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BİLDİRİ ÖZETLERİ

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Tarım Tekstillerinin Uygulama Alanları ve Özellikleri

Özlem AKAT SARAÇOĞLU[1]

Öz

Dünya genelinde nüfusun artışına paralel olarak tarımsal ürünler üzerindeki baskı çoğalmıştır. Bu nedenle tahıl, sebze ve çiçekler gibi ürün gruplarının muhafaza edebilmesi için tarımsal ürünlerin verim ve kalitesinin artırılması gerekmektedir. Son yıllarda, tarımsal üretimde geleceğin gereksinimlerini karşılayacak şekilde daha yüksek verim, daha kaliteli ve lezzetli tarımsal ürünler elde etmek için çeşitli teknolojiler tercih edilmiştir. Bu teknolojilerden biri de tarımsal tekstillerdir. Tekstil yapılarının yer aldığı yüksek teknolojili tarım tekniği benimsenerek, tarımsal üretimin verim ve kalitesini artırmak mümkün olabilecektir. Teknik tekstillerin bir alt sınıfı olan tarım tekstilleri estetik ve görsel özelliklerinden daha çok teknik performansları ve işlevsel özellikleri nedeniyle üretilen tekstil malzemeleridir. Tarım tekstilleri ya da Agro-tekstiller (Agrotech) ismiyle ifade edilen bu ürünler; tarım, bahçecilik, çiçekçilik, su ürünleri ve ormancılık sektörlerinin ihtiyaçlarına yönelik olarak üretilen teknik tekstil malzemeleridir. Agro-tekstiller; yüksek çevresel direnci, mekanik özellikleri, kolay işlenme yeteneği ve dayanıklılık özellikleri nedeniyle tarımsal üretimde elde edilen ürün miktarının, kalitesinin ve muhafazasının iyileştirilmesini mümkün kılar. Tarımsal üretim prosesinde ürüne zarar vermesi muhtemel olumsuz doğa koşullarının etkisinin en aza indirilerek ürünlerin korunması, toplanması ve paketlenmesi, bitkilerin büyüme sürecinin hızlandırılması, tarımsal alanların ilaçlanması, yabani otların çıkış kontrolü, tarımsal amaçlı drenaj ve toprak erozyon kontrolü, hayvansal üretimde hayvanların dış koşullarından korunması, balıkçılık gibi pek çok alanda çeşitli amaçlarla kullanılmaktadır. Bu çalışmada, tarımsal alanda kullanılan tarım tekstillerinin uygulama alanları ve tarım tekstili grubunda yer alan materyallerin özellikleri irdelenmiştir.

Anahtar Kelimeler: Tarım tekstilleri, tarımsal üretim, verim, kalite, özellik

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Fuzzy TOPSIS Application for Pharmacy Location Selection

Ayşe Nilgün KAYADELEN[1]

Abstract

Pharmacies are an important link in the health service chain, where the medicines written by the doctors are purchased and the patients are informed about how to use these medicines. Pharmacies are also health institutions that provide first level health advice, especially for people living in low-income areas. Pharmacies are the closest health information center for many people. For this reason, the accessibility of pharmacies is at the forefront. Ensuring comfortable accessibility will be possible by selecting the right location for pharmacies. In addition, the presence of more pharmacies than needed in one location may have a negative impact on the business. We can say that location selection is very important for pharmacies as it is for other health institutions, based on all these. There are many factors that affect the pharmacy location selection. Firstly, these factors should be determined, and then a selection should be made according to these factors. Pharmacy location selection is a decision-making process and multi-criteria decision-making methods are the leading tools used in decision-making processes. In the study, pharmacy location selection application was made by using the Fuzzy TOPSIS method, which is one of the multi-criteria decision making methods. The weights of the criteria to be used in the pharmacy location selection were determined by the Fuzzy AHP method. As a result of the application, the most suitable location was selected by the Fuzzy TOPSIS method among 4 alternative places for a new pharmacy to be opened in Çukurova district of Adana province.

Keywords: Fuzzy AHP, Fuzzy TOPSIS, Pharmacy Location Selection, Pharmacy, Multicriteria Decision Making.

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Gaussian Narayana-Perrin Numbers

Nusret KARAASLAN[1]
Hilal Efsa FAZLIOĞLU[2]

Abstract

The Narayana numbers originated from a problem with cows and calves proposed by the Indian mathematican Narayana-Pandit in the 14*th* century. This problem can be solved in the same way that Fibonacci solved its problem about rabbits.
The generalized Narayana sequence $\{V_n\}_{n\geq 3}$ is defined as follow:

$$V_n = V_{n-1} + V_{n-3}, \qquad V_0 = c_0, \quad V_1 = c_1, \quad V_2 = c_2.$$

This sequence is defined three special cases of which is called them Narayana, Narayana-Lucas and Narayana-Perrin sequences. Narayana, Narayana-Lucas and Narayana-Perrin numbers are defined, respectively, by the third-order recurrence relations

$$\begin{aligned} N_n &= N_{n-1} + N_{n-3}, & N_0 &= 0, & N_1 &= 1, & N_2 &= 1, \\ U_n &= U_{n-1} + U_{n-3}, & U_0 &= 3, & U_1 &= 1, & U_2 &= 1, \\ H_n &= H_{n-1} + H_{n-3}, & H_0 &= 3, & H_1 &= 0, & H_2 &= 2. \end{aligned}$$

Also, Gaussian Narayana sequence is defined $GN_n = GN_{n-1} + GN_{n-3}$, where $GN_0 = i, GN_1 = 1, GN_2 = 1$. In the present article, the sequence of Gaussian Narayana-Perrin numbers were defined for the first time in the literature. The Gaussian Narayana-Perrin sequence is defined recursively by

$$GH_n = GH_{n-1} + GH_{n-3}$$

with initial values $GH_0 = 3 - 3i$, $GH_1 = 2i$ and $GH_2 = 2 + 3i$.
Also, its clear that $GH_n = H_n + iH_{n-2}$ where H_n is the *n-th* Narayana-Perrin number. We then give the proof of the generating function and Binet formula for the Gaussian Narayana-Perrin sequence. Furthermore, we obtain some summation formula for this sequence. Moreover, we give some matrices related with this sequence. Finally, we also study some relations between the Gaussian Narayana and Gaussian Narayana-Perrin sequences.

Keywords: Narayana numbers, Narayana-Perrin numbers, Gaussian Narayana-Perrin numbers, generating function, Binet formula.

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Gaussian Narayana-Lucas Numbers

Nusret KARAASLAN[1]
Merve Nur FAZLIOĞLU[2]

Abstract

In the 14*th* century, the Narayana numbers came up as a result of solving the problem Narayana's cow which was presented by the Indian mathematican Narayana Pandit. This problem appears to be similar to Fibonacci's rabbit problem. So to find the answer, known as the Narayana sequence.
A generalized Narayana sequence $\{V_n\}_{n\geq 3}$ is defined by the third-order recurrence relation

$$V_n = V_{n-1} + V_{n-3}, \qquad V_0 = c_0, \quad V_1 = c_1, \quad V_2 = c_2.$$

Narayana, Narayana-Lucas and Narayana-Perrin numbers are defined three special case of the sequence $\{V_n\}$. Narayana, Narayana-Lucas and Narayana-Perrin numbers are defined, respectively, by the third-order recurrence relations

$$\begin{aligned} N_n &= N_{n-1} + N_{n-3}, & N_0 &= 0, \quad N_1 = 1, \quad N_2 = 1, \\ U_n &= U_{n-1} + U_{n-3}, & U_0 &= 3, \quad U_1 = 1, \quad U_2 = 1, \\ H_n &= H_{n-1} + H_{n-3}, & H_0 &= 3, \quad H_1 = 0, \quad H_2 = 2. \end{aligned}$$

Furthermore, Gaussian Narayana sequence is defined by the initial conditions $GN_0 = i$, $GN_1 = 1$, $GN_2 = 1$ and the recurrence relation

$$GN_n = GN_{n-1} + GN_{n-3} \quad \text{for all } n \geq 3.$$

The main objective of this paper is to define the sequence of Gaussian Narayana-Lucas numbers. This sequence is being defined for the first time in the literature. Gaussian Narayana-Lucas numbers are defined recursively by the relation $GU_n = GU_{n-1} + GU_{n-3}$ with initial values $GU_0 = 3 - 2i$, $GU_1 = 1$ and $GU_2 = 1 + 3i$. Also, it is clear that $GU_n = U_n + iU_{n-2}$ where U_n is the *n-th* Narayana-Lucas number. Then, we present generating function, Binet formula and the summation formulas for Gaussian Narayana-Lucas sequence. Moreover, we give some matrices related with this sequence. Finally, we show that there always exist interrelation between Gaussian Narayana and Gaussian Narayana-Lucas sequences.

Keywords: Narayana numbers, Narayana-Lucas numbers, Gaussian Narayana-Lucas numbers, generating function, Binet formula.

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Gaussian Bronze Lucas Numbers

Nusret KARAASLAN[1]

Abstract

In recent years, we have seen so many studies on the different number sequences. The well-known examples of these sequences are Fibonacci, Lucas, Pell and Jacobsthal. The Fibonacci numbers are defined recursively by $F_n = F_{n-1} + F_{n-2}$ with initial values $F_0 = 0, F_1 = 1,$ and the Lucas numbers are defined as $L_n = L_{n-1} + L_{n-2}$, where $L_0 = 2, L_1 = 1$.

Also, Gaussian forms of these sequences have taken so much interest recently. Horadam introduced the concept the complex Fibonacci numbers in 1963. After this seminal paper, Gaussian Fibonacci, Lucas, Pell and Jacobsthal sequences are studied by many authors. The Gaussian Fibonacci and Lucas sequences are defined recursively by the relations $GF_n = GF_{n-1} + GF_{n-2}$ and $GL_n = GL_{n-1} + GL_{n-2}$ where $GF_0 = i, GF_1 = 1,$ and $GL_O = 2 - i, GL_1 = 1 + 2i,$ respectively.

On the other hand, the Bronze Fibonacci sequence is defined by the recurrence relation $B_n = 3B_{n-1} + B_{n-2}$, where $B_0 = 0,\ B_1 = 1$. Similarly, the Gaussian Bronze Fibonacci sequence is defined as $GB_0 = i, GB_1 = 1,$ and $GB_n = 3GB_{n-1} + GB_{n-2}$.

Bronze Lucas numbers are defined as $BL_n = 3BL_{n-1} + BL_{n-2}$ with initial values $BL_0 = 2$ and $BL_1 = 3$ where $n \geq 2$.

In the present paper, we extend the Bronze Lucas sequence to the Gaussian Bronze Lucas sequence. This sequence is defined by the recurrence relation

$$GBL_0 = 2 - 3i, \quad GBL_1 = 3 + 2i, \qquad GBL_n = 3GBL_{n-1} + GBL_{n-2} \quad \text{for } n \geq 2.$$

Moreover, we give the generating function and Binet formula for the Gaussian Bronze Lucas number sequence. We also obtain some summation formula and determinantal representation of this sequence. Finally, by using Binet formula, we investigate well-known identities such as Catalan's, Cassini's and d'Ocagne's identities involving the Gaussian Bronze Lucas sequence.

Keywords: Bronze Fibonacci numbers, Bronze Lucas numbers, Gaussian Bronze Lucas numbers, generating function, Binet formula.

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Investigation of the Effect of Nanoparticle Reinforcement in Epoxy Adhesive on the Static Strength of the Joint in Single Patch Lap Bonding Joints

Edip ÇETKİN[1]

Abstract

Various joining techniques are used in the industry to join materials. Some of these are welding, bolting, rivet soldering and bonding techniques. It is preferred because it does not have disadvantages such as bonding technique, ITAB problem caused by high temperature such as welding, drilling holes in the parts to be joined for bolts and rivets, disturbing the homogeneity of the part, and a superficial connection type such as soldering.

In this study, the behaviour of single-patch lapped bonding joints made by adding 0.1%, 0.2% and 0.3% rations graphene nanoparticles into DP410, DP460 and DP490 epoxy adhesives under tensile load was investigated. For the sample and patch materials, composite materials produced by using the manual lay-up production method with 0/90 orientation angle in the form of twelve layers using jute-type fabrics were used. The samples used for the bonding joint were cut in 25 mm, 10 mm and 125 mm (width, thickness, and length) sizes according to ASTM 3039 standard, and the patch samples were cut in 40 mm length. In the tensile tests, it was observed that the graphene nanoparticle reinforcement had positive effects on all epoxy adhesives. However, the greatest effect was obtained from the bonding joints made with DP460 adhesive and 0.2% reinforced GNP.

Keywords: Epoxy adhesive, Jut composite, Nanoparticle

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Investigation of the Effect Of Alternative Fuel and Engine Parameters on Combustion Properties in Diesel Engines

Hasret DOĞAN[2]
Mehmet ÇELİK[2]

Abstract

Due to the increasing number of vehicles, the rate of toxic gases released into the atmosphere is increasing day by day. There are many different studies to reduce this situation Although some countries have given a date for limiting the use of diesel engines, it is a problem in the construction machinery and heavy transport sector, where the use of diesel engines is widespread. When emissions of diesel engines take into account, the output of CO, CO_2, NO_X is seen. Since diesel engines operate with lean mixture, the CO output is lower, the CO_2 output is higher. NO_X emissions are high due to the high temperature in the cylinder. And it is considered as a serious problem. The advance angles and the burned fuel have a great role in reducing NO_X emissions. In the study, it was determined that different diesel and ethanol mixtures (100% diesel, 90% diesel-10% ethanol mixture, 80% diesel-20% ethanol mixture) at different speed intervals and different injection advance values (15° - 18° – 21° CA) combustion characteristics were investigated with ANSYS program. ANSYS Forte is an analysis program for the design and development of internal combustion engines. Thanks to the fuel properties and combustion data it contains, it is possible to attain fast and accurate results. According to the results of this analysis, emissions were examined and found under which conditions they were higher and under which conditions they were lower. Since the main purpose of the study is the effect of the combustion end temperature on the parts, the piston used in the analysis was designed in the CAD environment and analyzed separately under temperature and pressure using the printouts. As a result of the temperature and pressure tests, the effects of changing end-of-combustion pressures and temperatures on the piston were examined.

Keywords: Diesel Engines, Ethanol, ANSYS, Exhaust Emissions

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A Novel Approach for Optimizatıon of High Speed End Milling Parameters

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Levent AYDIN[2]
Elif ARAS GÜLTÜRK[3]

Abstract

In this study, the effect of high speed end milling parameters consisting of cutting speed (S), feed rate (F) and depth of cut (D) on average surface roughness (Ra) response was investigated. This article proposes a novel approach for optimizing cutting parameters when machining hardened AISI H13 steel with TiN coated carbide insert end mill under semi-finishing and finishing conditions. A multiple-nonlinear model has been developed using Neuro-Regression approach to construct relationship between end milling parameters and surface roughness. The training ($R^2_{training}$) and the testing ($R^2_{testing}$) coefficients of determination were calculated for different regression models to see how well models identify the end milling parameters. The mathematical model for estimating the end milling process was found to be able to accurately predict the process as a result of multiple regression analysis. "Simulated Annealing (SA)" method, which is one of the stochastic optimization algorithms, was used in the optimization step. A design-optimization scenario has been introduced to define the process. As a result, optimum end milling cutting parameters that provide minimum surface roughness were determined. The results showed that the optimal combination for good surface finish are high cutting speed, low feed rate and low depth of cut values.

Keywords: End milling; Neuro-Regression Approach, Optimization; Surface Roughness, Simulated Annealing Algorithm.

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Optimization of Interlayer Bond Strength of Additively Manufactured Polyamide Samples

Mumin TUTAR[1]

Abstract

Fused filament production (FFF), one of the additive manufacturing methods, has become a popular method for the production of functional parts as well as prototype parts in recent years. FFF is an extrusion process, commonly known as 3D printing, in which the object is formed by depositing molten material layer by layer. In this method, there are materials such as PolyLactic Acid (PLA), Acrylonitrile Butadiene Styrene (ABS), which are most frequently used, as well as materials such as Polyamide (PA), which exhibit better mechanical properties and allow the production of functional parts that can operate under impact and load. Different industries using this method can be listed as automotive, machine manufacturing, aerospace, etc. The mechanical properties of additively produced parts largely depend on the processing parameters. Especially, the upright direction of the bond surface, which exhibits the lowest mechanical properties, plays a critical role under loading conditions. In this study, the bond strength was taken as the objective function, and the process parameters affecting the bond strength, such as layer height, extrusion width and printing speed, were taken as the variables. In order to determine the bond strength, cylindrical tensile test specimens made of polyamide material were subjected to the tensile test. Taguchi method was used for optimization and the effects of the parameters on the bond strength were evaluated.

Keywords: Additive manufacturing, Fused filament fabrication, Bond strength, Polyamide, Taguchi optimisation

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Neuro Regression Analysis and Optimization of Laser Powder Deposition AlSi10Mg Alloy

Umut ÇİFTÇİOĞULLARI[1]
Levent AYDIN[2]
Elif ARAS GÜLTÜRK[3]

Abstract:

In this study, laser power, scanning speed, powder feed rate and shielding gas flow rate were determined as input process parameters during the preparation of AlSi10Mg alloy by powder-delivery laser powder deposition (LPD) process. The aim of the study is to optimize the LPD parameters in order to obtain AlSi10Mg alloy with maximum density. A second-order multiple nonlinear polynomial model is used to explain the engineering phenomenon. In this way, four functional models were constructed using the hybrid method to test the accuracy of the experimental process predictions. Then, $R^2_{testing}$, $R^2_{training}$ and $R^2_{validation}$ values were calculated and the limitations of the candidate functions were checked to determine the most realistic model. Looking at the results, it can be said that all models describe the process well according to $R^2_{training}$. However, when $R^2_{testing}$ and $R^2_{validation}$ values are examined, it can be said that only one model is successful. The second-order multiple nonlinear (SON) model is determined as the most realistic model to describe the "relative density". Random search (RS) algorithm, which is one of the stochastic optimization methods, was used to determine the optimum process parameters that provide the maximum relative density. As a result, the best percentage of maximum relative density was obtained as 99.7063% in conditions where laser power = 143.214 w, Scanning speed = 410.861mm/min, Powder feed rate = 0.7727g/min and Shielding gas flow rate = 6.7292 L/mm. These optimization results were found to be consistent with the experimental results.

Keywords: Optimization, Laser Power Deposition, Neuro Regression Approach, AlSi10Mg, Relative Density,

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ZA40/SiC Alaşım Tozlarının XRD ve SEM Analizlerinin İncelemesi

Emre Deniz YALÇIN[1]

Abstract

In this study, Zinc-Aluminium (ZA40) and Silicon Carbide (SiC) powders were grinded by mechanical alloying at 400 rpm for 2 hours in a planetary ball mill. In the grinding process, 2 tungsten carbide mill chambers with a volume of 125 ml were used. 5:1 ratio was chosen as the ball powder ratio and tungsten carbide rods with a diameter of 10 mm were used. Experiments were carried out at room temperature under an argon atmosphere. While preparing the mixtures, 0-0.5-1 and 1.5% by weight SiC powders were added to the ZA40 matrix material. XRD (X-ray Diffractometers) and SEM (Scanning Electron Microscopy) analyses of the produced samples were examined. XRD analyses were performed with a Rigaku Corporation model instrument in the range of 20-80°. It was observed that Zn, Al and SiC peaks changed in XRD analysis. In SEM examinations, it was observed that the powders changed shape and there was a change in grain size. Particularly in the mechanical alloying process, the collisions between the ball-powder-mill powder particles subjected to the ball milling process caused changes in the powder size. According to the characterization results of the microstructures of the powders obtained after mechanical alloying; the grinding time during which the SiC particles were homogeneously dispersed in the ZA40 matrix was determined as 2 hours. It is very important to ensure the homogeneous distribution of the reinforcement particles in the matrix and to establish a good interface bond between the reinforcement particles and the matrix for optimum performance in the composite materials produced by the Powder Metallurgy method.

