition, main barriers of traceability system adoption are related to the lack of awareness, high costs, lack of necessary conditions and little government support, as well as the fact that this is a secondary activity (70.9% of respondents). Interestingly, 71.3% of respondents declared that implementation of a traceability system would improve the honey quality and the beekeeping sector in general. Strengthening of beekeepers training and risk awareness and related efforts of management on production documentation would lead to an effective adoption of traceability system in Tunisian beekeeping units. A "compulsory labeling" policy should be also put in place to monitor the traceability of marketed honey.

Keywords: Honey, Traceability, Beekeeping practices.

CIELAB COLOR PARAMETERS AND PIGMENT CONTENTS IN VIRGIN OLIVE OIL FROM DIFFERENT AREAS OF PRODUCTION IN ALBANIA

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ABSTRACT

Color makes a significant impression on the consumer and has a major effect on the acceptance of the oil due to the current association of green color with high quality oils and pale yellow color with refined oils. Olive oil color is due to two types of pigments, chlorophylls and carotenoids, which are attracting the attention of the scientist due to the probable health benefits that they can provide. The chlorophyllic and carotenoids composition of virgin olive oil are parameter not only of authenticity but also of quality. Aim of this paper was to characterize quality parameters (acidity value, peroxide index and specific extinction coefficient of K232 and K270), pigments content, and CIELAB color parameter that contribute in composition of virgin olive oil. The material for this experiment consisted of 13 samples of virgin olive oil collected from different areas of cultivation in Albania during crop season 2020-2021. Olive oils from coastal region (V, H1, H2 and S) were the richest in chlorophylls and carotenoids, ranging from 6.79 – 8.65 mg/kg and 8.12 – 9.38 mg/kg, respectively. Color analysis showed luminosity values L* are close to each other and range from 29.99 to 32.27. The –a* describing the greenness of the oil fluctuate from 0.7 – 1.31, which means that olive oil sample B2 is greener than the other. The b* value describing the yellowness of the oil range from – 0.07 to 4.54, meaning that olive oil sample V is more yellow than the others. Geographical location is a prevailing factor that acting with other factors impact color parameter and pigment content in virgin olive oil.

Keywords: CIELAB parameters, chlorophylls, carotenoids, virgin olive oil

ENHANCEMENT OF THE OXIDATIVE STABILITY OF CORN OIL UNDER ACCELERATED STORAGE BY BLENDING WITH GRAPESEED OIL (*Vitis vinifera*)

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ABSTRACT

Blends (10, 20 and 30% (H10, H20 and H30)) of grapeseed oil (GSO) with corn oil were prepared to evaluate the oxidative stability of corn oil during accelerated storage for 24 days. Oxidation evolution state was followed by peroxide index (PI), free acidity FA, p-anisidine index p-AV, specific extinction at 232 and 270 nm (K232 and K270), total oxidation (TOTOX), level of total polyphenols and lipid profile. The addition of grapeseed oil at 30% showed greater efficacy than those observed at 10 and 20%. A reduction in the evolution of total oxidation (TOTOX) was recorded after 24 days of accelerated storage at 65°C, in comparison with that observed for the control oil ($p<0.05$). The total polyphenol contents of the supplemented oils (H10, H20 and H30) decreased throughout the accelerated storage, but their contents remained higher than that observed for the control oil (HC). These results suggest that grapeseed oil could be used as a natural antioxidant to improve the oxidative stability of corn oil and extend its shelf life in the presence of changes that deteriorate its quality during storage.

Keywords: Corn oil, grapeseed oil, primary and secondary oxidation, oxidative stability, accelerated storage

DETERMINATION OF BIOLOGICAL POTENTIAL OF TILIA CORDATA FLOWER EXTRACTS

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ABSTRACT

Extraction is a very important stage in the isolation, as well as the identification of different bioactive compounds in the plants. The aim of this research was to produce aqueous and ethanolic extracts from *Tilia cordata* flowers, as well as to determine its antioxidant and antimicrobial potential. Ethanolic extract was characterized with higher (p<0.05) ability to capture free DPPH radicals compared to the aqueous extract. From the point of ability to chelate iron ions can be proved that ethanolic extract was characterized with slightly higher (p<0.05) values compared to the aqueous one, whereas at the highest tested concentration both of the extracts (51.57%, i.e. 49.03%, respectively) had higher (p<0.05) antioxidant potential compared to the citric acid (12.66%). These values were followed by IC50 values. Furthermore, ethanolic linden extract had higher (p<0.05) antimicrobial potential against most of the tested strains compared to the aqueous linden extract. Even that ethanolic extract showed the highest activity against *Staphylococcus aureus*, *Bacillus cereus*, *Listeria monocytogenes*, *Escherichia coli*, *Yersinia enterocolitica*, *Proteus vulgaris* and *Pseudomonas aeruginosa* only in one case, against *Listeria monocytogenes* (15.9 mm), showed higher (p<0.05) activity compared to the tetracycline. According to that, ethanolic linden flower extract showed good antioxidant and antimicrobial potential while it can be used in the food industry for producing functional food with increased biological value.

Keywords: Tilia cordata, extracts, antioxidant potential, antimicrobial potential.

ENHANCEMENT OF THE OXIDATIVE STABILITY OF CORN OIL UNDER ACCELERATED STORAGE BY BLENDING WITH GRAPESEED OIL (*Vitis vinifera*)

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ABSTRACT

Blends (10, 20 and 30% (H10, H20 and H30)) of grapeseed oil (GSO) with corn oil were prepared to evaluate the oxidative stability of corn oil during accelerated storage for 24 days. Oxidation evolution state was followed by peroxide index (PI), free acidity FA, p-anisidine index p-AV, specific extinction at 232 and 270 nm (K232 and K270), total oxidation (TOTOX), level of total polyphenols and lipid profile. The addition of grapeseed oil at 30% showed greater efficacy than those observed at 10 and 20%. A reduction in the evolution of total oxidation (TOTOX) was recorded after 24 days of accelerated storage at 65°C, in comparison with that observed for the control oil ($p<0.05$). The total polyphenol contents of the supplemented oils (H10, H20 and H30) decreased throughout the accelerated storage, but their contents remained higher than that observed for the control oil (HC). These results suggest that grapeseed oil could be used as a natural antioxidant to improve the oxidative stability of corn oil and extend its shelf life in the presence of changes that deteriorate its quality during storage.

Keywords: corn oil; grapeseed oil, primary and secondary oxidation, oxidative stability, accelerated storage.

CLEAR FRUIT JUICE PRODUCTION BY TANDEM FEEDING ULTRAFILTRATION METHOD

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ABSTRACT

Fruit juices are nutritious beverages that are obtained mechanically from ripe, fresh and clean fruits, display the typical characteristics of the fruit from which they are obtained, such as colour, taste and odor, are unfermented but can be fermented and can be made stable by physical means. The conversion of fruit to fruit juice may vary according to the relevant fruit, processing technology, end product quality and consumer demand, some fruits are clear (apple, grape, cherry, pomegranate, etc.) and some fruits (peach, apricot, etc.) rendered fuzzy. In the production of clear fruit juice, it is necessary to remove suspended solid particles or colloidal dissolved substances, suspended proteins, large molecules such as oil and polysaccharides, which cause turbidity in fruit juice. This process is carried out with a vacuum drum filter in small and medium-sized plants, but juice losses are high in this method. Contrary to the traditional method, clear fruit juice can be produced with ultrafiltration to remove suspended solid particles. Ultrafiltration is superior to traditional methods in separation processes with its advantages such as cost-effectiveness, superior chemical and thermal resistance, and environmentally friendly technology, but it creates a disadvantage in terms of fouling. This disadvantage of the membranes is tried to be reduced by covering the surface with various polyelectrolyte solutions and making them more hydrophilic. Our company has started some studies for the application of ultrafiltration in the production of clear fruit juice. Within the scope of these studies, we continue to work on surface modification of ultrafiltration membranes and tandem tank in order to develop the production line for the production of clear fruit juice. In addition to ultrafiltration, diafiltration is also applied in existing systems for more product recovery. In addition to covering the surface of the membranes with various polyelectrolyte solutions against pollution, tandem (double) tank application will be made in order to ensure continuity in production, and the production will continue from tandem tank and decanter when the CIP cleaning of the membranes begins. Thanks to the surface modification and tandem tank application, the required CIP period and time for cleaning the entire line is reduced, thus reducing the amount of water and washing chemicals used for CIP. With ultrafiltration and tandem tank applications, a minimum 40% increase in capacity can be achieved compared to production lines that produce clear fruit juice with the traditional method. While these applications bring about a decrease in energy consumption, a decrease in water consumption and cost, a decrease in the consumption and cost of washing chemicals, a decrease in CIP times and a decrease in personnel costs, they provide a minimum 40% increase in production capacity depending on the time gained from CIP time. Our company's work on this issue continues.

Keywords: Juice, ultrafiltration, clarification, membrane

ARTISANAL FRESH CHEESE QUALITY IMPROVEMENT USING DIFFERENT HURDLE TECHNOLOGIES COMBINATION

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ABSTRACT

The aim of this work was to compare the effect of different hurdle techniques combination, namely ionizing radiation by electron beam combined with LPS and incorporation of thyme essential oil encapsulated with LPS on the quality of artisanal fresh cheese and during storage at +4°C. Both combinations had a significant impact on studied physico-chemical parameters throughout the shelf life of the cheese. However, no significant effects were observed on the texture. The use of ebeam combined with LPS had a significant effect on the microbiological quality (aerobic mesophilic germs, yeasts and moulds and coliforms) compared to control cheeses and those activated only by LPS throughout the shelf life. The combination of encapsulated thyme essential oil with LPS demonstrated that on the first day the different concentrations (0.5, 1 and 1.5 ml/Kg) had a significant effect on the microbiological quality compared to the controls and LPS, but after nine days it was noted that only 1.5 and 1ml/kg had a significant impact on the microbiological quality of the cheese compared to the other samples. On the other hand, the activation of LPS alone had no significant impact on the evolution of these germs. The determination of the expiry date showed that the use of these combinations allowed an extension of the latter since it was noticed that the control cheese had an expiry date of 3.63 (4 days) days and that of LPS only 3.09 days (3 days). On the other hand, the combination of essential oil of thyme encapsulated with LPS gave different results depending on the concentration since the lowest concentration of 0.5 ml / kg with LPS resulted in 4.19 days, the average concentration of 1 ml /kg with LPS gave 8.01 days and the higher concentration of 1.5 ml/kg with LPS allowed an extension of the consumption date up to 10.40 days. Electron beam irradiation with LPS extended the expiration date of cheese up to 6.82, 10 .92, 16.93 days respectively for the low dose (0.5 kGy), medium dose (1kGy) and the highest one (1.5kGy).

Keywords: cheese, microbiological quality, essential oil encapsulations, electron accelerator, quality, shelf life

EFFECT OF LACTOPEROXIDASE SYSTEM ACTIVATION AND HEAT TREATMENTS OF REFRIGERATED COW'S MILK ON THE QUALITY OF UNCOOKED PRESSED CHEESE SAINT-PAULIN TYPE DURING RIPENING

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ABSTRACT

Saint-Paulin cheese was made from cow's milk refrigerated at 4°C for 72h and preserved by the combined effect of the lactoperoxydase (LP) system and different heat treatments (55 °C/15s and 72°C/15s). The effect of combination treatment on the physicochemical, microbiological and biochemical properties of cheese over a ripening period of 23 days was investigated, using a control (C0), refrigerated LP-inactivation cow's milk (C1) and refrigerated LP-activated cow's milk (LP). The LPA treatment showed the least contamination in flora count and the sample cheese made from milk refrigerated at 4 °C/72h, activated by LP and heat-treated at 55 °C for 15s (P55a) is comparable to the sample cheese made from milk refrigerated at 4 ° C/72h and heat treated at 72 °C for 15s (P72). LP cheese had significantly lower coliform, yeast and mould counts ($P < 0.05$) than the other cheeses; this confirmed the bacteriostatic effect of the LP system. Lipolysis did not reveal significant dissimilarities between samples. By cons, the activation of LP caused a 20% decrease in the index of proteolysis of cheeses for the same heat treatment, with indices close enough for the cheeses P72 and P55a. These results were confirmed by the azocasein method measuring the change in optical density of soluble nitrogen and non-protein nitrogen, during the ripening period of the four cheese samples studied. LP activation remedied to lower cheese yield. A gain of approximately 2,41 kg in the cheese produced using milk treated at 55 °C/15s after LP activation was perceived, against 1Kg of the amount of cheese per 100 L of milk with the activation of LPS cheese treated at 72°C/15s. Finally, sensory evaluation showed a preference of the cheeses P72 and P55a.

Keywords: Refrigerated milk, Semi-hard uncooked cheese, Lactoperoxidase system, Antibacterial, Proteolysis, Lipolysis, Sensory analysis.

EFFECT OF HIGH PROTEIN DIET ON WEIGHT LOSS AND BIOCHEMICAL PARAMETER

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ABSTRACT

The High Protein Diet (HPD) reduces obesity and/or fat mass and changes glucose levels in rats fed a high fat diet (HFD) inducing obesity. Male rats fed a high fat diet (HFD) for 12 weeks were subjected to an HPD diet for 12 weeks. Body composition, dietary intake, dietary habits, blood glucose, total cholesterol, triglycerides, urea-creatinine, and uric acid. Compared to a normal diet, HFD increased body weight and fat mass. Switching to HPD for 12 weeks reduced fat mass with a reduction in body weight gain, normalization of blood sugar and a decrease in diet. The same results are seen in rats on HFD-type diets or on HPD+ Probiotics (*Lactobacillus acidophilus*). These data indicate that HPD reduces fat mass and restores glucose homeostasis and loss of fat mass could be a potential peripheral mechanism of the beneficial effects of HPD.

Keywords: obesity, high protein diet, high fat diet, fat mass, probiotics

IMPROVEMENT OF THE HYGIENIC QUALITY OF A CONTAMINATED FRESH CHEESE BY THE ADDITION OF ESSENTIAL OIL FROM MENTHA SPICATA LEAVES

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ABSTRACT

Vegetable essential oils are gaining interest as natural food preservatives to ensure food safety and they are used as flavoring agents, possess antimicrobial properties under different conditions . The objective of this work is to study the effects of incorporating essential oils (EO) from *Mentha spicata* leaves on the quality of "petit suisse" type fresh cheese. The essential oil was extracted by hydrodistillation; the yield obtained is equivalent to 2.4 ± 0.1%. The EO were incorporated at concentrations of 0.2 ml / kg 0.5ml / kg to 0.75ml / kg cheese (finished product). Their effects were evaluated by monitoring changes in physicochemical and microbiological parameters for five weeks at 4 ° C ± 1 for fresh cheese. Adding the essential oil of spearmint at 0.5 or 0.75ml / kg to fresh cheese significantly extended its storage life. The results obtained showed that the pH and acidity were influenced by the addition of essential oils; therefore, there is an increase in acidity. Also, the presence of essential oils led to a significant decrease in the microbial flora in the flavored cheeses by comparison with the control. In fact, an inhibition of unwanted germs, yeasts and molds was observed in flavored cheeses from the first week. From all these results, we can conclude that the EO of spearmint seems to be more suitable as an anti bacterial and aromatic agent in fresh cheese.

Keywords: essential oil, storage, healthy, lactic acid bacteria

THE ROLE OF ENZYMES IN THE IMPROVEMENT OF DOUGH PROPERTIES PREPARED WITH WHEAT FLOUR

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ABSTRACT

The use of enzymes in the food industries has grown in the past few years due to their natural origin of them. They are used to improve the quality of the product, to make diversity and new products. The enzymes are extracted from the living cells and they are very active when the right substrate to interact with. In the baking industry, different types of enzymes are added to improve the texture and quality of the dough and the final products. They can be combined with ascorbic acid to develop and to give their contribution in the process. This study aims to determine the effect of enzymes: hemicellulose, xylose, lipase, cysteine, and ascorbic acid in the dough properties. The analyzes were done in the same sample of wheat flour, at a different rate, and for two hemicelluloses, cysteine and ascorbic acid a combination was done to see how they can interact with each other. The result has shown that cysteine has a soft effect on the dough properties affecting the energy and the resistance of the dough. The addition of the cysteine from 0 to 40 ppm has effect the R max from 387 to 226 BU in 45 min, elasticity from 149 to 153 mm, and energy of the dough from 81 to 51 cm 2. The Kmax was also reduced from 2.6 to 1.48 in 45 min of the proofing time. The use of hemicellulose from 0-50 ppm has increased the Rmax from 387 to 400 BU in 45 minutes of proofing, elasticity from 149 to 153 mm energy of the dough from 81 to 86 cm 2 and Kmax hasn't changed. But the combination of the two enzymes in 20-20 ppm has put the value of the energy to 66 cm 2, decrease the R max to 322 BU, and has less effect on the elasticity. Adding ascorbic acid to the dough till 40 ppm as an oxidizer agent has increased the value of R max to 20% BU, elasticity to 7%, and energy of the dough to 12 %. The resting time affects the dough's properties. In mostly all the samples the 90 min of proofing helps the dough to express all its properties.

Keywords: enzymes, dough, wheat flour, ascorbic acid, R max, K max.

Mentha piperita ESSENTIAL OIL FROM DIFFERENT GEOGRAPHICAL ORIGIN CHEMICAL PROFIL AND CYTOTOXIC ACTIVITY

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ABSTRACT

Essential oils from a broad spectrum of plant species have been shown to have antimicrobial, antioxidant, antiinflammatory, antiviral, cytotoxic and/or antitumoral activity. *Mentha piperita* has been extensively used in gastronomy and folk medicine in Serbia. *Mentha piperita* (Lamiaceae) is well known aromatic, medicinal, fragrant, honey-bearing, spicy and industrial plant, widespread throughout the world and native to Europe. It has been used since ancient times as an important flavouring ingredient and also as remedy for many illnesses. In traditional medicine peppermint is used for intestinal colic, headaches, diarrhea, nausea, flatulence, cramp and common cold. Large quantities are cultivated for the production of tea and essential oil. Peppermint herb and leaves contain between 1.2 - 2.5 % of essential oil. Oil possesses a fresh sharp menthol odor and a pungent taste followed by a cooling sensation. It is composed largely of monoterpenes (52 %) such as, menthol, isomenthol, menthone, and 1,8-cineol. The chemical components of peppermint leave and chemical composition of oil, vary with plant maturity, variety, geographical region and processing conditions. Thus, the aim of this study is determining the chemical profile and cytotoxic activity of peppermint essential oil from Serbia and the Russian Federation. Peppermint oil is used in aromatherapy, cosmeceuticals, perfumery, and in the flavoring of food products (chewing gums, sugar confectionery, ice creams, desserts) and alcoholic beverages. For medical and pharmaceutical point of view, essential oil is recognized for its analgesic, antiphlogistic, antiseptic, antimicrobial, antispasmodic, antiviral, nervine and vasoconstrictor properties. The cytotoxic activity of the peppermint essential oil, originated from Serbia and Russian Federation, was evaluated *in vitro* against three different human's cancer cell lines: the human cervix adenocarcinoma HeLa cells, the human lung adenocarcinoma A549 cells, the human colon adenocarcinoma LS-174 cells and normal fibroblast MRC-5 cells. Evaluation of cytotoxicity revealed that both Serbian and Russian juniper oil possess a cytotoxic potential against HeLa cells line. The MTT assay determined that cytotoxicity against A549 and LS-174 cells were the same, low, for both EOs. Therefore, peppermint essential oil, can be considered with a beneficial effect on health, immune regulation, and quality of life.

Keywords: *Mentha piperita*, essential oils, chamical profile, cytotoxic activity

SENSORIAL CHARACTERISTICS OF YOGHURT BASED ON GOAT'S MILK AND QUINOA FLOUR

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ABSTRACT

Quinoa (*Chenopodium quinoa* Willd.) is an annual herbaceous plant of the family Amaranthaceae, native to the Andes of South America. Indigenous peoples for thousands of years have domesticated it. It is currently considered a "Pseudocereal" since it belongs to the Chenopodiaceae family and not the Poaceae family. The chemical composition of quinoa has attracted the scientific community's attention for its high nutritional value, being rich in protein, unsaturated fatty acids, dietary fiber, vitamins, and minerals, with an extraordinary balance of essential amino acids. It is also characterized by the absence of gluten, which allows its use in the diet of celiac patients. Due to the high content of essential amino acids in its protein, quinoa is considered the only plant-based food was providing all of the essential amino acids, so the balance of essential amino acids in quinoa protein is superior to that of wheat, barley, and soy. In this context, a consumer test was carried out by a trained panel of 10 people from the team of the Beni Mellal Higher School of Technology, to assess their level of acceptance of yogurt based on quinoa flour and goat milk in four percentages: 0.6; 0.8; 1 and 1.2%, evaluating the effect of this addition on the sensory characteristics of yogurt using a detailed questionnaire. The results of this test showed that the addition of quinoa flour in high percentages has a positive effect on the sensory characteristics of yogurt, and the percentage of 1% shows its best attitude to give a very good firm yogurt, homogeneous and of very good taste with an acceptance index of 99%

Keywords: Quinoa, Quinoa flour, goat's milk, fermented goat's milk, Sensorial characteristics

ENHANCING FOOD SAFETY AND HYGIENE BY EXPLOITING THE ANTIMICROBIAL ACTIVITY AGAINST FOODBORNE PATHOGENS AND SPOILAGE BACTERIA OF A SUSTAINABLE NATURAL EXTRACT: PRELIMINARY IN VITRO RESULTS

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ABSTRACT

Food products are highly susceptible to microbial contamination potentially affecting their safety and quality attributes as well as reducing their nutritional value. Ensuring food safety and hygiene to consumers is a crucial task that needs to be constantly addressed by competent authorities and scientific community in order to pursue public health protection and to limit the high costs related to foodborne illnesses. At industrial level the use of synthetic preservatives in the food production chain to reduce or eliminate the undesired presence of microorganisms is highly diffused. However, recently, the interest in natural alternatives to classical preservatives has rapidly increased and may represent a new green strategy to prevent foodborne illnesses and food wastage. For instance, the use of natural antimicrobial compounds in the food industry defines a valuable and sustainable approach for the effective containment of microbial contamination along the production chain. Among natural compounds, olive-derived polyphones have proven to posse strong antioxidant, anti-inflammatory, anti-cancer effects but also antibacterial activity suggesting its potential use in food chain production. The aim of the present study was to evaluate the antimicrobial activity of a food grade olive mill waste water polyphenolic extract. The *in vitro* assessment was performed both on pathogenic and spoilage microorganisms strongly related to food safety and hygiene. The antimicrobial activity was preliminary assessed by agar well diffusion, subsequently microdilution method was applied to define the minimum inhibitory concentration (MIC) and the minimum bactericidal concentration (MBC) following the Clinical Laboratory Standards Institute (CLSI) guidelines. The results demonstrate the *in vitro* efficacy of the tested polyphenolic extract against the growth of dangerous foodborne pathogen, both Gram positive and negative, and undesired spoilage microorganisms, defining preliminary threshold values for further application on food models.

Keywords: food safety, natural antimicrobial, sustainable strategy

pagN: A NOVEL ADHESIN/INVASIN GENE IN SALMONELLA

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ABSTRACT

Salmonella genus is able to live in a wide range of environments and it is especially described as a facultative intracellular organism. Various adhesins and invasins play a role in this life form. One of them, PagN, is an outer membrane protein which is known to act as a part of invasion. This review summarizes current advances about the main characteristics of the *pagN* gene. Clarifying PagN functions on *Salmonella* invasion and understanding its effects on *Salmonella* dispersion and foodborne outbreak, has an importance for novel medical and industrial approaches.

Keywords: Salmonella, pagN, outer membrane protein, invasion, pathogenicity

EFFECT OF GOAT'S MILK CASEIN HYDROLYSATES WITH OR WITHOUT ZINC ON CARBOHYDRATE HOMEOSTASIS AND RENAL FUNCTION IN TYPE 2 DIABETIC RATS

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ABSTRACT

The present study aimed to evaluate the effect of goat's milk casein hydrolysates associated or not with zinc (Zn) on carbohydrate homeostasis and renal function in type 2 diabetic rats (T2D). T2D was induced in rats by a high-fat diet (HFD), followed by an intraperitoneal injection of a low dose of streptozotocin (35mg/Kg bw). The diabetic rats (n=21) were divided into three groups submitted to HFD or HFD combined with 500mg/kg bw/d of casein hydrolysates (HFD-CH) or HFD-CH supplemented with 0.023% Zn (HFD-CH-Zn). The control group (C) fed a standard diet. After four 4 weeks, changes in body weight, hyperglycaemia, oral glucose tolerance test (OGGT), glycated haemoglobin level and renal function were evaluated as well as changes in kidney histopathology. In the HFD group compared to the C group, the results showed a significant decrease in body weight, insulin levels, and HOMA-β index ($p<0.01$). In addition, a significant increase in glucose level, HbA1c, OGGT, and HOMA-IR index was noted as well as renal dysfunction. This was reflected in serum and urine creatinine, urea, and uric acid levels ($p<0.01$). Treatment of diabetic rats with CH and CH-Zn significantly increased body weight, insulin levels, and HOMA-β index compared to the HFD group ($p<0.01$). Furthermore, the combination of CH with Zn was more effective than CH alone. Both treatments also improved renal function by reducing serum creatinine, urea and uric acid. Histological analysis of the kidneys revealed the presence of an inflammatory infiltrate and necrotic-hemorrhagic foci in the HFD group. These changes seemed to be mitigate by both treatments (CH or CH-Zn). Goat's milk casein hydrolysates associated or not with Zinc showed a beneficial effect on hyperglycemia by improving pancreatic β-cell function, increasing insulin production and inducing a better tissue sensitivity to this hormone. In addition, they improved the renal function of diabetic rats consuming a high-fat diet.

Keywords: Casein hydrolysates, Goat's milk, Rat, Type 2 diabetes, Zinc.

EFFECT OF OLIVE CAKE ON LIPID PROFILE AND ADIPOCYTE SIZE DISTRIBUTION IN POST-WEANING OBESE RATS

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ABSTRACT

Olive cake (OC), the main by-product of olive oil production, is an excellent source of bioactive compounds and has been reported to exert numerous pharmacological properties, including antioxidant and anti-diabetic activities. Objectives: The present study aimed to evaluate the effect of olive cake on lipid profile and adipocyte size distribution in rats made obese since weaning. Post-weaning male Wistar rats (3 weeks old and weighing 45±5 g) were made obese on a high fat diet (HFD) for 14 weeks. They were then divided into two groups and fed the HFD supplemented (HFD-OC) or not (HFD) with 7.5% OC. In the same time, another group fed a standard diet was used as a control group (C). Four weeks later, body weight, adipose tissue weight, and lipid profile (total cholesterol (TC) and triglycerides (TG)) of very low-density lipoprotein (VLDL), low-density lipoprotein (LDL), and high-density lipoprotein (HDL) were determined. Histological analyses were performed in epididymal adipose tissue to determine the number and size distribution of adipocytes using image J software. The HFD significantly increased body weight gain, adipocyte mass, VLDL, TG and TC levels, decreased HDLTG and TC concentration and induced adipocyte hypertrophy. Treatment of obese rats with OC significantly reduced body weight gain and perirenal and epididymal adipose tissues weight compared to the C group ($p<0.05$). OC administration also reduced TG and TC in VLDL and LDL fractions, and increased those of HDL, in HFD-induced obese rats ($p<0.05$). In addition, adipocyte size distribution analysis showed a reduction in the mean size and increase in the number of small adipocytes in epididymal adipose tissue in OC-treated rats compared to the HFD group. These results showed that olive cake supplementation improves lipoproteins lipid profile and adipocyte distribution in obese rats

Keywords: Olive cake; Rat; Adipocyte distribution; Lipid profile; Obesity

OLIVE CAKE REDUCES BLOOD PRESSURE BY MODULATING GUT MICROBIOTA AND ITS METABOLITE IN DEXAMETHASONE-INDUCED HYPERTENSIVE RATS

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ABSTRACT

The gut microbiota (GM) is implicated in obesity, metabolic syndrome and in the progression of hypertension. Recently, it has been suggested that modulation of the GM by foods and herbs could treat and/or prevent cardiovascular disease. The present study aimed to evaluate the effect of olive cake (OC) on blood pressure, GM and their metabolite in a model of hypertension induced by dexamethasone Hypertension was induced in rats by intraperitoneal injection of dexamethasone (30ug/kg/day) and then the hypertensive (HT) rats were divided into two groups fed a diet supplemented (HT-OC) or not (HT) with 7.5% of OC for 28 days. A control group (C) was fed a standard diet during the same experimental period. At the end of the experiment, body weight gain, food intake, thiobarbituric acid reactive substance (TBARS) levels, superoxide dismutase (SOD) and catalase (CAT) activities were determined. The pH, moisture and microbial population of the caecal contents were also evaluated. The content of caecal and serum short-chain fatty acids (SCFA) (butyric acid, propionic acid, and acetic acid) was measured. A significant increase in systolic and diastolic blood pressure associated with a reduction in body weight gain and food intake was noted in the HT group compared with the C group ($P<0.05$). In addition, in serum, TBARS level was significantly higher and SOD and CAT activities were reduced the HT group compared with the C group ($P<0.05$). However, in hypertensive rats, OC reduced systolic and diastolic blood pressure by 35% and 28%, respectively, compared with the HT group. OC also reduced TBARS content and increased SOD and CAT activities ($P<0.05$) without showing a significant effect on food intake in hypertensive rat ($P>0.05$). Analysis of the cecal microbial population revealed that the abundance of Enterobacteriaceae spp and Bifidobacterium spp were significantly increased and decreased respectively, in the HT groups compared to the C group ($p<0.05$), whereas, the OC treatment significantly improved the relative abundance of bifidodacteria spps and reduced that of Enterococcus than the HT group. Also, the level of caecal and serum butyric acid was increased in rats treated with OC ($P<0.05$). In the caecal contents, in addition to butyric acid, the propenoic acid content was increased ($P > 0.05$). Collectively, these results showed that OC could attenuate dexamethasone-induced hypertension by modifying the gut microbiota and improving SCFA levels.

Keywords: Olive cake; Rat; Gut microbiota; Oxidative stress, Antioxidants, Short chain fatty acids; Hypertension; Dexamethasone.

MICROALGAE CULTURE FOR FOOD SUPPLEMENTATION: AN INSIGHT INTO LIPID FRACTION

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ABSTRACT

Climate change and natural resources scarcity are challenging food security. Accordingly, attention must be addressed to food production. Microalgae cultivation does not compete with land and resources required for traditional crops and has a superior yield compared to terrestrial crops. Moreover microalgae metabolites may represent high interest to food industry. This research aimed to assess microalgae lipid composition for potential food supplementation with polyunsaturated fatty acids (omega-3 and omega-6). Samples were firstly collected from water. Then, samples were grown on BG11 media. Identification of microalgae was made through microscopic observation and determination of some growth-kinetic parameters like pH and chlorophyll content. Samples then were cultivated in controlled conditions, harvested and lipid fraction composition was determined through Gas chromatography-mass spectrometry (GC-MS). Microalgae growth-kinetic analysis showed significant evolutions in pH and chlorophyll levels during 15 days of culture. Such evolution was probably related to photosynthesis reactions. Regarding microalgae lipid composition, three main components were identified: Methyl palmitate (70.24%), Palmitoleic acid (16.84%) and Stearic acid (12.41%). Unfortunately, no polyunsaturated fatty acid was detected. Dominance of methyl palmitate could suggest the use of microalgae lipid fraction as a natural additive in food industry as an emulsifier, stabilizer, wetting agent. Further investigations on microalgae culture conditions and its impact on fatty acid composition would be recommended.

Keywords: Microalgae, Gas chromatography-mass spectrometry (GC-MS), fatty acid, sustainable production.

