7th International Molecular Biology and Biotechnology Congress

25-27 April 2018, Konya, Turkey

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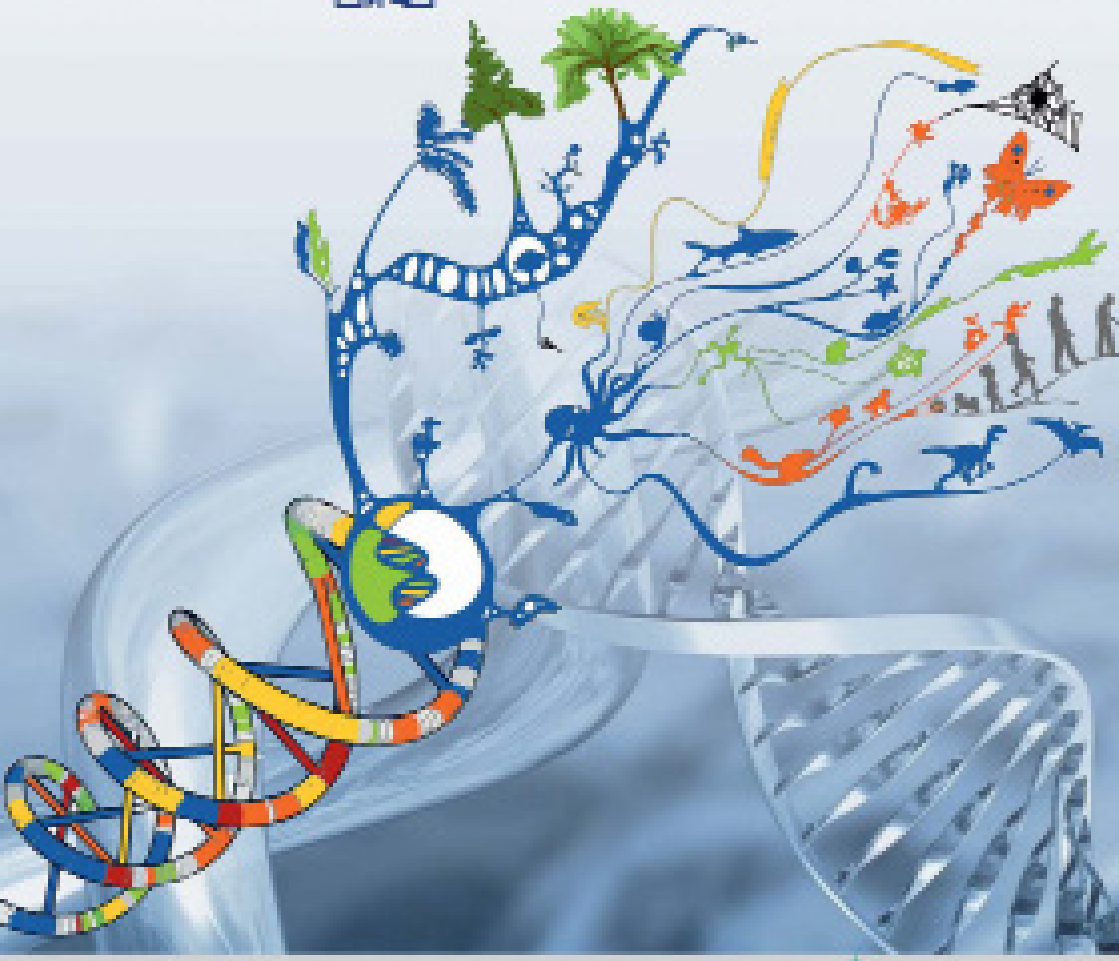

7th INTERNATIONAL MOLECULAR BIOLOGY and BIOTECHNOLOGY CONGRESS

POSTER ABSTRACT BOOK

KONYA

NECMETTİN ERBAKAN
UNIVERSITY

25-27 April 2018
Necmettin Erbakan University
MOLBIOTECH 2018

KONYA

NECMETTİN ERBAKAN
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April 25-27, 2018 - Konya

MOLBIOTECH 2018

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Preface

Dear colleagues,

It is my pleasure to welcome you to the 7th International Molecular Biology and Biotechnology Congress held in Konya, Turkey, from April 25 to 27, 2018. This congress is an interdisciplinary platform for the presentation of new and recent advances in researches in the fields of Molecular Biology and Biotechnology. Over 500 contributions from 15 different countries have been submitted and accepted for oral/poster presentations after peer review process.

Global population growth in the 21st century and limited natural resources present major threats and challenges. Recent advances in Molecular Biology and Biotechnology enable scientists and researchers to cope with the problems and to find out the solutions without threatening the natural resources and environment. This congress aims to bring scientists from international communities to highlight the recent advances and developments in Molecular Biology and Biotechnology and their application in Agriculture, Microbiology, Plant, Animal, Aquatic, Environment, Medicine and Industry.

Dear colleagues, it is our mutual purpose to find ways and methods for everyone to get benefit from the applications of Molecular Biology and Biotechnology in worldwide. Throughout the next three days, scientists from 15 different countries will discuss the problems and their solutions through the applications of Molecular Biology and Biotechnology.

I would like to thank to all the authors, reviewers, scientific committee, organizing committee, secretariat, session moderators and colleagues for their help in organizing this scientific event in Konya, Turkey. There is also a great thank for Necmettin Erbakan University for their support and collaboration.

Sincerely,

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Department of Biotechnology

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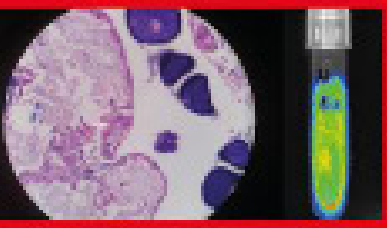


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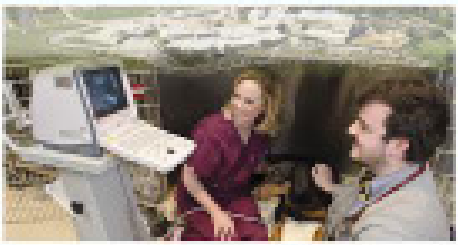


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The development of *in vitro* regenration method of *Brassica juncea* for gene transformation

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Abstract

The use of metal accumulator plants to remediate heavy metal-contaminated soils is becoming a popular, environmentally friendly and inexpensive technique for environmentalists. Hyper accumulator plants have been proven to accumulate heavy metals in large amounts and majority of these plant species belong to the Brassicaceae family. *Brassica juncea* is one of the important oil seed crops in *Brassicaceae* and is also being used for phytoremediation of heavy metals from polluted soils. In this study, we used *B. juncea*,Tomcot for micropropagation. *B. juncea* seeds were sterilized using 0.05% HgCl2 (mercury chloride), the seeds were sown in MS medium containing 50 µl Bap, 100 µl Bap, 200 µl Bap, 300 µl Bap and 400 µl Bap. After about 4 weeks of germination callus formation began and the best callus formation was observed in 200 µl Bap containg medium. After shoot formation the regenrated plants were transfered in different MS media containing MS+ 0.0 mg IBA or MS + 1.0 mg l-1 IBA or MS + 2.0 mg l-1 IBA for root formation. The best root scoring were observed in MS + 1.0 mg l-1 medium. The detail of plant regeneration techniques will be discussed in poster presentation.

Keywords: *Brassica juncea, in vitro* regenaration, callus formation

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Determination of mRNA expression in the leukocytes of coronary artery and cerebrovascular patients

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Abstract

The purpose of this study is to determine the gene expression profiles of catalase (CAT), glutathion-S-transferase (GST) and Presenilin 1 (PSEN1) genes in patients with coronary artery disease (CAD) and cerebrovascular disease (CVD). For this purpose, we performed with three groups including 18 cerebrovascular patients (9 male and 9 female, mean age 71.34), 20 coronary artery patients (11 male and 9 female, mean age 72.34) and 23 (12 male and 11 female, mean age 70.06) healthy adults. After sampling, RNA extraction from leukocytes isolated was performed. cDNA was synthesized by reverse transcription PCR (RT - PCR) method. mRNA levels were quantitatively determined by Real-Time PCR. Statistical differences were considered significant at $p < 0.05$. CAT expression level in coronary artery group was significantly lower than control group ($p < 0.05$). When compared to control, GST expression level in the cerebrovascular ($p < 0.05$) and coronary artery groups ($p < 0.01$) was significantly higher (almost 2-times). Expression of PSEN1 was significantly about twice as high as that of the control group and coronary artery group in patients with cerebrovascular disease ($p < 0.01$). As a result, significant changes in the expression of antioxidant enzyme genes and PSEN1 gene can be seen as a marker of oxidative stress in patients with coronary artery disease (CAD) and cerebrovascular disease (CVD).

Keywords: mRNA expression, catalase, coronary artery, Presenilin 1

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A geographic variation assessment for dwarf Lizard's mediterranean populations

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Abstract

Parvilacerta parva (dwarf lizard) was first identified as a new species based on a female specimen collected from Kayseri, Turkey (Boulenger, 1887). In later studies, the distribution of this species was extended to include all of Anatolia and the Caucasian region. Therefore, it is clear that this species is endemic to the Anatolian peninsula and Transcaucasia. Although the study about morphological description of *P. parva*, including the analysis of the intra-populational variability, was carried out by Peters (1962), who compared several Anatolian and Armenian specimens from different populations by ignoring sub-Anatolian geographic regions. After that there are some local populations morphological properties have been examined, the questions for evaluating the species under a geographic variation hypothesis is still unclear. Here, our aim is to determine the dwarf lizard's Mediterranean populations' morphological parameters for evaluating cumulative perspective in this region and its morphometric comparison with previously collected specimens and relevant literature. Morphometric parameters, such as median gularia, supraciliar granule and head-body length are major characters that reflects relatively mean regional values. However, the number of ventral plates and 4th subdigital lamellae changes between Southern Anatolia and the other regions, but these are not statistically significant. Moreover, dorsal plates and femoral openings vary independent of any geographic rule. After all, especially number of supraciliar granules that represents a latitudinal decrease by gradually is a key indicator morphological parameter for this species. To understand the population interactions between Anatolian sub-populations beyond a shadow of a doubt, genetic analysis for this species is recommended.

Keywords: *Parvilacerta parva*, lizard, southern Anatolia, geographic variation

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Improving the oxidative stability of NAD+- dependent formate dehydrogenase from plant *Gossypium hirsutum*

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Abstract

The NAD+-dependent formate dehydrogenases (FDH, EC 1.2.1.2) are important industrial enzymes in the regeneration of NAD(P)H which is an expensive coenzyme used in the synthesis of chiral molecules requested to be optically pure, and the reduction of CO2 to formic acid which is a commodity chemical and a stabilized form of H2. To improve the stability of NAD+- dependent FDHs is one of the prominent research area. Therefore, we aimed to increase the oxidative stability of NAD+-dependent FDH from plant *Gossypium hirsutum* (GhFDH) by the substitution of surface Met residues, which are susceptible to oxidation due to the presence of sulfur groups, to non-oxidative Leu amino acid. Surface methionine residues can easily be converted to methionine sulfoxide by reactive oxygen species. That's why they are critical regions for protein conformational change and loss of activity. GhFDH in the size of 38.65 kD contains 9 methionine amino acids, including M126, M214, M225, M234, M243, M258, M294, M299, M321 residues. Among them, mutations M225L, M234L and M243L were selected by using Swiss-Model homology modelling based on the *Arabidopsis thaliana* (AtFDH) crystal structures which has 87 % identity with GhFDH. Mutants were constructed by the usage of PCR based "Gene-Art Site-Directed Mutagenesis System".

Keywords: Formate Dehydrogenases, *Gossypium hirsutum*, Site Directed Mutagenesis, Homology Modelling

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Removal of copper (II) ions from heavy metals with sporopollenin of Lycopodium clavatum; isotherm and thermodynamic studies

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Abstract

With the rapid increase of the world population, energy and nutrient insufficiency, irregular urbanization, excessive consumption and environmental pollution has increased significantly. There are heavy metal containing organizations in the wastewater, at the forefront of the industrial establishments which increase environmental pollution and play an important role in the degradation of ecological balance. There are many methods for removing heavy metals. Especially, the method of removing heavy metals by adsorption method by modifying the sporopollenin obtained from plant walls is remarkable. In this study, firstly mono layer was modifying 3-chloropropyltrimetoxysilane compound to the surface of sporopollenin. 4,4' - ((1 Z, 11Z) -2,5,8,11-tetraazadodeca-1,8-dien-1,11-diil) difenol was immobilized to sporopollenin. Newly synthesized substance was characterized with infrared spectroscopy method. Adsorbtion of Cu(II) metal ions on immobilized sporopollenin were evaluated at different parameters like different amount of adsorbent , pH, interaction time, metal solution concentration and temperature. Langmuir, Freundlich and Dubinin-Radushkevich adsorption isotherms were calculated. For adsorbent, thermodynamic parameters were calculated. ΔH0, ΔS0 and ΔG0 values were estimated.

Keywords: Sporopollenin, Immobilization, Adsorption, Adsorption Isotherms, Thermodynamic

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Quantitative determination of tocopherols and tocotrienols in olive oil deodorizer distillate by HPLC-FLD

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Abstract

The most important by-product of edible oil refining is the deodorizer distillate (DD) obtained in the deodorization stage. Basically, deodorization is the final key step of the refining process accountable for removing targeted volatile compounds which are liable for producing unacceptable odor, color, taste and flavor in the oil. Increased use of industrial waste and by products fits the requirement of industry to fulfill with environmental rules. The replacement of natural products for synthetic materials has gained worldwide consideration in the food, pharmaceutical and other industries. Therefore, extra virgin olive oil DD (OODD) has been utilized as a natural source of FFAs, tocopherols, sterols, squalene in many fields. In this study, an automated HPLC-FLD system for quantification of tocopherols and tocotrienols in OODD was used. It was seen that OODD has total tocopherol in the level of 32.086,07 ± 335,47 mg/kg distillate. But tocotrienol species has been couldn't found as we expected.

Keywords: Deodorizer distillate, Olive oil, Tocopherol, Tocotrienol

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Antimicrobial activity of nanoemulsion based on different plant oil against fish spoilage bacteri

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Abstract

Polymerase chain reaction (PCR) was used for rapid detection and identification of fish spoilage bacteria from spoiled fish. A selected PCR band from each of isolates was sequenced. Identified bacterial strains were *Vibrio vulnificus*, *Photobacterium damselae*, *Proteus mirabilis*, *Serratia liquefaciens* and *Pseudomonas luteola*. Antimicrobial activity of nanoemulsion based on different plant oil (sage tea, laurel and rosemary) against identified fish spoilage bacteria were performed using the disc difusion method. Bacterial strains were more sensitive to sage tea and laurel nanoemulsion than naoemulsion based on rosemary oil. Laurel nanoemulsion had the highest entimicrobial activity against *V. vulnificus* and *Phot. damselae* with diameter zone of 1.5 and 1.35 mm, whilst the poorest effect was observed for Pseu. luteola (0.72 mm). Antimicrobial effect of laurel against *Pro. mirabilis* and *Ser. liquefaciens* were similar (0.8 mm). The least susceptible organisms to rosemary nanoemulsions were *Pro. microbilis* and *Phot. damselae*, although nanoemulsion based on sage tea was the most effective against these bacteria (diameter zones 1.2 vs 1.06 mm). The highest inhibition of rosemary nanoemulsion was found for *Pseu. luteola* with diameter zone of 0.8 mm.

Keywords: Moleculer techniques, Fish spoilage bacteria, Nanoemulsions, Plant oil

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Physical properties of microencapsulated anchovy fish oil with discard fish protein ısolate

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Abstract

Fish oil being a valuable source of polyunsaturated fatty acids is highly sensitive for oxidation. The microencapsulation method makes it possible transforming oil into a solid ingredient where the small droplets of oil are surrounded by a dry matrix of proteins and/or carbohydrates. A number of coating materials including caseinate, maltodextrin, whey protein and milk protein have been reported to protect fish oils against oxidation. In this study, the proteins of discard fish (*Equulites klunzingeri*) were extracted by using pH shifting process and used for microencapsulation of anchovy oil as a coating material. In order to investigate the usage of fish protein isolate (FPI) as a coating material in microencapsulation of fish oil, discard fish protein isolate were added instead of sodium caseinate at a ratio of 5% (5%FPI) and 10% (10%FPI). Then, scanning electron microscopy measurements were performed in order to observe the morphology of the microcapsules. The colour changes of microencapsulated fish oils were also monitored for 7 weeks at 25oC. Lightness value of SC, 5%FPI and 10%FPI groups were found as 91.00, 88.08 and 82.46, respectively. The lightness value of the all groups declined at the end of storage (76.07-82.91). Generally, no significant changes in "a" values were determined in all groups during storage. Although there were no significant changes of "b" values were observed in SC group throughout the storage period, significant changes were observed between 5%FPI and 10%FPI groups. Consequently, physical properties of microencapsulated fish oils were changed by the addition of discard fish protein.

Keywords: Scanning electron microscopy, microencapsulation, fish oil, fish protein isolate, colour

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Detection of *Alicyclobacillus acidoterrestris* in apple juice by a PCR-based technique

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Abstract

Alicyclobacillus species cause spoilage in highly acidic foods, especially those protected by pasteurization, such as fruit juices. Apple juice is the most important economical commodity among the fruit and vegetable juices in worldwide. *Alicyclobacillus acidoterrestris* creates unpleasant odor in apple juice and concentrates which causes considerable economic loss in apple juice industry. Conventionally Alicyclobacillus species can be identified by chromatography and conventional microbiological methods. Identification of *Alicyclobacillus acidoterrestris* by classical microbiological methods are time consuming and sometimes not capable of objective determination. In this study, a PCR-based identification method was established by species-specific DNA probes with high sensitivity and accuracy. Comparing with the classical methods, PCR-based methodology is capable of identifying *Alicyclobacillus acidoterrestris* in apple juices within a day which is very good advantage whereas conventional protocols take more than a week. The newly developed methodology presented in this work is very promising for Alicyclobacillus species identification in acidic beverages.

Keywords: Fruit juice, microbial contamination, microorganism detection

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Resolving ınterspecific relationships in plants: Universal sequences vs organelle genomes

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Abstract

Universal sequences in organelle genomes were adapted to molecular phylogenetics long before, thus, interspecific comparisons of such sequences (e.g. *rbcL, coxI*) became the standard approach to determine taxonomic relationships based on molecular data. While the conventional approach that employs a relatively limited number of substitutions present in a given universal sequence proved sufficient to resolve interspecific relationships in most cases, it is feasible now to perform genome-wide comparisons among taxa thanks to advances in next generation sequencing technologies. In the present study, the widely accepted standard sequence, the mitochondrial *coxI* gene, encoding cytochrome oxidase subunit I, was utilized to resolve relationships among a set of plant species including members of Solanaceae and Poaceae families. Entire mitochondrial genomes of the relevant species were also utilized in parallel analysis. Results of both approaches were comparatively evaluated in order to interpret the effect of sequence length and aid establishing standard approaches for plant phylogenetics.

Keywords: *rbcL, coxI,* organelle genome, mitochondrial genome

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Molecular modelling of biologically active toab compound and docking calculation on DNA-Toab ınteractions

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Abstract

Tetraoctylammonium bromide (TOAB) is a quaternary ammonium salt generally used as a phase transfer catalyst between an aqueous and an organic solution. TOAB is synthesized by refluxing trioctyl amine and n-octyl bromide in acetonitrile for 24 hours; the product is purified by recrystallization by adding ether and petroleum ether after dissolution in dichloromethane. Studies in the literature have reported that the synthesized tetraalkyl ammonium salts and quaternary ammonium based ionic liquids possess antimicrobial properties. In this study, the optimized molecular structure of TOAB molecule was determined by DFT method. The structure of this molecule was elucidated spectroscopically by comparing the experimental IR, ^{1}H-NMR ve ^{13}C-NMR spectra with the theoretical IR, ^{1}H-NMR ve ^{13}C-NMR spectra. It is considered that tetraoctylammonium bromide belonging to tetraalkylammonium bromide class is bound to DNA coil during heating. For this reason, the active region in which TOAB molecule can be found in DNA and the orientation of TOAB molecule were determined depending on the interaction of the ligand TOAB molecule with the receptor DNA in this study.

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Identification of novel hydrolases from Armutlu thermal springs, Turkey

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Abstract

Hydrolases are important and valuable enzymes due to their utilization of nearly every area of the industry for various aims. Efficient yield changes can be made by exploring new types of hydrolases from extremophiles. Armutlu, a coastal town which is a district of Yalova, Turkey, has been the main topic of various studies due to the geological activity of Armutlu peninsula. It is also famous for its hot springs. However, no information about the microbial community of these thermal springs exists. After sampling of sediments and water from the different parts of the thermal vents, samples were cultured at 60°C and genomic DNA isolates were utilized for 16S rDNA PCR method. The evaluation of the results of Sanger sequencing suggests that the microbial habitat of the Armutlu hot springs consists of mostly Geobacillus sp. Meanwhile, these samples have been screened for different types of hydrolases (e.g. amylase, lipase, protease) for the catalytic activity.

Keywords: Thermophiles, hydrolase, hot spring, Geobacillus, 16S rDNA

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Investigation of RYBP and MDM2 gene expression levels in colorectal cancer

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Abstract

Colorectal cancer is known as a major cause of morbidity and mortality throughout the world and the incidence of colorectal cancer is increasing in developing countries including Turkey. Murine double minute 2 (MDM2) oncogene which is a critical negative regulator of the tumor suppressor p53, playing a key role in controlling its transcriptional activity, protein stability, and nuclear localization. Ring1 and YY1 binding protein (RYBP) which is a member of the Polycomb group (PcG) proteins and regulates cell growth through both PcG-dependent and -independent mechanisms. The aim of this study was to investigate relationship between colorectal cancer and RYBP and MDM2 mRNA expression levels. Ethics committee approval required for the study was obtained from the Gaziantep University Medical Faculty Local Ethics Committee. Normal and tumor tissue samples were obtained from 43 patients who were diagnosed with colorectal cancer. MDM2 and RYBP mRNA expressions were analyzed by real time-PCR. In the result of study,there was no significantly significant difference in both RYBP and MDM2 mRNA expression between tumor tissues and normal tissues of colorectal cancer patients ($p<0.05$).

This study was supported by the Scientific Research Projects Department of Gaziantep University (Project No: FEF.YLT.17.13).

Keywords: Colorectal cancer, MDM2, RYBP, expression, real time pcr

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Screening of vegetable oils for the reactive extraction of lactic acid with tertiary amine extractant

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Abstract

Lately, reactive extraction is shown to be the most advantageous method to be used to recover carboxylic acids from fermentation media. A significant advantage of the method is the ability to be used in situ production/separation processes. The technique has several advantages; however toxicity of the organic phase members should be eliminated or at least reduced with the use of appropriate environmentally-friendly chemicals/biochemicals. The candidates should also provide an appropriate medium for the reaction between the extractant and target molecule. Recently, vegetable oils were shown to be utilized as a diluent in the organic phases. The high efficiencies have attracted the attentions. In this study, eight different vegetable oils (Hazelnut oil, sunflower oil, corn oil, almond oil, canola oil, safflower oil, soy oil, sesame oil) were tested as a diluent for the reactive extraction of lactic acid (LA) from aqueous solutions. The tertiary amine extractant (TAE) was dissolved in these oils at a concentration of 0.6 M and LA amount was varied between 0.2 and 1.0 M. Sesame oil gave the highest recovery value as 49% in these ranges of the parameters. Acid concentration positively influenced the extraction efficiency. Three oils giving the highest efficiencies were investigated in detail. Highest recovery percentages were 82.6%, 80.2% and 83.1% with sesame, sunflower and safflower oils, respectively; when initial LA concentration was 1.5 M and that of TAE was 2.0 M. Thus, all these vegetable oils can be used as organic phase diluent in reactive extraction of LA depends on their costs.

Keywords: Vegetable oils, Lactic acid, Reactive extraction, Tertiary amines

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Monitoring of *Alternaria* spore and alt a 1 allergen in Ankara

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Abstract

Airborne fungal spores are of great interest in not only in aerobiology but also in human health because of their impact on causing allergy. *Alternaria alternata* is one of the most important allergenic fungi in the atmosphere. Fungal allergens are produced by both spores and hyphae. The hyphal fragments are much smaller than the spores so they may reach the lower respiratory tract easily. In this study we aimed to examine a correlation between spore counts and the allergens by monitoring the spores and Alt a 1 allergens in Ankara province. Spores were collected from Burkard pollen and spore trap and counted daily. Alt a 1 sampling was carried out between June-October during 2015 by using BGI900 Cascade High Volume Air Sampler (900L/min.). The ambient air was sampled on polyurethane filters (PUF) which retain particles that their size is between 10>PM>2.5 were analyzed. PUF's were extracted in ammonium carbonate buffer, aliquoted, lyophilized and stored at -20^{0}C until use. Concentrations of Alt a 1 were measured by ELISA. The sum of seasonal *Alternaria* spore were 5598 spore/m3. Total allergen levels were measured as 29.31 pg/m3. The highest allergen concentration was measured on 25/08/2015 with 5.59 pg/m3. The correlation between daily levels of *Alternaria* spores and Alt a 1 were statistically significant ($r=0.259^{**}$; $p<0.05$). The correlation is not so high. This could be indicator of that Alt a 1 originated from fungal mycelium is as important as *Alternaria* spore to represent fungi allergen load in the air.(Project No: BAP 16L0430006)

Keywords: Alt a 1, *Alternaria*, spore, fungi, allergy, cascade air sampler

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Cell growth ınhibitory potential of *Craterellus cornucopioides* (*L.*) pers. together with antioxidant and antimicrobial properties

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Abstract

Craterellus cornucopioides (*L.*) Pers which is also known as trumpet of death or horn of plenty, is a wild edible macrofungus. This study was conducted to elucidate the potential health beneficial properties of *C. cornucopioides* grown in Karaman province. Bioactive ingredients (phenolics, flavonoids, β-carotene and lycopene) and DPPH radical scavenging activities were determined. Additionally, cell growth inhibitory effects on HepG2 cells together with some bacteria were evaluated. Accordingly, water and methanol extracts contains 37,71 ±1,42 µg/mg and 13,78 ±1,60 µg/mg phenolic contents, respectively. Similarly, methanolic extracts have higher β-caroten and lycopene content as compared to aqueous extracts. In parallel with these antioxidants, methanolic extracts have also higher DPPH scavenging activity (IC_{50}: 5,26± 0,67 mg/ml). Besides, water extracts have higher flavonoid contents (2,13±0,06 µg/mg) then the methanolic extracts. *C. cornucopioides* has also an important cell growth inhibitory effects on HepG2 cells (IC_{50}: 18,41 ±1,10 mg/ml for aqueous extracts and IC_{50}: 3,14 ±1,07 mg/ml for methanolic extracts). Moreover, both extracts were effective on six different bacteria tested. As a result, this study indicates that *C. cornucopioides* would reduce the cellular oxidative stress because of its high antioxidant ingredients, inhibit the growth of pathogen microrganisms and have some degree of cell growth inhibitory potential at least to the HepG2 cells.

Keywords: *Craterellus cornucopioides,* antioxidant, antibacterial, cytotoxicity, HepG2

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Evaluation of Vegetable Oils for the Reactive Extraction of Tartaric Acid with Trioctylamine

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Abstract

Due to the sharp increases in petroleum-based production costs, manufacture of large volumes of industrial chemicals such as carboxylic acids have started to be carried out by fermentation technique. Tartaric acid (TA) is a weak dicarboxylic acid and widely used in the food processing, chemical and pharmaceutical industries. Reactive extraction is shown to be one of the most suitable methods for its recovery from aqueous based production media. Use of toxic chemicals in organic phases is the main problem of the method. Their replacement with environmentally-friendly and also efficient biochemicals in the separation process would help commercialization and wider usage of the technique and the acid. In this work, four different vegetable oils (safflower, canola, sunflower and corn oils) were evaluated for the reactive extraction of TA. Trioctylamine (TOA) was used as the extractant. Both TA and TOA concentrations were varied between 0.2 and 1.0 M. The distribution coefficient was observed to increase with the increase in TOA amount and decrease in TA concentration. Highest extraction efficiency was obtained with corn oil as 92.2% when TA concentration was 0.4 M while TOA amount was 1.0 M. It was followed by sunflower, canola and corn oils. The recovery values were 91%, 89.4 % and 89.2% with these vegetable oils, respectively. The results showed that all the vegetable oils tested in this work can serve as an organic phase diluent during the reactive extraction of TA. Cost of the vegetable oil would be the critical parameter during the selection.

Keywords: Vegetable oils, Tartaric acid, Reactive extraction, Trioctylamine

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Use of non-toxic organic solvents and N,N-Dioctyl-1-octanamine for the recovery of tartaric acid from aqueous solutions

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Abstract

Recently several types of biochemicals have been produced by biological techniques instead of chemical syntheses. For example, several carboxylic acids are produced by fermentation today. Moreover, they are also found in industrial wastewaters. Tartaric acid (TA) is present at in grapes and this makes the wastewaters of the related industries has high amount of TA. Due to its hydrophilic and relatively polar nature, it is difficult to separate TA from aqueous solutions. Reactive extraction has been favored over the other techniques due to its high efficiency, ease of operation and low energy demand. However, toxic and expensive solvents used in the organic phases are the critical problem of the method. In this study, reactive extraction of tartaric acid from aqueous solutions using N,N-Dioctyl-1-octanamine in non-toxic diluents (vegetable oils) was investigated. The results were compared with 1-octanol. Initial concentration of TA and the extractant were between 0.2 and 1.0 M. Extraction efficiency was observed to increase with the increase in extractant amount while decrease in LA concentration. Highest extraction values with the non-toxic diluent, sunflower oil, were obtained at its natural pH value about 2 and where initial TA concentration was 0.4 M and that of the extractant were 0.8 and 1.0 M as about 91%. At the similar conditions, the recovery efficiency obtained with 1-octanol, which is the state of the art organic phase diluent in the literature, as 97%. The present work showed that a non-toxic natural solvent can be utilized in the separation processes of the industries.

Keywords: Tartaric acid, Sunflower oil, Recovery, Non-toxic diluent, Tertiary amine

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Development of a non-enzymatic electrochemical quantitative analyzing method for cadaverine

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Abstract

Biogenic amines, which play an important role in the biological functions of humans and animals, can exert toxic effects when consumed in foods in excess. Diamines such as cadaverine are regarded as mutagenic precursors because of their susceptibility to react with nitrites. These amines convert to pyrrolidine and piperidine by bringing nitrosopyrrolidine and nitrozopiperidine to the well. Therefore, the cooking is increased in the raw product with free nitrozamine. The aim of this work is to develop a non-enzymatic electrode that has been modified with pillar[5]arene for the identification of the cadaverine, which is important in food quality. For this purpose, the glassy carbon electrode has been modified using pillar[5]arene dispersed in the gelatin biopolymer. Morphology and electrochemical properties of modified electrode surface were investigated scanning electron microscope (SEM), atomic force microscope (AFM), cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). CV ve EIS results showed that pillar[5]arene increases electroactive surface area and provides a good electron transfer pathway at the solution-electron interface. Optimum experimental conditions and performance factors of modified electrode was examined. Linear working ranges were found to be 0.08-0.91 μM and 1.65-20.8 μM with detection limit of 0.06 μM. The prepared modified electrode was applied to detection of cadaverine amount in cheese and sausage samples.

Keywords: Cadaverine, non-enzymatic electrode, pillar[5]arene

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Thymus revolutus Célak essential oil affected the activities of antioxidant enzymes in different cancer cells

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Abstract

Thymus species are well known as medicinal plants because of their biological and pharmacological properties. *Thymus revolutus* Celak is an endemic species in Turkey. The intracellular redox potential, which is determined by the level of oxidants and reductants, has been shown to play an important role in the regulation of cell growth. The principal intracellular reductant is nicotinamide adenine dinucleotide phosphate (NADPH), which is mainly produced by the pentose phosphate pathway through the actions of glucose-6-phosphate dehydrogenase (G6PD). Another important reductant is glutathione (GSH). Oxidative stress generated by oxidants leads to cell death. Antioxidant enzymes such as glutathione reductase (GRx) and glutathione peroxidase (GPx) can protect the cells from the effects of oxidative stress. The purpose of this study was to compare the antioxidant enzyme activities in different types of lung cancer cells such as H1299 (parental nonsmall-cell lung cancer cells), drug-resistant H1299 (epirubicin-HCl resistant nonsmall-cell lung cancer cells), A549 (alveolar epithelial cells derived from human lung carcinoma), and A431 (human epidermoid carcinoma) after treatments of IC50 and IC70 concentrations of *Thymus revolutus* Célak essential oil and its two main components p-cymene (32.57%) and γ-terpinene (17.18%). After incubation, increased GRx in all cells due to decreasing reduced glutathione amount in the cells, were observed. Increased GPx and GST activities, especially after IC70 treatment of cells, as well as increased G6PD levels were seen. Enzyme activities of cells depended on concentrations and antioxidant capacities of the cells.

Keywords: *Thymus revolutus* Célak, p-Cymene, γ-Terpinene, Antioxidant enzyme activities

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Lack of association of monoamine oxidase-B gene A644G variant with schizophrenia and/or nicotine dependence

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Abstract

Schizophrenia (Sch) is a severe and chronic mental illness. Smoking prevalence is higher in patients with Sch than general population. Monoamine oxidase B (MAO-B) is one of the primary enzymes regulating metabolism of neurotransmitters such as dopamine. Several studies suggest that MAO-B gene may be implicated in the susceptibility to Sch.This study aimed to evaluate whether MAO-B A644G variant play any role in nicotine dependence (ND) and/orSch+ND etiopathogenesis. Since the MAO-B gene is located on the X chromosome, the case-control association study was done separately for female and male. Present study included 161 individuals with ND, 223 patients with Sch+ND, and 91 healthy controls. MAO-B A644G variant was analyzed using the polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method. Allele and genotype data were analyzed for significance of differences between cases and controls using the Chi-square ($\chi(2)$) test. No significant differences were observed between groups for the MAO-B A644G genotype and allele frequencies both in females and males($p > 0.05$). The present study demonstrated thatthere is nosignificantrelationship between MAO-B gene A644G variant and ND and/or Sch in this population. However, the mechanisms contributing to the association between MAO-B gene and Sch and/or ND risk still require further study.

Keywords: Schizophrenia, nicotine dependence, Monoamine oxidase B, A644G, variant

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Lipase ımmobilization on magnetic calix[4]arene bearing ımino-dicarboxylic/phosphonic acid complexes

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Abstract

In this study, iron oxide magnetite nanoparticles, prepared through a co-precipitation method, were coated with phosphonic acid or iminodicarboxylic acid derivatives of calix[4]arene to modulate their surfaces with different acidic groups. *Candida rugosa* lipase was then directly immobilized onto the modified nanoparticles through sol–gel encapsulation. The catalytic activities and enantioselectivities of the two encapsulated lipases in the hydrolysis reaction of (R/S)-naproxen methyl ester and (R/S)-2-phenoxypropionic acid methyl ester were assessed. The results showed that the activity and enantioselectivity of the lipase were improved when the lipase was encapsulated in the presence of calixarene-based additives; the encapsulated lipase with the phosphonic acid derivative of calix[4]arene had an excellent rate of enantioselectivity against the (R/S)-naproxen methyl and (R/S)-2- phenoxypropionic acid methyl esters, with E = 350 and 246, respectively, compared to the free enzyme. The encapsulated lipases (Fe-Calix-N(COOH)) and (Fe-Calix–P) showed good loading ability and little loss of enzyme activity, and the stability of the catalyst was very good; they only lost 6–11% of the enzyme's activity after five batches.

Keywords: Calix[4]arene, Magnetite nanoparticles, Lipase immobilization, Enantioselective

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Mechanical behaviour of antimicrobial Titanium-Niobium alloys produced by high energy ball milling as a function of alloying composition

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Abstract

Pure Ti and Ti alloys are useable for biomedical implant materials due to their properties such as low elastic modulus, super biocompatibility and good corrosion resistance. Titanium alloys used as biomaterials should not contain cytotoxic elements due to the health problems that they cause in human body. The aim of this study is to prepare titanium base alloys with the addition of niobium, tin and tantalum and investigate the mechanical properties as a function of alloying compositions and consider antimicrobial activities. Niobium, tin and tantalum are chosen because of their good biocompatibility which do not cause a negative tissue reaction. In this study, titanium alloys of different compositions were produced by mechanical alloying. After the milling was complete, as-milled titanium alloys were consolidated using an unaxial pressing and sintered at different temperatures up to 1150 ºC. Microstructural characterization was performed using Scanning Electron Microscope (SEM). Antimicrobial activity of samples against Staphylococcus aureus (ATCC 25923) were investigated by using the ASTM E2149-13a standard. The overnight cultures were centrifuged at 3,600g for 10 minutes at 5°C, washed twice, re-suspended in Sorensen's phosphate buffer, and the cell density of suspensions was adjusted to the 1.5×10^5 colony forming units (cfu)/mL. In brief, samples were sterilized by UV treatment and added to screwcap tubes containing 1 mL of working bacterial suspensions. The numbers of viable bacteria in suspensions before (time 0) and after exposure (at 220 rpm and 37 °C for 90 minutes) were determined by plate count technique. According to the results, antibacterial activity of the samples against S. aureus, may be considered as Ti24Nb 6Ta> Ti24Nb 6 Sn > Ti24Nb 6Sn 1Ta in spite of the fact that there was no significant antibacterial activity of three samples. Further, a more rigorous evaluation of antibacterial activity for both gram positive and gram negative and cytotoxic activity against human cell lines of the samples is needed in order to determine their biocompatibility.

This research was supported by Necmettin Erbakan University - BAP under grant number 151219009.

Keywords: Mechanical Alloying, Biocompatible, Titanium Alloys, Cytotoxic

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Neuroprotective effect of morin on rats exposed to doxorubicin

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Abstract

Flavonoids are ubiquitous compounds and are a family of phenolic compounds found in the components of many fruits, vegetables, juices and herbal dietary supplements and some of them are free radical extinguishing and antioxidant properties. Morin (3,5,7,2 ‘, 4’-pentahydroxyflavone) is a natural bioflavonoid which has been reported to exhibit antioxidant, anti-inflammatory, antidiabetic, anti-carcinogenic, neuroprotective, and antiproliferative effects in vivo and in vitro. It is first isolated from the *Moraceae* family and is found in most plants, fruits and wine. Doxorubicin (DOX) is an anticancer anticancer belongs to the family of anthracycline and was first isolated from *Streptomyces peucetius* in the 1960s. In the study, control group, morin hydrate (100 mg/kg), DOX (40 mg/kg), DOX + morin hydrate (50 mg/kg), DOX + morin hydrate (100 mg/kg) groups were formed to determine the neuroprotective effect of morin, a natural antioxidant against DOX-induced toxicity in brain tissue. At the end of the 10th day, experimental application was terminated and rat brain tissues were taken. A histopathological examination of the tissues was performed to determine the damage caused by DOX in the brain and the healing effect of morin against this injury. To determine the contribution of morinin to the antioxidant defense system in the brain tissue in response to oxidative damage resulting from DOX exposure, reduced glutathione and MDA levels and superoxide dismutase, catalase, glutathione peroxidase enzyme activities were determined. In addition, NF-κB, TNF-α and IL-1β levels were determined with the aim of determining the anti-inflammatory effect of morin. Anti-apoptotic protein Bcl-2 level was examined for antiapoptotic effect. AChE level were also determined to elucidate the curative effect on neurotransmission.

Keywords: Morin, Doxorubicin, Flavonoid, Neuroprotective effect

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Exposure of 1800MHz cell phone radiation may be effect the DRD2 gene expression levels in rat brain tissue

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Abstract

Development of electronic technologies, the public concern about the potential health hazards induced by radiofrequency electromagnetic fields (RF-EMF) has been grown. Brain is the most exposed tissue from the cell phones RF-EMF. Scientist concern about this exposure may be cause brain tumours, psychiatric disorders and neurodegenerative disease. Discoidin domain receptors (DDRs), including DRD1 and DRD2, are members of the receptor tyrosine kinase (RTK) family. DRD1 and DRD2 genes demonstrated significant association with schizophrenia, Alzheimer and Parkinson. Also associated with some cancers development including colorectal cancer, breast cancer and adenocarsinom. In this study we determined the expression levels of DRD1 and DRD2 genes in the rat's brain tissue exposed with 1800 MHz RF-EMF. Twenty-two female wistar albino rats were divided into three groups. Experiment group was exposed 1800Mhz RF-EMF 2h/day along 8 weeks. Control group was kept in their own conditions. Sham group was kept in experiment conditions without RF-EMF exposure. Immediately end of the 8 weeks the rats were sacrified and removed their brain, stored at -80oC. RNA isolation was performed from tissue homogenate. DRD1 and DRD2 genes expression levels was determined with TaqMan assays. Analyses showed that DRD2 gene expression level was significantly different from the sham and exposed groups according to the control group (p=0,021). Also DRD1 gene expression level was not significantly different between the groups (p=0,510). Cell phone use may be stimulate the neurodegenerative diseases. Further studies should be performed.

Keywords: Cell phone radiation, Brain tissue, DRD1, DRD2 Gene expression, Neurodegenerative diseases

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A study on antimicrobial activity of water-soluble calixarene derivatives

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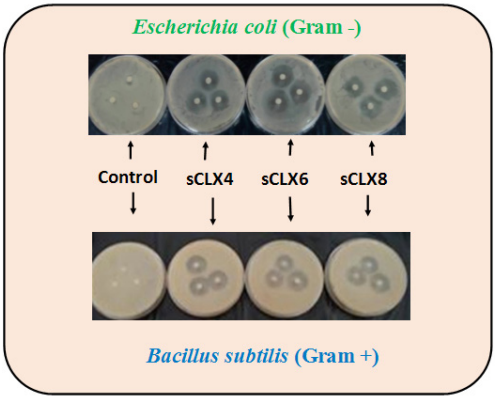
Abstract

A series of water soluble calixarene derivatives with sulphonated groups were synthesized and characterized by FT-IR and NMR. The antimicrobial activity of water-soluble calixarene compounds were investigated towards *Bacillus subtilis* (*B. subtilis*) and *Escherichia coli* (*E.coli*) by using disk diffusion method. From the antimicrobial test, it was seen that the growth of Gram-positive (*B. subtilis*) and Gram-negative (E. coli) bacteria were inhibited by calixarene derivatives (sCLX4-6-8). After incubation, the diametre of obtained zones for sCLX4, sCLX6 and sCLX8 were measured as 11,13,10 mm toward B. subtilis and 14,13,14 mm toward E. coli, respectively.

Keywords: Sulphonated calix[n]arene, *Escherichia coli*, *Bacillus subtilis*, Disk diffusion



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Cytotoxicity of PVA/PAA/Nanopomegranate seed nanocomposites

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Abstract

Poly (vinyl) alcohol (PVA) is one of the most frequent and the oldest synthetic polymer used in hydrogels because of its good biocompatibility. However, PVA has insufficient elastic and low hydrophilicity characteristics which restrict its use alone as a wound dressing material. Therefore, in this study poly(acrylic) acid (PAA) was used with PVA and nanopomegranate seed (nPS) was used as a filler material. In order to test the cytotoxicities of the synthesized hydrogels MTS assay was used. PVA/PAA and PVA/PAA/nPS (1 wt. %) samples showed 15.2 % decreases with respect to negative control after 24 hours of incubation and these decreases were found as statistically significant ($P<0.05$). On the other hand, PVA/PAA/nPS (2.5 wt. %) and PVA/PAA/nPS (5 wt. %) samples showed 14.75 and 11.12 % decreases respectively and these were statistically significant ($P<0.05$). After 48 hours of incubation, a dramatic decrease (21.44 wt. %) in cell viability was observed with PVA/PAA samples ($P<0.05$), while the other hydrogels showed increased absorbances with increasing concentrations of pomegranate seed. In conclusion, it is clear that the hydrogel nanocomposites prepared with pomegranate seeds decreased the cytotoxicity of pure polymers on healthy human lymphocytes.

Keywords: PVA, PAA, Nanopomegranate seed, Nanocomposite, Cytotoxicity

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Cytotoxicity of intercalated kaolinite nanoclays

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Abstract

Nanoclays that are naturally occurred layered silicates have been used with biopolymers for various biomedical applications with its important properties. The aim of this study is to determine the cytotoxic effects of kaolinite nanoclays intercalated with DMSO and DMSO/ Glutamic acid on human lymphocytes. In order to test cytotoxicity, nanoclay treated mediums were added into the cell cultures after 24 h of incubation of isolated lymphocytes. Then the samples were incubated for 48 h at 37°C (5% CO2). At the end of each 24 hour, 100 µL of cells were treated with 20 µL of MTS reagent. Cell viabilities were analyzed measuring the absorbances at 490 nm, after 4 hours of incubation at 37°C. According to our MTS assay results, kaolinite nanoclays modified with DMSO didn't show significant change in cell viability until its maximum concentration (500 µg/mL). In addition, viabilities didn't decrease significantly with DMSO/Glutamic acid modified kaolinite samples for 24 h but only decreased at 500 µg/mL for 48 h ($p<0.05$). As a result, we concluded that kaolinite samples modified with DMSO and DMSO/ Glutamic acid were nontoxic to the lymphocyte cells in a dose dependent manner.

Keywords: Kaolinite, Nanoclay, Cytotoxicity, Lymphocytes

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The evaluation of relationship between obesity and cardiac markers

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Abstract

Obesity increases the risk of sickness in many systems of the organism. Obesity is the major risk factor of cardiovascular disease and the mortality related with cardiovascular disease. In this study, it was investigated the relationship between obesity and cardiac markers. The obese group consisted of 124 female aged of 12-72 and 9 male aged of 15-64 (mean age: 48.2 ± 6.5) obese individuals, while the control group consisted of 97 female aged of 15-61 and 29 male aged of 15-62 (mean age: 46.2 ± 8.9) healthy individuals. Statistical results of analysed blood samples revealed that HDL-cholesterol levels of both groups was not statistically significant ($p > 0.256$); while Total cholesterol ($p < 0.009$), LDL-cholesterol ($p < 0.033$), Triglyceride ($p < 0.002$), CK-MB and Cardiac Troponin I ($p < 0.001$) levels were significantly increased in obese individuals when compared with control group. Any correlation was not detected between analysed biochemical parameters and body mass index.

Keywords: Obesity, cardiac markers, blood lipid parameters

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Effects of zebularine on life cycle of model organism galleria mellonella L. (Lepidoptera: Pyralidae)

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Abstract

Due to recent developments in epigenetics, DNA methylation has become more intriguing in last decades. DNA methylation is a chemical reaction has a pivotal role in gene expression and development. Alterations in DNA methylation may cause to cancer, developmental disorders and inaccurate cell differantiations. Zebularine is an inhibitory agent of DNA methylation which commonly used as atumor supressive in cancer treatments. Further researchs on model organisms have importance to obtain detailed information about effect of zebularine. Model organism greater wax moth Galleria mellonella was used for determination of effects of zebularine on development. During the study period to rare G. mellonella 25±2°C temperature and 60±5% relative humidity and 12:12 h light:dark conditions was provided. In order to determine the effects on pupation period, emerging period, adult life time, weight and lenght different doses (0,25mg/mL-32mg/mL) of zebularine injected into larvae from left hind leg. As a result of study, zebularine did not affect pupationan demerging periods. Adult life time prolongedas dose increased, except 4mg/mL which cause of short life time. While adult weights were not affected by any doses, 1 mg/mL doses caused to shortness of height. Determination of effects of zebularine on different organisms may contribute to understanding of gene expression mechanisms, cell differantiations, threatments of cancer and developmental disorders.

Keywords: Development, DNA methylation, Galleria mellonella, Zebularine

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The determination of cytotoxic effects of N-(3 oxododecanoyl)-L-homoserine lactone belonging to Pseudomonas aeruginosa in a human colorectal adenocarcinoma cell line

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Abstract

The intestinal epithelium plays a very important role to provide barrier integrity. This integrity can be disrupted a number of agents. Bacterial virulence factors are one of these agents. N-(3 oxododecanoyl)-L-homoserine lactone (3-oxo-C12-HSL) quorum sensing signal molecule is involved in the regulation of virulence gene expression in Pseudomonas aeruginosa. There is a few studies about the effects of quorum sensing signaling molecules on epithelial cells. Here, we investigated the cytotoxic effect of 3-oxo-C12-HSL signal molecule on human epithelial colorectal adenocarcinoma DLD-1 cells. For this purpose, DLD-1 cells were grown in RPMI 1640 medium supplemented with 10% heat-inactivated fetal bovine serum, 0.15 mM sodium bicarbonate, and %1 penicillin/streptomycin at 37°C in a humidified incubator with 5% CO2 and 95% air in a humidified atmosphere. The viability of cells treated with a set of concentartions of 3-oxo-C12-HSL (12.5, 25, 50 and 75 µM) was determined by MTT (3-(4,5 dimethylthiazol2yl)-2,5 diphenyl-tetrazolium bromide) methods in vitro. the morphology of cells were observed under an inverted microscope and a light microscope after staining with Giemsa. According to the results of MTT, 3-oxo-C12-HSL was found to be cytotoxic on DLD 1 cells with an IC50 value of 75 µM compared to control cells treated with 0.1 %DMSO as a solvent. The cells lost their epithelial like morphology and showed more rounded smaller shape after 24 hours treatment with 3-oxo-C12-HSL compared with the control cells. Since the tissue specificity is an important parameter in *P. aeruginosa* infections, we suggest that researches might be focused on the cytotoxic activities in a combination with the determination of host-bacterial relationships in DLD-1 cells.

Keywords: *Pseudomonas aeruginosa*, 3-oxo-C12-HSL signal molecule, MTT

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Synergistic effect of *Bacillus pumilus* ameliorates cadmium and zinc stress in wheat roots

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Abstract

Plant remains in close interaction with soil microbes. Generally, these microbes are mutualistic and beneficial for plants. Bacterial associations with plants have been well studied and known that communication between interacting partners involves physiological and molecular processes. Bacteria help plants directly by promoting growth via nitrogen fixation, nutrient channelization by solubilizing in absorbable forms, growth hormones production, production of 1- aminocyclopropane, 1- carboxylate (ACC) deaminase, and indirectly by producing siderophores, chitinases, fluorescent pigment molecules, antibiotics, β-1-3-glucanase and sometimes also by some poisonous compounds like cyanide. The effects of 150 µM $CdCl_2$ and 10 mM $ZnSO_4$ on the activities of antioxidant enzymes (superoxide dismutase (SOD), catalase (CAT), peroxidase (POX), ascorbate peroxidase (APX) and glutathione reductase (GR)), proline content (Pro), hydrogen peroxide content (H_2O_2) and lipid peroxidation (TBARS) evaluated in wheat roots (*Triticum aestivum* L.) growing in media with and without an amendment of *Bacillus pumilus* (PGPR) application for 7 days. 150 µM Cd and 10 mM Zn exposure, a significant decrease in activities of SOD, CAT, APX and GR began after the first day of stress in wheat roots. Ψ_{Π} and Pro decreased after both Cd and Zn stresses during the experimental period. Both stress caused an increase in H_2O_2 and TBARS as from the first day of stress. However, in stressed wheat roots, bacteria application resulted an alleviation on antioxidant enzyme activities, Pro, and a decline in H_2O_2 content. It could be concluded that exogenous bacteria may have the application possibility for a future practical trial of stress reduction leading to mitigate heavy metal toxicity and improve the water content and the antioxidant enzyme activities in wheat roots.

