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Treatment Response Relationship with Hematologic Parameters Before and After Chemoradiotherapy in Patients with Non-Small Cell Lung Cancer

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ABSTRACT

Aim: We aimed to investigate the relationship of treatment response with hemogram parameters that were evaluated by radiologic investigations with hematologic parameters obtained before and after treatment in the patients receiving curative intentional chemoradiotherapy with the diagnosis of non-small cell lung cancer in the years.
Method: By scanning retrospectively the files of 120 patients having admitted to The Department of Radiation Oncology in Atatürk University School of Medicine for curative chemoraditherapy in the years 2008-2014, clinical, radiologic and laboratuary data were collected; and out of these, 49 patients suitable for our study criteria were included in our study.
Results: In the evaluation of the distinction of tumor size with the relationship of the distinction of laboratuar parameters before and after the treatment, of hemogram findings , we could not observe any correlation among the white blood cell counts, neuthrophile counts, lymphocyte counts, monocyte counts, basophile counts, eosinophile counts, neuthrophile percentage, lymphocyte percentage, basophile percentage, monocyte percentage, eosinophile percentage, red blood cell (Rbc), hemoglobin (Hb), hematocrit (Hct), medium cell volume (MCV), medium thrombocyte volume (MPV), medium cell hemoglobin (MCH), medium cell hemoglobin concentration (MCHC), erythrocyte distribution width (RDW), thrombocyte counts (Plt), thrombocyte percentage in blood (Pct), thrombocyte distribution width (PDW), the rate of neuthrophile/lympocyte and the rate platelets/lympocyte.
Conclusion: Laboratory investigations carried out routinely may be of predictive value for treatment response due to both the display of anti-tumour immunity and systemic inflammature response. In our study, in addition to not having a correlation with non-small lung cancer, when more patients are evaluted, the comparison of the treatable and untreatable tumors may give significant results in the detection of predictive value.
Key Words: Non small cell lung cancer, chemoradiotherapy, hemathological parameters

Optimization of Laser Machining Parameters with Taguchi L_9 Orthogonal Array

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ABSTRACT

In recent years, it is desired to obtain geometric patterns for different purposes on dual-phase steel, which has been preferred especially in the automobile industry. In this study, it is desired to create grooves with the desired geometry on dual-phase steel with CO_2 laser that has 10600 nm wavelengths and 130 Watts maximum power lasers. The laser parameters required to obtain the groove with the desired geometry were obtained by the Taguchi method. In the study, it was also calculated to what extent the laser parameters were used to affect the result. As a result of the confirmation experiment, it has been shown that the Taguchi method is reliable for such studies.

Key words: Optimization, Taguchi Method, Ortogonal Array, Laser.

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How Effect Fe Dopand on CuO Thin Film Grown by USP Method

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ABSTRACT

Fe dopant effect on CuO thin films was carried out by ultrasonic spray pyrolysis (USP) method on glass substrate. The optical, morphological and structural properties were investigated of Fe dopant on CuO samples grown by USP method. The optical properties by UV–Vis spectroscopy, the morphological properties by scanning electron microscopy (SEM) and and structural properties of the samples were examined by X-ray diffraction (XRD). As a result of the absorption measurements, changes were observed in the band gaps of the samples with the doping of Fe. SEM images of the samples show that the morphologies changed in the with the Fe dopant. It was observed that the XRD peak intensities of the samples changed, and their degree shifted with the Fe dopant.

Key words: Zn dopant, MgO, USP.

ICOLES 2022

Investigating Zn dopent effect on MgO Thin Film Grown by USP Method

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ABSTRACT

In this study, Zn dopant effect on MgO thin films was carried out by ultrasonic spray pyrolysis (USP) method on glass substrate. The morphological, optical and structural effects were investigated of Zn dopant on MgO samples grown by USP method. How effect Zn doping on MgO, the morphological properties by scanning electron microscopy (SEM) and optical properties by UV–Vis spectroscopy and structural properties of the samples were examined by X-ray diffraction (XRD). SEM images of the samples show that the morphologies changed in the with the Zn dopant. As a result of the absorption measurements, changes were observed in the band gaps of the samples with the doping of Zn. It was observed that the XRD peak intensities of the samples changed, and their degree shifted with the Zn dopant.

Key words: Zn dopant, MgO, USP.

Photon Shielding Capability of Nicosel: Glass Sealing Alloy

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ABSTRACT

This study investigates alloys that can replace lead and its derivatives as a new alternative shielding material providing the most optimal properties that should be present in protective material. For this purpose, the present study focused on determining the photon-shielding capability of Nicosel: Glass sealing alloy. In this context, the photon shielding parameters (μ, μ_m, λ, $X_{1/2}$ and Z_{eff}) giving essential information about the radiation shielding capacity of the materials were determined both experimentally and theoretically in a wide range of radiation energy. For experimental measurements, two different detectors (Si(Li) and Na(Tl)) and nineteen different photon energies (from 30.8 to 1332.5 keV) emitted from seven different radionuclides (^{241}Am, ^{133}Ba, ^{109}Cd, ^{152}Eu, ^{22}Na, ^{137}Cs and ^{60}Co) were used in narrow-beam transmission geometry. Phy-X/PSD software was used for theoretical calculations. To make a remarkable assessment of the integration of Nicosel into nuclear energy applications, all the results obtained have been compared with the corresponding values of RS 253 glass and Cupero-Nickel alloy. Consequently, in the low energy region (E_{photon}< 100 keV), it was found that the Nicosel alloy has better shielding performance than RS 253 glass and Cupero-Nickel alloy. Additionally, in the high photon energy region (E_{photon}> 100 keV), the Nicosel alloy performed better than the Cupero-Nickel alloy and close to RS 253 glass. Due to both high attenuation efficiency and superior properties for radiation shielding, it was determined that the Nicosel alloy can be used as a new shielding material in nuclear applications.

Keywords: Nicosel, Radiation shielding, Glass sealing alloy, Mass attenuation coefficient.

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Evaluation of Particle Radiation Protective Performances of $XZrO_3$ (X=Mg, Ca, Sr and Ba) Ceramics

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ABSTRACT

This study focused on investigating particle radiation protective capacities of $XZrO_3$ (X=Mg, Ca, Sr and Ba) ceramics doped with alkaline earth metals. In line with this focus, the total stopping powers (TSPs; dE/dx; MeV/mm) and ranges (R; μm) for charged energetic particles such as electron (e^-), proton (H^+), and alpha (He^{++}) were calculated in the kinetic energy range of 0.01-20 MeV using SRIM Monte Carlo software for energetic H^+ and He^{++} particles and ESTAR NIST standard references databases for energetic e^- particles. Additionally, the fast neutron removal cross-sections (FNRCSs) of $XZrO_3$ ceramics for energetic neutrons were calculated using Phy-X/PSD software. The results obtained were comparatively presented as both a function of particle kinetic energy and the atomic number of X metal-doped in ceramics. According to the results obtained, it was found that there is a strong relationship between particle radiation protective performances and the kinetic energy of the charged particle. Furthermore, it was determined that the TSP, R and FNRCS values were strongly dependent on the atomic number of the X metal-doped in the ceramics.
Keywords: Ceramics, Mass Stopping Power, Range, Fast neutron removal cross-section.

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On Some Equations of Hyperbolic Padovan Sequences

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ABSTRACT

In this article, we extend Padovan numbers to hyperbolic Padovan numbers. We obtain some identities related with hyperbolic Padovan. Also we give binet-like formula for hyperbolic Padovan numbers.

Keywords: Padovan numbers, Pell-Padovan numbers, Hyperbolic numbers, Hyperbolic Padovan numbers, Hyperbolic Pell-Padovan numbers.

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Some Novel Integral Inequalities for Product of Geometrically Convex Functions

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ABSTRACT

The main motivation of this study is to prove sone novel integral inequalities for geometrically convex functions. In order to obtain the main findings, we have used some classical inequalities such as Hölder and Young inequality for certain powers of the functions. The results include some special means of the real numbers.

ICOLES 2022

A Mathematical Model for Multi-Manned U-Shaped Assembly Line Balancing Problem

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ABSTRACT

Assembly line balancing (ALB) is a well-known production system problem in the literature. It can be classified based on system characteristics, such as the production line design. Straight lines, U-shaped lines, and two-sided assembly lines are well-known types. Traditional line design (straight) has drawbacks, such as monotone operations, length of line, and inflexible system (Scholl,1999). A U-shaped line is, therefore, developed to eliminate these drawbacks. This layout type is ideal for just-in-time (JIT) and group technology, as well as it may provide to decrease cost, cycle time, and the number of workstations. Moreover, this type of layout allows workers to perform tasks inside the U-line (Chutima and Olanviwatchai, 2010). On the other hand, large-sized products like cars and household appliances allow performing more than one worker simultaneously on the same product. Therefore, in recent years, multi-manned stations have become popular in the assembly line environment. To the authors' best knowledge, the multi-manned U-shaped assembly line balancing problem has not been studied in the literature. The proposed problem includes assigning tasks to the proper workstations and scheduling workers inside workstations. The current study aims to develop mixed-integer non-linear programming to solve the multi-manned U-shaped assembly line balancing problem. The objective of the proposed model is to minimize the number of workers as a primary objective and the number of workstations as a secondary objective. The proposed mathematical model is verified on the small benchmark problem.

Keywords: Multi-manned assembly lines, U-shaped, mixed-integer linear programming.

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Some New Integral Inequalities of Hermite-Jensen-Mercer Type for Different Kinds of Convex Functions via Fractional Integral Operators

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ABSTRACT

In this paper, we will recall some well-known definitions and concepts related to fractional calculus and inequality theory. Then, we will prove some new integral inequalities of Hermite-Jensen-Mercer type for differentiable m-convex and quasi-convex functions via k-fractional integral operators. We will also give some special cases for our main findings by selecting certain values of parameters.

Key words: k-fractional integrals, quasi-convex functions, m-convex functions.

ICOLES 2022

Gradient Graphene Sponge Material Design for Solar Steam Generators

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ABSTRACT

With the rapid developments and population growth in modern societies, increased water pollution and the gradual decrease in freshwater resources have become a serious problem. Although many methods have been developed to overcome this problem, solar steam generators emerge as a renewable and sustainable strategy to obtain clean water from seawater, water containing heavy metals, and dyes [1]. The primary focus for water vapor production using solar energy is to design new photothermal materials that are biodegradable, sustainable, cost-effective, and have high solar vapor production efficiency [2,3].
In this study, a flexible, ultralight and hydrophobic 3D graphene sponge material (GSM) was fabricated. Gradient graphene sponge material (GGSM) was prepared by applying a simple acid treatment to GSM (Figure 1). Photothermal material was designed by modifying GGSM with perylene diimide and porphyrin derived supramolecules. (This study was supported by TÜBİTAK under project no: 121M347.)

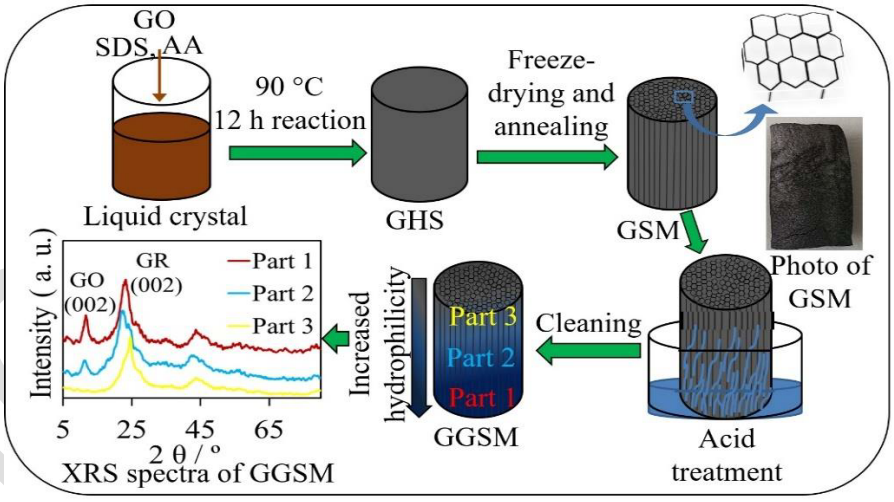


Figure 1. Scheme of the fabrication of the GGSM and XRD spectra of the prepared GGSM.
Key words: Gradient graphene sponge, photothermal material, solar steam generators

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Binary Metal Phosphite/Graphene Sponge: 3D Flexible Electrode for High-Performance Asymmetric Supercapacitor

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ABSTRACT

Flexible supercapacitors (SCs) have attracted great interest with the rise of wearable electronic devices. Recently, there has been an interest in research on the production of flexible graphene-based sponge for use in SCs. Graphene, as one of the advanced carbon nanomaterials, is a 2-dimensional (2D) single sheet of carbon atoms arranged in a hexagonal network [1]. The geometry transformation of 2D graphene into 3D graphene, not only improves its conductivity but also serves to increase the specific surface area and facilitate the porous structure via 3D cross-linking construction [2]. In recent years, transition metal phosphides (TMPs) have been attracted widespread attention. TMPs have emerged as more attractive electrode materials for SCs, due to their outstanding electroconductivity, metalloid feature, high electrochemical activity, together with good thermal and chemical stability [3].
In this study, a flexible, ultralight, 3D graphene sponge (GS) was fabricated. This freestanding GS was decorated with iron-nickel phosphite (FeNiP) by using the electrodeposition method. As-prepared 3D FeNiP/GS was characterized with numerous techniques and used as electrode material for asymmetric SCs (Figure 1). (This study was supported by TÜBİTAK under project no: 121M221.)

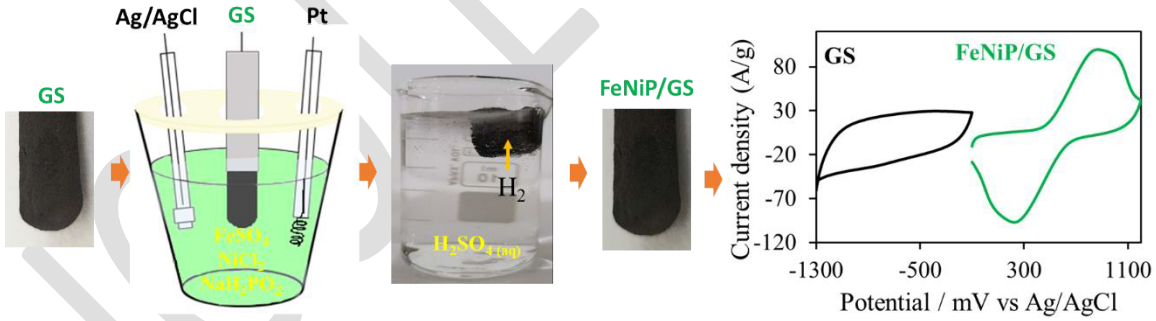


Figure 1. Scheme of the fabrication of the FeNiP/GS and cyclic voltammogram of GS and FeNiP/GS.

Key words: Graphene sponge, flexible material, binary metal phosphite, supercapacitor.

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Fabrication of Multifunctional Flexible Reduced Graphene Oxide Sponge

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ABSTRACT

In recent years, considerable work has been performed to explore flexible graphene sponge in various potential applications such as sensors [1] and supercapacitors [2]. This three-dimensional (3-D) materials assembled by atom-thick 2-D graphene sheets with excellent mechanical, electrical and thermal properties as well as the ease of scalable synthesis from inexpensive graphite have exceptional potential in real applications than individual graphene sheet [3].

In this study, we report on the preparation of multifunctional ultralight and flexible 3-D reduced graphene oxide sponge (rGOS) with foaming sol−gel method for both adsorber and electrode material (Figure 1). rGOS is acidified to be used as an adsorber, giving it hydrophilic properties. In addition, rGOS was annealed and used as electrode material. Characterization of the rGOS has been carried out using numerous techniques.



Figure 1. Photographs of ultralight and flexible rGOS.

Key words: Graphene sponge, flexible material, multifunctionality.

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A Flexible Freestanding Ag Nanoparticles Decorated Graphene Paper Electrode for Electrochemical Determination of H_2O_2

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ABSTRACT

Hydrogen peroxide (H_2O_2) as an important intermediate in biological processes is associated with cell damage and a variety of diseases, including autoimmune diseases, cardiovascular disease, and cancer [1-2]. Therefore, the accurate and low-level detection of H_2O_2 is much important in biological samples with simple and sensitive methods. Among the traditional methods, the electrochemical method is most attracted in electrochemical sensors owing to their excellent sensitive, simplicity, cost-effectiveness and eco-friendly [3].
In this work, we report a flexible freestanding silver nanoparticles decorated reduced graphene oxide (AgNP/RGO) paper as an amperometric H_2O_2 sensor (Figure 1). (This study was supported by TÜBİTAK under project no: 121Z779.)

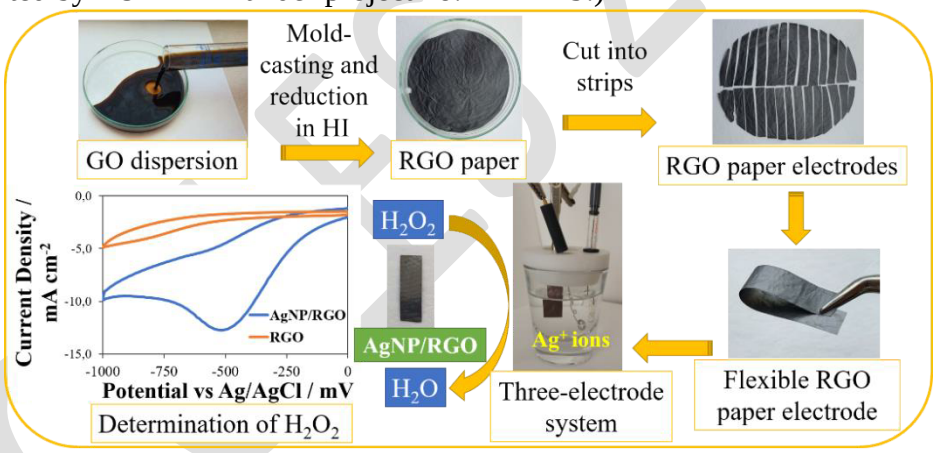


Figure 1. Schematic illustration of the fabrication of AgNP/RGO paper electrode and electrocatalytic reduction of H_2O_2.

Key words: Hydrogen peroxide, silver nanoparticles, graphene paper, flexible sensor.

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Fabrication of Flexible FeP/Graphene Sponge Material for Asymmetric Supercapacitor

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ABSTRACT

The recent rapid growth in graphene-based supercapacitors (SCs) has reached the point where there is a need for flexible all-solid-state SCs (FASCs) devices with physical flexibility, which will be a crucial advantage in modern electronic devices [1]. Two dimensional (2D) material, graphene, is highly preferred while designing FASCs [2]. With its expanded honeycomb appearance, it forms the basic building block of other important allotropes and can be stacked to form 3D graphite [2,3]. In recent years, metal phosphites have been promising candidates for SCs electrodes due to their much more porous structure, extremely high specific surface area, high electric conductivity, theoretical specific capacitance, high chemical stability, non-toxicity [4].

In this study, hybrid sponge electrodes were obtained by modifying graphene sponge material (GSM) with iron phosphite (FeP) using the electrochemical technique (Figure 1). Characterization of the FeP/GSM has been carried out in numerous techniques. (This study was supported by the Scientific Research Projects (BAP) under project no: FAB-2021-9120.)

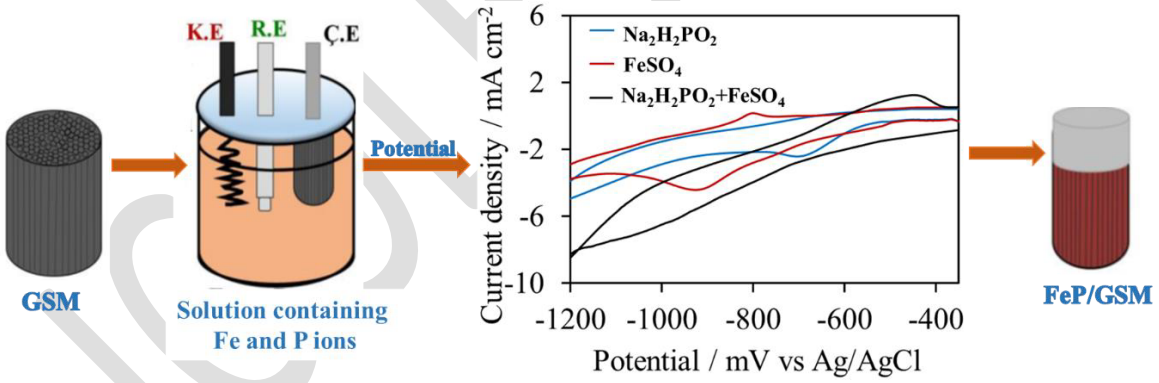


Figure 1. Schematic representation of the preparation of FeP/GSM.

Key words: Graphene sponge material, metal phosphite, flexible supercapacitor.

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Inhibitory Effects of Ethanol Extract of *Onobrychis buhseana* from Nakhchivan and Its Major Component β-Arbutin on Acetylcholinesterase, Butyrlcholinesterase and *α*-Glucosidase Enzymes

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ABSTRACT

There are more than 130 species of *Onobrychis* (Fabaceae), which has two subgenus [*Onobrychis* and *Sisyrosema* (Bunge ex Boiss.) Sirj.]. The genus Onobrychis is distributed in temperate and subtropical regions of Eurasia, North and Northeast Africa (Moghaddam et al. 2022). These species, known as sainfoin in Türkiye, are used as fodder plants (Ozbek 2011). The aboveground parts of *Onobrychis buhseana* used in the study was collected from Nakhchivan region in June 2020. In this study, the inhibition effects of *O. buhseana* ethanol extract and its main component β-arbutin (Figure 1) were investigated on acetylcholinesterase (AChE), butyrylcholinesterase (BChE) and *α*-glucosidase enzymes.

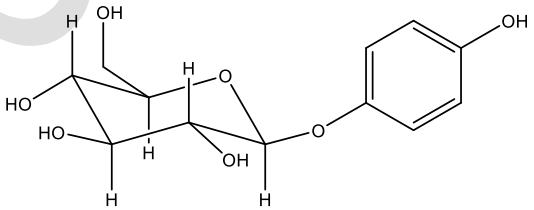


Figure 1. Chemical structure of β-arbutin

The dried and ground plant sample was extracted by maceration with an ethanol solvent and then separated into fractions by thin layer and silica gel column chromatography methods. β-arbutin was highly purified from the sub-fractions, its chemical structure was characterized by ^{1}H and ^{13}C NMR spectroscopic methods. The IC_{50} and K_i values were calculated to determine the inhibition effects of β-arbutin and ethanol extract on enzymes. According to the results obtained, the IC_{50} and K_i values of β-arbutin for AChE and BChE were calculated as

81.94±2.49 (r^2: 0.9935), 32.52±6.52 µM and 113.53±1.21 (r^2: 0.9345), 69.70±12.97 µM, respectively. On the other hand, it was determined that β-arbutin did not inhibit the *α*-glucosidase enzyme. The IC_{50} values of ethanol extract of *O. buhseana* for AChE, BChE and *α*-glucosidase enzymes were calculated as 21.46±0.23 (r^2: 0.9884), 63.20±1.35 (r^2: 0.9672) and 42.03±1.35 (r^2: 0.9387) mg/mL, respectively. When the results were compared with the positive controls, it was determined that β-arbutin showed strong anticholinesterase activity especially for AChE.

Key words: *Onobrychis buhseana*, β-arbutin, Acetylcholinesterase, Butyrlcholinesterase and *α*-Glucosidase

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ICOLES 2022

Optimization of Methylene Blue Dye Removal on Waste Jewelry Meerschaum Powder by Application of Response Surface Methodology

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ABSTRACT

This study relates to the adsorption of a cationic dye – methylene blue – on meerschaum powder waste that is processed as jewelry. In order to optimize the adsorption parameters and to investigate the removal behavior, the central composite design (CCD) based on the response surface methodology (RSM) approach was adapted to the experimental data. The initial dye concentration, solution pH and adsorbent dosage were selected as experimental factors and the effects of factors on the dye removal have been investigated. As a result of the study, the effects/interactions of experimental factors on dye removal were expressed with a mathematical model. Over 95% removal efficiency was achieved under optimum conditions determined by CCD.

Key words: Methylene blue removal, response surface methodology, waste jewelry meerschaum powder

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Cu (II) Removal from Aqueous Solution with Low-Cost Waste Material (meerschaum)

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ABSTRACT

In line with the rapid development of technology and the need for the industry, studies on the removal and recovery of heavy metals transferred to aqueous environments are increasing their importance day by day. In this context, finding easily available, inexpensive, environmentally friendly adsorbents comes to the fore. It is a low-cost effective method, using natural material wastes as an adsorbent in adsorption for heavy metals and removing them from the environment. In this study, the use of meerschaum wastes used in jewellery design as an adsorbent for Cu (II) ion from aqueous solutions without any pre-treatment was investigated. Box–Behnken experimental design was used to investigate the effects of parameters such as initial concentration (20–200 mg L^{-1}), pH (2-7), and adsorbent amount (0.1–0.5 g) on the removal of Cu (II). These optimization studies were performed while the time and temperature of the adsorption process hold at 30 min and 25 C respectively. The obtained optimization results showed that the material found as waste was effective in removing Cu (II) from model aqueous solutions. The use of this adsorbent in wastewater containing heavy metals is recommended as a precursor for further studies.

Key words: Box-Behnken Design, Cu (II), Waste Meerschaum

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One-step Electrochemical Reduction of Graphene Oxide Paper

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ABSTRACT

Graphene has taken its place as a basic nanomaterial in many different technological applications such as actuators [1] and sensors [2] since its discovery by mechanical separation in 2004 [3]. Flexible graphene papers attract attention due to their high mechanical flexibility, electrochemical performance and chemical stability [1,2]. Graphene oxide (GO) papers have high flexibility but are insulating. GO papers are generally converted to reduced graphene oxide (rGO) paper using a suitable reduction technique to provide electrical conductivity and electrochemical activity. Many different methods are used to prepare rGO paper by direct reduction of GO paper, such as chemical reduction [1,2], thermal annealing [2], hydrothermal reduction [4]. Such methods are toxic in nature, harmful to the environment and time consuming, thus it is in high demand to use gren methods for rGO production [1,5].

In this work, rGO paper (er) has been prepared by one-step electrochemical reduction of the GO paper. The electrochemical performance of rGO paper (er) was also compared with that of chemically reduced graphene oxide paper (rGO paper (cr)). It is determined that electrochemical behavior of rGO paper (er) can compete with rGO paper (cr) [1].

This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under project no: 120Z155.

Key words: Electrochemical reduction, Graphene oxide paper, Flexible electrode.

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Investigation of Antibacterial Effect and *in vitro* Enzyme Inhibition of Silver Nanoparticles Synthesized from Red Currant (*Ribes rubrum*) Using Green Nanotechnology

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ABSTRACT

Nanotechnology has created significant excitement worldwide as an essential technology in the 21st century. However, insufficient understanding of the dangers of nanotechnology has led to a decrease in interest in this technology. Today, green synthesis is accepted as one of the main branches of nanotechnology, where a greenway is adopted to synthesize nanostructures (Dutta and Das, 2021). Plant extracts contain various bioactive substances such as alkaloids, proteins, phenolic acids, sugars, terpenoids, and polyphenols, which have been found to play an important role in first reducing and then stabilizing metallic ions (Verma et al., 2019; Gulcin et al., 2022).