Keywords: ZA40, SiC, Powder Metallurgy, XRD, SEM

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Hole Drilling Unit Design For Woodworking Machines

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Kadir ÇAVDAR[2]

Abstract

In this study, boring heads, which are widely used in the woodworking industry, were examined and the sequential gear mechanism that provides power transmission within the units was designed depending on certain parameters. A general design of the boring head was created by making the gear train and gear wheel sizing calculations for the boring head with a specific body design. These calculations were compared by using gear wheel sizing algorithms in the computer environment and the geometry obtained from the design was turned into a solid model via the CAD program and mounted on the multi-hole drilling unit. In the study, the importance of gear trains used in boring heads in the construction was revealed, sizing calculations were made for the gears that could work in the boring head driven by the motor operating at 1.7 kW and 6000 rpm, and compared with the existing commercial mechanisms.

Keywords: Woodworking, mechanism, gear wheel, multi-hole drilling, machine

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New Process Development in Cabin Stabilizers Production

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Burak BAHAT[3]
Serdar MACİT[4]

Abstract

In this study, a new process design has been developed for cabin stabilizers, one of the shock absorber parts in the suspension systems of heavy commercial vehicles. For this purpose, new designs have been developed for dies in both the hot forging process and the machining process. In the new production process developed, optimum production conditions were determined by testing different process parameters in both forging and machining steps. Trials were made for different parameters with the new die design developed in the hot forging process step, which is one of the production stages of the stabilizer, and the die design, in which the most efficient, optimum speed and quality product is obtained was determined. In the machining step, with the innovative milling die developed specifically for the product and driven tool machining adapted to this die , process optimization has been achieved with minimum time, labor and consumption loss. The new die design developed for the hot forging operation includes multiple preforms and final shapes. A new and unique die design has been developed in which many operations can be performed using a single die . Compared to the previous process conditions, a new process design has been developed that increases the production capacity based on the unit/hour rate and at the same time reduces the use of raw materials. Hot forging and milling die designs were made in many different parameters in the development of innovative processes in the production of cabin stabilizers for heavy vehicles. Analysis studies were carried out with the Q-Form simulation program, and the optimum production capacity was determined by comparing the results of field trials, test results and prototype studies.

Keywords: Heavy commercial vehicles, Die Design, Cabin Shock Absorber, Hot Forging, Machining, Milling Die.

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The Use and Importance of Standards in Tunnel Lighting Calculations

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Ziya DORUK[3]

Abstract

Tunnel lighting design is vital and needs to be designed according to the standard to avoid visual adaptation problems when entering and exiting the tunnel. This standard was first drafted by the Commission Internationale de l'Eclairage in 1990 (CIE:88 1990) following the issue faced in designing Tunnel lighting. However, this standard helps calculate the amount of light depending on the amount outside the tunnel. This standard is then revised in the draft CIE 88:2004, including a new method of calculating the luminance value. Based on these two standards, different countries adopted their standard slightly differently according to geographical location.

This study makes a summary of the CIE 88:1990, CIE 88:2004, and European Standard specifications. The general information about the standards, usage and application are given in a summary form.

According to these standards, the tunnel is sectioned into five zones. The Access, Threshold, Transition, Inner, and the Exit zones. The luminance of the access zone is the determinant factor or variable; when calculating the luminance of the interior of the tunnel, the luminance of the Access zone needs to be known. The other zones' luminances are dimmed slowly by a certain ratio from the Threshold Zone toward the Inner Zone and then increases around the Exit zone based on the value of the Access zone luminance. This work will benefit the new Tunnel lighting designer and save more time while designing as all the necessary information is given concisely and clearly..

Keywords: Tunnel lighting, CIE standard, European Standard, luminance, Tunnel

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The Origins and The Development of Artificial Intelligence

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Abstract

The aim of this study titled as "The Origins and The Development of Artificial Intelligence" is to investigate the basis of artificial intelligence in according with the mathematical and technical improvements. Even though, it is fair to say for artificial intelligence that, is a relatively young discipline in the history of science, regarding that the term of "artificial intelligence" was first pronounced by John McCarthy in Dartmouth Conference in 1956, its conceptual history will be told starting from the Ancient times when artificial intelligence took place as a concept.

The question of "Can machines think?", which was posed by Alan Turing in 1950, will be discussed through the possibilities of a thinking machine's capacity of thinking and converging to the human mind will be questioned. In addition, it is aimed to discuss concepts such as consciousness and intentionality by analyzing Searle's "Chinese Room" example from different point of views.

In order to address the historical development of topics such as artificial thinking, artificial consciousness and machine learning which attributes human learning styles to the machine, as well as the processes of convergence to human cognitive capacities, in parallel with human thought, it is aimed to question comparatively the act of thinking, learning and language capabilities. The subject of artificial language is aimed to be discussed together with topics such as the ability of language, natural language processing and the semiology.

It's observed that artificial intelligence is such a multidimensional field and it has been developing with the contributions of many different types of disciplines such as mathematics, linguistics, neurology and biology which are in interaction with each other. Consequently, it is seen the artificial intelligence is a product of an interdisciplinary study. In this context, the history of artificial intelligence will be researched comparatively with an interdisciplinary approach.

Keywords/Anahtar Kelimeler: history of science, history of technology, artificial intelligence, artificial thinking, machine learning, natural language processing

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Efficient Fault Detection Technique in Power System by Machine Learning using Fault Indicator Patterns

Muhammad SULEMAN[1]

Abstract

Integration of energy source in power system has been increased and multiple interlinks of transmission and distribution has enhanced the probability of fault occurrence in the power system. This research focusses on Machine Learning ML technique to ensure the security of the power system by applying on protective scheme for fast relay response with accurate knowledge about the type of fault. Reliability and stability of power system is increased by accurately detecting the fault and isolating the faulty phase from system is important to prevent the fault propagation and protecting the electric component in the power system to avoid major damages. The fast fault detection algorithm is performed by feature extraction on voltage, current and frequency. The normal state model is developed for generating Fault Indicator Vectors (FIV) from the dataset. The FIV are processed by Decision Tree (DT) classifier for determining the type of fault by analyzing the deviation from the generalized principal model. The FIV pattern is evaluated to derive protection decision according to LG, LL, LLG fault. The purposed method is implemented on 100 km transmission line in the MATLAB and result shows clear deviation from generalized principal model which makes easier to compute the type of fault accurately in milliseconds.

Keywords: Power System, Fault Detection, Decision Tree, Fault Indicator Vectors, Machine Learning

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Torque Control for Interior Mounted Permanent Magnet Synchronous Motors Based on Third Harmonic Injection Pulse Width Modulation

Osman Emre ÖZÇİFLİKÇİ[1]
Mikail KOÇ[2]

Abstract

Permanent Magnet Synchronous Motors (PMSM) have a wide range of applications due to their high efficiency, high power density, controllability over a wide speed range and low acoustic noise. PMSMs can generally be divided into two types: Surface Mounted Permanent Magnet Synchronous Motors (SPM) and Interior Mounted Permanent Magnet Synchronous Motors (IPM). IPMs generate reluctance torque in addition to the torque from the magnets due to the difference in inductance in the dq-axes caused by the saliency structure of their rotors. Therefore, it is widely used in areas such as electric traction applications that require high torque. In this study, it is aimed to provide efficient torque control of IPMs with vector control technique based on third harmonic injection pulse width modulation (THIPWM) strategy. After the simulated motor is modelled on the dq-axes by means of Clark and Park transformations, a closed-loop control system is created in which the motor currents are fed back in both axes. By comparing the dq-axes currents measured from the motor output with the command dq-axes currents, the error is driven to zero with the PI regulators. Then, the torque control of the IPM was successfully achieved by applying the THIPWM strategy necessary to drive the inverter. With different torque-speed profiles, the behavior of the control system is investigated when the motor is loaded up to the unloaded and continuous torque value. In addition, the sensitivity of the control system to speed change under constant load or variable load was measured in the applied torque-speed profile. It has been verified by simulations that command torque values are obtained from the motor output and torque control is achieved successfully in different torque-speed profiles.

Keywords: Vector Control, AC Drive, PMSM, IPM, THIPWM

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TEŞEKKÜR
Bu çalışma 118E858 proje numaralı Bilimsel ve Teknolojik Araştırma Projelerini Destekleme Programı (1001) aracılığıyla Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBİTAK) tarafından desteklenmiştir.

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Deep Gated Recurrent Unit and Long Short Term Memory Based Anomaly Detection Technique

Merve Begüm TERZİ[1]

Abstract

A robust anomaly detection technique for ECG signals is developed using deep gated recurrent neural networks (GRNN) with Gated Recurrent Unit (GRU) and Long Short Term Memory (LSTM) unit. By training deep GRU and LSTM networks on normal ECG data acquired from healthy subjects, a robust prediction model that learns to predict future time steps of ECG time series is developed. The prediction errors are modeled using Multivariate Gaussian Distribution and the estimations of optimum parameters were performed via Maximum Likelihood Estimation (MLE) method. By using probability distributions of prediction errors and optimum threshold values, the classification of normal and abnormal ECG time series is performed. The results of the study show that deep LSTM networks with stacked recurrent hidden layers can learn higher-level temporal features in ECG time series without prior knowledge of the data and can robustly model normal time series behaviors. The performance results of the proposed deep learning and Gaussian-based statistical anomaly detection technique over the PTB-ECG database show that the technique provides the reliable diagnosis of cardiovascular diseases by performing the robust detection of anomalies in ECG time series.

Keywords: Big data, deep learning, recurrent neural network, long short term memory, gated recurrent unit.

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Self Protected 33 Kv, 500 kVA Distribution Transformer (CSP) Design, Prototype Production and Tests

Hilal YILDIZ[1]
Eray MAHMUTOĞLU[2]
Kübra ÖRNEK KOCABEY[2]

Abstract

The number of distribution transformer manufacturers is both relatively easy to design and manufacture, and the initial investment cost is low. It is very common both in our country and in the world. This situation creates an important competitive environment, and the number of distribution transformer manufacturers is both high and low due to the fact that the manufacturers are constantly new, efficient, relatively easy to design and manufacture, and low initial investment cost. The purpose of this project was created based on these requirements. In some countries such as America, Mexico, Uganda, and India, some of the electrical energy distribution is carried out with Completely Self Protected (CSP) transformers due to the advantages such as lower cost, more flexible operating conditions, and fast commissioning. In traditional distribution transformers, additional equipment such as disconnectors, breakers, surge arresters, measurement panel are mounted externally to protect the system. CSP transformers are electrical machines that do not encounter the maintenance and operation problems that can be encountered in conventional transformers. These transformers can protect themselves from secondary short This study presents the design, manufacturing and testing stages of 500 kVA, 33/0.4 kV, self-protected (CSP) distribution transformers in detail. The process from design to commissioning follows these steps; (i) design of electrical/thermal/mechanical parts, (ii) manufacture of winding/magnetic core, other mechanical parts, assembly of active part and implementation of prototype, (iii) routine, type and custom verification of transformer.

Keywords: Fully self protected transformer, distribution transformer, CSP

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Deep Learning with Gated Recurrent Neural Networks for Anomaly Detection

Merve Begüm TERZİ[1]

Abstract

A robust anomaly detection technique for ECG signals is developed using deep gated recurrent neural networks (GRNN) with Gated Recurrent Unit (GRU) and Long Short Term Memory (LSTM) unit. By training deep GRU and LSTM networks on normal ECG data acquired from healthy subjects, a robust prediction model that learns to predict future time steps of ECG time series is developed. The prediction errors are modeled using Multivariate Gaussian Distribution and the estimations of optimum parameters were performed via Maximum Likelihood Estimation (MLE) method. By using probability distributions of prediction errors and optimum threshold values, the classification of normal and abnormal ECG time series is performed. The results of the study show that deep LSTM networks with stacked recurrent hidden layers can learn higher-level temporal features in ECG time series without prior knowledge of the data and can robustly model normal time series behaviors. The performance results of the proposed deep learning and Gaussian-based statistical anomaly detection technique over the MIT-BIH database show that the technique provides the reliable diagnosis of cardiac arrhythmia (CA) by performing the robust detection of anomalies in ECG time series.

Keywords: Big data, deep learning, recurrent neural network, long short term memory, gated recurrent unit.

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The Effect of Mutation Type for the Identical Parallel Machine Scheduling Problem With Genetic Algorithm

M. Zühal ERİŞGİN BARAK[1]

Abstract

In this study, the type of mutation operators has been examined to assess Genetic Algorithm (GA) efficiency in a machine Scheduling problem. As a form of heuristic strategy, Genetic Algorithms (GA) have been widely employed in parallel machine scheduling. The order acceptance and scheduling problem has been a scheduling and optimization challenge in which the manufacturing firm should determine whether to accept or reject an order due to capacity constraints. The order acceptance and scheduling problem which is a special type of machine scheduling problem is handled on a manufacturing system with identical parallel machines. In the presented study, the Genetic Algorithm (GA) is examined to solve the machine scheduling problem. A Genetic Algorithm (GA) is used to support an operations manager in selecting a group of possible customers to maximize operational profit while also ensuring that all orders are delivered on time. Solving this model with a limited capacity yields an optimal capacity plan for the selected orders over a given (finite) planning horizon. After looking for a solution to the problem with the Genetic Algorithm, it is desired to examine the effect of different mutation approaches with the same operators. Genetic Algorithms (GA) denotes positive or negative performance, depending on the type of operators. Mutation type is one of these operators. The efficiency of mutation type on Genetic Algorithms (GA) for parallel machine scheduling was investigated in this work.

Keywords: Genetic Algorithm, Identical Parallel Machine Scheduling, Mutation

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Automated Nut Peeling Machine With Replaceable Blades

KAĞAN KAHRAMAN[1]

Abstract

With the rapid growth of the nuts sector day by day, the need for different machines in the sector is increasing. Considering these needs, it is aimed to select at least 3 different types of roasted nuts and to separate their shells from them. Machine design and manufacture suitable for this purpose has been made by considering these needs. The machine that is manufactured is of industrial type and it is a machine that can be used by nut manufacturers in their production lines and/or separately. With this machine, there may be other processes for the shells that are ignored during production and thrown away as waste. In our country, it is important to transform the food wastes (shells) resulting from the production and consumption of high amounts of nuts into products with high added value. With this machine, it is possible to evaluate the wastes such as hazelnut shells, sunflower seeds and pumpkin seed shells, which are consumed daily in our country and can be classified as both domestic food waste and normal food waste. According to the researches, it is possible to use the nut shells as fuel (for example, as an alternative fuel in diesel engines), to convert them into insulating sheets, and to use the dusts and ashes of certain shells in different composite functions. With the aim of easy consumption and production of some nuts and peeling, breaking and stacking of the shells that may arise with it, different types of shells have been obtained for the creation of fuel, insulator and composite materials. The aim of the thesis is to manufacture a machine with minimum of (I) peeling/breaking the shells of 3 kinds of nuts, (II) produce ready-to-eat products, (III) removes at least 80% of the shells of the product, (IV) easy to control via a screen, (V) keeping the recipes suitable for different types of nuts in its memory, (VI) can produce by selecting these recipes when requested.

Keywords: nuts, shell, nuts peeling, shell breaking

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Effect of Tapioca Starch and Chia Seed Blanching on the Drying Characteristics, Heat and Mass Transfer of Celery Root Chips

Nasim KIAN POUR[2]

Abstract

Celery root as a winter vegetable contains valuable nutrients. In order to produce a sustainable healthy snack and to encourage people specially children and young people to consume it, celery root was used to produce chips by blanching with tapioca starch (TS) (with the prebiotic properties) and chia seed flour (CSF) (as a good source of protein and omega 3 fatty acids) before drying. The blanching was carried out at 100°C for 10 minutes in water (C) (control), and aqueous solutions of salt (S) (0.1% w/w), TS (0.1% w/w), CSF (0.1%w/w), and blend of TS and CSF (TSCSF) (0.05%+0.05% w/w). After blanching, the samples were dried by the air (1.5 m/s,110°C, saturation humidity of Hs=25°C). Drying was accomplished in the falling rate period, which indicated that diffusion was the main mechanism in control of the drying process. According to the mathematical modeling of Fick's second law the moisture diffusion coefficient (Deff) of samples were 0.794×10^{-9}, 0.870×10^{-9}, 1.518×10^{-9}, 1.051×10^{-9}, and 1.693×10^{-9} (m^2/s) for C, S, TS, CSF, TSCSF, respectively. The Deff increased by 9.57%, 91.18%, 32.37%, and 113.22% for S, TS, CSF, TSCSF, respectively. In addition, drying time decreased as 6.25%, 53.13%, 21.88%, and 56.25% for S, TS, CSF, TSCSF, respectively. The drag force, heat, and mass transfer coefficients were 8.33×10^{-6} (N), 41.21 (W/m^2 K), and 0.034 (m/s), respectively. The results reveal that TSCSF can excellently improve the drying characteristics and decrease the drying time of celery root chips to an industrial extent.

Keywords: Celery Root Chips, Tapioca Starch, Chia Seed Flour, Blanching, Drying

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Use of Electro-Spin Spectroscopy Method in Determining the Oxidation Stability of Oils

Tuğba DEDEBAŞ[3]

Abstract

Edible oils consist of various components such as fatty acids and fat-soluble vitamins, which are known as nutraceuticals because of their health benefits and are necessities of daily life. However, in presence of factors such as light, heat, enzymes, and metals, they exhibit sensitivity to oxidation reactions causing decreases in nutritional quality and functional properties of cooking oils. Lipid oxidation is a complex process involving free radical chain reactions and the radicals are the key element of these reactions. Oxidation reactions vary mainly depending on various factors such as the composition of fatty acids that foods contain. Since oxidative food spoilage affects both shelf lives and nutritional properties of foods, it is important to understand and estimate the early phases of oxidation. Nowadays, the analyses performed using peroxide values, p-anisidine, specific absorption rates, and thiobarbituric acid reactive matters are among the popular methods used for determining the lipid oxidation. However, these methods are time-consuming and complex-to-run, require sample preparation and chemical use, and may create toxic waste. For this reason, spectroscopic methods such as fluorescence emission, hyperspectral imaging, infrared spectroscopy or magnetic resonance, raman spectroscopy, and electro-spin resonance spectroscopy are among the fast analytical methods that are widely used for determining the oxidation in oil in recent years. Among these methods, electro-spin resonance spectroscopy is a new and precise method used for determining the radical changes in the oxidation of oils. In electro-spin resonance spectroscopy, the spin capturing method allows identification of the reactivity of radical species occurring during the oxidative reducing reactions. In the present study, a general perspective to the mechanism of lipid oxidation process and the use of electro-spin resonance spectroscopy that is a method having a high sensitivity is provided.

Keywords: Lipid oxidation, Edible oils, Elecrospin resonance spectroscopy, New methods, Radica

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3d Food Printers and Digital Gastronomy Tourism

Emine AKSAN ALDANMAZ[1]

Abstract

Technological developments cause innovations and changes in the food and beverage sector as well as in every sector. Three-dimensional (3D) food printers are a new technology that provides the desired form, style, shape and taste in the food and beverage industry. In addition, by enabling the enrichment of the nutritional content of foods, products for children, athletes and patients can be produced. 3D food printers were first used in the development of confectionery, desserts, chocolate, pizza and bakery products. Later, it has been successfully applied in a wide variety of foods.