Keywords: *Bacillus pumilus*, Cadmium, PGPR, Antioxidant enzymes, *Triticum aestivum* L., Zinc

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Oxidative stress in women of severe acne vulgaris

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Abstract

Acne vulgaris is a common dermatological problem in women. Several etiological factors such as genetics, hormonal, ultraviolet radiation, microorganisms, cosmetics and stress are believed to be responsible for acne vulgaris. In our study, we aimed to assess the oxidative status in women with severe acne vulgaris. Malondialdehyde (MDA) is a naturally occurring product of lipid peroxidation after exposure to reactive oxygen species and free radicals and it may be used to evaluate oxidative damage by measuring of serum Thiobarbituric acid reactive substances (TBARS) levels. This study was performed on 92 women, 60 women with severe acne vulgaris and 32 healthy women. The principle was based on the spectrophotometric measurement of the color occurring during the reaction to TBARS with MDA. A portion of serum was mixed with 2mL of a solution containing 15% trichloroacetic acid, 0.38% thiobarbituric acid and 0.25N of hydrochloric acid. The mixture was heated at 100ºC for 30 minutes and, after centrifugation, the absorbance was measured at 532 nm. The total MDA content of the serum samples was determined by the difference in absorbance between test and standard samples using a solution of MDA as standard. The results were expressed as µmol/L. We observed a significant increase in the serum MDA levels in women with severe acne vulgaris as compared to healthy women ($p < 0.05$). In conclusion, this study revealed oxidative mechanisms may play an important role in etiogenesis and progression of the severe acne vulgaris, but there is a need to work more on this.

Keywords: Acne vulgaris, oxidative stress, malondialdehyde

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Promoter (-107T/C) polymorphism of paraoxonase 1 (PON1 and its relation to the risk of pseudoexfoliative glaucoma

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Abstract

Pseudoexfoliative glaucoma (PEG) is an ageing-related condition that occurs due to accumulation of pseudoexfoliation material in the anterior chamber of the eye, which blocks the normal functioning of the trabecular meshwork, leading to increased intraocular pressure and damaging the optic nerve. Early recognition and appropriate management of PEG is important in the prevention of glaucoma related blindness. However, the etiology of this disorder has not been clearly understood. Pathogenesis of pseudoexfoliation material formation was suggested to include oxidative stress. Paraoxonase 1 (PON1) is an important anti-oxidant enzyme of the plasma, which can also be found in ocular tissues, as well as in the aqueous humour. Expression level of this enzyme is affected by the promoter region genetic polymorphism -107T/C. The aim of this study was to evaluate the role of PON1 -107T/C (rs705379) single nucleotide polymorphism (SNP) in PEG risk. The study population consisted of 150 PEG patients and 150 control subjects. Blood samples were obtained from Gülhane Education and Research Hospital, Ophthalmology Unit, Ankara, Turkey. Genomic DNAs were isolated from whole blood samples and the genotypes were determined by PCR-RFLP analysis. The frequency of -107C allele frequency was not significantly different between the patient and control groups. C allele frequency was 0.473 in PEG patients and 0.429 in controls (P=0.461). Distribution of genotypes also did not differ significantly and were as follows: TT: 30%, TC: 45.3%, CC: 24.7% in PEG patients; TT: 29.3%, TC: 52.7%, CC: 18% in controls. The results of this study did not show any association between PON1 -107T/C SNP and PEG risk in the studied Turkish population.

Acknowledgment: This study was supported by TUBITAK (315S190)

Keywords: Glaucoma; Polymorphism; PON1; Promoter; Pseudoexfoliation; SNP

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Anti-glycation study of hydro-alcohol and aqueous extracts of Moroccan plant species

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Abstract

Inhibition of AGEs and free radicals generated during diabetes represents a major therapeutic target in the prevention and treatment of diabetic complications. *In vitro* study of the anti-glycation and radical scavenging activities of hydro-alcohol and aqueous extracts of Moroccan plant species. Anti-glycation effect of nine plant species used in traditional medicine, has been evaluated after extraction by hot (EAC) or cold (EAF) maceration and by ethanol (EE). Anti-glycation activity performed on BSA-Methylglyoxal system was measured by fluorescence and native electrophoresis. Total phenolic and flavonoid contents were assessed as well. With the exception of *S. indicum,* all the species studied had an average effect. The higher effect was recorded in *Laurus nobilis* and was dose dependent, inhibiting both formations of Amadori products and fluorescent AGEs. HPLC analysis revealed a richness of *L. nobilis* EE in flavonoids, with the presence of quercetin, vanillin and gallic acid. Extracts of *L. sativum, N. sativa, O. europaea* and *R. tinctorum* acted only as inhibitors of the fluorescent AGEs formation. A strong correlation was registered between antioxidant power and phenolic/flavonoid content. In contrast, there was no correlation between antioxidant and anti-glycation power. Phenolic and flavonoid compounds were strongly involved in the observed effect. While, the anti-glycation activity is probably attributed to non-antioxidant compounds.

Keywords: Anti-glycation, antioxidant, polyphenols, water extracts, ethanol extracts

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Mechanical characterization of 3D modelled cortical and cancellous bone properties

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Abstract

The structure of bone is anisotropic. Due to that, , there is a mechanical difference in the cortical and cancellous parts of the long bones. In this study, it is aimed to improve the basic parameters that the mechanical properties of bone tissue. Cross sectional dimensions of femur in CT were examined. Based on the mean morphometric properties of the femur longitudinal sections, the cortical thicknesses were determined to be 1.5 mm / 2.4 mm. In the same way, the scaffold is formed with filling rate of cancellous part as 15% and 30%. We created scaffolds using PLA with FDM (Fused Deposit Manufacturing) method. Mechanical tests were carried out with an electromechanical tester . Axial loads were applied at a speed of 10mm / min. A linear increase was observed in thick cortical subtrochanteric scaffolds with the comparison of 1000N - 2000N - 3000N. When the thickness of the cortex is examined alone, it is seen that the thickened cortex in the subtrochanteric region is less displaced than the thin cortex.As a result, we can show that, bone cortex and porosity are important in the mechanical properties of the bone, also the structure of bone varies with the segment of bone. At last but not least, we assume that 3D printers and modelling studies will give a chance to mimic the bone structure in the near future.

Keywords: 3d printing, cortical bone, cancellous bone

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Determination of yield and quality of fresh bean under deficit ırrigation in a semiarid climate

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Abstract

In the Konya region, green bean require frequent irrigation due to high evaporation and low precipitation during the growing season. However the drought in recent years at Turkey, especially in Konya plain has been one of the most important abiotic stress factor affecting the green bean production. The ways to reduce yield losses are deficit irrigation practices, to improve and disseminate the varieties that are tolerant to water stress. In this research, the response of two green bean varieties one of which was improved by Horticultural Department of Selcuk University Agricultural Faculty (S3) and a commercial variety existing in Turkey market (Nazende) to different irrigation water levels under drip irrigation has been investigated. The irrigation treatments included four irrigation water level according the amount of water evaporated from Class A Pan within 7 days period and based on 4 different pan coefficient (kcp1= 1.25; kcp2=1.00, kcp3=0.75 and kcp4=0.50). The results showed that while there was significant differences in pod length, pod width, no significant differences were observed in yield, pod per plant among varieties. It was found that significant differences in yield, pod length pod per plant among irrigation levels. The highest yield were obtained in kpc2 treatment with 3762.1 kg ha-1 for S3 and kpc1 treatment with 3525.1 kg ha-1 for Nazende. It was not observed significant differences in yield between kcp1; kcp2, kcp3 treatment for both varieties. It was concluded that the reduction in irrigation water quantity without lowering green bean yield can be expected in Konya.

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Keywords: Bean varieties, deficit irrigation, Konya

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Comparison of femur supracondylar and subtrochanteric mechanical properties

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Abstract

The structure of bone is anisotropic. Due to that, there is a mechanical difference in the cortical and cancellous parts of the long bones. It is aimed to improve the basic parameters of bone tissue. The purpose of the present study was to compare the structural properties of the fourth-generation composite femur with a different bone segment and cortical thickness/porosity. This study was carried out in order to reveal different mechanical properties in the subtrochanteric and supracondylar region of the femur. For this purpose, an average of eight longitudinal section subtrochanteric and supracondylar region of femur cross-sectional dimensions are taken from computerized tomography.Data processed with Solidworks to create a solid model. The study has been carried out with scaffolds by a cortical thickness of 2.4 / 1.5mm and a filling rate of 15% and 30%. Also, the section thicknesses were taken as 10 mm. Mechanical tests were carried out with an electromechanical tester (Shimadzu). Axial loads were applied at a speed of 10mm / min. At 1000N - 2000N - 3000N, the data were taken simultaneously. The subtrochanteric structures with same cortical thicknesses, it has a greater displacement in the larger porosity. However, no significant difference in smaller porosity. In comparison, under similar loads, sawbones and the scaffolds were found closer to the structure with 1.5mm of cortical thickness and the cancellous part with higher porosity. As a result, cortical thickness and porosity are important in the mechanical properties of the bone, also the structure of bone varies with the segment of bone.

Keywords: Mechanical properties, bone modelling, femur

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Analysis of antioxidant and cytotoxic potential of *Platismatia glauca* using human lymphocytes

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Abstract

All multicellular organisms try to protect themselves against harmful microorganisms that can cause disease. Immunity is a general term that describes the reaction and response of an organism to an agent that can cause all kinds of diseases such as bacteria, viruses, fungi. Lymphocytes are important cells of the acquired immune system that are antigen receptors. For this reason, protecting lymphocytes is of great importance for human health. Drugs developed with herbal products are important elements to strengthen the immune system. Lichens that have many medical features also have an important place in this area. Considering all these characteristics, the present study aimed to measure the cytotoxic and antioxidant capacity of methanol extract obtained from *Platismatia glauca* (L.) W.L.Culb. & C.F.Culb. on human lymphocytes. For this aim, 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT), total antioxidant capacity (TAC) and total oxidative status (TOS) analyzes were in the tested cells. Median *inhibitory concentration* (IC50) value was 84.02 mg/L. Cell viability decreased in a concentration-dependent manner. High and low concentration applications of the extract showed lower TAC values. In addition to this, it was reflected in the results of the study in which the extract applications increased TAC in cells statistically ($p < 0.05$) compared to negative control. Moreover, TOS experiments revealed that all applications had statistically different and lower values than positive control. All these results showed that methanol extract of *P. glauca* contained antioxidant capacity enhancing components on lymphocytes.

Keywords: Antioxidant, Cytotoxicity, Lichen, Lymphocyte, MTT

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The effect of hypercholesterolemia on biomarkers of kidney injuries in rabbit kidney tissue

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Abstract

Hypercholesterolemia plays an important role especially in cardiovascular diseases, chronic kidney diseases, obesity, metabolic syndrome and neurodegenerative diseases. As a result of increased LDL levels could trigger oxidative stress, foam cell formation, platelet activation/aggregation, endothelial dysfunction, apoptosis, inflammation and fibrosis. Chronic kidney disease (CKD) develops as a result of damage in the glomerular, tubular, and/or renal vascular structures and this inflammatory process is a chronic duration. Neutrophil gelatinase-associated lipocalin (NGAL), tissue inhibitor of metalloproteinases-2 (TIMP-2), monocyte chemoattractant protein-1 (MCP-1) and liver-type fatty acid binding protein (L-FABP) are emerging as new biomarkers of renal failure. The aim of our work; is to investigate if high cholesterol diet effects new biomarkers of kidney injuries in rabbit model. The first group of rabbits was only fed with diet. The second group was fed with diet containing 2% cholesterol, third group diet and received injections of 50 mg/kg/day of vitamin E intramuscularly and the rabbits in the fourth group were fed with diet containing 2% cholesterol and received injections of 50 mg/kg/day of vitamin E intramuscularly. After 8 weeks, we have measured lipid profile and vitamin E levels in rabbit serum samples by autoanalyzer and HPLC. Also, mRNA expressions of NGAL, TIMP-2, MCP-1 and L-FABP were measured by qPCR. We observed that neither high cholesterol diet nor Vitamin E supplementation had any significant change on mRNA expressions of NGAL, TIMP-2, MCP-1 and L-FABP in kidney tissue. Our other histologic results which were similarly observed glomerulosclerosis and interstitial fibrosis in all groups support this situation.

Keywords: Hypercholesterolemia, Kidney injuries, NGAL, TIMP2

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Secondary metabolite studies of wild and micropropagated *Taraxacum officinale* Linn.

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Abstract

In this study, the metabolite contents of the clonally propagated and naturally collected samples of the medicinally important *Taraxacum officinalis* plant were investigated. For the clonal studies, one leaf were isolated from one seedling and used as explants. The leaf explant was cut into 2 cm2 segments and transferred on MS medium supplemented with 2 mg L-1 benzyl amino purine (BAP) and 2 mg L-1 naphthalene acetic acid (NAA). The same procedure was applied every four weeks, and the plants were harvested at the end of the eighth week. For metabolite studies, dried and grounded samples were stirred in 60% of methanol over 3 hours at room temperature. After drying the crude extracts, they were separated into two fractions with C18 reversed-phase column chromatography using 10% and then with 100% of methanol. The metabolites of the samples were analyzed with Q-TOF LC-MS/MS in negative ion mode. Seed germination of *T. officinale* was observed in 10 days. Adventitious shoot regeneration was obtained at the end of the third week. After 8 weeks the shoots were harvested and dried for metabolite studies. More than 10 metabolites were characterized from natural and cloned *T. officinale*. The presence of the same metabolites in both natural and cloned plant extracts showed that the micropropagation of *T. officinale* can be potentially used as a new protocol for the production of beneficial secondary metabolites for pharmaceutical and supplemental food industries.

Keywords: Adventitious shoot, Clonal propagation, Plant growth regulators, Q-TOF LC-MS/MS, *Taraxacum officinale*

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Effect of silver nanoparticles in plant tissue culture media on seed germination and seedling growth in black carrot

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Abstract

It has been known since ancient times that silver has an antimicrobial effect on a wide range of microorganisms. Because of this property, there are many studies on the use of silver particles which is called nanoparticle as antimicrobials. The silver in the nano scale exhibits unusual physical, chemical and biological properties. It is an important feature of nanoparticles with excellent functional durability, heat resistance, ease of application, wide application area, environmentally friendly and non-toxic, broad scale antimicrobial spectrum, cost effective production process. Due to the advantages mentioned in recent years, there is growing interest in exploring the use of nano silver in plant tissue culture applications. In this study, the antimicrobial effect of silver nanoparticles was investigated in surface sterilization processes, which is the most important step of plant tissue culture applications. In order to assay the efficiency of nanosilver in sterilizing plant seeds an important medicinal and industrial plant, black carrot seeds were used as explant in this study. In the experiment, black carrot seeds were soaked in 3 different concentrations (0, 10 and 20 ppm) of nano silver with 2 different (5 and 10 min) exposure times, and then were transferred onto the Murashige and Skoog medium. As a result, there was a decrease in contaminations due to the increased concentration of nano silver. It has been determined that nano silver acts as an antimicrobial agent and does not negatively affect germination.

Keywords: Antimicrobial, Black carrot, Germination, Murashige and Skoog, Nano silver

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Metal ion modified montmorillonite catalysts on the degradation of selected pesticide

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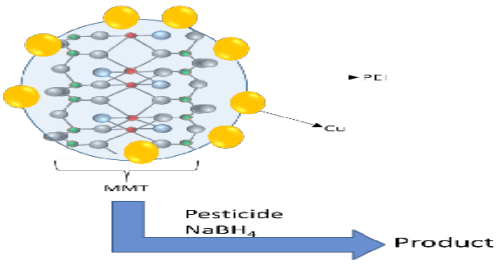
Abstract

Conventional water control approaches is not enough which the detection and removal of pesticides residual and other hazardous organic compounds in drinking water. The exponential growth of intensive agriculture in the Mediterranean region result uncontrolled use of pesticides has caused important pollution of water resources during last 20. century. Therefore, some efficient methods has been developed for the removal of various harmful pesticides from wastewater resources. Some of these methods are physical, chemical and biological methods involving adsorption, oxidation, catalytic degradation, membrane filtration and biological treatment. By means of unique properties (e.g. large specific surface area, small diffusion resistance, higher adsorption capacity, and faster adsorption equilibrium) nanomaterials have used for the removal of various contaminants from wastewater resources. Clay is an important clay mineral which a unique structure related its functional properties. Many studies have reported the application of catalysis on various clays and their modified forms. Montmorillonite has been selected a potential catalysis toward pesticides many times. In the present work, synthesis of a Cu/montmorillonite and its catalytic activity were reported. The prepared material was characterized by X-ray diffraction (XRD), scanning electron microscopy with Energy Dispersive Analysis (SEM–EDS), transmission electron microscopy (TEM) and UV–Visible diffuse reflectance spectrophotometry (UV–Visible). The synthesized metallic nanoparticles was used as catalyst in the degradation of a selected pesticide.



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Effect of dried jujube fruit on some properties of cookies

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Abstract

Jujube (*Zizyphus jujuba* Mill.) is a major fruit which is a member of Rhamnaceae family. The fruit is a tasty and highly nutritious. Jujube fruit is suitable enrichment material for food and food products with high mineral and vitamin contents. Also, jujube has significant levels of antioxidant activity and it contains many medicinal properties. In this study, the use of dried jujube fruit (DJF) instead of wheat flour (WF) in cookies was investigated. DJF was used in cookie samples at different five levels (0%, 5%, 10%, 15%, and 20%). Afterwards, physical (diameter, thickness, spread ratio and color values) and sensory (color, taste, odor, appearance and overall acceptability) properties of cookie samples were investigated. The use of DJF led to an increase in diameter and thickness values of the cookie samples. Also, cookie samples containing DJF showed the darkest color. Moreover, DJF affected the scores of sensory properties of cookie. As a result, DJF at a level of 10-15% can be used in cookie formulation for nutritional enrichment.

Keywords: Jujube fruit, cookie, health, nutrition

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Combination effect of I-BET762 and sorafenib in MDA-MB-231 breast cancer cell line

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Abstract

Breast cancer is the second considering most common cancer-related mortality in women. I-BET762 is inhibitor of bromodomain and extra terminal protein (BET) which is important in cell proliferation. Sorafenib is a multiple kinase inhibitor used in the treatment of cancer. Aim of this study was to investigate combination effect of I-BET762 and sorafenib on apoptosis in MDA-MB-231 breast cancer cell line. Cell viability was determined by using XTT method after the treatment with I-BET762, sorafenib and combination of both. Total RNA isolations of control and dose groups were conducted using TRIzol Reagent. Expressions of important genes in apoptosis including *CASP3, CASP7, CASP8, CASP9, BCL2, BAX, CYCS, FAS* and *P53* were investigated in control and dose groups by qPCR. According to XTT results, IC50 doses for 48 h of I-BET762 (7.01 µM) and sorafenib (5.62 µM) were determined in MDA-MB-23 using CompuSyn version 1.0 software. Combination index of I-BET762 and sorafenib was calculated 0.62 using 3.09 µM doses for both agents. Combination index <1 has indicated synergistic effect. Combination of I-BET762 and sorafenib significantly increased expression of *CASP7, CASP9* and *BAX* genes with higher fold change compared with other groups. Findings showed that I-BET762 can be effective of the combination with sorafenib in breast cancer therapy.

Keywords: Breast cancer, I-BET762, sorafenib

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Creating standard curves with 16S rRNA and denitrification functional gene regions for use in Real-time PCR absolute quantification

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Abstract

Real-time PCR (qPCR) is a commonly used method in microbial community analysis, allowing the quantification of the number of target genes in a community. Recently, the standard-curve technique of absolute quantification is widely used for these types of analysis. Plasmids containing cloned target sequences are commonly used as standards in absolute quantification. The aim of the present study was to calculate the mass of plasmid templates that correspond to copy numbers of target nucleic acid sequences. We amplified to nine different gene regions (16S rRNA 193 and 200 bp, nosZ clad I 1 and 2, nosZ clad II, nirK 165 and 514 bp, nirS 413 and 425 bp) by PCR, after a standart PCR reaction, the products were quickly purified and then ligated with the pGEM-T vector. The ligation mix was then transformed and blue/white screening was used to identify positive transformants. The positive colonies were selected for 9 gene regions and plasmid isolation was performed. PCR was performed with the T7-SP6 primer to confirm whether the clone was transferred, followed by sequence analysis. The all sequences were screened in Blast (NCBI) and the gene regions were confirmed. The 260/280 nanodrop measurements were made for standards, and gene copy numbers were determined and 10-1 – 10-8 serial dilutions were made. All qPCR analyses were performed on a Light Cycler 1.0 (Roche). After each qPCR run, melting curve analysis was performed to verify the presence of the desired amplicon. The study found that the 16S rRNA 200 bp for total bacteria abundant and nosZ clad I 1, nosZ clad II, nirK 165 bp and nirS 413 bp for denitrification functional gene regions could be successfully used primarily in qPCR absolute quantifications.

Acknowledgments: This research has been supported by Ankara University Scientific Research Project Coordination Unit. Project Number: 17L04300004, 2017-2018.

Keywords: qPCR, Standard Curve, Cloning, Copy number, Absolute quantification

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High variabiliy of D-loop characteristic of Eurasian perch *Perca fluviatilis* and roach *Rutillus rutilus*

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Abstract

Investigation into population-genetic structure of Eurasian perch *Perca fluviatilis* based on D-loop sequences analysis revealed phylogeographic patterns of this species in the Eastern Baltic region being unique and highly variable in comparison to perch samples collected in Scandinavian countries and some other Western and |Southern parts of the Europe. The obtained results indicate that the colonization of water basins by perch was complex in the eastern part of the Baltic Sea Region due to the past changes of connections between different water basins that forced formation of river systems and lakes during the last deglaciation period. High variability of partial MtDNA sequences was also detected among representatives of the roache (*Rutillus rutilus*) and this suggest application of D-loop as neutral and informative genetic markers for both fish species not only in population genetic analysis and phylogeographic studies but also it could be sencitive enaugh to reflect signals and illustrate long term influence of anthropogenic pollution of freshwater ecosystems

Keywords: *Perca fluviatilis, Rutillus rutilus*, D-loop, genetic variability

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New lines ın carcinogenesis: Long non-coding RNAs

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Abstract

Although more than 75% of the human genome is selectively transcribed, only a small portion of the transcripts are converted into final protein products. The rest of transcripts that do not have protein coding capacity are called non-coding RNA (ncRNA). These non-coding RNAs are divided into two major categories as small non-coding RNAs (sncRNA) and long non-coding RNAs (lncRNA), depending on their length. LncRNAs are a group of non-coding RNAs of > 200 nucleotides. They function through molecular and biochemical mechanisms, including -cis and -trans regulation of gene expression, epigenetic modulation of the nucleus and post-transcriptional control in the cytoplasm. LncRNAs may localize to part such as cytoplasm, nucleus, and mitochondria in the cell, and may alter their function depending on where they are localized. They have the ability to interact with various chromatin modifying complexes to modulate the chromatin state. The ability of collect and bind to chromatin to these complexes of lncRNAs can control gene expression by altering epigenetic structure. Recent studies have shown that lncRNAs may be an oncogenic or tumor suppressor function; suggesting that lncRNAs play an important role in the development and progression of cancer. LncRNAs play an important role in many types of cancer, and they may represent potential therapeutic targets because they can be used as biomarkers to predict recurrence and prognosis. In this review, will refer to the general characteristics, localizations, functions of lncRNAs, and cancer-related lncRNAs.

Keywords: Long non-coding RNAs, gene expression, cancer

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NBO and DFT/TD-DFT computational analysis of 2-amino-5-chlorobenzoic acid

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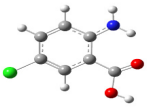
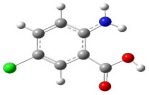
Abstract

Benzoic acid derivatives extremely important component of the vitamin B-complex. They widely found in plants and animals tissues and used in production of pharmaceuticals. Therefore, these molecules deserve to investigate with all details. In this work, conformational geometries of 2-amino-5-Chlorobenzoic acid (2A5ClBA) were studied using density functional theory (DFT) at the B3LYP/6-311++G(d,p) level of theory. First most stable conformer in the ground electronic state was calculated to be the being more stable than the other three conformers by ca.12.3, 29.1 and 38.0 kJ mol^{-1} (Fig. 1). The relative stability of the conformers was explained using the natural bond orbital (NBO) method. The barrier to conformational isomerization in S0 was calculated for all conformers. Energies of the low-energy excited states were calculated using the time-dependent density functional theory (TD-DFT).



$\Delta E(0) = 0.0$ kJmol^{-1}



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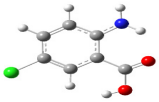

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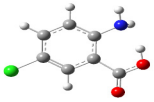

$\Delta E(0) = 38.0$ kJmol^{-1}

Figure 1. Conformers of 2A5ClBA with relative energies calculated by using DFT/B3LYP++G(d,p) level of theory.

Acknowledgement: This work was supported by Anadolu University Commission of Scientic Research Project under Grant no. 1705F407.

Keywords: 2-Amino-5-Chlorobenzoic Acid (2A5ClBA), DFT, TD-DFT, NBO

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I-BET762 and sunitinib demonstrate synergistic effect on breast cancer cells

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Abstract

Bromodomain and extracellular domain protein family (BET) inhibitors are one of the therapeutic agents used in the inhibition of enzymes and proteins have a role in the epigenetic mechanisms of cancer development. The aim of this study is to investigate the synergistic effect of I-BET762, a BET inhibitor, and sunitinib, a receptor tyrosine kinases inhibitor, on human breast cancer cells. The XTT method was used to assess the cytotoxic effects of I-BET762, sunitinib and combination of them. The combination effects were determined by calculating the combination index (CI) using the CompuSyn Version 1.0 software. This program is based on the median-effect analysis and synergy is defined as CI < 1. The IC50 doses of I-BET762 and sunitinib were found to be 13.94 μM and 36.24 μM, and 7.01 μM and 28.97 μM in MCF-7 and MDA-MB-231 cells for 48 h, respectively. The combination doses of I-BET762 and sunitinib were applied to the cells in ratios of 1:2.5 and 1:4 in MCF-7 and MDA-MB-231 cells, respectively. According to results, I-BET762 and sunitinib illustrated a synergistic effect on breast cancer cells at the combination doses inhibited 50% of cell viability (CI=0.61 in MCF-7; CI=0.49 in MDA-MB-231). Results indicated that I-BET762 and sunitinib can be an effective part of combination strategies in breast cancer.

Keywords: Breast cancer, I-BET762, sunitinib

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Gas phase study on molecular structure and EPR of three-furancarboxylic acid by DFT

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Abstract

To obtain molecular structure, conformational analysis of Three-furancarboxylic acid was performed and 5 conformers were determined. Geometry optimizations were performed with Becke's three-parameter hybrid-exchange functional combined with the Lee–Yang–Parr correlation functional (B3LYP) method and the standard 6-311++G(d,p) basis set. The optimizations were performed without any constraints (full optimization). Dipole moment and energy of the lowest energy conformer calculated as 1.469 Debye and -418.725 Hartree respectively. Molecular structure and spectroscopic properties of Three-furancarboxylic acid are an important tool to understand the interactions with other chemicals. The calculated molecular geometry parameters, molecular electrostatic potentials (MEPs), some thermodynamic parameters, were also given for further researchers. Furthermore, for these conformations 23 possible radicals were modelled by using density functional theory (DFT) computations with respect to molecular structure. Electron Paramagnetic Resonance parameters of these model radicals were calculated and then they were compared with the experimental ones.

Keywords: Molecular Modeling, DFT; Conformational Analysis , Radical models, Three-furancarboxylic acid

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DFT study on molecule and radical structures of ethyl alcohol

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Abstract

Ethyl alcohol is probably the most widely abused drug and has great impact on the practice of emergency medicine. Besides, ethyl alcohol is the principal type of alcohol found in alcoholic beverages. It is a volatile, flammable and colorless. People are consuming alcohol although alcohol consuming is very dangerous for human being. On account of clinical reports, both the teratogenic and fetotoxic effects were appeared to be related to the amount of alcohol consumed. In this study, conformational analysis of ethyl alcohol was performed by Spartan 08 program. Consequently, two conformers have been obtained. Then geometry optimizations calculations were performed in water. Thanks to geometry optimizations calculations, conformations energies were obtained. And stable conformer was detected. For this conformation, eleven possible radicals were modelled by using density functional theory (DFT) computations with respect to molecular structure. And then Electron Paramagnetic Resonance (EPR) parameters were calculated for these modeled radicals using the DFT/B3LYP method TZVP basis set. EPR parameters which were obtained from liquid phase experiment of ethyl alcohol were taken from literature. g parameters of model radical 8 is 2.00266. Experimental g value is good agreement with model radical 8. However, experimentally hyperfine coupling constants (hfcc) are not exactly agreement with theoretical models. Even so hfcc of model radical 8 are partly matched.

Keywords: DFT; EPR; Molecular modelling, Radical models, Ethyl Alcohol

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Relationship with gamma-aminobutyric acid b receptor 2 (gabbr2) gene polymorphism between migraine with aura

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Abstract

Migraine is the reason of the majority of the complaints made by the patients to the doctors. Familial tendency is rather common in terms of migraine. Even though there are lots and lots of theories put forward related to the cause of this disease; its mechanism is still a mystery today. Our study is carried out with the patients who have applied to the Medical Genetics and Neurology polyclinic. 108 patients with migraine with aura and 107 healthy people are included in the study. The migraine with aura is diagnosed according to the 2004 Migraine diagnosis criteria by the International Headache Association. Specially designed primers, real-time PCR method and the genotypes of the samples are examined. As consequence of our study, we have confirmed by both our literature scan and our study that genetic GABA receptor gene polymorphisms take place among the several pathophysiologic mechanisms which can cause migraine such as extreme excitability of the cerebral cortex, cortical depression, sterile neurovascular inflammation of the blood vessels, peripheral and central sensitivity of the trigeminovascular system. The significant outcome that we detect in our study can clinically explain that migraine with aura attacks can be prevented by the benzodiazepines which function as stimulating only GABAA receptors for some individuals. Despite all the theories put forward, there is no certain treatment for migraine. Symptomatically, none of the approaches can be applied for all the patients. In this case, it is not uncommon that most of the patients who undergo a migraine treatment are not content with the treatment and that they abandon the treatment most of the time. Therefore, pharm genetic examinations—in other words personal treatment—can be the future of migraine treatment. The detection of genetic differences among the patients can be an answer for the clinicians to the question; why some medicines are better for some patients and worse for others. Defining the polymorphisms and genetic biomarkers can make great contributions to the understanding of migraine pathophysiology. In parallel to all these, we consider that more extensive studies to be performed with GABA physiology and GABA modulators will shed light to migraine pathogenesis and treatment.

Keywords: Aura, GABA, Genetic, Migraine, Polymorphism

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Determination of erythromycin in aqueous media by calixarene coated QCM sensor

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Abstract

Recently, the use of antibiotics is increased. The presence of antibiotics in aqueous media causes water pollution, and also it is harmful for human life and wildlife. Bacteria gain resistance towards antibiotics because of drinking water which is include antibiotic. Erythromycin is an antibiotic which is used for treatment bacterial diseases because it shows ability to prevent to activities of gram-positive and gram-negative bacteria. Most farmers used it to protect animals and agricultural crops from bacteria. Accordingly, it causes antibiotics residues in animal and agricultural products. It can b affected human life directly. Quartz Crystal Microbalance (QCM) is a sensor device which is simple, easy-to-use, and can be used in gaseous and aqueous media. Detection process occurs with transform mass change on quartz surface to electrical signal. There are many studies about polymeric and macromolecules as sensing material. Among macromolecues, calixarene are macrocyclic which have three dimensional structure and unlimited derivatization possibilities. It can be synthesized by condensation of p-tert-butylphenol with formaldehyde under base condition. In this study, a modified QCM sensor by means of coating a calixarene derivative onto QCM surface was used for sensing of erythromycin in aqueous media.

Keywords: Biosensor, Calixarene, Erythromycin, Quartz Crystal Microbalance

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Synthesis and characterization of new thiazolidinone derivatives and evaluation of their genotoxic potentials

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Abstract

The thiazolidinone ring system has been widely employed in the investigation of pharmacologically active heterocyclic compounds. These heterocycles display diverse biological activities such as tuberculostatic, anticonvulsant, anti-arthritic, anti-inflammatory, antiviral, antidiabetic, antithyroidal, fungicidal, bactericidal, insecticidal and pesticidal. As a result of these valuable bioactivities, thiazolidinone derivatives are in a close relationship with living organisms and the environment, which rises the public concerns and necessitates preforming safety evaluations before their commercialization. In this regard, the present work was conducted to synthesize and characterize new thiazolidinone derivatives in order to provide new bioactive raw materials for pharmaceutical and medicinal researches. According to results, six compounds (C1-C6) were successfully synthesized and they were characterized as C1: 3-(4-butylphenyl)-2-(phenylimino)-5-(thiophen-2-ylmethylidene)-1,3-thiazolidin-4-one, C2:2-[(4-butylphenyl)imino]-3-phenyl-5-(thiophen-2-ylmethylidene)-1,3-thiazolidin-4-one,C3:2-[(4-chlorophenyl)imino]-3-(4-butylphenyl)-5-(thiophen-2-yl methylidene)-1,3-thiazolidin-4-one,C4:3-(4-chlorophenyl)-2-[(4-butylphenyl)imino]-5-(thiophen-2-yl methylidene)-1,3-thiazolidin-4-one,C5:3-(4-butylphenyl)-2-[(4-methylphenyl)imino]-5-(thiophen-2-yl methylidene)-1,3-thiazolidin-4-one, and C6:2-[(4-butylphenyl)imino]-3-(4-methylphenyl)-5-(thiophen-2-yl methylidene)-1,3-thiazolidin-4-one. Additionally, genotoxic potential of the synthesized products was also evaluated for decreasing the concerns on the public health and environmental safety issues. For this aim, the *Escherichia coli* WP2 bacterial reverse mutation assay was performed with the mutant tester strain *E. coli* WP2uvrA and N-Methyl-N'-nitro-N-nitrosoguanidine was chosen as positive control. According to the results, the synthesized thiazolidinone derivatives did not show any mutagenic effect on the tester strain up to 1 mM/plate. The revertant numbers were insignificant when compared to the control groups. In conclusion, the products of the present study can be considered as genotoxically safe at the tested concentrations and the findings reported here are valuable for further more complicated pharmaceutical studies.

Keywords: *E. coli* WP2 Assay, Genotoxicity, Thizolidinones

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Determination of amylase enzyme production potentials of thermophilic bacteria ısolated from hot water springs

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Abstract

Amylases are among the hydrolytic enzymes breaking down starch molecules by performing hydrolysis to smaller products such as dextrin, oligosaccharide and glucose and have a prominent place in biotechnological applications. Although amylase enzymes can be obtained from many sources such as plants, animals and microorganisms, microbial-derived enzymes are preferred more in industrial applications. The main advantages of usage of microorganisms for amylase production would be economically large production capacity and the desirable characteristics of the enzymes in these organisms. In this study, amylase enzyme production potentials of 12 thermophilic bacteria isolated and identified as molecular from hot water springs were determined spectrophotometrically and by using disc diffusion method. As a result of the studies performed, isolates of O12 and A4 demonstrated the highest amylase enzyme activity and there was no amylase enzyme activity observed in O5, O6 and O11 isolates.

Keywords: Amylase, Disc diffusion, Biotecnology, Enzyme

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Determination of lipase enzyme production potentials of thermophilic bacteria isolated from hot water springs

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Abstract

Lipase enzymes are triacylglycerol hydrolase enzymes which catalyse the hydrolysis of many water-insoluble free fatty acids and glycerols and catalyse many chemical reactions and have great prominence due to their widespread usage in the industry. Lipases are produced by microorganisms (bacteria and fungi), plants and animals. Moreover, lipases synthesized particularly in microbial organisms are of great industrial importance since they are more tolerant to changes in ambient conditions such as pH, temperature, salt concentration, and because their substrate spesificities are high. Some of these enzymes are widely used in the production of food, detergents, pharmaceuticals and various chemical substances. In this study, lipase enzyme production potentials of 12 thermophilic bacteria isolated and identified as molecular from hot water springs were determined spectrophotometrically and by using disc diffusion method. As a consequence of the studies performed, isolates of O9 and A4 demonstrated the highest lipase enzyme activity and there was no lipase enzyme activity observed in O5, O6 and O11 isolates.

Keywords: Lipase, Disc diffusion, Biotecnology, Enzyme

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Effect of Co-substrates on decolorization of reactive yellow-2 by the photosyntetic bacterium Rhodopseudomonas palustris strain 51ATA

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Abstract

Great major of the industrial dyes used in textile industry, have been discharged into the water during the dyeing phase. These dyes and their intermediate yields have affected negatively human health and the environment. Removal of these harmful compounds from waste water, has been one of the crucial problems of the textile industry. In this study, the decolorization of the dye Reactive Yellow-2" mediated glucose, sodium acetate and molasses as co-substrate by *Rhodopseudomonas palustris* ATA51 was investigated. Final dye concentration (100mg/L) were added into the growth media including co-substrates individually. The decolorization of dyes were measured spectrophotometrically (ʎ404) for periods. The findings have shown that the best co-substrate for decolorization was sodium acetate. However, the best medium for the bacterial growth or biomass was sodium acetate medium.

Keywords: Wastewater treatment, textile dye, Reactive yellow-2, *Rhodopseudomonas palustris*

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Morphological and molecular characterization of some hypogeous edible fungi of Niğde region

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Abstract

Hypogeous edible fungi are mycorrhizal fungi which have high nutritional and economic value. They are also known as truffles. Morphological characterization among relative species can be misleading and take much time. Thus, molecular studies on truffles take more attention among scientists due to their importance in both biotechnology and plant growth as well as taxonomy in recent years. Molecular characterization of truffles is based on comparison of sequenced Internal Transcribed Spacer (ITS) regions on rDNA. In this study some hypogeous edible fungi were collected from different locations in Niğde,Türkiye. Their morphological and molecular characterization were performed. Samples were first classified due to shape of fruiting body, colour of gleba, shape and number of spors in ascus. After nucleic acid isolation, ITS regions on rDNA were amplified by Polymerase Chain Reaction (PCR) using ITS1 and ITS4 primers. PCR products were sequenced and then data were compared with the database by GeneBank submission. All samples were identified as *Terfezia claveryi* Chatin.

Keywords: Truffle, ITS, *Terfezia claveryi*, mycorrhiza

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Preparation of calix[4]arene-ımmobilized biopolymers in the lipase-catalyzed enantioselective reactions

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Abstract

The study describes preparation of new calixarene biopolymers consisting of the immobilization of convenience calixarene derivative onto cellulose and chitosan biopolymers, and the encapsulation of these calixarene biopolymers with *Candida rugosa* lipase within a chemical inert sol–gel supported by polycondensation with tetraethoxysilane and octyltriethoxysilane. The catalytic properties of immobilized lipase were evaluated into model reactions employing the hydrolysis of p-nitrophenylpalmitate and the enantioselective hydrolysis of naproxen methyl esters from racemic prodrugs in aqueous buffer solution/isooctane reaction system. The resolution studies using sol–gel support have observed more improvement in the enantioselectivity of naproxen E=300 with Cel-Calix-E than with encapsulated lipase without calixarene-based materials. Furthermore, the encapsulated lipase (Cel-Calix-E) was still retained about 39%of their conversion ratios after the fifth reuse in the enantioselective reaction.

Keywords: Lipase, Calixarene, Biopolymer, Enantioselectivity, Naproxen

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Molecular and agro-morphological diversity assessment of cowpea (*Vigna unguiculata* L.)

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Abstract

Cowpea (*Vigna unguiculata* L.) consider as one of the highly popular pulse crops for thousands of people around the world. High tolerance to drought and salt environment and other harsh condition, its nutritional value, further as annual plant it's considered as good and fast resource for food to human and fodder for animal. In this study, three parameters were used to assess the degree of similarity and differentiation between nineteen cowpea landraces collected from Jordan. First parameter was inter-simple sequence repeat (ISSR) genetic marker, which shows a high degree of polymorphic ratio between these landraces. Also, sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) analyses of these nineteen landraces showed high degree of differences. Finally, agromorphological traits including number of days to first mature pod, flowering duration, height to first pod and color of the pods, number of node on main stem, leaf color, plant height and number of main branch were studied and support the molecular data.

Keywords: *Vigna unguiculata*, ISSR, SDS-PAGE

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Effects of brewing time and decoction on antioxidant capacity, total phenolic and flavonoid contents of yarrow (*Achillea millefolium*)

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Abstract

The objective of this study was to determine the effects of different infusion times and decoction on total phenolic contents, flavonoid content and antioxidant activity of yarrow (*Achillea millefolium*) which are traditionally used as medicinal herbal tea. The herbal teas are widely used as prevention or remedy of diseases because of their high antioxidant activity and valuable compound contents. It is important to determine the appropriate duration of infusion and methods in order to make the best utilization of yarrow. One gram of yarrow was brewed in 50 ml of water at 100 oC for 4, 8, and 16 minutes. Also, another group of samples were boiled for 5 minutes. The antioxidant activity of samples was evaluated by measuring 1,1-diphenyl-2-picrylhydrazyl (DPPH.) and ferric reducing antioxidant power (FRAP). Total phenolic and flavonoid contents were determined by Folin-Ciocalteu and aluminium chloride methods, respectively. Total phenolic content of the extracts ranged from 4,86 to 19,88 mg GAE (Gallic acid) /g DW (dry weight). The extract obtained from boiling had the highest phenolic compound content, flavonoids content and antioxidant activity. The flavonoid contents of the extracts ranged from 1,567 to 7,432 mg QUA (quercetin)/g DW. The activity of DPPH and FRAP were found to be IC50= 149,10 µg /ml and 231,46 µmol TE (Trolox) / g DW in boiling extraction, respectively. The total phenolic content, flavonoid content and antioxidant activity increased significantly with increasing brewing duration.

Keywords: *Achillea millefolium*, DPPH, Phenolic compound, Flavonoid, FRAP, Herbal tea

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A napthaldeyde-bearing Bodipy dye in biochemical applications: synthesis, characterization and photophysical properties for practical application

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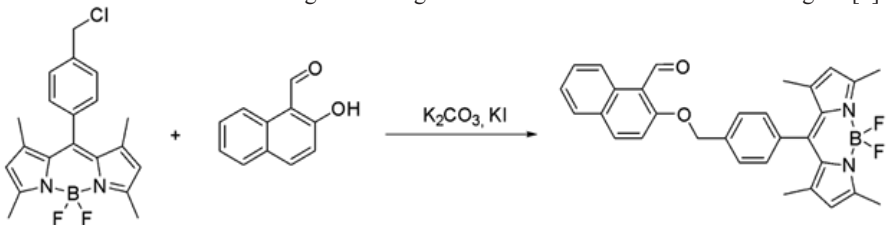
Abstract

4,4-difluoro-4-bora-3a,4a-diaza-s-indacene is more famous as Bodipy. Bodipy dyes can be served as perspective fluorescent sensors and chemosensors in a vast range of biochemical and medical applications. They have high emission intensity, tuneable excitation, longer wavelengths, high quantum yield, sharp absorption profile, high chemical photochemical stability and high solubility in many organic solvents..Nowadays, sensor researchers have taken advantage of the versatility of the synthesis of BODIPY to design sophisticated objects. The combination of these qualities makes BODIPY fluorophore an important tool in a variety of imaging and sensor applications. The design and development of novel fluoroionophores remain an active area of research, and various fluoroionophores exhibiting fluorescence enhancement (“turn-on”) or fluorescence quenching (“turn-off”) for heavy metal ions have been reported [1].By the functionalization the core of Bodipy, can be improved to extend the emission wavelength covering from the visible to the near infrared region [2].



Napthaldeyde-bearing Bodipy derivative was herein synthesized. The compound was characterized by NMR, FT-IR and melting point. The photophysical properties as absorption and emission were investigated by fluorescence spectroscopy and UV-vis spectroscopy. The energy transfer mechanism was examined depending on these photophysical measurements. Moreover, the prepared compound can be derived from aldehyde terminal for new sensor studies. The mechanisms of interaction with biomolecules and accompanying spectral behaviour of Bodipy are of major interest for fundamental science and practical applications. Bodipy’s derived from 8-aryl position were found to have high fluorescent respond upon the addition of amino acid derivatives.

Keywords: Biochemical, Napthaldeyde, Bodipy, synthesis, absorption, emission

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Calixarene coated QCM sensor for sensing of paracetamol in aqueous media

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Abstract

Paracetamol is widely used antipyretic and analgesic drug. Generally, it does not present any harmful side effect. But excess paracetamol make cause formation of nephrotoxic metabolites. Using of paracetamol in children who is younger than year, may cause an increasing in rhinoconjunctivitis, asthma and eczema [1]. Biosensors are analytical device which is can be used for biological sensing. In biosensor application, there are various methods such as electrochemical, calorimetric, optical, acoustic [2]. Among these methods, Quartz Crystal Microbalance (QCM) is acoustic sensor system which is used for gaseous and aqueous media. QCM technique is defined as frequency change according to mass change on quartz crystal. In sensor application, macromolecules can be used as sensing material. Among these molecules, calixarenes can be used for sensing of various analyte molecules as a host in host-guest chemistry [3]. In this study, a modified QCM sensor by means of coating a calixarene derivative onto QCM surface was used for sensing of paracetamol in aqueous media.

Keywords: Calixarene, Paracetamol, Quartz Crystal Microbalance, Sensor

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Association between EPHX2 gene promoter polymorphisms and preeclampsia

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Abstract

Preeclampsia is a pregnancy condition in which 140 mm Hg or higher systolic or 90 mm Hg or higher diastolic blood pressure and protein in the urine develop after the 20th week of pregnancy. Preeclampsia is a disease that complicates pregnancy, increases the maternal morbidity and mortality and its etiology is not yet understood. Epoxyeicosatrienoicacids (EETs) are arachidonicacid metabolites which have vasodilatator effects. Soluble epoxide hydrolase is encoded by EPHX2 gene and this enzyme catalyses the degradation of EETs to inactive diols or dihydroxy eicosatrienoicacids. Some stidies determined polymorphic sites in EPHX2 gene that cause individual differences in soluble epoxide hydrolase activity. sEH expression and its association with some diseases, such as hypertension and stroke have been investigated in several researches. These studies revealed an influence of EPHX2 gene expression on blood pressure by altering the sEH enzyme activity and/or EET levels. It has been known that promoter mutations can cause alterations in gene expression. Therefore,the aim of this study is to investigate the mutations in the EPHX2 promoter sequence and the association of these mutations with preeklampsia. In conclusion, rs62504268, rs72473923, rs4149232, rs4149235, 73227309, rs55763328, rs142408287, rs71220597 and rs772408666 polymorphisms in promoter region of EPHX2 were associated with preeclampsia. sEH enzyme may play a role in the pathogenesis of preeclampsia by contributing to reduction of the vasodilatator, anti-hypertensive and anti-inflammatory effects of EETs by rapid degradation of these molecules.

Keywords: Solubleepoxidehydrolase, Genetic Polymorphism, Epoxyeicosatrienoicacids

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Zoogeographical evaluation on Buprestidae (Coleoptera) biodiversity of Turkey

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Abstract

The family Buprestidae is called as Jewel beetles or metallic wood boring beetles. It is one of the biggest family of order Coleoptera including 2430 species in Palaearctic and 11.500-16.000 species in the World. Buprestidae fauna of Turkey composes of 404 species. The purpose of this study is understanding zoogeographical composition of Buprestidae (Coleoptera) biodiversity of Turkey according to present literature. We divided Palaearctic region to subregions (Southern Europe, Western Europe, Northern Europe and Eastern Europe, Siberia, Middle East, Middle Asia and Far Eastern Asian, North Africa) and compared Turkish Buprestidae fauna with these subregions and other zoogeographical regions of the World. Evaluation of data exhibited that, 90 species are endemic to Turkey. Turkish fauna shares most of species with the Asia part (Middle Asia, the Middle East, Siberia and the Far East) (265 species) of Palaearctic region. In addition, Neotropical Region (2 species), Afrotropical Region (2 species), Nearctic Region (8 species), Australian Region (1 species) shares less species with Turkey. *Agrilus viridis*, which is present in Turkey, distributes in whole Palearctic region. These kind of evaluations could make contributions to species conservation of this family by understanding their distributional patterns, and set off more detailed zoogeographical and phylogeographical studies on this family.

Keywords: Coleoptera, Buprestidae, Zoogeography, Biodiversity, Turkey

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Genetic analysis of resistance against fusarium oxysporum F. Sp. cubense

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Abstract

Fusarium wilt, a fungal disease caused by *Fusarium oxysporum* f. sp. cubense (Foc), is one of the most disastrous diseases of banana, causing an estimated annual yield loss of 60 to 90%. Attempts to control Foc using chemical, cultural and biological methods have not been very effective. Host plant resistance found in wild bananas (diploids) is the most appropriate and cost effective intervention to control Foc because it is durable and environmentally friendly . NARO-Uganda and IITA have already successfully utilised wild bananas to improve susceptible triploid *Musa acuminata* 'Matooke'. Conventional breeding in Musa is hampered by many factors, key of which is low number or complete absence of seeds in fruits, size of the plants, the crop's long life cycles, the long breeding cycle (10-12 yrs) coupled with limited knowledge of the genetics of resistance to diseases such as Foc. Understanding genetics of resistance to Foc and application of marker assisted selection (MAS) in breeding will aid in shortening the banana breeding cycle for resistance to Foc in Musa. This study aims at elucidating the genetics of Foc resistance in at least 2 diploid banana populations and mapping Quantitative Trait Loci (QTL) associated with resistance, as a first step towards marker assisted selection for Foc in banana. Preliminary results show that Screening of the 13 parents resulted in identification of parents resistant and susceptible to Foc. Parental combinations of Monyet x Kokopo, and Calcutta 4 x Mshare were chosen as potential parents of the mapping populations. Currently F1 (Monyet x Kokopo) lines are being screened in a pot experiments. Preliminary results of genotyping the Monyet and Kokopo parents and their 13F1's, Mshale and Calcutta4 and their F1's and 45 OP *Malaccensis* plants using 10 IRAP, 49 ISSR and 30 SSR markers revealed important polymorphism that could be used linkage studies to locate Foc QTL.

Keywords: Fusarium wilt, Molecular markers, banana population, genetics

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Prediction of swelling and degradation values of pva/starch scaffolds with regression models

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Abstract

Porous scaffolds fabricated by cryogelation method for tissue engineering applications mimic the native extracellular matrix in terms of characteristic properties. In this study, polyvinyl alcohol (PVA)/Starch scaffolds were produced with cryogelation technique. Various PVA/Starch ratios (90:10, 70:30 and 50:50, w:w) and crosslinking methods have been used to prepare cryogels. Chemically crosslinked cryogels were synthesized using glutaraldehyde as a crosslinking agent. For the physically crosslinked cryogels, sodium dodecyl sulfate (SDS) was used during cryogelation as the foaming agent. Swelling and degradation profiles of cryogels were determined. Chemically and physically crosslinked cryogels' swelling and degradation profiles were estimated with appropriate regression method on Statistical Package for the Social Sciences (IBM SPSS statistics 21). The aim of this study is to predict theoretically swelling and degradation values of PVA/Starch scaffolds with different ratios by using swelling and degradation data with appropriate regression models. Curve estimations have been calculated for all possible regression models (Linear, Logarithmic, Inverse, Quadratic, Cubic, Compound, Power, S-Curve, Growth, Exponential, Logistic) and best R-squared (R2) for each model is selected as an estimation model. Hereby, swelling and degradation data of PVA/Starch scaffolds prepared with different ratios and methods can be predicted by using equations for appropriate parameters.

Keywords: Prediction, swelling ratio, degradation rate, regression models, polyvinyl alcohol, starch

Acknowledgement: This work was supported by The Scientific Research Projects Unit of Mersin University (2018-1-TP3-2731).