In this study, *in vitro* inhibition of some metabolic enzymes of the juice extract and red currant-silver nanoparticles prepared as green synthesis were investigated. In addition, antibacterial activities of redcurrant water extract and produced silver nanoparticles were determined against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Escherichia coli* using the disc diffusion method (Eruygur et al., 2019). Gentamicin was also used as a positive control. Results showed that silver nanoparticles produced by green synthesis from redcurrant showed antibacterial effects. In addition, half maximal inhibition concentrations (IC_{50}) were calculated for enzyme inhibition of the water extract. The IC_{50} values of nanoparticles prepared by green synthesis are 45.21±0.91 mg/mL for AChE, 41.85±0.95 mg/mL for BChE, 81.56±1.91 mg/mL for hCA I and 71.48±1.93 mg/mL for hCA II. According to these values, it was determined that nanoparticles have effective inhibition effects on metabolic enzymes used in some global diseases. As a result, the silver nanoparticle obtained by green synthesis is very useful in biological medicine systems and in removing environmental wastes. It does not harm the environment and does not create toxic residues.

Key words: Nanotechnology, Green synthesis, Redcurrant, Enzyme, Antibacterial activity

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Electrocapacitive Performance of Flexible Polyindole/rGO Hybrid Paper

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ABSTRACT

Reduced graphene oxide (rGO) paper is multi-layered, flexible, and processable electrode platform, which can be used for many electrochemical applications such as sensor [1], battery [2], and supercapacitor [3]. Graphene oxide (GO) paper is an insulator and it is generally transformed to rGO paper via suitable reduction process to be performed as an electrode material. Surface modification of rGO paper is general route to achieve an effective electrode. Formation of polymer films at electrode surfaces is one of the viable routes to supply functionality. In this work, rGO paper was fabricated using mold-casting and is used as a working electrode for electropolymerization of indole. Formation conditions of polyindole (pin) film were optimized and electrocapacitive performance of pin/rGO paper was tested. It was determined that modification of rGO paper with pin increased capacitive performance of the electrode many times (Fig. 1). This study was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under project no: 121Z206.

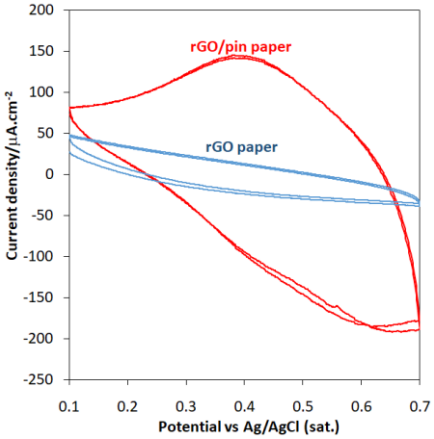


Figure 1. Cyclic voltammograms of rGO and rGO/pin papers in 1.0 M $HClO_4$ solution.
Keywords: Electropolymerization, polyindole, rGO paper, capacitance.

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Effect of Ruthenium Addition on Radiation Interaction Properties of UDIMET* 720Li Alloy

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ABSTRACT

The effects of ruthenium (Ru) additions on the radiation interaction properties of the nickel-base superalloy UDIMET*720Li (U720Li) were examined. The base alloy U720Li that is most commercially used and new U720Li alloys formed by adding various amounts of Ru, from 0% and 6% wt pct to the base alloy [1] have been investigated. Nickel-base superalloys combine high strength and good corrosion resistance, which are essential for applications such as modern gas turbine aero-engines, high-speed rotating components, high-pressure turbine disks, etc. UDIMET 720Li, a strengthened Ni-base alloy, is one of the most successful alloys, especially for high-temperature applications, and it is largely preferred where strength is required at high temperatures [2]. Therefore, the investigation of the U720Li to reveal the radiation interaction properties will be very useful for the applications that it is used. To evaluate the usability of any material for various purposes in nuclear and radiation applications, it is very useful to use various radiation interaction parameters to give significant information about the radiation shielding abilities of that material [3,4]. In this study, the interaction parameters calculated for present U720Li alloys in a wide energy range are these mass attenuation coefficient (MAC), linear attenuation coefficient (LAC), radiation protection efficiency (RPE), mean free path (MFP), half-value layer (HVL), total atomic and electronic cross-sections (ACS and ECS), effective atomic number (*Z*eff), effective electron density (*N*eff), effective conductivity (*σ*eff). These parameters were calculated using a new WinXCOM-based [5] computer software called Phy-X/PSD [6], which accurately calculates all photon-shielding parameters. To evaluate the use of the investigated alloys as a radiation-shielding material, all determined parameters were also calculated for lead (Pb) which is used as a shielding material in many radiation applications. Then results obtained were discussed comparatively to determine the shielding capacities of the examined U720Li alloys. The results have shown that the alloys with Ru contents had different radiation interaction parameters from the base U720Li alloy. The Ru additions to U720Li affected the radiation shielding capability of the U720Li because the chemistry of U720Li /elemental composition in the U720Li has been considerably modified /was influenced by the Ru additions.

Keywords: UDIMET, UDIMET 720Li, Alloy, Radiation, Shielding.

* Udimet is a trademark of Special Metals Corp.

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Reverse Minkowski Type Fractional Integral Inequalities

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ABSTRACT

The main aim of this paper is to establish some new inequalities of reverse Minkowski-type. To do this, a generalized fractional integral operator is used. The results obtained in the paper are generalizations of some results in the literature.

Key words: Generalized fractional integral operator, integral inequalities, convex functions.

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Some Inequalities Obtained with A Generalized Fractional Integral Operator

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ABSTRACT

In this study, new inequalities are obtained with the help of some basic mathematical operations and a generalized fractional integral operator. The integral operators used in this study include generalized fractional integral operators of Riemann-Liouville type and operators containing Mittag-Leffler functions in their kernels.
Key words: Generalized fractional integral operator, integral inequalities, convex functions.

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TiO_2-doped Al_2O_3 Bioceramics by DLP 3D Printing: Production, Mechanical Properties, and Biological Evaluation

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ABSTRACT

Ceramic-based biomaterials are produced using conventional manufacturing methods. The conventional manufacturing methods have limitations, such as material loss and a slow production process in producing personalized and complex ceramic implants. These limitations reduce the efficiency and success rate of the product. 3D printers, which are additive manufacturing methods, are a technology that enables very small and sensitive parts to be produced quickly in the desired design. In this study, TiO_2-doped Al_2O_3 bioceramic parts with complex shapes were fabricated by digital light processing (DLP) 3D printing technology and investigated their mechanical and structural properties as well as biocompatibility. The rheology studies showed that the slurry with 50 wt.% solid powder loading had a suitable viscosity to produce with a 3D printer. After sintering bioceramic parts, the sintered bodies reduced significantly, with a maximum shrinkage of 41.98 %. The density of Al_2O_3 ceramic decreased from 82.02 to 72.72% with 5 wt.% TiO_2 addition. The XRD results revealed that TiO_2-doped Al_2O_3 bioceramic has three crystalline phases consisting of corundum (α- Al_2O_3), titanium dioxide (TiO_2), and aluminum pentaoxotitanate (Al_2O_5Ti). The compression and flexural strengths of Al_2O_3 reached from 3.25 to 7.07 MPa and 1.07 to 4.24 MPa by 5 wt.% TiO_2 doping, respectively. The results demonstrate a high percentage of cell adhesion and proliferation confirmed by bioceramics' biocompatibility. The findings show that low-cost DLP3D printing techniques could be used to fabricate ceramics for various applications, including ceramic fuel cells, piezoelectrics, and dental applications.

Keywords: Additive manufacturing, Digital light processing (DLP), Al_2O_3, Mechanical properties, Rietveld refinement, Biocompatibility

The Investigation of Solvent-Drug Interactions between Antihistaminic Agent Pheniramine Maleate and Water/Ethanol

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ABSTRACT

The main purpose of this study is to determine the content of the interactions between Pheniramine Maleate (PM), an important antihistamine agent, and solvent molecules. PM is one of the histamine H1 antagonists with little sedative action. It is used in the treatment of hay fever, rhinitis, allergic dermatitis, and pruritus. Determining the behavior of such important pharmacological agents in solvent media also helps to determine the effectiveness of the drug, because solvent environments play a very important role in the distribution, diffusion and transport of a drug in the body. Therefore, in this study, PM-Water complexes and the interactions between these complexes were modeled using Density Functional Theory. In addition, the effects of ethanol added in certain amounts to the aqueous solutions of PM, where it is used in medical applications, on drug solubility were discussed in detail. As a result of the study, it was determined that PM, which is poorly soluble in water, dissolves better with ethanol added to the solvent at certain rates. This was interpreted as the use of the drug in this way could be more effective.

Key words: Pheniramine Maleate, Solvent-Drug Interactions, Density Functional Theory.

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A Modeling Study on Increasing the Solubility of Some Important Epileptic Drugs

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ABSTRACT

In this study, molecular structures of important epilepsy drugs such as Oxcarbazephine and Phenytoin were modeled in 3D and some physical and chemical properties of molecules were determined. In addition, solvent effects on these molecules, which are factors that directly affect drug transport, diffusion and absorption, were investigated. Since dissolution is directly related to the hydrogen bonds to be established between water molecules and drug molecules, the qualities of such interactions have been investigated. It is known that these drugs are either slightly soluble or insoluble in water. They are practically soluble in acetone, ethanol, and alkali hydroxides. Therefore, it has been investigated how much the solubility of these epileptic drugs can be changed by adding ethanol at certain rates in the aquatic environment. The results reveal that mixing these types of water-insoluble or slightly soluble drugs with ethanol in small proportions can increase dissolution and naturally increase the absorption and transport of the drug. In addition, since these types of drugs have high toxicity, increasing their effectiveness will also reduce such side effects.

Key words: Epilepsy Drugs, Solvent effects, Molecular Modeling.

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A New Cisplatin Complex: Synthesis, Spectrophotometric Characterization, Molecular Modelling and In Vitro Anticancer Activity

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ABSTRACT

Theobromine (3,7-dimethylxanthine) is known with biological and pharmacological activities for living organisms. In this study, a new cisplatin complex of Theobromine was synthesized using chemical synthesis methods. The compound was characterized using elemental analysis and infrared spectroscopy. Molecular modeling of the compound was done using Density Functional Theory. As a result of the modeling, the structural, physical, chemical, electronic and spectroscopic properties of the molecule were determined. Anticancer effects of the synthesized compound were detected on the SK-Mel 30 cancer cell line. The viability of SK-MEL 30 cells was measured by MTT test. The apoptotic activity of the cells was determined by Annexin-V FITC/PI staining. As a result of the study, it was revealed that the produced cisplatin complex had very significant effects on the SK-Mel 30 cell line. In this respect, it can be said that the compound is a good candidate for future anticancer research.

Key words: Anticancer drugs, Cisplatin complexes, Ir spectroscopy.

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Synthesis, Characterization, and Evaluation of Anticancer Activity of Acetaminophen Cisplatin (II) Complex

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ABSTRACT

Cisplatin is the first metal-based anticancer drug. Acetaminophen or paracetamol, an important pharmacological molecule, is a medication used to treat fever and mild to moderate pain. In this study, the cisplatin complex of acetaminophen was synthesized and characterized by experimental and theoretical spectroscopic methods. In addition, the anticancer effects of the new compound produced were investigated in vitro on the human breast cancer cell line (MCF-7). The viability of SK-MEL 30 cells was measured by MTT test. The apoptotic activity of the cells was determined by Annexin-V FITC/PI staining. The spectroscopic findings obtained showed that two acetaminophen molecules were covalently bonded with cisplatin. From the results of the study, it was seen that the final compound showed significant anticancer effects in MCF-7.

Key words: Acetaminophen, Anticancer effects, In vitro anticancer studies.

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Pesticide Removal from Fruits by Traditional and Innovative Non-Thermal Technologies: Current Applications and Future Perspectives

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ABSTRACT

Effective removal of pesticide residues from highly pesticide-exposed food products in agricultural areas is one of the most important needs for human health and food waste (Azam et al., 2020, Cong et al., 2021). Many different methods have been used to remove pesticide residues from fruits. However, traditional processes such as washing, chemical washing, peeling, etc. can cause nutritional value losses, and it may not be possible to apply to each fruit due to its structure (Bonnechère et al., 2012; Chung, 2018). The main focus of this study is to investigate the traditional and novel technologies for pesticide removal from fruits, to assess the effects on quality characteristics, and to evaluate the potential use of industrial applications.

Keywords: Pesticide removal, detoxification, fruits, non-thermal technologies.

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Investigation of T3 and T4 Hormones as Lactoperoxidase Inhibitors

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ABSTRACT

3,5,3'-triiodothyronine (T3) and 3,5,3',5' tetraiodothyronine (T4) secreted by the thyroid gland are two hormones that affect many metabolic pathways (Manna *et al.* 2013). Abnormality of the production and release of these hormones are called hypo-hyperthyroidism and cause a wide variety of side effects on metabolic systems in the body (Mullur *et al.* 2014). For example, their deficiency can lead to quantity instability of oxidants and antioxidants, resulting in increased levels of reactive oxygen species.

The lactoperoxidase (LPO) enzyme with oxidoreductase activity catalyzes the oxidation of organic and inorganic substrates in presence of H_2O_2. LPO, which is found in biological fluids converts this molecule into molecular oxygen and H_2O in order to protect the cell from the oxidative effect of H_2O_2 in the cells of living organisms with aerobic respiration (Kohler and Jenzer 1989).

In this study, the *in vitro* limiting effect of T3 and T4 hormones on LPO's catalyze capacity was investigated. For this purpose, LPO activity levels at five different concentrations of both molecules were assayed.

According to the results, IC_{50} values were determined as 6.47 µM for T3 and 5.92 µM for T4. Consequently, these two hormones represented themselves with good IC_{50} and expanded the LPO inhibitory library in better understanding the metabolic interactions.

Key words: LPO, Triiodothyronine, Tetraiodothyronine

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Therapeutic Role of Leptin Receptor Inhibition in PARP-mediated Temozolomide Resistance: First Report

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ABSTRACT

Glioblastoma (GB) is known to be as the most aggressive form in brain tumor. Due to the heterogeneous nature of GB in terms of genetic, epigenetic and clinical features, there is no definitive treatment protocol despite advanced treatment modalities. Temozolomide (TMZ) is the most widely used and most important chemotherapeutic agent in GB chemotherapy approach. However, primary and secondary resistance to TMZ often develops. The PARP repair pathway, especially PARP-1 gene involved in this pathway, plays an important role in chemotherapeutic resistance to TMZ. It has been reported that high expression of leptin receptor leads to TMZ resistance in GB. We aimed to investigate the possible role of leptin, leptin receptor antagonist "SHLA", in TMZ resistance via PARP-1 gene in GB cell lines.
The cytotoxicities of leptin, SHLA and TMZ were determined by MTT. The effects of these molecules on the expression changes in the PARP-1 gene were determined by RT-PCR in single and combined applications of these molecules.
The effects of TMZ, leptin, and SHLA on PARP-1 gene expression differ depending on the cell line. TMZ significantly increased the expression of PARP-1 gene ($p<0.05$) in all cell lines. While leptin and SHLA did not change PARP-1 gene expression in alone treatments for each, they reduced PARP-1 expression in only one cell line when used together. When leptin and SHLA were used together with TMZ, they significantly decreased the increased PARP-1 expression caused by TMZ ($p<0.05$).
Our results show that leptin and/or SHLA can reduce the increased PARP-1 expression caused by TMZ and may have therapeutic roles for GB. This study has shown for the first time that the use of a leptin antagonist can be an alternative treatment strategy in PARP-1-mediated chemotherapeutic resistance that occurs with the application of alkylating agents such as TMZ in GB.

Key Words: Glioblastoma, Leptin, SHLA, Temozolomide, PARP-1 gene

The Relationship of Protective Effect of Olive Leaf Tea Against Breast Cancer with miR-155-5p in Liver Tissue

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ABSTRACT

In this study, it was aimed to investigate the relationship between the protective effect of olive leaf tea (OLT) on breast cancer and miR-155-5p expression in liver tissue in mice. Ehrlich ascites tumor (EAT) was used as an experimental breast cancer model. The number of EAT cells from mice treated with OLT (400mg/kg) for 15 days, starting seven days before tumor inoculation, was determined. Expression levels of miR-155-5p in liver tissues were determined by qPCR, and expression differences were evaluated statistically. In addition, ALT and AST enzyme levels in liver tissue were measured. As a result of these analyzes, it was determined that OLT treatment could have a protective effect by reducing the number of EAT cells. While the fold change amount of miR-155-5p expression was 1.36 in the untreated-EAT group, it was found as 14.34 and 8.45 in the OLT-treated cancerous (EAT+OLT) and healthy (BSS+OLT) groups, respectively. Moreover, it was revealed that OLT application decreased liver enzyme levels to normal in the EAT+OLT group. Therefore, it is thought that miR-155-5p may be activated with the effect of OLT treatment, inhibiting possible cellular changes that may occur in the liver due to breast cancer existing in the organism and exerting a tumor suppressor effect. Additionally, the increase in miR-155-5p expression in the liver tissue of OLT-treated groups suggests that this miRNA may protect the organism from liver damage. In conclusion, it is considered that it may be beneficial to use olive leaf tea as a preventative against breast cancer and curative of liver damage.

Keywords: Breast cancer, Ehrlich ascites tumor, olive leaf tea, miR-155-5p, hepatoprotective effect.

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Investigation of the Effect of Different Plastic Bearing Forms on Ball Joint Clearance Values

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ABSTRACT

Suspension systems are systems created to absorb shocks and vibrations in vehicles and to keep the contact between the wheels and the road at the maximum level. The ball joint, which is a part of the suspension systems, connects the axle to the wishbones and ensures the connection of the wheels with the axle in all cases. The ball joint which has spherical ball pin connection prevent the wheels from being disconnected from the axle by pushing the axle up and down on bumpy roads. In this study, the effects of the plastic bearing form on the clearance values of ball joint which has spherical ball pin connection parts of the suspension system were investigated. The gap damage that occurs in these safety-critical parts causes the dynamics of the part to be adversely affected as a result of the loads in operation on the vehicle. In addition, as a result of the clearance that occurs, a sound problem occurs in the part and the driving comfort is deteriorated. In order to see the effect of the difference in the plastic bed form within the scope of the study, the bed raw material was combined and Hostaform C9021 POM material was used. In addition, 42CrMo4 (Q+T 26-33 HRC) for the ball pin and C45 (Norm. 172-216 HB) for the body are also used in common. Housings are processed in accordance with plastic bearing forms, and classification is made according to the tolerance range in order to see the distribution in the gap values. In order to minimize the production-related effects in the production of test samples, the ball joints were tempered at 110 C° after assembly, and residual regressions in the plastic bearings were removed. In the study, two different bearing forms which are fixed and flexible, were considered and the torque and clearance values obtained in different tolerance ranges were compared. As a result of the tests, it has been seen that the flexible plastic bearing has a better grip on the ball pin in the housing, and thus the axial and radial clearance values are better than the fixed bearing ball joints. While the clearance values in ball joints using flexible bearings remained in the range of 0,03-0,07mm in the axial direction, this range was 0,1-0,2 mm in fixed-bearing ball joints. Similarly, while the clearance formed in the radial direction is 0,06-0,1 mm in flexible bearing ball joints, the clearance value formed in this direction in fixed bearing ball joints is 0,18-0,3 mm. It has also been observed that the torque range from 0,5-3,0 Nm to 1,0-2,5

Nm has been improved by the use of the flexible plastic bearing. As a result, the highest clearance values were obtained in ball joints where the upper tolerance housing and lower tolerance joint sphere were mounted, and the tolerance range used during the production of the housing and joint ball has a high effect on the clearance values. The use of flexible plastic bearings in ball joints produced in nominal measurements resulted in lower clearance values in the axial and radial directions. The data obtained with this study, it is thought that this gain in torque and clearance values will also increase the wear resistance of the part, and it is thought to form the basis for further studies.

Key words: Ball Joint, Axial Play, Radial Play, Rotation Torque, Breakaway Torque

ICOLES 2022

Investigation of the Effect of Surface Hardening Process on Impact and Bending Loads for Ball Stud of Ball Joint

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ABSTRACT

The durability of the joint, which is the sub-component of the ball joint, which is a component of the suspension system, is very important in terms of driving safety. Surface hardening is applied to increase the durability of the joints used in ball joints. The applied surface hardening processes are salt nitration and gas nitration processes. Impact test and bending test are performed to test the durability of the applied surface hardening processes. Impact tests are short-term applications that provide information about the fracture behavior of materials or parts under sudden load. Bending tests, on the other hand, are the applications to determine the mechanical properties of the material against bending strength. In this study, the effects of surface hardening on impact and bending loads were investigated. In this context, impact and bending tests were applied to the ball pins fixed from the shaft. The impact test was carried out by letting a free fall of a 40 kg mass from a height of 1 meter. Bending test, on the other hand, determined the bending force by creating plastic deformation on the joint as a result of the force applied to the ball of the joint. As a consequence of the examinations, it was seen that the minimum 10° acceptance criterion was met in the impact test performed with salt nitration and gas nitrated joints. As a result of the Bending test, plastic deformation occurred around 40 kN on average in salt nitrided joints, while it was around 60 kN on average in gas nitrated joints. As a result, it has been observed that there is no visible difference in the strength of the part in gas nitration compared to salt nitration in terms of impact test and bending test, the strength of the part increased by approximately 40%. This study showed the effects of nitration processes on the part strength and sets an example for the development of the process in the future.

Keywords: Bending Test, Impact Test, Gas Nitriding, Salt Nitriding, Surface Hardening

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Improving Wear Resistance of Ball Joints with Plastic Bearing Form Change and Polishing Application

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ABSTRACT

The ball joint which is a part of the suspension system, is a part of the suspension system formed by the combination of different sub-detail parts.Wear on ball pin is very important in terms of ball joint durability and driving safety. The plastic bearing used in the ball joints transfers the force from the wheels to the housing and the wish bone, as well as its effect on wear resistance is quite high. In this study, the effects of improving the ball pin roughness on the wear resistance were investigated by making plastic bearing form and polishing process from ball pin sphares. In this context, two different plastic bed forms, fixed and flexible, were used.In addition, polishing process has been applied to the joint spheres in the products developed to increase the wear resistance. In this way, the surface roughness of pin sphare has been reduced from Rzmax 3 to Rzmax 1. In the study, housing material C45 (Norm. 172-216 HB), ball pin material 42CrMo4 (Q+T 26-33 HRC) and plastic bearing material Hostaform C9021 (POM) were selected and used in common in all products examined in order to eliminate raw material effects. After the assembly process, in order to reduce the effects on production and wear on the sub-components, the residual stresses on the plastic bearing are relieved by applying the tempering process to the parts after the assembly process. After the sample production, the parts were subjected to 48 hours of climatization and a special prescription wear test, and the change in torque and clerance after the first production was examined. In the post-test controls, it was observed that the average clearance of 0.1 mm in the axial direction increased to the range of 0.25 - 0.3 mm, and the average clearance of 0.2 mm in the radial direction increased to the range of 0.3 - 0.4 mm in the ball joints using fixed plastic bearings and unpolished joints.In ball joints using flexible bearings and polished joints, this change was observed to increase from 0.03 - 0.07 mm in the axial direction to an average of 0.1 mm, and in the radial direction to an average of 0.2 in the range of 0.1 - 0.12. As a result, it has been observed that the flexible bearing ball joints have higher wear resistance than fixed bearing ball joints.

Key words: Ball joint, wear, polishing, plastic bearing, surface roughness, clearance, torque.

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Investigation of the Use of Some Bacteria Promoting Plant Growth as A Biofertilizer in Grass

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ABSTRACT

In our country, intensive studies have been conducted on green field plants in recent years, but it is known that the number of studies using biofertilizer is low enough to be tried. Therefore, in this study, two different varieties of *Lolium perenne* species which have an important place in the formation of green fields of the bacteria that promote plant growth (PGPB) [Type 1: *Lolium perenne* (All starter), Type 2: *Lolium perenne* (Cutter)] potential to be used as a fertilizer in the development of soil was investigated. In this study, 7 different formulations prepared from bacterial strains determined to have potential to be used as biofertilizer were used. Bacteria were developed as negative control and chemical fertilizer were used as positive control. All trials were established in 3 replicates. In addition, analysis of enzymes (Peroxidase, GR, GSTY 6PGD and G6PD) which have important role in plant growth was also realized. According to the results obtained from the total wet weight measurements of cultivar 1 plant, all formulations except F7 formulation were found to be more effective than the negative control and the results were statistically significant. In addition, F1, F2 and F5 formulations were found to be equally effective when evaluated statistically with positive control. According to the results obtained from the total wet weight measurements of cultivar 2, F6 formulation improved greatly and was statistically significant compared to both positive and negative control. When the results obtained from enzyme analysis are evaluated, peroxidase, GR, GST, 6PGD and G6PD activities were 0.21 EU / ml, 2.17 EU / ml, 0.19 EU / ml, 0.5 EU / ml and 0.52 EU / ml respectively obtained from F6 formulation and the results were found to be significant compared to the negative control. Similarly, peroxidase, GR, GST, 6PGD and G6PD activities in cultivar 2 were 0.29 EU / ml, 1.8 EU / ml, 0.27 EU / ml, 0.45 EU / ml and 0.42 EU / respectively which were also obtained from the formulation F6 and these results were found to be significant compared to the negative control. In addition, enzyme results obtained from both varieties were found to be more effective than positive control. When all these results are taken into consideration, it is considered that several formulations, especially F6 formulation, have the potential to be used as an alternative to chemical fertilizers in grass cultivation.

Keywords: PGPR, *Lolium* sp., Bacteria, *Pseudomonas* sp., *Bacillus* sp.,

Lie Ideals with Homoderivations

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ABSTRACT

The purpose of this paper is to study homoderivations satisfying certain identities on Lie ideals of prime rings. Some wellknown results characterizing commutativity of prime rings by derivations have been generalized by using the concept of homoderivation.

Key words: homoderivation, Prime ring, Lie ideal.

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Note on the Special Class of Semi-Tensor Bundle

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ABSTRACT

Using projection (submersion) of the cotangent bundle T*M over a manifold M, we define a semi-tensor (pull-back) bundle tM of type (p,q). The goal of this work is to study vertical and complete lift of tensor fields in a special class of semi-tensor bundle tM of the type (p,q).

Key words: Vector field, complete lift, pull-back bundle**,** cotangent bundle**,** semi-tensor bundle.

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Solving Higher Order Quasi-Linear Parabolic Equations Using Fourier Method

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ABSTRACT

In the article, we examined the following problem:

$$\partial u/\partial t = k(t)(\partial^2 u/\partial x^2 + \partial^2 u/\partial y^2) + a(t)f(x,y,t,u)$$
$$u(0,y,t) = u(\pi,y,t), t \in [0,T]$$
$$u(x,0,t) = u(x,\pi,t), t \in [0,T]$$

We determined the existence, uniqueness and convergence of the solution of the higher order quasi-linear parabolic equation subject to periodic boundary conditions.

