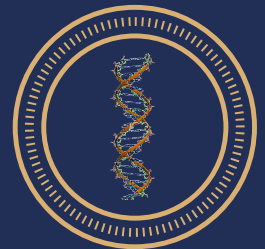


Online

ICABB 2020 CONGRESS



**4th International Congress on
Advances in Bioscience and
Biotechnology**



Book of Abstracts

SEPTEMBER 30, 2020

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Editors

İlker Camkerten

Güzin Camkerten

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Dear Scientist,

Fourth International Congress on Advances in Bioscience and Biotechnology **(ICABB)** organized by the Journal of Advances in **VetBio** Science and Techniques, and co-organized by Universiti Teknologi Malaysia UTM-Institute Of Bioproduct Development (IBD) (Malaysia) and Avicenna International College (Budapest, Hungary), and GREEN (Global Research, Education and Event Network) held **ONLINE**, in coordination from the Sarajevo / Bosnia and Herzegovina headquarters of the organization team on **September 30, 2020**.

We wanted to make this conference little bit special by bringing scientist together from different disciplines of Biology area and also to open new research and cooperation fields for them. In this sense, we desired to bring the distinguished scientist together to get know each other and to develop and implement new joint projects.

The scientist joined the congress was from different country. The total number of submission were 32 and after a careful evaluation 17 submissions were accepted by our scientific committee and 1 of them were accepted as poster presentation and, 16 of them were accepted as oral presentation and all those presentation was taken place in the conference booklet.

We would like to send our special thanks to Mr. Musa Köse and Mr. İsmet Uzun, ZENITH Group workers for their special efforts. And finally the most importantly I would like to thank to all the participants individually who came from far away to join this conference.

Chair of ICABB

Dr. Güzin Camkerten

Note for Turkish Participants: Kongremizin ONLINE düzenlenmesinde YÖK'ün 06.03.2020 tarihli tavsiye kararı dikkate alınmıştır.

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Keynote Address

Probiotics: The Small Biofactoties in Our Body “Science and Business”

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Probiotics are very important component in the body of almost all living organisms. These group of natural microbes are associated with human and animal bodies and located in all internal organs as well as body surface. They play crucial role for sustainable healthy growth by different direct and indirect mechanisms. This based on their potential to control other pathogenic microbes as well as the capacity to get maximal use of our diets by their enzymatic systems and through the produce many essential bioactive metabolites. For many years, it was believed that probiotics are only limited to lactic acid bacteria (LAB) group. However, nowadays, the list of microbes of proven probiotic properties includes many non-LAB as well as yeast from different groups. In the first part of this presentation, an overview will be given about the types and beneficial effects of microbes in human body and how can they play a crucial role in the life of healthy individuals. The second part of the presentation, will provide comprehensive information about the industrialization process of probiotic yeast (*Saccharomyces boulardii*) as model for large scale production platform from cell bank up to probiotic powder production. Another novel platform technology will be also presented for the large scale production of Selenium yeast (Se-yeast) as high potential biotherapeutic product.

Keywords: Probiotics, science, business

Overview upon the Biological Properties of Quercetin. Bee Products as Rich Sources of this Important Bioflavonoid

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Bee products (honey, polen, beebread, propolis, royal jelly) are important natural products, rich in nutrients which also possess high biologically active properties. Due to the complex chemical composition, they are highly appreciated both as value-added foods, and as important ingredients used in medicine, pharmacy and/or cosmetics. Phenolic fraction of bee products is minor, but very important in establishing their value, and for this reason, different modern analytical techniques are used to determine their presence and amount in the composition. Quercetin (3,3',4',5,7-pentahydroxyflavone) is one of the most ubiquitous flavonoids, and it is found in all bee products in different amounts. Numerous experiments have shown that quercetin exerts antiproliferative, antioxidative, antibacterial, anticancer and antiviral activity or severe complications associated with the pandemic influenza AH1N1 or even SARS-CoV-2 virus infection effects. The mentioned effects will be reviewed and connected with the presence of this bioflavonoid in bee products. In the context of the global health pandemic (COVID-19), safe, cheap interventions, biological rationale should be prioritized for experimental use both in prevention and in treatments, and bee products are definitively such products.