By offering an innovative approach in the field of gastronomy, 3D food printers are effective in making different styles and designs in foods.In this technology, digitally printed foods are obtained by changing the traditional food production method, and visually attractive, safe and standard quality customized foods can be produced. Thus, individual needs and preferences can be adapted. There are initiatives related to restaurants and bakeries that produce with 3D food printers. Today, when gastronomic tourism is on the agenda, travel motivation will have a significant impact on those who want to experience innovative and creative foods and beverages obtained with 3D food printers.

Increasing demand for customized foods will support the growth of the 3D food printer market worldwide. In this study, the innovations offered by 3D food printers in gastronomy and their contributions to digital gastronomy tourism have been compiled.

Keywords: 3D Printers, Food, Digital Gastronomy, Tourism

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Migration of Phthalate Esters from Packaging Materials into Foods

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Abstract

The fact that plastic packaging has very common usage areas in daily life brings with it various risks. Phthalates which are used as plasticizers in the plastic packaging industry are one of these risk factors. Phthalates have many adverse effects on human health, especially endocrine system disrupting and carcinogenic effects. Since one of the sources of phthalate exposure of people is plastic packaging, phthalate migration from plastic food packaging to foods has become more important, and the need to investigate this issue and evaluate the results has arisen in order to better understand the risks posed by phthalate migration. For this purpose, in this review study, studies on phthalate migration from plastic food packaging were examined and the effects of food composition, contact time, contact temperature, pH value of food, and type of plastic packaging on phthalate migration were evaluated.

As a result, since benzyl butyl phthalate (BBP) was not detected in polyethylene (PE) and polypropylene (PP) packages, and low amounts of BBP were detected in polyethylene terephthalate (PET) and polyvinyl chloride (PVC) packages, it was concluded that the migration of BBP may be related to the type of packaging used. Also, in the majority of the studies, di-ethylhexyl phthalate (DEHP) and di-butyl phthalate (DBP) were detected and the specific migration limits of DEHP and DBP which are 1,5 mg/kg and 0,3 mg/kg respectively were exceeded under extreme conditions such as long exposure time and high exposure temperature. In relation to the fat content of the food; it has been determined that the fat content of foods affects the migration and the migration of phthalates to fatty foods is higher than in foods with low or zero fat. It has also been determined that the pH value affects the amount of migration according to the type of phthalate ester.

Keywords: Phthalate migration, plastic packaging materials, DEHP, DBP, BBP

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Protein Enriched Baked Chips Production

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Osman SAGDIC[2]
Canan DOGAN[3]

Abstract

In the study, it is aimed to produce an innovative, functional, and healthy snack product that will support the needs in this field with the production of protein-enriched baked chips.Two products were developed in this study. One of them is Vegan protein enriched baked chips. Pea protein isolate is used as the main protein source. The other product is Animal protein-enriched baked chips. Collagen powder is used as the main protein source. The dough components of two chips are made from three different flours: Whole grain wheat flour, Sorghum flour, and Chickpea flour. They also provide fiber and protein to finish products.Acceptable texture properties are developed by using optimized baking conditions and dough quality parameters. To increase the sensory properties, spray oil and spices are applied to baked products.

At the end of the study, results show us that thickness, crunchiness, breakage resistance, taste, aroma and nutritional values all meet the expectations. Samples with and without spray oil and spicy application were highly rated by participants.As a result of this study, completely Vegan and protein-

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Investigation of Effects of Injection Pressure in 17-4 PH Stainless Steel Parts Production by Metal Injection Molding Method

Burak BAYRAM[1*]
Burak ÖZKAL[2]

Abstract

In this study, the effects of injection pressure on the microstructure and mechanical properties of 17-4 PH (UNS S17400, AISI 630) stainless steels produced by metal injection molding were investigated. In this context, the 17-4 PH initial feedstock material was injection molded under different pressures (900, 1200 and 1500 bars) into molds having different geometries suitable for tensile and bending tests. Following the binder removal, sintering was realized at 1300 °C under H_2 atmosphere. After sintering, the solution treatment of the samples was carried out at 1040 °C for 1 hour. Then, the samples were aged at 480 °C for 1 hour. Experiments were carried out in order to characterize the as-sintered, as-solution treated and as-aged conditions. Within this scope, the microstructures of the all samples were examined using optical microscope and SEM. Hardness measurements, tensile and bending tests were performed to determine mechanical properties. During binder removal, the weight losses of the samples molded in different geometries showed similar trends leading a linear relationship between the injection pressure and the initial piece weight. While both hardness and tensile strength values were decreased after solution treatment, these values were increased after the aging. Similarly, bending strength values of the samples were improved after aging. Moreover, compared to as-sintered condition, an increase was observed for the yield strength and toughness values after aging.

Keywords: 17-4 PH Stainless steel, Metal injection molding, Heat treatment, Mechanical properties, Microstructure

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Gold-Assisted Large-Scale Exfoliation of Bismuth Triiodide (BiI_3) Ultrathin Layers

Aydan YELTİK[1]
Felix DESCHLER[2]

Abstract

Renewable energy-oriented technologies provide an eco-friendly and sustainable approach to reduce the reliance on fossil fuels and resolve the associated environmental issues. In the context of the development of advanced and affordable materials, two-dimensional (2D) materials with unique structure and favorable properties have emerged recently as promising candidates for energy conversion and storage applications. In this study, other than liquid-based exfoliation and standard micromechanical cleavage, metal-assisted strain-induced exfoliation method was proposed for efficient production of large-area 2D BiI_3 crystals for the first time in the literature. BiI_3 is a highly promising material particularly for photovoltaics owing to the defect tolerant nature, high stability and unique optoelectronic properties. Optical and atomic force microscopy analyzes showed that 2D BiI_3 crystals with the lateral area of tens of microns could be obtained using gold in the proposed method. From the thickness analyzes, multiple (~5) layered BiI_3 structures with the thickness of about 4 nm was observed to be produced. The reason why the method works well in these crystals is speculated to be due to the sufficient tension applied for stripping the top layer(s) of the material. Herein, gold layer thickness was determined as another effective parameter considering the stiffness of the metal. As the results of different gold layer thicknesses (25, 40, 60 and 100 nm) were examined to define the optimum value, it was concluded that the production efficiency in terms of lateral size and reproducibility is higher for the samples with 100 nm Au compared to the others, which is the same case for 2D transition metal dichalcogenides. Besides helping for understanding the underlying characteristics of BiI_3 crystal from the fundamental building blocks, this study may pave the way for developing a universal production strategy of large-area high-quality 2D materials to be utilized in optoelectronic applications.

Keywords: Two dimensional material, BiI_3 crystal, mechanical exfoliation, optoelectronic properties.

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The Effect Of Co Change To Al-Ni-Co Alloy On Thermoelectric And Mechanical Properties

Canan ALPER BİLLUR[1]

Abstract

The electrical properties and mechanical properties were investigated depending on the microstructure properties of the Al-Ni-Co ternary alloy. The surface analyzes of the alloy's compositions were made with the SEM device. phases visualized by SEM and MAPPING in surface analysis. The compositions of the phases were determined by both atomic and by weight EDX analysis. The existence of the formed phases was also confirmed by XRD analysis. However, properties such as cell parameters, crystal structure and grain size were determined. The mechanical properties of Al-Ni-Co alloy were obtained by tensile testing and microhardness tests. Four samples of each compound were prepared for tensile testing. As a result of the tensile test, the tensile percent elongation curves of the tensile specimens produced with different alloy ratios. The hardness value for the each composition of Al-Ni-Co were obtained by making at least four measurements from each sample surface. Tensile test results and hardness measurement results were compared. According to tensile test results and hardness measurement results, parallelism in mechanical properties was observed. . It was observed that the electrical resistivity values obtained by the DC four point probe method (FPPM). The electrical resistivity was compared depending on the change of Co in the composition. However, it was observed that the electrical resistivity increased with the increase in temperature.

Keywords: Mechanical properties, ternary alloys, microstructure and electrical properties, intermetallic phase.

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Thermoelectrical and Microstructure Properties Of Zn-Al-Cu Alloy

Canan ALPER BİLLUR[1]

Abstract

The electrical properties were investigated depending on the microstructure properties of the Zn-[11-x] wt. % Al-x wt. % Cu (x = 0.5, 1, 4 (eutectic composition) ternary alloy. The intermetallic phases formed by the addition of Cu to the Zn-Al alloy and the surface analysis were visualized by SEM and MAPPING. Their compositions were determined by EDX analysis. Microstructural properties such as crystal structure and cell parameters of each composition of the alloy were measured with XRD diffraction device. It was also confirmed by XRD analysis that Cu_5Zn_8, Al_4Cu_9, Cu_3Al intermetallic phases were formed with the addition of Cu to the alloy. The electrical resistivity values were measured on temperatures ranging from 300K to 640K by the DC four point probe method (FPPM). It has been observed that these values vary between 9.7216 10^{-8} Ωm and 6.5881 10^{-7} Ωm. The resistivity value increased depending on the amount of Cu. The obtained results were compared with the existing literature results for Al, Cu elements and Al-Zn. the temperature coefficients of resistivity (TCR) (α_ρ) for the samples were calculated using the electrical resistivity results. Temperature coefficients of resistance (α_ρ) for Zn-[11-x] wt. % Al-x wt. % Cu (x = 0.5, 1,4)samples, respectively are12.11x10^{-3} κ^{-1}, 13.69x$10^{-3}\kappa^{-1}$, 14.64x10^{-3} κ^{-1}.

Keywords: Ternary alloys, microstructure and electrical properties, intermetallic phase

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Forecast of the Area and Density Enrichment Effects Estimated From Cluster Structures of Membrane Proteins

Emine GÜVEN[1]

Abstract

Cell membrane-bound receptors regulate signal initiation in several crucial cellular signaling pathways. In many such processes, receptor dimerization is necessary for activation, making signaling pathways sensitive to the distribution of protein in the membrane. Modern labeling approaches such as electron microscope imaging offer that certain macromolecule types tend to crowd in clusters, sometimes up to 30,000 proteins per μm^2 on the membrane. The origin of the protein crowding of clusters is not fully understood. Thus, we review recent advances in our understanding of protein crowding in membrane surfaces. Based on a description of protein crowding previously developed in the membrane based on mutual distance, we performed it on a group of transmission microscopy images of membrane proteins. A parameter was identified, resulting in cluster characterization and a procedure that assigned a geometric shape to each cluster. Additionally, lipid diffusion in membranes populated with more proteins was investigated in quite some detail. Clustered macromolecules frequently draw a heterogeneous protein distribution needed for fundamental cellular and biological processes forming transport carriers. Furthermore, receptor-enriched domains may significantly impact signaling pathways that rely on ligand-induced dimerization of receptors. The method produced sets of parameter values that can promptly be used in dynamical calculations as views of the quantitative components of the clustering domains.

Keywords: membrane proteins, microscopic images, receptors, dimerization, clusters

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Determination of Quality of Concrete with Air-Permeability Measurement in Assessment of the Durability of Concrete

Işıl SUNGUR KAŞIKCI[1]

Abstract

The durability of the hardened concrete is directly related to the quality and permeability of the cover-concrete (covercrete). The covercrete, which is about first 30–50 mm, has a key role as the first defense against possible risks and nearly all transport mechanisms in concrete are affected by the quality of this layer. It is also reported that there are good correlations between air-permeability coefficient and various concrete durability parameters.

In this study, concrete samples of three groups with different water/cement ratios are exposed to 100 freezing-thawing cycles. After the 28th day of the concrete production and after every 25 freezing-thawing cycles, the air-permeability coefficients are determined by TPT Method. Pull-off tests for determining adhesion strength and compressive strength tests are also applied consecutively after every 25 cycles until 100 freezing-thawing cycles are completed. The change of the air-permeability coefficient values with the change on the results of compressive and adhesion strength tests during the freezing-thawing cycles are followed and compared within each group.

In conclusion the air-permeability coefficient of covercrete, which is accepted as a durability indicator, is used for evaluation of the quality of covercrete and it is shown that the air- permeability coefficient can also be related with the data from mechanical tests as compressive and adhesion strength tests.

Keywords: "Concrete", "durability", "permeability", "cover concrete", "Torrent permeability tester (TPT) method"

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Evaluation of Plant Nutrition Status of Cotton Growing Harran Plain Soils

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Halil AYTOP[2]
Hatice Mehtap EKİZ[3]
Ömer Faruk DEMİR[4]
Hüseyin DİKİCİ[5]

Abstract

In this study, the amounts of some physical and chemical properties and their proportional distributions of the cotton plant-grown agricultural soils of the Harran Plain were investigated. For this purpose, soil samples were taken from 207 agricultural fields and 0-20 cm depth in Harran Plain in Şanlıurfa province. The topography, size and soil structure of the land were taken into consideration while collected soil samples. The coordinates of the places where soil samples were collected were determined by GPS (Global Positioning System). The research was conducted in 2014. For the purpose of the research, some physical (monoculture, water saturation) and chemical (soil reaction, electrical conductivity, lime content, organic matter, useful phosphorus and potassium) properties of the soils were determined. According to the results of the research, it was found that the majority of the soils where cotton plants were grown had a clay texture (82%). It was determined that the saturation values with water varied between 41% and 76%. Most of the soils (95%) have slightly alkaline reaction, unsalted, contain large amounts of lime, and it has been determined that the amount of organic matter is also low. The available phosphorus amounts of the soils were found very low (4%), low (37%), medium (29%), high (17%) and very high (14%). The available potassium levels were also found to be high (100%). To increase organic matter, animal manures, organic fertilizers and organomineral fertilizers should be used. In places where available phosphorus is deficient, it would be appropriate to fertilize with fertilizers containing these elements, depending on soil analysis.
Keywords: Distribution, Harran Plain, cotton, physical and chemical properties, agricultural soils.

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Determination of Phytoplasma Diseases, Possible Insect Vector Species and Measures to be Taken in Eastern Mediterranean Vineyard Areas

Elen İNCE[1]
Pelin KELEŞ ÖZTÜRK[2]
Adalet HAZIR[3]
Nüket ÖNELGE[4]

Abstract

Phytoplasma diseases that cause disease in plants are obligat prokaryotic organisms found in phloem vessels of infested plants. The movements take place with family-specific vectors such as Cicadellidae, Cixidae and Psyllidae fed on the flood. There are phytoplasma diseases that cause hundreds of plant species that have economic prescription. Grapevine Flavescence doree (FD) (*Candidatus* phytoplasma vitis) and Bois noir (BN) (*Candidatus* phytoplasma solani) are the most important of the nine phytoplasmic diseases in the complex disease group called Grapevine yellowing GY. Flavescence doree is listed in Annex-2/A Agricultural Quarantine Regulation on the list of "Harmful Organisms which are unknown in Turkey and constitute importance". Phytoplasma disease Bois noir is not a quarantine diseases on Quarantine List.

For this purpose, surveys were carried out in the vineyards in September-November, and samples were taken from the ovaries where the symptoms of Leafroll disease were intensively resembled as those of the phytoplasma disease. Samples were analyzed using Nested-PCR molecular method.

In this study, it was tried to determine of two most important phytoplasma diseases (Flavescence doree and Bois noir) in vineyards of Adana, Mersin, Osmaniye, Kahramanmaraş, Hatay, Gaziantep and Kilis regions. The first recording feature is the study of diseases and vectors in the region and the identification of one of the diseases.

As a result, in this first study of disease and vectors in the region, the presence of the disease has been precisely determined using molecular methods and the use of a standardized test protocol as a practical method for the application in the laboratory has been included.

Keywords: Vineyard, Phtoplasma diseases, vectors, East Mediterranean.

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Electrochemical Analysis of Dinobuton Pesticide by Square Wave Stripping Voltammetry

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Recai İNAM[2]
Ersin DEMİR[3]

Abstract

Developments in the agricultural industry cause an increase in the use of pesticides. There are different kinds of pesticites such as fungicides, herbicides, insecticides etc.Farmers for good efficiency use pesticides and pesticides can cause serious damage to the environment if not used under control. For this reason, it is crucial to analyze pesticides in agricultural products with accurate and reliable analytical methods. To date, many analytical methods has been developed for pesticide determination. Electrochemical methods have some advantages over other analytical methods in terms of features such as short analysis time, inexpensive equipment, short pretreatment time of electrodes and cells [1]. In this study, the electrochemical behavior of dinobuton conducted on glassy carbon electrode and multi-walled carbon nanotube electrode (MWCNT) using cyclic (CV) and square wave stripping voltammetry (SWSV). In the preliminary studies, optimum pH, step potential, amplitude, frequency, deposition time and deposition potential parameters were determined. Dinobuton peaks were recorded at different pH values from pH value 2 to 12, and optimum pH value of 7 was found. Supporting electrolytes were obtained with Britton-Robinson buffer solutions at different pH's. Figure 1 shows square wave stripping voltammograms at different concentrations for calibration plot. Thanks to the electroactive nitro groups on the dinobuton molecule, the electrochemical analysis of the dinobuton was performed from the peak at -745 mV. The limit of detection (LOD) and limit of quantification (LOQ) were determined as 1.64 µM and 5.47 µM, respectively, and the linear operating range value was found to be 1.60 –25.0 µM.

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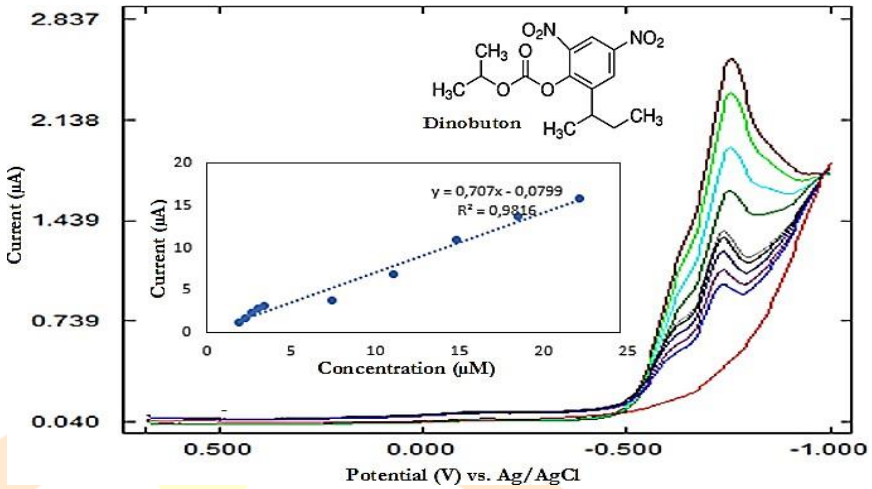

Figure 1: Square wave stripping voltammograms of dinobuton with changing concentration values and chemical structure of dinobuton.

Keywords: Dinobuton, fungicide, voltammetry, square wave stripping voltammetry, MWCNT modified electrode.

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Occurence of Butyry Lcholinesterase Polymorphisms in Patientsu Ndergoing Surgery in Slovakia

Lukas CUCHRAC[1]

Abstract

Post-Operative Residual Curarization characterized by the presence of musclefatigue, exhaustion, or insufficiency due to the use of neuromuscular blocking agents with prolonged postoperativeeffectispersistingproblem. Geneticallydeterminedchanges in cholinesterase activity canbe a major reason in persistentmuscleblockadeafteradministration of musclerelaxants. On theonesidethiscanbeavoided by choosinganagentthatisnotmetabolized by cholinesterase, on theothertheeffect of neuromuscularblockreversal agent alsodepends on. Characterization of thegeneticbackground of changes in plasmacholinesterase activity, specifically in Slovakia, isstilllacking. Due to thepresence of numerouspolymorphisms in theplasmacholinesterasegeneaffectingits activity and subsequentlytheresponse to administereddrugs, theworkisfocused on the screening of twopolymorphismsthatreduceits activity by approximately 30%. Initialresultssuggest a relatively high incidence of plasmacholinesterase variant K risk allele (18.75%)

Keywords: Butyrylcholinesterase, Cholinesterase, Neuromuscularblocker, Polymorphism

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Examination of Open Public Areas Within the Framework of Urban Resilience

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Hakan KAYA[2]

Abstract

Public areas where all segments of the society that shares the urban space can coexist encompasses physical environments that are open, private, or a mixture of both, and those that can be accessed by anyone. Public areas also serve as spaces where the society exists as a whole while also transferring its existence in a tangible or abstract manner. Therefore, while public areas serve as abstract spheres in terms of the production of values and ideals, they also point out to a significant tangible sphere in spatial terms. Due to involving collective use, public areas are of great importance in terms of urban durability.