BIOCHEMICAL CHARACTERISTICS OF WINES FROM AUTOCHTHONOUS GRAPE CULTIVARS IN VARIOUS AREAS OF ALBANIA

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ABSTRACT

The aim of this study is to investigate the biochemical components of Albanian wine produced from autochthonous grape varieties from different growing regions. Alcoholic fermentation is a biological process carried out by yeast. Maceration is a physic-chemical process that allows the extraction of anthocyanin and tannins to obtain the typical colour and structure of red wine. The control parameters of both processes are different, so it is necessary to optimise the conditions to control each of them. Temperature, mechanical processes and aeration are useful to promote extraction and improve the final balance of phenolic compounds in the wine. Phenolic compounds are natural bioactive known for their numerous health benefits. In the case of wines in particular, polyphenols and quality are closely linked. These components are very important for the quality of the wine as they contribute to the sensory characteristics: colour, taste, mouth feel, aroma, astringency and bitterness. For this study, several autochthonous varieties of black and white grapes (*Vitis vinifera* L.) were considered, such as: Shesh i Zi, (from the areas of Lundra, Berat, Paskuqan, Durrës), Kallmet (from Lezha, Kolplik, Rrëshen), Sheshi i Bardhë (from Paskuqni, Berat) and the last variety Pulës (from Berat) and are compared with the respective variety from the "Agricultural Technology Transfer Centre", Vlora. The trials and analyses are carried out in the laboratories of the Food Research Centre of the Faculty of Biotechnology and Food

Keywords: Wine, Biochemical Components, Phenolic Compounds; Black and White grape

INFLUENCE OF CLIMATIC CONDITIONS ON THE CHEMICAL AND BIOACTIVE COMPONENTS OF SOME APPLE VARIETIES CULTIVATED IN THE AREA OF KORÇA

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ABSTRACT

Apple (*Malus domestica*) is a valuable part of fruit culture in our country. Apple cultivation has been known since ancient times and is still widely cultivated today. In recent years, apple cultivation has experienced increasing development, so that the consumption of apples is growing more and more. This growth is due to the favorable climate for cultivation, but also to consumer demand and their preference for new products that can be made from the apple fruit. Apple is a fruit with high nutritional value, necessary for the human body, as it contains vitamins A and C, sugars, acids, minerals and so on. The content of these components varies depending on the variety, climate, soil and climatic conditions. This fruit is consumed not only as fresh fruit, but also in the form of unfermented and fermented juices such as apple juice, cider, vinegar, etc. The aim of this study is to characterize apple cultivars grown in Korça region through a two-year study of physicochemical parameters and antioxidant activity of apples. This study was conducted on four apple variety Idared, Starking, Gold and Pink Lady. The analyzes performed are physicochemical analyzes, vitamin C, total polyphenols, flavonoids, antioxidant activity, etc. The results of the two-year study show that the values vary not only from year to year, but also from variety to variety. It is assumed that these changes are due to the climatic changes and the varietal characteristics of the apple variety in the Korça area

Keywords: Apple, Climatic Condition, Bioactive Components, Variety

DETERMINATION OF BIOACTIVE PROPERTIES OF WATER-SOLUBLE EXTRACTS FROM UF AND WHITE CHEESE DURING STORAGE PERIOD

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ABSTRACT

In this study, the bioactive properties of water-soluble peptides (WSP) in the ripening process of cheese produced from pasteurized cow's milk and ultrafiltered cow's milk using 2 different enzymes of microbial and animal origin were investigated. Antioxidant, ACE inhibitor and antimicrobial properties of WSP obtained from cheeses produced in 4 different ways as UF milk + microbial enzyme, UF milk + rennet, Pasteurized milk + microbial enzyme and Pasteurized milk + rennet were determined during the 3-month maturation period. In the antioxidant analysis of WSPs obtained at the end of the maturation period, by using ABTS method (10 µL sample volume), the % inhibition values were found to be 54,5% in the Beyaz cheese produced with the lowest microbial enzyme, while it was 29,18% by using the DPPH method. According to ABTS method, while the highest % inhibition effect was determined as 59,13% in UF cheese produced with microbial enzyme, this value was determined as 20.04% in DPPH method. This situation revealed that the results of DPPH and ABTS method analysis used in the detemination of antioxidant activity differ from each other. The ACE inhibitory effect of WSPs was observed the lowest in the 0th month (19,47%) of UF cheese produced with rennet, and the highest in the 3rd month (70,46%) of the Beyaz cheese produced with rennet. It was determined that the ACE inhibitory effect increased depending on maturation. The antimicrobial effects of WSPs on *Salmonella typhi, Salmonela* Enteritidis, *Esherichia coli* DSM ATCC 10973, *E. coli* ATCC 95922 and *Staphylcoccus aureus* ATCC 95923 were investigated. In studies carried out at 200 mg/ml concentration, The WSP of the 1st month of UF cheese produced with microbial enzyme showed the highest antimicrobial effect against *S. typhi.* It has been determined that WSPs of 1st month from Beyaz cheese produced with microbial enzyme have antimicrobial effects on *S. typhi, S.* Enteritidis, *E. coli* DSM ATCC 10973, *E. coli* ATCC 95922. In addition, it was determined that the WSPs of the 3rd month of Beyaz cheese produced with microbial enzyme showed antimicrobial effects on *S. typhi*. None of the obtained WSPs showed antimicrobial effect on *S. aureus* ATCC 95923.

Keywords: Water Soluble Peptides, Antimicrobial, Antioxidant, ACE inhibitory

POPERTIES OF FOOD POWDERS, PRODUCTION METHODS AND CHARACTERIZATION

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ABSTRACT

Food powders are one of the most common forms of food materials. Day by day the volume and types of production of powders are increasing as a result of it being the most stable form of food that is also easy to use, handle, package and distribute. It has a longer shelf life compared to the liquid form of the products. Food powders are particulate solids that are produced from granular or liquid solids materials. One of the most common formate of food materials is food powder. Currently, many of the food are available in the market as powder form. Drying and crystallization are the two main methods of converting a liquid into a powder form and size reduction processes such as grinding and milling contribute to the production of the powder. The distribution, particle size, shape and surface properties depending on both properties of the raw materials and the processing conditions and methods used during their formation. Food powders are types from dry foods. Many new product formulations are developed by mixing several powders and the final product is obtained by water rehydration and further processing. Conditions that may cause physical and chemical changes leads to changes in functional properties or deterioration of sensory quality should be avoided during the production, packaging and storage of food powders. This study explained the characteristics and methods of producing food powders. Consumers tend to use strong foods that do not cause sticking and clumping during storage. The shelf life of foods is generally affected by physical changes and chemical reactions. All conditions that cause food powders to change must be controlled so that these changes do not occurs.

Keywords: Food Powders, granulation, drying, crystallization, rehydration, storage.

FUNCTIONS OF TYPE V SECRETION SYSTEM AND AUTOTRANSPORTER PROTEINS IN *Salmonella*

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ABSTRACT

Salmonella, a Gram-negative foodborne pathogen, is known as a serious infectious agent all over the world. There are various mechanisms that play a role in *Salmonella* pathogenicity and secretion systems are one of them. These secretion systems play a key role in the formation of biofilms, which are known as forms of resistance to all adverse environmental conditions, as well as adhesion to host tissues, colonization and host cell invasion, which are the main elements that manage *Salmonella* pathogenicity. Autotransporter proteins are one of the important pathogen-associated molecular patterns (PAMP) of *Salmonella* in attachment to host tissues, colonization and therefore host cell invasion. These autotransporter proteins called MisL, ShdA and SadA are secreted through the Type V secretion system (T5SS). This review aims to display the importance of T5SS and autotransporters secreted by this system for *Salmonella* virulence and summarize their functions on *Salmonella* adhesion, invasion and biofilm formation.

Keywords: Salmonella, T5SS, autotransporters, MisL, ShdA, SadA, biofilm, adhesion

INVESTIGATION OF THE ANTIMICROBIAL EFFECT OF WATER-SOLUBLE EXTRACTS OF DIFFERENT CHEESES, NISIN AND LYSOZYME ON *Clostridium* SPECIES RESPONSIBLE FOR LATE BLOWING DEFECT

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ABSTRACT

The Late Blowing Defect(LBD) is the structural and sensory changes that occur in cheese as a result of butyric acid fermentation by spore-forming absolute anaerobic *Clostridium* species. For this reason, significant economic losses occur in the dairy industry in the world. In this study, the antimicrobial effects of nisin, lysozyme and water-soluble extracts (WSE) from different cheeses on *Clostridium* spp., which are responsible for LBD, were investigated. In our study, 2 different *C. sporogenes* (73 and 97) and 1 *C. butyricum* (99) isolated from raw milk in SDU Food Engineering laboratories were used. In this study, WSE was obtained from 12 different cheeses, including 6 different Ezine cheeses, 4 Classic Beyaz cheese, 1 İzmir tulum cheese and 1 Şavak tulum cheese that are commercially available in Turkey. After determining the peptide profiles of the WSPs in HPLC, the antimicrobial effect on *Clostridium* spp. was investigated. In studies carried out at 50 mg/ml concentration, it was determined that all extracts did not have an antimicrobial effect on *Clostridium* spp. vegetative cells and spores, on the contrary, they increased (encouraged) the growth of *Clostridium* spp. cultures. The minimum inhibitory concentration (MIC) of nisin on *Clostridium* spp. vegetative cells was determined as 6.25 µg/ml and 12.5 µg/ml for *C. sporogenes* (73) and *C. sporogenes* (97), respectively, and 6.25 µg/ml for *C. buytricum* (99). It has been determined that the susceptibility to nisin is different between *Clostridium* species. The MIC value of nisin on all *Clostridium* spp. spores was 1.56 µg/ml. According to our results, *Clostridium* spp. spores were found to be more sensitive to nisin than vegetative cells. In addition, lysozyme did not show any antimicrobial effect on *Clostridium* spp. vegetative cells and spores at a maximum concentration of 10 mg/ml.

Keywords: Late Blowing Defect, Nisin, Lysozyme, Water-soluble extracts

COMPARISON OF PHENOLIC PROFILES OF BLACK TABLE OLIVES PROCURED FROM THE MARKET AND PRODUCED BY CLASSICAL METHOD

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ABSTRACT

Gemlik variety is one of the olive varieties that have economic importance in our country, and it is also used in olive oil production, especially in table olive production. Gemlik variety olives have high quality features such as thin skin, small seeds, high amount of meat and aromatic. Table black olives can be made from all kinds of olives. However, higher quality products are obtained from the "Gemlik variety" olives, which are shiny dark black colored, fleshy, have a small seed and thin skin, and are grown intensively in the Gemlik, Iznik, Mudanya and Orhangazi districts of Bursa. In this study, Gemlik type table olives sold in the market in Gemlik, Iznik, Orhangazi, Mudanya, Erdek and Akhisar regions and Gemlik type black table olives obtained from these six regions were examined in terms of phenolic compound content in the final product obtained by producing the brine (classical) method.

Keywords: Olive, market, phenolic compound

EFFECT OF ARTICHOKE BRACT POWDER ON BREAD QUALITY

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ABSTRACT

Evaluation of nutritional and functional valuable by-products in food industry is important in terms of both food enrichment and economic gains. The stem and bract parts make up about approximately 60% of the total weight of the artichoke plant (*Cynara scolymus* L.). Discarded parts of artichoke are rich in some nutritional compounds (dietary fiber, antioxidant contents, minerals etc.) but not have a usage area in food industry. In this study, artichoke bracts were dried and ground as powder and artichoke bract powder (ABP) added to the wheat flour at various rates (0, 2.5, 5, 7.5 and 10%) and used in bread making. Physical, textural and nutritional and quality parameters of ABP added bread samples were investigated. When the color values of the bread crumbs were measured, it was determined that redness and yellowness values increased contrary to lightness value as the ABP addition rate increased significantly ($p<0.01$). It was observed that the addition of ABP significantly decreased the lightness, redness and yellowness value of bread crust compared to control sample. The highest volume and the specific volume were found in control bread and it was determined that as the amount of ABP increased, the volume and the specific volume of breads decreased significantly ($p<0.01$). The highest hardness value was found in 2.5 % ABP added bread sample. It was determined that ABP addition reduced the hardness value of breads significantly ($p<0.01$). When the highest cohesiveness and resilience values found in control sample, there was no significant difference between ABP added breads ($p>0.01$). Texture analysis showed that the addition of ABP reduced the chewiness values of the breads. It was observed that as the ABP addition ratio in the bread recipes increased, the protein content of the breads decreased due to the low protein and high fiber content of ABP. As the ratio of ABP, which is known to be a good source of antioxidants, in the bread recipe increased, the antioxidant capacity of the breads also increased. At the end of the study, it was determined that the addition of ABP affected and improved various physical, textural and nutritional properties of breads. The addition of ABP up to 2.5 % was found acceptable in terms of the physical and textural properties of the bread.

Keywords: Artichoke bract powder, Bread, Food by-products, Fortification.

PROPERTIES OF FOOD POWDERS, PRODUCTION METHODS AND CHARACTERIZATION

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ABSTRACT

Food powders are one of the most common forms of food materials. Day by day the volume and types of production of powders are increasing as a result of it being the most stable form of food that is also easy to use, handle, package and distribute. It has a longer shelf life compared to the liquid form of the products. Food powders are particulate solids that are produced from granular or liquid solids materials. One of the most common formate of food materials is food powder. Currently, many of the food are available in the market as powder form. Drying and crystallization are the two main methods of converting a liquid into a powder form and size reduction processes such as grinding and milling contribute to the production of the powder. The distribution, particle size, shape and surface properties depending on both properties of the raw materials and the processing conditions and methods used during their formation. Food powders are types from dry foods. Many new product formulations are developed by mixing several powders and the final product is obtained by water rehydration and further processing. Conditions that may cause physical and chemical changes leads to changes in functional properties or deterioration of sensory quality should be avoided during the production, packaging and storage of food powders. This study explained the characteristics and methods of producing food powders. Consumers tend to use strong foods that do not cause sticking and clumping during storage. The shelf life of foods is generally affected by physical changes and chemical reactions. All conditions that cause food powders to change must be controlled so that these changes do not occurs.

Keywords: Food Powders, granulation, drying, crystallization, rehydration, storage.

FROM INVASION TO CONSUMER TABLE: AS A MODEL: LIONFISH

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ABSTRACT

While the importance of marine sources for not only food and feeding but also for biomaterial and sustainability of fisheries has become more essential for the public, decision-makers and researchers; the threat of invasive species on the marine sources has still been an important problem. According to the research, the main effects that threaten the coastal system are invasive species, tourism, destruction of the coasts and the lack of awareness of people. Alien species, which are one of these effects, face very different ecological factors in the geography where they have just moved. Some of these alien species spread rapidly, using the environment's available resources better than other species that already existed in the environment, and over time, they become invasive species, replacing natural species in the environment and invading new ecosystems to which they are moved. The lionfish, which is naturally found in the Pacific Ocean, has attracted the attention of researchers in recent years with its spread in different seas of the Earth. This invasive species has become prevalent in Turkey from Eastern Mediterranean to the Aegean Sea. Using and valorization of natural sources for maximum benefits are one of the important parts of sustainability goals globally. Therefore, the usage of invasive marine species as an alternative for food and feed sources is a promising approach for converting a threat into benefits. This review will evaluate the potential of utilization of lionfish as a food or feed sources model for invasive species in Turkey. The proximate composition, nutritional benefits and potential risks such as bioaccumulation of heavy metals or other environmental pollutants will be criticized. The economical feasibility will also determine within previous research. The results could be useful for the food industry and fisheries science.

Keywords: Lionfish, seafood, invasive fish species, valorization, and nutritional value

THE IMPACT OF DILL LEAVES ON THE SENSORY QUALITY OF TUNA PATE

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ABSTRACT

Canned tuna is one of the most traded food products around the world due to its availability in processing and consumption. Similar to other seafood processing methods, many by-products are generated during the tuna canning process and utilization of these by-products in the alternative value-added products production is a promising approach for circular economy and the environment. In this research, tuna pate was produced with the usage of chunks and trimming of canned tuna products. For these aims, two tuna pate groups were produced from without or dill leaf addition. Then each pate group was separated into three sub-groups in terms of packaging material; flint glass (F), amber glass (A), and plastic container (P). Packaged tuna pate groups are stored in the refrigerator for six months. Sensory attributes such as colour, odour, taste, texture, and general acceptance were also determined. The results showed that the sensory quality of dill leaf enriched tuna pate groups had higher sensory scores than control tuna pate groups. The results have also revealed that the tuna pate groups in the glass jar, especially in amber glass groups compared to plastic container groups had been evaluated more appropriate by panellists ($P<0.05$). These results revealed that the usage of dill leaf prolonged the shelf life of tuna pate within the sensory quality of tuna pate. The structure and colour of packaging materials also impacted the sensory quality of tuna pate.

Keywords: Seafood, quality, sensory attributes, dill leaves, tuna, spreadable pate

DURUM WHEAT GLUTEN QUALITY UNDER THE ADOPTION OF LONG-TERM CONSERVATION AGRICULTURE IN TUNISIA

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ABSTRACT

Switching from conventional (CT) to conservation agriculture (CA) to achieve sustainable agriculture improves yield, soil quality and conserves natural resources. The objective of the study was to examine the influence of soil managements (CA vs. CT) on gluten properties (gluten index (GI), Dry gluten (DG) and gluten water holding capacity (WHC)) of two durum wheat varieties (Monastir and Karim) grown during two years (2018-2019 and 2019-2020) in Tunisia. The results obtained indicate that soil management has a significant effect on DG and GI. In addition, Year x Soil Management interaction significantly influenced only the GI parameter. However, Variety x Soil Management interaction influenced GI, DG, WHC. The three-way Soil management system x Variety x Year interaction statistically affected GI and WHC. Therefore, we can conclude that under climate change conditions the shift to CA can improve the quality of Tunisian durum wheat.

Keywords: Conservation agriculture, Conventional agriculture, Durum wheat, Dry gluten, Gluten index

A HEPATOPROTECTIVE PLANT: *Silybum marianum* L.

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ABSTRACT

Milk thistle (*Silybum marianum* L.) is the common name of some spiny plants from the Asteraceae family. It is a weed that grows in many parts of the world. Since ancient times, its seeds are used as herbal remedies for many diseases. Milk thistle seeds are a rich source of fiber and may therefore have a high aflatoxin binding capacity. Besides that, silymarin, a component of milk thistle seeds, is a natural polyphenolic flavonoid with antioxidant properties. Polyunsaturated fatty acids can act as antioxidants, increasing the metabolism and excretion of mycotoxins, preventing their absorption or biological activation. It was concluded that the seeds of thistle can effectively reduce the level of aflatoxin in vitro. Clinical studies and experiments on this plant show that the silibin substance in the content of this plant is a strong antioxidant and it neutralizes the toxic substances taken from cigarettes, alcohol and polluted air and the free radicals produced as a result of oxidative damage. As a result, it has been revealed that the plant supports all liver functions and that the chemicals in the plant can be used to treat liver diseases and problems and to strengthen the liver.

Keywords: *Silybum marianum*, antioxidant, hepatoprotective

DEVELOPMENT OF ESSENTIAL OIL COMBINATION TO AMELIORATE THEIR ANTI-ESCHERICHIA COLI POTENCY USING A MIXTURE DESIGN APPROACH

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ABSTRACT

The objective of the present study is to optimize the combination of *Syzygium aromaticum, Cinnamomum zeylanicum, Myrtus communis* and *Lavandula stoechas* essential oils, using a simplex-centroid mixture design that provides best inhibitory effects against *Escherichia coli*. After essential oil extraction, the identification and quantification of tested essential oils constituents was made *via* GC/MS analysis. Then, their antimicrobial activities were screened against 14 bacteria, by measuring the inhibition zone diameter. Finally, a statistical mixture design plan was elaborated to establish the right essential oils combination capable of protecting milk from *E. coli* contamination. The preservative effect of essential oil mixture was estimated in milk contaminated with *E. coli*. Milk was supplemented with 2 mg/ml of essential oil mixtures and then *E. coli* strain was added to obtain a final bacterial population of about 105 CFU/ml. Afterward, milk was incubated for 24 hour at 37°C, and the pour plate method was used to enumerate viable bacteria. GC/MS data analysis revealed that camphor (35%), cinnamaldehyde (89%), alpha- Pinene (75%) and eugenol (75%) were distinguished as major compounds of lavender, cinnamon, myrtle and clove essential oils, respectively. Concerning the antimicrobial activity, obtained results illustrated that the studied essential oils were efficient against tested bacteria with varying magnitude. *C. zeylanicum* and *S. aromaticum* essential oils were more active than those of *L. stoechas* and *M. communis.* For the first two essential oils, the inhibition diameters varied from 15 to 26 mm and 17 to 39 mm (for *S. aromaticum* and *C. zeylanicum*, respectively). The complex simplex-centroid mixture design was used to build polynomial models describing the relationship between the antibacterial effect against *E. coli* strain and the proportion of each essential oil. Indeed, the attained optimal combination corresponds to 2.4% *S. aromaticum*, 38.2% *L. stoechas* and 59.4% *C. zeylanicum.* Considering the used mixture design data, the antimicrobial efficiencies of the studied essential oils are directly dependent on their proportions in the mixture, especially cinnamon one. These findings are to be taken into consideration for a successful application of these natural preservatives in food industries.

Keywords: E. coli; Essential Oils; Milk preservation; Mixture design

BIOACTIVE AND ANTIOXIDANTS COMPOUNDS: TRENDS AND CHALLENGES FOR FOOD PRESERVATION

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ABSTRACT

The preservation of food is essential for human health and survival. Nowadays numerous strategy are used including reducing water activity, increase or decrease the temperature, modify the redox potential, preservatives, and competitive microorganisms are mostly used in the preservation of food products. Moreover, artificial preservatives (sorbate, sulfite, or nitrite) are supplemented into the food. Those chemical molecules may cause serious health hazards such as hypersensitivity, asthma, neurological damage, hyperactivity, and cancer. For this reason, scientist are investigating on the possibility to use natural compound including plant extract to preserve the nutritional and quality of the food. Plant extracts are engorged with various bioactive compounds expressing antioxidants and antimicrobials activities, such as phenolic compound. Those compounds are largely represented in numerous plants species and can be easily extracted. Moreover, phenolic compounds have witnessed of their beneficial properties to human health including in the prevention of cancer, diabetic and cardiovascular diseases, and treatment of numerous microbial infection. Those biological activities are related to their potent antioxidant and scavenging activity and antimicrobial activities. Thus, incorporation of plant extracts rich in phenolic compounds in foods can be considered in order to preserve the human health and food quality.

Keywords: Plant extract, antioxydants, antimicrobials, food preservation

THE POTENTIAL OF AVOCADO SEED POWDER AS A NATURAL ADDITIVE IN ICE CREAM: PHYSICOCHEMICAL, SENSORY AND DIGESTIVE PROPERTIES

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ABSTRACT

Large numbers of peels and seeds are produced during the industrial processing of avocados. As an inedible component of the fruit, the seeds are underused and thrown away as waste. The avocado seed, one source of phytochemicals, makes up 13–18% of the size of the entire fruit. Since Ice cream is one of the world's most popular frozen desserts today, its global consumption is on the rise. The objective of this research was to formulate a new flavored functional ice cream based on avocado seed powder (ASP). To carry out this duty, the powder has been added at different concentrations (0.25, 0.5, 0.75, and 1%), followed by freezing and analysis. According to the findings of various analyses, including FT-IR spectroscopy analysis to determine the functional groups, overrun, melting, texture, sensory characteristics, total extractable phenolic content (TPC), and antioxidant activity before and after stimulating in vitro enzymatic digestion, this study examined the impact of ASP on ice cream. The findings revealed a notable improvement in the characteristics of ice cream in general. Samples after digestion showed an increase in TPC content, which may be related to the polyphenols' gradual released during the digestive process. Unexpectedly, antioxidant activity data showed fluctuating results which can be explained by the effect of the digestion process on polyphenols' structure, chemical, and functional properties. In conclusive, the ASP can be used as flavouring agent in ice cream and can be used as functional ingredients to create functional dessert.

Keywords: Avocado seeds, ice cream, natural additives, flavoring agents, in vitro digestion

EXTENDING SHELF LIFE OF MINI BREADS BY DEVELOPMENT AND APPLICATION OF EDIBLE CELLULOSE-BASED FILMS

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ABSTRACT

The application of essential oils to edible films has the potential to increase the microbiological safety of foods. Edible coatings are a recent application in bakery products to extend shelf life and incorporate functional properties such as an antimicrobial and an antioxidant compound, where coating is an important step. In this study, essential oils found in laurel, clove, and oregano were applied to an edible film surface and used to treat preservatives and salt-free breads. Salt and preservative-free breads were prepared and baked according to the specified formulations. Ethanolic extractions of laurel, clove, and oregano were carried out using the ultrasonic-assisted extraction method. The edible film mixture was prepared by adding microcrystalline cellulose, NaOH, urea and distilled water. The synthesized films were stored in a polyethylene bag for further analysis. Just before the breads coating application, laurel, clove, oregano oils and a commercial preservative (10 mg/g bread) were sprayed onto the surface of the sterilized films. Bread samples were coated one by one with the films with different contents. The coated breads taken into sterile petri dishes were kept at room temperature for 15 days. Uncoating breads were also prepared as a control group. Yeast and mold count analyses were performed at 5-day intervals. Laurel oils slowed the growth of mold on the bread for 15 days longer than a commercial preservative and oregano oils, which lost its effectiveness after 5 days. Antimicrobial films containing laurel oils have the potential to improve the safety and quality of breads, thereby meeting the expectations of both food manufacturers and consumers who purchase them.

Keywords: Edible Cellulose-Based Films, Coating, Anti-microbial effect, Laurel oil, Bread.

CLIMATE CHANGE AND FOOD SECURITY

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ABSTRACT

Food security, which means dependable access to safe, affordable, and nutritious food is completely linked with climatic conditions of ecosystems. Weather describes the behavior of the atmosphere in the short term in a particular region, while the term climate describes the long-term more general weather conditions in larger areas. While a significant part of the sun's rays reaching the earth is reflected from the earth, our atmosphere sends some of the sun rays reflected from the earth back to the earth with the help of gases such as carbon dioxide, methane and water vapor, which are also described as greenhouse gases. With the greenhouse gases that act as insulation in this way, the average temperature on earth reaches 15 °C levels, allowing humans, animals and plants to continue their lives. This natural effect of greenhouse gases is called the "greenhouse gas effect". The amount of greenhouse gases in the composition of the atmosphere started to increase after the industrial revolution, and the rate of carbon dioxide in the atmosphere increased by 40% in this process. The burning of fossil fuels, especially coal, is the main responsible for the increase in the carbon dioxide ratio in the atmosphere, and due to this proportional increase, the earth's temperature has warmed over 1 °C nowadays. Climate change negatively impacts conditions that have devastating effects on food security, livelihoods and human health. While the effects of climate change on agricultural production are increasingly felt all over the world, most of the food production systems are pushed to the breaking point at the point of adequate and balanced nutrition for people. In addition to all these, climate change also threatens global food security through reduced availability of local agricultural products, price increases, logistics problems and production cuts due to raw materials. In short, climate change puts adequate and quality food production at risk. In this context, in order to avoid the worst climate change scenarios in the future, it is imperative that we must reduce the carbon emission rate and create a world where the average global temperature rise does not exceed 2 °C.

Keywords: Food security, climate change, carbon emission, food safety, greenhouse gases.

HURDLE EFFECT APPROACH IN DRYING OF DAIRY PRODUCTS

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ABSTRACT

Control of microbial growth in foods by various methods as cooling, pasteurization, acidification, fermentation and water activity reduction etc.is the major object of both consumer and food industry. Minimally processing of foods is a target of today's consumer and hurdle technology is an approach that was developed for precisely these reasons. Hurdle effect is a term used to define using different acting preservation methods for maintaining microbiological stability, safety together with protection of sensory and nutritional quality. Combination of preservation factors can be more effective in maintaining microbial stability and safety. In product point of view, use of two preservation methods together in a mild manner could be more effective microbiologically and more satisfactory in terms of product quality. The selection of coupling methods is crucial, it could be product-dependent and process dependent. The initial material of dairy products is raw milk. Raw milk is highly perishable due to its nutritious composition so requires rapid cooling below 6°C after milking under suitable sanitary conditions. Dairy products can deteriorate due to physical conditions that the product is exposed to and also chemical, enzymatic and microbiological means starting from milking to processing, packaging, distribution, storage and during consumption. The rate of these deterioration reactions depends mainly the state of the product and the conditions maintained. Refrigeration is mandatory for dairy products except for dried dairy products. Dried dairy products need dry, cool, odorless environment and low relative humidity conditions. Milk powder (skimmed or full-fat), whey powder, caseinates, yogurt powder and cheese powder are dairy powders having potential use in food industry. Dried cheeses, dried yogurts known as Kurut or Keş are produced for supplying extended shelf-life compared to their fresh-state and snacks of dairy origin are also produced by drying for novelty. In drying, water activity (aw) of the product is reduced by removal of water that slows down the possibility of microbial growth in the product, but not a complete inactivation is supplied. The aw tolerance of bacteria changes according their nature either being spoilage or pathogenic bacteria. Since pseudomonads are the major spoilage microorganisms in chilled stored products especially threats microbiological quality of dairy products with high water activity and pH near to neutral. Lowered aw (~0.97) by drying prevents their growth. There are various applications used in aw reduction both related and applied to food itself (hypertonic medium) and/or use of technologies (vacuum effect etc.) coupled with drying. In this study, use of hurdle technologies in drying of dairy products is covered.

Keywords: Drying, dairy products, hurdle effect, minimally processing, osmotic drying, packaging.

NATURAL PHENOLIC COMPOUNDS FOR THE CONTROL OF OXIDATION, BACTERIAL SPOILAGE, AND FOODBORNE PATHOGENS IN BEEF BURGER

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ABSTRACT

Burger is one of the most appreciated meat products worldwide for its ease of preparation considered a time-saving strategy in the modern lifestyle. Nevertheless, the grinding process of raw meat, leads to a less stable food matrix favoring microbial spoilage. The use of antioxidant molecules protect the grinded meat from oxidation and delay the microbial growth. Some natural extract possess antioxidant and antimicrobial activity; the experimental study carried out analyze the possibility of using olive mill wastewater polyphenolic extract as replacement of synthetic preservatives in beef burger. The experimental addition of polyphenolic extract leads to a reduction of lipid oxidation and an increase of antioxidant capacity of treated samples of about 60%. The substances added also successfully modulated spoilage microbial populations with an average growth reduction of 15%. The study proved that olive mill wastewater extracts are able to significantly improve oxidative and microbial stability of beef burger during cold storage.

Keywords: Hamburger, olive mill waste water, microbial spoilage, Tbars, Orac

THE PLACE OF FOOD INSPECTIONS IN LEGISLATION AND AN ANALYSIS OF THE FOOD INSPECTION STUDIES CARRIED OUT IN KASTAMONU

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ABSTRACT

Food safety is defined as following the necessary rules and taking precautions during the production, processing, storage, transportation and distribution stages of foods that will not harm people's health. In ensuring food safety, besides the food safety awareness of consumers and responsible behavior of companies, effective food inspection systems developed by governments are important. In Turkey, the inspection of foods offered for consumption within the scope of food safety is carried out in the countryside according to the legislation on food inspection. It is carried out by the Food and Feed Branch Units of the Provincial/District Directorates of Agriculture and Forestry. In recent years, important studies and inspections related to food inspections have been carried out in provinces/districts. However, there are not many studies on the information of these studies and the conclusions to be drawn from these audits. However, increasing the number of these studies, sharing the results obtained from these inspections and questioning the effectiveness of food inspections according to these inferences is an important issue, and doing this effectively is important for the society to reach safe food. In this study, the place of food inspection carried out by the Provincial/District Agriculture and Forestry Directorates in the legislation is briefly explained. The operation of the food inspection process in Kastamonu province is explained. In Kastamonu, the food inspection studies carried out by the Food and Feed Branch Unit of the Kastamonu Provincial Directorate of Agriculture and Forestry between 2015 and 2021 are presented in tables. It has been tried to understand the importance of food inspections in ensuring the food safety of the consumer. Based on the data of Kastamonu province, the importance of food inspections and suggestions for decision makers on this issue are presented.

