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FIYATLARIMIZA KAHVALTI DAHIL OLUP, KDV HARIÇTIR

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Editors

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Hesham A. El ENSHASY

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Dear Scientist,

The sixed International Congress on Advances in Veterinary Sciences & Technics (icavst) was organized in Aksaray, Türkiye. We are very happy for organizing this congress in such a beautiful city and country that we have strong historical ties.

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

The scientist joined the congress was from different country and mostly from Turkey. Total over the one hundred scientists were registered in the congress. The total number of submissions were 43 and after a careful evaluation 32 submissions were accepted by our scientific committee and 2 of them were accepted as poster presentation and 29 of them were accepted as oral presentation and all those presentations was taken place in the conference booklet.

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

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Abbreviation
FVM: Faculty of Veterinary Medicine

CONTENTS

	Page
Preface	**i**
Program Schedule	**ii**
Oral Presentation	
Poster Presentation	

ORAL PRESENTATIONS July 26, 2022

10:10- 10:20	**INVITED SPEAKERS**	
10:30	**Prof. Dr. rer. Nat. Hesham A. El ENSHASY** "The Future of Anti-infectives: Beyond Conventional Antibiotics"	1
11:30	**Dr Ernesto Hernandez - "**Bioprocessing and biocatalysis for a post COVID world"	2
11:00- 12:30	**SESSION I Chairman: Dr. Tamercan MORKOÇ**	**Page**
13:00	**Muhammad Nauman Aftab** "Low cost bioethanol production from various plant biomass by nano-coupled recombinant β-glucosidase from Thermoanaerobacterium thermosaccharolyticum"	3
13:15	**Siti Fatimah Zaharah Mohd Fuzi** "Screening of functionalized rice husk biochar with cyclodextrin for carbazole absorption in wastewater"	4
13:30	**Dalia Sukmawati** "Mechanism of yeast from cacao bean fermentation to inhibit the growth of cacao pathogenic mold"	5
13:45	**Nur Izyan** "Sateera®-based Sanitary Pad as Potential Natural Deodorizer"	6
14:00	**Daniel Joe Dailin** "Platform technology for plastic waste bioremediation using microbial approach"	7
13:20-15:00	**SESSION II Chairman: Prof. Dr. Hidayet Metin ERDOĞAN**	**Page**
14:30	**Nor Hasmaliana binti Abdul Manas "**Spray Drying Evaluation for Development of Pineapple Prebiotic Powder and Prebiotic Properties"	8
14:45	**Çağlar Akaçay** "The effect of different agricultural wastes and pH environments on yield and nutritional quality of medicinal mushroom (Lentinus edodes)"	9
15:00	**Ayşe İkinci Keleş** "Histopathological Evaluation of the Protein Tyrosine Phosphatase and Tensin Homologue (PTEN) Gene Causing Endometrial Carcinoma"	10
15:15	**Duygu Çamkerten** "The Effect of Supplementation of Beta-Alanine and High Intensity Interval Swimming Training on Lactic Acid and ACTH Hormone in Rats: A Preliminary Report**"**	11

15:30	**Hatice Büşra Lüleci** "Computational Prediction of the Metabolic Alterations shared by Alzheimer's Disease and Type 2 Diabetes"	12
15:20–16:50	**SESSION III- Online. Chairman: Assoc. Prof. Dr. Ayşe İKİNCİ KELEŞ**	
13:00	**Mazura Jusoh** "Microwave assisted extraction and phytochemical analysis of peperomia pellucida for treatment of dengue"	13
13:10	**Siti Alyani Mat** "tREATED cocoa bean (theobroma cacao L.) extracts and its antibacterial properties"	14
13:20	**Ida Madiha Yusoff** "Ultrasonic treatment, high speed mixing and thermal pasteurization for selected tropical fruits"	15
13:30	**Maizatulakmal binti Yahayu**"Recovery of phenolic-rich condensate from pineapple waste biomass as potential rubberwood preservative agent"	16
13:40	**Zaitul Iffa Binti Abd Rasid** "The Development of Mangrove Wood Vinegar-based Sanitary Pad"	17
13:50	**Nor Farahiyah Aman Nor** "Effect of Homogenization Speed and Duration in Virgin Coconut Oil Emulsion"	18
15:20–16:50	**SESSION IV- Online. Chairman: Assoc. Prof. Dr. Ayşe İKİNCİ KELEŞ**	**Page**
14:10	**Osama AbdelHadi**"Bioprocess Optimization Scaling Up Platform Development for Biomass and Spores Production by Bacillus amyloliquefaciens"	19
14:20	**Seda Beyaz** "InvestıgatIon of the TherapeutIc Effect of Fullerene C60 agaInst Heart TIssue Damage by Some ProteIn SIgnalIng Pathways and HIstopathologIcal Bıomarkers"	20
14:30	**Volkan Karakurt** "Evaluating the activity and stability of protease immobilized onto chitosan and silica gel beads against some metallic ions, organic solvents and detergent	21
14:40	**Ece Evliyaoğlu** "Stability of the housekeeping gene β-actin to temperature increase in rainbow trout"	22
14:50	**Merve Gebeş**"Determination of the Effect of Plant Growth Regulators on Secondary Metabolite Contents in S."	23
17:20–18:40	**SESSION V-- Online. Chairman: Assoc. Prof. Dr. Ayşe İkinci Keleş**	**Page**
15:10	**Aslıhan Baykal**"Evaluation of the apoptotic effect of tannic acid on canine mammary carcinosarcoma cells"	24
15:20	**Aslıhan Baykal**"Determination of the effects of Traf2 and Nck-interacting protein kinase (TNIK) inhibitor on PI3K/Akt/mTOR signaling in canine lipid-rich carcinoma cells"	25
15:30	**Hayrun Nisa Bülbül** "Antibacterial Efficacy of Alternative and Conventional Endodontic Irrigants on S. mutans and E. Faecalis"	26
15:40	**Beyza Doğruyol** "Preparation and Characterization of Antibacterial Composites Containing Hexagonal Boron Nitride Nanoparticles"	27

15:50	**Fatih Ortakcı** "Isolation and molecular ıdentification of a Novel PiChia kudriavzevii FOL-27"	28
16:10	**Nurgül Koçak** "Investigation of the cytotoxic effect of silver nanoparticles obtained from betula pendula roth leaf extract by green synthesis on mcf-7 cancer cells"	29
	POSTER PRESENTATIONS JULY 26, 2022	
16:00	**Nor Hasmaliana binti Abdul Manas** "Entrapment of multi-enzymes for conversion of starch to malto-oligosaccharides"	30
16:00	**Elif Karaman** "The construction of affinity agent production platform by using pyrg auxotroph aspergillus oryzae and the production of the nanobodies (vhh)"	31

INVITED SPEAKERS

THE FUTURE OF ANTI-INFECTIVES: BEYOND CONVENTIONAL ANTIBIOTICS

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Nowadays, antibiotics are widely used worldwide with many therapeutic applications. Since the initial commercial production of antibiotics in 1930s starting with successful commercialization of penicillin's (as model β-lactam antibiotic) followed by the discovery of tetracyclines group (tetracycline, oxytetracycline, and chlorotetracycline), many antibiotics have been discovered by different groups of researches worldwide. For more almost 100 years for now antibiotics saved life of many people worldwide. It was estimated that if antibiotics were not existed in treatment protocol, the number of deaths could be tripled. However, with the extensive use of antibiotics with miss-use and miss-dose problems in addition of the extensive uses of antibiotics in non-medical fields such agriculture, aquaculture, and animal feeding many problems have been created. Continuous exposure of human body to subclinical doses of antibiotics, lead to the development of new generation of microbes which are resist to many known antibiotics. In addition, extensive uses of antibiotics in human body can lead to the significant reduction of natural human microbiomes (probiotics) which play significant role in general human health. Therefore, the need of applying other natural anti-infectives which cannot lead to microbial resistance over time without inhibition of neutral microbiota is needed. In this lecture, the new trends of anti-infective development will be presented, providing a futuristic view of novel antimicrobial bioactives of the future.