It is observed that open public areas stand out in the context of urban resilience against natural disasters, which has become a common subject in the agenda of our country in recent years. Open public areas play a critical role in maintaining the vital functions of the society against the shock produced by any type of disaster, establishing sustainability and urban identity, and meeting common needs. In order to maintain the city's resilience in the face of a disaster, it is critical to first establish a "Disaster Management Plan," which identifies the risks, weaknesses, and vulnerabilities, as well as the strengths and tactics to address them. Pre-planning how to use open public spaces will reduce the city's disaster damage, and these public spaces will boost urban resilience while also offering a sustainable urban existence even in the event of a disaster, according to this proposal.

The geographical position of the city, its geomorphological, geological, and meteorological geographical aspects, the city plan, and the determination of the characteristics of the structures are all key stages in the construction of this disaster management plan. Analyzing these characteristics in depth and developing disaster plans based on this information will be critical to the success of urban resilience.

Keywords: Management Plan, Disaster Management Plan, Geographical, Urban

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Estimation of Obesity Levels of Young Adults using Random Forest and Decision Tree Classifier Algorithms

Bengü ÖZTÜRK[3]

Abstract

Obesity is becoming an emerging problem throughout the world. Studies showed that obesity among younger adults, has been associated with many health risks. Individual based precautions sometimes do not make a high impact on overall population health. Countries may have different support actions to prevent obesity, and government bodies set instructions to overcome many health problems in their country. Machine learning predictive models can be built to gain insights of population health from the big data generated upon several surveys. This study is aimed to develop classification models to estimate weight status (Insufficient Weight, Normal Weight, Overweight I, II, III and Obese I, II, III) of the people based on their eating habits, physical conditions, and characteristics. The Random forest and decision tree models were built in RStudio, the dataset was splitted into train and test sets by 70:30%. Overall, random forest model significantly outperformed simple decision tree model. Random forest was 80% accurate in predicting classes while 53% of the data could be correctly predicted by decision tree. Recall (80%) and precision (80%) were higher in random forest. Decision tree revealed high performance on capturing true negative classes rather than true positives which might be due to the imbalanced distribution of the data. The important features for estimating weight status based on meanDecreaseGini were age (meanDecreaseGini 250), gender, frequency of technical device usage (TUE), frequency of main meal consumption (NCP), alcohol consumption (CALC), physical activity (FAF), eating food between meals (CAEC). Random forest model could be used as machine learning algorithm which can predict person's tendency to obesity, at high accuracy level.

Keywords: obesity, predictive modeling, classifiers, random forest, logistic regression

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Investigation of the Effects of Different Graphite Types on the Thermal Conductivity of Polyamide Matrix Composites

Kübra KARABACAK[1]

Abstract

Polyamides are the most extensively used engineering plastics and, like many other polymers, are insulating materials. With today's quickly evolving technology, the conductivity of various plastics has grown, and they have begun to be chosen over metals. Because of their low cost, light weight, and flexible form, polymers with improved conductivity are generally chosen all over the world. Conductive polymers were found in 2000, and their application has grown over a large region with the growth of technology and continues to spread. They have major benefits such as being able to be obtained using easy-to-apply procedures. However, when a general comparison is made, research in the field of conductive polymers in our nation are insufficient, and they are considered as items utilized solely to suit the demands of specific industries. The heat conduction property of a substance is its thermal conductivity value; it is vital for eliminating heat from the material. In this case, it is possible to ensure that heat is evacuated from the devices in which the polymer material is utilized, hence reducing heat-related failures. Producing polymer composites with high thermal conductivity and mechanical qualities is crucial, especially to fulfill the demand for heat dissipation in electronic devices, as well as improving the physical and chemical properties of polymers with evolving technologies. Polymers with higher conductivities, which are employed in a variety of industries including military, automotive, industrial, electronics, textiles, and construction, have risen to prominence in recent years. Thermal conductivity is critical for dispersing the heat created by electrical equipment. PA matrix composites were created in this work by combining several kinds of graphite with polymaid matrix at a 30% loading rate. The thermal conductivity and mechanical characteristics of the composites generated were examined. The melt mixing process was used to produce composites in a twin screw extruder. For characterisation testing, all plates were then injection molded. Thermal conductivity measurements were performed in accordance with ASTM E 1461 using a thermal conductivity equipment and the laser flash technique. While expanded graphite had the maximum heat conductivity, graphite with medium particle size had the best mechanical qualities.

Keywords: Polyamide, Graphite, Thermal conductivity, Conductivity, Composite

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Effects of Climatic Change on Marine Phytoplankton

Emine Erdem CİNGÖZ[1]
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Abstract

The global increase in human activity and the impacts of climate change have significant altered marine environments. The impact of climate change on phytoplankton is one of the most important fact of climate change effects because phytoplankton are the primer productivity level, and from them both material and energy are transferred to higher level organisms such as fishes. Phytoplankton are the most important primary producers, accounting for approximately half of the Earth's primary production in marine ecosystems. Phytoplankton also plays important roles in nutrient cycling and energy transfers in the marine environment and are sensitive to environmental change. Because of their role in the biological pump phytoplankton also control important biogeochemical processes such as carbon sequestration. Global climatic change has also led to increases in seawater temperatures. In addition, increasing sea surface temperatures due to global warming have caused phytoplankton biomass to decline at a rate of 1% per year in 80% of the global oceans. Other climatic factors, such as ocean currents, El Niño events, and precipitation inputs, can also have a profound impact on phytoplankton . The total abundance of phytoplankton, diatoms, dinoflagellates, and their major species have all increased since 1991. As different species exhibit different degrees of adaptability to their environment, some regional differences were observed. The number of dominant species decreased for example Pseudo nitzschia spp., Skelotenema costatum, and Tripos furca becoming the predominant diatoms and dinoflagellates. These changes in dominance are associated with reductions in species diversity and evenness. The aim of this study to discuss climate change effects on phytoplankton structure.

Key words: Phytoplankton, Climatic Change, Eutrophication, Sea water, Sea water temperature

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Synthesis of Polyurethane Polymer For Elasthane Yarn Production and Yarning

Fuat TAŞKESER[1]
Kemal KARADENİZ

Abstract

Man-made fibers are gaining popularity compared to the natural fibres in recent times. Elasthane is a synthetic fiber known for its exceptional elasticity. It can be stretched to a great length and then also recovers it's near to original shape. It can be stretched to almost 500% of its length. So, Elasthane fabrics are mostly used in garments where comfort and fit both are required like hosiery, swimsuits, exercise wear, socks, surgical hose, undergarments, gloves, cycling shorts, wrestling suits, rowing suits, specialized clothing like zentai suits, motion capture suits, denims, etc. In this study, flexible yarn production, which is indispensable for comfort in clothing, was investigated. Unfortunately, the production of flexible yarns has not been realized locally until today. It is tried to meet the need in the form of imports or the production of foreign companies in our country. This situation, which reduces the added value in our country, which is extremely active in the field of textile, has drawn our attention. In this sense, a study has been carried out on the feasibility of polyurethane-based flexible yarns in a prototype sense. The polymerization of different combinations between isocyanates, polyols and chain extenders was used to obtain the polyurethane polymer. Comparisons of the produced polyurethane material with the elastane raw material used in the market were made.

Keywords: Polyurethane, elastomer yarn, flexible yarn, elastic yarn.

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Polymeric Fibers Containing Graphene

Elham ABDOLRAZZAGHIAN[1]
Meltem YANILMAZ[2]

Abstract

Due to their superior properties, nanofibers are preferred in many fields, especially in tissue engineering, drug delivery, seed coating material, cancer diagnosis, lithium-air battery, optical sensors and air filtration. Compared to conventional fibrous structures, nanofibers are lightweight one-dimensional nanomaterials with diameters in the range of tens to hundreds of nanometers, controllable pore structures, three-dimensional interconnected structures, high surface-to-volume ratios, and high mass transport properties which make them ideal for use in different applications. Many methods are used for production of nanofibers. However, centrifugal spinning is a technique that allows very fast nanofiber production. Besides, in this technique, wider range of polymers and solvents can be used and nanofibers with high porosity can be obtained by using different solution and process parameters. Diameter, total surface area, porosity and pore size of nanofibers affect performance. In addition, using nanofillers is a promising method to improve the properties of the fibers. The incorporation of graphene into the fibers improves mechanical, electrical, and thermal, properties of the fibers. In this study, polyacrylonitrile / polymethylmethacrylate fibers containing different ratios of graphene were produced by centrifugal spinning technique. Nanofibers containing 3, 5 and 7 wt.% graphene based on polymer weight were produced. Morphological and structural characterization was carried out using SEM, TEM and FTIR. The effect of graphene on nanofiber diameters and the distribution of graphene in the nanofibers have been studied. The morphology of the fibers prepared in nanocomposite structure was examined using SEM. The effect of graphene on nanofiber morphology was also determined by TEM. While nanofibers containing 3, 5 wt.% graphene had uniform morphology, it was observed that graphene affected fiber formation. When 7 wt. % graphene was used, bead formation was observed. In addition, increasing graphene content to 7 wt. % caused a decrease in average fiber diameters.

Keywords: Nanofibers, morphology, graphene, polymers, fiber diameter

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Mobiltech and Usage Areas

Okşan ORAL[1]
Esra DİRGAR[2]

Abstract

Automotive applications (cars, trucks, buses, trains, ships and aerospace) represent the largest single end-use area for technical textiles. These are called "MOBILTECH". Mobiltech products can be broadly classified into two categories: visible components and concealed components. Visible components include seat upholstery, carpets, seat belts, headliners, etc. Concealed components include Noise Vibration and Harness (NVH) components, tyre cords, liners, composite reinforcements for automotive bodies, civil and military aircraft bodies, wings and engine components, etc.

Mobiltech today covers not only isolation and safety aspect but also focuses on comfort and style. The customers look for aesthetically pleasing interiors, great comfort and fuel economy.

Some of the applications in this industry are: Air bag fabrics, fabric used as a basis for reduction in weight of body parts, tyre cord fabrics (including hose and drive belt reinforcements), automotive upholstery and other textile fabrics used inside the vehicle, tyres (for cord reinforcement material, side and thread walls, carcass piles etc), engine (radiator hoses, power steering, hydraulic lines, filters etc), composites for body and suspension parts (bumpers, wheel covers, door handles etc), comfort and decoration (seating, carpets, interior decoration), safety (seat belts, air bags, seat fire barriers etc).

Demand for transport sector in the emerging economies is remarkably increasing. At this point, transportation textiles, is a target to be focused for the textile industry. In this study, transportation textiles, and their properties and innovations in these areas were investigated.

Keywords: Mobiltech, technical textiles, automotive applications.

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Acoustic Textiles; Importance, Usage Areas

Okşan ORAL[1]
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Abstract

Acoustics is an interdisciplinary science that deals with the study of all mechanical waves in gases, liquids and solids, including vibration, sound, ultrasound and infrasound. Acoustic application is present in almost every area of modern society. Acoustics is defined as the scientific study of sound that includes the effect of reflection, refraction, diffraction and interference.

Adding acoustic properties to the environment can be done by various methods. Among these, acoustic textiles have an important place. Acoustic textiles are an important sub-branch of technical textiles. The use of textiles for acoustic property is based on two main advantages of these materials, namely low production costs and small specific gravity.

The usage areas of acoustic-featured textiles are listed as acoustic panels, automotive interior designs and upholstery, curtains, military materials, and architectural designs. Acoustic panels are used as flooring or wall-ceiling-floor building material in acoustically important environments such as cinemas and concert halls. Acoustic comfort factors play an important role in automobile preferences of today's customer. Architectural acoustics can be about achieving good speech intelligibility in a theatre, restaurant or railway station, enhancing the quality of music in a concert hall or recording studio, or suppressing noise to make offices and homes more productive and pleasant places

In this study, the usage areas and properties of acoustic textile materials were examined.

Keywords: Acoustic textile, Sound absorbing textile, Noise, Noise reduction, Acoustic panels

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Investigation of Pyrolysis Properties of Soma Lignite Coal by Thermogravimetric Analysis Method

Dilan KÖKSAL ÖZTÜRK[1]
Prof. Dr. Menderes LEVENT[2]
Dr. Öğr. Üyesi Kadir GÜNDOĞAN[3]

Abstract

Coal is the most preferred traditional fuel that has existed in the world for centuries. Our country supplies most of its energy from lignite coal. At the same time, it stands out among other fuels with its large reserves in the world, low cost and high energy efficiency. However, traditional energy production from coal causes environmental problems such as acid rain, waste storage and the release of harmful gases such as sulphur and nitrogen gases. Therefore, studies on clean coal technologies are increasing in order to reduce these problems. For the most efficient use of coal as a fuel it is important to know the combustion behaviors of coal. Thermal analysis methods are one of the effective methods used to determine the combustion characteristics of coal. In this study, the pyrolysis properties of Soma lignite samples were analyzed by non-isothermal thermogravimetric method and the effects of particle size on thermal conversion data were investigated. The samples were heated up to 1000 OC in the presence of inert nitrogen gas and their thermal transformations were completed. Characteristic coke combustion and active pyrolysis steps of Soma lignite were determined from thermal conversion curves. When the results were analyzed, it was seen that the particle size did not significantly affect the conversion time, conversion temperature and other combustion parameters of the samples.

Keywords: coal, soma lignite, pyrolysis, thermogravimetric analysis, clean energy.

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A Multi-step Virtual Screening for the Discovery of Novel Small Molecule Inhibitors of Lin28–pre-let-7 Interaction

Berin KARAMAN MAYACK[1]

Abstract

Lin 28 protein targets mRNAs, nuclear RNA binding proteins, and genes involved in cell cycle regulation and translation steps and regulates the biogenesis of certain microRNAs in embryonic stem cells and developing tissues. Lin28 has shown to play a role in the pathogenesis of many disorders such as diabetes, sickle cell anemia, neurodegenerative and cardiovascular diseases, and cancer. It is also considered to be an important therapeutic target in the areas of cellular reprogramming and regeneration.

To understand the role of Lin28: let-7 microRNA interactions in clinical disorders, potent and selective chemical probes with cell permeable properties are of great importance. In particular, a structure-derived rationale for Lin28-selective inhibition is lacking so far. In this project, computer aided drug design methods were used to discover potent and Lin28-selective small molecule inhibitors. For this purpose, ligand- and structure-based virtual screening studies were combined. As a first step, a fingerprint-based virtual screening search was conducted on ChemBridge virtual compound library. Next, hit compounds were docked onto the crystal structure of Lin28: let-7 microRNA fragment. A hierarchical structure-based virtual screening workflow using Glide HTVS (highthroughput virtual screening) followed by glide SP (Standard Precision) docking methodologies was utilized. Finally, docking poses were filtered based on protein-ligand interaction fingerprints. Compounds showing high affinity with drug-like properties were selected to assess biological activity.

Keywords: Lin28, let-7, docking, virtual screening, cancer

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Structural Performance Evaluation of Historical Bursa Green Mosque

Ali İkbal TUTAR[1]
Ferit ÇAKIR[2]

Abstract

The Ottoman Empire, which ruled Anatolia for more than 600 years, brought many religious, social and artistic structures to the region. In particular, some structures are equipped with unique features to display the power of the rulers and the splendor of the empire. However, most of these structures are damaged over time due to natural or human origin reasons. Since Turkey is located in an earthquake zone, these structures are under seismic risk. For these structures to be preserved correctly, first of all, their structural behavior should be examined and the parts that are at risk in terms of structural performance, if any, should be strengthened/repaired with appropriate techniques. In this study, Bursa Green Mosque, which exhibits the characteristic examples of early period Ottoman tile art with its technical and adornment features, was discussed and the structural performance of the mosque examined. Within the scope of the study, the structural finite element model of Bursa Yeşil Mosque, located in the Yeşil district of Bursa, was firstly prepared, and then the structural performance and seismic behavior of the structure were evaluated by using finite element analyses. In the finite element analyses static, modal and response spectrum analyses were conducted to determine structural performance.

Keywords: Bursa Green Mosque, Structural Performance, Seismic Behaviour, Finite Element Method, Static Analysis, Modal Analysis, Response Spectrum Analysis

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Determining the Optimum Rubber Content for Bitumen Modification in Hot Climatic Regions

Dr. Abdulgazi GEDİK[1]

Abstract

Repeated heavy traffic loads and extreme weather conditions are known as the most prominent detrimental factors behind asphaltic pavement deformation. Pavement deterioration is closely related to the rheological performance of bituminous binder. When exposed to high temperature and/or long time loading, bitumen predominantly exhibits viscous behavior. Hence, it is essential to remedy the performance of neat bitumen by some modifications that ultimately contribute to high temperature susceptibility for asphalt paved roads. Considering the southeastern city of Adiyaman as one of the hottest regions in Turkey, this study intends to investigate the effect of rubber modification in conventional pure B50/70 penetration graded bitumen. According to the technical specifications of Turkish General Directorate of Highways, the asphaltic materials to be used in this city should be manufactured by PG 64-16 performance graded binder. In order to obtain this target binder at optimum modifying agent level, different amounts of rubber (8%, 10% and 12% by weight) were incorporated into neat bitumen. The conventional and rheological properties of modified binders with each rubber level were evaluated at unaged, short-term aged and short + long-term aged stage. To do this, the most prevalently used tests (specific gravity, flashing point, penetration, softening point, elastic recovery, dynamic shear rheometer, and bending beam rheometer) were conducted on the samples. In conclusion, the test results demonstrated that modifying B50/70 bitumen with 8% rubber fulfills the specifications required for KMB 76-16 performance graded binder and this modified binder could be conveniently used for asphaltic mixture production in hot-climatic regions.

Keywords: Bitumen Modification, Rubber, Rheology, Asphalt Pavements, Hot-Climatic Regions.

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Experimental and numerical study of interface failure modes of clay masonry units

Didem DÖNMEZ[1,*]

Abstract

The bond strength between masonry units and mortar is the weakest link in a masonry wall. In this study, simplified test setups are emphasized in order to predict the interface damage modes of the brick masonry elements. For the estimation of flexural or tension bond strength and shear bond strength, two basic test setups are emphasized. One of them is the triplet shear strength test which has been adopted by the European Committee for Normalization as the standard test for determining the joint shear properties, and specimens are formed with 3 brick units. The other test is tension bond strength tests of Z-shaped specimens. In order to determine the flexural or tension bond strength of masonry, the specimens are constructed from two units in a Z-shaped configuration, and failure is induced by bending under three-point loading. By examining the results of the tests, the interface bond strengths and damage patterns were obtained as mode I (opening) and mode II (shear). The numerical models and analyzes of the tests were made in the ABAQUS program, and the brick-mortar interface parameters were evaluated. Also, the aim of this study is to evaluate two test setups through non-linear finite element analysis. The simulation method is based on the interface cohesive zone mixed-mode fracture model. This study provides information on how to define and interpret interface damage modes of masonry units in a simpler way.

Keywords: Masonry units, Z-shaped specimen test, Triplet test, Interface cohesive zone model, Failure modes.