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Physiolocial evaluation of iron deficiency reactions of different commercial stawberry genotypes

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Abstract

Iron deficiency is a serious problem that is widespread in many parts of the world, especially in calcareous soils with high pH in arid and semi-arid regions. While nearly 60% of our country's agricultural land has high lime content and 85% has high pH, almost all of the agricultural land in Central Anatolia has these characteristics. This situation causes iron deficiency chlorosis to occur especially in species susceptible to iron deficiency. The incidence of iron deficiency in plants varies from species to species and even from genotype to genotype. In recent years strawberry has become the most popular fruit crop for Turkish farmers due to its high nutritional value and can adapt to different soil climatic conditions. However, due to the lack of Fe in the soil, crop loss is a factor every year. In this study, 12 varieties of strawberries in the cultivation under greenhouse conditions in Turkey and Their activity against Fe deficiency was tested by Fe and Fe-free fertilization method. Varieties that are effective against Fe deficiency due to thier physiological and morphological mechanisms, were supported by resutls form various physiological and elemental analyzes. As a result, strawberry varieties which are resistant to iron deficiency and yield the most was determined.This study aimed to decrease the usage of Fe fertilizer in strawberry cultivation by determining resistant strawberry varieties.

Keywords: Strawberry, Variety, Iron, Iron Deficiency

Acknowledgement: This study is supported by Selcuk University and the Agrobiotechnology Laboratory

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Study the gene expression of blaOXA23 and blaOXA24 genes in Imipenem resistant *Acinetobacter baumannii* isolated from burn wounds

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Abstract

The aim of this study was to identify changes in the gene expression of blaOXA genes in *Acinetobacter baumannii*, isolated from burn wounds, in response to subinhibitory concentrations of Imipenem. The gene expression of blaOXA genes was conducted by using real-time quantitative PCR assay. Ten isolates were chosen which had high resistance to Imipenem with minimum inhibitory concentrations (MICs) from 16 to >256 µg/ml and also contained the two blaOXA genes 23 and 24. It was found that the highest value of gene expression fold was recorded for the gene blaOXA23 (6.96) in the local isolate K5 in contrast with the Imipenem untreated samples, while the highest value of fold for blaOXA24 gene was 3.68. It was obvious there was a direct proportion between MICs values and folds of gene expression, therefore the increase of antibiotic concentration in the growth medium led to increase of gene expression. The results of 16S rRNA gene expression, which was used as a reference gene, demonstrated that this gene was well suited as housekeeping gene because of the minimal variations of expression of this gene whether in Imipenem treated and untreated samples. It was concluded that the resistance of A. baumannii to Imipenem was related to the genes blaOXA23 and blaOXA24 but the main role may be due to blaOXA23. The presence of both genes increases the resistance of this species to Imipenem.

Keywords: *Acinetobacter baumannii*, gene expression, blaOXA

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Effects of pesticides on antioxidant defense mechanisms and lipid peroxidation products of insects

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Abstract

Agrochemicals, one of the most important environmental pollutants, cause a variety of toxic effects on living organisms. Antioxidant defense mechanisms have been developed in response to these toxic effects. There are enzymatic and nonenzymatic antioxidant mechanisms against oxidative damage in tissues. Antioxidant enzyme systems; two superoxide dismutase (CuZnSOD and MnSOD), catalase (CAT) and glutathione peroxidase (GPx) enzymes. One of the most important non-enzymatic endogenous antioxidants is glutathione (GSH). In the event that antioxidants are inadequate against free radicals in the organism, oxidative stress occurs. Many insecticides have been shown to cause oxidative damage by suppressing insect antioxidant enzymes. Insecticides; especially lipid peroxidation by acting on unsaturated fatty acids in the cell membrane. Lipid peroxidation begins with the removal of a hydrogen atom from the chain of fatty acids in the membrane structure initiated by free radicals. Lipid peroxidation; It is a chemical chain reaction that damages the cell by changing lipid structure and producing reactive aldehydes. One of the most important indicators of lipid peroxidation by cleavage of polyunsaturated fatty acids is molondialdehyde (MDA), a dialdehyde with three carbons. MDA formed; deformation, ion transport, enzyme activity and aggregation of cell surface components. Lipid peroxidation was measured by measuring the amount of the resulting MDA; the oxidative effect of insecticides on insects can be determined. In addition, measuring the amount of MDA plays an important role in the search for new chemicals that are alternative to insecticides.

Keywords: Malondialdehyde, Oxidative damage, Insecticides, Antioxidant

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A new magnetite-cross-linked enzyme aggregates (CLEAs) of peroxidase for decolorization of methylene blue

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Abstract

The peroxidase enzyme catalyze oxidation of many organic compounds, by means of action of H2O2 or organic hydroperoxides. The biocatalysts stability and reusability are the problems of the enzyme bioremediation processes that allow an effective biotransformation of organic contaminant at different reaction conditions. The Fe3O4 magnetic nanoparticles (MNPs) were prepared by coprecipitation method. The two methods which used to immobilize peroxidase on TA-MNPs were simple, economic, and produce magnetic biocatalyst shows an improved stability and keeps the magnetic conduct typical of MNPs, which allows for easy separation and reusability in successive catalytic cycles. The prepared TA-MNPs-CLEAs-starch-peroxidase was characterized by XRD, SEM, VSM, FTIR. In the present work the thermodynamic of the thermos-stable free and immobilized enzyme were also determined and discussed. Lastly reusability and storage stability of the immobilized peroxidase were verified to show the improvement of immobilized peroxidase. The starch was used as a co feeder to preparing TA-MNPs-CLEAs-peroxidase and applied to decolorize the methylene blue. The effect of different parameters such as loading amount of hydrogen peroxide, temperature, pH and dye concentration on the process of de-colorization were investigated. The little amount of TA-MNPs-CLEAs-starch-peroxidase was able to remove a higher content of methylene blue (93.18%) compared to the free enzyme. This suggests that TA-MNPs-CLEAs-starch-peroxidase has the possible of application in environmental biotechnology especially wastewater treatment.

Keywords: Fe3O4 MNPs, Tannic acid, TA-MNPs-CLEAs, Coprecipitation method, Methylene blue, Wastewater treatment

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Injectable molecularly imprinted microcryogels for bovine serum albumin delivery

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Abstract

Implantable delivery systems for therapeutic agents including from small drug molecules to hormones have been studied. Due to the risks and trauma of the surgical implantation, minimally invasive procedures have recently become important. Most of the injectable materials are administrated in sol-gel form in which solution form during injecting and gelation after injection. However, solution form can leak into other tissues and may cause lack of proper gelation at tissues. Hence, in this study, molecularly imprinted microcryogels (MIMs) were designed which can flow through a catheter or a small-bore needle in solid form while keeping its mechanical strength. Synthesis, characterization and *in vitro* release profiles of injectable MIMs were described for an application of protein delivery systems. Bovine serum albumin (BSA) was used as a model protein to investigate the release behaviors of the MIMs. A polymerizable derivative of L-tryptophan, i.e., N-methacryloyl-L-tryptophan (MATrp) was synthesized, and MATrp-BSA complex was prepared. BSA imprinted 2-hydroxyethyl methacrylate (HEMA) based MIMs were produced in the presence of MATrp-BSA complex. MIMs were characterized by swelling, surface area and macroporosity measurements and scanning electron microscopy (SEM). *In vitro* release studies were applied to examine the effects of cross-linker ratio and protein loading on release rate of BSA in delivery medium. Kinetic studies were also performed to analyze the release mechanisms of the MIMs.

Keywords: Albumin delivery, Injectable, Microcryogels, Molecular imprinting

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Exogenous cysteine alleviates mercury stress by promoting antioxidant defense in maize (*Zea mays* L.) seedlings

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Abstract

Mercury (Hg) is one of the most important environmental pollutant negatively affects plant growth and development. Cysteine plays an important role in plant response to various environmental stress factors. In the present study, the alleviation of Hg stress through exogenous cysteine treatment to maize seedlings were evaluated by using some biochemical and molecular parameters. For this purpose, a hydroponic experiment was set up to investigate the effect of Hg alone (100 µM) and in combination with cysteine (200 µM) on reactive oxygen species, antioxidant enzyme activities and mRNA expression levels of some antioxidant genes in maize seedlings. The results showed that Hg treatment alone significantly increased the malondialdhyde (MDA), hydrogen peroxide (H2O2) and superoxide levels (O2.-) in maize seedlings. After treatment with 200 µM exogenous cysteine combined with 100 µM HgCl2, the concentration of MDA, H2O2, O2.- in seedlings notably decreased and catalase (CAT), glutathione reductase (GR), superoxide dismutase (SOD) and peroxidase (POD) activities in seedlings increased significantly. Furthermore, RT-PCR results showed that the mRNA levels of CAT, GR and SOD genes were up-regulated at Hg+cys treatment groups compared to the Hg treatment alone. The results of the study indicated that exogenous cysteine improved resistance to Hg-stress in maize seedlings by activating antioxidant defense system.

Keywords: Antioxidant, Cysteine, Gene expression, Malondialdhyde, Mercury

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Stimuli responsive polymers for biomedical applications

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Abstract

Smart polymers that respond with a property change to a variation in the environmental conditions are an attractive class of materials for advanced applications. A wide variety of responsive polymer materials have been reported that respond to various external parameters, such as temperature, pH, mechanical stress, ionic strength, electric field and so on. These polymers are also variously referred to as "environmentally-sensitive", "smart" or "intelligent" polymers. Over the past 25 years, many interesting biomedical uses have been proposed for stimuli-responsive polymers, including uses in diagnostics, drug delivery, tissue engineering (regenerative medicine), and cell culture. When used as "smart biomaterials" they may be (i) dissolved in or phase separated out of aqueous solutions, (ii) adsorbed on or (iii) chemically grafted onto aqueous-solid interfaces, or the smart polymer molecules may be chemically cross-linked, H-bonded, and/or physically entangled in the form of (iv) hydrogels. This study briefly overviews the field of stimuli-responsive polymers and describes some biomedical applications to date of such "smart" polymers.

Keywords: Stimuli-responsive, biomaterials, polymers, biomedical applications, drug delivery

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Determination of the cytotoxic and apoptotic effects of zerumbone on A172 and U87MG human glioblastoma multiforme cell lines

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Abstract

Glioblastoma multiforme (GBM) is a malignant and aggressive primary neuroepithelial brain tumor affecting the central nervous system. Many studies have been done to diagnose and treat the tumor. Current treatment strategies are based on open surgery, chemotherapy, and radiotherapy. Moreover, the studies continue regarding therapeutic approaches for its treatment. The anticancer properties of the zerumbone (ZER) material isolated from the *Zingiber zerumbet* plant have been shown in many studies. In our study, we investigated the cytotoxic effect of ZER in GBM cell lines and the changes in expression levels of some genes related to apoptosis. A172 and U87MG GBM cell lines were cultured and treated with ZER at variable doses. At the end of the study, it was determined the optimum amount of ZER dose for the IC50 value and the duration of application. Significant differences were also found in apoptotic gene expressions. In the light of the results obtained, the study is thought to be the source of future work related to the subject.

Keywords: Glioblastoma multiforme, Zerumbone, Apoptosis

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Simple and fast determination of caffeine in soft drinks by a spectrophotometric method

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Abstract

Caffeine is a naturally occurring substance found in leaves, seeds or fruits of plants, contained in many soft drinks and foods, and is a part of a group of compounds known as methylxanthines. Caffeine is widely consumed as coffee itself but caffeine intake is not limited to direct incept from coffee bean, it is also taken from the beverages such as hot beverages or cold soft drinks. The total consumption of caffeine should be restricted since caffeine is a molecule that acts directly on human metabolism. Depending on the frequency and dose of intake, caffeine has both beneficial and adverse effects on consumer. It is known as stimulant that has an impact on central nervous system, is diuretic and affects weight loss by reducing caloric intake. However, as most active substances, higher dosages may present adverse effects as hypertension, arrhythmia, seizure or even death. In this work, a relatively simple and fast method to determine the caffeine amount in soft beverages is reported. Several soft drinks and cold teas found in Turkish market were investigated for their caffeine amount by using UV spectrometry. Sample preparation included extraction of caffeine with dichloromethane, centrifugation and analysis of caffeine in the organic layer. The extraction parameters were optimized for maximum efficiency and the method was validated. The results showed that, the declared amount of caffeine in widely known brands were significantly different form the measured quantity. Consequently, the results of this study may raise awareness among consumers about caffeine intake from commercial beverages.

Keywords: Caffeine, UV spectrophotometry, soft drinks

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In vitro genotoxic and antigenotoxic activity of *Melaleuca alternifolia* (tea tree) oil

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Abstract

Tea tree oil is derived from the paper bark *Melaleuca alternifolia*, which is part of the family Myrtaceae, has been used widely as a tropical antiseptic for a long time. Resent investigations have confirmed that tea tree oil exhibits broad-spectrum antimicrobial activity as well as anti-inflammatory and antioxidant property. Despite the progress in characterizing the pharmaceutical properties of tea tree oil, less work has been done on the safety and toxicity of the oil. The present study was designed to investigate the in vitro genotoxic and antigenotoxic activities of the tea tree oil. Tea tree oil was not genotoxic to TA98 tester strain in the *Salmonella*/microsome assay, in the same test, oil displayed antigenotoxic activity, reducing the mutation ratio induced by 4-nitro-o-phenylenediamine, a well-known mutagen. These findings indicate that tea tree oil is acceptable as a safe substance in the development of commercial pharmaceutical products.

Keywords: *M. alternifolia*, Tea tree oil, Genotoxicity, Antigenotoxicity

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Radioprotective effects of some flavonoids on the carbonic anhydrase parameter of AUERAC rats irradiated with γ-rays

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Abstract

The flavonoid term comes from the Latin word "flavus", which means yellow. Regardless of their nutritional status and their physiological functions in plants, flavonoids are essential components of human diet. Flavonoids are polyphenolic compounds commonly found as secondary metabolite in many plants and fungi. Flavonoids possesses a therapeutic potential. In our study, the in vivo effects of some flavonoids including naringenin, quercetin, and hesperidin on the activity of the carbonic anhydrase enzyme (CA) in brain and eye tissues of rats were evaluated. The animal experiments and procedures were performed in accordance with national guidelines for the use and care of laboratory animals and approved by Ataturk University's local animal care committee (22.02.2018, 75296309-050.01.04). For this purpose, one healthy group and seven experimental groups (n: 6) were formed (control group, irradiated group, naringenin group, quercetin group, hesperidin group, naringenin + irradiated group, quercetin + irradiated group, hesperidin + irradiated group). The CA activities were measured for each tissue using esterase activity methods. The activity values for each tissue obtained were calculated. All the experimental results were provided in mean EU/mL ± standard deviation (±Stp). There was significant difference between control group and seven experimental groups with regard to the CA enzyme levels of brain and eye tissues. Actually, it was observed that there were significant decreases of enzyme activities in seven experimental groups in brain and eye tissues according to CA level. The present study was provided with the seven experimental groups exposure effects on enzyme inhibitions, and we believe that further research is necessary to conduct in this subject.

Keywords: Carbonic anhydrase, enzyme inhibitions, flavonoids, radioprotective effects

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Adipogenic differentiation potential of mesenchymal stem cells under honey bee venom treatment

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Abstract

In this study, we hypothesized that the complex compound,honey bee (*Apis mellifera*) venom can differentiate adipose tissue-derived mesenchymal stem cells (AdMSCs) into adipogenic lineage. To test this hypothesis, firstly, the biological activity of the venom was tested on a rat by subdermal injection. Secondly, AdMSCs were cultured in standard medium conditions and dose-dependent cytotoxicity of the venom was measured with MTT analysis. According to these results, 50 mg/ml venom concentration was determined to be applied on cells in the upcoming experimental stage. Lastly, positive and negative control groups and venom-applied group (experimental groups) were created and the last one was treated with 50 mg/ml venom during 21 days to induce adipogenic differentiation. Then, Oil Red O staining was performed to determine the red-colored neutral lipid vacuoles inside the cells. As expected, the negative control group showed no differentiation and the positive control group formed lipid vacuoles by induction with adipogenic media. Also the venom applied AdMSCs formed lipid vacuoles observed from day four to twenty one, in a more granular form when compared with positive control group. These results support our alternative hypothesis and we suggest that AdMSCs have an adipogenic differentiation potential when treated with bee venom without an adipogenic media.

Keywords: bee venom, AdMSCs, cytotoxicity, adipogenic differentiation

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In vitro germination efficiency of gamma irradiated seeds of cotton (*Gossypium hirsutum* L.) cultivars Carmen and NP-Özbek-100

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Abstract

Cotton (*Gossypium hirsutum* L.) is one of the most important natural textile fibre and valuable seed oil crops in the world and therefore it plays an important role in the global economy. Both in our country and in the world, cotton frequently encounter Verticillium wilt symptoms caused by *Verticillium dahliae* Kleb. that limit plant production and the rate of yield. In this regard, major strategies like development of new crop varieties, creating genetic variability through mutation induction etc. are of great importance for sustaining crop production and yield. The use of in vitro culture techniques and radiation-induced mutation can provide a good alternative method to create genetic variability and rapidly multiply the selected mutants. In the present study, the effect of gamma irradiation on germination efficiency and growth parameters was studied to determine convenient radiation dose and to evaluate in vitro selection studies in cotton. For this purpose, the seeds of Carmen and NP-Özbek-100 cultivars were exposed to different doses of 60Co gamma irradiations (0, 100, 200, 300 and 400 Gy). Gamma irradiated and control seeds of two cultivars were cultured on ½ Murashige and Skoog medium. The results indicated that germination rate and seedling growth were significantly affected by radiation dose. As compared to controls, both two cultivars, dose dependent reduction in germination rate was observed in treatments. The critical dose was determined as 300 Gy according to the lowest germination rate in both two cultivars.

Keywords: *Gossypium hirsutum* L., In vitro selection, Gamma irradiation, *Verticillium dahliae* Kleb

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Potential novel protease discovery from lake acıgöl by functional screening approach

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Abstract

Extreme environments have a big potential for discovery of new species, new metabolites, novel enzymes and metabolic pathways of organisms'. In this study, functional based screening approach is used to isolate potential biotechnological novel protease enzymes from Lake Acıgöl where is good location for extreme environments with its high salinity (about 200g/L NaCl). It Sediment samples were used for protease activity screening. For this purpose, 1 g of Lake Sediments were transferred into 9 ml %10 NaCl containing Nutrient Broth. 100 µl diluted of sediment samples were spreaded on the %10 NaCl and %1 Skimmilk containing Nutrient Agar Plates. After the incubation period (at 30 °C for 7 days). Protease activity of the isolates was detected by screening for zones of hydrolysis around colonies. These protease positive isolates were identified by 16s rDNA cloning methodology. The results indicate that AG5-B isolate shows 92% similarity with *Virgibacillus marismortui* strain 123 and AG5-T isolate shows %95 similarity with *Planococcus rifietoensis* strain M8. Also, Both isolates have a big potential to be new species and their proteases are would be novel enzyme.

Keywords: Lake Acıgöl, Functional screening, Protease

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The effectiveness of exenatide, sitagliptin and insulin in treatment of diabetic neuropathy: A comparative experimental study in rats

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Abstract

Diabetic peripheral neuropathy affect snearly two-thirds of patients with diabetes and is a major cause of poor quality of life. Exenatide (synthetic exendin-4) is a glucagon-like peptide-1 receptor agonist developed as a first-in-class diabetes therapy. Sitagliptin is an oral anti hyperglycemic drug which is a dipeptidylpeptidase 4 class. In this study, we aimed to compare the effectiveness of exenatide, sitagliptin and insulin in treatment of diabetic neuropathy.Thirty five rats were divided into five groups (n=7 rats) as group I (control), group II (diabetes; singledose 43 mg/kg streptozotocin), group III (sitagliptin; singledose 43 mg/kg streptozotocin and 10 mg/kg sitagliptinper day for 15 days), group IV (exenatide;single dose 43 mg/kg streptozotocin and 0.1 µg/kg exenatide per day for 15 days) and group V (insulin;single dose 43 mg/kg streptozotocin and 3 IU insuline per day for 15 days). Compound motor nevre actionpotential (CMAP) was recorded to monitor the nevre function.Latency and amplitude were measured from CMAP recordings. In the diabetes, sitagliptin and exenatide groups, mean amplitu designificantly reduced with compared to control group. Administration of sitagliptin and exenatide did not improve CMAP amplitude. In the diabetes group mean latency prolonged when compared control group. There was no significant difference between control and other treated groups for latency value. Our findings have shown that streptozotocin-induced diabetes develops axonalanddemyelinating neuropathy. Sitagliptin and exenatide administration did not affect axonal neuropathy while improving demyelinating neuropathy. Insulin administration reduced both axonalanddemyelinating neuropathy.

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Utilization of processed yellow pea powder on Turkish noodle

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Abstract

Cooking and fermentation processes improve the nutritional properties of legumes with decreasing antinutritional factors like tripsin inhibitor and phytic acid. In this study cooked and fermented yellow pea powder (FPP) were used in Turkish noodle formulation at 5, 10, 15 and 20% ratio. Some physical (cooking properties and color), chemical (ash, protein, phytic acid, mineral matter, antioxidant activity and phenolic content) and sensory properties of noodles were determined. As the FPP ratio increased in noodle formulation yellowness and cooking loss values of the noodle increased significantly ($p<0.05$). Ash and protein content of the noodle changed between 1.25% and 1.97%, 13.78% and 17.25%, respectively. Phytic acid content of the FPP decreased about 67% ratio compared to raw yellow pea. Ca, Fe, K, Mg, P and Zn values of noodles changed between 45.33-57.97 mg/100g, 2.1-3.13 mg/100g, 236.35-490.89 mg/100g, 36.50-64.43 mg/100g, 277.28-305.89 mg/100g and 1.38-1.90 mg/100g, respectively. Increasing amount of FPP also increased the all mineral content of noodles. FPP usage in noodle formulation did not cause an adverse effect on sensory properties except a slight decline on odor score.

Keywords: Yellow pea, cooking, fermentation, noodle, phytic acid

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Microbial production of biopolymers

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Abstract
The use of fossil resources increases carbon dioxide emissions. The use of renewable resources instead of petroleum-derived polymers is necessary to protect the environment and reduces carbon dioxide emissions. Biotechnological methods have been used to polymers production. Lactic acid is produced by fermentation using microorganisms in industrial biotechnology. These polymers are poly(lactic acid) (PLA), polyhydroxyalkanoates (PHAs), fungal chitosan and etc. PLA is synthesised chemically from lactic acid monomer. PHAs and PLA have ester linkages in their backbone. Chitosan is comprise of N-glucosamine monomers. It is a cationic polysaccharides. In this review, production of microbial polymers will be explained. Large amount of producer and commercial name of the microbial polymers will be expressed in this study.

Keywords: Poly(lactic acid), polyhydroxyalkanoates, fungal chitosan, industrial biotechnology

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Zoogeographical evaluation of meloidae (coleoptera) biodiversity of Turkey

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Abstract

The focus of this study is to understand zoogeographical composition of Meloidae (Coleoptera) of Turkey. This family is very interested in the World. In particular, Cantharidin, which is secreted by members of this family, is used in many cancer treatments. Species of Meloidae can be recognized by the following morphological characters: narrow and elongate body; soft and flexible elytra; narrower pronotum than head and elytra. According to the literature, Meloidae family is represented by 177 species in Turkey, 3.000 species in the World. As a result of zoogeographical evaluations of Meloidae species by dividing Palaearctic region to subregions (Southern Europe, Western Europe, Northern Europe, Eastern Europe, Siberia, Middle East, Middle Asia, Far Eastern Asia and North Africa) and comparing Turkish Meloidae fauna with these subregions, it is evident that 30 species and 1 subspecies are endemic to Turkey. Turkish fauna shares most of species with Asia region (Siberia, Middle East, Middle Asia, Far Eastern Asian) (119 species). As a result, *Meloe violaceus, M. brevicollis* and *Apalus bimaculatus* species are distributed all over the Palaearctic region. These assessments could make contribution to this family's conservation and trigger more detailed zoogeographical and phylogeographical studies on this family.

Keywords: Coleoptera, Meloidae, Zoogeography, Biodiversity, Turkey

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In vitro regeneration techniques in the grass pea (*Lathyrus sativus* L.) plant

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Abstract

The Lathyrus genus is in the legumes family with annual or perennial species number of 160. There are 58 species naturally grown in our country, 18 of them are endemic. In our region, 8 species were identified, 2 of them were endemic. In the world, Lathyrus species are evaluated in the animal feed as green grass, hay and grain feed, fertilization of soil as a green manure plant and human nutrition as food grain legume plant. The cultivation of Lathyrus species are very rare in our country and are generally used in animal feeding and in small quantities in human nutrition. Grass pea (*Lathyrus sativus* L.) plant is the most used species in the world and in our country because it is resistant to adverse soil conditions, drought and flooding. Various tissue culture methods are used to develop and reproduce this species. Plant tissue culture is being applied both in the development of new varieties and genetic changes in existing varieties, and in the production of species which are difficult to reproduce and protect of the disappearing species. The basic system used in plant tissue culture processes and genetic improvements is plant regeneration. In this review, some studies related to the in vitro regeneration techniques of the grass pea plants have been put together and the techniques used in regeneration have been evaluated.

Keywords: Grass pea, *Lathyrus sativus*, in vitro, regeneration techniques

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Green synthesis of the Carob modified silver nanoparticles and investigation of its catalytic activity

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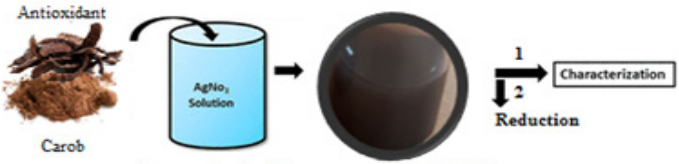
Abstract

Carob modified silver nanoparticles (Crb-AgNPs) are synthesized by chemical reduction from silver nitrate and plant extracts of Carob plant. Silver ions have been normally used in catalytic applications for years and silver particles altered with nano technological methods offers new possibilities. Dyes are the major effluents from various industries such as paper, plastic, leather, food, and textiles that cause significant pollution. There are several methods in the literature such as chemical reduction, catalytic degradation, adsorption and coagulation for the safe disposal of these compound. Among them, the chemical reduction of organic molecules using a strong reducing agent in the presence of noble metals such as Pt, Au, Ag and Cu is one of the famous removal methods in this field. AgNPs are synthetized successfully by using plant extract of carob (Crb-AgNPs). The extract from the carob acts as a reducing and stabilizing agent for the AgNP's and UV analysis shows strong plasmon resonance between 420 and 480 nm. The Crb-AgNPs obtained are characterized by ultraviolet-visible (UV–visible) spectrometer, transmission electron microscopy (TEM), X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR). The catalytic performance of the Crb-AgNPs was examined for the degradation of Rhodamine B (RhB) in aqueous medium at room temperature using sodium borohydride (NaBH4) as the source of hydrogen, which indicated that the composite had an excellent catalytic activity.



Green synthesis of silver nanoparticles (AgNPs)

Keywords: Rhodamine B, catalytic degradation, cinnamon, silver nanoparticle

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Preparation and characterization of antioxidant nanoparticles for rhodamine B degradation

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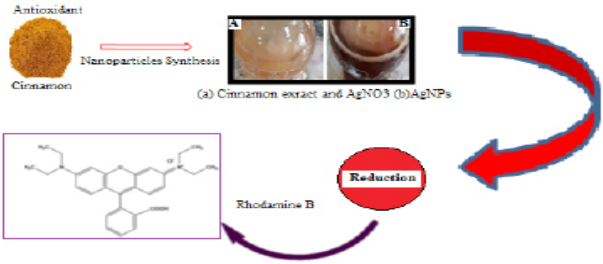
Abstract

In this study, we developed cinnamon/silver nanoparticles (Cnm-AgNPs) and evaluated their potential to be degradation of Rhodamine B (RhB) dye. Toxic chemicals are used in several of the processes for production of nanoparticles, either in the form of reducing agents to reduce various metal salts to their corresponding nanoparticles, or as stabilizing agents to prevent agglomeration of nanoparticles. These compounds are highly dangerous to organisms and to the environment, and due care must be exercised in their proper handling and disposal of toxic chemicals. Various herbs and plant sources occlude powerful antioxidants that are present as phytochemical constituents in seeds, stems, fruits and leaves. These naturally occurring antioxidants have existed in the human food chain for thousands of years and are known to be non-toxic to living organisms and to the environment. The synthesis of metallic nanoparticle using plant extracts as the reducing agents is one of the most widely used green methods. For example, cinnamon was used to produce silver nanoparticles and the synthesized nanoparticles were found to have superior catalytic property to organic molecules degradation. In this study, using cinnamon extract at room temperature (25oC) characterized using spectroscopic techniques and the potential of Cnm-AgNPs with regard to the catalytic degradation of a organic dye (e.g., RhB) was evaluated in the presence of NaBH4. The prepared Cnm-AgNPs was characterized using Fourier transfer infrared spectroscopy (FT-IR), transmission electron microscopy (TEM), and Scanning electron microscopy (SEM-EDX). The synthesized nanoparticles have been successfully applied as a catalyst in the degradation of RhB by NaBH4.



Keywords: Rhodamine B, catalytic degradation, cinnamon, silver nanoparticle

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Development of transcriptome based SSR marker in hazelnut

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Abstract

Our country, which is the biggest hazelnut producer in the world, needs to increase both the breeding and molecular studies on hazelnut plants. DNA markers provide the most important contribution to the development of abiotic and biotic stress resistant genotypes. Additionally, they are valuable tool for protection of the genetic resources. SSR markers can be developed by sequencing of both genomic DNA and mRNA. However, the development of genomic DNA based SSR marker by construction of library is time consuming, costly and labor-intensive. One of the most important advantages of SSR markers generated from transcripts obtained from RNA-Seq data is that they are successfully applied to various genotype in a very short time. There are a few genomic studies on hazelnut in our country. In present study, SSR primer pairs have been developed from hazelnut transcriptome data by using MISA software (http://pgrc.ipk-gatersleben.de/misa/). During the development of SSR markers, SSRs of 1-6 nucleotide length were considered for analysis. After analysis of available SSRs, their distribution and frequency were determined. The two nucleotides repeat motifs were the most common (12.932; 50.9%) SSR patterns followed by single repeats (6.027; 20.7%). Three, four, five, and six nucleotides repeat motifs were fewer than previous ones. The developed SSR markers were analyzed by the Genome-wide Microsatellite Analyzing Tool Package (GMATA) program.

Keywords: Hazelnut, Transcriptome, SSR marker, Sequencing

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Use of lavender (*Lavendula officinalis*) flowers for protection of honeycombs from greater wax moth (*Galleria mellonella*) damage

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Abstract

One of the most important pests in honey bee breeding is the greater wax moth. The greater wax moth larvae cause great damage to stocked, pollen and embossed honeycomb and give economic damages to the beekeepers. The majority of these chemicals used to protect against this pest interact with honeycomb structure. In order to avoid the effects of chemicals, stock honeycombs must be stored and stored at +4 ^{0}C. However, other methods are needed since each beekeepers has no chance of storing honeycomb in cold temperature. One of these methods is the use of lavender (*Lavendula officinalis*) flower during the storage of stock honeycombs. Lavender is a fragrant plant with a length of about 1 meter that opens in summer. Lavender flower contains tannins, alkaloids, glycosides and significant amounts of volatile fatty acids The aim of the study was to protect honeycombs from greater wax moth by use of dried lavender flowers. Thus, 300 stock honey combs inhabited by honey bees (*Apis mellifera* L.) which not exposed to any chemicals were stored with dried lavender flowers in the spring of 2016. The result of the study showed that stock honeycombs stored in the spring of 2017 were only affected by 10% from greater wAX moth and 90% of the stock honeycombs were usable.

Keywords: Honey bee, greater wax moth, Lavender, Stock, Honeycomb

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Potential use of different mushroom species to ıncrease nutritional value of wheat straw

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Abstrac

In the feeding of ruminant animals, roughage is important both in rumen functions and the performance of ruminant animals. In our country, wheat straws are widely used as rough feed. According to the National Research Council (NRC), wheat straws contain 3% crude protein, 1.5 mcal/kg metabolizable energy, 43% crude fiber, 58% acid detergent fibre (ADF) and 81% neutral detergent fibre (NDF). However, the nutritional value of he wheat straw is very low and it is only possible to get rumen conditions in ruminant animals. For this reason, studies based on increasing the nutritional value of wheat straw are of great importance. It was indicated that oyster mushroom (*Pleurotus ostreatus*) inoculated to wheat, rice and corn straw at different levels, decreased the cellulose, ADF, NDF and lignin contents of the straw, but increased the crude protein level and digestibility of straw at the end of the incubation (21, 28 and 35 days). In the other study conducted on wheat straw, in vitro digestibility of straw was observed to increase with the use of *Phlebia brevispora* type of mushroom. Pleuretus florida (oyster mushroom) inoculation also reduced cellulose content of straw by 20%, and increased crude protein content and digestibility of straw by 20%. Therefore, in this review, we will investigate the potential use of different types of mushroom in order to increase the nutritional value of wheat straw, which is widely used to meet the ruminant feed requirements of ruminant animals in our country.

Keywords: Wheat straw, Animal nutrition, Mushroom use

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Comparison of wheat germ stabilized by termal and non-termal processes

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Abstract

Wheat germ is the component of wheat kernel with the highest nutritional value. In spite of this, wheat germ is one of the main by-products of milling industries. Wheat germ is rich in polyunsaturated fatty acids and decreases storage quality of whole flour due to oxidation/rancidity reactions coming from its high enzyme activity. For this reason, the human consumption of wheat germ is very limited, since the major part of it is used for other purposes and especially animal feeding. The aim of this study was to investigate the stabilization of wheat germ and improve storage stability. In the experiments related with wheat germ storage stability, wheat germs was treated with five different stabilization applications (dry heating, autoclaving, microwave, infrared and Ultraviolet-C), stored in three different conditions (refrigerator (4-6 ºC), room temperature (24±1 ºC) and vacuum packaging). Stabilization tests were conducted at 0th, 90th, and 180th days of storage. As parameters, mold-yeast growth, peroxide value, para-anisidine value, tocopherol (α, β and γ) contents of the stabilizated wheat germ were measured. As a result of this study, all stabilization processes had an improving effect on storage stability of wheat germ. Especially, vacuum-packed treatment had positive effecton storage stability. According to the results obtained, autoclave as a thermal treatment and ultraviolet-C process as a non-thermal treatment were the stabilization methods that were determined to produce effective results.

Acknowledgement: This study was supported by The Scientific & Technological Research Council of Turkey (TUBITAK) (Project number: TOVAG–113 O 452)

Keywords: Wheat germ, stabilization, autoclave, microwave, infrared, ultraviolet-C

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Use of whole wheat flour in traditional tarhana production

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Abstract

Tarhana is our a fermented product that is more consumed than other cereal products and, even so in different formulations, is generally produced using wheat flour, yoghurt, yeast, various vegetables and spices. The products that are used to enrich as are required to be appropriate for natural structure of tarhana as well as to play a role on development of nutritional and functional properties of final product. In this project, it is aimed to produce a cereal based traditional food having better nutritional properties. The main outlines of the project are composed of investigation on facilities to use whole wheat flour in place of rafined wheat flour that is readily used in traditional tarhana production the project. For this purpose, the usage of whole wheat flour (WWF) to improve tarhana samples chemical, nutritional and sensorial properties was studied. For this purpose, Bezostaja-1 wheat samples were milled on a laboratory type hammer mill and WWF was obtained. The WWF samples were used as replacement of wheat flour in five different rations (0, 25, 50, 75 ve and 100 %) for the production of tarhana samples. Some physical, chemical and sensory properties of tarhana samples were investigated. L* and b* values of the tarhana samples decreased while a* values increased when rafined wheat flour was repleaced by WWF. In terms of chemical properties, ash, crude protein, crude fat, phytic acid and total phenolic contents increased with increasing amount of WWF. In conclusion, it was determined that (a) can be used a raw material in tarhana production due to its functional, nutritional and chemical properties, (b) WWF may be an alternative in tarhana production except antinutritional properties, (c) in order to sensorial properties in flour blends 50% rafined wheat flour: 50% WWF ratio is convenient.

Keywords: Whole wheat flour, tarhana, health, nutrition

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Molecular characterization of *Listeria monocytogenes* isolated from chicken samples

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Abstract

Nowadays, there would be considerable consumption area of meat and meat products since they contain essential amino acids, oils, carbohydrates, vitamins and minerals, rich nutrient, high water activity, as well as pH value allowing many microorganisms to grow including pathogenic microorganisms. Especially in recent times, the rapid development observed in the chicken industry is conspicuous. This situation is related to less fat content, higher protein ratio and easier digestion when it is compared to other meats. Pathogenic bacteria are also present in chicken meat which is very rich as microflora. The most common species is *L. monocytogenes*. It is possible to observe *L. monocytogenes* in uncooked animal-based nutrients, seafood, meat and meat products, cooked chicken and uncooked vegetables and fruits. In this study, *Listeria monocytogenes* species were isolated from the chicken samples that would be ready-to-eat and these isolates were phenotypically and genotypically characterised. This species was identified as a result of conventional tests in 5 out of 150 chickens studied. Afterwards, the results were verified by 16S rRNA PCR analysis and other genotypic methods. GTG5, ERIC and BOX- PCR methods were then used to profile isolates at the genotypic level. It was determined that ERIC PCR was very successful method for genotypic profiling of this species.

Keywords: *Listeria monocytogenes*, Chicken, 16S rRNA- PCR, ERIC PCR

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A thermostable α-amylase for raw starch degradation and apple juice clarification by using thermophilic *Anoxybacillus* sp. SO-6

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Abstract

A thermophilic *Anoxybacillus* sp. SO-6 was isolated from a thermal spring water from Afyonkarahisar, Turkey. The isolate was identified after morphologic, biochemical, physiological and 16S rRNA analyzes. Its Accesion number was KJ434783. *Anoxybacillus* sp. SO-6 was produced thermostable α-amylase. Some factors such as temperature, pH, temperature and pH stability, detergents, surfactants, various starches and metal ions on influence of partially purified enzyme characterization were studied for its characterization. The optimum temperature and pH were 85 °C and 6.0, respectively. TLC analysis was also tested. The raw starch of wheat and corn were invastigated as substrates to determine the raw-starch-degrading efficiencies of partially purified α-amylase of *Bacillus* sp. SO-B6 for 3 h. It exhibited good degradation range towards to raw starch of corn and wheat. The hydrolysing yield of 1% corn and wheat starch grains were found as 34.3% and 40.8% at 4 h, respectively. Thermostable α-amylase hydrolyzed the 79% and 91% of soluble starch content in red and green apple juice at 85 °C in 3 h.

Keywords: Thermophilic bacteria, α-amylase, raw starch, apple juice clarification

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Synthesis and investigation of anticarcinogenic effects of fluorene based asymmetrical Schiff base

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Abstract

Recently, due to the increasing use of the coordination compound in analytical, bioinorganic, pigment and medicinal chemistry, many researchers have studied these topics, especially, the important role of the complexes of Schiff bases in coordination chemistry. Schiff bases usually synthesized by the condensation of primary amines and active carbonyl groups. Asymmetrical ligands are Schiff bases obtained by stepwise condensation of the appropriate diamine with two different carbonyl compounds. Asymmetrical Schiff base ligands have many advantages over their symmetrical counterparts in the composition, geometry, and properties of transition metal complexes. Asymmetrical Schiff bases may also serve as models of relevance for biologically important species and catalysts for various organic transformations and their magnetic and optical properties are promising for optoelectronic applications and the design of biosensors. Schiff base complexes have suitable biomimetic properties that can mimic the structural features of active sites. Among different types of pharmacologically active Schiff bases, the anticancer agents are one of the hottest topics of research worldwide. Schiff bases have capability of binding DNA and proteins, which resulted with cytotoxicity on tumor cells. In this study, the fluorescent unsymmetrical Schiff base was obtained by the condensation of 1,2-phenylenediamine, 2-hydroxy-1-napthaldehyde and fluorene-2-carboxaldehyde. Synthesized this compound was identified by using spectroscopic methods (FTIR, ^{1}H NMR). Fluorescence properties of this compound was examined towards different metal cations. The anticarcinogenic effect of this compound was also investigated.

Keywords: Condensation, Schiff Base, Fluorescent, Anticarcinogenic

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Influence of refinery steps on the content of sterols in pomegranate seed oil

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Abstract

Sterols, which are steroidal alcohols, are found in animal and vegetable oils and, are sterile cyclic compounds containing a group of alcohols with a side chain of 8-10 carbons. The pomegranate seed oil contained a large amount of plant sterols (phytosterols). The sterols, which form an important part of the non-saponified parts of the oils, have as inhibiting the development of colon cancer, lowering the level of lipid in the side, being used as anti-polymerizing agents for frying oils, emulsifying agents for cosmetic producers and mostly use as prodrugs and intermediates for the production of steroid hormone drugs. Refining is the removal of impurities in crude oil without altering the natural properties of the oil and without altering its structure. The refining process is the most important factor in determining the quality and economic performance of oils. Additional refinements are applied and costs are increased to improve the qualities of oils obtained by poor refining processes. Because the parameters in the refining process are not correctly determined, there is observed a continuous decrease in the content of bioactive components in the oil during refining. The aim of this study was to investigate the influence of refinery steps on the content of sterols in pomegranate seed oil by GC-MS. Obtained results showed that sterol content discreased depending on refining conditions such as temperature, adsorbent, vacuum and time in pomegranate seed oil refining process. The refining step was found to be the bleaching step with the greatest loss of sterol.

Keywords: Pomegranate seed oil, refining, sterol

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Green synthesis of luminescent nitrogen doped graphene quantum dots and their application as an anti-microbial, DNA binding, DNA cleavage and cation sensor agent

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Abstract

Graphene quantum dots (GQDs), possess smaller lateral size and high biocompatibility, thus having potential in biomedical applications. In in this study, graphene quantum dots (GQDs) containing N atoms were synthesized using hydrothermal reaction of citric acid and polyethylenediamine (PEI). Compound was characterized by UV-Vis, FT-IR spectroscopy, transmission electronmicroscopy (TEM) and thermogravimetric analysis. The antimicrobial activity of the compound was investigated for its minimum inhibitory concentration (MIC) to bacteria and yeast cultures. UV-Vis spectroscopy studies of the interactions between the GQDs and calf thymus DNA (CT-DNA) showed that the compound interacts with CT-DNA via electrostatic binding. DNA cleavage study showed that the GQDs cleaved DNA without any external agents. Moreover, the compound was investigated for its ability selectively sense biologically active metal ions. Support from Canakkale Onsekiz Mart University, The Scientific Research Commission (ÇOMÜ-FBA: 2018-1291) is greatly acknowledged.

Keywords: Graphene quantum dots (GQDs), DNA binding, DNA cleavage, Citric acid, Hydrothermal reaction

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Zoogeographical evaluation on coccinellidae (coleoptera) biodiversity of Turkey

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Abstract

The family Coccinellidae is called as Lady beetles or Ladybugs. This family is one of the biggest family of order Coleoptera and has 1208 species in Palaearctic and 6.000 species in the World. Coccinellidae fauna of Turkey includes 110 species. Coccinellidae family is an important insect group because of its economic point of view as a biological control agent and because of its diversity and adaptability in different habitats. Most of the species can be identified by the compact, rounded, body form with convex dorsum and flattened venter. The main of this study is understanding zoogeographical composition of Coccinellidae (Coleoptera) biodiversity of Turkey due to present literature. We divided Palaearctic region to subregions (Southern Europe, Western Europe, Northern Europe, Eastern Europe, Siberia, the Middle East, Middle Asia, the Far Eastern Asian and North Africa) and compared Turkish Coccinellidae fauna with these subregions and other zoogeographical regions of the World. Evaluation of data showed that, 13 species are endemic for Turkey. Turkish fauna shares most of species with the European part (Southern, Western, Northern and Eastern Europe) (87 species) of Palaearctic region. In addition to that, Afrotropical (15 species), Australian (3 species), Nearctic (15 species), Neotropical (3 species), Oriental (7 species) Regions also shares some species with Turkey. *Coccinella septempuncta, Adalia bipunctata* and *Hippodamia variegata* species have been identified as the most widespread species in the world. Zoogeographical evaluations may have contributions on species conservation and set off more detailed zoogeographical and phylogeographical studies on this family by understanding their distributional patterns.

Keywords: Coleoptera, Coccinellidae, Zoogeography, Biodiversity, Turkey

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Development of high performance liquid chromatography method for determination of malondialdehyde in human plasma samples

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Abstract

MDA is indicated as a biochemical marker of oxidative stress. The nonspecific reactivity of TBA clearly renders colorimetric TBARS method unsuitable for determination of MDA in body fluids. Recent years, development of HPLC method was continued by human plasma MDA analysis. Therefore, in this study aimed to modify a new high performance lipid chromatography (HPLC) method for human plasma MDA determination. In present study, plasma MDA assays were performed by Shimadzu Shim-Pack SBC-ODS; 2.5 mm X 15 cm column (Japan) in the Agilent HPLC 1200 Series (Germany) by modifying the methods of Hong et al. and of Seljeskog et al. for the measurement of total plasma TBA-MDA levels. Plasma MDA levels were analyzed by HPLC using fluoresans dedectors. Floresan detector wavelengths were set at 530 nm (excitation) and 560 nm (emission). Statistical analysis was performed with SPSS v16. P values of <0.05 were considered to indicate statistical significance. The MDA linear range was 0.032–20.0 μM (R2 = 0.9955 Intra-day Variation Coefficient (CV) values of MDA for 20 μM was 4,41%. Recovery values for 20 μM, 10 μM and 5 μM were 101,5 %; 94,56%; 99,84% respectively. Sample property factors such as lipemic, hemolysis, icteric samples, of freeze-thraw effects were examined. The interference of the hemolysis on MDA level was higher. Therefore, we concluded not to analyze MDA levels in hemolysis samples. However, the HPLC method is easy in applying procedure and has linearity in high concentrations, acceptable recovery levels. These findings show that HPLC method has an advantageous over the colorimetric method. This study was supported by the Selcuk University Research Foundation under the project number of 15202021a as a thesis of master degree.

Keywords: Malondialdeyde, HPLC, lipid peroxidation

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The molecular mechanism of a new phytotherapeutic agent ın cancer biology: *Inula viscosa*

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Abstract

Cancer treatment has attracted the interest of researchers because of their significant impact on health. For the discovery of new therapeutic agents, plants are regarded as one of the main sources of biologically active substances. Today, about 60% of the drugs used for cancer treatment are isolated from natural products. *Inula viscosa* is a perennial aromatic plant that grows in the natural habitat in the Mediterranean Sea and gives a strong smell. In addition to the treatment of gastroduodenal disorders, it is used in the treatment of lung diseases and diabetes in traditional medicine. It is also widely used due to its anti-inflammatory, anthelmintic, antipeptic, antiseptic and antiphlogistic activities. *I. viscosa* contains more than fourteen natural compounds and in many studies strong antiproliferative and antimicrobial activities of these compounds have been reported. Recent studies have highlighted the anti-carcinogenic and antitumoral effects of I. viscosa. *I. viscosa* has shown significant cytotoxic effects in cancer cell lines through inhibition of proliferation and induction of caspase-dependent apoptosis and is involved in a mitochondrial mediated signal pathway. In addition, Inula extract has been shown to induce telomerase shortening which can inhibit telomerase activity, as well as induce apoptosis by inducing an increase in annexin-V labeling and caspase-3 activity. In a conclusion, the Inula extract has an anti-carcinogenic effect and this effect is associated with the induction of apoptosis. However, more research is needed on plant extracts and in vivo cytotoxic effects and mechanisms.

Keywords: *Inula viscosa,* phytotherapeutic agent, antitumoral, anticarcinogenic

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Molecular ecology studies on freshwater turtle; *Trionyx triunguis*

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Abstract

Nile Softshell Turtle, *Trionyx triunguis* is distributed throughout Nambiya from Mauritania and Somalia and the Mediterranean coast in Egypt and Turkey. According to IUCN (International World Conservation Union) criteria, species are in the "Critically Endangered" till 2006. However, the 2006 IUCN Red List was included in the category "Low Risk". The Mediterranean subpopulation has been listed as ''Critically Endangered'' since 1996. It is suggested that the Mediterranean subpopulation should be included within the "Vulnerable" status of the last population size study. Molecular ecological studies have become one of the most important tools for conservation. Genome-specific analyzes of ecological aspects for conservation biology can help to understand why some populations develop at the most basic level while others are less. Until now, studies on *Trionyx triunguis* genetics have been limited to basic levels of cytochrome b, ND4 and microsatellites. With the Next Generation Sequencing methods that we can reach high and comprehensive data, more individuals and locus data can be accessed with the same cost and effort as previous ones. The methods used in Next Generation Sequencing are designed to take advantage of the large amount of data generated by genomic studies to understand more deeply the important questions in molecular ecology.

Keywords: Molecular Ecology, *Trionyx triunguis*, Next Generation Sequencing

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Determination of fatty acid profile of some salvia species in konya region by gc-fıd

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Abstract

Since ancient times the crude herbal extracts of aromatic plants have been in use for different purposes, such as food, drugs and perfumery (Heath, 1981). The essential oils are considered among the most important antimicrobial substances present in these plants. Volatile oils are a complex mixture of compounds, mainly monoterpenes, sesquiterpenes, and their oxygenated derivatives (alcohols, aldehydes, esters, ethers, ketones, phenols and oxides) (Delamare, 2007). Other volatile compounds include phenylpropenes and specific sulphur- or nitrogen-containing substances. Generally, the oil composition is a balance of various compounds, although in many species one constituent may prevail over all others (Cowan, 1999). Salvia, the largest genus of the Lamiaceae family, includes about 900 species, spread throughout the world, some of which are economically important since they have use as spices and flavouring agents in perfumery and cosmetics (Delamare, 2007). The analysis of the fatty acid composition of several Salvia species indicates that linolenic acid is its main constituents. However, several authors have documented significant species-specific variations in the concentration of these compounds and/or presence of others in high concentrations (Delamare, 2007). In this study, an automated GC-FID system for determination of fatty acid profile of some salvia species in Konya was used. It was seen that salvia species analysed have high amounts of linolenic acid mostly. The biggest linolenic acid ratio was %48,2547 and the lowest linolenic acid ratio was %6,4275. One of Salvia has undecanoic acid ratio in the level of %50,2368, surprisingly.

Keywords: Fatty acid profile, Gas chromatography, Medicine plants, Salvia

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The effect of melatonin on HIF pathway in breast cancer stem cells

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Abstract

Cancer stem cells are known to be effective in cancer initiation, progression, metastasis, recurrence, and treatment response. Cancer stem cells exhibit resistance to the conventional chemotherapy and radiotherapy, so blocking of cancer stem cells is important in the treatment of cancer. Most cancer cells proliferate faster than normal cells, and traditional chemo and radiotherapies in cancer treatment target particularly rapidly dividing cells. It is important to design the treatment regimens that do not harm to normal stem cells and other cells in our bodies. In this study, we aimed to reveal the effect of melatonin, which is known to have apoptotic activity on cancer stem cells, in the hypoxic conditions of the tumor mass. We determined the expression of Bax, Bcl-2, HIF1A, TGFA, VEGF, MYC and GAPDH genes by real-time PCR in cancer stem cells that sorted from MCF-7 and HEK293 cells. According to the results, melatonin has been shown to reduce the amount of CD44 + / CD24- stem cells in MCF-7 while increasing the amount of CD44+/ CD24- stem cells in HEK293. It is known that cancer cells develop resistance to radiotherapy and chemotherapy in the hypoxic environment. In the literature, it is thought that melatonin may have an effect on self-renewal factors (such as Oct4, Sox2, Nanog, Klf4). Melatonin may suppress the self-renewal factors and promote differentiation, and lead to a decrease in the amount of stem cells. According to our results, it seems possible that melatonin is able to do this through the HIF pathway.