Keywords: Antibiotics, Anti-infective, Future

BIOPROCESSING AND BIOCATALYSIS FOR A POST COVID WORLD

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Current climate change concerns and our post COVID world continue to change the way we used to live, sometimes opening opportunities for sustainable societies by deploying better human creations. For instance, biotechnology approaches are mentioned as key option in several worldwide initiatives, including the UN Sustainable Development Goals, COP26 and more. Bioprocessing and biocatalysis are major parts of biotechnology for materials transformation. Biomass instead of petroleum, coal or controversial food feedstocks can produce cheaper, safer, faster and environmentally friendlier products and services. For instance, advanced biofuels, bioplastics, biooil, sugars, biofertilizers, proteins and foods to cite a few. In the current bioeconomy, the global biotechnology market grew 2.9% in 2022 and could be US$2.44 Trillion in 2028. The biotechnology market contributes 2.7% to the GDP in OECD countries. By 2030, the biotechnology market could be greater in non-OECD countries; more than 50% of total world agricultural output and 35% of chemicals and related output would depend on biotechnology. Over 40 countries have a national strategy related to bioeconomy and 13 have a dedicated bioeconomy strategy. Bioprocessing and biocatalysis are key players to build up a more sustainable future offering a better quality of life to people worldwide.

Keywords: Bioprocessing, biocatalysis, COVID

ORAL PRESENTATIONS

LOW COST BIOETHANOL PRODUCTION FROM VARIOUS PLANT BIOMASS BY NANO-COUPLED RECOMBINANT B-GLUCOSIDASE FROM THERMOANAEROBACTERIUM THERMOSACCHAROLYTICUM

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With an increasing demand of an alternating source of energy for industries and transportations, thermostable cellulases are considered to be an important enzymes for the saccharification of cellulosic material for biofuel production. β-glucosidase is an essential cellulase enzyme and plays a key role in the degradation of cellulosic biomass and produce simple sugars that can be converted into biofuel. In the current research work, cloning, expression, purification and characterization of β-glucosidase was carried out from Thermoanaerobacterium thermosaccharolyticum into E. coli. β-glucosidase gene from thermophile T. thermosaccharolyticum was amplified through PCR and later cloned in pET-21a(+) vector by utilizing standard procedures. β-glucanase was expressed in E. coli and enzyme thus obtained was purified by ammonium sulphate precipitation and immobilized metal ion affinity chromatography with 2.74 fold purification having 31.87 U mg-1 specific activity and recovery of 29.42%. Molecular weight of the purified β-glucanase was 75 kDa as determined by sodium dodecylsulphate polyacrylamide gel electrophoresis (SDS-PAGE). Effect of temperature, pH, metal ions, organic solvents on the purified enzyme was analyzed. The enzyme was stable upto 80°C with a broad pH range of 4-9, with optimum temperature 70°C and pH 6.5. The enzyme activity was increased in the presence of metal ions especially Mg+2 and Ca+2, reduced activity in the presence of Cu and Mn and was highly affected by EDTA. However, an addition of 30% Isopropanol and absolute ethanol resulted in decrease of enzyme activity to 66% and 62% respectively. Saccharification ability of β-glucosidase was tested on various pre-treated biomass that were analyzed by scanning electron microscopy for the removal of lignins and disruption of cellulose contents. The highest saccharification percentage was observed with sugarcane baggase (18.4%), Hazelnut cob (15.8%), Hazelnut shell (13.1%) and Rhododendron (10.6%) after 72 h of incubation at 55°C with 25 units of enzyme. Immobilization of purified β-glucosidase enzyme with magnetic nanoparticles showed better saccharification results and reusability. With atleast 50% enzymatic activity, the immobilized β-glucosidase was reused 13 times for the process of saccharification. Maximum bioethanol production (3.18±0.05 g/L) was obtained utilizing yeast strain of Wickerhamomyces anomalus. The results suggest that recombinant β-glucosidase can be used in the bioconversion of natural biomasses into simple sugars which could be efficiently used in the biofuel industry for the bioconversion of raw biomass into bioethanol. The immobilized β-glucosidase can further facilitate in the saccharification by repeated usage and help in the reduction of the cost of the biofuel production process significantly.

Keywords: B-Glucosidase, Plant Biomass, Nano-Particles, Thermoanaerobacterium Thermosaccharolyticum

Oral Presentation

SCREENING OF FUNCTIONALIZED RICE HUSK BIOCHAR WITH CYCLODEXTRIN FOR CARBAZOLE ABSORPTION IN WASTEWATER

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Aromatic chemicals accumulate more and are maintained longer in marine organisms than alkanes. The octanol and water partition coefficients significantly determined the build-up of aromatic hydrocarbons. Hydrocarbons with a greater molecular weight are released more slowly after absorption. Water body degradation is not just an indicator of environmental degradation, but also poses a threat to the ecosystem. In this study, a novel material, rice husk biochar functionalized with cyclodextrin (RHB-CD), was examined to improve the adsorption capability for heterocyclic aromatic hydrocarbons (HAH) removal from wastewater. Biochar from rice husk was functionalized with cyclodextrin by adjusting the parameters of biochar mass (5-10g), cyclodextrin concentration (1-5% w/v), and sonication time (1-5 min). The adsorption capability of functionalized RHB-CD was compared to that of raw biochar. Using Fourier Transform Infrared Spectroscopy (FTIR), the qualitative characterization of functional groups was determined. One would anticipate RHB-CD to lead the path for new ecologically friendly methods of wastewater treatment based on the results. The study suggests the types of bonding that modify the photochemical and photophysical properties of the guest molecules in the inclusion environment, while concurrently visualizing the new window of knowledge for the host-guest inclusion complex.

Keywords: Functionalized Biochar, Aromatic Hydrocarbon, Wastewater, Carbazole, Cyclodextrin

MECHANISM OF YEAST FROM CACAO BEAN FERMENTATION TO INHIBIT THE GROWTH OF CACAO PATHOGENIC MOLD

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Decreasing of cacao production in Indonesia caused by several things, including disease attacks that caused by the molds. Chemical fungicides caused serious health problem and affect the sustainability of agro-ecosystem. The alternative fungicides are the use of yeast as a biological agent. This study aimed to determine the yeast isolates from cacao bean fermentation from the State University of Jakarta Culture Collection (UNJCC) which have the potential to inhibit the growth of pathogenic molds on cacao pods and the mechanism of their inhibition. All test isolates were subjected to molecular identification and analysis based on the ITS area for mold isolates and the D1/D2 region for yeast in the PCR process as well as morphological characterization. The tests carried out were antagonistic test using multiple culture technique, activity test for volatile compounds using uniform petri dish technique, and detection of killer toxin compounds. The data were analyzed using one-way ANOVA and Chi-square test. Molecular identification and morphological characterization, antagonist test, inhibitory activity test of volatile compounds, and detection of killer toxin were carried out on 4 yeast isolates from the UNJCC collection. The identification results showed that the yeast isolates UNJCC Y-158, UNJCC Y-159, UNJCC Y-160, UNJCC Y-161 were Rhodotorula alborubescens, Meyerozyma guilliermondii, and Pichia kudriavzevii, respectively. A total of 4 yeast isolates (UNJCC Y-158, UNJCC Y-159, UNJCC Y-160, UNJCC Y-161) had the potential to inhibit the growth of molds F. decemcellulare UNJCC F9, F. solani UNJCC F18, and C. siamense UNJCC F14. Based on antagonism test, Pichia kudriavzevii UNJCC Y-160 had the best inhibiton against F. decemcellulare UNJCC F9 dan F. solani UNJCC F18, while the best inhibition against C. siamense UNJCC F14 produced by P. kudriavzevii UNJCC Y-160 and P. kudriavzevii UNJCC Y-161. Based on volatile test, the best inhibition against F. decemcellulare UNJCC F9 produced by M. guilliermondii Y-159, P. kudriavzevii Y-160 and P. kudriavzevii Y-161, while the best inhibition against F. solani UNJCC F18 produced by P. kudriavzevii UNJCC Y-160. The best inhibition against C. siamense UNJCC F14 produced by P. kudriavzevii UNJCC Y-160 and P. kudriavzevii UNJCC Y-161. Two isolates of yeast UNJCC Y-160, UNJCC Y-161 were able to produce killer toxins against fungi F. decemcellulare UNJCC F9 and F. solani UNJCC F18 through detection of killer toxin compounds.