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Improvement of Air Quality in Dusty Environments and Cost-Benefit Analysis: A Case Study

Ali Kemal ÇAKIR[1]

Abstract

As stated in paragraph 4 of article 10 of the 6331 legislation about the "Occupational Safety and Health Law" "Employers ensure required controls are in place for the measurement, analysis and research of the identification of risks which workers are exposed in terms of safety and occupational health". So, we have started our project. It is aimed to eliminate dust of quartz in the plant by using pneumatic transport in the study. So, the potential environmental problems and health effects are also minimized. The air quality was visible improvements a result of dedusting activity. The measurements of the air quality before and after dedusting system show that the project is successful. An important decrease was determined in dust measurements when compared to the previous measurements in Micronized and Mill Plants. The measurement before the project was 13300,50µ/ Nm^3 while afterwards the number came down to 408 µ/ Nm^3. This result is a support of the idea the purpose of system and the positive trend air quality. So now for our personnel who works for 7,5 hour per day, there is less possibility of developing occupational diseases like silicosis.

Keywords: Pneumatic Conveying, Dust, Silicosis, Cost-benefit analysis

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Multi-product Multi-period Disassembly Line Balancing Problem: A Generic Optimization Model

Fatma Betül YENİ[1]
Emre ÇEVİKCAN[2]

Abstract

Nowadays, as a result of the rapid development in technology and innovation, new products are entering into the market incessantly. Therefore, products on the market are quickly getting old and unpopular. At this point, product recovery is become an important issue because of the economic and environmental reasons. The disassembly process, considered as the one of the most important step of product recovery, is described as the systematic separation of desirable components from end-of-life products through a series of operations. The design and balance of the disassembly line is highly important for an efficient process. Studies related to the disassembly lines in the literature have increased especially in recent years. In this study a multi-product multi-period disassembly line balancing problem is presented. A comprehensive mixed integer linear programming (MILP) model is developed to formulate the addressed problem by considering the multi-manned station concept. The main purpose of solving the problem is to find task-to-station and worker-to-station assignments and lot sizes for all products over periods with the overall cost objective. Since the disassembly line balancing problem is addressed as NP-hard in the strong sense, the proposed model is only run for small-sized problems using GAMS and the results are obtained.

Keywords: disassembly line balancing problem, multi-product, multi-period

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System Reliability Analysis with Stochastic Models

Kübra IŞIK[1]
Selda KAPAN ULUSOY[2]

Abstract

In today's competitive manufacturing environment, there are many factors that businesses should consider in order to maintain their position in the market. One of these is system reliability. System reliability is the possibility of systems or system components to fulfill the desired function in specified conditions within a certain time interval. A reliable manufacturing system will assure the product throughput. With system reliability analysis, it is ensured that the manufacturing machine lines stay in satisfactorily performing conditions.

Reliability is the probability that a system fulfills its intended functions under operating conditions for specified time period. To perform a system reliability analysis it is important to understand the behavior of the failure process of the system and build a stochastic model to represent this behavior. System reliability metrics such as the average time between failures, the average number of failures that occur in a certain time period, and the system availability can be estimated utilizing the stochastic model.

In this study, a stochastic model is built for a several similar machine lines by analyzing the maintenance data of them and system reliability metrics have been estimated. It has been investigated whether the current periodic maintenance plan of the company is sufficient or not, and suggestions will be given on improvement activities.

Keywords: System reliability, Reliability analysis, Stochastic models, Parametric models, Non-parametric models

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The SEM and XRD Data Analysis in Mineralogy of Fault Clay

Ayşe Didem KILIÇ[1]

Abstract

In this study, along a line of approximately 77 km on the Eastern Anatolian fault were investigated different rock types ranging from breccia, mylonite, cataclasite to fault clay which is one of the most important active fault zones in Anatolia. The deformation processes and fault mechanisms of the fault rocks and the alteration and neomineralization were investigated properties of the fault rocks formed under different environmental conditions from igneous rocks to sedimentary rocks. Petrographic observations, mineralogical descriptions were made and SEM and XRD analysis studies were carried out in fault clays. The analysis results showed that the fault clay was illite, chlorite, montmorillonite and accompanied by feldspar, dolomite, calcite and quartz minerals. The results of both analyzes are compatible with each other. According to these results clays are product of hydrothermal alteration with both protolith-induced and tectonic effects.

Keywords: East Anatolia Fault, alteration, clay, analitic methods

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Assessing Shallow Geothermal Energy Potential of University Campus in Balikesir, Turkey Using Thermal Response Test

Ayşe ÖZDOĞAN DÖLCEK[1]

Abstract

Shallow geothermal systems use ground as an energy source/or sink to heat/or cool the buildings by utilizing a constant ground temperature. These systems have high energy efficiency beside with economical and environmental benefits. They are basically implemented in combination of two systems; Ground Source Heat Pump (GSHPs) and Underground Heat Storage (UHS) systems. Describing the site geology and its thermopyhsical properties are the most important stage in the design of shallow geothermal systems. This study aims to characterize the underground geology and its shallow geothermal energy potential (e.g., GSHPs) of the study site. Thus, the thermal response test (TRT) was set up at the Balikesir University Campus in Balıkesir, Turkey. Firstly, a geological survey was carried out for the field and an optimum place was decided for further analysis. A single borehole was drilled in the site and was equipped with a single U-tube and underground temperature monitoring sensors. TRT was conducted on this single borehole to determine thermal properties including ground thermal conductivity, borehole resistance and undisturbed ground temperature. A constant heat rate TRT and a constant temperature TRT were conducted for 48 hours. Underground temperature change was also monitored during testing and afterward to assess the ground temperature recovery time.

Keywords: shallow geothermal energy, ground source heat pump systems, thermal response testing, underground geology, ground temperature recovery

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Determination of Mass Loss Of Süphan Perlite Under High Temperature

Ali KILIÇER[1]

Abstract

Perlite, which has attracted the attention of the construction industry in recent years, is a material of volcanic origin. In terms of physical properties, it has 5-6 degrees of hardness according to the Mohs hardness scale, whose color can be from white to gray in nature. When its chemical properties are examined, the average SiO2 content is between 71-75%, Al2O3 content is 12-18% and Na2O is 2.9-4.0%. In addition, the most striking feature of perlite is its ability to expand up to 20 times its own body. Due to all these features, there are many publications and studies about perlite in many sectors recently. It is used in many fields such as agriculture, medicine and chemistry sector, especially in the construction materials sector. In order for perlite to be used in different areas, it is necessary to determine its usage areas with various analyzes. Within the scope of this study, the mass loss resistance of perlite, which has been used frequently as an insulation material recently, was investigated. In this context, Thermal Gravimetric Analysis (TGA) was carried out to examine the thermal behavior of raw perlite taken from the Süphan Region of Van, and to determine the mass loss under this behavior. When the TGA results were examined, the mass loss of raw perlite against temperature was measured as 3.153%. This ratio gives a very good result when compared with other raw materials. For example, in studies with various CaO2 and Aluminum Silicates, it is observed that the mass losses of these materials vary between 5-10% under high temperature. When the results obtained from raw perlite are compared with other results, they are promising in terms of mass loss at the first stage. In the next stages, with reference to this study, the production of new composites from raw perlite and how much mass loss can be reduced with these new materials should be examined. Carrying out these studies will be an important work especially for the rapidly growing construction sector.

Keywords: Perlite, TGA Analysis, Mass Loss.

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Gamma-ray shielding properties of xBi_2O_3:(100-x)GeO_2 glasses system

İlyas ÇAĞLAR[1]
Gülçin BİLGİCİ CENGİZ[2]
Gökhan BİLİR[3]
Hüseyin ERTAP[4]

Abstract

This study assesses the gamma radiation shielding properties of binary germanate glasses with composition of xBi_2O_3 – (100-x)GeO_2 (x = 10 – 30), where x=10, 20 and 30. The glass samples were synthesized using the traditional melt quenching method. The mass attenuation coefficients (μ_m), linear attenuation coefficients (μ), mean free paths (MFP), half value layers (HVL) and effective atomic numbers (Z_{eff}) of synthesized germanate glasses were experimentally determined 662, 1173 and 1332 keV gamma ray energies using 3″ × 3″ NaI(Tl) detector with a resolution of 7.5% at 662 keV. The experimental results of all the germanate glasses were compared with the theoretical results obtained from WinXCOM program. It was observed that μ_m, μ and Z_{eff} values increased with the increase in Bi_2O_3 concentration and decreased with the increase in gamma ray energy. The MFP and HVL values also decrease with the increase in Bi_2O_3 concentration and increase with the increase in gamma ray energy. The results revealed that the increase in Bi_2O_3 concentration improves the gamma ray shielding ability of the glasses. The shielding properties of binary germanate glass samples are better than some standard shielding concretes and RS-253 G18 commercial shielding glass. The results also revealed that among the investigated glasses, the 70 mole% GeO_2 –30 mole% Bi_2O_3 glass with the highest density has the extra capability to reduce gamma radiation as a shielding material.

Keywords: Germanate glass, Gamma ray, Shielding properties, Mass attenuation coefficient, NaI(Tl) detector

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Gamma radiation shielding properties of xWO_3:$(100-x)TeO_2$ glass system

İlyas ÇAĞLAR[1]
Gülçin BİLGİCİ CENGİZ[2]
Gökhan BİLİR[3]

Abstract

Gamma ray attenuation properties of tellurite glasses modified with WO_3 has been investigated in this paper. The xWO_3:$(100-x)TeO_2$ (where x=10, 15, 20% mole) glass samples were synthesized using traditional melting and quenching method. Some gamma ray shielding parameters such as mass attenuation coefficient (μ_m), linear attenuation coefficient (μ), mean free path (MFP), half value layer (HVL) and effective atomic number (Z_{eff}) were experimentally determined by employing NaI(Tl) gamma ray spectrometry at 662, 1173 and 1332 keV gamma ray energies obtained from ^{137}Cs and ^{60}Co radioactive sources. These radiation shielding parameters were also calculated theoretically using WinXCOM program at the energy range of 15 keV to 15 MeV. The experimental results of μ_m, MFP, HVL and Z_{eff} were found to be in a good agreement with the calculations. It was found that values of mass attenuation coefficient, linear attenuation coefficient and effective atomic number values increase, whereas half value layers and mean free paths decrease with the increase WO_3 content. The results also revealed that TeW-3 glass containing 80 mole% TeO_2 and 20 mole% WO_3 is the best candidate for shielding against gamma rays among the synthesized glasses. The obtained results also compared with those of some standard radiation shielding materials that are commonly used in the nuclear applications.

Keywords: Gamma radiation, Mass attenuation coefficient, Shielding properties, Tellürite glass, NaI(Tl) detector

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Dose calculations for different gamma emitters in the air using point source

F. Aysun UĞUR[1]

Abstract

Today, radionuclides are used in medicine for diagnostic and therapeutic purposes. In this study, distance-dependent dose calculations of Tc-99m, Tl-210 and F-18 radionuclides used in vivo in nuclear medicine using point source were studied. The calculations were performed with the Rad-pro calculator program. The obtained data are interpreted with graphs depending on the energy and activity of radionuclides.

Keywords: Nuclear medicine, dose calculation, point source, Tc-99m, Tl-210, F-18

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Electrochemical Determination of Propoxur in Modified Glassy Carbon Electrode

Gökhan UZUN[1]
Zühre ŞENTÜRK[2]

Abstract

Propoxur (2-isopropoxyphenyl-N-methylcarbamate) is one of the more common carbamate pesticides currently in use in the world. It was introduced in 1959 with a rapid destruction and long residual effect, used against lawn, forestry and household pests and fleas. Carbamate pesticides kill insects by irreversibly inactivating the enzyme acetylcholinesterase. It has been used to control numerous species of household and public health pests such as flies and mosquitoes, which affect humans and animals. The present paper presents the results of an electrochemical study and proposes an electrochemical method to quantify the carbamate pesticide, propoxur, using a modified glassy carbon electrode. Propoxur undergoes an irreversible oxidation process with a well-defined peak in aqueous solutions. The electrochemical behavior of propoxur was investigated by cyclic voltammetry (CV) and square wave voltammetry (SWV) on modified glassy carbon electrode in a phosphate buffer (pH, 2.5) solution. The electrochemical behaviour of propoxur was evaluated by CV. Fig. 1 shows the voltammogram obtained in a solution containing $4x10^{-4}$ M propoxur in phosphate buffer (pH, 2.5) solution. An irreversible oxidation peak was observed at ~ 1.50 V, which demonstrates no pH dependence during the process of propoxur oxidation at the modified glassy carbon electrode surface over the pH range studied.

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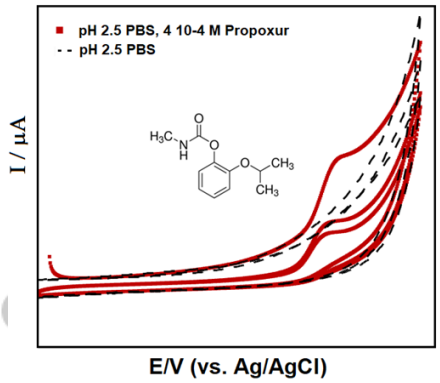

Keywords: Propoxur, modified glassy carbon electrode, voltammetry, pesticide, square wave voltammetry

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Determination of Macro and Trace Element Levels of Red Algae *Liagora ceranoides* (J.V.Lamouroux) and *Liagora viscida* ((Forsskål) C.Agardh) Species and From Mediterrenian Sea (Antalya/Turkey) by ICP-OES Method

Hatice Banu KESKİNKAYA[1]
Numan Emre GÜMÜŞ[2]
Cengiz AKKÖZ[3]
Emine Şükran OKUDAN[4]

Abstract

Algae form an important group in freshwater and form the basis of many aquatic nutrient cycles. They serve as primary producers in the food chain in their habitats and produce organic material using sunlight, carbon dioxide and water. In addition to being the main source of nutrients in the food chain, they produce the necessary oxygen for consumer organisms. In addition, algae have an important role in determining water quality. Heavy metal pollution is one of the most important causes of pollution in lakes and seas around the world. Macroalgal species are generally preferred as indicator organisms to measure heavy metal levels in both the seas and the freshwater in the World. Macro and micro elements accumulate in macroalgae with higher concentrations than the waters surrounding these organisms. In our study, elemental analysis of *Liagora ceranoides* (J.V.Lamouroux) and *Liagora viscida* ((Forsskål) C.Agardh) macroalgae samples taken from the Mediterrenian Sea (Antalya) coastal area in Turkey, are made. Measurements of samples were made on the ICP-OES device. Elemental concentrations of *Liagora ceranoides* and *Liagora viscida* were determined as following order: Ca>K>Na>Mg>Fe>P>B>Zn>Mn>Pb>Cu>Co=Cr=Ni,Ca>K>Na>Mg>Fe>P>B>Pb>Mn> Zn>Cu>Ni>Cr respectively. Only the Cd, Co and Mo elements remained below the limit values. Pearson Correlation Matrix Analysis (PCA) was performed to reveal the relationship and difference between the elements in samples. According to PCA analysis, macro and trace elements showed positive and negative correlation with each other. About macro elements, calcium has the highest value in both algal samples have been measured. According to these results, it can be said that algae has high absorption ability.

Keywords: macroalgae, aquatic ecosystems, *Liagora ceranoides, Liagora viscida* , elemental composition.

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Adsorption Calculations of Clay Mixtures in Radioactive Waste Storage Systems

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Abstract

Adsorption percentages of clay minerals in radioactive waste storage systems vary. In this study, different clay minerals with high adsorption were mixed at different rates and adsorption values were obtained. The clays used in the experiments were 50 micrometers thick and the concentration of the radioactive solution was constant and different clay minerals were mixed at different rates and adsorption percentages were calculated.

Keywords: Adsorption, clay, radioactive waste, bathc method

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Treatment by Electrocoagulation Using Waste Metals of Petroleum Wastewater

Gülizar KURTOĞLU AKKAYA[1]

Abstract

Electrocoagulation (EC) is an effective method used for treating many industrial wastewaters. In this study, the EC process was preferred for treating petroleum wastewater. Petroleum wastewater was obtained from a national petroleum refinery in Kocaeli, Turkey. All experimental studies were conducted with 250 mL wastewater volume at ambient temperature (20–25 °C). Perforated sheet metal, which is a waste material in the process and frequently used in the industry, was preferred as the anode, and plate iron with the same surface area was used as the cathode. It was placed the cathode in the middle of the circular anode and the reaction was obtained the entire surface of the anode and cathode. The effect of parameters affecting the EC process such as pH, current density, electrolysis time were investigated on COD removal. At the end of the study, the optimum pH, current density and electrolysis time were 8, 10 mA/cm2 and 5 min, respectively, and the highest COD removal efficiency was 92%. The large number of iron compounds formed in the environment contributed greatly to the removal of COD. The results showed that the waste perforated electrode provides a better treatment efficiency than other electrodes for treating petroleum refinery wastewater.

Keywords: Petroleum refinery, Oil refinery, Wastewater treatment, Electrocoagulation, COD

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The Effect of Ischemic Conductivity and Regularization Methods for Localizing the Ischemic Region on the Heart: A Finite Element Study

Hamed KAGHAZCHI[1]
Mustafa Kerem ÜN[2]

Abstract

Electrocardiography (ECG) is a common diagnostic tool based on reading potentials on human torso and make deductions about the heart health. The ECG data can be numerically processed to locate the ischemic zone in the heart (called the inverse problem of ECG). The objective of this study is to evaluate the effect of assumed conductivity (healthy or unhealthy) in the numerical heart model and different regularization techniques on the performance of the numerical procedure to locate the ischemic zone in the heart. A finite element code has been written to solve the inverse problem on realistic chest geometries. The program allows the assignment of different conductivity values to different points of the problem domain. That way, the pathological tissue has been represented not only by inducing the pathological membrane potential (as usually done in the literature) but also the pathological conductivity values to achieve a more realistic ischemic heart model. The torso potentials are calculated in the forward analysis with and without the ischemic conductivity taken into account. These data constitute the pseudo-experimental input data for the inverse problem where the transmembrane potentials (TMP) distribution is reconstructed as output. With the reconstructed TMP the ischemic region is located. Different regularization methods, including a novel one introduced here, have been tried to solve the inverse problem. We have observed that taking the ischemic conductivity into account when producing the pseudo-experimental data does not appreciatively effect how accurately the ischemic zone is located in the heart.

Keywords: Electrocardiography, Finite Element, Ischemic Conductivity, Regularization Methods, Inverse Problem

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A new iteration method for the solution of third-order BVP via Green's function

Zaur RASULOV [1]

Abstract

The iterative methods are used to solve initial and boundary value problems in a range of fields, such as image restoration, segmentation, variational inequality and etc. Successive approximation method was introduced by Liouville in 1837. Then Picard [1] developed the classical and well-known approach in 1890, which proved the existence and uniqueness of the solution of initial value problems. Afterwards, several notable researchers introduced many iterative methods to approximate the solution of a given problem to get better approximation with a minimum error.

On the other hand, third order boundary value problems (BVPs) have received much attention in many scientific and engineering applications and many branches of pure and applied mathematics in the last decade. Therefore, finding solutions of second or third order nonlinear initial value or boundary value problems has become a very interesting problem.

In this study, a new iterative method for third order boundary value problems based on embedding Green's function is introduced. The existence and uniqueness theorems are established, necessary conditions are derived for convergence. The new method is implemented on several numerical examples including linear and nonlinear BVPs. The accuracy, efficiency and applicability of the results are demonstrated by comparing the new results with the exact results and results of existing well-known methods. The obtained method extends and generalize the corresponding results in the literature.

Keywords: Boundary value problems, fixed point iteration method, Green's function, integral operator, rate of convergence.