Keywords: antiviral effects, bee products, bioactive properties, quercetin

Rapid Detection of Food-Borne Pathogens Bacteria *Staphylococcus aureus* in Contaminated Meat and Milk Product by Real Time PCR

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The development of rapid, sensitive, and specific detection methods has increasingly become the center of attention in handling food poisoning cases. In this study, the methods of Real Time PCR with nuc gene targets were developed for the detection of *Staphylococcus aureus* in food samples of meat and milk. The purpose of this study is to find a specific, sensitive, and rapid detection method for *Staphylococcus aureus* bacteria. The results showed that the primer nuc gene with Gradient PCR could detect *Staphylococcus aureus* bacteria from pure culture at 57-61 °C by producing amplicons measuring 135 base pairs. Amplification by Real Time PCR in the same sample at annealing temperature of 58°C and a concentration of 53 ng/μL gave a Ct value of 15,10. The primer specificity test of the nuc gene shows that the primer can recognize the target bacteria with a very strong fluorescent signal at the Melting Curve of 79.18 °C, whereas non-target bacteria give low fluorescent signals and different T_m values. The primer sensitivity of the nuc gene has a detection limit (LOD) of 98.4 pg/μL or 5,26 x 10⁻² CFU / mL. Based on these results, the Real Time PCR method with the nuc gene has the potential to be a method of detecting specific, sensitive, and rapid for *Staphylococcus aureus* bacteria in a food sample.

Keywords: Real-time PCR, *Staphylococcus aureus*, food borne pathogens, nuc gene, rapid detection

Acknowledgements: Ministry of Research, Technology and Higher Education (Indonesia) by the scheme PDUPT under the contract agreement number 2/SP2H

Bottom up approach for capped silver nanoparticles and their antibacterial activity

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Problem: Bacterial resistance is increasing with the adaptation of microbes regularly. Current medical strategies are unable to address many of such questions for well-being related to antibacterial and anti-inflammation diseases.

Objective: Silver nanoparticles are the tiny particles of silver from 1 to 100 nm in size. The current study is based on developing capped silver nanoparticles (AgNPs) by trisodium citrate (TSC) bottom up approach. Silver nanoparticles are majorly applied in medicine from diagnostic applications to therapeutic, apart from its antimicrobial activity. In most of the therapeutic applications, the antimicrobial and anti-inflammatory properties are mostly considered and explored.

Research Methods: Turkevich method was used to prepare silver precursor i.e. silver salt (AgNO₃). The ions of silver are reduced by reducing agent for their non-valent metal atom for this research, Trisodium Citrate (Na₃C₆H₅O₇) was used as the reducing agent in this study. However, capping agent used was Adipic acid. Characteristic of the AgNPs/AA were analysed by UV-Vis spectrophotometer and FT-IR for the analysis of functional groups. AgNPs limit their applications due to their nanotoxicity.

Results and Conclusion: The silver nanoparticles are colloidal, stable, uniform and polydisperse in nature. Their size is less than 100nm. These silver nanoparticles were checked against six antibiotics, against Gram-positive (Enterobacteriaceae, Escherichia coli, Staphylococcus aureus) and Gram-negative bacteria, (Pseudomonas aeruginosa, Salmonella typhi, Klebsiella pneumoniae) ATCC 8885, ATCC 2881, ATCC 8868, ATCC 9353 by disc susceptibility test. The best resistance was shown against Azithromycin for K. pneumoniae.

Keywords: Nanoparticles, bottom up approach, Adipic acid, Azithromycin, K. pneumoniae

Acknowledgements: The authors would like to thankful to Department of Chemistry, University of Karachi, Dr. Irshad Hussain of (Professor SBASSE, LUMS), for analysis of DLS and Surface Potential and Dr. Sana Shamim (Professor, Department of Pharmacy, DUHS)

Estimation of alpha and beta diversity in different forest communities based on Sentinel S2 spectral species in natural monument “Tajan”

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The research aim was to analyse alpha and beta diversity of forest communities in sampled area of natural monument “Tajan” using method of spectral diversity recorded on satellite image. Alpha diversity refers to the frequency of occurrences of different species within forest communities while beta diversity refers to different composition of species between forest communities.