Keywords: food, food inspection, food safety, consumer, Kastamonu

EVALUATION OF A PESTICIDE ENRICHED POTATO DIET (METRIBUZIN AND MANCOZEB) ON BIOCHEMICAL PARAMETERS AND KIDNEY HISTOLOGY IN THE WISTAR RAT

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ABSTRACT

Pesticides have made tremendous progress in controlling food resources and improving public health (especially in the fight against insects, vectors of diseases), and the flip side of the coin has emerged rapidly. Resistance phenomena in insects and reproductive disorders in birds have shown dramatically the limits and dangers of these substances to the environment, to ecosystems but also to human beings.The aim of our work is to show the effect of the consumption of potatoes contaminated by two types of pesticides, Metribuzin herbicides and Mancozeb fungicide in western Algeria on the biochemical parameters and kidney histology in the wistar rat.The experimental protocol includes different rat groups, control rats receive a potato diet that is uncontaminated by pesticides, and other groups of rats that receive a pesticide-contaminated potato diet, Metribuzin in two different doses (D1 1.3 mg / kg / day and D2 13 mg / kg / day) and Mancozeb (D1 5 mg / kg / day and D2 50 mg / kg / day) for three months. biochemical parameters measured are Glucose, urea, creatinine and clearance, kidney is removed for histological analysis. The results obtained show a significant hyperglycaemia, increased blood urea, Creatinine and clearance of Mancozeb and Metribuzin compared to control rats. Histological analysis of kidney shows an inflammatory infiltrate and architectural disorganization of kidney cells in rats consume both types of pesticides. Conclusion Mancoezb and Metribuzin have an effect on the biochemical parameters and disorganization of kidney architecture in the rat.

Keywords: Metribuzin, Mancozeb, Kidney, Wistar rat

PREFERENCE SCORES BETWEEN HYPERTENSIVE AND NORMOTENSIVE SUBJECTS

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ABSTRACT

This paper purports to determine whether there is a relationship between blood pressure levels and salty food preferences. A total of 215 subjects aged from 18 to 55 years, 110 normotensives and 105 hypertensive subjects were recruited. Preferences for salty foods were assessed by scores ranging from 0 "never tastes" to 5 "likes a lot," and thresholds of sensitivity to salty taste were assessed by the three alternatives forced choice test (3-FCA) with increasing concentrations. Statistical analyses were performed using StatView version 5 software. The significance level was 0.05. Our results indicate that the SBP in the whole sample was positively correlated with the PSF (r = 0.28; P = < 0.0001), the PSFF (r = 0.20; P = 0.0027), and the PTSF (r = 0.20; P = 0.003).). A negative correlation was observed between the DBP and the PSFF (r = ₋ 0.27; P = 0.0049), and the PTSF

Keywords: Salt, blood pressure, food preferences, comparison, scores.

SODIUM INTAKE BETWEN TREATED HYPERTENSIVE AND NORMOTENSIVE SUBJECT

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ABSTRACT

This paper aims to investigate if there is relationship between blood pressure and sodium intake. A total of 215 subjects aged from 18 to 55 years, 110 normotensives and 105 hypertensive subjects were recruited. Daily sodium intake was assessed by repeated 24-hour recall. Statistical analyses were performed using StatView version 5 software. The significance level was 0.05. The results of the statistical analysis indicated that dietary and sodium intakes of the hypertensive patients were within the normal range and that there was no significant difference between normotensive and hypertensive patients. However, no significant relationship was observed between caloric intake and health status. A significant negative correlation was observed in hypertensives between sodium intake and systolic blood pressure SBP ($r = - 0.21$; $p = 0.03$). Normotensives and hypertensives have similar amount of salt and energy intakes.

Keywords: Salt, blood pressure, sodium intake, comparison.

EVALUATION OF THE VIABILITY OF *Quercus canarıensıs* IN THE FOREST OF OULED BECHIH (SOUK AHRAS)

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ABSTRACT

The forest of Ouled Bechih is for forestry and ecotourism. Managed by the Conservation of Forests of Souk Ahras; this massif is formed specially by the cork oak (*Quercus suber*) and the zeen oak (*Quercus canariensis*) spreading over an area of 6582 ha. The quality of the stands can be given by the PHF index, a three-digit index that gives a judgment of the position of the tree in relation to the others and thus indicating the dominance and the stage of competition or exposure to the dominant stage. The objective of this work is to analyze the PHF index to assess the state of viability of zeen oak in the forest of Ouled Bechih to predict the future of this stand. The results obtained can be used for the management of this forest.

Keywords: PHF, zeen oak, vitality, management.

DEMOGRAPHIC STRUCTURE AND SPATIAL DISTRIBUTION OF HOLM OAK IN THE CHETTABA FOREST

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ABSTRACT

The holm oak is the main species of the state forest of Chettaba which covers an area of 2398ha where it occupies 1127ha. However, during the last decade, a particular attention and a scientific and forestry interest have been expressed for this species. Plantations of holm oak were studied in the Chettaba forest, the diameter at 1.30 m from the ground, the total height of holm oak individuals were measured on 4 plots according to an altitudinal gradient. The diameter and height structures were fitted to the theoretical Weibull distribution. According to this test of fit, the holm oak stand is characterized by a relative predominance of young and small diameter individuals, which suggests a good regeneration of the species. These results contribute to the improvement of the knowledge on the indicators of the current state of the holm oak stands which can be used as a basis in the management of the Chettaba forest.

Keywords: holm oak, Weibull distribution, demographic structure, spatial structure.

DIVERSITY AND ENHANCEMENT OF NWFPS FROM PLANT GROUPS IN THE FOREST OF TESSER MRAMET OF THE MONTS DE TLEMCEN

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ABSTRACT

The general objective of this study is the sustainable management of the forest ecosystems of the Tlemcen mountains with a view to lasting conservation of floristic biodiversity, to promote these non-timber forest products (N T F Ps). A random inventory was carried out and Dendrometric measurements focused on height and diameter at 1.30m (DBH). In this study, diversity indices were calculated. The results obtained made it possible to note that the average values of specific richness, of the diversity index of Shannon (H') and of equitability of Piélou (E) are respectively of 7 ± 2 species /plot, H'=0.5 et E=0.2. The average density of woody plants is 1100 individuals/ha with an average basal area of 1.8 ± 0.5 m 2 /ha. These results contribute to evaluating the floristic diversity of the forest and the improvement of knowledge on the state indicators of the natural woody populations that can serve as a basis for the management of NWFPs of forest species in the different economic and social domains.

Keywords: Diversity, NWFP, Sustainable management

FLORISTIC COMPOSITION AND STRUCTURE OF THE ZOUAGHA FOREST (EASTERN ALGERIA)

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ABSTRACT

The general objective of this study is the rational management of forest ecosystems for the sustainable conservation of floristic biodiversity. Two types of analysis are carried out: structural analysis and analysis of the principal tree species. The dominant woody species are Quercus suber, Quercus canariensis and Quercus afares. The cork oak is the principal species in the Zouagha forest (East Algeria). The average density of this species in this forest is 375 individuals/ha. The structure shows that the trees in the height classes between 2 and 6 m have a very high density, which is evidence of natural regeneration. The total structure indicates that smaller trees are more abundant than larger ones ($17.5<d\leq27.5$cm). In effect, this work provides a database for the forest, but it represents only one facet to be considered for its protection and restoration.

Keywords: Cork oak, Zouagha, Structure, Principal species

ADAPTATION OF THE HOLM OAK

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ABSTRACT

Our work consists in quantifying the content of total soluble sugars and chlorophyll in the leaves of holm oak (*Quercus ilex* L.) seedlings derived from acorns of three varieties from eastern Algeria (Tébessa, Batna and Souk Ahras); the latter have undergone physical and physiological treatments before germination. The content of total soluble sugars is higher in the leaves of the seedlings of the Tébessa variety, derived from acorns without pericarp. Concerning total chlorophyll, the highest content is also obtained for the same variety but for the treatment of germinated acorns; whereas the ratio of chlorophyll a/b is higher for the Batna variety (acorns without pericarp). The accumulated amounts could be related to the tolerance level of the environmental conditions, contributing to the maintenance of cell turgidity, created by the osmotic adjustment for which soluble sugars are responsible.

Keywords: Quercus ilex, soluble sugars, chlorophyll, adaptation.

ASSOCIATION OF MC4R AND CACNA2D1 GENE POLYMORPHISMS WITH CARCASS CHARACTERISTICS AND MEAT QUALITY IN TURKISH NATIVE CATTLE BREEDS AND THEIR CROSSBREDS WITH THE HOLSTEIN-FRIESIANS

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ABSTRACT

Carcass characteristics and meat quality are economically important traits in cattle breeding. Concerning the genotypic background of these phenotypic traits, polygenic inheritance should be taken into consideration and thus multiple genes may have significant effects. Although there are cattle breeds specifically developed for beef production, native breeds and their crosses with culture breeds still have a substantial share in meat production. On the other hand, these native breeds are important constituents of Turkish national biodiversity. Therefore, this study aimed to evaluate the effects of SNPs of bovine Melanocortin-4 receptor (*MC4R*) and calcium voltage-gated channel auxiliary subunit alpha-2 delta 1 (*CACNA2D1*) genes on beef yield and quality traits in Turkish native cattle breeds. In this context, a total of 102 bulls including Turkish Grey Steppe (*n*=28), East Anatolian Red (*n*=36), Zavot (*n*=9), and their F1 crossbreds with the Holstein-Friesians (*n*=29). All animals had the same environmental and feeding conditions. The phenotypic traits measured were slaughter weight, hot carcass weight, chilled carcass weight, dressing percentage, chilling loss, carcass fatness score, carcass pH, and marbling score. DNA was isolated from whole blood by the standard phenol-chloroform–isoamyl alcohol extraction method. In this study, g.59164671G>C polymorphism in the *MC4R* gene (c.856C>G) and g.38638971A>G polymorphism in the *CACNA2D1*gene (c.2027A>G) were evaluated (rs108968214 and rs448872602, respectively) by using the PCR-RFLP. The gene and allele frequencies, Hardy–Weinberg equilibrium, gene heterozygosity, polymorphism information content, the effective allele number, the fixation index, the level of possible variability realization, the Shannon-Weaver diversity index were estimated. Association analysis was performed by the least-squares method as applied in a general linear model by selecting statistical models based on the adjusted coefficient of determination values with Tukey's test as the post-hoc comparison. Results revealed that the GG genotype has a remarkably low frequency in all examined breeds. Polymorphism information content ranged from 0.2446 to 0.3699 and the effective allele number ranged from 1.3931 to 1.9616. The highest gene heterozygosity was observed in Turkish Grey Steppe cattle (0.4898) whereas the highest level of diversity was observed in the Holstein crossbreds (Shannon-Weaver diversity index=1.041). In this study, a novel effect of the g.38638971A>G polymorphism of the bovine *CACNA2D1* gene on marbling score ($P<0.05$). Individuals with the GG genotype had a higher marbling than those with the AA and AG genotypes. There was no significant association between the *MC4R* genotypes and any of the phenotypic traits analyzed. BTA 24q27 and BTA 4q18, where the *MC4R* and *CACNA2D1* were located, respectively, are close to genomic regions for some crucial QTLs associated with carcass characteristics and meat quality. Hence, novel associations of *MC4R* and *CACNA2D1* genotypes with these traits are not surprising. To the best of our knowledge, this is the first study reporting a possible association with the *CACNA2D1* g.38638971A>G genotypes and bovine marbling. Moreover, the breeds studied in this study are the national biological wealth of Turkey and thus the present genetic evaluation

may be useful for further research on the corresponding subjects, especially for the bovine *CACNA2D1* gene.

Keywords: cattle, MC4R, CACNA2D1, carcass traits, association analysis

THE CHLORPYRIFOS FOUND IN HONEY BEE COLONY FOOD STOCKS IS CYTO- AND GENOTOXIC ON THE *Allium cepa* MODEL SYSTEM

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ABSTRACT

Chlorpyrifos is pesticide widely used in agriculture. In Bulgaria, it is applied in the treatment of vegetable, technical, cereal, etc. crops, including rape and other plants important for honey bees and beekeeping. It was recognized as a reason for honey bee death rate in some regions in Bulgaria which intensify the need for more detailed studies of its toxic effect. In order to investigate its toxicity, samples of bee hive food stocks – honey, wax and pollen have been collected on signals for high mortality and severe loss of bee colonies in some regions of Bulgaria. The pesticide residues have been determined by a chemical chromatographic analysis (via RESIDUE 19/04 LC-MS / MS methods). The chlorpyrifos has been found to be present in samples of food stocks in the bee colonies from Sliven (0.010 – 0.030 mg/kg), where during the last year 2021 the honey bee summer colony losses have been calculated as more than 90%. Based on these results, the present study aims to characterize the impact of the chlorpyrifos on the cell division rate in the *Allium cepa* L. root meristem and to analyze its potential genotoxic effect in laboratory conditions. Data achieved in the current investigation reveal that the insecticide chlorpyrifos has a cytotoxic and genotoxic effect on the model system *Allium cepa*. It causes chromosomal aberrations such as chromosomal bridges, acentric fragments, lagging chromosomes, and micronuclei. The highest percentage of chromosomal abnormalities has been found for the maximum permissible concentration of the tested pesticide. The toxic effect of the pesticide found by the usage of the model system is indication of its genotoxic potential also in relation to honey bees. Future studies with *Apis mellifera* in situ will give more clarity on this problem.

Keywords: Pesticides; chlorpyrifos; cytotoxicity; genotoxicity; *Allium cepa* model system; honey bee colony losses

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (*Apis mellifera* L.) in Bulgaria".

NEONICOTINOIDS FOUND IN THE HONEY BEE COLONY POLLEN HAVE CYTO- AND GENOTOXIC EFFECT ON THE *Allium cepa* MODEL SYSTEM

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ABSTRACT

Neonicotinoids are a major class of new insecticides developed over the last 30 years. Their use is associated with a number of adverse environmental effects, including increased mortality of honey bees in areas with arable crops. The potential genetic risk of neonicotinoids requires extensive study of their genotoxicity. By use of a chromatographic analysis residues of some neonicotinoids (including imidacloprid – 0.013 mg/kg) and other pesticides (Cyprodinil – 0.047 mg/kg and Metholachlor , metholachlor-S – 0.015 mg/kg) were detected in the floral pollen, which is a part of the food stocks in honey bee hive. The pollen samples were collected on signals for high mortality and severe loss of bee colonies in some of apiaries of the Ruse region. The aim of the present study was to analyze the potential toxic effect of the neonicotinoid Nuprid 200 SL and Calypso 480 SC with active substances imidacloprid and thiacloprid, respectively, on the *Allium cepa* plant system. Data from the experimental work done indicated that the studied neonicotinoids reduced the mitotic activity and increased the frequency of the chromosomal aberrations in the *Allium cepa* root meristem cells. The tested solutions of these pesticides caused a wide range of anomalies associated with disorders in the formation of the cell's division apparatus and the integrity of chromosomes, which clearly demonstrated their genotoxic potential. A positive relationship was found between the established frequencies of chromosomal aberrations and the concentration of the pesticides. The results obtained regarding the cyto- and genotoxicity of the studied in laboratory conditions neonicotinoids could be accepted as a serious signal for the potential danger for the honey bee viability. Future studies of the neonicotinoids' toxic effects on *A. mellifera in situ* would help to clarify their role in the increasing honey bee colony losses in some agricultural regions Bulgaria.

Keywords: Neonicotinoids; honey bee colony losses; *Allium cepa* model system, cytotoxicity, genotoxicity

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (*Apis mellifera* L.) in Bulgaria".

HAVE THE PESTICIDES ACTELLIC 50 EC AND RIVAL CYTO- AND GENOTOXICITY ON THE *Allium cepa* L. MODEL SYSTEM?

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ABSTRACT

Xenobiotics are artificial compounds, which are not biodecomposed for a long period, pollute to a great extent the environment and have a toxic effect on living organisms. *The potential genotoxic effect of these compounds can be established by studying their mutagenicity.* In the present study, the general toxic, cytotoxic and mutagenic effect of two pesticides, which are considered as xenobiotics in the environment - Actellic 50 EC (with the active substance pirimiphos-methyl) and Rival (with the active substance propamocarb hydrochloride) were analized on *Allium cepa* L. root meristem cells. The two agrochemicals have been used in agricultural practice against pest insects on vegetation, the grain and soil pathogens in cultivation bulbs and in the seedlings for green house. The data of studying showed that pesticides Actellic 50 ЕК (in concentration 10 µg/l and 60µg/l) and Ривал ((in concentration 40 µg/l and 80 µg/l) had cytotoxic effects and decrised the cell division. Genotoxic effect was expressed in the initiation the wide spectrum of chromosome aberrations, such as: anaphase and telophase bridges; chromosomal fragments; lagging and “vagrant” chromosomes and so on. It is established the incrising frequency of the cells with micronuclei, which was also the evidence for genotoxic potential on researching xenobionts. The future analyses with another models and methods for genetic analyses would contribute an additional clearness concerning the mechanisms of toxic effect of the investigated pesticides.

Keywords: Pesticides; Actellic 50 EC; Rival; cytotoxicity; genotoxicity; Allium cepa model system;

ACKNOWLEDGMENTS:

This study was supported by the Scientific Research Fund of University of Plovdiv “Paisii Hilendarski” through the contract FP-21-BF-008 “Integrated biomarkers on local economically important fish species in the Black Sea applied for health risk assessment and ecological monitoring of priority toxic substances according to the Marine Strategy Framework Directive (Directive 2008/56/EC)”.

PRELIMINARY DATA ON DNA DAMAGE IN HEMOCYTES AND SPERMATOZOA OF DRONES FROM APIS MELLIFERA POPULATIONS WITH HIGH MORTALITY RATES

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ABSTRACT

Honey bee colony loss is an alarming global phenomenon for which science is still searching for an explanation. The species is characterized by high environmental pollution sensitivity and this is the reason to be used for different biomonitoring studies. The high mortality of honey bees all over the world is associated with various causes – the genetic pollution in the adapted local populations and their replacement with hybrids, the increasing number of diseases and new pathogens, the environmental pollution with agrochemicals, heavy metals and etc., the global climate change. There is increasing evidence of the negative role of various pesticides widely applied in agricultural practices. The focus of this study was to assess the level of DNA damage by comet assay in honey bee (*Apis mellifera*) populations with an established high mortality rate. The study included four populations from the territory of Bulgaria – Vinitsa, Dimovtsi, Plovdiv, and Krasnovo (as a control). Differently to the control, high honey bee mortality was reported in the other three populations, and pesticide residues in samples of bees and food stocks in the hives detected by a chromatographic analysis. In order to investigate the potential toxic effect of the pesticides, hemolymph and spermatozoa of drones were collected and tested. The comet parameter Tail intensity (TI%) showed increased values for both – hemocytes and spermatozoa. This fact proves the presence of a genotoxic effect as a result of the bioaccumulated pesticides in the studied colonies. The circumstance that environmental pollution with agrochemicals negatively affects the hereditary apparatus of the spermatozoa reveals the danger of deterioration of the drone reproductive capacity and subsequently a decrease in the number and strength of honey bees in the colony.

Keywords: Apis mellifera, DNA damage, comet assay, pesticides, colony losses

ACKNOWLEDGMENTS:

This study was supported by the National Research Fund of Bulgaria through the contract KP-06-H5112/2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (Apis mellifera L.) in Bulgaria"

CYTO- AND GENOTOXIC EFFECT OF HEAVY METALS ON MARSH FROG (*Pelophylax ridibundus* PALLAS, 1771) IN POLLUTED AREA IN SITU

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ABSTRACT

The amphibians have a big potential as bioindicators as a key element in toxic substances transfer between aquatic and terrestrial habitats and their role of prey or predator. The marsh frog *P. ridibundus* is an unprotected anuran with the widest distribution in Bulgaria and in recent years it has been used as a successful bioindicator for anthropogenic pollution. The nuclear abnormalities (NAs) in erythrocytes of the marsh frog (*P. ridibundus*) including micronuclei and DNA damage, measured with comet assay, have been studied to assess the cytotoxic and genotoxic effect in heavy metal polluted area *in situ*. In this study we assess the cyto- and genotoxic potential of the polluted waters (Chaya River), close to the lead-zinc smelter near Plovdiv (Bulgaria), situated in an area that has been contaminated with heavy metals for 60 years. Frogs from Strandzha Natural Park (Veleka river) were used as a negative control. The assessment of peripheral blood smears dyed with acridine orange have shown the highest NAs frequency of the following types: notched nuclei, nuclear buds and blebbed nuclei. The significantly higher values ($P \leq 0.0001$) of mean Total NAs frequency, micronucleus frequency and comet parameter Tail Index (TI%) in the impact area, compared to these from the control region, demonstrate a clear cyto- and genotoxic effect on amphibians' blood cells *in situ*, which shows that the anurans in the polluted region are vulnerable to chronic exposure of polymetallic contamination.

Keywords: nuclear abnormalities, micronuclei, DNA damage, comet assay, heavy metals, Pelophylax ridibundus

PRINCIPLES FOR DISCRIMINATION AND REASONS FOR CONSERVATION OF LOCAL BULGARIAN HONEY BEE *A. M. rodopica*

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ABSTRACT

The conservation of genetic polymorphism in the gene pool of local populations is a priority goal of many biological studies and activities, focused on the relationship between genetic variability and the vitality of honey bees. There are proofs that the local bees survive longer and are better adapted to the local environment, including pathogens and diseases which mean that the genetic diversity of local subspecies, ecotypes and populations should be preserved. Some basic steps for the conservation of the national genetic resource of *A. m. rodopica* could be pointed out by usage the local Bulgarian honey bee as a model: identification of local honey bee populations for certain territories; specifying their valuable biological, behavioral and productive qualities; specifying genetic markers in accordance with the established valuable qualities, which should be the scientific basis of activities for conservation of the national genetic resource and developing together with government institutions mechanisms at national level for the protection of the local bees. The distribution areas of the local Bulgarian honey bee, which is the subject of the National Bee Breeding Program 2021, were established. It was found that the local Bulgarian honey bee is characterized by valuable qualities – high levels of queen fertility, high productivity, good overwintering, highly expressed hygienic behavior, and low levels of defensive and swarming behavior. Local Bulgarian honey bee could be discriminated from other European subspecies and origins by morphometric, ethological, isoenzymical and different DNA markers. There were characterized 6 enzymic, 3 mt DNA and 25 microsatellite DNA markers which could be successfully used for *A. m. rodopica* discrimination. The presented data are an appropriate scientific base for developing a system of measures for conservation of the national genetic resource of *Apis mellifera rodopica* and for conducting activities on studying the risk factors for honey bees health and viability.

Keywords: Apis mellifera rodopica, conservation, genetic markers

ACKNOWLEDGMENTS: This study is supported by the National Research Fund through the contract KP-06-H5112 / 2021 "Complex assessment of genetic and environmental factors related to the losses of honey bees (Apis mellifera L.) in Bulgaria".

PHENOTYPIC VARIABILITY OF SOME HUMAN DESCRIPTIVE AND BEHAVIOR CHARACTERISTICS

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ABSTRACT

The phenotypic diversity relating to some descriptive features of the human hand in a complex with the basic personality traits, as well as the possible relationships between them were studied in a sample of 945 individuals. Using a self-reported questionnaire, data were collected about the following descriptive features of the human hand: hand dominance (left or right); hair on back of hand; hairiness of the middle phalanges and a bent little finger. The basic characteristics of personality – extraversion, agreeableness, conscientiousness, emotional stability and intellect/imagination – were studied through the Goldberg's "Big-Five factor markers, International Personality Item Pool – IPIP" questionnaire, adapted to the Bulgarian culture. The frequencies of the investigated phenotypic groups and statistic relations were calculated by usage of descriptive statistics and SPSS software. Statistically significant variations in the mean values of the personality factors were observed in relation to the descriptive traits studied, as follows: higher levels of conscientiousness and agreeableness in people with a dominant right hand ($p = 0.025$ and 0.053, respectively) and higher levels of emotional stability in people with a dominant left hand ($p = 0.052$); higher levels of emotional stability and lower levels of extraversion in people with hair on back of hand ($P = 0.012$ and 0.064, respectively); higher levels of intellect/imagination in people with hairiness of the middle phalanges ($p = 0.00$); higher levels of conscientiousness and emotional stability in persons with a straight little finger ($p = 0.004$ and 0.05). The results of the investigation provide information on phenotypic diversity regarding the studied descriptive and behavior characteristics, as well as on the established correlations between them. Future researches in this field would enrich the information concerning the polymorphism in the human populations and the feature of their phenotypic profile.

Keywords: phenotypic variability, human descriptive traits, human personality traits

FACTORS ASSOCIATED WITH SUCCESSFUL VAGINAL BIRTH AFTER CESAREAN SECTIONS

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ABSTRACT

Vaginal birth after cesarean section (VBAC) increases the chance of subsequent vaginal deliveries and reduces the repeat cesarean section (CS) rate with a certain postoperative morbidity. The aim is to detect the outcome of VBAC during the second birth order in a tertiary hospital in Albania. A total of 100 women eligible for trial of VBAC at the Department of Obstetrics and Gynecology, University Hospital "Koço Gliozheni", Tirana, Albania, in the period 2015-2019 were included in this study. Clinical data were collected before and after delivery. Logistic analysis and odds ratio (OR) showed that body mass index (BMI) ≤25 kg/m2 (OR 1.6; $P < 0.01$), height ≥150 cm (OR 1.8; $P < 0.01$), gestational age ≤40 weeks (OR 2.2; $P < 0.01$), and inter-delivery interval ≥2 years (OR 1.7; $P < 0.01$) were significantly associated with successful VBAC. Also cervical dilatation ≥4 cm (OR 1.9; $P < 0.01$), and duration of active phase of labor ≤7 h (OR 1.7; $P = 0.02$) were significantly associated with successful VBAC. VBAC is safe in properly selected cases. Careful decision of labor augmentation and spontaneous onset of labor in women with previous LSCS increase the success of VBAC.

Keywords: Outcome, previous cesareani vaginal birth factors

ASSOCIATION OF PSORIATIC ARTHRITIS AND METABOLIC SYNDROME

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ABSTRACT

Psoriatic arthritis is associated with higher prevalence of metabolic syndrome (MS). The prevalence of MS varies according to the studied population as it suffers influence of genetics, aging, sedentary behaviour and diet. Objective: To study the prevalence of MS in patients with psoriatic arthritis and the influence of psoriasis variables on its appearance in Regional Hospital of Vlora, Albania during 2017-2019. Methods: A group of 70 psoriasis patients were studied for MS and compared with 70 controls. Psoriasis type, nail involvement, psoriasis extension measured by PASI (Psoriasis Area and Severity Index) were obtained through physical examination and history of previous myocardial infarction, angina and stroke were obtained through chart review. Results: Comparison of MS prevalence in psoriasis patients (49.0%) with controls (35.0%) showed difference with p=0.04; OR=1.8 (95%CI=1.02-3.23). Patients with psoriasis had higher body mass index (p=0.02), higher systolic blood pressure (p=0.007), lower HDL cholesterol (p=0.01), higher glucose (p=0.04), higher waist circumference (p=0.003) and more angina pectoris (p=0.03; OR=2.5; 95% CI=1.04-6.15) than controls. When psoriasis sample with and without MS were compared, those with MS were older (p<0.01), had disease onset at older age (p=0.02), more tobacco exposure (p=0.02), and a tendency to have less scalp involvement (p=0.06) in univariate analysis. Logistic regression showed that only age and scalp involvement were independently associated with MS in the psoriasis sample. Conclusion: In our psoriasis sample, MS prevalence is high and the items that deserve more attention are central obesity, low HDL, hypertension and smoking habits. In the psoriasis group, MS was associated independently with older age and less scalp involvement.

Keywords: psoriatic arthritis, metabolic syndrome, metabolic diseases

MONONUCLEOSIS-LIKE ILLNESSES DIAGNOSTIC EVALUATION

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ABSTRACT

Clinicians face a diagnostic challenge when a patient with the classic fever, pharyngitis, and lymphadenopathy triad of infectious mononucleosis has a negative "spot" heterophile antibody test. This screening test, although commonly considered sensitive for the presence of Epstein-Barr virus (EBV) infection, may be negative early after infection. A growing number of pathogens have been reported to cause heterophile-negative mononucleosis-like illnesses, including cytomegalovirus (CMV), human herpesvirus 6 (HHV-6), human immunodeficiency virus (HIV), adenovirus, herpes simplex virus (HSV), *Streptococcus pyogenes*, and *Toxoplasma gondii*. Other infectious and noninfectious disorders also may present in ways that mimic mononucleosis, but fail to generate EBV's archetypal triad of clinical findings. A systematic approach to the diagnosis of mononucleosis-like illnesses ensures that conditions warranting specific therapy are distinguished from others requiring only supportive care. When a patient presenting with pharyngitis, lymphadenopathy, and fever has negative results on both HetAb and EBV-specific serologic tests, the clinician is faced with a diagnostic challenge. Consideration must be given to the many potential causes of heterophile-negative mononucleosis-like illness, with confirmatory testing driven by a careful appraisal of the patient's clinical course, history of exposures and risks factors, and physical examination.

Keywords: Epstein-Barr virus, Infectious mononucleosis, Mononucleosis-like illness

HEALTH WORKERS' PRACTICE IN THE DIAGNOSIS AND MANAGEMENT OF LESHMANIASIS CASES

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ABSTRACT

Leishmaniasis is a major public health problem. While cutaneous leishmaniasis (CL) is the most common form of the disease, visceral leishmaniasis (VL) is the most serious and almost always fatal if left untreated. Early diagnosis and prompt and effective treatment were the first strategies recommended by the World Health Organization to control this disease. In the Eastern Mediterranean Region (EMR), WHO is supporting ministries of health through a strategic plan that focuses on training programme managers and health workers in diagnosis and case management. With this perspective, this study aims to assess the practice of health workers in the diagnosis and management of leishmaniasis cases. It is a cross-sectional study conducted in active leishmaniasis foci in central Morocco among health professionals working in public sector primary health care facilities, using random sampling. The sex ratio (male to female) was 44.3:55.7. Most respondents (67%) were under 40 years of age. Regarding the professional category of the respondents, the majority (74.9%) was nurses and (9.8%) were doctors. All participants had seen a case of leishmaniasis during their professional career. The majority of respondents (98.6%) did not participate in any form of active or participatory diagnosis. (67%) stated that they started treatment of cutaneous leishmaniasis based on clinical diagnosis only. In addition, the majority of the respondents (88.7%) were not involved in raising awareness about the disease. Furthermore, the 84.7% of participants did not use the information system in case management. However, the 89.6% of them were aware that an epidemiological investigation will be mandatory for any confirmed case. (85.5%) stated the need for training in the diagnosis and management of leishmaniasis cases. The practices of health professionals are inadequate, which requires research into the factors influencing this level of practice in order to intervene effectively.

Keywords: *Leishmaniasis,* diagnostic, case management, health workers, practice, experiment.