Keywords: Melatonin, MCF-7, HEK293, HIF

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A facile preparation of copper nanoparticles using nitrogen-doped graphene quantum dots as biomaterials with DNA interactions, antioxidant, and biological properties

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Abstract

Some studies have shown that the synthesized nitrogen-doped graphene quantum dots (GQDs) consist of hydroxyl, carbonyl, and carboxylic acid groups on their surface, and thus have the ability to reduce metal cations under heat. The resulting metal nano particles (M-NPs) are formed close to the surface of the GQDs, so it is easy to assembly of these Ag-GQDs compounds in solution because of the so-close distance and electrostatic interactions between them. In this study, the synthesized nanocomposites consisting of copper nanoparticles(GQDs-CuNPs) and graphene quantum dots has been characterized by UV-Vis, FT-IR spectroscopy, transmission electronmicroscopy (TEM), EDS and thermogravimetric analysis. The antimicrobial activity of the compound was investigated for its minimum inhibitory concentration (MIC) to bacteria and yeast cultures. The interactions of the GQDs-CuNPs with DNA were studied by the UV-Vis spectra and gel electrophoresis method. UV-Vis spectroscopy studies of the interactions between the GQDs and calf thymus DNA (CT-DNA) showed that the compound interacts with CT-DNA. DNA cleavage study showed that the GQDs cleaved DNA without any external agents.

Keywords: Nanoparticles, DNA interactions, Minimum inhibitory concentration (MIC), Spectroscopy

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Biosynthesis of ZnO nanoparticles by using aqueous extract of *Robinia pseudoacacia* L. seeds and their characterization

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Abstract

ZnO nanoparticles have been one the most preferred nanomaterials for synthesis due to their unique properties. In this regard, *Robinia pseudoacacia* aqueous extract mediated biosynthesis of ZnO nanoparticles and their characterization studies were done in the present study. The seeds were collected from *R. pseudoacacia* trees in the Atatürk University campus area in October 2017. The aqueous extract was prepared on a magnetic stirrer with constant stirring for 2h. Then, it was filtered by Whatman® No:1 Filtration-Paper and kept at +4 °C in the dark until use. In the biosynthesis reaction, the aqueous extract was added into the zinc acetate•2H2O precursor solution (final concent. 200 mM), and then incubated with stirring for 6 h. In the end of this period, NaOH solution (2 M) was added and kept on the stirrer at 60 °C for overnight. The precipitate was collected by centrifugation and washed. Finally, the product was characterized by using SEM and EDS. The results of the present study showed that ZnO nanoparticles were successfully biosynthesized from the precursor by using the seed aqueous extract of *R. pseudoacacia*. The average size of produced nanoparticles was 30 nm. Besides, they had plate-shaped with rounded corners. Consequently, the results of the present study indicated that the aqueous extract of *R. pseudoacacia* seeds may be used for biosynthesis of ZnO nanoparticles from the zinc acetate•2H2O precursor. Besides, with the optimization of this production process, new ZnO nanoparticles with various beneficial features can be synthesized in the further studies.

Keywords: Biosynthesis, Energy dispersive spectroscopy, *R. pseudoacacia*, Scanning electron microscopy, ZnO nanoparticles.

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Effects of chromatin remodeling complexes on trehalose accumulation in yeast *Saccharomyces cerevisiae*

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Abstract

Trehalose has many important physiological roles in *Saccharomyces cerevisiae*, such as energy and carbon source, reserve carbonhydrate and metabolic regulator in yeast. Furthermore many studies have shown that trehalose is accumulated under stress conditions like heat stress, ethanol stress, nutrientional starvation, desiccation and osmotic stress. In other words, trehalose contentof cell is an indicator of stress tolerance. The genes involved in trehalose synthesis and breakdown is thightly regulated in both transcriptional and protein level. Chromatin remodelers have a role in transcriptional regulation. SWI/SNF chromatin remodeling complex mobilizes nucleosomes, and SAGA complex acts as a coactivator to recruit the TATA-binding protein to the TATA. SWR1 complex replaces the canonical histone H2A with the variant H2A.Z. In this study we investigated the effects of SWR1, SAGA and SWI/SNF chromatin remodelers on the trehalose accumulation by means of enzymatic assay. In our researh, the exponentional growing cells of Δswr1, Δspt7, Δsnf2 mutant yeast strains, the essential subunits of these complexes, respectively, and their wilde type strain were used. Trehalose contents of Δswr1 and Δspt7 yeast cells were similar to wild type. But trehalose accumulation of Δsnf2 mutant yeast cells was 20-25 fold higher than wild type yeast cells. These results showed that SWI/SNF chromatin remodeling complex is essential for regulation of trehalose metabolism.

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Keywords: SWR1, SAGA, SWI/SNF, Trehalose, *Saccharomyces cerevisiae*

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Detecting of SMN1 and SMN2 genes by MLPA technique

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Abstract

Spinal muscular atrophy (SMA) is an autosomal recessive genetic disorder affecting the nervous system. SMA is characterized by degeneration nerve cells of the spinal cord, resulting progressive weekness of the motor neurons and muscle atrophy. SMA prevalence is estimated approximately 1 per 10,000 live births. It is caused by mutations in the survival motor neuron 1(SMN1) gene, known as functional form on chromosome 5q13.2 also pseudogene is SMN2 in rare cases of SMA. Mutations in the SMN1 cause SMA, while the copy numbers of SMN2 affects the prognosis of the disease differs from that of SMN1 by a single nucleotide in exon 7 (840C-T), that leads to decreasing transcription and deficiency of the normal SMN protein. In the case, we reported a SMA newborn was detected in our molecular genetic laborotory and the clinic. We analyzed SMN1 and SMN2 gene by Multiplex Ligation-dependent Probe Amplification (MLPA) technique is a multiplex PCR method detecting large deletions and duplications also abnormal copy numbers in the genes. Neonatal patient had homozygous deletions in exon 7 and 8 in SMN1 gene and two copies of SMN2. Paternal and maternal MLPA results showed that the parents were carrier for SMA because of the heterozygous deletions in exon 7 and 8 both of them also father had one copy of SMN2. The result were not a surprise for us because of the parents were consanguineous. As a result, consanguineous marriage is one of the most important health problems in our country, especially for genetic diseases recessively.

Keywords: SMA, SMN genes, MLPA

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Possible alternative uses of some yellow pea products in cake productions

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Abstract

Utilization possibilities of yellow pea products such as yellow pea milk (YPM) containing high protein, and fermented yellow pea flour (FYPF) in cake production were investigated. YPM was replaced with whole egg at 0, 20, 40 and 60% ratio in cake formulation. FYPF was replaced with wheat flour at 0, 10, 20 and 30% ratio to improve the nutritional status of cake samples. Physical, chemical and sensory properties of cake samples were determined. FYPF increased ash, protein, mineral and antioxidant activity of the cake samples. FYPF at the highest ratio (60%) resulted in maximum enrichment in the nutritional quality of cake samples. Volume index values of the cake samples decreased over 40% of YPM and 20% of FYPF levels compared to control samples. Firmness values of the cake samples were adversely affected at high utilization ratios of the YPM and FYPF. The use of FYPF in cake formulation significantly ($p<0.05$) affected the crumb L* and b* values. When physical, chemical and sensory properties were evaluated together, it was determined that YPM (up to 40%) and FYPF (up to 20%) can be used successfully in cake formulation.

Keywords: Cake, egg, yellow pea, milk, fermantation

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Morphological, hematological and histopathological effects of propyl paraben on endocrine glands of male rats at prepubertal period

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Abstract

Propyl paraben is widely used as antimicrobial excipients in pharmaceuticals, personal care products and foods preventing microbial and fungal contamination. In this study we studied the effects of propyl paraben on endocrine gland of rats. For this purpose propyl paraben were given by oral gavage at 10, 250 and 750 mg/kg/day doses to castrated immature male Wistar Albino rats. According to Hershberger Bioassay, at their 6 weeks of age, rats were castrated and given 8 days for recovery. After that, rats were divided into six groups including the vehicle control, negative control (0.4 mg/kg/day TP), positive control (3 mg/kg/day FLU + TP) and propyl paraben treatment groups (10, 250, 750 mg/kg/day PP + TP). During the experiment, body weights and food and water consumption were noted. After 10 days of treatment period, rats were killed and dissected, the stated tissue weights of endocrine organs were measured and histopathological examination was done. According to the result of the comparative analytic studies, the critical decrease in the tissue weight of the spleen, thymus, pancreas and thyroid, which 250 mg/kg/day and 750 mg/kg/day dose paraben was being applied to them, has been observed and the histopathological disruption in these tissues have been observed. These findings show that the propyl paraben that has been using as an antimicrobial preservative has a critical side effect on endocrine tissues.

Keywords: Endocrine system, Hershberger Bioassay, Propyl Paraben, Histopathology

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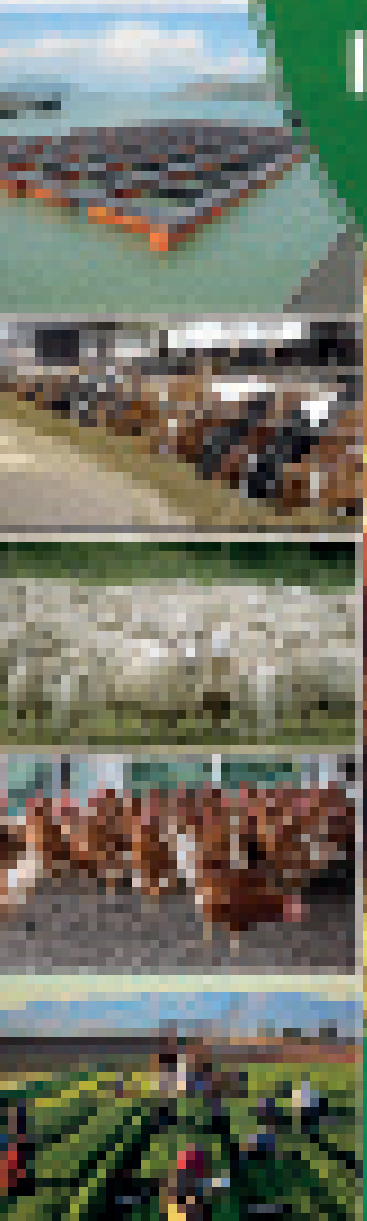

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Magnetic nanoparticles loaded electrospun pcl nanofibers for drug delivery applications

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Abstract

In this study, Fe3O4 magnetic nanoparticles (MNPs) were loaded into poly (e-caprolactone) (PCL) nanofiber mats via electrospinning method and the composite materials were characterized. MNPs were synthesized by a conventional co-precipitation method and treated by oleic acid in order to obtain hydrophobic nanoparticles. The MNPs were added to PCL solution before electrospinning at varying concentrations (4, 8, 16, 32, 64 and 128%, w/v). The chemical structure of the nanofibrous membranes was investigated by Fourier transform infrared spectroscopy (FTIR). Scanning electron microscopy (SEM), and analyses by optical and confocal microscopes demonstrated that MNPs loaded PCL nanofibers (MNP@PCL NFs) were homogeneously distributed in the membranes. Fiber diameter changed and bead formation occurred as the concentration of MNPs increased from 4 to 128%. The effect of MNPs concentration on drug loading, the encapsulation efficiency and the release properties of the composite nanofibers were investigated by using hydrophilic (Rhodamine B) and hydrophobic (Nile red) dyes, compared with plain PCL nanofibers. The dyes were used as model drug compounds in order to simulate drug release from MNP@PCL NFs. The release rate of Rhodamine B from the plain PCL nanofiber mats was faster compared to the composite materials. The results showed that the release of the model molecule was affected by the hydrophilic/hydrophobic character of the drug. MNP@PCL NFs may have the potential for using as targeted drug delivery vehicles for tissue engineering applications.

This work was supported by the Scientific Research Projects Unit of Mersin University, Project No: 2015-TP2-1345

Keywords: magnetic nanoparticles, poly (Ɛ-caprolactone), electrospinning, drug delivery

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Morphometric ınvestigation of eyeball and harderian gland in ostrich (*Struthio Camelus*)

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Abstract

The ostrich's eye differs in size, shape and localization in the skull according to the mammals. Its lens has pulvinus anularis lentis. This structure is important for accomodation in poultry. Harderian gland is one of the accesory organ of the eye, is present in all poultry. This gland may have numerous functions such as lubrication of eye, pheromone production, osmoregulation, thermoregulation, and photoprotection. The aim of this research is to reveal some morphometric values of eyeball and harderian gland in ostrich. Morphometric information about these anatomical structures in ostriches was limited in the literature study. Both sides of the eyeballs and harderian gland of 3 adult male ostrich were used. Eyeball and harderian gland were removed from orbita. In the eyeball; the diameters (dorso-ventral/temporo-nasal) of the eyeball, iris, pupil, cornea and lens were measured by digital caliper. SPSS 20 statistical package program (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) was used for analysis of data. The intraclass correlation coefficient is calculated. The homogeneity of the variances from the preconditions of the parametric tests was checked by the "Levene" test. The normality assumption "the Shapiro-Wilk" were examined by the test. Differences between the two dependent groups were assessed by the "Wilcoxon test". There was no statistically significant difference between right and left in eyeball and harderian gland. In terms of intraclass correlation coefficient, a compliance was observed at diameter (dorso-ventral) of the lens (p=0,0002).

Keywords: Eyeball, Harderian gland, Ostrich, Morphometry

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Evaluation of preferential anticancer activity of p-tert-butylcalix[4]arene against human prostate carcinoma cell line, pc3

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Abstract

The search for new potent anticancer drugs that can only target cancer cells, rather than affecting normal tissues is very much commendable. Supramolecular calixarene is a highly promising candidate in this regard and could be modified to enhance preferential cytotoxicity for targeted therapy. Calixarenes are a family of bowl or cone shaped synthetic supramolecular macrocycles, composed of phenol units linked by methylene bridges through and an aldehyde. Metylpyridinium functionalized p-tert-butylcalix[4]arene were synthesized (AMP on 3 and 4 position) by appropriate procedures. The structure of the synthesized compounds was characterized by 1H-NMR and FT-IR. In-vitro as cancer and healthy models, PC3, Human Prostate Adenocarcinoma and L929, Healthy Mouse Fibroblast cell line (1x10-5) were cultured with 50-500 µM of 3/4-AMPs. After 24 h incubation, cell growth/proliferation analysis were done by XTT assay. The results showed that p-tert-butylcalixarene compounds affect PC3, in the pridinium group 4 position was found to be more cytotoxic than at the positions 3 after incubation time without effecting on L929. Our research directs that calix[4]arene shows effective preferential cytotoxicity at a concentration range of 25 to 500 µM with enhanced preferential cytotoxicity shown by the modification of pyridinium group at the position 4 against PC3. The effect of surface altered calixarene by pyridinium groups on preferential cytotoxicity in cancer cell in-vitro by comparing with innate preferential toxicity shown by unaltered. The results reported in this study demonstrated that tumor-preferential in-vitro cytotoxicity of p-tert-butylcalix[4]arene against PC3 over L-929 cells present a promising approach for efficient and safe cancer therapy.

Keywords: Calixarene, PC3, Prostate Cancer, Anticancer

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Highly sensitive, low-cost and disposable ITO-PET based immunosensor for detection SOX2 antigen

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Abstract

SOX2 helps the regulation of cell pluripotency and is closely related to early embryonic development, neural and sexual differentiation. SOX2 is amplified and overexpressed in some malignant tumors such as squamous cell, lung, prostate, breast, esophageal cell, colon, ovaria, glioblastoma, pancreatic cancer, gastric cancer, head and neck squamous cell carcinoma. In this study, an ITO (indium tin oxide) based biosensor was constructed to detect SOX2. To generate a hydroxylated electrode surface, ITO electrodes were modified with NH4OH/ H2O2/H2O. Later, ITO-PET electrode surfaces were modified with 3-glycidoxypropyltrimethoxysilane (3-GOPS). Then, anti-SOX2 was covalently immobilized onto the electrode surfaces. 3-GOPS concentration, anti-SOX2 concentration and incubation time, SOX2 incubation time were optimized. Electrochemical impedance spectroscopy (EIS) and cyclic voltammetry (CV) were utilized for immobilization and optimization steps of the biosensor. For analytical characterization of constructed immunosensor; linear range, repeatability, reproducibility, regeneration studies were investigated. The linear range of the immunosensor was detected as 0,625 pg/mL – 62,5 pg/mL. Square wave voltammetry technique was applied to the biosensor. Storage life of the biosensor was determined. Finally, the designed biosensor was applied to real human serum and compared with ELISA results.

Keywords: Biosensor, SOX2, Electrochemical impedance spectroscopy

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Diagnosis of BCR-ABL gene sequence with RT-PCR technique in chronic myeloid leukemia patients

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Abstract

The aim of this study is to demonstrate the presence of BCR-ABL hybrid gene with RT-PCR (Reverse Transcriptase-Polymerase Chain Reaction) method in 25 patients CML cases and identifying the chromosome in cytogenetic way to determine the correlation between them.Lymphocyte cultures were made from bone marrow material and cytogenetic analysis was performed with light microscope after GTG banding.Total RNAs were isolated from blood, bone marrow and cell line. cDNAs were synthesized from mRNAs. Thus, the target DNAs were amplified by PCR. K562 cell line was used as positive control, pure water was used as negative control. In our cases it was established to be found the ratio of BCR-ABL gene positive was 80% , the ratio of Ph chromosome positive was %80. As our RT-PCR results, which are coherent with cytogenetic analysis, has been showed that RT-PCR method, which was more quick and more sensitive, could be used for diagnosing the malign illness and watching the response for the treatment.

Keywords: BCR-ABL gene, RT-PCR, Chronic Myeloid Leukemia

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Screening Y microdeletion of the SY254 gene region in infertile men

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Abstract

In our study we aimed to demonstrate Y microdeletion on the sY254 gene region in 25 primary infertile male patients by using PCR method. Lymphocyte cultures were made from blood material and cytogenetic analysis was performed with light microscope after GTG banding. Total DNA was isolated from peripheral blood. DNA purity was checked and target gene regions were amplified with PCR method by using oligonucleotid primers. sY14 gene region which is on the Y chromosome used as internel control and pure water used as negative control. In total 25 infertile patients;13 individuals had azospermia, 12 individuals had oligospermia. As the results of our study, in sY254 gene region no microdeletion was determined.

Keywords: Y microdeletion, sY254, Azospermia, Oligospermia

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Effects of long term ıron toxicity on antioxidant related enzyme in rat spleen at gene and protein level

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Abstract

Iron plays an important role in biological processes such as oxygen transport, energy production, and synthesis of DNA, RNA and protein. Although it is essential for all living organisms, excess iron intake induces reactive oxygen species (ROS) the through Fenton reaction. Elevated ROS leads to damage of biomolecules and organ function. Therefore, antioxidant system act to protect the cell against oxidative damage. The aim of this study was to provide a better understanding of how the long-term iron overload affects the gene expression and activity of some antioxidant enzymes including glucose 6-phosphate dehydrogenase (G6PD), 6-phosphogluconate dehydrogenase (6PGD), and glutathione reductase (GR) as in vivo. For this reason, 15 male rats were classified into five groups. First group, considered as control, was given only deionized water. Other groups were exposed daily to the different concentrations of nontoxic (0.87, 3 ppm) and toxic (30 and 300 pmm) iron with drinking water for 100 days. Then, the expression of G6pd, 6pgd, and Gr were examined by real time PCR in rat spleen. Enzymatic activities of those genes were spectroscopically examined. According to our results, iron overload reduced the gene expression of G6pd, 6pgd, and Gr. The G6PD enzyme activity was significantly decreased in the presence of non-toxic and toxic iron concentrations. However, the 6PGD enzyme activity was increased in the presence of 3, 30, and 300 ppm iron. While the enzymatic activity of GR in the presence of nontoxic iron was activated, no changes were seen in the presence of toxic iron concentrations.

Keywords: Iron overload, Oxidative stress, Gene expression, Enzyme activity, Spleen

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Chromosomal aberrations

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Abstract

Chromosome aberrations (CA) are one of the important biological consequences of exposure to physical factors and genotoxic chemicals. Studies have shown a linkage between the frequency of chromosomal abnormalities and cancer formation. The majority of chromosomal abnormalities are caused by the inability to repair damaged chromosomes, improper repair, or abnormalities that occur in the migration of chromosomes to the poles during cell division. Chromosomal aberrations are divided into two main types as numerical and structural aberrations. Numerical abnormalities are usually occur from a failure of chromosome division, which results in cells with an extra chromosome or a deficiency in chromosomes or euploidy. Structural CAs occur due to a loss of genetic material, or a rearrangement in the location of the genetic material. According to organizational unit of the metaphase chromosome involved in the aberration, there are two types of structural chromosomal aberrations as chromatid type (breaks and changes) and chromosome type (breaks, fragments, sister union, dicentric chromosomes, ring chromosomes, isochromosomes and translocations). While chromatid type aberrations induced by ionizing radiation form in the G2 and mainly in the S phase of the cell cycle, chromosome type aberrations occur in the G1 phase. True radiomimetic chemicals induce similar pattern of aberrations as ionising radiation. Chemical mutagens that do not directly induce DNA chain breaks but cause other lesions have been shown to induce only chromatid type aberrations in processed DNA, independently of the S phase. There are several types of chemicals which can effectively induce chromosomal aberrations with diverse modes of action. In this rewiev molecular mechanisms of formation of CA will be presented.

Keywords: Genotoxicity, chromosomal aberrations, DNA damage

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Genetic transformation in plants: Current problems and strategies

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Abstrac

Researches of plant genetic transformation is important tool in plant biotechnology and a useful tool for cultivar improvement. There are many methods for insertion of novel genes into the nuclear, mitochondrial or chromosomal genomes of different plant species. This work aimed to investigate the criteria to verify plant transformation; the practical necessities for transformation systems; the integration of tissue culture, gene transfer, selection, and transgene expression strategies to achieve transformation in plant species; and other constraints to plant transformation including regulatory environment, public perceptions, intellectual property, and economics. The major technical challenge facing plant transformation strategy is the development of techniques and constructs to produce a high proportion of plants showing predictable transgene expression without collateral genetic damage. This will require answers to a series of biological and technical questions, some of which are defined. Recent improvements in genetic transformation have made it possible to transfer genes into the various crop species. A successful transformation system requires an efficient tissue culture-based regeneration protocol. Plant regeneration relies on the totipotent cells and it can be stimulated to regenerate into whole plants. However, because of only a limited regeneration rate of plant species, this insight is limited. Therefore, much effort has been aimed at establishing and improving plant regeneration systems. Still, efficient regeneration alone does not necessarily lead to efficient transformation.

Keywords: *Agrobacterium* spp., Microparticle bombardment, Polyethylene glycol (PEG), gene transformation

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Theoretical calculations on electron paramagnetic resonance parameters of liquid phase formamide by density functional method

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Abstract

DNA is a highly polar molecule, evolved to be stable in high-dielectric environments considered in most experimental and theoretical studies. Accordingly, the large impact of solvent modification on the properties of DNA is not surprising. Some organic solvents like formamide and methanol maintain the duplex structure. DNA duplex does not lose its structure completely, and the two strands remain bound when DNA is transferred from aqueous solution to the gas phase. For that reason in our study, we determined formamide molecule and its model radicals structure in water and acetone. Formamide is a reagent that is an ionizing solvent in aqueous buffers. It is widely utilized in biochemistry and molecular biology, particularly in nucleic acids research. To obtain molecular structure in water and acetone, conformational analysis of formamide was performed and only one conformer was determined. Including recommended radical in experimental study, total eight radicals were modeled. And their a ve g values were calculated and then they were compared with the experimental ones.

Keywords: DFT; EPR; Molecular modelling, Radical models, Formamide

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Anti-proliferative effects of *Lavandula stoechas* ssp. *stoechas* essential oil on colon cancer

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Abstract

Lavandula genus is an important member of *Lamiaceae* family. People use commonly *Lavandula stoechas* ssp. *stoechas*, known as "karabaşotu", as a medicinal plant for various diseases around the world and also in Turkey. The aim of this study was to investigate anti-proliferative effects of essential oil extracted from *L. stoechas* ssp. *stoechas*. Essential oil was extracted by hydrodistillation using Clevenger-type apparatus from the leaves and flowers of *L. stoechas* ssp. *stoechas* grown wild in Aydin. The human colon cancer cell line HT-29 was maintained in RPMI 1460 supplemented with 10% fetal bovine serum (FBS), and incubated under 5% CO2 at 37°C. The esential oil was diluted in dimethyl sulfoxide (DMSO) and then in RPMI as needed. Cells were treated with up to 250 µl/L of essential oil with 0.1% DMSO as control for up to 72 h in 96-well plate. The viability levels of the cells after the treatment were measured with MTT (3-{4,5-dimethylthiazol-2yl}-2,5-diphenyl tetrazolium bromide) assay and detected spectrophotometrically at 570 nm. Experiments were performed three times in triplicates. The results were analyzed via analysis of variance (ANOVA) test. Differences with a P value of less than 0.05 were considered as significant. *L. stoechas* ssp. *stoechas* essential oil showed significant anti-proliferative effect on HT-29 cells in a dose- and time-dependent manner ($P<0.05$). Approximately 50% of the cells were killed by 250, 200, and 150 µl/L essential oil treatment for 24, 48, 72 h, respectively.

Keywords: *Lavandula stoechas* ssp. *stoechas*, essential oil, colon cancer, MTT, cytotoxicity

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A new stem cell technology: Cultured meat

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Abstract

Lab-based, in vitro or cultured meat production, is performed by growing stem cells in an environment outside the animal. Culturing stem cells is performed in an environment where the nutrients necessary for the division and differentiation of cells into muscle cells exist. Cultured meat is considered as an alternative to traditional meat and have both advantages and disadvantages. Meat produced in a sterile laboratory environment reduces the risk of human exposure to diseases such as *Salmonella* infection, pesticides, arsenic, dioxins and hormones. Since 50,000 metric tons of meat can be produced from just10 stem cells with this method, it is argued that less time, energy, land, water, gas emissions and carbon footprint will be spent compared to traditional methods. The vegetarian approaches that limit meat consumption can be minimized by using this method. It is believed that the amount of meat that is already inadequate due to the rapid increase of the world population will not be distributed equally to the population. However, cultured meat is believed to prevent this inequality. In addition to these advantages, it is argued that thanks to stem cell studies, the meat production will be unlimited and that the production of pork or cow-based meat, which are against the religious perceptions "Halal" or "Jhatka", may cause religious and social concerns. The fact that meat have a potential market for now and that the consumers do not need a new taste can be regarded as disadvantages. Thus, cultured meat is a new biotechnology subject that needs to be elaborated on.

Keywords: Cultured meat, Stem cell technology

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The effect of ellagitannins and ellagic acid on human gut microbiota

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Abstract

Ellagitannins, having an unstable state in nature and under physiological conditions, are generally converted by hydrolysis and polymerization reactions to structures that are not easily hydrolyzable by water, such as the ellagic acid. Ellagic acids are the polyphenols found in fruits and nuts, such as pomegranates, raspberries, walnuts, and almonds. Examining the ellagic acid content of 100 grams of various foods, it was determined that the pomegranate contained 200 mg of ellagic acid; whereas raspberries contained 150 mg, and strawberries 63 mg. During recent years, ellagitannins and ellagic acid were found to have antimicrobial, anticarcinogenic, antioxidant and anti-inflammatory effects. Ellagitannins, affected by pH levels in small intestine and caecum might convert to ellagic acid. It is hence stated that the ellagic acid had notable effects on the human gut microbiota. A significant increase in the count of beneficial bacteria, also known as probiotics, was observed as a result of consuming foods rich in ellagitannins. A research conducted by the utilization of pure bacteria isolates revealed that the ellagitannin derivative pomegranate juice inhibited the growth of pathogenic *Clostridia* and *Staphylococcus aureus*; whereas it had no effect on probiotic *Lactobacilli* and *Bifidobacteria* count. Another research conducted in a medium inoculated with human fecal microbiota, demonstrated that consumption of pomegranate products not only increased bifidobacteria and lactobacilli, but also increased production of short chain fatty acids. Human research regarding the effect of ellagitannins and ellagic acid containing foods on human gut microbiota would be more valuable.

Keywords: Ellagitannins, ellagic acid, human gut; microbiota

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Investigation of roles of yfha-yfhk and cuss-cusr two component systems on survival of *E.coli* w3110 under different stress conditions

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Abstract

Bacteria have a signal transduction called a two-component system in order to adapt to external environmental stimuli. From these systems, some functions of CusS-CusR and YfhK-YfhA two-component phosphorylation systems have been identified. However, it has been thought that these systems have different roles under different stress conditions other than designated ones. Therefore as a first step, mutants of these systems were obtained and their roles were investigated against various metals (Cu, Co, Zn) and antibiotics (Kanamycin, Tetracycline, Streptomycin) effect. In the study, the mutant genes of Escherichia coli BW25113 strain were transferred to the bacteria *Escherichia coli* W3110 through P1 transduction method. In addition, by means of the plasmid obtained the roles of the genes in the studied stress conditions were controlled through performing by complementation tests. At the end of the study, obtained data were analyzed statistically through student t test. As a result of these analyzes, it was determined that yfhA, yfhK, cusS and cusR for zinc, yfhK and cusS genes for cobalt metal have a role, while yfhA, yfhK and cusR genes are important for copper stress ($p<0.05$). While yfhA, yfhK and cusR genes have a role against tetracycline in working antibiotics, it has been determined that yfhA, cusS and cusR genes play an important role against streptomycin.

Keywords: *Escherichi coli*, pH stress, two-component systems

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The effects of iron (Fe^{+3}) on the expressıon levels of heat stress proteın genes in Mcf7 cell line

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Abstract

One of the most abundant metals in the world, is iron, which is essential for the organism. The incidence of injury to internal organs such as heart is kept by tissues in high concentrations in the liver and the pancreas. In our study, we investigated how iron ions given at different doses affect the 70 kDa HSP gene expression, which is a stress protein in the MC7 cell line. In this study, iron ion Fe3 + (0,87ppm, 3ppm, 30ppm, 300ppm) was given to 5 different application groups at different concentrations. At the end of this application process, a cDNA library was constructed from the RNA samples obtained from the cells. The use of this Hsp70 (Hspa1a, Hspa4, Hspa5), Hsp90 (Hsp90aa1) that occurring in the expression levels of genes have been identified by changes in the Real-Time PCR method. It was determined that the iron ion given at a concentration of 30ppm significantly increased the Hspa1a gene expression.

Keywords: Gene expression, HSP, Iron ion, MCF7 cell line, Real-Time PCR

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Alterations ın sodıum butyrate induced cytotoxıcıty of Mcf7 breast cancer cells treated with rosmarinic acid

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Abstract

In recent years, the exploration of new anti cancer agents have been focused on the plant-based natural products and natural derivatives of substances produced in human body due to their cytotoxic effects. Among these natural products, Rosmarinic acid (RA) and sodium butyrate (NaBu) have been commonly studied. RA is a phenolic derivative of caffeic acid found in rosemary and NaBu is also a derivative of naturally occurring butyric acid in colon. Although their anti-cancer activies have been demonstrated, the synergistc/antognistic effects of their combination in cancer cells have not been elucidated yet. Therefore, the current study was conducted to clarify the cytotoxic effects in MCF7 breast cancer cell line model. RA at the doses of 37.5 μM,75 μM and 150 μM was applied while NaBu was used at the doses of 1.25 mM,2.5 mM ve 5 mM . In the combination treatment, only the highest dose of NaBu was used with other studied doses of RA. To determine the cytotoxic effects of all treatments, 3-(4, 5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) and Sulforhodamine B (SRB) assays were used. The results of the both assays indicated that RA alters the antiproliferative effects of NaBU in MCF7 cells in the combination treatment.

Keywords: Rosmarinic acid, Sodium butyrate, Combination therapy, Cytotoxic effects, Breast cancer

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Investigation of cytotoxic activity of metylpyridinium functionalized *p-tert*-butylcalix[4]arene diamide on metastatic breast cancer cells

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Abstract

The search for new potent anticancer drugs that can only target cancer cells, rather than affecting normal tissues is very much commendable. Supramolecular p-tert-butylcalix[4]arene is a highly promising candidate in this regard and could be modified to enhance preferential cytotoxicity for targeted therapy. The important requirement for effective anticancer therapy is a tumor-selective vehicle. p-tert-butylcalix[4] arene functionalized with a pyridinium group on different positions were synthesized by appropriate procedures. The structure of the synthesized compounds was characterized by 1H-NMR and FT-IR. As cancer and healthy in-vitro models, MDA-MB-231, Human breast adenocarcinoma and L929, Healthy Mouse Fibroblast cell line cells (2x105) were cultured with 100, 250 and 500 µM of 2/3/4-AMPs. After 24 h incubation, cell growth/proliferation analysis were done by XTT assay and xCELLigence RTCA System. Our research directs that calix[4]arene shows effective preferential cytotoxicity at a concentration range of 25 to 100 µM with enhanced preferential cytotoxicity shown by the modification of pyridinium group at the position 3 against MDA-MB-231 breast cancer cells. We examined the dose- and time-dependent inhibition of the growth of the human breast adenocarcinoma MDA-MB-231 and healthy mouse fibroblast L-929 cell lines after p-tert-butylcalix[4]arene treatment with IC50 45.35 µM value of The effect of metylpyridinium functionalized calixarene on preferential cytotoxicity in cancer cell in-vitro by comparing with innate preferential toxicity shown by unaltered. The results reported in this study demonstrated that tumor-preferential in-vitro cytotoxicity of *p-tert*-butylcalix[4]arene against MDA-MB-231over L-929 cells present a promising approach for efficient and safe cancer therapy.

Keywords: *p-tert*-butylcalix[4]arene, MDA-MB-231, L-929, Cytotoxicity

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Has juglone an antioxidant effect on pancreatic cancer cell line?

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Abstract

Natural products are beneficial for the protection against certain human malignancies including pancreatic cancer. In this study, it is aimed to determine the cytotoxic effect of juglone and also to investigate its effect on ROS production in pancreatic cancer cell lines. Changes in enzymatic (SOD, CAT, APX and GSH) antioxidant systems, as well as oxidative parameters (H2O2 and MDA) have a critical role in ROS production. We evaluated the anticancer and antioxidant activity of the juglone The effect of juglone on cell viability was evaluated by MTT assay and antioxidant enzyme activities were measured by kinetic reading. We compared with Juglone treatment and control groups at different hours.Juglone reduced the cell viability of human pancreatic cancer cells in a concentration-dependent manner. The IC50 of juglone on the pancreatic cell line was 21,05 μM. It had a significantly higher degree of enzymatic activity to cope with the oxidative stress.In conclusion our results indicate that juglone is a potent anticancer molecule and may prove essential in pancreatic cancer therapy. Juglone can be played a central role for antioxidant system defense in pancreatic cells. beyond a shadow of a doubt, genetic analysis for this species is recommended.

Keywords: Ascorbate peroxidase, catalase, juglone, MTT

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Investigation of *Citrus exocortis* viroid and *Hop stunt viroid* infecting fig trees

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Abstract

Fig (Ficus carica L.) is one of the most important crops in Turkey. Viroids have been identified as the causative agents of severe diseases in many economically important crops. Fig trees are mostly susceptible to many viroid species belongs to family Pospiviroidae such as Citrus exocortis viroid (CEVd), Hop stunt viroid (HSVd). To investigate the incidence of those viroids, we collected 60 suspicious symptomatic leaf samples from different locations. Total nucleic acids were extracted from leaves using ZR Plant RNA MiniPrep™ Kit- Zymo Research and used as a template for cDNA synthesis. cDNA was synthesized by abm's EasyScript™ cDNA Synthesis Kit. Viroid specific primers CEVd_F: 5′-GATGGAAGGAAGGAGACGAGCTCC-3′ - R: 5′-GCTGGCTCCACATCCGATCGTCGCT-3′ for CEVd and HSVd-F: 5′-AACCCGGGGCAACTCTTCTC-3′ - R: 5′-AACCCGGGGCTCCTTTCTCA-3′ for HpSVd detection were used for PCR analysis. PCR analysis was performed under the following conditions: denaturation 94°C 5 min, 40 cycles of 94°C for 30 s, 60°C for 45 s, and 72°C for 1 min; and a final extension for 10 min at 72°C. The PCR products visualized under UV light after electrophoresis on 1.5% agarose gels. None of the viroids were detected on screened fig samples by RT-PCR analysis. The results demonstrated by this study will be helpful in any further study on fig viroids.

Keywords: *Ficus carica* L., HSVd, CEVd, RNA, cDNA, PCR

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Immunological activity of *Lobothallia radiosa* (Hoffm.) hafellner in RAW 264.7 macrophage cells

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Abstract

This study was conducted to demonstrate the effects of Lobothallia radiosa (LOB) on immunological activity of RAW 264.7 macrophage cells for the first time in literature. L. radiosa is a crustose placodiomorph lichen which prefers rocks as a subtrates. It synthesizes norstictic acid, atranorin, and stictic acid. Dried lichen samples were extracted by ethanol at a ratio of 1:20 (w/v) with the help of soxhlet extractor (26°C, 2 hr). Then, solvent was removed from samples by rotary extractor (250 rpm, 50°C, 1 hr.) and lyophilization for 12 hours. RAW 264.7 cells were cultured in the presence of various concentrations of extracts up to 72 hr. The percentage of cell viability was determined by metabolism of the tetrazolium salt XTT and real-time and label-free monitoring of cell viability of macrophages by xCELLigence system in addition to microscopic analysis. The dose-dependent effects of LOB on nitric oxide (NO) production was investigated by Griess method to determine its inflammatory profile in macrophages (i.e. innate immune cells). Evaluation of the effect of this lichen species on immune system is very vital since it has been using for anti-cancer studies recently.

Keywords: Cytotoxic activity, RAW 264.7 macrophages, *Lobothallia radiosa*, xCELLigence, inflammation

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The effects of bisphenol a on the proportions of alpha naphthyl acetate esterase positive peripheral blood lymphocytes

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Abstract

Bisphenol A (BPA) is an endocrine disrupting chemical widely used in the production of polycarbonate plastics and epoxy resins. Enzyme histochemical studies can be used to evaluate the functional development and maturation of the immune system. Alpha naphthyl acetate esterase (ANAE), a lysosomal enzyme, has been demonstrated in mature, immunocompetent circulating T-lymphocytes of many animal species. The aim of this study was to determine the effects of BPA on the proportions of ANAE positive peripheral blood lymphocytes (PBL) in rats. For this purpose a total of 40 rats were used. The animals were divided into five groups of as following: control, vehicle, BPA-5, BPA-50 and BPA-500. Each group was consisted of eight animals. BPA was dissolved in ethanol, then mixed with corn oil. The control group was untreated. The vehicle group was given the ethanol-corn oil mixture. The BPA-5, BPA-50 and BPA-500 groups were given 5, 50, and 500 µg/kg body weights/day, respectively. After 8 weeks, peripheral blood samples were obtained from the animals and blood smears were prepared. After ANAE demonstration, the cells having lymphocyte morphology and 1 to 3 large, reddish-brown granules were classified as ANAE-positive lymphocytes. The percentages were determined by counting 200 lymphocytes on each smears. The proportions of ANAE positivity were 43,37%, 36,50%, 32,62%, 31,37% and 30,75% respectively. The differences of ANAE positive PBL between the groups were statistically important ($p<0.01$). It was concluded that BPA has immunotoxic effect of PBL, and it might caused functional changes of lymphocytes decrasing enzymatic activity.

Keywords: BPA, ANAE lymphocytes, rat

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Detection of methicillin resistance and presence of panton valentine toxin by multiplex PCR in *Staphylococcus aureus* strains ısolated from raw milk and ıce cream

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Abstract

Methicillin resistant *Staphylococcus aureus* (MRSA) is considered to be one of the most common pathogens causing nosocomial infections and food poisoning events all over the world. İn the case of defective pasteurization, raw milk and dairy products are potential sources of S. aureus. The aim of this study is to investigate the MRSA ratio and PVL (Panton-Valentine Leukocidin) carriage of *Staphylococcus aureus* strains isolated and identified from raw milk and ice cream in Konya. A total of 55 S. aureus strains were isolated from raw milk (49) collected from various farms and ice cream samples (6) sold in the open in Konya. The obtained isolates were identified as *S. aureus* with conventional methods (Colonial morphology, Gram staining, catalase test, coagulase test, hemolysis test, lecithinase test and mannitol salt agar fermentation) and genotypic methods. Multiplex polymerase chain reaction was applied to detect the genes 16S rRNA, *mecA, femA* and PVL. Only one of the 55 *S. aureus* strains (1.8%) was detected as MRSA and this strain is ice cream isolate. And also all isolates were PVL negative. Although this study can certainly not implicate food as a source of human MRSA infection, the finding of MRSA in milk and dairy product, including strains implicated in human infections, does raise concern and the possibility that food plays a role in the community spread of MRSA. In order to prevent *S. aureus* contamination in raw milk and ice cream samples, it is appropriate to meet the hygiene requirements and further increase the measures.

Keywords: Methicillin resistance, Multiplex PCR, PVL, *Staphylococcus aureus*

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Mitochondrial DNA analysis and mitochondrial diseases

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Abstract

Mitochondria are the organelle in which cellular respiration is carried out in eukaryotic organisms. Cellular respiration is the process of forming ATP energy by breaking down the nutrients with oxygen. Free oxygen radicals coming out in the result of the electrons escaping from the electron transport chain creates damage firstly in the mitochondria and then in the cell. Mutations occur in mitochondrial DNA (Mt-DNA) which are exposed to free oxygen radicals and are specific for mitochondria. In the result of the mutations, single and double branching, abasic areas, base modifications and sugar damage may occur in Mt-DNA, or there may be cross-linking between DNA and protein (Cooke at al. 2003, Evans and Cooke 2004). These mutations cause mainly Alzheimer and Parkinson, many diseases originated from endocrine glands, brain, heart and liver diseases. In this review, the structure and genetics of Mt-DNA and diseases related to Mt-DNA and mechanisms of formation were discussed.

Keywords: Mitochondrial DNA, free oxygen radicals, mutation, insertion, deletion.

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Biosynthesis of iron nanoparticles using black tea extract and their application for degradation of methylene blue

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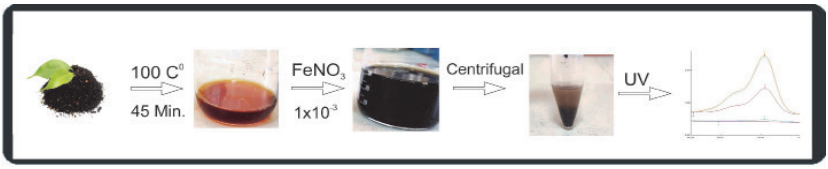
Abstract

Much attention has been paid to iron nanoparticles (FeNPs) due to their fine control of their physical, chemical, and structural properties, such as good electrical conductivity, chemical activity, sub colloidal size and strong reduction power . The large surface area of nanoparticles can lead to surprising surface and quantum size effects. Because of the particle size decreases a number of surface atoms increases, surface atoms tend to have more unsatisfied bonds with attendant higher surface energy. Plants are used widely and efficiently for large scale synthesis of nanoparticles because integration of green chemistry principles to nanotechnology is one of the key issues of nanoscience research . FeNPs has a great deal to propose at the nanoscale magnetic and catalytic properties in addition iron is the least-expensive metal catalyst that could be used for catalytic degradation reaction. The aim of the present study was to the green synthesis of FeNPs using black tea extract and their use for the catalytic degradation of a methylene blue (MB). The stable FeNPs were further characterized by Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD) and scanning electron microscopy (SEM-EDX). To decrease the water pollution of industries with a large amount of toxic and non-biodegradable colored dye effluents, an efficient technique is required to safely remove harmful pollutants . In this study, the reaction between methylene blue (MB) and NaBH4 catalyzed by nanoparticles (NPs) thin films has been studied.



Keywords: Methylene blue, catalytic degradation, black tea, iron nanoparticle

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Evaluation of the relationship between *Demodex* (Acari: Demodicidae) density and the skin biophysical parameters in patients with acne vulgaris

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Abstract

The stratum corneum (SC), the outermost layer of the epidermis, is a natural barrier which prevent the entrance of microorganisms. The SC normally has lower acidic pH (ranging 4 to 6). If skin pH is increase the SC's barrier function may decrease. In addition, when transepidermal water loss increases, skin moisture decreases, and the skin becomes dry, consequently may decrease of the SC's barrier function. Decreased SC barrier function may allow easier penetration of Demodex mites on the skin. The aim of study was to evaluate relationship between Demodex density and the skin biophysical parameters such as moisture, pH, and temperature in AV patients. A total of 210 patients with AV were included in the study. Measurements for skin biophysical parameters were conducted on the cheek, nasolabial area, and chin. Samples were taken from the same facial regions using the ''standard superficial skin biopsy'' technique and examined under light microscopy. The mean density of Demodex in patients with lower skin moisture, higher skin pH and temperature were determined as 22.3/cm2, 20.4/cm2 and 22.5/cm2respectively. Whereas, in those patients which having higher skin moisture, lower skin pH and temperature, were 5.3/cm2, 5.9/ cm2and 6.7/cm2 respectively. There was a significant correlation between the mean mite density and skin moisture ($P<0.05$), while skin pH and temperature were not statistically significantly correlated to mite density ($P>0.05$). Our findings indicate that density of Demodex may be affected by skin biophysical parameters. Hence, raising moisture and acidity of the skin can reduce Demodex infestation in patients with AV.

Keywords: *Demodex*, skin moisture, skin pH, skin temperature, skin barrier

Acknowledgement: We would like to thank the Erzincan University, Coordinator of Scientific Research Projects, which suported this study (Project No: TSA-2017-441), Erzincan University Clinical Research Ethics Committee (Decision No: 2016-08/07) and the all volunteers who participated to this study.

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Demodex (Acari: Demodicidae) infestation in patients with acne vulgaris

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Abstract

Acne vulgaris (AV) is a chronic inflammatory disease of the pilosebaceous unit. Although AV is not life-threatening, it can lead to social phobia and depression due to facial scars. *Demodex* mites are arthropod microorganisms belonging to the family Demodicidae (Acari). Two species are human-specific parasites: *Demodex folliculorum* and *D. brevis*. The present study was conducted to evaluate *Demodex* infestation in AV patients. A total of 360 participants were enrolled in the study, including 210 patients with AV and 150 healthy controls. Samples were obtained from the right cheek, left cheek, nasolabial area, and chin using the ''standard superficial skin biopsy'' method, and examined under light microscopy. *Demodex* mite positivity (≥5) was detected in 62.4% of patients with AV and in 16.7% of the controls. *Demodex* density was higher in the AV patients (mean 25.7 mite/cm2) than in the controls (mean 6.72 mites/cm2). Overall, 3,367 Demodex mites were isolated from 131 (62.4%) of the patients. Of these infestations, 2,074 were only *D. folliculorum*, 52 were only *D. brevis,* and 1,241 were both *D. folliculorum* and *D. brevis.* One hundred sixty-eight mites were isolated from 25 (16.7%) of the controls; 153 samples contained only *D. folliculorum* and 15 contained both species. Differences the between the AV patients and the controls were significant ($P < 0.001$). In conclusion, the present study determined that the majority of AV patients in Erzincan, Turkey, are infested with *Demodex* mites. It may be helpful to consider these findings in clinical assessments of AV patients.

Keywords: Acari, acne vulgaris, *Demodex*, infestation, Erzincan

Acknowledgement: We would like to thank the Erzincan University, Coordinator of Scientific Research Projects, which suported this study (Project No: TSA-2017-441), Erzincan University Clinical Research Ethics Committee (Decision No: 2016-08/07) and the all volunteers who participated to this study.

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Investigation of PDGF-α expression in eyelid, conjunctival and orbital tumors

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Abstract

Eyelid, conjunctival and orbital tumors are an extremely rare malignant neoplasm all over the Word However, these tumors are the most commonly observed cancer types in ophthalmology patients. The most common diagnosis is basal cell carcinoma (BCC) among these patients (~90%). Cancer cells activate several adaptation and survival mechanisms and promote angiogenesis by releasing a lot of growth factors. Several growth factors with angiogenic activity have been described. These include platelet derived growth factors (PDGFs). PDGF-α is a member of the platelet-derived growth factor (PDGF) family and plays important roles in in the embryonal development and in wound healing as well as in the development of several pathological conditions such as atherosclerosis and tumorigenesis. The present study aims to investigate the expression of PDGF-α in conjunctival and orbital tumor patients from rare tumor types. In this study, we determined the expression levels of PDGF-α expression in 20 patients with eyelid, conjunctival and orbital tumors by RT-PCR. The data were analyzed with ΔΔCt method. PDGF-α mRNA expression level in the tumor tissue were 2.93-fold higher than in the control tissue. A significant difference in PDGF-α expression was detected between groups (p= 0.01). The result of this study demonstrated that increased PDGF-α expressions might be associated with eyelid, conjunctival and orbital tumor metastasis and tumor-related angiogenesis. We think that further understanding of the PDGF-α mechanism might be a promising strategy to prevent metastasis formation and tumor growth

Keywords: Eye, Tumor, PDGF-α, Expression, RT-PCR

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Age-Related Apoptotic Evaluation of the Effect of *Ginkgo biloba* Extract on Bone Tissue

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Abstract

Ginkgo biloba extract is used to treat Alzheimer, vascular dementia and age-related mental memory impairment. It specifically affects the formation of osteoprogenitor cells in bone marrow, increases osteoblast function and inhibits osteoclasts by triggering osteoblast differentiation and mineralization. Our aim is to compare effect of GbE on bone texture and epiphyseal cartilage between young/old groups in terms of apoptosis and osteoclast levels. In the study, 40 male Wistar albino rats were divided into 4 groups. Group1:30 days young control (saline,2months,-2doses), Group2:30 days young GbE (100mg/kg/day,2months,2doses), Group3:24 month old control (saline,2months 2doses), Group4:24 month old GbE (100mg/kg/day,2months,2doses). Hematoxylin-eosin and immunohistochemical staining with caspase-3, caspase-9 antibodies was performed in decalcified femoral sections. In hematoxylin-eosin staining, in old control group the number of osteoclasts was significantly higher than the young control group. The number of osteoclasts in old GbE group decreased significantly compared to old control and that in the young GbE group it was similar to the young control group. In immunohistochemistry findings, caspase-3 and caspase-9 reactions were observed in femur epiphysis and in endosteum layer of diaphysis area of old control group, while younger control group showed weak expression. In old GbE group, caspase-3 and caspase-9 involvement were observed weak to moderate, while in young GbE group were found weak in the same areas of bone tissue. It was concluded that, GbE reduced the number of osteoclasts in old bone tissue and at the same time decreased bone destruction by reducing apoptosis especially in endosteal layer of osteoblasts in diaphysis region.

Keywords: Bone, caspase-3, caspase-9, *Gingko biloba*, osteoblast, osteoclast

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Synthesis of Magnetic Alginate/Rice Husk Composite Beads and Removal of Cationic Dye from Wastewater

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Abstract

Due to the most of dyes are toxic, biologically non-degradable and even carcinogenic, they cause various environmental and health problems. Several processes to remove dyes such as physical, chemical and biological from wastewater have been tested. The aim of this study is to prepare and characterize magnetic alginate/rice husk composite beads and use them as adsorbent for removal of cationic dye, methylene blue (MB). Characterization of beads performed by using Fourier Transform Infrared (FTIR), Scanning Electron Microscopy (SEM) and Thermogravimetric Analysis (TGA). The ability of magnetic alginate/rice husk composite beads as an adsorbent for the removal MB from an aqueous solution has been investigated. The various operating parameters such as pH, contact time, temperature and initial dye concentration optimized. It was determined while pH was no significant effect on dye removal efficiency of beads, Temperature and ionic strength caused a decrease on removal efficiency.