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On Integral Representations of q,ω -Gamma and q,ω -Beta Functions

Müzeyyen YÜKSEL[1]
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Abstract

The regular calculus uses limits in calculating the derivatives of real functions. However, the calculus without limits is nowadays known as quantum calculus or q -calculus. A q -analog, also called a q extension or q -generalization, is a mathematical expression parameterized by a quantity q $(0<q<1)$ that generalizes a known expression and reduces to the known expression in the limit $q\to 1$. One type of q -calculus is Hahn calculus (q,ω -calculus). In the middle of the XXth century, Hahn introduced his difference operator $D_{q,\omega}$ which is defined by $D_{q,w}f(x)=\dfrac{f(qx+\omega)-f(x)}{(qx+\omega)-x}$. This Hahn difference operator unifies two important difference operators: The first is the q-difference operator (or Jackson difference operator), and the second is the forward difference operator. When $\omega\to 0$ this operator reduces to q -derivative operator D_q, and when $q\to 1$ it reduces to forward difference operator Δ_ω. Since 2009, with the introduction of the inverse derivative (integral operator) and fundamental theorems of the Hahn operator, studies on this subject have increased and many mathematical problems have been extended to Hahn calculus. Similar to the q -analog, in this study we present q,ω -analogues of gamma and beta functions. That is, we define q,ω -integral representations of q,ω -gamma and q,ω -beta functions associated with Hahn difference operator, and then establish some basic properties of them similar to classical and q -analogues.

Keywords: q,ω -gamma function; q,ω -beta function; Hahn calculus; q -calculus

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Comparison of Load Balance Algorithms Using CloudAnalyst Simulation

Ersin ÇAĞLAR[1]
Sertuğ KAPTAN[2]

Abstract

Information Technologies have been advancing rapidly over the past decade with new developments happening almost every day. There have been new technologies that were developed in the field of IT such as Cryptocurrency, Artificial intelligence, Virtual reality, Cloud Computing etc.. . One of the newer technologies used in our era is Cloud Computing developed by major companies in order to supply the users' demand. Cloud computing is used in almost every field providing services to people over the internet. Cloud computing can be summarized as a technology that delivers the resources to its users for the services that they demand. These resources are kept in a place called data center, which are the locations with physical computing resources to provide the users in the moment of demand. These data centers have their own computing techniques which are Load balancing , Broker policies , etc. Load balancing is used to balance the workload, demanded by the user, on the data centers so that Data centers do not end up overloading and crashing. In this paper, we mainly focus on load balancing techniques on the number of users from each different continent and we compare Load balancing algorithms which are, Ant colony, Round Robin, Equally Spread Current Execution load, etc., to identify which performs better and under what conditions do they perform well. Cloud analyst software with packages, that provide necessary load balancing algorithms that are not in the default cloud analyst.

Keywords: Load Balance, Simulation, CloudAnalyst, Cloud Computing, Datacenters.

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Artificial Bee Colony Algorithm for Anomaly Based Intrusion Detection

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Rifat KURBAN[2]
Tuba KURBAN[3]

Abstract

Computer networks are facing an increasing number of threats. Therefore, establishing and maintaining a secure computing environment is very important. Researchers use variety of methods to ensure the security of networked systems with anomaly-based intrusion detection systems (IDS). Data classification is one of the main problems of these anomaly-based detection. Artificial bee colony algorithm is an effective optimization algorithm that models foraging behavior of bees in nature. In this paper, an artificial bee colony algorithm based, semi-supervised intrusion detection method is proposed to optimize the cluster centers and identify the best clustering solutions. Experimental studies are carried out on different sub-sets of KDD Cup 99 database to evaluate the performance of the proposed method. Test results show that the proposed algorithm can be used as a model for anomaly-based intrusion detection system.

Keywords: intrusion detection; artificial bee colony algorithm; data clustering

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Combining Qualitative and Quantitative Research Methodologies in Assesing Health Effects of Alcohol

Özerk YAVUZ[1]

Abstract

Today we see marketing science is being used in various fields in positioning goods and services in the minds of the customers and in the marketplace eventually. Alcoholic beverage in this context are considered to be one of these goods types which are marketed to satisfy the needs and expactations of consumers from this type of good. In the last decades alcohol usage became an important behavioral pattern in various contexts and settings and gained popularity in many social and cultural settings. It found acceptance in several entertainment settings which can be in the form of more social or more individualistic. As seen in the analysis of many behavioural patterns it is believed to be several factors and antecedents that lead to engaging drinking alcohol. Interest of human to alcohol and alcohol consumption known for many decades. With the help of transitions of the society and business landscape it found place in many organizational settings and landscapes in a more social and individualistic way. There are several studies associated with alcohol consumption and its benefits, dangers and risks associated with its short term, long term and excessive usage in literature. In this study some of the factors associated with alcohol consumption is investigated with the triangulation approach of qualitative and quantitative research methodologies composed of in depth interviews, observation and supervised and supervised forms of data ming with the aim of having an comprehensive understanding of the phenomena and highlighting the risks and dangers associated with long term, excessive usage.

Keywords: Computer Engineering, Marketing, Alcohol Consumption, Triangulation, Machine Learning

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Bit Prediction on Keccak-[200] Cryptographic Function with LSTM Neural Network

Melike KARATAY[1]
Aybars UĞUR[2]

Abstract

Reliable random number generators are needed in many areas of cryptography. Because these random number generators are generated by mathematical algorithms, they are called pseudo-random number generators. In particular, pseudo-random number generators are used in key generation in cryptography. Usually, cryptographic hash functions are used to generate random numbers. Cryptographic hash functions are an effective solution for random number generation because they are collision, pre-image and second pre-image resistant. The Keccak algorithm has been declared by NIST (National Institute of Standards and Technology) as the last hash function standard. The security of the Keccak hash function is based on the security bits called capacity. Capacity bits are not output throughout the algorithm. But these bits also go into all of the Keccak step operations. In this study, hidden capacity bits, which constitute the security of the Keccak-[200] hash function, are predicted using the LSTM (Long-Short Term Memory) deep learning model. By generating random bit sequences, Keccak step operations were applied on these bit sequences for 2-round. A dataset was created from the bit sequences in 1-round and 2-round outputs. On this dataset, for the first time, random bit sequences generated in the 2-round of Keccak-[200] have been predicted by LSTM.

Keywords: Cryptanalysis, Deep Learning, LSTM, Neural Network, Random Number Generator.

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Improvement of Thermal Stability of Unsaturated Polyester Resin Films by Using Different Ratios of Nano Silica

Selinay GÜMÜŞ[1]
Kaan AKSOY[2]
Ayşe AYTAÇ[3]

Abstract

The polyester resin system has a flexible structure, which is one of the most basic requirements of insulation materials to absorb the thermal shock of the heating and cooling cycles in thermal insulation systems. Resistance to thermal shocks increases with increasing thermal conductivity. Improving the thermal conductivity of insulating resins is possible with the inclusion of nano fillers. Nano fillers are used to improve the thermal conductivity properties of the polymeric matrix. This study presents the results of investigating the thermal properties of modified unsaturated polyester resin (UPE) by incorporating nano silica. UPE-silica mixtures were obtained by adding nanoparticles at 0.5, 1, 3 and 5 wt. % ratios. Composites containing fillers were produced by conventional solution casting methods. This study aims to increase the resistance of unsaturated polyester resin to thermal shocks. The thermal, morphological, and structural properties for both the pure resin and the nano filled resins were investigated by curing the prepared resins. The properties of pure resin and nano silica filled resins were compared. The thermal conductivity coefficient of cured UPE-silica films was measured. In addition, its thermal stability was determined with a thermo gravimetric analyser (TGA). Morphological analysis was characterized using a scanning electron microscope (SEM) and the chemical structure of the films was characterized using Fourier Transform Infrared (FTIR) spectroscopy. The properties are expected to vary with increasing silica content.

Keywords: Nano filler**,** Unsaturated Polyester, Silica, Thermal Stability, Thermal Conductivity

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3D Printed Models of Baby Face Expression Design from Ultrasound Images

Mehmet Erhan ŞAHİN[1]

Abstract

In line with the developments in the field of health, medical imaging techniques have an important place in the diagnosis and follow-up of diseases. Medical imaging is used in different ways in different departments. One of them is Ultrasonography (USG), which is generally used in pregnancy follow-up in the Department of Obstetrics and Gynecology. New methods for the diagnosis and follow-up of diseases are presented by combining the developments in engineering sciences and medical fields. It is a three-dimensional (3D) printer technology for creating physical models used as rapid prototyping in this technology. In this study, the modeling of baby facial expressions from ultrasound images and their design with a three-dimensional printer were carried out. USG recordings are made during pregnancy follow-up and these images can be recorded. First, USG images were taken. Three-dimensional solid models of baby facial expressions were created from these images in the computer environment. The resulting solid model has been converted to STereoLithography (STL) format in order to be able to print from a 3D printer. Finally, 3D printing with Polylactic Acid (PLA) material was carried out. Thus, physical modeling was carried out with the help of a three-dimensional printer from the images obtained from USG, which is a medical imaging method.

Keywords: Ultrasound, Modeling, 3D printing

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An example of the current neotectonic features of Western Anatolia: The seismicity of Denizli and its surroundings

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Yavuz GÜNEŞ[2]
Mehmet KARA[3]
Kıvanç KEKOVALI[4]

Abstract

Denizli and its surroundings is one of the most seismically active regions in Turkey. The region is located at the eastern end of the two most important graben (Gediz and Büyük Menderes) in Western Anatolia. Therefore, active fault segments that produce earthquakes in the region are very diffused and large and contain different zones, causing intense seismic activity in the region. Particularly in recent years, the successive earthquakes in the region are the result of a complex tectonic deformation dominated by the N-S-directed extensional tectonic regime in Western Anatolia. However, the penetration of the African Tectonic Plate under the Anatolian Plate, which is effective on our southwest coasts, makes the defined uniform deformation in the region very complex and as a result of this, intense seismic activity occurs in the region. The region produced significant earthquakes in historical and instrumental periods. Moderate-sized earthquakes and intense seismic activity in recent years show that the young basins continue their tectonic evolution in the region. With the evaluation of the current data, most of the earthquakes occurred in the region occurred in the upper crust, earthquake-producing seismogenic zone has been seen 7-10 km to be around. In the scope of the study, faulting mechanism solutions of important earthquakes occurred in recent years revealed that in general the direction of W-E, N-S, NW-SE oriented normal faulting and oblique (normal faulting with strike slip component) dominate the region. The stress analysis revealed that the dominant direction of the TMax stress axis in the region is in the NNW-SSE direction. This shows that, the region is compatible with the regional stress axes.

This study is supported by Boğaziçi University Research Projects Commission under SRP/BAP project No. 16403. We thank to Boğaziçi University Research Fund Commission and members.

Keywords: Denizli, Western Anatolia, extensional tectonic regime, seismic activity

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Obtaining Nanomaterials from Erciş Pumice with Polyvinyl Alcohol

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Abstract

Raw pumice from Van, Erciş was used in this study to obtain nanomaterial. In this respect, as a carrier, polyvinyl alcohol (PVA)-based nanomaterials were successfully produced by using the electrospinning technique. The average diameter of PVA-based nanomaterial as a control nanocarrier was determined to be lower than 58 nm. Scanning electron microscopy (SEM) used 200.00 KX images revealed that depending on loading of pumice to PVA (P-PVA) provided crosslink between the nanomaterials. Furthermore, the P-PVA nanomaterial had a maximum of 113 nm and a minimum of 61 nm diameter. In this study, in order to fabricate P-PVA nanomaterials, electrospinning parameters were arranged to be 10 kV (supplied voltage), 10 cm (distance between the collector and Taylor cone), and 0.72 ml/h, respectively. On the other hand, for the fabrication of PVA nanomaterials, electrospinning parameters were determined to be different than the nanomaterials obtained from the pumice and PVA combination. This study revealed that following some chemical or physical processes in order to decrease the diameter within mm-sized, electrospinning was effectively applied to fabricate pumice-loaded PVA-based nanomaterial having lower diameters as compared to PVA-based nanomaterials. These obtained nanomaterials including pumice had a higher contact area as compared with micro-sized pumice. Therefore, especially in material science, this novel approach can be a guiding role for further studies.

Keywords: Pumice, nanotechnology, electrospinning, nanometer, fabrication.

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Use of Alloys Electrodes in the Electrocoagulation Process

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Abstract

The electrocoagulation (EC) process is recognized as a common wastewater treatment method that has been widely researched for a wide variety of wastewater sources due to its flexibility, easy installation, environmentally friendly nature and low footprint. Due to its process design and low-cost material, the EC process is widely accepted compared to other physicochemical processes. The critical operative factors in the EC process and the important relationship between EC and the typical chemical coagulation approach have been extensively evaluated as they are the main variables governing the contaminant elimination process. It clearly shows that the most suggested removal mechanisms of (oxy) hydroxide flocks against oxyanions, cationic heavy metals and organic pollutants during EC are adsorption and co-precipitation, charge neutralization and surface complexation, and direct/indirect radical oxidation, respectively. It is noteworthy that most researchers have studied EC using either iron or aluminum electrodes. Most of the Al and Fe electrodes used are not in pure form, but are alloys containing 99% Al and Fe, which contain many different metals. These alloys, obtained by adding different metal percentages, are efficiently used as electrodes in the EC process. Not only Al and Fe alloys, but also different alloys were used in this process. The aim of these studies is to increase the efficiency of EC treatment and to work with inexpensive electrodes. In this context, in this study, the parameters affecting EC are explained and the alloys used in EC treatment and studies in the literature are evaluated.

Keywords: Electrocoagulation, Alloy, electrode, treatment.

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Mask R-CNN based Apple (*Malus Domestica*) Detection and Segmentation

Eray ÖNLER[1]

Abstract

Apple (*Malus Domestica*) is an edible fruit originating from Central Asia (*Malus Siversii*). According to the amount of production in 2020 in the world, the largest producer is China with an annual production of 40.5 million tons. With an annual apple production of 4.3 million tons (2020), Turkey is the 4th largest apple producer after China, the EU and the USA. Apple is produced on 1.7 million decares of land in Turkey. In fruit production, 4-12% of the product is lost during harvest. In order to prevent and reduce losses that may occur during harvest, detection and monitoring of fruit maturity, design of harvesting systems that will not cause physical damage to the product, proper temperature management, and development of harvesting methods suitable for the product can be used. Autonomous harvesting machines that will be developed by considering these goals have the potential to prevent and reduce losses during harvesting. The first and most important stage of harvesting with autonomous machines is to detect where the fruit is on the tree with the help of various sensors. The aim of this study is to detect the fruits on the tree one by one through image and to obtain the pixel mask of the detected fruits. We used the state-of-the-art Mask R-CNN object detection and segmentation algorithm to detect fruits and obtain pixel-wise masks. In the presented approach, we created two models by using ResNet50 and ResNet101 as feature extractors and then compared them in terms of mAP (minimum average precision). The dataset required for the training of the system was created by manually eliminating the images collected with the keyword "apple tree" via the Bing image search engine. Dataset consists of 170 images in total. We used 120 images for training and 50 images for validation.

Keywords: Deep learning, Convolutional neural networks, instance segmentation, Mask R-CNN

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Privacy Attack With Osint Tools on Big Data

Emil ÇAY[1]
Selim BAYRAKLI[2]

Abstract

In the cyber security space, individuals share their personal information in many environments such as social media, forum sites, far from digital footprint awareness. Even a user who is interested in the entry-level operating system, programming language and OSINT (open source intelligence) tools can collect intelligence about people using completely open source in cyber attacks that violate the privacy of people. In fact, it has been stated that anonymized micro data from big data can be compared with the information obtained by OSINT tools and that unwanted information belonging to individuals can be used for doxing actions. OSINT Framework under the umbrella of user names, email addresses, domain names, IP addresses, images, videos and documents, social networks, messaging applications, search engines People, phone numbers, Forum, Blog, IRC chat records, archival documents, and there are many components such as meta data information. Open source operating systems and related open source programs that can access personal information, as well as examples of their use, and information that may violate confidentiality can be accessed on targeted accounts, as well as social media accounts and electronic mail accounts belonging to these accounts can be found with what tools have been studied. In this statement, as a completely big data environment, information will be provided about how many information related to people on the web, especially first name, last name, e-mail, photo information, from location information to camera images, can be easily accessed in accordance with the information shared by people.

Keywords: Big data, OSINT, open source, privacy, attack.

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Production of complex anthocyanins using recombinant microorganisms

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Abstract

Organisms' metabolic pathways can be manipulated by the use of recombinant DNA technology. The development of metabolic engineering including genome sequencing and synthesis, protein engineering, computational system biology, and synthetic biology tools have enabled researchers to generate robust microbial cell factories to produce a wide range of natural and non-natural primary and secondary metabolites, commodity chemicals, and biofuels.

Anthocyanins are plant pigments that are responsible for a wide variety of flower and fruit colors with hues of predominantly red, orange, purple, and blue. These anthocyanin pigments can be used as food and beverage additives and for generating pharmaceutical and cosmetic products.

However, the usage of anthocyanin pigments is limited due to their color instability. For that reason, in this study, we aimed to produce complex anthocyanin-based molecules by using recombinant microorganisms to get more stable and/or more bioactive anthocyanins. While prenylation (having a prenyl group) has been detected on most flavonoids, such as chalcones, flavanones, flavones, flavonols, and isoflavones, the key to synthesizing prenylated flavonoids is to find an efficient and stable prenyltransferase. For this purpose, the genes coding fungal prenyltransferases were transferred to *E. coli* and tested to obtain their ability to prenylate different flavonoid and anthocyanin molecules. Our results showed that complex anthocyanin molecules can be obtained by recombinant microorganisms.

Keywords: anthocyanin, *E. coli*, genetic engineering, pigment

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Effects of Certain Nutritional Additives to the Culture Medium on Androgenesis in Pepper (*Capsicum annuum* L.)

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Nuray ÇÖMLEKÇİOĞLU[2]

Abstract

Double-haploid techniques provide significant advantages in obtaining homozygous pure lines to be used in breeding and development new variety studies in a short time. In this study, the effects of maltose and various nutritional additives (4 µg l^{-1} vitamin B12, 225 mg l^{-1} vitamin C, 500 µg l^{-1} folic acid, 14.0 mg l^{-1} zinc, 115 µg l^{-1} selenium, 2 mg l^{-1} L-carnitine, 2 mg l^{-1} fructose, 932 mg l^{-1} acetyl L-carnitine, 115 mg l^{-1} citric acid, and 50 mg l^{-1} coenzyme Q10) on embryo formation in pepper anther culture were investigated. These nutritional additives were added to the culture medium or anthers kept in solution containing these additives. Tonton F1 capia type pepper (*Capsicum annuum* L.) was used in the study. Isolated anthers were cultured in 4 different media; The culture media used were: 1) **M1** was 4 mg l^{-1} NAA (naphthalene acetic acid), 0.5 mg l^{-1} BAP (benzyl amino purine), 0.20% activated charcoal, 10 mg l^{-1} $AgNO_3$, 30g l^{-1} sucrose and 7 g I^{-1} agar containing MS (Murashige and Skoog, 1962). 2) **M2** was 30g l^{-1} maltose containing (instead of sucrose) M1. 3) For **M3** anthers were incubated in solution containing these nutrient additives for 24 hours than planted on the M2, and 4) **M4** nutritional additives were added to the M2. Anther planted Petri dishes were subjected to high temperature at 35 ºC for 2 days in continuous dark conditions. Then, they were taken to the climate room adjusted to 25 ºC temperature and 16/8 hour photoperiod. The obtained embryos were transferred to hormone-free MS medium. Embryo development was observed in all culture media. The number of embryos obtained per 100 anthers were 9.1, 6.1, 20.9 and 4.9 for M1, M2, M3 and M4 respectively.