Keywords: Yeast, Mold, Antagonist, Volatile, Killer Toxin

THE DEVELOPMENT OF MANGROVE WOOD VINEGAR-BASED SANITARY PAD

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Mangrove wood vinegar or pyroligneous acid also known as Sateera® is a by-product of charcoal made from the billets of Rhizophora. Mangrove wood vinegar exhibits a high degree of antimicrobial activity against various microorganisms along with the significant antioxidant activity. It has been traditionally used as a deodorizer, fertilizer, sterilizer and antimicrobial agent. In this study, the mangrove wood vinegar was spray-dried with the addition of a different percentage of maltodextrin to produce the best Sateera® extract powder. The physical properties of the resulting powder were analysed based on its loss of drying and hygroscopicity index. The different percentages of Sateera® extract powder (batch 1: 100 g Sateera® extract powder, batch 2: 200 g Sateera® extract powder) were incorporated into the third layer of the sanitary pad. The physical properties of the Sateera®-based sanitary pad were evaluated after 1 week exposed to room temperature. It is shown that the pad was stable in terms of its physical properties. The absorption index of the Sateera®-based sanitary pad was investigated by using gelatine solution to imitate the viscosity of a menstrual fluid. It is revealed that the Sateera®-based sanitary pad exhibits a comparable absorption index (batch 1: 2.98 ± 0.09; batch 2: 2.98 ± 0.04) with the commercial sanitary pad (2.89 ± 0.10). The Sateera® incorporated sanitary pad shows a promising result to be commercialized in the market with increased absorbency index for prolonged refreshness.

Keywords: Sateera®, Sanitary Pad, Mangrove Wood Vinegar

PLATFORM TECHNOLOGY FOR PLASTIC WASTE BIOREMEDIATION USING MICROBIAL APPROACH

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Due to its widespread usage in agriculture, architecture and construction, health, and consumer products, plastics play an essential role in every area of the economy across the world. They are the foundation of many businesses since they are utilized in the production of a variety of commodities such as defense materials, sanitary wares, tiles, plastic bottles, fake leather, and a variety of other home items. Food packaging, pharmaceutical packaging, detergent packaging, and cosmetic packaging all employ plastics. Per year, almost one trillion single-use plastic bags are used across the world, or roughly two million every minute. Plastic pollution poses a severe danger to the planet's environment and human existence. The buildup of plastic on land and at water has sparked interest in degrading these polymers. As a result, in order to lessen the environmental impact of plastics, appropriate biodegradable technologies must be used. Microbes that can digest plastic waste, particularly non-biodegradable polymers like polyethylene, polypropylene, polystyrene, polyvinyl chloride, and polyurethane, are one way to solve this problem. Many bacteria have the ability to break down plastics. However, while this biodegradation process is not fully efficient, it is a way forward from traditional plastic waste treatment. More research on microorganisms that digest polyvinyl chloride is needed since this type of polymer is the most difficult to decompose. This work focuses on the origins of plastics, strategies for managing plastic trash, and the biodegradation of plastic waste utilizing various microbes.

Keywords: Plastic Types, Waste, Bioremediation, Microbes, Degradation

SPRAY DRYING EVALUATION FOR DEVELOPMENT OF PINEAPPLE PREBIOTIC POWDER AND PREBIOTIC PROPERTIES

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The pineapple fiber is known to have a prebiotic effect that may improve intestinal health and improve the immune system. The pineapple fiber in powder form is effortless to consume, has a better shelf life, and is easy to transport. However, the spray-dried pineapple powder is often affected by its final quality such as loss of the nutritional value associated with the harsh processing conditions. Therefore, the aim of this study is to optimize the processing parameters of the spray drying with intention to retain most of the pineapple nutrition. Iinlet temperature was varied at 150 and 180 oC with maltodextrin concentrations of 25, 30 and 35% (w/w) as encapsulator. The results show that spray drying at the optimum condition of 150 oC and 25% (w/w) of maltodextrin resulted in the pineapple powder recovery of 22.3±0.10%, moisture content (MC) of 6.46±0.25%, solubility of 94.72±0.05%, hygroscopicity of 12.94±0.30%, the antioxidant activity of DPPH scavenging activity (EC50) of 30.9±0.30 mg/ml, and total phenolic acid (TPC) of 18.88±0.31mg/g of gallic acid. Scaling up of the process using a pilot-scale spray dryer with a capacity of 30 L/hr yielded 83.52% of powder recovery and produced a better quality of pineapple powder with retention of more antioxidant activity (31.33±0.22, mg/ml) and TPC (9.33±0.33 mg/g Gallic acid). The pineapple prebiotic powder exhibited significant prebiotic index of 3.435, promoting the growth of Lactobacillus lactis. The pineapple prebiotic powder developed from this study is highly potential dietary fiber as prebiotic and contains high antioxidant to improve the intestinal health and general health, respectively.

Keywords: Prebiotic, Pineapple, Spray Drying, Antioxidant

THE EFFECT OF DIFFERENT AGRICULTURAL WASTES AND PH ENVIRONMENTS ON YIELD AND NUTRITIONAL QUALITY OF MEDICINAL MUSHROOM (LENTINUS EDODES)

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In this study, Lentinus edodes (Shiitake) mushroom which has medical characteristics has been cultivated on the agricultural wastes. In the study, hazelnut shell (Corylus sp.) (HS), oak wood (Quercus sp.) (OW) and beech wood (Fagus orientalis) (BW) sawdust were used from agricultural wastes. Each waste was ground to 3-4 mm and made to compost material. The compost materials were soaked for several days until its moisture reaching 70%. Formulations were formed with combination of 100% and 50% of each agriculture waste. For pH balance, lime (CaCO3) were added at 1% ratio to dry compost weight. pH values of the compost combinations were measured by 6.64, 6.55, 6.35, 6.58, 6.63, and 6.43 for 100 % of HS, 100% OW, 100% BW, 50% HS: %50 BW, 50% HS :50% OW and 50% OW : 50%BW, respectively. The formed compost formulations were sterilized by autoclaving at 121 ° C at 1 atm pressure. At least 3 composts replicates were prepared from each waste type. After sterilization, 2% Lentinus edodes mycelium compared to dry compost weight was inoculated in microbiological safety cabinet with UV. The Composts were kept in the incubation chamber at a relative humidity of 80% and a temperature of 26 ° C. The composts which completed the development of micelles were stored in ice water for 24 hours. After ice water application, each compost was expected to fruit body. After fructification, the yields/microbiological efficiences were calcilatuled and nutrition quality was determeined. Accordin to the results obtained from the study, the highest yield and biological activity were determined in the environment where the pH of oak sawdust was 6.55. Hazelnut shells and combinnations have the highest values in terms of total nitrogen and protein. There was no significant difference between compost combinations in terms of total energy, carbohydrate and fat ratios.