Keywords: Fourier Methods, Periodic Boundary Conditions, Quasi-Linear Parabolic Equations.

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Hoarded Graphs

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ABSTRACT

In this work, we first introduce the definitions of n-set-families and hoarded graphs. Then we give the steps to follow to obtain the set-family corresponding to a hoarded graph, and an example implementation of these steps.

Key words: n-set-family, hoarded graphs.

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Study of the Antidiabetic Activity of Certain Organometallic Compounds by In Vitro and In Silico Approach

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ABSTRACT

Understanding the mechanisms of maintaining carbohydrate homeostasis and developing new molecules of therapeutic interest are crucial steps in the fight against diabetes. This last process requires several optimization cycles between the identification and proposal of an active molecule and the validation of it as a drug. Our work focused on the evaluation of the affinity of the DFc-BN, intended to inhibit the catalytic action of the alpha amylase, involved in the enzymatic regulation of carbohydrate metabolism, in diabetic subjects. We used, in the first part of our work, the in silico prediction of the physicochemical, pharmacokinetic and toxicological properties of the 3 Fc-BN compounds selected, using the servers: swissADME , admits SAR and Protox. The results showed that all these compounds have good druglikeness characteristics. Subsequently, using the enzyme preparation with the DFc-BN, in the reaction medium, makes it possible to determine the parameters: IC_{50} and ΔG from which we arrived at the biological efficacy of the compounds studied. The results obtained by molecular docking (Docking) confirm the results in vitro; they showed negative ΔG values which reflect the good affinity of the ligands with the biological target. The formation of hydrogen bonds, between ferrocenic derivatives (more specifically the Fc-Cy) and the enzyme, confirms the antidiabetic efficacy of these derivatives and allows them to be considered as future anti-diabetic drugs.

Keywords: DFc-BN, α-amylase, antidiabetic activity, Docking, swissADME.

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Biochemical Monitoring of Type 2 Diabetes

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ABSTRACT

Type 2 Diabetes accounts for 90% of all forms of diabetes. It is steadily increasing in recent years. Its severity comes from chronic complications that it causes. Thus, it constitutes a public health problem.
The study focused on 106 type 2 diabetic patients: 73 patients with complications of diabetes and 33 patients without any complication.
The objective of our work is to make a comparison between these two groups of diabetics on certain biochemical parameters including: glycemia, glycated hemoglobin, triglycerids, total cholesterol, and microalbuminuria. The comparison of average rates of these parameters is performed using the z and t tests (comparison of two averages).
Our results showed a significant difference in triglycerids between the two groups of complicated and uncomplicated diabetics. Hypertriglyceridemia is seen in unbalanced complicated diabetics.

Key words: Type 2 Diabetes, complications, glycemia, glycated hemoglobin, triglycerids, total cholesterol, and microalbuminuria.

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Anti-hemolytic and Ferrous Ion Chelating Activities of Aqueous Extract of *Hypericum tomentosum*

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ABSTRACT

The aim of this study is to evaluate the antioxidant activity of aqueous extract of *Hypericum tomentosum* by ferrous ion chelating test and anti-hemolytic activity. In this study, the aqueous extract was prepared by boiling plant's leaves in distillated water then lyophilized after filtration (Gülçin et al., 2010). The antioxidant activity was evaluated by testing the ability of this plant to chelate the ferrous ion (Fe^{2+}) and by the capacity to prevent hemolysis induced by thermal decomposition of AAPH (2,2'-Azobis (2-amidinopropane) dihydrochloride) according to Le et al., 2007 and Mezti et al. (2019), respectively. The results show that the aqueous extract from this plant exerted a dose-dependent ferrous ion chelating. This plant protect membrane of erythrocyte against lysis by scavenging reactive oxygen species. In conclusion, *H. tomentosum* may serve as potential source of natural antioxidant for pharmaceutical application.

Key words: *Hypericum tomentosum*, antioxidant, hemolysis, chelating, AAPH

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Inhibition of Myeloperoxidase Activity by Methanolic Extract of *Hypericum tomentosum*

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ABSTRACT

The goal of this study is to investigate the effects of *Hypericum tomentosum* plant on myeloperoxidase (MPO) activity, a major enzyme constituent in human polymorphonuclear neutrophils (PMNs) (Prokopowicz et al., 2012; Kato, 2016), for that, PMNs were isolated from freshly heparinized blood according to Bouriche et al. (2016). The release of MPO from PMNs was induced by $10^{-6}/10^{-5}$M of formyl-methionyl-leucyl phenylalanine /cytochalasin B to get supernatant enriched by MPO, this supernatant was incubated with different concentrations of methanolic extract of *H. tomentosum*. The results showed that the MPO activity was decreased in the presence of *H. tomentosum* methanolic extract in dose dependent manner. In conclusion, our data suggest that *H. tomentosum* might be critical source for the prevention/ modulation of excess, uncontrolled inflammatory events.

Key words: Neutrophils, *Hypericum tomentosum*, Myeloperoxidase.

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Evaluation of Wearable Health Technologies Used in Covid-19 By Entropy and Electre Method

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ABSTRACT

In recent years, the disease called the new coronavirus (Covid-19) is an infectious disease that has spread all over the world. Social isolation is among the measures taken to prevent this disease, which has become the epidemic of our age. Many countries have developed different solutions to ensure social isolation. One of these solutions is technological devices that can monitor the course of the disease remotely. These devices are called "Wearable Health Technologies (WHT)". The aim of this study; is to determine the order of WHT devices that provide the most effective use in the follow-up process of the disease. In the problem, which should be considered as a multi-criteria decision-making problem, 7 criteria (respiratory rate tracking, heart rate tracking, temperature tracking, real-time data transmission, price, battery life, single or reusable) and 6 alternatives (BioButton, LoopSignal, LifeSignals, VivaLNK, Cosinuss, AARM) are determined. The ENTROPY method is used to calculate the criteria weights, and the ranking among the alternatives is made by the ELECTRE method. According to the results obtained, the best ranking is found as Cosinuss, LifeSignals, BioButton, LoopSignal, VivaLNK and AARM.

Keywords: Multi criteria decision making problems, Wearable Health Technologies, Entropy, Electre

Relaxant Effect of Quercetin on Spontaneous Contraction and Induced Contraction of Rabbit Ileum

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ABSTRACT

The aim of the present study is to evaluate the relaxant effect of quercetin on the spontaneous contraction and the contraction induced by carbachol (10 µM) of the rabbit ileum *in vitro*. Spontaneous rhythmic activity of rabbit ileum whole segments is characterized by an average tension of 2.07 ± 0.11 g and a frequency of 8.82 ± 0.36 contractions per minute (cpm). Quercetin added to whole segments of the ileum cumulatively every 15 minutes to obtain the following concentrations: 0.5, 1, 10, 30 and 100 µM; decreases the average tension of contractions from 30 µM quercetin; where with a concentration of 100 µM of quercetin, the average tension of contractions decreases by 64% ($P \leq 0.05$). However, statistical analysis does not show any significant effect of quercetin on contraction's frequency. A few segments continue to contract rhythmically even with a high concentration of quercetin; while others lose the ability to oscillate. But, the frequency generally tends to decrease by increasing the concentration of quercetin. The response of the entire ileal segments is then tested by adding 10 µM carbachol. Quercetin 100 µM decreases the maximum tension of carbachol induced phasic contraction by 70.4% ($P \leq 0.05$). Indeed, the maximum tension of the contraction's peak was 5.05 ± 1.17 g (n = 3) in the control segment; while the maximum tension of the phasic contraction induced by carbachol was 1.51 ± 0.38 g (n = 5) in the segment treated with quercetin 100 µM. These results provide a pharmacological basis for the traditional use of quercetin-rich herbal medicines for the relief and treatment of gastrointestinal disorders.

Key words: Ileum, Quercetin, Carbachol, Contractile activity.

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The Comparative Study of the Antibacterial, Antioxidant and Anti-Inflammatory Potential of the Aqueous Extract of Two Eucalyptus; *E. radiata* and *E. cinerea*

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ABSTRACT

Eucalyptus is a medicinal plant of the Algerian traditional pharmacopoeia. *E. radiata* and *E. cinerea* (Myrtaceae) are known locally as l'kalitous. The objective of this study is to evaluate antibacterial, antioxidant and anti-inflammatory activities of each aqueous extracts (EAq) of their leaves. The extractions yielded 27.83% for *E. radiata* and 4.84% for *E. cinerea*. The antibacterial activity was evaluated by the agar diffusion method against three standard bacterial strains. The results reveal that the *E. radiata* EAq was active on *E. coli* (20±7.07 mm), *S. aureus* (18±2 mm) and *P. aeruginosa* (11.66±1.52 mm), this of *E.cinerea* was also active against the three strains; E. coli (19±2.64 mm), *S. aureus* (23.5 mm) and *P. aeruginosa* (15.33±0.57 mm). The antioxidant activity was evaluated using the DPPH test, the two extracts had a remarkable antioxidant activity with IC50 = 0.38 ± 0.02 mg/ml by *E. radiata* and 0.49 ± 0.14 mg/ml by *E. cinerea* comparing to the BHT (0.94 ± 0.37 mg/ml). The anti-inflammatory activity was made in vitro by the protein (BSA) inhibition denaturation test. Both of extracts had anti-inflammatory dose dependent effects with a percentage of inhibition reaching 75% at 250 µg /ml showed by *E. radiata*. In conclusion, those results corroborate with the traditional use of the two plants.

Key words: Antibacterial activity, antioxidant activity, anti-inflammatory activity, Eucalyptus radiata, Myrtaceae.

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In Vitro Antioxidant Activity and Cytotoxicity against Red Blood Cells of Methanolic Extract from *Scabiosa succisa* L.

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ABSTRACT

There is a need for the discovery of novel natural antioxidants that are safe and effective at a global level. The aim of this work is phytochemical study , antioxidant and hemolytic activities of *Scabiosa succisa. Scabiosa succisa* has been used in traditional medecine for its therapeutic properties. In this study, methanol was the solvant used to extract phenolic compounds from aerial part of *Scabiosa succisa.* Total polyphenols and flavonoids content were estimated using Folin-Ciocalteu reagent and 2% Alumine chloride respectively. The results showed high level of total polyphenols and flavonoids in the methanolic extract with 137.07 ± 43.45µg gallic acid equivalent/mg of dry extract; 113.9 ± 5.5µg quercetine equivalents/mg dry extract, respectively. The extract possesses DPPH scavenging effect with IC_{50} = 0.06± 0.015mg/ml, and possesses a very low percentage of hemolysis of RBCs with 0.2% and 0% at the concentration 0.25mg/ml and 1mg/ml respectively. These results indicate that methanolic extract from aerial part of *Scabiosa succisa* is rich of phenolic compounds and has potential antioxidant and anti hemolytic activities .

Key words: *Scabiosa succisa*, methanolic extract, antioxidant activity, hemolytic activity.

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In Vitro Assessment of Irritant Potential and Toxicity of Acetonic Extract from *Physconia venusta (Ach.) Poelt* Lichen

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ABSTRACT

This study was conducted to evaluate toxicity as well as irritation efficacy of acetonic extract fom the lichen *Physconia venusta*. The hen's egg chorioallantoic membrane test HET-CAM was used for irritation/toxicity of extract. And the brine shrimp lethality test was used to evaluate the extract toxicity. The results showed that the extract did not show any mutagenicity, toxicity or irritation effect even at the highest concentration.

Key words: lichen, brine shrimp, HET-CAM test.

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Docking of T6361 Analogues to Develop New Inhibitors of the Bacterial Enzyme MurA

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ABSTRACT

Emergence of bacteria resistance exhibited against known antibiotics required to looking for new alternatives by fast, effective, and less expensive ways. In this work, we reported a computational study aimed to explore new inhibitors of targeted bacterial enzyme MurA, the concept was docking of structural analogues of its inhibitor T6361 in the open form of MurA structure and the ADMET profil of retained ones was evaluated. Results revealed two compounds ZINC12557212 and ZINC96435764 as new inhibitors of MurA, and overall they were compliant with ADMET parameters. This study could be enhanced by performing tests *in vitro* and *in vivo*.

Key words: Antibiotics, MurA, Docking, ADMET profil.

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Chiral Separation and Molecular Docking of Fluoroquinoline Antibiotics on Different Chiral Selectors

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ABSTRACT

Today in our pharmacies are a lot of developed drugs possess chiral centers, chirality has become increasingly important topic issue in drug research and has attracted increasing consideration in the pharmaceutical industry. The main objective of this work is to applied a simple direct isocratic high-performance liquid-chromatographic methods for chiral separation and determining the enantiomeric purity of some antibacterials drugs using commercialized polysaccharides stationary phases (Chiralcel® OZ-3, Chiralcel® OD-H, Chiralcel® OD, Chiralcel® OJ, Chiralpak® AD, Chiralpak® IA and Chiralpak® IB). The result data illustrates the ability of the cellulose and amylose derivatives to yield good resolution. Therefore, this process has advantages over with ease of use. It is more simple and fast procedure for sample pre-treatment, easy preparation of the mobile phase, use of a low flow rate in the chromatographic system, and, consequently, decreased use of organic solvent in the mobile phase. In addition, considering the importance of understanding the chiral recognition mechanisms associated with the chromatographic enantioresolution, computational study by molecular docking were also achieved to determine mechanism of separation and elution order. The modeling studies indicated strong interactions of R-enantiomers with Chiralcel® OD-H chiral selector than S-enantiomers. The supramolecular mechanism of the chiral recognition was established by modeling of chromatographic studies. It was observed that hydrogen bondings and π-π interactions are the major forces for chiral separation. The present chiral HPLC method may be used for enantiomeric resolution of quinolones in any matrices.

Key words: Antibiotic, HPLC, Cellulose-amylose CSPs, Docking, chiral separation.

ICOLES 2022

Evaluation of Antioxidant Activity and Polyphenols Content of *Melilotus indicus* Extracts

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ABSTRACT

Melilotus indicus is a medicinal plant known for its ethno-medicinal activities such as antibacterial, anticoagulant, antispasmodic, emollient, laxative and narcotic effects. The objective of this study is to evaluate the antioxidant activity of aqueous extract (AqE) and ethanolic extract (EE) from *Melilotus indicus* using two methods: the DPPH (2, 2'-diphenyl-1- picrylhydrazy) test and β-carotene bleaching assay. Moreover, phenolic compounds contents were estimated in both extracts. Results showed that total polyphenols content in ethanolic extract was 120.067 µg GAE/mgE and 144.382 µg GAE/ mgE for aqueous fraction. Flavonoids contents in studied extracts were very close (26.375 µg QE/mg of ethanolic extract and 25.65 µg QE/mg of aqueous extract). Aqueous fraction was found to possess a higher scavenging capacity against DPPH radical (IC_{50} = 0.09 ± 0.002 mg/ml) than ethanolic extract (IC_{50} = 0.28 ± 0.037 mg /ml). The inhibitory activity of the tow extracts in the β-carotene/linoleic acid assay was estimated to 70.983 ± 4.22 % for aqueous extract and 66.169 ± 3.445 % for ethanolic fraction.

Keywords: *Melilotus indicus*, antioxidant activity, polyphenols, DPPH scavenging, β-carotene.

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Comparison of Different DNA Isolation Protocols in terms of Time and Quality in Old and New Insect Samples

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ABSTRACT

Insects, belong in the Arthropoda phylum, are the most numerous animal group in the world, with more than 1.000.000 species. Insects ensure the sustainability of life on earth by pollinating plants, improving soil texture by decomposing organic materials and providing nutrients to humans. In this study, starting from the necessity of performing DNA isolation for sequence analysis, DNA fingerprinting, gene-genome analysis, it is aimed to compare three different isolation methods in terms of time and quality for obtaining genetic material from museum samples (old) and new samples of insects. Isolated DNA samples can be used in order to carry out studies such as species identification, taxonomic relations, comparison of insect-plant and –microfauna relations, revealing genomic, population and genetic diversity, bio-geography determination, combating agricultural pets etc. The samples belong to same insect species, collected at most 9-12 months ago considered as new speciemen and old speciemen of 7-28 age constitute the material of study. Three DNA isolation protocols: Phenol-Chlorofom, Salting Out and DArT, consitute the methods of the study. Within the scope of this study, when 1% DNA quality gel images and $A_{260/280}$ and $A_{260/230}$ values were considered together, it was observed that the best results in terms of quality were obtained with phenol-chloroform method in newly collected samples. When $A_{260/280}$ values are examined, it can be deduced that DArT protocol is the most appropriate protocol in terms of purity of both old and new insect samples. When evaluated in terms of time, it was observed that the Phenol-chloroform method was the shortest protocol lasting for about 1 h and 45 min. Accordingly, it was concluded that the Phenol-chloroform method is the most appropriate protocol for both old and new samples. The obtained DNAs can be used for next experimental stages or stored as stock material at -20 ºC for further studies. Determining appropriate protocol to obtain high quality isolated DNA materials is important for the continution of studies. Our study is also important in terms of identifying species and determining systematic status of species, especially by examining the taxonomic relationships. Using molecular taxonomy in addition to classical taxonomy allows identification of insects on species basis. In addition, useful information is presented for researchers who will study insect molecular biology in following years.

Key words: Insect, Coleoptera, Cerambycidae, DNA isolation, Genetic material.

Optimization of some Superoxide Dismutase (SOD) Genes for Real-time PCR analysis in Wheat

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ABSTRACT

Environmental stress causes significant decrease in crop quality and losses of productivity every year. One of the important mechanisms by which plants are damaged in adverse environmental conditions is the overproduction of oxygen species such as superoxide, hydrogen peroxide and hydroxyl radicals. In addition, such oxidative stresses have been shown to occur in plants exposed to high and low temperatures, particularly high light intensities, drought, presence of air pollutants such as ozone or sulfur dioxide, ultraviolet light and herbicides. Hydroxyl radicals instantly react with proteins, lipids and DNA, causing rapid cell damage. Therefore, plants have developed enzymatic and non-enzymatic mechanisms that efficiently scavenge oxygen radicals. However, hydroxyl radicals are too reactive to be eliminated enzymatically, but formation of radicals is limited by the release of O_2 and H_2O_2. Superoxide dismutases (SOD), which are also the subject of this study, are key enzymes that scavenges O_2 radicals ($2O_2 + 2H^+ \rightarrow H_2O_2 + O_2$), contain metals, and act as the first line of antioxidant defense. In this study, eight SOD genes were chosen for real-time PCR optimization. Specific primers were designed and annealing temperature optimization were performed for real-time PCR analysis. In addition, annealing temperature optimization for β-actin specific primers were performed using the same DNA sample. β-actin is a housekeeping gene with a constant expression profile that is commonly used as a normalizing factor in expression profile studies. Evaluation of the relative and absolute values of SOD gene expressions and the changes of SOD gene expressions over time and under different conditions can be easily studied using the established real-time PCR protocols. These studies can provide important information of wheat coping mechanism under different stress conditions.

Key words: *Triticum aestivum*, SOD genes, β-actin, Real-time PCR.

Woman and Obstructive Sleep Apnea Syndrome

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ABSTRACT

Introduction: Obstructive sleep apnea syndrome (OSAS); is a syndrome characterized by obstructive apnea and hypopnea, which develops due to repetitive collapses of the upper airways during sleep, and is often manifested by a decrease in blood oxygen saturation and excessive sleepiness during the day. In the studies, the incidence was found to be 1/3 among men and women.

Objective: We aimed to define the demographic characteristics of men and women with OSAS and to determine the differences between them.

Methods: The records of patients who applied to our hospital clinical sleep labarotary between October 2020 and July 2021 were reviewed retrospectively. Demographic characteristics, smoking, comorbidities, snoring, witnessed apnea, excessive daytime sleepiness Epworth Sleepiness Scale (ESS) were defined. Polysomnographic (PSG) data of the patients were recorded. Chi-square test was used to compare categorical variables between woman and man , t-test was used to compare incremental values. SPSS version16 was used .

Results: 351 patients were included in the study. 240 (68.4%) of the patients were man, 111 (31.6%) were woman, and the mean age was 56.04±11.64 years. The mean values of the patients' height, weight, BMI, ESS, minimum oxygen saturation in their PSG, mean oxygen saturation, time under 90% saturation during sleep, and apnea-hypopnea index (AHI) are shown in Table 1. Variables of BMI and age in female patients with OSAS was found to be statistically significantly higher than male patients (p=0.001, p=0.001). When the comorbidity diseases with OSAS were investigated by gender, it was found that hypertension, diabetes mellitus and asthma bronchiale were statistically significantly higher in women than in men (p=0.023, p=0.001, p=0.001). There was no difference between male and female patients in terms of OSAS severity, such as AHI, minimum oxygen saturation, mean oxygen saturation, and time spent under 90% saturation during sleep.

Conclusion: Since OSAS is a part of a systemic disease, comorbidities are more common. In our study, we noticed that comorbidity was more common in female patients. It is important for women with comorbid diseases to take a detailed anamnesis, evaluate them for OSAS, and refer them to sleep outpatient clinics.

Table 1: Demographic data and PSG findings of the patients

	N	Minumum	Maximum	Mean	Std.Deviation
Age	351	29	91	56.04	11.64
Height	351	135	195	168.74	9.68
Weight	351	60	175	93.05	18.70
Body mass index	351	20.05	64.28	32.74	6.38
Epworth sleepiness scale	344	0	24	7.67	5.21
Minimum oxygen saturation	350	30	97	71.29	14.87
Mean oxygen saturation	351	34	99	92.81	5.26
Time spent under %90 saturation during sleep (min)	348	0	468	98.35	113.17
Apnea hypopnea index	350	1.10	123.80	36.08	25.84

Table 2: Comparison of the data of woman and man patients

	Woman (n=111)	Man (n=240)	p value
Age	59.40±10.68	54.49±11.76	p=0.001
Height	159.65±6.84	172.95±7.73	p=0.001
Weight	89.14±19.93	94.87±17.85	p=0.007
Body mass index	34.94±7.1	31.72±5.7	p=0.001
Epworth sleepiness scale	7.71±5.23	7.65±2.2	p=0.915
Minumum oxygen saturation	71.60±15.16	71.15±14.76	p=0.793
Mean oxygen saturation	92.52±4.79	92.94±5.47	p=0.489
Time spent under %90 saturation during sleep (min)	102.21±127.64	96.57±106.07	p=0.666
Apnea hypopnea index	33.08±26.32	37.47±25.55	p=0.140
Smoking	%32.4 (n=36)	%62.5 (n=150)	p=0.001
Snore	%98.2 (n=109)	%97.1 (n=233)	p=0.418
Daytime sleepiness	%94.6 (n=105)	%93.3 (n=224)	p=0.424
Witnessed apnea	%96.4 (n=107)	%94.6 (n=227)	p=0.329
Hypertension	%30.0 (n=71)	%44.5 (n=49)	p=0.023
Diabetes Mellitus	%17.1 (n=41)	%32.4 (n=36)	p=0.001
Coronary artery disease	%0.9 (n=1)	%5 (n=12)	p=0.046
Congestive Heart Failure	%2.3 (n=3)	%2.9 (n=7)	p=0.606
Chronic obstructive pulmonary disease	%5.4 (n=6)	%9.6 (n=23)	p=0.131
Asthma bronchiale	%19.8 (n=22)	%3.8 (n=9)	p=0.001
Allergic rhinitis	%4.5 (n=5)	%1.2 (n=3)	p=0.069

Genital Tract Pathologies of Ewes Slaughtered at an Abattoir in Algeria

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ABSTRACT

This study aimed at evaluating the genital tract pathologies of ewes slaughtered at an abattoir in Algiers during 2021 and to describe the microscopic changes associated with these cases. The macroscopic diagnosis revealed that out of a total of 269 examined matrices, 34 (14%) presented pathological lesions on the different parts of the female genital tract. Pathologies of the uterus were the most frequent with a rate of 76.47%, followed by pathologies of the oviduct (11.76%), then congenital pathologies which recorded a rate of 8.82%. Ovarian abnormalities were revealed in 2.94% of the cases. In addition, microscopic observation made it possible to confirm these suspected pathologies during visual examination and to describe the lesions on a microscopic scale. Finally, the results collected demonstrated a strong correlation between the pathologies encountered in post-mortem and the impact on female reproduction.

Keywords: female genitalia, pathologies, sheep, post-mortem, macroscopy, microscopy.

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Investigation of Mechanical and Wear Behavior of 3D Printed CaCO3 Filled PP Composites

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ABSTRACT

It is known that polymer-based materials are increasingly replacing traditional materials in industrial applications, both in the aerospace and automotive sectors. Recently, the interest in 3D printers, which is one of the polymer-based material production methods, and the amount of production in the sector are increasing day by day. It is clearly seen that 3D printers, which were used as hobby devices in the beginning, have evolved from being hobby devices to industrial production devices. When current studies are examined, it is clearly observed that 3D printers not only uses pure polymers, but also usage of composite materials has begun. In this study, Pure PP and various weight filling ratio $CaCO_3$ filled PP composite flaments were produced. Wear test and three-point bending test specimens were produced with the produced filaments on the 3D printer and tested. When the Mechanical Test results were examined, it was determined that the flexural strength of the composite samples was affected adversely. The wear test results showed that the particle reinforcement reduced the friction coefficient by making a lubricating effect on the surface.As a result, it has been seen that it can be produced with composite filament in applications requiring low friction, where the mechanical strength can be waived to a certain extent. Especially when it is considered that there is a ratio of approximately 1/10 between the prices of matrix and reinforcement materials, composite filament gains more importance in order to reduce the cost of the final product.

Key Words: 3D Printer, Composite Filament, Polymer Composite, Polypropylene (PP), $CaCO_3$.

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Ethanolic and Aqueous Extract of *Arisarum vulgare* and Antioxidant Activity

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ABSTRACT

Medicinal plants are of great importance to the human health. This is due to their antioxidant activity, which is attributed form secondary metabolite in which polyphenols have the most important role. *Arisarum vulgare*, is a plant which belongs to Araceae family. It is native to Mediterranean Sea and current in North African area. This species is used in traditional medicine against respiratory diseases, headache, asthma...etc. Because of their polyphenols high contain, it shows an important antioxidant activity. *In vitro* antioxidant activities were investigated following DPPH free radical scavenging assay. In this study we have compared DPPH free radical scavenging between ethanolic and aqueous extract of *Arisarum vulgare* plant using the method of Blois (1958) and vitamin C as a positive control. The result shows a big difference in DPPH free radical scavenging between the two extracts in which the ethanolic extract have a high antiradical activity with an IC_{50} of 0.331mg whereas the aqueous extract have an IC_{50} of 2.095mg which stay an acceptable value compared with positive control. In conclusion, we can say that this plant has an important antioxidant activity in both extracts with a high value in ethanolic one, probably due to their polyphenols high contain.

Keywords: *Arisarum vulgare*, ethanolic extract, aqueous extract, DPPH, polyphenols.