The research area covered part of the natural monument “Tajan” in central Bosnia. Twenty-four circular plots with radius of 25 meters were established in broadly classified six most present forest communities selected by species dominance in tree layer (pine, oak, beech, fir, mixed beech-fir with beech dominance and mixed fir-beech with fir dominance). Sample plots were geolocated, recorded, and dominant tree species were identified. The main remote sensing data source was Sentinel S2 satellite image captured in June 2019.

Spatial prediction of distribution frequency for twenty spectral species on spatial unit 400 m² size using principal coordinate analysis (PCoA) was applied. The statistical significance of divergent species composition between analysed forest communities was assessed with permutational analysis of variance. The model validity was evaluated with analysis of variance on Bray – Curtis distances.

The mapping of predicted spectral alpha and beta diversity is conducted on forest research area. Predicted alpha diversity is represented with Shannon (H') index with range values from 0.63 to 1.56. High beta diversity and statistically highly significant differences in predicted species composition between investigated forest communities were registered ($p < 0.01$).

Alpha and beta biodiversity prediction using spectral species is giving promising insight in spatial distribution of biodiversity on broader forest areas. The results can contribute to better understanding of spatial characteristics of diversity in natural monument for the purpose of conservation and improvement planning measures. More detailed knowledge of the spatial distribution of alpha and beta diversity could be provided by more intensive field sampling and multi-temporal satellite images in future.

Keywords: alpha and beta diversity, forest communities, spectral species, Sentinel S2A, natural monument

Use of *Vitreoscilla* Hemoglobin Technology for biodesulfurization of a model organosulfur compound

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Dibenzothiophene (DBT), an organic, sulfur containing component of petroleum based fuels, has been used as a model compound for microbial desulfurization studies. In the past, a number of biotechnological approaches have been investigated as ways to improve sulfur removal from DBT. The present study focused on enhancement of DBT desulfurization through Vhb technology. For this, biodesulfurization (BDS) of DBT was carried using the BDS competent moderate thermophile *Paenibacillus* 32O-Y and this strain bearing the *Vitreoscilla* hemoglobin gene, *vgb* (strain 32O-Y*vgb*). Both strains were incubated in media containing DBT as sulfur source over a range of initial concentrations. Within this concentration range, the presence of *vgb* was correlated with enhanced growth at 0.1 and 0.5 mM initial DBT concentrations. The use of Vhb technology may provide a useful increment to BDS when combined with other biotechnological approaches.

Keywords: Bacterial Hemoglobin, DBT, *Paenibacillus*, biodesulfurization

Acknowledgements: This work was supported by the Scientific and Technological Research Council of Turkey (TUBITAK, 118Y416)

Platelet hyperreactivity related with COVID-19 disease severity

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Objectives: A hypercoagulability status has been reported in SARS-CoV-2 infection. As platelets are referred as immune cells, the purpose of the study was to examine platelet activation and aggregation in COVID-19.

Material Method: This case–control study comprised 61 patients with SARS-CoV-2 infection and 18 healthy individuals. The patients were separated into groups with respect to the need of treatment in intensive care unit (ICU). CD41, CD61, CD42a and CD42b were determined as platelet activation markers and platelet aggregation tests were analyzed in all groups.

Results: Platelet CD41, CD61, CD42a and CD42b expressions were significantly elevated in ICU patients compared to non-ICU patients and healthy donors. Patients in ICU group had increased platelet aggregations than those in non-ICU patients and controls. Additionally, platelet activation and platelet function tests strongly correlated with inflammatory and coagulation markers involving C-reactive protein (CRP), Interleukin-6 (IL-6), neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR) and monocyte to lymphocyte ratio (MLR) and D-dimer and fibrinogen concentrations.

Conclusion: Enhanced platelet activity and faster platelet aggregation were observed in ICU COVID-19 patients. It is possible that platelet hyperreactivity may contribute to the progression of SARS-CoV-2 infection. The intense relationships between platelet activation and functions tests shows that systemic inflammation and cytokines may trigger the hypercoagulability in COVID-19 patients in ICU or hyperactivated platelets could augment the inflammation and be involved in COVID-19 pathophysiology.

Keywords: Platelet aggregation, COVID-19, flow cytometry, inflammation, platelet activation, SARS-CoV-2.