Keywords: Lentinus Edodes (Shiitake), Medicinal Mushroom, Hazelnut Shell, Beech Sawdust, Oak Sawdust, Ph

HISTOPATHOLOGICAL EVALUATION OF THE PROTEIN TYROSINE PHOSPHATASE AND TENSIN HOMOLOGUE (PTEN) GENE CAUSING ENDOMETRIAL CARCINOMA

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Objectives: Protein tyrosine phosphatase and tensin homolog (PTEN) (BZS, MHAM, MMAC1, PTEN1, TEP1), a lipid and protein phosphatase, is one of the most frequently mutated genes in cancer. This gene is identified as a high-frequency mutated tumor suppressor in numerous cancers. Among the mutated and cancer-causing genes in endometrial cancers, the PTEN gene ranks first with 78.9%. The aim of this study is to determine the histological changes of this gene on the Endometrium.

Research Methods: It has been determined that the PTEN gene is effective in the endometrium from the cBioPortal site (78.9%). After the gene was identified, histopathological analysis was performed on the tissue images of 75 patients obtained from cBioPortal and Human Protein Atlas. Histopathological analyzes were performed on immunohistochemistry (Antibody HPA031335) and Hematoxylin-eosin stained images.

Results: As a result of the analysis, the rate of white-skinned women developing endometrial cancers caused by the PTEN gene was 56%. According to the localization areas of endometrial cancers, tumor localizations could not be fully defined as 73.3%, in anterior endometrium (20%), and posterior endometrium (6.7%). Endometrial hyperplasia was common in histopathological evaluations. When endometrial cells were evaluated, pathological changes were observed in cells in the stroma (10-25%), smooth muscle cells 65-80% and secretory cells (5-10%). As a result of the analysis, it was determined that cancer cases were 69 years old and above and the prognosis was not good.

Conclusion: According to the results of the study, the PTEN gene causes the most endometrial cancers. Pathological changes, especially in muscle cells, are a remarkable feature. Considering this feature, it shows us that endometrial thickening is very important in doctors' controls.

Keywords: Endometrial Hyperplasia; Endometrial Carcinoma; PTEN; Histopathology

THE EFFECT OF SUPPLEMENTATION OF BETA-ALANINE AND HIGH INTENSITY INTERVAL SWIMMING TRAINING ON LACTIC ACID AND ACTH HORMONE IN RATS: A PRELIMINARY REPORT

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Purpose: The purpose of this study was to determine the effect of beta-alanine supplementation and high intensity interval swimming training on lactic acid and adrenocorticotropic hormone (ACTH) levels in rats.

Method: Twenty-nine albino male rats (age: 12 weeks) were included as subjects in this study. Rats were divided into four groups as beta-alanine (n=7), training (n=8), beta-alanine+training (n=8), and control group (n=6). Rats performed high-intensity interval swimming training for 5-week (adaptation for one week, swimming training for four weeks, 5 days/week). During the training period, rats received Beta-alanine supplementation according to body weight measured every week for 5 days a week. Lactic acid and adrenocorticotropic hormone (ACTH) levels in rats were determined from blood samples taken after high-intensity swimming test performed at the end of the swimming exercise period. One-way ANOVA was used to determine difference between groups.

Results: A significant difference was found between ACTH levels of the groups ($F(3,28)= 3,881$, $p=0,021$). ACTH levels were significantly higher in beta-alanine, training and beta-alanine+ training groups than in the control group ($p<0,05$). A significant difference was found between lactic acid levels of the groups ($F(3,28)= 5,943$, $p=0,003$). It was found that lactic acid level was higher in beta-alanine, training and beta-alanine+ training groups than the control group ($p<0,05$). In addition, lactic acid levels were significantly lower in beta-alanine and beta-alanine+training groups than in the training group ($p<0,05$).

Conclusion: It was revealed that beta-alanine supplementation, swimming training and swimming training together with beta-alanine supplementation increased the ACTH level, while beta-alanine supplementation decreased the lactic acid level in the rats.

Keywords: Rat, Swimming, Beta-Alanine, Lactic Acid, ACTH Hormone

COMPUTATIONAL PREDICTION OF THE METABOLIC ALTERATIONS SHARED BY ALZHEIMER'S DISEASE AND TYPE 2 DIABETES

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Alzheimer's disease (AD) is a type of dementia that causes impairment in memory, reasoning, and thinking. Type 2 diabetes (T2D) is common in the general elderly population and is significantly associated with a higher risk of dementia. However, metabolic alterations responsible for this association are largely unknown. In this study, we aim to predict metabolic alterations in hippocampus region of the brain by predicting the activation of the metabolic reactions based on the gene expression levels of control, AD, and T2D samples from healthy individuals and in vivo disease models (Mus musculus and Rattus norvegicus). The associated transcriptomic datasets were retrieved from Gene Expression Omnibus (https://www.ncbi.nlm.nih.gov/geo/). The data was mapped on genome-scale metabolic network models using the Integrative Metabolic Analysis Tool (iMAT) to create sample-specific metabolic networks. For each reaction in the metabolic network, the active/inactive reaction ratio across disease and control samples was calculated to predict affected reactions and their pathway associations. We predicted a set of relevant reactions/pathways to be affected between control-AD or control-T2D and commonly affected pathways in both diseases. Bile acid, fatty acids, cholesterol, glycosphingolipid, steroid, inositol phosphate metabolism, chondroitin sulfate, and keratan sulfate metabolisms are commonly affected pathways in both AD and T2D patients. Metabolic alterations indicate T2D to be a risk factor for AD. In conclusion, mapping transcriptome data on genome-scale metabolic networks to predict the condition-specific activity of reactions enabled the identification of metabolic relations between AD and T2D.

Keywords: Alzheimer's Disease, Type 2 Diabetes, Sample-Specific Metabolic Networks, Transcriptome.

MICROWAVE ASSISTED EXTRACTION AND PHYTOCHEMICAL ANALYSIS OF PEPEROMIA PELLUCIDA FOR TREATMENT OF DENGUE

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Dengue is among the most widespread mosquito-borne diseases and it is endemic in many tropical and sub-tropical parts of the world. To date, no effective antiviral or vaccine is available for this chronic disease. Peperomia pellucida (P. pellucida) has demonstrated positive results against chronic diseases due to the presence of phytochemicals, mainly phenolic compounds. The extraction process of bioactive compounds increases the efficient collection of extracts with high bioactivity. Microwave-Assisted Extraction (MAE) is a "green technology" widely employed for plant matrix. In this work, the impact of temperature (60–150 ◦C) and extraction time (5–25 min) on the extraction yield and individual compounds concentrations were evaluated. Furthermore, the phytochemical analysis in 10 extracts was performed by spectrophotometer in order to know its total phenolic content. The results show that 145 ◦C, 15 min, was the best extraction condition. Temperature and extraction time have been shown to be potential factors in affecting MAE for obtaining bioactive compounds from P. pellucida.

