1.EBAT
EURASIA BIOCHEMICAL APPROACHES& TECHNOLOGIES CONGRESS

27-30 OCTOBER 2018 ANTALYA

1st Euroasia Biochemical Approaches & Technologies Congress

EBAT-2018

Abstract Book

KİMYAGERLER DERNEĞİ
TURKISH CHEMISTS SOCIETY

1.Euroasia Biochemical Approaches & Technologies Congress

EBAT 2018

27-30 October 2018
Antalya-TÜRKİYE

Dear Colleagues,

Dear Scientists and Delegates from Public or Private Sector,

You are cordially invited to join us at the **"1st EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES (EBAT) CONGRESS"** which will be held from October 27 th to 30 th, 2018 at the Side Star Elegance Hotel, Side/Antalya.

The congress will focus on the topics containing biochemical approaches related with biochemistry and its many disciplines such as protein purification and technologies, industrial enzyme applications, molecular biochemistry, bioengineering, bionanotechnology, bioinformatics, biophysiscs, bioanalytics, biosorption, biochemistry of natural products, biomaterials and biological activity assignment.

Countless rich applications of industrial technologies can be already seen in the world, which are designed by taking biochemical approaches into consideration in many industrial fields such as food, drug, agriculture, dye, textile, cleaning and cosmetics. Therefore, the aim in this congress is to discuss the recent advances in approaches and applications about the topics based on biochemistry as well as the topics listed above including standard, well established methods and applications. In this context, the goal is to develop a natural, scientific environment for the discussion of biochemical approaches revealed in universities and other R&D departments and technologies that the industry wants to design based on these approaches. There will be various oral and poster presentations to facilitate the distribution of ideas, experiences and commercial expectations about the topics shared.

Besides a satisfying scientific program, we would also like to present you with an opportunity to experience the historical atmosphere of the Side antique city while you are attending the congress.

Once again thank you for your contributions and interest to our congress and we are looking forward to welcoming you in Side/Antalya from October 27 th to 30 th, 2018.

Sincerely,

Thank you for attending the conference.

On Behalf of the Organizing Committee
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1st EBAT Congress Chair

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1. EUROASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS PROGRAMME

October 27, 2018 Saturday		
14:00-16:00	**Registration**	***Registration Desk***
16:20-17:00	**Opening Ceremony**	***Salon Aspendos***
	Session 1 Chair-Assoc. Prof. Dr. Harun BUDAK	***Salon Aspendos***
17:00-17:30	S-001- Prof. Dr. Henrik OSTER *Molecular gears of the circadian clock system*	
17:30-18:00	S-002- Dr. Lars GEFFERS *Make data great again! - Big Data in precision medicine*	
18:00-19:00	**Mounting of posters**	***Salon Aspendos***
19:00-20:00	**Dinner**	
20:00-	**Welcome Reception**	***Foyer Area***
October 28, 2018 Sunday		
09:00-09:30	**Session 2 Chairs-Prof. Dr. Figen ZİHNİOĞLU** ***Honorary Session for Prof. Dr. Azmi TELEFONCU#***	***Salon Aspendos***
09:30-10:00	S-003- Prof. Dr. Franz THEURING *Treatment of Alzheimer's Disease by employing Tau-Aggregation-Inhibitors: being a Tauist in Amyloid Land*	
10:00-10:30	S-004- Prof. Dr. Reinhard STERNER *Using ancestral sequence reconstruction to characterize primordial enzymes*	
10:30-11:00	S-005- Prof. Dr. Pankaj VADGAMA *Adaptation of membrane technology for enhanced performance electrochemical biosensors in medicine*	
11:00-11:20	**Coffee Break**	
	Session 3 Chair-Prof. Dr. Şükrü BEYDEMİR	***Salon Aspendos***
11.20-11:50	S-006- Prof. Dr. Rana SANYAL *Macromolecules that fake to be biomolecules: Nanomedicine in the Works*	

11:50-12:10	S-022- Prof. Dr. Ö. İrfan KÜFREVİOĞLU *Recombinant Production of Human Carbonic Anhydrase VA Isoenzyme and Investigation of In Vitro Effects on Enzyme Activity of Some Sulfonamide Derivatives and Phenolic Compounds*
12.10-12:30	S-035- Dr. Ayça AKTAŞ KARAÇELİK *Effects of Some Food Additives on Carbonic Anhydrase Activity*
12.30-14.00	**Lunch**
	Session 4 Chair-Prof. Dr. Ö. İrfan KÜFREVİOĞLU ***Salon Aspendos***
14.00-14:20	S-016- Assoc.Prof. Dr. Murat UYGUN *Heavy Metal Removal from Environmental and Biological Samples by Metal Chelated Cryogels*
14:20-14:40	S-011- Dr. Canan ÖZYURT *Genetically Encoded Bioluminescence Resonance Energy Transfer (BRET) Biosensor for Detection of D-Allose*
14:40-15:00	S-012- Sevilay İNAL KABALA *A New Biosensor for Osteoporosis Detection*
15:00-15:20	S-047- Prof. Dr. Ahmet KAHRAMAN *The Role of Vitamin D Levels in Type 2 Diabetes Mellitus Pathogenesis*
15:20-15:40	S-052- Assist. Prof. Dr. Deryanur KILIÇ *Antimicrobial Screen, Molecular Modelling and ADME Prediction of Some New Urea/Thiourea Derivatives*
16:00-16:20	**Coffee Break**
	Session 5 Chair-Prof. Dr. Cenk SELÇUKİ ***Salon Aspendos***
16:20-16:40	S-046- Assist. Prof. Dr. İhsan ÇETİN *Evaluation of Measurement Techniques for Mitochondrial DNA Copy Number*
16:40-17:00	S-017- Assist. Prof. Dr. Zehra ÖLÇER *Development of Phenylboronic Acid Modified Electrode Surface for Using Biosensor Applications*
17:00-17:20	S-019- Assist. Prof. Dr. Mehmet KUZUCU *Investigation the Effects of UV-C on the Experssion Levels of Some Genes Included in Intracellular pH Homeostasis of Deinococcus radiodurans*

17:20-17:40	S-028 Can AYGÜN *Cloning, Heterologous Expression and Purification of Toxoplasma gondii FabG (3-Oxoacyl-[Acyl-Carrier-Protein] Reductase) Enzyme*
17:40-18:00	S-044- Assist. Prof. Dr. Fevzi TOPAL *A Research on Phenolic Contents and Antioxidant Capacity of Almond Oil*
18:00-19:15	**Short Oral Presentations** (Salon Aspendos, Mimosa, Melissa and Magnolia)
12:30-19:00	**Poster Presentations** ***Salon Aspendos***
October 29, 2018 Monday	
09:00-09:10	**Session 6 Chair-Prof. Dr. Safiye ERDEM SAĞ** ***Salon Aspendos*** ***Republic Session***[##] **(Stand in silence, independence anthem)**
09:10-09:40	S-007- Prof. Dr. Candan TAMERLER *Interface Engineering through Biomolecular Self Assembly and Materials Synthesis*
09:40-10:00	S-029- Dr. Önder AYBASTIER *Investigation of Antioxidant Ability of Inula helenium Roots to Prevent Oxidatively Induced DNA Damage by Gas Chromatography-Tandem Mass Spectrometry*
10:00-10:20	S-055- Assist. Prof. Dr. Şebnem EŞSİZ *Effect of Ivermectin on the Structural Dynamics of Human GABA Receptor Ion Channel*
10:20-10:40	S-027 Dr. Gözde AYDOĞDU TIĞ *Label-free Electrochemical Immunosensor for Neutrophil Gelatinase-Associated Lipocalin Detection*
10:40-11:00	S-036- Prof. Dr. Oktay ARSLAN *Investigation of The Effects of New Tadalafil Derivatives On Cyclic Nucleotide Phosphodiesterase 1 Isoenzyme*
11:00-11:20	**Coffee Break**
	Session 7 Chair-Prof. Dr. Bilge Hilal ÇADIRCI ***Salon Aspendos***
11:20-11:50	S-008- Assist. Prof. Dr. Dina SCHENIDMAN *Macromolecular structure and dynamics based on SAXS profiles*
11:50-12:10	S-013- Abeer ALESKNDRANY *Concentration-Dependent Effect of Levothyroxine on DPPC Membrane*
12:10-12:30	S-014- Prof. Dr. Ayşegül UYGUN ÖKSÜZ *Fuel Free Magnetic Nanomotors*

12:30-14:00	**Lunch**
	Session 8 Chair-Prof.Dr. Ahmet KAHRAMAN *Salon Aspendos*
14:00-14:20	S-020- Dr. Zehra BAŞI *The Investigation of Effect of Polar And Apolar Extracts of White Chicory (Cichorium İntybus L.) Plant on Angiotensin Converting Enzyme (ACE, EC 3.4.15.1) and Acetylcholinesterase (AChE, EC 3.1.1.7) Enzyme in Human Plasma*
14:20-14:40	S-048- Assist. Prof. Dr. Münevver Müge ÇAĞAL *The Antimicrobial Activity of Essential Oil of Satureja hortensis Incorporated with Nanoliposome Prepared by Dynamic High-Pressure Microfluidization*
14:40-15:00	S-024- Assoc.Prof. Dr. Lokman UZUN *Functional Monolithic Cryogels as Support Materials for Enzyme Bioreactors*
15:00-15:20	S-025- Dr. Elif Burcu AYDIN *An Electrochemical Biosensor For Sensitive Detection Of Lung Cancer Biomarker Based On Polythiophene Polymer With Densely Populated Carboxyl Groups Modified Disposable ITO Electrode*
15:20-15:40	S-026- Dr. Ebru DEVECİ *Antioxidant and Immunomodulatory Activities of the Isolated Compounds from Porodaedalea pini and Fuscoporia torulosa Mushrooms*
15:40-16:00	S-030- Assist. Prof. Dr. Mehmet ÖZBİL *Computational Investigation on Influenza A Virus M2 Protein Inhibition*
16:00-16:20	**Coffee Break**
	Session 9 Chair-Prof.Dr. İsmet YILMAZ *Salon Aspendos*
16:20-16:40	S-015- Prof. Dr. Nuriye Nuray ULUSU *Are the quantum dots substrates for the enzymes: New perspectives in medicine?*
16:40-17:00	S-032- Prof. Dr. Bilge Hilal CADİRCİ *Enzymatically Bioactive Polypeptides From Sulusaray Hot Spring, Tokat*
17:00-17:20	S-021- Assoc. Prof. Dr. Barış BİNAY *Production of Engineered Formate dehydrogenase for CO_2 Reduction*
17:20-17:40	S-040- Prof. Dr. Murat KÜÇÜK *Suitability of FRAP, ABTS and DPPH Antioxidant Methods for On-line HPLC-Antioxidant Applications*
17:40-18:00	Break

	Session 10 Chair-Prof. Dr. Murat KÜÇÜK *Salon Aspendos*
18:00-18:20	S-042- Ress. Assist. Ceyhun IŞIK *Immobilization And Characterization of β-D-Galactosidase Onto Eggshell Membrane As A Natural Carrier Platform*
18:40-19:00	S-045- Dr Ebru KOCADAĞ KOCAZORBAZ *Pruduction of Bioactive Peptides Using Enzymatic Hydrolysis from Thrachinus Draco Muscle Hydrolysate and Their Potential Use in Biological Processes*
12:30-19:00	**Poster Presentations** *Salon Aspendos*
October 30, 2018 Tuesday	
	Session 11 Chair- Assist. Prof. Dr. Barış BİNAY *Salon Aspendos*
09:00-09:30	S-009- Assist. Prof. Dr. Çağlar ELBUKEN *Micro Scale Engineering For Biochemical Analysis*
09:30-09:55	S-018- Assist. Prof. Dr. Ayşe ERDOĞAN *Effects of Cetuximab and Stabilized Silver Solution on Cell Cycle in Lung Cancer Cells*
09:55-10:15	S-034- Müşerref ARSLAN ÖÇSOY *Development of DNA Aptamer Directed Magnetic Graphene Oxide for Targeted and Enhanced Photothermal Therapy Towards Methicillin-Resistantstaphylococcus Aureus Cells*
10:15-10:40	S-037- Assist. Prof. Dr. Fatih SEVGİ *Comparative Evaluation of Antibacterial Activity of Cd-based Quantum Dots*
10:40-11:00	S-038- Assist. Prof. Dr. Fatih AKTAŞ *Thermostable L- Amino acid Dehydrogenase Purification, Characterization and Kinetic Mechanism*
11:00-11:20	**Coffee Break**
	Session 12 Chair-Prof.Dr. Azra BOZCAARMUTLU *Salon Aspendos*
11:20-11:50	S-010- Prof. Dr. Azmi TELEFONCU *NANOZYMES: New Generation of Artificial Enzymes*
11:50-12:10	S-039- Zeynep Efsun DUMAN *Enhanced Production of Recombinant Staphylococcus simulans Lysostaphin using Media Engineering*
12:10-12:30	S-041- Assist. Prof. Dr. Sedat BİLGİÇ *Effect of Royal Jelly, Grape Seed Extract, and Lycium Barbarum Against DiethylnitrosamineI induced Nephrotoxicity*
12:30-14:00	**Lunch**
	Session 13 Chair-Prof.Dr. Sefa ÇELİK *Salon Aspendos*

14:00-14:20	S-054- Assist. Prof. Dr. Sedat ÇETİN *Diplotaenia Turcica's Effect on Liveliness on the NRK-52E Cell Line in Different Concentrations and Periods*
14:20-14:40	S-033- Assoc. Prof. Dr. İsmail ÖÇSOY *Nanotechnology in Detergent Industry: Enzymes Incorporated Hybrid Nanoflower and Their Enhanced Stain Removal Capability*
14:40-15:00	S-049- Bürke ÇIRÇIRLI *Comparison of Anticancer Effects of Nitrogen Doped Graphene, Reduced Graphene Oxide and Drug Doped Graphene on Cancer Cell Lines*
15:00-15:20	S-050- Feyza SÖNMEZ *Expression and Function of Hepatic and Renal Thioredoxin System in Mice Treated with Iron*
15:20-15:40	S-051- Togayhan KUTLUK *Optimization of enzymatic reaction parameters of trimethylolpropane esters from biodiesel via response surface methodology (RSM)*
15:40-16:00	S-053- Assoc. Prof. Dr. Mehmet KAHRAMAN *A Plasmonic Platform for SERS-based Biosensing*
16:00-16:20	**Coffee Break**
16:20-18:00	**Closing Ceremony (Closing Speeches, Awards and certificates, Taking Photos and Departure from Hotel)**

Short Oral Presentations (28.10.2018, Sunday; 18:00-19:15)

Chair in Salon Aspendos: Prof. Dr. Nagihan SAĞLAM ERTUNGA
Chair in Salon Melissa: Assist. Prof. Dr. Çağlar ELBÜKEN
Chair in Salon Mimosa: Assoc. Prof. Dr. Lokman UZUN
Chair in Salon Magnolia: Prof.Dr. Hasan ÖZDEMİR

Code	Lecturer	Title	Salon
S-057	Hamiyet KÖSE	Are There Any Correlations Between Mean Platelet Volume, Platelet Levels and Sperm Parameters?	*Aspendos*
S-060	İhsan ALACABEY	Efficient composites for removal of micropollutant from aqueous solutions via flash chromatography	*Aspendos*
S-061	Şule ŞAHİN ÜN	A Green Chemistry Approach For The Biosynthesis And Characterization Of Palladium Nanoparticles	*Aspendos*
S-062	Gamze ZEHİR KIRKBİR	New Mercapto-1,2,4-triazole Compounds as Candidate Molecules for Ulcer Treatment	*Aspendos*
S-065	Özal MUTLU	Structural Modelling and Molecular Docking Analysis of Trichomonas vaginalis Iron-Containing Superoxide Dismutase towards Computer-Aided Drug Design	*Aspendos*
S-066	İlknur YILDIZ	In Silico Investigation on Anti-Depression Effects of Hypericum Perforatum Flavanoids: Molecular Docking with Monoamin Oxidases	*Melissa*
S-067	İlke DEMİR	Molecular Docking of New Hybrid Triazole Derivatives into Tyrosinase Enzyme	*Mimosa*
S-072	Ayşe Başak ÇAKMEN	Preparation of polyurethane in aliphatic structure using trimethylolpropane ethoxylate as crosslinker and electrospinning application	*Aspendos*
S-073	Erdoğan ÖZGÜR	Plastic carbonic anhydrase via molecular imprinting approach for efficient bioconversion of carbon dioxide	*Aspendos*
S-074	Muhammet AYDIN	Sensitive And Label-Free Electrochemical Immunosensor Based On Brush Type Polymer Modified ITO Electrode For Lung Cancer Biomarker Detection	*Aspendos*
S-077	Ahmet ÇETİN	Bioremediation OF C.I. Direct Red 23, Acid Red 249 AND C.I. Red 337 by Deinococcus radiodurans	*Aspendos*
S-078	Özlem YALÇIN ÇAPAN	Synthesis and Characterization of Thermoresponsive PNIPAM Hydrogels	*Aspendos*
S-080	Yakup KOLCUOĞLU	Investigation of inhibitor activity on newly synthesized Novel trisubstitue 1,2,4- triazole compounds on AChE	*Aspendos*
S-082	Ergün GÜLTEKİN	Investigation of Tyrosinase Activities of Some Thiosemicarbazide Derivatives Containing 1,2,4-	*Mimosa*

		Triazole-3-on Ring	
S-086	Neslihan NOHUT MAŞLAKÇI	Investigation of Antibacterial Properties of PMMA/PEO Fibers Loaded With Antimicrobial Agent	*Aspendos*
S-087	Sercan ÖZBEK YAZICI	Optimization for Co-Production of Protease and Cellulase from *Bacillus subtilis* M 11 in Solid-State Fermentation	*Aspendos*
S-089	Ensar EREL	Preparation Of The Gallic Acid-Based Sensor With Polyurethane Membrane Screen-Printed Carbon Electrode For Determination Of Serotonin	*Magnolia*
S-091	Mehmet VAROL	Assessment of the Skin Protection Capacities of Pulvinic Acid Derivatives toward Ultraviolet-Induced Damage	*Mimosa*
S-092	Banu TAKTAK KARACA	Molecular Design of Materials Selective Engineered Proteins for Bionanotechnology	*Magnolia*
S-094	Semra ALKAN TÜRKUÇAR	Development of A New On-Line HPLC-Carbonic Anhydrase Inhibitor (CAI) Method and Effects of Some Parameters on BCA Enzyme Activity	*Melissa*
S-096	Fatih UÇKAYA	Antioxidant and Antiaging Effect of Three-phase Partitioned Inula viscosa and Its Cream Formulation	*Mimosa*
S-098	Mehrad POURNAKI	Synthesis and Characterization of Urolithin-Grafted Chitosan as a Selective, Fluorescent Probe for Sensing Iron(III) in Aqueous Solution	*Mimosa*
S-100	Mehmet DOĞRU	Determination of Antimicrobial Activities of *Nepeta nuda* subsp. Lydiae	*Mimosa*
S-101	Meltem Betül SAĞLAM	Phthalocynaines as Antimicrobial Agents	*Mimosa*
S-103	Dilek ALAGÖZ	Stabilization of *Rhizomucor miehei* Lipase Immobilized on 3-aminopropyl-Functionalized Silica Gel	*Mimosa*
S-105	Çiğdem ÇETİN	Immobilization of Feruloyl Esterase on 3-aminopropyl-functionalized Silica Gel	*Mimosa*
S-106	Deniz YILDIRIM	Immobilisation and Stabilisation of Ene-reductase by Entrapment in Sol-Gel	*Melissa*
S-109	İlker ÜN	Profilling and Determination of Extracted DNA Solution Impurities by qNMR	*Mimosa*
S-110	Azra BOZCAARMUTLU	The Effect of Co-administration of Berberine, Resveratrol and Glibenclamide on Xenobiotic Metabolizing Enzyme Activities in Rat Liver	*Mimosa*
S-116	Esin EREN	Antibacterial Activity of Wool Fabrics Treated With Different Azo Dyes	*Mimosa*
S-118	Melike YILDIRIM AKATIN	Antimicrobial Activities of Some Bryophytes Selected From Several Districts Near Trabzon	*Melissa*

S-120	Ebru KOCADAĞ KOCAZORBAZ	Production of Bioactive Peptides by Enzymatic Hydrolysis From Milk Proteins and Their Potential Use in Biological Processes	*Mimosa*
S-121	Ratiba SERIDI	The Capper in Algeria: Determination of The Total Polyphenol Content of The Species Capparis spinosa. Ethanolic Extract	*Mimosa*
S-123	Mehmet DOĞRU	Biological properties of *Saponaria prostrata* subsp. Prostrata	*Magnolia*
S-127	Sevda ALTUN	The Function of Thioredoxin and Thioredoxin-Binding Protein in Cancer	*Melissa*
S-130	Büşra KURNAZ	In vitro and In silico Investigation of Tyrosinase Inhibition By Some Novel Triazole Derivative Compounds Containing Fluoroquinolone Skeleton	*Melissa*
S-132	Ramazan KALIN	Purification and Biochemical Characterization of A Novel Peroxidase: Kohlrabi Radish (*Brassica oleracea* L. Var Gongylodes)	*Melissa*
S-133	Funda KARTAL	Immobilization of *Burkholderia cepacia* Lipase for Improved Catalytic Properties	*Melissa*
S-134	Selmihan ŞAHİN	Immobilization of Bovine Serum Albumin on Pumice: Influence of Short Crosslinkers	*Melissa*
S-135	Ahmet Ufuk KÖMÜROĞLU	Stinging Nettle Seed Effects on Some Cytokines in Rats Fed with High Fat Diet	*Melissa*
S-138	Berna HUKKAMLI	Investigation of the Effect of Acute Inflammation on Hepatic and Renal Thioredoxin System in Mice	*Melissa*
S-140	Adem ERGÜN	Polyphenol Oxidase Inhibitory Properties of Some Benzimidazolium Salts	*Magnolia*
S-141	Zeynep DEMİR	Prooxidant And Antioxidant Effect Of Root Extract Obtained From *Gypsophila bicolor* (Caryophyllaceae) In Lung And Epidermoid Cancer Cells	*Magnolia*
S-144	Yasin Adem WEDAJO	Enlighting Catalytic Mechanism of Ceriporiopsis Subvermispora (CsFDH) With Site Directed Mutagenesis	*Magnolia*
S-146	Güvenç GÖRGÜLÜ	Ketooxime Derivative as a Potential Antitumor Agent: Synthesis, Characterization, DFT and Molecular Docking Studies	*Magnolia*
S-147	Onur Can BODUR	Preparation of a New Modified Carbon Paste Electrode with Hydrogen Peroxide Sensitive	*Magnolia*
S-152	Ozgun TEKSOY	Hepatoprotective effects of silymarin against thioacetamide-induced hepatic injury in rats	*Magnolia*
S-153	Mustafa GAZİ	Urolithin B as a Simple, Selective, Fluorescent Probe for Sensing Iron(III) in Semi-Aqueous Solution	*Melissa*

S-154	Elif ÖZYILMAZ	Synthesis of Magnetic p-Sulphocalix[8]arene Octacarboxylic Acid Derivative and Its Use In Lipase Immobilization	*Magnolia*
S-155	Elif AYAZOĞLU DEMİR	Cytotoxic Effects of a 1,2,4-triazole-3-one derivative complex in Human Melanoma Cells	*Magnolia*
S-158	Nalan ÖZDEMİR	Enzyme Mimic Properties of His-Zn^{2+} Hybrid Nanoflowers	*Aspendos*
S-159	Yonca EVCİ DUMAN	Non-Covalent Immobilization of Bacillus Pumilus Y7 Alkaline Protease on Bentonite with Kinetic and Thermodymanic Properties	*Magnolia*
S-160	Elif Sibel ASLAN	Understanding of Iron Efflux Mechanism by Genetically Designed Hephaestin in Different Cell Lines	*Magnolia*
S-161	Barbaros DİNÇER	Starch Production By Using Yeast	*Magnolia*

Poster Presentations *, **

Salon Aspendos

Code	Presenter	Title
S-056	Hamiyet KÖSE	Association Between Nötrofil Lenfosit Ratio Levels and Semen Analysis
S-058	Nagihan SAĞLAM ERTUNGA	New Chalcone Derivatives Containing Pyridine and Biological Activities
S-059	Nagihan SAĞLAM ERTUNGA	New Chalcone Derivatives and Biological Activities
S-063	Ö. İrfan KÜFREVİOĞLU	Partial Purification and Characterization of Lipoxygenase (LOX) Enzyme from Bovine Liver, Investigation of In Vitro Effects on Enzyme Activity of Salicylic Acid and Some Flavon Derivative Compounds
S-068	Şükrü BEYDEMİR	CAI and II Isozymes: Purification from Human Erythrocytes, Inhibition and Antioxidant Levels of Some Plants
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S-115	T. Abdulkadir ÇOBAN	The Effects Of Some Medicine On The Carbonic Anhydrase I And II Enzyme Which Were Purified From Human Erythrocyte
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S-119	Melike YILDIRIM AKATIN	*Pellia epiphylla* and *Polytrichum formosum* as Potential Sources of Antibacterial Agents
S-125	Hasan AYALOGLU	The Inhibitory Effects Of Some Newly Synthesized 1,2,4 Triazole-5-one Derivatives On Carbonic Anhydrase-II Activity
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S-149	Sefa ÇELİK	Therapeutic Potential of Bee Venom in the Treatment of Testicular Cancer
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S-156	Elif AYAZOĞLU DEMİR	Cytotoxic Effects of Ethanol and Dimethyl Sulfoxide on Human Melanoma Cells
S-157	Nalan ÖZDEMİR	Preparation and Characterization of Horse Radish Peroxidase-Zn^{2+} Hybrid Nanoflowers
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***** Poster Presentations (28.10.2018 Sunday, 12:30-19:00; 29.10.2018 Monday, 12:30-19:00)

** All poster presentations will be mounted during congress in Salon Aspendos on a board which submission number was attached. They will be removed as of lunch time on 30.10.2018 (Tuesday). Poster presenters should remain with their posters throughout whole poster sessions.

Prof. Dr. Azmi TELEFONCU is a pioneering scientist for the development of biochemistry in Turkey. His valuable contributions are not limited as a pioneer but continues with direct or indirect contributions on the education of top qualified researchers in the field. Throughout his academic life, he tried to explain the necessity and importance of biochemistry education and became the founder of the first Biochemistry Department in Turkey. He also participated in the activities of YÖK and TÜBİTAK, elegant governing organizations of higher education in Turkey. Additionally, he organized numerous national and international scientific meetings and published many books and papers. He has recently retired in 2015; but he still continues his scientific studies to enlighten the community in biochemical sciences with his new R&D projects. As Biochemistry Society, we dedicated an Honory Session for Prof. Dr. Azmi Telefoncu on 28.10.2018 Sunday between 9:00-11:00 for his invaluable contributions, innovative approaches and the values in biochemistry. In this session, close friends and colleagues of Prof. Dr. Azmi Telefoncu will be present as invited speakers and share their scientific and personal experiences. All the members of the Biochemistry Society are cordially invited to the congress and to the Honorary Session. We would be pleased to welcome you all.

The session on 29.10.2018 between 9:00-11:00 is organized as Republic Session as it is National Republic Day. This session will honor ATATÜRK and his colleagues who founded Republic of TÜRKİYE

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ABSTRACTS

INVITED LECTURES

S-001

Molecular Gears of the Circadian Clock System

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Life on Earth is shaped by the rotation of our planet around its axis. In order to cope with (predictable) changes in the environment occurring as consequence of the succession of day and night, most species have developed internal timing systems that allow them to reliably anticipate and adapt to the 24-hour day cycle. In mammals, a ubiquitous network of cellular clocks regulates physiology and behavior through tissue-specific transcriptional programs along the day. A master pacemaker located in the suprachiasmatic nucleus (SCN) of the hypothalamus integrates external light information to adapt this internal clock network to geophysical time in a process termed *entrainment*.

While light is the main synchronizer of central clocks, circadian oscillators of peripheral tissues readily adapt to changes in the daily feeding-fasting cycle. Mistimed sleep and feeding schedules – as frequently observed in human shift workers – lead to internal clock desynchrony promoting the development of various metabolic and neuropsychiatric disorders.

The secretion of endocrine factors such as glucocorticoids or melatonin is an important aspect by which time information is passed from the SCN to peripheral tissues and clocks. On the other hand, deregulation of hormone levels may provide feedback to clocks in cells of the central nervous system, adjusting homeostatic setpoints and altering behavioral functions.

In this talk I will summarize the current knowledge on how circadian timekeeping is organized at the molecular level, how circadian and endocrine systems communicate to control physiological functions, and report some of our recent findings on the role of specific tissue clocks in the regulation of energy metabolism.

S-002

Make data great again! - Big Data in precision medicine

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Together with other national and international stakeholders, the Luxembourg Centre for Systems Biomedicine embarked in 2015 on a long-term research program for precision medicine, the National Centre of Excellence in Research on Parkinson's Disease (NCER-PD), focused on improving the diagnosis and stratification of Parkinson's disease (PD) by combining detailed clinical and molecular data of patients to develop novel disease biomarker signatures. Here, the ultimate goal is to diagnose PD at an earlier stage and with a higher specificity than currently possible.

The development of integrated biomarker signatures based on clinical, molecular, and imaging characterization using advanced computational approaches holds great potential for improving our understanding of PD and its underlying mechanisms. This is addressed in the two crucial aspects of the research program: the establishment of a deeply phenotyped state-of-the-art PD cohort (HELP-PD) and the development of a methodology for the molecular characterization of PD pathogenesis (DIAGNOSIS). These projects complement and boost each other in our efforts to identify and validate PD biomarker signatures from clinically well characterized cohort subjects and corresponding molecular data. To this end, omics data are combined with clinical data and used as input for pathway and network analyses as well as for mechanism-based computational models of the metabolic system.

Moreover, Luxembourg has successfully put itself on the map as an international data hub for PD and has also recently become the ELIXIR node for Translational Medicine in Europe.

More than three years into the program, it is worthwhile to reflect on what has been achieved so far and to provide a perspective of what is yet to come.

S-003

Treatment Of Alzheimer's Disease By Employing Tau-Aggregation-Inhibitors: Being A Tauist In Amyloid Land

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Alzheimer's disease (AD) is an irreversible, neurodegenerative disorder characterized by the progressive loss of memory and thinking skills. There are currently two main hypotheses regarding the cause of dementia in AD: the Aβ cascade hypothesis based on aggregation of extracellular Aβ, and the tau aggregation hypothesis based on intracellular tau aggregates, the so-called neurofibrillary tangles. The neurofibrillary tangle is composed of tau protein, and tau aggregation in the brain is directly linked to clinical dementia. The clinic-pathological correlations, strongly supported by the genetic evidence for a primary role for tau protein aggregation in a wide range of neurodegenerative disorders led to the inference that a drug which blocks the aberrant tau aggregation could have beneficial effects in the treatment of AD.

To establish the validity of the tau aggregation hypothesis, we have developed tau-transgenic animal models and demonstrated that tau aggregation on its own is sufficient to produce cognitive and other behavioural defects, and that blocking tau aggregation reverses these defects. Diaminophenothiazines such as LMTM were identified *in vitro* and *in vivo* as Tau-Aggregation-Inhibitors (TAIs). This provides prominent support to the rationale for treating AD using TAI therapy, and after successfully passing a phase 2 clinical trial, LMTX™ now has entered worldwide into phase 3 clinical trials to treat AD. Interestingly, two independent phase 3 clinical trials demonstrated that it is effective only as monotherapy and that the minimum effective dose might be substantially lower for LMTM than that previously identified using MTC in the phase 2 trial.

Proteomic techniques are being employed to get insights into the treatment effects mediated by LMTM. Therefore mouse brains were collected before and after treatment with this TAI and we performed 2D gel electrophoresis followed by appropriate MS analysis.

For diagnostic purposes in AD biomarkers are commonly determined using immunoassays or optical methods with often not comparable results. The most established biomarkers for AD are β-amyloid peptide 1-42 (A1-42), total tau-protein (T-tau) and hyperphosphorylated tau-protein (P-tau) in cerebrospinal fluid (CSF) and their ratios. To develop new and accurate methods for measuring peptide and protein biomarkers from onset and through progression of neurodegenerative diseases, at µg/L levels and below in small µL sample volumes we choose the tau-transgenic mice to work with. This study is part of the ReMiND project, an EU-EURAMET/EMPIR initiative and collaborative efforts are set up to develop accurate, reliable and traceable methods for the detection and quantification of AD biomarkers.

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S-004

Using Ancestral Sequence Reconstruction To Characterize Primordial Enzymes

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Many modern enzyme complexes are characterized by a high catalytic efficiency and allosteric communication between the constituting protein subunits. We were interested whether primordial enzyme complexes from extinct species displayed a similar degree of functional sophistication. To this end, we used ancestral sequence reconstruction to resurrect the a- and b-subunits of the tryptophan synthase (TS) and the HisF and HisH subunits of the imidazole glycerol phosphate synthase (ImGP-S) complex from the last bacterial common ancestor (LBCA), which presumably existed more than 3.4 billion years ago. We show that all four reconstructed subunits are highly thermostable and assemble to TS and ImGP-S complexes, respectively, which are similar to those of extant species[1, 2]. Importantly, the reconstructed LUCA TS was catalytically active and displayed both substrate channeling and allosteric communication[2]. Moreover, the characterization of an evolutionary intermediate that links LUCA HisF with modern HisF proteins shows that the identification of protein interface hotspots can be very efficient when reconstructed proteins are included in the analysis[3].

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-005

Adaptation Of Membrane Technology For Enhanced Performance Electrochemical Biosensors In Medicine

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Bioelectrochemical sensors have secured an exceptional niche in Medical Point of Care testing. As well as providing simplified reagentless measurement, they have the potential for reagentless continuous monitoring. However, there is a need to establish a stable interface with the sample matrix, whether it is blood or tissue. However, internally reliable transduction chemistry might be, the response sequence is exquisitely susceptible to chages in target molecule flux to the sensing surface. So cellular and colloid/protein deposition externally can lead to added diffusion barriers and so distort measurement. Moreover, electrochemical devices are inherently non-selective and diffusible redox molecules can readiliy cause additional background responses and microsolutes can 'silently' passivate the working electrode with nano-film barriers. Our focus has been on glucose, lactate and oxygen sensors because of their importance for acute metabolic conditions, including shock and diabetes.

Our approach has been to use biocompatible, diffusion control polymeric membranes for device selectivity and stabilisation. These have been, variously, of microporous or dense homogeneous material. Microporous membranes have been typically track etched structures with defined, cylindrical, pores able to reduce target molecule diffusion, facilitate co-substrate (O2 transport) fo oxidases and thereby serve as a diffusion limiting phase whereby the operational range of the device extends above enzyme saturation kinetics and superficial barriers due to biofouling buildup have minimal added effect. The dense membranes are able to reject organic interferents, allowing small peroxide from the oxidase reactions to access the working electrode. This classic first generation system has been the mainstay of our work enabling miniaturisation and sufficient security to allow invasive tissue monitoring. Further barrier membranes have included polyurethane, modified polycarbonate, PVC and protein membranes; the latter as potentially degradable barriers for chronic wound monitoring. We have also devised recess tip enzyme electrodes where the recess gap serves as a non-material barrier for device protection and selectivity.