MANAGEMENT OF NEONATAL ENCEPHALOPATHY

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ABSTRACT

Neonatal encephalopathy (NE) is a syndrome that can occur in newborn babies in which neurological function is disturbed. The most frequent cause of NE is lack of oxygen to the baby at some point during pregnancy or birth. NE is associated with high mortality and morbidity. Factors predisposing to NE can be antenatal, perinatal, or a combination of both. Antenatal maternal factors, familial factors, genetic predisposition, hypoxic ischemic encephalopathy, infections, placental abnormalities, thrombophilia, coagulation defects, and metabolic disorders all have been implicated in the pathogenesis of NE. At present, therapeutic hypothermia is the only treatment available, regardless of etiology. 50–80% of cases of NE are due to acute hypoxic ischaemia secondary to perinatal asphyxia. Perinatal asphyxia is characterised by impairment of gas exchange between the placenta and the fetus resulting in hypoxaemia, hypercapnia accompanied by metabolic acidosis and clinically defined as "failing to initiate or maintain regular breathing at birth". NE secondary to confirmed intrapartum hypoxia-ischaemia with umbilical cord blood acidosis, clinical encephalopathy, electroencephalographic (EEG) abnormalities and characteristic patterns of injury on brain MRI is termed as hypoxic-ischaemic encephalopathy (HIE); it is often associated with multi-organ impairment. Other possible causes of NE include neurometabolic disease, genetic conditions, infection (meningitis, TORCH etc), drug exposure, neonatal epilepsy syndromes, nervous system malformation and neonatal stroke. The requirement for investigation to exclude these other causes will depend on the presentation, history and clinical features of the individual case. Recognizing the etiology of NE involved can also guide investigations such as metabolic and sepsis workups to ensure optimal management and may allow the development of targeted adjunctive therapies related to the underlying mechanism and develop preventative strategies.

Keywords: Neonatal encephalopthy, etiology, antenatal, perinatal, targeted adjunctive therapies

THE PROCEDURE OF PUSHING DURING THE SECOND STAGE

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ABSTRACT

There are different methods used in literature for the treatment of the 2nd stage of labor. The practice of encouraging sustained, directed (Valsalva) bearing down efforts during the second stage of labour is widely advocated in many delivery wards. The alternative is supporting the women's spontaneous pattern of expulsive efforts (exhalatory bearing down efforts). These two practices have been compared in several trials. The spontaneous pushing resulted in three to five relatively brief (4-6 seconds) bearing-down efforts with each contraction, compared with the 10-30 second duration of sustained bearing-down efforts, accompanied by breath holding. The latter method results in somewhat shorter second stages of labour, but may cause respiratory-induced alterations in heart rate and stroke volume. If the woman is lying flat on her back, it may be associated with compression of the aorta and reduced blood flow to the uterus. In the published trials mean umbilical artery pH was lower in the groups with sustained bearing down, and Apgar scores tended to be depressed. The available evidence is limited, but the pattern emerges that sustained and early bearing-down efforts result in a modest decrease in the duration of the second stage, but this does not appear to confer any benefit; it seems to compromise maternal-fetal gas exchange. The shorter spontaneous pushing efforts seem to be superior. In many countries the practice of fundal pressure during the second stage of labour is common. It is meant to expedite the delivery, is sometimes performed shortly before delivery, sometimes from the beginning of the second stage. Apart from the issue of increased maternal discomfort, there is suspicion that the practice may be harmful for the uterus, the perineum and the fetus, but no research data are available. The impression is that the method is at least used too often, with no evidence of its usefulness.

Keywords: labour, spontaneous pushing, evidence

MAIN CAUSES OF BLINDNESS AND VISUAL IMPAIRMENT IN CHILDREN AT THE MED 6 MARRAKECH UNIVERSITY HOSPITAL CENTER

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ABSTRACT

This study aims to determine the main causes of blindness and visual impairment in children consulting at the Mohamed 6 university hospital center in Marrakech. And it also proposes to contribute to the implementation of actions that make it possible to fight against avoidable blindness and visual impairment. A survey was conducted at the diagnostic center and at the ophthalmology department of the Mohamed 6 University Hospital in Marrakech, among children under 15 suffering from blindness or visual impairment. It was conducted using the standard WHO/PBL eye examination protocol. Of all the children examined, we detected 30.4% with visual impairment caused by cataract followed by glaucoma (23.9%) then refractive error (17.4%). The majority of these cases have a congenital form of the above causes. According to the results, the hereditary factor plays a very important role in most children suffering from blindness and visual impairment caused by cataracts, glaucoma or refractive error. The majority of children suffer from avoidable blindness and visual impairment if the causes are treated effectively and efficiently. Where does the importance of this study come from in order to carry out the strategies of the Ministry of Health and Social Protection in Morocco for the fight against these major eye problems.

Keywords: Blindness, Visual impairment, Child, causes, UHC Med 6, Marrakech

SEXUAL AND REPRODUCTIVE HEALTH EDUCATIONAL NEEDS AND RELATED FACTORS AMONG UNIVERSITY STUDENTS IN EDİRNE, EASTERN THRACE

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ABSTRACT

The sexual and reproductive health education and training needs of university students were evaluated. To understand the necessity of reproductive health education and training for young people by exploring the attitudes and perceptions of university students in Edirne towards reproductive health. Determining the needs of young people about sexual health; was to raise awareness. From May 2022 to July 2022, 642 Trakya University students in Edirne participated in our study. Of the 567 students who provided valid answers, 57.03% were female and 42.97% male. To the participants; Some of their socio-cultural characteristics, their demands for reproductive health services, their attitudes and experiences towards sex, and whether they were exposed to audio-visual materials were asked. Participants' knowledge and awareness about sexual health and sexually transmitted infections (STI; AIDS, Syphilis, etc.), HPV (Human Papilloma Virus) and cervical cancer were evaluated. 14.86% of them had graduated from health high schools. 85.14% had a background other than health high schools. A total of 21.2% of the respondents had previously received reproductive health training. The majority of the students supported school-based reproductive health education and also learned about sexual health mainly from books, schoolmates and the internet, especially on social media. 19.2% of the survey participants opposed premarital sexual behavior and 29.1% were able to identify the types of sexually transmitted infections listed in the survey. Although 92.2% knew how HIV was transmitted, only 64.7% knew when to use a condom and 70.3% knew that condom use could reduce the risk of HIV infection. Reproductive health education lags behind the current attitudes and demands of university students. Although students' attitudes towards sexual issues were liberal, their education on reproductive health and STI / AIDS, HPV, Cervical cancer was still limited. For this reason, it is necessary to provide effective and quality reproductive health education and training to young people, especially in universities. Suggested sexual and reproductive health education programs, which include various interactive activities, should be used effectively in university-based practices under the leadership of health professionals and academics who are experts in their fields.

Keywords: Reproductive Health, Reproductive Health Education, Sexuality, University Students

RELATIONSHIP BETWEEN STRESS LEVEL AND VAGINITIS SYMPTOMS; A STUDY WITH TRAKYA UNİVERSİTY HEALTH SCIENCES UNDERGRADUATE STUDENTS

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ABSTRACT

The aim of our study was to determine the relationship between stress levels and vaginitis symptoms in 2021 university students at Trakya University Health School. In our study, we used a cross-sectional approach. Data were collected through face-to-face interviews with 583 female students at Trakya University Health School between February 2022 and June 2022. The sociodemographic characteristics of the participants were recorded. Those with chronic gynecological disease, psychiatric disease, married, and those who applied to the hospital due to vaginitis were not included in the study. The study was carried out on a voluntary basis. Stress levels of the participants Depression Anxiety Stress Scale (DASS 42) was used. Vaginitis symptoms were evaluated with the "Genital Hygiene Behavior Scale". Approximately one-third (n= 192) (32.93%) of the 583 participants were experiencing stress. Among the participants evaluated with DASS 42; With 115 female students (67.04%), moderate stress level was the highest percentage. Participants; 40 (20.83%) were scored mild, 37 (19.27%) scored high. Most of the participants experiencing moderate and high levels of stress (84.04%); had experienced vaginitis symptoms in the last 1 year. The statistical test results obtained were significant (p= 0.019). What is remarkable for our results; in younger women, vaginitis symptoms were increased during periods of stress. However, these symptoms caused no hospital admissions, both in terms of age and because the symptoms did not exceed three days. If abnormal vaginal discharge is ignored, serious consequences can occur. Abnormal vaginal discharge can cause serious complications such as sepsis, infertility, and chronic pelvic pain. Stress seems to be one of the triggering factors. Being able to manage stress well will play a preventive role in the formation of vaginal discharge in young women. More awareness should be created on stress and vaginitis in young women. Early recognition of vaginitis symptoms and prompt initiation of treatment; It is important to prevent possible complications.

Keywords: Genital Hygiene, Genital Hygiene Behavior Scale, Stres, Vajinit, Young Female, Depression Anxiete Stress Measurement (DASS 42)

VAGINISMUS - IS IT POSSIBLE TO SCREEN YOUNG WOMEN?

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ABSTRACT

Despite its universal prevalence, it is observed that vaginismus has not been adequately studied in young women in the premarital period. Vaginismus is considered to be a spasmic response that underlies most of the symptom-focused behavioral and cognitive therapy approaches that have dominated the sex therapy field to date. However, there is a prevailing opinion that it would be more accurate to think of vaginismus as multifactorial. The symptom-only approach has been criticized as reductionist. Various physical, psychological, social and cultural factors contribute to vaginismus. Therefore, considering that this disorder is multidimensional and that more attention should be paid to all biological, psychological and social dimensions in its treatment, this study was conducted to evaluate the bio-psychological factors contributing to vaginismus in our country. This descriptive cross-sectional study was conducted with the students of Trakya University in Edirne in 2022. Volunteer participants who were sexually active (with or without penetration) were included as a condition of participation in our study. Those who were married and had a known psychiatric illness were not included in the study. First of all, 275 female students participated in the study, but 218 students completed all the questions. In this study, a preliminary diagnosis of vaginismus was made by applying a questionnaire by the specialist. Demographic and gynecological information forms were used among the data collection tools. The "Vaginal Penetration Cognition Questionnaire", which is a valid and reliable assessment tool, was included. The first version of the "Vaginal Penetration Cognition Questionnaire" had 40 questions. The scale was reduced to 22 questions after initial validity and reliability by Klaassen and Ter Kuile. The scale is used to examine the perspectives and feelings of women with vaginismus and dyspareunia. This scale evaluates factors related to the perception of vaginal penetration. The other scale used is; It was "Sexual quality of life-female". This scale was developed by Symonds et al. Developed by. The scale consists of 18 6-point Likert type items ranging from strongly agree to strongly agree. Getting a high score on the scale; means higher quality of sexual life. According to the results of this study, the mean age of women was 21.52 ± 1.49. The results of this study showed that fear of sexuality, positive cognition and negative self-perception, sexual intimacy, sexual quality of life, and education variables were the final predictors of vaginismus diagnosis score. Therefore, this disorder is considered multidimensional. The most important building block in the success of vaginismus treatment is that the problem is not only attributed to physical but also to psychological causes. In order to fully understand vaginismus, it is important to investigate it as complicated. Interpersonal and cultural levels continue to be explored. Many scientists support a more holistic approach to both understanding and treating vaginismus. It may be helpful to incorporate a biopsychosocial and experiential approach to vaginismus perspectives. A multidisciplinary approach to vaginismus treatment is better suited to effectively respond and resolve the complex nature of this distressing sexual challenge for men and women in adult intimate relationships.

Keywords: Vaginismus, Sexual Dysfunction, Sexual Behavior, Disorders of Sexual Development

EFFECT OF L-DOPA ON LIVER CYTOTOXICITY

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ABSTRACT

Carboplatin is an alkylating chemotherapeutic agent that induces apoptosis in rapidly dividing cells used in cancer therapy. It has fewer side effects than other platinum-based chemotherapeutic agents such as cisplatin. Hepatotoxicity is important in dose regulation in high-dose platinum chemotherapy. Levodopa (L-DOPA) is the amino acid precursor of dopamine. Because L-DOPA is used in the synthesis of dopamine in brain cells, it is used in the treatment of Parkinson disease. Dopamine is synthesized from L-DOPA in hepatocytes, and dopamine synthesized in the liver cannot cross the blood-brain barrier. Some studies have suggested that dopamine may have a protective effect on hepatocytes. In our study, we aimed to evaluate the cytoprotective effect of L-DOPA in hepatocyte cell damage induced by carboplatin dose-dependently in AML12 liver cell line. In our study, there are carboplatin, L-DOPA, Carboplatin + L-DOPA groups. Viability of cells was evaluated with MTT test at dose range of 3.13, 6.25, 12.5, 25, 50 ,100 µM. The IC50 value of carboplatin in the AML12 cell line was found to be 62.65 µM. The L-DOPA IC50 value was outside the so-called dose range. The IC50 value of carboplatin + L-DOPA was found to be 601.55 µM. In the light of the data obtained, it was observed that the cytotoxic effect of carboplatin on the AML12 cell line at the IC50 value decreased statistically significantly when combined with L-DOPA. Further studies are needed in this regard.

Keywords: Carboplatin, L-DOPA, cytotoxicity, AML12, MTT

ETHNOBOTANICAL DATA ON *Delphinium tourn*. EX L. (*RANUNCULACEAE*) TAXA

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ABSTRACT

The genus *Delphinium* Tourn. ex L. is a member of the *Ranunculaceae* family. The family members are medicinal, ornamental, and weed plants. The name "*Delphinium*" comes from ancient Greeks, the shape of the flower buds reminiscent of dolphins. The genus has represented by 519 naturally grown species in temperate, subtropical Asia, Europe, Africa, and North America. In Turkey, there are 31 species and 32 taxa with an endemism ratio of 55. The ethnobotanical data was reviewed within the study. The data shows this specific knowledge: the most mentioned countries are India, USA, Nepal, Pakistan, and Turkey; the most used parts of the species are flower, root, whole plant, and seed; species used against asthma, cold, pneumonia, severe diarrhea, aches (tooth-, stomach- and headache), and externally used as hair tonic and parasite killer. Besides the curative effects, *Delphinium* species have toxic effects that should not overlook. Also, it seems that although the richness of the genus in Turkey, the local uses are not as comprehensive as in other countries.

Keywords: *Delphinium*, ethnobotany, local uses

MORPHOLOGICAL PROPERTIES OF *Delphinium venulosum* BOISS. (*RANUNCULACEAE*)

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ABSTRACT

Delphinium Tourn. ex L. (*Ranunculaceae*) species have local uses as asthma, cold, pneumonia, severe diarrhea, stomachache, and externally as a hair tonic and parasite killer. The genus members also have toxic effects due to the complex diterpenoid alkaloids they contain. *Delphinium venulosum* Boiss. (hezaren) growns in the steppe, fallow fields, and vineyards in Turkey and it is an endemic species and Iran-Turan element. For it is better recognition the morphological properties of the species presented. *D. venulosum* was examined in detail morphologically in this study. The species was collected from Eskisehir/Turkey and pressed and dried samples were used for examinations. The detailed botanical description was fulfilled, the sepals, petals, flower, stamen, ovarium, fruit and seeds hand-drawings were done. Also for micromorphological properties stem, pedicel, flower, follicle, seed, and pollen surfaces were viewed by SEM and photographed. The plant is 32-70 cm tall, branched from the base, and bract segments are oblanceolate, linear, and acute. Seeds are subpyramidal and pollen grains are prolate-spheroidal, tricolpate, colpus membrane with granules, and exine ornamentation is microechinate, and perforate.

Keywords: *Delphinium venulosum* Boiss, morphology, micromorphology

STUDY OF MODERN CHANGES IN SOILS PROPERTIES IN TERMS OF THEIR STRUCTURAL PORE SPACE

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ABSTRACT

Modern evolutionary processes of soil self-organization occur constantly and everywhere. In modern conditions, the anthropogenic load and global climate changes are particularly significant factors in the corresponding changes in soil properties. Therefore, it is important to unambiguously assess in the monitoring mode not only the neutral level of soil degradation but also the improvement and deterioration of their properties that determine the productive function. The soils of the energy-limited humid zone deserve special attention with a radical change in the processes of soil formation in the semiarid conditions of climatic changes. It is also important to assess the consequences of hydraulic reclamation on soil properties. The Institute of Water Problems and Land Reclamation of the National Academy of Agrarian Sciences of Ukraine offers a solution to this problem through complex laboratory diagnostics of the water-physical properties of soils with the determination of the structure of the pore space (SPS). The diagnostic system is based on the use of a capillary hysteresis loop of water-holding capacity. The peculiarity of the methodical approach of these tests is the saturation of a soil sample with an undisturbed structure to the full moisture content (FMC) in a vacuum chamber and testing according to the algorithm as rapid desorption from FMC to slow equilibrium sorption to repeated rapid desorption. The difference in soil moisture saturation between the branches of rapid desorption, in which there is no trapped air (T.A.) in the soil, and equilibrium sorption characterizes the total volume of equilibrium trapped air in pores of a certain size for each value of the capillary potential. The curve VT.A.= f (P), or functionally related to the capillary potential of the porosity radius VT.A = f (r), is called the structural characteristic of the soil, which is a differential curve of the distribution of the pore space of the soil by radii. The absolute value of this trapped air can reach 15-20% of the soil volume. This requires mandatory consideration of hysteresis in hydrological calculations. Large-scale testing of the developed diagnostic system revealed the spatial and temporal patterns of soil pore space variability, which gave reason to recommend it as a tool for research into epigenetic changes in the pore space of the three-dimensional soil matrix. These studies established a unique SPS of Chernozem soil, which has the form of a monotonically growing curve and has the largest share of structural macroporosity, resistant to external factors, compared to other soils. With depth, the volume of macroporosity in Chernozem soil naturally decreases, which confirms the general progressive direction of soil formation aimed at densification of the parent rock. Accordingly, the decrease in the volume of macroporosity, which is manifested by the downward bending of the structural characteristic curve, clearly indicates the degradation of soil properties, which begins with a decrease in the volume of the largest porosity. According to the developed concept of dynamic soil formation, macroporosity plays the most important role in ensuring the energy efficiency of the interaction of the soil with the factors of the external environment (climate).

Such an interaction consists in the emergence of many internal (subordination) energy-consuming thermodynamically unbalanced processes in the soil, the centers of which are the macropores in the soil. These processes are the transformation (dissipation) of the external energy flow. In general, the level of energy efficiency of the soil, which depends on the SPS, as a design of the system and the presence of moisture, as a working fluid in the thermodynamic system of the soil, correlates with its productive function, that is, fertility.

Keywords: Soil, pore space, trapped air, hysteresis

USING HALOPHYTES IN PHYTOREMEDIATION OF SALT-AFFECTED SOILS

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ABSTRACT

Soil salinity is one of the most important factors affecting agricultural production negatively. The basic principle in the improvement of saline soils is to remove excess salt from the root zone of the plant and to provide ideal soil conditions that will prevent salt accumulation again. The main methods that can be used in the improvement of saline soils; deep version, sandblasting, washing, use of chemical improvement materials. Since most of these methods require high labor and cost, phytoremediation method has become increasingly important as an alternative in the reclamation of saline soils. Phytoremediation is a breeding method that is generally carried out through the cultivation of halophyte plants that are highly resistant to salt and accumulate salt in their tissues. The aim of this study is to reveal the usability of the phytoremediation method to regenerate saline soils that cannot be economically evaluated. In addition, it is aimed to bring halophyte plant cultivation to the fore in order to initiate the vegetation process in lands that do not have sufficient vegetation as a result of soil salinity, and thus to reduce soil erosion and desertification in these areas.

Keywords: halophytes, salinity, phytoremediation, soil

EFFECT OF CULTIVATION ON SPATIAL VARIABILITY OF SOIL ORGANIC CARBON CONTENT IN A SMALL SCALE FIELD

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ABSTRACT

Soil cultivation is generally done to form a homogeneous media to supply optimum growth conditions for seeds and plants. In this study, spatial variability of soil organic carbon content (SOC) in a cultivated field was determined by geostatistical method. Conventional tillage was used with a mouldboard plough at a depth of 15 cm in a field. A total number of 49 soil samples were taken from a square grid at 5 m spacing of a 30 x 30 m2 plot selected in the center of field. The SOC contents of soil samples varied between 1.18% and 1.73%. Clay content (31.48 to 43.97%), bulk density (BD) (1.12 to 1.41 g/cm3), total porosity (F) (46.79 to 57.73%), volumetric water content (θ) (19.64 to 43.86%), soil pH (6.47 to 7.40) and electrical conductivity (EC) (0.31 to 0.80 dS/m) values also showed variations among the sampling points. In kriging interpolation for the spatial variability of SOM, the biggest r2 (0.766) and the smallest RSS (0.0013) values were determined with Gaussian model. Spatial dependences of the SOC was strong in the field with 6.4 of nugget/sill ratio. The semivariogram of SOC showed spatial dependence with a range of 157.61 m. The SOC had significant positive correlations with clay (0.365**), F (0.287*) and significant negative correlations with soil BD (-0.286*), θ (-0.362*) and silt (-0.429**) content. This study showed that spatial variability of SOC in arable fields can be predicted with monitoring soil organic carbon in cultivated fields for global warming researches.

Keywords: Soil organic carbon, tillage, soil properties, spatial variability

EFFECT OF TOBACCO WASTE ON YIELD AND MINERAL NUTRITION OF BARLEY

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ABSTRACT

The aim of this study was to investigate the effect of tobacco waste (TW) application on plant growth and mineral nutrition of barley (Hordeum vulgare). Four doses of TW (0, 2, 4 and 6%) were applied into the 1 kg pots in a randomized plots experimental design with three replications. After the germination of seeds, soil moisture level in the pots was kept at the field capacity with irrigating distilled water after weighing the pots daily. The experimental study was ended at the stem elongation stage when the flag leaf just visible after 6 weeks of sowing. The dry weight of barley increased from 0.77 g/pot in control treatment to 2.57 g/pot in 4% doses of TW treatment, significantly ($P<0.01$). Macro and micro nutrient contents in plant samples generally increased with the farmyard manure application over the control. It was determined that the highest nutrient contents in plant samples were N (4.66%), P (0.21%), Fe (326,64 ppm), Zn (56.31 ppm) and Cu (40.60 ppm) in 4% doses, Ca (0.39%), Mn (108.40 ppm) in 2% doses, Mg (0.15%) in 6% doses and K (0.45%) in the control application. On the other hand all macro and micro nutrient uptake values were generally higher in 4% TW application ($P<0.01$). It can be concluded that tobacco waste can be used as a soil conditioner to improve plant nutrition and growth in organic farming systems.

Keywords: Tobacco waste, barley, macro-micro nutrients, yield

THE APPLICATION OF IMAGE TEXTURES AND MACHINE LEARNING FOR THE EVALUATION OF CHANGES IN BELL PEPPER FLESH CAUSED BY LACTO-FERMENTATION

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ABSTRACT

Food preservation is used to maintain the quality of perishable fruit and vegetables. There is a need to process raw materials to extend their shelf life. However, the quality of processed foods should be controlled. The objective of this study was to develop discriminative models to evaluate changes in the structure of bell pepper flesh as a result of spontaneous lacto-fermentation. The fruit samples were bought at the local supermarket. Twenty fruits were used in the experiments. Five pieces with the dimensions of 1 cm × 1 cm were cut from each fruit using a sharp knife. The pepper pieces were imaged on the inside of the flesh using a digital camera. Then the same pieces were subjected to lacto-fermentation with the use of horseradish, garlic, dill, and the potable water with the table salt at the concentration of sodium chloride of 3% in brine. The pepper samples were stored in glass jars for 3 days at a temperature of about 20 °C and then for six months at a temperature of about 10–12 °C. After storage, lacto-fermented samples were also imaged. Both images of fresh and lacto-fermented pepper samples were processed to compute texture parameters from different color channels *L*, *a*, *b*, *R*, *G*, *B*, *X*, *Y*, *Z*, *S*, *U*, and *V*. The discriminative models were built based on selected features using various machine learning algorithms. The correctness of discrimination of fresh and lacto-fermented pepper samples reached 99% for some algorithms, including Naive Bayes, Bayes Net, Multilayer Perceptron, FLDA (Fisher Linear Discriminant Analysis), LMT (Logistic Model Tree). In the case of each algorithm, the values of performance metrics such as TPR (True Positive Rate), PRC (Precision-Recall) Area, ROC (Receiver Operating Characteristic) Area, MCC (Matthews Correlation Coefficient), F-Measure, Recall, and Precision were greater than or equal to 0.98. The obtained results confirmed the change in the structure of pepper flesh caused by spontaneous lacto-fermentation, which was revealed as differences in the texture parameters of the outer surface of the fresh and preserved samples, allowing for their discrimination with high correctness.

Keywords: food preservation; quality; image processing; discriminative models; performance metrics

ANTIMICROBIAL AND ANTIOXIDANT PROPERTIES OF POMEGRANATE (*Punica granatum* L.) PEEL BIOACTIVE COMPOUNDS (In-vitro)

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ABSTRACT

This review aimed to discuss the pomegranate peel extraction methods and the ability of its bioactive compound as an antimicrobial and antioxidant agent. Currently, extracts of plant bioactive compounds are commonly used as medicinal properties. Pomegranate planting is predicted to reach approximately 300 thousand hectares worldwide, with a production of 3 million metric tons of which about 76% of production comes from Turkey, India, Iran, and the USA. The antimicrobial and antioxidant activity of pomegranate peel extract (PPE) is related to its phytochemical compounds including punicalagin, ellagic acid ellagitannin anthocyanins, catechol, catechin, hesperidin, quercetin, and glucosides. Because of their ability to protect sensitive bioactive components from thermal degradation and oxidation, non-conventional pomegranate peel extraction methods such as supercritical fluid extraction, ultrasound-assisted extraction, and microwave-assisted extraction yielded total phenolics more efficiently than soxhlet extraction and maceration methods. Previous studies reported that methanol solvent has the highest yield of that other polar solvent in extracting the pomegranate peel. PPE increased DPPH activity and showed antioxidant activity similar to synthetic antioxidants such as butylate d hydroxyanisole (BHA) and butylated hydroxytoluene (BHT). PPE has a broad antimicrobial spectrum which has an inhibitor against both gram-negative and gram-positive bacteria including *Salmonella*, *E. coli*, *S. aureus*, *P. aeruginosa*, *B. subtilis*, and *S. typhimurium*. Furthermore, PPE extracted with methanol and ethanol is reported to have great antimicrobial properties among the other solvents.

Keywords: Antimicrobial, antioxidant, extract, pomegranate peel

TIME- AND DISTANCE-RESOLVED ROBOTIC IMAGING OF FLUID FLOW IN VERTICAL MICROFLUIDIC STRIPS: A NEW TECHNIQUE FOR QUANTITATIVE, POINT-OF-NEED MEASUREMENT OF BLOOD COAGULATION

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ABSTRACT

Coagulation and thrombosis play a major role in cardiovascular health and disease. Conventional coagulation assays have been automated, but much research still relies on complex laboratory assays that can be time-consuming, expensive, laborious and require personnel with specific technical training. Combining mass-produced microfluidic devices with open-source lab instrumentation enables rapid development of inexpensive, highly configurable, and high-performance haematological tests. We present for the first time a low cost (under £300), open-source customizable robotic instrument for microfluidic analysis of the dynamic activation of blood coagulation. The imaging Rig for Microfluidic blood analysiS (RMS) consists of a servo motor, a camera, and a lightbox. Motion, illumination and imaging are together controlled by a Raspberry Pi. The RMS system allows simultaneous measurement of capillary rise in 12x 10-bore hydrophilic Teflon® FEP microcapillary film test strips totalling 120 individual capillaries and can capture 180 images of all capillaries in 30 seconds, enabling precise monitoring of blood sample flow during stimulation in 160 to 270 micron diameter capillaries. We have carried out an extensive set of experiments using fluids of know viscosity, density, and surface tension, in this case glycerol: water mixtures with concentrations of glycerol ranging 0 – 60 % w/w. We observed the equilibrium capillary height decreased with the increase in glycerol concentration due to a reduction in the surface tension and increase in density of fluid. Then we tested the blood components in terms of the velocity and equilibrium height. The pure water and HBS samples and platelet-rich and poor plasma samples showed a superficial fluid velocity very similar. On the other hand, the RBCs collected in different tubes showed higher values of instantaneous superficial velocity and higher equilibrium heights compared to WB. Finally, we tested capillary flow dynamics of blood following activation by thrombin. The equilibrium capillary rise of blood showed sensitive to the amount of thrombin loaded in the microcapillaries (500, 158, 50 and 0 U/mL). This resulted in clearly measurable reductions in both fluid velocity and equilibrium capillary rise. Capturing high quality and time-lapse images of capillary rise of blood in the capillaries enabled us to quantify haemostatic changes in WB. This demonstrates the power of time-resolved digital imaging of microfluidic devices using inexpensive open-source hardware, a step towards automated multi-parameter microfluidic blood analysis.

Keywords: Microfluidics, Thrombosis, coagulation, Thrombin, Raspberry Pi, platelet coagulation, blood analysis

IMPACT OF COVID-19 PANDEMIC ON MENSTRUAL CYCLE IN YOUNG WOMEN IN EDIRNE PROVINCE, TURKEY

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ABSTRACT

The COVID-19 pandemic has profoundly affected the lifestyle of the global population, albeit to varying degrees in every society. During the pandemic period, the stress and anxiety faced by women, who are the important part of society. It was inevitable that it would have an impact on reproductive health. It is known that stressful periods and psychological distress can change women's menstrual periods. Therefore, an observational study was conducted on the menstrual cycles of young women throughout the pandemic. 482 volunteer young women aged between 18 and 32 living in Edirne participated in the study online and were asked to complete the survey questions. 431 participants were able to answer all questions completely. The mean age was 22.7 ± 1.6 years. 39% of respondents reported recording their menstrual cycles using a mobile app or diary. 23% were using hormonal contraception. 49% reported changes in their menstrual cycle since the start of the pandemic. 23% reported worsening of premenstrual symptoms. Compared to the pre-pandemic period, 28% reported new onset menorrhagia and 32% reported new dysmenorrhea. 29% of respondents reported experiencing irregular menstrual delays. Cycle length ranging from 28 days to 31 days and bleeding days from 5 days to 9 days, greater variability ($p = 0.01$) was detected. There was a median increase of 2 days ($p < 0.0001$) at the minimum. The COVID-19 epidemic, especially menstrual irregularities in women; significantly affected reproductive health. The long-term effects of this on women's health have not yet been adequately determined. Future studies should address this in detail in the female population of all ages.

Keywords: COVID-19 pandemic, menorrhagia, menstrual abnormalities, Young Adult

GENDER INEQUALITY DURING THE COVID-19 PANDEMIC; FROM THE WINDOW OF UNIVERSITY STUDENTS

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ABSTRACT

The COVID-19 pandemic has caused unprecedented disruptions in the global sociocultural space. Especially in developing countries, access to health institutions have been delayed, resulting in socioeconomic income loss and high unemployment rates. However, evidence for gender differences in economic outcomes, if any, in economic outcomes such as income, spending, savings, and job loss in a multi-country pandemic was limited. We conducted a study involving university students living in different geographical regions and from families of various income levels. Our study with Trakya University Health Science School students; made with online interviews. 179 female and 216 male students participated in the study. In our study, first of all, sociodemographic characteristics were recorded. The data obtained from the survey we prepared on gender were used. The effects of COVID-19 on gender inequality in these results were evaluated. COVID-19 risk perception was high, with a gender gap to the detriment of young women (63.6% versus 72.2%; $p<0.001$). Participants' concerns about the pandemic and challenges to prevention were examined. During pandemic, restricted access to contraception was detected among women using hormonal contraceptives (34.6%). Gender asymmetry was observed in depressive symptoms (21.8% male; 34.3% female) in the participants. Gender inequalities disproportionately made young women unable to meet their basic economic needs ($p<0.005$). During the pandemic, women were in greater need of health services ($p<0.001$). At the bivariate level, in the pandemic process; women had lower self-determination control to go out (87.2% versus 70.0%). Women had less consistent access to secure, private internet (57.1% vs. 69.3%). Gender-specific concerns for women included difficulties in accessing menstrual hygiene (49.8%). Qualitative results identified the augmenting effect of economic disruption and isolation on premenstrual syndrome in women. It was observed that privacy restrictions increased among young women. Our findings showed that, due to the COVID-19 pandemic, women were 19 percent more likely than men to worry about not being able to find a job or permanently losing their job. Women also expected their labor incomes to fall 30 percent more than men. Perhaps because of these concerns, women tend to reduce their current consumption and increase their savings. Factors such as the different rates of participation in the business sectors for men and women and the widening of this gap in the pandemic can play an important role in explaining the gender gaps. This indicates an increased pandemic in gender differences, probably due to varying rates of infection and women's share of socioeconomic and academic power. In young adults, the COVID-19 pandemic has been found to increase underlying inequalities. At the same time, they are faced with the gender-based effects of the pandemic, which reflect the negative economic, social and academic impacts. Young women should have equal access to resources, including economic, health and technology-based support. Gender-sensitive remediation efforts are needed. The unique and unavoidable academic, economic and social needs of young people must be addressed.