Cytotoxic effects of palladium complexes with pyridine derivative ligands on hepatocellular carcinoma cell line

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Cis-diamminedichloroplatinum (II) was synthesized in 1962, later known as cisplatin. It was used in the treatment of several types of cancer. Some palladium(II) complexes were tested in animals bearing transplanted tumors. Although the activity of palladium complexes was shown to be lower than that of platinum analogues with similar structures. Moreover, many palladium(II) and palladium (I) neutral complexes were found to exhibit antitumor activity. The biological activities of pyridine derivatives were studied for various biological actions. Metal halide complexes of pyridine derivatives were extensively studied. However, the antitumor activities of these halide complexes have received less attention in the literature. This report describes the synthesis and cytotoxicity of Dichlorobis (4-(4-nitrobenzyl) pyridine)palladium(II) (PdCl₂L₂1) K1, Dichlorobis (2-amino-5-bromopyridine) palladium(II) (PdCl₂L₂2) K2, Dichlorobis (1,3-dimethylpyridine) palladium(II) (PdCl₂L₂3) K3, Dichlorobis (3,4-dimethylpyridine) palladium(II) (PdCl₂L₂4) K4 complexes on HepG2 human hepatocellular carcinoma cell line.

A solution of PdCl₂ (0.025 mol) in ethyl alcohol (40 mL) was added dropwise to a stirred and heated (70°C) solution of pyridine derivatives (4-(4-nitrobenzyl) pyridine, 2-amino-5-bromopyridine, 1,3-dimethylpyridine, 3,4-dimethylpyridine) (0.05 mol) in ethyl alcohol (20 mL). The reaction mixture was refluxed for 2 h at a 70°C and then cooled to allow for the precipitation of the complexes. The complex that was obtained was filtered off, washed with ethyl alcohol and dried in a desiccator. The prepared complexes were characterized by FT-IR and ¹H-NMR spectrometers. Cytotoxic effects of complexes on HepG2 cell line were investigated using MTT cell proliferation assay.

The chemical structures of the complexes were verified by using ¹H-NMR and FT-IR spectrometer. Analytical and spectral results are consistent with the proposed structures. The cell viability changes were found to depend on the concentrations and type of the complexes. According to the cell viability data K4 was determined the most toxic. Further studies are needed to better understand the metabolic effects of these complexes.

Keywords: Cytotoxic activity, HepG2, Palladium complexes

Effect of dimethyl sulfoxide (DMSO) on growth of different bacteria

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Dimethyl sulfide (DMS) a volatile sulfur compound could be biologically produced in sea-surface water and realized to the atmosphere. Oxidation of DMS forms DMSO (dimethyl sulfoxide) can be consumed by bacteria as a sulfur source. This work aimed to investigate the potential effects of DMSO on growth of different bacteria. Therefore, two *Paenibacillus* strains (32O-W and 32O-Y), *B.subtilis* ATCC 6633 and *E.coli* ATCC 25922 strains were incubated in minimal liquid media including 0.1 mM DMSO for 96 hours. Although the growth (OD₆₀₀ values) of *E.coli* and *B. subtilis* strains were found to be constant, the OD₆₀₀ values of *Paenibacillus* strains increased throughout the 96 hour cultivation. As a result, the growth of *Paenibacillus* strains were not inhibited by DMSO and these strains can be used for biodesulfurization of organic sulfur compounds.

Keywords: Bacterial Growth, DMSO, *Paenibacillus*, *Bacillus*, *E.coli*

Acknowledgements: This work was supported by the Scientific and Technological Research Council of Turkey (TUBITAK, 118Y416).

Microbial remediation in environmental pollutants cleanup: Biosorption and Bioaccumulation

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Today, some physical, chemical and biological removal methods are used to treat and control toxic organic and inorganic pollutants in different receiving environments. However, biotechnological treatment methods have many advantages when comparing with other methods. In particular, it is widely used in the removal of potential toxic pollutants due to its low cost, easily applicable, degradation of organic pollutants and an environmentally friendly method.

Biosorption and bioaccumulation mechanisms are frequently made use of in the biotechnological remediation of materials with high organic content such as agricultural and domestic wastes.