Miniaturised sensors protected with multilayer barriers have enabled *in vivo* tissue monitoring. Glucose has shown a temporal mismatch with blood levels which is further exacerbated in the case of lactate. Though some of this will be artifactual, eg due to tissue reactive change at the implant site, a substantial proportion appears to be the result of inter-compartmental transport limitations, especially evident during rapid change. In the case of oxygen there appears to be a further, short term, periodic fluctuation in levels that may represent vascular bed responses. Planar membrane functionalised potentiometric electrodes were devised for sweat ions and used PEDOT:PSS as solid internal electrolyte, developed later as a soft textile variant. Additional work on an MIP film for the antidepressent Fluoxetine will be described along with in situ membranes in microfluidic separators. Overall, the convergence of polymeric materials with bioelectrochemical sensors will enhance the practical use of the latter, and with that clinical care.

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S-006

Macromolecules That Fake to be Biomolecules: Nanomedicine in the Works

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"Classical" macromolecules are first characterized via size exclusion chromatography upon synthesis. This initial characterization is routinely achieved with a refractive index detector where the molecular weight of the polymer is calculated via comparison to a polymeric standard, commonly linear polystyrene (PS) or polymethylmethacrylate (PMMA). The problem demonstrates itself with a higher extext when the substance in question gets structurally further away from these standard polymers. A common solution is to go back to a UV detector if one can obtain "standards" of the polymer of choice. While preparing polymeric systems that bear peptides and/or drug molecules, i.e. nanomedicines, the structure thus the problem becomes even more complicated. Light scattering detectors come to the rescue, yet with questions of their own. Recently, a novel group of nanomedicines are synthesized in our group against pacreatic adenocarcinoma. These "nano" molecules are characterized and compared to many other structurally diverse macromolecular systems previously prepared in our group.

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S-007

Interface Engineering through Biomolecular Self Assembly and Materials Synthesis

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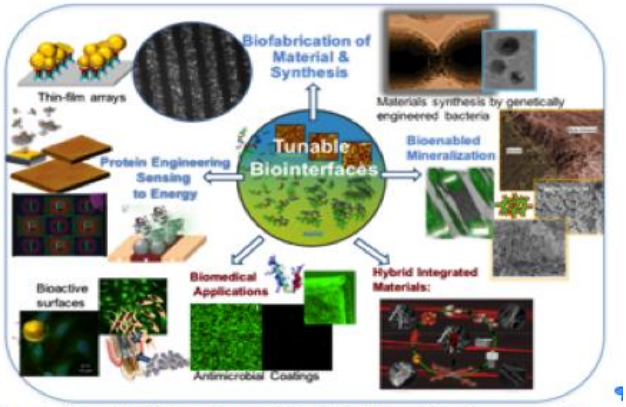

Figure: Tunable Interactions at the Bio-Nano Interfaces results in diverse biomolecular hybrid materials systems impacting diverse applications including medicine and technology.

Bio-Nanomaterial interfaces and surfaces is one of the most rapidly expanding fields that is dynamic across the disciplines from engineering to life sciences. All solid material systems have boundaries, of which the properties are different from bulk material at the nanoscale. How these "in-between regions" merge into one another becomes a critical challenge, and also a fascinating question, which has moved to the forefront in the development of new technologies ranging from biomedical to energy production. Biological materials provide the inspiration for harnessing design strategies to develop innovative materials that simultaneously self-assembled, self-organized and self-regulated; characteristics that are intricate to achieve in purely synthetic systems[1-3]. Proteins play an essential role in fabrication of biological materials due to their diverse functions ranging from structural to biochemical. The ability to mimic any of these functions can be a game changer in designing new class of biologically functional materials and devices. Molecular recognition guides the interfacial interactions in biological materials. Recognizing this, our group has been exploring the smaller protein domains, i.e. peptides as the key fundamental building blocks to mimic the molecular recognition at the solid material interfaces. Our approach includes decoding the peptide-material interactions and utilizing them in the precision assembly of abiotic/biotic materials. Building upon the modularity of protein domains, we further engineer these material selective peptide based building blocks to incorporate additional functions as multifunctional chimeric molecules ranging from short peptide chimera to recombinant fusion proteins [2,4,5]. Armed with an extensive array of multifunctional molecular units, we tackle different technological areas built upon the self-organized biomolecular-solid interfaces[2-5]. Presented specific examples will include biofunctionalization of surfaces with bioactive as well as bio-repulsive attributes, protein/peptide based hybrid nanoassemblies for targeting and sensing, nanofibers that are integrated with fluorescence proteins and nanoparticles pairs and bioenabled mineralization[3,4].

Recent Publications

1) Poudel L, **Tamerler C**, Misra A, Ching W-Y. **2018** J. Phys. Chem. C, C 121 (51), 28354-28363
2) Ye Q., Spencer P., Yuca E., **Tamerler C**. **2017** Macro. Mate and Eng., 302(5), 1600487. "FRONT COVER"
3) Yazici H., ONeill M., Kacar T., Wilson BR., Oren EE., Sarikaya M.**, Tamerler C. 2016** ACS Appl. Mate. and Inter., 8(8), 5070-5081.
4) Zhang, S., Karaca, B. T., VanOosten, S., Yuca, E., Mahalingam, S., Edirisinghe, M., **Tamerler, C**. **2015** *Mac Rap Comm, 36(14), 1322-1328,* "FRONT COVER"
5) Yucesoy, D. T., Taktak-Karaca, B., Cetinel, S., Caliskan, B. H., Adali, E., Karaguler, N. G., **Tamerler, C. 2014** *Bioins, Biom and Nano, 4*(1), 79-89.

S-008

MACROMOLECULAR STRUCTURE AND DYNAMICS BASED ON SAXS PROFILES

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Proteins generally populate multiple structural states in solution. Transitions between these states are important for function, such as allosteric signaling and enzyme catalysis. Structures solved by X-ray crystallography provide valuable, but static, atomic resolution structural information. In contrast, Small angle X-ray scattering (SAXS) profiles, while limited in resolution, contain information about conformational and compositional states of the system in solution. Moreover, SAXS profiles can be rapidly collected for a variety of experimental conditions, such as ligand-bound and unbound protein samples, different temperatures, or pH values. The challenge lies in data interpretation since the profiles provide rotationally, conformationally, and compositionally averaged information about protein shape in solution. We have developed a novel computational method, MultiFoXS that simultaneously uncovers the set of structural states and their population weights for multiple input SAXS profiles. The input is a single atomic structure, a list of flexible residues, and one or more SAXS profile(s) for the protein. The method proceeds in two steps. In the first step, it samples the input structure by exploring the space of the φ and ψ main chain dihedral angles of the user-defined flexible residues. In the second step a SAXS profile is calculated for each sampled conformation with FoXS, followed by a branch-and-bound enumeration of the multi-state models that are consistent with the SAXS profile. The method was benchmarked on over 30 cases with experimental SAXS profiles, including large multi-domain proteins and proteins with long disordered fragments. Moreover, comparison of conformations and their weights between the ligand-bound and unbound SAXS profiles can help in determining the allosteric mechanism. The applicability of the method extends beyond SAXS and it has been applied to datasets from cross linking Mass Spectrometry, Electron Microscopy, and residual dipolar couplings.

S-009

Micro Scale Engineering For Biochemical Analysis

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The new biochemical technologies require the marriage of science and engineering at a profound level. In this talk micro scale engineering will be discussed with an emphasis on development of novel biochemical analysis tools. The talk will explain two fundamental technologies that yield improvement in widely used biochemical analysis. The emphasis of the talk will be on the importance of developing novel approaches using trans-disciplinary approaches.

The first example will focus on the measurement of red blood cell behaviour for development of rapid diagnostic technologies. As opposed to conventional diagnostic assays, this approach leads to significant improvement in analysis time and analysis volume[1]. The technology will be explained starting from microscopic red blood cell properties to an engineering system design level.

The second system that will be explained is about digital polymerase chain reaction (dPCR) technology. dPCR is recently gaining traction due to its ability to absolute quantification for rare targets[2]. A new microfluidic droplet-based technology will be introduced to achieve very high assay precision for an on-chip dPCR system. The details of successful sample encapsulation will be discussed by using engineering principles.

References:

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2) C. M. Hindson, J. R. Chevillet, H. A. Briggs, E. N. Gallichotte, I. K. Ruf, B. J. Hindson, R. L. Vessella and M. Tewari, “Absolute quantification by droplet digital PCR versus analog real-time PCR,” Nature Methods, **2013**, v. 10, pp. 1003–1005.

S-010

NANOZYMES: New Generation of Artificial Enzymes

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Enzymes are biological catalysts that can convert substrates into products in biochemical reactions. However, in general, the enzyme activity of proteins is lost after exposure to extremes of pH and high temperature, and proteins are also susceptible to digestion by proteases in the environment, which dramatically hinders their practical applications in industry. To overcome the limitations, there is increasing interest in enzyme mimetics, which are more robust than proteins and easier or more economical to produce. In addition, non-protein biomolecules with enzyme-like activities have been discovered, such as *Ribozymes, DNAzymes* and *Abzymes*.

In last decade, there have been several efforts by chemists and biologists to create synthetic structures that can mimic the functions of natural enzymes. In this context, nanomaterials are the most experimented materials and currently established as one of the promising alternatives to the natural enzymes. Among nanomaterials, AuNPs, carbon-based materials, and CeO2 NPs are established as effective nanozymes exhibiting the properties of natural peroxidase, oxidase, catalase, and superoxide dismutase enzymes.

In the field of artificial enzymes, the functional nanomaterials with enzyme-like characteristics, termed as *Nanozymes*, are currently garnering immense attention. Recent developments in nanotechnology have led to the generation of nanomaterials exhibiting the catalytic activities analogous to natural enzymes. In last decade researchers found some nanomaterials, such as fullerene derivatives, metal, and metal oxides, exhibited unexpected intrinsic enzyme-like activities, which has ignited intensive research activity in the field of nanozymes. Compared with natural enzymes, nanozymes are advantageous in several aspects, such as low cost, ease of mass production, robustness to harsh environments, high stability, long-term storage, and size/composition dependent activity.

Due to the absence of an active site in Nanozymes, where only a specific substrate molecule binds and undergoes a chemical reaction, researchers have developed various strategies to endow nanozymes with specificity to target molecules. The most representative strategies can be divided between the oxidase-coupled method and the surface-modification method. Nanozymes used for the development of novel biosensor, immunoassay, cancer diagnostics, therapeutics, and environmental engineering technologies.

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ABSTRACTS

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S-011

Genetically Encoded Bioluminescence Resonance Energy Transfer (BRET) Biosensor for Detection of D-Allose

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D-Allose is a rare sugar in nature and in recent years, it has been an attractive molecule due to its metabolic effects. D-allose has many pharmaceutical effects, including antitumor, anti-inflammatory, antihypertensive, immunosuppressant, and anti-oxidative[1]. Therefore, novel biosensors are needed for determination of its therapeutic efficiency and intracellular localization.

BRET (Bioluminescence Resonance Energy Transfer)-based genetically encoded sensor systems are important tools for *in vivo* monitoring. BRET system relies on a protein recognizing target metabolite (periplasmic ligand binding protein, for example, which is cloned between donor (luciferase) and acceptor (fluorescent protein) proteins[2]. Upon specific binding of metabolite, the conformation of recognition protein changes, which makes donor and acceptor proteins come closer to each other. The energy is transferred from donor to acceptor and the excited fluorescent protein shows an emission peak at a certain wavelength. Detection is achieved by this signal.

In this study, we developed a novel method for detection of D-allose. The BRET[1] system consists of YFP (Yellow Fluorescent Protein), ABP (Allose Binding Protein) and Rluc (Renilla Luciferase) components, while the BRET[2] system consists of GFP (Green Fluorescent Protein), ABP and Rluc components. Four different BRET constructs (BRET[1]-1, BRET[1]-2, BRET[2]-1, BRET[2]-2) were obtained using overlap extension PCR approach. Following this step, the resulting plasmids were transformed into *E. coli* BL21 DE3 cells. Heterologous expressions of BRET proteins were achieved in *E. coli* BL21 DE3 cells under dark conditions at 25° C and 200 rpm. The His-tagged proteins were purified by immobilized metal chelate affinity chromatography (IMAC). The biosensors were compared in terms of BRET efficiency. BRET[1]-1 system with Rluc at N-terminal and YFP at C-terminal was found to be superior to the other three biosensor constructs. The BRET[1]-1 enabled D-allose detection at sub-nanomolar level. In addition, D-ribose and D-glucose did not interfere with the BRET signal in the working concentration range. In conclusion, we designed and characterized a novel BRET system that can be used for *in vivo* applications.

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1.EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
27-30 OCTOBER 2018 ANTALYA

S-012

A New Biosensor for Osteoporosis Detection

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Osteoporosis is a disease that is characterized with deterioration of bone tissue and increased risk of fracture as a result of decrease in bone mineral density, which is an important public health problem, because it can progress insidiously without symptoms[1]. Today, bone mineral density is measured by radiological techniques. Alternative techniques are needed because of the disadvantages such as the cost of radiological techniques, excessive radiation intake and the necessity of specialist personnel for the devices. The quantitative determination of biochemical markers that play a role in bone mineralization may be a good alternative for the osteoporosis diagnosis and especially in the follow-up of treatment. Biochemical markers that play a role in bone mineralization are the alternatives that can be used for diagnosis and especially following treatment. The biochemical tests also have advantages such as ease of sample collection and repeatability of the test.

In this study, a specific and sensitive immunological biosensor to use in early osteoporosis diagnosis and evaluating the response to drug treatment has developed for the quantitative determination of the osteocalcin (Ocn) molecule[2], which is one of bone biomarkers, using electrochemical impedance spectroscopy (EIS). Anti-osteocalcin antibody was immobilized onto gold electrode surface via covalent immobilization method by using 6-mercaptohexanol, 1,4-butanedioldiglycidyl ether[3], ethanolamine (EA) and glutaraldehyde. Immobilization steps and biosensor characterization were specified by cyclic voltammetry and electrochemical impedance spectroscopy. The detection time of this developed biosensor system was one hour. Its detection range was determined as 10-60 pg/µL Ocn concentration during this period. This constructed biosensor was successfully used to artificial serum samples spiked with Ocn.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-013

Concentration-Dependent Effect of Levothyroxine on DPPC Membrane

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Levothyroxine is a manufactured form of thyroxine hormone (T4) which is derivatives of tyrosine bound covalently to iodine and it is one of the most famous drugs, used to treat thyroid hormone deficiency. Moreover, it acts like the endogenous T4 secreted by the thyroid gland, which is converted to its active hormone, L-triiodothyronine (T3).

This study aimed to evaluate the temperature and concentration-induced effects of T4 on dipalmitoyl phosphatidylcholine (DPPC) model membranes using two noninvasive techniques, namely Fourier Transform Infrared (FTIR) Spectroscopy and Differential Scanning Calorimetry (DSC). The interaction of T4 with DPPC multilamellar liposomes (MLVs) was investigated as a function of temperature and low and high concentrations of T4 (3 and 15 mol %). The investigation of the C-H, C=O, and PO^{-}_{2} antisymmetric double stretching modes in FTIR spectra and DSC studies reveal that the inclusion of T4 changes the physical properties of the DPPC MLVs.

The DSC results demonstrated that the low concentration of T4 (3 mol %) does not induce a significant change in the overall shape of the thermotropic profile of DPPC MLVs. In contrast, at higher concentration of T4 (15 mol %), the phase transition shifts to lower temperatures and a significant broadening in the phase transition curve is also observed. On the other hand, our FTIR data revealed that the low concentration of T4 leads to an increase in the wavenumber of the CH_2 stretching mode, implying a disordering effect in the gel phase, whilst the high concentration orders the system in the liquid crystalline phase. Furthermore, T4 causes the same effect on membrane dynamics increasing the dynamics of the system both in the gel and liquid crystalline phases. We also observed same action for T4 at low and high concentrations in the interfacial region of the membrane, by monitoring the wavenumber of the C=O stretching and PO^{-}_{2} antisymmetric double stretching bands, respectively.

S-014

Fuel Free Magnetic Nanomotors

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Nanotechnology has led to the development of powerful synthetic micro/nano motors that convert energy into movement and able to perform advanced assignments at the micro- and nano-scales[1]. These small motors is improving on specific applications such as, noninvasive surgery, targeted drug delivery, security and defense, environmental monitoring and remediation, cell manipulation and isolation. Nanomotors can be self propelled or externally powered in the liquid phase by different types of energy sources such as catalytic, magnetic, ultrasonic, electric fields and light propulsion mechanisms. Nano and micro motors driven by magnetic fields are one of the most promising approaches due to their advantages on motion control, biocompatibility, long lifetime and great potential to in vivo studies. In this study, we investigated the applicability of the nanomotors for miRNA hybridization sensing using synthetic oligonucleotides. The changes in the fluorescence intensity as well as the changes in the speed of micromotors were examined before and after hybridization. The propulsion of the micromotor was performed in the presence of magnetic field.

S-015

Are the quantum dots substrates for the enzymes: New perspectives in medicine?

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GSH is an important antioxidant molecule involved in both various enzymatic and non-enzymatic reactions and also used as a coating material for luminescent quantum dots. GSH is used by glutathione-s-transferase (GST) enzyme family, which are responsible for the detoxification of the xenobiotics, natural various class of toxic compounds and drugs. GST and GSH have a crucial role in the preventing reactive oxygen species (ROS)-induced damage, redox regulation, and drug resistance in tumor cells. In our study, GSH coated Ag2S luminescent quantum dots were synthesized and their substrate anolog property was tested by using 1-chloro-2,4-dinitrobenzene (CDNB) as a chromogenic synthetic substrate. The enzymatic activity of the GSH coated Ag2S quantum dots was measured by using placental GST enzyme and we compared GST activity of quantum dots with the GSH which is the natural substrate of the GST enzyme. We determined the photoluminescence spectra of the GSH-Ag2S NIRQDs in buffer before and immediately after the addition of GST enzyme, CDNB and the combination and we have also observed the time dependent changes in the photoluminescence of GSH-Ag2S QDs after GST enzyme addition. In conclusion, our data may provide a new perspective in the evaluating QDs in various medical applications such as drug resistance or as a pharmacophore.

S-016

Heavy Metal Removal from Environmental and Biological Samples by Metal Chelated Cryogels

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Industrial wastewater, contaminated surface water and ground water contain huge amount of heavy metals such as lead, mercury, chromium, arsenic, cadmium, zinc, copper and nickel. Water, which contaminated with these heavy metals, causes vital threats to life of human and other living organisms.[1] Heavy metals have been commercially removed from the contaminated water by various techniques, such as chemical oxidation, biological treatment, coagulation and adsorption. Among these methods, adsorption is the most intensively applied one, due to its high efficiency, cheapness and simplicity.[2,3] Cryogels, which characterized with interconnected macroporous sponge-like structure, are a new generation monolithic, polymeric materials. Because of these macroporous structure, cryogels allow extremely high flow rates and, demonstrate low pressure drops. Also these materials are highly compatible with viscous liquids such as blood, and exhibit any blockage in their pores due to the highly wide open macroporous structures of cryogels.[4]

In this work, N-acetylcystein modified poly(acrylamide-co-methyl methacrylate) [poly(AAm-MMA)] cryogels were prepared and applied for the efficient removal of heavy metal ions [Zn(II), Cd(II) and Pb(II)]. For this purpose, poly(AAm-MMA) cryogels were synthesized by using free radical cryopolymerization method and then functionalized by N-acetylcysteine. Prepared cryogels were characterized by FTIR, SEM and EDX analysis. Metal ion concentrations in all solutions were determined by stripping voltammetry and the heavy metal removal efficiency was found to be as 98.33 % for Zn(II), 90.74 % for Cd(II) and 96.19 % for Pb(II). Additionally, this newly synthesized cryogel was successfully used for removal of heavy metals from environmental (tape and sea waters) and biological samples (artificial human serum).

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S-017

Development of Phenylboronic Acid Modified Electrode Surface for Using Biosensor Applications

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It's important that sensor surface chemistry assays because of the easy immobilization of biological sensing molecules on the chip surface and especially not damage of these molecules through surface effects. When the biosensor surface is covered with organic film and then covalent immobilized molecules, sensor surface can be reused, sensing molecules can be protected side effects and decreased non-specific binding. Boronic acid can form reversible bonds with 1,2- or 1,3-diols under easily controllable reaction conditions. Boronic acid modified self-assembled monolayers can be formed on both gold and silver nanoparticles or gold electrodes, and used immobilizations of glycoproteins[1]. However, only a few reports have involved in boronic acid modified monolayers for the electrochemical sensing of glycoproteins. Glycoproteins which have short oligosaccharides exist in various cellular events with different functions and serve in many cellular events as cell surface recognition.

In the current study, it was developed a method for preparing novel sensor surface modified boronic acid on gold electrode which could specifically recognize the glycoproteins. In previous project, a novel electrode array integrated microfluidics has been designed and characterized in order to create a sensor chip which is easy, rapid, and cheaper to produce also have good electrochemical sensing properties[2]. This new designed gold electrode was used to obtain phenylboronic acid active surfaces. Phenylboronic acid was covalently bounded to mercaptoundecanol self-assembled monolayer on gold electrode via glutaraldehyde reactions. In this coated electrodes, the specific binding of glycoprotein with self-assebled layer was studied using horseradish peroxidase (HRP) as a model protein. Cyclic voltammetry and amperometry assays showed that the binding of HRP with phenylboronic acid modified gold surface. All of the study was carried out using automated biosensor device MiSens, relies on the Real-Time Electrochemical Profiling (REP™) technology[2,3]. Automated biosensor device MiSens has a microfluidic channel integrated biochip, has been developed by TÜBİTAK-BİLGEM and supported by GTU for research and development studies.

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S-018

Effects of Cetuximab and Stabilized Silver Solution on Cell Cycle in Lung Cancer Cells

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Lung cancer is one of the most common cancer-causing deaths worldwide. Epidermal growth factor receptor (EGFR) and its ligands are signal molecules involved in various cellular functions such as cell proliferation, cell differentiation, cell motility, cell survival and tissue development. It has been shown that EGFR is expressed more than normal in a variety of lung cancer cells in many studies. Cetuximab is a chimeric monoclonal antibody directed to EGFR. Cyclins play a critical role in the progression of the cell cycle by activating CDK4 and CDK6.

The aim of this study was to determine the changes in the expression levels of topoisomerase II-alpha, cyclin D1 and cyclin D2 in parental (P-H1299) and epirubicin-HCl resistant (R-H1299) lung cancer cells treated with cetuximab alone and also with stabilized silver solution (st-Ag).

mRNA was isolated using 'RNeasy Mini Kit (Qiagen)' from the cells that were treated with cetuximab alone and also with st-Ag solution for 72 hours. mRNA isolated from the cells was converted to cDNA under appropriate conditions using 'Titan One Tube RT-PCR System Kit'. In Reverse Transcriptase Polymerase Chain Reaction (RT-PCR), denaturation 1 min at 94°C, annealing 1 min at 55°C for topoisomerase II-alpha and cyclin D2 genes, 1 min at 58°C for cyclin D1 gene and extension 2 min at 72°C. 30 cycles were performed. PCR products were analyzed by 2.5% gel electrophoresis. Adobe Photoshop CS4 programme was used for band density analyzing.

Co-administration of cetuximab with st-Ag solution was found to be more effective in both cells in reducing the expression of topoisomerase II-alpha (excluding R-H1299 cells), cyclin D1 and cyclin D2 than cetuximab alone administration. Thus, it was demonstrated that the combined treatment caused more arresting in the G1 phase of the cell cycle than cetuximab alone treatment.

The combination of cetuximab and st-Ag may provide a rationale for future clinical investigations of lung cancer treatment.

Keywords: Lung cancer, cetuximab, stabilized silver solution, cyclin D1, cyclin D2, topoisomerase II-alpha

S-019

Investigation the Effects of UV-C on the Experssion Levels of Some Genes Included in Intracellular pH Homeostasis of *Deinococcus radiodurans*

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D. radiodurans is a non-motile, spherical shaped, aerobic and polyextremophilic gram-positive bacteria[1,2]. *D. radiodurans*, which entered into the Guiness records book as the world's most resistant aerobic organism to radiation also resistant to low moisture, UV-C rays, high amounts of reactive oxygen species, and genotoxic agents such as mitomycin C[3,4].

D. radiodurans can repair pyrimidine damages (dimerization and bipyrimidine products), lipid peroxidation, DNA-protein cross-linking, and double DNA breaks that occurs when exposed to UV-C rays. It has been reported that *D. radiodurans* is 23 times more resistant to UV-C (254 nm) than E. coli[4].

pH imbalances that occur in cells exposed to UV-C rays are thought to cause problems in enzymes involved in DNA repair. The most discussed issue in the elimination of damage caused by UV-C rays is; It is the mechanism of DNA repair genes. The effect of enzymes and non-enzymatic systems responsible for the regulation of pH in the UV-C resistance of *D. radiodurans* is unknown.

In this research, in *D. radiodurans*' cultures irradiated at different UV-C (100, 200, 300, 400, 500 J/m2) doses; expression levels of β-carbonic anhydrase, hydrogenase (HypA and HypB genes), arginine decarboxylase, glutamate synthase major subunit, urease accessory protein (UreE and UreG) genes were examined by RT-qPCR method. Glyceraldehyde 3-phosphate dehydrogenase gene was used as reference gene in the study. In the experiments performed, the highest expression level in UV-C treated cultures was determined 85 fold in the UreE gene at 500 J / m2. It was also found that the β-carbonic anhydrase level 54-fold more compared to the reference gene.

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S-020

The Investigation of Effect of Polar And Apolar Extracts of White Chicory (*Cichorium İntybus* L.) Plant on Angiotensin Converting Enzyme (ACE, EC 3.4.15.1) and Acetylcholinesterase (AChE, EC 3.1.1.7) Enzyme in Human Plasma

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In this study, the effects of hexane and methanol extract from *Cichorium intybus* L. plant on angiotensin converting enzyme (ACE, EC 3.4.15.1) and acetylcholinesterase enzyme (AChE, EC 3.1.1.7) activity in human plasma were investigated. Hexane extract of this plant showed no effect on the ACE and AChE enzymes. Methanol extractof this plant showed inhibition effect on these enzymes. The IC_{50} values were calculated as 0.72 mg/mL for human plasma ACE and 1.386 mg/mL for human plasma AChE. The inhibition type of inhibitors was determined to be reversible noncompetitive inhibition from Lineweaver-Burk graph.

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S-021

Production of Engineered Formate dehydrogenase for CO_2 Reduction

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Keywords: CO_2 reduction, protein engineering, format dehydrogenase, Pichia expression system.

Global warming and climate change have inspired a global effort to reduce the amount of atmospheric carbon dioxide. Many approaches have been considered and adopted for reducing CO_2 emissions[1]. To catalyze CO_2 conversion, chemical, photochemical, electrochemical methods have been employed. However, these three methods require often high operating temperatures, pressure and electric/luminous energy and also selectivity / yield issues accompany these methods[2]. Among these approaches enzymatic CO_2 reduction offers a feasible and promising technology for both greenhouse gas recycling and efficient production of chemicals and fuels (a win-win strategy) due to their mild reaction conditions, high selectivity and also eco friendly nature[3,4]. The most promising candidate enzyme is formate dehydrogenase (FDH) due to its beneficial reaction features.

The aim of this study is to discover new structural and functional principles to improve enzyme efficiency in the reduction of CO_2 to obtain novel NADH dependent FDH and also the multidimensional mutational analysis of the mutations generated in positions related to the functional properties and interactions of the amino acid positions which are in or near the active site of NAD^+-dependent FDH with a substrate preference for CO_2. *Chaetomium thermophilum* FDH gene (*ctfdh*) was cloned into pPICZα vector and transformed into *Pichia pastoris*. Iterative saturation mutagenesis study was performed on the five residues considered to be important for catalytic efficiency in FDH's active site. The G93H-I94Y mutant showed 7-fold higher CO_2 reducing activity than wild type. The re-designed FDH was highly purified and fully characterized. The obtained results indicated that it is the most significant candidate enzyme to develop a commercial system for reduction of CO_2.

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S-022

Recombinant Production of Human Carbonic Anhydrase VA Isoenzyme and Investigation of *In Vitro* Effects on Enzyme Activity of Some Sulfonamide Derivatives and Phenolic Compounds

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Carbonic anhydrase (carbonate hydrolase EC 4.2.1.1) is an enzyme that catalyses reversibly reactions of carbon dioxide hydration and dehydration of bicarbonate in living organisms. Sixteen isoenzymes of the enzyme were detected in mammalian tissues till now[1]. CA V isoenzyme is found in some of the tissues located in the mitochondrial matrix. Carbamoyl phosphate synthetase-I and pyruvate carboxylase enzymes are predicted to play a role in urea turnover and gluconeogenesis due to the presence of bicarbonate ion [2].

In this study, CA VA (carbonic anhydrase VA) gene was amplified by PCR using human pancreas cDNA library with gene specific primers. Then, recombinant DNA was obtained by TA cloning method using the pET SUMO vector. Putative recombinant DNA was transformed into competent *E. coli* cells by heat-shock method. Plasmids were isolated from positive transformants identified by colony PCR. Sequence analysis of the recombinant plasmid was performed with vector primers. Subsequently, CA VA gene was expressed in *E. coli* BL21DE3 cells. The obtained recombinant protein was purified with Ni-resin column. Inhibition studies for CA VA isoenzyme were performed with different sulfonamide derivatives and phenolic compounds. Esterase activity measurements were made at five different inhibitor concentrations and IC_{50} values were determined by activity %-[I] graph. The IC_{50} values were calculated as 0.87 mM for sulfanilamide, 14.88 mM for acetazolamide and 6.00 µM for eupatorin. While the enzyme activity was unaffected in eupatilin, the activation effect for the gardenin A was observed.

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S-024

Functional Monolithic Cryogels as Support Materials for Enzyme Bioreactors

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Papain is a cysteine protease enzyme isolated from the latex of *Carica papaya* and catalyzes the hydrolysis of peptide, amino acid esters, and amide bonds. For this reason, it is widely used in food, pharmaceutical, biology, and biomedical research. It is well known that the papain enzyme, as other proteases, is prone to auto-digestion. Papain cleaves antibodies into two Fab fragments and one Fc fragment. Fab fragments are monovalent antibody structure that contains the complementarity determining region (CDR) without the Fc fragment. Fab fragments can be linked to these by specifically recognizing antigens. Therefore they are particularly useful in antibody-antigen interactions and are used instead of the whole structure of IgG.[1]

Various materials have been used as supports to immobilize enzymes, such as monoliths, magnetic composite microbeads, magnetic nanoparticles, disk, and cryogel bioreactors. Among various materials, cryogel bioreactors have been considered as ideal supports in view of their advantages such as supermacroporous structure, allowing separation at higher flow rate with lower back-pressure, reusability, easy preparation, chemical and mechanical stability.[2,3]

In the literature, it is considered that immobilized support materials are able to operate in a batch system and therefore can not be used as a bioreactor. In this study, it is suggested to make a cryogel bioreactor which can be studied in a continuous system as well as immobilization conditions of papain enzyme are simple and effective. With the aim to design an effective and convenient method for papain immobilization using cryogel bioreactor, covalent immobilization was performed between epoxy groups of the matrix and amino groups of the papain enzyme. The enzyme immobilized cryogel bioreactor was characterized by FTIR, SEM, and swelling tests. The enzyme specific activity at broad pH ranges, substrate concentration, temperature, storage stability, operational stability, and kinetic behavior of immobilized papain were compared with free papain in solution using casein as a substrate. IgG digestion products obtained from immobilized and free papain were characterized by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE). Besides, the obtained IgG digestion products from papain immobilized cryogel bioreactor were analyzed by high performance liquid chromatography (HPLC).

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-025

An Electrochemical Biosensor For Sensitive Detection Of Lung Cancer Biomarker Based On Polythiophene Polymer With Densely Populated Carboxyl Groups Modified Disposable ITO Electrode

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Protein p53 is an important biomarker in tumor suppressing process and has a significant role in cellular functions such as cell growth and proliferation, DNA repair, and apoptosis.[1] Loss of p53 function results the induction of tumors and gene mutation, therefore a conformational change is formed in the structure of p53 protein.[2] During mutation, the cell proliferation is formed and it results in tumor formation. After destruction of tumor cells, p53 protein is released from cancer cells and penetrates into the circulation.[3] The level of p53 protein is ranged from 0.52 ± 0.23 ng/mL to 1.03 ± 0.59 ng/mL in serum samples from cancer patients.[4] An important increase in the serum level is a sign of different types of cancers like lung.[5] The accurate and sensitive detection of p53 protein is important due to these significant roles of p53.