Keywords: COVID-19 pandemic, Gender Inequality, Young People, COVID-19, gender; Gender Analysis, Women

STUDY OF THE ANTIBACTERIAL EFFECT OF PISCHIO LENTISK OIL (*Pistacio lentiscus*)

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ABSTRACT

The (lentiscus pistacia) plant has been known since ancient times for its many medicinal properties, and the substances extracted from it are widely used in traditional medicine in the treatment of certain diseases such as eczema, mouth sores and kidney stones. jaundice; Stomach pain, asthma and respiratory problems.Pistachio oil is widely used in traditional medicine, especially in the northeastern regions of the country and in Tunisia, against respiratory allergies and the treatment of burns.Microbiological studies have already been carried out on the essential oil and vegetable oils extracted from this plant by laboratory methods, and they have shown the presence of activity of the essential oil against bacteria, but the ineffectiveness of the 'vegetable oil. It was made on the effectiveness of vegetable oil extracted in the traditional way. Our work was carried out to find new, more natural effects in the presence of bacterial resistance to antibiotics, using the medicinal plant *Pistacia lentiscus*.

Keywords: *Pistacia lentiscus* plant, pistachio oil, microbiological analyzes, antibiotic

CO-RESPONSIBILITY OF THE POPULATION AND HEALTH PROFESSIONALS IN THE FIGHT AGAINST LEISHMANIASIS

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ABSTRACT

Leishmaniasis is a parasitic disease that constitutes a public health problem, and its control requires the mutual support of the various actors: health professionals and the community. This is a descriptive exploratory study to determine the status of community participation in the control of leishmaniasis in an endemic area "Province of Al Haouz" in the Marrakech Safi region. A questionnaire was sent to health professionals in the province of Al Haouz (n=50). In addition to an interview with the population of Al Haouz aged over 18 years (n=384) to explore knowledge, attitudes and practices. The main results of the questionnaire revealed that health professionals' knowledge of leishmaniasis is moderately acquired with regard to the three types of leishmaniasis, the diagnosis, the nature of the disease, the dominant form in the province. The knowledge of the transmission of the disease, the reservoir, the vector species, the actions of the GILAV committee is weak. The knowledge acquired about the disease comes mainly from experience or in some cases from initial training. However, there is an absence of training for health professionals in relation to leishmaniasis in Al Haouz. Finally, no one declared their participation in a community-based project to combat leishmaniasis. The population interviewed is dominated by women (56%), cutaneous leishmaniasis is the only form known by 28% of the population, and the respondents' knowledge of leishmaniasis is low regarding transmission, causes, types and preventive measures. In addition, the population uses traditional remedies to drive out the vector or treat skin leishmaniasis, no leishmaniasis prevention materials from the local authorities have been distributed, nor have education and awareness sessions on leishmaniasis been organised. The gap in knowledge, attitudes and practices of the population in relation to leishmaniasis, the low level of involvement of health professionals in the activities of the leishmaniasis control programme, justifies the absence of community participation.

Keywords: *Leishmaniasis,* prevention, participatory approach, attitude, knowledge, practice, community, health worker

STUDY ON METHANE COMBUSTION UNDER OXYGEN DILUTED CASE IN A TUBE BURNER

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ABSTRACT

The methane combustion under oxygen diluted cases in a tube burner is numerically investigated in this paper. For the inlet condition of the tube burner, the combustion air was assumed to be diluted with CO2 for 20% on molar base and O2 fraction was obtained as 10% on molar base. The simulations were run for the different pre-heating values of the oxidizer mixture. It was determined that the oxidizer mixture had to be pre-heated up to the certain value in order to obtain a stable combustion. The results show that the pre-heating process of the diluted oxidizer mixture extends the flame zone as the pre-heating degree is increased. This proves that using a pre-heated and diluted oxidizer mixture for methane combustion has the advantage to increase the heat transfer rate due to the extended flame zone and to reduce the NOx emissions by lowering the maximum flame temperature value.

Keywords: Oxygen dilution, methane combustion, air-prehetaing

EFFECTS OF DIFFERENT TPMS LATTICE STRUCTURES ON THE MECHANICAL BEHAVIOUR OF HIP IMPLANT

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ABSTRACT

Triply periodic minimal surfaces (TPMS) porous lattice structures have remarkable properties in terms of designing bio-inspired medical implants. TPMS porous structures that repeating regularly solids can be mathematically controlled and defined by functions. Characteristically qualifications of TPMS structures such as energy absorption, stress shielding effect, lightweighting, good mimic to natural bone, increasing celling on contact area of bone and implant are desired for hip implant. In this study, Hip implant is shelled and infilled with Gyroid, Diamond, Lidinoid, Schwarz and SplitP TPMS lattice structures and their mechanical behaviors are investigated. Implicit body is created from CAD body. Unit cell size is defined same value for every lattice structure. Resultant force and fixed supports are applied according to literature. Finite element analysis (FEA) is carried out with constant conditions for each lattice structure. FEA results are evaluated. The results show that highest Von-Mises stress is observed on Schwarz infilled hip implant. Lidinoid infilled hip implant which has the lowest Von mises stress is most suitable design.

Keywords: TPMS Lattice Structures, Hip Implant, Finite Element Analysis

INVESTIGATION OF ENGINE PERFORMANCE VALUES AND EXHAUST EMISSIONS OF TRACTOR IN DIFFERENT DRIVING CONDITIONS

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ABSTRACT

Recently, efficiency in internal combustion engines has gained great importance due to the increase in oil prices and the increase in harmful exhaust emission levels. For this reason, it is necessary to make the working conditions suitable in parallel with the technological developments in tractor engines. Engine performance values and harmful exhaust emissions also vary depending on the use of tractors in field conditions. In particular, terrain conditions, climatic conditions, fuel used, engine performance values and driving characteristics of the user significantly affect both fuel consumption and harmful exhaust emissions. In this study, the performance values at 1400-1800-2200rpm engine speed, where the tractors are used most while driving, and the harmful exhaust emissions that occur under these conditions were investigated. According to the test results, the highest fuel consumption at 1400rpm, which is the engine's maximum torque, was 16.4L/h, and the lowest 14.8L/h fuel consumption value was obtained at 2200rpm engine speed. When the exhaust emissions are examined, it is seen that the lowest carbon monoxide level is realized at 115 ppm and 2200 rpm engine speed.

Keywords: Energy, diesel engine, power, fuel, emissions.

EXPERIMENTAL INVESTIGATION OF OUTPUT POWER USING PHASE CHANGE MATERIAL (RT-44HC) IN POLYCRYSTALLINE SOLAR PANELS

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ABSTRACT

The demand for renewable energy sources is increasing day by day due to the gradual decrease of fossil-based energy sources, increasing costs and environmental problems. Recently, electricity generation from solar and wind energy has become more preferred in many countries. Photovoltaic panels are used in the conversion of solar energy directly into electricity. During energy conversion in photovoltaic panels, the module cell temperature also increases with the effect of ambient temperature. This reduces the output power obtained from the photovoltaic panel. It is important to obtain maximum energy from photovoltaic panels due to the variable solar radiation during the day and the losses due to operating conditions. Especially in summer, increasing temperature significantly reduces the output power of photovoltaic panels. In this study, it is aimed to reduce the temperature increase during energy conversion in polycrystalline photovoltaic panels with the application of phase change materials (PCM)Rubitherm RT44HC and to increase the PV Panel power. Energy production values were recorded for one month from the photovoltaic panels installed in Edirne climatic conditions. 10.4% more electrical energy was obtained from a single PV panel with PCM compared to the standard panel.

Keywords: Energy, Photovoltaic, Phase change material, Temperature, Efficiency

COLD ROLLING BEHAVIOUR OF ALMG3/SICP COMPOSITES

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ABSTRACT

It is known that particle reinforced metal matrix composites (PRMMCs) lose their cold deformation ability and show brittle behavior with the increase in the amount of ceramic reinforcement they contain. The low ability of cold deformation restricts the use of these materials in a wide range of industrial areas. Recently, studies investigating the cold plastic forming applications of PRMMCs have been increasing rapidly, thanks to the development of production methods to overcome the reinforcement matrix interface problems of PRMMCs, heat treatment applications to increase ductility, and the use of matrix materials with high ductility. In this study, metal matrix composite materials prepared at different reinforcement ratios by adding SiCp particles into AlMg3 aluminum alloy that is semi-solid phase were cold rolled and their cold deformation abilities were investigated depending on rolling parameters.

Keywords: Metal Matrix Composites, Cold Rolling, SiCp Reinforcement

CA / P BASED CERAMIC COATING ON 7075 ALUMINUM BY DIP COATING AND AT LOW TEMPERATURE MULTI-STEP SINTERING METHODS

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ABSTRACT

EN AW 7075 aluminum plates were coated with Ca/P based bioceramic coating material by applying classical immersion and sequential immersion sol gel coating methods. Immersion and sintering were applied in two different ways. In the first method, three -stage dipping and then one-time sintering were applied until the desired coating thickness was achieved. In the second method, sintering was performed at low temperature (550°C) after each immersion and sequential sintering was performed, consisting of three dips and three times sintering. Both the number of dips and the number of sintering have been observed to affect the physical structure and strength of the coating. Stereo microscope and scanning electron microscope (SEM) were used to study the surface structure of coatings. Cracking and shedding caused by the incompatibility of the different thermal expansion coefficients of the aluminum substrate and the Ca/P-based coating were less common in the samples that were dipped twice and sintered twice. It has been observed that sequential dipping and sintering at low temperatures reduces crack formation and coating defects.

Keywords: Sol Gel Coating, Low Temperature Sintering, Aluminum Surfaces

A SEMI-SOLID MIXING PROCESS TO PREPARE A HOMOGENEOUS ALUMINUM MATRIX COMPOSITE SLURRY

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ABSTRACT

The ability of metal-based composites to provide the expected functional performance; is possible with the selection of the correct production method and precise control of the successive critical production processes. Generally, the most critical process of the production processes consists of pre-treatment of matrix and reinforcement materials, mixing, shaping, and finishing seen as mix operations. The composite mixing; is carried out by solid, liquid, or semi-solid processes. The difficulties encountered due to the physical and chemical nature of each process result in inhomogeneous reinforcement distribution, agglomeration of the reinforcement, pushing out of the mixture, settling, formation of unwanted reaction products, and wetting problems. In this study, the effect of reinforcement ratio, the reinforcement type, and the size on the mixing performance of AlMg3/SiCp composites produced by the semi-solid mixing process was investigated and it was observed that this method eliminated many of the problems that arise in the production of particle reinforced metal-based composite materials.

Keywords: AlMg3/SiCp Composites, Semi-Solid processes, The Composite Mixing

EFFECT OF WELDING CHAMBER GEOMETRY ON THE PRODUCT QUALITY FOR HOLLOW ALUMINUM PROFILES

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ABSTRACT

Hollow profiles are used in many engineering applications. Porthole dies are widely used in the manufacturing of the hollow and complex shaped profiles by extrusion. One of the most important parameters in die design that affects the quality of the profile is the amount of residual aluminum, which is called the dead zone, which will occur during billet transitions in the welding chamber. In this study, a new design was made in the welding chamber of the current die in order to prevent material accumulation in the billet transitions, and the results of the new design were examined. 3D finite element model for modelling porthole die extrusion was carried out based on Inspire Extrude Metal 2021.2 software using ALE algorithm. AA6063 aluminium alloy was chosen as material. The temperature of billet was selected as 460°C and the ram speed of 5 mm/sec was set up. Finally, the FEM results were analyzed and the new die design was evaluated primarily in terms of profile quality.

Keywords: Porthole die; Extrusion; Welding chamber

THE EFFECT OF DIFFERENT WHEAT CULTIVAR AND TURMERIC/GINGER POWDER USAGE ON PHYSICAL AND SENSORY PROPERTIES OF BULGUR

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ABSTRACT

In this study, two different wheat cultivar (*Tr durum* and *Tr aestivum*) were used in bulgur production with and without turmeric and ginger powder addition. Turmeric and ginger powder were used during cooking stage of bulgur process. The effect of wheat cultivar and turmeric/ginger powder addition on physical and sensory properties of bulgur were determined. L*, a*, b*, SI and Hue values of the bulgur samples changed between 41.95-52.23, 3.31-5.46, 13.86-26.86, 14.54-27.24 and 71.47-82.09, respectively. Bulgur produced from *Tr. durum* wheat showed higher lightness and yellowness and lower redness than *Tr. aestivum* bulgur. The use of turmeric powder in both bulgur varieties decreased the lightness and increased the yellowness value. According to cooking test results, bulgur produced from *Tr. aestivum* wheat revealed higher weight and volume increase than that of *Tr. durum* bulgur. Utilization of turmeric and ginger powder in bulgur production process did not change significantly weight and volume increase values. While the use of turmeric powder in both wheat cultivars affected the sensory properties positively, ginger powder decreased the taste and general appreciation score.

Keywords: Bulgur, Wheat cultivar, Turmeric powder, Ginger powder, Durum, Aestivum

SEQUENTIAL LEARNING VIA HAPTIC INTERACTION

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ABSTRACT

From birth, humans learn a variety of motor skills through the interaction with someone (e.g., parent, teacher, coach or therapist) using auditory, haptic or visual feedback. For instance, children learn how to walk or how to ride a bicycle through the interaction with their parents. Here, the touch to support behind the child while teaching a motor skill is called 'Haptic'. While learning a new kind of motor skill through the interaction with someone, there may be a dual instability due to unknown interacting partner (e.g. parent) or unknown environmental dynamics (e.g. external force field). To date, the studies focused on the partner's initial skill level (e.g. expert or novice) in skill learning through adaptation to virtual force fields in reaching tasks. However, whether a human distinguish that an action is based on own action or partner's action remains still unclear. We hypothesized that paired subjects would separate partner's dynamics from environmental dynamics in a cooperative motor task, which would facilitate skill learning through the interaction with someone. In this study, we adopted a haptic-motor task: a joint cursor was connected to two cursors controlled by the paired subjects with virtual springs and subject to external force field. The subjects' cursor positions were invisible, so the participants interacted with their partner through only haptic feedback. Experimental results suggest that sequential learning (first familiarize with partner's dynamics, and then learn environmental dynamics together or first learn environmental dynamics alone, and then learn partner's dynamics under familiarized environmental dynamics) is more advantageous rather than simultaneous learning (learning environmental dynamics and partner's dynamics simultaneously) to learn motor skills via haptic interaction.

Keywords: motor skill learning, motor skill, haptic

CYPERUS DIFFORMIS CONTROL IN CALIFORNIA WATER-SEEDED RICE AS AFFECTED BY APPLICATION TIMING OF FLORPYRAUXIFEN-BENZYL

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ABSTRACT

Rice is a staple food that feeds more than half of the globe. Weed infestations are the primary problem in California rice fields. The continuous use of herbicides and the lack of crop rotation have resulted in herbicide-resistant weeds to different modes of action. The necessity of novel herbicides has become more significant than ever. Florpyrauxifen-benzyl is a new auxin-type rice herbicide to control grass, sedge, and broadleaf weeds. *Cyperus difformis*, smallflower umbrella sedge, is a troublesome sedge weed in California rice fields. A field study was conducted in the growing seasons of 2021-2022 at the California Rice Experiment Station to determine the effects of florpyrauxifen-benzyl on different growth stages of *C. difformis*. To evaluate sedge weeds control, Clomazone at 622 g ai/ha was applied to all plots to control *Echinochloa* species at the day of seeding. Florpyrauxifen-benzyl was applied at 40 g ai/ha to 1-leaf, 10, 15, 20, and 25 cm sedge stages, respectively. A backpacked, CO2-pressurized six nozzle spray boom with XR8003VS(AI) nozzles at 206 kPa pressure delivering 187 l/ha was used. Methylated seed oil (0.7 l/ha) was added to all treatments. The study was performed as a randomized complete block design with four replicates. All plots were evaluated for weed control and crop injury ratings at 7, 14, 21, 28, and 42 days after treatments. Weeds were counted at 28 DAT within two randomly selected areas in each treatment plot, and plots were harvested for yield, and the yield was measured. The greatest chlorosis, 12%, and necrosis, 10%, were observed at 7 DAT of 1-leaf *C. difformis* sedge stage. Rice gradually recovered over time from injury and appeared normal at the end of the growing season. Florpyrauxifen-benzyl applied at the 1-leaf sedge stage was the most effective treatment for *C. difformis* and *Echinochloa* species control. At 42 DAT, *C. difformis* and *Echinochloa* spp. control was 98 and 100%, respectively. All treatments achieved 100% control of broadleaf weeds at 42 DAT. The highest yield at harvest, 12,431 kg/ha, was when florpyrauxifen-benzyl was applied at 25-cm sedge growth stage application, which is the latest application timing of this study.

Keywords: Application timing, California rice, Cyperus difformis, Florpyrauxifen-benzyl, Smallflower umbrella sedge

RICE PANICLES DEVELOPMENT AS AFFECTED BY FLORPYRAUXIFEN-BENZYL APPLICATIONS IN CALIFORNIA WATER-SEEDED RICE

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ABSTRACT

Rice is a staple food that feeds more than half of the globe. Weed infestations are the primary problem in California rice fields. The continuous use of herbicides and the lack of crop rotation have resulted in herbicide-resistant weeds to different modes of action. The necessity of novel herbicides has become more significant than ever. Florpyrauxifen-benzyl is a new auxin-type rice herbicide to control grass, sedge, and broadleaf weeds. A field study was conducted in the growing seasons of 2021-2022 at the California Rice Experiment Station to determine the effects of florpyrauxifen-benzyl when applied after the rice panicle initiation growth stage. Florpyrauxifen-benzyl was applied at 40 and 80 g ai/ha after panicle initiation rice growth stage at 52 days after seeding. A backpacked, CO2-pressurized six nozzle spray boom with XR8003VS(AI) nozzles at 206 kPa pressure delivering 187 l/ha was used. Methylated seed oil (0.7 l/ha) was added to all treatments. The study was performed as a randomized complete block design with four replicates. All plots were evaluated for weed control and crop injury ratings at 7, 14, 21, 28, and 42 days after treatments. Weeds were counted at 28 DAT within two randomly selected areas in each treatment plot, and plots were harvested for grain at the end of the season. The results showed that the highest necrosis, 32%, was observed at 7 DAT florpyrauxifen-benzyl applied at 80 g ai/ha treatment. Rice gradually recovered over time and appeared normal at 28 DAT. Florpyrauxifen-benzyl at 80 g ai/ha was the most effective treatment. The highest *Schoenoplectiella mucronata* and *Leptochloa* spp. control was observed with 35 DAT as 83% and 95% control, respectively. Similarly, the highest *Cyperus difformis* and *Echinochloa* spp. control was observed at 42 DAT with 96% and 93% control, respectively. However, the highest yield at harvest, 9,619 kg/ha, was achieved at the florpyrauxifen-benzyl 40 g ai/ha treatment. While both florpyrauxifen-benzyl treatments caused 8% grain blanking in panicles, untreated control showed 14% blanking. Seeds per panicles were 86, 83, and 82 for florpyrauxifen-benzyl treatments at 40, 80 g ai/ha, and untreated control.

Keywords: Application timing, California rice, Florpyrauxifen-benzyl, Panicle initiation

EVALUATION OF THE EFFICACY OF SOME ENTOMOPATHOGENIC FUNGUS ISOLATES AGAINST TOMATO LEAF MINER *Tuta absoluta* (MEYRICK) LARVAE [LEPIDOPTERA: GELECHIIDAE])

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ABSTRACT

Tomatoes leaf miner (*Tuta absoluta*) is one of the most important constraints to tomato production. The use of entomopathogen fungi would be a cost-effective solution to control any pest. However, the pathogenicity and virulence difference among entomopathogenic fungi, Beauvaria and Metarhizium isolates and concentrations are not widely well investıgated. The objectives of this study were therefore initiated to test the pathogenicity of some entomopathogenic fungus isolates against Tuta absoluta. The experiments were conducted at Bursa Uludag University, Turkey and Kulumsa Agricultural research center, Ethiopia laboratory commencing from 2021 to 2022. Tuta absoluta adults were collected and were reared on tomato seedling in growth chamber. The third instar larvae of Tuta absoluta were inoculated with four Ethiopia EPF isolates (B1, PPRC-56, M1 and M2) and four EPF Turkish isolates (AK-10, AK-14 AK-11 and AK-12) at different conidia concentrations (0, 106, 107,108,109 and 1010 conidia/ml) in a factorial experiment arranged in completely randomized design with three replications. Mortality rate assessment data was conducted and analyzed. The analysis of variance for mortality percentage revealed significant variations ($p<0.05$) among EPF species isolates and conidia concentrations. The results revealed that Beauvaria bassiana isolates were found to show the highest mortality rate 70% to 81%, the lowest LC50, 1.87x104 to 9.79x104 conidia/ml, LC95, 5.68x108 to 1.10x1011 conidia/ml and shortest incubation period LT50 ,3.6 to 5.7 days , highly virulent against Tuta absoluta and should be preferred to be used. Metarhizium anisopliae include M1, M2, AK-11 and AK-12 were determined as moderately virulent against Tuta absoluta having mortality rate 46 to 63 %, the highest LC50, 1.36x106 to 4.94x107 and LT50, 4.3 to 8 However, among all isolates "Metarhizium anisopliae AK-12 " showed the least mortality 46 %, has the highest LC50 value, 4.94x107 followed by "Metarhizium anisopliae AK-11. Hence, the effectiveness of Beauvaria bassania isolates were more than Metarhizium anisopliae. Results also revealed that among EPF concentrations 1x1010 is the most effective dose rate while 1x106 is the least effective to kill larvae. As the current work revealed the potential variation among EPF species isolates and conidia concentrations effectively against Tuta absoluta, further isolates that showed moderately virulent should be further evaluated against Tuta absoluta.

Keywords: Beauvaria bassania , isolates, Metarhizium anisopliae Tomato, ,Tuta absoluta

MONITORING, INTRODUCTION, AND USEFUL TRAITS OF *Agrıophyllum squarrosum* L.

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ABSTRACT

The aim of this work is to determine the distribution areas of Agryophyllum squarrosum (L.) (Agriophyllum L.) in the Western Kazakhstan region and the Aktobe region of the Republic of Kazakhstan. Scope of the work included following activities: monitoring and introduction of species composition, studying the economically useful potential, phenological observations, biochemical analysis in terms of distribution areas with description of coordinates of germination sites, introduction, studying the biological features of Agryophyllum squarrosum (L.) in culture. The fodder productivity of wild-growing Agryophyllum squarrosum (L.) in the monitoring points of the Zhanakala area of Western Kazakhstan region amounted to 6-8 cwt / ha of green mass or 2-2.5 cwt / ha of hay, in the Shalkar area of Aktobe region - 4-5 cwt / ha; 1.0-1.5 cwt/ha.

Keywords: *Agriophyllum squarrosum* (L.), introduction, monitoring, expedition, plant, forage productivity, green mass, hay, distribution area, expedition, monitoring, species, biochemical analysis, productivity.

ANTIMICROBIAL POTENTIAL OF *Juniperus communis* ESSENTIAL OILS FROM DIFFERENT GEOGRAPHICAL ORIGIN

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ABSTRACT

Common juniper (*Juniperus communis*) is a slow-growing coniferous tree with dark fleshy fruits and needles in whorls of three. The berries of common juniper are usually used for flavouring gin, while the other parts of the plant are rich sources of essential oils that are already in use in various medicinal therapies. This study aimed at investigating *in vitro* antimicrobial activity of commercial *Juniperus communis* essential oils from Serbia and Russia and determine their possible use as biopreservative in pharmaceutical and food industry. For this purpose the essential oils were individually tested against six bacterial strains, two yeast strains and one fungi strain, namely *Bacillus cereus* ATCC 11778, *Staphylococcus aureus* ATCC 25923, *Listeria monocytogenes* ATCC 35152, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Salmonella Typhimurium* ATCC 13311, *Saccharomyces cerevisiae* ATCC 9763, *Candida albicans* ATCC 10231, *Aspegillus brasiliensis* ATCC 16404. *In vitro* antimicrobial activity was performed by disk-diffusion method and the results are presented as diameter of the inhibition zone in milimeters. The obtained results of testing the antimicrobial potential of tested oils from different geographical origin showed moderate activity against gram-positive bacteria, while no activity was observed in the case of gram-negative bacteria. The only difference between the tested essential oils was noticed in the case of *Candida albicans*. Namely, in this case only essential oil from Russia showed low activity, while for the other eukaryotes the both examined essential oils expressed no activity. The essential oils of *Juniperus communis* from the both countries showed noticable potential against tested gram-positive bacteria. The results presented in this work support the use of the essential oils of *Juniperus communis* in traditional medicine, but also they could be used as an interesting biopreservatives for different industries.

Keywords: *Juniperus communis,* essential oil, in vitro antimicrobial activity

SAFFLOWER AS A SOURCE OF HEALTHY TEA AND VALUABLE VEGETABLE OIL

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ABSTRACT

Currently one of the courses of vegetal sector of Kazakhstan is the expansion of plant crops range by using new, less-used and competitive crops, and one of those crops is a valuable safflower (Carthamus tinctorius L) oil crop. As a result of an ecological safflower variety trials was found that in drought conditions of Aktobe region (Western Kazakhstan) the most promising and competitive varieties, giving the highest fees of oil per unit of land and suitable for cultivation in different soil and climatic conditions, are late-maturing varieties and variety samples of safflower with high yield and oil content. With the help of the ecological safflower variety trials at the Aktobe Agricultural Experimental Station (Western Kazakhstan), a new highly productive variety of safflower "Akhram" (created by the method of individual selection from the variety sample SI-CEN 1230/PCOY//PCOY/POI-5/3/S-517 / RS-223) was developed, with a high content of petals per plant, suitable for the production of healthy safflower tea. Seeds of the variety have a high content of oil, rich in polyunsaturated fatty acids, such as: linoleic acid, 11-octadecenoic acid, palmitic acid.

Keywords: Safflower oil crop, variety, petals, healthy tea, seeds, safflower oil

ANALYZING OF ANTHOCYANIN ACCUMULATION AND GROWTH RATIOS OF BLACK CARROT SSP. CALLUS UNDER THE SALICYLIC ACID AND SALINITY STRESSES

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ABSTRACT

Carrot (*Daucus carota*), a member of the Apiaceae family, is rich in antioxidants. Especially purple carrot plants produce a secondary metabolite from the flavonoid family called anthocyanin. These secondary metabolites are known to have significant antioxidant activity. Salinity is an abiotic stress that threatens crop yield, including disturbing osmotic equilibrium and generating reactive oxygen species in plant cells. Exposure to salinity is known to induce or stimulate the production of plant seconder metabolites. Salicylic acid (SA, 2-hydroxybenzoic acid), one of the plant growth regulators, is used in the stimulation of many signaling pathways involved in various plant defense responses. The aim of this study is application of different elicitors to increase anthocyanin accumulation by activation of plantdefense pathways. In this regard; seeds of "Daucus carota ssp. (purple carrot)" taken from the ‘’Republic of Türkiye Ministry of Agriculture and Forestry Atatürk Horticultural Central Research Institute’’ were used and studies were carried out to obtain callus culture. First of all, the seeds were surface-sterilized and MS medium was prepared for seeds to plant and germinate. Explants which were obtained from hypocotyl of germinating plants were used to establish callus cultures in MS medium containing 50 uL of BAP (6-Benzylaminopurine) and 500 uL of 2,4-D (2,4-dichlorophenoxyacetic acid). 1 month-old calli were exposed to different concentrations of saliyclic acid and sodium chloride, then the changes in anthocyanin amounts and growth ratios were calculated through 20 days and samples were taken in every 5 days. Anthocyanin amounts in the calli were analyzed by UV-visible spectrophotometer method and fresh weights were measured. Results of growth measurements has showed that, when growth rate of control group was increased 5.7 fold at the end of 20 days, in 50 mM NaCl it was 6.04 fold and 3.6 fold in 50 uM SA, respectively. The outcomes of this study might serve to understand better the relationship between the anthocyanin production and salicylic acid, salinity.

Keywords: Anthocyanin, callus, carrot, growth, salycylic acid, salinity

COMPARISON OF THE PRODUCTIVE PERFORMANCES OF TWO SHEEP BREEDS: THE BARBARINE AND THE NOIRE DE THIBAR

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ABSTRACT

The objective of this work was to compare the productive performances of the two Tunisian meat sheep breeds namely the Barbarine and the Noire de Thibar and to quantify the phenotypic progress made by the two breeds during the period 2009-2014. Data from the study were obtained from the Livestock and Pasture Board. The study involved 93,709 Barbarian lambs in 30 herds and 34,664 Noire de Thibar lambs in 9 herds. The statistical analysis is divided into three parts. The first part consists of a descriptive analysis. In the second part, performance was adjusted according to two factors: the age of the mother and the sex-mode of birth. The third part revolves around the comparison of two races using variance analysis. In order to identify sources of non-genetic variation affecting production traits (P10, P30, P70, P90, GMQ 10-30, GMQ 30-70and GMQ 30-90) and to compare production performance, three models were used. Classes of factors have been defined. With each factor showing a significant effect, a comparison of the means of the different levels was made with the technique of least squares (lsmeans). The first model corresponds to a linear 3-factor variance analysis model (mother age, sex, birth mode and race) which is used to test primarily the race effect. Two other multivariate linear models, by race, were applied to compare and quantify phenotypic progress. The calculation of average weight performance and daily earnings at typical ages showed a difference between the two breeds. This was confirmed by the highly significant effect of the breed ($Pr<0.01$). Noire de Thibar Lambs achieve the best weights with 6.28 kg at 10 days, 10.24 kg at 30 days, 14.54 kg at 70 days and 18.97 kg at 90 days. The Barbarian race is still ranked second in all types of ages. The GMQ 10-30 realized are respectively 192 g/d and 173 g/d for the Noire de Thibar and the Barbarine. Also for the GMQ 30-70, the Noire de Thibar is still ranked first (157 g/d). Analysis of phenotypic correlations indicated that the majority of correlations between body weights and between weight gains were positive. P70 has a strong positive correlation with most of the growth traits studied. Sex and mode of birth factors have a highly significant effect ($Pr<0.01$) on lamb growth. Single born lambs perform better than multiple lambs. Among the single lambs, males are the heaviest. The age of the mothers showed higher LGQs in lambs from mothers between the ages of 3 and 5 years while the lowest were in lambs from mothers aged 6 and over. The year of birth factor also showed a highly significant effect on the growth of lambs since the climatic conditions of each year influence the availability of forage resources and therefore they influence the productive performance of the lamb. Concerning phenotypic progress during the study period, the Noire de Thibar breed gained 3450 and 3540 g in the weight of lambs at 70 and 90 days of age respectively. The Barbarine breed has been stagnant in weight of lamb at 10 and 30 days since 2009.