Keywords: Dengue virus, Peperomia Pellucida leaves,Microwave-assisted extraction, Phenolic compound

TREATED COCOA BEAN (THEOBROMA CACAO L.) EXTRACTS AND ITS ANTIBACTERIAL PROPERTIES

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Theobroma cacao L. has been shown to possess antibacterial activity against foodborne pathogens. Fermentation of cacao beans is very important to develop flavour precursor and develop antibacterial compounds resulted from the biochemical changes inside the beans. This study was conducted to evaluate the antibacterial activity of treated cocoa extract against several foodborne pathogens namely Bacillus cereus, B. subtilis, Escherichia coli, Klebsiella pneumonia, Pseudomonas aeruginosa, Salmonella Typhimurium, Staphylococcus aureus and Listeria monocytogenes. Cocoa beans were treated with Candida sp.-, and Blastobotryst sp.- as starters. Temperature and pH changes were monitored during fermentation. The cocoa beans were extracted using methanol, ethanol and hexane as solvents and screened for antibacterial activities using disc diffusion test. Gas chromatography-mass spectrometry (GCMS) analyses have exhibited several active compounds including caffeine, theobromine, gamma-tocopherol, hexadecanoic acid and gamma-tocopherol in all three fermentations. Selected cocoa extract was elected to examine the microfloral reduction in strawberries after treated with different extract concentration (0.05%, 0.50% and 5.00%) and at different exposure time (5 min and 10min). It is revealed that the natural microflora in strawberries resulted in reduction of at least 2 log10 CFU/mL after treatment with different concentration of extract. Overall, treated cocoa extract possessed substantial antibacterial characteristics and can potentially develop as natural food sanitizer and preservatives

Keywords: Antibacterial Agents, Foodborne Pathogens, Fermented Cocoa Beans, Theobroma Cacao L.

ULTRASONIC TREATMENT, HIGH SPEED MIXING AND THERMAL PASTEURIZATION FOR SELECTED TROPICAL FRUITS

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Fruits undergo various foods processing in order to enhance the organoleptic properties, nutrient content and extend its shelf life. The aim of this study is to determine the effect of food processing parameters such as thermal pasteurization, ultrasonic treatment and high speed mixing on total phenolic contents and antioxidant properties of tropical fruits. Five tropical fruits: banana, watermelon, mango, papaya and pineapple were selected. The fruits were prepared into puree and treated with three different processing conditions i: thermal pasteurization, ii: ultrasonic treatment, iii: high speed mixing. The fruits samples were analysed for the total phenolic contents and DPPH radical scavenging activity assay. The results clearly demonstrated that ultrasonic was the best treatment for total phenolic contents and antioxidant activity. Papaya was found to be the richest sources of antioxidant compounds. The results suggest that all selected tropical fruits have shown potential as sources of natural antioxidants.

Keywords: Pasteurization, Ultrasonic, Mixing, Total Phenolic Content, Antioxidant Properties

RECOVERY OF PHENOLIC-RICH CONDENSATE FROM PINEAPPLE WASTE BIOMASS AS POTENTIAL RUBBERWOOD PRESERVATIVE AGENT

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Improper management of lignocellulosic biomass generated from agricultural activities would lead to serious environmental problems. Pyrolysis offers a simple yet efficient alternative technique where pyroligneous acid (PA) is a major by-product obtained during slow pyrolysis of lignocellulosic biomass. PA has a potential to be used as rubberwood preservative in replacing conventional wood preservative such as boron and copper-chromium-arsenate which is toxic to human and posed a threat to the environment. In this study, the potential antitermites and anti-fungal properties for PA obtained from the pyrolysis of pineapple waste biomass were investigated. PA from pineapple waste biomass showed insignificant inhibition properties against both Pycnoporus sanguineus and Coriolus versicolor, but were successful in inhibiting the growth of both Aspergillus niger and Botryodiploidia theobromae for 7 days when applied at 70% and 100% concentrations. PA also exhibited good antitermites properties based on its ability to achieve 100% mortality of Coptotermes curvignanthus after one-week incubation, using non-diluted PA. GC-MS results on dichloromethane extract of PA revealed the presence of phenolic compounds and phenol with ortho-substituents such as 2,6-dimethoxyphenol and 2-methoxy-4-methylphenol. Both compounds have been reported to play an important role in termiticidal activity by previous study. The result showed that PA from pineapple waste can act as antifungal and antitermite agent but not as anti-wood decaying fungi agent. This result can be used as a good preliminary indication for future application of PA from pineapple waste as wood preservative.

Keywords: Pyroligneous Acid; Rubberwood; Antifungal; Anti-Termites; Phenols

BIOPROCESS OPTIMIZATION SCALING UP PLATFORM DEVELOPMENT FOR BIOMASS AND SPORES PRODUCTION BY BACILLUS AMYLOLIQUEFACIENS

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Production of high cell mass and spore of Bacillus amyloliquefaciens requires extensive study for the development of a suitable medium composition and cultivation strategy. Therefore, the aim of this study was to optimize the B. amyloliquefaciens cultivation medium for supporting high cell mass and spore production in fulfilling the demand for industrial production. At first, different production media were screened to select the best medium which supports the highest cells growth and spore production. The best medium was found to have the following composition: glucose, 25.0 g L-1; yeast extract 15.0 g L-1; and CaCl2, 2 g L-1. This medium yielded the highest cell mass and spore number of 3.21 g L-1 and 1.7x10^9 in shake flask cultivation. MgSO4 and MnSO4.H2O were added to the medium with 0.5 and 0.1 g L-1 respectively, due to their high effect on spores' production. The medium composition was further optimized using two approaches: One-factor-at-a-time (OFAT) and statistical method using response surface methodology (RSM). The produced biomass using optimized OFAT, and statistical optimized medium were 3.86 g L-1 and 4.74 g L-1, respectively. For the purpose of further industrialization, cultivations were carried out using batch mode in a 16-L, 150-L and 1500-L stirred tank bioreactor under uncontrolled pH conditions, with maximum biomass achieved at 5.66 g L-1, 5.85 g L-1 and 4.23 g L-1 respectively. In conclusion, the results suggest that the production medium was successfully optimized with an increment of cell mass about 53% using the RSM method. In addition to that, the process was successfully scaled up from 16-L up to 1500-L bioreactor achieving final yield of 4.23 g L-1. Whereas the final cell count and spore of Bacillus amyloliquefaciens obtained from the spray dried powder produced were 2.9x10^15 CFU/mL and 2.5x10^15 spores mL-1.

Keywords: Bacillus Amyloliquefaciens, Biorocess, Optimization, Cell Biomass, Spores Production

EFFECT OF HOMOGENIZATION SPEED AND DURATION IN VIRGIN COCONUT OIL EMULSION

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The homogenization process is an essential step during the preparation of virgin coconut oil emulsion for smaller particle sizes, thus increasing the emulsion's physical stability. This study is purposely to evaluate the effect of the process parameters of homogenization speed and duration by using a rotor-stator homogenizer. The virgin coconut oil was used to be encapsulated using Tween 80 as the surfactant at the range of homogenization speed (5,000 to 25,000 rpm) and in the range of duration (5 to 25 minutes). The interfacial tension (IFT), rheology properties, and particle size were studied to evaluate the emulsion formation. The results showed that the speed of 15,000 rpm in 10 minutes was the optimum condition for good rheology properties with the smallest particle sizes, d50 (1.31± 0.34 µm). The interfacial tension indicated no significant effect at the selected range of homogenization speed ad duration. In conclusion, the speed, and duration of homogenization affected the rheology properties and particle size of the VCO emulsion