Biosorption is an extracellular adsorption process independent from metabolism. The system is passive and the biosorbents used are not alive. Bioaccumulation is an active process, bioaccumulators are made up of living cells and it is a more complex process. When all these aspects are considered, bioaccumulation is a more complex and expensive method than biosorption in the treatment of various pollutant groups. The general purpose of this study is to reveal the differences, current status and research potential in the literature of biosorption and bioaccumulation, which are microbial improvement methods used in the treatment of various contaminants such as dyes, heavy metals and drug residues.

Keywords: Bioaccumulation, Biosorption, Contaminant removal, Eco-friendly, Remediation

Evaluation of trout farms in adana in terms of occupational health and safety

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As in many other sectors, there is loss of life and property in the aquaculture sector as a result of work accidents, which is one of the most important problems of working life. Occupational health and safety are practices that should be emphasized in terms of risks and potential dangers, as the employees in the aquaculture industry generally do not have a safe and healthy working environment. In this study, it was aimed to measure the awareness levels of the employees in terms of occupational health and safety by conducting a survey of 35 items on occupational health and safety in 10 trout farming facilities in Adana and the relevant occupational health and safety legislation. According to the findings obtained, it was found that 20% of the personnel of the trout production enterprises operating in the Adana region received Occupational Health and Safety training. In addition, 30% of the operating personnel stated that they had information about the risk of carrying heavy loads, 20% of them found themselves competent in OHS and 80% of them should receive training on this subject. As a result, it has been revealed that the enterprises in the region are not equipped with this issue and the risks of accidents and losses can be reduced by training.

Keywords: Occupational Health and Safety, Adana, salmon trout

The effect of biochemical blood parameters on udder lobe with subclinical mastitis

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Subclinical mastitis; although it does not cause any visible symptoms or changes in milk or udder, serious disorders in the udder parenchyma, decrease in milk quality/quantity and biochemical changes in the living body cause economic losses. In our study, a total of 30 Holstein breed dairy cows were used during the lactation period. Groups; Group 1 (those with negative test results but no subclinical mastitis), Group 2 (those with subclinical mastitis in two udders), Group 3 (those with subclinical mastitis in four udders) and 10 animals in each group. All of the cows in the study were in the mid-lactation period (100-200 days after birth), and cows whose udder lobes appeared normal in the clinical examination but showed a positive reaction with CMT were included in the study. For biochemical analysis, 5 ml of blood was taken from V. Jugularis of all animals and serum was extracted and glucose, T-cholesterol, T-bilirubin, AST and ALT measurements were made in Arkray Spotchem EZ SP-4430 dry system biochemistry analyzer. The data obtained were analyzed with the Oneway ANOVA test. In the evaluation of glucose and total cholesterol measurements between groups; While there was no difference between group 1 and group 2 ($P>0.05$), the difference between groups 1 and 3 was significant ($P<0.001$). In total bilirubin measurements between groups, the difference between Group 1 and other groups (with subclinical mastitis) was significant ($P<0.001$), while AST and ALT measurements were found to be significantly different between all groups ($P<0.001$). As a result, considering the disease state of the udder lobes; It has been concluded that by supporting the relevant organ according to the use of drugs, determining the duration of the treatment and biochemistry results, the success of the treatment can be increased and unnecessary drug residues and costs can be prevented.

Keywords: Subclinical mastitis, biochemistry, lactation

The Effects of the Addition of Inactivated Yeast Metabolites (*Saccharomyces cerevisiae*) to Rations Prepared with Different Roughage Materials on Nutrient Digestibility and Rumen Parameters of Lambs