Electrochemical impedance spectroscopy (EIS) is a label-free and successful technique, which has been used in the detection of various biomarkers. By using this technique, the changes in capacitance or charge-transfer resistance originated from the specific binding of biorecognition elements to their desired molecules, which formed on the electrode surface can be monitored.[6]

In this study, we have developed an electrochemical immunosensor based on polythiophene polymer with densely populated carboxyl groups for p53 cancer biomarker detection. In the design of immunosensor, anti-p53 antibodies were utilized as biorecognition molecules. The anti-p53 antibodies attached to the carboxylic groups of polythiophene polymer present on the disposable ITO electrode covalently. Developed immunosensor exhibited a good linear detection range (0.03-7.5 pg/mL) with a limit of detection of 10 fg/mL. In addition, the developed immunosensor was highly selective for p53 biomarker in human serum. Analytical performance of the developed immunosensor proved the applicability in clinical diagnostic applications.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-026

Antioxidant and Immunomodulatory Activities of the Isolated Compounds from *Porodaedalea pini* and *Fuscoporia torulosa* Mushrooms

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Antioxidant is defined as any substance that inhibits the oxidation of compounds or neutralize free radicals at low concentrations. There is an increasing trend in consumer preferences for natural and safe antioxidants for food applications due to the toxic and carcinogenic effects of synthetic antioxidants.[1]

The aim of the study is to determine antioxidant and immunomodulatory activities of the isolated compounds; campesterol (**1**), ergosta-7,24(28)-dien-3β-ol (**2**), dioctyl phthalate (**3**), ergosterol peroxide (**4**), pinoresinol (**5**), 4-(3,4-dihydroxyphenyl)but-3-en-2-one (**6**) from *P. pini*; ergosterol peroxide (**4**), 4-(3,4-dihydroxyphenyl)but-3-en-2-one (**6**), oleanolic acid (7), 28-norolean-12-en-3β-ol (**8**), javeroic acid (**9**), β-sitosterol (**10**), oleanonic acid (**11**), 2,3-dihydroxy cinnamic acid (**12**), 3,4-dihydroxy benzaldehyde (**13**), ergosta-4,6,8(14)-22-tetraen-3-one (**14**) and 5*α*,8*α*-epidioxyergosta-6,22-dien-3β-il-palmitate (**15**) from *F. torulosa*. Antioxidant activities of isolated compounds were performed by β-carotene-linoleic acid, DPPH$^{\bullet}$ scavenging, ABTS$^{\bullet+}$ scavenging, cupric-reducing antioxidant capacity (CUPRAC) and metal chelating assays. Immunomodulatory activities of all isolated compounds were tested by the methods as described by Hansen *et al*.[2] and Helfand *et al*.[3] and ibuprofen was used as standard. 3,4-dihydroxy benzaldehyde (**13**), 4-(3,4-dihydroxyphenyl)but-3-en-2-one (**6**) and pinoresinol (**5**) compounds showed the highest antioxidant activities among the isolated compounds. Also, these compounds exhibited higher antioxidant activity than BHA and α-tocopherol used as standards in DPPH$^{\bullet}$ scavenging, ABTS$^{\bullet+}$ scavenging and cupric-reducing antioxidant capacity (CUPRAC) assays. The highest immunomodulatory activity was found in oleanonic acid (**11**) (IC_{50}: 18.26±0.37 µg/mL) and oleanolic acid (**7**) (IC_{50}: 21.83±0.54 µg/mL) compounds.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-027

Label-free Electrochemical Immunosensor for Neutrophil Gelatinase-Associated Lipocalin Detection

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Acute renal failure (ARF) is a common disorder in clinical nephrology, associated with high mortality and morbidity rate, despite significant progress in treatment procedures[1]. ARF is typically diagnosed by measuring serum creatinine (SCr) levels. However, SCr concentrations might not change till about 50% of kidney function is damaged[2]. Thus, new biomarkers are needed to explore the ARF sensitively and accurately. Recently, the neutrophil gelatinase-associated lipocalin (NGAL) has been studied as a new biomolecule in the early diagnosis of ARF with promising results[3]. There are several conventional methods to measure NGAL, such as immunoblotting[4], electrochemical immunoassay[5], and chemiluminescence assay[6]. Therefore, sensitive, label-free, and low cost determination of NGAL is still of critical urgency for early diagnosis of ARF.

In this study, a label-free immunosensor for neutrophil gelatinase-associated lipocalin (NGAL) detection has been fabricated by immobilization of anti-NGAL antibodies to electropolymerized L-arginine (P(L-Arg)) deposited and multi-walled carbon nanotube (MWCNT) modified glassy carbon electrode (GCE). Morphological and electrochemical characterization of bare and modified electrodes was carried out by scanning electron microscopy, and cyclic voltammetry, respectively. The factors affecting the immunosensor sensitivity such as polymerization cycle number, antibody concentration, and interaction time have been optimized. Under the optimal conditions, the developed immunosensor exhibited a wide linear range between 25 ng/mL and 750 ng/mL. Low detection (7.21 ng/mL) and quantification limits (24.0 ng/mL) were obtained. The reliability of the immunosensor was investigated in artificial serum samples with high recovery values.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-028

Cloning, Heterologous Expression and Purification of *Toxoplasma gondii* FabG (3-Oxoacyl-[Acyl-Carrier-Protein] Reductase) Enzyme

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Toxoplasma gondii is a host dependent opportunistic protozoan parasite and the causative agent of toxoplasmosis, infection by this parasite which is prevalent across the entire human population with an approximate one third total infected and 10 to 90% seropositivity rates varying country to country depending mostly on conditions of economic development. Toxoplasmosis is associated with AIDS in immune-compromised patients and various Pre-natal complications and rare post-natal deteriorations. *Toxoplasma gondii* is, like the causative malaria agent *Plasmodium falciparum,* a member of the Apicomplexa phylum and contains a non-photosynthetic plastid-like organelle called the apicoplast, which is an evolutionary product of a secondary endosymbiosis process of an endosymbiotic alga species. Like chloroplasts, apicoplasts have their own genomes in addition to nuclear proteins subcellularly localized to the plastid organelle. Among these proteins are the FASII plant-like prokaryotic fatty acid synthesis pathway enzymes, exclusive to bacteria, plants and apicomplexans used to synthesize host derived long and very long chain fatty acids. FASII has been demonstrated to be essential for the sustained survival of the apicomplexan *Toxoplasma gondii* and the fact that FAS II components are marginally different from the single superstructure of FASI in humans support its resident enzymes as possible drug targets, therefore further experimental elucidations of FASII enzymes are much needed. For this purpose, one such enzyme was produced *in vitro*, in order to proceed with further kinetic and activity analyses in the future. In this study, FASII terminal enzyme called 3-oxoacyl-[acyl-carrier-protein] reductase (FabG) (EC: 1.1.1.100), which catalyses the β-ketoacyl-ACP reduction to β-hydroxyacyl-ACP products in a NADPH cofactor dependent manner, was chosen. The TgFabG gene was cloned excluding the unstructured N-terminal signal and transmembrane domains by PCR from a circular cloning vector PTZ57RT/T-FabG, ligated to an expression vector pLATE31, expressed in transformed *Escherichia coli* (BL21DE3) cells, separated and visualized via an 18% SDS-PAGE gel and successfully purified by a 6xHistidine tag affinity chromatography process. As a result, for further biophysical, *in vitro* drug screening and inhibition studies, highly pure recombinant *Toxoplasma gondii* FabG protein was obtained in appropriate amounts.

S-029

Investigation of Antioxidant Ability of *Inula helenium* Roots to Prevent Oxidatively Induced DNA Damage by Gas Chromatography-Tandem Mass Spectrometry

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Natural antioxidants are substances that may protect living cells against the effects of free radicals. Free radicals can damage cells, and may play a role in heart disease, cancer, neurodegenerative diseases, various inflammatory conditions and other diseases. Antioxidants can delay or inhibit the oxidation of lipids or other molecules by inhibiting the initiation or propagation of oxidative chain reactions.[1,2]

Inula helenium L. is a perennial herb which is distributed in Europe, North America and East Asia. The roots are collected in autumn after 2 to 3 years of growth. They are used in folk medicine to treat variety of diseases including asthma, cough, bronchitis, indigestion, gastritis, infectious and helminthic diseases.[3]

In this study, the extracts of the roots of *I. helenium* were obtained in methanolic, acidic methanolic media using ultrasonic-assisted extraction. The total phenolic contents of extracts were determined by Folin-Ciocalteu method and also total antioxidant capacities of extracts were determined by ABTS and CHROMAC methods. Phenolic compounds were analyzed in the extracts using high-performance liquid chromatography-diode array detection (HPLC-DAD). DNA base damage products were analyzed sensitively and selectively by gas chromatography tandem mass spectrometry (GC-MS/MS) to investigate the protective powers of chlorogenic acid and ferulic acid with different concentration, and the extract of *Inula helenium* L. root against oxidative DNA damage. The experiments proved a significant decrease in the amount of the DNA base damage products when antioxidants were used. The results showed that ferulic acid has better protection of DNA against oxidation than chlorogenic acid. The methanolic extract of *Inula helenium* L. root was revealed to inhibit the oxidative DNA damage.

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S-030

Computational Investigation on Influenza A Virus M2 Protein Inhibition

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M2 protein of influenza A virus plays a vital role in virus' life cycle. N-terminal residues (amino acids 1-23) enable the virus to interact with host, C-terminal amino acids are needed for proliferation, and amino acids 23-46 form the trans membrane helical region functioning as proton channel, which assists the protonation of virus interior and the transfer of virus DNA into (human) host.[1-3] In the channel His37 residues act as a pH sensor, changing their protonation states at low/high pH leading to opening and closing of channel, and Trp41 and Asp44 residues operate as proton gates.[4]

Binding sites for two commercial inhibitors of this channel, rimantadine (RIM) and amantadine (AMA), chemical and structural effects of binding on the proton channel are still under debate. Recent RIM bound NMR structure revealed structure with ligand bound outside of the channel, opposite of previously identified binding pocket inside the channel,[4] intensifying the debate. Chemical effect of inhibitor binding on protonation states of His37 residues has not been clearly observed, as well.

By combination of molecular docking, classical molecular dynamics (MD), and constant pH MD simulations, we identified novel binding sites for RIM and AMA molecules on M2 channel structural alterations occurred upon ligand binding. Furthermore, we investigated the change in the protonation states of His37 and Asp44 residues upon ligand binding. RIM binding slightly increased protonated state population of one of His 37s and Asp 44s, whereas AMA binding drastically increased same population creating more basic channel at physiological pH. Understanding binding sites and outcomes of binding will lead new inhibitor design studies.

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S-032

Enzymatically Bioactive Polypeptides From Sulusaray Hot Spring, Tokat

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In this study Sulusaray hot spring is examined in terms of bioactive polypeptides and the active compounds were identified in the therapeutic polypeptide structure.

For this purpose, 40 liters of water samples from the Sulusaray hot spring were filtered through 0,45 µm and 0,22 µm pore sized membranes followed by 3 and 30 kDa cut off nitrocellulose membranes. The protein concentration of the extract was determined by the Bradford method[1]. Extracted proteins were screened for their antimicrobial activity against pathogenic bacteria and lipase, amylase, protease, oxidase and catalase enzymatic activities of the extracted polypeptides were also investigated. The bioactive polypeptides are displayed to be separated by SDS-PAGE method. Identification of polypeptide producer microorganisms were done by metagenomic analysis.

As a result of the studies, it was found that the polypeptide mixture having a concentration of 65.5 µg / ml was effective against strains of *S. enteritidis, C.utilis, C.albicans, E. coli, B. subtilis and P.vulgaris* strains, and that have 1.384 U / ml amylase, 0.263 U / ml lipase and 1.64 U / ml protease enzyme activities. It has been found that the polypeptide mixture contains two separate polypeptides, predominantly 70 kDa and 35 kDa in size. Sequence analysis results revealed that the hot spring contains bacteria from the classes Proteobacteria, Bacteriodes, Chloroflexi, Deinococcus thermus and Cyanobacteria and fungi from the family Ascomycota. As a result, it is predicted that the bioactive polypeptide sources contained in the water are produced by these organisms.

Keywords: Bioactive Polypeptides, Sulusaray Hot Spring, Antimicrobial Activity, SDS-PAGE, Metagenomic

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S-033

Nanotechnology in Detergent Industry: Enzymes Incorporated Hybrid Nanoflower and Their Enhanced Stain Removal Capability

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The industrial enzymes have been intensively used in many industrial sectors such as detergent, textile, leather and food. The market sizes of industrial enzymes used only in the detergent in the 2017 is about 20-25 million euros while their global market size is also about 5.2 billion Euros in the world[1-2].

In the project, a new enzyme encapsulation technique called “nanoflower technology” which is completely compatible with green nanotechnology, offer, for the first time, to produce single or multiple enzymes incorporated flower shaped hybrid nanocomposite called “nanoflower” with greatly enhanced catalytic activities and stabilities for their uses mainly in the detergent industry[2-5]. Enzyme nanoflowers exhibit much enhanced enzymatic activity and stability compared to the free enzyme and conventionally immobilized enzymes currently imported and used in detergent industry. This much increase on enzymatic activity and stability of nanoflowers can be attributed to the high surface area, porous structure and high localized enzyme concentration at nano scale of nanoflowers.

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S-034

DevelopmentofDNAAptamerDirectedMagneticGrapheneOxidefor Targeted and Enhanced Photothermal Therapy Towards Methicillin-Resistantstaphylococcus Aureus Cells

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Herein, we developed DNA aptamers, which was selected by SELEX (systematic evolution of ligands by exponential enrichment) process for methicillin-resistant staphylococcus aureus (MRSA), conjugated magnetic graphene oxide (MGO) for targeted and photothermally enhanced therapy to destroy the MRSA bacteria. The iron oxide (Fe_3O_4) nanoparticles (NPs) produced on the surface of the GO provide magnetism by an external magnet and GO acted as platform for DNA aptamer functionalization and photothermal agent under the near infrared laser (NIR, 808 nm) radiation. DNA aptamer was utilized as targeting ligand for molecular recognition of MRSA. Finally, this the multifunctional DNA aptamer functionalized MGO nanoplatform effectively and rapidly kill the MRSA under NIR laser radiation.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-035

Effects of Some Food Additives on Carbonic Anhydrase Activity

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With the increase in the production of processed foods in modern food technology, the use of food additives has also gained momentum. Food additives; are substances added to foods to prevent deterioration of food during preparation of food, to improve taste, structure or nutritional value, to improve sensory properties such as color, appearance, taste. Although studies on the effects of food additives on human enzymes are present to some extent, studies about their effects on carbonic anhydrase (CA) are not widely available in the literature.[1, 2]

For this purpose, the effects of 20 different food additives (12 colorants, 2 antioxidants, 3 sweeteners, 2 preservatives and 1 acidity regulator) on bovine carbonic anhydrase enzyme (BCA) and human carbonic anhydrase isoenzymes (hCAI and hCAII), purified by affinity column chromatography, were investigated. By using esterase activity measurement method of CA, % CA inhibition and IC_{50} values were determined for all samples. When the investigated food additives were evaluated as a group, the higher inhibition values were detected in the colorants, among which erythrocyte B, a synthetic colorant, showed the highest inhibition ($IC_{50(BCA)}$: 11 µM, $IC_{50(hCAI)}$: 19 µM ve $IC_{50(hCAI)}$: 5 µM). Sweeteners with little or no effect on the BCA enzyme were found to have an effect even if it is low on the activities of hCAI and hCAII isoenzymes (saccharine $IC_{50(hCAI)}$: 2049 µM ve aspartame $IC_{50(hCAI)}$: 2817 µM; saccharine $IC_{50(hCAII)}$: 1015 µM ve Aspartame $IC_{50(hCAII)}$: 2936 µM). BHT, which is incorporated as antioxidant into many foods and beverages, has a greater effect on CA activity compared to ascorbic acid. In this study, the question brought to presence as whether the side effects that are caused by excessive consumption of some foods containing food additives are related to the carbonic anhydrase enzyme inhibition.

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S036

Investigation Of The Effects Of New Tadalafil Derivatives On Cyclic Nucleotide Phosphodiesterase 1 Isoenzyme

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Tadalafil, is one of the most important specific inhibitors of cyclic nucleotide phosphodiesterase (PDE) 5 isoenzyme, available under the name Cialis, which is used for erectile dysfunction (ED) treatment successfully [1]. It is known that ED drugs have some major side effects like headache, face flushing, vision disorders, back pain, and cardiovascular disorders [2]. Thus, we believe that it is important to know the effects of such drugs on other isoenzymes of PDE which have very important physiological functions. PDEs (E.C. 3.1.4.17) are an enzyme family, which selectively hydrolysis of 3'-cyclic phosphate bond of cAMP or cGMP to control the level of second messenger molecules inside the cell, and thus play a critical role in intracellular signalling [3,4]. In this study, we examined the inhibitory effects of new tadalafil derivatives on PDE 1 isoenzyme, which is a calcium/calmodulin-stimulated, and cAMP/cGMP dual-substrate phosphodiesterase located in heart, brain, lung, testis, and smooth muscle [3,5]. Hence, PDE 1 is very important in regulation of smooth muscle contraction, dopaminergic signaling, immune cell activation, sperm functions, and neuronal signaling [6]. In order to test the inhibition of PDE 1, a colorimetric cyclic nucleotide phosphodiesterase assay kit were used under our optimized conditions. As a result, while tadalafil (IC_{50}=178 µM), allyltadalafil (IC_{60}= 105 µM), morpholinotadalafil (IC_{50}=375 µM) and furfuryltadalafil (IC_{60}=97 µM) inhibited PDE1 in µM level, cyclohegzyltadalafil and piperonyltadalafil showed activator properties in working concentrations (20-600 µM).

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S-037

Comparative Evaluation of Antibacterial Activity of Cd-based Quantum Dots

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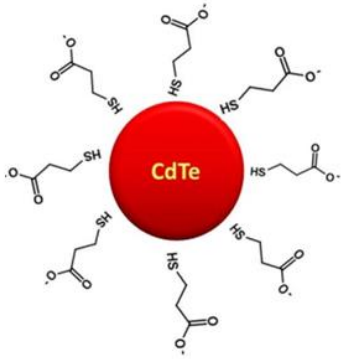
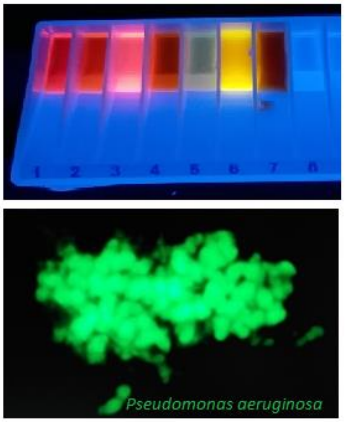
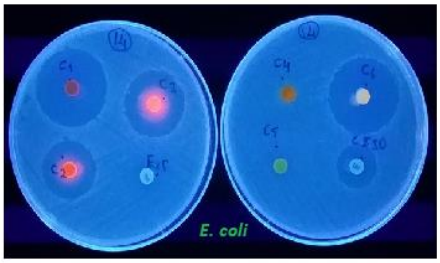
Quantum dots (QDs) are a unique class of semiconductors that have a characteristic fluorescence. QDs are nanoscale crystalline clusters that contain a metallic spherical core and chalcogen elements. Their surface is usually coated with different molecules to modification for specific activities. Due to their unique optical properties such as their great photostability, bright photoluminescence, narrow emission, and broad UV excitation, they can be used in many biological, biochemical applications and biomedical diagnosis such as biosensors, cell imaging, in-vivo processes and biolabeling. *In vitro* and *in vivo* imaging of cellular processes with QDs is well established, primarily for eukaryotic cells. However, relatively little is known about bacterial cell interactions with QDs. These findings prompted us to investigate the toxicity of QDs on different bacterial species in a comparative study based on growth inhibition.







A series of water-soluble Cd-based quantum dots and functionalized their surface with polar ligands such as 3-mercaptopropionic acid (MPA) or thioglycolic acid (TGA) were synthesized and characterized by UV–vis absorption spectroscopy, their photoluminescence measurements, X-ray diffraction (XRD) and transmission electron microscopy (TEM). The antibacterial activity was investigated using disc diffusion method , broth microdilution techniques and also fluorescence microscopy images. The study also confirms that gram positive bacteria are relatively resistant to the bactericidal action than gram negative bacteria. Such studies are crucial in the demonstration of therapeutic importance of cadmium nanoparticles.

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S-038

Thermostable L- Amino acid Dehydrogenase Purification, Characterization and Kinetic Mechanism

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L–Amino acid dehydrogenase enzyme (L-AADH), which recognizes the amino acid as the substrate, reversibly catalyzes the reductive amination reactions of the amino acid with oxidative deamination and oxoacid using NAD (H) as the coenzyme. The members of the L- AADH superfamily have been targeted for protein engineering to alter their substrate specificity due to their potential use in the biocatalysis of chiral amines and unnatural amino acids(1,2).

In this study, we describe the purification, characterization and kinetic mechanism of the L-AADH from the thermophile, *Thermomicrobium roserum.* The optimum pH for the deamination and amination reactions of this enzyme were 9.0 and 9.5, respectively. This L-AADH is stable at 70 °C and remains active for both deamination and amination reactions after 30min incubation at this temperature. The kinetic properties of the enzyme were measured by monitoring of the changes in absorbance at 340 nm due to the oxidation of NADH or the reduction of NAD+. The Km values obtained were 1.504 ± 0.2471 mM for the deamination substrate and 1.945 ± 0.1671 mM and 11.10 ± 2.41mM for different amination substrates. When using the non-natural amino acid substrates L-norvaline, L-norleucine, and L-α-aminobutyrate, the Km values were 27.26 ± 1.50 mM, 96.28 ± 10.70 mM and 28.74 ± 1.368 mM respectively.

The robust properties of the enzyme make it a suitable candidate for industrial applications.

This Project was supported by BAP research grant (2018.06.02.688.) from Duzce University.

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S-039

Enhanced Production of Recombinant *Staphylococcus simulans* Lysostaphin using Media Engineering

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Some healthcare associated infections that are acquired in healthcare settings such as hospitals, nursing homes, dialysis centers are mostly related to methicillin resistant *Staphylococcus aureus (S. aureus)* which can cause significant medical and economic losses along with costs. So developing antibacterial enzymes has been gaining importance to be able to prevent such infections.[1]

Lysostaphin (EC 3.4.24.75, Glycyl-glycyl endopeptidase) is an enzyme that degrades the cell wall of almost all known staphylococcal species; especially *S. aureus* and S. *carnosus, S. epidermidis, S. haemolyticus, S. saprophyticus, S. hominis, S. simulans, S. xylosus, S. hyicus* ATCC 11249 and *S. intermedius* ATCC 29663.[1-2] Therefore, lysostaphin has significant potential in biotechnological applications of the treatment of staphylococcal infections[1]. Despite promising results of lysostaphin as bacteriocin killing human and animal staphylococcal pathogens, it is still not widely used in healthcare settings. One of the significant limiting factors that prevents lysostaphin being used in the biotechnological practice is its high production costs (1 mg–130 €/ Sigma-Aldrich).[3]

This study aims to investigate the effect of different media on expression of lysostaphin from *S. simulans*. Commercial media like Laura-Bertani, Terrific Broth, auto-induction and our constructed media were tested. The gene encoding *S. simulans* lysostaphin cloned into *p*BAD vector in *Escherichia coli* was used as the source of the enzyme. Moreover, optimum fermentation conditions were determined to increase the recombinant enzyme production. In conclusion, the tested media provide a robust improvement of protein yields in shake flasks. Further studies are going to be conducted in order to produce recombinant lysostaphin in large scale by using optimum conditions determined in laboratory scale.

Acknowledgement: We would like to thank TÜBİTAK (project no. 216M012) for financial support for this study.

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S-040

Suitability of FRAP, ABTS and DPPH Antioxidant Methods for On-line HPLC-Antioxidant Applications

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Bioactivities of natural compounds especially from plants have attracted attention for many decades. Among them the highest frequency encountered in the literature is with antioxidant activity. Thousands of compounds have been identified from plants as antioxidants, and tens or hundreds of them have high activity. Natural antioxidants find many applications in various fields or industries such as health, food, cosmetics, etc. Thus search for new ones with superior properties is one of the main focuses of recent research with the use of HPLC separation of plant extracts and simultaneous determination of their antioxidant activities, i.e. on-line HPLC-Antioxidant methods. One of the major drawbacks of on-line HPLC methods is limited reaction time for post-column bioassay before reaching to detector, generally less than three minutes.

In this study, we focused on the comparison of the three most widely used antioxidant methods for use post-column in RP-HPLC-DAD with UV-Vis detection. The reaction completeness by time for FRAP, ABTS and DPPH antioxidant assay procedures were followed comparatively. 15 antioxidant standards, including 13 phenolics, ascorbic acid and Trolox, were tested spectrophotometrically. Three of the standards were tested at different concentrations as well. The three methods were also applied as on-line HPLC assays (on-line HPLC-DAD-FRAP, on-line HPLC-DAD-ABTS and on-line HPLC-DAD-DPPH) by using a mixture of 15 standards. Furthermore, the three on-line methods were compared for the analyses of methanol extracts from Echinacea (*Echinacea purpurea*), green tea (*Camellia sinensis*) and yayla çayı (*Thymus praecox* OPIZsubsp. *grossheimii* (Ronniger) Jalas).

The reaction completions were observed in shorter times, within a few minutes, in FRAP and ABTS assays, while they took much longer times with DPPH assay, which shows suitability order of FRAP>ABTS>DPPH in on-line HPLC applications. The on-line-HPLC-DAD-FRAP method, developed in our laboratory, proved superior with the antioxidant standards and the plant extracts, with lower level of noise and better quantitative peaks. The method can be applied in analytical and preparative HPLC investigations and adopted for combinatorial approaches.

S-041

Effect of Royal Jelly, Grape Seed Extract, and Lycium Barbarum Against Diethylnitrosaminel induced Nephrotoxicity

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Objectives: We aimed to investigate, the effects of royal jelly (RJ), grape seed extract (GSE), and Lycium barbarum extract (LBAE) against diethylnitrosamine (DEN) induced nephrotoxicity, in experimental animal model.

Material and Methods: Fifty female Sprague Dawley rats were divided into five groups (n=10): Control, DEN, DEN+RJ, DEN+GSE, DEN+LBAE. All the DEN administrated groups were intraperitoneally (i.p.) injected with three doses of DEN (200 mg/kg), on treatment day 0, 15, 30 of the 16-week experimental period. Then 100 mg/kg of RJ was given to DEN+RJ group, 100 mg/kg of GSE was given to DEN+GSE group, and 400 mg/kg LBAE was given to DEN+LBAE group with the daily drinking water from day 0 for 16 weeks.

Results: RJ, GSE and LBAE treatments significantly reduced weight loss induced by DEN. The increase of malondialdehyde (MDA) level and decrease of catalase (CAT), superoxide dismutase (SOD), and glutathione (GSH) levels by DEN, was significantly suppressed by these treatments ($p<0.05$). In addition, these dietary supplements increased the total antioxidant status (TAS) levels and decreased serum oxidative stress index (OSI), total oxidant status (TOS), serum creatinine (Cr), blood urea nitrogen (BUN) levels significantly ($p<0.05$).

Conclusions: Improvements were prominent in case of RJ > GSE > LBAE. Our results indicated that RJ, GSE and LBAE might be useful for prevention of the nephrotoxicity induced by DEN via ameliorative effects on biochemical and oxidative stress indices.

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S-042

Immobilization And Characterization Of β-D-Galactosidase Onto Eggshell Membrane As A Natural Carrier Platform

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β-D-galactosidase has been widely employed for hydrolyzing lactose from industrial dairy foods. The hydrolysis of lactose minimizes problems of crystallization in sugar-containing foods. Moreover, it decreases health issues for lactose intolerant individuals by increasing the solubility and digestibility of dairy foods.[1] However, the hydrolysis using free enzymes increases the production cost of lactose-free/low-lactose foods. Thus, the immobilization of β-D-galactosidase for the hydrolysis of lactose is a promising strategy for the food industry when the aim to produce of lactose-free/low-lactose foods. Moreover, an immobilized enzyme can be easily recovered and reused in several hydrolysis cycles, which reduces the cost/benefit ratio in the industrial process.[2]

The eggshell membrane (ESM) is a part of an egg that contains certain essential and widely used nutrients. The utility of ESM, together with eggshell (ES), has long been underestimated because it was considered waste material. However, it is today being widely studied because of its unique properties, which are a result of its fascinating structure.[3]

In this work, β-D-galactosidase was immobilized onto ESM which is an amorphous natural biomaterial with an intricate lattice of stable and water insoluble fibers. β-D-galactosidase was immobilized on to the ESM by adsorption and crosslinking methods. For the optimization of β-D-galactosidase immobilization, the amount of ESM (5 mg), the adsorption time (20 min), the unit of β-D-galactosidase (0.4 U/ml) and the amount of glutaraldehyde (1%) were determined as basic parameters. The optimum temperature, optimum pH, thermal stability, pH stability, kinetic parameters and reusability parameters were investigated. Also characteristic parameters of immobilized β-D-galactosidase compared with free β-D-galactosidase. Findings from present study will guide development of a low cost and alternative method for the removal of lactose from milk.

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S-043

A Purification Of Pectin Lyase Enzyme From Alkaline Bacillus Sp. Strains And Its Effect On Orange Juice

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Pectins on the cell wall of the fruit make the orange water cloudy. In conventional methods, heating disrupts the aroma and freezing is expensive, so enzymes are used to break up pectins. While stability is maintained, filtration time is reduced to help purification and turbidity is eliminated. Thus, the fruit juice is increased in volume.

In this study, selection of *Bacillus licheniformis* species, isolation and purification of pectin lyase enzyme, determination of effect on orange juice, increase of qualities such as image and taste of fruit juice were aimed.

Bacteria from soil samples known to be alkaline were streaked on selective medium and stained with CTAB and 6 bacteria were selected considering the zone diameter. Pectin lyase positive strains were identified by the biolog gen3 microplate method. As a result of identification, the breeding interval of the selected Bacillus licheniformis was found, the supernatant was isolated and purified by the DEAE Sephacel method and assayed for activity. Activated tubes combined and the presence and molecular weight of the enzyme was determined by SDS-PAGE and Zymogram tests. After the optimum pH and temperature of the purified pectin lyase enzyme was determined, it was used in the process of obtaining orange juice and examined whether it affected the yield or not.

The relative activity of the purified enzyme was found to be 74%, the molecular weight 36.5 kDa, the optimum pH 9, and the temperature 60 ° C. Enzyme increased the yield of orange juice by 25%, crude extract by 16%.

It has been suggested that *Bacillus licheniformis* can be easily cultivated, food requirements are low, unwanted toxic byproducts are not produced, low cost and high yields can be used in the fruit juice industry.

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S-044

A Research on Phenolic Contents and Antioxidant Capacity of Almond Oil

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Almond, which is a fruit of the Rosaceae family tree. Almond oil has been used for health and beauty since ancient civilizations like Indian, Chinese and Greek and nowadays it has become the most important raw material of many cosmetic products. The almond kernel is highly enriched with single and polyunsaturated fatty acids, tocopherols and phenolic compounds. Many beneficial effects on human health due to these compounds, which have almond oil, have been demonstrated in many studies.[1]

For these reasons, our study aimed to determine the antioxidant capacity of almond oil. The amounts of phenolic compounds such as caffeic acid, ferulic acid, citric acid, citric acid, quercetin, α-tocopherol, pyrogallol, p-hydroxybenzoic acid, vanillin, p-coumaric acid, gallic acid and ascorbic acid in almond oil are measured by high performance liquid chromatography and they were quantitatively determined by tandem mass spectrometry (LC-MS-MS).[2] The most abundant compound found in almond oil was 619.0 mg / kg ascorbic acid. This is followed by 15.0 mg/kg p-hydroxy benzoic acid.

We studied their $ABTS^{\bullet+}$, $DPPH^{\cdot}$, $DMPD^{\bullet+}$, H_2O_2, superoxide anion radical ($O_2^{\bullet-}$) scavenging effects, Fe^{3+}, Cu^{2+} and $[Fe^{3+}\text{-}(TPTZ)_2]^{3+}$ reducing ability, and Fe^{2+} chelating activity. Also, α-tocopherol, BHA, trolox, and BHT were used as positive controls. It was observed that the antioxidant capacity of almond oil is close to the standards.[3]

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S-045

Pruduction of Bioactive Peptides Using Enzymatic Hydrolysis from *Thrachinus Draco* Muscle Hydrolysate and Their Potential Use in Biological Processes

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Peptides with biological activities, released during gastrointestinal digestion or food processing, play an important role in metabolic regulation and modulation, suggesting their potential use as nutraceuticals and functional food ingredients for health promotion and disease risk reduction. Many studies have reported that peptides from various food sources possess bioactivities, including antihypertensive, antioxidant, anticancer, antimicrobial, and opioid activities as well as immunomodulatory and cholesterol-lowering effects. More studies are being performed exploring the sources, bioavailability, and possible physiological/functional properties and the mechanisms of action of bioactive peptides. Bioactive peptides can be produced by one of three methods: solvent extraction, enzymatic hydrolysis and microbial fermentation of food proteins. Among these the enzymatic hydrolysis method is preferred in the food and pharmaceutical industries because the other methods can leave residual organic solvents or toxic chemicals in the products. Bioactive peptides are inactive within the sequences of the parent proteins. They are released by enzymatic hydrolysis and then they may exert various physiological functions. The marine environment represents a relatively untapped source of functional ingredients that can be applied to various aspects of food processing, storage, and fortification. Moreover, numerous marine-based compounds have been identified as having diverse biological activities, with some reported to interfere with the pathogenesis of diseases [1-3] . Bioactive peptides isolated from fish protein hydrolysates have been shown to possess anticoagulant, anticancer and hypocholesterolemic activities besides other benefits. In this context, *Thrachinus draco* which is a weever fish of the family Trachinidae is selected as peptide source in this project. The aim of this work was to purify and identify peptides with biological activities (DPP4, ACE, trypsin inhibition, Metal chelating/antioxidant properties) from *Thrachinus draco* muscle tissue proteins hydrolysate. Results showed that *T. Draco* represents a good source of bioactive peptides. Purified peptides were evaluated by means of their biological activity effectness IC_{50}/EC_{50} and peptide sequences. The results indicate that all peptides are novel and high effectiveness for each activity, .so that could be considered as a promising potential functional peptides as antioxidant, antihypertensive, immun0modulatory and antidiabetic (Type 2).

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S-046

Evaluation of Measurement Techniques for Mitochondrial DNA Copy Number

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Mitochondrial diseases are heterogeneous and complex disorders that can be caused by mitochondrial genome defects. Mitochondrial deoxyribonucleic acid (mtDNA) encodes 2 ribosomal ribonucleic acids, 22 transfer ribosomal ribonucleic acids and 13 polypeptides that comprise components of adenosine triphosphate synthase and electron transport chain. Mitochondrial deoxyribonucleic acid (DNA) is a multi-copy genome whose cell copy number varies depending on tissue type. Majority of genetic variants found in mtDNA are associated with 1% included mtDNA replication problems and genetic rearrangements,~2% to insertions,~3% to copy number variations, ~15% corresponding to deletions, and another ~79% to single nucleotide polimorphisms.[1]

Mitochondrial DNA content is analyzed using competitive polymerase chain reaction and Southern blot hybridization methods. Southern blot analysis has become a standard method for investigating quantitative DNA alterations for characterizing mitochondrial diseases. This measurement method is necessary for identifying basic problems such as genome organization, gene structure and gene expression. On the other hand, the need for well-defined quality controls, time-consuming series of steps and a large amount of biopsy tissue make southern blot analysis laborious. These difficulties have led to the improvement of quantitative real-time polymerase chain reaction approach. Therefore, real-time or kinetic polymerase chain reaction and single or multiplex methods are used more frequently to determine the number of mtDNA copies.[2]

The mitochondrial DNA template will be overrepresented, thereby masking the determination of the nuclear gene. For this reason, such measurement necessitates assay in two wells. One approach is the use of TaqMan probe-based quantification with one probe on the nuclear genome, and the other is the probe on the mitochondrial genome.[3] Measurement of mitochondrial DNA content is substantial for understanding many cellular processes. On the other hand, mitochondrial DNA content is affected by the time between blood withdrawal and cell separation, where cell separation method used. Therefore, not only the selection of cell and tissue type, but also the method to be used must be carefully determined to avoid false positive or negative results.[4]

Keywords: Mitochondrial DNA, southern blot analysis, polymerase chain reaction, TaqMan probe

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
27-30 OCTOBER 2018 ANTALYA

S-047

The Role of Vitamin D Levels in Type 2 Diabetes Mellitus Pathogenesis

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Introduction: The aim of this study was to investigate the relationship between vitamin D (Vit D) and calcium (Ca) values in Type 2 Diabetes Mellitus (Type 2 DM) patients and to provide data for the literature in Afyonkarahisar region.