Keywords: Alginate, rice husk, methylene blue, dye removal

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Investigation of determined water sources in Zonguldak province for *Cryptosporidium* spp.

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Abstract

Cryptosporidiosis is a very important zoonotic disease which caused by Cryptosporidium spp. Cryptosporidium species is known as a major cause of diarrhoea and gastroenteritis in humans and animals. Cryptosporidium oocysts spread to animals through contaminated feed and water with the faeces. Infective Cryptosporidium oocysts are thick-walled so highly resistant to chlorine and UV disinfection. In this study, water samples were taken from 15 different wells in Zonguldak province of Turkey. These samples were investigated for Cryptosporidium spp. Water samples were analyzed for Cryptosporidium oocysts and their antigens respectively, by using the modified Ziehl-Neelsen method and the CryptoQuick kit. According to the results, no antigens were detected in studies performed with the CryptoQuick kit. However, Cryptosporidium oocysts were detected by modified Ziehl-Neelsen method in water samples taken from Gülüç, Aktaş-3 and Kozlu regions of Zonguldak. Ziehl-Neelsen method is preferred for more accurate results in routine-scanning. Gülüç is an open well which its water used by the inhabitants of the region. In this case, it can be dangerous in terms of human health and also cause water-borne outbreaks. Therefore, the screening of water resources in rural areas is very important for the detection of zoonotic diseases such as cryptosporidiosis.

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Tumor preferential activity of *p-tert*-butylcalix[4]arene on human osteosarcoma saos-2 cells

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Abstract

The search for new potent anticancer drugs that can only target cancer cells, rather than affecting normal tissues is very much commendable. Supramolecular Calixarene (p-tert-butylcalix[4]arene) is a highly promising candidate in this regard and could be modified to enhance preferential cytotoxicity for targeted therapy. Calixarenes 5,11,17,23-Tetra-tert-butyl-25,27-bis (2 or 3 or 4-aminomethyl-pyridineamido)-26,28-dihydroxycalix[4]arene functionalized with a pyridinium group on different positions were synthesized (AMP on 2, 3 and 4 position) by appropriate procedures. The structure of the synthesized compounds was characterized by 1H-NMR and FT-IR. As cancer and healthy in-vitro models, Saos-2 is a human osteosarcoma cell line and L929 healthy mouse fibroblast cells (1x105) were cultured with 25-250 µM of 2/3/4-AMPs. The control group was treated with DMSO at the concentration of 0.1% in every assay After 24 h incubation, cell growth/proliferation analysis were done by XTT assay. The results of XTT assay were used to determine percentage cell death with respect to control (untreated cells) as a function of absorbance of dissolved formazan produced from conversion of XTT dye by the action of mitochondrial dehydrogenase enzyme. Our research directs that calixarene shows effective preferential cytotoxicity at a concentration range of 25 to 250 µM with enhanced preferential cytotoxicity shown by the modification of pyridinium group at the position 3 against Saos-2 human osteosarcoma cancer cells. The results reported in this study demonstrated that tumor-preferential in-vitro cytotoxicity of p-tert-butylcalix[4]arene against Saos-2 over L-929 cells present a promising approach for efficient and safe cancer therapy

Keywords: Calixarene, Anticancer, Saos-2, Tumor Preferential

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Investigation of the effect of *Thymbra spicata* extracts on L929 fibroblast cells

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Abstract

Wound, physical or chemical damage caused by the skin surface can be described as tearing or disintegration of the skin surface. Since ancient times, extracts of various plant species have been used for wound burn treatment. When looking at the content of these plants, it appears that the compounds they contain used for scientific purposes. Wound healing is a biological process involving many cell types, various cytokines, growth factors, and interactions between them. Wound healing process consists of hemostasis, inflammation, proliferation, and reorganization of the tissues. Each phase of the wound healing process occurs when specific cell types are displaced to affect other cells. In this study, Thymbra spicata, a species belonging to Lamiaceae family, was used. The pure water extract of Thymbra spicata was applied onto L929 fibroblast cells. Hematoxylin eosin staining was done for examination of cell morphology. The WST-1 test was used to determine the cytotoxicity of the extracts. Double staining method was used to show apoptosis - necrosis and the cell proliferation was determined using xCELLIGENCE - Real Time Cell Analysis System depending on the concentration of apoptosis and necrosis determined by WST-1. Finally, the genotoxic effect of the plant extract was investigated using the micronucleus test. As a result, the extract obtained from Thymbra spicata caused neither cell toxicity (85±3.5% cell viability) nor genotoxicity ($p>0.05$) on L929 fibroblast cells with a negligible very low apoptotic-necrotic effect.

Keywords: *Thymbra spicata,* cytotoxicity, genotoxicity, apoptosis, necrosis, in vitro

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Chromosomes of hybrid (O. × *haradjanii*) and its parents (O. *laevigatum* and *O. syriacum* subsp. *bevanii)* of the genus *Origanum* L. (Lamiaceae)

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Abstrct

Origanum L. comprises 22 species (25 taxa) and eleven hybrids in Turkey and 22 of which are endemic. The species are mainly concentrated in the Mediterranean area of Turkey. Root-tip meristems were provided from seed by germinating them on wet filter paper in Petri dishes at room temperature. Firstly root tips pretreated for 16 h in α-monobromonaphthalene at 4°C, fixed in 3:1 absolute alcohol/glacial acetic acid, then the root tips were hydrolyzed with 1 N HCl for 12 min at room temperature and stained with 2% aceto-orcein for 3 h at room temperature. Stained root tips were squashed in a drop of 45% acetic acid and permanent slides were made by mounting in Depex. The chromosomes were counted by Software Image Analyses (Bs200ProP) loaded on a personal computer. According to the karyological results, *Origanum* × *haradjanii* (*Origanum laevigatum* × *Origanum syriacum* subsp. *bevanii)* have a similar somatic chromosome number, which is n=15 for the haplotype. Chromosome analyses support that O. × *haradjanii* is a natural hybrid that is generated from crossed homoploidy of *O. laevigatum* and *O. syriacum*, which means that the hybrid taxon is generated by homoploid hybridization (all taxa have 2n = 30 chromosomes).

Keywords: Chromosome, *Origanum* × *haradjanii,* Turkey

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Immobilization of globulin on calixarene based Cu-affinity nanofiber

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Abstract

A new calixarene nanofiber was synthesized for the improving of a new immobilized metal affinity material. Firstly, the calixarene was synthesized then, chelated with Cu on nanofiber surfaces to produce an immobilized metal affinity nanofiber (IMAN) adsorbent for Globulin immobilization. The amount of Cu (II) ions were loaded to surfaces of the calixarene based nanofiber. The binding amount of the copper was determined as approximately 1.5 ppm by using ICP. Immobilization of globulin on nanofiber at 7,6 of pH was analyzed by using fluorescence spectroscopy. The binding amount of globulin was found to be 0,068 µg to 2.25 cm-2 of the Nanofiber/Cu at pH 7.4. The characterization of the prepared surfaces was performed by FT-IR, TEM and SEM.

Keywords: Nanofiber, immobilization, IMAC, globulin

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Green synthesis of silver nanoparticles (AgNPs) by using leaf extract of *Origanum bilgeri* and effect of pH changes on the synthesis

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Abstract

Origanum bilgeri P. H.Davis is one of the endemic plants originated from Turkey (Davis et al., 1988). In this study, silver nanoparticles were green synthesised by using extract of endemic *O. bilgeri* leafs for the first time. Effect of different pH values on the synthesis was observed with number of distribution measurements by Dynamic Light Scattering (DLS) method. Nanoparticle synthesis was achived by using aqueus leaf extract of *O. bilgeri* (T.D. 4343) at room temperature. 5 ml extract was mixtured with 95 ml $AgNO_3$ (1 mM) for nanoparticle synthesis at three different pH values (5.37, 6.77, 8.65) and it was followed by centrifugation at 4°C (9000 rpm/20 min), washing two times to remove any unbound residues by distilled water and storage at 4°C. The obtained AgNPs were taken into a 96 well uv microplate and absorbances of reaction mixtures were measured in the 200–800 nm wavelength range by using a spectrophotometer. Also, polydispersity and size distribution measurements of AgNPs were carried out through sonication of diluted reaction mixtures. Three replicates were done for this measurement. According to obtained data from spectrophotometric measurement at the end of 2 hours of the synthesis, maximum absorbances were found at 400 nm, at 430 nm, at 410 nm for pH 5.37, pH 6.77, pH 8.65 values, respectively. As a result of DLS analysis, the number of distrubition was found as almost at the same level for the reaction mixtures of pH 6.77 and pH 8.65, while the number of distrubition is the highest one in the reaction mixture at pH 5.37.

Keywords: *O. bilgeri*, Green synthesis, Silver nanoparticle

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Fingerprint analysis and simultaneous determination of phenolic compounds in extracts of *Salvia rosifolia* by LC-MS/MS

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Abstract

The genus *Salvia* L. (sage) consists of about 900 plant species and represents one of the most important and the largest genera of the Lamiaceae family. The name of *Salvia* comes from the Latin words salvare, salveo, salvus or salvere meaning healing, non-harmful and safe and refers to the numerous medicinal applications of *Salvia* plants. Salvia species are known for their several therapeutic properties in folk medicine to treat tuberculosis, bronchitis, pyretic, rheumatoid arthritis, colds, wounds and skin infections, headache, cerebral ischemia and memory disorders, as well as hepatitis. Terpenoids (di- and triterpenoids), phenolic acid derivatives and flavonoids are the predominant secondary metabolite constituents of *Salvia* species. *Salvia* species mainly contain two major types of biologically active compounds: lipid-soluble abietane-type diterpenoid tanshinones and carnosic acid and water-soluble phenolic acids and flavonoids. Phenolic acids which are widely distributed in plant species are responsible for their various therapeutic effects. Petroleum ether, chloroform and ethanol extracts of *S. rosifolia* collected in 2015 were prepared. In addition, ethanol extracts of various parts of *S. rosifolia* collected in 2015, 2016 and 2017 were prepared. Content analyzes of 19 phenolics of these prepared extracts were determined by LC-MS / MS. Ethanol extracts were found to be richer than petroleum ether and chloroform extracts in terms of phenolic content. Ethanol extracts have been found to be richer in terms of apigenin, kosmosiin, rosmarinic acid, and 6,7-dehydrorhenone.

Keywords: *Salvia rosifolia,* LC-MS/MS, Phenolic Compounds

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Histological evaluation of osteogenesis in mesenchymal stem cells on fibrin glue and fibronectin coated Ceraform

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Abstract

Fibrin sealants have been used for cell delivery for growth factors in order to increase bone growth and vascularization. A growing number of studies have been performed about osteogenic potential of adipose tissue derived mesenchymal stem cells (ADSC) in combination with several growth factors which are increasing the bone formation. Ceraform®, is a synthetic calcium phosphate ceramic, used as a bone substitute. In this study the behaviour of ADSC osteogenically induced on Ceraform with different tissue adhesives namely fibrin glue (FG) and fibronectin (FN) were investigated. The cells were cultivated for 28-day period by osteogenic induction medium. Days 1, 7, 14, 21 and 28 were selected as specific intervals for incubations. Samples were stained with Hematoxylin & Eosin and Alizarin red to observe osteogenesis (calcification of matrix) and examined under the light microscope. According to the results, on day 7, there were undifferentiated cells but on day 14, osteoblasts were differentiated and morphologically changed on especially FG coated Ceraform group. At the same time, inorganic matrix was increased and this was supported by the increased alizarin red stainings. On FN coated groups, the osteogenic differentiation of cells was not apparent as FG coated groups. Consequently, FG coating of Ceraform combined with adipose-tissue derived mesencyhmal stem cells would be an alternative approach on bone regeneration applications in bone injury.

Keywords: Mesenchymal stem cell, ceraform, fibrin glue, fibronectin, osteoinduction, histology

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Improvement of catalytic activity of lipase in the presence of lower rim substituted calix[4]arene

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Abstract

In biotechnology, lipases are the class of enzymes most widely used in the kinetic resolution of racemic compounds and organic synthesis. In particular, lipase from Candida rugosa has important industrial uses. It is well known that Candida rugosa is used in a wide variety of esterification reactions and hydrolysis. The activity of Candida rugosa lipase (CRL) is high and it also has broad specificity in reaction medium, as compared to free lipase, which has low activity, and is usually unstable in organic medium or in harsh conditions such as high temperature or excessive pH. The stability, catalytic activity, and reusability of immobilized lipase are improved in continuous operations by the immobilization of CRL on various supports, providing the separation of products. Investigations of the immobilization of CRL on different carriers have been reported by a series of recent studies, and carriers have included chitosan, amberlite, cyclodextrin, and calixarene. The calix[4]arene platform in supramolecular chemistry shows interesting organizational properties for the construction of ligating sites to recognize different species. The increasing interest in these compounds is due to the simple large-scale synthesis of calixarenes, and the various methods by which they can be selectively functionalized either at the upper rim or the lower rim. In this study, we synthesized lower rim substituted calix[4]arene amide derivative and their use as additives in the sol–gel encapsulation process. The influence of these materials on the enantioselective hydrolysis of racemic Naproxen methyl ester has also been evaluated.

Keywords: Calix[4]arene , Candida rugosa lipase, Sol–gel encapsulation, Naproxen methyl ester

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Investigation of biofilm formation in Escherichia coli porin proteins

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Abstract

In this study, it was researched whether OmpA, OmpC, OmpF, OmpG, OmpT, LamB and PhoE porin proteins of Escherichia coli W3110 has a role in the formation of biofilm in the presence of different metals. In the study, ompA, ompC, ompF, ompG, ompT, lamB and phoE mutant strains of E. coli W3110 were used. Minimal inhibition concentration (MIC) values of these strains were determined by serial microdilution method in the presence of CuSO4, NiSO4 and ZnSO4 metals in Luria-Bertani (LB) Brot media. Biofilm formation in LB broth at half the concentration included metal was investigated. Confirmation of genes which plays a role in biofilm formation was determined by completion tests.No biofilm formation was observed in E. coli W3110 strain in the presence or absence of metal. However, ompA, ompC and lamB mutant strains were found to produce biofilm in both metal-free media and in media containing Cu + 2 and Ni + 2, but not biofilm in the presence of Zn + 2 metal. ompA, ompC and lamB genes, which plays a role in biofilm formation has been confirmed by complementation tests.

Keywords: *Escherichia coli,* biofilm, porin protein, metals

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Evaluation of juglone effects on metastasis by cell migration assay

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Abstract

Pancreatic cancer (PC), a highly aggressive and malignant cancer characterized by high metastasis and angiogenesis, is one of the deadliest cancers worldwide. Incidence and mortality of PC is increasing every year and estimated death is third leading in the cancer-related disease in US for 2018. The lack of early specific clinical signs and symptoms of PC cause late diagnosis at stages in which metastase have already occurred. Late diagnosis, high metastatic potential and the chemoresistance to drugs which are used to treatment have led to searching for different treatment strategies in PC. Combinations of natural components with low toxicity with standard chemotherapeutic agents can provide additional or synergistic effects, alleviate side effects, increase uptake of conventional drugs, and support the immune system to fight cancer. Juglone is a secondary metabolite that can be isolated from the leaves, roots, shells and fruit of Juglandaceae walnut trees. On the otherhand, knowledge about juglone's cytotoxicity, and effects on angiogenesisand metastasis. is insufficient. In our early study, effect of juglone on metastasis and angiogenesis in BxPC-3 and PANC-1 human pancreatic cancer cell lines was determined changing of target genes expressions which are related about angiogenesis, metastasis. Cell migration (wound healing) assay is a technique which is used to analyze metastatic behavior. The aim of this study is to analyze the migration of normal cells and cell proliferation-suppressed cells in juglone treated BxPC-3 and PANC-1 cell lines with low serum concentration in cell medium (serum starvation) and normal serum concentration in cell medium (nonstarvation).

Keywords: Pancreatic Cancer, Juglone, Cell Migration Assay

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Effects of acrylamide on oxidative stress modulators in HEK293 cell line

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Abstract

Acrylamide is a cytotoxic, genotoxic and neurotoxic chemical for the human.During the cooking process at high temperatures, the lower amount of acrylamide is formed and taken into the human body. High level of acrylamide uptake causes genotoxic and neurotoxic effects, however the cellular damage mechanisms of long-term low-dose acrylamide uptake are not fully known yet.The present study was carried out to investigate the effects of different doses of acrylamide on oxidative stress modulators such as glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT) in HEK293 cell line. Effects of acrylamide on the viability of HEK293 cells were evaluated using MTT method. To measure GSH, SOD and CAT, we used an EnzyChrom GSH, SOD and CAT Assay Kit. As a result, radical oxygen species formed by the metabolism of acrylamide have increased oxidative stress in cells and the amount of SOD significantly decreased. The amount of GSH decreased in proportion to the increase in the amount of hydrogen peroxide and the level of oxidized GSH (GSSG) has declined. Moreover, CAT which has the same function as GSH is also increased up to IC50 dose level then the amount decreased. It was determined that the hydrogen peroxide formed is first neutralized by glutathione however if the capacity of glutathione is insufficient catalase inactivated the hydrogen peroxide. Increased oxidative stress in cells leads to oxidation of DNA, proteins and lipids. This causes the decrease in cell viability, increase in cell death and tumorigenesis. Our work has supported that the induction of oxidative stress causes carcinogenesis.

Keywords: Acrylamide, Oxidative stress, HEK293

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Quantitative evalutaion of biocompatibility ın the terms of cytotoxicity of four different adesive bonding agents before polymerization

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Abstract

G-Premio BOND (GPB), 3M espe single bond universal (ESBU) and dentsply sirona-prime bond universal (DSBU) are universal, single component, light-cured dental bonding agents. They are compatible with total-etch, self-etch and selective-etch techniques and indicated for use in all classes of direct restorations. Tokuyama Universal Bond (TUB) is a two component self-cured dental adhesive system. The aim of this study was to make a quantitative comparison of the cytotoxic potentials of these adhesive bonding agent. To evaluated cytotoxic potentials of the test materials on L929 rat fibroblast cells were used SRB (Sulforhodamine B) test. Four different dilutions (0.1%, 0.01%, 0.001%, 0.0001%) of the unpolymerized form of materials was quantitatively incubated in three different time periods (24h, 48h, 72h). In the statistical analysis of the data obtained as a result of the SRB test; TUB was determined as the most cytotoxic after the 24-hour period, DSBU after the 48-hour period and the 72-hour period. GPB was showed at least cytotoxic potential all of the incubation time (20-60% cell viability at 0.1% dilutions), while other tested adhesive have similar effect (10-20% cell viability at 0.1% dilutions). This effect was observed to significantly increase related to dose and changes were seen related to time. Although most of the dental adhesive systems are used after their polymerization, also are treated unpolymerized components during application, or after application. So, the toxic effect of monomeric forms of them must be assessed. According to our results GPB was found more safety dental adhesive. However, they could be tested also after polymerization.

Keywords: Biocompatibility, Cytotoxicity, bonding agent, polimerization, quantitative comparison

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Development of biodiesel production methods from cotton oil

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Abstract

Biodiesel; chemical methods from vegetable or animal oils are an environmentally friendly fuel that is the final methyl ester form. Chemically, long chain fatty acids can be defined as mono alkyl esters. Biodiesel is produced by reacting vegetable or animal oils with an alcohol and a catalyst. Biomass fuel is renewable, while diesel fuel can be used as diesel fuel. In recent years, renewable energy plants in the world have concentrated on agriculture (biodiesel, bioethanol, biogas and biomass), and many countries are on the fast track. A.B: Approved by the European Parliament (EP) and the Council of Europe (EC) with "Directive 2003 / Support for biofuels 30 / CE". With this directive, for the first time, all Member States are obliged to use renewable fuels. The cotton oil methyl ester used in this study was obtained; transesterification method was used. During this process, changing temperature, time and catalyst ratio were determined and optimum values of cotton oil in biodiesel production were determined and usage properties for biodiesel improved.

Keywords: Biodiesel, cotton oil, extraction, energy

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Antioxidant properties of *Onobrychis argyrea* subsp. *isaurica*

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Abstract

The aim of this study was to determine the antioxidant activity of *Onobrychis argyrea* subsp. *isaurica*. Antioxidant activity were investigated by different assays, including total antioxidant capacity (phosphomolybdenum and metal chelating assays), free radical Scavenging assays (DPPH, ABTS), iron and copper reduction potency (FRAP and CUPRAC). In addition to these methods, the total phenolic and flavonoid contents of the extracts were also studied. Methanol, ethyl acetate and water extracts of Onobrychis argyrea subsp. isaurica were used in all of the methods applied. Total phenolic and flavonoid content and total antioxidant capacity of *Onobrychis argyrea* subsp. *isaurica* were generally higher in methanol extract than in ethyl acetate and water extracts. In DPPH, FRAP and CUPRAC methods, the highest results were obtained in methanol extracts. The highest activities of ABTS radical scavenging and metal chelating capacities were also detected in water extracts. According to the study results, Onobrychis argyrea subsp. isaurica may be used as a source of natural antioxidants.

Keywords: Antioxidant, *Onobrychis argyrea*, total phenolic, total flavonoid

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Determination of ozone gas effect on zeta potential and ph values of fresh pomegranate water

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Abstract

Pomegranate (*Punica granatum*), which is highly rich in bioactive compounds, has increased its use as a medical food because of its positive effects on health, and pomegranate juice has become popular due to these important biological effects. Ozone is used as a disinfectant in the food industry because it does not harm the environment and does not leave toxic residues. Ozone is a powerful oxidant that can lead to physiological, chemical and microbial changes in fresh products. In this study, ozone gas (3.5 g / h) were treated to freshly squeezed pomegranate juices in 25 ml volumes for 5, 15, and 30 minutes and left at +4oC for 24 hours. The zeta-potential and pH values of the pomegranate juices were measured immediately and 24 hours later. pH values of pomegranate juice samples decreased from 3.26 to 3.01 with the increase of ozone application period. It has been observed that cold standing does not change pH values. The pomegranate juices treated with ozone for up to 15 minutes have statistically ($p < 0.05$) reduced zeta-potential values after the application but the reduction is not significant after 24 hours. The ozone treatment of 30 minute increased the zeta potential.

Keywords: Pomegranate juice, *Punica granatum*, ozone gas, zeta-potential

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An investigation the effect of $NiFe_2O_4$/CNT catalyst toward photocatalytic hydrogen evolution

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Abstract

Photocatalytic hydrogen production, which is known artificial photosynthesis, from water have great attention due to providing high energy yield without pollutants by products. The purpose of this work is to supply alternative hydrogen evolution reaction (HER) catalysts materials to platinum. In dye-sensitized system, NiFe2O4 and NiFe2O4/CNT structures have systematically investigated the enhancement of HER activity. NiFe2O4 and NiFe2O4/CNT structures have been prepared by hot injection method and characterized by X-ray powder diffraction (XRD) and scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy. These structures have been reported to be active catalysts for the photocatalytic hydrogen evolution from water under the visible light irradiation by using Eosin-y dye as a photosensitizer and triethanolamine as the sacrificial electron donor. A comparative study demonstrated that NiFe2O4/CNT catalysts have been improved HER performance than NiFe2O4. This is thought to be due to the inhibition of recombination of electron−hole pairs and electron transport efficiency of CNT.

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Keywords: Carbon nanotubes, hydrogen evolution, metal oxides

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Comparative study of nanofiber structures for hydrogen production at liquid-liquid interfaces

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Abstract

Natural photosynthesis occurs in biological membranes that can be viewed at thin organic liquid membranes separating two Aqueous solutions. Inspired by biological photosynthesis, hydrogen production from water may be an approach to solve the global energy crisis. Liquid/liquid (L/L) interfaces has been proposed as a model system to explore the activity of hydrogen evolution reaction (HER). In this work, transition-metal oxides nanofibers have been investigated for the HER. Transition metal oxides are promising due to their low cost and earth-abundant to replace by using the platinum-group metals. Nanofiber structures have been synthesized by electrospinning technique. Our approach herein is the use of metal oxide nanofiber structures in HER at polarized liquid/liquid interfaces between an acidic solution and an organic solution which contain decamethylferrocene (DMFc) acting as an electron donor. These catalytic activities have been investigated by two-phase reactions and cyclic voltammetry methods at water/1,2 dichloroethane interface.

This study has been supported by UNESCO-Loreal for Woman in Science programme, TUBITAK (The Scientific and Technological Research Council of Turkey) (215M309), Selcuk University Scientific Research Projects (17201067) and Turkish Academy of Sciences via a TUBA-GEBIP fellowship. This paper is the part of MSc thesis prepared by Gizem Yanalak

Keywords: Metal oxide, hydrogen evolution, liquid-liquid interfaces, co-catalyst free

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Polyphenol oxidase enzyme activity in gemlik olives during the different developmental periods

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Abstract

The olive is a popular fruit in the Mediterranean countries, and commonly used as table olives and olive oil. Polyphenol oxidase (PPO) is responsible for the progressive browning of the fruit during the maturation process on the tree, or during the postharvest technological treatments. PPOs are a group of Cu-containing enzymes that catalyze the oxidation of colorless phenols to colored quinones. In this study, the PPO activity in the fruits of Olea europaea L. cultivar Gemlik was studied during four developmental stages. Utilizing the equations of the Linewear-Burk graphs, the KM and Vmax values of cultivar Gemlik PPO enzyme at different maturity periods (August, September, October, November) were determined. The KM and Vmax values of olive PPO enzyme were determined using catechol as substrate. It has been observed that the Vmax values gradually increased depending on the maturity periods.

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Bacterial and parasitic zoonoses in fish and fish products

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Abstrac

Food-borne infections such as zoonotic disease are gaining importance due to increasing in the number of outbreaks in the recent years throughout the world. There has been increasing outbreak based on zoonotic diseases by the increase in consumption regional fish dishes such as sushi, sashimi, ceviche, carpaccio based on raw or minimally processed fish, by the growth in the international market in fish and fish products, and by the spectacular development of aquaculture. Zoonotic diseases are infections that can be naturally transmitted from animals to humans. Consumption of raw or under-cooked infected fish tissue and, ingestion of fish tissue contaminated with feces from infected fish result in food borne zoonotic disease. Overall 46.15 % of fishborne zoonoses are transmitted orally which are mostly helminthic diseases are caused by trematodes, cestodes and nematodes. These parasites have been known to cause some diseases like gastritis, ulcer, cancer or appendictis in human. As bacterial fish-borne zoonoses, only *Mycobacterium* spp., *Streptococcus iniae, Clostridium botulinum,* and *Vibrio vulnificus* have been reported. In this rewiew, we will focus on the most important and prevalent emerging and re-emerging fish-borne zoonoses in the world including the current situation, sources of human infection and control regimes.

Keywords: Bacteria, Parasite, Zoonoses, fish-borne, foodborne

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Vaccine therapy for cancer

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Abstract

Despite various strategies to treat cancer, it is still one of the most deadly diseases worldwide. Although there is a critical need to develop cancer vaccines, vaccines are not available for many cancer. There are 2 types of cancer vaccines: Prophylactic and Therapeutic. Subunit vaccines Gardasil and Cervarix against Human Papillomavirus 16 and 18 approved by FDA are used to prevent cancer causing infections, while an FDA approved dendridic cell (DC) based vaccine Spileucel-T is used for treatment of metastatic prostate cancer. The down side of DC based vaccines is they are expensive, need to be patient specific, and their production is challenging. On the other hand, subunit vaccines consisting tumor associated antigens and adjuvants are more economically feasible with their ease of production and marketing. The problem of subunit vaccines is that the immunogenicity of most antigens is low and most of them being self antigens. Prophylactic vaccines are given to healthy individuals to prevent virally induced tumors and generation of long term humoral immune response is the main goal. Otherwise, induction of an acute effector response may induce undesired side effects, such as inflammation. On the other hand, therapeutic vaccines are given to people with established tumors and compromised immune system and primarily rely on CD8+ T cell responses for the elimination of cancer. Furthermore, generation of a long term memory is also critical for therapeutic tumor vaccines to control recurrences. Therefore, vaccine formulations should be chosen based on type of treatment.

Keywords: Vaccine, Cancer, Tumor, Prophylactic, Therapeutic

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Highly enantioselective direct aldol reaction catalyzed by tetraoxocalix[2]arene[2]triazine (R)-phenylethylamine derivative

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Abstract

The aldol reaction is recognized as one of the most powerful carbon–carbon bond-forming reactions in modern organic synthesis. It provides an atom-economic approach to β-hydroxyl carbonyls, which make up a large family of chiral intermediates for the synthesis of biologically active substances and natural products. Since the early reports in the 1970s that the L-proline catalysed intramolecular aldol reactions that L-proline can mimic type I aldolase to enantioselectively catalyse intermolecular aldol reactions, interest in organocatalysis has increased spectacularly in the past few years as a result of both the novelty of the concept and unique activation modes, because of the fact that the operational simplicity, ready availability of catalysts, less toxicity, efficiency, and selectivity make many organocatalytic reactions attractive method to synthesize complex structures superior to those carried out using more conventional methods. Novel bifunctional chiral R-Phenylethylamine bearing a Tetraoxocalix[2]arene[2]triazine scaffold was synthesized and applied in catalytic asymmetric Aldol reaction of acetone with benzaldehyde derivatives in different solvents. The corresponding adducts were obtained in excellent yields (up to 92%) and with high enantioselectivities (up to 99% ee).

Keywords: *Asymmetric aldol reactions, Enantiomeric excess, NMR, Tetraoxocalix[2]arene[2]triazine*

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Anti-inflammatory effects of resveratrol in diabetic kidney tissues

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Abstract

Diabetes is a common disease among the people and negatively affects the quality of life. It causes special complications with hyperglycaemia due to the absence, inadequacy or ineffectiveness of insulin hormones, and affects many organs in the body if not treated. In this study, we aimed to elucidate the oxidative stress and inflammation status of kidney tissues in diabetes and investigated the effects of resveratrol, which is a strong antioxidant and anti-inflammatory agent, on these parameters. Equal age male Wistar rats were divided into four groups two of which diabetes was induced with streptozotocin (55 mg / kg). To the one control and one diabetic group, resveratrol (20 mg / kg) was injected to the animals intraperitoneally for 3 weeks as a single daily dose. The oxidative stress and inflammation states in kidney tissues were evaluated. Accordingly, lipid peroxidation (MDA) has been shown to increase significantly ($p < 0.05$) in diabetic groups together with proinflammatory cytokines such as IL-6, IL-8, TNF-α. Anti-inflamatory effects of resveratrol administration on inflammatory markers in kidney tissues have been demonstrated. The results of this study include explanatory data in diabetic kidney tissues regarding the diabetes research, such as new drug production.

Keywords: Resveratrol, Diabetes, Kidney, Anti-inflammatory effect

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The effects of monoethyl hexyl phthalate (MEHP) and monobutyl phthalate (MBP) at INS-1 pancreatic beta cells

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Abstract

Phthalate plasticizers used in a wide range of common plastic products are released into the environment and may pose a risk of increased incidence of diabetes mellitus. In this work, we studied the effects of monoethyl hexyl phthalate (MEHP), the metabolite of diethylhexyl phthalate and monobutyl phthalate (MBP), the metabolite of dibutyl phthalate exposure on INS-1 rat pancreatic beta cells. 5 different doses (1ng/mL, 10-1 ng/mL., 10-2 ng/mL., 10-3 ng/mL. and 10-4 ng/mL) were used for both of phthalates and MTT analysis for cytotoxicity screening of INS-1 cells exposed to MBP and MEHP during 24, 48 and 72 h. Also, Total Oxidant Status (TOS) and Total Antioxidant Status (TAS) were analyzed. The mRNA expression levels of FOXO-1, PDX-1, SIRT-1, INS-1, INS-2, p53, BCL-2, BCL-XL were measured with real-time PCR. For MEHP, the cell viability was decreased with 1ng/mL, 10-1 ng/mL and 10-2 ng/mL dose groups compared to control group. For MBP, the highest decrease was observed at the end of 72 h treatment. TOS levels were increased and TAS levels were decreased for MEHP and MBP dose levels. PDX-1 is a transcription factor necessary for pancreatic development, including β-cell maturation and the expression levels of this were decreased at 1ng/ml of MEHP and MBP. Statistical analyses were performed by using a SPSS 20.0 program for Windows. All values were examined by two sample t test to detect differences among groups. P values less than 0.05 were considered statistically significant.

Keywords: Phthalate, Diabetes, plasticizer, MEHP, MBP.

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Chitosan: A promising antiviral against Betanodavirus

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Abstract

Viral encephalopathy and retinopathy (VER) also known as viral nervous necrosis (VNN), caused by betanodavirus, is one of the major devastating threats in sea bass Mediterranean aquaculture. To date, therapeutic procedures are not fully effective in the case of VNN. Therefore, to determine a sustainable strategy to protect sea bass species, a new approach to inhibit betanodavirus infection is recommended. Chitosan, a polymer extracted by alkali deacetylation of chitin from crustacean shell, has a broad spectrum of unique biological activities, including its ability to inhibit viral infections. However, the antiviral activity of chitosan against betanodavirus has never been studied. In this frame, we used chitosan extracted from *Parapenaeus longirostris* shrimp shell *waste to evaluate the antiviral potential on betanodavirus (RGNNV*). *SSN-1 cell infected by RGNNV was exposed to* different concentration of chitosan (0.1%, 0.5% and 2%) for seven days. Following inoculation period, cell culture suspensions were collected to assess viral gene expression. Results showed a good antiviral activity against betanodavirus where *cytopathic effect* was drastically reduced at 0.5% concentration of chitosan. Moreover, viral gene (RNA2) expression was down expressed during the seven days post inoculation. The chitosan showed high antiviral activity against betanodavirus which seemed to be dependent on its concentration.

Keywords: Antiviral activity, Betanodavirus, Chitosan, Gene expression

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Extracellular matrix and vascular anomalies in obesity and insulin resistance

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Abstract

The purpose of current study was to examine the relation of extracellular matrix (ECM) with vasculature in insulin resistant adipose tissue. RT-PCR was used for gene expression analyses of collagen, elastin and angiogenic factors, and immunohistochemistry (IHC) for additional abdominal sc adipose tissue analyses. Adipocyte-macrophage coculture experiments were measured in an angiogenesis assay. CD31 mRNA which is an endothelial marker showed no significant correlation with body mass index or insulin sensitivity. In a subgroup of 17 subjects consisting of nine obese and eight lean, CD31-positive capillary number in obese was decreased by 58%, While larger vessels were increased by 70%. When IHC is used, elastin had decreased and collagen V expression increased in obese subjects (compared with lean). Adipocytes cultured with M2 macrophages had reduced of elastin and increased collagen V expression.

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Fabrication of curcumin loaded chitosan and silver based spheres for biomedical applications

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Abstract

Curcumin as a yellow natural compound extracted from turmeric roots is an important candidate in the treatment of various diseases. However, the clinical applications of curcumin is greatly limited due to its poor solubility and low bioavailability. In order to overcome these limitations, curcumin was loaded into a particle-based delivery system using chitosan (CH). CH is a natural, low toxic, biodegradable and biocompatible polymer which is abundantly available in nature. CH interacts very easily with bacteriums and most of the proteins thereby enhancing the antimicrobial effect of silver particles. The present study involves the fabrication of curcumin loaded CH and CH-Ag particles by a simple one-step production. Curcumin loaded CH and CH-Ag composite materials were synthesized in concentrated NaOH solution at room temperature. Particles were successfully synthesized and characterized with the use of UV-Visible and Fourier Transform Infrared Spectroscopy. The surface morphology and diameter of the synthesized particles were determined by Optical Microscopy. Our study demonstrated that curcumin loaded CH and CH/Ag particles can be utilized as a potential material for use in biomedical approaches including delivery systems and tissue engineering applications to prevent microbial contamination and to inhibit the growth of microorganisms.

Keywords: Fabrication, Chitosan, Silver, Curcumin, Tissue engineering

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Preventive effects of Oleuropein on SiO2 nanoparticles induced oxidative stress on *D. melanogaster*

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Abstract

Nowadays, nanotechnology is one of the most active research areas with both steady-state chemical material and biological systems. In the past decades, especially nanomaterials have been widely used in the fields of biomedicine, pharmaceutical, and other industry. Among the produced nanomaterials, silicon dioxide (SiO_2) have the potential for widespread applications. SiO_2 nanoparticles are used in many areas such as chemical mechanical polishing and as additives to drugs, cosmetics, printer toners, varnishes, and food. Considering their wide range of applications, the potential adverse effect of SiO_2 nanoparticles is of great interest on human health and the environment. Oleuropein is a natural phenolic antioxidant, which is present in an elevated concentration in olives, olive oil, and olive tree leaves. It scavenges reactive oxygen and nitrogen species and recent studies have shown that oleuropein is an anti-tumor agent, which is completely non-toxic in several animal species. The aim of this study was to investigate the effects of SiO_2NP (20-55nm) application on oxidant-antioxidant systems on *Drosophila melanogaster,* and the protective role of Oleuropein (OLE) on these effects. For this purpose, the same old third instar larvae (72±4 h) of D. melanogaster were divided as follows: untreated control groups including distilled water, treated groups including SiO2 (0,1, 1 and 10mg/mL) and OLE (100µM), and another treated groups including SiO2+OLE. Later, the oxidant (for SiO2 application group) and antioxidant systems (for SiO2+OLE application groups) of the biochemical tests and measurements were made. Total antioxidant status (TAS) and total oxidant status (TOS) of adult individuals were measured using commercially available kits. Using tissue homogenates of *D. melanogaster*, oxidative stress index (OSI) was calculated with TAS and TOS measurements. It was determined that the TAS value was found higher, and TOS value was found lower in SiO2 application group than SiO_2+OLE application groups ($p<0.05$). In addition, it has been put forth that OLE preventive formation of free radicals and inhibit lipid peroxidation caused by SiO_2 and stimulate the detoxification enzymes

Keywords: *Drosophila melanogaster,* Nanoparticles, SiO_2, Oleuropein, Oxidative **stress**

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Evaluation of awareness on radiation sources and radiation protection among Turkish community

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Abstract

Radiation has negative biological effects on living organisms, which may vary depending on the dose and the duration of exposure. Humans use the ionising radiation properties of radionuclides for many different processes, including energy production, industry, diagnosis and treatment of medical problems. Among the artificial radiation, the largest pie slice is ionising radiation from medical applications and it represents the majority of radiation doses to which the general population is exposed. It is also exposed to radiation in daily life like natural background radiation including cosmic, terrestrial, internal and many consumer products that contain non-ionising radiation sources including mobile phone, microwave oven. In this study, it was aimed to assess the awareness on radiation and radiation protection among Turkish community. A cross sectional questionnaire applied 300 people between 5 and 15 November 2017. Statistical analysis was done by SPSS using the Chi-square and Kruskal Wallis test.

Keywords: Radiation, Radiation protection, questionnaire

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Selective recovery of levulinic acid and formic acid from mixed acid solutions by reactive extraction method

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Abstract

Nowadays, chemical industry is under an increased pressure to develop green and sustainable materials and methods. The endeavour is to develop more eco-friendly and cost-efficient production processes, technologies and chemical transformations of biorenewables. Levulinic acid (LA) is shown as one of the most important platform chemicals in this century since it can be used in the production of green fuels. It can be produced from lignocellulosic materials via chemical and biological means. There is a growing need for its selective recovery from multiple acid solutions containing by-products and unreacted substrates. Reactive extraction is one of the most appropriate methods for the purpose. The present study is on the selective extraction of levulinic acid (LA-0.25 M) and formic acid (FA-0.25 M) from their binary solutions. Trioctylamine (TOA) was used as the extractant and dissolved in organic solvents. Effects of several reactive extraction parameters were studied. Formic acid (pKa=3.75) was preferentially extracted from the binary solution, as expected due to its higher acidity. The highest separation factor was obtained at pH 1.92 which is the natural pH of the solution, as about 9.5 and 9.3 with the use of 0.3 M TOA in heptanol and octanol, respectively. The increase in TOA amount to 0.5 M decreased the separation factor to 7.4 and 8.9 for the two alcohols, respectively. The extraction efficiency of FA was more than 95% and purity was less than 60% in these conditions. The increase in pH increased the purity, however decreased the extraction efficiency of the acids.

Keywords: Levulinic acid, Formic acid, Selective extraction, Trioctylamine, Recovery

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Sequencing of the Amylopullulanase (apu) gene of *Thermoanaerobacter brockii brockii* and identification of conserved regions

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Abstract

Starch is mostly used raw material in industry and it has to be hydrolyzed before using. Starch hydrolysis is carried out by three main steps named as gelatinization, liquefaction and saccharification. Firstly, raw starch is exposed to high temperature to obtain it like gel form material. Then some endo-amylase enzymes such as α-amylase is required for enzymatic degradation in liquefaction step. In the saccharification step, exo-amylases such as glycol-amylase enzyme and de-branching enzymes are used to hydrolyze the starch. Since the starch molecule has also some branch points one in every 20-25 D-glucose units, de-branching enzymes are also required together with α-amylase enzyme to reduce starch molecule to oligomers. Amyllopululanase enzyme (EC 3.2.1.41) is one of the de-branching enzymes with an extra α-amylase activity. So it would be possible to decrease of by product formation and process time and also with increase of yield in starch hydrolysis process. Amylopullulanase enzyme from thermophilic *Thermoanaerobacter brockii brockii* has a high potential in starch industry. Sequencing of amylopullulanase enzyme from *Thermoanaerobacter brockii brockii* is unknown yet. Here we aimed to define the DNA sequence of the amylopullulanase from *Thermoanaerobacter brockii brockii* by using primer-walking method.

Keywords: *T. brockii brockii ,* de-branching, Amylopullulanase, Primer-walking

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Use of anion exchange resins for the recovery of succinic acid from aqueous solutions

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Abstract

Succinic acid (SA) is a dicarboxylic acid that has a wide use in various industries. It is known as one of the most important platform chemicals in industry. Besides its chemical synthesis, it can be produced by fermentation technique and today a significant portion of the industrial SA is provided by this method. Following to that, its selective and efficienct recovery is required. Several techniques have been evaluated for the process. Ion exchange and adsorption are shown to be appropriate ones for the aim. In this work, SA was separated from aqueous solutions using several types of anion exchange resins. Aqueous solutions of SA with pre-determined initial concentrations (0.1-0.5 M) were used and different initial resin doses (0.5-1.5 g) were chosen in the experiments. Effects of several process parameters, e.g., initial acid concentration, resin amount, temperature and contact time were investigated. The data presented that contact time had a positive effect till reaching the equilibrium. Among kinetic models studied, the pseudo-second order was the most appropriate one. Equilibrium data showed that the recovery efficiency decreased with the increase in initial SA concentration and the decrease in resin dosage. Highest efficiency was obtained as 97.5% at 298 K with 0.1 M SA and 1.5 g resin using Lewatit MP-62. Several adsorption isotherms (Langmuir, Freundlich etc.) were applied to equilibrium data to understand the recovery mechanism. The data was observed to follow the former one. Temperature had a negative effect on the process and it was exothermic according to thermodynamic data.

Keywords: Ion exchange, Adsorption, Succinic acid, Recovery, Anion exchanger

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Morphological alterations in the brain of rats exposed to sinusoidal low frequency electromagnetic field from neonatal to adult: an ultrastructurally examination

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Abstract

Magnetic fields of devices that used for everyday, which is more than magnetic field of human body and natural environment, can impair the harmony. Our aim in this study was investigated that if exposure to magnetic fields in everyday life level was affected brain in rats or not ultrastructurally. Fourteen Wistar albino male weaned rat pups were divided as magnetic field (MF) and control group. The rats in the MF group were exposed to magnetic field with 50 Hz frequency and 1.5 mT intensity 5 days in each week during the 7 months. Rats in the control group that also underwent the same period and conditions but no received magnetic field in Helmholtz coils. At the end of 7 months, brains were removed and examined ultrastructurally. In the frontal and temporal cortex sections of the control group neurons, glial cells and nerve fibers were observed to have normal structure. In the sections of MF group, many neurons had nuclear vacuoles in the temporal cortex but in the frontal cortex, this number was lesser. Glial cells were observed as normally in the frontal cortex. On the other hand glial cells of the temporal cortex had intracytoplasmic vacuoles and granular endoplasmic reticulum cisterns were swelled. Perivascular edema was remarkable. Increased axonal densities, axonal withdrawal and separation into myelin sheaths were observed in the cortexes. Plus, mitochondrial destruction was rarely observed in the frontal cortex. The findings of this study show that sinusoidal low frequency magnetic field causes structural changes in brain.

Keywords: Magnetic field, electron microscopy, brain, rat, neuron

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The characterization and evaluation of mineral release performance of '*Bolus*' in artificial fluid of rumen

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Abstract

A nutritional supplement for ruminants called "bolus" contains trace elements and vitamins. Boluses in a range of form of recipe prepared in terms of mineral and vitamin contents are administrated to the rumen of animals and are released in a controlled manner in order to keep the levels of minerals and vitamins in the targeted therapeutic window. In this study, the synthesis, the characterization and in vitro degradation profiles of boluses were investigated. The Boluses were characterized by a helium pycnometer, surface area and pore size analyzer using the Brunauer–Emmett–Teller (BET) method, the contact angle measurements and scanning electron microscopy (SEM). In vitro degradation studies were performed in an artificial rumen fluid at a pH of 5.5 and a temperature of 37 °C in order to determine the stability and the degradation kinetic of the boluses. The bolus samples were washed with deionized water, freeze-dried and weighed in every three days. The artificial rumen fluid was refreshed in every three days to prevent mass transfer limitation due to a concentration and pH change of the fluid. The densities of the boluses were found to be between 2,30-2,40 g/cm^3. The surface areas and porosities of the boluses were determined in the range of 0,990-1,400 m^2/g and 0,002-0,004 cc/g, respectively.

Keywords: Artifical rumen fluid, Bolus, bioproduct development, degradation

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The modelling the growth kinetic of *Pseudomonas pseudoalcaligenes* in M9 medium under the different environmental factors

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Abstract

Microorganisms play an important role in the development of energy efficient and cleaner production and waste treatment processes. The modelling of growth kinetic may help process optimization especially while reaction pathways and kinetic constants cannot be fully obtained for a single organism yet. *Pseudomonas pseudoalcaligenes* with its ability to grow under pHs of up to 10 makes it an alternative tool for the treatment of cynanide-containing wastes in industry. In this work, M9 minimal medium with mineral salts was used to study the effect of C/N ratio (5, 10, 20 and 50) and Fe^{+2} (5, 10, 20 and 50 ppm) concentrations in range of temperature from 32 ^{o}C to 36 ^{o}C and pH from 7,50 to 8,50. The calibration based on optical densities versus the number of microorganism in the culture was carried out. Baranyi function using the DMFit curve fitting program developed by Baranyi (1998) was used to estimate the growth rate at the given environmental factors. The comparison of experimental growth rates with the estimated values from the model is in good agreement. Our study also shows that C/N ratio of 5, Fe^{+2} concentration of 50 ppm at a pH of 7.5 and a temperature of 34 oC shows the highest growth rate

Keywords: Growth kinetic, modelling growth rate, predictive microbiology, *Pseudomonas pseudoalcaligenes.*

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Changes in the expression levels of CAT, SOD1 and SOD2 in kidney tissues in response to diabetes and resveratrol

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Abstract

Diabetes is a disease that occurs when the pancreas does not produce enough insulin hormones in mammals or when the insulin hormone it produces is not used effectively. It is known as state of hyperglycaemia. Resveratrol which is a plant-derived polyphenolic compound has anti-inflammatory, antiplatelet aggregation, anti-carcinogenic, cartilage preservative and anti-aging properties. The antioxidant system is essential for cellular response to cope with oxidative stress under physiological conditions. Furthermore, antioxidant enzymes such as CAT, SOD and GSH-Px and non-enzymatic electron receptors such as GSH could be used as an index to assess the level of oxidative stress. The aim of this study is to reveal how diabetes would affect the renal antioxidant enzymes (SOD, CAT, GST, GPx) and to elucidate the regulatory effect of ersveratrol. Male Wistar rats of equal age were divided into four groups as follows; diabetic (n=12), control (n=12), diabetic group supplemented with resveratrol (n=9), control group supplemented with resveratrol (n=12). Diabetes was induced in respective groups with single intraperitoneal streptozotocin (55 mg/kg) administration. One week after the diabetes, resveratrol was given as 20 mg/kg/day throughout 3 weeks. Changes of protein expression levels were determined by using Western blot analysis. According to results, while renal CAT expressions were down-regulated in diabetic group, SOD1 protein levels were augmented just above the control levels. Besides, when applied to the control group, resveratrol increased the level of SOD-2 protein significantly ($p < 0.05$), the same effect has not been shown in other antioxidant enzymes. As given to the diabetic animals, resveratrol increased the CAT and SOD2 expression while it repressed the SOD1 expression. In conclusion, this study includes data on the use of resveratrol, which may reduce the treatment or adverse effects of diabetes and diabetic metabolic diseases.

Keywords: Diabetes, Kidney, Resveratrol, Protein expression, Western blot

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Alternative usage of taro (*Colocasia esculenta* (L.) Schott) products

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Abstract

Taro (*Colocasia esculenta* L. Schott) is a member of the Arum family (Araceae) and it is known as dasheen, eddoe, cocoyam or tannia. It is cultivated in southern provinces of Turkey, especially Mersin-Bozyazı, and consumed as root vegetables, potatoes. Taro is important carbohydrate source and also contains high amount of dietary fiber, mucilage and mineral. On the other hand taro contains antinutritional factors such as oxalate and phytic acid. The most effective methods to reduce the antinutrient factors of taro are soaking cooking and fermentation. This study was conducted to improve alternative usage area of taro products such as fresh taro (FT) and taro flour (TF) in traditional fermented food stuff, tarhana. To prepare TF, taro corm was sliced, cooked in acidic boiling water, dried and grinded. FT and TF were used in tarhana formulation as replaced with wheat flour at 5-20% ratio (dry matter basis). Some physical and chemical properties were determined. pH values of tarhana samples changed between 4.72 and 4.85 (FT); 4.73 and 4.88 (TF). Color values of tarhana samples changed significantly ($p<0.05$) with usage of FT or TF compared to control tarhana. Ash values of tarhana containing FT and TF increased from 1.55% (control) up to 2.11% and 2.30%, respectively. A significant decrement was observed in protein content of tarhana samples, especially high utilization levels of taro products. As a result of sensory analysis, a slight decrease was observed in overall acceptability score of tarhana sample with high usage levels of FT and TF.