Keywords: Virgin Coconut Oil, Emulsion, Homogenization, Rheology Properties

BIOPROCESS OPTIMIZATION SCALING UP PLATFORM DEVELOPMENT FOR BIOMASS AND SPORES PRODUCTION BY BACILLUS AMYLOLIQUEFACIENS

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Production of high cell mass and spore of Bacillus amyloliquefaciens requires extensive study for the development of a suitable medium composition and cultivation strategy. Therefore, the aim of this study was to optimize the B. amyloliquefaciens cultivation medium for supporting high cell mass and spore production in fulfilling the demand for industrial production. At first, different production media were screened to select the best medium which supports the highest cells growth and spore production. The best medium was found to have the following composition: glucose, 25.0 g L-1; yeast extract 15.0 g L-1; and CaCl2, 2 g L-1. This medium yielded the highest cell mass and spore number of 3.21 g L-1 and 1.7x10^9 in shake flask cultivation. MgSO4 and MnSO4.H2O were added to the medium with 0.5 and 0.1 g L-1 respectively, due to their high effect on spores' production. The medium composition was further optimized using two approaches: One-factor-at-a-time (OFAT) and statistical method using response surface methodology (RSM). The produced biomass using optimized OFAT, and statistical optimized medium were 3.86 g L-1 and 4.74 g L-1, respectively. For the purpose of further industrialization, cultivations were carried out using batch mode in a 16-L, 150-L and 1500-L stirred tank bioreactor under uncontrolled pH conditions, with maximum biomass achieved at 5.66 g L-1, 5.85 g L-1 and 4.23 g L-1 respectively. In conclusion, the results suggest that the production medium was successfully optimized with an increment of cell mass about 53% using the RSM method. In addition to that, the process was successfully scaled up from 16-L up to 1500-L bioreactor achieving final yield of 4.23 g L-1. Whereas the final cell count and spore of Bacillus amyloliquefaciens obtained from the spray dried powder produced were 2.9x10^15 CFU/mL and 2.5x10^15 spores mL-1.

Keywords: Bacillus Amyloliquefaciens, Biorocess, Optimization, Cell Biomass, Spores Production

INVESTIGATION OF THE THERAPEUTIC EFFECT OF FULLERENE C60 AGAINST HEART TISSUE DAMAGE BY SOME PROTEIN SIGNALING PATHWAYS AND HISTOPATHOLOGICAL BIOMARKERS

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In this study, the effect of fullerene C60 nanoparticle on some protein signal pathways and histopathological parameters against 7,12-dimethylbenz [a] anthracene (DMBA) induced heart tissue damage in Wistar albino female rats was investigated. The animal experiments part of this study was conducted in the Firat University Experimental Animal Research Center (FUDAM) with the permission of the Firat University Animal Experiments Ethics Committee dated 18.03.2021 and numbered 2021/05. In this study, 60 Wistar albino female rats (n = 60, 8 weeks old) were used. These rats were divided into 4 groups and each group included 15 rats. Groups: (1) Control Group: Fed with standard diet; (2) C60 Group: C60 (1.7 mg/kg bw, oral gavage); (3) DMBA Group: DMBA (45 mg/kg bw, oral gavage); (4) C60 and DMBA Group: C60 (1.7 mg/kg bw, oral gavage) and DMBA (45 mg/kg bw, oral gavage) group. The rats were decapitated after 16 weeks and their heart tissues were taken and examined. Expression levels of p53 and HO-1 proteins in heart tissue were determined by western blotting technique. In addition, heart tissues were evaluated by histopathologically. As a result, p53 and HO-1 protein expression levels were significantly increased in the groups. C60 + DMBA compared to the group DMBA. According to the histological results, inflammatory cell formation, edema and streak loss were reduced in the C60 + DMBA treated treatment groups compared to the DMBA groups.

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Keywords: Fullerene C60, Heart Tissue, HO-1, P53.

EVALUATING THE ACTIVITY AND STABILITY OF PROTEASE IMMOBILIZED ONTO CHITOSAN AND SILICA GEL BEADS AGAINST SOME METALLIC IONS, ORGANIC SOLVENTS AND DETERGENT

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As the use of proteases in industrial applications increases, the need for proteases with good operational stability and improved stability against various chemicals in the reaction medium is increasing. Objectives: In study, it was aimed to biochemical characterization and immobilization of protease onto chitosan and silica gel beads support by glutaraldehyde-mediated cross-linking and to determine its potential for use in the detergent industry. Methods: The pH/temperature, kinetic, operational stability, organic solvent and metal ion stability studies and compatibility in surfactants and commercial solid and liquid laundry detergents of free and immobilized enzyme were evaluated. The synthesized material was characterized via SEM and FTIR. Results: The optimum pH of the free and immobilized protease was determined as 7 and 10, respectively, and the optimum temperatures were determined as 40°C and 50°C. The immobilized enzyme exhibited good operational stability, retaining half of its activity after the 5th hydrolysis cycle and 94% of its relative activity at +4°C at the end of the 5th week. The immobilized enzyme had higher activity than the free enzyme and increased its activity by more than 18%, especially in the presence of Mg2+ ions for 1 hour. It was also increased approximately 4.4 and 3.4 fold in the medium containing ethanol and xylene respectively. In the presence of Tween 80, where the free enzyme was lost about 43% of its activity, the immobilized enzyme increased more than 6.5 fold and it is more stable and shows better activity in commercial solid detergents. Conclusions: The stability of the immobilized enzyme in various chemical agents, metallic ions, organic solvents, surfactants and commercial detergents, and its adaptation to harsh washing conditions that require alkali and high temperatures have been enhanced. The synthesized immobilized protease with its superior characteristics can be evaluated in various industrial applications, especially in the detergent industry.

Keywords: Chitosan, Silica Gel, Protease, Immobilization, Detergent Industry

STABILITY OF THE HOUSEKEEPING GENE B-ACTIN TO TEMPERATURE INCREASE IN RAINBOW TROUT

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Housekeping genes are used as internal standarts in gen expression studies. These genes guidies the interpretation of the expression of target genes since these genes show stable and specific level of expression. However, deviations in the stability of housekeeping genes were observed depending on the differences of genes or organisms that leads to misinterpretation of the results of the study. In the present study, the response of β-actin, that is the most commonly used control gene in expression studies, to heat stress in Rainbow trout species were studied. According to the findings, heat stress did not cause a significant change on the expressions of β-actin gene in this species ($P>0.05$). β-actin can be used as a housekeeping gene in thermal stress in rainbow trout.

Keywords: Gene Expression, Rainbow Trout, Beta (B)-Actin, Thermal Stress

DETERMINATION OF THE EFFECT OF PLANT GROWTH REGULATORS ON SECONDARY METABOLITE CONTENTS IN S. SCLAREA

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Determination of the Effect of Plant Growth Regulators on Secondary Metabolite Contents in S. sclarea

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Plants have been used for various purposes from past to present. Among these purposes, treatment with traditional methods is also included. With the development of alternative medicine, the active ingredients in the plants were determined and it was determined in which area they could have therapeutic properties, and the interest and need for medicinal plants increased. With the development of biotechnology, various methods are used to increase plant production in in vivo and in vitro environments. Plant growth regulators have an important place in this sense. Plant growth regulator applications affect plant yield depending on application methods, amounts and application times, and valuable metabolites in plants can be produced in a short time and in greater amounts. Salvia sclarea has antibacterial, antiseptic, antifungal, anticarcinogenic, anti-inflammatory, etc. It is a medicinal plant with high economic value. Although secondary metabolites are not produced as much as primary metabolites in plants, they are compounds that have at least as important a place as them. Many studies have been carried out using plant growth regulators to produce valuable metabolites of S. sclarea by tissue culture methods, and a great deal of yield has been achieved. In addition, studies on the effect of plant growth regulators on the production of metabolites of S. sclarea in vivo are limited. Plant growth regulators are known to be widely used in agriculture. In this study, 4 different cytokines (BAP, KIN, TDZ, m-T) were applied at 3 different concentrations (25, 50, 100 mg/L) to S. sclarea plants grown in pots containing 3:7 perlite/peat in the plant growth room. As a result of the application, the changes in the secondary metabolite contents of the plants were examined by GS/MS method. As a result, it was determined that the secondary metabolite contents of the leaf extracts of S. sclarea plant differed quantitatively and qualitatively depending on the type and concentration of cytokinins applied.