Materials and Methods: 159 (65 male, 94 female) patients with Type 2 DM and 120 healthy (60 male, 60 female) subjects who were admitted to Afyonkarahisar University of Health Sciences, Faculty of Medicine between 02.06.2016 and 02.06.2017 were included in the study. Their mean ages were 56.56 years in patients with Type 2 DM and 34.53 years in healthy subjects. The data of the included patients were retrospectively obtained by scanning from the Enlil program which is the information management system (HIS) of our hospital. Patients receiving Type 2 DM treatment and those with any metabolic disease were excluded from the study.

Results: In the summer months, the type 2 DM and the healthy subjects were found to have low serum vitamin D levels (51.2%, 58.3%, respectively). It was shown that the majority of diabetic and healthy individuals who had a measurement in the winter months had normal serum vitamin D levels (81%, 83.3%, respectively).

In the majority of the patients with Type 2 DM and healthy subjects, normal serum Ca levels was shown in the summer and winter months (Male: 9.24±0.7 and 78.4% (winter), 9.81±0.4 and 74.4% (summer), Female: 9.25±0,6 and 85% (winter), 9,62±0,6 and 85% (summer), respectively).
A significant positive correlation was found between serum vitamin D levels and serum Ca levels (diabetic: r=0.909, p=0.0001, healthy: r=0.837, p=0.0001) in healthy subjects.

No significant difference was observed between female with Type 2 DM and healthy individuals in terms of serum vitamin D (women: 19.53±13.1 (winter), 20.43±17.1 (summer), male: 21.61±9.42 (winter), 22,64±13,73 (summer) (p=0.469), but there was a significant difference in male group (p=0.041). While there was no correlation in healthy subjects between insulin and vitamin D values, it was seen positive strong correlation in patient group. r=0.45, r=0.88, respectively).

Conclusion: There were a strong correlation serum vitamin D levels between serum vitamin D levels and insulin, Ca, glucose, OGTT, HbA1c and PTH levels in patients with type 2 diabetes. It is thought that serum vitamin D levels may play an effective role in explaining the pathogenesis of type 2 diabetes and regulating the treatment protocol.

Key words: Vitamin D, Type II Diabetes Mellitus

S-048

The Antimicrobial Activity of Essential Oil of *Satureja hortensis Incorporated with Nanoliposome* Prepared by Dynamic High-Pressure Microfluidization

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Satureja hortensis (*S.hortensis*) which is an annual herb used as nostrum in Eastern Anatolia region of Turkey for the treatment of different infectious diseases and disorders.

The aim of the present study was to investigate an antimicrobial activity of essential oil *of S. hortensis* incorporate into the nanoliposome. For this purpose, first of all essential oil of *S. hortensis* were prepared in to the nanoliposomal drug delivery systems in order to improve antimicrobial activity of essential oil. Microfluidization technique was supplied the most homogeneous flow to produce the smallest droplet sizes[1].

The essential oil of *S.hortensis* were incorporated into egg yolk phospholipid nanoliposomes by ratio (2:1) using high speed homogenizer(at 20.000 rpm) and characterized as well as egg yolk phospholipid mentioned above.

Then the essential oil of *S.hortensis* were successfully encapsulated in egg yolk based nanoliposomes and the possible improvement of their antimicrobial activity were tested by a disc diffusion and micro dilution assay against to *Pseudomonas vulgaris, Escherichia coli, Staphylacoccus aureus, Bacillus subtilus, Pseudomonas aeruginosa.* The antimicrobial tests results showed that the Nanoliposomal *S.hortensis* essential oil formulation have potential antimicrobial activitiy against *P. vulgaris, E. coli* and *B.subtilus*.

Keywords: *Satureja hortensis*, essential oil, nanoliposome, antimicrobial

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S-049

Comparison of Anticancer Effects of Nitrogen Doped Graphene, Reduced Graphene Oxide and Drug Doped Graphene on Cancer Cell Lines

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Introduction: Grafen (GN) has been used potentially for biomedical diagnosis, drug release and treatment of various diseases due to its different physical and chemical properties[1,2,3] . The GN that has managed to become interesting in the world of science has a specific surface area. Because of this feature, it is shown as a promising nanomaterial by scientists for more compatible and therapeutic applications with the biological system.[1,2,3] However, there is no study describing the anticancer effect of N-graphene, reduced graphene oxide and epirubicin-graphene on epidermoid carcinoma and lung cancer cell lines.

Purpose: In this study, the anticancer effect of nitrogen doped graphene (N-GN), reduced graphene oxide (r-GO) and epirubicin doped graphene (Epi-GN) on epidermoid carcinoma (A431) and lung cancer (A549) cells were compared.

Materials and methods: N-GN, was produced that the GO and melamine gel mixture which is pyrolyzed in the Ar atmosphere, was bounded covalently nitrogen N atoms to the graphene plates. The graphene, epirubicin and pure water for the obtaining of the Epi-GN mixture were mixed in an ultrasonic bath and incubated at + 4°C. r-GO is a GN derivative that contains minimal functional groups in the GO structure. The cytotoxic effect of N-GN, r-GO, Epi-GN on cell lines A431 and A549 was determined with the Cell Titer-Blue^R Cell Viability Assay Kit. [4] The effects of N-GN, GO and Epi-GN on the cell membrane were determined by spectrophotometric measurement of MDA (malondialdehyde) levels[5] and glutathione peroxidase activities. [6]

Results: IC_{50} concentration values of N-GN, r-GO and Epi-GN in A431 for the cell line were calculated 150 µg/ml, 187 µg/ml and 170 µg/ml respectively. IC_{50} concentration values of N-GN, r-GO and Epi-GN in A549 for the cell line were calculated 75 µg/ml, 133 µg/ml and 167 µg/ml respectively. The levels of MDA in A549 cells exposed to N-GN, r-GO and Epi-GN at IC_{50} concentration were found 1.1, 1.13 and 1.22 times higher than in A431 cells respectively. The activity of glutathione peroxidase in A549 cells exposed to N-GN, r-GO and Epi-GN at IC_{50} concentration was found 1.01, 1.05 and 1.02 times higher than in A431 cells respectively.

Conclusion: According to the cytotoxicity test, A431 cells against N-GN, r-GO and Epi-GN were found to be more resistant than A549 cells. The levels of MDA and activity of glutathione peroxidase in A549 cells exposed to N-GN, r-GO and Epi-GN at IC_{50} concentration were found higher than in A431 cells. According to this results, the damaging effect of N-GN, r-GO and Epi-GN on the cell membrane is higher in A549 cells. Compared to the results obtained, it was found that N-GN, r-GO and Epi-GN had a higher anticancer effect in the A549 cell line than the A431 cell line.

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S-050

Expression and Function of Hepatic and Renal Thioredoxin System in Mice Treated with Iron

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Almost all cells in living organisms use iron as cofactors for basic biochemical pathways such as energy metabolism, cell growth and proliferation, oxygen transportation, DNA, RNA, and protein synthesis. Although iron is an indispensable element for vital activities, it may also be toxic due to its ability to donate and accept electrons within the cell. Therefore, iron trafficking is tightly regulated by hepcidin (Hamp), which is regarded as the marker for iron accumulation.[1] Many studies have shown that iron accumulation mediates oxidative stress by increasing the production of reactive oxygen species (ROS) that causes cardiovascular diseases, anemia, canser, neurodegenerative diseases and many other diseases.[2] Antioxidant defense systems which eliminate the harmful effects of ROS in the organism.[3] Thioredoxin system, composed of nicotine amide adenine dinucleotide phosphate (NADP), thioredoxin (TRX) and thioredoxin reductase (TRXR), and thioredoxin related protein (TXNIP), is an important antioxidant system that controls cell death, oxidative stress, and cellular redox balance.[4] In this study, we investigated the effects of iron overload on hepatic and renal thioredoxin system at gene and protein levels in mice.

For this purpose, 10 male BALB/c mice were divided into 2 groups. Control group was intraperitoneally injected with 0.5 mg of dextran 5 solution. In the treatment group, 5 mg iron dextran solution was intraperitoneally injected twice weekly for 3 weeks to form systemic iron loading. To demonstrate the formation of oxidative stress in liver and kidney tissue, the levels of some metabolites (GSH, GSSG, GSH/GSSG), which are the markers of oxidative stress, were spectroscopically analyzed. Quantitative gene expression of Trx, TrxR and Txnip and some genes (Hamp, Fth, Fpn) responsible for the regulation of iron homeostasis was investigated by Real Time PCR in both tissues of control and treatment groups. In addition, the specific enzyme of TRXR activity was spectroscopically investigated. In conclusion, significant changes of the expression and function of hepatic and renal thioredoxin system in mice treated with iron were determined. This work was funded by a grant from Scientific Research Project of Ataturk University of Turkey (Grant Number: PRJ2016/151)

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S-051

Optimization of enzymatic reaction parameters of trimethylolprone esters from biodiesel via response surface methodology (RSM)

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The lubricants primarily form a thin film layer which provides slipperiness between the surfaces to prevent such friction, wear and energy loss. Secondary task, preventing corrosion on the metal surfaces that may occur over time.[1 -2] During the use of lubricants in environmentally sensitive areas (water related sectors, municipal activities, mountaineering, forestry and agricultural sector), accidents and leaks cause oil losses which amounts to around 50%. Due to the toxic properties of lubricants the damage to the environment is very high. They can also stay in nature for many years without degradation. In order to protect the environment especially from the pollution caused by mineral-based lubricants and hydraulic oils, it is necessary to reduce the losses that can occur during use as much as possible and make the oil to be reusable[2]. This study was performed to optimize reaction parameters for the transesterification reaction between waste edible oil methyl ester and trimethylolpropane (TMP) by using response surface methodology (RSM). The affectional parameters were choosen as temperature (35–55°C), amount of catalyst (0–10 wt%), waste edible oil methyl ester-to-TMP molar ratio (6:1–4:1-3:1) and reaction time (0–96 h), in order to produce TMP triester.The optimum reaction conditions were determined to be temperature at 35°C; amount of catalyst, 5 wt%; molar ratio, 3:1 and 48 h of reaction time, under these conditions 94.3 % TMP ester's yield was obtained.

Acknowledgements
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S-052

Antimicrobial Screen, Molecular Modelling and ADME Prediction of Some New Urea/Thiourea Derivatives

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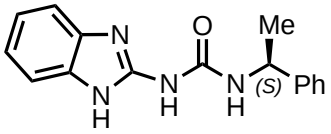
Urea/thiourea derivatives have important functions in various fields. The interest in these derivatives in recent years has been increasing because of the chemical and biological properties. Due to a wide range of urea and thiourea derivatives, anti-HIV, HDL promoter, analgesic, antibacterial, it is noteworthy in medical chemistry.[1-3]



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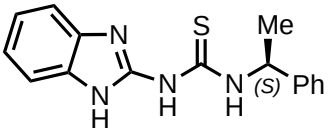

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A series of novel urea/thiourea derivatives have been designed and synthesized. These compounds were assayed for antibacterial activity against *Escherichia coli, Pseudomonas aeruginosa, Bacillus cereus* and *Staphylococcus aureus* using disc diffusion method. The MIC values were determined using micro-well dilution test for the compounds formed inhibition zones in disc diffusion test. Chloramphenicol was used as positive control. According to the results of disc diffusion method, most synthesized derivatives indicated activity against Gram-positive bacteria but not Gram-negative bacteria. This may be due to the fact that the cell wall structure of Gram-negative and Gram-positive bacteria is different from each other. The minimum inhibitory concentration (MIC) of compounds which showed inhibition zones were determined by serial two-fold dilution assay. Compound **1** had MIC value of 62.5 µg/mL against both *S. aureus* and *B. cereus*. Compound **2** had MIC value of 62.5 µg/mL against only B. cereus. Docking studies were performed to determine the probable binding conformations of the compounds. Also ADME properties of the synthesized compounds were predicted.

This research was supported by this project (BAP-2015/357) of the Research Fund of Atatürk University.

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S-053

A Plasmonic Platform for SERS-based Biosensing

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Surface-enhanced Raman scattering (SERS) is an emerging analytical technique for the detection and identification of chemicals and biological molecules and structures. Rapid, sensitive and accurate identification of biomolecules and structures is critical not only clinical diagnostics but also industrial applications. Several studies have been demonstrated that SERS can be used as powerful technique for the identification of bacteria and proteins using different sample preparation methods and SERS substrates. Sample preparation and SERS substrates are critical factors to obtain strong, sensitive, and reproducible SERS spectra from the analytes. In this study, label-free identification and characterization of bacteria and proteins on plasmonic silver nanodomes (AgNDs) structures is demonstrated. AgNDs are fabricated by combining of soft and nanosphere lithographies. First, convective-assembly method is used for the deposition of the latex particles (1600 nm) uniformly on a regular glass slide. After polydimethylsiloxane (PDMS) is poured on the latex thin film to obtain nanovoids on the PDMS surface. The prepared nanovoids are used as template for AgNDs fabrication. Finally, the nanovoids are filled with silver (Ag) by electrochemical deposition to obtain AgNDs. Different types of bacteria and proteins are used to test the performance of the fabricated AgNDs for SERS-based biosensing.

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S-054

Diplotaenia Turcica's Effect on Liveliness on the NRK-52E Cell Line in Different Concentrations and Periods

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Aim: This research was planned to determine the various concentrations of the *Diplotaenia Turcica* extract,which is traditionally known to be good for diabetes, blood pressure, and rheumatism, to be used in several studies in cell culture.
Material and Method: The NRK-52E cells were proliferated in an environment of 37°C, 5% CO_2 and 95% of humidity, and in a RPMI 1640 DMEM media containing 1% penicillin/streptomycin 2 mM L-Glutamine and 10% FBS. The cells were cultured in a plate of 96 as to be 10^4 . *Diplotaenia Turcica* plant was prepared with ethyl alcohol and water extract. The prepared *Diplotaenia Turcica* plant was applied to the renal cell line for 6,12 and 24 hours of time. Afterwards, the MTT assay was performed and liveliness percentage was determined.
Findings: Different concentrations of *Diplotaenia Turcica* extract applied in the 6,12 and 24th hours had no effects on the cell liveliness under 50 µg/ml of concentrations and similar results to the control group was observed. 50 µg/ml concentration was observed to increase the cell proliferation in the 3rd hour by 20%, 40% in the 6th hour, and by the 24th hour resulted in a liveliness rate close to the control group and did not change the proliferation. But, all concentrations above 50 µg/ml were determined to cause cell death in all application periods and that these concentrations are cytotoxic.
Result: It was found that concentrations over 50 *µg/ml* of *Diplotaenia Turcic*a in future in vitro studies cannot be used as a useful dose for being cytotoxic but, 50 µg/ml and below are useful concentrations.
Keywords: Diplotaenia Turcica, NRK-52E Cell, MTT

S-055

Effect of Ivermectin on the Structural Dynamics of Human GABA Receptor Ion Channel

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Conformational dynamics of beta2alpha1gamma2 GABA receptor, ligand gated ion channel from nicotinic acetylcholine receptors model based on GluCl X-Ray structure is studied via 100 nanoseconds Molecular Dynamics simulation in lipid and water environment. GluCl provided the first inhibitory X-ray channel structure for Cys-loop superfamily of ligand gated ion channels. Due to the homology modelling and removal of ivermectin molecules from target structure, structural shifts along pore lining residues and contact differences at the interface of transmembrane and extracellular domains are observed as well as a noticeable change in the stability of the receptor. Additionally, the ion channel permeation and correlation of ion channel and ligand binding site differences have been observed. Ivermectin molecule acts as a foot-in-door mechanism for the ion channel part of the protein.

S-056

Association Between Nötrofil Lenfosit Ratio Levels and Semen Analysis

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AIM: NLO (neutrophil lymphocyte ratio) ratios have been reported in various reports that have increased in many diseases related to acute and chronic inflammation. Infertility is worldwide common problem that depends on many different biological reasons. Therefore, it is important to indicate biochemical prognostic markers which are easily and cheaply analyzed. Seen from this aspect, we evaluate observational data retrospectively whether there is a possible relationship between neutrophil lymphocyte ratio and semen parameters of infertile men.

METHODS: The study was performed in 89 man including Normozoospermi (n=48), Oligozoospermia (n=30) and Azoospermiospermia (n=10) who were admitted to the IVF Center of Department of Histology and Embryology of Medicine Faculty of Selcuk University between 2015-2018 period. Neutrophil lymphocyte levels were measured with a Beckman Coulter LH-780 hematology analyzer. Statistical analysis was performed with SPSS v21. Values of <0.05 were considered to indicate statistical significance. (x±SD)

RESULTS: NLR values groups were 2,55±0,50; 2,68±1,38; 2,15±0,44 respectively in Normozoospermia, Oligozoospermia and Azoospermia groups. There was no statistically significance between Normozoospermia, Oligozoospermia and Azoospermi groups in the NLR variance (P=0,861).However, there were significant correlations between values of NLR and total sperm motility(r=0,015; r=-0,025), head anomaly (r=-0,009; r=-0,087), acrosomaly anomaly (r=0,312; r=-0,026), nuclear anomaly (r=-0,071; r= 0,221), tail anomaly (r=0,124; r=0,197), neck tail anomaly (r=0,084; r=-0,084), in Normozoospermia, and oligozoospermia, respectively (p=0,00).

CONCLUSIONS: It has been determined that NLR values correlate significantly with the most of the parameters of semen analysis. For the future studies, it is needed to evaluate NLR values with the more number of the infertility individuals into indicate whether NLR may be a useful parameter in prognosis of the oligozoospermic man.

Key Words: Neutrophil Lymphocyte Ratio, NLO, Infertility, Male Infertility.

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S-057

Are There Any Correlations Between Mean Platelet Volume, Platelet Levels and Sperm Parameters?

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AIM: Mean platelet volume (MPV) and Platelet levels, are parameters routinely measured in full blood count, and are also examined in a number of clinical settings. Infertility problems in males are manifested by abnormalities in semen analysis. The present study will retrospectively analyze whether the hematological markers, MPV and PLT, are likely to correlate with the semen parameters of infertile men.

METHODS: The study was performed in 89 man including Normozoospermi (n=48), Oligozoospermia (n=30) and Azoospermiospermia (n=10) who were admitted to the IVF Center of Department of Histology and Embryology of Medicine Faculty of Selcuk University between 2015-2018 period. The average age for the Normozoospermia, Oligozoospermia and Azoospermia groups were 27.77 ± 1.62; 30.77 ± 2.78; 32.33 ± 5.98 years old, respectively. MPV levels and Platelet levels were measured with a Beckman Coulter LH-780 hematology analyzer. Statistical analysis was performed with SPSS v21. Values of <0.05 were considered to indicate statistical significance. (x±SD)

RESULTS: MPV values of Normozoospermia, Oligozoospermia and Azoospermia groups were found as 8.18 ± 0.30; 8.14 ± 0.36; 8.44 ± 0.74 . PLT values were found as 241.29 ± 13.39; 237.37±17.23; 266.4±32.84 respectively (p>0.05). However, there were significant correlations between values of respectively MPV, PLT and total sperm motility(r=0,005; r=0,097), head anomaly (r=-0,040; r=0,134) acrosomaly anomaly (r=0,123; r=-0,026), nuclear anomaly (r=-0,274; r= 0,257), total mitochondrial loss (r=-0,072; r=0,034), tail anomaly (r=-0,213; r=-0,143), neck tail anomaly (r=0,087; r=-0,294), teratozoospermia index (r=-0,088; r=-0,098) in Normozoospermia group (p=0,00). There were significant correlations between values of respectively MPV, PLT and total sperm motility(r=0,173; r=-0,230), head anomaly (r=0,699; r=0,364) acrosomaly anomaly (r=0,445; r=-0,111), nuclear anomaly (r=0,506; r= -0,256), total mitochondrial loss (r=-0,516; r= 0,305), tail anomaly (r=-0,120; r=0,074), teratozoospermia index (r=-0,214; r=0,065) in Oligozoospermia group (P = 0.00).

CONCLUSIONS: MPV and PLT values correlate significantly with the parameters of semen analysis. For the future studies, these results may supply clinical approach in prognosis of the oligozoospermic man.

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S-058

New Chalcone Derivatives Containing Pyridine and Biological Activities

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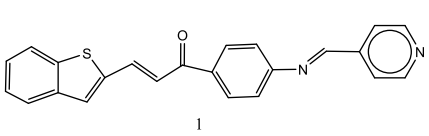
Chalcone derivatives display a broad spectrum of biological activities such as antiinflammatory, antiplatelet, anticulcerative, antimalarial, antitumor, analgesic, antiviral, antitubercular, anticancer, cardiovascular, immunomodulatory, inhibition of leukotriene-B, antioxidant, antihyperglycemic, antimicrobial, antifungal, inhibition of chemical mediator release, inhibition of tyrosinase, and inhibition of aldose reductase.[1-3] In addition to these enzymes, chalcone derivatives have also α-amylase and α-glycosidase and carbonic anhydrase inhibition potential. İnhibition of these enzymes are important for the treatment of some diseases.[4-5] It was found that compounds 1-3 being new chalcone derivatives inhibited the α-amylase and CA activities with different ratios.



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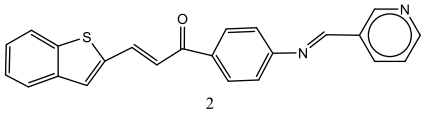

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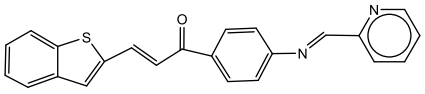

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S-059

New Chalcone Derivatives and Biological Activities

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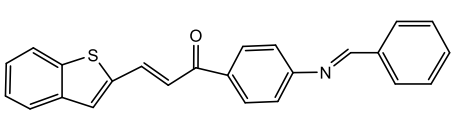
Natural and synthetic chalcones have attracted a great deal of interest from various biological activities such as antiinflammatory, antihyperglycemic, analgesic, antiplatelet, anticulcerative, inhibition of chemical mediator release, antitubercular, anticancer, cardiovascular, antimalarial, immunomodulatory, inhibition of leukotriene-B, antioxidant, antimicrobial, antifungal.[1-3] Chalcone derivatives also show inhibition effect on some important enzymes such as tyrosinase, aldose reductase, α-amylase and glycosidase and carbonic anhydrase (CA). Inhibition and activation of the CA activity is important for the treatment of many diseases. Molecules having α-amylase inhibition potantial can be candidate as antidiabetic and antiobesity compounds.[4, 5] Compounds 1-3 being new chalcone derivatives inhibited the α-amylase and CA activities with different ratios.



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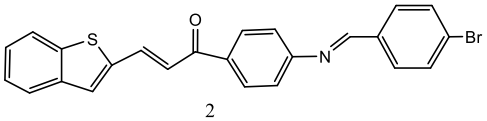

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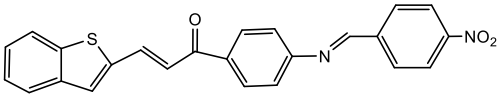

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
27-30 OCTOBER 2018 ANTALYA

S-060

Efficient composites for removal of micropollutant from aqueous solutions via flash chromatography[Ψ]

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Today, environmental pollution mainly caused by industrial wastes (paper, paint, cosmetics, textile etc.), hospital wastewater (chemical substances, pharmaceuticals, personal care products, endocrine disruptors, disinfectants etc.), food technology, oil refineries and sewage wastes. Removal of harmful compounds from environmental drains is of great importance in protecting human health and the environment, therefore, they must be purified before being released into the environment. The increasing use of cryogel based composites as an efficient adorbents for the removal of organic contaminants due to their excellent adsorption dynamics, high capacities, and structural properties. In this study, we focused on developing cryogel based composites having different physochemical properties for efficient and rapid removal of micropollutants, estradiol was chosed as model endocrine distruptor via flash chromatography. In this context, we synthesized three different composites including hydrophilic, acidic, and hydrophobic nature. In addition, we synthesized plain hydrophilic cryogel for comparison purpose. We characterized all columns by applying Fourier transform infrared spectroscopy, scanning electron microscopy, swelling test, and BET measurements. The factors effecting on removal performance including target concentration, pH, interaction time, centrifugation speed, and temperature were evaluated compherensively. The data were analyzed by applying Langmuir and Freundlich isotherms as well as adsorption kinetics were evaluated by applying pseudo-first and –second order kinetics model. In addition, thermodynamics parameters Gibbs free energy , enthalpy, entropy coeeficient for adsorption process was calculated. In the light of the results, we should mention that the composites developed were classified as a promising alternative adsorbent for micorpollutant removal from aqueous solutions.

Ψ This study was supported by Mardin Artuklu University Coordination Unit of Scientific Research Project with a grant number of MAÜ.BAP.18.SHMYO.002.

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27-30 OCTOBER 2018 ANTALYA

S-061

A Green Chemistry Approach For The Biosynthesis And Characterization Of Palladium Nanoparticles

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Synthesis of metal nanoparticles through green chemistry route is a rising eco-friendly and cost-effective approach in nowadays and has drawn researchers' attention [1-3]. The aim of this study was to develop a low cost and environmentally method for synthesizing palladium nanoparticles (PdNPs). We described a green method for biosynthesis of PdNPs using nontoxic and renewable Punica granatum peel extract act as reducing and capping agent. Formation of palladium nanoparticles has been observed with colour change and confirmed by UV-vis spectroscopy due to the surface plasmon resonans of PdNPs (Fig. 1). PdNPs were characterized by UV-Vis, FT-IR, XRD, SEM, EDX and TEM. Fourier transform infrared spectroscopy reveals the active role of phytochemicals from Punica granatum in reduction and stabilization of nanoparticles. X-ray Diffraction (XRD) pattern shows that the synthesized PdNPs were face centered cubic crystalline in nature. SEM and TEM analysis give information about the morphology of nanoparticles. Biological approach for synthesis of palladium nanoparticles using plant extracts was noticed as a possible low-cost and eco-friendly alternative to chemical and physical methods.

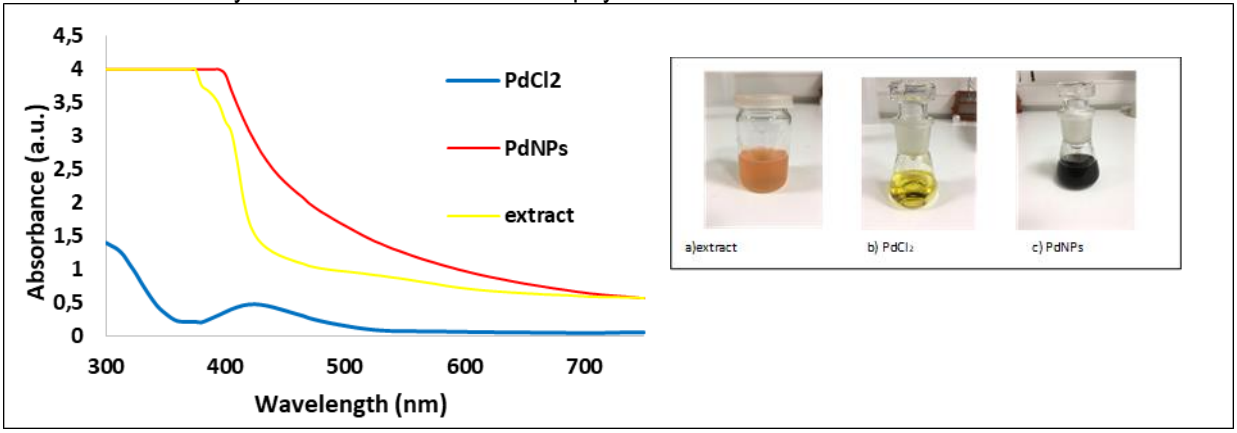

Figure 1. UV-Vis spectra and photographs of Punica granatum peel extract, $PdCl_2$ and PdNPs.

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S-062

New Mercapto-1,2,4-triazole Compounds as Candidate Molecules for Ulcer Treatment

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It is known that many heterocyclic compounds containing the 1,2,4-triazole ring possess significant pharmacological properties such as anticonvulsant, antifungal, antimicrobial, analgesic, antiviral, anti-inflammatory, antioxidant, antitumor, anti-HIV and antihypertensive [1]. In addition, many heterocyclic compounds with this cyclic structure are used as drugs in the market [2,3].

In this study, the inhibitory potentials of newly synthesized mercapto-1,2,4-triazole compounds on urease having clinical and industrial importance were examined and thiourea was used as the reference inhibitor molecule. It was observed that studied molecules were inhibiting urease in various ratios (in the concentration range of nM). Autodock Vina 1.1.2 and Discovery Studio 4.5 Client programs were used to modelling urease and inhibitor interactions in the active site of the enzyme. In addition, the binding energies of the inhibitor molecules were calculated using these programs. 1,2,4-triazole compounds used in the study compound **1** found the most effective inhibitor. In conclusion, when the results obtained are evaluated, it can be considered that compound **1** has the potential to be used in the pharmaceutical industry.

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S-063

Partial Purification and Characterization of Lipoxygenase (LOX) Enzyme from Bovine Liver, Investigation of *In Vitro* Effects on Enzyme Activity of Salicylic Acid and Some Flavon Derivative Compounds

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Lipoxygenase (EC 1.13.11.34; LOX) is a non-hem iron-bearing dioxygenase which converts oxygen into fatty acids containing two or more unsaturated bonds and converts them into fatty acid hydroperoxides. Lipoxygenase activity is described in more than 60 developed plants, in mammals, in echolalia, in fungi, in cyano bacteria, and in prokaryotes.[1] LOX 5, LOX 8, LOX 12 and LOX 15, the four- headed isoenzymes of LOX enzymes are commonly found in animal tissues. [2]

In this study, LOX enzyme from bovine liver was partially purified by homogenization with liquid nitrogen followed by precipitation of ammonium sulphate at 30-50% saturation. Characterization studies were carried out and the optimum ionic strength value was determined as 0.5 mM, optimum pH value was pH 4.0 and optimum temperature value was 50 ° C.

The inhibitory effect of salicylic acid, eupatorin, eupatilin and gardenin A on LOX enzyme was investigated. For this, activity measurements were made at 5 different inhibitor concentrations and the Activity %- [I] plots were plotted and IC_{50} values were calculated. 1.43 µM for salicylic acid, 0.46µM for eupatorin, 0.15 µM for eupatilin and 5.31 µM for Gardenin A.

This research was supported by the project (BAP-2015/357) of the Research Fund of Atatürk University.

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S-065

Structural Modelling and Molecular Docking Analysis of *Trichomonas vaginalis* Iron-Containing Superoxide Dismutase towards Computer-Aided Drug Design

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Trichomonas vaginalis is a flagellate protozoan parasite causes a nonviral sexually transmitted disease in human[1]. Nitroimidazole is used as a therapeutic agent for *T. vaginalis* infections conventionally; however, reports showed that the parasite has been developed resistance against the drug[2]. Therefore, discovery of alternative drugs would be necessary. Computer-aided drug design contributes drug discovery with prediction structure of targets or active ligands for the identification of potential drugs[3]. In this study, iron-containing superoxide dismutase of *T. vaginalis* (*Tv*SOD) was designated as a drug target because of the having role in regulation of oxidative stress which is crucial for survival inside host and absent in human counterpart[4-5]. Comparative model of *Tv*SOD was built by Modeller 9.15 and SWISS-MODEL programs by using *E. coli* SOD as a template structure. Then the models were structurally minimized and validated by web-based servers for quality check. Potential drug binding pockets of *Tv*SOD were predicted by using DoGSiteScorer Server and three pockets were determined as possible binding sites. Small chemicals that obtained from the NCBI PubChem/coumarins and ZINC databases were screened to the druggable sites by using Schrödinger GLIDE-virtual screening workflow program. Based on the docking results from the three different sides and top 5 ligands, XP-GScores were ranged from -4.660 kcal/mol to -7.591 kcal/mol. The best results have been taken from the Site2 which is nearby the active site. A coumarin-glycoside called as rubricauloside have been found in three pockets and within Site0 and Site1 had the highest binding free energy (-60.221 kcal/mol and -46.945 kcal/mol, by MM/GBSA method). Another coumarins-based compound (PubChem_ID 129817054) had the best docking results (-7.591 kcal/mol and -7.517 kcal/mol) and ligand efficiency (-0.315 and -0.312) within Site0 and Site2 respectively. As a conclusion, coumarin derivatives seem to be more effective in *Tv*SOD enzyme binding based on the virtual high-throughput screening and molecular docking results. This *in silico* study is expected hopefully to be the basis for *in vitro* drug screening studies against *T. vaginalis* SOD enzyme.

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S-066

In Silico Investigation on Anti-Depression Effects of *Hypericum Perforatum* Flavanoids: Molecular Docking with Monoamin Oxidases

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Hypericum Perforatum L. (HPL) is a herb belonging to the family of Clusiaceae, commonly known as the St. John's Wort, which has been medically valuable for centuries. This plant which is rich in flavonoids is widely used for the treatment of various neurological diseases (such as anxiety, depression, insomnia). Its efficacy against depression is comparable to the standard antidepressants. Moreover, it draws attention with fewer side effects.

Monoamine oxidase (EC-1.4.3.4, MAO) is an important enzyme that catalyzes the deamination of key neurotransmitters such as serotonin, norepinephrine and dopamine. There are two functional isoenzymes, MAO-A and MAO-B playing important roles in neurodegenerative diseases. MAO-B inhibitors are used in the treatment of Parkinson and Alzeimer diseases, while MAO-A inhibitors are associated with psychiatric conditions and depression. Since many MAO inhibitor drugs have adverse side effects, identification of new compounds with high activity and selectivity is an essential demand.

The aim in this study is to screen the ingredients of HPL herb regarding their potential for MAO inhibitory activity using computer-aided drug design tools. To achieve this goal, the geometries of various active flavonoid ingredients of HPL were optimized with PM6 by selecting the most stable conformations in Spartan 16. The optimized structures were docked into the active sites of MAO-A ve MAO-B using Autodock Vina. The predicted binding energies revealed that quercetin is the most active ingredient which preferentially binds to MAO-A isoform. These results provide new insights into the anti-depressian activity of HPL which will enable the design of new active lead compounds.

S-067

Molecular Docking of New Hybrid Triazole Derivatives into Tyrosinase Enzyme

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Tyrosinase is an enzyme that contains the binuclear copper center and plays an important role in the synthesis of melanin which gives color to the hair, skin and eyes.[1] It is found in animals, plants and microorganisms. In the first step of the melanin synthesis, tyrosinase catalyzes conversion of monophenol (tyrosine) or o-diphenol (L-DOPA) to o-quinone derivatives and melanin is formed at the last step. If the melanin synthesis increases in the body, it causes hyperpigmentation. For this reason, tyrosinase inhibitors are widely used in the treatment of pigmentation disorders in medicine and cosmetics. Also, these inhibitors are used in agriculture and food industry to prevent the loss of taste and view quality.

In this study, potential inhibitors of tyrosinase were explored by molecular docking with new hybrid triazole compounds containing fluoroquinolone skeleton. The structures of 45 compounds were optimized using Spartan 16 with DFT M06-2X/6-31G** method. They were docked into the active site of tyrosinase enzyme (pdb:2Y9X) using Autodock Vina. Calculated binding energies revealed that these compounds have moderate to high affinities to tyrosinase confirming their potential use as new industrial products after further experimental testing.