The Effects of the Taurine Application on the Development and Protein Profile of the Maize Seedlings Exposed to the Cadmium Toxicity

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ABSTRACT

Today, heavy metals, which have started to accumulate widely in ecosystems, have become an important environmental problem that threatens the lives of all organisms. Therefore, excessive accumulation of heavy metals in the tissues and organs of plants adversely affects vegetative and generative developments of plants. Cadmium (Cd), one of the phytotoxic heavy metals, is among the most environmentally dangerous heavy metals due to its high mobility in soils, easy and rapid uptake by plants, and being toxic even at low concentrations. Thus, it is obvious that some strategies are necessary to protect plants from the harmful effects of cadmium. One of these strategies is the application of various substances to plants for reducing damage caused by heavy metals. In this study, the efficacy of taurine against the harmful effects of cadmium in maize seedlings was investigated. According to our results, taurine increased the root and shoots development of maize seedlings in both cadmium-free and cadmium environments. Also, cadmium caused reducing the protein content of maize seedlings. Moreover, it was determined that taurine application increased the protein content in cadmium-free and cadmium environments. It was clearly demonstrated in SDS-PAGE in which the protein profile was determined that protein synthesis was stimulated by the application of taurine.

Acknowledgement: This study was supported by TÜBİTAK with the project numbered "121Z672".

Keywords: Cadmium, maize, taurine, protein profile.

Determination of Carbon Footprint in a Chemical Storage Company

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ABSTRACT

Carbon footprint; a term used to express the lasting effect of human consumption activities on nature or the equivalent greenhouse gas emitted as a result of these activities. Reducing the carbon footprint as a definition of energy means reducing or optimizing energy consumption. In this study, carbon footprint of a Chemical Storage Company from the various emission sources was calculated. Tier 2 methodology developed by the Intergovernmental Panel on Climate Change (IPCC) were used to calculate the carbon footprint. Fuel consumption, refrigerant gas, heating, fire extinguishing equipment and electric welded carbon footprint are investigated. As a result of the studies, a significant portion of the carbon footprint was generated by electricity consumption, while the total CO2 emission was 7.333,82 tons. CO2 emissions of fuel, heating, electricity, fire extinguishing equipment and the use of refrigerant gas activities respectively; It was found as 450,32 tons, 1,719,42 tons, 4,937,12 tons, 0,47 tons and 226,51 tons.

Key words: Carbon footprint, Greenhouse Gas, Climate Change, Greenhouse Gas.

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Evaluation of Dust Amount in a Textile Mill Using Recycled Cotton Fibers for Yarn Production

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ABSTRACT

Occupational health and safety is an issue that should be emphasized in order to protect employees' health and supply safety workplaces. The textile sector consists of many sub-sectors such as yarn, weaving, dyeing, and non-woven production. All processes in textile production contain some hazards in terms of occupational health and safety. Cotton which is so important raw material in the textile industry is natural, renewable, and sustainable fiber. Although cotton fiber has many advantages in terms of usage, employees are exposed to cotton dust when necessary precautions are not taken in all processes from the ginning stage to the final yarn stage in the production of cotton yarn. Especially, by using shorter fibers due to process conditions in yarn production from recycled cotton fibers, dust density can be higher in yarn production mills from recycled cotton. There is a risk of byssinosis as a result of inhalation of cotton dust. In this study, dust concentration of yarn (from recycled cotton fibers) production mill was measured, and these results were compared with the dust concentrations measured in cotton yarn production mills in the literature.

Key words: Cotton dust, Recycled yarn, Byssinosis.

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Assessment of Circular Textile Economy Strategies in Turkey

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ABSTRACT

Circular Economy is defined as a market economy that maintains teh added and fundamental value of physical resources. At teh same time it also aimed to keep teh resources as long as possible within teh economy and capture their till their end-of-life in order to minimize raw material consumption, waste and value chain risks. So while teh circular economy sustains its value, it also contributes to minimize teh waste as returning materials and resources to teh product cycle. One of teh sectors that have much waste as pre-consumer and post-consumer waste produced included in is teh textile sector. Various textile processes need to have too much water consumption. With teh decrease of natural resources, there is a need to develop novel approaches besides apparel and textile recycling to supply sustainability and reduce pollution. Turkey is one of the leading partners of textile industry in the world. Textile companies have been awared about this increasingly important subject as sustainability in textiles and apparel. In dis study, some taken strategies and goals of companies are presented.

Key words: Sustainability, Circular economy, Sustainable textiles, LCA (Life Cycle Assesment).

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Development of Eco-friendly Water-based Polyurethane Varnish and Investigation of Film Properties

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ABSTRACT

Environmental concerns have increased the interest in using bio-based resources for polyurethane production. Commercially used water-based polyurethanes (WPU) in coatings are a strong alternative to solvent-based products as an environmentally friendly material. The polyols used in the production of polyurethane are derived from petroleum-based resources that are considered unsustainable. For this purpose, the use of vegetable-derived oils in polymer synthesis is very important for sustainability, since they are renewable and low-cost. In this study, environmentally friendly water-based polyurethanes as varnish materials were developed using a bio-based polyol prepared from grape seed oil. For this, a series of self-crosslinking water-based polyurethane dispersions with side chains with (3- (2-Aminoethyl) aminopropyl) trimethoxysilane (AEAPTMS) as the diamine chain extender were prepared. The effect of NCC amount and its modification on the physical, mechanical and thermal properties of the prepared water-based dispersions and the obtained films were examined in detail using various characterization methods. In addition, some commercial varnish additives such as wetting agent, antifoaming agent, adhesion promoter and smoothing agent were added to the WUDs to determine their effectiveness as a varnish material, and the final product performances were investigated.

Key words: Varnish, waterborne polyurethane, nanocrystalline cellulose, bio-polyol, self-crosslinking

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Various Metal Oxide-based Electrode Design for Solar Cell Applications

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ABSTRACT

Topographic essential synthesis of nanomaterials by adjusting easy preparatory factors is an effective way to improve a variety of nanostructured materials. The SILAR technique is used to evaluate the manufacturing samples of MoO_3, TiO_2, and $MoTiO_5$ nanostructures. These nanostructures of MoO_3, TiO_2, and $MoTiO_5$ are used as electrode materials in photovoltaic systems. The link between photoelectrochemical characteristics and MoO_3, TiO_2, and $MoTiO_5$ nanostructures is studied in depth. The photoelectrochemical characteristics of MoO_3, TiO_2, and $MoTiO_5$ nanostructures are discovered to be highly dependent. At a 5mV/s scan rate, the photocurrent of MoO_3, TiO_2, and $MoTiO_5$ electrodes surged fast when sunlight was turned on, reaching values of 1.03mAcm^{-2}, 1.68mAcm^{-2}, and 14.20mA cm^{-2}, respectively. As soon as the sunshine was turned off, the photocurrent value dropped to zero. Photocurrent transitions showed quick, homogeneous photocurrent counterpart; this suggested that charge transfer in these ingredients is speedy and possibly related to the crystal buildings of MoO_3, TiO_2 and $MoTiO_5$. $MoTiO_5$ nano-belt and nano-disc thin films have typical uses in the photoelectrochemical sector because they have the best photoresponse and stability. In conclusion, the structure of MoO_3, TiO_2, and $MoTiO_5$ nanostructures was effectively altered using the SILAR approach by adjusting basic preparation conditions. Experiments also indicated that altering the deposition time may change the size of $MoTiO_5$ nanostructures. In enlarged $MoTiO_5$ nanostructures, photocurrent measurements demonstrated a decreased fault concentration and higher optical quality. The photocurrent produced by the $MoTiO_5$ nanostructures is steady and reproducible over many cycles, showing that the electrode is photocorrosion-free. The new production method is predicted to pique relevancy in the study of further metal oxide nanostructures and nanomaterials.

Key words: Photoelectrode, MoO_3, TiO_2, $MoTiO_5$, SILAR.

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Zeolites /HAP Nanocomposites Prepared by Solgel Route

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ABSTRACT

Zeolite/hydroxyapatite nanocomposites, and more particularly inorganic/zeolite nanocomposites have important and specific physico-chemical properties. Thus these materials have a large number of potential applications (Khorasani 2019, Thibaud, 2016).In the current work, nanocomposites **ZEO/polymer** and nanocomposite based on hydroxyapatite **HAP.ZEO/polymer** were grown by solgel method. The purpose of this study is the use of this type of composite materials to eliminate pollutants .The Hydroxyapatite powder of biological origin used in the present work was extracted from the bones of cattle and zeolite synthesized by sol gel method .The prepared samples are analyzed by Fourier transform infrared (FTIR), X-ray diffract ration (XRD).

Key words: caractérisation, DRX, IR, hydroxyapatite, Zolithes, sol gel

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Revenue Forecast Models Using Hybrid Intelligent Methods

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ABSTRACT

The aim of this study is to forecast the revenue of a seller taking part in an online e-commerce marketplace by using hybrid intelligent methods in order to help the seller to build solid financial plan. For this purpose, three different approaches were applied in order to accurately forecast the revenue. In the first approach, after applying only simple preprocessing steps on the dataset, forecast models were developed with Random Forest (RF). In the second approach, Isolation Forest (IF) was used to detect outliers on the dataset and minimum Redundancy Maximum Relevance (mRMR) feature selection algorithm was utilized to correctly select the features that affect the quality of revenue forecast. In the last approach, the feature selection process was performed first and then the Density-Based Spatial Clustering and Application with Noise (DBSCAN) was used to cluster the dataset. After these processes were carried out, forecast models were developed with RF. The dataset used includes daily revenue of a seller among with several other features and covers the time period from January 1st, 2017 to December 31st, 2021. Mean Absolute Percent Error (MAPE) was used for evaluating the performance of the forecast models. The results show that the average MAPE of the third approach is 17.40% lower than that of the first approach, and 10.15% lower than that of the second approach.

Keywords: Revenue forecasting, Machine learning, Hybrid methods, Marketplace

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Nonlineare Optical Properties and Quantitative Structure-activity Relationship (QSAR) Studies of 2-phenylbenzofuran Derivatives

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ABSTRACT

Benzofuran, as an important heterocyclic compound, is extensively found in natural products as well as in synthetic materials. They have attracted researchers due to their broad range of biological activity. They have vital role as pronounced inhibitors against a number of diseases, viruses, fungus, microbes and enzymes.

Density Functional Theory (DFT) calculations, in the ground state of 2-Phenylbenzofuran, were carried out using the GGA-PBE, PBV86 and meta-GGA-TPSS hybrid functionals with 6-31G (d, p) as a basis set. First, theoretical calculations were performed using these functional to obtain the stable conformer of the molecule. In addition, Mulliken population (MPA), natural population (NPA) and natural bond orbital (NBO) analyses were also calculated using the same level of theory. Additionally, the NLO properties of 2-Phenylbenzofuran and those of its derivatives have been investigated by GGA-PBE/6-31G (d,p) level of theory. The first-order hyperpolarizability value of all 2-Phenylbenzofuran derivatives was found within the range extending from 4.00×10^{-30} to 43.57×10^{-30} (esu). It indicated that these derivatives possess remarkable NLO properties. In addition, a multiple linear regression (MLR) procedure was used to envisage the relationships between molecular descriptors and the antiprotozoal properties in vitro against, Plasmodium falciparum as well as cytotoxicity against mammals and structures of 49 2-Phenylbenzofuran derivatives; the quantitative structure-activity relationship (QSAR) studies have been performed using quantum descriptors. The QSAR relationship was applied to determine a correlation between the various physico-chemical parameters of the studied compounds and their biological activities. The statistical quality of the QSAR models was assessed using statistical parameters, i.e. R^2, R^2_{adj} and R^2_{cv}.

Key words: NLO; NBO; 2-Phenylbenzofuran; MLR; QSAR.

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Chemical Elucidation of Pure Biomolecules Separated from *Calycotome spinosa* (L.) Link as well as Their Antioxidant and Antimicrobial Capacities

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ABSTRACT

Two new compounds were isolated for the first time from *Calycotome spinosa* (L.) Link, 5-Hydroxyindoline (4) and D-pinitol (5), together with three well-known flavonoïds Chrysin-*7-O-(β-D-glucopyranoside)*(1), Chrysin-*7-O-β-D-(6"-acetyl)glycopyranoside* (2) and Apigenin-*7-O-β-D-glycopyranoside* (3). The structures of these compounds were elucidated by spectroscopic data and mass spectrometric analyses; including a novel approach; 1D-NMR, 2D-NMR with LC-ESI-TIMS^2. In the present study, the new compound (4) separated from leaves MeOH extract showed the greatest radical scavenging activity (DPPH) (IC_{50}<10µg/mL) and the highest total antioxidant capacity (TAC=985.54±0.13mg AAE/g extract). Furthermore, the strongest reducing power (EC_{50}=344.82±0.02µg/mL) as well the remarkable scavenging potential by ABTS assay (IC_{50}=7.8 ±0.43µg/mL) were exhibited by the same composite (4). Followed by the MeOH extract and the compound (3), that also represented potent antioxidant capacities. In contrary, the compound (5) had the lowest activity. Moreover, compound (4) has exerted a selective antibacterial activity against *S. aureus* (ATTC-25923), *P. aeruginosa* (ATTC-27853) and *Salmonella abony* (NCTC 6017), with inhibition zones of 16±0.5, 9.83±0.29 and 8±0.28 mm, consecutively. To the best of our knowledge, 5-Hydroxyindoline was isolated from plants for the first time in our current work. These interesting findings suggest that *C. spinosa* (L.) Link could be a vital natural resource for valuable antioxidant and antimicrobial molecules in food and pharmacological industries.

Key words: *Calycotome spinosa* (L.) Link, LC-ESI-LTIMS/MS, NMR, 5-Hydroxyindoline, antioxidant activity, antimicrobial potential.

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Novel Metal Complexes of Ni(II), Mn(II) and VO(IV) Containing N,O-donor Schiff Base Ligand: Synthesis, Spectroscopic Characterization and DFT Investigation

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ABSTRACT

A bidentate Schiff base ligand containing N and O as donor heteroatoms has been used to synthesize series of new stable transition metal complexes of general composition of $M(L)_2$ with M = Mn, Ni and VO. This ligand was obtained from condensation of 2-methoxybenzylamine on 2,3- dihydroxybenzaldehyde in methanolic solutions in which its complexes were obtained by mixing the corresponding metal acetate salt and the ligand in 1:2 molar ratio. To identify their molecular structures and redox/electrochemical properties, the resulting three complexes have been characterized by different analytical techniques such as FT-IR, UV-Vis, mass spectroscopy, thermogravimetry and cyclic voltammetry. Moreover, the effect of the metal on the complexes electronic properties with their reactivity has also been studied by Density Functional Theory (DFT). The stable structures were optimized by using the hybrid B3LYP/6–31 G method. The spectroscopic data obtained suggest that the metal is bonded to the ligand through the phenolic-like oxygen and the imine-type nitrogen atoms. Electronic and vibrational absorption spectra of the nickel complex was found to be of square-planar geometry while square-pyramidal and octahedral geometries have been proposed for VO(IV) and Mn(II) complexes, respectively. The thermogravimetric analyses of these complexes confirmed the presence of water molecules in their structures and thermal decomposition led to the formation of metal oxides as the latest residues. The voltammogram of the Ni(II) complex suggests the existence of quasi-reversible redox system in DMSO solution.

Keywords – Schiff base complexes, Spectroscopy, Thermogravimetry, DFT, Cyclic voltammetry.

Experimental and Quantum Chemical Studies on Corrosion Inhibition Performance of New Compounds for Mild Steel

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ABSTRACT

The effect of synthesized Schiff base 4,4'-bis(2-carboxaldehyde thiophene) diphenyl diimino ethane (L) on the corrosion of mild steel in acidic media 1 M HCl has been investigated using electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization. These studies have shown that (L) is a good corrosion inhibitor for mild steel in 1M HCl. The adsorption of inhibitor on mild steel surface was found to follow Langmuir isotherm model and the adsorption isotherm parameters (Kads, ΔG0ads) were determined. Quantum chemical calculations were further applied to reveal the adsorption structure and explain the experimental results.

Key words: Mild steel, Corrosion inhibition, Adsorption isotherm, Quantum chemical studies

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Artificial Intelligence in Health: From Surgeons to Robots

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ABSTRACT

When it comes to artificial intelligence, machine technologies that think like humans come to mind. Artificial intelligence, whose history dates back to Aristotle, entered the field of health in the 1970s. The first expert artificial intelligence applications in the field of health are known as Internist-1, CASNET and MYCIN. Later, this technology started to show itself in many areas of health. The potential for both AI and robotic surgery in healthcare is huge. Just like in everyday life, AI and robots are increasingly becoming part of the healthcare ecosystem. Looking closely at AI technology used in many areas of health to benefit doctors and patients; Important topics such as medical decision making, early diagnosis and treatment, drug development and medical imaging draw attention. Of course, when it comes to artificial intelligence, some question marks come to mind. Artificial intelligence technologies with many advantages in the field of health; It also raises concerns about critical issues such as who will be held responsible if it will replace doctors or if the initiative in medical decision making is left entirely to artificial intelligence. The main purpose of this study; In addition to informing the reader about the use and development of artificial intelligence technology in health, it is also researching and discussing critical problems such as fear of unemployment, inability to adapt to technology and lack of infrastructure, especially for surgeons, in the face of rapidly developing artificial intelligence technology. It is aimed to look at the event from two different perspectives by taking the opinions of experts in the field and to offer solutions. The data of the study consists of books, journals, articles, publications and reports. In the first part, the history, definition and usage areas of artificial intelligence will be briefly mentioned. In the second part, examples of applications of artificial intelligence in the field of health and robotic surgery will be given. In the third part, the concerns brought about by artificial intelligence applications in the field of health and the solution proposals researched in order to eliminate these concerns will be included.

Interval Valued Jensen's Inequalities for h-Convex Functions on Time Scales

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ABSTRACT

In the presentation, I discuss h-convex function, supermultiplicative function and h-convexity for interval valued function on time scales. Some generalizations of Jensen's inequality in interval valued analysis for h-convex functions as well as h-supermultiplicative functions on time scales. In seek of applications of generalized Jensen's inequality, inequalities of Hermite-Hadamard type for functions which are h-convex on time scales are established. Further h-discrete and q-analogues of newly proved results are also part of discussion.

Roman Domination Number of Central Graphs

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ABSTRACT

Let $G = (V, E)$ be a simple graph with vertex set $V = V(G)$ and edge set $E = E(G)$. Also let $f: V \to \{0,1,2\}$ be a function that labels the vertices of G satisfying the condition that every vertex u for which $f(u) = 0$ is adjacent to at least one vertex v for which $f(v) = 2$. The *weight* of a Roman dominating function is the value $f(V) = \sum_{u \in V} f(u)$. The minimum weight of a Roman dominating function on a graph G is called *the Roman domination number* of G. In this paper, we study on this variant of the domination number for central graphs of some special graphs.

Key words: Graph vulnerability, Domination, Roman domination.

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Prevalence and Risk Factors Associated with Pathologies Recorded at Jijel Slaughterhouse in Algeria

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ABSTRACT

Meat is a food of animal origin, which can be contaminated by infectious, parasitic, and other non-infectious agents responsible for diseases, which threaten the health of consumers. This still poses a public health problem in Algeria and in many countries. In order to assess the epidemiological situation of certain diseases in the Taher region in Jijel and to determine the influence of certain variation factors and to estimate the risk on public health, a study was extended over a period of 14 months out of a total of 1756 cattle slaughtered at the Taher slaughterhouse. The results showed that 609 cattle (34.68%) showed lesions. The highest rate of pathologies was observed on the liver (37.27%) followed by the lungs (30.21%). While the lowest rate was recorded on the digestive system (0.33%) followed by the kidneys (1.14%). In addition, the liver and lungs were more contaminated with hydatid cyst compared to other organs (20.69%, 19.05% respectively). Our data showed that the diseases affected mainly females (55.82%) than males (44.17%) (P <0.001). Furthermore, cattle aged between 3 and 5 years were the most affected (43.51%) and local breed cattle showed more lesions (71.59%). These results testify to the real risk represented by the consumption of organs affected by diseases and the need to recognize the agents of contamination and the mode of transmission, and to implement an extension and control program in this region depending on the epidemiological aspect of the lesions.

Key words: Abattoir, lesions, incidence, sex, race, age, public health.

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Machine Learning Based Demand Forecast Models for E-Commerce Industry

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ABSTRACT

The goal of this research is to provide more accurate sales strategies by predicting the future product sales of companies in the e-commerce sector. In this way, companies can determine the right strategies for future and maximize their profits. For this purpose, Long-Short-Term Memory (LSTM) and Light Gradient Boosting Machine (Light-GBM) methods were used to accurately predict the sales counts of a product for an e-commerce company. A 4-year data set (01.01.2017 - 31.12.2020) was used for generating demand forecasting models. The sales counts in the last week of the dataset (25.12.2020 - 31.12.2020) and the sale counts in the last month (01.12.2020 - 31.12.2020) were forecasted. Mean Absolute Percent Error (MAPE) was used for evaluating the performance of the prediction models. The results show that the MAPE values for the LSTM models change between 14.2 and 27.2 whereas the MAPE values for the Light-GBM models change between 15.6 and 22.4.

Keywords: Demand forecasting, Machine learning, E-commerce

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Inhibition of Main protease SARS CoV-2 (Mpro) by Curcumin

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ABSTRACT

SARS-CoV-2, a rapidly spreading new human coronavirus, has affected almost all the countries around the world. The lack of specific drugs against SARS-CoV-2 is a significant hurdle towards the successful treatment of COVID-19. Although phytochemicals in nature can be a quick solution due to their wide therapeutic spectrum and strong pharmacological activities. In this context, the low toxicity, and high pharmacokinetic properties of curcumin, reveal the need for investigation of curcumin to boost up research for the development of effective therapeutics against COVID-19. Since the main protease (Mpro) is required for viral gene expression and replication, it is a promising target for antagonists to treat novel coronavirus disease. In the current study, we investigated the efficacy of this natural phytochemical, using molecular docking and pharmacophore screening. Molecular Operating Environment (MOE) version 2019.10 showed that the ligand performed very well, producing a good score (-7.16). The binding interactions of the docked complexe demonstrated that curcumin formed with the Mpro three hydrogen donor bonds, at Arg 188, Thr 24, Cys 145 and two acceptor bonds was observed for Thr 25 and Cys 145. His41 and Cys145 form the catalytic dyad in the Mpro active site. Curcumin was tested for obeying Lipinski's rule of five parameters. However, it seems that do not violate this rules of any drug filter approach. It exhibited a molecular weight of 368.38 (<500 Da), a high lipophilicity LogP = 3.71 (<5), only two hydrogen bonds donors (<5), six hydrogen bond acceptors (<10), therefore, lip druglike is 1. With these encouraging results, curcumin can be further explored f to arrive at possibly newer potent agents with better anti COVID-19 therapeutic activity. Accordingly, we recommend further fast *in-vivo* and *in-vitro* evaluations, preclinical and clinical studies at least for the aforementioned promising compound.

Keywords: Curcumin, Mpro, SARS-CoV-2, Molecular docking.

Existence and Uniqueness Solution of Dengue Fever Mathematical Model with Fractional Derivative Operator

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ABSTRACT

As it is known, fractional derivative and integral operators have become very important in recent years. Every operator contributing to the literature has some advantages. In this study, we will first extend the mathematical model based on Dengue Fever to the Caputo-Fabirizio fractional derivative operator. Next, we will do the existence and uniqueness solutions of the model. Finally, we will analyze the Dengue Fever model with some simulations.

Key words: Mathematical model, fractional operator, existence and uniqueness solution.

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Bullen Type Inequalities for Convex Functions on the Co-Ordinates

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ABSTRACT

Bullen inequality, along with classical inequalities such as Hermite Hadamard, Jensen and Ostrowski's inequality, has an important place in theory. It has wide usage in many areas with its application areas such that for averaged midpoint-trapezoid quadrature rules and applications in numerical integration. In this study, in order to obtain a variant of the Bullen inequality, an integral identity with double integrals is given. With the help of this identity, many inequalities have been demonstrated for convex functions in coordinates and reduced results have been mentioned for the bounded functions.

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Science of Cryptology and Key Distribution Schemes

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ABSTRACT

Communication and telecommunucation; it includes facts from past to present. In communication, people have applied various encryption processes so that the information they transfer to the other party cannot be accesded by third parties or malicious people. Undoubtedly, the importance of mathematical expressions is very great on the basis of encryption processes used in the transfer of information. In the light of previous scientific studies on this subject, the subject was approached from a different angle. In the first part , general information about the field of cryptography, which is the science of encryption, was given , in the second part, mathematical expressions were briefly mentioned, and in the third part, information security elements and cryptosystems were mentioned. In the last part, key distribution schemes and protocols, which constitute the main theme of our thesis, were mentioned.

Key words: cryptology, encryption, deciphering, key distribution scheme and protocols.

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TE Wave Propagation along a Circular Waveguide with a Finite-Length Coating

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ABSTRACT

In this study, the propagation of transverse electric waves along a circular waveguide which has a finite impedance wall is analyzed. The problem constitutes a mathematical model for a finite coating inside a circular waveguide which allows a rigorous analysis such as Mode-Matching Technique in order to determine the reflection and transmission coefficients. The same geometry is also simulated in a full wave solver and the results are compared with the rigorous calculations.

Key words: Circular waveguide, electromagnetic wave propagation, impedance wall.

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Ergonomic Risk Assessment with REBA and RULA Methods for Private Security Services Employees of a University

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ABSTRACT

Ergonomics is the science of designing the work, equipment, workplace, and working conditions to fit the worker. Ergonomics aims for the establishment of a healthy working environment taking into account human physical and mental limitations. For this purpose, the physical abilities and limitations of the human body are evaluated, and how the characteristics of the employee are related to the work done, the equipment used, and the working environment. Regardless of the industry, well-planned ergonomic conditions have a great impact on the working comfort of employees and directly affect work efficiency and productivity. Therefore, ergonomics has recently been taken into account by both employers and workers and is widely used to design works, types of equipment, and workspaces for workers in different work sectors.

As a result of ignoring ergonomic conditions, occupational musculoskeletal disorders (MSDs) among employees are seen commonly, and many work accidents have been reported in many employment sectors. The most important reason for MSD is that employees stay in uncomfortable and painful positions for a long time due to their work. In order to eliminate work environment problems threatening employee health and safety, ergonomic risk factors should be attentively identified. Afterward, the insufficient ergonomic conditions of the employees regarding their work need to be improved.

For ergonomic risk analysis, the two main assessment methods that are frequently used and highly successful are the Rapid Upper Extremity Assessment (RULA) and the Rapid Whole Body Assessment (REBA). The physical and mental limitations and abilities of the employee are scored using RULA and REBA, a risk analysis is made, and suggestions for improvement are made in line with the scores.

In this study, it is aimed that to determine the possible ergonomic risks for employees of the private security services of a university by using RULA and REBA ergonomic risk assessment methods and to provide solutions to eliminate the risks caused by posture disorders, physical factors, etc.

Keywords: Ergonomic, REBA, RULA,

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The Effect of Heavy Layer Material Density and Sample Mounting Method on Sound Transmission Loss

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ABSTRACT

In this study, the sound transmission loss of the heavy layer material used in the Inner Dash Insulators, which is one of the parts that prevents the engine-borne noises from reaching the cabin, was investigated by using the Impedance Tube. The mounting of the heavy layer material inside the Impedance Tube due to its rigid structure is one of the most important factors affecting the measurement results. Different approaches have been developed for mounting the sample in the Impedance Tube and eliminating gaps that may create resonance in the edge regions. For impedance tube measurements, the gaps were closed by applying adapter or sealing material to the sample edges, and the modified measurement methods were compared with the conventional method (testing without using any apparatus/material on sample edges). The produced samples with three different densities were measured with three different measurement methods, and the sound transmission loss test results were compared. In this way, it is aimed to contribute to the relevant literature by revealing how the change in density affects the acoustic performance of the heavy layer material and by providing guidance on which mounting method is most suitable for performing a consistent measurement.