Keywords: *Capsicum annuum* L., Anther culture, Androgenesis, Nutritional Additives, Culture medium

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Genetic Connectivity of Yellowfin Tuna (Thunnus albacares) in Atlantic Ocean

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Abstract

The yellowfin tuna, *Thunnus albacares* is an economically important pelagic fish species with worldwide distribution in tropical and subtropical waters. Yellowfin tuna populations are heavily exploited, and they are currently listed as least concern in IUCN Red List. Yellowfin tuna is a migratory species and currently managed as a single stock in the Atlantic Ocean, yet uncertainty remains regarding their population structure. In the present study, genetic variation in yellow fin tuna in the Atlantic Oceans was investigated. The ND4 region of the mtDNA was analyzed from 83 samples of yellow fin tuna from the Middle Atlantic Bight, Northeast Atlantic Coast, Venezuela Coast, and Senegal Coast. The generated partial sequence of ND4 gene region was 623 bp long. Within the sequence, 27 variable sites were identified and 8 of which were identified as parsimony informative. A total of 19 haplotypes were detected from ND4 gene and these haplotypes were separated by 1-16 substitutions. The haplotype diversity and nucleotide diversity were calculated as 0.8657 and 0.00345, respectively. The pairwise distance between sampling sites was ranged between 0.002 and 0.004. Analysis of molecular variance (AMOVA) revealed low variation among populations and high variation within populations. Results of the present study suggest the possibility of genetic homogeneity between different regions.

Keywords: mtDNA, ND4, genetic variation

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Determination of Nutritional Status of Olive Groves in Manisa Province by Leaf and Soil Analysis

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Abstract

This study was carried out to determine the nutritional status of olive plant in Manisa province. For this purpose, soil and leaf samples were taken simultaneously from Saruhan, Ahmetli, Golmarmara, Alasehir, Akhisar and Turgutlu districts. In soil samples were done texture, pH, EC, lime, organic matter, extractable nitrogen, phosphorus, potassium, calcium, magnesium, boron, iron, copper, zinc, manganese. In the leaf samples were determined total nitrogen, phosphorus, potassium, calcium, magnesium, boron, iron, copper, zinc, manganese. 65.22% of the soils were determined in the sandy clayed loam, 73.91% were mild alkaline, 43.48% low, 34.78% high lime, 100% saltless and poor humic. The extractable nitrogen, phosphorus, potassium, magnesium and calcium contents of the soils were changed between 0.06-2.06 mg kg^{-1}; 78.30-325.63 mg kg^{-1}; 1.94-30.55 mg kg^{-1}; 63.34-611.67 mg kg^{-1} and 1558.86-4978.78 mg kg^{-1}, respectively. Extractable manganese, zinc, copper, iron and boron

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contents of soils were ranged between 5.58-46.20 mg kg^{-1}; 0.20-1.35 mg kg^{-1}; 0.34-6.19 mg kg^{-1}; 1.73-13.89 mg kg^{-1}; 1.57-6.83 mg kg^{-1}, respectively. When the nutrient contents of soil and leaves were evaluated together; it was determined that there were serious nutritional problems in terms of boron, zinc, potassium and nitrogen approximately 65%, 52%, 35% and 26% of the olive groves, respectively. Also, it was observed that there were no nutritional problems in terms of calcium, magnesium, iron and manganese, and there were some nutritional problems in terms of phosphorus and copper. High quality and high yield production in olive agriculture; balanced fertilization, addition of organic fertilizers and other technical applications. As with all plant species, fertilization programs for olive plant should be established according to soil and leaf analysis result. According to the results of analysis, it is important to give the deficient macro and micronutrients in addition to phosphorus, nitrogen and potassium fertilizers which will be given with basic fertilization.

Keywords: Olive, soil fertility, plant nutrition, Manisa

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Color content changes during the distinct flower development stages of *Rosa damascena* Mill.

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Sabri ERBAŞ [3]
Damla GÜVERCİN ÖNDER [4]
Murat MUTLUCAN [5]

Abstract

Color is an important feature of flowering plants and it affects flowers' visual appearance and influences industrial and commercial utilization of flowers. It is also important for attracting different pollinators to aid fertilization and production. In the present study, changes in total anthocyanin, chlorophyll a, b and total chlorophyll content, total carotenoids and colorimetric parameters (*a**,*b**,*c**,*L**,*h°*) were investigated using *Rosa damascena* Mill. petals harvested at five developmental stages (Stage 1, bud closed; Stage 2, sepals splited and their ends just started to separate from each other; Stage 3, sepals completely separated and petal colour was intensified; Stage 4, partially opened flowers; Stage 5, fully bloomed flowers). Total anthocyanin content was the lowest at S1 and anthocyanin content increased 9 fold at S3, and declined by 37% at S5. Chlorophyll a content was the highest at S1 but decreased sharply at S2 and its reduction was not significant at later development stages. Changes in chlorophyll b content was similar to changes in total carotenoid content during the S1-S5 stages. Chlorophyll b content slightly increased at S2 but it was not significant, and its content decreased at later stages. Total chlorophyll content did not change significantly at S1 and S2 but its amount dropped by 61% at S3. Later stages did not show any significant changes for total chlorophyll content. The highest carotenoid content was observed at S2 (8.08 µg ml^{-1}FW) and carotenoid content at later stages went down as the petal developed. Petals had lighter colors after S2 as was observed by reduced *a** and *c** and increased *b** and *L** values. The results showed *R. damascena* petals undergo significant color changes during flower development and blooming and may help to understand pigment metabolism. Our results may also help breeders and distillers for the improvement of petal color and development of appropriate harvesting and distillation techniques.

Keywords: Damask rose; anthocyanins; chlorophyll; carotenoids; colorimetric parameters

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Musilage Phenomenan in Adriatic Sea and Sea of Marmara

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Abstract

Mucilage is an exopolymeric organic substance due to the overgrowth of sea phytoplankton under stressful conditions. Also known as marine snow or sea snot. The first event was recorded in the scientific literature in the North Adriatic Sea in 1729.

Now It has taken place globally in the Mediterranean Sea, Ariake Sound in West Japan, Tasman Bay and near the Pacific coast in the USA, Marmara Sea, Turkey. Mucilage aggregates affects the phytoplankton populations in the water column, even when aggregates are at early stages. In Adriatic Sea the role of prymnesiophytes and other small flagellates is crucial for the initial phases of mucilage appearance. Several diatom and dinoflagellate species may contribute to the aggregate formation and enlargement. Tripos furca, Cylindrotheca closterium, Oxytoxum spp., Hemiaulus hauckii and Gonyaulax fragilis in Adriatic Sea and some phytoplankton species thought to influence mucilage formation in the Sea of Marmara characterized by Cylindrotheca closterium, Gonyaulax fragilis, Thalassiosira rotula, Skeletonema costatum. Mass mortalities in benthic species due to mucilage, underline the unhealthy conditions of the Sea of Marmara. Mucilage aggregates themselves may also affect the phytoplankton populations, development of a rich diatom community and enhancing nanophytoplankton growth. This study aims to provide information on the causes and consequences of mucilage phenomenan in the coastal areas.

Keywords: Phytoplankton, Musilage Aggregates, Marine Snow, Sea of Marmara, Adriatic Sea

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The Use of Waste Eggs From Egg Chicken Enterprises By Drying, as a Substitution of Protein, Oil and Calcium in Rat Rations and the Effects of the Prepared Feed To Animal Performance

Enes ÖZDEMİR[1]
İskender YILDIRIM[2]
Abdoulaziz HAMISSOU MAMAN[3]
Ekrem Musa ÖZDEMİR[4]

Abstract

In this study, it is to ensure that poultry waste and waste materials are processed with appropriate techniques and regained for animal nutrition. In the study, it is planned to dry the egg first. The ration will be prepared according to the daily nutritional needs of a mouse. Since the whole egg powder is rich in protein, fat and calcium, the ration will be prepared according to the nutrient analysis values after drying the egg powder instead of Soybean meal, Vegetable oil and Marble while preparing the ration. Finally, animal experiments are planned. Experiments; It will be held at Istanbul Medipol University Medical Research Center (MEDITAM). N:40 mice 21 days old will be randomly divided into 4 groups. Trial groups; Group A: 3% of the feed to be given to n:5 female and n:5 male mice will be used as a protein source in the diet. Group B: 5% of the feed to be given to n:5 female and n:5 male mice will be used as protein source in the ration. Group C: 7% of the feed to be given to n:5 female and n:5 male mice will be used as protein source in the ration. Egg powder will be used. Control group (F): n: 5 female and n: 5 male mice are the control group and will be fed with normal feeding. After 8 weeks of feeding 4 groups, the animals of each group will be sacrificed and the live weight of the rationed feed with egg powder and protein needs completed. increase, the development of albumin, total protein and calcium in the heart, liver, kidney and blood on animals will be observed.

Keywords: egg powder, mouse, chicken, feed, ration

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The impact of COVID-19 lockdowns on nutritional habits and physical activities of individuals in North Cyprus

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Neşe ORMANCI[2]
Tuğba Büşra ÇALIŞKAN[3]

Abstract

COVID-19 was declared a "pandemic" in March 2020 by the World Health Organization. Various measures were adapted by different countries round the world to cope up with this pandemic which affected the daily lives of people. Public health agencies requested governments to impose restrictions on free movement of individuals like staying at home and quarantine leading to social isolation in order to contain the spread of disease. These measures led to changed daily lifestyles like altered nutritional habits, sleep patterns and physical activities. This particular research was carried out in April 2021, to study the impact of taken measures on daily routines of particpants in North Cyprus using an online questionnaire. 582 people partcipated in the study of which 398 were women and 184 were men. SPSS, version 24 was used for statistical analysis. Of the total participants 68.4% were females and 31.6% were males, 58.2% of participants were married and 45% were university graduates and 51% were working online. Mean BMI of the participants was 25.05. 59.3% of females and 45.7% of males said that while staying at home their favourite foods consumption increased. Nearly 41% of all participants had no change in their sleep habits. 74.4% of females and 66.3% of males opted sedentary lifestyle during these lockdown times. increase their consumption of food and drink, have problems in weight control due to stress, and due to situations that require being at home, such as quarantine, a less active lifestyle is maintained compared to normal times, and in general, inactivity and excess food consumption return to individuals as weight gain. The study showed the negative impact on dietary habits and physical activities which can be related to stress and restrictions imposed on usual daily life activities like outdoor sports, changed work hours and work environments.

Keywords: COVID-19; dietary habits; lifestyle; physical activity; sleep pattern

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Metal-Organic Frameworks Design and Synthesis for Cancer Therapy and Diagnosis

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Abstract

Metal-organic frameworks (MOFs) are nanostructured coordination polymers designed and synthesized from variety of inorganic metal ions and variety of organic linkers through diverse methods and strategies to obtain versatile three-dimensional structures with diverse morphologies, compositions, sizes and chemical properties. Thus, they behave like a single entity with completely different physiochemical properties and this enables them to be used widely in different applications which include drug delivery. Their high porosity and tunable pore size with high surface area and pore volume provides them with high loading capacity enabling drug to be efficiently loaded within the pores. They have good biodegradability and good biocompatibility. Their easy surface modification enables their easy functionalization, so they can be multifunctionalized, loaded with drugs/diagnostic agents and used for active-targeted drug delivery. Also their composition and structure can be designed to obtain tailored responsive chemical and physical properties allowing their use for stimuli-responsive controlled drug release. All these have made them excellent candidates as drug carriers for use in cancer therapy and diagnosis to prevent the hard side effects of non-targeted cytotoxic cancer therapy. Recent successful laboratory trials have been made for synthesizing MOF loaded with cytotoxic therapeutic/diagnostic agents tailored to be stimulant responsive for cancer environment characteristics like low pH, magnet, redox, etc, applying the concept of passive targeting where the drug-loaded MOF accumulates in cancer cells through enhanced permeability and retention and then cancer environment stimulates the degradation of MOF and release of drug. Other successful trials have been made for functionalization of drug-loaded MOF with ligands that specifically binds to over-expressed receptors of cancer cells allowing selective entrance of drug-loaded MOF only to cancer cells applying the concept of active targeting. Successful trials also have implied both passive and active targeting together.

Keywords: Metal Organic Frameworks - Drug Delivery - Cancer therapy - Cancer diagnosis - Stimuli responsive

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Examining Level Design in Different Video Game Genres from an Architectural Point of View

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Abstract

Modern videogames are results of combined efforts of many talented and professional individuals from different areas of expertise. Game developers need programmers, level designers, artists, musicians, and many other people. Sometimes, they even need martial artists to capture difficult moves later used by game characters. However, one of the most important aspects of a videogame is architecture of level design. It defines how comfortable players are while they enjoy the game. Depending on the game type, theme, setting, and genre, different requirements are posed for level design. This study aims to analyze the level designs of the ten basic and most popular game genres, including "action/shooters games", "slasher/beat'em-up games", "survival horror games", and "open world role-playing games" from standpoint of architecture. The list of genres presented in the study is accompanied by commentary of what constitutes the experience players expect from a particular game. It is argued that level design should anticipate this expectation and conform to it to make gaming experience as comfortable as possible. As long as this objective is achieved, players will want to return to the game and play it again and again, creating positive feedback for the company and generating fan bases. Such communities make it easier for companies to exist because they are devoted buyers of digital products and valuable sources of feedback. Therefore, this study also provides a reference that orients developers toward the player-oriented model of game creation. More importantly, it tells architects what to expect and how to meet expectations of gaming community in the framework of digital architecture.

Keywords: Digital Architecture, Game Design, Genres, Videogames

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The Effects of Heavy Metals in Food on Human Health

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Abstract

Today, heavy metal ions, which constitute a large part of environmental pollution, have an increasing importance due to their negative effects on human health. In addition, it is included in the food chain with the contamination of plant productions and pastures on contaminated soils, negatively affecting human health as well as affecting all living systems. Heavy metal-contaminated plants also enter the food chain of animals and pass into animal meat and milk and are indirectly included in foods. In addition, drinking water can be contaminated from equipment and containers used during the production, storage and distribution of food, packaging and packaging materials or potable water. Heavy metals with densities greater than 5 g/cm3 and having a wide variety of chemical properties and biological functions are not normally found in the human body, but they are outsourced. Although some are necessary for human health in trace amounts, they can cause poisoning when taken in excess of the daily consumption amount. For this reason, heavy metal contaminations have a very important place in terms of food safety, which is concerned with the health of individuals and their healthy living. This review; lead, cadmium, manganese, arsenic, mercury, zinc, iron, cobalt, nickel, chromium, molybdenum, selenium, boron and antimony will be mentioned. Also; the effects of heavy metal consumption on human health will be explained. Measures to be taken in daily life to minimize possible health risks by reducing heavy metal consumption will also be touched.

Keywords: Heavy metals, health, toxicity, food contamination, food safety

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The Effect of Different Temperature and Time Applications on Some Properties of Traditional Fried Clotted Cream

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Abstract

In this study, a traditional fried clotted cream was produced by applying directly heating processes (two different temperatures and times) to clotted cream (produced from cow's milk). The aim of this research is to determine the effects of heat treatment applied to traditional fried clotted cream in terms of chemical, physical, microbiological, and sensory analyses, fatty acids profile and some carbonyl compounds. Clotted cream which was added salt was evaluated according to the control sample which was partially heat treated (1 minute at 95±2°C) by applying heat treatment at two different temperatures (110 °C and 130 °C) and two different times (5 minutes and 10 minutes). The water activity, total dry matter (%), lactic acid (%), acid value (%), peroxide value (mek O_2/kg fat), L*, a*, b*, browning index, microbiological and sensory analyses of fried clotted cream on the 1st, 30th and 60th days was investigated. The L*, a* and b* values of the fried clotted cream samples were found between 37.17 - 74.13, -1.31 - 1.62, 0.57 - 2.76 on the first day of storage, respectively. While the statistical difference was significant for the acid values (%) of the samples ($P<0.01$), the peroxide value was found to be lower in all heat-treated samples compared to the control group ($P<0.01$). The sample with the highest score in the taste, smell and acceptability value of fried clotted cream was the one that was heat treated at 130 °C for 5 minutes. It was found that the prominent fatty acids detected in the fried clotted cream samples were myristic, palmitic, stearic acid, and oleic acid from polyunsaturated fatty acids. With the increase of temperature and time, color and sensory properties of fried clotted cream changed, shelf life was extended and some characteristic carbonyl compounds were observed in the samples.

Keywords: Fried clotted cream, Free fatty acids, Carbonyl compounds, Temperature, Time.

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Applications of h-BN in Lithium-Sulfur Batteries

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Ali Osman AYDIN[4]

Abstract

Considering today's technological developments, storable energy gains great importance. With the development of the electric vehicle industry, it is of great importance that energy storage technology is long-lasting, safe, low-cost and environmentally friendly. In addition to their advantages such as high energy density and environmental friendliness, lithium batteries also have some disadvantages. Degradation at high temperatures, the need for a protective circuit, loss of capacity as a result of overcharging or thermal degradation can be considered among these disadvantages. Hexagonal boron nitride (h-BN) plays an important role in many studies conducted to avoid these disadvantages.

In this study, it is aimed to improve the properties of Li-S batteries and prevent their disadvantages thanks to the h-BN nanocomposite, which has unique characteristics and provides advantages in the areas where it is used. For this purpose, the superior mechanical and chemical properties of hexagonal BN were combined with reduced graphene oxide (rGO) to provide co-deposition of rGO layers in the composite film. In addition, free and flexible rGO/h-BN/S composite paper electrodes containing different amounts of BN by weight and impregnated with sulfur were prepared. The obtained composite papers were used as cathodes in Li-S batteries without using binders. Within the scope of this study, morphological and structural analyzes of the composite films were conducted with X-ray diffraction (XRD), field-emission scanning electron microscopy (FE-SEM) and energy dispersive x-ray spectroscopy (EDS). After the CR2032 cell was assembled, the charge-discharge capacities were checked by carrying out electrochemical performance tests. As a result, the rGO/h-BN based composites will be developed as environmentally friendly and metal-free materials by further increasing the electrochemical performance and electron transport of lithium batteries.

Keywords: Hexagonal BN, Li-Sulfur batteries, rGO/h-BN/S composite paper electrodes

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Comparative Analysis of Hourly Electricity Consumption on Weekdays and Weekends

Kerim DİNCER[1]
Fatih Mehmet NUROĞLU[2]

Abstract

Electricity consumption, which changes hourly, has an extremely dynamic structure. There are many reasons (temperature values, working hours, public holidays, religious holidays, etc.) that affect hourly electricity consumption. Daily maximum consumption values, export and import values, installed power investments, interest in renewable energy, private sector investments, electricity consumption per capita and the number of households are increasing day by day. The effect of these changes on daily electricity consumption should be well studied. If a successful consumption forecast is to be made, the characteristic consumption characteristics of the days should be determined. First of all, a good distinction should be made between weekdays and weekends. Hourly consumption differences should be examined. In this study, the months of July, October, January and April of 2019 and 2020 were studied. Weekdays and weekends are analyzed in two separate graphs. It has been observed that weekdays and weekends have some similar characteristics among themselves. A random month was chosen from each season. Differences and similarities in electricity consumption of different years and months have been interpreted. These obtained data will be very useful in consumption estimates.

Keywords

Characteristic of Electricity Consumption, Hourly Load Forecasting, Electricity Demand Forecast, Short Term Forecasting, Consumption Analysis.