We acknowledge TUBITAK for the financial support of the project no: 117Z199

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S-068

CAI and II Isozymes: Purification from Human Erythrocytes, Inhibition and Antioxidant Levels of Some Plants

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Carbonic anhydrases (CAs) are enzyme family catalyzing the interconversion of CO_2 and HCO_3^-. Also, CAs are metallo-enzymes including a Zn^{2+} in its active site. The enzyme is a pH regulatory in all organisms. CA having 16 isozymes in mammals has different catalytic activities. The isozymes have different cellular localization and susceptibility to various inhibitors. CAs play important roles in many biological processes such as acid-base balance, respiration, carbon dioxide and ion transport, bone resorption, ureagenesis, gluconeogenesis, lipogenesis and body fluid generation. Therefore, to determine the CA inhibitors and activators is vital to develop a therapeutic perspective against the some disorders. Especially being cytosolic isozymes CAI and II are widely expressed in mammalian tissues and the effects of several types of molecules on these both isozymes of the CAs have been tested all over the world.

In the present study, CAI and II isozymes were purified from human erythrocytes with yield of %91.4 and %83.4 by affinity chromatography, respectively. The specific activities of the isozymes 146775 and 272549 EU/mg proteins, respectively. The purity of the isozymes was checked by SDS-PAGE. Besides, the aqueous and ethanol extraction were done of *Equisetum arvense*, *Origanum vulgare*, *Achillea millefolium*, *Artemisia absinthium*, *Hypericum perforatum*. Both enzyme inhibition levels and antioxidant parameters studies were carried out on the CAI and II isozymes of these extract.

As a result, IC_{50} values for CAI and II of the aqueous and ethanol extraction of *Equisetum arvense*, *Origanum vulgare*, *Achillea millefolium*, *Achillea millefolium*, *Artemisia absinthium*, *Hypericum perforatum* were presented as following table, respectively.

IC_{50} values (mg/ml)	Aqueous Extraction		Ethanol Extraction	
	CA-I	**CA-II**	**CA-I**	**CA-II**
Equisetum arvense	0.69	0.56	0.41	0.85
Origanum vulgare	0.63	0.40	0.32	0.34
Achillea millefolium	0.61	0.55	0.24	0.81
Artemisia absinthium	0.40	0.45	0.42	0.59
Hypericum perforatum	0.34	0.53	0.27	0.32

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S-070

The Research of In vitro Effect of Extracts of *Ecballium Elaterium* and *Salvia Triloba* Plants on Acetylcholinesterase Enzyme (AChE; EC 3.1.1.7) in Human Serum

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In the present study, the effects of chloroform extract of *Ecballium elaterium* and methanol extract of *Salvia triloba* plant on acetylcholinesterase (AChE, EC 3.1.1.7) enzyme activity in human serum were investigated. *Ecballium elaterium* chlorofom extract did not show any effect on AChE enzyme activity. Methanol extract from *Salvia triloba* demonstrated the inhibition effect on AChE enzyme activity. The IC_{50} value was estimated as 0.488 mg/mL for human serum AChE. The inhibition type of inhibitor was determined to be reversible competitive inhibition from Lineweaver-Burk graph.

S-071

Electrochemical Sensor Applications With Flourene Based Polyimide Modified Screen Printed Carbon Electrode For The Determination Of Melatonin

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Melatonin (N-acetyl-5-methoxytryptamin) is an essential hormone that is synthesised in the pineal gland and its primary responsibility has been to regulate circadian rhythms[1]. This hormone has great influence on a variety of physiological and behavioural processes including neurological, psychiatric, reproductive and as neuroprotective agent in Alzheimer and Parkinson's disease models. Disorders such as anxiety and seasonal depression are related to it[2]. In addition, melatonin is an effective antioxidant, presents inhibitory activity on some cancer forms[3].

In this study, polyimide films were synthesized from 2,7-Diamino fluorene, promellitic dianhydride used to modification screen-printed carbon electrode (cspe) to elimination of the interferant species for determination of melatonin. Prepared composite membranes as melatonin selective film were characterized by FTIR, DSC, DTA, TGA and SEM techniques Furthermore, melatonin selectivity properties of polyimide membrane based electrodes was examined by differential pulse voltammetry (DPV) technique. The voltametric results indicate that the polyimide membrane based electrodes can be used as a sensor for determination of melatonin with the good sensitivity, selectivity, rapidly and very high R-Value (0,9880).

We would like to thank Inonu University BAP for financial support within the project numbered İ.Ü.BAPB2016/33.

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S-072

Preparation of polyurethane in aliphatic structure using trimethylolpropane ethoxylate as crosslinker and electrospinning application

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The preparation of membranes that can be used for biomedical purposes by electrospinning is an intensive research area in recent years. Especially wound dressing materials are the most important application area where these membranes are used. For this purpose, it is very important to prepare different types of biocompatible polymeric materials to be used in the formation of fibers in electrospining process. The aim of this study is to prepare and characterize polyurethanes using trimethylolpropane ethoxylate as an aliphatic and crosslinker and to prepare membrane by electrospinning.

In the study, hexamethylene diisocyanate (HDI), polyethylene glycol (PEG 200), trimethylolpropane ethoxylate (TMPE 170) and polyurethanes using different tween species were prepared in an inert atmosphere and at 70 oC reflux. The polyurethanes are structurally characterized by FTIR and thermally DSC, TGA and DTA. The prepared polyurethanes were converted into membranes at 20 kV and 3 mL / h flow rate by electrospinning. Membranes prepared from fiber structure are morphologically characterized.

As a result, it was determined that polyurethanes prepared in biomedical field.

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S-073

Plastic carbonic anhydrase via molecular imprinting approach for efficient bioconversion of carbon dioxide

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Global warming and/or climate change, one of the most important international problems depends on the fossil fuel consumption and gives the worse signals to cause the more serious situation due to the emission of green house gases such carbon dioxide (CO_2). The United Unions hold the Climate Change Conferences to assess current situation and suggest a series of recommendations. Some of the recommendations suggested are to keep the increase in atmosphere temperature maximum +2^{o}C by 2025, to reduce the use of fossil fuels, to increase the financial supports for the researches about alternative and renewable energy sources and to reduce CO_2 emission and/or to remove it from environment. Carbonic anhydrase, responsible for CO_2 bioconversion in mammalian, is the most powerful enzyme in nature with the highest turnover coefficients, in the range of 400,000-600,000 s^{-1}. Molecularly imprinted polymers have recently used for the researches in medicine, chemistry, biology, environmental and food sciences as a selective adsorbent and specific biorecognition element. The success and the potential application spectrum of molecular imprinted polymers have triggered the interest on the topic and the number of published articles/reviews have been growing exponentially. If the substrate molecules are imprinted into polymers structure to form the cavities, it is also possible to create artificial active sites for catalytic reaction. Thus, we aimed to develop bio-inspired, efficient and environmentally friendly artificial enzymes. Under the study; following approach was implemented: (i) Synthesis of CO_2 imprinted hydroxyethyl methacrylate (HEMA)-based biocompatible plastic enzymes by means of polymerizable L-histidine derivative, ii) the characterization of developed materials and, iii) the optimization of enzymatic activity conditions. We chose HEMA as basic functional monomer because the US Food and Drug Administration approved it as biocompatible, biological environment and eco-friendly materials. By this way, we developed environmental- and cost-friendly artificial enzymes.

S-074

Sensitive And Label-Free Electrochemical Immunosensor Based On Brush Type Polymer Modified ITO Electrode For Lung Cancer Biomarker Detection

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Interleukin (IL)-8 is an inflammatory chemokine that is present in the C-X-C chemokine subfamily.[1,2] IL-8 is expressed by various cell types such as activated monocytes and macrophages, T cells, neutrophils, NK cells and also endothelial cells. [3] An increase in IL-8 concentration is a sign of cancer types such as brain, breast, cervical, colorectal[2], gastric, lung, melanoma, ovarian, prostate, renal, oral cancer.[4]

Electrochemical impedance spectroscopy (EIS) is one of the oldest electroanalytical technique and has gained interest in recent years. This technique is usually utilized to monitor the changes in electrode-electrolyte interfacial features induced by antibody-antigen interaction, DNA hybridization or enzyme-substrate catalysis. [5]

In this study, we fabricated a label-free impedimetric immunosensor for Interleukin 8 determination. For this purpose, we synthesized a brush polymer which included epoxy groups at the end side of the polymer. This synthesized polymer was used as immobilization matrix for biorecognition element. Brush polymer offered epoxy groups for binding amino groups of antibodies. Anti-IL 8 antibodies were used as biorecognition molecules and used to determination of IL 8 antigen. During the electrode fabrication, spin coating technique, which was simple, one step and low-cost technique, was utilized. Two different electrochemical methods, cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) were utilized to monitor the biosensor modifications. The impedance responses were linearly related to the concentrations of IL 8 antigen in the range of 0.02 to 4 pg/mL, with a detection limit of 6 fg/mL. In addition, the proposed immunosensor had good repeatability, reproducibility and selectivity.

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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
27-30 OCTOBER 2018 ANTALYA

S-075

Cytotoxic effects of silicon phthalocyanine, naphthalocyanine bearing acetyl piperazine groups and their water soluble derivatives

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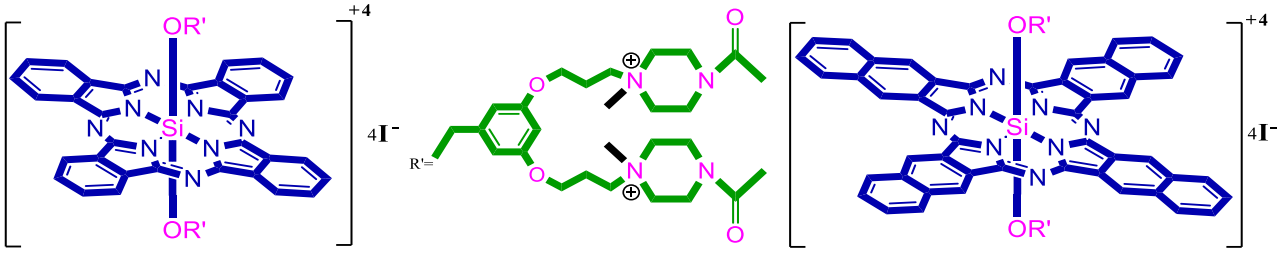
Silicon complexes of phthalocyanines (SiPcs) attract great interest due to their unusual spectral properties, increased solubility, and additional binding sites for further modification.[1] In addition, because of their high singlet oxygen yields, strong and low toxicity in the dark silicon phthalocyanines are used as photosensitizer agents in photodynamic therapy.[2] The water solubility increases the possible usages of silicon phthalocyanine compounds in biomedical application.

Today, cancer is one of the most serious health problems and the second most common cause of death. The number of people living beyond a cancer diagnosis reached nearly 14.5 million in 2014 and is expected to rise to almost 19 million by 2024. Screening for new anticancer drugs is still important and is one of the major goals in medicinal chemistry.[3]

In this work, cytotoxic effects of silicon phthalocyanine, naphthalocyanine bearing acetyl piperazine groups and their water soluble derivatives were investigated upon human breast (BT-20), melanom (SK-Mel 128), prostate (DU-145), liver (SNU-398) and lung (A549) cancer cells. Also, the toxic effect of these substances on healthy normal cells was examined on human fibroblast cells (HFC).This study was supported by The Scientific & Technological Research Council of Turkey (TÜBİTAK, project no: 116Z364).

KEYWORDS: WATER SOLUBLE, SILICON PHTHALOCYANINE, ANTICANCER



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1. EBAT EURASIA BIOCHEMICAL APPROACHES & TECHNOLOGIES CONGRESS
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S-076

Water Soluble Silicon Naphthalocyanine and its DNA Binding, Photocleavage, Topoisomerase Inhibition Properties

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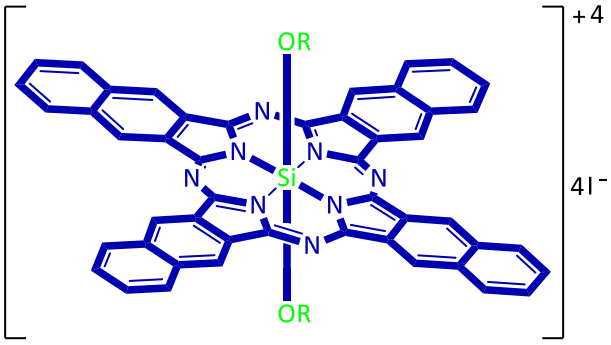
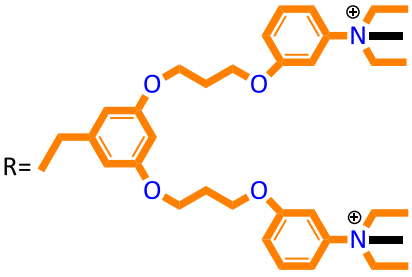
Being a class of useful dyes, phthalocyanines (Pcs) have been investigated over the last decades.[1] One of their most outstanding aspects is functioning as photosensitizers for photodynamic therapy (PDT).[2] PDT is one of the alternative methods cancer treatments. The most essential feature of a photosensitizer is able to generate reactive oxygen species, in particular singlet oxygen under light irradiation and solubility in organic solvents and aqueous media. The low solubility of phthalocyanines and aggregation in organic solvents and aqueous media is an important problem in application of PDT. Silicon phthalocyanines have a comparably decreased tend to aggregate and high solubility in solutions. The non-aggregated silicon phthalocyanine derivatives was presented in the past few years.[3]

In this study, new water soluble axially disubstituted silicon napthalocyanine was synthesized for the first time. The binding modes of the Pc with calf thymus-DNA (CT-DNA) was carried out using UV-Vis absorption titration, competitive ethidium bromide and thermal denaturation experiments. In addition, DNA-cleavage activities (hydrolytic, photoinduced, oxidative) were investigated using supercoiled pbr322 plasmid DNA on agarose gel electrophoresis. Also, the topoisomerase I,II inhibitory was investigated using agarose gel electrophoresis. This study was supported by The Scientific & Technological Research Council of Turkey (TÜBİTAK, project no: 116Z364).

KEYWORDS: silicon naphthalocyanine**,** electrophoresis, DNA binding and cleavage activities.





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S-077

Bioremediation OF C.I. Direct Red 23, Acid Red 249 AND C.I. Red 337 by *Deinococcus radiodurans*

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The *Deinococcus radiodurans* is a Gram-positive, red-pigmented, non-sporulating, nonmotile bacterium that was originally identified as a contaminant of irradiated canned meat. *D. radiodurans* has a remarkable ability to survive intense doses of γ radiation. This organism also shows high tolerance to other DNA damaging agents, UV radiation, mitomycin C and high concentration of hydrogen peroxide. The radiation resistance of *D. radiodurans* makes it an ideal candidate for bioremediation of sites contaminated with radiation and toxic chemicals.

The main techniques available in the literature for the biodegradation of wastewaters involve adsorption, precipitation, chemical degradation, electrochemical, photochemical, biodegradation processes, among others. Microbial biodegradation has been proposed as a cheaper and less environmentally aggressive alternative. C.I. Direct red 23 and C.I. Red 337 are azo dye that is used extensively in the textile industry. The extensive use of the dyes often poses pollution problems in the form of colored wastewater discharged into environmental water bodies. It not only affects aesthetic merit but also reduces light penetration and photosynthesis.

We was to investigate the effects of various parameters (initial concentration of dye, pH, temperature, agitation speed, composition of medium) on C.I. Direct red 23 and C.I. Red 337 and to correlate kinetic properties with C.I. Direct red 23 and C.I. Red 337 concentration. In our study, over 85,7 % removal of the C.I. Direct red 23 and C.I. Red 337 was performed within half an hour and on some parameters of the process are optimized.

S-078

Synthesis and Characterization of Thermoresponsive PNIPAM Hydrogels

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Thermoresponsive hydrogels are three-dimensional polymer networks which undergo conformational changes in aqueous media depending on the external temperature. As the lower critical temperature (LCST) is close to the body temperature, the main thermoresponsive hydrogel used for biomedical applications, is Poly(N-isopropylacrylamide) (PNIPAM). Below LCST, PNIPAM hydrogels swell in aqueous media, above LCST they become insoluble and shrink. This behavior makes it possible to design drug release systems controlled by external temperature.[1,2] Swelling/shrinking response of PNIPAM hydrogel depends on several factors such as crosslinker type, crosslinking density, hydrophobic/hydrophilic balance and initiator type.[3] In this study, different thermoresponsive hydrogels were synthesized by using Ethylene glycol dimethylacrylate (EGDMA) and N,N'-Ethylenebis acrylamide (EBAM) as crosslinkers via photo and thermo initiators. The hydrogels were characterized by FTIR spectroscopy. Effects of the initiation system and the crosslinker type on the release, swelling behavior and in vitro cytotoxicity of the hydrogels were investigated.

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S-080

Investigation of inhibitor activity on newly synthesized Novel trisubstitue 1,2,4-triazole compounds on AChE

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Acetylcholinesterase (AChE) is a member of the cholinesterase family and is very important in many fields such as neurobiology, toxicology and pharmacology. The main function of AChE is to catalyze hydrolysis of acetylcholine to choline and to maintain acetylcholine level of the central nervous system within the normal range. Overexpressing AChE may accelerate amyloid fibrillation incorporation of amyloid beta peptides. This results in Alzheimer's disease. Therefore, acetylcholinesterase inhibitors are considered an effective approach to treat Alzheimer's disease [1-3].

The synthesized compounds were assayed for their *in vitro* inhibitory activity against human erythrocytes acetylcholinesterase (AChE). Donepezil was used as the standard inhibitor molecule in the study. The inhibition type of the most active compound among the studied molecules was found to be noncompetitive and K_i value was calculated as 0.154 µM.

The study was support from by KTU-BAP (Project number FBA2014-89).

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S-081

Inhibition of *Canavalia ensiformis* urease with new 1,2,4-triazole compounds

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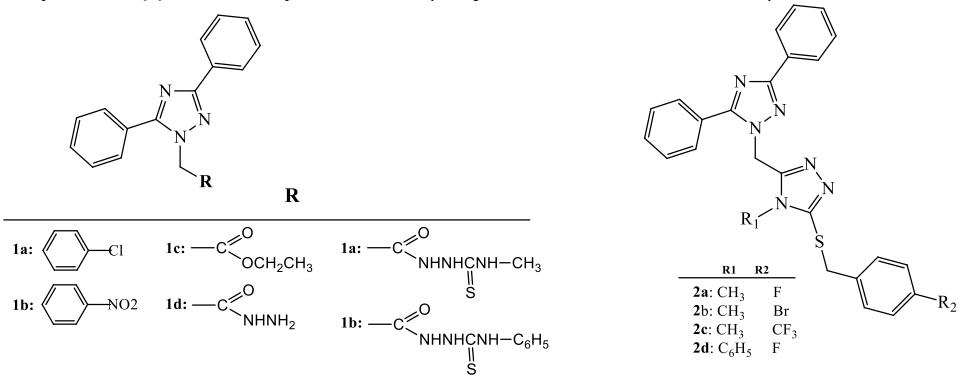
Urease is a metallo-enzyme and found in many organisms from bacteria to high plants. The enzyme catalyze hydrolysis of urea to NH_3 and CO_2 spontaneously [1]. As a result of enzyme catalysis, excessive release of ammonia can lead to problems in medicine and agriculture. The amount of excess ammonia in soil causes alkalinity and ammonia toxicity in agriculture. And also, bacterial ureases are important virulence factors for pathogenesis in many diseases in medicine such as peptic ulcer, reflux, stomach and cancer. Therefore, investigation of urease inhibitors is very important for environmental pollution reduction and treatment of peptic ulcers and other urea-related diseases [2, 3].

In this study, some novel trisubstitue-1,2,4-triazole derivatives were evaluated for anti-urease properties. **1-2** was found most active molecules and **2d** molecules were found low IC_{50} values among the other tested molecules. The inhibition type of **2d** molecule having lowest IC_{50} value was found to be noncompetitive and K_i values were calculated as 0.0864 µM. Also, tested compounds according to the enzyme inhibition assays against urease were docked into the crystal structure of Jack bean (*Canavalia ensiformis*) urease (pdb: 4h9m, 1.52 Å) using the GOLD Suite software package (v5.6.1, CCDC, Cambridge, UK) and the ChemScore scoring function. Urease inhibition studies are based on the comparison of the active compounds with thiourea, these molecules may be thought of as potent inhibitors in chemical biopharmaceutical designs against urease.

The study was support from by KTU-BAP (Project number FBA2014-89).



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S-082

Investigation of Tyrosinase Activities of Some Thiosemicarbazide Derivatives Containing 1,2,4-Triazole-3-on Ring

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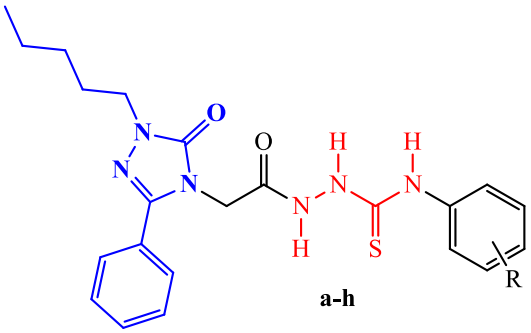
Thiosemicarbazides are convenient precursors which have been extensively utilized in heterocyclic synthesis. From the point of view of biological activity, thiosemicarbazide derivatives are useful intermediates and subunits for the development of molecules having pharmaceutical or biological interest.[1] In addition, ıt is known that heterocyclic compounds bearing 1,2,4-triazole ring have also significant biological activities such as anticonvulsant, antidepressant, antioxidant, anti-inflammatory, analgesic, antinociceptive, antibacterial, antimycobacterial, antifungal, antiviral, anticancer and anti-urease.[2] Because of these properties, synthesis of novel 1,2,4-triazole derivatives are important. For this purpose; thiosemicarbazide derivatives containing 1,2,4-triazole ring were synthesized and their tyrosinase activities investigated. Among the synthesized **c, d** and **g** compounds showed very good activities.



a-h

	R
a	2-F
b	3-F
c	4-F
d	2,4-F_2
e	2-Cl
f	3-Cl
g	4-Cl
h	2,4-Cl_2

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S-083

A study on the Synthesis and Tyrosinase Activities of Some Novel Semicarbazide Analogs

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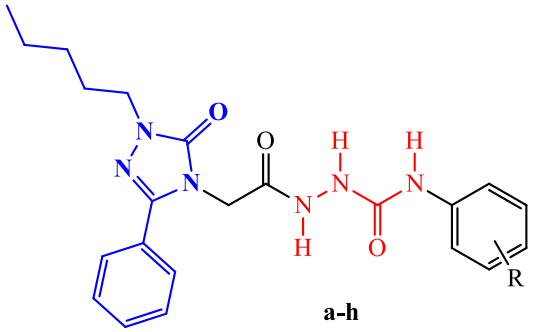
Semicarbazides are of special importance because of their versatile biological and pharmacological activities. Semicarbazides are potent intermediates for the synthesis of pharmaceutical and bioactive materials and thus, they are used extensively in the field of medicinal chemistry.[1] 1,2,4-Triazole derivatives due to their broad-spectrum activities have potential applications in the fields of pesticides and medicines possessing antifungal antibacterial, antitumor, antitrypanosomal, antiproliferative, and antibiotics properties.[2] Several clinical 1,2,4-triazole drugs were used widely in clinical therapy, for instance, voriconazole and fluconazole.[3] In this study, a series of semicarbazide derivative containing triazole group was synthesized and its Tyrosinase activities were investigated and among the tested compounds **h** has very good tyrosinase inhibition.



a-h

	R
a	2-F
b	3-F
c	4-F
d	2,4-F_2
e	2-Cl
f	3-Cl
g	4-Cl
h	2,4-Cl_2

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27-30 OCTOBER 2018 ANTALYA

S-084

Using Of The Plectenchyma Tissue Of A White-Rot Fungus For Biosorption Of Metal Ions From Aqueous Solutions

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The removal of Pb(II), Cu(II) and Zn(II) ions from the aqueous solutions was studied using *Lentinus concinnus*, the white-rot fungus. Two different structures of the fungus (mycelium and plectenchyma) were used, for the first time in the literature. The comparison of these forms for metal adsorption behavior was studied. Plectenchyma is the general term for fungal tissues formed by the close association of the hyphae[1]. Mycelium is a network-like structure that consists of loose hyphae. In higher fungi, the mycelium gets organized into a loose or a compact woven tissue-like structure. These are termed as the plectenchyma[2]. The mycelium and the plectenchyma biomasses were prepared as active and inactive forms. The experiments were realized using a glass reactor in the batch system. The effects of pH, temperature, the initial concentration of metal ions, biomass dosage and the ternary metal ions, on the removal of metal ions, were investigated. The optimum pH values were determined for all biomasses as pH 5.0. The Langmuir and Freundlich adsorption isotherm models were used for the description of the adsorption equilibrium. It was determined that the adsorption can be defined by the Freundlich isotherm model. As a result of experiments conducted in the batch system, it was found that the active plectenchyma has a higher removal rate than other biomasses. The adsorption capacities and removal rates for active plectenchyma were obtained as, 0.432 mmol/g (89.58 mg/g), 93.12% for Pb(II), 0.869 mmol/g (55.26 mg/g), 53.00% for Cu(II) and 0.498 mmol/g (32.55 mg/g), 27.00% for Zn(II). Consequently, it was determined that the plectenchyma tissue of the *Lentinus concinnus*, has a higher adsorption capacity than the mycelium structure, for removal of metal ions from wastewaters.

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S-085

Chemical Characterization and Biological Activities of Polysaccharides Extracted from Tree Mushrooms

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Mushroom polysaccharides, one of the most important components isolated from the mushrooms, have attracted much attention by the researchers for their significant pharmacological activities such as antioxidative, immunomodulatory, anti-inflammatory, antihyperglycaemic and antihyperlipidemic.[1] In addition, natural mushroom polysaccharides have more advantages than synthetic antioxidants because of their non-toxicity, local accessibility and environmental friendliness.[2]

In this study, polysaccharide extracts were obtained from *F. fomentarius, F. torulosa, G. adspersum, G. applanatum, G. lucidum, P. igniarius, P. ostreatus* and *P. pini* tree mushrooms. The major monosaccharides were found as galactose and glucose in all polysaccharide extracts by using GC-MS. Characteristic polysaccharide peaks were observed in the FT-IR analysis and HPLC was used to determine molecular weight of the polysaccharide extracts. β-carotene bleaching, DPPH free radical scavenging, ABTS cation radical scavenging, CUPRAC and metal chelating assays were used to test antioxidant activity while anticholinesterase activity was determined by Ellman method. *F. fomentarius* polysaccharide extract exhibited the highest antioxidant activity in β-carotene-linoleic acid assay with the IC_{50} value of 2.55±0.40 µg/mL while *G. applanatum* polysaccharide extract showed the highest antioxidant activity in $DPPH^{\bullet}$ (IC_{50}: 45.58±0.21 µg/mL), $ABTS^{\bullet+}$(IC_{50}: 16.62±0.31 µg/mL) and CUPRAC ($A_{0.50}$: 59.90±0.53 µg/mL) assays. Also, *P. ostreatus* polysaccharide extract (56.31±.0.74 %) showed the highest inhibitory activity against BChE enzyme among all the polysaccharide extracts.

The Mugla Sitki Kocman University Research Fund is also acknowledged under project number (MUBAP 17/283).

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S-086

Investigation of Antibacterial Properties of PMMA/PEO Fibers Loaded With Antimicrobial Agent

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Nanofibers have attracted considerable attention in recent years for drug delivery and other biomedical applications, with a number of unique properties such as high surface area, a complex porous structure and the variety of materials suitable for processing into fibers.[1-4]
In this study, fibers based on bis-chalcone derivatives were successfully prepared by electrospinning technique to increase the bioavailability of biocompatible polymethyl methacrylate (PMMA)/polyethylene oxide (PEO) fibers loaded with Streptomycin (sulfate) as an antimicrobial agent and to create a synergistic effect. Morphology of the fibers of both containing drug and without drug was investigated by Scanning electron microscopy (SEM). Characterization of fiber structures was performed by Fourier transform infrared (FTIR) spectroscopy. Importantly, antibacterial studies have shown that the antibacterial effect of fibers containing Streptomycin (sulfate) and the bioavailability is significantly increased.

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S-087

Optimization for Co-Production of Protease and Cellulase from Bacillus Subtilis M 11 in Solid-State Fermentation

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Cellulase and protease are important commercial enzymes. Proteases are used in leather, detergent, food, chemical, and pharmaceutical industries. Besides, cellulolytic enzymes have various applications in laundry, textile, paper, animal feed and fruit juice extraction. Enzymes can be produced from plants, animals and microbial sources (bacteria, fungi). The genus *Bacillus* is frequently used for the production of various enzymes.

Solid-state fermentation has gained significance in the production of enzymes and more advantage than submerged cultures for enzyme production.

Due to the wide applications of protease and cellulases, it is important to obtain a suitable medium for industrial enzyme production. Therefore, this study deals with the optimization of substrate and fermentation conditions for the co-production of protease and cellulase from B. subtilis under same fermentation conditions in solid state fermentation.

Method: Protease and cellulase from *B. subtilis* M-11 was produced in the eight different natural substrates. The best protease and cellulase activities were obtained from the medium containing oat substrate. Certain fermentation parameters involving incubation time, incubation temperature, moisture level, and initial pH were studied separately for optimization of fermentation conditions.

Results: The maximum production of protease and cellulase were obtained from B. subtilis in SSF using oat flour as compared to other substrates. Protease exhibited maximum production during 48 h, at the range of 75% moisture content of oat flour, temperature 27-37°C and pH 8,5–9,5. However, in same medium, maximal yield of cellulase production was obtained from moisture level 75%, initial pH 8.5 at 37-47 ºC for 72 h.

Conclusion: The results from this study suggest that *B. subtilis* can be used for the production of cellulase and protease and both enzyme activity were enhanced by optimization of various fermentation parameters.

S-089

Preparation Of The Gallic Acid-Based Sensor With Polyurethane Membrane Screen-Printed Carbon Electrode For Determination Of Serotonin

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Serotonin (5-hydroxytryptamine, 5-HT) is a monoamine neurotransmitter synthesised in serotonergic neurons in the central nervous system and plays a crucial role in the emotional system together with other monoamine transmitters such as regulation of mood, sleep, emesis (vomiting), sexuality and appetite. Low levels of serotonin have been associated with several disorders, notably depression, migraine, bipolar disorder and anxiety[1]. Thus, fast detection of 5-HT in the blood is significant to the diagnosis, illness monitoring, prognosis and outcome of the depressed patients[2].

In this study, a gallic acid-containing polyurethane film as serotonin selective film was synthesized and characterized. Polymeric membranes and electrochemical amperometric techniques have been successfully used to elimination of the interferant species for determination of serotonin. The following reactants were used in the syntheses of polyurethanes: 4,4'-diisocyanodiphenylmethane, gallic acid and polyethylene glycol 200 (PEG200). The ratios of PEG–gallic acid monomer units in the polyols were: 99:1, 97:3 95:5, and 90:10, respectively. Structural characterizations of polyurethanes were characterized by FTIR, DSC, DTA, TGA and dynamic contact angle measures. Furthermore, polyurethane film was formed by dropping of polyurethane solution on screen-printed carbon electrode to prepared serotonin selective electrode. The voltametric results indicate that the polyurethane based electrodes can be used as a sensor for determination of serotonin with the good sensitivity, selectivity, high reproducibility and high R-value (0,9901).

We would like to thank Inonu University BAP for financial support within the project numbered İ.Ü.BAPB2016/33.

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S-091

Assessment of the Skin Protection Capacities of Pulvinic Acid Derivatives toward Ultraviolet-Induced Damage

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Aim and Objective: Photoprotective potentials of lichen-derived small-molecules seem to be evolved to protect the photosynthetic partner toward ultraviolet rays that have an ability to inhibit photosynthesis, and pulvinic acid derivatives are known as the pigmented small-molecules located in the cortex of lichen thalli, which are the most exposed parts of lichens to ultraviolet rays [1]. Although the photoprotective capacity of pulvinic acid derivatives is considered as worthy, the references in the literature about their cosmetic potential for skin protection toward ultraviolet-induced damage seem to be insufficient [2]. The lichen-originated pulvinic acid derivatives were therefore evaluated in silico to determine their cosmetic potential for skin protection, for the first time.

Material and Methods: Photoprotective potentials of pulvinic acid derivatives were evaluated using computational biology, chemistry and pharmacology platforms such as Gaussian, GAMESS, PASS, PaDEL-DDPredictor and VEGA QSAR platforms and alpha-tocopherol was employed as positive control.

Result: The calculated p-values suggest that pulvinic acid derivatives can be divided into three groups as the most promising, promising and unpromising compounds for skin protection toward ultraviolet rays. Calycin, pulvinic acid, pulvinamide, pulvinic acid lactone and 2-hydroxypulvinic acid lactone were determined as unpromising substances, though epanorin and rhizocarpic acid were identified as promising compounds. On the other hand, leprapinic acid, demethylleprapinic acid, pinastric acid, leprapinic acid methyl ether, 4-hydroxyvulpinic acid and vulpinic acid were determined as the most promising compounds, respectively.

Conclusion: The preliminary results showed that the provided model is reliable to predict photoprotective potentials of the compounds because there is a tight correlation between the calculated p-values and the previously obtained experimental results, especially for vulpinic acid [3]. Therefore, the pulvinic acid derivatives identified as the most promising ones should be evaluated by further in vitro and in vivo experiments.

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S-092

Molecular Design of Materials Selective Engineered Proteins for Bionanotechnology

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Nature has evolved biomolecules that manage functional properties in the form of self-assembly and self-organization, catalysis, sensing, signaling and storage. Additionally, nature hybridizes materials such as inorganic and organic molecules to build complex structures and materials. The ability to reproduce the structures and functions of biomolecules related to how they assemble and combine with inorganic materials is greatly desired for new technologies ranging from biomedical to energy production. With recent improvements in bionanotechnology, there have been numerous breakthroughs in employing biomolecules to assemble and/or functionalize nanoparticles (NPs) that provide new material functionality when interact with the optical, electronic and magnetic properties of nanomaterials[1,2]. For example, biomolecules such as peptides, proteins or DNA are mostly used for the synthesis of different materials to modify NP properties and structure and more importantly, convey biological activity and molecular recognition function to nanomaterials in designing new class of biologically fuctional devices[2]. Taking that into consideration, we have mainly used inorganic binding peptides as the fundamental building blocks in order to mimic molecular recognition onto the material surfaces. Herein, we propose a bio-enabled approach which is able to depict the protein-material interactions in the controllable assembly of hybrid materials. Depending on the modular organization of a protein, we design and engineer multifunctional fusion proteins by using material selective peptides as building blocks[3,4]. We will provide specific examples on the peptide based assembly of multifunctional proteins and the use of enzymes on different set of inorganics that lead to the self-organized hybrid material system for targeting and sensing.