Keywords: Growth, Noire de thibar, Barbarine, productive performance

EVALUATING THE NITROGEN REMOBILIZATION AND PARTITIONING OF SELECTED TURKISH OAT CULTIVARS

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ABSTRACT

Nitrogen management has always been a major consideration of cereal cultivation. Despite the abundance of reports on this matter, studies about the efficiency of N remobilization is limited. This study aims to evaluate the genotype and nitrogen effects on the N remobilization of selected oat cultivars. Field trials were conducted according to the split block experimental design with 4 replications in 2015-2016 and 2017-2018 growing seasons in Marmara conditions. Nitrogen contents (%) and yields (g m^{-2}) of stems, leaves and panicle samples of 5 oat cultivars (Kahraman, Sebat, Yeniçeri, Seydişehir, Chekota) were determined during anthesis and harvest maturity, which were grown under 5 nitrogen regimes (0, 5, 10, 15 and 20 kg da -1) for the calculation of total remobilization (TR) and the remobilizations (RL, RS), remobilization efficiencies (REL, RES) and nitrogen partition indexes (NPIL, NPIS) from leaves and stems individually. Results of ANOVA suggested that genotype, year, nitrogen and genotype x nitrogen effects were found statistically significant for alltraits. PCA Biplot analysis revealed that remobilization from leaves and stems increased with the increasing nitrogen doses. Moreover, stem nitrogen contents were found as prominent sources of nitrogen for Kahraman and Yeniçeri genotypes when leaf nitrogen contents of Sebat, Chekota and Seydişehir were higher. Leaf nitrogen contents could also be more influential on overall nitrogen remobilization of oat especially in higher nitrogen doses.

Keywords: Nitrogen, Remobilization, Partition index, oat, leaves, stems

APPROBATION OF THE MOLECULAR MARKERS FOR SELECTION OF DROUGHT TOLERANT GENOTYPES AMONG UKRAINIAN WINTER BREAD WHEAT VARIETIES

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ABSTRACT

The problem of climate change has manifestation in Ukraine - climatic drier zones moving farther to the north of country and in the Southern regions there are trends towards desertification. According to Sidorenko and Chebotar (2020) in the half of the latest 20 years average rainfall in April and May was less than normal so it has influence at the period of earing and flowering of winter bread wheat (*Triticum aestivum* L.). Yield and quality loss are attributable to drought stress in the vegetative and reproductive phases. One of the urgent problems is the search for suitable genetic markers for drought tolerant genotypes of wheat. With the aim of approbation of molecular markers for selection of the most drought tolerant genotypes we analyzed wheat varieties that were developed in Institute of Irrigated Agriculture National Academy of Agrarian Science of Ukraine (IIA NAAS) during the last 10 years. The varieties studied as material were: Anatoliya, Blago, Burgunka, Koshova, Ovidii, Rosinka, Soborna, Khersonska bezosta, Khersonska 99. In wheat, resistance to drought is a complex (often associated with resistance to high temperatures) and a quantitative trait, the manifestation of which is significantly influenced by environmental factors. We investigated the single nucleotide substitution of *A* to *G* at position 5917 bp of *TaSnRK2.8-A* gene and presence of the *a* allele (1113 bp) *null allele* (*n*) of the *Dreb1-A* gene. There were significant differences between the varieties in terms of yield under conditions of drought and irrigation, as well as in terms of drought resistance index. The influence of factors "Year" and "Allele of *TaSnRK2.8-A* gene" was statistically significant on yield under irrigation and yields in drought and drought resistance index depended on the interaction of factors genotype x environment ("Year" x "Allele of *TaSnRK2.8-A* gene"). Wheat varieties with the *G* allele had higher yields under irrigation and when grown in conditions of drought in 2018. No significant differences were detected between varieties with different alleles of the *TaSnRK2.8-A* gene in terms of yield grown in conditions of drought in 2016 and 2017. According to the two-factor analysis (Year" x "Allele of *Dreb1-A* gene was found that *aa* genotypes had significantly higher yields when grown under irrigation in 2016 and 2017, and in 2018 plants with *aa* genotypes did not differ significantly from *nn* genotypes. The same *aa* genotypes when grown in the rainfall did not differ in yield from *nn* genotypes in the 2016, 2017, 2018 research years. The average yield of the studied varieties of bread winter wheat on irrigated land was 2.4 times higher than on rainfed land over three years of observation. It will be useful to study drought tolerance in a collection of Ukrainian varieties using genome-wide association mapping.

Keywords: Wheat varieties, drought, molecular markers, tolerant genotype

ALLEVIATION OF ADVERSE EFFECTS OF SALT STRESS ON FABA BEAN (*Vicia faba* L.) PLANTS BY EXOGENOUS APPLICATION OF SALICYLIC ACID

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ABSTRACT

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

Keywords: Salicylic acid, growth, faba bean, salinity, oxidative stress.

FORAGE PRODUCTION POTENTIAL, PROBLEMS AND SOLUTIONS PROPOSAL OF ANKARA PROVINCE

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ABSTRACT

31.75 million tons of quality roughage produced in Turkey meets 32.5% of the current animal stock's life share requirement. When the Ankara province is evaluated specifically, it is seen that the roughage deficit is 2.34 million tons. The problems in roughage production for Turkey in general are also valid for the province of Ankara. However, due to the ecological and climatic characteristics of the province of Ankara, the issue should be evaluated in much different dimensions. For this reason, it is important to increase the production of high quality roughage both in Turkey and in Ankara. Supports related to the subject provided have increased the cultivation areas and production amounts. However, it is seen that the current productions do not meet the need. For this purpose; Efforts should be made to establish forage crops culture in producers, to improve pastures and to inform farmers about the economic value of forage crops.

Keywords: Roughage, Ankara province, forage crops, cultivation area, animal population.

INOCULATION WITH ARBUSCULAR MYCORRHIZAE PROTECTS WHEAT FROM THE COMBINED EFFECTS OF BORON TOXICITY AND SALINITY UNDER LOW- AND HIGH-PHOSPHORUS CONDITIONS

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ABSTRACT

Salinity and boron (B) toxicity are two major abiotic stress factors that reduce crop yields and thus threaten both the economy and global food security. They frequently co-occur in fields in arid and semi-arid regions, particularly where agriculture depends on poor-quality irrigation water with a high electrical conductivity (EC) and high B concentration. The combined impacts of salinity and B toxicity on crops differ from their isolated effects because of conditional interactions between them. Although such interactions have been subject to a lot of studies in the literature, there are inconsistencies in results and the physiological factors underlying them are largely unknown. Arbuscular mycorrhizae (AM) are fungal root-colonizing endophytes from the phylum Glomeromycota. The mutualistic symbiosis can enhance plant growth, contribute to mineral nutrition and increase tolerance to abiotic stress factors such as drought and salinity. The availability of phosphorus (P) in the soil is closely related to mycorrhizal colonization. In this study, a pot experiment was carried out under greenhouse conditions. Bread wheat (*T. aestivum* cv. Nusrat) plants were grown at different levels of salinity, B toxicity and P availability in either autoclaved or autoclaved and AM-inoculated soil. For inoculation, a commercial product containing three different Glomus species was used. The main effects of salinity and B toxicity and the effects of their interaction on vegetative growth, mineral homeostasis, oxidative damage, and yield parameters were determined. Also, mycorrhizal colonization was documented in root samples by staining and light microscopy. While both salinity and B toxicity significantly decreased shoot dry weight at the vegetative stage, their interaction was not significant in terms of growth parameters. Inoculation with AM and high soil P application increased the shoot biomass by 35% and 32%, respectively. Shoot B accumulation was reduced by salinity and mycorrhizal inoculation. Inoculated plants also accumulated less Na under saline conditions. Relative electrolyte leakage from leaves increased with salinity in the absence of B toxicity. However, salinity significantly alleviated membrane damage under B toxicity. While low P supply limited grain yield, mycorrhizal inoculation significantly increased different yield parameters. Moreover, mycorrhizal colonization enhanced grain P concentration by approximately 17%. Although the co-occurrence of salinity and B toxicity may increase the total stress burden on wheat, salinity and B toxicity can partially mask and even alleviate the adverse effects of each other. Arbuscular mycorrhizae may increase growth and yield of wheat in the presence of combined salinity and B toxicity stress by minimizing ionic toxicities and improving the overall mineral homeostasis under both low-P and high-P conditions, indicating that P fertilization in conventional agriculture does not negate the benefits of AM. Inoculation with AM is promising as an effective tool to grow wheat sustainably in stress-prone areas.

Keywords: Keywords: Wheat (*Triticum aestivum*), abiotic stress, B toxicity, salinity, arbuscular mycorrhiza, mineral homeostasis

A NOVEL PLANT-BASED ENZYMATIC PROTEIN HYDROLYSATE APPLIED AS A SEED-SOAKING AGENT ENHANCES GROWTH OF WHEAT SEEDLINGS UNDER CONTROL AND DROUGHT CONDITIONS

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ABSTRACT

Plant biostimulants offer an ecofriendly, innovative and sustainable contribution to crop yields and global food security. When applied in low amounts to seeds, foliage or soil, they can positively affect plant growth, mineral nutrition, yield, quality and abiotic stress tolerance. Protein hydrolysates, which can be of plant or animal origin, are categorized as biostimulants because of the growth-promoting effects of free amino acids and peptides in their composition. Seed soaking is a pre-sowing treatment which can result in Marocter and synchronized germination and seedlings with increased vigor and stress tolerance when compared to seedlings grown from unsoaked seeds. Drought impairs germination and seedling vigor. This study was conducted to evaluate the biostimulant effects of a novel protein hydrolysate on wheat seedlings in the absence or presence of drought stress when applied to wheat seeds as a seed soaking agent. The protein hydrolysate (PH) used in this study is obtained from corn gluten through a proprietary enzymatic process. In the first experiment, bread wheat (*Triticum aestivum* cv. Nusrat) seeds were soaked in dH2O (control), 2% PH, and 5% PH for 12 h. After soaking, seeds were thoroughly rinsed with dH2O and sown in vermiculite under controlled greenhouse conditions. Pots were maintained at approximately 75% water holding capacity. The aboveground parts of the seedlings were harvested 14 and 21 days after sowing. In this preliminary experiment, seed germination rate and vegetative growth parameters were examined. In the second experiment, which was carried out to study the effects of different concentrations of PH on the root traits, shoot mineral accumulation, and drought tolerance of wheat seedlings, seeds were soaked in dH2O (control), 0.1% PH, 1.0% PH, and 2.0% PH solutions for 12 h. After soaking and rinsing, seeds were sown in vermiculite and grown under controlled greenhouse conditions. Pots were maintained at 75% water holding capacity to ensure uniform seedling emergence. After emergence, half of the pots were kept well-watered whereas the other half were not watered until harvest to expose the seedlings to an increasing intensity of drought stress. Shoot and root tissues were harvested separately at 14 and 21 days after sowing (DAS). Roots were scanned and analyzed by WinRHIZO to evaluate the effects of drought and PH treatments on root growth and morphology. Shoot samples were analyzed for their mineral concentrations by ICP-OES. In the first experiment, PH treatment had no effect on shoot fresh weight two weeks after sowing, it significantly enhanced shoot fresh weight of three-week-old plants. Seed soaking with the high level of PH enhanced the shoot biomass by 15% in the absence of any stress treatment. Low (2%) and high (5%) PH treatments increased plant height by 14% and 23%, respectively. In the second experiment, drought stress decreased plant height as well as shoot and root dry weights significantly. Seed soaking with 2% PH enhanced root length, root surface area, and root volume by 25% under drought while the average root diameter did not respond to seed treatment. Mineral analysis revealed significant increases in the shoot contents of some essential mineral nutrients that can be attributed to changes in root growth due to drought and PH applications. The experimental corn gluten-based PH is effective as a low-cost biostimulant when applied to wheat seeds as a seed-soaking agent.

Effects are dose-dependent and conditional. Stimulation of root growth may contribute to seedling establishment under drought. Further studies are needed to document the effects of seed soaking with this PH on wheat and other crops grown in soil and establish the physiological basis of the benefits in the absence and presence of abiotic stress factors.

Keywords: Wheat (*Triticum aestivum*), drought stress, water deficit, biostimulants, protein hydrolysates.

FRESHLY REISOLATED *Piriformospora indica* ACCLIMATED TO B TOXICITY ANDSALINITY STRESS IN VITRO BOOSTS STRESS TOLERANCE AND GROWTH OF WHEAT

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ABSTRACT

Boron (B), an essential micronutrient for all higher plants, easily causes toxicity and thereby significant economic losses at high concentrations. It is most common in arid and semi-arid regions, especially where poor-quality groundwater I s used for irrigation. Frequently, it co-occurs with salinity stress in Turkey and other countries with similar geological and climatic features. Compartmentalization, exclusion of toxic ions, maintenance of mineral homeostasis under stress and upregulation of antioxidative defense responses are among the relevant tolerance mechanisms. Beneficial soil microorganisms including Piriformospora indica, which is a root-colonizing, arbuscular mycorrhiza-like endophytic fungus, are in recent years investigated as biological agents against abiotic stresses. Although they can boost stress tolerance and thus growth of various crops, the stress factors can limit their vigor and the extent of the beneficial interaction between them and the host crops. To the best of our knowledge, the potential of Piriformospora indica was not investigated before for wheat grown under B-toxic conditions. There is no information in the literature about whether P. indica itself and the root colonization with this fungus may be limited by B toxicity in the absence or presence of salinity stress or not and whether acclimation of P. indica during in vitro culture may help alleviate such adverse effects of stress on P. indica performance. In this study, P. indica was freshly reisolated from infected roots in vitro to maintain its symbiotic potential. Gradual acclimation of P. indica to increasing and practically relevant levels of B toxicity and salinity was performed in vitro and the concentrations that severely limit P. indica growth in solid and liquid culture were determined. In a pot experiment conducted under controlled glasshouse conditions, one bread wheat cultivar (*Triticum aestivum* cv. Nusrat) and one durum wheat cultivar (Triticum durum cv. Saricanak) were grown in the absence of P. indica or presence of non-acclimated P. indica or presence of acclimated P. indica under B toxicity and salinity. Effects of stress factors and P. indica inoculation on vegetative growth parameters were quantified. Colonization of wheat roots by P. indica was documented by staining and microscopy. Shoot samples were analyzed by ICP-OES to determine the effects of stresses and inoculation of essential and toxic element concentrations. Various physiological parameters related to stress damage and antioxidative defense were measured by spectrophotometric assays. Both B toxicity and salinity decreased the vegetative growth of wheat. Inoculation of soil with acclimated P. indica significantly decreased B and Na accumulation in shoot of bread wheat cultivar when compared to inoculation of soil with non-acclimated P. indica. Membrane damage caused by B toxicity was slightly alleviated when plants were grown in soil inoculated with acclimated P. indica. Light microscopy revealed the presence of typical pear-shaped spores of P. indica in wheat root samples taken from soils inoculated with both acclimated and non-

acclimated P. indica. However, it was noted that the spore density was lower when acclimated P. indica was used. In conclusion, acclimation of P. indica to stress factors in vitro prior to inoculation of host plants is a promising strategy to maximize the stress-alleviating effects of this endophytic symbiont.

Keywords: Boron toxicity, *Piriformospora indica*, salinity, wheat, acclimation

ACKNOWLEDGEMENT:

This project was funded by the TUBITAK 1001 project 118Z984 with the title “Investigation of the application potential and physiological effects of Piriformospora indica as a biological agent against boron toxicity in wheat”.

INVESTIGATION OF BORAX-COLEMANITE MIXTURES AS SLOW-RELEASE AND LOWER-RISK BORON FERTILIZERS FOR SOYBEAN

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ABSTRACT

Boron (B), which is an essential micronutrient for higher plants including legumes, has an extraordinarily narrow sufficiency zone between the critical deficiency and toxicity levels. Therefore, both toxicity and deficiency of B are widespread problems in global crop production. In order to meet the B demand of plants and at the same time avoid toxicity risk, efficient but lower-risk B fertilizers are required. This study investigated borax as a highly-soluble B fertilizer, colemanite as a low-solubility B fertilizer and their combinations in different ratios in the cultivation of soybean (*Glycine max* cv Asya). First, in order to elucidate the effects of borax-colemanite mixtures, we investigated these fertilizers during vegetative growth of soybean in two types of soil with different pH levels. Then, we conducted a soilless experiment to observe the effects of these fertilizers during early growth of soybean on root growth and development. WinRHIZO was used to quantify selected parameters of root growth and morphology. Finally, for demonstrating the effects of these fertilizers on soybean growth and yield, we conducted a soilless experiment with leaching under greenhouse conditions. In this experiment, changes in shoot growth, root growth parameters, leaf chlorophyll concentration, B concentrations and contents in different plant parts, membrane integrity and antioxidative enzyme activities were determined. Boron toxicity resulted in reduction of shoot biomass of borax-supplied plants by 50% but this reduction was alleviated in plants supplied with borax-colemanite mixtures by up to 25%. Membrane damage due to B toxicity was decreased by up to 60% when borax was replaced with borax-colemanite mixtures. Visual B toxicity symptoms on plants were observed. In the last experiment where leaching was allowed, plants supplied with borax-colemanite mixture showed higher seed yield under different B doses. High-solubility B fertilizers easily leached from the substrate while low-solubility B fertilizers released B slowly. It was concluded that high- and low-solubility B fertilizers in different combinations are promising for soybean cultivation and the best combination depends on soil and environmental conditions. Although higher percentages of colemanite reduce B toxicity risk and delay its occurrence in soybean due to its low solubility, over-application of colemanite may result in more severe toxicity than borax in the long run.

Keywords: Boron toxicity, borax, colemanite, slow-release, soybean

FACTORS AFFECTING PLANT SECONDARY METABOLITES

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ABSTRACT

It is a common perception that the content of secondary metabolites in pure lines of next-generation pedigree selections or in intra- and inter-species crosses should be constant, like other qualitative and quantitative traits, but in fact, this is often not the case. In this review article, we try to give possible explanations for why the content of secondary metabolites fluctuates in later generations (from F7) of next-generation pure lines as well as intra- and inter-species crosses. Genetic, ontogenic, morphogenetic and environmental factors are extremely important in the biosynthesis and accumulation of secondary metabolites. The biosynthesis of PSMs depends on these various factors, although other factors remain constant, a change in only one factor can change the content of PSMs. Here, we provide a detailed view of the possible roles of various factors in secondary metabolite instability. A good understanding of the mechanisms involved in secondary metabolite synthesis, degradation and accumulation in plants is essential for the future formulation of strategies for genetic improvement of secondary metabolite production in plants.

Keywords: Secondary metabolites, genetic improvement, biosynthesis

COMPARATIVE ANATOMICAL INVESTIGATIONS ON FOUR *VIOLA* L. (*VIOLACEAE*) TAXA FROM EUROPEAN TURKEY

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ABSTRACT

Comparative anatomy of 4 taxa of *Viola* distributed in Edirne province of European Turkey was studied. The investigated species are *Viola kitaibeliana* Roem., Schultes, *Viola tricolor* L., *Viola arvensis* Murray (sect. *Melanium*; annual, biennial and caulescent), *V. odorata* (sect. *Viola;* perennial and acaulescent). General anatomical features of examined *Viola* species are discussed. Cross sections of root, stem, leaves and petiole (in *V. odorata*) were observed under light microscope for various anatomical features. The following characters were found to be taxonomically informative: cross-section shapes of the aerial stem, as well as the number of vascular bundles in the aerial stem. The results showed that, root included periderm in the outer. There were parenchymatous cortex, endodermis and pericycle under the periderm respectively. Pericycle contains primary phloem and xylem and pith was filled with xylem elements. In taxa of sect. *Melanium*, stem cross-sections are elliptic with two wings, but they are semi-circular with two wings in taxon of sect. *Viola*. The number of vascular bundles in the stem can be used to delimit the species. Sclerenchymatic ring was not seen in stem of *V. odorata*. While it was the same thickness in the *V. tricolor* and *V. kitaibeliana*, it had thicker in *V. arvensis*. Calcium oxalate crystals were observed in all vegetative organs of taxa examined *Viola*. The root all examined taxa had a secondary structure. The amphistomatic leaves had a single layered epidermis with usually hairs and bifacial mesophyll. Stomata are anisocytic. The cell shapes of the epidermis are different in superficial sections. Our results show that anatomical characters are useful for delimiting species within *Viola*.

Key words: *Anatomy; Violaceae; Viola, European Turkey.*

INVESTIGATION OF THE EFFECT OF CAPSAICIN WITH SODIUM SELENITE ON MDA-MB-231 CELL LINE

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ABSTRACT

The determination of the in vitro cytotoxic effects of active substances in foods has gained importance in recent years. There are many methods for determining cytotoxicity or cell viability. In our study, apoptosis test was performed to determine cell viability. Apoptosis is a physiological event known as cell suicide. After the cell receives a signal for apoptosis, it shows biochemical and morphological changes. It shrinks and begins to condense, the cytoskeleton disintegrates, the nuclear membrane dissolves from place to place, and the nuclear DNA fragments. The cytoplasm of a cell undergoing apoptosis shrinks. As the cell shrinks and shrinks, it breaks up into small membrane-enclosed fragments. These fragments are called apoptotic bodies. The fluorescent microscopy method we used in our study is a form of staining using fluorescent substances to determine apoptosis. Since fluorescent dyes can bind to DNA, they make the cell's chromatin, or nuclear region, visible. Apoptotic cells were visualized by using dyes that bind to DNA to detect changes in capsaicin and sodium selenite treated cells. In this way, the separation of dead and living cells was made. In our study, acridine orange: ethidium bromide 1:1 ratio was used to separate live and dead cells. MDA-MB-231 cells were seeded in 6 flasks with $2x10^5$ cells in each well, and after overnight incubation, the control was incubated with 50 µM and 100 µM capsaicin. At the end of 24 hours, cells were stained with 3 µL of acridine orange (0.1 mg/ml) and 3 µL of ethidium bromide (0.1 mg/ml) and evaluated for apoptosis under fluorescence microscope. In addition to the cells prepared in the same way, sodium selenite solution prepared in 10^{-1} nM, 10^{-2} nM and 10^{-3} nM doses was given to the cells. The results were compared with respect to the control groups. Since acridine orange only binds to the DNA of living cells, viable cells appeared green, while ethidium bromide caused a red color in necrotic cells. However, when the two dyes were used together, they stained apoptotic cells in a yellow-orange color and reflected the characteristic apoptotic nucleus appearance, allowing the detection of apoptosis. As a result; After the application of increasing doses of capsaicin and sodium selenite, it caused a significant increase in the number of apoptotic cells, while sodium selenite positively affected this effect. The highest apoptosis rate was reached at 100 µM capsaicin and 10^{-1} nM sodium selenite concentration. The highest number of necrotic cells was observed in the concentration of 100 µM capsaicin and 10^{-1} nM sodium selenite, parallel to the number of apoptotic cells. The number of necrotic cells was determined less than the number of apoptotic cells.

Keywords: Capcaicin, Apoptosis , MDA-MB-231

USE OF SELECTED *TRICHODERMA* SPP. STRAINS IN ECOLOGICAL AGRICULTURE

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ABSTRACT

In our previous studies *Trichoderma* species diversity in different soil types of Serbia was examined on molecular level. A total of 41 isolates were collected from four different soil types at 11 sites in Serbia. Isolates were identified based on their Internal transcribed spacer regions (ITS) and *tef1* sequences. The isolated and identified strains are deposited at the Szeged Microbiology Collection (SZMC; szmc.hu) and at Educons University. Selection of *Trichoderma* strains to be tested for plant growth stimulation was done through 4 steps: Soil selection and characterization, isolation and identification of fungi of the genus *Trichoderma* from different soil types at the molecular level, enzymatic characterization of isolates and *in vitro* antagonism tests. Based on preliminary results 2 strains (*T. harzianum and T. bevicompactum*) were chosen for test with plants. Research with strains was conducted through the following phases: investigation of the influence of on the germination of tomato seeds, influence of *strains* on physiological characteristics of tomato plants in the early stages of plant development, influence of strains on morpho-physiological characteristics of tomatoes grown under semi-controlled conditions and under conditions of water stress, influence of strains on morpho-physiological and biochemical characteristics of two tomato varieties grown under controlled conditions and in field. The great potential for the use of *Trichoderma* based inoculants for the growth and promotion of plant health as well as ability to have positive effect on plants grown in abiotic stress, explains the need for designing a new biostimulator that will affect the processes of germination, growth, fruit formation and its quality in growing plants in vegetable production. This will help in decrease in use of manufactured fertilizers and pesticides.

Key words: *Trichoderma*, Ecological Agriculture

UNIVERSITY-INDUSTRY INTERACTIONS AND ENTREPRENEURIAL ACTIVITIES IN AGRICULTURAL BIOTECHNOLOGY

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ABSTARCT

Transdisciplinary research - teaching - education has gained importance in discussing university action and sustainable R,D. There are numerous attempts to grasp the efforts of universities towards sustainable R,D outside of their impacts through teaching and research, which are often subsumed under the term "3rd mission" of universities. This "3rd mission" depicts a broader and more adaptive role for higher education institutes, and their contribution to social, cultural and environmental development based on regional needs. The "3rd mission" requires interaction between universities and regions, and, thus, offers possibilities for higher education institutes to engage more actively. Within the 3rd mission, universities contribute to sustainable development through their technical expertise, cultural mission, and role as leaders in the implementation of regional sustainability plans R,D might therefore benefit from the participation of academics in several ways. First, by enhancing a system perspective and critical thinking that support balancing social, environmental, and economic factors; second, by helping develop knowledge-based products and services; third, by raising funds; and, finally, these benefits might also increase the acceptability of results in the wider public. In plant biotechnology, the production of genetically pure lines, engineering for insect and disease resistance, as well as storage protein and other nutritional improvements have been the core topics. Potential benefits from tissue culture, biofertilizers, bio-pesticides, and medicinal plants are also vital tremendous. Developing countries are already benefiting and should continue to benefit significantly from advances in agricultural biotechnology. In recent years, the researcher entrepreneur has become a role model in research institutions and business circles. There is a need for would-be entrepreneurs to be exposed to the topics most critical to successfully founding, financing, and operating a biotechnology company. This talk focuses on understanding the patterns of university-industry collaboration, factors influencing such collaboration, and the role of government support in university-industry partnerships in agricultural biotechnology especially for academic start-up formation and creating a commercial channel in the market.

Keywords: Innovation, Agricultural biotechnology, University-industry Collaboration, Entrepreneurial activities, Spin-off

DIVERSITY AND ENHANCEMENT OF NWFPS FROM PLANT GROUPS IN THE FOREST OF TESSER MRAMET OF THE MONTS DE TLEMCEN

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ABSTRACT

The general objective of this study is the sustainable management of the forest ecosystems of the Tlemcen mountains with a view to lasting conservation of floristic biodiversity, to promote these non-timber forest products (N T F Ps). A random inventory was carried out and Dendrometric measurements focused on height and diameter at 1.30m (DBH). In this study, diversity indices were calculated. The results obtained made it possible to note that the average values of specific richness, of the diversity index of Shannon (H') and of equitability of Piélou (E) are respectively of 7 ± 2 species /plot, H'=0.5 et E=0.2. The average density of woody plants is 1100 individuals/ha with an average basal area of 1.8 ± 0.5 m 2 /ha. These results contribute to evaluating the floristic diversity of the forest and the improvement of knowledge on the state indicators of the natural woody populations that can serve as a basis for the management of NWFPs of forest species in the different economic and social domains.

Keywords: Diversity, NWFP, Sustainable management

QUİNOA 'EFFECT OF ORGANIC FERTILIZATION AND SALINITY IN THE OASES OF ADRAR (SOUTH-WEST ALGERIA)

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ABSTRACT

Quinoa is a multifunctional crop. Given its exceptional nutritional properties and ability to grow in marginal environments, the Food and Agriculture Organization of the United Nations has declared quinoa to be one of the plants that will play an important role in the global food security of this work, complementing the research of the Technical Institute for the Development of Desert Agriculture (ITDAS) in the project to introduce quinoa in Algeria, the objective of our work is to study some characteristics morphological effects of quinoa under the effect of organic fertilization and in parallel their response to different concentrations of salinity on germination. in the region of Adrar southwest of Algeria. In this regard, Algeria is trying to introduce it and intensify its cultivation and spreading. The subject of our research falls within this context

Keywords: Quinoa plant, morphological properties, organic fertilizers, salt concentration

EFFECT OF ORGANIC AND INORGANIC AMENDMENTS ON THE PERFORMANCE OF MAIZE HYBRID

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ABSTRACT

Maize is the 3rd most important cereal crop of Pakistan after wheat and rice. A field experiment was conducted at National Agricultural Research Centre, Islamabad Pakistan to examine the effect of organic and inorganic amendments on the growth of maize hybrids. The experiment was laid out in Randomized Complete Block Design, with three replications. Two maize hybrids (Pioneer-30K08 and Pioneer-3025W) were used in this experiment. Various organic and inorganic amendments i.e. T0 = control, T1 = compost, T2 = farm yard manure, T3 = poultry manure, T4 = biochar, T5 = biofertilizer, T6 = NPK, T7 = foliar application of moringa leaf extract, T8 = salicylic acid, T9 = indole acetic acid and T10 = indole butyric acid were applied on the maize hybrids. Data on, leaf area, plant height, chlorophyll content, relative water content, transpiration rate, stomatal conductance, photosynthetic rate, cob length, grains cob-1,1000-seed weight, biological and grain yield were measured. Performance of maize hybrid Pioneer-30K08 showed promising results regarding growth and yield. Application of farmyard manure also showed maximum results and improved growth and yield of maize hybrids.

Keywords: Farm yard manure; nitrogen; poultry manure; compost; biochar; maize

THE REFLECTANCE INDEX AS INDICATORS OF DROUGHT TOLERANCE OF SOME DURUM WHEAT (*Triticum durum* DESF.) GENOTYPES GROWING UNDER SEMI-ARID CONDITIONS -SETIF- ALGERIA

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ABSTRACT

Water shortage stress and the associated challenges are a major set of abiotic factors damaging and constraining the international production of durum wheat. The objectives of this study are to evaluate the efficiency of using the RGB reflectance index and chlorophyll contents as best tools to select a high yielding of 15 durum wheat genotypes growing under semi-arid conditions. The number of days to heading, grain yield, thaousand kernels weight, number of spikes per meter square, and plant height were measured at maturity. RGB reflectance index by numerical images analysis and chlorophyll contents were estimated. ANOVA showed a significant effect of genotypes for all traits. The local landrace Boutaleb which was the best yielding genotype registered a low Red reflectance index. The correlations test revealed that the chlorophyll contents was significantly and negatively correlated ($P<0.01$) with reflectance index at red and blue. PCA showed that grain yield was affected by Number of spikes per mete square, the high values of RGB reflectance index contribute at the elevation of the weight of 1000 kernels and plant height, a negative relation was observed between chlorophyll contents and RGB reflectance index.

Keywords: Grain yield, Reflectance, RGB, chlorophyll, semi-arid, Algeria

PHENO-MORPHOLOGICAL STUDY BETWEEN FIVE VARIETIES OF QUINOA (*Chenopodium quinoa* WILLD.) IN SEMI ARID REGION OF ALGERIA

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ABSTRACT

Quinoa (*Chenopodium quinoa* Willd.) has been cultivated for several thousand years in South America, It is a highly nutritious food product, with a high mineral content. Quinoa is now considered an alternative to traditional crops in a climate change scenario, given it more stability to adapt to marginal soils, droughts and frosts. Despite the interesting agronomic and nutritional characteristics of this crop, quinoa is characterized by individual attempts to define its phenological stages. This work consists of evaluating the phenological, and morphological behavior of five quinoa varieties in arid region. The research demonstrated considerable variation across genotypes in a range of morphological characters, which are useful as indicators in characterizing quinoa plants, including height in (cm) and color of the stem, morphology of the leaves (size, serration), and color of the seeds. Genotypic differences were noted. The varieties have more favorable characteristics.