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The Effects of Covid-19 on Electricity Consumption

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Abstract

Some national or international problems cause great changes in electricity consumption. The effects of these problems on electricity consumption should be well studied. With the appearance of Covid-19 in Turkey, there have been some changes in electricity consumption. This unexpected event caused restrictions, bans, some changes in working hours and economic difficulties. People started to work from home, could not go out at certain hours, working hours decreased and production in factories slowed down. With these developments, reductions and differentiations in electricity consumption have been observed. These changes, which return to normal after a certain period of time, are frequently discussed, interpreted and solutions are offered. It is important to detect changes in electricity consumption. Because these data are needed both in determining the actions we need to take for the period we live in and in determining the scenarios that can be experienced for the future periods. In this study, the changes caused by Covid-19 in Turkey's electricity consumption values were examined. Sudden peaks, total consumption, export values, monthly changes, unexpected movements on electricity groups are compared with the previous years. It is aimed to have foresight for the changes that a global epidemic like Covid-19 or an unexpected global event may cause in electricity consumption.

Keywords: Covid-19, Electricity Consumption, Unexpected Changes, Epidemic and Electricity, Changes of Electricity.

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Investigation of Antimicrobial and Anticarcinogenic Bioactive Metabolite Production Potentials of Three Local Streptomyces Strains

Gizem TERZİ[1]
Aslıhan KURT KIZILDOĞAN[2]

Abstract

The ineffectiveness of drugs used to treat infectious diseases and cancer requires the identification of new bioactive compounds for new drug discoveries. In this sense, *Streptomyces* sp, included in the Actinomycetes group, is a very important genus that produces 7600 compounds of the polyketide (PK) and nonribosomal peptide (NRP) types, most of which have antimicrobial, antifungal, anticancer and antitumor properties. However, only 10% of *Streptomyces* genomes can be activated under standard laboratory conditions.

In this study, we aimed to obtain new Streptomyces isolates with ability to produce bioactive molecules exerting antimicrobial/cytotoxic activity. Thus, three local *Streptomyces* sp. strains were isolated from the soil of the Amasya apple orchard and they showed 99% of 16S rRNA sequence identity to other *Streptomyces* sp. strains which are known as antimicrobial and antitumoral compound producers. The local *Streptomyces* strains named as *Streptomyces* sp. GA1, GA2 and GA3, were cultured in ISP4 for 120 h at 28°C and 220 rpm. Supernatants from ISP4 liquid cultures were used in bioactivity experiments. The antimicrobial activities were determined by agar disk diffusion and broth microdilution methods using nine indicator microorganisms. Their cytotoxic activities were also determined by MTT assay using human embryonic kidney cells (HEK293) epidermal human colon adenocarcinoma cells (CaCO-2), human prostate carcinoma (LnCap) and human breast adenocarcinoma (McF-7) cells.

As a result, all strains exerted 512 µg/ml Minimal Inhibitory Concentration (MIC) values against indicator strains. Increased concentrations of human prostate carcinoma (LNCAP) cancer cell line decreased cell viability. This, in turn, suggests that it inhibits the proliferation of the cell. No changes in the cancer cell line of human breast adenocarcinoma (MCF-7) were observed. Our results might be further improved by purification of the exact bioactive molecules as a candidate in medicine.

Keywords:*Streptomyces* sp., fermentation, supernatant, antimicrobial activity, cytotoxicity

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Problems and Solutions in The Breeding of Medicinal Plants

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Abstract

Medicinal plants are plants with high economic value that have been used as medicine for the protection of health and the fight against diseases since ancient times. It is used as a spice and flavoring in the food industry and is preferred in the cosmetic industry and religious ceremonies because of its pleasant smell. With these usage areas, medicinal plants are among the agricultural products whose importance is increasing day by day. Due to its climate, agricultural potential, surface area, geographical situation, and plant diversity, our country is among the leading countries in the trade of medicinal plants. Turkey provides raw materials for many herbal products that constitute the input of herbal medicines, plant chemicals, food and additives, cosmetics and perfumery industries in developed countries. Many of these plant species grow naturally in the flora of our country. These plants are mostly collected from nature and find a place in the domestic and foreign markets. These plant species, which are unconsciously collected from nature, are decreasing day by day and even disappearing. The cultivation of these plants is important both in terms of preventing the extinction of the species and meeting the global demand. The main problems encountered in culture are product quality and yield, which are not at the desired level. Therefore, irrigation occupies a very important place. It will be possible to obtain more yield and better quality products from the unit area only with well-planned breeding programs. This research aims to discuss the problems encountered in the breeding of medicinal plants, their breeding methods, and their suitability to the current situation, to examine the application of practical and different techniques for medicinal plant breeding, and to present solutions.

Keywords: Medicinal plant, Breeding metods, Production

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Fungal Diseases And Mold Flora in Amygdalus Communis

İlknur ARSLAN[1]

Abstract

It is noteworthy that the interest in almond cultivation in Adıyaman has increased in recent years. In addition to this increase, it is faced with fungal factors that cause significant yield losses in almond fields. In this study, Fungal diseases occurring in almond orchards in Besni, Gölbaşı and Kahta districts of Adıyaman province and microfungi found in fruit were investigated. In order to determine the prevalence of these disease agents, 25 different orchard censuses were made in 2 different districts. Polystigma ochraceum, Wilsonomyces carpophilus, Taphrina deformans, Monilinia laxa, diseases were detected in the districts where the disease survey was carried out. The most common of these diseases are Polystigma ochraceum, Monilinia laxa, Taphrina deformans, Wilsonomyces carpophilus, respectively.

Another major problem in almonds is microfungi. These microfungi can be exposed to contamination of almonds during harvest, drying and storage. Insufficient drying and improper storage conditions may cause mold formation in dried fruits.

These microfungi cause both economic and serious health problems. This is a problem that almond growers do not want. In the districts of Besni, Kahta and Gölbaşı, where almond cultivation is common, 100 kernels of 25 grams of almonds were collected from 100 different orchards at harvest time. When the samples taken were investigated in the laboratory in the direction of mold flora, generally 40% Fungal infection was observed. Penicillium, Fusarium and Aspergillus genera, known as storage fungi, were found in these samples. The low rate of mold in stored almonds indicates that the drying and storage conditions are suitable.

Keywords: Almond, Fungal Diseases, Microfungi, mold flora

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Studies On The Determination Of Ectoparasites and Their Prevalence Rates İn Cattle İn İzmir, Aydın and Muğla Regions

Bilal DİK[1]
Özge ÖKTEM[2]

Abstract

This study was planned to determine the prevalence and prevalence rates of ectoparasites in cattle in Muğla, Aydın and İzmir regions and was carried out in 12 districts of Muğla, Aydın and İzmir provinces between June 2020 and 2021. During the study period, 191 (% 14,11) of 1353 cattle were infested with ectoparasites. Accordingly, out of 191 infested cattle, 138 (% 72,25) ticks, 24 (% 12,57) lice, five (% 2,61) mites, seven (% 3,67) fleas, eight (% 4,19) hippoboscid, nine (% 4,71) infested with tabanid species. Tick infestation was found only in April, May, June, July and August, and no tick infestation was found in other months. Four adult tick species (*Hyalomma marginatum, Hyalomma excavatum, Hyalomma detritum, Rhipicephalus turanicus*) were detected in cattle. Lice infestation was found only in February, and four lice species (*Bovicola bovis, Linognathus vituli, Solenopotes capillatus, Haematopinus quadripertusus*) were detected in cattle. Mite infestation was encountered only in cattle of Aydın region and only *Chorioptes bovis* species were encountered. *C. bovis* or other mites could not be detected in cattle in Muğla and İzmir regions. Flea infestation was found only in İzmir region cattle in June, July and August, and two flea species (*Ctenocephalides canis*, *Ctenocephalides felis*) were encountered. Hippoboscid infestation was encountered only in October and June in Muğla, Aydın and İzmir regions, and all of the species were identified as *Hippobosca equina*. Tabanid species were encountered in June and July, and three species (*Tabanus bromius, Tabanus exclusus, Philipomyia aprica*) were detected in infested cattle.

Keywords: Aydın, Izmir, Muğla Cattle, Ectoparasites

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Effect of Osmotic Stress on Coleoptile Length in Barley Varieties

Selçuk KODAZ[1]

Atom Atanasio Ladu STANSLUOS[2]

Abstract

This study carried out in a complete randomized design with 3 replications to determine the effect of osmotic stress on coleoptile in barley varieties. In the study, 74 varieties of barley were tried in 3 different osmotic stresses (Control, -4 Bar and -6 Bar). In the results of the study, significant differences were determined between the varieties and osmotic stress applications, and the variety × dose interaction was significant due to the different responses of the varieties to osmotic stress applications. According to the means of the applications, the coleoptile lengths of the varieties ranged between 14.23-38.11 mm, while the mean coleoptile length was 25.95 mm. The lengths of coleoptile were determined between 18.32-44.67 mm in the control, 14.50-38.75 mm in -4 Bar and 9.67-34.42 mm in -6 Bar osmotic stress, while the mean coleoptile lengths were 30.96 mm, 25.91 mm and 20.98 mm respectively. Erciyes variety showed the longest coleoptile in the control, followed by Çatalhüyük 2001 and Cumhuriyet 50 varieties. Cumhuriyet 50 variety has the longest coleoptile in -4 Bar osmotic stress application, followed by Akdane and Çatalhüyük 2001 varieties. In -6 Bar osmotic stresses, the longest coleoptile was Çatalhüyük 2001 variety, followed by Cervoise and Akhisar 98 varieties. According to the mean average of the applications, Çatalhüyük 2001 variety had the longest coleoptile, followed by Cumhuriyet 50 and Cervoise varieties. The shortest coleoptile length was Gazda variety followed by Harman and Hilal varieties. According to the mean average of the applications, 3 varieties have a coleoptile length above 35.00 mm, 42 varieties were between 25.00-35.00 mm, and 30 varieties were under 25.00 mm.

Keywords: Barley, Coleoptile, Osmotic stress, PEG 6000, Osmotic potential

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Comprehensive Mining and Characterization of CRISPR-Cas System in Veillonella spp.

Özge KAHRAMAN ILIKKAN[1]

Abstract

Veillonella is a gram-negative diplococci. Veillonella spp. are known to grow on on lactate, pyruvate, malate or fumarate. That bacteria fermentates lactate into propionate and acetate has been associated with marathon running atlets and has made bacteria favorable for improving athlete performance. For example, Veillonella atypica gavage approach has been shown to improve treadmill run time in mice. Up to date, only Veillonella atypica genome has been comprehensively analyzed and CRISPR systems have been revealed. Therefore, this research aimed to comprehensively investigate Veillonella spp. CRISPR systems, Cas1 and Cas2 proteins, and bacteriophage invaders through spacer analysis. 40 whole and draft genomes belonging to strains of 9 different species were downloaded from NCBI. CRISPR types, repeat sequences, spacers of strains were obtained with CRISPR-Cas++ tool. Cas1 and Cas2 amino acid sequences were obtained from NCBI. All Cas1 and Cas2 amino acid sequences were aligned by the ClustalW alignment algorithm with the MEGA X tool and the UPGMA tree was constructed by using bootstrap method 500 replicates in Geneious Prime 2020.1 software. Spacers belonging to a bacteriophage were analyzed with the CRISPRTarget tool. Seven different CRISPR types were revealed in genera. Namely, 45% III-A, 21% II-A, 11% II-C, 9% I-B, 8% III-D, 4% I-C, 2% I-F. Cas1 and Cas2 proteins were clustered according to subtypes. Phage invaders of genera were Proteus phage PM 85, Proteus phage PM 93, Clostridium phage PhiS63, Clostridium phage PhiS63, Clostridium phage PhiS63, Bacillus phage Grass, Escherichia phage pro147, Campylobacter phage CPt10, Thermoanaerobacterium phage THSA-485A, Bacillus phage Hoody T, Bacillus phage CAM003.

Keywords: Veillonella spp., CRISPR, bacteriophage, Cas1, Cas2

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Determination of Knowledge Level of Manager Personnel about Food Safety Management System in Four and Five Star Hotel Operations of Antalya

Mihriban Ülkü KÖRK[1]
Bedia ŞİMŞEK[2]

Abstract

The aim of the study is to evaluate the levels of knowledge and implementation on food safety management systems of the staff at four and five-star hotel enterprises in Antalya. The research was included 153 hotel businesses; 65 of them are four-star, 88 of them are five-star. Research data were collected in September-November 2021 period. The data of the study was analyzed with statistical package program SPSS 28.0. Normal distribution tests, frequency tests and Chi-Square tests were applied to data. It was reported to have the most ISO 22000 (HACCP) food security management system in the enterprises of the hotel administrators participating in the study. According to the results of this study, the frequency of the regeneration of food security was renewed at most annually, there were also hotel enterprises which have never renewed food safety management systems. %54.2 of managers have got information about the legal legislation of HACCP system. Only 89.5% of hotel enterprises have HACCP plan and team. There are food engineers in the HACCP teams of hotel businesses. The majority of hotel businesses have implemented HACCP systems by consulting services. The HACCP system was increased customer satisfaction. With the implementation of the HACCP system, the personnel have increased knowledge of hygiene-sanitation and food safety. Five-star hotel enterprises were found to create a pandemic team and the implementation of the measures taken for the pandemia, and they are better practicing these precautions.

Keywords: Survey, hotel, food safety management system, HACCP, quality

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Effect of Induction Hardening on Different Firearm Materials

Kazım BOZDOĞAN[1]
Melike KARAKOÇ[2]

Abstract

The heating and cooling processes applied in solid form in order to remove the residual stresses and internal structure tensions that may occur in steels after cold and hot forming to gain hardness and toughness, to increase the resistance of the material against impacts, to change the crystal structure and increase the corrosion resistance are called heat treatment. In the selection of heat treatment methods to be applied to materials, preference should be made by considering criteria such as material structure, cost, applicability of the process, properties expected from the structure after heat treatment.
When the reasons for the effects of adhesive, abrasive, corrosive, erosive and pitting wears are questioned in terms of wear diversity, it is very important in terms of life and efficiency that the surfaces of the materials working under abrasive wear stress with sawdust, dust, etc. located in surfaces are hard and resistant to abrasion. In order to solve these problems, induction surface hardening processes are used effectively in the arms and defense industry as a suitable process for this type of materials.
It is utilized as a versatile heating method that includes uniform surface hardening, local surface hardening, total hardening and heat treatment of hardened parts in applications of induction surface hardening process for use in different sectors. In the hardening process, a high frequency magnetic field is obtained by passing high frequency alternating current through an inductor. These high-frequency currents are moved on the surface of the metal and the surface of the part is heated and suddenly cooled under favour of the resistance of the metal against these currents. Precise control of the hardening depth is the most basic parameter of the process.
Our company, which operates in the production of Firearms, has focused on development studies in the use of different parts as components in the production line. Therefore, it has been especially evaluated that the effect of heat treatment may cause different gains in applications for industrial use in the sectoral sense. Firearm parts containing different ratios of alloying elements, Barrel extension (4140 Steel), Trigger (1040 Steel), Hammer (Ck45) have been hardened by induction. During all these processes, the control of the desired hardness and hardness depth was analyzed and studies were carried out to determine the optimum processing times.

Keywords: Heat Treating,Micro Structure,İnduction,Hardness,Stells,Wear.

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Analysis of Post-Quantum Cryptographic Systems

Melike KARATAY[1]
Ebru YALÇIN[2]

Abstract

The need for stronger encryption systems is increasing with the development of technology. Public-key cryptography is under threat with Shor and Grover algorithms. To close this gap, scientists have started to develop algorithms that can remain strong even post-quantum. Quantum computers threaten the original purpose of every secure and authentic communication, as they are able to perform calculations that traditional computers cannot. More specifically, quantum computers can quickly crack encryption keys by calculating or searching through all the secret keys. Even elliptic curve encryption, now considered the most secure and efficient scheme, appears to be weak against quantum computers. As a result, the need for strong encryption algorithms for quantum calculations has emerged. In 2017, a competition was started by NIST (National Institute of Standards and Technology) to determine the standard encryption system in the field of post-quantum cryptography. Many systems have been proposed in this process. Lattice-based systems have come to the fore as the most promising systems. After completing two rounds in the competition, the systems that qualify for the third round were announced by NIST. In this paper, the encryption and security parts of the lattice-based systems that passed from the second round to the third round in NIST's Post-Quantum Cryptography project were examined.

Keywords: Cryptography, Post-Quantum, Lattice-Based, Encryption, Security.

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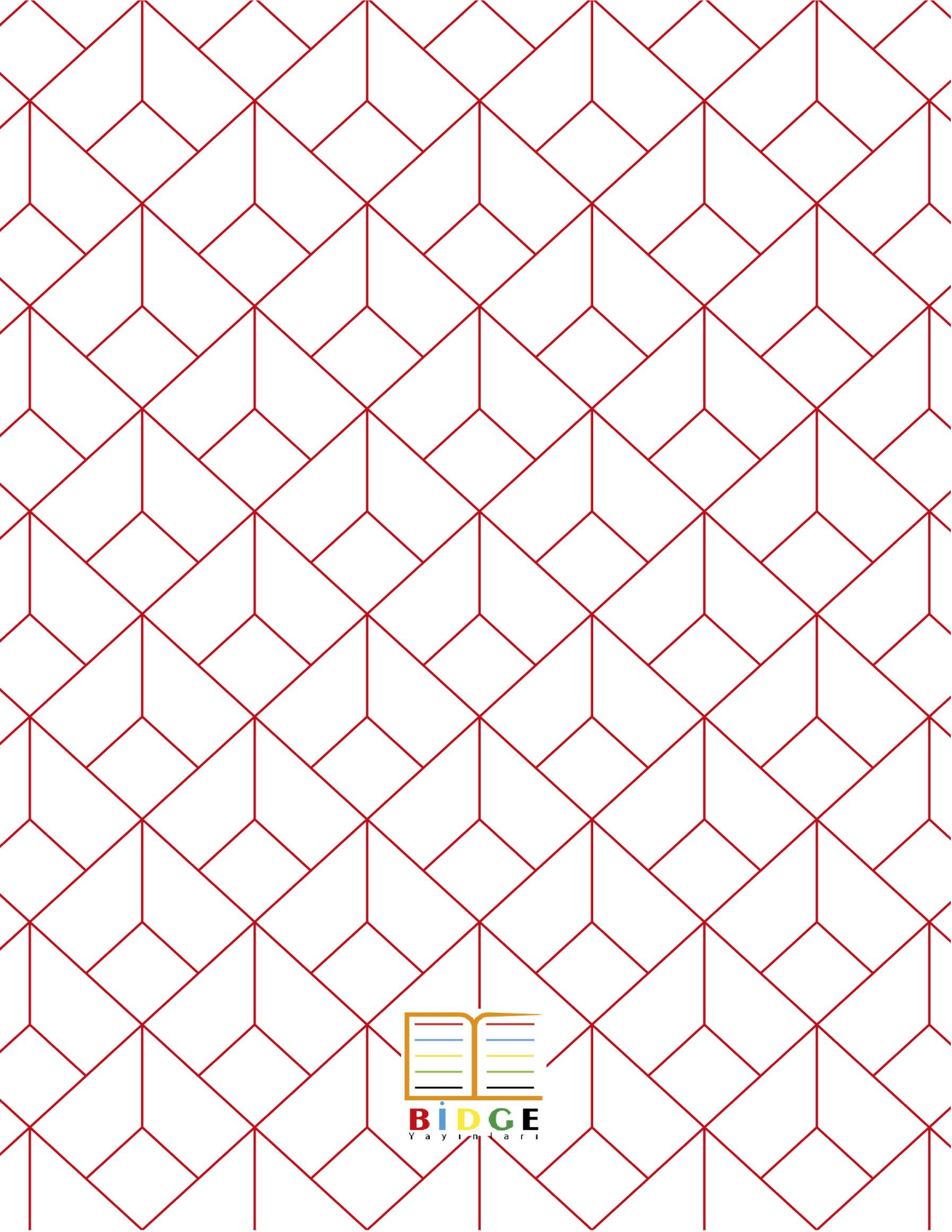
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