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S-093

Effects of Organic Solvents on Carbonic Anhydrase Hydratase Activity

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It is known that enzymes undergo denaturation in an organic solvent environment and that their catalytic activities are significantly suppressed when compared to aqueous media.[1] However, many studies have been carried out to show that enzymes can also exhibit catalytic activity in organic solvent media.[2] Carbonic anhydrases (CA, EC 4.2.1.1.) are crucial therapeutic targets to be inhibited/activated for the treatment of diseases such as glaucoma, cancer, obesity, epilepsy and osteoporosis.[3] So far, inhibition of Carbonic anhydrases (CA, EC 4.2.1.1.) have been investigated in great detail with several clinically used CA inhibitors, but there is limited information on how organic solvents affect CA activity.

In our study, the effect of five organic solvents (acetonitrile, acetone, methanol, ethanol, and DMSO) test at 12 different concentrations (0%, 1%, 2%, 4%, 6%, 8%, 10%, 14%, 18%, 22%, 26%, 32%) on bovine carbonic anhydrase (BCA) activity was investigated by CA's hydratase method. The solvent percentages causing 50% inhibition of enzyme hydratase activity were 10.2% for methanol, 18.4% for ethanol; 31.6% for acetone; 31.7% for acetonitrile and 27.0% for DMSO. No significant inhibition was observed up to 25% concentration with DMSO. The IC_{50} values of acetazolamide and sulfanilamide, which exhibit inhibitory effect on the hydratase activity of BCA enzyme, have been determined as 24 nM and 2.6 µM, respectively. How the organic solvents at 10% concentration affect the IC_{50} values of acetazolamide and sulfanilamide was investigated. The results showed that the activity of the enzyme was affected slightly when working with organic solvents at low concentrations. This work presents important information for the studies with HPLC and FIA research and inhibitor, activator, and indicator dissolution processes.

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S-094

Development of A New On-Line HPLC-Carbonic Anhydrase Inhibitor (CAI) Method and Effects of Some Parameters on BCA Enzyme Activity

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Carbonic anhydrase inhibitors (CAI) have been a highly dynamic research topic in recent years. This enzyme has become the target enzyme for drugs used in animals and especially for the treatment of a number of human diseases such as glaucoma, edema, obesity, cancer, epilepsy and osteoporosis.[1] In recent years, studies on natural carbonic anhydrase inhibitors have increasingly aroused interest and curiosity.[1] On-line High Performance Liquid Chromatography (HPLC) applications provide advantages in identifying bioactive compounds. Antioxidant and enzyme inhibitory studies with separated compounds are frequently encountered.[2] For developing a new on-line HPLC-CAI method for determining inhibitors from mixtures, some parameters such as temperature, pH, buffer concentration, which may be effective in the on-line HPLC system, were evaluated using spectrophotometric esterase activity of bovine CA (BCA) enzyme, and the appropriate conditions were determined. Change on effect of inhibitors by solvents was studied. On-line HPLC-DAD-CAI method was developed using the standard inhibitors sulfanilamide and acetazolamide. Chromatographic conditions have been determined and optimized for optimal separation in HPLC. Each standard was prepared at ten different concentrations to determine the IC_{50} value and run by improved on-line HPLC-CAI detection system (RP-HPLC-DAD-UV). Peak areas and peak heights at each concentration of the standards were calculated using Chem Station (Agilent) program, and both were plotted against concentration. IC_{50} values were determined for sulfanilamid and acetazolamide as 0,23 mM ve 0,15 mM from peak area and 0,11 mM ve 0,01 mM from peak heights, respectively. The developed on-line HPLC-DAD-CAI method will fill a significant gap in the identification of compounds with high CAI effect in the mixtures obtained from natural sources and from synthetic libraries. These methods can be used in combination with other on-line HPLC bioactivity methods to detect compounds with high bioactivity value which can be used in various sectors, particularly in health.

*This study was supported by 2211-C Priority Areas Domestic PhD Scholarship Programme of TUBITAK-BIDEB.

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S-095

Effects of *Camellia sinensis* L. Tea on Carbonic Anhydrase Activity

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Tea obtained from leaves and buds of *Camellia sinensis L.* plant is the most extensively consumed beverage after water in the world. The inhibition and activation effects of carbonic anhydrase (CA) enzyme by many bioactive components and drugs have been investigated and reported in the literature.[1, 2] The discovery of biocompatible and water-soluble inhibitors of natural, toxic, low or no side effects will provide important findings for the search of drug substances used in various diseases. For this purpose, the effects of black tea, green tea, white tea, tea fiber and tea garbage aqueous extracts on bovine carbonic anhydrase enzyme (BCA) and human carbonic anhydrase isoenzymes (hCAI and hCAII), purified by affinity column chromatography, were investigated. For this purpose, esterase activity measurements were made at five different concentrations of each tea extract. Graphs of activity (%) - inhibitor concentration [I] were drawn for extracts with inhibitory effect. The inhibitor concentrations (IC_{50}) causing 50% inhibition and % inhibition values were calculated.

C. sinensis tea extracts were found to have a significant effect on the activity of BCA and hCAII isoenzymes. While the inhibition effect on hCAI and hCAII isoenzymes was most observed in antique green tea ($IC_{50(hCAI)}$: 0.107 mg/mL; $IC_{50(hCAII)}$:0.022 mg/mL) and organic Zümrüt green tea ($IC_{50(hCAI)}$: 0.192 mg/mL; $IC_{50(hCAII)}$: 0.012 mg/mL), the lowest effect was observed in Altınbas classical black tea (IC_{50} (hCAI): 0.548 mg / mL) and white tea (IC_{50} (hCAII): 0.163 mg / mL). Studies have shown that the components with aqueous extracts from these teas can significantly inhibit carbonic anhydrase. The natural compounds to be identified as inhibitors will make an important contribution to the design of drug and pharmacological applications to be used in the treatment of many diseases, especially glaucoma.

*This study was supported by 2211-C Priority Areas Domestic PhD Scholarship Program of TUBITAK-BIDEB.

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S-096

Antioxidant and Antiaging Effect of Three-phase Partitioned *Inula viscosa* and Its Cream Formulation

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Inula viscosa is a plant commonly used for the treatment of inflammation, germicide, expectorant, cough reducer, diuretic, anemia and cancer.[1] In addition to its medicinal effect, this plant has been preferred because it is thought to be free radical scavenger and antiaging effect due to its phenolic compounds.[2] The aim of the study is to determine whether the plant and its cream formulation have antioxidant and anti-aging potential.

The plant was extracted with both the traditional maceration method and the novel three-phase system, and the two methods were compared. The inhibition of DPPH free radical scavenging, ABTS cation radical scavenging, superoxide anion radical scavenging, reduction of copper ions, reduction of iron ions and inhibition of lipid peroxidation were investigated to determine the antioxidant effects of the obtained extracts and cream. In addition, elastase enzyme inhibition was studied for the investigation of anti-aging potential. As a result, the three-phase partitioned method was performed at a higher yield than the maceration, and the extracts showed antioxidant and antiaging effect at levels close to the standards. It was also determined that the creams prepared from the extracts had an activity of 80% of them.

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S-097

A New Metallo-Serine Neutral Protease from Bacillus sp. BHC01

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In the presented study, it is aimed to search for new proteases with novel properties from bacteria and to characterize the properties of the enzyme.
The best protease producing microorganisms was isolate and characterized. After detecting the relation between protease producing time and the growth curve of the bacteria, the protease was purified by chromatographic methods. The purified enzyme was characterized. Results: A 32 kDa molecular weight neutral metallo–serine protease from newly isolated Bacillus sp. BHC01 was purified 2.6–fold with a final 38,617.0 U/mg protein specific activity. Optimum reaction temperature and pH of the enzyme was found to be 50 ° C and pH 7.5, respectively. Fe+2, N+1, Co +2 and Mg +2 ions were detected as activators, and Cu+2 metal ions was observed as inhibitors. The kinetic constants of the enzyme Km and Vmax is measured as 0.574 mg/mL, 338.1 mmol/ml.min, respectively.

One of the highest protease specific activities that have ever published has found. Because EDTA and PMSF, both inhibit the enzyme, it is concluded that this enzyme is a metalloprotease but it must have some serine residues in order to reach an active folding.

Keywords: Bacillus, Chromatography, Metallo-serine protease, Protective effect of Cu+2

S-098

Synthesis and Characterization of Urolithin-Grafted Chitosan as a Selective, Fluorescent Probe for Sensing Iron(III) in Aqueous Solution

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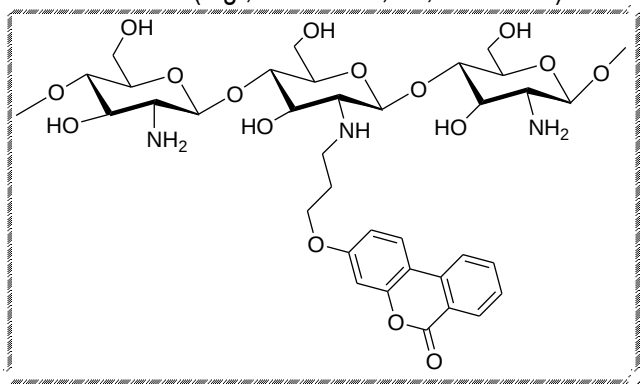
Heavy metal pollution deriving from various sources becomes more threatening to the environment day by day. From this point of view, it is also of significance to find methodologies to treat environmental metal pollutions. This also covers the identification of alternative techniques for selective metal detecting technologies. Within this study, we have prepared a Urolithin B (i.e., 3-hydroxy-6H-benzo[c]chromen-6-one) analogue grafted chitosan polymer. Mainly, 3-(3-chloropropoxy)-6H-benzo[c]chromen-6-one was synthesized from urolithin B and it was grafted on medium molecular weight chitosan. Employing our previous experience and observation on the characterization of Urolithin B as a selective, fluorescent probe for sensing Iron (III), we have questioned its application in a polymer chain[1]. The grafted polymer was physically and chemically characterized using IR, 1H-NMR, and thermal gravimetric analysis. Following that, we have conducted a serious of experiments to identify the fluorometric properties of the grafted polymer. Employing the λmax values detected for excitation and emission of fluorescent active grafted polymer, the quenching effect of various metals on fluorescence was investigated based on grafted polymer-metal interactions. It was found that the grafted polymer displayed selective interaction with Iron (III) among the other metals tested (e.g., various +1, +2, +3 metals).



Referances:

Fallah, A., Gülcan, H.O. and Gazi, M. J Fluoresce **2018** https://doi.org/10.1007/s10895-018-2290-8 (Accepted)

S-099

The Investigation of the Interaction of Urolithins with Cyclooxygenase Enzymes

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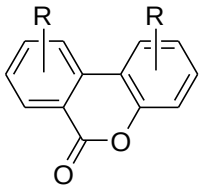
rolithins are the bioavailable metabolites of ellagitannins. Ellagitannins are abundantly found in dietary sources, including but not limited to berries, nuts, and in particular pomegranate juice. These compounds are converted to urolithins (i.e., hydroxylated benzo[c]chromen-6-one derivatives) within the gastrointestinal tract. The routine exposure to these dietaries have been suggested to have positive role for the prevention and treatment of various diseases, including inflammatory disorders. Considering the fact that arachidonic acid pathway yielding out prostaglandins is one of the major routes for the generation of inflammation, we have questioned a possible role of urolithins to act as inhibitors of cyclooxygenase (COX) enzymes (i.e., COX-1 and COX-2). The urolithin compounds and their methyl ether metabolites were synthesized and their structures were identified. Following that, COX inhibition assays were performed. Based on the results, the compounds displayed varying results depending on their hydroxy-, and methoxy- substitutions. The results in one way have pointed out the significance of urolithins as anti-inflammatory agents depending on dose, and frequency of exposure. On the other hand, it is apparently observed that these compounds might utilized as important scaffolds for the design of novel COX-inhibitor (i.e., non-steroidal anti-inflammatory) molecules.



R: -OH, -OCH_3

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S-100

Determination of Antimicrobial Activities of Nepeta nuda subsp. Lydiae

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Infections due to variety of bacterial etiologic agents such as pathogenic Staphylococcus aureus, Escherichia coli, Salmonela spp. are most common. Recently drug resistance to these pathogenic bacteria has been commonly reported from all over the world [1]. Therefore, we urgently need to develop natural antimicrobial drugs for the treatment of many infectious diseases; one approach is to screen local medicinal plants for possible antimicrobial properties. Plant materials remain an important recourse to combat serious diseases in the World [2].

Antimicrobial activity of *Nepeta nuda* subsp. *lydiae* was determinated by the disc diffusion method. In this study, the extract of *Nepata nuda* subsp. *lydiae* was showed the highest antibacterial activity against the *B. megaterium*. At the same time the lowest antibacterial activity was showed against *P. aeruginosa* and *K. pneumoniae*. The extract of *Nepata nuda* subsp. *lydiae* showed the highest antifungal activity against *C. albicans*but it did not show any significant antifungal activity against *Y. lipolytica* and *S. cereviciae.*

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S-101

Phthalocynaines as Antimicrobial Agents

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The use of photosensitizers and light is complementary as well as alternate method to the conventional way of fighting against pathogenic microbes. When light of a specific wavelength is illuminated to such photosensitizer molecule, particles with high reactivity are generated that can destroy pathogenic microbial cells. As one of the photosensitizers phthalocyanine and their analogues show great potential as antimicrobial agents producing reactive oxygen species, especially in medicine to inactivate various microbial pathogens. However, their biocidal effects may also be employed to inhibit various undesirable organisms. The reason for performing antimicrobial activity tests in this study is to investigate the potential of these phthalocyanine compounds to be used in antimicrobial drugs. These compounds were tested against Gram-positive and Gram-negative bacterial strains and a yeast strain. As compared with standard drug, some of the test bacteria were found to be resistant to the tested compounds. The other were not. But it was observed that there were significant anticandidal activities for some compounds. It was also argued that the structural properties of the subject compounds examined for their antimicrobial properties make these compounds an antimicrobial agent. It was concluded that the variable biological properties of the phthalocyanines might result from the pattern and the degree of the substitutes.

S-102

Lipase Immobilization onto Nanoparticles Embedded Cryogels

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Lipase (triacylglycerol hydrolase; EC. 3.1.1.3) is one of the most extensively used enzymes, which catalyzes the hydrolysis of triacylglycerol to glycerol and fatty acids. Lipases can catalyze a wide range of enantio and regioselective reactions, such as hydrolysis, esterifications, transesterifications, aminolysis and ammonialysis.[1] Also, lipases constitute one of the most important groups of industrial enzymes. They find diverse applications in fats and oil hydrolysis, food industry, detergent industry, peptide synthesis and pharmaceutical industries.[2]

Recently, the synthesis and applications of nanoparticles for biotechnological studies have been attracted considerable attention because of their unique physical and chemical properties owing to their extremely small size and very large specific surface area.[3] Nanoparticles provide an ideal remedy to the conflicting issues usually encountered in the optimization of adsorbed enzymes: minimum diffusional limitation, maximum surface area per unit mass and high enzyme loading.[4]
Cryogels are new and good type of adsorbents used for protein purification with many advantages such as large pores, short diffusion path, low pressure drop and very short residence time for both adsorption and elution. The main disadvantage of the cryogels, on the other hand, is their low surface area and thus low adsorption capacity.[6] In actual, bioseparation processes, it is a great importance to increase the adsorption capacity of supermacroporous cryogel. Therefore, nanoparticles embedding would be a useful improvement mode to use in the preparation of novel composite cryogels for increasing both surface area and adsorption capacity.

In this presented work, Reactive Green 19 dye modified poly(HEMA) nanoparticles were embedded into the poly(HEMA) cryogel structure and were used for the immobilization of lipase. For this, characterizations of the nanoparticles, cryogels and the nanoparticle embedded cryogels were carried out by SEM and SEM-EDX analysis. Then, the effects of the pH, initial lipase concentration, ionic strength and flow rate on the lipase adsorption onto nanoparticle embedded cryogels were also evaluated.

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Stabilization of *Rhizomucor miehei* Lipase Immobilized on 3-aminopropyl-Functionalized Silica Gel

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Enzymes are promising biocatalysts for the production or degradation of chemical compounds, but low stabilities of free enzymes restrict their industrial applications. Therefore, development of effective immobilization methods to maintain or increase enzyme activity and stability remains a challenge. As a support for protein immobilization, silica provides a high degree of chemical, physical and biological resistance, along with high surface areas that can be easily modified with functional groups all of which are highly desirable properties in support for enzyme immobilization. [1–3]

In this study, *Rhizomucor miehei* lipase was covalently immobilized on 3-aminopropyl-functionalized silica gel activated with glutaraldehyde. The effects of pH and temperature on hydrolytic activity was investigated and compared for free and immobilized lipases. The free lipase revealed maximum activity at pH 7.5 and 35 °C for *p*-NPP hydrolysis. The immobilized lipase showed maximum activity at pH 7.5 and 50 °C. The free lipase maintained 46.6% of its initial activity after 24 h incubation time at 35 °C, while the immobilized lipase protected 92.4% of its initial activity after the same incubation time at 35 °C. When the free and immobilized lipase preparations were incubated at 50 °C, the residual activities were 7.0, and 88.4%, respectively after 24 h incubation time.

These results show that the immobilization of lipase on 3-aminopropyl-functionalized silica gel activated with glutaraldehyde gave thermally more stable lipase preparations.

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Covalent Immobilization of *Trichoderma longibrachiatum* Xylanase on 3-Carboxypropyl-functionalized Silica Gel

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Xylan is the second most abundant carbohydrate in nature after cellulose. Xylanases (EC 3.2.1.8; endo-β-1,4-d-xylanase) catalyze the hydrolysis of xylan with β-1,4-xylanolytic linkages. Xylanases are widely used in various industrial applications such as pulp, paper, food and feed industries. There also has been interest in using xylanases to produce xylooligosaccharides. [1-3] It has been reported that xylanases immobilization on solid supports have many advantages, such as the reuse of enzyme, possibility of product separation, improvement of enzyme activity, stability, selectivity and specificity, and continuous operation in packed-bead reactors, resulting in the reduction of the production costs. [4]

In this study, endo-1,4-β-Xylanase from *Trichoderma longibrachiatum* was covalently immobilized on 3-carboxypropyl-functionalized silica gel. The free and immobilized enzyme activities were characterized in terms of optimal pH and temperature. The optimum pH and temperature values were determimed as 6.0 and 50 °C, respectively for the free xylanase. The corresponding values were 6.0 and 60 °C for the immobilized xylanase. The immobilized enzymes showed better thermal stability at 60 °C than that of the free enzyme.

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Immobilization of Feruloyl Esterase on 3-aminopropyl-functionalized Silica Gel

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Feruloyl esterases (E.C. 3.1.1.73) are serine esterases, belonging to the carboxylic acid esterase family and cleave the ester bonds between hydroxycinnamic acids and hemicellulosic sugars in the plant cell wall. [1] Feruloyl esterase plays an indispensable role in hydrolyzing plant cell walls, and ferulic acid will be released as by-product, which has potential applications in food and medicine industry. [2] However, industrial application of feruloyl esterases is often hampered by a lack of long-term operational stability and difficult recovery and re-use of feruloyl esterase. These drawbacks can generally be overcome by immobilisation of feruloyl esterases.

In this study, feruloyl esterase was covalently immobilized on 3-aminopropyl-functionalized silica gel activated with glutaraldehyde. The optimum pH and temperature of free and immobilized feruloyl esterase enzyme were investigated. The optimum pH for free and immobilized enzyme was 6.5 for the both preparations. Furthermore, the optimum temperature of free and immobilized feruloyl esterase was found to be 40 °C for the both preparations. The results of thermal stability studies showed that the immobilization caused to increase the stability of feruloyl esterase at 40 °C.

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Immobilisation and Stabilisation of Ene-reductase by Entrapment in Sol-Gel

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Asymmetric reduction of C=C bonds represents one of the most widely employed strategies for the production of chiral molecules, because it leads to the creation of up to two stereogenic centres. [1, 2] Ene-reductases catalyze the reduction of activated C=C bonds with excellent yields and enantiomeric excess, while working under mild conditions of pH and temperature. [3] However, when an enzyme is selected as biocatalyst for any reaction, its application is often hampered by its difficult recovery and recycling as well as by its low stability under processes conditions. The drawbacks of these enzymes may be, in many cases, solved by using proper immobilization protocols. [4]

In this study, a commercial ene-reductase was immobilized by encapsulating ene-reductase in sol-gel materials produced by the fluoride-catalyzed hydrolysis of mixtures of metiltrimetoxysilane and tetramethoxysilane. [5] The free and immobilized enzyme activities were spectroptometrically measured at 340 nm using NADPH+H$^+$ as cofactor and 2-cyclohexen-1-one as substrate.

The optimum pH and temperature values were determimed as 7.0 and 30 °C, respectively for the both free and immobilized enzymes. The free ene-reductase maintained 77.5% of its initial activity after 24 h incubation at 30 °C, while the corresponding value was 88.2% for the immobilized ene-reductase. This result showed that the thermal stability of ene-reductase was increased by immobilization.

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Purification Of The Japanese Radish (Daikon) Peroxidase Enzyme In A Single Step By Using 4-Amino Benzohydrazide Derivatives In Affinity Chromatography

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Peroxidases (POD: E.C: 1.11.1.7) are proteins that belong to the oxidoreductase enzyme class and contains heme groups. Peroxidases found in animals, plants and microorganisms catalyze redox reactions between some reducing agents and peroxides.[1,2] Peroxidases play roles in many cellular processes such as plant growth and response to stress, hormonal regulation of plant growth, cell wall metabolism, and the response of cells to oxidation defense.[3] Peroxidases are commercially important enzymes, and thus the peroxidase enzyme purifications are becoming increasingly important.

In this study; The 4-amino 2-bromo benzohydrazide and 4-amino 3-bromo benzohydrazide molecule were coupled to the Sepharose 4-B-L tyrosine support matrix and the affinity gel was synthesized to purify the daikon peroxidase enzyme in a single step and in high purity. As a result of our study, 130 fold purification (with a yield 16.5%) values were reached.

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Investigation of Free And Immobilized Cellulase Activity in Buffer-Ionic Liquid Medium

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Cellulases catalyze the hydrolysis of β-(1–4) linkages in cellulose. Cellulases have been used in many industries, such as bioenergy, food, animal feed, textile, and paper and pulping. [1, 2] However, the inactivation of cellulases in the operational conditions limits their industrial application. [3] The enzyme immobilization techniques offer a solution to resolve the problem of cellulase inactivation. Furthermore, it is difficult to dissolve cellulose in buffers due to its rigid structure. Recently, the use of ionic liquids (ILs) as reaction media in carbohydrate industry due their excellent properties. [4]

In the present study, cellulase from *Aspergillus niger* cellulase was covalently immobilized on modified Immobead 150 support. The free and immobilized cellulase preparations were characterized in terms of optimum pH and temperature. The hydrolysis of cellulose using the free and immobilized cellulase preparations in some buffer containing ILs such as 1-ethyl-3-methylimidazolium chloride ([emim][Cl]), 1-butyl-3-methylimidazolium chloride ([bmim][Cl]), 1-allyl-3-methylimidazolium chloride ([amim][Cl]), and 1-decyl-3-methylimidazolium chloride ([dmim][Cl]) were investigated.

The optimum pH and temperatures values were determined as 5.0 and 65 °C, respectively for the both free and immobilized cellulases. Of the tested ILs, the free showed its maximum in buffer containing [bmim][Cl] (5%, v/v), while the immobilized lipase showed its maximum in buffer containing [amim][Cl] (5%, v/v).

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Profilling and Determination of Extracted DNA Solution Impurities by qNMR

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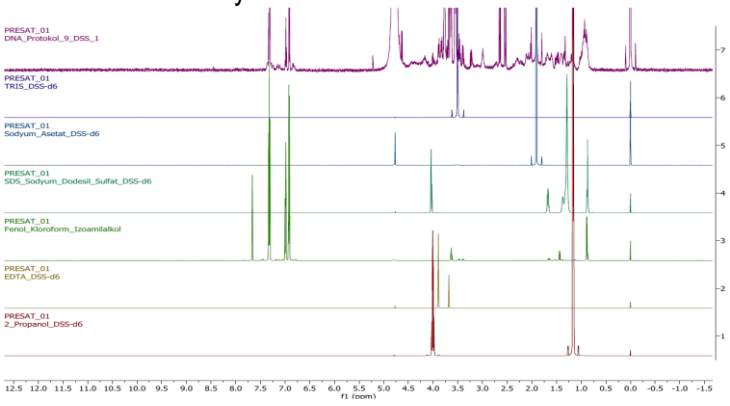
Quantitative nuclear magnetic resonance spectroscopy (qNMR) has been developed into an important tool in the drug analysis[1], bio macromolecule detection, food analysis, and metabolism study[2]. Compared to general quantification methods such as chromatographic techniques, qNMR method has various advantages: (i) sample preparation is easy, fast, and without derivatization (ii) recovering the sample after the analysis is possible especially in case of using external standard method (iii) while the reference material is used as independent of the sample in qNMR, it must have a structural similarity to the sample in chromatographic analyses (iv) the chromatographic techniques require calibration curve, it is up to the operator in qNMR.

Molecular markers have an important role in monitoring, diagnosis and treatment. DNA is one of the bio-marker in health science, as early detection of cancer and other genetical diseases. DNA can be extracted different method from the samples, but the extraction protocol has an important role, especially health sciences.

Polymerase Chain Reaction (PCR) is the gold standard technique of the DNA analysis. The reaction efficiency depends on the extracted DNA purity, and concentration. Impurities of the extracted DNA solution can be inhibited the PCR, for this reason, the low concentration bio-markers can't be detected. Since the reaction can be inhibited by the extraction chemicals, it is important to profiling, and quantification of impurities.

In this study, we compared several DNA extraction methods from blood samples and investigated impurities effect on the Polymerase Chain Reaction.



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The Effect of Co-administration of Berberine, Resveratrol and Glibenclamide on Xenobiotic Metabolizing Enzyme Activities in Rat Liver

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In the near future it is possible to use plant derived antioxidant molecules in the form of drug in the treatment and prevention of diseases. But, the role of plant derived materials in drug-drug interaction has not been well defined. Diabetes is one of the most common metabolic diseases around the world. Glibenclamide is a drug used in the treatment of diabetes (D). The aim of this study was to determine the effects of berberine and resveratrol on xenobiotic metabolizing enzyme activities in diabetic rats treated with glibenclamide. Experimental diabetes was created by the administration of streptozotocin (STZ). Resveratrol (5 mg/kg) (R), glibenclamide (5mg/kg) (G) and berberine (10 mg/kg) (B) was administered individually or in combinations. Livers of rats were taken under anesthesia at the end of treatment period (12 days). Microsomes and cytosols were prepared by differential centrifugation from the liver tissues. 7-Ethoxyresorufin O-deethylase (EROD), 7-pentoxyresorufin O-dependentylase (PROD), aniline 4-hydroxylase (A4H), erythromycin N-demethylase (ERND), glutathione S-transferase (GST), catalase (CAT) and glutathione reductase (GR) activities were measured in microsomes and cytosols. In addition, histopathological studies were also performed in the liver tissues. EROD activity of DR was significantly different from DB, DBG and DRB. PROD activity of DR was significantly different from D, DG, DRG, DBG, DRB and DRBG. PROD activity of DB was significantly different from DRB and DRG. A4H activity was not affected from the administration of these chemicals. ERND activity of DR was significantly different from DRG and DRB. GST activity of DR was significantly from DRG. CAT activity of DR was significantly different from DB. GR activity of DR was significantly different from DB, DG and DBG. It is clear that resveratrol, berberine and glibenclamide administrations modified some of the xenobiotic metabolizing enzyme activities in diabetic rats.

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Current Status of Pollution in the West Black Sea Region of Turkey

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The Black Sea is under the risk of pollution. Some areas, such as harbours, rivers and coastal cities, have tendency to create local pollution in the Black Sea. In our previous study, the presence of pollutants in Zonguldak Harbour was shown by chemical analysis and biomarker enzyme activity measurements in the pelagic fish, flathead mullet (*Mugil cephalus*) between 2005-2011. In the same study, bottom-feeder fish, striped red mullet (*Mullus surmuletus*) samples were also caught in 2006, 2009-2011. Biomarker enzyme activities were also measured in the liver of striped red mullet.

In this study, our aim is to determine the current status of pollution in the West Black Sea Region by using striped red mullet. Striped red mullet samples were caught from the Zonguldak Harbour, Kefken and Amasra in 2016. Fish were killed by decapitation and livers were removed immediately and flash frozen in liquid nitrogen. Liver microsomes and cytosols were prepared by differential centrifugation. 7-ethoxyresorufin O-deethylase (EROD) activities were measured by spectrofluorometic assay in microsomes. Glutathione S-transferase, catalase and glutathione reductase activities were determined by spectrophotometric assay in cytosols. Highly elevated cytochrome P4501A (CYP1A) related 7-ethoxyresorufin O-deethylase activities were measured in striped red mullet caught from the Zonguldak Harbour. The lowest EROD activities were measured in fish samples caught from Amasra and Kefken. EROD activities of striped red mullet caught from Zonguldak Harbour were significantly different from Amasra and Kefken. Glutathione S-transferase (GST) and catalase enzyme activities of striped red mullet caught from Zonguldak Harbour were significantly different from Kefken. Glutathione reductase activities were also measured in striped red mullet samples. However, there was no induction in this enzyme activity in striped red mullet samples caught from Zonguldak Habour. Highly elevated EROD activities was also measured in striped red mullet samples caught from Zonguldak Harbour in our previous study in 2006, 2009-2011. The results of the current study indicate that Zonguldak Harbour is still polluted with organic pollutants. The study presented covers the comparison of ten years biomonitoring results measured in striped red mullet caught from the West Black Sea Region of Turkey.

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Preparation of Enzyme Immobilized Cryogel Bioreactors

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The cryogels have a three-dimensional polymeric skeletal structure connected by interconnected macroporus is a support material that allows transport by transmission, and have been classified as new generation support matrices to possbily be applied in various biodegradation processes. The fine network structure of the cryogels is very close to the fiber capillary inside the fiber bioreactors. Nowadays, cryogel bioreactors have also been used for the production of therapeutic proteins, including monoclonal antibodies. In addition, the biocatalyst produced by enzyme immobilization to cryogel macroscopies permits processing of the macromolecular substrate. Because the substrate is rapidly diffused without mixing into the macropores. Cryogels developed for the separation of bioparticles are highly suitable for bioreactors.

Enzymes are biocatalysts that catalyze chemical and biochemical reactions that occur in living cells. In order to reduce the high cost of purifying enzymes, to improve the reusability of enzymes, to enable them to be removed from the environment as desired, and to increase the stability of enzyme activity, enzyme immobilization is preferred instead of freeing the enzymes in reactions. In this study, the design of bioreactors to be used as a continuous biodegradation system has been realized by taking advantage of the unique properties of cryogels such as porous structure, durability, chemical and mechanical stability. The enzyme was immobilized on cryogel bioreactors by covalent binding and pH, temperature, substrate concentration, enzyme amount, reaction time and storage effect were investigated with these.

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Performance of Different Immobilized Formate Dehydrogenases in The Oxidation of Formate And Reduction of Hydrogen Carbonate (HCO_3^-) Reactions

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Formate dehydrogenases (FDHs, EC 1.2.1.2) are the important class of dehydrogenases, catalyzing the oxidation of formate to carbon dioxide (CO_2) by using $NAD(P)^+$ as cofactor. This activity of FDHs is important when they used with another oxidoreductases such as alcohol dehydrogenases, lactate dehydrogenases to regenerate expensive cofactor $NAD(P)H\text{-}H^+$. Recently, FDH-catalyzed the reduction of CO_2 to formate has been growing interest since the product (formic acid) is an important raw material to produce fuels and chemicals. However, most of FDHs such as *Candida boidinii* and *Chaetomium thermophilum* have a homodimeric nature when they are catalytically active. Under certain experimental conditions, the subunit–subunit interactions may be weakened and the multimeric enzymes may tend to dissociate, producing their rapid inactivation.[1-4]

In this study, NAD^+-dependent FDHs from *Candida boidinii* (*Cb*FDH) was cloned and produced. After cell disruption and centrifugation process, the filtrate was used as crude FDH source. Then, *Cb*FDH was immobilized in polyvinyl alcohol and alginate hydrogels by encapsulation and on montmorillonite by adsorption to obtain more stable FDH preparations. The free and immobilized FDH preparations were characterized in terms of formate oxidation and CO_2-reducing activities.

All the free and immobilized FDHs showed their maximum activities at pH 8.0 and 50 °C in terms of formate oxidation activity. However, the both free FDH and FDH immobilized in polyvinyl alcohol hydrogel showed their maximum activities at pH 4.0 and 40 °C in terms of CO_2-reducing activity. Furthermore, FDH immobilized in polyvinyl alcohol hydrogel showed fairly higher activity than those of FDH immobilized in alginate hydrogel and FDH immobilized on montmorillonite.

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Polyhistidine Tag Effect on Solubility and Activity of *Chaetomium thermophilum* Formate Dehydrogenase (*Ct*FDH)

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Recombinant DNA methods are being widely used to express proteins in the form of fusion or chimeric proteins[1]. For large-scale purification of recombinant proteins, the affinity tags are generally preferred due to the specificity of the process and the relatively easy purification procedures. However, incorporating an affinity tag has also been reported to have a negative effect on the desired protein and result in a variation in protein conformation, undesired flexibility in structure studies, inhibition of enzyme activity, toxicity and alteration in biological activity[2]. Although His-tag engineering has been extensively performed for protein purification, the effect of His-tagging on different enzyme terminal regions has not been investigated well[3].

The aim of this study is to evaluate the effect of the N- and C-terminal Histidine tag on the solubility and activity of recombinant *Ct*FDH. Three recombinant *Ct*FDHs were expressed as soluble proteins in *E. coli* named as a N-, a C- and a N/C-terminus histidine tagged *Ct*FDH. The expression levels and activities of these three recombinant *Ct*FDHs were determined and compared with each other. As a result, the C- terminus His tagged *Ct*FDH has the highest specific activity when compared with N-terminus His tagged one and N/C- terminus his tagged CtFDH. Therefore, to add a polyhistidine tag at the C terminus of the CtFDH is favorable for solubility and higher efficiency as with other most of FDHs. An interference on N-terminal region of *Ct*FDH has an undesired effect on enzyme. These experimental results confirm the the significance of N termini for FDHs folding and activity[4].

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S-115

The Effects Of Some Medicine On The Carbonic Anhydrase I And II Enzyme Which Were Purified From Human Erythrocyte

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The carbonic anhydrase enzyme family reversibly catalyzes the carbon dioxide hydration and bicarbonate dehydration reactions in the living body. Carbonic anhydrides contain Zn^{+2} ions in active sites. This enzyme family, which has vital importance for living things, consists of 16 different isoenzymes.