Key words: Heavy layer, Sound transmission loss, Impedance tube, Material density, Sample mounting method.

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Increasing the Bioavailability of Curcumin through Micro Encapsulation

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ABSTRACT

Curcumin, a hydrophobic bioactive molecule, is currently being promoted because of its nutritional and functional properties. Particular attention is paid to their encapsulation as an active ingredient in a polymeric matrix in order to increase their low solubility in aqueous medium. The objective of this work is to contribute to the improvement of the bioavailability of curcumin by designing the nanosuspension, using the anti-solvent precipitation process. The optimization of the formulation was carried out while modifying the most influential parameters on the particle size. On the other hand, the methods of characterization of morphological and pharmacological properties were performed. The results of this work show the efficiency of this encapsulation strategy which can be of particular interest for the valorisation of hydrophobic bioactive molecules in order to ensure their therapeutic efficacy.

Key words: curcumin, bioavailability, nanosuspension, encapsulation, surface response.

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The McEliece Based Public-Key Cryptosystem Approach

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ABSTRACT

In this paper, we introduce a new public-key cryptosystem based on linear codes. McEliece studied the first code-based public-key cryptosystem. We are inspired by McEliece system in the construction of the new system. We examine its security using linear algebra and compare it with the other code-based cryptosystems. Our new cryptosystem is too reliable in terms of security.

Key words: Linear codes, public-key cryptosystem, linear system

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Effect of Illumination on Properties of Organic Diode Based on P3HT Material

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ABSTRACT

Effect of illumination on I-V current-voltage characteristics of organic diode based on Poly(3-hexylthiophene) (P3HT) oligomers is evidenced. As-grown diode is fabricated by spray pyrolysis route and front contact is manufactured by PVD process. The current-voltage characteristics of Al/Si/P3HT/Ag heterojunction diode under dark and 200 mWlight are measured. A rectifying of 4316.43 is recorded and diminishes as result of illumination and the photocurrent (Iph) of 18.2 µA at -1V is revealed. Photovoltaic parameters of P3HT/Ag diode like V_{oc}, I_{sc}, V_m, I_m, P_m, FF and efficiency are extracted. Furthermore, X-ray analysis reveals the presence of crystalline structure along (100) orientation. The transmittance of P3HT film shows a valley of 51.36 percent and a peak of 87 percent inside the visible band. This is a property of some polymers that could be used as an optical filter.

Key words: (P3HT) oligomers, I-V current-voltage, illumination, Photovoltaic parameters.

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A Mathematical Model for Illicit Drug Use with Global Derivative

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ABSTRACT

We leave in a changing wold and over time things or quantities change, this idea opened a door for scientist to introduce the concept of derivatives. The founders of the concept of derivative defined the derivative of a function y with a variable x and called it derivative of y with respect to x. In this talk, we apply the newly suggested concept of rate of change by A.Atangana where the rate of change is defined as a derivative of a function f with respect to a function g. Furthermore, we give a full representaion of the numerical scheme, covegence and error anaysis to solve a general cauchy problem. We then aply the new scheme to the drug addiction and abuse model. Numerical approximations are presented for each different scheme and its applications to durg addiction model.

Key words: Rate of change, Global derivative, Illicit drug use.

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A Numerical Study of the Various Tunnel Transversal Sections (Four Tunnel Shapes) Using the Finite Element Method

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ABSTRACT

Tunnels have now become critical components of our countries contemporary infrastructure advancements. Due to the importance and economic of these underground constructions, several tunneling projects are being carried out by many shapes. This paper presents the stability of four different tunnel shapes by numerical study using finite element method code OPTUME. With the different shapes of tunnels, the stability study was done by looking at the deformation of the lining, horizontal displacement, and soil settlements.

Key words: Numerical Modelling, Shapes Tunnel, Stability, OPTUME.

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A Novel Approach for Differential Equations Using Clique Collocation Method

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ABSTRACT

This paper generated the novel approach called the Clique polynomial method (CPM) using the clique polynomials raised in graph theory. Here, some problems have been considered to examine the implemented method proficiency. These problems are rehabilitated into an algebraic equation system using the clique polynomials and collocation technique. Illustrative examples and their comparison with the other method leads to the result that using CPM works much more better that using Clique polynomials through tables and graphs. Moreover, we conclude that the implemented method in this study is highly accurate and effective.

Key words: Collocation method, Graph Theory, Clique polynomials.

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Electricity Demand Forecast for the Turkish Marketplace Using Machine Learning Combined with Look-Back Approach

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ABSTRACT

Since current technology is insufficient to store a considerable amount of electrical energy, supply and demand must always match or be balanced by electricity producers. Therefore, accurate electricity demand forecasting plays a key role in the planning and decision systems of producers. The aim of this study is to predict the hourly electricity demand in the Turkish electricity marketplace using machine learning combined with look-back approach. Hourly electricity consumption data provided by Energy Exchange Istanbul (EXIST) was used as the dataset and forecasts were generated for seven different days by using eXtreme Gradient Boosting (XGBoost). Forecast models with and without consecutive look-back and periodic look-back approaches were developed. Mean Absolute Percentage Error (MAPE) was utilized to evaluate the performance of the models. According to the results, the average MAPE obtained with the look-back approach (3.33) was 57.36% lower than that obtained without the look-back approach (7.81).

Keywords: Demand forecasting, Machine learning, Turkish electricity marketplace

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Experimental and Numerical Investigation of the Performance of Concrete, Which Has Been Developed, Based on Algerian Diatomite to Improve the Thermal Insulation of Buildings

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ABSTRACT

In the present investigation, we have developed concrete based on Algerian diatomite in the form of gravel in different quantities. This work aims to study the development of concrete on the thermal side. A comparative study of an experimental benchmark and a numerical analysis is carried out for these new materials to improve the hygrothermal insulation of the building construction. Different configurations are realized in the laboratory of the University of Tlemcen by using different quantities of diatomite gravel and we mix these forms with the concrete that was analyzed with the help of the infrared camera TESTO. On the other hand, an appropriate 2D numerical model is solved using the finite element method (FEM). The results of both studies (numerical and experimental) show a good agreement and the relative error does not exceed 3.6%. The obtained results allow us to conclude that the use of diatomite in the form of gravel is considered one of the best solutions for developing concrete on the thermal side. The results show that diatomite in gravel form in concrete reduces the temperature by 3°C.

Keywords: Concrete, Diatomite gravel, Heat and moisture transfer.

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Experimental and Numerical Study of the Performance of Screed, which Has Been Developed, Based on Gravel and Powder Diatomite

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ABSTRACT

The problems of cracks in new and old building slabs require the use of a concrete screed to eliminate these cracks and ensure the finishing of the slab.
In the present work, we have developed the concrete screed based on diatomite in gravel and powder form with different quantities. The aim of this work is to study the thermal development of the screed. A comparative experimental study and a numerical analysis is carried out for these new materials to improve the hygrothermal insulation of the building construction. Different configurations are carried out in the laboratory of the University of Tlemcen using different quantities of diatomite with the concrete screed which was analyzed using the infrared camera TESTO. On the other hand, an appropriate 2D numerical model is solved using the finite element method (FEM). The results (numerical and experimental) show a good agreement and the relative error does not exceed 3%. The obtained results allow us to conclude that the use of diatomite in the form of gravel is considered as one of the best solutions to develop the concrete screed from a thermal and weight point of view. The results obtained show that diatomite in gravel form reduces the temperature by 5.3°C.

Key words: diatomite, screed, Heat and moisture transfer

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Behavior of Reinforced Concrete Members Exposed to High Temperatures

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ABSTRACT

The changes in the thermal and mechanical properties of the construction materials, sectional responses of reinforced concrete (RC) members were presented for different temperature levels. A parametric study was carried out to determine the effects of high temperatures on the behavior of RC elements by comparing with the results those of the reference element which does not expose to high temperature. Aiming at this goal, a series of RC members were modeled and analyzed by using finite elements in ANSYS program. The models were also verified by comparing the results published in the literature. The RC members were assumed as exposed to standard fire curve (ISO 834) for 1 to 3-hour time periods. At the end of the analyses, temperature variations in cross-sections of the RC elements were obtained. The thermal, mechanical properties of the materials, and sectional responses of the RC elements were determined by using obtained temperature variations. It was concluded that as the temperature getting increase, the strength, modulus of elasticity, thermal conductivity, and density decrease for both concrete and reinforcement bars. On contrary, an increase in the strain capacities, thermal expansion, and specific heat was obtained by increasing in temperature level.

Key words: RC elements, high temperatures, thermal properties, mechanical properties, sectional response, finite elements.

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Physical and Chemical Characterization of the Films of CDS and Its Electrochemical Application by Cyclic Voltammetry

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ABSTRACT

CdS is a relatively easy material to deposit and its field of application is very wide. The n-type semiconductor CdS is with a band gap of 2.42 eV at room temperature. Due to its optical, electrical and morphological properties. The aim of this work is the characterization of the films of CDS by UV-Vis spectrophotometry and Scanning Electron Microscope SEM and finally the electrochemical study of this films by cyclic voltammetry (CV). The results obtained confirmed that the electrochemical technique is capable of successfully producing nanomaterials with very interesting properties comparable to so-called physical methods.

Key words: CDS, UV-VIS, CV, Scanning Electron Microscope SEM.

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Reversibly Crosslinked Isotactic Polypropylene/Graphene Nanocomposites, Thermal And Mechanical Properties

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ABSTRACT

This work aims to develop nanocomposites based on isotactic polypropylene and graphene by the reactive extrusion method of the reversible crosslinking type (RXR).
This study showed the efficiency of graphene as a nanofiller to achieve important specific properties in nanocomposites elaborated in the molten state by the reactive extrusion method. The incorporation of graphene nanosheets in the nanocomposites has developed a significant effect on the thermal properties (thermal stability, crystallization and melting behavior), mechanical (impact fracture) which have been greatly improved by the addition of low mass fractions of graphene (< 1%). The improvements achieved in these properties widen the field of application of polypropylene.

Key words: graphene, polypropylene, nanocomposites, reactive extrusion, reversible crosslinking

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Elimination of Waits due to Row Lock by Vertically Linked Database Architecture

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ABSTRACT

With the developing technology and today's needs, data sets reach huge sizes, and there is a great development in the hardware allocated for database management systems (DBMS). With the increase in hardware quality, it has become vital to use this resource efficiently. Since the number of operations on the data increases with the size of the data set, reaching a data in the desired time is as important as reaching that data. However, in DBMS architectures, performance degradation is inevitable due to row lock as the amount of data grows and the number of threads accessing tables increases. This situation causes loss of time as the operation is disrupted and financial loss as resources cannot be used efficiently. On the one hand, as the customer of a DBMS increases, its demands begin to increase and differentiate as well. It is very difficult to respond to different demands with different architecture and it is not a sustainable method. Vertically linked database structure not only prevents row lock but also allows customization at runtime.

Key words: Row lock, Vertically linked, Customization at runtime.

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New Estimations for Chebyshev Type Inequalities via Generalized Proportional Fractional Integral Operators

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ABSTRACT

In this paper, we have proved several new integral inequalities of Chebyshev type via generalized proportional fractional integral operators. We have presented some special cases for the main findings.

Key words: Chebyshev Inequality, GPF integral operators, Hölder inequality.

ICOLES 2022

Some Novel Approaches of Simpson's Type for Convex Functions via Atangana-Baleanu Integral Operators

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ABSTRACT

In the present note, several novel estimations of Simpson's type have been presented by using an integral identity that includes Atangana-Baleanu fractional integral operators for convex functions. We have used the basic definitions, some classical inequalities and elemantery analysis methods.

Key words: Simpson's Inequality, convex functions, Hölder inequality, Atangana-Baleanu fractional integral inequalities.

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New Simpson's Type Integral Inequalities for s-Convex Functions in the Fourth Sense with Applications

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ABSTRACT

In the present note, some novel Simpson's type integral inequalities have been proved by using an integral identity, s-convex functions in the fourth sense and some well-known analysis methods. We have discussed some special cases and given some applications for the main findings.

Key words: Simpson's Inequality, s-convex functions, Hölder inequality.

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Bioressourses Valorisation for Biodegradable Polymer Nanocomposites

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ABSTRACT

The aim of this work is to develop composite membranes based on polymers and containing natural surfactants as microporous filler, which behaves as filters, and to use them in organic and mineral depollution, this membrane filtration technique is a very attractive separation method due to its low cost and high selectivity.
The membranes are based on biodegradable polymer and the reinforcement is the natural surfactant, will be used for the elimination of metal ions and organic dyes contained in aqueous solutions with a retention rate greater than 80%
The results obtained show the existence of a selective retention which increases with the increase in the concentration of surfactants in composite membranes.

Key words: Composite membranes, Polymer, Natural surfactant, Microporous, Retention.

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Designing A Quality Control Process Using Multi-Criteria Decision Making Techniques and Acceptance Sampling Method for Quality Control of Finished Products in A Production Plant

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ABSTRACT

The problems that faced in the production processes affect the quality of the product negatively. The aim of this study is to design a new control process in order to prevent from sending defective products to the customer of a leading company in the white goods production. The company currently controls all machine types at the same rate, but a defect in a product type with a high feature level brings more costs to the plant. The company does not have the resources to make 100% quality control of all the machines produced. For this reason, it has been decided to design a new sampling plan that can increase the efficiency of defect detection In the first stage of the study; important criterias for the plant were determined in order to improve the product quality indicators, and criterias weights were found using AHP, the alternatives were ranked according to their importance by using the Topsis method. In the second stage of the study, according to these importance levels, using the acceptance sampling method; the type of sampling plan, inspection levels sample size and acceptance number were determined.

Key Words: Final product quality control, acceptance sampling, MCDM, AHP and TOPSIS

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3D Modeling and Justification of an Electrical Vehicle with Multibody Modeling Softwares

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ABSTRACT

The severing global warming problem and high cost of the non-renewable fossil fuels have pushed the researchers and companies to develop further options. Consequently, the design of the Electrical Vehicles (EVs) has been initiated, which are environmental friendly energy-efficient vehicles, and they are expected to be utterly replaced with the ones using the fossil fuels in the near future. In this paper, the dynamic model of an EV has been obtained with the MATLAB/Simulink and the MapleSim multibody modelling softwares. In order to build the EV, its components have been constructed and located step by step in the main vehicle model. The EV model consists of the mechanical part, the DC servo motor, the battery, and the controller. The modelled EV has been simulated with four different driving cycles that are FTP75 (Federal Test Procedure), HWFET (Highway Fuel Economy Test), ArtemisRR (Artemis Rural Road), and LA92/UCDS (Unified Cycle Driving Schedule). Simulated position and speed states of the EV models are justified by comparing the ones derived with the well-known physical laws and the Root Mean Square Error (RMSE) values for each driving cycle.

Keywords: 3D modelling, electrical vehicles, multibody modelling softwares, parametric modelling, and simulation and analysis.

Time-Varying Target Tracking Control of the Electric Autonomous Vehicles based on the Detected Lane Lines and other Vehicles

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ABSTRACT

Until now, humans have been in control of the vast majority of the vehicular operations. In the meantime, recent advancements in sensing technology, computing power, data processing, and connectivity have made it possible to launch new vehicles that are autonomous as they can perform transportation tasks without any human interventions. In order to develop fundamentally autonomous vehicles, a variety of research in related fields has been conducted; so that the first versions of the Electric Autonomous Vehicles (EAVs) have been just introduced. This paper focuses on the autonomous tracking of the vehicles based on the detected lane lines and the other moving neighboring vehicles. OpenCV Python codes have been used for constructing the lane lines and the vehicle detection. The road lane lines recognition method utilizes the Canny Function and the Hough Transform to reveal the number of lines data in the polar coordinates of the images. After the coordinate transformation of the images, feature extraction, Support Vector Machines (SVMs), and sliding window techniques have been used to detect and track the moving vehicles on the road. In addition, the algorithm is able to track the vehicle in the videos which essentially contains a series of images. Thus, the detecting algorithm can be applied to the images extracted from the videos iteratively. This paper finally analyses the algorithm that detects and tracks the lane lines and the vehicles in various road images and videos.

Keywords: Electric autonomous vehicles, hough transform, image processing, lane lines detection and tracking, support vector machine, vehicles detection and tracking.

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An Artificial Intelligence Based Platform for Outsource Staff Scoring

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ABSTRACT

When giving outsourcing service, the companies try to make a match between the employee and the job/project to be served, considering important points such as qualification of the employee, efficiency of the project and labor planning. As this is an experience-based and manually performed process, it is not possible to guarantee that a match will be the best one. Therefore, the aim of this study is to develop a software that matches the employee with the right project using data analysis and artificial intelligence. We worked on the problem of scoring candidates for a particular position in a particular company. The results of the employee search are obtained by artificial intelligence according to the desired filter and listed with respect to the matching rates. In order to develop employee scoring models, Support Vector Machines (SVM) and Convolutional Neural Networks (CNN) are used. Confusion matrices are obtained to observe the performance of the developed models, where 10-fold stratified cross validation is conducted. As a result of SVM classification, the confusion matrix presents an accuracy of 96.2%. As a result of CNN implementation, the confusion matrix presents an accuracy of 80.75%. Finally, some other performance measures such as recall, precision and F-measure are also used.

Key words: Outsourcing, Labor management, SVM, CNN.

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On Identities with r – Derangement Numbers

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ABSTRACT

In this study, we derive some identities involving $r-$ derangement numbers and generalized hyperharmonic numbers of order r by using the generating functions and Riordan arrays. For example, for $n \geq r$,

$$\sum_{i=0}^{n-r}(-1)^i \binom{r+1}{i} \frac{D_r(n-i)}{(n-i)!} = \frac{(-1)^{n-r}}{(n-r)!},$$

and

$$\sum_{i=0}^{n-r-1} \frac{(-1)^i}{i!} H_{n-r-i}^{2r}(\propto) = \sum_{i=r}^{n-1} \frac{1}{i!} D_r(i) H_{n-i}^{r-1}(\propto).$$

Key words: Sums, generalized harmonic numbers, $r-$ derangement numbers, generating functions, Riordan arrays.

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Ostrowski Type Inequalities for Different Kinds of Convex Functions via Caputo-Fabrizio Fractional Integral Operators

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ABSTRACT

The main objective of this paper is to establish some new generalizations of Ostrowski type inequalities with the help of Caputo-Fabrizio fractional integral operators, essentially utilising the convexity property of the functions. In this sense, the results are obtained for functions whose absolute values of the first derivatives are some different kinds of convex.

Key words: Ostrowski inequality, Caputo-Fabrizio fractional integral, s-convexity in the fourth sense

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Some Atangana-Baleanu Fractional Integral Inequalities for Convex Functions

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ABSTRACT

In this paper, we present several new Hermite-Hadamard type inequalities for different kinds of convex functions via Atangana-Baleanu fractional integral operators. The proofs are made with quite basic analysis and based on Hölder and Power mean inequalities.

Key words: Atangana-Baleanu fractional integral, Hermite-Hadamard inequality, convexity

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Approximate Controllability of Fractional Stochastic Sobolev-Type Volterra-Fredholm Integro-Differential Equation

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ABSTRACT

An approximate controllability of fractional stochastic Sobolev-type Volterra-Fredholm integro-differential equations of order 1<r<2 is the major impetus for our discussion. The essential discoveries are established using principles and ideas from stochastic analysis, the theory of cosine family, fractional calculus, and Banach fixed point techniques. We begin by emphasising the availability of mild solutions before demonstrating the fractional stochastic control equation's approximate controllability. Our findings are then applied to the notion of nonlocal circumstances. Finally, an application for drawing the theory of the key results is established.

Key words: Approximate controllability, Stochastic system, Volterra-Fredholm Integro-differential equation, Fractional derivative, Sobolev type equation, Nonlocal conditions.

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On the Spectrum of A Electro-Magnetic Scrodinger Operator

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ABSTRACT

In this paper, we consider an electromagnetic Schrödinger operator defined by the differential expression

$$L(Q,q) = (-i\nabla + Q)^2 + q$$

in d-dimensional paralellepiped F, where $d \geq 2$, with the Neumann boundary condition and investigate the asymptotic behavior of the eigenvalues of this operator which is more complicated than the study of the one with just electric potential ($Q = 0$). The goal is to obtain the perturbation series by using energy as a big parameter.

Keywords: eigenvalues, electromagnetic potential, schrödinger

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On the Unstable Eigenvalues of A Polyharmonic Operator

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ABSTRACT

We consider a matrix operator

$$H(l,V) = (-\Delta)^l + V,$$

in R^d , $d \geq 2$, $\frac{1}{2} < l < 1$, where V is the multiplication operator by a symmetric sxs matrix $V(x)$ which is periodic with respect to an arbitrary lattice. It is well-known that the eigenvalues of H are divided into two groups: stable (non-resonance) and unstable (resonance). In this study, we obtain the asymptotic formula for the unstable eigenvalue, more precisely, when the eigenvalue of H belongs to a part of resonance domain called single resonance domain which has asymptoticaly full measure on the resonance domain. Roughly, the number of unstable eigenvalues which do not belong to the single resonance domain is small compared to the number of the ones in the single resonance domain. In [1], we obtained asymptotic formulas for the stable eigenvalues of H. The unstable eigenvalues requires a detailed and carefull analysis in higher dimensions. In [2], we found the asymptotic formula for unstable eigenvalue in tems of the eigenvalues of a matrix C and in this study, we give a detailed analysis of this matrix C in a single resonance domain and obtain higher order asymptotics for this group of eigenvalues.

Keywords: eigenvalues, matrix potential, periodic, polyharmonic, resonance

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Analysis of the Academic Achievement Considering by Fractional Order Metapopulation Modelling

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ABSTRACT

Academic achievement is very important as it enables students to be well-equipped for professional and social life and shapes their future. In the case of a possible academic failure, students generally face many cognitive, social, psychological and behavioral problems. This problem experienced by the students has been addressed in this study with the mathematical model considered by the metapopulation model. Studies in mathematical modelleing have shown that some factors originating from the student, school and family affect academic achievement. Through the mathematical model considered in this context, it is aimed to determine the level of effectiveness of the main factors that play a role in the academic achievement of students and their relations with each other. Thus, the academic achievement of the students will be increased with the preventive and supportive studies to be planned for the determined basic factors. In this work we have handled with the help of the fractional operator, and first the local and global stability analysis of the equilibrium points of the model, then the positivity, existence and uniqueness of the solutions will be shown. According to us, this study is very important in terms of its original and multidisciplinary approach to academic success, which is an important issue in the field of social sciences.
Key words: Academic achievement; Fractional operator; Local stability; Global stability.

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Analysis of A Covid-19 Model with Piecewise Derivative Modelling

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ABSTRACT

Since December 2019, many mathematical models have been developed to understand How virus spread within populations, and proposed models helped us for understanding the dynamics of the outbreak. Several researchers have used distribution to model and predict the spread, while other have employed models based on classical and nonlocal differential and integral operators. Very recently a type of calculus was suggested to handle processes with crossover behaviours, the calculus was called piecewise calculus, where differential and integral operators are defined piece wisely. In this paper, we will consider a mathematical covid-19 model under some assumptions. It is also important to note that, this model was already presented, however in this paper, different analysis will be presented, as the model will be subjected to piecewise differential and integral operators. Also the existence and uniqueness result is verified. Finally numerical scheme is given with piecewise derivative.

Key words: Piecewise derivative, covid-19 modelling, stability analysis, numerical analysis.

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Mathematical Modelling of Viral Dynamics in Oysters with Fractional Order Approach

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ABSTRACT

Many mathematical models have been formulated based on basic laws that explain the spread of a virus within an individual. These models have been used to determine the impact of the virus on the immune system to treatment. Viral dynamics is a branch of applied mathematics concerned with describing the progression of viral infections with many organisms. In mathematics viral dynamic models have been used to study HIV, Hepatitis B virus, Hepatitis C virus and etc. In this talk a viral dynamic model in oysters has been considered. This model was developed before without fractional approach. So in this study, we present the model with fractional order derivative. Also the existence and uniqueness result is verified. Finally numerical scheme is given with Adams-Bashforth method.

Key words: Fractional order equations system, oysters dynamics, stability analysis, numerical analysis.

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Machine Learning Based Churn Analysis for Sellers on the E-Commerce Marketplace

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ABSTRACT

The purpose of this study is to develop churn models for sellers on the e-commerce marketplace by using machine learning methods. In this sense, three approaches were applied for developing the models. The dataset used in this study includes ten features, which are maturity type, maturity interval, city of the seller, total revenue of the seller, total transaction of the seller, sector type of the seller, business type of the seller, sales channel, installment option and discount type. Random Forest (RF) and Logistic Regression (LR) were used for churn analysis in all of the approaches. In the first approach, models were developed without applying preprocessing operations on the dataset. Undersampling / oversampling methods were used in the second and third approaches, respectively, to balance the dataset. By using stratified cross validation on the dataset, F-scores of the churn models were obtained. The results show that F-scores were 0.76, 0.71 and 0.92 for the three approaches developed with RF, and 0.84, 0.68 and 0.69 for the three approaches developed with LR, respectively.

Keywords: Churn analysis, Machine learning, Marketplace

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Predicting the Electricity Market Clearing Price Using Machine Learning Based Univariate Time Series Methods

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ABSTRACT

We are in a period where energy resources are becoming more and more important in today's world. Terms such as climate change, global warming and renewable energy have now become words that can be heard every day in our lives. Since electricity is one of the most important energy sources, production diversity has also increased. Electrical energy is not an energy source that can be stored. It is produced and consumed instantly. The electricity Market Clearing Price (MCP) in Turkey is regulated and calculated by Energy Exchange Istanbul (EXIST) in order to maintain the balance between the energy produced and the energy consumed, in other words, the balance of supply and demand. Predicting MCP for a balanced formation is a very important factor for electricity producers and suppliers. In this study, machine learning based univariate time series methods have been used to predict the MCP values for different days of the year. More specifically, Long Short-Term Memory (LSTM), Multi Layer Perceptron (MLP), Gated Recurrent Unit (GRU) and Recurrent Neural Networks (RNN) have been utilized to develop MCP prediction models. Performance of the developed models has been assessed via Mean Absolute Percentage Error (MAPE). Results ranged from 5.98 to 12.53% for LSTM, 5.03 to 11.61% for MLP, 5.59 to 14.33% for GRU, and 5.36 to 14.07% for RNN. Considering the results obtained, one can conclude that machine learning based univariate time series methods perform well for predicting MCP in Turkish electricity market.

Key words: Machine Learning, Deep Learning, Market Clearing Price, Prediction

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Electrical Energy Storage Methods and Solution Recommendations

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ABSTRACT

Energy is required to be ready to be used whenever and wherever it is needed. Nevertheless, that's not always possible. That's why we need to store it so we can use the energy at any time. Limited energy resources increase the production trend to edible energy sources and storage technologies are of great importance. There are many different storage methods available today. The most preferred method for energy storage is done with chemical-based batteries. However, in places where energy storage capacity is large, this method is insufficient. In this context, different methods are used to store electrical energy. Most of the electricity energy in our country is being greeted by thermal power plants. Therefore, thermal power plants are kept in hot reserves and additional power plants are needed. The production of electrical energy from edible energy sources is increasing rapidly. However, the need for storage systems is increasing because production has a variable production characteristic from edible energy sources. In this study, information on electrical energy storage technologies will be provided and new deployments will be addressed.