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This study is planned in order to determine the effects of the supplementation of inactivated yeast metabolites (IYM) (*Saccharomyces cerevisiae*) to rations containing alfalfa hay (AH), meadow hay (MH) and wheat straw (WS) on lambs in terms of nutrient digestibility and some rumen parameters. In this study where 36 singleton born male Anatolian Merino lambs of 26.22±1.07 kg average weight, weaned at age of 2,5 months were used; 6 groups were formed for each roughage, 3 with IYM additive and 3 without IYM additive. Lambs were kept in individual partitions, were offered roughage in constant amounts (150 g/day) while concentrated feed and water were offered ad libitum. Extra IYM were added in constant amounts (7 g/day) to the roughage of the groups with supplement. Concentrate feed (2730 Mcal/kg ME, 17.41% protein) were kept in the feeders after roughage and/or roughage + IYM mixture were consumed. At the end of the period of stool collection (last 10 days of fattening) rumen liquid samples were extracted using rumen catheter and the pH, ammonia nitrogen (NH₃-N) and volatile fatty acids (acetic acid, butyric acid and propionic acid) amounts were determined. At the end of the research, it has been seen that crude cellulose (P<0.05) and hemicellulose (P<0.01) digestibilities were effected from the different roughage used in ration and that ADF (acid detergent fiber) (P<0.01) and cellulose (P<0.001) digestion increased with IYM addition. The effect of feed x additive interaction on acetic acid, propionic acid and total volatile fatty acids concentrations were found significant (P<0.01). The concentration of NH₃-N in rumen was effected by roughage type while acetic acid: propionic acid ratio was effected by additive (P<0.05). It is concluded that the addition of IYM to lamb rations results in positive effects on rumen fermentation and some cell wall components digestibility.

Keywords: Lamb fattening, digestibility, rumen parameters, inactive yeast

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Histology of retina in the *Nannospalax xanthodon* (Rodentia: Spalacidae)

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Blind mole rats (*Nannospalax xanthodon*) are wild subterranean rodents of the Spalacidae family. These animals are strictly fossorial rodents with various specific features that emphasize their adaptation to underground life. Blind mole rats have underdeveloped, non-functional subcutaneous eyes and are not able to detect light stimuli. There is no definite information about the retina histology of blind mole rats owing to the spreading these animals to only a certain habitat. The present study aimed to investigate of the histological structures of the retina in *Nannospalax xanthodon*. For this purpose, eye tissue samples were taken from five blind mole rats (*Nannospalax xanthodon*). The samples were fixed in 10% neutral buffered formalin, processed using routine histological methods and mounted in paraffin blocks. Six micrometer-thick sections were cut and stained with Crossmon's trichrome, H&E and periodic acid Schiff method. This study has shown even though the eye in *Nannospalax xanthodon* is severely regressed, the presence of a well-defined and functional retina. The lens greatly degenerated and the stratification of the retinal layers was very clear. The eyes studied had no pupil, which seemed to be collapsed by the accumulated heavily pigment. Retinal layers were observed to be composed of retinal pigmented epithelium, receptor layer, outer nuclear layer, outer plexiform layer, inner nuclear layer, inner plexiform layer, ganglion cell layer, and nerve fibre layer. The mammalian eye is an essential intermediate in processes like reproduction, thermoregulation and hibernation, which require information about changes in photoperiod. In conclusion, *Nannospalax xanthodon* is blind but the retina may still be photosensitive and functionally may play a role in photoperiodic perception. These findings are important in having a better understanding of their evolution and adaptation to subterranean life.

Keywords: Histology, Retina, *Nannospalax xanthodon*

Effects of Hypericum Perforatum on Serum and Tumor Tissue Total Antioxidant Capacity, Total Oxidant Capacity and Nitric Oxide levels in Experimental Breast Cancer

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Hypericum perforatum is one of the plants whose effects are investigated in cancer treatment. Nitric oxide is a modulator involved in many physiological and pathological processes. The imbalance between the production of reactive oxygen species (ROS) and the antioxidant defense system that detoxifies ROS results in oxidative stress. Excessive accumulation of ROS can cause damage to biomolecules, resulting in lipid peroxidation, mutagenesis and cancer. The aim of the study is to determine the effects of Hypericum perforatum on serum and tumor tissue total antioxidant capacity, total oxidant capacity and nitric oxide levels in Ehrlich ascites carcinoma (EAC) in mice.

In the present study forty adult female Balb-c mice were divided into five groups as followed; Control-tumor negative group, Control Tumor positive group, low-dose H. Perforatum, high-dose H. Perforatum and doxorubicin groups. All animals (except Group 1) were introduced 2.5 x 10⁶ EAC cells. Water extract of H. Perforatum was applied tumor bearing mice at different doses orally once every other day, for 10 days.