In this study, purification of carbonic anhydrase I and II isoenzymes (HBcA I and HBcA II) from human blood by affinity chromatography. At the same time, on the purified HBcA I and II isoenzymes, the inhibitory effects of some of the active ingredients in humans on in vitro conditions were investigated for the first time. Based on the results obtained, HBcA I was 106.04 fold and HBcA II was 425.33 fold. Amikacin Sulfate and Feniramidol HCl all of the active ingredients had inhibitory effect on HBcA I, whereas Amikacin Sulfate active substance had effect on HBcA II. This suggests that each enzyme has its own kinetics and inhibitors have different effects on each enzyme.

In this study, human erythrocyte carbonic anhydrase I and II isoenzymes (hcbCA I and hcbCA II) were purified by affinity chromatography method. The inhibitor effect of the agent materials of some medicine that human use in daily life on CA I and II isoenzymes that we purified in *in-vitro* conditions has been investigated. At the end of inhibition studies all of the substances showed competitive inhibition.

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Antibacterial Activity of Wool Fabrics Treated With Different Azo Dyes

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Azo dye is one of the most significant chemical classes of organic compounds due to its various application areas including textile industry, lasers, electro-optical devices, biological-medical studies. Azo groups display a significant improvement in biological activity (such as antibacterial activities).[1-3] Main aim of this study is to evaluate antibacterial activity of wool fabric treated with different azo compounds against various bacterial (such as *Escherichia coli* and *Staphylococcus aureus*, etc.)

In this study, the antibacterial influence of different azo compounds was investigated on the wool fiber fabric. The structural morphology of wool fiber was evaluated using scanning electron microscopy (SEM). The antibacterial activities of different azo dyes were comprehensively compared which are depended on changing substituent, i.e. electron- withdrawing groups (such as: $-SO_3H$) and electron-donating groups (such as $-CH_3$). Before coating on surface of wool fabric, azo dye with SO_3H group at para position of aromatic ring showed a zone inhibition of 16 mm, whereas azo dye with $-CH_3$ moiety displayed a zone inhibition of 10 mm against *S.aureus*.

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S-117

Immobilization and characterization of *Rhizomucor miehei* lipase onto different supports

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Lipases (triacylglycerol hydrolases E.C. 3.1.1.3) are commonly used with biotechnology applications in most industries such as pharmaceutical, textile and food.[1] They hydrolyze triglycerides and also catalyze esterifications of glycerol and long chain fatty acids. Inter-esterification, alcoholysis, aminolysis and acidolysis are the other reactions of lipases.[2] Due to its wide range of applications and reaction diversity, Immobilization of lipases has been improved. Better recovery and reusability of the enzyme can be achieved by immobilization, which is particularly desirable for enzymatic processes involved in technologies with high economic impact.[3]

In this study we immobilized *Rhizomucor miehei* lipase (RML) onto Montmorillonite K-10 which is a neutral clay. Although Km value was 3,92 for the free enzyme the immobilized enzyme Km value was 0,224 because of the van der Waals interactions on the large surface area of the support. Also we used polyvinyl alcohol lenses (LentiKats) for RML immobilization. We demonstrated that the half life of the immobilized enzyme has 7.36 times greater than the free enzyme. We also studied other physical, chemical and kinetic properties for free enzyme and immobilized enzymes.

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S-118

Antimicrobial Activities of Some Bryophytes Selected From Several Districts Near Trabzon

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Many searchers represented that bryophyte extracts have cytotoxic, antimicrobial, insecticidal, antiviral, nematocidal effects. Several districts near Trabzon are considered for studies of bryophytes in their extensive flora because of ample rainfall lasting all year[1]. In the present study, the antimicrobial activities of *Plagiomnium cuspidatum* and *Rhizomnium punctatum* against some microorganisms were detected by two methods (agar well diffusion method and MIC techniques). Methanolic extracts of *Plagiomnium cuspidatum* (517,5 mg/mL) and *Rhizomnium punctatum* (435,1 mg/mL) were investigated antimicrobial activity aganist *Bacillus cereus, Staphylococcus epidermis* and *Staphylococcus aureus. Plagiomnium cuspidatum* with MIC value of 64,7 mg/ml showed best antibacterial activity *against Staphylococcus aureus.* Methanolic extract of *Rhizomnium punctatum* also possessed MIC value of 217,5 mg/mL against three different bacteria. The current study indicates that antimicrobial agent potential of *Plagiomnium cuspidatum* and *Rhizomnium punctatum* extracts should be investigated in more detail so human may be exploited them for in the future.

This work was financed by KTU-BAP (Project number is 7251).

KEY WORDS: Antimicrobial activity*, Plagiomnium cuspidatum*, *Rhizomnium punctatum,* Bryophtes, Trabzon

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Pellia epiphylla and *Polytrichum formosum* as Potential Sources of Antibacterial Agents

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The bryophytes, are a diverse group of land plants include the subgroups Bryophyta (mosses), Marchantiophyta (liverworts), and Anthocerotophyta (hornworts)[1]. It is reported that their secondary metabolites such as aromatics, phenolic compounds, and flavonoids are known to be toxic to bacteria and fungi[2]. This study was performed to determine the antibacterial activity of methanol extracts of *Pellia epiphylla* and *Polytrichum formosum* harvested from East Black Sea region against various microorganisms. The susceptibility of microbial strains to methanolic extracts of these bryophtes was determined using agar well diffusion method and MIC techniques.

Extract of *Pellia epiphylla* and *Polytrichum formosum* at the concentration of 233 mg/mL and 266,4 mg/mL, respectively, exhibited antimicrobial activity aganist *Staphylococcus aureus, Staphylococcus epidermis* and *Bacillus cereus. Pellia epiphylla showed the best antibacterial activity against Staphylococcus epidermis* (13,32±1.47 mm). In addition, the methanolic extract of *Pellia epiphylla* possessed the highest antibacterial activity against *Bacillus cereus* (MIC value of 1.8 mg/mL). *Polytrichum formosum* had the highest antibacterial activity against *Staphylococcus aureus* and *Staphylococcus epidermis* (MIC value of 33.3 mg/mL).

This short study highlight *Pellia epiphylla* and *Polytrichum formosum* as potential source for phytotherapeutic remedies and chemical products used in different fields of chemistry, pharmacology, biology and different branches of life sciences.

This work was financed by KTU-BAP (Project number is 7251).

KEY WORDS: *Pellia epiphylla, Polytrichum formosum,* Bryophtes, Antimicrobial activity, East Black Sea Region

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S-120

Production of Bioactive Peptides by Enzymatic Hydrolysis From Milk Proteins and Their Potential Use in Biological Processes.

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Bioactive peptides, which are inactive in the sequence of milk proteins, are released by digestive system enzymes during passage from the gastrointestinal tract or the hydrolysis of proteinase and peptidase enzymes secreted by lactic acid bacteria during the fermentation of the milk, and specific protein fragments that have a positive effect on human health[1-2]. The aim of this work is the enzymatic production of bioactive peptides using enzymatic hydrolysis from milk proteins and evaluation of their biological activities such as antioxidant/metal chelating, antimicrobial, deglycation, DPP-4, ACE inhibition and α-glucosidase inhibition[3-4], For this purpose defatted milk was precipitated by using various techniques and defatted milk, TCA and acetone precipitates were hydrolyzed by trypsin. The optimization of hydrolysis was performed by means of E/S versus time dependent hydrolysis degree (%). Furthermore the peptide hydrolysates were evaluated for their biological activities related with diabetes and its complications. The peptide profiles of protein hydrolysates were also examined by using thin layer chromatography (TLC). As a result, it was considered that peptide hydrolysates obtained from tryptic hydrolysis of milk proteins could be an important source for the production of bioactive peptides upon their purification and characterization.

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The Capper in Algeria: Determination of The Total Polyphenol Content of The Species *Capparis spinosa*. Ethanolic Extract.

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Capparis spinosa (Capparidaceae), dicotyledonous of the spermaphyte class, is a sustainable and woody plant, widely used in traditional medicine in the Mediterranean countries, including Algeria. The Caper is a spontaneous, xerophytic, heliophilic and medicinal species. It tolerates climatic constraints in arid and semi-arid zones and extreme temperatures [2]. In addition to its therapeutic virtues, it can have a very useful ecological role in these regions for protection against erosion [1].

We undertook a phytochemical study of the aerial part of *Capparis spinosa* L., and we have targeted a spectrophotometric analysis of phenolic compounds by developing a calibration range with gallic acid [3] after preparing an ethalonic extract from this plant [4].

The assay of the extract was carried out by a spectrophotometer.

The results showed a fairly high extract yield and a high concentration of total polyphenols.

Key Words: *Caparis spinosa*, ethalonic extract, phenolic compounds, assay, spectrophotometer.

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Biological properties of *Saponaria prostrata* subsp. *prostrata*

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The antioxidant activities of ethanol and water extracts of *Saponaria prostrata* were determined by different in vitro methods such as; DPPH, ABTS, FRAP and CUPRAC assays. The results were compared to BHA, BHT and ascorbic acid as standard antioxidant compounds. Both water and ethanol extracts presented moderate antioxidant potential activity.

Also, the antimicrobial activity of *Saponaria prostrata* was determined by the disc diffusion method. In this study, the highest antibacterial activity was observed against the *S. aureus* (13±0.81mm inhibition zone). The extract showed lower antibacterial activity against *B. megaterium, E. aerogenes* and *K. pneumonia*. However the extract did not show any antimicrobial activity against, *E. coli, P. aeroginosa, C. albicans, Y. lipolytica* and *S. cereviciae*.

In another step of this study, phenolic compounds of *S. prostrata* were identified by LC-MS/MS. Hesperidin and rutin, were found to be the most abundant compounds in the methanol extract of *S. prostrata*, among the twenty-seven compounds studied by LC–MS/MS. Also, smaller amounts of quinic acid, malic acid, protocatechuic acid, p-coumaric acid, hyperoside, kaempferol, quercetin, p-coumaric acid, apigenin, luteolin and rhamnetin were identified, quantitatively. In conclusion, leaves of *S. prostrata* have high potential of phenolic contents that mainly attributed with biological activities.

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The Inhibitory Effects Of Some Newly Synthesized 1,2,4 Triazole-5-one Derivatives On Carbonic Anhydrase-II Activity

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Carbonic anhydrase (CA) catalyzes the slow conversion reaction of carbon dioxide to bicarbonate and proton. It plays an important role in many physiological events in red blood cells and other parts of animals and plants. A few of these physiological events are pH balance, digestion, providing bicarbonate for enzymatic reactions and ion exchange between cells. Carbonic anhydrase inhibitors, which reduce production of intraocular fluid with a corresponding decrease in intraocular pressure (IOP), have been used as ocular hypotensive agents for the treatment of glaucoma. Besides, these inhibitors are also used for the treatment of common diseases such as epilepsy, cancer and obesity.

In this study, some 1,2,4 triazole derivative compounds were synthesized and the inhibition effects of these molecules on CA-II esterase activities were *in vitro* and *in silico* investigated. IC_{50} values as a marker of CA inhibitory potentials of the inhibitor candidate molecules were calculated for each of these molecules by using Inhibitor Concentration-Relative Activity% graphs. The lowest IC_{50} value at micromolar level (60.80 µM) was calculated in the presence of compound 7c. Kinetic studies showed that this molecule reversibly and uncompetitively inhibited CA-II activity. Molecular modeling studies also showed that the compound 7c could bind to the active site of the enzyme by performing weak interactions with Gln102, Leu240, Ala241 and Trp243.

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Peptide Based Antiglycating Agents From Various Plants

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Diabetes mellitus is one of the most common diseases in most of the developed countries. It can affect nearly every organ and system in the body. Hyperglycemia in diabetes causes non enzymatic glycation of proteins and leads to their structural and functional changes, resulting in diabetic complications like nephropathy, retinopathy, neuropathy, and angiopathy. Glycation of proteins starts with the formation of Shiff's base, followed by intermolecular rearrangement and conversion into Amadori products. Amadori products undergo cross linkage to form a heterogeneous protein-bound moieties, termed as advanced glycated end products (AGEs). They have been recently demonstrated to be linked to glucose auto-oxidative process and may influence the generation of oxygen free radicals. The formation of AGEs is not only linked to diabetes but also to several diseases like Alzheimer's and age related diseases. Among others deglycation process acting on Shiff bases (glycosylamines) which are the first products of the nonenzymatic glycation. The first step in this deglycation process occurs by transfer of the sugar moiety from the Shiff base to one of the low-molecular weight intracellular nucleophiles. Transglycating agents therefore reverse glycation in itsearly stages. Any agent capaple of doing this, if potent, would be very important for life-extension, since glycation in the body can only be slowed down but not stopped. A few such agents have been found but whether their role as transglycating agents is physiologically important remains to be determined. There are numerous publications describing the in vitro antiglycating affect of some peptides like glutathione, carnosine and its analogs, polyamines, thiols and thiolamines. Until now many efforts have been made to seek new AGE inhibitors, in particular those from natural sources without adverse effect[1-3]. In this work is to investigate peptide based antiglycation agents from various plants that inhibit AGEs formation. The IC50 values of soya, barley,almond and wheat peptide isolates wereestimated as 1.3, 6.8, 7.3 and 7.6 µg / ml, respectively. Inhibition of AGE formation at physiological conditions was tested with 2..5 µg/ mL oat isolate. After 7 days 57%, and 14 days 69% of inhibition of AGE formation was observed. Among all plant peptide isolates soya was found to be most efficient by means of antiglycating, antioxidant and metal chelatation activity.

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The Function of Thioredoxin and Thioredoxin-Binding Protein in Cancer

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Thioredoxin (TRX), a small redox-active multifunctional protein, plays pivotal roles in regulating cellular signaling pathways.[1] TRX also plays an important role in the scavenging of reactive oxygen species, inhibition of apoptosis, stimulation of cell proliferation and angiogenesis.[1-2] TRX interacts with apoptosis signal regulatory kinase-1 (ASK-1), one of the JNK / MAPK pathway proteins under normal conditions, thereby suppressing apoptosis.[3] The overexpression of TRX is seen in many human cancer. Antiapoptosis signaling by elevated TRX levels in cancer may leading to drug resistance in cancer therapy.[2-3] Thioredoxin-binding protein (TXNIP), the tumor suppressor protein, inhibits TRX in cancer cells, and so inhibited carcinoma cell proliferation and induced apoptosis by triggering mitochondrial-mediated ROS generation and activating JNK/MAPK pathways.[4] In recent years, targeted inhibition of TRX has been increasingly recognized as an important modulator of tumor development, so TRX/ TXNIP is a promising strategy for cancer treatment.[3-4]

Keywords: Thioredoxin, Thioredoxin-binding protein, JNK/MAPK pathways, Cancer

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Molecular Dynamics and Docking Simulations on the Formate Dehydrogenase Enzymes

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Nicotinamide adenine dinucleotide (NAD^+) dependent formate dehydrogenase (FDH) enzyme catalyzes oxidation of formate ion to carbon dioxide with the reduction of NAD^+ to NADH. According to reversible oxidation reaction, carbondioxide transforms into formate ion. Such property of FDH enzyme provides an opportunity to capture carbondioxide for industrial applications.

The ultimate aim is to design mutant forms of *Chaetomium thermophilum* FDH enzyme (*Ct*FDH) which will be used in further experimental studies to increase the binding affinity of carbon dioxide to its active site. However, the X-ray structure of *Ct*FDH is not available. Thus, the aim of this work is to obtain the homology model of *Ct*FDH and explore the ligand interactions with the active site residues applying molecular dynamics, docking and homology modeling tools. Gromacs 2016.3 software with the Gromos 54a7 force field and AutoDock Vina program were used for the simulations. Molecular docking studies of several ligands were applied to X-ray structure (pdb: 2GSD) of the moraxella FDH (*Mor*FDH) enzyme followed by relaxation of these structures by means of 40 ns Molecular Dynamics (MD) simulations to investigate ligand binding. 3-D homology model structure of the wild type *Ct*FDH[1] enzyme was generated from its data (*Ct*FDH, UniProt accession number: G0SGU4) by Swiss Model using X-ray structure of *Candida Boidinii* FDH (pdb:5DN9) as template. The homology model was then relaxed by 20 ns MD simulations in order to determine the non-covalent binding conformations and the binding affinity of the ligand. The effect of the active site positions on *Ct*FDH has been explored which helps to find the residues and interactions that are responsible for increasing the binding affinity of carbondioxide by this fungus.

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In vitro and *In silico* Investigation of Tyrosinase Inhibition By Some Novel Triazole Derivative Compounds Containing Fluoroquinolone Skeleton

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Tyrosinase enzyme has an important role in the biosynthesis of melanin pigment. Melanin pigment has useful duties such as preserving our skin from harmful ultraviolet rays and hindering the improvement of cancer illness[1]. Therefore, in case of melanin deficiency, various skin stains and some diseases occur in our body. Due to these reasons, new inhibitor molecules must be designated and synthesized to inhibit tyrosinase activity in order to treat certain diseases.

In the current study, firstly, Some novel molecules such as Ethyl *N*-pyridin-4-ylglycinate (18), 2-(pyridin-4-ylamino)acetohydrazide (19), *N*-ethyl-2-[(pyridin-4-ylamino)acetyl]hydrazinecarbothio-amide (20), 4-ethyl-5-[(pyridin-4-ylamino)methyl]-2,4-dihydro-3*H*-1,2,4-triazole-3-thione (21) were designated and synthesized. Then, mushroom tyrosinase inhibitory potential of these molecules have been examined. All inhibition studies were performed at pH 5.0 and 25 °C. Final enzyme and substarate (*L*-tyrosine) concentrations in the reaction mixture were adjusted as 30 µg/mL and 0.17 mM, respectively. Kojic acid was used as a reference standard inhibitor. Among the studied molecules, compound 21 was found to be the most effective inhibitor in terms of its IC_{50} values (at µM levels). The results of molecular docking studies are well consistent with that of inhibiton studies. Furthermore, results of molecular docking studies showed that molecule 21 could bind to the active site of the enzyme by weakly interacting with particularly HIS263, VAL283, ALA286 and ASN260 residues.

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S-132

Purification and Biochemical Characterization of A Novel Peroxidase: Kohlrabi Radish (*Brassica oleracea* L. Var Gongylodes)

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Plant peroxidases (PODs) (EC 1.11.1.7) catalyse the hydrogen peroxide-dependent oxidation of a wide variety of substrates, including phenol compounds. PODs are found in all cells and play a role in many critical biological processes, such as the host-defence mechanism.[1] Affinity chromatography is a separation method that depends on molecular conformation. 4-aminobenzohydrazide is a well-known POD inhibitor that inhibits the myeloperoxidase enzyme; therefore, 4-aminobenzohydrazide and 4-aminobenzohydrazide derivatives can be used as the ligands for plant POD purification.[2,3]

The study, the peroxidase enzyme was purified for the first time by affinity chromatography using the 4-aminobenzohydrazide molecule as a ligand from kohlrabi radish (*Brassica oleracea* L. Var Gongylodes). The purity of purified enzyme and molecular mass were determined by SDS-PAGE. The purification results and molecular mass of the peroxidase enzyme purified from kohlrabi radis were found to be 257.4 times with a yield of 35.7% and 58.2 kDa. Optimum pH, optimum ionic strength, optimum temperature, K_m and V_{max} values of guaiacol and H_2O_2 substrates were determined for purified kohlrabi radish POD. Finally, the inhibition parameters of the 4-aminobenzohydrazide molecule used as a ligand on purified POD were determined. IC_{50} value were found to be 507.1 µM. K_i value were calculated as 741.3±83 µM.

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Immobilization of *Burkholderia cepacia* Lipase for Improved Catalytic Properties

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Lipases are naturally designed to act at an oil-water interface, which makes them very compatible with organic solvents. These enzymes may act in different reaction media, recognize a wide variety of substrates and catalyze a large number of reactions, such as hydrolysis, esterifications, aminolysis, transesterification, interesterification and others. This reaction versatility make these enzymes very attractive for applications in a variety of industries such as food, pharmaceutical, detergent, leather, textile, cosmetic, and paper. *Burkholderia cepacia* lipase is an extracellular enzyme, and it is one of the most widely used biocatalysts in biotechnological processes. The extensive use of this lipase is due to its ability to recognize a wide variety of substrates, heat resistance, and tolerance to multiple solvents, including short-chain alcohols.[1]

Immobilization an effective way for altering enzyme catalytic properties and can address the issue of enzymatic instability. Some advantages of enzyme immobilization are employment of enzymes in different solvents, at extremes of pH and temperature. Furthermore, substrate-specificity, enantioselectivity and reactivity of the enzyme can be modified.[2] Cross-linked enzyme aggregates (CLEAs) have been proposed as an alternative to conventional immobilization on pre-existing solid supports.[3] The preparation of CLEAs involves the precipitation of the enzyme and subsequent chemical cross-linking of the protein aggregates. Physical aggregation of enzyme molecules into supermolecular structures can be induced, without perturbation of the original three-dimensional structure of the protein, by the addition of salts, organic solvents or nonionic polymers to an aqueous solution of the protein. These solid aggregates are held together by noncovalent bonding and readily collapse and redissolve when dispersed in an aqueous medium. It has been suggested that the chemical cross-linking of these physical aggregates produces cross-linked enzyme aggregates in which the reorganized superstructure of the aggregates and, hence, their activity is maintained.[4]

In this study microbial lipases from *Burkholderia cepacia* was immobilized by using the crosslinked enzyme aggregates technique. Optimal conditions were determined for immobilization process. In addition to the precipitant type and its ratio to be used in enzyme precipitation step, crosslinker concentration and crosslinking time were also determined. Furthermore, the effect of enzyme pre-treatment with additives on the activities of resulted CLEAs was investigated. Finally, the characterization studies were carried out for the immobilized enzyme that prepared optimum conditions.

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S-134

Immobilization of Bovine Serum Albumin on Pumice: Influence of Short Crosslinkers

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Pumice is natural porous silica based material and Turkey is one of the primary countries with regard to pumice deposit[1-2]. It has been used in building sector, textile, agricultural, cosmetics, chemistry applications and so on[2]. Silica based support materials provide a high degree of chemical, physical and biological resistance, high surface areas, easily modification with functional groups all of which are advantageous for protein immobilization[3].

In this study, pumice stone (210-400 µm) as a carrier and bovine serum albumin (BSA) as a model protein were used to show effect of short crosslinkers on protein binding. Pumice stones (PSs) were coated with 3-aminopropyltriethoxysilane (APTES) by silanization reaction (Sil). For activation of silanized pumice stones, glutaraldehyde (GA), terephtalaldehyde (TE), 1,4-phenylene diisocyanate (DIC), 1,4-phenylene diisothiocyanate (PDC), 1,3-phenylene diisothiocyanate (MDC) were used as a crosslinker. After activation with each of these crosslinkers, BSA was immobilized on these PSs for 3 h. The influence of immobilization time and protein concentration on covalent immobilization was studied.

Results showed that maximum binding of BSA was 170 µg for APTES coated PSs, 59 µg for PDC, 48 µg for MDC, 43 µg for TE. However, it was not observed BSA binding on PSs activated with GA and DIC after 3 h immobilization.

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S-135

Stinging Nettle Seed Effects on Some Cytokines in Rats Fed with High Fat Diet

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In this study, we aimed to investigate the effect of stinging nettle seed on some cytokines in rats fed with high fat diet.

32 rats were divided into 4 groups with 8 rats in each group; Control group, high-fat diet group (HFD), high-fat diet + stinging nettle seed group (HFDSNS) and stinging nettle seed (SNS) group. The feed containing high fat diet was prepared by mixing normal pellet (45%) with butter. HFDSNS and SNS groups were given orogastric gavage with the stinging nettle seed extract 300 mg / kg. At the end of the 10-week study, rats were sacrificed by cervical dislocation and blood was collected by intracardiac route. Serums of blood were separated. Serum IL-4, IL-6, IL-10 and TNF-α were studied by ELISA. endothelial nitric oxide synthase (eNOS) reactivity was examined as Immunohistochemically in liver tissue.

IL-10 and TNF levels were significantly higher in the HFD group than in the control group. TNF α and IL-10 levels were significantly lower in the HFDSNS group compared to the SNS group. eNOS immune-expression was observed in cynosoidal endothelial cells, Kuppfer cells / macrophages and vascular endothelial cells, whereas negative results were obtained in hepotocytes. The eNOS reactivity was found to be higher in the HFD group than in the control group.

SNS can be effective in preventing inflammation caused by HFD. Thus SNS can be a promising candidate for treatment of obesity.

Keywords: High fat diet, stinging nettle seed, cytokines

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Microalgae growth and lipid production in fizzy drink wastewater media

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The treatment of wastewaters when they are given back to nature plays an important role in the recovery of the wastewater if the existing water resources need to be protected. Microalgae have an economic precautionin treating wastewater due to adaptation to growth by consuming organic nutrients in wastewater and conducting photosynthesis. At the same time, this technology is also capable of producing biofuels as an alternative energy source in the form of biodiesel, bioethanol, and biogas. In this study, microalgae growth ,lipid productivity andnutrient removal in wastewater media was investigated. Before inoculation of microalgae, wastewater was centrifuged at 4000 rpm to remove the solid particles and was diluted with tap water in different ratios (0-40%). Wastewaters were inoculated with microalgaein 250 mL open flasks in a 200 rpm shaking incubator for a month at 27 ° C. After incubation maximum cell concentration (Xmax=1.03 gdw/L), growth rate (max=4.0 x10-3), doubling time (173 h) of the microalgae were reached in 40% diluted medium. Fat content (22%) and lipid productivity (1.32x10-3 g/L.d) were determined concurrently. It was determined that microalgae lipids were rich in oleic (C18:1 38%) and linolenic acid (C18:3 34%). The efficiency of COD treatment in the presence of microalgae had been almost 80%. This work is promising for future applications of the wastewater treatment plant and alternative energy facilities to work together.

Keywords: algae oil, biodiesel, chlorella, fizzy drink wastewater, lipid, microalgae

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The Effect of Iron on Thioredoxin System in Mouse Heart Tissue

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Iron is an essential nutrient for all living organisms that plays a significant role in many biological processes such as energy production, oxygen transportation, cell growth and proliferation, catalysis of essential reactions, DNA, RNA, and protein synthesis.[1] Therefore, iron homeostasis is firmly regulated by hepcidin hormone.[1] Although iron is an essential element for life, its excessive amount causes oxidative stress by increasing the production of reactive oxygen species (ROS) in the body that causes cardiovascular diseases, cancer, neurodegenerative diseases and thalassemia.[1-3] Thus, preventing oxidative stress by antioxidant mechanisms containing the thioredoxin system is indispensable for cell survival.[2-3] It is known that the disruption of iron homeostasis induces cardiovascular diseases, but this mechanism is still unclear.[3] In the present study, the effect of iron on thioredoxin system was investigated in detail at gene and protein levels in mouse heart tissues. For this purpose, 10 male BALB/c mice were divided into 2 groups. Control group was intraperitoneally injected with 0.5 mg of dextran 5 solution. In the treatment group, 5 mg iron dextran solution was intraperitoneally injected twice weekly for 3 weeks to form systemic iron loading. The quantitative iron content and the amount of glutathione (GSH), which is oxidative stress markers were spectroscopically measured. Then, the quantitative gene expression changes of hepcidin (Hamp), ferritin (Fth), and ferroportin (Fpn) genes responsible for iron homeostasis regulation and thioredoxin (Trx) and thioredoxin reductase (TrxR) genes from thioredoxin system were examined by Real Time PCR. The impact of the gene expression on quantitative protein expression was demonstrated by western blot. Moreover, the effect of iron overload on the function of thioredoxin reductase enzyme was spectroscopically examined. In conclusion, quantitative changes in the thioredoxin system, in which the antioxidant defense system against the oxidative stress that may occur in mouse heart tissue with iron overload, has been identified. This work was funded by a grant from Scientific Research Project of Ataturk University of Turkey (Grant Number: PRJ2016/151)

Keywords : Heart, Iron metabolism, Oxidative stress, Thioredoxin system

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Investigation of the Effect of Acute Inflammation on Hepatic and Renal Thioredoxin System in Mice

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Inflammation is a protective response of organisms to pathogens, damaged cells, tissue damage, physical, and chemical agents by means of vascular, humoral, and cellular reactions in immune systems. The inflammation process is divided into two groups as acute and chronic. Acute inflammation is the first and short-term response of the organism to physical and chemical agents or tissue damage. The severity and right duration of acute inflammation are important for the host response.[1] Chronic inflammation occurs as a result of prolonged and severe persistence of acute inflammation. Chronic inflammation induces intracellular stress by inducing reactive oxygen species (ROS). The increased amount of ROS is caused by the oxidative stress that triggers diabetes, cancer, obesity, aging, cardiovascular, and neurodegenerative diseases.[2] The organism uses antioxidant systems to tolerate oxidative stress and to provide cellular homeostasis.[3] The thioredoxin system consists of thioredoxin (TRX), NADPH, thioredoxin reductase (TRXR), and Thioredoxin interacting protein (TXNIP), an important antioxidant system required for cellular physiology and cell survival.[4] In this study, effects of acute inflammation on hepatic and renal thioredoxin system were investigated in mouse at gene and protein level. To show the formation of the inflammation pattern, quantitative gene expressions of interleukin-1 (IL-1) and interleukin-6 (IL-6) proinflammatory cytokines, which are considered to be inflammatory markers, were examined by Real Time PCR (qRT-PCR) in male mouse liver and kidney tissues obtained from control group and intraperitoneally injected with lipopolysaccharide (LPS) group. The levels of reduced glutathione (GSH) and oxidized glutathione (GSSG) metabolites, which are considered as oxidative stress markers, were spectroscopically investigated. The gene expression levels of the thioredoxin system components Trx and TrxR were investigated by qRT-PCR. The enzyme activities of TRXR were examined spectroscopically. Quantitative protein expressions of TRX and TXNIP were determined by western blot method. In conclusion, the hepatic and renal thioredoxin system in mice were affected at gene, protein, and activity levels in the case of acute inflammation. This work was funded by a grant from Scientific Research Project of Ataturk University of Turkey (Grant Number: PRJ2016/151)

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Extract of Mate Leaf (*Ilex paraguarisensis*) Effcets on Lipid Dropled Enzymes İn Rats Fed With High Fed Diet

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In this study, we aimed to investigate the effect of Mate leaf tea (Ilex paraguariensis) on lipolysis enzymes in rats fed with high fat diet (HFD).

The study was used 32 wistar albino rats. Rats were divided into four groups with 8 rats in each group. Control group (C), High fat diet (HFD) group; HFD+ Mate group and Mate group. While the control group was fed with standard pellet feed, HFD and HFD + mate group were fed with pellet feed prepared in 300 g / kg butter. HFD and HFD + mate groups were given Mate leaf tea with orogastric probe. At the end of the 8-week experiment, the blood samples were taken by intracardiac route. Serum insulin, lipoprotein lipase (LPL), adipose triglyceride lipase (ATGL) and perilipine were studied by ELISA. Immunohistochemical examination was performed for the presence of insulin in the pancreatic tissue.

ATGL levels were significantly higher in the HFD group than the control group, whereas the levels of perilipine were significantly lower. ATGL and insulin levels were significantly lower in the HFD+mate group than in the HFD group. There was no significant difference between the groups in terms of insulin immuno-expression.

Mate tea can prevent the development of obesity by affecting lipolysis enzymes

Keywords: High Fat Diet, Perilipin, ATGL, Lipoprotein Lipaz

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Polyphenol Oxidase Inhibitory Properties of Some Benzimidazolium Salts

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The metalloenzyme polyphenol oxidase (PPO, EC 1.14.18.1) is widely distributed in nature. PPO enzyme, sometimes called as catecholase, phenol oxidase, phenolase, catechol oxidase or tyrosinase, is considered to be an o-dipenol. PPO (EC 1.14.18.1), a multifunctional copper containing enzyme, is widely distributed in nature. Many inhibitors of PPO are known and some of these inhibitors are currently being used to prevent browning. The inhibitors used must be substances that can stop enzymatic browning in food, do not affect the quality of food and are non-toxic. Sulfites are a widely used PPO inhibitor, however, they are not allowed to use in the case of fresh, marketed and served vegetables and fruits. Benzimidazole is a heteroxyclic compound formed by the incorporation of imidazole and benzene rings. Benzimidazole derivatives have a wide range of applications and applications. Benzimidazole compounds are commonly used as carbon skeleton in N-heterocyclic carbene complexes and are used as ligands for the synthesis of metal complexes in a wide variety of structures.

In this study, the enzyme solution obtained from banana was applied to the affinity column (Sepharose 4B-tyrosine-p-aminobenzoicacid) (Arslan et al. 2004) to purify the enzyme. The purity of PPO from the affinity column was assessed by SDS polyacrylamide gel electrophoresis according to the method of Laemmli. Two benzimidazolium salts were used as an inhibitor of the pure enzyme. They all inhibited the enzyme. IC_{50} values of the compounds were found as micromolar levels.

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Prooxidant And Antioxidant Effect Of Root Extract Obtained From *Gypsophila bicolor* (Caryophyllaceae) In Lung And Epidermoid Cancer Cells

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Introduction: Between the natural herbal resources of our country economic value which is highest Çöven type is *Gypsophila bicolor* Grosh. (*G. bicolor*). It is grown in the vicinity of the Van region and is produced for commercial purposes. *G. bicolor* plant with a high content of triterpenoid saponin is used very commonly in the food industry. It is believed that using it not only in the food industry, but also in the health field will contribute to the therapeutic point of view.

Purpose: In this study, the antioxidant and prooxidant effects of the root extract obtained from *G. Bicolor* plant on the cell membrane of different lung cancer cells (H1299 and A549) and epidermoid carcinoma cells (A431) were investigated.

Material and method: The DPPH (2,2-diphenyl-1-picrylhydrazyl, free radicals) test revealed that the ethanol extract of *G. bicolor* roots had an antiradical effect. The cytotoxic, prooxidant and antioxidant effects of the root extract from *G. bicolor* on the cells were studied with the CellTiter-Blue® Viability Assay Kit.[1] Malondialdehyde levels, which are the result of membrane lipid peroxidation, were measured using a fluorescence spectrophotometer to reveal the protective and the damaging effect of the root extract on the cancer cells.[2]

Findings: IC_{50} values of *G. bicolor* root exctract were found to be 70, 200 and 60 µg/ml at 24 hours in A431, A549 and H1299 cells, respectively. IC50 values of hydrogen peroxide were found to be, 295, 400, 50 µg/ml at 24 hours in A431, A549 and H1299 cells, respectively. Cells pre-incubated with root extract were exposed to H_2O_2 for 24 hours. Root extract has been shown to protect cells against H_2O_2(IC_{50}) at low concentrations (A431= 5 µg/ml, A549= 5 µg/ml, H1299=10 µg/ml). In addition, the root extract applied on the cells at high concentrations (IC_{50}, IC_{70}) produced membrane damage and increased MDA (Malondealdehit) levels, a product of lipid peroxidation. On the other hand, before H_2O_2 (Hidrojenperoksit) administration, cells were preincubated with root extract at low concentrations which were protects, cells against H_2O_2-induced cytotoxicity and membrane damage. In addition, the antiradical effect of G. bicolor root extract was found to be close to α-tocopherol, ascorbic acid and BHT.