Keywords: *Chenopodium quinoa* Willd., Adaptation, Genetic diversity, Morphology, Phenological stages, Drylands

PIEGING DETERMINATION OF THE DIVERSITY AND ABUNDANCE OF INSECT FAMILIES ASSOCIATED WITH GROWING TOMATOES IN BLIDA GREENHOUSE

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ABSTRACT

In Algeria, the production of tomatoes under greenhouse is carried out under conditions of high pressure of insect pests. However, few studies have examined the diversity of these insects and the assessment of their abundance. In this study, the objective was to establish a list of the families of insect pests, parasitoids and predators captured using yellow traps at the level of the tomato crop under greenhouse shelter of the Faculty of Nature Sciences in Blida. Our 4-month study identified 37 genera and species of insects. These insects belong to nine orders and 26 families. For insect pests the main families represented by *Aleyrodidae, Aphididae, Cicadellidae, Gelechiidae, Noctuidae* and *Tephritidae*. Natural insect enemies have also been found in low abundance in traps. They belong to the families of *Coccinellidae, Ichneumonidae, Braconidae, Ceraphronidae, Platygastridae, Mymaridae* and *Scelionidae*. There is an almost similar evolution of auxiliaries and pests in the cultivation of tomatoes under greenhouse: the peaks of the pest population are observed between the 14th and 28th day after transplanting (DAT) and that of auxiliaries between the 28th and 35th DAT.

Keywords: Ravageurs, auxiliaires, Biodiversity, Tomate souce, Blida

CHEMICAL COMPONENT CHANGE OF COCOA POD HUSK DUE TO THE FERMENTATION PROCESS USING ASPERGILLUS NIGER WITH DIFFERENT LEVEL OF TURMERIC POWDER

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ABSTRACT

As one the cocoa production center in Indonesia, the availability of cocoa pod husk (CPH) in South Sulawesi is abundant. This waste has a great potency as an alternative feedstuff for such ruminant as goat. However due to some limitation, such as high fiber and low crude protein content, this stuff need to be processed in order to optimize its use. The study aimed to evaluate the change in the chemical components of the CPH due to fermentation process using *Aspergillus niger* with different levels of turmeric powder. The experiment was carried out according to completely randomized design consisted of five treatments and three replications giving the total number of experimental units of 15. The treatments were CPH without fermentation (T0), CPH fermented without any addition (T1), CPH + 0.5% turmeric powder + *A. niger* (T2), CPH + 1.0% turmeric powder + *A. niger* (T32), CPH + 1.5% turmeric powder + *A. niger* (T4). The fermentation was carried under anaerobic condition for 21 days. The results of study indicated that increase level of turmeric powder together with the use *A. niger* in the fermentation of CPH significantly affected ($P<0.05$) the crude protein, crude fiber, and nitrogen free extract contents of CPH, however the treatment did not have any significant ($P>0.05$) effects on the crude fat and ash components of the CPH. In conclusion, fermentation CPH using turmeric powder and *A. niger* could be considered as one of alternative methods to improve the chemical components of the CPH so that its use as ruminant feed can be optimized.

Keywords: Cocoa pod husk, Aspergillus niger, Tumeric powder, Fermentation, Chemical composition

EFFECTS OF HORSE CHESTNUT EXTRACT (*Aesculus hippocastanum* L.) ON BONE AND CALCIUM METABOLISM IN HIGH-PROTEIN DIETARY RATS

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ABSTRACT

The aim of this study was to examine the effects of giving rats high protein diets horse chestnut (*Aesculum hippocastanum* L.) extract on bone and calcium metabolism. In this study, in which casein was used as a high protein source, 50 male Sprague-Dawley rats, 2-3 months old, were divided into 5 groups, one as a control and the other for the study. While the control group (C) was fed a standard rat diet, high protein group (HP) was fed an additional 25% casein to the standard diet, high protein and horse chestnut group (HP + HC) was fed an additional 25% casein to the standard diet and an extract of horse chestnut, horse chestnut group (HC) was fed a standard diet horse chestnut extract; ethyl alcohol group (EA) was fed a standard diet plus a 20 ml%50 ethyl alcohol and water mixture. Animals were given 100 mg/day/kg of horse chestnut extract dissolved in 20 mL of %50 ethyl alcohol and water mixture via gavage. For 30 days, rats were housed with 12 hours of light and 12 hours of darkness at normal room temperature. Calcium, parathyroid hormone (PTH), vitamin D, calcitonin, ostecalcin, phosphorus, alkaline phosphatase (ALP), total protein, urea nitrogen, and glocose levels were determined in blood samples taken at the end of the study. The serum calcium level of ethyl alcohol group is lower than control and study groups' levels ($P<0.001$). Applications of high protein diet and horse chestnut extract had no effects on plasma parathyroid hormone (PTH), calcitonin, osteocalcin, vitamin D and serum alkaline phosphatase but plasma vitamin D level was obtained an increased in ethyl alcohol group ($P<0.07$). In our study serum inorganic phosphorus ($P< 0.001$), plasma total protein ($P< 0.001$) and urea nitrogen ($P< 0.001$), levels were elevated in feeded rats with high protein compared to the control group, the difference between high protein feeded with horse chetnut extract and the other study groups' serum inorganic phosphorus and plasma urea nitrogen were statistically significant but applications of high protein diet and horse chestnut extract had no effects on plasma total protein levels. The high protein diet and extract application did not cause a significant difference in plasma glucose levels but at animals which feeded with ethyl alcohol and horse chestnut extract plasma glucose levels showed a statistically significant decrease ($P<0.001$). It was concluded that high protein feeded and ethanolic extract of horse chestnut had no effect on blood calcium level and hormones that regulate blood calcium levels. However, horse chestnut feeded caused a decrease in blood urea nitrogen and will reduce the negative effect of ethyl alcohol.

Key words: *Aesculum hippocastanum* L., aescin, calcium, rat, saponin

HISTOLOGICAL EXAMINATİON OF ANNUAL CYCLE OF GONAD DEVELOPMENT OF *Barbus cyclolepis* (CYPRİNİDAE) FROM THE MARİTZA RIVER (BULGARIA)

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ABSTRACT

This study was to perform histological analysis of the process of gametogenesis of the round-scaled barbel *Barbus cyclolepis,* from the middle course of the Maritza River (Bulgaria). 183 specimens were sampled monthly by electrofishing from March to November. The ovaries and testes of the mature individuals undergo a regular annual cycle, divided into six stages. The ovulation period started in early May, continues until July, and in early August was already terminated. All mature females showed characteristics of batch spawning reproduction type. A single case of ovotestis was established in a male fish (3.8 g and 65 mm) caught in April. The ovotestis did not differ from the testis macroscopically, but the histological examination revealed previtellogenic oocytes, positioned in groups or separately among the testicular lobules. The possible reasons for the appearance of this abnormal development in the gonads of the male barbel are discussed.

Keywords: *Barbus cyclolepis*, ovaries, testis, ovotestis, sexual maturity

SIMULATION STUDY OF LECITHIN BASED NANOLIPOSOME ENCAPSULATING COENZYME Q10

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ABSTRACT

Liposome-based drug delivery systems have been studied since the 1950s. The amphiphilic properties of liposomes have made them preferred materials as drug delivery systems. Thanks to this property, they can carry polar and non-polar materials. By using this system, it is aimed to increase the bioavailability of the drug, to transport the drug to the target area while making use of the non-toxicity of liposomes. Lecithin, an important component of the lipid bilayers of cell membranes, was chosen for liposome formation. Lecithin is a natural lipid mixture of phospholipids and is often preferred as various nanosystem delivery vehicles such as liposomes and nanoparticles. Coenzyme Q10 is a vitamin-like fat-soluble molecule. This molecule acts as electron and proton carrier in mitochondria and participates in aerobic cellular respiration by producing energy in the form of ATP. In the study, different concentrations of liposomes were obtained from lecithin molecules and the concentration of coenzyme is kept constant. Density profiles of the formed structure, RDF analysis, Voronoi analysis and encapsulation efficiency were examined. Unlike experimental studies, this study was carried out with dissipative particle dynamics (DPD) method as coarse-grained (CG) simulations in computer environment. This research is financially supported by TUBITAK project no. 119Z034.

Keywords: Simulation, Coenzyme Q10, Lecithin

CHEMICAL AND STRUCTURAL CHARACTERIZATION OF A (1,6) DEXTRAN PRODUCED BY LEUCONOSTOC MESENTEROIDES SUBSP MESENTEROIDES LGM5 FOR FOOD PURPOSES

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ABSTRACT

Polysaccharides aroused great interest among scientists over the past thirty years. These macromolecules from renewable and abundant sources such as plants (cellulose, starch, alginate...) animals (chitin, hyalauronique acid...), microorganisms (pullulan, dextran produced by Leuconostoc mesenteroides...), and these polysaccharides have taken an important place in the world of polymers as evidenced by the recent studies on them affecting the increasingly diverse applications in the food industry , cosmetics but also in paints and textiles due to their gelling properties , thickening , emulsifying moisturizer (especially sought food : cream, ice vinegar ..). For this purpose, a production of exopolysaccharide by *Leuconostoc mesenteroides subsp mesenteroides* LGM5 strain isolated from Algerian animal's samples was investigated. The EPS was composed exclusively of glucose based on componential analysis of this hydrolysis biopolymer by thin layer chromatography. Moreover, investigations carried out on the structural characterization of this polysaccharide by FTIR and NMR (H1 and C13) analysis confirmed that it is an α (1,6) dextran with 11.03 % of α (1,3) branching. New potential applications of polysaccharides yet emerge, especially in an area at the interface between the pharmaceutical and food world, such as prebiotics.

Keywords: *Leuconostoc mesementeroides subsp mesenteroides*, exopolysaccharides, prebiotics, food

DINUCLEOSIDE POLYPHOSPHATES (NPNN'S) INVOLVEMENT IN STOMATAL CLOSURE IN ARABIDOPSIS THALIANA

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ABSTRACT

Regulation of plant defense mechanisms occurs on a molecular level, in which signal transduction plays a key role. The ability of extracellular nucleotides to initiate diverse signalling responses in animal cells is well established, while in plants is recognised only just now. A growing number of nucleotides classified as signalling molecules are being identified. Our recent studies focused on the function of dinucleoside polyphosphates (NpnN′s) in plant cells. In plants, these so-called uncommon nucleotides are molecules involved in defense reactions by triggering induction of the protective secondary metabolites synthesised *via* the phenylpropanoid pathway. Although Ap4A and other NpnN′s have been identified almost across all kingdoms of organisms, the mechanisms of signal perception and transduction evoked by Np4N′s remain unknown. Recently, extracellular ATP (eATP) has been added to the group of signalling nucleotides. Studies have shown that eATP-treated leaves of *Arabidopsis thaliana* have closed stomata, leading to enhance resistance to biotic stress factors. Plants respond to eATP by elevation of messenger agents, i.e. nitric oxygen (NO) and reactive oxygen species (ROS), which have been identified as essential components of the complex signalling network inducing stomatal closure. Simultaneously, messenger agents trigger the transient phosphorylation of MAPK, especially MPK3 and MPK6, and the expression of defense-related genes. So far, only two plant receptors of eATP have been identified, i.e. P2K1 (LecRK-I.9) and P2K2 (LecRK-I.5). Our preliminary studies conducted on peeled *A. thaliana* wild-type (Col- 0) leaves treated with 2mM solution of various NpnN′s showed that similarly to eATP only Ap4A and Cp4C effectively close leaf stomata. In this communication, we report that ROS are involved in signal transduction evoked by Ap4A and Cp4C. We have observed an increase of superoxide (•O2−) at intra- and extracellular levels. Moreover, leaves treated with 2 mM solution of Ap4A and Cp4C with the addition of ROS enzymatic scavengers, namely catalase (CAT) and superoxide dismutase (SOD) lacked stomata closure. Neither CAT nor SOD by itself did not induce stomatal movement. Interestingly, a study on peeled *p2k1, A. thaliana* knockout mutant, leaves treated with 2 mM solution of Ap4A and Cp4C suggests that P2K1 is involved in signal perception evoked by Ap4A but not by Cp4C. Additionally, quantitative real-time PCR analysis indicate up-regulation of the genes encoding selected serine-threonine protein kinases (SnRK) involved in the regulation of plant's responses to nutrient limitation, drought, cold, salt, and osmotic stresses.

Keywords: Arabidopsis thaliana; dinucleoside polyphosphates (NpnN′s); diadenosine tetraphosphate (Ap4A); dicytosine tetraphosphate (Cp4C); plant signaling; stomata

BIOSTIMULANT ACTIVITY OF ALLELOPATHIC PLANT EXTRACTS ON SUNFLOWER (*Helianthus annuus*)

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ABSTRACT

Biostimulants increase plant growth and yield by activating physiological and metabolic processes to improve plants nutrient uptake from the soil. The biostimulant effect of plant extracts obtained from plant leaves, roots and seeds are intended for increasing the uptake of nutrients available in growth media. It also helps to increase the stress tolerance of plants. Many factors such as the production method, biochemical content, application method, application dose, application frequency, and target plant species of plant extracts are closely related to the positive or negative effects of the allelopathic effect. Field trials have a vital role in developing low-input innovative approaches, their applicability in field conditions, their effects on yield and quality parameters, and the determination of success rates and deficiencies. In addition, it has aimed to obtain findings that will contribute to the recovery of production wastes (such as post-harvest plant parts, roots, leaves and plant pulp) and increase the usage areas. Sunflower seeds were treated with different doses of the prepared plant extract. The effects of plant extracts on the studied parameters of sunflower varied according to the processing time and the type of plant extract. It has been determined that it has a significant positive effect on physiological processes such as germination time, seedling formation, tray formation time, and tray diameter in sunflowers. According the results, physiological maturity processes were approximately 20% Marocter between the extracts applied and the non-extracted sunflowers seeds. In addition, statistically significant differences were determined between yield parameters such as the number of grains per tray and oil yield. Besides, important results have been obtained that will contribute to the application of exogenous seed preparation of renewable, bio-based plant extracts, low-input sustainable agriculture and organic farming systems. It was determined that the application of exogenous plant extract in sunflower created significant differences in the criteria examined from germination to harvest. In addition, the study is one of the important studies in which the wastes generated as a result of plant production and processed products gain economic value by recycling them as biostimulants.

Keywords: Plant extracts, biostimulant, sunflower

INVESTIGATION OF THE CYTOTOXIC AND GENOTOXIC EFFECTS OF YTTERBIUM OXIDE (Yb2O3) NANOPARTICLES ON HUMAN DERMAL FIBROBLAST CELLS

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ABSTRACT

Nanoparticles, which gained importance in parallel with the development of nanotechnology, appear in all areas of our lives today. Many different nanoparticles are synthesized for different purposes and are used in countless fields from medicine to textile, from cosmetics to defense industry. One of these nanoparticles is ytterbium oxide (Yb2O3). Although products using ytterbium oxide nanoparticles have taken their place in the market, information and literature about their biological effects are quite limited. The use of ytterbium oxide nanoparticles in many fields, including medicine and biomedicine, and the envisioning of a number of applications in the near future, require investigation of the possible effects of these nanoparticles on human health. For this purpose, possible *in vitro* cytotoxic and genotoxic effects of Yb2O3 nanoparticles on normal human dermal fibroblast (NHDF) cells were investigated. Cytotoxicity was evaluated using the xCELLigence real-time cell analysis system, while genotoxicity was evaluated using a single cell gel electrophoresis (comet) test and cytokinesis-block micronucleus test. Cells were exposed to Yb2O3 nanoparticle concentrations (0.1, 10, 50 and 100 µg/mL) for 3 and 24 hours while evaluating the genotoxic effect. The findings showed that Yb2O3 nanoparticles increased the genetic damage index and the percentage of damaged cells in NHDF cells. A significant increase was observed, especially at doses of 50 µg/mL ($p<0,05$) and 100 µg/mL ($p<0,001$) compared to the negative control. Similarly, the micronucleus ratio increased with increasing dose, the increase occurred at 100 µg/mL ($p<0,001$) dose was higher than 10 µg/mL and 50 µg/mL ($p<0,05$) dose. As a result, it can be said that Yb2O3 nanoparticles have dose and time dependent cytotoxic and genotoxic effects on NHDF cells.

Keywords: Ytterbium oxide nanoparticles, dermal fibroblast cells, nanotoxicology, cytotoxicity, DNA damage, genotoxicity, comet assay, micronucleus assay.

MALE FERTILITY PRESERVATION AND CANCER TREATMENT IN THE ORAN REGION

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ABSTRACT

Each year, cancer affects more than one million young adults in high-income countries. In developing countries, such as Africa, cancer treatments can affect fertility and can also cause infertility. The aim of this study is to describe the epidemiological characteristics of cancer patients who wish to preserve their fertility during cancer treatment. At the same time, our study aims to take stock of access to fertility preservation for young cancer patients in our region. Patients and methods: I carried out a retrospective study by exploring the medical records of 98 patients with different cancer and whose management was carried out at the level of medically assisted procreation (AMP) El-Mawloud d 'Oran over a 12-year period from January 1, 2009 to April 30, 2021. For data collection, we used a structured exploitation sheet to obtain the necessary information. Variables were analyzed using SPSS Software Version 20.0. The median age of the patients was 30.48 years with extremes ranging from 16 to 60 years. The predominant age group is between 31 and 40 years old. Most of the patients were unemployed 47% and 20% were still studying. The patients reside in the north-west of Algeria with a percentage of 38% while the rest of the percentage is divided between the rests of the country, from 9% to 1%.El-Mawloud Medicated Reproductive Assistance Center (AMP) notes an average of 7.69 patients / year, which came to cryopreserved sperm. 90% of patients have testicular cancer and 10% have other cancers, 15% of patients with testicular cancer have undergone orchiectomy, 94% have cryopreserved their sperm before Starting the Protocol cancer treatment (100% chemotherapy). While 6% of them were only informed about the possibility of freezing their spermatozoa while they hadstarted their therapeutic protocol, 75% of patients were referred to the center by their doctors in order to cryopreserve their sperm. While 25% did so on their own. At the end of this work, we concluded that a lot of progress remains to be made in order to promote techniques for preserving the fertility of young cancer patients in our region. We recommend the organization of awareness campaigns for patients and health professionals on the risks of impaired fertility associated with ontological treatments, as well as the various strategies available to overcome this problem.

Keywords: Cancer, Treatment, Infertility, cryopreservation, AMP

DATABASE AND SOME SOIL/LAND CHARACTERISTICS OF KUMKALE AGRICULTURAL ENTERPRISE SOILS IN THE ENVIRONMENT OF GEOGRAPHIC INFORMATION SYSTEMS

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ABSTRACT

TİGEM, which has been operating since 1994, is a state institution whose aim is to protect the gene resources as well as the production of seeds, breeding and raw materials for agriculture and agriculture-based industry. There are more than 30 agricultural enterprises established for similar purposes in Turkey. One of these enterprises is Kumkale Agricultural Enterprise located within the borders of Çanakkale province. The aim of this study is to reveal the current potentials of Kumkale Agricultural Enterprise lands, for which detailed studies have been made before, to create a database in GIS environment and to produce various thematic maps. In this study, important soil characteristics such as slope, soil depth, surface stoniness, drainage, as well as soil series and physiographic units included in the survey report were mapped and the areas covered were calculated in GIS environment. With the digitization has determined that the agricultural enterprises lands in question are spread over an area of 7309 decares in total. In terms of soil series, the highest distribution area belongs to Karabatak series (948.2 da), while Alluvial soils (3094.8 da) have the highest distribution area in terms of physiographic units. In addition, most of the lands consist of 0-2% slope, deeper than 120 cm, stone-free and without drainage problems. As a result, it will be useful to examine both the temporal and spatial changes of the lands of TİGEM, which has a significant production capacity in Turkey, to make new field studies and compare them with the old survey studies in terms of guiding future studies.

Keywords: Kumkale, soil mapping, GIS, agricultural enterprise

OVERVIEW OF SOILS OF TAHIROVA AGRICULTURAL ENTERPRISE IN GIS

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ABSTRACT

The General Directorate of Agricultural Enterprises, which protects genetic resources and supports agriculture-based industry, as well as plant and animal production, was established to produce all kinds of goods and services. In this study, various thematic maps were produced by evaluating some of the land and soil properties of Tahirova Agricultural Enterprise's soils, which were previously surveyed and mapped, in GIS environment and by creating a database. There are 9 different soil series in the agricultural enterprise. These series are named as Camlık, Turplu, Ciftecesmeler, Sabanada, Gonen, Tatliazmak, Saplı, Tahirova, Kulubeada. Among the series, soils of Gönen series show the highest distribution with 2551.82 da. This is followed by the Tahirova series with 2134.62 da. The Kulubeada series, which occupies the least area, spread over 281.32 decares of land. In addition, the physiographic unit that occupies the most space in the enterprise is Aluvials and it constitutes 62% of the area. A large part of the enterprise land; It consists of flat, 0-2% inclined, very deep (120 cm+), stone-free, well-drained, salt-free areas. Except for the lands in the northern part of the enterprise land, there is no significant agricultural problem. Soil depth, drainage and salinity problems in the lands in the northern region reach levels that hinder agricultural production. As a matter of fact, these lands have defined as IV., VI. and VII class lands. Except for a very small area in the south of the enterprise, there is no slope problem in the lands. Soils are deep and very deep and do not constitute an obstacle to agricultural production. With this and similar studies, it is among the most important studies to monitor the temporal changes in the lands of TİGEM, which has the most important lands in Turkey, and to evaluate this in the GIS environment.

Keywords: Tahirova, GIS, soil mapping, soil series

DISSIPATIVE PARTICLE DYNAMICS SIMULATIONS OF MRNA DELIVERY WITH IONIZABLE CATIONIC LIPD DOTAP

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ABSTRACT

Messenger ribonucleic acid (mRNA) is a single-stranded molecule of RNA that corresponds to the genetic sequence of a gene and is read by a ribosome in the process of synthesizing a protein. If we want to synthesize a protein, we have two ways. The first way, we can add the gene that synthesizes the protein but since it directly affects DNA, it can affect its work, which is risky. The second way is mRNA inserted into the cell. The second way is safer than the first way. Recent developments show that lipid nanostructures are suitable for mRNA delivery. Lipids are amphiphilic molecules. They have hydrophilic (polar) and hydrophobic (apolar) parts in their structures. Both hydrophilic and hydrophobic active ingredients can be encapsulated with high efficiency. The lipid nanostructures are like the cell membrane that these nanostructures are biocompatible. They are designed for encapsulation, protection and intracellular delivery of the molecule desired to be delivered, especially nucleic acids. They do not have any side effects. Last years researcher found new lipid nanoparticles that are referred as lipids. Ionizable lipids can escape from the immune system more effectively, so they show a more efficient delivery performance. Through the ionized lipids, both the stability of the genetic material is ensured and the entry into the target cell is facilitated. We are interested in DOTAP (Dioleoyl-3-trimethylammonium propane) cationic lipids that are ionizable. We use dispersive particle dynamics (DPD) method as coarse-grained (CG) simulation in the computer environment. We simulate DOTAP and mRNA interaction with the DPD method. This work is supported by TUBITAK with project no 221Z263.

Keywords: DPD, liposome, DOTAP, corse-grain, mRNA delivery

INVESTIGATION OF FIN DESIGNS FOR ENHANCING THERMAL EFFICIENCY OF PV

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ABSTRACT

One of the most important obstacles to increasing the performance of PV (Photovoltaic) panels is the high panel temperature. Most of the study on PV is about solving the problem of decrease in thermal efficiency of the overheated panel. In order to eliminate this obstacle, the aim of this study is to perform a cooling design to increase the thermal efficiency of a monocrystalline solar panel. First of all, the drawing of a reference PV panel was made in Solidworks program. Then, validation of thermal analysis of PV panel based on the STC (standard test conditions) values was performed by using the ANSYS Steady State Thermal program. After the validation, two PV models with different cooling parts were designed. The cooling parts were made of aluminum and consist of holed and non-holed fins. Analysis of new design PV models was made with STC values again. When the simulations were examined, an efficiency increase of 0.92% was obtained on the panel as a result of the cooling system integration. The holed fin has not been significantly affect the efficency results compared to the non-holed design. It was determined that adding a cooling parts to the PV panel causes a significant decrease in the panel temperature.

Keywords: PV, Thermal efficiency, Fins

NUMERICAL INVESTIGATION OF THE EFFECT OF FRONT WING MODELS ON AERODYNAMICS OF F1 CARS

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ABSTRACT

One of the main topics of the automotive industry has been the improvement of vehicle design aerodynamics to reduce the drag coefficient. In order to reduce lap times in F1 (Formula 1) races, it is of great importance to improve car aerodynamics. In this study, the effect of front wing design on aerodynamics in F1 cars was investigated. Three different front wing models were designed in Solidworks program. Then three-dimensional airflow simulation was applied on the Petronas F1 car model. Simulations were made by using Ansys Fluent software. The free flow velocity was calculated as 75 m/s and the solutions were carried out in the k-ε turbulence model. According to simulations, drag force and drag coefficient were calculated and streamlines on different wing models were demonstrated. As a result of analysis it was concluded how the changes in the front wing model affect the aerodynamics of the F1 car and the best wing model for enhancing aerodynamics efficiency were determined.

Keywords: Front wing, Aerodynamics, Formula 1, Drag coefficient, Drag force

YIELD, GROWTH, PHYTOPHAGOUS AND NATURAL ENNEMIE'S ENTOMOFAUNA ARE IMPACTED BY SEAWEED ASCOPHYLLUM NODOSUM EXTRACT AND MULCH ON CHERRY TOMTO VARIETY CULTIVATED UNDER GREENHOUSE

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ABSTRACT

Sustainable tomato crop fertilization requires the consideration of nutritional plant balance as well as the impact of the phytophagous and natural enemies' arthropod communities that are attracted to the crop. The current study examined the effects of two bio-fertilizers, a botanical compost (100g/pot) and a seaweed extract-based *Ascophyllum nodosum* product (4ml/l), on the growth and production parameters of a cherry tomato variety cultivated in pots during a three months period from april to june 2021. All treatments incorporated into sterilized soil, were compared with fertilizers NPK 15-15-15 (5g/pot) and urea 46% and an unfertilized control. Plant development and captured entomofauna were examined both with and without mulching. The average number of flowers and fruits produced per plant, as well as plant height growth, were all positively impacted by the seaweed extract. The application of plant compost and NPK mineral fertilizer, however, did not have as much effect on plant growth and yield. Significantly different changes were found when the interactions of the mulch factor with the other factors (fertilizer and development period) were analyzed. The presence and average abundance of phytophagous and beneficial entomofauna communities appear to have been influenced by the modality with or without mulch. Phytophagous insects communities captures using yellow and blue sticky traps were composed, in order of importance, of thrips, whiteflies, aphids, and cicadoidea. These phytophagous categories' average abundances vary according to the insect pest, the mulching technique, and the fertilizer usage. We compiled a list of 23 taxa of beneficials, including Aranea, parasitoids, and pollinators. There was a good representation of the parasitoid species from the genera *Aphelinus* and *Encarsia* that are specific to aphids and whiteflies, respectively.

Keywords: Seaweeds, organic fertilizers, tomato crop, sustainable agriculture, insect diversity, greenhouse

QPCR AND TROUBLESHOOTING: FROM DEVELOPMENT TO VALIDATION APPROACHES

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ABSTRACT

The quantitative polymerase chain reaction is powerful tool usually employed in medical and agri-food laboratories. *Campylobacter* is recognized as leaders of intestinal and extra-intestinal foodborne illnesses in humans. *Campylobacter jejuni* and *Campylobacter coli* are the main species that can infect humans from the consumption of contaminated animal meat and/or their products. The aim of this poster is to report the critical checkpoint in case of genes real time amplification problems. To achieve this, scientific search engines including PubMed, ScienceDirect, Web of Science, Scopus, Wiley Online, and Google Scholar were consulted to collect data. It is worthy to mention that there is a scarcity of available studies about quantitative PCR troubleshooting. The main found contributions of this interest were firstly analyzed qPCR procedure to check the protocol and then repeat the experiment (operator error). Secondly, if case of problem persistence, a checkerboard technique remains necessary to investigate in order to determine the convenient master mix compounds concentration, including dNTP, buffer, $MgCl_2$ and *Taq polymerase*. The most important reagent are oligonucleotides sequences of primers and probes. Furthermore, others steps should be checked such as amplification program, instruments failure, template, etc. In conclusion, the qPCR troubleshooting is simply a logic problem that improves with practice and experience.

Keywords: *Campylobacter*, qPCR, troubleshooting, Development and Validation

EVALUATION OF ANTIMICROBIAL ACTIVITY OF ACETIC AND CITRIC ACIDS AGAINST Salmonella *thyphimurium* IN CHICKS FEED

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ABSTRACT

Today, the general public has become increasingly aware of salmonellosis problems. Organic acids are known by their antimicrobial potential and commonly used for improving the quality of poultry feed. In this context, the present work evaluated the inhibitory effect of two organic acids namely; acetic acid and citric acid at different levels of contamination by *Salmonella* Thyphimurium. The neutralization of these organic acids *in vitro* and in one day chick's organs was also investigated during the search for *Salmonella* serovars in birds as described in the Moroccan standard "NM 08.0.550". The effect of two organic acids on *Salmonella* Thyphimurium were tested *in vitro* and in the presence of chick's organs at different concentrations set of strain and organic acids tested. The MIC results demonstrated that citric and acetic acid inhibited *Salmonella* Thyphimurium at concentrations of 0.625%, and 0.512 % for the three levels of strain concentrations: 10, 100, 10^3 CFU/mL, respectively. The concentration of 0.04M of Na_2HPO_4 solution has proved, *in vitro*, in caecums and organs of chicks (in presence of organic acids) that strain introduced, even at low concentrations can be recovered. The use of additives has beneficial effects in *Salmonella* control program. However, the present results recommend the amendment of *Salmonella* research standard, taking into account the probable presence of organic acids in digestive content of one day old chicks.

Key words: MIC; Moroccan standard "NM 08.0.550"; One day old chicks; Organic acids; *Salmonella Thyphimurium*

CHARACTERIZATION OF COWPEA (*V. unguiculata* L.) ACCESSIONS FOR MORPHOLOGICAL AND YIELD PARAMETERS UNDER AGROECOLOGY OF SOUTH BULGARIA

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ABSTRACT

Cowpea [*Vigna unguiculata* (L.) (Walp.)] is a warm crop which is grown throughout the tropics and subtropics of the world. In Europe, cowpea is grown in southern part of the continent including Bulgaria, where it is grown near to boarder of Greece and Turkey. Collecting and preserving cowpea landraces are important activities aimed to conserve very well adapted local diversity as a source for crop improvement to meet the current and future challenges of climate change, like heat, drought, flooding and salinity, new pests and diseases. Cowpea can be grown under harsh conditions with low external inputs without irrigation. The goal of this work was to characterize and evaluate a subset of cowpea germplasm collection under field conditions without irrigation. 25 cowpea accessions with different origin (15 Bulgarian, 3 Chinese, 6 Korean and 1 Nigerian) were characterized and evaluated following the International Cowpea descriptor list. A total of 18 quantitative and qualitative traits were collected during vegetation and postharvest period. Days to flowering and days to maturity stages, plant height, leaf length and width, number of pods per plant, seed size and weight of seeds per plant and weight of 100 seeds were the most useful parameters for discrimination purposes. Higher-yielding, earlier maturing plants with big size of seeds were identified. Accessions with cat. No BOE0035, A9E1073 and A8E0553 were among the earliest flowering and early maturity accessions. Plant height of studied germplasm subset ranged between 41,6 and 140cm; number of pods per plant were from 5,2 to 20,8; weight of seeds per plant varied from 5,0g to 25,0g. The results of this research could be the base towards more efficient germplasm management in order to use cowpea collection as a source for the genetic improvement, particularly as an alternative grain legume crop suitable for cultivation in marginal dry areas.