Keywords: Plant Growth Regulators, Secondary Metabolite, Cytokinin

EVALUATION OF THE APOPTOTIC EFFECT OF TANNIC ACID ON CANINE MAMMARY CARCINOSARCOMA CELLS

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Mammary tumors are pathological cases that originate from the mammary gland and canine mammary tumors have an important role in in the treatment of human mammary tumors due to the similarities with human mammary tumors. Tannic acid (TA) has drawn attention due to its anticancer properties specifically inducing apoptosis in some types of cancers. In the veterinary field, there is no study yet on the effectiveness of TA in canine mammary tumors. For this purpose, we aimed to evaluate the apoptotic effect of TA on canine mammary carcinosarcoma (CMCS) cells which were obtained from an 11-year-old female with the complaint of a mass (3-5 cm). We determined the potential therapeutic effect of TA on CMCS cells through the viability WST-1 assay, Annexin-V analysis and Acridine Orange (AO) staining. Our findings demonstrated that TA significantly inhibited cell viability and caused apoptotic cell death with characteristic apoptotic morphology. Therefore, our results suggest that TA-based therapy could be a promising strategy for the treatment of CMCS cells. However, more studies are needed to elucidate the therapeutic effects of TA on different subtypes of canine mammary tumors with advanced molecular analysis.

Keywords: Tannic Acid, Apoptosis, Canine Mammary Tumor

DETERMINATION OF THE EFFECTS OF TRAF2 AND NCK-INTERACTING PROTEIN KINASE (TNIK) INHIBITOR ON PI3K/AKT/MTOR SIGNALING IN CANINE LIPID-RICH CARCINOMA CELLS

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Mammary gland tumors have the highest incidence among dogs. Lipid-rich carcinoma is a very rare histological type of mammary tumor. However, it is generally observed in young female dogs and the success of current treatment options is limited. Therefore, innovative approaches are required for the treatment of canine mammary tumors. Traf2 and Nck-Interacting (TNIK) is a member of the mitogen-activated serine/threonine-protein kinase family that regulates Wnt signaling pathway. Additionally, the phosphatidylinositol-3-kinase (PI3K)/Akt and mammalian targeting of rapamycin (mTOR) signaling pathways is crucial for many aspects of cancer cell growth. Therefore, we aimed to determine the effect of NCB-0684 as a TNIK inhibitor on PI3K/Akt/mTOR signaling in canine lipid-rich carcinoma cells via determination of Akt and mTOR mRNA levels with RT-PCR analysis. Our findings demonstrated that NCB-0684 inhibited Akt and mTOR gene expression levels at higher concentrations. However, the effectiveness of TNIK inhibitor is changed dependently its concentration. Thus, our results claim that NCB-0684 could suppress PI3K/Akt/mTOR signaling. However, further investigations need to clarify the inhibitory activity of TNIK inhibitor on PI3K/Akt/mTOR signaling in canine mammary tumors

Keywords: Canine Mammary Tumor Cells, TNIK Inhibitor, PI3K/Akt/Mtor Signaling

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ANTIBACTERIAL EFFICACY OF ALTERNATIVE AND CONVENTIONAL ENDODONTIC IRRIGANTS ON S. MUTANS AND E. FAECALIS

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Objectives: Effective removal of microorganisms from the root canal system plays an important role in the success of endodontic treatment. Sodium hypochlorite and chlorhexidine are commonly used irrigation solutions in endodontics, but due to their disadvantages, the search for alternative irrigation solutions continues. This study aimed to evaluate the in vitro antibacterial activities of alternative and conventional endodontic irrigation solutions against Enterococcus faecalis and Streptococcus mutants.

Methods: The following solutions were evaluated: 5.25% sodium hypochlorite (NaOCl); 2% chlorhexidine (CHX); 0.02% (200 ppm) hypochlorous acid (HOCl); 0.1% Polyhexanide (PHMB). Sterile saline was used as a negative control. Antiseptics were impregnated on disk-shaped filter papers. Then, these discs were placed first separately and then in pairs to investigate the synergistic effects of antiseptics when used alone or together, and the zone diameters were measured by the Kirby Bauer disc diffusion method.

Results: In S.mutants, 20mm inhibition zone diameter was measured for both CHX and HOCl when used alone, and the highest antimicrobial activity was observed. Approximately the same efficacy was observed in NaOCl (6mm) and PHMB (5mm). The highest efficacy was observed in CHX+HOCl (20mm) in combined use. In E.faecalis, the highest antimicrobial activity was observed in CHX as a 5mm inhibition zone diameter when used alone, and in CHX+HOCl (12mm) and CHX+PHMB (10mm) when used in combination.

Conclusions: Alternative endodontic irrigation solutions had different antimicrobial effects on test microorganisms. The use of hypochlorous acid, which is an alternative irrigation solution, together with chlorhexidine may provide microbiological advantages in clinical use.

Keywords: Antimicrobials, Chlorhexidine, Endodontics, Irrigation, Microbiology, Sodium Hypochlorite

Oral Presentation

PREPARATION AND CHARACTERIZATION OF ANTIBACTERIAL COMPOSITES CONTAINING HEXAGONAL BORON NITRIDE NANOPARTICLES

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Hexagonal boron nitride nanoparticles are accessible to process and are used in many antibacterial studies with low toxicity materials. The use of hexagonal boron nitride nanoparticles, which are used as an antibacterial material in the research, is shallow in the composite content. In addition, many studies show it is effective in antibacterial studies. In the study, hexagonal boron nitride and hexagonal boron nitride nanoparticles coated with silica will be modified with PGMA polymer to form an antibacterial, chemically resistant, high thermal stability, and non-toxic composite.

As a result of this study, it was aimed to find the most effective concentration of hexagonal boron nitride and hexagonal boron nitride nanoparticles coated with silica to be used in the composite. With the data obtained from this study, it is predicted that this material with high stability and non-toxicity can be easily used in future antibacterial studies and dental composite applications. In this way, it is thought that it can shorten the duration of long-lasting antibacterial studies and contribute positively to the preparation process of the studies. In addition, it aims to use this material, which is proven effective in dental applications, non-toxic, effective, and highly stable in dental examinations.

Keywords: Hexagonal Boron Nitride, Glycidyl Methacrylate, Silica, Antibacterial, Nanocomposites

ISOLATION AND MOLECULAR IDENTIFICATION OF A NOVEL PICHIA KUDRIAVZEVII FOL-27

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A novel yeast strain from fermented turnip beverage called shalgam produced in southern Anatolia region of Turkey was isolated upon incubation in YPD agar for 2 days at 30 °C. The DNA extraction of this yeast organism was performed using Machery-Nagel microbial genomic DNA isolation kit according to the protocols described in the manual. To quantify and DNA quality check, extracted DNA sample was loaded to NanoDrop spectrophotometer. Further, the DNA was amplified using the yeast specific primers for highly conserved regions of chromosome. The primers used to run PCR amplifications were as follows ITS1: TCCGTAGGTGAACCTGCGG, ITS4: TCCTCCGCTTATTGATATGC, NL1: GCATATCAATAAGCGGAGGAAAAG, NL4: GGTCCGTGTTTCAAGACGG, and GACA4: GACAGACAGACAGACA. Among 3 different primers used, only NL1/NL4 primer pair provided specific binding to DNA which became evident in gel electrophoresis bands. Thus, NL1/NL4 amplified PCR products were first purified and sent for Sanger sequencing. The DNA fragment reads were further processed using BLAST function in NCBI. The closest hits achieved with NL1/NL4 Sanger reads were belong to Pichia kudriavzevii strains although no 100% nucleotide identity achieved. This indicates that yeast organism isolated from fermented plant material "shalgam" is a unique strain of Pichia kudriavzevii sp. To better understand the metabolic potentials of this novel strain, whole genome analysis by next generation sequencing should be explored.