Results And Discussion: According to the findings, the cytotoxic effects of root excract on cell lines have been seen to increase due to dose. MDA levels increased in cells exposed to high concentrations of root excract. These results show that root excract had a prooxidant effect on the cells at high concentrations and antioxidant effect at low concentrations on the cancer cells. It has been shown that the H_2O_2-induced membrane damage is reduced in cells that have been pre-incubated with low concentrations of the root extract of this plant. This demonstrates the root excract had membrane protective property of root exctract on cells. The damaging effect of H_2O_2, a potent

oxidant, was eliminated in cells that were preincubated with *G. bicolor* root extract at low concentrations. This suggests that *G. bicolor* root extract has an antioxidant effect on the cancer cells.

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An Impidimetric Biosensor for A1AT Determination

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Acute Phase Proteins (AFP) is plasma proteins, which are synthesized during acute phase response, and are caused starting physiological changes. When a disease related to the serum level of AFP has occurred, the quantitative analysis of AFP is critical to diagnose the condition and to monitor the condition during treatment. α-1 antitrypsin (α-1 protease inhibitor) is one of the acute phase proteins[1]. (α-1 antitrypsin (A1AT) is synthesized in the liver and its main function is to protect the lungs from enzymes that have a destructive effect. Therefore, A1AT level in the blood is important. A decrease in the amount of A1AT leads to a variety of diseases such as lung emphysema, liver apoptosis, liver cancer, panniculitis, which can result in death[2,3]. This deficiency occurs as a result of mutations in the gene encoding the A1AT protein. The diagnosis of these diseases is of vital importance since there is no permanent treatment of A1AT deficiency in today's technology. Because individuals diagnosed should be able to live a life based on the level of A1AT deficiency. Thus, the person can survive for a much longer time and live a quality life. Also, A1AT has been proposed as an important biological marker in the very early stages of Alzheimer's Disease and liver cancer[4].

The aim of this study is to develop a strategy for design of impidimetric biosensor system, which is specific, cost-effective and easily applicable for the quantitative analysis of A1AT protein in serum. For this purpose, 500 ng/5µl of anti-A1AT antibody was immobilized onto gold electrode surface via covalent immobilization techniques by using mercaptododecanoic acid, EDC/NHS couple, PAMAM and glutaraldehyde. Biosensor responses were determined by using 500ng/5µL aliquots of AAT for 6 times. All immobilization steps were characterized by using cyclic voltammetry and electrochemical impedance spectroscopy.

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Inhibitory Effects of Some Novel Flavonoids on Glutathione S-Transferases

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Glutathione S-transferases (GSTs) (EC 2.5.1.18) are a superfamily of multifunctional xenobiotic metabolizing enzymes that play a crucial role in phase II, detoxification of chemical toxin, drugs, metal ions and carcinogenic metabolites. GSTs's inhibition or induction may significantly affect metabolism and biological effects.[1]

In this study *in vitro* effects of four newly synthesized flavonoids on the activity of purified glutathione S-transferase (GST) were evaluated. GST was purified using simple chromatographic methods including ammonium sulfate precipitation and Sepharose 4B-L-tyrozine-1-napthylamine hydrophobic interaction chromatography. The four novel flavonoids potently inhibited GST activity, with IC_{50} values for E9, E10, E11, and E12 of 30.6, 29.5, 12.4 and 28.7 micro molar, respectively.

Flavonoids are natural phenolic compounds, frequently found in fruits and vegetables. Diets rich in vegetables and fruits are protective against cardiovascular diseases, certain forms of cancer and other diseases. However, many problems may be associated with dietary supplement use, including potential adverse effects and flavonoid-drug interactions. Although reasonable consumptions of a flavonoids-rich diet (that may lead to GST induction) are mostly beneficial, the uncontrolled intake of high concentrations of flavonoids in dietary supplements (that may cause GST inhibition) may threaten human health.[1,2]

Keywords : Glutathione S-transferase, Inhibition, Flavonoids, Toxic Effects

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S-144

Enlighting Catalytic Mechanism of Ceriporiopsis Subvermispora (CsFDH) With Site Directed Mutagenesis

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Formate dehydrogenases (FDHs) are a set of enzymes that catalyze the oxidation of formate to carbon dioxide and concomitant reduction of NAD+ to NADH, as well as the corresponding reverse reactions. NAD+-dependent formate dehydrogenase (FDH) is a high-value-added enzyme due to its usage to produce NAD(P)H coenzyme required by oxidoreductases and very limited activity against CO2.

Although these enzymes have conserved amino acids positions forming catalytic site, they have almost different kinetic rates for the same substrate. FDH of Ceriporiopsis subvermispora (CsFDH, BAF98206.1) has shown lowest activity in the formate oxidation reaction compared to FDH of Ancylobacter aquaticus KNK607M (AaFDH, BAC65346.1), Moraxella sp. C-1 (MsFDH, CAA73696.1), Paracoccus sp. 12-A (PsFDH, BAB64941.1), Thiobacillus sp. KNK 65MA (TsFDH, BAC92737.1) and CbFDH (CAA09466.2).

Therefore, the most promising Ceriporiopsis subvermispora (CsFDH) could be a good candidate FDH to study catalytic mechanism for FDHs.

To enlighten catalytic site of CsFDH, it was aligned with well-known FDHs and non-aligned three positions were selected for mutation based on their relative proximity to the active site. Asparagine by Phenylalanine at position 312 (AsnCs312Phe), Valine by Proline at position 313 (ValCs313Pro), and Valine by Threonine at position 331 (ValCs331) were tested with site directed mutagenesis method.

The obtained experimental results showed that the selected positions contribute to form active site pocket. Computational molecular modelling will give idea about possible reasons of changing activity of CsFDH after mutations.

Keywords: Ceriporiopsis subvermispora (CsFDH), Catalytic site, Site directed mutagenesis, Computational molecular modelling.

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S-145

A Novel Diimine-Dioxime Molecule and its Dinuclear Cu(II) Complex as a Model for Catalase and Catechol Oxidase

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One of the most important factors in the development of coordination chemistry is the activity of Schiff bases, oximes and their complexes. For many years, numerous molecules with imine and oxime groups have been synthesized and their metal complexes have been obtained. In recent years, important activities of synthesized ligands and complexes in different areas have been examined. One of the important activities of synthesized ligands and metal complexes is enzyme-like activities. Since the isolation and purification of enzymes are costly and isolated from natural environment are not very stable, synthesis of compounds that exhibit enzyme-like properties is very important.[1]

In this study, a novel ligand 2-([1,1'-biphenyl]-4-yl)-2-((2-((1-([1,1'-biphenyl]-4-yl)-2-(hydroxyimino)ethylidene)amino)phenyl)imino)acetaldehyde oxime and its homodinuclear Cu(II) complex were synthesized starting from biphenyl. Synthesized molecules were characterized by ^{1}H- and ^{13}C-NMR, FT-IR, UV-vis, elemental analysis, ICP-OES, molar conductivity, magnetic moment measurements and thermal analyses. Spectroscopic and stoichiometric data of the synthesized metal complex indicated that the metal:ligand ratio was found to be 2:1. The data also revealed that the first Cu(II) ion was coordinated through imine and oxime nitrogen atoms, while the second Cu(II) ion was bound to oxime oxygen atoms. Furthermore, catalase and catecholase-like enzymatic activities of the complex were investigated by measuring the evolved dioxygen from the disproportionation reaction of hydrogen peroxide and following spectrophotometrically oxidation reaction of 3,5-di-*tert*-butylcatechol to 3,5-di-*tert*-butylquinone, respectively.[2] It is concluded that the synthesized complex has both the enzyme activity and the potential to be used as an enzyme-like molecule.

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S-146

Ketooxime Derivative as a Potential Antitumor Agent: Synthesis, Characterization, DFT and Molecular Docking Studies

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Since the second half of the twentieth century, researchers have focused on defining the relationship between molecular structure and biological effects of chemical compounds in order to reach new drug-active compounds. These new techniques have become increasingly important in the development of chemical compounds as a new drug-active substance, achieving more effective compounds, and defining the mechanisms of action. The importance of protein-ligand docking methods in drug design is indisputable. Molecular docking techniques are often used to investigate how drug or drug candidates and enzyme, nucleic acid, receptor proteins, generally defined as the target molecule, are compatible with each other in computer-aided rational drug design.

For this purpose, a novel ketooxime derivative containing 2-benzylaminoethanol in its structure was synthesized using a synthetic plan that took place in three steps. Novel ligand 2-([1,1'-biphenyl]-4-yl)-N-benzyl-N'-hydroxy-N-(hydroxymethyl)-2-oxoacetimidamide was characterized using elemental analysis ^{1}H- and ^{13}C-NMR, FT-IR and UV-vis techniques. The molecular structure, spectroscopic properties, frontier molecular orbitals and molecular electrostatic potential diagram of the ligand was also calculated by using DFT/B3LYP method with 6-311G(d,p) basis set in ground state. The calculated data were in a good agreement with experimental ones. Moreover, the inhibitory effects of the novel ligand to vascular endothelial growth factor (VEGFR-2) and cyclooxygenase-2 (COX-2) were examined by molecular docking (ligand–protein) simulations. Modelling was performed on SwissDock web server using EADock DSS algorithm. The full fitness score and binding affinity values revealed that the ligand can act as potential inhibitor against tumour growth.

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S-147

Preparation of a New Modified Carbon Paste Electrode with Hydrogen Peroxide Sensitive

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Introduction: Carbon paste electrodes are widely used in electro analysis owing to their low background current, wide potential window, chemical inertness, simple, and fast preparation from inexpensive materials. Carbon paste electrodes (CPE) can also be easily modified with electro catalysts or enzymes by means of simply mixing the modifier into the carbon paste matrix. In addition, the carbon paste electrode offers a renewable electrode surface[1]. Hydrogen peroxide is a product formed in many reactions catalyzed by some oxidase enzymes. Enzyme biosensors can be prepared by the oxidation of the enzymatically produced hydrogen peroxide[2,3]. Therefore, the electrodes to be sensitive to hydrogen peroxide is important in preparing the biosensors. In this study, a novel modified carbon paste electrode using the involves PAMAM-Sal-dendron sensitive to hydrogen peroxide, was prepared. For this purpose, firstly, this compound was synthesized. Then the optimal working conditions of the modified carbon paste electrode were determined.

Materials and Methods: PAMAM-Sal-dendron terminated dendrimer were prepared by reacting of PAMAM and *aldehyde (Sigma-Aldrich) in hot DMF (15 mL) (Fig.1). Modified carbon paste electrode was prepared by mixing graphite powder, nujol and* PAMAM-Sal-dendron*. Electric contacts were made by platinum wire. The electrochemical studies were carried out using an Epsilon EC electrochemical analyzer with a three-electrode cell. The working electrode was a carbon paste (diameter of 0.8 cm, length of 3cm glass-tubes) electrode. The auxiliary and reference electrodes were a Pt wire and Ag/AgCl electrode (3M KCl), respectively. The hydrogen peroxide sensitivity of the modified electrode is based on the oxidation of hydrogen peroxide to 0.4V vs. Ag/AgCl.*

Results: Synthesized compounds FT-IR and Uv-GB spectral analyses were observed at the expected value. In the spectra of PAMAM-Sal-dendron appearing bands at 1637 cm^{-1} are assigned to $u(C=N)_{imine\ group}$ stretching vibrations. UV-Vis spectra of PAMAM-Sal-dendron was taken in DMSO. The band observed in between 225-230 nm and 305 nm which may be considered to $\sigma \rightarrow \sigma^*$ and $\pi \rightarrow \pi^*$ transition for PAMAM-Sal-dendron, respectively. The modified carbon paste electrode was found to be sensitive to hydrogen peroxide. Optimum pH of modified carbon paste electrode was found to be 8.0. Linear working range at pH 8.0 of the electrode was $1.0x10^{-6}$–$1.0x10^{-3}$ M.

Conclusions: PAMAM-Sal-dendron was synthesized.

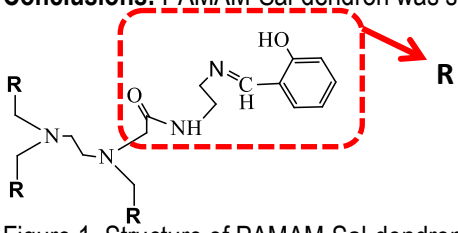

Figure 1. Structure of PAMAM-Sal-dendron

The structural characterizations of synthesized compounds were made by using the spectroscopic methods. The modified carbon paste electrode was found to be sensitive to hydrogen peroxide. With the prepared electrode, hydrogen peroxide can be determined in various samples. It can also be used to prepare biosensor with enzymes that produce hydrogen peroxide as a product.

Acknowledgements
The authors are grateful to the Research Foundation of Gazi University (05/201713), for supporting this study.

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S-148

In vitro Radical Scavenging Capacity and Total Phenolic Content of Blackthorn Leaves

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Natural antioxidants provide the protection of metabolism against to harmful effects of the free radicals and retard the process of chronic disorders.[1,2] And also they prevent the oxidative deterioration of lipids in foods due to their phenolic contents. Therefore there has been an increasing interest in natural antioxidants present in fruits, herbs, vegetables and spices. The antioxidant characteristics of plants can be attributed to their polyphenol contents. Polyphenols are products of secondary metabolism of plants including phenolic acids, flavanones, flavones, antocyanidine, isoflavones, tannins, and are synthesized in all parts of plants.[3] The presented study was aimed to evaluate the radical scavenging of extracts of blackthorn leaves and also to determinate its total phenolic, flavonoid and tannin contents.

The samples were obtained by extracting with ethanol and water from blackthorn leaves. The free radical scavenging capacities of the extracts were investigated using DPPH• and $ABTS^{\bullet+}$ radical scavenging methods.[4,5] The ethanol extract of blackthorn leaves showed good activity in neutralizing the both DPPH• and $ABTS^{\bullet+}$ free radicals. The total phenolic, flavonoid and tannin contents of extracts were determined as µg gallic acid equivalent, µg quercetin and catechine equivalents, and µg tannic acid equivalent, respectively. The observed radical scavenging capacity of the ethanolic extract may be related to its phenolic contents. Consequently, it can be suggested that ethanol extract of blackthorn leaves may be used as alternative antioxidant sources in various fields like food and food applications.

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S-149

Therapeutic Potential of Bee Venom in the Treatment of Testicular Cancer

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The present study aimed to evaluate the tumor growth inhibiting effects of bee venom in tumor cell cultures (*in vitro*). Growth inhibitory effect of bee venom administered in various concentrations (0, 2, 4, 8, 10 and 20 µg mL^{-1}) to human testicular germ cell tumor cell line (1618-K) was estimated by counting their viable cell number after 24 h of treatment. To investigate the cytotoxic effect of bee venom on 1618-K cells, MTT assay was performed. MTT assay revealed that 10 µg/ml bee venom cause an approximately 50% 1618-K cell death after 24hr. On the other hand, the same concentration of bee venom cause an approximately 5% human primary gingival fibroblast cell viability after 24hr. Overall, our findings suggest that bee venom at 10 µg/ml concentration can't be used for treatment of testicular cancer.

Key words: Bee venom, testicular cancer cell line, 1618-K, cytotoxicity

S-150

Purification and *In vitro* Investigation of the Effects of Some Compounds on Lactoperoxidase

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Lactoperoxidase enzyme (LPO; E.C.1.11.1.7) is a glicoprotein, present in mammalian milk, tear and saliva, which contains prostetic heme group. In this study, a new affinity gel was synthesized to purify bovine milk lactoperoxidase (LPO) enzyme. Ethylene diamine was bound to CNBr-activated Sepharose-4B matrix as a spacer-arm, and 4- isothiocyonate benzene sulfonamide which is an inhibitor of the enzyme was used as ligand.

The purity of the enzyme has been checked by SDS-PAGE and a single band has been detected. The kinetic constants of the enzyme (Km and Vmax) were determined by Lineweaver-Burk method. Km and Vmax values were determined to be 1,44 mM and 1000 U/mL.min, respectively.

We investigated the *in vitro* effects of Devamed, Diüril, Atrol-F, Taylomisin, Killoxacin and Geosol on the activity of LPO and IC_{50} values were determined. For the compounds the IC_{50} values were 0,052 mM, 0,066 mM, 0,089mM, 0,012 mM, 0,095mM and 0,012mM, respectively. All of the veterinary medicines inhibited the LPO enzyme.

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S-151

Determination Of The Optimum Conditions For Electrochemical Determination Of Guanine

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Guanine is a purine base found in the structure of DNA and RNA. Guanine is the easiest oxidizing agent in purine and pyrimidine bases. Therefore, when preparing many nucleic acid biosensors, the guanine oxidation signal is usually used[1,2]. For this reason, the determination of the environments where guanine is best determined has been important.

In this study, optimum conditions for electrochemical determination of guanine, which is a purine base, was investigated. For this purpose, glassy carbon electrode, gold, nickel, palladium, silver, platinum and pencil graphite electrodes were used as working electrodes. As support electrolyte, Tris, Britton-Robinson, Acetic acid / Acetate, Citrate, Ammonia / Ammonium chloride buffers, nitric acid, hydrochloric acid, potassium nitrate were used. For determination of guanine with square wave voltammetry (SWV) method, the pencil graphite electrode and 0.1 M pH 6 phosphate buffer were chosen as the most suitable working conditions among all working electrodes and support electrolyte. Limit of determination (LOD) and limit of quantity (LOQ) values were determined to be 0.1135 mM and 4.5 mM, respectively for guanine determination by pencil graphite electrode. The linear working range was found to be 0.698-979 mM. Guanine determination was carried out in synthetic and real samples.

S-152

Hepatoprotective effects of silymarin against thioacetamide-induced hepatic injury in rats

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Hepatic disease refers to the damage of cells, tissues, structure or liver function, and can be induced by biological agents and autoimmune diseases as well as the effect of different chemicals such as certain drugs, toxic compounds and excessive consumption of alcohol. Silymarin (SM) has been revealed to have anti-oxidative, anti-fibrotic and anti-inflammatory effects in experimental liver diseases. The aim of this study was to examine the protective effect of SM in thioacetamide (TAA)–induced liver injury in rats. Twenty-eight adult male rats were assigned into 4 groups (control, TAA, SM50+TAA and SM100+TAA). Liver injury was induced with 50 mg/kg/day intraperitoneal (i.p.) TAA for 14 days. To evaluate the protective effects of SM, the rats were pre-administrated with 50 and 100 mg/kg/day of SM orally for 14 days and then treated with i.p. 50 mg/kg/day TAA for additional 14 days. Histopathological and immunohistochemical (Bax, caspase3, TUNEL and Bcl-2) evaluations and miRNA analyses (miR-122, miR-192, miR-194) were performed in liver tissue. In hematoxylin-eosin staining, several degenerations including nuclear vacuolizations, haemorrhage, eodematous and inflammatory areas were observed in thioacetamid-treated group, while control group was normal with typical nucleus and cytoplasm. In 50 mg/kg SM co-treated group, still the similar degenerations were observed. However, in 100 mg/kg SM co-treated group, liver histology was similar to that of control group. TAA leaded to an increase in staining of Bax, caspase 3 and TUNEL and a decrease in staining of Bcl-2 when compared to control group. 50 mg/kg SM co-treatment did not alter the staining of Bax, caspase3, TUNEL and Bcl-2, whereas 100 mg/ml SM co-treatment changed the staining markedly when compared to TAA alone group. The amount of miR-192 and miR-194 decreased in all the groups when compared to the control group. Moreover, the amount of miR-122 was lower in SM 100+TAA group and higher in control group when compared to TAA group. In conclusion, high dose SM was effective in protecting against TAA-induced liver damage while low dose SM was not.

S-153

Urolithin B as a Simple, Selective, Fluorescent Probe for Sensing Iron(III) in Semi-Aqueous Solution

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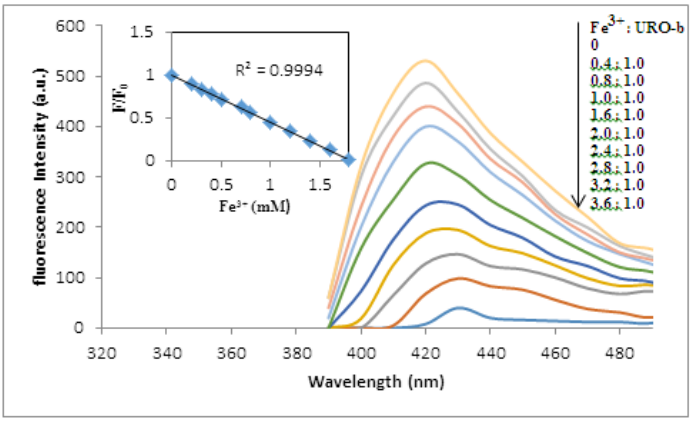
The development of simple, environmental friendly, and cheap reagents with metal binding properties are quite important not only for the treatment of environmental pollution but also for their application inmedicine[1]. In this study, we aimed to employ urolithin B (URO-b) to characterize its properties inmetal binding studies. URO-b is a fluorescent activemolecule and it shows an excellent quantum yield and large Stokes shift results in no overlap between the excitation and emission spectra [2]. Within this study, for the first time, we displayed a natural chromen analogue, Urolithin B, as a simple, selective, fluorescent iron (III) sensing probe. Following the synthesis and structure identification studies, the selective metal binding property of the compound was displayed employing fluorescence techniques. Accordingly, urolithin B has the capacity to coordinate selectively to iron (III) with a 3:2 stoichiometry[4].



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S-154

Synthesis of Magnetic *p*-Sulphocalix[8]arene Octacarboxylic Acid Derivative and Its Use In Lipase Immobilization

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Calix[n]arenes synthesized by activation of phenol formaldehyde under appropriate conditions, have been subject to many research because of having ring structure which easily and limitless functioned from either phenolic-o-position or p-positions. Since calix[n]arenes has basket structure, they have been used to carry many ions and molecules. In recent years it has been observed that calixarenes could be used to carrier of amino acid, protein and enzymes.[1] The main problem in this kind of molecular carrier studies is the separation process. In previous studies, magnetic calixarene derivatives have been used for enzyme immobilization.[2-4]

In this study, *p*-sulphocalix[8]arene derivatives containing carboxylic acid were prepared according to suitable procedure and these derivatives were immobilized onto magnetic iron oxide nanoparticles for lipase immobilization. The structure of the synthesized compounds and magnetic nanoparticles were identified by spectroscopic (FTIR, NMR) and other techniques (TGA, TEM, SEM). Parameters such as optimum temperature, pH, thermal stability and reusability of the immobilized enzymes were investigated.

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S-155

Cytotoxic Effects of a 1,2,4-triazole-3-one derivative complex in Human Melanoma Cells

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Backround/Aim: Malignant melanoma is an aggressive disease and its incidence is increasing faster than other cancers in the world. Current therapeutic approaches include surgical resection, chemotherapy, photodynamic therapy, and immunotherapy. Chemotherapy is one of the most used treatment strategies in melanoma along with radiotherapy and photodynamic therapy. However, there are many disadvantages of chemotherapy, among which, drug resistance in cancer cells and toxicity in the normal cells are more common. New pharmacological approaches are therefore needed to overcome these problems. Melanogenesis is mainly regulated by tyrosinase enzyme and the inhibition of tyrosinase is the most common approach to treat melanoma. It is reported that 1,2,4-triazole derivative complexes have *in vitro* tyrosinase inhibitor activity. The aim of this study was to determine the cytotoxic effect of a novel 1,2,4-triazole derivative complex (its tyrosinase inhibitory effect was previously shown) in human melanoma cells.

Materials and Method: Melanoma cells were treated different concentrations (1.95-500 µM) of the complex for 24 h and the cytotoxicity was determined using MTT assay. Cisplatin and kojic acid were used as a reference chemotherapeutic drug and a reference tyrosinase inhibitor in the cytotoxicity studies, respectively.

Results: All three compounds showed a dose-dependent cytotoxic effect in melanoma cells. The IC_{50} values were calculated as 16.8 µM and 8.02 µM for complex and cisplatin respectively.
Conclusion: Together these findings suggest that complex may be an effective chemotherapeutic drug in the treatment of melanoma. Further studies are now necessary to obtain a more detailed understanding of the exact interaction of the signaling pathways involved.

Key words: Cisplatin, Complex, Cytotoxicity, Kojic acid, Melanoma cell

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Cytotoxic Effects of Ethanol and Dimethyl Sulfoxide on Human Melanoma Cells

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Backround/Aim: Cell culture systems are widely used to investigate the in vitro effects of drug candidate molecules and natural products. Mainly, experiments with cell culture systems are usually carried out in growth media. Since most of these candidate molecules are water-insoluble, solvents are often used in cell-based assays. Ethanol and dimethyl sulfoxide (DMSO) are the most commonly used solvents for this purpose. Although the cytotoxic effect of ethanol and DMSO at different concentrations in various cell lines was demonstrated, there is no report about the cytotoxic effect of these solvents on human melanoma cell lines. In this study, it was aimed to determine the cytotoxic effect of ethanol and DMSO on human melanoma cell line.

Materials and Method: Melanoma cells were treated with different concentrations (0.1%, 0.2%, 0.4%, 0.6%, 0.8%, 1%, 2% and 4% v/v) of ethanol and DMSO for 24 h. To evaluate the cytotoxic effect of ethanol and DMSO on the human melanoma cells, MTT colorimetric assay, a widely used and validated cytotoxicity test, was applied.

Results: According to the obtained results, the cytotoxicity increased significantly with increasing the concentration of ethanol and DMSO compared to that of the control group. The IC_{50} values of ethanol and DMSO were calculated as 1.77 and 1.21 (v/v, %), respectively.

Conclusion: It could be concluded that ethanol and DMSO at the concentrations < 0.4 (v/v, %) might be compatible solvent vehicles towards the melanoma cells. We think that the current study observations are important when selecting an appropriate ethanol and DMSO concentration in cell-based studies for melanoma cell lines.

Key words: Cytotoxicity, Dimethyl sulfoxide, Ethanol, Melanoma cell

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Preparation and Characterization of Horse Radish Peroxidase-Zn^{2+} Hybrid Nanoflowers

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As we know, divalent metal cations such as Zn^{2+}, Cu^{2+} and Ca^{2+} are often associated with the catalytic or regulatory activities of proteins.[1] They can form complexes with these metal ions because of their strong affinity. Interaction between the proteins and metal ions allows the formation of hybrid structures with flower-like shapes (hybrid nanoflowers) under certain conditions. In the literature, there are lots of reports about protein-inorganic hybrid nanoflowers.[2-5] Most of these studies focused on protein-Cu^{2+} hybrid nanoflowers. It is known that, the selection of biomolecules and its corresponding metal ions plays a important role in formation of hybrid nanoflowers.[3] And different metal ions can form hybrid nanoflowers of the same biomolecules with different functional properties. The composition and morphology of the enzyme-inorganic hybrid nanoflowers strongly dependent on the incubation time, precursors concentration and synthesis pH.

In this study, using Zn^{2+} ions, unlike Cu^{2+}, hierarchical fowerlike horse radish peroxidase-Zn^{2+} (HRP-Zn^{2+}) hybrids were synthesized according to published methods,[3-5] with slight modifications. Than the synthesised HRP-Zn^{2+} hybrid nanoflowers were characterized using some techniques (SEM, EDX, XRD etc.).

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Enzyme Mimic Properties of His-Zn^{2+} Hybrid Nanoflowers

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Metals are important for the activity of some biomolecules.[1] They are constituents of many metalloproteins, in which they have either catalytic or structural functions. Protein molecules can form complexes with some metal ions because of their strong affinity. They can bind specifically to the metal ion coordination sites through certain amino acid residues like histidine exposed on the protein surface. Interaction between the proteins (and also aminoacids) and some metal ions allows the formation of hybrid structures with flower-like shapes (organic-inorganic hybrid nanoflower) under certain conditions.[2-5]

In this work, we synthesized flower-like organic-inorganic hybrid structure (His-Zn^{2+} hybrid nanoflowers) using histidine aminoacid as organic component and Zn^{2+} ions as inorganic component. Some important features of these hybrid nanoflowers were studied as a function of synthesis conditions. For this purpose, SEM, FTIR, EDX and XRD analysis were performed. And, the peroxidase like activity of the synthesized His-Zn^{2+} hybrid nanoflowers was determined.

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Non-Covalent Immobilization of *Bacillus Pumilus* Y7 Alkaline Protease on Bentonite with Kinetic and Thermodymanic Properties

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Proteases are enzymes that catalyse the peptide bonds in proteins. They are widely found in nature. They are isolated from plant, animal and microbial sources. In this study, non-covalent immobilization of alkaline protease enzyme from *Bacillus pumilus* Y7 with bentonite was performed. Kinetic and thermodynamic parameters of free enzyme and immobilized enzyme have been studied. The molecular weight of the enzyme was found 15 kDa by SDS-PAGE analysis and was also supported by native-PAGE and zymogram analysis. Optimum pH for free enzyme and immobilized enzyme were 10.0 and 6.0, respectively and optimum temperatures were determined for free enzyme and immobilized enzyme 35 °C and 32 °C, respectively. The Arrhenius activation energies (E_a) were calculated as 15.28 kJ/mole and 102.4 kJ/mole for the free enzyme and the immobilized enzyme, respectively. The Michaelis-Menten constant (K_m) and the maximum velocity (V_m) at pH 8, 30 °C for the free enzyme were 6.05×10^{-6} M and 20.16 U/mL/min respectively, and for the immobilized enzyme 27.3×10^{-6} M and 34.13 U/mL/min, respectively. The turnover number (k_{cat}) and catalytic performance (k_{cat} / K_m) of the enzymes were found to be 24.39 min^{-1} and $4x10^6$ min^{-1} for the free enzyme, 180.4 min^{-1} and $6.6x10^6$ min^{-1} for the immobilized enzyme in order[1]. Thermodynamic parameters of free enzyme were calculated as; $\Delta G^{\#}$: 66.21 kJ/mole; $\Delta G^{\#}_{E\text{-}T}$: -38.31 kJ/mole; $\Delta G^{\#}_{ES}$: - 30.27 kJ/mole; $\Delta H^{\#}$: 13.3 kJ/mole; $\Delta S^{\#}$: -0.17 kJ/moleK and the thermodynamic parameters of immobilized enzyme were calculated as $\Delta G^{\#}$: 61.15 kJ/mole; $\Delta G^{\#}_{E\text{-}T}$: -56.22 kJ/mole; $\Delta G^{\#}_{ES}$: -26.45 kJ/mole; $\Delta H^{\#}$: 99.52 kJ/mole; $\Delta S^{\#}$: 0.12 kJ/moleK[2,3].

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S-160

Understanding of Iron Efflux Mechanism by Genetically Designed Hephaestin in Different Cell Lines

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Iron is an essential nutrient because it is a central part of haemoglobin, which carries oxygen in the blood, and of other essential proteins, which makes it more precious than gold in our life. Multicopper ferroxidases (MCFs) are known to play key roles in iron nutrition, efflux and homeostasis in organisms ranging from yeast to humans[1]. Knowledge of the synthesis, distribution and regulation of hephaestin protein will help to understand its role in cellular iron efflux [2,3].

The aims of the work described here were to synthesize high levels of biologically active recombinant hephaestin for structure / function studies using as a model, the published 3-D structure of ceruloplasmin and to study expression of active recombinant soluble hephaestin. The construction of tagged fusion proteins, Hp_{sec}-GFP (Hp_{sec}-GFP, a secretory form of hephaestin tagged to GFP) and Hp_{sec}-GFP (HIS_6 tagged to secretory hephaestin) and their expression in COS, CHO cell lines, confirmed with western blot analysis. In this study attempts were made to produce biologically active hephaestin and show an activity using both gel and solution based oxidase assays. In addition, HIS tagged hephaestin was also generated in an attempt to purify large quantity of the protein for further biophysical and functional characterisation. The immunoprecipitated recombinant hephaestin protein (Hp_{sec}-GFP) expressed in cultured COS and CHO cells was shown to possess oxidase activity using an 'in gel' assay with the substrate o-oxylamine or phenylenediamine.

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S-161

Starch Production By Using Yeast

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Starch is the main product of photosynthesis and its the most dominant reserve polysaccaride that stored in photosynthetic and non-photosynthetic tissues. Starch is a staple food in human and animal diets, but also a raw material widely used for industrial purposes, such as food, paper and textile.

Due to global warming, it is thought that the world will gradually become deserted and agricultural areas will decrease. therefore, laternative food sources are sought.

In this study, regardless of the climatic conditions, the capacity of producing starch by several new yeast culture isolated from tea was determined. *Cryptococcus humicolus* HTM1 strain and *Cryptococcus laurenti* HTM7 strain were used for starch production. In order to determine the starch production capacity of these yeast strains, producing of starch were followed for 6 days using glucose, fructose, sucrose and maltose. In addition, by changing the pH, the medium which they could produce the highest starch was determined. HTM1 yeast strain produced the highest starch amount in medium containing of glucose, fructose and sucrose, while HTM7 strain produced in maltose medium. HTM1 yeast strain in the glucose and sucrose medium on 5th day, in the fructose medium on 6th day, HTM7 yeast strain in the maltose medium on 5th day, the highest level of the producing of starch were observed. It was found that the highest starch level was produced by HTM1 strain at pH 8 for glucose and fructose media, at pH 7 for sucrose medium and by HTM7 strain at pH 7 for maltose medium.

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PURIFICATION OF POLYPHENOL OXIDASE FROM CANCUR PLUM (*Prunus domestica* L.)

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Polyphenol oxidases (PPO), are copper-containing metalloenzymes, catalyzes the hydroxylation of monophenols to o-diphenols and the oxidation of o-diphenols to o-quinones in the presence of oxygen. In this study, PFO was purified from Cancur plums (*Prunus domestica* L.), collected from Ardahan, Turkey, using Sepharose-4B-L-tyrosine-p-aminobenzoic acid affinity gel. The PPO was characterized with natural and SDS-polyacrylamide gel electrophoresis, and in terms of biochemical properties. It was determined to have two isoenzymes by electrophoresis chromatogram of Cancur plum PPO. It was detected that the enzyme showed the highest activity at between 30-40 °C and pH 5.0-7.0 in the presence of L-tyrosine, 3,4-dihydroxyhydrocinnamic acid (DHHCA), 3,4-dihydroxyphenylpropanoic acid (DHPPA), p-coumaric acid, catechol and 4-methyl catechol substrates. Cancur PPO has a monophenolase and a diphenolase activity and is the interested in the catechol substrate, follow by 4-methyl catechol, DHHCA, L-tyrosine, DHPPA, p-coumaric acid substrates. It was found that The PPO was inhibited with ascorbic acid, sodium metabisulfite, benzoic acid and sodium azide in the presence of 4-methyl catechol as a substrate.