Key words: Cowpea, germplasm, collection, characterization

MANAGEMENT OF NEONATAL ENCEPHALOPATHY

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ABSTRACT

Neonatal encephalopathy (NE) is a syndrome that can occur in newborn babies in which neurological function is disturbed. The most frequent cause of NE is lack of oxygen to the baby at some point during pregnancy or birth. NE is associated with high mortality and morbidity. Factors predisposing to NE can be antenatal, perinatal, or a combination of both. Antenatal maternal factors, familial factors, genetic predisposition, hypoxic ischemic encephalopathy, infections, placental abnormalities, thrombophilia, coagulation defects, and metabolic disorders all have been implicated in the pathogenesis of NE. At present, therapeutic hypothermia is the only treatment available, regardless of etiology. 50–80% of cases of NE are due to acute hypoxic ischaemia secondary to perinatal asphyxia. Perinatal asphyxia is characterised by impairment of gas exchange between the placenta and the fetus resulting in hypoxaemia, hypercapnia accompanied by metabolic acidosis and clinically defined as "failing to initiate or maintain regular breathing at birth". NE secondary to confirmed intrapartum hypoxia-ischaemia with umbilical cord blood acidosis, clinical encephalopathy, electroencephalographic (EEG) abnormalities and characteristic patterns of injury on brain MRI is termed as hypoxic-ischaemic encephalopathy (HIE); it is often associated with multi-organ impairment. Other possible causes of NE include neurometabolic disease, genetic conditions, infection (meningitis, TORCH etc), drug exposure, neonatal epilepsy syndromes, nervous system malformation and neonatal stroke. The requirement for investigation to exclude these other causes will depend on the presentation, history and clinical features of the individual case. Recognizing the etiology of NE involved can also guide investigations such as metabolic and sepsis workups to ensure optimal management and may allow the development of targeted adjunctive therapies related to the underlying mechanism and develop preventative strategies.

Keywords: neonatal encephalopthy, etiology, antenatal, perinatal, targeted adjunctive therapies

COMPARATIVE EVALUATION OF GLUCOSE INHIBITION ON GALACTOOLIGOSACCHARIDE SYNTHESIS IN TWO DIFFERENT REACTORS

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ABSTRACT

Galactooligosaccharides (GOS) are an important class of food-grade oligosaccharides produced enzymatically from dairy lactose by β-galactosidase. The enzyme catalyzes hydrolysis and transgalactosylation reactions simultaneously and thus glucose and galactose concentrations increases over time in reaction medium. Considering that galactose is used in the transgalactosylation reaction, keeping the glucose concentration under control would be possible with glucose oxidase enzyme (GOE). Formed glucose molecules in this way can be oxidized to gluconic acid and therefore inhibition level of glucose can be decreased. Therefore, the aim of the presented study is to investigate the effects of GOE on GOS synthesis in two different reactors. Continuous stirred batch reactor (reactor-I) and osmotic membrane distillation integrated reactor (reactor-II) were set to work for lactose concentration (LC) of 32 °Bx, temperature (T) of 35 °C and enzyme concentration (EC) of 6 U/g lactose solution (LS). Initially (t=0), 0.06 mg/g substrate (9.8 U/g LS) GOE from *A. niger* was added to the reaction medium. GOS synthesis were carried out with GOE free, 1x GOE and 4x GOE. The amount of total GOS obtained for 420 min reaction time was found to be 25.72%, 26.39% and 27.10% for reaction mediums of GOE free, 1x GOE and 4x GOE in reactor-I, respectively. In the same order, 27.55%, 27.44% and 26.89% total GOS amounts obtained for reactor-II. There was an increase in the total GOS amount with addition of GOE compared with the result of GOE free experiments. On the contrary, there was a slight decrease in total GOS amount with GOE experiments with respect to GOE free ones. In reactor-II, the inhibition effect of monosaccharides increases as the reaction medium concentration increases with time. Therefore, in the studies performed by adding glucose oxidase in reactor-II, the total GOS and lactose conversion values decreased slightly compared to the studies performed without adding GOE. Since the reaction medium does not concentrate in reactor-II, the concentration of monosaccharides increases more slowly. For this reason, GOE has a slightly positive effect in terms of GOS synthesis performance in this reactor. As a result, the addition of high amount of GOE to Reactor-I was not found to be applicable since it would significantly increase the unit cost of GOS.

Keywords: Glucose, Galactooligosaccharide, Reactor

ENZYMATIC SYNTHESIS OF GALACTOOLIGOSACCHARIDE IN OSMOTIC MEMBRANE DISTILLATION INTEGRATED SYSTEM: EFFECT OF WATER REMOVAL RATE

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ABSTRACT

Galactooligosaccharides (GOS) have been identified as the most specific bifidogenic factors among the prebiotic carbohydrates. GOS are synthesized from lactose by transgalactosylation (TG) reactions catalyzed by the enzyme β-galactosidase. However, GOS synthesis efficiency of this enzyme is low because it catalyzes TG and hydrolysis reactions simultaneously. In order to increase the efficiency of GOS synthesis, the integration of osmotic membrane distillation system into the enzymatic GOS synthesis process was done. Compared with continuous stirred batch reactor, an increase in total GOS was achieved in this production system since it provides high selectivity separation of only water from the enzymatic reaction medium with a microporous membrane with high hydrophobicity. However, insufficient permeate flux values were obtained at low reaction temperatures due to narrow area of flat membrane. Therefore, it was considered that the desired reactor performance might have not been achieved due to this drawback. Also, it is observed in this reactor that TG activity was higher in the first 1-2 hours of the GOS synthesis reaction. In this manner, it was aimed to investigate how the TG activity would be affected if the concentration of galactosyl receptors in the environment increased in this time period, in other words, if the water removal rate was increased. For this purpose, GOS synthesis was studied with a flat membrane at different initial feeding amounts and a capillary type membrane with a larger membrane area. Osmotic membrane distillation integrated reactor were set to work for lactose concentration (LC) of 32 °Bx, temperature (T) of 35 °C and at different enzyme concentrations (EC). It was found that no significant difference was observed in the total GOS at increasing or decreasing water removal rates compared to the results obtained with the 300g initial feed solution. There was no correlation between TG activity and water removal rate. It was conducted that the enzyme needs particular time for TG activity, so a slow increase in the reaction medium brix rate provides better results. Because the rapid increase in the concentration of enzyme inhibiting agents in the reaction medium limited the TG activity.

Keywords: Galactooligosaccharide, Enzyme, Osmotic membrane

PRINCIPLES OF TQM IN TOBACCO PRODUCTION IN R. NORTH MACEDONIA

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ABSTRACT

Introducing and use of total quality management in tobacco production is very current and a complex category which, in the future, will give an incentive of its implementation in order to achieve competitive advantage. The effects of total quality management are only an indicator of further studies. This study is focused on the analysis of a very important point of view in the process of implementing total quality management in tobacco production for gaining competitive advantage. By integrating the basic principles of total quality management, the tobacco producers themselves begin to experience the benefits and positive effects of utilizing it. The studies that were made will contribute to furthering the knowledge of this current global process and will stimulate tobacco producers to have a more scientific approach to the assesment of the benefits of total quality management in the future, and at the same time, to begin using total quality management in order to acquire competitive advantage.

Keywords: TQM, TQM principles, tobacco, tobacco production

PRODUCTION OF STARCH-BASED BIOPLASTIC AND ITS USE IN 3D PRINTERS

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ABSTRACT

Polymer filaments are widely used in 3D printers using additive manufacturing technology such as FDM Technology. Bioplastic materials and composite materials are produced from these filaments. In order to slow down and prevent environmental pollution, which has become one of the major problems of our age, the use of environmentally friendly materials that do not harm nature has become a necessity. In this study, the changes in the mechanical properties of the polymer formed by adding graphite additive to starch matrix biopolymers and removing the glycerol with hardening properties from the mixture were analyzed and the use of this polymer mixture in three-dimensional printers with "core –xy" type screw extruder was applied. In addition, the mechanical and physical behaviors of bioplastics such as tensile strength, electrical conductivity and morphological structure, obtained by adding graphite and some fiber materials, as reinforcement material to bioplastics whose matrix material is starch, was also examined.

Keywords: Corn starch, biodegradable materials, bioplastic, 3D printer

STUDY ON ARTHROPOD SAMPLING TECHNIQUES

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ABSTRACT

The objective of this study is to make a biocenotic inventory of the main arthropods dependent on the vine. Our experimental device is based on different capture techniques, in particular colored traps, these are yellow or blue plastic containers filled with water containing a small quantity of detergent playing a wetting role, the principle of the method is to attract flower insects. A second technique of barber pots, these are metal pots filled with water and a small amount of washing up liquid, they are used to capture ground walking arthropods such as beetles, the Japanese umbrella technique is a square of canvas white, stretched at the four corners of the wooden rods, it is used to harvest living insects on the tree and it consists of hitting the branch from top to bottom using a stick. Special monitoring using pheromone traps against the Californian thrips (*Frankliniella occidentalis*) in order to establish these fluctuations during the vegetative cycle of the vine.

Keywords: Arthropods, vine, trap, inventory, sampling technique

STUDY ON THE CYCLE OF THE VINE

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ABSTARCT

The objective of this study is to describe the different stages of the vine cycle. The vine grows cyclically each year, it goes through two distinct cycles, the winter cycle which goes from mid-November to March, this is when the vine rests and the vegetative cycle which extends from March to mid-November. , this is when the vine will be active. In the spring the vine was pruned during the winter which leaves cut wounds, the sap rises at the end of the pruning corresponding to the weeping phase. between the end of March and mid-April the buds open to let new shoots appear (bud burst phase), Leafing occurs at the end of spring, so the stage where the leaves appear, after leafing the flowers will arrive, this is the bloom. In June comes the phase of setting, The flowers having been fertilized, they will turn in to grapes and form a small berry. Around August we will witness the veraison, the moment when the grape berries begin to change color. After the veraison phase when entering the maturation stage, the grapes will ripen and take their final shapes and sizes sowe arrive at the harvest, this is the time when we pick the grapes between September and October.

Keywords: Vine, vine cycle, vegetative cycle, winter cycle, grape

VIRTUAL SCREENING FOR IDENTIFICATION OF HUMAN BLEOMYCIN HYDROLASE INHIBITORS

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ABSTRACT

Knowledge of accurate binding poses of small-molecule ligands to the rapidly increasing number of proteins with known three-dimensional structures is key to understanding the mechanisms of function of these proteins. Protein activity is often modulated by binding of a small molecule to specific sites on the protein, and the disturbance of such regulation can cause diseases. Hence, many drugs work by inhibiting the function of excessively active proteins. Also, the proper activity of malfunctioning or non-functioning proteins causing a disease can be restored by the binding a specific chemical. Human bleomycin hydrolase is a papain superfamily cysteine protease that has the signature active site residues of this family and acts as an aminopeptidase. The main physiological role of bleomycin hydrolase is not yet known, but it catalyzes the inactivation of the antitumor drug bleomycin. However, its presence in dystropic neurites of amyloid plaques suggests that it plays a role in processing of the amyloid precursor protein, which is the source of β-amyloid peptides that aggregate creating amyloid plaques of sporadic and familial cases of Alzheimer's Disease. Therefore, in this study we suggest that inhibiting human bleomycin hydrolase would prevent the degradation of the amyloid precursor protein to β-amyloid peptides. In order to find potential inhibitors, we developed a computational workflow for virtual screening and applied it to human bleomycin hydrolase. The workflow includes i) pharmacophore creation from either the target protein or the known active ligand or from both, ii) pharmacophore filtering to reduce the size of the library, iii) molecular docking of the filtered compounds to the target's binding site, iv) scoring the bound poses with different scoring functions, and v) running two sets of molecular dynamics simulations on a smaller selected subset of compounds to predict their binding free energy to the target protein by the LIE method. As a result of the study, four molecules were shown to micromolar inhibition activity.

Keywords: Computer-aided drug design, docking, pharmacophore, bioinformatics, molecular dynamics simulations

COMPARATIVE INVESTIGATION OF THE EFFECTS OF CURCUMIN AND NEW GENERATION ULTRASOL CURCUMIN ON A NEUROBLASTOMA CELL LINE

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ABSTRACT

Neuroblastoma is a common cancer type in childhood and originates from sympathetic nervous system cells. It is a heterogeneous cancer type and can regress spontaneously or may become tolerant to the treatment. Natural substances have been used as a supplement to overcome the side effects and/or disadvantages of therapies used for the treatment of neuroblastoma. Curcumin, isolated from turmeric, has been recognized as an effective anti-cancer agent that regulates multiple intracellular signaling pathways such as cell proliferation, cell survival, metastasis, tumor suppressor and apoptotic pathways. It has been observed that curcumin supplementation induces apoptosis and cell cycle arrest in neuroblastoma cell lines. However, low water solubility, poor pharmacokinetics and bioavailability limit the clinical use of curcumin, and new analogues are being developed. The next generation ultrasol curcumin (NGUC) containing 20% curcuminoids has recently been developed and shown to be almost 65 times more bioavailable than curcumin *in vivo*. Thus, we here studied the effects of NGUC on the proliferation and survival of a neuroblastoma cell line (N1E-115) *in vitro* using MTT and flow cytometric analysis. We found that administration of 100µM, 50µM and 25µM curcumin induced nearly 40% cell death after 48h incubation. Interestingly, NGUC also induced 30-40% cell death at 200µM and 100µM concentrations. The percentage of apoptotic, necrotic and live cell analysis by flow cytometry after Annexin-V and Propidium iodide staining revealed the similar results. Given that NGUC contain only 20% curcuminoids, in compared with 95% in natural turmeric extract (4.75 times less curcuminoids in NGUC), our results might suggest that NGUC is more efficient to promote cell death in N1E-115 cell line. However, both *in vitro* and *in vivo* studies are needed to confirm and also extend our findings.

Keywords: Neuroblastoma, Curcumin, Ultrasol Curcumin

COMPARATIVE INVESTIGATION OF THE EFFECTS OF CURCUMIN AND NEW GENERATION ULTRASOL CURCUMIN ON A GLIOMA CELL LINE

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ABSTRACT

Glioma is one of the most common types of primary brain tumors that occur in the brain and spinal cord. The heterogeneous structure of tumor cells, highly metastatic nature, and inability of anti-tumor drugs to cross the blood-brain barrier are associated with poor prognosis, and current treatment for glioblastoma mainly includes radiotherapy and chemotherapy. Curcumin is the main ingredient of spice turmeric, and has anti-tumor activities against a wide variety of cancer cells through regulation of multiple mechanisms. Despite its advantages, there are some limitations in the clinical use of curcumin including low solubility in water, poor bioavailability and pharmacokinetics. In order to overcome these limitations, the analogues of curcumin have been developed. One of those analogues is the next generation ultrasol curcumin (NGUC) containing 20% curcuminoids, which has recently been formulated and shown to be approximately 65 times more bioavailable than natural curcumin. Due to its advantages over curcumin, in this study we tested the effects of NGUC on the proliferation and survival of glioma cells (C6) *in vitro* by MTT and flow cytometric analysis. We found that while administration of 50μM curcumin induced 40% cell death after 48h incubation, NGUC induced 30% cell death at 200μM concentration and %35 at 100μ concentration. The similar results were obtained from the flow cytometric analysis after Annexin-V and Propidium iodide staining. Collectively, as NGUC contain only 20% curcuminoids, compared to 95% in natural turmeric extract (4.75 times less curcuminoids in NGUC), our results suggest that NGUC might be more effective than curcumin in inhibiting the proliferation and survival of C6 cells. However, it should be noted that both *in vitro* and *in vivo* studies are needed to confirm and also extend our findings.

Keywords: Glioma, Curcumin, Ultrasol Curcumin

CONTRIBUTION TO THE STUDY OF PARASITES ENCOUNTERED IN DEER (*CERVUS ELAPHUS*, LINNÉ, 1758)

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ABSTRACT

Parasites are very harmful beings for all domestic and wild animal species, in particular the deer, which prompted us to carry out this study within three stations: the Hamma trial garden, the Zéralda hunting center and the Akfadou site. Our study was based on the search for endoparasites by coprology, and a search under magnifying glass for ectoparasites. For this first analysis, two methods have been adapted: flotation, which is qualitative, and McMaster, which is quantitative. the results obtained show a very apparent predominance of nematodes, in particular the family of strongyles with a very high frequency reaching 94.6% in certain samples analyzed, followed by a lower frequency of flagellates, followed by ciliates, trematodes, cestodes and finally a negligible frequency of around 1% for coccidia. Regarding ectoparasites, only one species has been identified, namely: Acarus sp. 19 species of endoparasites are found, namely: *Balantidium coli*, *Chilomastix* sp., *Eimeria* sp., *Trichostongillus* sp., *Chabertia* sp., *Ostertagia* sp., *Nematodirus* sp., *Haemonchus* sp., *Strongyloides* sp., *Bonustomum* sp., *Ancylostoma* sp., *Ascaris* sp., *Toxocara* sp., *Capilaria* sp., *Trichuris* sp., *Cooperia* sp., *Taenia* sp., and a single species of ectoparasites (*Acarus* sp.). Deer living in the wild, for example, those from Akfadou in which the most parasitic species have been identified are more exposed to parasitic infestations, due to their purely natural life and consequently the absence of prophylactic means. and therapeutic. Ectoparasites were not as present, a single species of mite *Acarus* sp., was highlighted and in a single sample taken from the test garden.

Keywords: Deer, Parasites, Hamma Test Garden, Zéralda Hunting Center, Akfadou

PRELIMINARY REVIEW AND EVALUATION PROCESS OF ENVIRONMENTAL IMPACT ASSESSMENT REGULATİON

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ABSTRACT

EIA Regulation, which was published by the Ministry of Environment, Urbanization and Climate Change on 7th of February, 1993 and had various revisions over time, was updated with the regulation numbered 31907 on 29th of July, 2022, within the scope of green development goals. With this regulation, the Environmental Impact Assessment Regulation published in the Official Gazette dated 25/11/2014 and numbered 29186 was repealed. With the context of Environmental Impact Assessment (EIA) Regulation, many plans such as Zero Waste, Greenhouse Gas Mitigation, Impacts on Climate Change, Environmental Monitoring, Environmental and Social Management are required to be included in the EIA reports under "Sustainability Plan". With the arrangements for informing the public and increasing their participation in the process (art. 9) are included in the Stakeholder Engagement Plan, the number of communication ways in participation were increased. Considering the environmental impacts of the activities/projects, EIA lists have been adjusted. In this scope, the number of activities for which it is required to prepare an EIA Report has been increased. Some of the sectors were also included in the list of projects that will be fully implemented, regardless of the threshold value. Projects that require an EIA report are listed in Annex-1 of the regulation. For the activities/projects included in the list of the projects whose environmental impacts are subject to preliminary examination and evaluation, it is obligatory to conduct a cumulative impact assessment, prepare an environmental and social action plan, and prepare a sustainability and environmental monitoring plan for a more comprehensive and detailed examination of their environmental impacts. In this study, the application and examination process of the projects whose environmental impacts are subject to preliminary examination and evaluation within the scope of the Annex-2 list of the updated EIA regulation, which has a much higher rate in Turkey, and the process of deciding whether an EIA report is required or not are explained.

Keywords: Environmental Impact Assessment, EIA Legislation, EIA Regulation

EVALUATION OF SUBTERRANEAN CLOVER FROM A POINT OF VIEW POSSIBILITY TO USE IN BULGARIAN ENVIRONMENTAL CONDITIONS

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ABSTRACT

Subterranean clover (*Trifolium subterraneum* L.) is an annual drought resistant legume with winter-spring type of development and ability for self-sowing. It is a widespread component in the pastures of the temperate areas of Central and Northern Europe and America. Subterranean clover was assessed as pure crop and component of perennial mixtures with traditional forage crops in the environmental conditions of Bulgaria. It was found the dry mass yield from pure grown subclover ranging between 3600 and 4300 kg/ha. In addition, subclover forage biomass was well balanced by principal chemical composition with optimal Ca: P ratio. Mixed crops are more effective than pure grown in using environmental resources, better withstand adverse conditions and are more productive. The suitability of subclover as a component of both mixtures with perennial grasses and with perennial legumes was studied. The results showed it is suitable component of mixtures contributing to as follows: better botanical composition, weed reducing, higher dry mass yield, longevity. In addition, its effect on the quality characteristics of forage biomass from mixtures was assessed. Leaf to stem ratio as an important characteristic for the intake of the forage by animals was calculated. As a legume it contributes to increase of leaf to stem ratio, both in legume-subclover mixtures and in grass-subclover mixtures. For birdsfoot trefoil it was found from 13.0 to 20.1% higher for mixtures with subclover compared to the leaf to stem ratio for pure grown birdsfoot trefoil. The same tendency was found for sainfoin-subclover mixtures, where the leaf to stem ratio was from 9.5% to 12.8% higher, and also for alfalfa-subclover mixtures. The content of cyanglycosides as antinutritional compounds causing poisoning in animals was determined. It was found high level in birdsfoot trefoil grown alone. However, in mixtures of birdsfoot trefoil with subclover the cyanglycosides content was more than 50% reduced and the forage mass obtained was not toxic. The palatability of the crops tested was assessed in *in vivo* experiments with sheep. The subterranean clover was grazed at 100%, as from legumes, sheep prefer this crop the most, followed by birdsfoot trefoil and sainfoin, and cocksfoot from grasses. Subterranean clover is an appetizing and preferred species for grazing by sheep due to its low crude fiber content and higher crude protein compared to the same for other crops. Due to its self-seeding capacity, it may be used for undersowing of degraded seed production swards. The direct undersowing of degraded seed production swards of perennial legumes and grasses, apart from giving the opportunity to improve the botanical composition of the grass swards, their use for forage obtaining, but also led to significantly increase the amount of nitrogen accumulated in the soil. When degraded seed production perennial ryegrass swards were undersowed with subterranean clover, the amount of nitrogen accumulated in the soil increased to 10.6%, and in degraded seed production alfalfa swards to 18.7%, respectively. The above showed the possibility subterranean clover to be used as a component of sown pasture swards in Bulgarian environmental conditions. It is adaptable to the changing climatic conditions and responsible to the challenges of agriculture nowadays for bigger resource use efficiency.

Keywords: Subterranean clover, *Trifolium subterraneum,* Bulgarian

WATER KEFIR AS ANOVEL SOURCE FOR EXOPOLYSACCHARIDE PRODUCER LAB STRAINS AND THEIR POTENTIALS AS STARTER CULTURES

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ABSTRACT

Fermentation is the process of microorganisms processing perishable foods, increasing their nutritional value, digestibility and producing new products. Because of the rising numbers of vegetarianism, lactose intolerance sensitivity the consumption of plant based and dairy-free products are increasing day by day. Water kefir (WK) is an example of non-dairy fermented beverage that cultivated by WK grains. WK is a sparkling, mildly sour, slightly alcoholic and carbonated beverage which is produced by fermentation of an aqueous sucrose solution in the presence of dried fruits and insoluble water kefir grains. These grains are soft, shapeless gelatinous multitude. Its high sugar matter and low amino acid content, water kefir provides a strenuous living space for microorganisms. In the WK habitat there is a symbiotic commerce between yeast and lactic acid bacteria. Lactobacillus (L.) nagelii, L. hordei and Saccharomyces (S.) cerevisiae are some of the prevalent microorganisms. The growth of L. nagelii and L. hordei are improved in the presence of S. cerevisiae. Kefir grains involves lactic acid bacteria, yeasts, and sometimes bifidobacteria and/or acetic acid bacteria which consume sucrose to produce CO_2, ethanol, acetic acid, lactic acid and exopolysaccharides. EPS are metabolic by-products of microorganisms. The major component of the matrix of WK grains is dextran. Dextran is synthesised by lactic acid bacteia and is a homopolysaccharide of glucose linked with an α (1→6) glycosidic bond. Exopolysaccarides (EPS)-producing lactic acid bacterias are industrially important microorganisms. Studies continue on the development of new functional products and their use as a starter culture.

Key Words: Water kefir, EPS, Lactic acid bacteria, Fermentation, Dairy-free product

HIGH HYDROSTATIC PRESSURE (HHP) PROCESSING STRATEGIES ON ANTIOXIDANT PHENOLIC BIOACTIVE COMPONENTS IN FOODS AND BEVERAGES

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ABSTRACT

Phenolic compounds, especially flavonoids have health-promoting benefits that play some important roles in foods as visual appearance, taste, aroma and represent an abundant antioxidant component of the human and animal diet. High hydrostatic pressure processing (HHPP) conditions (300–700 MPa) at moderate initial temperatures (around ambient) are generally sufficient to inactivate vegetative pathogens for pasteurization pro- cesses, some enzymes, or spoilage organisms to extend the shelf-life. The aim of the review is to reveal the effect of high hydrostatic pressure processing strategies on the retention of antioxidant phenolic bioactives in foods and beverages. HHPP can increase extraction capacity of phenolic constituents and ensure higher levels of preserved bioactive constituents. High pressure extraction (HPE) can shorten processing times, provide higher extraction yields while having less negative effects on the structure and antioxidant activity of bioactive constituents. HPE enhances mass transfer rates, increases cell permeability, increases diffusion of phenolics and retains higher levels of bioactive compounds. Total phenolics in HHPP-treated foods were either unaffected or actually increased in concentration and/or extractability following treatment with high pressure.

Keywords: HHP, Plant Foods, Plant Beverages, Phenolics, Bioactives

THE INDUSTRY 4.0 ASSESMENTS OF VALUE-ADDED FOOD PRODUCTS DURING 2020-22 PERIOD

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ABSTRACT

Food and beverage industries encounter manifold challenges from recalls regarding serving customer demands. It is predicted that Industry 4.0 will turn manufacturers into predictors instead of reactors. The sustainability of the food systems in the pandemic duration is another issue that this sector should address in order to restrain the possible forthcoming pandemic times. In COVID-19 duration, there is need the sustainability of bioactive constituent applications for ``value-added food and supplement products`` and ``functional foods`` and need the pursuing and monitoring of food plant design studies, production strategies through Industry 4.0. implementations. In this proceeding content, value-added food products in food science in terms of Industry 4.0 procedures in COVID-19 duration.

Keywords: Value-added products, food science, Industry 4.0, COVID-19

MANUFACTURING STRATEGIES ON FOOD SUPPLEMENT EFFERVESCENTS AND BIOACTIVE COMPONENT RETENTION

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ABSTRACT

Plant based food effervescence as dietary supplements, and/or fortificated foods, food byproduct based food powders may be great value-added products for getting healthy bioactive constituents. Activated phenolic bioactives and probiotics which have been naturally extracted to be highly potent and easily absorbed by using food tablets. The unit dose, temper evident, solid preparations of active ingredient and ingredient mix, powder quality for safety manufacturing; should be monitored. Through the powder forming, the flexible design of dosage forms as technical manufacturing parameters has been considered. Owing to the supplement manufacturing, consumer demand, routes of drug delivery, oral utilization capacity should be examined. In this context, the bulk density, the tapped density as pre-compression parameters have been confirmed while thickness, hardness, % weight variation, % friability, % invitro drug release as post-compression parameters have been carried out as physiochemical properties. Besides chemical profiles, functional properties, and detailed clinical nutrition data of expressed effervescents. In this presentation, agrifood and plant based supplement manufacturing strategies and research data on mulberry-based, citrus- based, tomato-based, honey-based effervescent chemistry and nutritional quality have been carried out.

Keywords: Plant foods, effervescent, strategy, quality, property, supplement

COMPARISON OF TWO APPS BUILT WITH UNITY AND VUFORIA

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ABSTRACT

Augmented reality is to show computer-generated virtual objects simultaneously in the real world by using the camera feature of our smart devices. This research aims to provide information and example usage of augmented reality in order to reduce paper waste by using technology. Since the studies in this field are mostly in the gaming and entertainment sector, it is a striking deficiency that the advantages of this technology are not explained. An electronic device will be selected in the research and its user manual will be taken as reference, then this user manual will be turned into an application using augmented reality technology. At the same time, a new manual will be prepared for the user manual that has been turned into an application, and this manual will only contain markers and the manual will definitely be less than half the number of pages of the original manual.

Keywords: Augmented reality, User Manual, Mobile Application, Vuforia, Unity

THE INFLUENCE OF DIFFERENT CARRIER AGENTS FOR DRYING OF FERMENTED FRUIT BEVERAGES AS POWDER

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ABSTRACT

Fermented fruit beverages are belonged to the functional fermented foods and have many health benefits. Generally, fermented fruit beverages are prepared traditionally and consumed in a small scale. Hardaliye (fermented grape beverage), turnip juice, beverages of fruit vinegars, beverages and syrups of local fruits are products that are produced by lactic acid fermentation and have probiotic properties. Epidemiological evidence has been provided showing that constituents in fruits are beneficial to human health and contribute to the prevention of degenerative processes caused by oxidative stress. Besides, fermented fruit beverages have importance for the evaluation of non-table quality fruits and gaining added value. However, fermented fruit beverages are produced using high content of additives (sulfur dioxide potassium sorbate, sorbic acid, metabisulfites, etc.) for commercial production because of the short shelf life of fruits. Therefore, it is thought that new methods will have positive effects to increase the shelf life of fermented beverages. It is known that pasteurization, which is the most common method of increasing the shelf life, will adversely affect the probiotic properties of these beverages. Therefore, a new process that improves the shelf life of fermented fruit drinks while preserving their properties would be very beneficial in the food industry.

Drying of these juices to obtain powder for extending their shelf life is a new method. In addition to the advantages it provides in shelf life, storage, and distribution, it also provides the opportunity to be easily used in different food formulations. Spray drying is a widely used method for drying liquid foods. However, some problems can be arisen, especially the damage of heat to nutrients. Freeze drying is one of the techniques used to produce high quality instant products. Freeze drying process reduces thermal damage and preserves the nutritional composition, flavour, and colour of the products because it performs in low temperature and water activity.

However, the stickiness that occurs in such products with high sugar and acid ratios are challenging factors for traditional drying methods. High molecular weight carriers or drying aids such as maltodextrin, gum arabic, waxy starch, pectin, vegetable fibers and starches as encapsulation agents are added to fruit juices includes high sugar and acid content. The lyophilization process using carrier agents will providing many benefits for fermented fruit beverages, which are produced traditionally. It will increase the health benefit by reducing the additive content. Besides, it will be obtained ready-to-use beverage form with longer shelf life.

In addition, the changing product form will increase the added value of the products and they can be included in the formulations of different product combinations and food supplements.

Keywords: Carrier agent, fermentation, fermented grape beverage, hardaliye, instant beverage, lyophilization.

THE EFFECT OF RED GRAPE POMACE SUPPLEMENTATION ON SOME REPRODUCTIVE TRAITS OF FEMALE RABBIT

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ABSTRACT

The present work aimed to study the effect of red grape pomace on zootechnical and reproductive parameters of primiparous female rabbits of the New Zealand-California crossbreed. Twenty-four rabbit females aged between 5 and 6 months were used during 90 days. Females were divided into three homogeneous groups with respect to body weight (3647.8± 61.42 g). The dams in the control group (T, n=8) received a diet based on 150g/dam/day of a conventional concentrate and Oat hay ad libitum. Females of treated groups received the same ration supplemented with 1% (T1, n=8) or 2% (T2, n=8) of dry red grape pomace. Water was distributed ad libitum. The parameters related to body weight, food intake and reproductive performance of the dams were studied. Mann- Whitney U test was used to compare body weight, food intake and fertility between both groups. The threshold of significance was fixed at 5 %. Our results showed that there was no difference between female of different groups for food intake. The mean quantity of concentrate was about 135.46 ±10.2 g/day during the trial period. No effect of the supplementation with red grape pomace was observed on body weight (P>0.05). Fertility rate was higher in treated groups (T1 and T2) than in control one, 58% and 57% vs 34% (P<0.05) respectively. In addition, dams of T2 group had the best litter size (4.81), compared to the T group (2.5) and the T1 one (3.19). Our results suggest that red pomace grape may improve primiparous reproductive parameters in female rabbit. However, this stimulatory effect should be studied over a longer period of time and a larger number of animals.

Key Words: Grape pomace, rabbit, reproductive performance

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