Key words: Energy storage systems, Electrical energy, Renewable energy sources.

ICOLES 2022

The Scale Removal Processes Before Cold Rolling

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ABSTRACT

The formation of an oxide layer on the surfaces of metals as a result of contact with air during processing at high temperatures is a natural process and the resulting oxide layer is called scale. Especially during the sheet metal production processes, the scale layer is an unsuitable shell for rolling and coating processes. It is necessary to remove the scale layer before cold rolling in order not to cause quality defects by mixing with the interior of the flat product and not to damage the work rolls during rolling. The scale removing process before cold rolling is called as pickling process and carried out in industrial applications by using acid with a chemical or electrochemical method. In this study, the properties and parameters of pickling process and the operating conditions in terms of environmental difficulties are complined and then alternative scale removing methods which are gas reduction and slurry blast methods are searched.

Key words: Scale, Cold Rolling, Pickling Process, Slurry Blasting, Gas Reduction

ICOLES 2022

Obtaining Bone Model Similar to the Material Properties of the First Metatarsal Bone Using 3D Printer Technology

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ABSTRACT

The aim of this study is to obtain the artifial first metatarsal bone model that is similar material properties with the real bone. It is difficult to find the real bone for biomechanical test and the bone model is also expensive. This study aimed to develop an easy-to-manufacture, easy-to-customize and inexpensive method. 3D printer tecnology was used to produce the artificial bone model. The bone mechanical properties were calculated via MIMICS software using computer tomography images . 3D bone model was produced in different infill density and infill pattern to determine the real bone mechanical properties using 3D printer. The infill density of the bone model was adjusted as 20%, 40% and 60%. Five different infill pattern types as grid, cubic, triangle, trihexagon and gyroid were used. The produced models were subjected to torsional test and the elasticity modulus of all models were obtained. The results of the elasticty modulus of all produced (artificial) and modelled (calculated) bone were compared and the optimum bone model was obtained. The optimum infill density and infill pattern was determined as %40 and trihexagon, respectively.

Keywords: Artificial Bone, Material Properties, First Metatarsal Bone, 3D Printer.

Life-Cycle Assessment and the Environmental Impact of Buildings

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ABSTRACT

Interactive methots to support the construction sector in achieving climate neutrality. The service implemented in the form of experimental development studies will enable the evaluation of the environmental impacts of materials and construction products in the context of regional conditions and the current building materials market. Climate change has emerged with the contribution of many factors, it is basically related to the gases released into the atmosphere, and these gases are known as the warming of the planet by causing the heat energy from the sun to be trapped on the planet's surface and as a result, the irregularities in the climate. In this study, these data will be evaluated with LCA analysis in processing processes.The study will fill the gap of tools and information about the impact of building materials on the environment, and will enable designers and investors to make responsible investment decisions in the context of construction decarbonisation

Key words: Life Cycle Assesment, Buildings, Architectural Design

ICOLES 2022

An Industry Free Large Scale Time Series Forecasting System

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ABSTRACT

The purpose of this study is to develop an industry free large scale time series forecasting tool by implementing a web-based platform which allows the user to predict future values of a given time series data. With this tool, the user can predict the amount of product or services a company will sell in any given period (daily, weekly, monthly, quarterly, yearly etc.), therefore allowing the business to estimate their future revenue in long or short term. The tool contains algorithms such as XGBoost, LightGBM and CatBoost that are widely used in time series forecasting, displays the runtime and error metrics for each algorithm and provides a reporting screen for detailed explanation. There is also a feature store in the industry free forecasting tool which stores time-based features generated from each time period range. Spark is used to make the tool scalable and to process large amounts of data.

Key words: Time Series, Machine Learning, Forecasting

ICOLES 2022

Parallel-Like Curves in Galilean 3-Space

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ABSTRACT

In this study, we consider curves at a constant distance from the edge of regression on a curve in 3-dimensional Galilean space. First, we construct parallel like curves generated from a curve under the condition that the curve is a unit velocity curve in Galilean 3-space. We obtain the Frenet frame of the constructed curve and examine the curvature properties. Finally, we define ruled surfaces of type *A* produced by curves at a constant distance from the edge of regression in Galilean 3-space. Also, we provide examples.

Key words: Galilean 3-space, Edge of regression, Ruled surface.

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Propolis as A Natural Acaricidal against the Ectoparasite of Honeybees *Varroa destructor*

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ABSTRACT

Varroa destructor is an ectoparasitic mite that affects colonies of honey bee *Apis mellifera* worldwide. In the last years, substances of botanical origin have emerged as natural alternative acaricidal to diminish the population levels of the mite. Honeybees use propolis collected from plants for coating the inner walls of their nest. This substance possesses antimicrobial, antiseptic, anti-inflammatory and antitumor proprieties. The aim of this study is to evaluate the acarcidal effect of propolis extract on *V. destructor*. A propolis sample was extracted using ultrasound assited method and topical application was carried out by subjecting mites to contact with various propolis concentrations. The activity of mites was observed for the next 8 h after the beginning of each treatment. The results showed that acaricidal effects of propolis extracts were stronger with increasing concentrations of the propolis extracts.We conclude that propolis can be regarded as a natural acaricidal used to limit the mites.

Key words: Propolis, *Varroa destructor*, *Apis mellifera*, natural acaricidal

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Antibiotic Susceptibility Profile of Infections Caused by Urinary Catheters of Hospitalized Patients and Isolation of Their Pathogenic Isolates in the Region of Medea (Algeria)

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ABSTRACT

A total of 100 samples were obtained from urinary catheters. Various culture media are used as well as various tests being demonstrated namely the cytobacteriological examination allowing us the detection of leukocytes, red blood cells and germs, the blast test for detection of candida albicans, the API biochemical gallery then the antibiogram. The results obtained show that 66% of women hospitalized with catheters suffer from a urinary tract infection compared to 34% of men. The results of the antibiogram show that a resistance of the isolate *Pseudomonas spp* to cotrimoxazole rifampicin and chloramphenicol (100%) and penicillin (77.77%) but sensitive to tobramycin ceftazidine gentamicin (100%), as for *Enterobacteriaceae*, resistant to Ampicillin with 92.85%, cefazoline with 85.71% ° and cefaletine with 71.42%. As for *Staphylococcus aureus*, it is resistant to cefoxitin and oxacillin (100%), on the other hand it is sensitive to other antibiotics such as rifampicin, vancomycin, chloramphenicol (100%).

Key words: catheters - urinary - resistance.

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Assessment Report of Physico-Chemical and Bacteriological Quality of Two Water Sources in the Souarekh Region of El Kala North-East, Algeria

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ABSTRACT

The good quality of source water for the consumption by humans and other living organisms is an important element for public health. This study was conducted at __ during __ to evaluate two water sources in the region of Souarekh in the wilaya of El Tarf (Ain Siglèb and Ain Siporex) for the various physical parameters (T°, pH, EC, Salinity, TDS and Turbidity), chemical (CAT, Ca^{+2}, Mg^{+2}, Na^{+}, K^{+}, Cl^{-} and Cl_2) and pollution indicators (PO_4^{-3}, NH_4^{+}, NO_3^{-}, NO_2^{-}, BOD_5 and COD). For the bacteriological analyses, the presence or absence of total and faecal coliforms, sulfuto-reducing clostridia, faecal streptococci, *Salmonella*, *E. coli* and *Cholera Vibrio* were determined. The results indicated that most of the physico-chemical parameters of Ain Siglèb and Ain Siporex are situated within or at the margin compared to the admissible limits of the Algerian and World Health Organization (WHO) standards for drinking water and irrigation water. Microbiologically, the results showed that the water sources studied undergo significant contamination by total coliforms, faecal coliforms, streptococci and clostridium in Ain Siglèb compared to that of Ain Siporex. In recent years, much research has focused on the study of groundwater and the quality of surface water resources. This work adds to other works and deals with the physico-chemistry and the bacteriological quality of spring water taken from the sub-basin in the region of El Tarf. These, mainly agricultural region is located in the northeast of Algeria.The surface waters studied are of good quality for agriculture and suitable for the irrigation of most crops, but attention must be paid to leaching, which is difficult in soils with low permeability, and to drainage. These need special attention due to extreme climate change and increased pollution.

Key words: Ain Siglèb, Ain Siporex, bacteriology, physico-chemical parameters, water quality

First Report of *Fusarium solani* Causing Crown Rot and Damping-off on Durum Wheat in Algeria

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ABSTRACT

The research of Phythopathgenic *Fusarium* isolates from wheat seeds sampled from Tazolt-Batna province in North-eastern Algeria showed the existence of two isolates of the species *Fusarium solani* for the first time in the seeds of the durum wheat in Algeria. The identification was carried out on the basis of macroscopic and microscopic characteristics. The pathogenicity test was performed, on three durum wheat varieties to determine the impact of this isolate on gemination rate, coleoptile length and basal part of durum wheat seedlings. The results showed that *Fusarium equiseti* caused a significant diminution in length and emergence rate of coleoptile reached the 46.84 and 42.22% respectively, and a decrease in the length of the root and vegetative systems by 38.48 and 42.8% consecutively. It also caused a diminution in the fresh weight of the root and vegetative systems by 26.88 and 35.11% respectively.

Keywords: *Fusarium solani*, Crown Rot, Damping -off, Durum Wheat, Algeria.

Numerical Simulation of Temperature, Humidity and Air Velocity in a Greenhouse with a System of Condensation

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ABSTRACT

The greenhouse assures protection against insects, pests and extreme climate conditions such as heavy rain, strong winds and low or high temperatures by providing a favorable environment for crop development, so controlling it, is crucial for good plant growth. However, this is not a simple matter because several physical phenomena take place (transpiration, condensation, ventilation, leakage, etc.) in addition, conventional semi-arid greenhouses use large amounts of water, for both evaporative cooling and irrigation. The goal of this research is to examine the feasibility of installing a water recovery system for reducing semi-arid greenhouse water consumption in a new one that can produce energy and recycle water by evapotranspiration in order to preserve up to 80% of it. The distribution of humidity, temperature and velocity of humid air inside the greenhouse was numerically investigated using 3D CFD ANSYS FLUENT code adapted for the Saharan region in Algeria under regional parameters (longitude: 0.28, latitude 27.86, time zone GMT+1) in a greenhouse of sizes 5m x 3m x 8m (W x H x L), our simulation is based on three types of geometry with three inclinations of the roof of the greenhouse to know the most suitable for our problem. This study will help us to know the quantity of water evaporated from the water droplets of plant transpiration, this moisture is intended for condensation and water recovery for watering plants.
The results demonstrated the computational capabilities to adequately represent the physical phenomenon under consideration and that the integration of a water recovery system to a semi-arid Greenhouse is technically feasible.
Key words: greenhouse, ANSYS FLUENT, evapotranspiration, water recovery.

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Contribution to the Use of Parietal Proteins for the Identification of Fungal Strains

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ABSTRACT

In this modest work, we have studied the possibility of using the electrophoretic profiles of fungal parietal proteins as a criterion for identification and classification. The study of parietal proteins focused on 4 different fungal species: *Aspergillus niger, Aspergillus phoenicis, Rhizopus sp* and the yeast *Saccharomyces cerevisiae.* The choice of strains used is based on certain conditions in order to give scientific value to the results obtained. The strains are first reactivated on solid media and then cultured in a stirred water bath for 3 days, under the same physicochemical development conditions. The wall proteins are extracted according to the method of Wong et al. (2007). The proteins are separated by electrophoresis under denaturing conditions in the presence of 8% SDS according to the "SDS-PAGE" technique described by Laemmli U.K., (1970). The molecular weights are calculated according to the relative mobility of the proteins compared to a standard law established with standard proteins. *Saccharomyces cerevisiae* has a protein profile of 21 bands whose apparent molecular weights are scattered between 48 and 115 kDa. *Aspergillus niger* is characterized by a profile of 40 protein bands dispersed between 9 and 129 k Da. *Aspergillus phoenicis* has a profile of 39 bands whose molecular weight is between 9 and 129 kDa and *Rhizopus sp.* which is characterized by a protein profile of 25 bands whose molecular weight is between 9 and 120 kDa. In addition, the presence of a majority protein band of 9 kDa is observed in the protein profiles of the three filamentous species; *Aspergillus niger, Aspergillus phoenicis*, and *Rhizopus sp*., but it is absent in yeast, we can assume that this protein is unique to filamentous fungi.

Key words: Fungal cell wall, parietal proteins, SDS-PAGE, fungi.

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Composition and Antibacterial Activity of the Essential Oil of *Saccocalyx satureioides* (Lamiaceae)

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ABSTRACT

Saccocalyx satureioides Coss & Durieu (Lamiaceae) is an endemic, strongly aromatic woody sub-shrub, growing wild in the presaharian regions of Algeria. The essential oil was analyzed by means of GC and GC-MS. Thirty constituents were identified representing more than 96% of the total oilwith monoterpenes as major constituents (more than 94%). The major components were □-terpineol (21.5%), thymol (23.5%), borneol (14.3%) and p-cymene (12,1%). Furthermore, the essential oil was tested for its antibacterial activity against pathogenic bacteria using the agar-disc diffusion method. Twenty-six strains were tested from wich 22 clinical isolates and 4 reference strains (Escherichia coli ATCC 25922, *Klebsiella pneumoniae* ATCC 700603, *Pseudomonas aeruginosa* ATCC 27 853, *Staphylococcus aureus* ATCC 25 923). The essential oil of *Saccocalyx satureioides* exhibited antibacterial activity against almost of bacteria strains except *Pseudomonas aeruginosa*.

Keywords: *Saccocalyx satureioides*, antibacterial activity; essential oil; Algeria; chemical composition; Lamiaceae, GC-MS.

ICOLES 2022

Effects of Biochar on Mineral Content of Soybean Seedling Under Salinity

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ABSTRACT

In this study, the effects of biochar application at different doses on the mineral element content of soybean seedlings under salt stress were investigated under greenhouse conditions in the Department of Field Crops of Atatürk University in Turkey. A pot experiment was conducted a factorial completely randomized design with two factors; salinity levels (0, 50, and 100 mM NaCl) and biochar doses (weighed at the rate of 0%, 2.5%, and 5%). In the study, leaf and root mineral contents (N, P, K, Ca, Mg, S, Mn, Fe, Zn, B, Cl, and Na) were investigated. The results of the study showed that salinity stress conditions generally caused a decrease in the plant nutrient element content of leaf and root of soybean seedlings except for Na and Cl while amendment of biochar into soil media enhanced the plant nutrient element content of leaf and root of soybean seedlings. This positive effect of biochar treatments on enhancing mineral element conten was dose dependent. In conclude, biochar can be used as an amendment for increasing plant nutrient use efficiency of plants under saline conditions.

Key words: Soybean, Biochar, Salt stress, Mineral content

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Morphophysological Parameters of Wheat Genotypes Depending on the Water Supply

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ABSTRACT

To determine drought tolerance of 10 wheat varieties (3 durum and 7 bread) differing in architectonics, the research was performed under normal and drought conditions.
The reduction in the plant height due to cultivation conditions rather than genetic properties of the genotypes occurred because of the decreasing length of upper internodes by 0.47-9.51%. Structural components of the product were determined. The greatest reduction in above-ground dry biomass per unit of the field was detected in Barakatli 95and Garagylchyg 2 genotypes.
The amounts of pigments were determined to evaluate the level of the photosynthetic apparatus development, its physiological state, formation and accumulation potential of the product. The content of chlorophyll a, b and carotenoids was determined during the grain forming, milk ripening, and wax ripening phases. Green plastides were broken down and chlorophyll content decreased under drought. Chlorophyll a content decreased more sharply compared with chlorophyll b. Chlorophyll a content decreased more sharply in all phases in the durum variety Barakatli 95 (during the phases, respectively, 19.7; 16.6 və 35.6%) and bread variety Gyrmyzy gul 1 (21.9; 15.3 və 39.5%). Chlorophyll b amount decreased less in the durum variety Tartar (11.0; 7.30 və 14.2%) and bread variety 4thFEFWSN-50 (4.83; 10.8 və 9.20%).
Amounts of the photosynthetic pigments were determined in various regions (Gobustan and Jalilabad Regional Experimental Stations). Chlorophyll a content decreased more in the Gyrmyzy gul 1 and Garagylchyg 2 varieties (in Gobustan: 2.302 and 2.979 mg/g fresh weight) in Jalilabad: 2.096 and 2.737 mg/g fresh weight) under rainfed conditions. Drought had a relatively less impact on chlorophyll a content in the Azamatli 95 and Gobustan varieties. Chlorophyll b content ranged from 0.033 to 2.398 mg/g fresh weight in Gobustan and from 0.057 to 2.175 mg/g fresh weight in Jalilabad, whereas the content of s did not decrease.

Key words: wheat, drought tolerance, photosynthetic pigments, chlorophyll, carotenoid

Subject and Functionality of the Proof Preferred by Pre-Service Teachers

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ABSTRACT

In this study, the subject that the pre-service teachers find most useful for proof in analysis courses, the functional structure of the proof that they remember the most, and the reasons for preferring this proof were examined. Case study which is a qualitative research design was used for the study. The data were collected through a semi-structured interview form prepared by the researcher. These data were also evaluated by means of content analysis. Open-ended questions were asked to four pre-service teachers. According to the findings, the subject that the pre-service teachers found the most suitable for proof was trigonometry, similarly, it was determined that the proof they remembered the most was about trigonometry. In addition, the reasons for preferring proof were also asked to the pre-service teachers, and according to the answers, the permanence and causality functions of proof came to the fore. According to the results obtained from the research, it was found beneficial for both meaningful and permanent learning that especially the formulas in trigonometry were taught by proof rather than memorization.

Key words: Proof, Trigonometry, Mathematics teaching.

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Idioms in Gülten Dayioğlu's Book "Akilli Pireler" and the Classification of These Idioms in terms of Their Shape-Meaning Features

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ABSTRACT

There is an important role of idioms in language vocabulary. Diversifying ways of expression of language and being effective in transferring them from dignity to concreteness, idioms are language elements expressing literal and figurative situations. Idioms are given special meaning in describing and explaining people's ways of perceiving the World, perspectives to event and situations in our language, too. They show different usage features while they doing this. It contains many factors such as human, nature, creation features, colours, and numbers. It especially uses sense organs and all kinds of meanings that these organs evoke. Meanwhile, it also uses human relations and effect of emotions. Idioms have organized in their self, and they have built linguistic element of possible reference of deep meanings from simple expression. Idioms, containing and make all kinds of factors that affect nation's tradition, life style , religion and moral elements material in semantic and formal way, became an important element of language. This organized structure that carries deep meanings by means of combining two or more words reveals the subtlety of language. In this context, these structures that make everything about language material are seen exists as stereotypes in terms of form and meaning by using human, sense organs, colours and numbers, too. In this study, which was created using Gülten Dayıoğlu's book "Akıllı Pireler", idioms were examined in terms of shape-meaning features. According to the meanings of the words used in idioms as shapes; They are classified as "Idioms related to human organs, interpersonal communication and human relations, those related to abstract-metaphorical senses, those related to colors and numbers, and those related to nature and animals". This study was created by using the text analysis method, which is one of the qualitative research methods. 304(three hundred four) idioms have been found in the book separately. Repetitive idioms and the number of their repetitions are indicated. The idioms in the Turkish Language Institution Proverbs and Idioms Dictionary, Ömer Asım Aksoy's Idioms Dictionary, Yusuf Çotuksöken's Idioms Dictionary for Primary and Secondary Schools have been examined and the existence of these idioms has been proven. In addition, all the sentences in which the idioms are used are written one by one and the sentence in which they are included is shown by indicating the page numbers. The book "Akıllı Pireler" has been scanned and all expressions in the book have been checked by using the ORC method.

Key words: Gülten Dayioğlu, Akıllı Pireler, Idioms, Form-meaning

Study Based on the Adaptation of Çarşamba Township Traditional Children's Game and the Aplications to An Activity for Turkish Lessons

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ABSTRACT

Although games are generally known as activities for having fun, studies have shown us that these are development tools. Games, whose past is as old as human history, are very important cultural products for reasons such as the development of intelligence, communication skills and adaptation to society. The aim of this study is to identify the games that have this importance and adapt them as activities for Turkish lessons. In the study, 24 plays were collected from 15 live sources from Çarşamba district of Samsun. The data were collected with a semi-structured interview form and voice recording was made during the interviews. Later, the games that were compiled in accordance with the Turkish lesson outcomes were adapted as Turkish lesson activities and the results were tried to be obtained from the findings.

Keywords: Kid games, activity, adaptation, Demirli, folklore

Secondary School 8th Grade Students' Views About Distance Education Programme

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ABSTRACT

In the process of distance education program, both experts and teachers uttered and faced various problems and obstacles. Lgs has a big importance for the secondary class students in terms of transition to the upper echelon and this exam applied at the end of the 8th year of their education year. In this pandemic period, 8th class students attach more importance for this reason. In this direction, this research is focused and approached on pre- pandemic education of 8th grade education and in the pandemic distance (online) education period. In this research which has 25 student participants, semi structured interview form is applied. Composing of the research, 3 experts' opinion has taken. These experts consist of 2 Turkish education teachers and 1 school counsellor. The results obtained that distance education has affected students' success, their interest to education more negatively rather than positive effects.

Key words: distance education, Turkish lesson, students of 8th class

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An Investigation on the Rhetorics in Turkish Tale Rhymes

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ABSTRACT

The stereotypes used in the fairy tales were used with separate patterns in the introduction, development and conclusion sections of the fairy tales.These stereotypes affected children's reading and fairy tale listening skills, and control the variables in their attention. While some tale rhymes were written in verse, some tale rhymes were written in prose. Turkish tales have been compiled from many sources and written down. These repetitions of phrases have ben sometimes written as long and sometimes short. The rhymes in these tales that were written down contain different elements and structures. Although rhymes were used with certain patterns in Turkish tales, these patterns were also shaped according to the tales and the narrator. The rhymes of fairy tales, which contain elements rich in form and content, were also reflected in the learning and language of children. Sound repetitions used in fairy tale rhymes are also reflected in children's reading and speaking. The nursery rhymes in Turkish tales, which have ben taken from different sources and examined, were examined in terms of subject, structure, richness and rhetoric. The rhymes selected by scanning Turkish tales were analyzed and examined using qualitative research. While selecting the sources, attention was paid to rhymes, and rhymes with different patterns were chosen rather than rhymes created with similar phrases. Turkish fairy tale rhymes were examined in detail, and the sound repetitions and rhetoric used were emphasized. While the rhetoric found differed according to the rhymes, the generally determined rhetoric were also determined. In this study, twenty tale nursery rhymes were tried to be examined in detail. Although the rhymes of tales were generally simile, personification, integrity and exaggeration, rhetoric such as symmetry, reference and leff u nesr are also encountered in some rhymes. The effect of rhetoric on the rhymes of fairy tales has been researched and examined. It has been determined that rhetoric adds a poetic style to fairy tale nursery rhymes, creates fairy-tale-like elements in fairy tales, and attracts the attention of the audience by making the tales interesting.

Key Words: Rhymes in Turkish fairy tales, fairy tale, rhyme, rhetorics, repetitions

Impact of Hormonal Treatment Based on Melatonin Implants on the Reproductive Performance of Sheep in Algeria

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ABSTRACT

To better manage environmental variation (diet, photoperiod and seasonality of reproduction) that can influence the reproductive performance of spawners during the natural mating, it is necessary to improve thes main parameters related to the fertility of breeding rams (body condition and weight, scrotal measurements, quality and quantity of semen and sexual ardor).
The main aim of this experiment is to study the effect of hormone treatments based on melatonin implants on the fertility of breeding rams. It involved a total of twenty (n = 20) Ouled Djellal (OD) breeders distributed equally in two groups: melatonin-treated group M and untreated control group C. The following parameters: body weight (Pcp), body condition score (BCS), scrotal circumference (SC), scrotal length (LS), testicular weight (Pt), and plasma testosterone concentration (T) were regularly recorded for each ram. In addition, and in order to test the in vivo fertility of these spawners three hundred OD ewes were used for the natural mating of spring season. The treatment of rams with melatonin improved ($p < 0.05$ to $p < 0.01$) testicular development. A slight difference of (6.67%, and 9.34%) ($p > 0.05$) in favor of the ewes group M compared to group C was recorded for fertility and fecundity respectively. Finally, this treatment has no influence on (T) or on (Pcp) and (BCS) of rams.
In general, we can conclude that the treatment of rams with melatonin has no practical interest in improving the reproductive performance of Ouled Djellal sheep.

Key words Bred Ouled Djellal, Rams, Performance of reproduction, Melatonin

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Radical Scavenging Abilitiy and Ferrous Ion Chelating Capacity of *Ammodaucus leucotrichus* Seeds Extracts: *In Vitro* Study

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ABSTRACT

The present study was conducted to investigate the antioxidant capacity of *Ammodaucus leucotrichus*, used to treat many diseases in Algerian folk medicine. Total polyphenols and flavonoids content revealed that ethyl acetate extract (EAE) was the highest of both of them. The results obtained from the iron chelating capacity showed that, Aqueous fraction (AqE) was the most effective with $\mathbf{EC_{50}}$ = 0.221 mg/ml. Moreover, EAE performed a strong scavenging activity of $OH^{\bullet}$ and H_2O_2 ($\mathbf{IC_{50}}$ = 0.305 mg/ml and 0.047 mg/ml, respectively). The antioxidant effect of *A. leucotrichus* can be largely attributed to its chemical constitution. Since *this species* showed significant antioxidant activity, it can be developed into a safe herbal formulation useful in stress and stress related disorders.

Key words: *A. leucotrichus*, Reactive oxygen species, Antioxidants, Chelating, Scavenging.

Implication of *Atriplex halimus* in Phytoremediation to Clean Up Contaminated Soils with Heavy Metals (Zinc, Cadmium and Lead)

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ABSTRACT

Phytoremediation is an effective and affordable approach to strategy that uses plants as filters for accumulating, immobilizing and transforming contaminants to a less harmful form. The present study was aimed at evaluating phytotoxicity of various concentrations of lead acetate, zinc and cadmium (0, 2000, 4000, 6000 and 8000 ppm) in Atriplex halimus L. Plant sample analyses after harvest indicated that root growth is more sensitive to metals than shoot length, relative water content were significantly reduced by increasing (Zn, Cd and Pb) concentration, considerable improvement of TI in the shoot, there were significant increase on chlorophyll content in most of polluted plants in comparison with the respective controls. This study will conduce to the ecological risk management for trace elements-contaminated soils.

Key words: Phytoremediation, Trace elements, soil, defense mechanisms, *Atriplex halimus* .