Keywords: Taro, *Colocasia esculenta* (L.) Schott, tarhana, flour, fermentation, cooking

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The effect of monosodium glutamate used in childhood on neurofilament and dopamine receptor D2 expressions in hippocampal neurons

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Abstract

Monosodium glutamate (MSG) is a flavor enhancer added to several processed foods and with known neurotoxic effects. The purpose of this study was to investigate the probable toxic effect of MSG on neurons in the hippocampal region of rats in childhood and the protective effect of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) on Neurofilament (NF) and dopamine receptor D2 (DRD2) expression in the brain using immunohistochemical methods. Six female Wistar rats in the childhood period were used in each group. Group 1 represented the healthy control group, Group 2 received MSG (4 mg/kg on days 1, 3, 5, 7 and 9 intraperitoneally (ip)), Group 3 received MSG + EPA (MSG + 300 mg/kg for 9 days ip), Group 4 received MSG + DHA (MSG + 300 mg/kg 9 days), and Group 5 received MSG-EPA+DHA (MSG+300+300 mg/kg 9 days). Brain tissues were collected at the end of the 9th day. NF and DRD2 expression results were evaluated immunohistochemically. NFs were strongly stained in the axons of neurons in the dentate gyrus (DG) region of the hippocampus and moderately in the CA1 region. In the MSG group, weak NF expression was observed in both regions. Similar staining was observed in the MSG-EPA, MSG-DHA and MSG-EPA+DHA groups to that in the control group. DRD2 reaction was normal in neurons in the DG region in the control group, and was granular in form and powerful in neuron cytoplasm in the CA1 region. DRD2 expression in the MSG group decreased slightly compared to the control group. Similar powerful reaction to that in the control group was observed in the other three groups. In conclusion, since MSG caused a decrease in NF and DRD2 neural signal molecules in the CA1 and DG regions of the hippocampus of rats in the childhood period compared to the control group, we think that it may have an adverse effect on cognitive functions in this age group and that omega-3 fatty acids such as EPA and DHA can reduce these adverse effects of MSG.

Keywords:MSG, EPA, DHA, Brain, NF, DRD2

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Immobilization of laccase onto chitosan based metal-chelated copolymer nanoparticles and ıts application in phenol removal using ABTS as mediator

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Abstract

This study presents immobilization of laccase onto metal-chelated chitosan nanoparticles (Cu (II)-PEI-CHT-g-poly (glycidyl methacrylate)) via adsorption and its application in phenol removal from aqueous solution. Chitosan based copolymer nanoparticles were synthesized by radical copolymerization and characterized using FTIR, TGA, SEM and zeta-sizer analysis. Maximum laccase immobilization capacity of metal chelated chitosan based nanoparticles was 65.75 ± 2.51 mg/g. The immobilized laccase had a broader application pH and temperature range and better stability and reusability compared with free laccase; after eight cycles of continuous use, the activity of the immobilized enzyme remained above 50 ± 0.62%. Laccase immobilized on Cu (II)-PEI-CHT-g-poly (glycidyl methacrylate) NPs showed significantly great performance on phenol removal (>96%) in the presence of mediator, ABTS.

Keywords: Laccase, phenol removal, nanoparticles, mediator

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Retrospective study: Association between monocyte, neutrophil, eosinophil and lymphocyte volume levels and multiple myeloma

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Abstract

Multiple Myeloma is a hematologic malignity, which emerges as a result of uncontrolled growth of malign plasma cells, a kind of white blood cell, and is still incurable. Antibody-producing plasma cells (immunoglobulin) can be described as cells which eliminate effects of pressurizing cells and immune reactions. Immunoglobulin includes neutrophils, lymphocytes and monocytes. Monocytes are pioneers of dendritic cells which important role in the immune system that governs the responses of the T-cell against tumors. Lymphocytes have an important role in the destruction of the M-protein. Neutrophils are important in assessing the degree of susceptibility of the cells to infection. Therefore, the aim of the present study was to evaluate the association of monocyte, neutrophil, eosinophil and leucocyte volume values, which are widely available hematological marker, with disease in multiple myeloma patients as retrospective data. 60 patients with Multiple Myeloma aged 64.5±11.2 and 107 healthy control aged 64.9±10.3 years were admitted to the Polyclinic of Hematology in Faculty of Medicine of the Selcuk University have been included in the study. The Monocyte, lymphocytes, neutrophil volume levels were significantly higher in patients as respectively 175.62±8.06; 95.05±6.08; 152.51±8.18 compared with control group as respectively 170.41±8.15; 89.78±4.92; 148.19±8.04. The eosinophil volume levels were 157.5±22.4 in patients group and 157±17.3 in control group (p=0.953). According to this study's results, increased Monocyte, lymphocytes, neutrophil volume values except eosinophil volume may be a potentially useful prognostic biomarker in patients with Multiple myeloma.

Keywords: Multiple Myeloma, monocyte, lymphocytes, neutrophil.

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Electron paramagnetic resonance and nuclear magnetic resonance study of captopril molecule with density functional theory

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Abstract

Captopril is a group of drugs known as ACE inhibitors. ACE inhibitors are used in high blood pressure and heart failure treatments. In this study 13C and 1H chemical shifts and Electron Paramagnetic Resonance (EPR) parameters of captopril molecule were calculated with DFT method. Firstly conformation analysis of captopril were performed with PM3 method. The most stable conformer was determined using the Density Functional Theory (DFT). 13C and 1H chemical shifts of captopril molecule were calculated with DFT method. Possible radicals were modeled with DFT calculations using the most stable conformer. The EPR parameters of modeled radicals were calculated using the DFT method for each of radicals.

Keywords: Captopril, Nuclear Magnetic Resonance, Electron Paramagnetic Resonace, Density Functional Theory

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Investigation of toxic dichromate anion extraction ability and anticarcinogenic effects of N-methylpyrrol derivative of calix[4]arene

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Abstract

Toxic oxyanions like arsenite, arsenate, chromate, and dichromate contamination of water are serious hazards. The United States Environmental Protection Agency (US EPA) declared chromium as one of the greatest threat to humans. The permissible limit of hexa-valent chromium in drinking water is set as low as 0.05 mg/L. Toxicity of chromium compounds depends on its oxidation stat. According to the World Health Organization, Cr(VI) is one of the most toxic metals. The vast majority of industrial effluents and wastewaters, such as mining effluents, dilute leaching solutions generated during hydrometallurgy, electroplating rinse liquors, etc., carry Cr(VI) in low concentration. Chromium(VI) is a common pollutant introduced into natural waters from a variety of industrial waste waters including those from the textile dyeing, leather tanning, electroplating and metal finishing industries. Calixarenes are macrocyclic compounds widely used in supramolecular chemistry. Their unique three-dimensional structures with almost unlimited derivatization possibilities on the "lower" and "upper" rims, along with a tunable shape, make calixarenes ideal candidates for building blocks or scaffolds in the design of new, more sophisticated molecules. The anticancer activity of various functionalized calixarenes has been reported by several research groups. Due to their superior geometric shape, calixarenes can accommodate drug molecules by forming inclusion complexes. In this study, a new calix[4]arene derivative in the cone conformation was synthesized from 25,27-bis(3-aminopropoxy)-5,11,17,23-tetra-tert-butyl-26,28-dihydroxycalix[4]arene by treatment with 1-methylpyrrol-2-carboxaldehyde. Extraction studies of this compound with Na2Cr2O7 were evaluated at different pH values and anticarcinogenic effect of this compound was investigated.

Keywords: Toxic oxyanions, Calixarene, Extraction, Anticarcinogenic

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Determination of antimicrobial activity of essential oil of Turkish endemic, *Thymus spathulifolius* (Lamiaceae) obtained by hydro-distillation method and chemical composition by GC-MS

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Abstract

Thymus spathulifolius Hausskn. & Velen. (Lamiaceae) is an endemic to Turkey and it has very limited distribution area in inner Anatolia. The dried and powdered aerial parts of the Thymus spathulifolius were submitted for hydro-distillation method using a Clevenger-type apparatus for about 3 h to give an oil with 3.85% (v/w) yield. After drying with anhydrous sodium sulphate and filtration, the oil was stored at refrigerator until use. The analysis of the obtained essential oils was carried out using an Agilent 7809B GC system, equipped with a HP-Innowax capillary column (60m, 0.25mm i.d., 0.25 µm film thickness) and a 5977B Mass Selective Detector system. The essential oil of T. spathulifolius was tested against a panel of microorganisms including *Staphylococcus aureus* (ATCC 29213), *Enterococcus faecalis* (ATCC 29212)), *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 25922) and *Candida albicans* (ATCC 10231) for determination of minimum inhibition concentration (MIC) by micro-dilution method. The essential oil of T. spathulifolius was characterized by a majority of monoterpenes such as Thymol (45%), p-cymene (26.8 %), carvacrol (6.8%), $_{\gamma}$-Terpinene (6.1%), and Borneol (2.4%). The MIC value of the essential oil for *E. coli, S. aureus, C. albicans* was 2.5 mg/mL, for *P. aeruginosa* and *E. faecalis* were founded 5 mg/mL. In addition, the bioauthographic analysis showed an inhibition zone on TLC plate, which are also confirming antimicrobial activity of the oil. The activity may be attributed to the domain compound-thymol presents in the oil. This study scientifically supports the use of this plant or its volatile oils as a deterrent against degradation in food or pharmaceutical formulations.

Keywords: *T. spathulifolius,* Essential oil, Antimicrobial, GC-MS

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Effect of SNP rs13266634C/T in solute carrier family 30/Zinc transporter gene (SLC30A8) on type 2 diabetes in a broad Turkish population.

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Abstract

SLC30A8 (solute carrier family 30/zinc transporter) encodes the ZnT-8 protein, a zinc carrier that is overexpressed in the pancreatic islets. Insulin is stored as a hexamer linked to two zinc ions in pancreatic beta-cells. The ZnT-8 protein is localized on the membrane of the insulin secretory vesicles and transfers the zinc, necessary for insulin storage and secretion, to the secretory vesicle from the cytoplasm. Therefore, ZnT-8 appears to be a critical factor in the pathway of insulin storage and secretion, and variations in the SLC30A8 gene are thought to be a risk for type 2 diabetes (T2DM) development leading to insulin release defects. In our study, we investigated the role of SLC30A8 gene and its prominent variant rs13266634C/T (R325W) in type 2 diabetes in a broad Turkish population (460 T2DM patients and 440 healthy). We detected a significant association between type 2 diabetes and SNP rs13266634C/T of SLC30A8 gene (OR:2 [95% CI: 1,38-2,98] and OR:3,3 [95% CI: 1,30-7,69] P=0,000 and P=0,011, under dominant and additive models, respectively). Genotype distributions were in the Hardy-Weinberg equilibrium in both study groups (P>0.05). Also, SNP rs13266634C/T had a strong effect on insulin (P=0,022) and fasting glucose levels (P=0,003). This variant in SLC30A8 gene may increase blood glucose levels by reducing insulin secretion. In conclusion, in Turkish population, SNP rs13266634C/T of the SLC30A8 gene might contribute to genetic background of type 2 diabetes, a disease which emerges from the interactions among multiple genes, variants and environmental factors.

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Evaluation of the in vitro anticancer and antimicrobial activity of methanolic leaf extract of *Thuja occidentalis*

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Abstract

Recently, natural product derived substances have received considerably more attention for their potential as new anticancer and antimicrobial agents. In the present study we aimed to investigate the possible anticancer and antimicrobial effects of methanolic leaf extract of *Thuja occidentalis* (MTOL). Anticancer activity of MTOL was evaluated in human lung carcinoma (A549), human breast carcinoma (MCF7) as well as in normal (non-neoplastic) human bronchial (Beas-2B) cells using the XTT test. The cells were exposed to serial concentrations of MTOL (1–1000 µg/mL) for 24 h. The results of XTT assay revealed IC50 values of Beas-2b: 221.45 ± 21.12, 301.05 ±19.2 and 114.62 ±7.86 µg/mL for Beas-2B, A549 and MCF-7 cells, respectively. Antimicrobial activity tests were performed using the well-agar diffusion method. Escherichia coli ATCC 2922, Yersinia enterocolitica ATCC 9610 were selected as gram negative test group whereas Staphylococcus aureus ATCC 25923, Enterococcus faecalis ATCC 29212 were selected as gram positive test group. All test bacteria were exposed to serial concentrations of MTOL (0.1 - 20 mg/ml). It was observed that the lowest concentration of MTOL had no effect on gram positive bacteria. However, MTOL showed an inhibition zone of 17 mm in gram negative bacteria at the same concentrations. All results showed that MTOL is more effective in MCF7 human breast carcinoma cells and also against gram negative bacterial strains.

Keywords: Thuja occidentalis, Anticancer effect, Antimicrobial effect

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Antimicrobial effects of some herbal extracts on acne bacteria ınstead of chemical methods

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Abstract

Acne, as a family of skin disorders is one of the most prevalent dermatologic diseases in the world. It usually affects almost everybody during the life. There is a variety of medications for acne vulgaris including topical agents, oral antibiotics, oral retinoids and oral hormonal therapies. In view of increasing resistance to existing anti-microbial agents, side effects and sometimes high cost of treatment, interest in medicinal herbs has been progressively increased. In this study different plant extracts were tested for antibacterial activity against acne bacteria. In this study aimed to prevent the spread of acne by means of finding plant-based remedies rather than chemical drugs without damaging the skin. Lemon peel (*Citrus limon*) pomegranate peel (*Punica granatum*), fern (*Pteridium aquilinum*), white mulberry leaf (*Morus alba*), japanese persimmon *(Diospyrios kaki*), rhus cotinus (*Cotinus coggyria*) were used for antibacterial activity against acne bacteria. Acne bacteria was obtained from youngest man's face under sterile conditions. The plant materials were air-dried, crushed into small pieces, and 10 grams of each were extracted with soxhlet extractor using 200ml of 80% methanol solution for 24 hours. Spore and gram staining were performed. The antibacterial activities of six extract were tested against acne bacteria using the agar well diffusion method. In Gram staining, the bacteria was as Gram (+), and showed morphologically as coccobacillus, spore structure was not observed. The study showed that pomegranate peel formed the biggest inhibition zone (33 mm) against the acne bacteria.

Keywords: Acne, Antibacterial activity, Herbal extract

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A new biomarker for obesity: Can GDF-15 fight obesity?

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Abstract

Obesity is considered as one of the 10 most risky diseases by the World Health Organization, and is among the most common causes of cancer risk increase according to the AARC 2015 report. Obesity is a major cause of type 2 diabetes and this rapid increase in obesity has also caused a concomitant increase in type 2 diabetes, cardiovascular disease and some types of cancer. The most important problems that trigger obesity are imbalances in the regulation of food intake, energy storage and energy expenditure. For this reason, anti-obesity drugs aim to reduce food intake and suppress appetite. Recent studies suggest that a molecule named GDF-15 is directly related to nutrient uptake, body weight and fat accumulation by acting directly on the brainstem and hypothalamic nutrition centers, indicating that this may be an important factor for obesity. GDF15 is a cytokine originally defined 20 years ago and is a different member of the transforming growth factor-β (TGF-β) superfamily. Serum concentrations of GDF-15, also called PLAB, PDF, MIC-1 or NAG-1, increase slightly in several disease states, especially in inflammation, injury and cancer. In normal weight individuals, the level of GDF-15 in circulation is about 0.2-1.2 ng / ml. Significant increases in serum levels of GDF-15 have been reported in diseases such as cardiovascular disease, rheumatoid arthritis, insulin resistance, obesity and diabetes, in which circulating levels may increase 10-100 times in various diseases. Studies have shown that germline GDF-15 broad knock-out mice have a mildly obese phenotype, with less fat tissue transgenically overexpressing GDF-15 and decreased glucose and insulin tolerance due to anorexia, increased energy expenditure macrophage infiltration and inflammatory activation of white fat. This suggests that GDF-15 may play a role in the protection of obesity and type 2 diabetes, suggesting that recombinant GDF-15 may be effective for the treatment and complications of severe obesity.

Keywords: Obesity, GDF-15, biomarker

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Selection of reliable reference genes for qPCR analysis on MCF7 cells with melatonin treated

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Abstract

Melatonin, also known as N-acetyl 5-methoxytryptamine, is a hormone that is produced by the pineal gland in animals and regulates sleep and wakefulness. Melatonin has been shown to inhibit various carcinomas, including MCF7. A correct choice of safe reference genes as an intragroup control is ineluctable to procure accurate results. Here, we present an assessment of 5 reference genes (18SrRNA, ACTB, GAPDH, TUBA1 and SDHA) to normalize gene expression data in MCF7 cell line treated with melatonin. Treated and untreated cell samples were collected from cell culture. After isolation of total RNAs, cDNA synthesis was performed and Ct data obtained with qPCR. The BestKeeper program was used for descriptive analysis of the data. geNorm and NormFinder software packages were used for estimating the values for each gene. Results acquired by geNorm indicated that average expression stability values (M) of all nominee genes were smaller than 1.5 (accepted M value for geNorm), showing that all the evaluated genes can be employed as housekeeping genes. GAPDH (M=0,034) and ACTB (M=0,032) were reported to be the most stable. Similarly, NormFinder (respectively stability value were 0,012 and 0,014) results were in accord with geNorm's results. GAPDH and ACTB think about being most suitable reference genes to evaluate new gene expression in the MCF7 with melatonin treated.

Keywords: Melatonin, MCF7, qPCR, Housekeeping gene, BestKeeper, geNorm, NormFinder

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Molecular mechanisms of micronucleus formation

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Abstract

Humans are frequently exposed to various physical and chemical substances such as medicines, agricultural chemicals, cleaning products, food additives, environmental pollutants, radiation and rays. In the body, these chemicals either may become activated or detoxified to prevent toxic effects through various enzyme systems. When these chemical exposures are increased, carcinogenic and mutagenic events take place in the body. Severe exposure to genotoxic agents may lead to changes in mechanisms of chromosomal division and formation of DNA damage which involved in the development and progression of many diseases. Micronucleus (MN) test is one of the commonly used genotoxicity test performed with all types of cells reproducing by mitosis in the in vitro and in vivo studies to determine the genotoxic effects of chemical and physical agents on somatic cells. Micronuclei formed during mitosis do not integrate in the main nucleus and appear in the cytoplasm of the cells. MN originate from acentric chromosome or chromatid fragments created by misrepair of DNA or unrepaired DNA fragments in anaphase. Malsegregation of whole chromosomes may also lead to MN formation due to hypomethylation of repeat sequences in centromeric and pericentromeric DNA, defects in kinetochore proteins, dysfunctional spindle and defective anaphase checkpoint genes. Although MN test has been widely used for many years due to its simplicity, reliability, validity and applicability to different types of cells, there isn't sufficient information about the mechanism of MN formation. The main purpose of this mini review is to give information about the molecular mechanism of MN formation.

Keywords: Micronucleus, genotoxicity, chromosome damage

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Development of a highly simple and practical automated method for determining ıodine values of edible oils

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Abstract

The main objective of this study was to develop a new automated flow injection analysis (FIA) method -expected to be an alternative to standard methods- for iodine value (IV) used in determination of unsaturation degree of edible oils. Iodine value (IV) is determined using classical titration methods which have several limitations such as timing, protection of the reaction mixture from light and atmospheric oxygen and the use of large volumes of toxic solvent. To overcome these drawbacks an automated procedure is highly desirable. The proposed method is based on the interaction of ICl3 dissolved in n-propanol (carrier phase) with double bond in oil sample to produce I2. For this purpose, ICl3 solution dissolved in n-propanol was used as reagent and the oil sample and reagent solution were directly injected together, into the carrier phase flowing at 3 mL min-1 in the form of *"30 µL reagent/10 µL sample/30 µL reagent"*. The results showed that the proposed new FIA method is found to be a good method due to their superior properties such as reducing the use of solvents potential danger for the environment, allowing the realization of rapid analysis with low cost. Also, validation studies showed that FIA method was found to be a wide linear range and LOD and LOQ values calculated in terms of "g I2/ 100 g oil" were found to be as 12.3 ve 37.2, respectively.

Keywords: Edible oils, Flow injection analysis (FIA), Iodine value (AV), Validation

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Utilization of non-conventional edible seed oils as potential energy source

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Abstract

A large quantity of oils and fats, used for human consumption or for industrial purposes, are derived from plant sources. With the growing body of evidence that all fats and oils are not equivalent, interest in polyunsaturated fatty acid (PUFA) profiles has been emerging. Depending on this, a great interest has been begun to new sources of non-conventional edible seed oils obtained by cold pressing due to their higher nutritive value than refined oils. This study includes the investigation of physicochemical properties of some cold pressed oils (pumpkin seed, walnut seed, flaxseed, black seed, and poppy seed oil) that have not traditionally been used and the determination of superior properties of them by comparing with refined oils. FAC results showed that cold-pressed walnut seed oil had the greatest level of PUFAs (72.02 %) and a good n-6/n-3 ratio (4.9), due to a high content in linolenic acid (18:3 n3). The cold-pressed flaxseed oil with 66.89 % PUFAs content followed the cold-pressed walnut seed oil. The total tocols content ranged between 490.24-977.47 mg kg-1 oil for all tested cold pressed seed oils. Cold-pressed poppy seed oil proved to be the most stable of all the cold pressed seed oils tested, with an OSI of 4.92 h at 120°C. As a conclusion, many unconventional cold pressed oils can be thought as more beneficial for health compared to refined ones in term of having valuable components and no chemical contaminant.

Keywords: Cold Pressed Seed Oil, Fatty Acid Composition, Tocols Profile, Oxidative Stability, Rancimat
15, 137–149.

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Brain ınfarct volume measurement in non-cardiogenic ıschemic stroke patients

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Abstract

Stroke is the second most common cause of death worldwide and is the leading cause of serious disability. Estimating severity of the disease and early risk assessment is crucial. Several methods have been proposed in the literature for risk assessment and to estimate stroke prognosis and patient monitoring. From our patient population; 10 stroke patiens were selecting according to inclusion criteria. The inclusion criteria for patient group were as follows:lack of any contraindication to MR imaging, first stroke, diffusion abnormalities restricted to single anatomic location, ER referral after first 6h, lack of any forms of acute/chronic cardiopulmonary disease, coronary artery disease, diabetes, no drug or substance addiction/abuse, non-obesed body mass index (BMI)<30d, lack of malign hypertension confirmed by medical reports and initial examination. All MR examinations were performed with 1.5T MRI scanner. Axial T1-weighted, axial and coronal T2-weighted, axial fluid attenuation inversion recovery and diffusion weighted images with apparent diffusion coefficient (ADC) maps were acquired. On the MR images, acute cerebral ischemia was defined as bright area separated from normal brain parenchyma with a demarcation line on diffusion weighted images with correspondent hypointensity on ADC maps. All readings were performed by a single radiologist who was blind to the patient data. Evaluation was made by patient basis in offline workstation and the stroke volumes were calculated using DTI Studio Analyze system. According to the results of our study, the measurement of the quantitative volume of infarct areas in stroke cases is very important in terms of patient follow-up and prognosis.

Keywords: Brain, DTI studio, infarct, volume measurement

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Investigation of the distribution of two polymorphisms of *HIF1 Alpha* in children with neural tube defects and their mothers

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Abstract

The incidence of neural tube defects is still high, albeit a reduction due to folic acid like applications. In some studies, an association between oxygen pressure, apoptosis, and neural tube closure is mentioned. In these studies, it has been shown that hypoxia is required in the induction of apoptotic processes that are essential for neural tube closure. Increasing the oxygen level during the critical period of development has been shown to produce similar results as using caspases that block the neural tube closure. In studies performed on mice, genes that are thought to be involved in apoptosis and neural tube formation such as protooncogene ski, homeobox gene Cart1, and tumor suppressor gene p53 were found to be regulated by hypoxia. Hypoxia Inducible Factor (HIF-1) is taking place in the physiological response to the hypoxia by increasing angiogenesis, vasodilatation, anaerobic glycolysis, and erythropoietin levels. It has been reported that mouse embryos with homozygous HIF-1 alpha mutation cannot survive and exhibit neural tube defects and cardiovascular anomalies. In this study, we investigated the distribution of two polymorphisms (rs11549465, rs11549467) of HIF1 alpha gene, which is thought to be related to NTD, in children with NTD and their mother by PCR-RFLP method. According to our results in G1970A, there was no difference between the control group and children with NTD and their mothers. For C1772T, we observed that there was a statistical difference between allelic distributions in comparison between the mothers and the control groups.

Keywords: Neural tube defects, Hif1 alpha, rs11549465, rs11549467

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UV-visible spectroscopic studies of the metal complexes of a new indole-based schiff base

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Abstract

In the literature, much effort has been given to monitor the concentration of the cupper ion for environment protection and human health because it plays a critical role in many biological and environmental processes. Schiff-base based ligands have been studied during the past years because of their facile synthesis, structural labiality, and unusual configurations. In this study, a new Schiff base ((E)-1-(((2-(1H-indol-3-yl)ethyl)imino)methyl)naphthalen-2-ol) (L) were prepared by condensation reaction between tryptamine and 2-hydroxy-naphthaldehyde and characterized using 1H nuclear magnetic resonance. Then, complexation property of the Schiff base L toward selected metal ions (Li^+, Na^+, K^+, Mg^{2+}, Ca^{2+}, Ba^{2+}, Ag^+, Ni^{2+}, Zn^{2+}, Hg^{2+}, Co^{2+}, Cd^{2+}, Al^{2+}, Fe^{2+}, Cu^{2+} and Pb^{2+}) has been investigated by UV-visible spectroscopy. The results from the UV-vis spectroscopic studies revealed that the ligand L showed marked sensitivity and selectivity to Cu^{2+} ions.

Keywords: Schiff base, Cupper (II) ion, Complexation, UV-visible spectroscopy

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Molecular phylogeny of the genus *Trinia* (Apiaceae) based on nrDNA its sequence in Turkey

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Abstract

The flowering plant family Apiaceae comprises approximately 460 genera and 3700 species. Trinia Hoffm. belongs to Apiaceae family and is a small genus. Trinia comprises about 10 species and the genus are distributed Europe and SW Asia. Trinia was revised by Hedge and Lamond for the *Flora of Turkey* and the *East Aegean Islands* in which two species, *Trinia glauca* (L.) Dum. and T. scabra Boiss. & Noë, were accepted. *Trinia scabra* is endemic for Turkey. The aim of the present study was to determine phylogenetic relationships among Trinia and related genera that are collected from Turkey using nrDNA ITS sequence. Genomic DNA has been isolated using the DNA isolation kit and ITS region of studied taxa have amplified using universal ITS4 and ITS5a primers. PCR condition is 95 °C for 5 min initial denaturation, 35 cycles of 94 °C for 1 m denaturation, 50 °C for 1 m annealing, and 72 °C for 1 min extension, 72 °C for 10 min final extension. PCR products were visualised by agarose jel. The amplified fragments were sequenced using the same primers used for amplification. ITS1+5.8S rDNA+ITS2 sequences of the studied taxa were aligned via Bioedit and were used to construct phylogenetic trees by using PAUP. *Trinia* and *Seseli* are classified in different tribes up to recently. However, molecular analysis has shown that *Trinia* and *Seseli* are sister group.

Keywords: Trinia, ITS, Turkey, endemic, phylogeny

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Utilization of traditional tarhana powder in puffed rice cake production

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Abstract

Tarhana is often produced by lactic and yeast fermentation of wheat flour, yoghurt, tomato paste, onion and some species. Nutritional, functional and sensory properties of tarhana have been revealed in many researches. Tarhana can be consumed as soup and also chips form in Turkey. In this study, tarhana powder were used in puffed rice-corn cakes production at %0, 2.5, 5 and 10 ratios to improve nutritional, functional and sensory properties of the end product. Also puffed cakes prepared with (%30) and without corn. Diameter, thickness, spread ratio, color (L*, a* and b*) values and sensory properties were determined. Increasing amount of tarhana powder in puffed cakes resulted in a slight decrement in diameter and thickness. L*, a* and b* values ranged between 70.38 and 82.89, -1.18 and 5.67, 6.76 and 25.39, respectively. As expected, tarhana usage increased darkness, redness and yellowness of the samples. Those increments were found more remarkable in puffed cakes containing corn. Tarhana powder usage ratio over 7.5%, decreased the all sensory scores. When physical and sensory characteristics are evaluated together, a new rice based product can be improved with 2.5-5.0% tarhana powder and 30% corn utilization.

Keywords: Tarhana, corn, rice, puffed cake

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Effects of various biofertilizer applications on the P uptake and yield of central Anatolian originated wheat genotypes

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Abstract

While nutrient use efficiency in the first year of application by plants is less than 50%, however the use of biofertilizers can aid in improving this recovery. When it comes to phosphorus (P), its fundamental importance for society is unparalleled. The limited available amounts of phosphate rock reserves; its high fixation under alkaline and acidic soils; and its exceedingly vital importance to plant and human growth and development, stresses the need to both improve fertilizer use as well as, plant acquisition efficiency. In Turkey, most soils are low in organic matter content, with high levels of lime, clay, and pH. In 2016, approximately 4.6 million tons of phosphorus fertilizers (17% P2O5) were applied to plants in Turkey; 56% of the P consumed was used in cereal farming. Wheat is the most widely grown cereal crop and consumes the most P fertilizer in Turkey. Most of Turkey's wheat production occurs in the Central Anatolian region. Since P recovery by plants from chemical fertilizers ranges between 10-30%, depending on the soil characteristics, the aim of this research was to identify wheat varieties from the Central Anatolian region which under P deficiency and various biofertilizer applicationss had low and high P acquisition efficiency. Per the results, Tosunbey and Bayraktar 2000 had the highest and lowest P acquisition efficiency, respectively. A field experiment is currently being conducted to evaluate the effects of the various biofertilizers on fertilizer use efficiency under field conditions, as well as, on plant and soil biological, physiological, and chemical properties.

Keywords: Phosphorus deficiency, Wheat, Biofertilizers, Phosphorus Acquisition

Acknowledgement: This study is supported by Selcuk University and the Agrobiotechnology Laboratory

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Brain derived neurotrophic factor (BDNF) expression in the filum terminale with tethered cord syndrome (TCS)

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Abstract

The filum terminale (FT) is a thin fibrous band that connects the spinal cord to coccyx. Some events disrupt the structure of the FT and cause TCS. The aim of our study was to investigate the effect of BDNF on the development of TCS. Three groups were formed for this purpose. Group A; normal FT group obtained from cadaver, Group B; normal appearance FT group obtained from patients with TCS, Group C; anormal appearance FT group obtained from patients with TCS. BDNF expression was demonstrated using immunohistochemistry technique in the FT samples. Group A contained loose collagen fibers, nerve fibers and blood vessels. It was found that the collagenous fibers were abundant and were stained moderate intensity with BDNF. Furthermore, a strong reaction was detected in the ependymal cells surrounding the central canal. Group B consists of more intense collagenous fibers. In some places, it was observed that the expression of BDNF was changed from weak to medium. In ependymal cells, which had central channel laying, weak staining was noted. In group C, intense collagen fibers and fat cells increased. BDNF expression in both collagen fibers and ependymal cells was close to negative. BDNF expression was strongly observed in the ependymal cells of the control group, while weakening in group B and negative in group C suggested that BDNF might be effective in the structural change in FT in the development of THC. Identification of biomarkers associated with THC will provide important information for elucidating the mechanisms underlying this disease.

Keywords: Filum Terminale, Tethered Cord Syndrome, Brain derived neurotrophic factor

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A new perspective to produce biopharmaceuticals: Molecular pharming

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Abstract

Molecular pharming is defined as the production of pharmaceutically important proteins in plants. Plant tissue culture studies, rDNA studies and plant genetic transformation are the main steps of the development of biopharmaceuticals in plants. Tomato, potato, lettuce, maize, carrot and rice have been used to produce pharmaceutically useful proteins. Insulin, somatotropin, human serum albumin, interferon, lactoferrin, monoclonal antibodies (plantibodies), hemoglobin, cancer therapeutic antibodies, human growth factor and edible vaccines have been produced in plants. The production of biopharmaceuticals in plants is considered cost effective, safe, easy and high yield potential. In the near future, plants are going to have importance in pharmaceutical biotechnology.

Keywords: Edible vaccine, Biopharmaceuticals, Genetically modified organisms, rDNA

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Chemical compounds profile of pholliota aurivella extract and its potential effects on serum biochemical parameters

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Abstract

This study presents chemical composition of *Pholiota aurivella* extract and effects of the extract on serum biochemical parametres. Ethanol-based lyophilized extract obtained from fruting bodies of *Pholliota aurivella* was found as a rich source of phenolic (p-comaric and protocatechuic acids) and fatty acid (linoleic, oleic and palmitic acids) compounds. However, the extract contained high level of Arsenic according to normal level. Intraperitoneal administration of CCl4 (0.5 ml/kg, twice a week) and treated groups (CCl_4+mushroom doses) to rats for 28 days resulted in significantly elevated ($p<0.05$) serum levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH) compared to Control group. Consequently, it was observed that there was no protective role of *P.aurivella* extract against CCl_4-induced damage in rats. The extract contained high level of Arsenic which might be one of the main source of toxic effects of *Pholoita aurivella*.

Keywords: *Pholiota aurivella,* Biochemical parameters, Arsenic, CCl_4, Rat

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Antiproliferative activity of *Thecocarpus carvifolius* against colon cancer cell, caco-2

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Abstract

The aim of this study was to investigate different cytotoxic activities of *Thecocarpus carvifolius* on human breast adenocarcinoma cell line (MCF-7) and mouse fibroblast cell line (L929). 40 g of dried and pulverized sample were extracted in pure methanol at 300C for 24 hours with a sample to solvent ratio of 1:10 (w/v) and incubated in the oval shaker 180 rpm. The crude methanol extracts were weighed to calculate the yield. 5 g of crude extract was dissolved in a total 400 mL of methanol/water mixture (7:3 v/v) and 400 mL hexane was added in a separator funnel, and mixture was vigorously shaken and kept steady until organic and aqueous phase were separated. Fractionation steps were further continued with aqueous phase mixed with organic solvents in increasing polarity: chloroform, and ethyl acetate, respectively. MCF-7 and L929 were cultured in the presence various concentrations of extracts for 72 hr. T. carvifolius inhibited the survival of MCF-7 and L929 cells in a concentration and time dependent manner, shown by XTT. According to cytotoxic analysis, IC50 values of extracts were calculated as 59 µg/ml on MCF-7. Although, T. carvifolius effected MCF-7 in low doses, it did not show same activity on L929 cells. These finding suggest that *T. carvifolius* effects on breast cancer cells at low doses is cytotoxic but there is no activity on healthy cell lines. So, presented results support further investigations of *T. carvifolius* as a prospective therapeutic agent with potential relevance in the treatment cancer.

Keywords: Cytotoxicity, L929, MCF-7, *Thecocarpus carvifolius*, XTT

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Determination of tyrosinase inhibitory activity and volatile compounds of *Pilosella hoppeana*

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Abstract

Pilosella hoppeana belongs to the family Asteraceae exhibits antioxidant wound healing, antibacterial, antifungal, anti-inflammatory, antitumor, antiseptic effects. The plant has been known for its anti-inflammatory potential in Balıkesir for many years. The aims of the research were to analyze the volatile compounds by using GC-MS and detect tyrosinase inhibitory of the plant. The IC50 value of tyrosinase inhibitory activity was measured as 112, 202 (µg/mL). Limonene, α-terpineol, anethole, nonanal and decanal were specified by GC-MS. According to the results, the plant was contained moderately volatile compounds and observed significiant tyrosinase inhibitory activity.

Keywords: *Pilosella hoppeana*, GC-MS, tyrosinase inhibitory activity

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Determination of proteolytic CAPN1 and CAST gene expressions in different bovine muscles

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Abstract

The objective of this study was to detect the expression levels of the proteolytic CAPN1 and CAST genes between different muscle groups of the bovine skeletal muscle. In theory, genes must be expressed different levels in different muscle groups in order to be effective on the maturation of the meat. Otherwise, genes that expressed equally in all muscles should analogously contribute to the transformation of the meat on entire carcass. In this regard, we expected to observe statistically significant differences or at least a trend between high and low quality muscles, especially the genes associated with meat maturation. In the present study, 15 Angus were used in the same age and gender, and 12 different muscle groups were sampled which were offered for consumption. Gene expression values of CAPN1 and CAST analyzed by using qPCR. Our work indicated that CAPN1 and CAST genes have shown significant differences ($p < 0.001$) between muscles. However, these differences were not between high and low quality muscles for the CAST gene. Thus, in the calpain / calpastatin proteolytic system, CAPN1 gene might be more effective than CAST gene for the determination of meat quality.

Keywords: CAPN1, CAST, qPCR, Different skeletal muscles, Bovine

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Heat shock protein 90 gene in *Meloidogyne* species on molecular phylogeny

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Abstract

A protein superfamily, Heat shock proteins (HSPs) are widely used in many organisms including nematodes. HSPs are classified at numerous gene families, based on particular molecular weights that some of them most conserved and rich in cells including heat shock protein 90 (HSP 90). *Meloidogyne* genus termed also root knot nematode group is the most damaging plant parasitic nematodes in the world that estimated its damage more than 50 billion US dollars. They have around a hundred species, infect more than 2000 plant species, and live from temperate to tropic climates in the world. Genetic relations may have understood using molecular phylogeny that HSP 90 gene is one of them due to conserved features within cells. However, the evolutionary history of *Meloidogyne* species has not been fully understood. For this aim, existed data of *Meloidogyne* species were taken from The National Center for Biotechnology Information. Evolutionary analysis were carried out in MEGA7 using 13 nucleotide sequences: 12 Meloidogyne species and one outgroup. Codon positions were 1st+2nd+3rd+Noncoding. All positions containing gaps and missing data were eliminated. Results revealed that three main clades were observed that *M. artialle* is the most primitive species, in contrast, *M. graminicola, M. naasi, M arenaria* and *M. incognita* were found to be advanced species in different clades. In general, tropical climate-*Meloidogyne* species found to be more advanced in the tree of molecular phylogeny that may relate to heat response

Keywords:Heat shock protein 90 gene, *Meloidogyne*, Molecular phylogeny

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Cu(II) resistance, removal and bioacumulaton and its influences on antioxidant defense enzymes by using thermophilic Anoxybacillus flavithermus SO-17

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Abstract

The thermophilic bacterium *Anoxybacillus flavithermus* was isolated from Gecek spring mud samples, Afyonkarahisar, Turkey. Acccording to biochemical, physiological, morphological, and 16S rRNA gene sequencing analysis revealed that, the thermophilic isolate was identified as A. flavithermus. The thermophilic *A. flavithermus* exhibited significant resistance to Cu(II) in solid and liquid medium. Minimum inhibitory concentrations were 145 and 600 mg/L for Cu(II), respectively. The removal yields were determined as 90.7%, 100%, 98.4%, and 95.2% at concentration of 2.5, 5, 7.5, and 10 mg/L, respectively. *A. flavithermus* had the bioaccumulation capacity differ according to metal concentration and incubation time. The highest bioaccumulation capacity was found as 102.36 mg/g dried bacteria at 10 mg/L for and 36th h. SEM and FT-IR analysis were also investigated for surface characterization. In addtion to these, the influences of various concentrations of Cu(II) on SOD and CAT enzymes, which are significant members of antioxidant defense system, were also experimented.

Keywords: Thermophilic bacteria, Cu(II), resistance, bioaccumulation, antioxidant enzyme

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Cryogenic conservation stratagies of plant seeds: applications and limitations

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Abstract

There are much more seed banks in the world established for the ex situ conservation of plant diversity, the majority of which conserve crop diversity, storing a combined total of over four million accessions of food and forage crops covered by the multilateral system of benefit sharing of the International Treaty on Plant Genetic Resources for Food and Agriculture. These seed banks distribute seed germplasm to crop scientists and researchers around the world, and the seed is germinated as the first step in the quest for genes to improve quality, to improve yield, and/or to overcome biotic or abiotic stresses. According to desiccation responses, seeds have been divided into two main categories: desiccation-tolerant (orthodox) and desiccation-sensitive (recalcitrant). A third category has been known as suborthodox, which are relatively desiccation-tolerant seeds, but they cannot resist desiccation down to water contents as low as those tolerated by orthodox seeds and they are freezing sensitive. The storage of seeds of many plant species in liquid nitrogen at –196°C is now well developed and applied to agricultural crops and for the purpose of rescue of rare and endangered plant species. This work aimed to study seed cryopreservation applications, limitations and also consider the current knowledge that is available to guide the management and use of wild species collections in seed banks.

Keywords: Dehidration, liquid nitrogen, orthodox seed, recalcitrant seed, seed bank

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Toxicity of green synthesized silver nanoparticles to yeast *Schizosaccharomyces pombe*

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Abstract

Nanotechnology is an interdisciplinary science, which utilizes the principles of physics, chemistry, biology and materials science for synthesis and fabrication of nanoparticles/nanostructures. Nanoparticles find wide spread applications in catalysis, energy science, agriculture, environment and medicine. Despite of the wide application of these nanomaterials, there is a serious concern regarding the impacts of manufactured nanomaterials on human health and the environment. Increasing the awareness of green chemistry and other biological processes has created a desire to develop an environmentally friendly approach to the synthesis of nanoparticles with various advantages such as simplicity, cost effectiveness, and compatibility for biological studies. The fission yeast *Schizosaccharomyces pombe* is an important model organism for the study of eukaryotic molecular and cellular biology. *S. pombe* is a widely used in eukaryotic cell biology to study the oxidative stress and aging as well as regulation of cancer cells metabolism This study aims determination of toxicity of silver nanoparticles (AgNP) compared with silver ions (AgNO3) to *S. pombe.* In the study, silver nanoparticle synthesis has been achieved using biological (green) synthesis process using extracts of Thymbra spicata. Characterization of the synthesized nanoparticles was performed by Dynamic Light Scattering (DLS), Transmission Electron Microscopy (TEM) and UV/Visible spectroscopy. DLS results show that biosynthesized nanoparticles have particle diameter with an average of 70 nm. The effect of biosynthesized AgNPs and Ag-ions on cell growth was determined different concentrations of both were added and the yeast were incubated at 30 °C, and growth was monitored by observing changes in OD600 as a function of time. Results demonstrated that Ag in the form of ions was more toxic than the biosynthesized AgNPs.

Keywords: *Schizosaccharomyces pombe*, silver nanoparticles, growth

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Multifactorial modelling of microrna associated repression and ıts subsequent effects on gene expression in MicroRNA:Target network

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Abstract

MicroRNAs negatively regulate expression of many genes, efficiency of which depends on concentration of targets, content and structure of seed region. Current models consider one microRNA and its targets, or one mRNA and microRNAs targeting that mRNA. In this study, a network-based model was developed incorporating factors that are important in microRNA activity such as free energy, microRNA expression and gene expression levels, seed structure and position of target region on mRNA. The gene and microRNA expression data were downloaded from The Cancer Genome Atlas (TCGA), microRNA:target pairing data was obtained from previously performed high-throughput sequencing studies using CLASH and CLEAR-CLIP. In this regard, microRNA expression, gene expression and microRNA:target databases were combined and the initial network created from the dataset was accepted as steady-state. The model was used to calculate how the expression of other genes will change in the network upon perturbation of single gene expression. As an example, in a microRNA:target network extracted from a breast cancer patient with 61 microRNAs and 186 genes, two-fold increase in one of the genes resulted in 15% of targets being up-regulated and 81% being constant . When gene expression changes calculated for the genes two genes node away from initial perturbed gene, we observed increase in 53% and decrease in 18% of all genes in the network. Our model can help understand gene expression changes in context of complex microRNA:target network and pave the way for gene expression analysis in context of ceRNAs such as circRNAs, lncRNAs.

Keywords: MicroRNA, Network, Gene expression regulation

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Determination of proliferative and cytotoxic properties of Luteolin

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Abstract

Particularly anticarcinogenic activities of phenolic compounds are noteworthy. Studies in human cell cultures and animal models have shown biological effects such as anticancer properties of flavonoids, DNA damaging effects, free radical cleansing properties, and apoptosis and cell signaling pathways that are involved in cell cycle control. Some researchers have reported that the protective effects of often-consumed fruits and vegetables on cancer are due to their flavonoid content. Luteolin, one of the important members of flavonoids, is abundant in many plants such as carrots, black pepper, mint, thyme, olive oil, sage, rosemary and celery. In this study, the effects of Luteolin on cytotoxicity, cell viability and cell number were investigated by WST-1 and LDH tests on HUVECs. According to the obtained findings, it was determined that Luteolin had proliferative effect and increased cell number and viability in all concentrations used.

Keywords: Luteolin, HUVECs, LDH, WST - 1

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Micropropagation of olive (*Olea europae* L.): The effects of Fe-EDDHA on *in vitro* shoot formation

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Abstract

Olea europaea L. has been cultivated from ancient times using traditional propagation systems including cuttings or by grafting onto seedling rootstocks. Additionally, the development of tissue culture techniques for mass propagation of olive plants has also received considerable attention in the last two decades. In fact, micropropagation can be applied for mass scale production and may represent an effective alternative to the traditional techniques for the olive cultivars that show easy- and medium-adaptation to in vitro conditions. However, further investigations are needed to optimize the technique and adapt it according to specific requirements of different cultivars. This study aimed to investigate the effects of FeEDDHA on *in vitro* shoot formation of olive cultures by using semi-solid medium with and without FeEDDHA. Optimum decontamination that allowed subsequent plantlet establishment was 2.5% commercial bleach treatment for two times 10-min, after which 56% of the shoot tips were free of contamination and all of them were able to survive and regenerated. Both cultivars of *O. europaea* L. shoots responded well to in vitro applications when cultured on the optimized proliferation MS medium supplemented with 10 µM zeatin and and 50mgL-1 FeEDDHA.

Keywords: FeEDDHA, *in vitro* propagation, MS Medium, Olive, Zeatin.

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Identification of lactic acid bacteria isolated from Turkey dry fermented sausage

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Abstract

Product-specific flavor, consistency and the situation providing aroma-forming in fermented sausages would be bacterial, enzymatic and biochemical reactions during ripening. Lactic acid bacteria are found in some foodstuffs in plant and plant wastes, in the mouth, intestines and vagina flora of the mammals, depending on the genus and species. Various methods are used to classify lactic acid bacteria. These might be sorted as morphology, form of glucose fermentation, development at different temperatures, lactic acid production type, ability to develop in high salt concentration and acid or base tolerance. These bacherias are *Lactobacillus, Lactococcus, Weissella, Streptococcus, Leuconostoc, Aerococcus, Oenococcus* and *Pediococcus.* In this study, isolation of lactic acid bacteria from sausage samples obtained from the market was carried out. Afterwards, these bacteria were analysed by morphological, biochemical, physiological and phenotypic methods. Genotypically, the bacteria were identified by using 16S rRNA, GTG5 and BOX-PCR analyses. These methods were then corroborated with the API 50 CH system, which would be a metabolic profiling method. As a result of the analyses, the following species were observed: *Lactobacillus plantarum, Pediococcus pentosaceus Lactococcus lactis* subsp. *lactis, L. curvatus* subsp. *curvatus, L. fermentum, Weisella viridescens* and *L.delbrueckii* subsp. *delbrueckii.* According to the results, it was observed that the predominant flora in sausage belongs to *Lactobacillus* species.

Keywords: *Sausage, Lactic Acid Bacteria, API, 16S rRNA PCR, BOX-PCR, GTG5-PCR*

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Isolation, identification and molecular characterization of lactic acid bacteria collected from different regions of Turkey white cheese samples

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Abstract

Lactic acid bacteria (LAB) are a group of natural catalase negative and gram-positive bacteria that would be lactic acid-forming as a final product. The sources of milk and dairy products of LAB have been quite remarkable in terms of studies. The most widely consumed and fermented dairy product containing the richest group as microflora is cheese. In the first stage of the study, samples of cheese were collected from different regions in Turkey and bacterial isolation from these samples was performed. Many conventional tests and genotypic methods were used for this purpose. As a consequence of the 16S rRNA sequence analysis and the API 50 CH method used, 45 bacterial isolates belonging to *Lactobacillus kefiri, L. brevis, L. casei, L. paracasei, Pediococcus lolii, Staphylococcus haemolyticus, P. parvulus, L. paraplantarum, Staphylococcus hominis, L. buchneri, L. plantarum, Enterococcus faecium, Micrococcus yunnanensis, Microbacterium paraoxydans* and *Rothia dentocariosa* were obtained. Genomic fingerprint analysis was then performed. It was observed that (GTG)5-PCR was more successful than BOX-PCR in terms of discriminating strains. In addition, it was deduced that two isolates were similar to *L. buchneri* and *E. faecium* with rate of 98% and 97% respectively, and these three isolates might be the new species.

Keywords: *Cheese, Lactic acid bacteria, Isolation, Identification,16S rRNA-PCR*

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Novel thiosemicarbazone copper complexes exert anti-metastatic effect through inhibition of epithelial mesenchymal transition in cancer cells

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Abstract

Newly synthesized copper complexes of 2-hydroxy-5-methoxyacetophenone thiosemicarbazone and its N(4)-substituted phenyl and ethyl derivatives that have proved anti-microbial properties were characterized previously. Here we report first evidence on anti-metastatic activity of the complexes at the molecular level. The evaluations of potential anti-cancer activity of these complexes were carried out against highly metastatic MDA-MB-231 (ATCC HTB-26) breast adenocarcinoma cell line by MTT assay. Our results suggest that all tested copper complexes have high cytotoxic effects with the range of 1.76-3.53 μM IC50 values in vitro. The UV-Vis studies results indicated that the main copper complex have high DNA binding ability. Due to this the subjected complexes could alter transcriptional regulations of the genes. Further western blot experiments on the MDA-MB-231 cell line have shown that the complexes posses anti-metastatic property via supression of epithelial mesenchymal transition which is the initiator process of cancer metastasis. The complexes and its N(4)-substituted derivatives upregulate expression of E-Cadherine epithelial cell marker and downregulate expression of N-Cadherine and Vimentin mesenchymal cell markers in MDA-MB-231 cells, thus supressing cell metastasis. Furthermore our complexes downregulate expression of Twist1 transcription factor play key role in the regulation of epithelial mesenchymal transition. According to our results these copper complexes and its derivatives could be considered as potential anti-cancer agents to counteract metastatic abilities through inhibition of epithelial mesenchymal transition of metastatic and drug resistant cancer cells.

Keywords: Thiosemicarbazone, metastasis, epithelial mesenchymal transition.

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Understanding the relationship between single cell morphology and colony pattern of *Pseudomonas pseudoalcaligenes*

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Abstract

Understanding of colonization of surfaces by a type of bacteria is of great importance not only for human health but also for industry e.g. biofilm formation. Alkaliphilic autochthonous propersties of the strains of *Pseudomonas pseudoalcaligenes* lead this specie to be applied in the treatment of cynanide-containing wastes of industries such as gold mining, steel and petrochemical. Besides the fact that bacteria have their own unique shapes, the changes in colonial morphology in response to environmental conditions and genetic factors have also been known. In this study, we have invastigated the morphological change in colonies of *Pseudomonas pseudoalcaligenes* (CECT 318) and its relationship with the single cell structure. Single colonies obtained throughout a serial dilution were examined on nutrient media solidified with agarose ratios of 0,5%, 1,0%, 1,5% and 2% (% w/v). The colony patterns obtained through the incubation at a temperature of 32 oC were collected by a digital camera as a function of time. The single cell images of the related colonies by SEM were collected. For samples on silicon supports, the bacteria were fixed with 2% glutaraldehyde, washed and resuspended in water and then deposited onto the silicon platelets as a 1-µl droplet. It is shown that the flagella-dependent and flagella-independent motility of bacteria are affected by medium content thereby show the most suitable morphology for environmental conditions

Keywords: Colony morphology, bacteria shape, *P. pseudoalcaligenes.*

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Isolation and molecular characterization of alkaliphilic and alkali-tolerant cellulase-degrading *Bacillus* strains.