Keywords: Pichia Kudriavzevii, Fermented Plant Material, DNA Isolation, ITS, Sanger Sequencing, Molecular Identification

INVESTIGATION OF THE CYTOTOXIC EFFECT OF SILVER NANOPARTICLES OBTAINED FROM BETULA PENDULA ROTH LEAF EXTRACT BY GREEN SYNTHESIS ON MCF-7 CANCER CELLS

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Breast cancer is the most common type of cancer in women and the side effects of the methods used in the treatment are quite high. There is still a need for new treatment methods with lower side effects and higher efficiency for higher success rates and improving the quality of life of patients. In this study, silver nanoparticles (AgNPs) were synthesized from B,pendula plant extract by green synthesis method. The plant extract and AgNPs were treated separately for MCF-7 and MCF-12A cell lines for 24, 48 and 72 for three different hours and their cytotoxicity success levels and cancer selectivity against cancer cells were compared.

After the leaves of B.pendula plant were dried and the aqueous extract was obtained, AgNPs were synthesized. Characterization of synthesized AgNPs was performed with UV-vis, FTIR, TEM, XRD, EDX and DLS-ZETA. AgNPs and the aqueous extract of B.pendula plant were treated at different concentrations to each cell line for 24, 48 and 72 for three different hours after that, their cytotoxic effects were examined with XTT.

According to the results obtained, the average size of the DLS data result of AgNPs was found to be 109.02 nm. Compared to the plant extract, AgNPs were found to be much more effective as a cytotoxic agent against cancer cells. In addition, AgNPs have a cytotoxic effect on MCF-7 breast cancer cells at much lower concentrations compared to MCF-12A, which is a healthy epithelial cell. This clearly demonstrates the selectivity of B.pendula extract and AgNPs against cancer cells.

It shows that AgNPs synthesized with B.pendula extract have the potential to be a promising and adjunctive anti-cancer therapy agent as an alternative or supportive to chemotherapy in the treatment of breast cancer.

Keywords: Breast Cancer, Green Synthesis, Silver Nanoparticles, Cytotoxicity

POSTER PRESENTATIONS

ENTRAPMENT OF MULTI-ENZYMES FOR CONVERSION OF STARCH TO MALTO-OLIGOSACCHARIDES

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Conversion of starch to value-added products requires several enzymes to efficiently break the complex structure of the polysaccharide. A specific combination of maltogenic amylase (MAG1) and cyclodextrin glucanotransferase (CGTase) provides a novel pathway of producing malto-oligosaccharides (MOS) from starch. However, the use of free enzyme is hampered by low enzyme recovery and low enzyme stability. Enzyme entrapment strategy was used in this study to improve enzyme recovery and stability for efficient conversion reaction. Both enzymes are entrapped individually in calcium alginate (CA) beads. Optimization of the entrapment process was performed using Response Surface Methodology by manipulating the calcium chloride, alginate and enzyme concentrations. The entrapped MAG1 (CA-MAG1) and CGTase (CA-CGTase) exhibited 88.06% and 89.45% of activity recovery, respectively. The thermal stability of both enzymes was enhanced greatly at 45 °C by retaining at least 50% of their activities after 50 minutes of incubation compared to that of free enzymes (10 minutes). The entrapped enzymes retained more than 50% of its activity after eight cycles of usage, showing high reusability. Hydrolysis of starch using the CA-MAG1 and CA-CGTase showed improvement of 1.25-fold compared to free enzyme with total MOS production of 183.82 mg/g during step-by-step reaction. The entrapment strategy used in this study was successful to develop a highly stable and reusable enzymes for MOS production.

Keywords: Enzyme Immobilization, Entrapment, Oligosaccharides

THE CONSTRUCTION OF AFFINITY AGENT PRODUCTION PLATFORM BY USING PYRG AUXOTROPH ASPERGILLUS ORYZAE AND THE PRODUCTION OF THE NANOBODIES (VHH)

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The expression of monoclonal antibodies (mAbs) consisting of large (150 kDa) and complex structures is limited because of solubility, folding, effectiveness, and cost problems in heterologous microorganisms. Nanobody (VHH) is an affinity reagent that was discovered in camelids. VHH consists only of a heavy (H)-chain; nevertheless, hydrophilic amino acids are replaced with hydrophobic amino acids within the VL domain of mAbs to compensate for lacking a VL domain in VHH. The small size (4 nm and 2.5 nm in diameter), high specificity and affinity to bind antigens, low immunogenicity, thermal resistance, high solubility, and increased tissue penetration capacity of VHH are prominent features. Aspergillus oryzae is a filamentous fungus in GRAS (Generally Recognized as Safe) statute. It has been safely used in industrial biotechnology in producing various biomolecules for centuries. Our study aims to produce VHH in (orotidine-5'-monophosphate decarboxylase gene) pyrG auxotroph A. oryzae RIB40, taking advantage of its powerful secretory capacity. Additionally, it is aimed to describe that A. oryzae is a practical platform for expressing affinity reagents at a low cost. The auxotrophy was generated by gene replacement through plasmid carrying upstream and downstream sequences of pyrG but lacking the open reading frame of pyrG. The codon-optimized encoding sequence of VHH (PDB 1QBZ) with a 6xHistag fused to C-terminus was synthesized and inserted into an expression vector under the control of the native amylase gene promoter. Transformations were achieved through a protoplast-mediated transformation. Expressions studies showed that VHH was successfully expressed and secreted at 14 kDa in the soluble form. Metal affinity chromatography was used to purify secreted VHH. The binding of VHH to its antigen, RNAse A, was verified by gel filtration following incubation with RNAse A. The results demonstrate that A. oryzae can be used as a useful biotechnological platform to obtain functional VHH affinity reagents.

Keywords: Nanobodies, Aspergillus Oryzae, Pyrg Auxotrophy, Biotechnological Platform

SCIENCE AWARDS

LIFETIME ACHIEVEMENT AWARD

ENOCH Y. PARK

"SHIZUOKA UNIVERSITY"

BEST ORAL PRESENTATIONS

1ST DALIA SUKMAWATI

"MECHANISM OF YEAST FROM CACAO BEAN FERMENTATION TO INHIBIT THE GROWTH OF CACAO PATHOGENIC MOLD"

2ND NOR HASMALIANA BINTI ABDUL MANAS

"SPRAY DRYING EVALUATION FOR DEVELOPMENT OF PINEAPPLE PREBIOTIC POWDER AND PREBIOTIC PROPERTIES"

3RD ASLIHAN BAYKAL

"EVALUATION OF THE APOPTOTIC EFFECT OF TANNIC ACID ON CANINE MAMMARY CARCINOSARCOMA CELLS"

BEST VISUAL PRESENTATION

ELIF KARAMAN

"THE CONSTRUCTION OF AFFINITY AGENT PRODUCTION PLATFORM BY USING PYRG AUXOTROPH ASPERGILLUS ORYZAE AND THE PRODUCTION OF THE NANOBODIES (VHH)"

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