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Cytotoxic Sesquiterpenoids from *Ammoides atlantica* Aerial Parts

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ABSTRACT

Seven new terpenoids, namely, guaiane (1−4), eudesmane (5), and bisabolane (6) sesquiterpenoids and a furanone (7), were isolated from the aerial parts of Ammoides atlantica, a herbaceous plant growing in Algeria, together with eight known compounds. All metabolites were characterized by their 1D and 2D NMR and HRESIMS data. A combined DFT/NMR method was applied to study the relative configurations of 1−4, 6, and 7. All compounds, except 2, were assayed against MCF-7, A375, A549, HaCaT, and Jurkat cell lines. Compounds 8, 10, and 11 induced a dose-dependent reduction in cell viability with different potency on almost all cell lines used. The most active compounds, 8 and 10, were studied to assess their potential apoptotic effects and cell cycle inhibition.

Key words: Ammoides Atlantica, Naturel Products, Spectroscopy Characterization.

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Characteristics of the Potato Plant and Its Attitude to Environmental Factors

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ABSTRACT

Potatoes are less demanding on soil conditions than other crops and are grown on all soil types when modern technological cultivation methods are applied. However, it should be taken into account that in soils with light mechanical composition, normally ventilated, sandy, rich in humus, black and subsoil, potato grows more intensively, tubers grow faster, resulting in increased productivity.

Studies in Azerbaijan show that potato plants germinate 5-6 days later in heavy soils than in light soils. In general, the optimal pH of the soil is 5.5-6.0 for normal plant growth.

The surface mass of the plant is subject to freezing when the soil temperature is -1.5; -1.7^{0}C, and the roots are -1; -2^{0}C. Potato tubers usually start to germinate when the soil temperature is 8^{0}C. However, in the germinated state, potato tubers can grow at a temperature of 4-6^{0}C.

The optimal soil temperature for the normal development of potato plants and the formation of tubers should be 17-20^{0}C during the day and 12-14^{0}C at night. When the temperature reaches 29-30^{0}C, the process of formation of potato tubers stops, the tubers gradually loosen, the inner part darkens and loses its commodity quality by becoming deformed.

The potato plant is also resistant to prolonged drought. However, a drop in humidity of less than 50 percent in the soil weakens the plant's growth and development, resulting in reduced productivity. Thus, for the formation of 1 kilogram of dry matter, the potato plant must receive 550 liters of water. This demand is 450 liters for barley and wheat, 650 liters for beans, and 700 liters for alfalfa and other crops.

The application of scientifically based crop rotation in potato growing is one of the most important and decisive factors. Employees of the Azerbaijan Scientific-Research Institute of Vegetable Growing recommend the following planting schemes for seed potatoes:

1. Three-field planting scheme
a) Potatoes; b) Corn-root crops; c) Legumes.
2. Four-field planting scheme
a) Autumns; b) Potatoes; c) Spring cereals; d) Clover.
3. Five-field planting scheme
a) Autumns; b) Potatoes; c) Roots; d) peas; e) Oats.

Potato varieties grown in moist and irrigated soils are usually located in the relatively topsoil, forming a weak root system and are severely damaged by water shortages. Late-maturing

potato varieties form a stronger root system than cultivars and are more resistant to drought as they work deeper into the soil.
Normally, potato tubers take a maximum of 9 days to germinate, 15 days to emerge, 39 days to form leaves and stems, 49 days to thicken rows, 50 days to bud, 69 days to flower, 79 days to form tubers, and 89 days to turn yellow and mature are. These periods may vary depending on the varietal characteristics of the plant and the climatic conditions of the year.

Key words: potato plant, environmental factors**,** potato tubers, varietal characteristics, climatic conditions.

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Study of Basic Physiological Features of Drought-Resistant, High-Yielding Wheat Genotypes by Modern Methods

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ABSTRACT

In the 2020-2021 research year, various morphophysiological studies were conducted on 96 samples of durum and bread wheat genotypes, grouped into 3 groups (early, medium, late ripening) by maturity, with an area of 10 m2 in the Absheron Experimental Base Station, of Research Institute of Crop Husbandry in Azerbaijan.

The subject of the reserarch was determination of a drought effect on different physiological parameters and yield indexes of cultivated in different soil - climatic conditions and differ on maturing bread and durum wheat genotypes, study of photosynthesis and transpiration intensity, daily and ontogeny respiration intensity dynamics of different level leaves of the wheat varieties in various water supply conditions.

Under terminal drought stress and control treatments, there were significant differences between cultivars in terms of all traits studied. Also, terminal drought stress decreased leaf net photosynthesis rate (Pn), stomatal conductance (Gs), transpiration rate, and increased leaf temperature and sub-stomatal CO2 concentration. Cultivars differed in their response to water stress. In general, tolerant cultivars showed a higher Pn and Gs and leaf water content under both moisture conditions compared with susceptible ones. A greater reduction in gs and transpiration rate and smaller reduction in Pn under stress condition led to a remarkably higher photosynthetic water use efficiency of the tolerant cultivars.

The net photosynthesis rate (Pn), stomatal conductance (Gs), transpiration rate per leaf area (E), leaf temperature (Tl) and intercellular CO_2 concentration (Ci) were measured using a portable photosynthesis system LI-6400 (LI-COR, USA) on the flag leaves on midday (09:00-12:00) at after anthesis.

Grain Yield and Its Components

Grain yield, biomass, and number of spikes per m2 for each cultivar were measured by harvesting 10 m2 of the central part of each plot at crop maturity. Harvest index was measured by dividing grain yield to biomass production. The number of grains per spike and 1,000-grain weight were measured on 10 randomly selected main shoots.

Stress Susceptibility Index

Stress susceptibility index (SSI) was used to differentiate the resistant and susceptible cultivars and was defined as:

SSI= [1-(Ys/Yp)]/SI

Where, *Ys* and *Yp* are grain yield of each cultivar under control and water deficiency, respectively, while SI is Stress index = 1(Ys)/(Yp), where, Yp and Ys are the mean grain yield of all cultivars under the control and water deficiency, respectively.
During the study, we analyzed changes in gas metabolism and some physiological features of different wheat genotypes responding to drought stress. Such research will provide valuable information that can be used as a genetic basis for wheat production to increase productivity and productivity from stress.
From here, it can be concluded that there is a difference between durum and bread wheat genotypes, compared to the other varieties within the group. This is due to the fact that early maturing genotypes complete their development before the severe drought occurs, which leads to a small difference in variants. On the other hand, the overlap between the variants in the late mature samples coincides with the prolongation of ripening period and occurrence of severe drought.

Key words: wheat genotypes, photosynthesis, stress susceptibility index, stomatal conductance, grain yield

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Anti-Ulcer and Anti-Oxidant Activity of the Aqueous Extract of Baboon Flowers (*Matricaria chamomilla L*)

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ABSTRACT

Matricaria chamomilla L. belongs to the family of Asteraceae, it is a medicinal plant commonly used in traditional medicine. During this study the yield of the extract was calculated, the phenolic and flavonoid content was estimated, as well as the evaluation of the antioxidant, anti-ulcer activity induced by ethanol in mice of the aqueous extract of Matricaria chamomilla L. flowers. The yield of the extract was 18.08%. while the total phenolic content and falvonoids was 81.1 ± 3.41 mg gallic acid equivalent/g dry weight of the extract and 23.43 ± 0.12 mg quercetin equivalent /g of dry weight of the extract repsectively. The amount of chlorophyll a was estimated at 1.08±0.09 µg/ml, chlorophyll b at 2.15 ±0.22 µg/ml. The total carotenoid was 1.72 ± 0.06 µg/ml. The antioxidant activity was also estimated by DPPH, ABTS scavenging, iron chelating capacity, where the IC50 and EC50 value were estimated, respectively 209.04 ± 1.05 µg/ml, 23 ± 1.91 µg/ml and 41.64 ±3.26 µg/ml. In addition to the reducing power, which was estimated at A0.5 value as 54.8 ± 4.83 µg /ml. This study demonstrated the protective effect of the aqueous extract of *Matricaria chamomilla* L. flowers on the stomach of ethanol-induced ulcers in mice at rates of 91.78 ±3.45 and 83.83 ±5.93% for doses 200 and 400 mg/kg respectively

Key words: Matricaria chamomillan L., Phenolic content, Anti-oxidant activity, anti-ulcer activity.

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Fixed Point Property for Asymptotically Nonexpansive Mappings on Large Classes in an ℓ^1-like Banach Space in Connection with Köthe-Toeplitz Duals of Cesàro Difference Sequence Spaces

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ABSTRACT

In this study, we investigate the fixed point property for asymptotically nonexpansive mappings on some large classes of closed, bounded and convex subsets in an ℓ^1-like Banach space which is in connection with the Köthe-Toeplitz duals of Cesàro difference sequence spaces. In 1970, Cesàro Sequence Spaces was introduced by Shiue. In 1981, Kızmaz defined difference sequence spaces for ℓ^∞, c_0 and c. Then, in 1983, Orhan introduced Cesàro Difference Sequence Spaces. It has been noticed that their Köthe-Toeplitz duals are contained in ℓ^1 and fails the fixed point property for nonexpansive mappings. Very recently the authors studied these spaces and they saw that there exist large classes of closed bounded and convex subsets with fixed point property for nonexpansive mappings as they wanted to do an analogue study of Goebel and Kuczumow's from 1979 where Goebel and Kuczomow studied the same question in larger space ℓ^1. It is notable that after Goebel and Kuczumow's study, Kaczor and Prus wanted to find large classes of closed bounded and convex subsets with fixed point property for asymptotically nonexpansive mappings; then indeed they gave positive answer in ℓ^1. In this study, we study Kaczor and Prus analogy in the space in connection with the Köthe-Toeplitz duals of Cesàro difference sequence spaces and show that asypmtotically nonexpansive mappings on some large classes of closed, bounded and convex subsets of that space have fixed points.

Key words: Fixed point property, Asymptotically nonexpansive mappings, Köthe-Toeplitz duals, Cesaro difference sequences, ℓ^1-like Banach space

Coefficient Estimate of Fixed Point Property for Uniform Lipschitz Mappings on an ℓ^1-like Banach Space in Connection with Köthe-Toeplitz Duals of Cesàro Difference Sequence Spaces

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ABSTRACT

In 1970, Cesàro Sequence Spaces was introduced by Shiue. In 1981, Kızmaz defined difference sequence spaces for ℓ^∞, c_0 and c. Then, in 1983, Orhan introduced Cesàro Difference Sequence Spaces. It has been noticed that their Köthe-Toeplitz duals are contained in ℓ^1. We recall that Dowling, Lennard and Turett showed that if a Banach space contains an isomorphic copy of ℓ^1, then it fails the fixed point property for uniform Lipschitz mappings. So we work on a right shift mapping defined on a closed, bounded and convex subset of an ℓ^1-like Banach space which is in connection with the Köthe-Toeplitz duals of Cesàro difference sequence spaces. Very recently Nezir, Das and Güven studied the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces and they obtained upper bound estimate for the right shift mapping to be uniformly Lipschitz failing the fixed point property on a class of closed, bounded and convex (c.b.c.) subsets in those spaces. In this study, we study the analog question to obtain upper bound estimate for the right shift mapping to be uniformly Lipschitz failing the fixed point property in the space in connection with the Köthe-Toeplitz duals of Cesàro difference sequence spaces.

Key words: Fixed point property, uniformly Lipschitz mappings, ℓ^1-like Banach space Köthe-Toeplitz duals, Cesaro difference sequences

Fixed Point Property for Asymptotically Nonexpansive Mappings on Large Classes in an ℓ^1-like Banach Space in Connection with Köthe-Toeplitz Duals of Generalized Cesàro Difference Sequence Spaces

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ABSTRACT

In this study, we investigate the fixed point property for asymptotically nonexpansive mappings on some large classes of closed, bounded and convex (c.b.c.) subsets in an ℓ^1-like Banach space which is in connection with the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces. In 1970, Cesàro Sequence Spaces was introduced by Shiue. In 1981, Kızmaz defined difference sequence spaces for ℓ^∞, c_0 and c. Then, in 1983, Orhan introduced Cesàro Difference Sequence Spaces. Later, Et and Tripathy et. al. generalized the space introduced by Orhan for any $m \in \mathbb{N}$. It has been noticed that their Köthe-Toeplitz duals are contained in ℓ^1. Very recently Nezir and Mustafa studied these spaces and they saw that there exist large classes of c.b.c. subsets with fixed point property for nonexpansive mappings as an analogue study of Goebel and Kuczumow's from 1979 where Goebel and Kuczomow studied the same question in larger space ℓ^1. It is notable that after Goebel and Kuczumow's study, Kaczor and Prus wanted to find large classes of c.b.c. subsets with fixed point property for asymptotically nonexpansive mappings; then indeed they gave positive answer in ℓ^1. In this study, we study Kaczor and Prus analogy in the space in connection with the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces and show that asypmtotically nonexpansive self-mappings on some large classes of c.b.c. subsets have fixed points.

Key words: Fixed point property, Asymptotically nonexpansive mappings, Köthe-Toeplitz duals, Cesaro difference sequences, ℓ^1-like Banach space

Coefficient Estimate of Fixed Point Property for Uniform Lipschitz Mappings on an ℓ^1-like Banach Space in Connection with Köthe-Toeplitz Duals of Generalized Cesàro Difference Sequence Spaces

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ABSTRACT

In 1970, Cesàro Sequence Spaces was introduced by Shiue. In 1981, Kızmaz defined difference sequence spaces for ℓ^∞, c_0 and c. Then, in 1983, Orhan introduced Cesàro Difference Sequence Spaces. Later, Et and Tripathy et. al. generalized the space introduced by Orhan for any $m \in \mathbb{N}$. It has been noticed that their Köthe-Toeplitz duals are contained in ℓ^1. We recall that Dowling, Lennard and Turett showed that if a Banach space contains an isomorphic copy of ℓ^1, then it fails the fixed point property for uniform Lipschitz mappings. So we work on a right shift mapping defined on a closed, bounded and convex subset of an ℓ^1-like Banach space which is in connection with the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces. Very recently Nezir, Das and Güven studied the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces and they obtained upper bound estimate for the right shift mapping to be uniformly Lipschitz failing the fixed point property on a class of closed, bounded and convex (c.b.c.) subsets in those spaces. In this study, we study the analog question to obtain upper bound estimate for the right shift mapping to be uniformly Lipschitz failing the fixed point property in the space in connection with the Köthe-Toeplitz duals of generalized Cesàro difference sequence spaces.

Key words: Fixed point property, uniformly Lipschitz mappings, ℓ^1-like Banach space Köthe-Toeplitz duals, Cesaro difference sequences

Nonlinear Schrödinger Equation on Metric Graphs: Infinity Growing Potentials, II

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ABSTRACT

In this article, we consider nonlinear Schrödinger equations (NLS) with linear and nonlinear potentials on metric graphs. Applying the linking theorem, we establish existence and multiplicity results for NLS solitary waves.

Key words: Metric graphs, nonlinear Schrödinger equation, solitary wave solution, Palais-Smale condition, linking theorem, 35Q55, 35R02, 47J30.

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ICOLES 2022

Water Consumption Forecast Models Using Time Series Based Deep Learning Methods

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ABSTRACT

The goal of this research is to develop water consumption forecast models for the city of Istanbul by using state-of-the-art univariate time series based deep learning methods. More specifically; Recurrent Neural Network (RNN), Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) have been used to develop forecast models with different time lag options. The dataset includes water consumption amount in Istanbul, which covers the time period between January 1st, 2011 and March 31st, 2021. The daily water consumption during March 2021 has been used as the test set, whereas the the rest of the data has been used as the training set. For the purpose of assessing the performance of the developed models, Mean Absolute Percentage Error (MAPE) has been used. The results show that the performance of the water consumption models developed with different methods and time lags is comparable and the MAPE's of all models are less than 2.5%. One can conclude that univariate time series based deep learning methods are viable tools for forecasting the water consumption within acceptable error rates.

Keywords: Deep Learning, Water Consumption, Time Series, Forecasting.

ICOLES 2022

Phytochemical Study and Biological Activities of Seaweed (*Ulva lactuca*)

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ABSTRACT

Within the framework of the valorization of the marine algae biomass of the Algerian coasts, this study is devoted to the phytochemical study and the evaluation of the antioxidant and antimicrobial activities of a local seaweed. *Ulva lactuca* is characterized by a high rate of total polyphenols, and a low content of flavonoids. The study of radical scavenging activity by DPPH , and the quantification of the total antioxidant capacity, reveals the presence of antioxidant properties. The evaluation of the antimicrobial power on bacteria reveals a bactericidal effect. Furthermore, no effect of the extract is observed against fungi.

Key words: *Ulva lactuca*, Antimicrobial activities, Antioxidant potency

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Study of Physical and Mechanical Performance of Structural Concrete with Chicken Feather Fibers under High Temperatures

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ABSTRACT

Concrete structures in buildings or other structures may be subjected to accidental conditions such as fire. Our role is to protect these buildings for fire damage (safety of people and structure). The aim of this study is to investigate the effect of chicken feather fibers on the physical and mechanical behaviour of concrete subjected to high temperature, and to compare with concrete without fibers .In our study, we used chicken feather fibers in quantities of 0.15 % of the volume of concrete to change and improve the residual physical and mechanical properties of the ordinary concrete .The concrete specimens were subjected to various heating cycles from the room temperature to 150°C, 250°C and 500°C . The heating rate was fixed at 1 °C.min^{-1}. The results of the tests showed that the chicken feather fibers affect the mechanical performance of the concrete in the hardened state and result in a decrease in an increase in tensile strength by bending, and porosity.

Key Words: ordinary concrete, CHicken feather fibers, Temperature, Mechanical properties, Physical properties, Porosity.

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Using *Bacillus cereus* to Improve Coriander Productivity in A Vertical Farming System

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ABSTRACT

At present, due to the interest of consumers in environmentally friendly food, the search for new highly efficient ways of growing and improving the quality of finished vegetable products in closed agroecosystems is relevant [1]. One of the innovative technologies for increasing the efficiency of plant growth is the use of growth-promoting bacteria. [2]. The aim of this study was to increase the productivity of *Coriandrum sativum* L. under the controlled conditions of a closed vertical farm using a *Bacillus cereus* strain biofertilizer. Coriander plants of 'Caribe' and 'Santo' varieties were grown on vertical racks using low-volume technology by flooding under conditions of a regulated agroecosystem for 30 days. LED lamps PAR 150 µmol $m^{-2}s^{-1}$ were used on the racks with different spectral ratio, %: B:G:R ~ 15:36:49 (1 lighting variant) and B:G:R ~ 13:32:55 (2 lighting variant). The far red spectrum 12 (1 variant) and 6% (2 variant) was added to the main illumination spectrum for early seed germination and subsequent active plant growth. Growth-promoting bacteria *Bacillus cereus* was used as an inoculant-biofertilizer in addition to the basic mineral nutrition. Their use contributed to an increase in the growth of the above-ground mass of coriander in the 'Karibe' variety in the 2nd lighting variant, in the 'Santo' variety - in the 1st variant. Thus, the largest increase in the above-ground mass was 19.76 g/plant in the variety 'Santo' and 18.08 g/plant in the variety 'Karibe'. The increase in the yield of coriander from the use of bacteria in the above variants of the experiment averaged 40.0% in relation to the variants with a similar level of illumination without the use of a bacterial culture.

Key words: *Bacillus cereus, Coriandrum sativum*, productivity, vertical farming.

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Faunistical Records of Dermestidae (Coleoptera) in Igdır Province of Turkey

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ABSTRACT

In this study conducted to determine Dermestidae (Coleoptera) fauna of Iğdır province between the years of 2017-2018. A total of 12 species belonging to subfamily Attageninae, Dermestinae and Magatominae. Among these one species of the subfamily Attageninae, one species of the subfamily Dermestinae and 10 species of the subfamily Magatominae are listed. All of them ***Dermestes* (*Dermestes*) *lardarius*** Linnaeus, 1758, ***Anthrenus* (*Anthrenus*) *goliath*** Saulcy in Mulsant & Rey, 1868 and ***Anthrenus* (*Nathrenus*) *verbasci*** (Linnaeus, 1767) are reported for the first time from Iğdır.

Key words: Coleoptera, Dermestidae, Fauna, Iğdır, Turkey.

ICOLES 2022

Elaboration of A Nanoemulsion Based on An Extract of A Plant Species with Therapeutic Virtues

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ABSTRACT

Medicinal plants have been considered a good source of medicinal compounds since ancient times. Currently, the demand and research for new phytochemical ingredients of plant origin are increasing substantially due to their effectiveness, lower toxicity and green nature. This study is part of the development of the species *Teucrium polium L* which is commonly used as a medicinal plant in Algeria against a variety of human pathologies.

The present work is devoted on the one hand, to the extraction of the aerial parts of *T. polium* by the technique of maceration with ethanol, the yield in dry matter gave a content equal to 11%, the chemical composition was analyzed by qualitative methods based on coloring and precipitation reactions and made it possible to identify 8 compounds such as tannins, saponosides, terpenoids, quinones, reducing compounds, polyphenols and flavanoids, Application of extracts medicinal plants by the dermal or transdermal route is limited by their low solubilities, their low cutaneous permeabilities and their low bioavailabilities. In order to improve these last parameters, new techniques have been developed in order to realize release systems. For this purpose, nanoemulsions were prepared by a low energy emulsification method and gave rise to droplets of nanometric size of the order of 14.6 nm determined by Dls. The composition of the formulation and the process conditions have been optimized in order to obtain stable nanoemulsions. A nanoformulation shows promise as a drug delivery system for topical application.

Key words: Teucrium polium L, medicinal plants, phytochemical, nanoformulation, nanoemulsion, Dls.

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ICOLES 2022

Impact of Industrial Effluents on the Water Quality of Boussellam Valley and Surrounding Areas, Setif, Northeastern Algeria. Cases of Cadmium and Copper

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ABSTRACT

Pollution is a global phenomenon that affects the continent, water and air. Water pollution is a major threat and global challenge that puts the sustenance of life on earth at risk as water plays a primary role in daily life. Our study area is located in the Boussellam region of the Wilaya of Sétif. Whose the valley of Boussellam it passes this valley is considered as a zone of evacution of the various solid and liquid waste which are related to the human daily and the industrial activities. This exposed its water to pollution and changed its color to black, especially during the drought period. Most of the waste that pollutes the water of Boussellam valley comes from the city of Sétif and from the industrial area and agricultural activity along the valley that drains into the Ain Zada dam. This work is based on the sampling which was done between the years 2014 and 2020 in order to see the annual evolution of the industrial parameters in the waters of the wadi and the surrounding plain, in particular Cadmium and Copper and the results taken from the Ain Zada dam agency (Sétif) for previous years between 2006 and 2014. The analyzes were carried out at the laboratories of the Institute of Water Sciences and Techniques of Gabès (ISSTEG) and the laboratories of the Faculty of Sciences of Gabès in Tunisia for the period of October 2014 and the GNL laboratories of Skikda for the periods of April 2014, April 2016 and October 2016, and March 2020. The results show the increase in the concentrations of Cadmium, of which we have recorded a clear growth, with levels greatly exceeding the standards (> 0.003 mg/l) varying between 0.006 mg/l in October 2014 and 0.026 mg/l in March 2020 on the other hand, we have not noticed any threat from copper, whose tenors are within Algerian drinking water standards (< 2 mg/l) for all points and periods, the contamination is mainly due to wastewater discharged from the industrial zone and the daily activity of the city of Sétif.

Key words: Boussellam Valley, Water, Industrial Pollution, Cadmium and Copper, Sétif.

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Evaluation of Antioxidant Activity and Polyphenols Content of *Melilotus indicus* Extracts

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ABSTRACT

Melilotus indicus is a medicinal plant known for its ethno-medicinal activities such as antibacterial, anticoagulant, antispasmodic, emollient, laxative and narcotic effects. The objective of this study is to evaluate the antioxidant activity of aqueous extract (AqE) and ethanolic extract (EE) from *Melilotus indicus* using two methods: the DPPH (2, 2'-diphenyl-1- picrylhydrazy) test and β-carotene bleaching assay. Moreover, phenolic compounds contents were estimated in both extracts. Results showed that total polyphenols content in ethanolic extract was 120.067 µg GAE/mgE and 144.382 µg GAE/ mgE for aqueous fraction. Flavonoids contents in studied extracts were very close (26.375 µg QE/mg of ethanolic extract and 25.65 µg QE/mg of aqueous extract). Aqueous fraction was found to possess a higher scavenging capacity against DPPH radical (IC_{50} = 0.09 ± 0.002 mg/ml) than ethanolic extract (IC_{50} = 0.28 ± 0.037 mg /ml). The inhibitory activity of the tow extracts in the β-carotene/linoleic acid assay was estimated to 70.983 ± 4.22 % for aqueous extract and 66.169 ± 3.445 % for ethanolic fraction.

Keywords: *Melilotus indicus*, antioxidant activity, polyphenols, DPPH scavenging, β-carotene.

ICOLES 2022

Acute Toxicity Study of Aqueous Extract of Leaves of *Thymus algeriensis* In Swiss Albino Mice

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ABSTRACT

Thymus algeriensis (Lamiacées) is a species used in the traditional medicine to treat respiratory system and against illnesses of the digestive tube. The aim of this study is to evaluate the acute toxicity of aqueous extract of *Thymus algeriensis* leaves in *Albino Wistar* male and female mice. The extract was administered orally at single dose of 2000 mg/kg and 5000 mg/kg and then the mice were observed individually for the first four hours, then over a period of 24 hours and at least once daily for 14 days. Results recorded no mortality or signs of toxicity, no significant differences in body weight, food consumption, absolute organ weights between controls and treated animals. and showed no change in the biochemical parameters. No histological changes were observed in organs of treated mice compared to control. These results suggested that aqueous extract of *Thymus algeriensis* is safe when consumed by oral route.

Key words: *Thymus algeriensis*; acute toxicity; biochemical parameters; histopathology examination.

ICOLES 2022

Synthesis, Characterization, Theoritecal study and Inhibitory Activity of Schiff bases ligands on Beta-Lactamases

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ABSTRACT

Two Schiff bases ligands L^1 and L^2 tetradentate have been synthesized and characterized by routine physicochemical methods namely the melting temperature, solubility, molar conductance, UV-Vis spectrophotometry, IR-FT, NMR1H and NMR13C. These molecules proved to be stable, soluble in organic solvents, non-electrolytes. The structures of L^1 and L^2 and their electronic properties were calculated in the gas phase using Functional Density Theory (DFT) via the B3LYP/6-31G (d, p) method. Calculations show that the ligand L^2 is the most reactive because it has the smaller energy gap. The ligands L^1 and L^2 have been used as inhibitors against a semi-purified Beta-lactamase (BLs) and have been shown to have a significant inhibitory effect ($IC_{50} \leq 40.03$ µM), compared to the standard inhibitor, EDTA (IC_{50} = 3.98 mM). An overlap between their energy differences (HOMO, LUMO), their reactivities and their IC_{50}, reveals that the more the energy gap decreases, the more the reactivity increases, the more the IC_{50} decreases and the more the ligand is effective.

Key words : Schiff bases ligands, DFT, Beta-Lactamases, Inhibition, EDTA.