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Abstract

Cellulose is the major structural polysaccharide that are found in plant cell walls and some algae. It is consist of β(1→4) linked D-glucose units and this organic polysaccharide is the most abundant organic polymer on Earth. It is reported that the annual production of this renewable polymer is about 100 billion tons. Cellulase is one of the most important industrial enzymes that catalyse hydrolysis of cellulosic substrates into its monomeric glucose component. This commercial enzyme is widely used in many industrial areas such as textile industry, food industry and in laundry detergents. In this study, totally 94 alkaliphilic and alkalitolerant *Bacillus* strains isolated from different origins and these strains were evaluated for cellulase enzyme activities. All isolates were incubated on CMC medium at 30°C for 72 h. At the end of this incubation period, petri dishes were stained for 15 minutes with 0,1 % congo red and then the excess dye was removed with 1M NaCI. After the excess dye removal process, strains with a clear zone around them were determined to be cellulase positive. As a results of this qualitative analyses, the isolates with the highest cellulose enzyme activity has been selected for molecular characterization. According to biochemical tests results and 16S rDNA gene sequence analysis results the strain SB104 has been identified as *Bacillus pumilus*; strain SB120 has been identified as *Bacillus aerius*; strain SB138 has been identified as Bacillus safensis; strain SB147 has been identified as *Bacillus licheniformis*.

Keywords: Alkaliphilic, Alkali-tolerant, *Bacillus*, Cellulase, Molecular Characterization.

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How TrxR activity changes in an iron-overload mouse heart?

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Abstract

Iron is an essential nutrient for all living organisms. Although it is required for many vital biological processes such as energy production, oxygen transport, synthesis of DNA, RNA and protein, the accumulation of iron in the body produces reactive oxygen species which causes oxidative stress. Thus, preventing oxidative damage via antioxidant system is indispensable for cell survival. Since the misregulation of iron metabolism may cause cardiovascular diseases, cancer, neurodegenerative diseases, and thalassemia, iron homeostasis is firmly regulated to organize a complex biochemical network in the body. In the present study, effects of iron overload on thioredoxin reductase (TrxR), which is one of the enzymatic antioxidant system, was investigated in mouse heart at the gene and protein levels. For this purpose, 10 male BALB/c mice were divided into 2 groups. Control group was intraperitoneally injected with 0.5 mg of dextran 5 solution. In the treatment group, 5 mg iron dextran solution was intraperitoneally injected twice weekly for 3 weeks to form systemic iron loading. The expression of hepcidin (*Hamp*), ferroportin (*Fpn*), ferritin *(Fth*) genes was examined by qPCR in mouse heart. Quantitative iron content, GSH level, and TrxR enzyme activities were examined. According to our results, quantitative iron content was significantly increased. However, no changes were seen in GSH level. While the gene expressions of *Hamp* and *Fpn* was increased, no changes were seen in Fth expression. TrxR enzyme activity was significantly increased. It may be said that TrxR protects the cell against iron-overload induced oxidative stress in mouse heart.

Keywords: Iron, Hepcidin, Oxidative stress, Thioredoxin reductase

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The expression levels of matrix gla protein (mgp) in various cell lines

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Abstract

Matrix Gla protein (MGP) is a member of vitamin K-dependent protein. MGP enacts in cellular growth and differentiation. It was observed in many in vitro studies that MGP is expressed in some cell types including osteoblast, chondrocytes, and fibroblasts. Besides, MGP presence was detected in several tissue. However, precise physiological function of MGP is still unknown. In our study, expression levels of MGP in various cell lines were investigated. Human cell lines; Chon-001 (chondrocyte), U-2OS (osteosarcoma), HEK-293 (embryonic kidney), Beas-2b (bronchial epithelial) were propagated under optimum cell culture conditions. Total RNA was isolated from cell cultures. Then expression of GAPDH and MGP were analyzed with real time qPCR. Gene Globe Data Analysis Center (Qiagen) was used to analyze real-time PCR data. The results were expressed as "fold-change". Our results indicate that MGP gene is expressed in Chon-001, U-2OS, HEK-293, and Beas-2b cell lines. Moreover, we observed that MGP gene expression was at maximum levels in human chondrocyte cells while at minimum levels in human osteosarcoma cells. It was shown in many cell culture models that MGP expression increases after cells exceed normal confluence threshold. Moreover, it was also demonstrated that MGP expression levels were high in developing perinatal organs such as kidney and lungs in early stages of embryological development. Considering the data in our study, we suggest that MGP shows a spatio-temporal expression pattern regarding cell and tissue type. Besides, further studies are needed in order to comprehend the action mechanism and role of MGP in human biology.

Keywords: MGP, Chon-001, U-2OS, HEK-293, BEAS-2B

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COI barcode based species specific primers for identification of sunn pest species

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Abstract

Accurate taxonomic *identification* of *pest* and *natural enemy* species is *important* and is essential before initiating an IPM programme. Traditional identification techniques rely on examination of morphological characters which have some shortcomings and limitations. Screening large numbers of samples requires undamaged specimens and substantial sample preparation which is also time consuming. The most serious drawbacks of only using this approach for species identification is the fact that some traits or characters are apparent only during certain life cycle stages or in one gender. Therefore, DNA-based approaches can compensate for the deficiencies in morphological identification. The universal *Folmer* primers have been probably the most *widely used* primer pair for amplification of cytochrome c oxidase (COI) gene in many animal groups. In this study we have sequenced a 658 base pair (bp) region of the (*COI) gene* of the most economically important species of the sunn pest are *Eurygaster integriceps* Puton and *Eurygaster maura* (L.) using universal primers. Analyzed nucleotide sequences were found without pseudo genes and indels that match with high similarity to the sunn pest sequences in NCBI database. The DNA barcodes were used in order to design new species specific primers by alignment of sequences based on highly conserved regions that is present in both species. *COI* barcode based species specific primers will enable rapid and accurate identification of aforesaid sunn pest species.

Keywords: DNA barcoding, COI, sunn pest, primer design

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Investigation of protein carbonyl groups as oxidative stress indicator on biological systems

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Abstract

In biological systems, it is very important to determine the relationship between high protein carbonyl group formation, oxidative stress and cell damage. The use of protein carbonyl groups as biological markers of oxidative stress is more advantageous than the measurement of other oxidation products due to the earlier formation and relative stability of carbonylated proteins. The most commonly used marker to assess protein oxidation is to identify protein-bound carbonyls. The protonic carbonyls can all be identified by a variety of methods based on the derivatization of the carbonyl group. Some hydrazine derivatives which are formed with the most common 2,4-dinitrophenylhydrazine (DNPH) are used. Hydroxylation of aromatic groups and aliphatic amino acid side chains resulting from the oxidation of proteins leads to the nitration of aromatic amino acid radicals and sulfhydryl groups, the sulfoxylation of methionine, the chlorination of aromatic and primary amine groups, and the conversion of some amino acid radicals to carbonyl derivatives. Oxidation also results in the formation of cross-linked proteins and breakage of the polypeptide chain, which in turn results in the formation of alkoxyl radicals, the most important of which are radicals. In addition, the functional groups of proteins react with oxidation products of polyunsaturated fatty acids such as 2-alkenal, 4-hydroxy-2-alkenal and ketoaldehyde and some carbohydrate derivatives (carbohydrate addition or carbohydrate oxidation products) to form inactive derivative compounds. Protein carbonyl content is the most common and useful biomarker of protein oxidation. Oxidative modifications of enzymes and structural proteins cause numerous diseases. Rapid and novel advances in the identification of oxidative proteins provide new diagnostic biomarkers for oxidative damage, leading to the creation of effective antioxidant therapy. Determination of protein oxidation can be used in early diagnosis of many diseases, especially cancer.

Keywords: Protein carbonyl, protein oxidation, cell damage, free radicals

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Ion exchange chromatography in protein isolation and purification

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Abstract

The components that make up a substance have differences such as molecular weight and ionic charge. While these components are passed over a fixed phase with the help of a moving phase, the same type of components are gathered together depending on the pace of travel over the stationary phase. Chromatography is a separation and / or purification technique based on the principle that components of the same species together and complete their progress over the stationary phase for a specific period of time. The chromatographic method in which the stationary phase is distinguished from the ion exchange principle is called ion exchange chromatography. At each pH of the protein, there is a net charge due to the positive or negative charge of the amino acids forming it. Accordingly, the binding of the protein to the negatively charged material (if it is positively charged itself) or to the positively charged material (if it is negatively charged itself) constitutes the basis of the separation in ion exchange chromatography. In ion exchange chromatography, ion exchange materials are used as the column material. An ion exchanger consists of a matrix in a water-insoluble polymeric structure and functional groups bearing a positively or negatively charged chemical bond thereto. The matrix portion of the ion exchangers may be aluminum silicate, a synthetic resin, or a polysaccharide derivative. The ion-exchange resins are mainly used for the purification of small molecule globulin proteins and peptides. In the purification of proteins due to their advantages such as water retention and water swelling properties, as well as the non-denaturation of proteins, the resins have been replaced by polymeric cellulose and dextran derivatives over time. Ion exchange chromatography is particularly used for the isolation and purification of a wide variety of macromolecules such as enzymes, proteins, nucleic acids..

Keywords: Protein isolation, purification, ion chromatography

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Development of genome specific microsatellite marker in *Cucurbita pepo* L.

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Abstract

Cucurbita pepo L. is an economically important member of the Cucurbitaceae family and perhaps the most polymorphic species with respect to fruit characteristics. Cultivated varieties display a rich diversity of vine and flowering type. Despite the agronomic and economical importance of the plant, the first whole genome sequence assembly was published at 2017. In this study whole genome sequence (261.355 Mb) of the *Cucurbita pepo* L. was bioinformatically analyzed to determine the microsatellite motifs for developing primers to generate genomic molecular markers. Repeated motifs were searched using the Perl script program MISA within whole genome sequence, by applying the parameters; di-nucleotide ≥7, from trinucleotide to hexanucleotide ≥6, and distance between two SSRs ≤200 bp.Primers were designed by using Primer3 software by applying high stringency primer designing parameters. As a result of analyses 28.367 newly developed microsatellite markers were evenly distributed to 20 chromosomes of *C.pepo* with high density coverage. For the first time, huge amount of microsatellite markers were developed in this study and this information will provide valuable information to breeders for future molecular breeding programs.

Keywords: *Cucurbita pepo* L., Molecular marker, MISA program, Primer3 software, SSR

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Short-term genotoxicity test

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Abstract

Humans are exposed to various chemical substance and physical factors (irradiation) in their daily life. Some of these agents may have genotoxic activity by leading DNA damages such as gene mutation, structural chromosome aberration, recombination and numerical changes. These damages can lead several health problems, from cancer to a wide variety of different diseases containing tissue defects, infertility, ageing, and multifactorial disorders and also cause hereditary defects due to mutations in germ cells. Therefore, identifiying mutagenic/genotoxic substances, in order to minimize exposure to these compounds is important for preventive medicine. Several genotoxicity tests with different endpoints have been developed since 1970 and used to detect mutations in single gene, chromosome, or genome and also endpoints representing primary DNA damage. Mutagenicity tests are performed by using bacteria, invertebrates, mammals, fishes and plants. In the “in situ” and “in vivo” studies, eucaryotic organisms are exposed to the evironmental compartment for monitoring purposes. In vitro test systems are performed with bacteria, primary tissue cultures, blood cells and permanent cell lines from eucaryotic organisms such as V79, CHO, and CHL. Most frequently used genotoxicity tests are namely bacterial Ames test, E.coli WP2, umuC and SOS chromo assays, Mammalian hypoxanthineguanine phosphoribosyl transferase (HPRT) forward mutation test and Mouse lymphoma thymidine kinase (TK) gene mutation assays, Somatic mutation and recombination test (SMART), Comet assay analysing integrity of DNA, Unscheduled DNA synthesis (UDS) assay measuring repair activity after exposure to genotoxins, Chromosomal aberration (CA), Micronucleus (MN), and Sister chromatid exchange (SCE) tests detecting macro damages of chromosomes which visible in the light microscope. Positive results obtained from genotoxicity tests indicated that tested agents have the potential to be carcinogens and/or mutagens for human.

Keywords: Genotoxicity tests, Mutagenicity tests, DNA damage

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Use of next generation discovery technologies in plants

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Abstract

DNA sequencing studies emerged recently with the rapid development of Molecular Biology have enabled the possibility of sequencing whole genomes of plants using new generation technologies. New generation DNA sequencing methods are divided into three groups: sequencing through synthesis, sequencing through ligation, and sequencing one molecule. The number of studies performed synthetic sequencing methods using Roche 454 and Illumina sequencing technologies are higher in plants. The greatest goal of the studies was the discovery of many DNA markers in one go. Due to the complex nature and size of the plant genome, a new generation of sequencing is needed. Sequencing methods offer high data quality with long, accurate and fast readings and are very useful because they are economically viable. In addition, they light the selection of plant populations, genetic diversity, quantitative feature locus (QTL) mapping and marker-assisted selection. In recent research, it has been used successful in the identification of important plant varieties such as corn, barley, zucchini, rice, wheat and potatoes. This study is about the assessment of the use of next-generation sequencing technologies in the field of plant technology.

Keywords: New Generation Sequencing (NGS), DNA sequencing analysis, Plant Biotecnology

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Synthesis of some new thiadiazine derivatives and their biological activities

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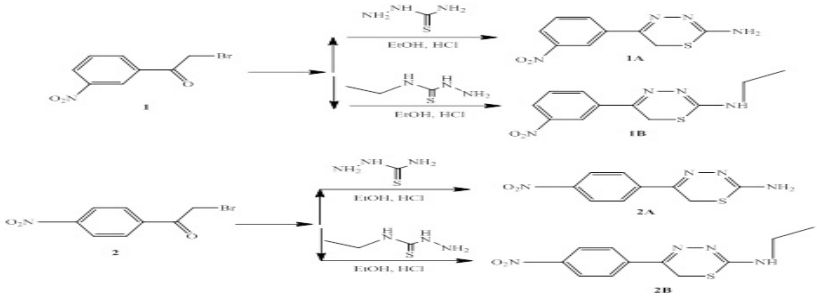
Abstract

In recent years, interest in thiadiazines has increased due to the high biological activity and broadspectrum action of their derivatives . Many thiadiazines have been discovered with possible applications in medical practice as sedatives, antianxiety agents, antiasthmatic agents, anticonvulsants, myorelaxants, coronary vasodilators, and spasmolytics. 1,3,4-thiadiazine derivatives are also being used in agriculture as herbicides, fungicides, pesticides, insecticides and plant-growth regulators. The 1,3,4-thiadiazine system was first reported by Bose employing a reaction of α-bromoacetophenone with thiosemicarbazide. In this study we describe a series of 6H-1,3,4 thiadiazines. Reaction of α-bromoacetophenone derivatives with thiosemicarbazide in ethanol at room temperature as the first step, followed by refluxing of the ethanolic solution of the obtained product in the presence of small amount of HCl. The biological activities of the synthesized products were then examined.



Scheme 1. Synthesis of Thiadiazine derivatives.

Keywords: 1,3,4-thiadiazines, Thiosemicarbazides, Antimicrobial activity, Biological activity.

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Determination of protease enzyme production potentials of thermophilic bacteria isolated from hot water springs

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Abstract

Proteases are known as enzymes in the hydrolase group, which hydrolyse proteins to peptides and free amino acids. In order to fulfil this function, all protease groups would break the amide bond in the polypeptide chains. There has been an increased interest in microbial proteases since plant and animal proteases can not meet the needs in the world. Microorganisms are excellent enzyme sources due to their wide range of biochemical diversity and susceptibility to genetic interventions. Proteases obtained from microbial sources are more advantageous than those obtained from plant or animal sources, because of high catalytic activity, no undesired byproduct formation, more stability and more quantitative yields. This makes microbial proteases unprecedented for biotechnological applications. In this study, protease enzyme production potentials of 12 thermophilic bacteria isolated and identified as molecular from hot water springs were determined spectrophotometrically and by using disc diffusion method. As a result of the analysis carried out, it was observed that isolates of O16, O12 and A10 have maximum activity and O9, O3, O5 and O11 bacteria have no protease enzyme activity.

Keywords: Amylase, Disc diffusion, Biotecnology, Enzyme

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Quantitation of β-sitosterol in crataegus orientalis (Rosaceae) by gas chromatography-mass spectrometry

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Abstract

Hawthorn belongs to *Crataegus* L. genus of the Rosaceae family and it has been reported that Crataegus contains nearly 21 species in Turkey. *Crataegus orientalis* is a species of hawthorn and fruits, flowers and leaves of its have been used for the treatment of cardiovascular diseases, hypertension and arteosclerosis diseases since ancient times. In experimental and clinical studies demonstrate that different taxa of hawthorn have antiinflammatory, antioxidant, antivascular, antiviral, antithrombotic, antifungal effects and also it is effective in the early stages of congestive heart failure. Due to its positive effects on the cardiovascular system, hawthorn has recently become a popular herbal medicine in phytotherapy. Beta-sitosterol, plant sterol ester, is a substance found in plants. β-sitosterol is used for heart disease and high cholesterol. This study aims at the simultaneous determination of β-sitosterol in *C. orientalis* by GC-MS method. The retention times of β-sitosterol were found to be 14.9 min. The validation of the proposed method was carried out for specificity, linearity, accuracy, precision, limit of detection, limit of quantitation and recovery. The linear ranges were 1-100 µg/ml for β-sitosterol. The intra- and inter-day precisions, expressed as the relative standard deviation (RSD), were less than 4.99%, determined from quality control samples for β-sitosterol, and accuracy was 1.33% in terms of relative error. The application of a simple, rapid and accurate GC-MS method was carried out the quantitation of β-sitosterol in *C. orientalis*. Therefore the proposed method can be used for the routine quality control analysis of β-sitosterol in *C. orientalis.*

Keywords: β-sitosterol, GC-MS, *Crataegus orientalis*, cholesterol-lowering effect

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Determination with qRT-PCR of expression levels of some antioxidative enzymes in safflower types (*Carthamus tinctorius* L.) applied by boric acid

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Abstract

Today fossil based primary energy resources like coal, petrol and natural gas have been depleting and these energy resources have ecological harm. For these reasons, new renewable energy sources are preferred in recent years. Animal fats and herbal products like soy beans, corn and sunflower are used to obtain renewable energy. Safflower (*Carthamus tinctorius* L.) is the leading among those herbal products. It is an enduring herbal because of its high tolerance to cold and hot; its tolerance to salinity and weeds. This fact arises the idea that its reaction to different stress factors should be analysed. Changes on three different safflower type (Balcı, Dinçer and Remzibey) brought by APX, GR, CAT and SOD enzyme activities of boric acid in different concentrations at expression level are found. Though the element boron is one of the micro elements absolutely necessary for the growing of the plants, too much boron found in the soil is a stress factor which limits the plant growth and productivity. In this study, total RNAs are isolated from the leaves of three safflower types (Balcı, Dinçer and Remzibey) grown in different boric acid concentrations (0: control, 5, 10, 15, 20 mM). These RNA samples are transformed into first strand complementary DNA (cDNA). APX, GR, CAT and SOD gene expression levels is identified with qRT-PCR as a result of normalisation with GAPDH which is determined as reference gene. Difference on gene expression levels of antioxidative enzymes based on increasing boric acid concentration in three safflower types.

Keywords: *Carthamus tinctorius*, boric acid, seedling, RealTime-PCR

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Topoisomerase mutations are associated with resistance to the second generation quinolones in *Pseudomonas aeruginosa* clinical ısolates

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Abstract

Background: *Pseudomonas aeruginosa* is a clinically significant pathogen causing opportunistic infections and nosocomial outbreaks. The emergence of multi-drug-resistant strains in P. aeruginosa isolates has increased worlwide. Fluoroquinolones and aminoglycosides are two important classes of antibiotics used in the treatment of *Pseudomonas* infections. Fluoroquinolones act as bactericidal agents by inhibiting DNA gyrase and topoisomerase IV, thus inhibiting DNA transcription and replication. The second-generation quinolones have broader clinical applications in the treatment of complicated urinary tract infections and pyelonephritis, sexually transmitted diseases, selected pneumonias and skin infections. Though topoisomerases I and III are not very susceptible to inhibition by the quinolones, topoisomerases II and IV are the lethal targets of the quinolones. In the present study, we investigated susceptibility profiles of the clinical samples to the second generation fluoroquinolones ciprofloxacin and ofloxacin and the mutations related with fluoroquinolones resistance (topoisomerase II: gyrA and topoisomerase IV: parC genes). Methods: A total of 54 *P. aeruginosa* isolates were collected from various clinical specimens from hospitalized people in Sinop and nearby cities, Turkey. The isolates were identified based on Gram staining and conventional biochemical tests. Reference strain *P. aeruginosa* ATCC 27853 was used as a positive control for all tests. Antibiotic susceptibility profiles were determined with Kirby-Bauer disc diffusion test. DNA extraction from the bacterial isolates was carried out by standard phenol chloroform method and gyrA and parC target gene sequences were amplified by PCR using specific primers. For restriction fragment length polymorphism (RFLP) analysis, PCR products were treated with SacII and HinfI enzymes for gyrA and parC respectively, and the fragments were separated on agarose gel stained with ethidium bromide and visualized on gel documentation system. Results: The results of disc diffusion test showed that 21 samples (38.9%) were sensitive and 33 samples (61.1%) were resistant to ciprofloxacin. For ofloxacin, 6 samples (11.1%) were sensitive and 48 samples (88.9%) were resistant. We found mutation in gyrA (Thr-83→Ile) in 17 (51.5%) of ciprofloxacin resistant samples. There was no mutation found in ciprofloxacin sensitive samples. We found mutation in parC (Ser-87→Leu) in 14 (42.4%) of ciprofloxacin resistant samples. Mostly, parC mutation accompanied gyrA mutation, only 4 isolates had a mutation in parC without a gyrA mutation. We found mutation in gyrA in 16 (33.3%) of ofloxacin resistant samples and the same value was also found for parC mutation. Only one sample had a mutation both in gyrA and parC genes in ofloxacin sensitive samples. Conclusion: Since gyrA mutations are the major mechanism of resistance to fluoroquinolones for clinical strains of *P. aeruginosa* and that additional mutations in parC could lead to a higher level of quinolone resistance, these mutation screening tests would be appropriate for epidemiological surveillance.

Keywords: Topoisomerase II (gyrA), Topoisomerase IV (parC), *Pseudomonas aeruginosa*, Ciprofloxacin, Ofloxacin

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Codon bias trends in three domains of life

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Abstract

Although synonymous codons encode the same amino acid, these codons are not used randomly in a genome and this phenomenon is known as 'codon usage bias'. Synonymous codon biases though often referred to as silent mutations can exert a plethora of effects on the cell that directs us to consider novel biological hypotheses. The initial hypothesis related with the biased codon usage was related with the abundance of tRNA molecules to enable the mRNA being translated faster and/or more accurately. This concept reflects the optimal codon biases in highly expressed genes taking into consideration of the fact that translation is energetically very expensive and inaccurate translation wastes limited cellular resources. It has been known that; species exposed to selection for rapid growth exhibit a stronger codon usage bias. Besides, fast-growing bacteria with relatively low generation time generally have more tRNA genes which is positively correlated with genome size and G+C content to increase translation speed. However, codon bias is less distinguished in higher eukaryotic genomes, a fact that may reflect different translation mechanisms among the three domains of life. Today, a plenty of novel biological hypotheses including amino acid starvation responses, cyclically expressed proteins, tissue-specific expression patterns, cellular differentiation, tRNA modifications, stress response genes, and carcinogenesis also have an extensive coverage in the literature. For humans, a concept known as 'isochores' corresponding to genomic regions with distinct G+C compositions is present. This contributes to variation scales among genes in terms of codon usage bias and signs a different selection mechanism compared with lower organisms. Though among bacteria generally the values of selected codon usage bias (S) are highly correlated with both the number of rRNA operons and tRNA genes, a different, not so straightforward codon-mediated translational control plays role in humans reflecting the tissue-specific pattern; genes selectively expressed in one human tissue can generally be discriminated from genes expressed in other tissues based on their synonymous codon usage. It seems that each genome has a specific codon usage signature reflecting particular evolutionary forces acting within that genome. We aim to recapitulate the codon usage trends both in prokaryotic and eukaryotic genomes in terms of a molecular evolutionary perspective.

Keywords: Codon bias, prokaryotic genomes, human genome, isochores, translation efficiency, molecular evolution

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Calixarene nanofiber design for human gingival fibroblast 3D-cell culture

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Abstract

A growing body of evidence has suggested that 3D cell culture systems, in contrast to the 2D systems, represent more accurately the actual microenvironment where cells reside in tissues. The main advantage of using 3D cell aggregates/spheroids in tissue regeneration is their ability to mimic not only the architecture of the cells in vivo, but also the cells' natural tendency to fuse and form tissue units with well-defined morphogenic and functional properties. p-tert-butylcalix[4]arene, similar to a ring basket, represent a third generation of supramolecular hosts. Due to having a cyclic structure and large surface area, calixarenes, can be functionalized easily with polar and apolar groups, be a good carrier for cations, anions and neutral molecules. Electrospinning of p-tert-butylcalix[4]arene nanofibers with different functional groups were performed and their Human Gingival Fibroblast (HGF-1) cytocompatibility behaviour on cell adhesion function were examined. The structure of the synthesized compounds was characterized by 1H-NMR and FT-IR. Then the nanofibers of these synthesized compounds were withdrawn by electrospinning. Surface characterization of the nanofibers was done by SEM, TEM and AFM analysis. As cell in-vitro models, HGF-1 cells (2x105) were cultured on nanofibers. Cell growth/proliferation analysis were done by XTT assay and fluorescent microscopy analysis with DAPI stain. Finally, SEM/EDS measurement was used to characterize the morphology of the attached cells and evaluated the cell proliferation. It has demonstrated that ECM-adhered gingival fibroblast monolayers and spheroids indeed migrate, rearrange, and create 3D cell-constructs on calixarene nanofibers.

Keywords: Calixarene, Nanofiber, 3D-Cell Culture, Human Gingival Fibroblast

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Influence of the functionale variants of NR3C1 and UCP2 genes on risk of ankylosing spondylitis in a Turkish cohort

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Abstract

Ankylosing spondylitis (AS), chronic autoimmune disease, a polygenic disease caused by the combined influence of environmental and genetic factors. The human glucocorticoid receptor gene (NR3C1) is considered to play a role in the the glucocorticoid response in individuals with autoimmune diseases. Uncoupling protein 2 (UCP2) is a member of the mitochondrial transporter superfamily. We proposed to investigate the role of NR3C1 Bcl-1 (rs41423247) and UCP2 -866G/A (rs659366) variants in Turkish patients with AS. NR3C1 Bcl-1 and UCP2 -866G/A variants in a total of 74 patients with AS and 80 healthy controls were genotyped using polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). The NR3C1 Bcl-l allele and genotype frequencies were found similar in the two groups. There was a significantly difference genotype and allele frequencies of UCP2-866G/A variant between AS patients and controls. The AA genotype and A allele of UCP2 -866G/A variant were increased in patient group compared to control group, respectively (p=0.006, p=0.001). The subjects carrying the UCP2 -866G/A variant AA genotype showed a 4.115-fold increased AS risk than control group (OR:4.115, 95%CI:1.499-11.296). Additionally, we found that UCP2 -866G/A variant AA genotype was associated with Ankylosing spondylitis quality of life (ASQoL) (p=0.036). We demonstrated for the first time that UCP2 -866G/A variant was associated with AS. These findings indicate that the the UCP2 -866G/A variant may contribute to AS susceptibility in a Turkish cohort.

Keywords: Ankylosing spondylitis, NR3C1, UCP2, PCR-RFLP, ASQoL

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Typing of *Staphylococcus aureus* strains ısolated from raw milk and ice cream by pulsed field gel electrophoresis

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Abstract

Bacterial food-borne pathogens are a major cause of morbidity and mortality throughout the world. *Staphylococcus aureus* is one of the major pathogenic bacteria found in milk and dairy products. For this reason, typing methods are important tools for determining the primary sources of bacterial contamination. Pulsed-field gel electrophoresis (PFGE) is known as the ‘‘gold standard’’ for typing *S. aureus*. The purpose of this study was to investigate 55 *S. aureus* strains isolated from 260 raw milk and 150 ice cream samples in terms of genetic diversity. Pulsed-field gel electrophoresis was used to identify the genetic relations of S. aureus isolates. The phylogenetic dendogram of strains were established according to PFGE profiles obtained after restriction with SmaI. At a similarity level of 80%, ıt was determined that the 55 *S. aureus* strains revealed 43 different pulsotypes represented by 9 subtypes. According to the findings obtained, 55 *S. aureus* isolates isolated from raw milk and ice cream were found to have high genetic diversity and consequently clonal associations were low. However it was determined that *S. aureus* isolates isolated from the milk collected from the same area were related or possible related. No related or possible related isolate between ice cream and raw milk isolates was detected. The results showed that PFGE is a powerful method to follow the sources of food contamination.

Keywords: Genetic diversity, Pulsed-field Gel Electrophoresis, *Staphylococcus aureus*

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Adventitous shoot regeneration from cotyledonary leaves of Melissa officinalis on medium containing TDZ-IBA

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Abstract

Melisa officinalis is an important herbaceous medicinal plant of . Lamiaceae family and shoes wide distribution in Mediterranean, Europe and Central Asia regions. Cotyledonary leaves from 7-10 days old seedlings were cultured on MS medium supplemented with 0.10, 0.20, 0.40 and 0.80 mg/l Thidiazuron (TDZ) using single or in combination with 0.10 mg/l Indole-3-butyric acid. The medium was also enriched with 3.0% sucrose, gelled with 0.65% agar with 5.8 pH. Shoot regeneration started after 3 weeks of culture but explants showed signs of necrosis and subcultured to same medium with addition of 1.0 mg/l Polyvinylproline (PVP). Addition of PVP exerted positive signs on explants and multiple shoot regeneration without sign of necrosis were recorded and data were taken after 10 weeks of culture. Among mediums, 0.40 mg/l TDZ with 0.10 mg/l IBA induced more callogenesis, regeneration frequency, and shoots per explant. İn vitro regenerated shoots were rooted successfully on MS medium supplemented with IBA. Later on, these plants were transferred to pots containg torf for acclimatization.

Keywords: In vitro, Adventitous, Regeneration, Cotyledonary leaves

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Biotechnological approches for genetic ımprovement of cowpea (*Vigna unguiculata* L. Walp.)

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Abstract

Cowpea (*Vigna unguiculata* L. Walp.) is one of the most important and widely cultivated legumes in many parts of the world, particularly in Africa, Europe, Latin America and some parts of Asia and the United States. It is an excellent substitute for animal proteins by resource-poor people and vegetarians because of its high seed protein content (about 25%) and rich amino acids. Almost 80-90% production of total cowpea ğroduction is confined to African countries. However, scaricity of water and other biotic and abiotic factors are the major reason of low production per unit. In recent years, number of biotechnological and molecular biology tools has been employed for its improvement in order to increase yield. The emergence of "omic" technologies and the establishment of model legume plants are promising strategies for understanding the molecular genetic basis of stress resistance, which is an important bottleneck for molecular breeding. Biotechnology tools such as marker-assisted breeding (Quantitative Trait Loci (QTL), RAPD, RFLP, AFLP, SSR), plant tissue culture techniques (Other tissue-culture derived techniques ; somaclonal variation, in vitro mutagenesis, doubled haploids culture, and wide hybridization), and genetic transformation can contribute to solve or reduce some of these constraints. However, only limited success has been achieved so far. This study revealed the use of different biotechnological techniques and tools for the genetic improvement of cowpea.

Keywords: Cowpea, Biotechnology, Genetic improvement, *Vigna unguiculata*

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Interactive effects of hydropriming and light emitting diodes (LEDs) on germination and growth of black chickpea (*Cicer arietinum*) under in vitro conditions

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Abstract

Chickpea (*Cicer arietinum*) is third most consumed edible legume after bean and pea worldwide. The production of chickpea covers more than 20% of total legume production. The production of chickpea is limited due to several biotic and abiotic factors. Light is an important factor that affects the growth and development of plants. In recent years, there is an increasing pattern of using light-emitting diode (LED) lights in different colours in lab and green house studies to check the exact demand of light for plant. On the other hand, priming techniques provides an alternative way to enhance seed germination and plant growth on problematic soils especially against salt stress. The black chickpea is an important medicinal plant due to its benefits on human health but lesser known than other varieties of chickpeas. In this study, the combined effect of various LEDs lights and hydropriming on the germination and development of black chickpea under in vitro conditions. Black chickpea seeds were surface sterilized with 3.5% NaOCl for 15 min followed by 5 min rinsing with distilled sterilized water for three times. Thereafter, seeds were primed with water for 1, 2 and 4 hrs and cultured on MS medium supplemented with 3% sucrose and solidified with 0.65% agar. Seeds were divided into three groups and placed under blue, red and white LEDs lights for photoperiod of 16 h dark and 8 h light at room temperature. Control experiment was also conducted by placing non primed seeds under different LEds lights on MS medium. Data regarded germination and plant growth and development were taken after 15 days of culture. Results indicated that 100% germination was recorded within one day irrespective of hydropriming and LEds type. Whereas, plant growth and development was statistically affected by both hydropriming and LEds type.

Keywords: Hydropriming, light-emitting diode (LEds), Black chickpea, Germination

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Upregulation of heat shock protein in response to thermal stress and UV-A irradiation in Egyptian cotton leafworm, *Spodoptera littoralis*

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Abstract

Heat shock proteins (HSPs), highly conserved protein families, are best known with being quick responsive to not only raising temperatures but also to the most of stress conditions including biotic and abiotic stresses such as microbial agents, cold shock, UV exposure, etc. HSPs are molecular chaperones that function in folding/unfolding of proteins, and also protect cells against stress. They comprise five families based on their molecular masses, referred as HSP60, HSP70, HSP90, HSP100, and small HSPs. *Spodoptera littoralis*(Boisd.), also known as the Egyptian cotton leaf worm, is a polyphagous organism that found extensively in Mediterranean and Asian countries. The pest causes economic losses in a wide range of crops including cotton, corn, and tobacco. In this study, we examined expression levels of heat shock protein 70 gene of *S. littoralis* (SpliHSP70) in response to heat shock (42°C), cold shock (0°C) and UV-A radiation in third instar larvae. Heat and cold shock treatment showed an increasing effect on SpliHsp70 while transcript level of heat shock treatment was found much more effective than cold shock treatment. Upregulation of SpliHsp70 was monitored in all time periods from 30 to 180 minutes in response to UV-A radiation with the highest level occurred after 60 minutes of exposure.

Keywords: BHeat shock protein (HSP), *Spodoptera littoralis*, abiotic stress, gene expression

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Effect of different carbon and nitrogen sources on decolorization efficiency and laccase activity of fungal pellets in repeated–batch system

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Abstract

Textile industry uses dyes with different chemical structure. Reactive dyes are used extensively in the textile industry. Dyestuff causes serious environmental pollutions. The objective of this study was to investigate the decolorization of Reactive Green 19 and Reactive Blue 171 dyes by white rot fungal pellets in order to confirm the possibility of practical application via repeated-batch cultivation. Additional nitrogen and carbon source was used and high decolorization rates were achieved in dye-contained media without pH adjustment. The degradation of textile dyes by white rot fungi is a process associated with metabolic and / or extra-intracellular enzymes and additional carbon and nitrogen sources are increasing the yield. Reactive Green 19 was decolorized at the rate of 80 and 78 % within 4 hr by Trametes versicolor, and *Funalia trogii* free pellets, respectively. These values were 80 and 71% for Reactive Blue 171, in this respect. When the peptone, yeast extract, glucose and copper were added at different concentrations, the decolorization efficiency was increased. Maximum laccase activity of *F. trogii* pellets (7.47±0.37 U/ml) was obtained after first use in copper-contained media. After separation by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE), the molecular weight of *T. versicolor* and *F. trogii* laccase bands was determined as approximately 64 and 61 kDa, respectively. Green bands were obtained by the activity staining process with laccase substrate (ABTS) after gel renaturation step. Additional nutrients affected the removal of the color of the dyes positively.

Keywords: Reactive dyes, Fungal pellets, Additional nutrients, Laccase, Decolorization

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Influence of Lupin (*Lupinus albus* L.) hull flours on some properties of cake

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Abstract

Lupin (*Lupinus albus* L.) is member of the family *Leguminosea*. The hull of the lupin contains high amount of ash, dietary fiber, antioxidant substances and mineral matter. In this study, lupin hull flour (LHF) was used for production of high fiber cake production. LHF was replaced with wheat flour at 5, 10, 15 and 20% ratio in cake formulation. Cake samples were also prepared with and without additives (guar gum and diacetyl tartaric esters of mono and di glycerides). Effect of LHF level and additive usage on some physical (crust and crumb colour values, firmness, volume index, symmetry index and uniformity index), chemical (moisture, ash, protein, cellulose and minerals) and sensory properties of cake samples was determined. While moisture, ash, cellulose and Ca, Fe, Mg and Mn content of the cake samples increased with LHF usage, a significant decrement was observed in protein content. High utilization ratios of LHF had an adverse effect on volume index values of the cake samples. This adverse effect was partially eliminated by the use of additives. Cake samples containing additives presented more attractive crumb colour values. As a result of the technological and sensory properties, it was recommended that LHF can be used in cake formulation successfully up to 10 % addition level without additives, and up to 15% level with the aid of additives.

Keywords: Lupin bran, cake, guar gam, diacetyl tartaric esters of mono and di glycerides

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Screening of newly introduced wheat cultivars to Jordan environment

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Abstract

Wheat is a major cereal crop in the world, it has high nutritional value. Wheat growth and productivity are influenced by biotic and abiotic stresses. Drought and salinity can reduce wheat productivity by more than 80%. In this study, the effect of drought and salinity on newly introduced cultivars of wheat (Mamorai, Um rabee, Acsad1315) studied and compares their stress tolerance to local cultivars (Horani, Acsad65, Sham1). Different physiological and biochemical parameters were investigated. ISSR analysis showed significant differences between studies varieties.

Keywords: Wheat, ISSR, proline

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Effect of different nitrogen source on growth and lipid accumulation microalgae *Chlorella variabilis*

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Abstract

Nitrogen is one of the major elements required for growth and other physiological activities of microalgae. Microalgae can use different forms of nitrogen such as nitrate, nitrite, ammonium, and urea. Although the type of nitrogen used by microalgae depends on the species, microalgae usually prefer ammonia as a nitrogen source and the usual order of preference is ammonium, urea, nitrate, and nitrite. However, types of nitrogen sources and their concentrations affect the growth of microalgae cultures and their biochemical structures. It has been reported in many studies that microalgae accumulate more lipids under nitrogen- starvation growth conditions. Therefore *Chlorella variabilis* microalgae growth and lipid accumulation behaviour under different types of nitrogen source [sodium nitrate ($NaNO_3$), ammonium chloride (NH_4Cl) and urea ($(NH_2)_2CO$)] in growth medium (BG11) was investigated in this work. Microorganism growth was periodically monitored spectrophotometrically at 660 nm. After 17 days of incubation maximum growth rate (μmax =0.44 h-1) and lipid productivity (4.20 mg/L.day) were obtained in the presence of NaNO3 in the growth medium as the nitrogen source. Compared to the other nitrogen sources (NH_4Cl, $(NH_2)_2CO$-), $(NH_2)_2CO$ did not significantly change the growth rate and the lipid productivity, however, increased the doubling time of the microorganism (23h). According to the results, use of microalgae as a raw material in the production of renewable energy resources is hopeful in the future.

Keywords: lipid, microalgae, nitrogen, renewable energy

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Effect of ıron loading factor on magnetic relaxivity properties of magnetoferritin

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Abstract

Different sizes of magnetic iron oxide (composed of mostly magnetite and/or maghemite (Fe_3O_4 − γ-Fe_2O_3) nanoparticles were synthesized with various theoretical iron loadings from 500 to 5000 iron atoms per protein molecule by using recombinant human H-chain ferritin protein as a biotemplate for the evaluation as a magnetic resonance imaging (MRI) contrast agent. The biomaterial called magnetoferritin is comparable in size to other commercially available ultrasmall superparamagnetic iron oxide contrast agents for MRI, but with the unique features such as excellent homogeneity of particle size and providing further modification to impart cell-specific targeting. The effect of iron loading factor on the R_1 and R_2 relaxivity of magnetoferritin samples were determined by a magnetic resonance scanner under 90 and 300 MHz at room temperature. It was seen a clear size dependence of the nanoparticles on their relaxivity and an increase in R2 relaxivity with the iron loadings. The sample with the highest iron loading of 5329 Fe/cage (experimentally found iron loading factor) has R_2 value of 165.2 $mM^{-1}.s^{-1}$ at room temperature and at a frequency of 300 MHz. This high R_2 value demonstrates that magnetoferritin nanoparticles may serve as T_2 contrast agent in MRI with high efficiency when compared with commercially used iron oxide MRI contrast agents. However it does not show a considerable change in R1 relaxivities with various loadings. The sample with the highest iron loading of 5329 Fe/cage has R_1 value of 1.98 $mM^{-1}.s^{-1}$. R_1 and R_2 values were slightly higher when lower frequency (90 MHz) was used.

Keywords: Magnetoferritin, MRI, Contrast Agent

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In vitro antioxidant and antiproliferative activities of gypsophila aucheri: Analysis of its phenolic compounds by RP-HPLC

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Abstract

The genus *Gypsophila* L. having 126 species worldwide is mainly distributed in the Irano-Turanian and Mediterranean regions and it is the third biggest genus of Caryophyllaceae family in Turkey, possessing 55 species in the country and represented by 58 taxa, 33 of which are endemic. The aim of this study was to investigate the antioxidant and antiproliferative activities of *Gypsophila aucheri* extracts as well as their phenolic contents by using the reversed-phase high performance liquid chromatography (RP-HPLC) technique. Antioxidant potentials of the extracts were evaluated by four different methods namely, 1,1-diphenyl-2-picrylhydrazyl (DPPH) and 2,2′-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical scavenging capacity tests, cupric ion reducing antioxidant capacity (CUPRAC), and metal chelating assay. Antiproliferative activities of the extracts were tested against human breast carcinoma (MCF-7), cells. The antioxidant assay results showed that methanol extract of Gypsophila aucheri displayed more pronounced antioxidant activity than water extract together with its higher phenolic content, revealed by RP-HPLC analysis. In paralel to the antioxidant activity, methanol extract exhibited more promising cytotoxic activity against the tested cancer cell line. However, both extract displayed moderate antiproliferative activity when compared to 5-Fluorouracil and Vincristine, which are chemotherapy drugs used to treat several different types of cancer. The obtained data suggest that methanol extract of *Gypsophila aucheri* could be evaluated as a promising source for food and nutraceutical industries due to its striking antioxidant and moderate antiproliferative potentials together with high phytochemical profile.

Keywords: *Gypsophila aucheri*, phenolic compounds, antioxidant activity, antiproliferative activity, MCF-7 cells.

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Synthesis and characterization of biodegradable microcryogels

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Abstract

Cryogels are the gel matrices fabricated at sub-zero temperatures using monomeric or polymeric precursors. Cryogels can be obtained by forming homogeneous or heterogeneous polymer networks cross-linked physically or covalently. Today, cryogels are used in a variety of areas of biotechnology such as carriers for immobilization of molecules and cells, chromatographic materials, matrices for cell separations and cell culture. In this study, cryogels were synthesized in a micro-level using a solid template having microwells. The 6% (w/v) gelatin was dissolved in deionized water at about 40°C and glutaraldehyde was added as a cross-linker to this mixture. The solution was rapidly poured into microwells of the solid template and both sides of the template were covered with 10 cm x 10 cm sized glasses. Polymerization was carried out at -16°C for 24 hours. At the end of the 2-hour lyophilization process, the microcryogels were gathered from the solid template. Swelling tests, optical microscopy, scanning electron microscopy, surface area and macroporosity were performed in order to characterize the surface and bulk morphologies of the microcryogels. *In vitro* hydrolytic degradation of microcryogels was also investigated in phosphate buffered saline buffer (pH 7.4) at 37°C. Size of microcryogels were found between 400-600 μm with the macropores between 20-80 μm. Degradation of the microcryogels were completed around 35 days.

Keywords: Biodegradable, Biotechnology, Gelatin, Microcryogel

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The effects of Mig1/2 and Nrg1/2 repressors on trehalose accumulation in *Saccharomyces cerevisiae*

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Abstract

Trehalose is deposited by *Saccharomyces cerevisiae* as a storage carbohydrate and as a stress protectant. The regulation of trehalose level in yeast cell is strictly controlled by trehalose synthesis and degrading enzymes. The biosynthesis of trehalose is catalyzed by TPS complex and the breakdown of trehalose is catalyzed by neutral trehalase enzyme. The trehalose content of yeast cells increases in response to nutrient starvation and different environmental stresses. Mig1 and Mig2 are zinc-finger DNA binding transcription factors that are involved in glucose repression. Nrg1 and Nrg2 repressor proteins have also zinc-finger DNA binding domain in order to bind STRE and PDS elements on the promoters. Both Mig1/2 and Nrg1/2 are involved in regulation of genes controlled by glucose. In our research, the effect of Mig1/2 and Nrg1/2 repressor proteins on the accumulation of trehalose were investigated by using Δmig1, Δmig2, Δnrg1, Δnrg2 mutants and their isogenic wild-type yeast strain. The trehalose content of exponentially growing Δmig1 yeast cells was 6 fold higher than that of wild type and other mutant yeast cells. Nitrogen starvation triggered trehalose accumulation both in wild type and mutant yeast cells except Δmig1 mutant cells. Also the trehalose content of Δmig2, Δnrg1 and Δnrg2 mutant yeast cells were 3-4 times higher than wild type in nitrogen deprivation. These results showed that Mig1 transcription factor is essential for maintainence of trehalose level both in standart and stress conditions, while Mig2, Nrg1 and Nrg2 repressor proteins are essential under stress conditions.

This work was parts of different projects that supported by Çanakkale Onsekiz Mart University The Scientific Research Coordination Unit, Project numbers: FYL-2014-301 and FYL-2016-829.

Keywords: Mig1, Mig2, Nrg1, Nrg2, Trehalose, *Saccharomyces cerevisiae*

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Synthesis of chiral tetraoxocalix[2]arene[2]triazine (R)- naphthylethylamine derivative as organocatalyst for asymmetric direct aldol reactions

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Abstract

Asymmetric aldol reaction is one sort of the most important carbon–carbon formation reactions, which can generate many valuable biologically optically active β-hydroxy carbonyl compounds and it has tremendous utility in organic synthesis. Up to now, three direct procedures can be performed to achieve chiral aldol products. They are biocatalysis methods, procedures catalysed by chiral metal especially zinc-involved complexes, and the asymmetric organocatalytic protocols. Among these methods, the third one is currently the most important and interesting procedure. Many highly efficient small molecular organocatalysts have been developed and the asymmetric organocatalytic aldol reactions have rapidly grown to their adolescence from infancy. Tetraoxocalix[2]arene[2]triazine-based organocatalysts were readily synthesized and applied to the direct asymmetric aldol reactions of ketones and aromatic aldehydes. Under preparative conditions, corresponding adducts is formed in high yield and with enantioselectivities up to 88% ee.

Keywords: Tetraoxocalix[2]arene[2]triazine, Asymmetric aldol reactions, Enantiomeric excess

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The investigation of ıschemic modified albumin levels in acne vulgarised cases

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Abstract

Acne vulgaris is a common skin disease. When acne is untreated, it can cause social isolation, difficulty in finding jobs, depression and suicide as a result of emotional and physical scar formation. Ischemia-modified albumin (IMA) is a novel marker of tissue ischemia. IMA is serum albumin in which the N-terminus has been chemically modified. The diagnostic albumin Co2+ binding test is based for IMA on the observation that the affinity of serum albumin for Co2+ is reduced after N-terminus modifications. Nowadays, IMA is accepted as a marker of oxidative stress. It has been proposed that reactive oxygen species such as superoxide (•O2−) and hydroxyl (•OH) radicals generated during ischaemia modify the N-terminus of serum albumin resulting in IMA formation. This study was performed on 88 women, 58 women with severe acne vulgaris and 30 healthy women. IMA level was measured by a colorimetric assay based on measurement of unbound cobalt after incubation with patient serum. Increased amounts of IMA results in less cobalt binding and more residual unbound cobalt available for complex with a chromogen [dithiothreitol (DDT)], which can be measured photometrically. We observed a significant increase in the serum IMA levels in women with severe acne vulgaris as compared to healthy women ($p < 0.01$). In conclusion, this study revealed oxidative mechanisms may play an important role in etiogenesis and progression of the severe acne vulgaris, but there is a need to work more on this.

Keywords: Acne vulgaris, oxidative stress, ischemic modified albumin

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Effects of ozonated water on dough reology

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Abstract

Ozone is one of the agents that have potential applications in the food industry. It is used in different areas, as an oxidizing and sterilizing agent. In this study, ozonation (3.5 mg / hour) was applied to water for 5, 15 and 30 minutes with an ozone generator using atmospheric air. The effects of ozonated water on the rheological properties of dough were investigated by using Mixolab® and the analyses performed using with ozonated water instead of pure water. Ozone application increased the values of C1, C2, C3 and C4 according to the control. As the duration of ozonation increased, the C5 values increased significantly. It has been determined that ozone application is effective on kneading, viscosity and retrogradation parameters.

Keywords: Dough rheology, Mixolab®, Ozone gas

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Production and investigation of non-toxic titanium binary alloys produced by powder metallurgy method

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Abstract

Titanium and its alloys possess good mechanical properties, excellent biocompatibility and high corrosion resistance. Niobium helps adapting the human bone structure and is a β-stabilizing element. Titanium–niobium alloys is used as a biomaterial which is a non-toxic, non-allergenic and does not react with any microorganism. In this study is to produce Ti-Nb alloys by adding different amounts of Nb and to investigate the antimicrobial effects of titanium. High energy ball milling experiments were carried out at room temperature in a Spex™ 8000D Mixer/Mill. After the milling the powders were consolidated at room temperature using a uniaxial press and sintered at different temperatures such as 750 0C, 950 0C and 1150 0C. Mechanical test such as hardness was carried on as-milled and sintered samples and microstructural characterization was performed with Scanning Electron Microscope (SEM). Antimicrobial activity of samples was quantitatively assessed under dynamic contact conditions in accordance with the ASTM E2149-13a standard. After incubation (at 220 rpm and 37 °C for 90 minutes) of samples in 1 mL of working bacterial suspensions, the numbers of viable bacteria in suspensions before (time 0) and after exposure were determined by plate count technique. The results indicate that the studied samples showed no significant antibacterial activity against S. aureus. Finally, a more rigorous evaluation of cytotoxicity of the samples is needed in order to determine their biocompatibility. This research was supported by Necmettin Erbakan University - BAP under grant number 151219009.

Keywords: Titanium-Niobium Alloys, Non-toxic, Antimicrobial, High Energy Ball Milling

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Optimization of fruit bar formulation by mixture design

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Abstract

Snack foods are generally smaller than main meals and mostly consumed by children and young people. These products is estimated to cover 20% of the daily diet, therefore they have a high market value. In recent years, healthy alternatives for these products such as fruit bars, cereal bars, fruit leathers and jellies are researched. In this study, the fruit bar ingredients namely fruits (50-80%), nuts (10-40%) and honey (10-30%) were optimized using mixture design to achieve best sensorial and textural properties. The results showed that sensorial properties (texture, chewiness, taste and general) were better when nut amounts were highest. Similarly, instrumentally determined textural properties (springiness, cohesiveness and chewiness) were also better in high nut products. However, an optimal fruits, nuts and honey combination were needed to achieve low adhesiveness. Using the obtained results, the optimum formulation was calculated using desirability function to achieve highest texture, chewiness, taste, general sensorial properties andspringiness, and the lowest adhesiveness and cohesiveness. The optimum formulation was determined as 50% fruits, 35.6% nuts and 14.4% honey. This optimized formulation can be used in future studies to increase functionality of the fruit bar.