Compared with Group 1, there was a significant decrease in serum TAS level in Group 5 and Group 2. There were no significant differences between the groups in tumor tissue TAS levels. Serum TOS levels were decreased in Group 2 and Group 4 and increased in Group 5 and Group 3 compared to Group 1 (p <0.05). However, these changes are not statistically significant. But there were significant decreased in Group 2 and 4 compare to group 5 in serum TOS level. There were no significant differences between the groups in tumor tissue TOS levels.

When the serum NO levels were evaluated, no significant difference was found between the groups. But significant reduction was observed in tumor tissue NO levels in Group 3, 4 and 5 compare to group 2.

Keywords: Hypericum Perforatum, Total Antioxidant Capacity, Total Oxidant Capacity, Nitric Oxide, Breast Cancer

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Evaluation of the shear bond strength of different cement types to dentin surface after magnetic resonance imaging

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Aim: The aim of this in vitro study is to evaluate the effect of magnetic resonance imaging on the shear bond strength of Co-Cr metal specimens cemented with different cement types to dentin surface.

Materials and Methods: Ninety human molar teeth were prepared until sufficient circular area of dentin was exposed and were assigned into 4 groups for the application of 1 of 3 types of cement: (1) Glass ionomer, (2) resin-modified glass ionomer, and (3) resin (n=30). Each group then was subdivided into 4 subgroups according to the duration of magnetic resonance application: control (no application), 15, and 30 min (n=10). Co-Cr metal specimens were fabricated using laser sintering system in the final dimensions of 7 mm in diameter and 3 mm in thickness. Magnetic resonance imaging application was performed after their cementation according to randomization. Shear bond strength test was performed to assess the effect of magnetic resonance imaging on the adhesion of metal specimens to dentin surface.

Results: In the glass ionomer cement; the value of the shear bond strength of 15 min group was significantly lower than that of the control group ($p < 0.05$). In the same vein, the value of the 30 min group was significantly lower than the value of the 15 min group ($p < 0.05$). In the resin cement and resin-modified glass ionomer cement; the value of 15 min group was lower than that of the control group ($p > 0.05$). The value of the 30 min group was lower than the value of the 15 min group, but these differences are not reached the significance level ($p > 0.05$).

Conclusions: In patients using prosthesis made of Co-Cr alloy, resin or resin-modified glass ionomer cement are recommended for patients with a history of frequent exposure to magnetic resonance imaging.

Keywords: Glass ionomer cement, resin-modified glass ionomer cement, resin cement, magnetic resonance imaging, shear bond strength

Clustering of high forest types based on spectrally characterized vegetation and environmental conditions using Sentinel S2 data

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Native mixed high forest types are the most present forest cover in central Bosnia. They appear in different forest species composition and environmental conditions. Forest type classification is based on typology criteria considering vegetation and soil components terrestrially observed. Recent interest is related to possibility to characterize wider areas of different forest types using satellite data. The objective of this research was to analyse similarities between different forest types regarding Sentinel S2 spectrally based indicators of forest biomass and environmental conditions.

Research area of 240.8 ha covered private native mixed high forests distributed in Ilidža municipality. Here is used time-series (seven images) of Sentinel S2 images from vegetation season in 2017. Images are pre-processed, generated normalized difference vegetation indices (NDVI) and performed tasselled cap transformations (greenness, brightness, wetness). Six different native high forest types were analysed. Clustering was based on Ward's method (squared Euclidian distance) for transformed values averages on management class level. Discriminant analysis was used to confirm differentiation.

Clustering resulted in three clusters. The first cluster contains secondary fir-spruce, oak and secondary beech forest on deep soils. The beech-fir-spruce and secondary fir-spruce forests on shallow soils belong to the second cluster while black alder forest on river valleys is separated in the third cluster. Discriminant analysis revealed consistent results with two significant functions (eigenevalues of 10 and 1) with 99% cumulative discrimination. It seems that similar environmental conditions are present for different forest species compositions. Soil type appears as differential attribute for clustering which confirms correlation of remotely sensed area characterisation with terrestrial soil type identification.

Obtained clusters indicate environmental similarities for diverse forest species composition what could be used in further consideration related to forest type typology classification. Additional forest type characteristics and satellite data could be integrated in further research for forest management planning purposes.

Keywords: forest types, Sentinel S2A image, normalized difference vegetation index, tasselled cap transformation



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