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Antioxydant and Antibacterial Activities of Different Extracts of Medicinal Plant

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ABSTRACT

Atriplex halimus L is a useful species in folk medicine. Extracts prepared from the crushed leaves of Atriplex halimus by three extraction techniques, by maceration (E1), decoction (E2) and by infusion (E3), revealed a variable yield, the most important of which is the extract obtained by decoction (28%) followed by the maceration extraction method and finally by the infusion. Phytochemical tests can detect the presence of flavonoids, tannins (many more catechetic tannins), alkaloids, saponins, sterol and terpene. The total polyphenol content was determined using the Folin-Ciocalteu reagent, it is 12.58, 12.38 and 10.11 mg/ EAG/mg, in the extracts obtained E1, E3 and E2 respectively. Visualization under UV at 366 nm, made it possible to highlight numerous spots in all the extracts. The number of spots in E1 is higher than that in the other two methods. Variable antimicrobial activities with the extracts were performed on two strains of bacteria, the results showed that the extract E3 has a modest activity towards strain S.aureus. As regards the antiradical activity of the various extracts, the results obtained show IC_{50}s which vary between 145 mg/ml, 63.42 mg/ml and 157.73 mg/ml for the extracts E3, E2 and E1, respectively.

Key words: Antibacterial activity ; Antioxidant activity, IC_{50}, DPPH, Inhibition.

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Extraction of Algerian *Ammoides verticillata* Essential Oil and Its Bio Actives Identification: Process Optimization and GC-MS Analysis

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ABSTRACT

Essential oils are nowadays very popular among the general public who aspire to treat themselves effectively with simple and natural means. Our work, which is part of the study and development of aromatic plants with essential oils in Algeria, describes the quantitative and qualitative composition of the essential oil of *Ammoides Verticillata*, in order to determine the yield by the extraction process of hydrodistillation (HD). Yield optimization was done using three variable factors (heating temperature, grind size and maceration time). The results showed that the maximum yield of essential oil of 2.88% was obtained with 15 minutes maceration of 50g of uncrushed plant at a heating temperature of 250°C. The chemical compositions of the extracted *A. verticillat*a EOs were analyzed using a gas chromatography-mass spectrometer (GC–MS). The main components of the essential oil obtained from HD were thymol, limonene, p-cymene, γ-terpinene, α-pinene, carvacrol and terpinen-4-ol. The results obtained represent a scientific contribution to a better knowledge of A*mmoides Verticillata*. However, further researches are important for determining the active molecules and evaluating new therapeutic properties and biological activities.

Key words: *Ammoides Verticillata*, Hydrodistillation, Optimisation, Chemical compositions.

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Dash, D.R., Pathak, S.S., Pradhan, R.C., 2021. Extraction of oil from *Terminalia chebula* kernel by using ultrasound technology: Influence of process parameters on extraction kinetics. Ind. Crops Prod. 171, 113893. https://doi.org/10.1016/j.indcrop.2021.113893.

Optimization Extraction and Chemical Composition of Essential Oils from Algerian *Ammoides verticillata* (Duby) Briq.

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ABSTRACT

Essential oils are nowadays very popular among the general public who aspire to treat themselves effectively with simple and natural means. Our work, which is part of the study and development of aromatic plants with essential oils in Algeria, describes the quantitative and qualitative composition of the essential oil of *Ammoides Verticillata*, in order to determine the yield by the extraction process of hydrodistillation (HD). Yield optimization was done using three variable factors (heating temperature, grind size and maceration time). The results showed that the maximum yield of essential oil of 2.88% was obtained with 15 minutes maceration of 50g of uncrushed plant at a heating temperature of 250°C. The chemical compositions of the extracted *A. verticillata* EOs were analyzed using a gas chromatography-mass spectrometer (GC–MS). The main components of the essential oil obtained from HD were thymol, limonene, p-cymene, γ-terpinene, α-pinene, carvacrol and terpinen-4-ol. The energy necessary to perform the extraction of *A. verticillata* EO was 2.1 kWh for 180 min of HD. Regarding environmental impact, the amount of carbon dioxide released into the atmosphere during HD extraction was (1.68 kg CO2/g EO). The results obtained represent a scientific contribution to a better knowledge of *Ammoides Verticillata*. The enhanced hydrodistillation could be used as a green method for extraction of essential oil.

Key words: *Ammoides Verticillata*, Hydrodistillation, Optimization, Chemical composition.

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Dash, D.R., Pathak, S.S., Pradhan, R.C., 2021. Extraction of oil from Terminalia chebula kernel by using ultrasound technology: Influence of process parameters on extraction kinetics. Ind. Crops Prod. 171, 113893. https://doi.org/10.1016/j.indcrop.2021.113893.

Antioxidant and Antimicrobial Activities of Extracts and Essential Oil of *Artemisia herba-alba* From The Region of M'sila (North-East of Algeria)

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ABSTRACT

Artemisia herba-alba is a medicinal plant belonging to the *Asteraceae* family, known as desert wormwood and in Arabic as « Chih ». In Algeria, this species is very common in steppes. In traditional medicine it is used as antispasmodic, hypoglycemic, antdiabetic and to treat hypertension. Extracts and essential oil from this plant are known for their antimicrobial, antioxidant, insecticidal, and antispasmodic activities. In the present study, antioxidant and antimicrobial activities of extracts (hexane, acetone, methanol and aqueous fractions) and essential oil from *A. herba-alba* are evaluated. Aqueous extract was the most rich in polyphenols (85.2 µg GAE/mg E), acetone fraction the richest in flavonoids (83.89 µg QE/mg E) and methanol extract contained the highest amount of tannins (226.83 µg TAE/mg E). In the FRAP assay, acetone fraction showed the best capacity to reduce iron with a maximal absorbance value of A = 1.90 at a concentration of 2 mg/ml. The highest percentage inhibition in the β-carotene / linoleic acid test was obtained by methanolic extract (87.54 % after 24h of incubation). In antimicrobial activity assays, the plant extracts showed a good potency against *S. aureus* and *E.coli*. Besides these two bacterial strains, essential oil from the studied species exhibited a high activity against *P. aeruginosa*.

Key words: *Artemisia herba-alba*, polyphenols, essential oil, antioxidant, antibacterial.

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Phenolic Profile, Antioxidant and Antibacterial Activities of Extracts From Algerian *Bryonia dioica*

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ABSTRACT

Bryonia dioica is a medicinal plant belonging to the *Cucurbitaceae* family; it is common in Algeria in the Tell regions and locally called « Berestom ». This plant is widely used in traditional medicine for the treatment of cancers and inflammatory diseases. In this study, the antioxidant activity of extracts prepared from the tubers of the plant is evaluated by different in vitro methods and antibacterial activity by means Agar well diffusion method. The extraction of active substances is carried out by four solvents with different polarities (hexane, acetone, methanol and distilled water), using the technique of maceration. Among studied extracts, acetone fraction was the most rich in polyphenols (45.72 µg GAE/mg extract), in flavonoids (14.36 µg QE/mg E) and in tannins (71.41 µg TAE/mg E). In the FRAP assay, the same extract (acetone) showed the best capacity to reduce iron with a maximal absorbance value of A = 0.67 at a concentration of 6 mg/ml. The highest percentage inhibition in the β-carotene / linoleic acid test was obtained by hexane extract (45.74 % after 24h of incubation). Furthermore, acetone fraction was the only active extract against *S. aureus* with an inhibition zone of 15 mm at a concentration of 200 mg/ml.

Key words: *Bryonia dioica*, polyphenols, ferric reducing power, β-carotene bleaching, antibacterial activity.

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Effect of Nitrogen Fertilization on the Vegetation Height and Above-Ground Biomass of Two Bread Wheat (*Triticum aestivum* L.) Varieties Conducted under Supplemental Irrigation in the Region of Sétif- Algeria

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ABSTRACT

The experiment was conducted at the experimental farm of Ferhat ABBAS Sétif-1 University during the growing season 2020-2021 with the aim to study the effect of nitrogen fertilization with urea (46% N) applied in different configurations on the development of vegetation height and aerial biomass for two varieties of bread wheat (*Triticum aestivum* L.) conducted under supplemental irrigation. The results showed a highly significant phenotypic variability (P<1%) for the vegetation height trait on Hidhab (HD1220) variety with an increase of 13.6% compared to the control treatment, while the fertilization effect was more significant (P> 0.1%) for the semi-dwarf variety Djanet (ACSAD 899) where application of 60 kg.ha^{-1} of urea fertilization at the jointing stage (Z31) accompanied by 25 mm of supplemental irrigation greatly improved the accumulation of dry matter in the first leaves and plant stems, producing a important mass recovery with an increase of up to 25% compared to the control treatment.

Key words: *Triticum aestivum* L., Nitrogen fertilization, Supplemental irrigation, Vegetation height, Above-ground biomass.

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Response of Soil Microbial Biodiversity to Environmental Stresses and its Implications in Sustainable Agriculture

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ABSTRACT

Soil microbial diversity is a key indicator of soil health and fertility. The main drivers of soil ecosystems include plant and soil type and all factors are governed by environmental conditions. There is a dire need to explore beneficial microbial responses for managing the risks to sustainable agriculture in an environment threatened by climate change. Soil is a limited resource and environmental stresses are decreasing agricultural productivity day by day. To check the effect of environmental stresses like drought, salinity, and heavy metal on soil microbial biodiversity and testing the efficacy of tolerant Plant growth Promoting Rhizobacteria alone and in combination with effective soil amendment techniques for improving plants growth under predicted abiotic stresses of climatic change.Experiments were conducted to isolate and characterize stress tolerant Rhizobacteria, and to check their stress mitigation potential. Modified plant biomasses like compost, biochar, and bio-organic fertilizer were used as soil amendments techniques. Various morphological, physiological, biochemical, growth and productivity parameters were studied.Microbial strains were isolated from the stressed region. The identification of isolated microbial strains was carried out by physiochemical and 16s rDNA sequencing and phylogenetic analysis. Stress tolerance and different plant growth-promoting traits of isolated strains were evaluated under normal as well as in stress condition. Inoculation of seeds with PGPR along with compost, biochar and bio-organic fertilizer improved all growth and productivity parameters, increased nutrient status and improved osmolyte production and hence helped the survival and growth under stress conditions.Microorganisms have a variety of evolutionary adaptations and physiological acclimation mechanisms that allow them to survive and remain active in the face of environmental stress. Building our understanding of the interdependence of micro-organism communities, environmental stresses and plant responses will be important for understanding climatic effects on soil health and plant growth. Our new understanding of microbial diversity in response to environmental stresses will allow us to cure and conserve our environment and grow more food.

Total Phenolic, Total Flavonoid Content, Antioxidant and Antimicrobial Activities of Methanolic and Aqueous Extracts of Leaves and Root of *Atractylis gummifera* L.

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ABSTRACT

Atractylis gummifera is a toxic plant widely used in Mediterranean traditional medicine against colds, dizziness, and headaches, as an antisyphilitic, against boils, as a purgative, emetic and deworming. The present study was designed to investigate the phenolic, flavonoid contents, antioxidant and antimicrobial activities of methanolic and aqueous extracts of leaves and root of *Atractylis gummifera* . The antioxidant activity of methanolic and aqueous extracts were determined by DPPH free radical scavenging activity and reducing power. Antimicrobial activity against three pathogens and one yeast (*Escherichi Coli* ATCC 2592; *Pseudomonas aeruginosa* ATCC27853 ,*Bacillus Subtilis* ATCC6633, and *Candida Albicans* ATCC1024.The results showed that plants with high antioxidant properties have high antimicrobial activity.

Key words: Antioxidant**,** *Atractylis gummifera*; antimicrobial.

ICOLES 2022

Incompressible Fluid Flows in Different Spaces

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ABSTRACT

Goal of this research is to study the incompressible fluid flows in different spaces with numerical experiments. It has been shown that some theoretical regularity results for some spaces for various differential equations both linear and nonlinear equations in some papers. My purpose is to demostrate the numerical results of these improvements. The numerical tests provided to show that the computed solution is stable and the accuracy in both space and time is improved with assumptions in different spaces.

Key words: Incompressible Fluid Flows, regularization.

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Identification of Plant Parasite Nematodes in Crop Production Areas in Pasinler Plain of Erzurum Province

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ABSTRACT

There are biotic and abiotic factors limiting crop cultivation, and one of the most important biotic factors is plant parasitic nematodes (PPN). Crop production is carried out intensively in the Pasinler plain in Erzurum, in the North East Anatolian Region. In this study, samplings were made in Erzurum province Pasinler plain before planting in April-May 2021, after planting in July-August 2021, and before harvesting in September-October 2021.
Plant parasitic nematodes were obtained from soil samples using the Baermann-funnel method, and the morphological identification was made. Population Densities (PD) of *Pratylenchus* spp., *Paratylenchus* spp., *Ditylenchus* spp., *Geocenamus* spp., *Helicotylenchus* spp., *Aphelenchus* spp., *Aphelenchoides* spp., *Tylenchus* spp., *Dorylaimus* spp., *Cepholobus* spp., *Rhabtodit* spp., *Wilsonema* spp., *Acrobeles* spp., *Filenchus* spp., *Mononchus* spp. were found to be 75,4, 32,5, 63,9, 39,4, 34,1, 28,1, 64,9, 46,3, 22,2, 102, 15, 10, 10, 16,7, 10, respectively. As a result of the study, it was determined that the crop cultivation areas of the Pasinler plain of Erzurum province are heavily contaminated with plant parasitic nematodes.

Key words: Crop, Erzurum, Population density, Survey.

ICOLES 2022

Biological Activities of Extracts and Essential Oil of *Thapsia garganica* Roots Collected From The Region of M'sila in North-East Algeria

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ABSTRACT

Thapsia garganica (*Apiaceae*) is an endemic herbal medicine growing spontaneously in the Mediterranean area, known in Algeria as «Derias or «Bounafaa». It is used in traditional medicine as diuretic, emetic and purgative, but especially as an anti-inflammatory agent in the treatment of rheumatism. In the present study, phenolic profile, antioxidant and antibacterial activities of extracts (hexane, acetone, methanol and aqueous) and essential oil from *T. garganica* are evaluated. Among studied extracts, acetone fraction was the most rich in polyphenols (35.93 µg GAE/mg extract), in flavonoids (17.65 µg QE/mg E) and in tannins (73.02 µg TAE/mg E). In the FRAP assay, the same extract (acetone) showed the best capacity to reduce iron with a maximal absorbance value of A = 0.83 at a concentration of 6 mg/ml. Interestingly in the β-carotene / linoleic acid test, the highest percentage inhibition was obtained by hexane extract (75.82 % after 24h of incubation). Antibacterial activity of the studied plant was evaluated using Agar well and Agar disc diffusion methods. The highest inhibition zones were obtained by the plant essential oil against *S. aureus* and *E.coli*.

Key words: *Thapsia garganica*, polyphenols, essential oil, antioxidant, antibacterial.

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Effect of Nitrogen Fertilization on the Vegetation Height and Above-Ground Biomass of Two Bread Wheat (*Triticum aestivum* L.) Varieties Conducted under Supplemental Irrigation in the Region of Sétif- Algeria

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ABSTRACT

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Effect of Different Extracting Solvents on Phenolic Content and Antioxidant Activity of Extracts From Algerian *Marrubium vulgare*

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ABSTRACT

Marrubium vulgare (*Lamiaceae*), known in Algeria as «Merriouet», is a medicinal herb originated in Mediterranean area and central Asia, nowadays is common in all continents. It is used in folk medicine to treat many illnesses but especially digestive disorders. In the present study, phenolic profile and antioxidant activity of *M. vulgare* extracts prepared using solvents from different polarities are evaluated. According to the obtained results, total phenols content was proportional to the polarity of solvent used for the extraction; aqueous extract showed the highest amount in polyphenols with a value of 60.84 µg GAE/mg E. Acetone extract was found to be the most rich in flavonoids (100.12 µg QE/mg E), while methanol fraction contained the highest tannins content (81.29 µg TAE/mg E). In the FRAP assay, the capacity of extracts to reduce iron was proportional to their tannins contents, the best activity was obtained by methanol fraction with A = 0.94 at a concentration of 2 mg/ml. In the β-carotene / linoleic acid test, the highest percentage inhibition was obtained by less polar extracts (hexane and acetone) with a value of 84% after 24 h of incubation. Furthermore, all fractions did not have any effect on *E. coli*, *P. aeruginosa* and *S. aureus* at a concentration of 200 mg/ml.

Key words: *Marrubium vulgare*, Solvent polarity, polyphenols, antioxidant.

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Coefficient Bount Estimates for Certain Class of Analytic Functions

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ABSTRACT

In this paper, we introduce and examine certain subclass $M_q(\varphi,\beta)$ of analytic and univalent functions on the open unit disk in the complex plane. Here, we give coefficient bound estimates for the function belonging to this class. Some interesting special cases of the results obtained here are also discussed.
In addition, it has been shown that the results obtained at the specific values of the parameters overlap with the results available in the literature.

Key words: Subordination, coefficient bound, univalent function, q - derivative.

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Coefficient Bount Estimates for Certain Class of Analytic and Univalent Functions

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ABSTRACT

In this paper, we introduce and examine certain subclass $M(\varphi,\beta)$ of analytic and univalent functions on the open unit disk in the complex plane. Here, we give coefficient bound estimates for the function belonging to this class. Some interesting special cases of the results obtained here are also discussed.
In addition, it has been shown that the results obtained at the specific values of the parameters overlap with the results available in the literature.

Key words: Subordination, coefficient bound, univalent function.

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Fekete-Szegö Problem for Certain Class of Analytic Functions

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ABSTRACT

In this paper, we introduce and examine certain subclass $M_q(\varphi,\beta)$ of analytic univalent functions on the open unit disk in the complex plane. Here, we solve Fekete-Szegö problem for the class $M_q(\varphi,\beta)$ of analytic univalent functions belonging to this class. Some interesting special cases of the results obtained here are also discussed.
In addition, it was seen that the results obtained at the specific values of the parameters matched the results available in the literature.

Key words: Subordination, Fekete-Szegö problem, univalent function, q-derivative.

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Fekete-Szegö Problem for Certain Class of Analytic and Univalent Functions

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ABSTRACT

In this paper, we introduce and examine certain subclass $M(\varphi,\beta)$ of analytic univalent functions on the open unit disk in the complex plane. Here, we solve Fekete-Szegö problem for the class $M(\varphi,\beta)$ of analytic univalent functions belonging to this class. Some interesting special cases of the results obtained here are also discussed.
In addition, it was seen that the results obtained at the specific values of the parameters matched the results available in the literature.

Key words: Subordination, Fekete-Szegö problem, univalent function.

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AW(k)-Type Curves According to q-Frame

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ABSTRACT

In this study, we deal with AW(k)-type curves (k=1,2,3) according to q-frame in Euclidean 3-space. We set the relations between the q-curvatures k_1, k_2, k_3 of a given curve in IE^3.

Key words: AW(k)-type curve, q-frame, q-curvatures.

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D_iD_j-Quaternionic Curves

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ABSTRACT

In this study, some curvature conditions of quaternionic curves are obtained by writing the position vectors of quaternionic curves as linear combinations of new vector fields, named as D_i $(1 \leq i \leq 4)$ that are produced from Frenet frame fields of the quaternionic curves. Also, the relations between D_iD_j-quaternionic curves and the rectifying quaternionic curves and the osculating quaternionic curves are presented. Moreover, the results obtained are illustrated with an example in which the new vector fields are examined.

Key words: Darboux vector, quaternions, vector fields.

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On Bipolar Fuzzy Supra Preopen Sets

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ABSTRACT

The aim of this research is to study the certain properties of bipolar fuzzy supra preopen sets. The concepts of bipolar fuzzy supra pre-interior, bipolar fuzzy pre-closure operators are introduced and investigated. Based on the bipolar fuzzy preopen sets new type of bipolar fuzzy supra continuous mapping is studied.

Key words: Bipolar fuzzy set, bipolar fuzzy supra topology, bipolar fuzzy supra preopen set, bipolar fuzzy supra pre-continuous mapping.

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Spacelike TF-Type Surfaces in Minkowski Space-Time

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ABSTRACT

In the present study, we consider spacelike TF-type surfaces in four-dimensional Minkowski space IE_1^4. We give the definition of spacelike translation-factorable surfaces. Then, we evaluate the curvature properties. We present the necessary and sufficient conditions for these surfaces to have zero mean curvature and Gaussian curvature and classify spacelike flat and minimal translation-factorable surfaces in IE_1^4.

Key words: Factorable surface, Translation surface, Minkowski 4-Space.

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TE Wave Propagation in Parallel-Plate Waveguides with Nonperiodically Corrugated Walls

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ABSTRACT

In this study, the propagation of transverse electric waves along parallel-plate wavegudes with nonperiodically corrugated walls is analyzed. The problem is first studied rigorously by using Mode-Matching Technique in order to determine the reflection and transmission coefficients. Besides, the current mathematical model for corrugated walls is tested for average thickness and average height of the corrugations. The same geometries are also simulated in a full wave solver and the results are compared with the rigorous calculations.

Key words: Parallel-plate waveguide, electromagnetic wave propagation, corrugated walls.

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Investigation of the Effects of CO2 Laser Parameters on the Geometry of the Grooves Formed on the Transparent Polycarbonate (PC) Surface

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ABSTRACT

Polycarbonate (PC) is a widely used manufacturing plastic. In addition to being optically transparent, the PC has many applications because it is durable and strong. As the name suggests, Polycarbonates contain carbonate groups. PC is a thermoplastic group member that is thermoformable, moldable and easy to mechanically process. PC's material properties are notable for several reasons: It is a highly translucent, glass-like material that offers high impact and environmental resistance, making it an excellent alternative to real glass in applications where fracture resistance is a desirable property. This includes aircraft and automotive windshields, architectural applications, electronics, aquarium windows and even medical implants. Formation of grooves having maximum groove width without heat deformation around groove on transparent PC during laser surface texturing has several undesirable outcomes with regard to groove quality. Hence it is essential to select optimum laser process parameters to maximize groove width and minimize Heat deformation zone around the groove. This paper presents application of the Taguchi optimization method to obtain grooves possessing maximum groove width influenced by laser texturing conditions such as laser scan speed, laser beam power, frequency and the number of repetition. Then the optimal values of laser scan speed, laser beam power, frequency and the number of repetition were determined. According to the result of the confirmation experiment using optimum parameters, it was observed that experimental results were compatible with Taguchi method. The details of experimentation analysis and analysis of variance are presented in this paper.

Key words: Laser machining, Polycarbonate (PC), Taguchi Method, Parameter Optimization

Investigation of the Effects of CO_2 Laser Parameters on the Geometry of the Grooves Formed on the Transparent Acrylic (PMMA) Surface

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ABSTRACT

Polymethyl methacrylate (PMMA) is a widely used manufacturing plastic. Because of its high transparency, PMMA is also known as "acrylic glass" or "plexiglass". PMMA's material properties are notable for several reasons: It is a highly translucent, glass-like material that offers high impact and environmental resistance, making it an excellent alternative to real glass in applications where fracture resistance is a desirable property. This includes aircraft and automotive windshields, architectural applications, electronics, aquarium windows and even medical implants. Formation of grooves having maximum groove width without heat deformation around groove on transparent Polymethyl methacrylate (PMMA) during laser surface texturing has several undesirable outcomes with regard to groove quality. Hence it is essential to select optimum laser process parameters to maximize groove width and minimize Heat deformation zone around the groove. This paper presents application of the Taguchi optimization method to obtain grooves possessing maximum groove width influenced by laser texturing conditions such as laser scan speed, laser beam power, frequency and the number of repetition. Then the optimal values of laser scan speed, laser beam power, frequency and the number of repetition were determined. According to the result of the confirmation experiment using optimum parameters, it was observed that experimental results were compatible with Taguchi method. The details of experimentation analysis and analysis of variance are presented in this paper.

Semi-infinite Jet Pipe Problem Revisited

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ABSTRACT

In this study, a generalized shear layer model is developed and applied to the well-known semi-infinite jet pipe problem. The model is derived by the help of integral mean value theorem and the time-harmonic wave equation is solved with Fourier transform. The problem is then reduced into the solution of a Wiener-Hopf equation and the resulting reflection coefficient is compared with the previous approaches.

Key words: Flow acoustics, Shear layer model, Jet pipe.

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Expression Profiles of Some Genes Related to the Detoxification and Reproductive System in Water Fleas (*Daphnia magna*) Exposed to Pesticide

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ABSTRACT

In this study we were to investigate the expression levels of some gene related to the reproductive and detoxification system in water fleas exposed to sub-lethal dose of cypermethrin (20 ng/L) pesticide. Daphnia magna were placed in beakers. The study was carried out with sub-lethal dose of cypermethrin pesticide applied to Daphnia magna 0, 24, 48, 72, and 96h. Gene expression profiles were determined using Real Time PCR. At the end of the experimental period pesticide application in Daphnia magna; While the expression levels of CYP314, CYP360A8, GST, P-gp, HR96, and DMRT genes increased with respect to the control group over time, the expression levels of the VTG and CUT genes decreased compared to the control group. According to our findings, it was observed that cypermethrin caused significant changes in the expression levels of detoxification and reproductive system related genes in Daphnia magna. Therefore, it can be suggested that acute cypermethrin toxicity activates the detoxification mechanism and negatively affects reproduction of Daphnia magna. At the same time, CYP314, CYP360A8, HR96, and P-gp genes associated with detoxification could be mentioned as the potential biomarker for detecting pesticide pollution in aquatic environments that found Daphnia magna.

Key words: Cypermethrin; *Daphnia magna*; Detoxification; Reproductive system.

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Analysis A Mathematical Model of Cell-to-Cell Spread of HIV-1 via Fractional Derivative

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ABSTRACT

In this work, we analysed the cell-to-cell spread of HIV-1 mathematical model with new Caputo fractional derivative. We present the existence and uniqueness of the coupled solutions for both definitions of fractional derivatives using the fixed-point theorem. We also analysed uniqueness of the solutions. Finally, numerical examples of the solutions are provided to show that the Adam-Basford method are computationally efficient.

Key words: modeling, fracitonal derivative, numerical solutions.

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The Possible Beneficial Roles of Baicalein and Bergenin Against Gentamicin-Induced Liver and Kidney Tissue Oxidative Injury: A Histopathological, Immunohistochemical and Biochemical Study

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ABSTRACT

We planned to demonstrate the effects of baicalein and bergenin against gentamicin-related kidney and liver tissue injury. For this purpose, we grouped 32 Sprague Dawley, male rats as control, gentamicin, baicalein (100 mg/kg intragastric administration for 14 days), and bergenin (100 mg/kg intragastric administration for 14 days) groups. We created hepatotoxicity and nephrotoxicity by intraperitoneal gentamicin implementation (80 mg/kg/day) for 14 days. We evaluated alkaline phosphatase, urea, alanine transaminase, creatine, and aspartate transaminase levels, oxidative stress, apoptosis markers, histopathological and immunohistochemical results.
When the gentamicin group compared to the control group, oxidative stress parameters raised, and antioxidant system activity declined. On the contrary, these results significantly changed in the baicalein and bergenin treatment groups compared to the gentamicin group. Besides, 8-OHdG and caspase-3 expressions were severe in the gentamicin group compared to the control group. These expressions were quite mild in bergenin and baicalein groups compared to the gentamicin group. The biochemical, immunohistochemical, and histopathological findings revealed that the treatment of baicalein and bergenin are effective agents in alleviating liver and kidney tissue oxidative damage induced by gentamicin.

Keywords: Baicalein; bergenin; gentamicin; liver; kidney; oxidative stress.

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