Keywords: Fruit bar, formulation optimization, sensorial properties, textural properties, mixture design

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Functional properties of the hawthorn fruits and ıts use ın the food ındustry

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Abstract

Hawthorn (*Crataegus* spp) is a plant belonging to *Crataegus* genus of Rosaceae family and there are 50 species of hawthorn in the northern hemisphere and 17 species in our country. Hawthorn needs to sun for growing, but it can adapt to nearly all climatic conditions. The color of fruits ranges from yellow to red. İt is a traditional medicinal plant and has long been used as a folk medicine. Traditionally, hawthorn leaves, flowers and fruits are dried and then used against many diseases such as throat inflammation, cough, kidney diseases, lung diseases, diarrhea, kidney stones and gout disease. It is mostly used in the treatment of cardiovascular diseases. The antioxidant compounds of hawthorn fruit inhibit the formation of free radicals and regulate the functions of heart. Hawthorn fruits contain protein, vitamin, sugar, cellulose, fat and minerals such as Ca, P, K, Mg and Fe. Moreover they contain functional bioactive compounds such as flavonoids, anthocyanins and triterpene saponins. Therefore, they have recently gained importance in the food industry. The trend towards natural products that are beneficial to human health increased the demand for hawthorn fruit in the food industry. For this reason, the functional properties of hawthorn fruit were reviewed in this study.

Keywords: Hawthorn fruits, functional properties, flavonoids

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Effects of terpinolene on antioxidant enzyme system of the fission yeast (*S. pombe*)

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Abstract

Terpinolene is one of the most abundant monoterpens. In this study, we aimed to assess oxidative and cytotoxic effects of terpinolene. We used fission yeast (*S. pombe*) as a uni-cellular model organism, also known as micro-mammal, due to the resemblance of *S. pombe* cells to mammalian cells at the molecular level. We analyzed oxidative stress levels using DCFDA staining and antioxidant response using real-time PCR, in addition to turbidimetric analysis. DCFDA fluorescence gradually increased (1.3, 1.5, 1.7 and 1.9-fold increase) in correlation with increasing concentrations of terpinolene (200-800 mg/L). Real-time PCR experiments showed us 1.5-3-fold increase in SOD1 levels and 1.2-2-fold increase in GPx1 levels in response to gradually increasing doses of terpinolene. mRNA levels were statistically different from control group ($p<0.05$). This data points out antioxidant enzyme system can be (de)regulated by terpinolene via oxidative stress in fission yeast (*S. pombe*). Besides, gradual decreasing trend of cell viability showed by turbidimetric analysis was consistent with increasing amounts of ROS and antioxidant response. In conclusion, terpinolene potentially caused cytotoxicity mediated by oxidative stress which also induces antioxidant enzymes for clearance of ROS. Further studies can be planned to shed light on molecular mechanisms of terpinolene cytotoxicity and consequential cell death.

Keywords: Terpinolene, SOD1, GPx1, ROS, *S. pombe*

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The determination of effects of in ovo administrated bisphenol a on the development of thymus and proportion of alpha-naphthyl acetate esterase enzyme lymphocyte by means of histological and enzymehistochemical methods in chicken

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Abstract

Bisphenol A [2, 2 bis (4-hydoxyphenyl) propane; BPA] is a widely used endocrine disruptors and has estrogenic activities. The aim of this study is to the determination of effects of in ovo administrated BPA on the development of thymus and proportion of alpha-naphthyl acetate esterase enzyme (ANAE) lymphocyte in chicken. For this purpose, 310 fertile eggs of Isa Brown laying parent stock were divided into 5 groups as control, vehicle-control, 50,100, and 250 µg/egg BPA. Test solutions were injected into yolk before incubation. At the 13th, 18th and 21th days of incubation, 10 eggs were opened from each group and tissue samples were taken from the embryos. Tissue samples were processed for enzyme histochemical methods in addition to routine histological techniques. BPA-treated groups were found to be retarded embryonic development of thymus tissue compared to the control group. In BPA-treated groups, lymphoid tissue had less cell density and the number of ANAE positive lymphocytes decreased. The percentage of peripheral blood ANAE positive lymphocytes was significantly lower in the BPA-treated groups than in the control groups ($p < 0.05$). It was also noted that BPA had a negative effect on the mast cells in the thymus ($p < 0.05$). It has been found that BPA effects embryonic development of thymus, decreases ANAE positive lymphocyte rate and in mast cell counts. It was concluded that significant disturbances in the immune system function of the treated animals might be occured and legal regulation on the use of BPA should be revised.

Keywords: BPA, Thymus, ANAE, Chicken

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Investigation of sensing ability of calixarene coated QCM sensor for ascorbic acid in aqueous media

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Abstract

Ascorbic Acid (AA) which is known as Vitamin C, plays important role in human activity. Inefficacy of AA causes scurvy and hypoimmunity, and also excessive of AA cause diarrheal, hyperacidity, coronary heart diseases. Biosensors are analytical device which is can be used for biological sensing. In biosensor application, there are various methods such as electrochemical, calorimetric, optical, acoustic. Among these methods, Quartz Crystal Microbalance (QCM) is acoustic sensor system which is used for gaseous and aqueous media. QCM technique is defined as frequency change according to mass change on quartz crystal. In sensor application, macromolecules can be used as sensing material. Among these molecules, calixarene can be used for host-guest chemistry for construction of various receptors for charged or neutral molecules. In this study, a modified QCM sensor by means of coating a calixarene derivative onto QCM surface was used for sensing of AA in aqueous media.

Keywords: Ascorbic Acid, , Calixarene, Quartz Crstal Microbalance, Sensor

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CRISPR/CAS9 system: An effectıve genome edıtıng tool for plants

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Abstract

In genetic engineering, targeted genetic manipulation using artificial nucleases was first provided by zinc finger nucleases (ZFNs) and then by transcription activator-like effector nucleases (TALENs). Both are artificial fusion proteins fused to the nuclease domain of the restriction enzyme FokI containing the DNA binding domain, and they have been successfully used in many organisms including plants. After 2013, these powerful gene editing tools were replaced by the CRISPR/Cas9 system. CRISPR is actually an adaptive immunity system developed by bacteria against viruses. When a bacterium is infected with a virus, it binds its DNA with its complementary CRISPR RNA and cuts it with Cas 9, which works with this RNA.Researchers have shown that when CRISPR RNA is redesigned according to the desired mutation type, it can be cleaved in a targeted manner from the desired region of DNA and the desired mutations can be designed in a simple, efficient and in expensive manner compared to other gene editing methods. Targeted gene editing with the CRISPR/Cas9 system has been tested in many plants, primarily rice, maize, *Arabidopsis thaliana*, and positive results have been observed.This study examined the CRISPR/Cas9 system, its advantages and limitations in other gene editing methods, and some CRISPR / Cas9 studies in plants.

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Mechanisms of sister chromatid exchange

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Abstract

Sister chromatid exchange (SCE) is a classic assay used for a long time in toxicology studies which gives reproducibly robust quantitative results. SCEs represent an exchange of a DNA template between the parental strands in the duplicated chromosomes and originate from breakage of two sister chromatids, following an exchange of the fragments, rejoin with one another, during DNA replication in S phase of mitosis. Its frequency is considered a reliable marker of pathological cell situations, as well as a genetic indicator for potential genotoxic/mutagenic compounds. The technique for detecting such exchanges uses advantage of the semiconservative nature of DNA synthesis by growing cells in the presence of 5'-bromo-2'-deoxyuridine (BrdU), a thymidine analogue, for two cycles of DNA replication. Standard culturing techniques and conventional cytogenetic preparations followed by differantial staining with fluorescent plus Giemsa (FPG) technique allows the newly synthesized DNA within a chromatid to be recognized. Since BrdU incorporation results in much weaker staining, sister chromatids visualized as asymmetric chromatid staining or "harlequin" chromosomes. The formation of SCE is elevated by mutagenic agents that form DNA adducts or that interfere with DNA replication. It is show correlation with induction of point mutations, gene amplification, recombinational repair and cytotoxicity. In this brief review, molecular mechanisms of SCE, the role of the single-strand break DNA repair protein XRCC1 in suppressing SCE and key protein "effectors" that regulate the appearance of SCE is also presented.

Keywords: Genotoxicity, Sister Chromatide Exchange, DNA Damage

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Enzyme inhibitory properties of methanolic extract of *Nepeta congesta* var. *congesta* (Lamiaceae)

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Abstract

In this study, enzyme inhibitory properties of methanolic extract from *Nepeta congesta* var. *congesta* (Lamiaceae) were investigated. For this purpose, anti-cholinesterases, anti-tyrosinase, anti-amylase and anti-glucosidase effect of this extracts were studied. Acetylcholinesterase and butrylcholinesterase inhibitory activities of the extracts were found to be 2.69 and 2.99 mgGALAE/g extract, respectively. Antityrosinase effect of the extract was 30.29 mgKAE/g extract. α-amylase and α-glucosidase inhibitory activities of the metanolic extract were determined as 0.36 and 0.67 mmolACAE/g extract, respectively. The results suggest that *Nepeta congesta* var. *congesta* may be considered as a valuable source of natural enzyme inhibitors.

Keywords: Enzyme inhibition, *Nepeta congesta*, Lamiaceae, natural agents

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CRISPR is a new tool to better understand population diversity of plant pathogenic bacteria

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Abstract

Various identification and typing techniques are available for plant pathogens. A newly recognized genetic structure called as clustered regularly interspaced short palindromic repeats (CRISPR) contains a family of short DNA repeat sequences in combination with Cas (CRISPR-associated) proteins, are considered to provide acquired resistance against mobile genetic elements in genetic material of diverse group of bacteria and archaea. The arrays of highly conserved direct DNA repeats that are interspersed by unique, similarly sized spacers. CRISPR repeats alter in size from 21 to 47 bp and are splited up with nonrepetitive and regularly-sized spacer sequences. Most of the these spacer share common sequences with bacteriophage, plasmid, and other laterally-transferred DNA sequences. The obtaining of new introduced genes that could offer a discriminating factor is an important determinant in genome evolution. Rezzonico et al. (2011) and McGhee and Sundin (2012) was applied CRISPR for investigating the genetic diversity of E. amylovora that is casual agent of fire blight in rosacea plants and has almost nealy homogeneous species with a low level of genetic diversity. They found high diversity among tested isolates and more considerably discrimination in comparison other performed analysis. For other species, CRISPR genotyping enabled the differentiation of strains that were shown in previous studies. CRISPR can be suggested a very good tool for example, multi host pathogen capable of causing disease on numerous plant specimens in all over the world like Pectobacterium carotovorum that has heteregenous strains and this structured integration of repeates and spacers can allow providing evolutionary history, utilizing for bacterial typing of strains belonging to same species, understanding the epidemiological studies, tracing pathogen movement and clarification the origin of newly introduced pathogens of plants.

Keywords: CRISPR, Genetic diversity, Genome modification

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Isolation and identification of cellulolytic bacteria from the carp's intestine and investigation of their cellulolytic activity

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Abstract

Grass carps have good ability to degrade cellulose of aquatic plants with the aid of the cellulolytic bacteria in their gastrointestinal tract. The purpose of this study is to isolate cellulolytic bacteria that have probiotic activity from a grass carp's intestine. For this purpose, 20 cellulolytic bacteria were isolated from the carp's intestine using carboxymethyl-cellulose (CMC) agar media. Two bacterial strains that have higher cellulolytic activity were selected between the isolates by congo red staining and the selected isolates were designated as BH4 and BH9. BH4 and BH9 were identified with firstly Gram-staining then with 16S rRNA sequence analysis method. By gram staining, it was determined that BH4 was gram positive, coc shape whereas BH9 was gram positive, rod shape. According to 16S rRNA sequence, BH4 was identified as Staphylococcus cohnii and BH9 was identified as Bacillus pimulus. To find the activities of carboxymethyl cellulose (CMCase) of the strains, BH4 and BH9 were incubated in nutrient agar that contains 1 % (w/v) CMC at 37 oC for 8 days. Following incubation, the amount of glucose released from CMC by cellulolytic isolates was determined by the dinitrosalicylic acid (DNS) solution. During the CMC degradation studies with these strains, at the end of 8days incubation time, in the medium containing 1 % (w/v) CMC, CMC degradation rate for BH4 and BH9 were determined 25.68 % and 39.64 % and the CMAase activity of the strains were determined as 237.78 µmol/min and 367.04 µmol/min respectively.

Keywords: Cellulolytic bacterium, Probiotic activity, Staphylococcus cohnii, Bacillus pimulus, CMC degradation

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The role of HUVEC conditioned medium ın laryngeal cancer cells proliferation

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Abstract

Cancer growth is regulated by stromal cells such as endothelial cells (EC) within the tumor microenvironment. However, the functions of endothelial cells within the microenvironment of head and neck squamous cell carcinoma (HNSCC) remain poorly understood. We hypothesized that ECs may like other stromal cell types, regulate cancer cell behavior and affect cancer proliferation. Thus, here we performed an in vitro non-contact co-cultivation system to analyze the influence of healthy cells (endothelial cell line HUVEC cells) on tumor cells (laryngeal cancer cell line HEp-2). We prepared conditioned medium (CM) from HUVEC cell cultures to mimic the environment of HUVEC cells around the tumor cells. HUVEC cells were plated in DMEM containing 10% FBS and allowed to attach overnight, and the supernatants were collected, centrifuged to remove cell debris, and called as HUVEC-CM that was used to culture HEp-2 cells. Cells were cultured in the presence of increasing concentrations (%0, % 10, %25, % 50, %75 and %100) of HUVEC-CM for 24, 48, and 72h to show the effect of concentration of HUVEC-CM on the proliferation of HEp-2 cells. MTT (Thiazolyl Tetrazolium Blue) proliferation assay was performed to measure cell proliferation. The proliferation assay showed that while %75 and %100 HUVEC-CM inhibited cancer cell proliferation, % 10, %25, % 50 HUVEC-CM increased the cancer cell proliferation compare to the cells in normal medium. We believe that further studies will contribute to our understanding of tumor microenvironment effect in head and neck carcinoma.

Keywords: Endothelial cells, Head and neck squamous cell carcinoma, Tumor microenvironment, Cell proliferation, Co-culture

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Effects of *Cinclidotus pachylomoides* (Bryophyta) extracts on relative water contents and photosynthetic pigment amounts in wheat and wild oat

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Abstract

The bryophytes form the ecosystem by affecting the higher plants around them by allelopathic effect of their secondary metabolites. In this study, the extracts of Cinclidotus pachylomoides Bizot in different concentrations (0, 25 and 50 mg.mL -1) and three different solvents (distilled water, ethyl alcohol and ethyl acetate) on relative water contents and photosynthetic pigment amounts of Triticum aestivum L. and Avena sterilis L. seedlings. The relative water content of wheat and wild oat leaves was calculated. In addition, the absorbance values of samples were measured at different wavelengths (663 nm, 645 nm, 652 nm and 450 nm) in the visible spectrophotometer and the pigment (chla, chlb, chla / b, total chl and carotenoid) amounts were determined. The relative water content of the wheat seedlings was increased in ethanol treatments and decreased in the distilled water and ethyl acetate treatment groups to the control. Significant reduction was in the treatment of 50 mg.mL-1 C. pachylomoides distilled water (37.44%). In the case of wild oat seedlings, it decreased in all treatment groups. The maximum reduction was found to be 50 mg.mL-1 C.pachylomoides ethyl alcohol treatment with 56.62% ($p < 0.05$). The highest values for photosynthetic pigment amounts of wheat were determined by treatment of 50 mg.mL -1 ethyl alcohol and 25 mg.mL -1 ethyl acetate. In wild oats, the amount of photosynthetic pigments in all treatment groups decreased. As a result, changes in relative water content and amount of photosynthetic pigment may be due to the allelopathic effect of C. pachylomoides.

Acknowledgment: We are grateful to TUBITAK (Project no: 115O923) for financial support.

Keywords: Allelopathy, Avena sterilis, Carotenoid, Chlorophyll, Triticum aestivum

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Rosmarinic acid improves the antioxidant capacity in maize leaves through ascorbate-glutathione cycle under chromium-induced oxidative stress

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Abstract

Organic acids are also important in plants as components of tolerance mechanisms and involve in detoxification of toxic metals. Rosmarinic acid (RA), one of the water-soluble phenolic acids. Chromium (Cr) is known to be a toxic metal that can cause severe damage to plants and animals. Cr-induced oxidative stress involves induction of lipid peroxidation and disturbing the photosynthetic process in plants that causes severe damage to cell membranes. Antioxidant enzymes/nonenzymes like ascorbate peroxidase (APX), glutathione reductase (GR), monodehydroascorbate reductase (MDHAR), total ascorbate (tAsA), oxidized and reduced glutathione (GSH and GSSG), dehydroascorbate (DHA) are found to be susceptible to Cr resulting in a decline in their catalytic activities. The antioxidant activity of RA plays important roles to reduce the risk for cancer, atherosclerosis and other diseases associated with augmented oxidative stress. This study was designed to investigate the protective effects of RA on Cr-induced oxidative stress in maize (Zea mays) leaves. Plants were grown in nutrient solution containing Cr (150 and 300 microM) and/or RA (50 and 100 microM) for 7 days (d). After exposure to Cr stress, the significant reduction in the activities of GR and DHAR and the contents of GSH and GSSG observed in wheat. Also, Cr excess caused an increase in the contents of DHA, tAsA, hydrogen peroxide (H2O2) and lipid peroxidation (TBARS). Under the increased rate of RA application, the oxidative stress induced by Cr treatments was reduced, providing an increase in MDHAR, DHAR, the contents of GSH and DHA, and decrease in H2O2 and TBARS and the contents of GSSG and tAsA when compared to the stress alone. Collectively, these data indicate that addition of RA can provide protection against the adverse effects of Cr stress by modulating ascorbate glutathione cycle in maize leaves exposed to Cr.

Keywords: Antioxidant system; Chromium stress; Lipid peroxidation; Rosmarinic acid; Zea mays

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Synthesis and investigation of anticarcinogenic effects of fluorene basedasymmetrical Schiff base

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Abstract

Recently, due to the increasing use of the coordination compound in analytical, bioinorganic, pigment and medicinal chemistry, many researchers have studied these topics, especially, the important role of the complexes of Schiff bases in coordination chemistry. Schiff bases usually synthesized by the condensation of primary amines and active carbonyl groups. Asymmetrical ligands are Schiff bases obtained by stepwise condensation of the appropriate diamine with two different carbonyl compounds. Asymmetrical Schiff base ligands have many advantages over their symmetrical counterparts in the composition, geometry, and properties of transition metal complexes. Asymmetrical Schiff bases may also serve as models of relevance for biologically important species and catalysts for various organic transformations and their magnetic and optical properties are promising for optoelectronic applications and the design of biosensors. Schiff base complexes have suitable biomimetic properties that can mimic the structural features of active sites. Among different types of pharmacologically active Schiff bases, the anticancer agents are one of the hottest topics of research worldwide. Schiff bases have capability of binding DNA and proteins, which resulted with cytotoxicity on tumor cells. In this study, the fluorescent unsymmetrical Schiff base was obtained by the condensation of 1,2-phenylenediamine, 2-hydroxy-1-napthaldehyde and fluorene-2-carboxaldehyde. Synthesized this compound was identified by using spectroscopic methods (FTIR, 1H NMR). Fluorescence properties of this compound was examined towards different metal cations. The anticarcinogenic effect of this compound was also investigated.

Keywords: Condensation, Schiff Base, Fluorescent, Anticarcinogenic

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Pyrene-armed calix[4]arene based fluorescent sensor for F^- ions and imaging of living cells

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Abstract

Calixarenes are macrocyclic compounds widely used in supramolecular chemistry as useful basic skeletons for the construction of lipophilic, water-soluble and ionophoric receptors. Their unique three-dimensional structures with almost unlimited derivatization possibilities on the "lower" and "upper" rims, along with a tunable shape, make calixarenes ideal candidates for building blocks or scaffolds in the design of new, more sophisticated molecules. Anions are ubiquitous and play important roles in many biological and chemical systems. There is an increasing interest in the design and development of receptors that selectively recognize specific anions. For instance, considerable effort has been devoted to studies of F- receptors because of the serious effects of F- in the human body. Ionophore is an important component in designing molecular sensors, its donor atoms, conformation, size, steric hindrance etc. determines selectivity. Among various ionophores, calixarenes are an important class of macrocyclic compounds and also an ideal platform for the development of complexing agents for metal ions and anions. In this study herein the synthesis and fluorescent properties of fluorogenic pyrenyl calix[4]arenes chemosensors. The tetrabutylammonium salts of F-, Cl-, Br-, H2PO4- , NO3- , HSO4- , CH3COO- ions were used to evaluate the metal ion binding properties of this compound in CH2Cl2:CH3CN (1:1 v/v). When excited at 325 nm, fluorogenic pyrenyl calix[4]arenes chemosensors revealed emission at 392 nm F- anion quenched the fluorescence of chemosensor. Pyrene based calix[4]arene was applied in fluorescence imaging of living cells.

Keywords: Calix[4]arene, Fluorescent, Living cells

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The effects of environmental stress conditions on wheat varieties: morphological, physiological and biochemical

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Abstract

Wheat is one of the most important cereal products in the world and it was first grown in the south-eastern part of Turkey about 10.000 years ago. Wheat has an important place in human nutrition because of the essential amino acids, minerals and vitamins, a large number of antioxidant components in its contain. Different biotic and abiotic stresses caused free radical overproduction in wheat species as other plants. As a result, it is decreased effect of the antioxidant systems while increase reactive oxygen species (ROS) that are toxic, reactive. ROS damage the structure of proteins, lipits, DNA, carbohydrates and the other metabolits. The generation of reactive oxygen species (ROS) is one of the earliest biochemical responses of biotic and abiotic stresses. Environmental stresses, such as drought, salinity, cold, salinity, heavy metals and heat trigger a series of morphological, physiological, biochemical and molecular changes. To minimize the harmful effects of ROS, wheat have a strong antioxidant defend system. This system includes such as non enzymatic antioxidants (glutathione, ascorbate, carotenoids) and enzymatic antioxidants (superoxide dismutase (SOD), peroxidase (POD), catalase (CAT), ascorbate peroxidase (APX). All of this affects the growth, development and ultimately yield of wheat species resulting in severe economic losses and a food crisis.

Keywords: Wheat, Antioxidant System, Growth, Yield, ROS

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Formulation and nutritional evaluation of new diet soup powder using Pinar Melkior (*Lactarius piperatus*) mushroom

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Abstract

Pınar melkior (*Lactarius piperatus*) mushroom has been specifically chosen to improve the formulation due to its high antioxidant, protein and fibrous content in our diet soup making research. Mushroom soup is commonly made and consumed among the public. However, since white flour is put into the inside, white flour has been processed, so the content of protein and fiber has fallen and the proportion of carbohydrate has increased. This causes the glycemic index to suddenly increase after it is eaten, as it facilitates digestion of the soup. This is an important risk factor for both obesity and diabetes mellitus. For this reason, instead of white flour, we prepared a diet soup formulation using endemic Pınar melcior which is known as a medicinal herb, using polymer carbohydrate derivatives which are difficult to digest and obtained from by products of the organic fruit sector. The amount of moisture, amount of ash, amount of protein, antimicrobial activity has been tested to analyze the chemical properties of prepared soup. Also the antioxidative activity of the soup, (with ferric cyanate reduction method Fe^{3+}-Fe^{2+} reduction activity, along with cuprac method, cupric ions (Cu^{2+}) reducing capacity, according to FRAP method) was determined. The test results suggest that the prepared formulation will provide a wide range of use in the food industry due to its long shelf life due to the content of both mushroom and polymeric carbohydrates and its intestinal system is hardly digested due to its fibrous structure.

Keywords: Pınar melkior (Lactarius piperatus), Diet soup, Antioxidat activity, Antimicrobial activity

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Formulation of dietary *Plurotus ostreatus* mushroom soup powder and investigation of it's antioxidative and antimicrobial activities

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Abstract

The *Pleurotus ostreatus* mushrooms is a renewable fungus belonging to *Pleurotaceae* family. *Pleurotus ostreatus* is one of the mushrooms that are popular among the public, consumed extensively and are of high economic value. In this study; It was aimed to develop a formulation of quick diet soup product by using oyster (*Pleurotus ostreatus*) mushroom and to evaluate the importance of functional food production and healthy nutrition. The mushroom soup formulation was developed at two different concentrations of mushrooms and it was lyophilized using the freeze drying method. Then, the moisture content, the amount of ash, the amount of protein, the antimicrobial activity of the dried soup were tested. In addition, the content of diet ready soup, total phenolic compound amount assign, total flavonoids amount assign, along with ferric cyanate reduction method Fe^{3+}-Fe^{2+} reduction activity, along with cuprac method, cupric ions (Cu^{2+}) reducing capacity, according to FRAP method was determined. It was determined that the soup form of the high mushroom content soup had higher reduction activities and antimicrobial activity. When the findings are taken into account; the formula we have prepared is thought to be a successful diet product due to its low calorie and high fiber content, which causes a feeling of satiety due to polymer-forming carbohydrates.

Keywords: *Pleurotus ostreatus* mushrooms, Formulation of diet soup, Antimicrobial activity, Antioxidant activity

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Green synthesis of ıron nanoparticles and their bactericidal activity

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Abstract

Iron, the most ubiquitous of the transition metals and the fourth most plentiful element in the Earth's crust. Iron has a great deal to offer at the nanoscale, including very potent magnetic and catalytic properties. Various chemical and physical methods are being applied to obtain iron nanoparticles of specific sizes and morphologies. However; in recent years, more environmentally friendly techniques have gained great attention. These techniques are carried out through plants containing antioxidants like green tea (*Camellia sinensis*). The nanoparticles such as silver and iron obtained with green tea, are included in the literature. Studies proceeded with silver are common, however, the toxic effects of silver are being discussed lately. Therefore, the antimicrobial activity of iron nanoparticles has become under focus for this purpose. In this study iron nanoparticles that has been synthesized by employing different plant sources is characterized. The iron oxide particles that has been obtained by this simple and environmentally friendly method was tested as an antimicrobial structures against as common mildly pathogenic bacteria species -*Escherichia coli, Bacillus subtilis, Enterococcus faecalis, Pseudomonas aeruginosa* and *Staphylococcus aureus*- and showed bactericidal effect on all abovementioned species at different concentration.

Keywords: Iron nanoparticles, Green synthesis, Antimicrobial activity.

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Determination of antimutagenic effects of some plantago extracts using *Ames/E.coli* WP2 test system

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Abstract

The *Plantago* genus is rich in secondary metabolite-rich components. In this study, antimutagenic effect of aerial parts of methanolic extracts of five species/subspecies of Plantago genus grown in Turkey (*P. major* subsp. *intermedia*, *P. major* subsp. *major*, *P.scabra, P. holosteum, P. lagopus)* using the Ames and *E. coli* WP2 test system. *S. typhimurium* TA 98, TA 100 and TA 102 strains were used in the Ames test system and *E. coli* WP2 uvrA strains was used in the *E. coli* WP2 test system. According to the results obtained in the study, it was shown that P.major subsp. major were determined as the highest antimutagenic effective plant since all tested concentrations of extract were shown antimutagenic activity at varying ratios in TA102, TA100 and *E. coli* wp2 strains. In particular, the antimutagenic effects of the extracts of P. major subsp. intermedia (48%, 400 µg/plate) and *P. major* subsp. *major* (47%, 100 µg/plate; 45%, 25 µg/plate) on *E. coli* WP2 uvrA strain was remerkable. The extract of P. scabra was moderately antimutagenic in all tested concentrations (39% inhibition, 100 µg/plate) in the TA 100 strain. The *P. lagopus* extract showed a weak antimutagenic effect for all strains at the concentration of 400 µg / plate, whereas it was found to be moderately antimutagenic in the TA102 strain at 100 µg/plate. *P. holosteum* extract showed a weak antimutagenic effect on TA 100 strains. As a result, extracts obtained from *Plantago* species/subspecies were found to be effective in terms of their antimutagenic activity.

Keywords: *Plantago*, Ames test, *E. coli* WP2 test, antimutagenicity

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Solar light driven photocatalytic degradation of atrazine using TiO2/bismuth nanoparticle/polyoxometalate nanocomposite

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Abstract

In this study, we were synthesized a novel nano composite containing TiO2 nanoparticles (TiO2NPs) and bismuth (BiNPs) by using polyoxometalate (H3PW12O40, POM) without any reducing agent and tested in photocatalysis to remove atrazine (ATR) from aqueous solution. Transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), and X-ray diffraction patterns (XRD) showed the formation of the nanocomposite (TiO2NPs / BiNPs / POM). The BET surface area increased after intercalation of TiO2NPs and BiNPs. The effects of operating variables such as initial atrazine (ATR) concentration, pH and contact time in adsorption were studied. The kinetics, isotherm and thermodynamic parameters for the removal of the atrazine (ATR) were also investigated. In addition, TiO2NPs / BiNPs / POM also shows high photocatalytic activity for degradation of ATR from aqueous solution. The combination of adsorption and photocatalysis using the nano composite is demonstrated as a more effective technique for removal of pesticides from aqueous solution.

Keywords: Photocatalysis, adsorption, nanoparticles, polyoxometalate, kinetics

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A new method for the determination of valproic acid ın human plasma by Hplc-Uv: Application to a therapeutic drug monitoring study

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Abstract

In this study, a high-performance liquid chromatography method was developed and validated for quantitative analysis of VPA in plasma. The validity of the method was monitored in real plasma samples of 34 patients under epilepsy treatment using VPA. For the optimization of HPLC and UV detector conditions; column, mobile phase, injection time, retention time, UV wavelength, pump flow rate and pressure, and effect of internal standard were evaluated. The chromatographic separation was carried out with a reverse-phase C18 analytical column (4.6 x 250 mm, 5 µm particle size), at 40 °C. The mobile phase prepared as a mixture of 20 mM KH2PO4 (1% triethylamine) and acetonitrile (52.5:47.5, v/v) was isocratically apply to the column at 1 mL/min flow rate and ultraviolet detector was set at 213 nm and 230 nm VPA and diazepam which used as an internal standard. Accuracy and precision were found between (-8.76) - 7,87 (RE%) and 2.84 - 6.59 (RSD%), respectively for intraday and interday reproducibility study. The detection and quantitation limits were 2.19 and 6.63 µg/mL, respectively. Plasma recovery values at 20, 60 and 120 µg/mL ranged from 81.44% and 106.37%. VPA levels were found in the range of 2.85 to 116.35 µg/mL in blood samples taken from volunteer patients who were under epilepsy treatment with VPA between 500 and 1500 mg/day.The method developed, validated and successfully applied to patient samples is a simple, rapid, reliable method that can be used in both therapeutic drug monitoring study and overdose toxicological analysis of patients using VPA.

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Investıgatıon of plasma signal transducer and activator of transcription 3 (Stat3) and Bcl-2 associated X protein (Bax) levels ın rats fed hıgh fat and hıgh sucrose dıet

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Abstract

Consumption of a diet high in saturated fats and sucrose is an important factor in the increasing occurrence of these metabolic disorders. *Signal transducer and activator of transcription 3* (STAT3) and *Bcl-2 associated X protein* (Bax) are multifunctional protein that are important for immune responses, cell survival, apoptosis, and proliferation. However, ıt is unknown about the relationship between the STAT3/ Bax and high sucrose/ high fat diet. In this study, samples from 28 adult male wistar albino postnatal (8-12 weeks) male rats were used. These rats were grouped as high sucrose fed, high fat fed, high fat and high sucrose fed. Plasma STAT levels of fed with standard feed, fed with high sucrose diet, fed with high fat diet and fed with high fat and high sucrose diet were found as (X + SD) 0.25 ± 0.007, 0.26 ± 0.02, 0.27 ± 0.02 and 0.29 ± 0.04 pg/ml respectively. Plasma Bax levels of fed with standard feed, fed with high sucrose diet, fed with high fat diet and fed with high fat and high sucrose diet were found as (X + SD) 0.35 ± 0.02, 0.34 ± 0.02, 0.35 ± 0.01 and 0.33 ± 0.01 ng/ml respectively.There were no significant differences between plasma STAT3/ Bax levels of the groups. Our findings show that there was no relationship between the STAT3/ Bax and high sucrose/ high fat diet

Keywords: High fat diet, high sucrose diet, *STAT3*, Bax, Bcl-2

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Detection of *Alicyclobacillus acidoterrestris* in apple juice by a PCR-based technique

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Abstract

Alicyclobacillus species cause spoilage in highly acidic foods, especially those protected by pasteurization, such as fruit juices. Apple juice is the most important economical commodity among the fruit and vegetable juices in worldwide. *Alicyclobacillus acidoterrestris* creates unpleasant odor in apple juice and concentrates which causes considerable economic loss in apple juice industry. Conventionally Alicyclobacillus species can be identified by chromatography and conventional microbiological methods. Identification of *Alicyclobacillus acidoterrestris* by classical microbiological methods are time consuming and sometimes not capable of objective determination. In this study, a PCR-based identification method was established by species-specific DNA probes with high sensitivity and accuracy. Comparing with the classical methods, PCR-based methodology is capable of identifying *Alicyclobacillus acidoterrestris* in apple juices within a day which is very good advantage whereas conventional protocols take more than a week. The newly developed methodology presented in this work is very promising for Alicyclobacillus species identification in acidic beverages.

Keywords: Fruit juice, microbial contamination, microorganism detection

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Toxicity of graphene oxide in maize (*Zea mays* L.) seedlings

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Abstract

Graphene oxide (GO) is widely used in various industrial and biological applications. Although the increase in the use of graphene oxide and the release of it into the environment, the effects of GO on plants have been investigated in a few studies. In the present study, the impact of GO on the root and shoot growth, total chlorophyll content, reactive oxygen species formation and antioxidant enzyme activities of maize was investigated using a concentration range from 500 to 2000 mg/L. The treatment of GO has significantly increased the root and shoot elongation, however, total chlorophyll content has been found to decrease. GO application caused significant increase in the superoxide production (O2.-), the amounts of hydrogen peroxide (H2O2) and malondialdhyde (MDA). Superoxide dismutase (SOD) and peroxidase (POD) activities increased by 500 and 1000 mg/L GO applications and decreased by 2000 mg/L GO application when compared to control. Glutathione reductase (GR) activity was also increased by GO application in a dose-dependent manner. The results of the study indicated that GO has the potential to cause detrimental effects on plants during its release in the environment.

Keywords: Glutathione reductase, Graphene oxide, Hydrogen peroxide, Peroxidase, Superoxide dismutase

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Biosynthesis of ruthenium nanoparticles using chitosan immobilized *Bacillus cereus*: Nanocatalytic studies

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Abstract

In this paper, the biosynthesis study of ruthenium nanoparticles (RuNPs) using chitosan immobilized on *Paenibacillus macerans* (PM/C) was performed via bioreduction without any reducing agent. Transmission electron microscopy (TEM) showed that the RuNPs were formed as uniformly sized and shaped in the range of 10–30 nm. Scanning electron microscopy (SEM), x-ray photoelectron spectroscopy (XPS) and x-ray diffraction patterns (XRD) confirmed the formation of the PM/C/RuNPs. XRD diffraction patterns revealed that ruthenium ions on the Bc/C was reduced to Ru (0). This situation shows successful RuNPs synthesis using PM/C. In the bioreduction studies, the effects of operating variables such as initial metal concentration, pH and contact time were also investigated. The RuNPs formed on PM/C were used as a bionanocatalyst for the reduction of 4-nitrophenol (4-NP). The kinetic models and the thermodynamic parameters were investigated to reveal the reduction mechanism.

Keywords: Biosynthesis; ruthenium nanoparticles; chitosan; *Paenibacillus macerans*

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Prototype model biogas power plant

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Abstract

Biogas is among the renewable energy sources and the prospect is not yet recognized. Today, Turkey biogas producing only 0.84% of the total power generation *. The reason for this is that organic wastes cannot be assessed. In order to solve this problem, one house must have a prototype of the biogas plant. In this study, 'Prototype Model Biogas Power Plant' will be able to produce biogas by using only organic garbage to everyone's home, and a research has been carried out to realize heating, cooking and electricity generation with this produced gas. As a working principle, a biogas plant is reduced to small sizes and the wastes thrown into it are fermented for a certain period of time, and CO2 and CH4 gas are released as reaction result. This produced biogas can be stored in storage tanks and used whenever desired. In this study, occupancy rate will be observed by means of the indicator of the gas reservoir to avoid overfeeding. The waste that is decomposed at the end of the production will be recovered as fertilizer. In this way, it is aimed to reduce environmental pollution, to enable everyone to produce their own energy, and to reduce the need for fossil resources. The system in this study will mainly consist of waste tank, gas storage and gas connection valve. Thanks to the valve, we produce according to our needs by connecting to the equipment such as the hob heater, generator. In this way, all organic wastes taken as domestic waste will be recovered and high efficiency fertilizer will be obtained. This system with low cost will provide endless energy to the houses using the average LPG tube.

*Ministry of Energy in Turkey (2018) Electricity Transmission Company data

Keywords: Biogas Production, Prototype Model, Clean Energy

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Biosorption of reactive dyes from aqueous solution by Paenibacillusmacerans: Kinetic, thermodynamic and equilibrium studies

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Abstract

Batch studies were conducted for thermodynamic, kinetics and equilibrium studies on the biosorption of Reactive red 198 (RR 198) and Reactive Blue 4 (RB 4) from aqueous solution by Paenibacillusmacerans. The operating variables studied were initial dye concentration, biomass concentration, contact time, temperature and solution pH. Results show that the pH value of 1 is favorable for the biosorption of dyes. The biosorption data have been analysed using Langmuir, Freundlichand Tempkin isotherms. The isothermal data for biosorption followed Langmuir Model. The biosorption processes conformed to the pseudo-second-order rate kinetics. Thermodynamic parameters such as enthalpy, entropy, and Gibb's free energy changes were also calculated and it was found that the biosorption of dyes by Paenibacillusmacerans was a spontaneous process. The biosorption mechanism of biomass was explained by FT-IR spectroscopy and the FT-IR spectrum confirmed the presence of –COOH, C O, and –NH2 groups in the biomass structure. The maximum adsorption efficiency of RR 198 and RB 4 is 98.95 mg g^{-1} and 97.43 mg g^{-1}, respectively.

Keywords: Biosorption, reactivedyes

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Quantification of biofilm structures on laser treated titanium ımplants by the novel computer program COMSTAT

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Abstract

The structure of biofilm formation on Titanium treated with Laser surface was analysed by a novel computer program, COMSTAT, which comprises ten features for quantifying three-dimensional biofilm SEM and Flouresence Microscopy image stacks. In situ 24h biofilms of same volunteree results were used for analysed. Analysis by the COMSTAT program of four variables describing biofilm structure – mean thickness, roughness, substratum coverage and surface to volume ratio –showed that the four different Titanium surface represent different modes of biofilm growth. Titanium polished surface had a unique developmental pattern starting with single bacterial layer on the surface growing into more colonies. Titanium polished surface had a stronger tendency to form micro-colonies and uniform biofilm formation . Titanium polished after treated with Laser surface had thin biofilm formation and more less bacterial colonies. Finally, the biofilm structures of Titanium etched after treated with Laser surface had a more thickness biofilm layer and different type of phenotype bacteria. Analysis of biofilms of a different type of Titaium surface growing in situ 24h showed that mean biofilm thickness related with surface topology. The laser treated surface had characterized less adherence surface for dental bacteria. Moreover, biofilm roughness decreased with etcehed surface, whereas surface to topology ratio increased with treated surface mean that polished titanium after laser treated surface had not useful for bacterial adherence.

Keywords: COMSTAT, Ti, Biofilm formation, dental implant

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The ınvestigation of apoptosis ın rats fed high fat and high sucrose diet

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Abstract

High-fat and high-sucrose intakes were shown to contribute to syndromes such as hyperlipidemia, glucose intolerance, hypertension, and atherosclerosis. Numerous studies showed that a high-fat and/or high-sucrose diet induces insulin resistance in rodents. The effect of a long-term high-fat, high-sucrose diet on the apoptosis has not been clarified. This research project aims to investigate plasma Caspase 3 (CASP3) levels in High-fat and High-sucrose Fed Rats. For this purpose, Konya Necmettin Erbakan University, KONÜDAM Experimental Medicine Research and Application Center which was available from 28 adult Wistar albino postnatal (8-12 weeks) male rats fed, accompanied by a high-fat, high-sucrose or standard chow. It was divided into several groups, in its blood (plasma) CASP3 levels (markers of apoptosis) were studied with the ELISA method. The plasma CASP3 levels of fed with standard feed, fed with high sucrose diet, fed with high fat diet and fed with high fat and high sucrose diet were found as (X + SD) 0.34 ± 0.007, 0.36 ± 0.03, 0.36 ± 0.01 and 0.35 ± 0.02 ng/ml respectively. There were no significant differences between plasma CASP3 levels of the groups. Our findings shown that high fat and high sucrose diet may not cause apoptosis. We belive that our finding will contribute to further understanding of the etiopathogenesis of feeding a high-fat and high-sucrose diet-related diseases.

Keywords: CASP3, high fat diet, high sucrose diet

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A novel magnetic iron and cobalt nanoparticles anchored carbon nitride nanotubes recyclable nanocatalyst for the reduction of nitrophenol compounds

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Abstract

In this study, a novel catalyst based on FeNPs / CoNPs bimetallic nanoparticles involved carbon nitride nanotubes was prepared and characterized by transmission electron microscope (TEM) and x-ray photoelectron spectroscopy (XPS). The nanomaterial was used in catalytic reductions of 4-nitrophenol and 2-nitrophenol in the presence of sodium borohydride. We were studied various and different experimental parameters such as temperature; the dosage of catalyst and the concentration of sodium borohydride were studied. The rates of catalytic reduction of the nitrophenol compounds have been found as the sequence: 4-nitrophenol > 2-nitrophenol. The kinetic and thermodynamic parameters of nitrophenol compounds were determined. The nanomaterial was separated from the product by using a magnet and recycled after the reduction of nitrophenol compounds. We suggested to present reduction mechanism take advantage of the kinetic models and the thermodynamic parameters. The recyclable of the nanocatalyst is economically significant in industry.

Keywords: Photocatalysis, nanoparticles, carbon nitride nanotube, kinetics

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Adsorption of reactive red 120 on chitin

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Abstract

Textile industry is one of the most important sources of pollutants in liquid form. Approximately 70% of all the dyes used in industry are azo dyes . Moreover, azo dyes are used in paper, food, leather, pharmaceutical and cosmetic industries. Untreated textile effluents cause environmental pollution and public health problems. Chitin, poly (b-(1-4)-N-acetyl-D-glucosamine) is the most abundant biopolymer after cellulose. Chitin is found in the exoskeleton of arthropods and cell wall of fungi. Chitin was used for removal of environmental pollutants such as cadmium, orange G, orange IV and xylenol orange. In this study azo dye reactive red 120 was removed from aqueous solutions using chitin as adsorbent. Dye adsorption studies were carried out as function of pH, biomass dose, initial metal concentration contact time and temperature. The adsorption models were evaluated for Langmuir and Freundlich models, although adsorption process obeys both of the models, the linearity was observed for Freundlich model rather well.

Keywords: Chitin, textile dye removal, adsorption

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A novel impedimetric biosensor based on silver nanoparticles involved carbonnitride nanotubes for detection of DNA arrays

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Abstract

A highlysensitive method for detection of DNA hybridization was developed. This method was based on the modification of glassy carbon electrode with silver nanoparticles (AgNPs) involved carbonnitride nanotubes (C3N4NTs). This nanocomposite was used as a platform for impedimetricgeno sensing using 5′-TA GGG CCA CTT GGA CCT-(CH2)3-SH-3′ single-stranded probe (ss-DNA), 5′-AGG TCC AAG TGG CCC TA-3′ (target DNA), 5′-SH-C6-TAG GGC CA-3′ (non-complementary-1) and 5′-SH-C6-TGC CCG TTA CG 3-′ (non-complementary-2) oligonucleotide sequences. The film exhibited excellent properties for immobilizing DNA probes and sensing DNA hybridization. The DNA immobilization and hybridization on the film were studied by cyclic voltammetry (CV), and electrochemical impedance spectroscopy (EIS), and found that the charge transfer resistance (Rct) of the electrode increased with the concentration of the target DNA hybridized with thes s-DNA. The linear detection range was from 1.0 × 10−13 M to 1.0 × 10−7 M and the detection limit was 1.50 × 10−13 M (n = 6). Compared with the other electrochemical DNA biosensors, the proposed biosensor showed its own performance of simplicity, good stability, and high sensitivity.

Keywords: DNA arrays, biosensor, impedimetry, nanocomposite

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Histologic investigation of ışgın (*Rheum ribes* L.) in diabetic rats

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Abstract

Rheum ribes L. (Işgın) is a perennial plant of the Polygonaceae family and has many bioactivity. It is known that one of these bioactivities has an antidiabetic effect.The phenolic component profile of Rheum ribes L. And the flavanoids it contains make this plant potentially an antioxidant source. Oxidative stres plays an important role in the pathogenesis of complications of diabetes mellitus. In our study, it was aimed to histologically examine the effects of Rheum ribes L. plant on liver tissue in rats with experimental diabetes model.In this study 36 rats were divided into 6 different groups.Group I is the control group, Group II diabetes group and Streptozotocin was administered intraperitoneally at 40 mg / kg. Diabetes was formed in Group III and the infusion of Rheum ribes L. Plant was given to the animals in this group by gavage for 15 days. In group IV diabetes was induced and ethanol extract of Rheum ribes L. plant (50 mg / kg) was administered by gavage for 15 days.Group V diabetes was not induced but the infusion of Rheum ribes L. Plant was given to the animals in this group by gavage for 15 days. Group VI, diabetes was not induced , but the animals in this group were given ethanol extract (50 mg / kg) of Rheum ribes L. for 15 days by gavage. As a result of these applications, the experimental animals were sacrificed and liver tissues were removed.Tissues were prepared and visualized for electron microscopy. Comparing Group II with Group I, lipid vacuoles increased in the presence of edema in the mitochondria. In some areas fibrosis areas are encountered.Group IV and Group II were compared, similar structures were observed in both groups.Group III and group II were compared, an increase in lipid vacuoles was not observed in this group. The bile duct channels between the other organelles and hepatocytes in the hepatocytecyto plasm were normal.As a result of the study, we think that infusion of *Rheum ribes* L. Plant against the damage at the cell level caused by diabetes may have a the rapeutic effect.

Keywords: Oxidative stress, diabetes, Işkın, electron microscopy

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Quantitative determination of synthetic dyes in cosmetic products by HPLC

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Abstract

In this study, we developed and optimized a method for simultaneous quantitative determination of tartrazine (TRZ), sunset yellow (SY), allura red (AR), brilliant blue (BB) and erythrosine-B (Ery), which have toxicological important. For the preparation of the cosmetic products, 10 mg and 25 mg were added to the water-MeOH mixture (1: 1 v / v), then dissolved in the ultrasonic bath at 60 ° C for 1 hour. Finally, the dissolved samples filtred with a 0.45 µm filter were loaded into HPLC as 20 µL volume. Detection limits of methods for TRZ, SY, AR, BB and Ery were calculated as 3S/b (n=7), 0.16, 0.12, 0.14, 0.15, and 0.12. The relative standard deviations of method between 3.6 % and 4.8 %. Dyes were quantitatively determined by HPLC coupled by a diode array detector. The separation was performed gradiently on a Zorbax C18 reverse phase analytical column (4.6 x 250 mm, 5 µm) with 20 mM ammonium acetate buffer/acetonitrile/methanol as a mobile phase mixture, at 30°C. Mobile phase rate was 1 mL/min. Detection wavelengths were set to 428, 480, 510, 630 and 530 nm for TRZ, SY, AR, BB and Ery, respectively. The retention times were 8.5, 12.7, 14.4, 17.8, 23.1min for SY, AR, FG, Ery and QY, respectively.

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Molecular characterization of *Satsuma dwarf virus* (SDV) at east mediterranean region in Turkey

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Abstract

SDV, the type species of the genus Sadwavirus, has polyhedral particles that are ca. 26 nm in diameter and has two separate positive-strand RNA genome components, RNAs 1 and 2. This virus is widely spread and cause serious damage to citrus production in Japon. SDV is a definite virus species in the genus Sadwavirus, and CiMV and other related viruses are classified as strains of SDV. SDV is one of the virus in satsuma (*Citrus unshiu*) production areas in Turkey.To obseved the presence and distribution of SDV,a survey was conducted in150 satsuma orchard and 38 citrus nurseries from east Mediterranean Region(EMR) in Turkey from May 2014 to April 2018. Sesame seedlings were used for biological indexing. Molecular detection of SDV FW 5'-ACTAGGGATAGCGCCCTAG-3', R-5'-GGACCGATATTGGGCCAT-3' were used at RT-PCR to amplify of SDV RNA2 gene.The infected plants showed the expected size of CPsV coat protein fragment (342) which was absent in the healthy plants. Blast analysis showed that nucleotide sequences had greater than %98 nucleotide identity with corresponding region of SDV reference genomes in NCBI genbank.

Keywords: *Citrus inshiu*, SDV, Satsuma, Citrus virus, Turkey

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Karyologıcal and morphologıcal examınatıon of the populatıon of blınd mole rats (spalacıdae: nannospalax) ın Adana

Tuncay Tuluk

Abstract

In this study, blind mole rats of Adana province were examined in detail in terms of karyology and morphology. As a result of the karyological studies, it was determined that the 3 cytotypes belonging to N. ehrenbergi were 2n = 53 NF = 66, 2n = 54 NF = 70 and 2n = 56 NF = 70. Four cytotypes in the N. xanthodon species, 2n = 46 NF = 68, 2n = 54 NF = 74, 2n = 58 NF = 72 and 2n = 60 NF = 74 show spread in the province of Adana. From these cytotypes 2n = 46 NF = 68, 2n = 53 NF = 66 and 2n = 54 NF = 70 cytotypes were defined for the first time. In addition, the first hybrid form 2n = 53 NF = 76 was determined for mole rats in Turkey.

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Enzymatic hydrolysis of waste filter coffe ground oils

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Abstract

Filter coffee wastes are continually rising as a result of the increasing food consumption around the world. It can be considered as an alternative waste raw material for the production of renewable energy sources because of the oil content of about 10-15%. It is anticipated that in the last years, it will be possible to provide a biodiesel and bio-lubricant of approximately 340 million gallons if the coffee waste consumed in the world is evaluated by this method. Hydrolysis of oil and fat is a remarkable industrial processes. The products, fatty acids, and glycerol are basic raw materials for a wide range of applications. Fatty acids are used as raw materials in cleaning, cosmetics, textile, paint and lubricating oil industry. Glycerin has a wide use in the cosmetics and pharmaceutical industry. Fatty acids structures can be degraded due to the high temperature and pressure of the current chemical hydrolysis process. In addition, the product purification process is difficult and the cost of process equipment is high. In spite of that, enzymatic processes are more attractive and environmentally friendly than traditional chemical hydrolysis because of that lipases can work under milder processes conditions. In this study, the effect of important parameters such as lipase (Lipozyme TL IM) amount and temperature were investigated on hydrolysis of waste filter coffee ground oils (WFCO). The WFCO was obtained from dry coffee wastes by soxhlet extraction using hexane as solvent. WFCO was heated to 100°C and filtered for remove water and impurities before using. WFCO hydrolysis reactions were implemented that in 50 ml flasks with oil:water mass ratio of 1:10 at 400 rpm, 24 hours at different biocatalyst amount (0-100 mg) and temperatures (25 - 55 °C). The fatty acids obtained were determined by NAOH titration. As a result of the experimental studies, in the presence of 40 mg lipase and 25 °C temperature, 96% free fatty acids were obtained. The free fatty acids obtained from hydrolysis will be used as raw materials in the biolubricant and biodiesel synthesis in future studies.

Keywords: Biolubricant, waste coffe, hydrolysis, lipase

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