



**ANKARA UNIVERSITY
FACULTY OF PHARMACY**



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S** **13th** **International
SYMPOSIUM ON
PHARMACEUTICAL
SCIENCES**

Book of Abstracts

**JUNE 22-25, 2021
ANKARA, TURKEY**





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Dear Participants and Guests,

I would like to express my sincere appreciation for the valuable contributions of all the participants of 13th International Symposium on Pharmaceutical Sciences (ISOPS). As we all know, the COVID-19 pandemic is still ongoing and the vaccination programmes are proceeding throughout the world. However, during 2021 we continue to face travel bans, governmental and contract restrictions in many countries. Therefore, the symposium was organized as a virtual event for the first time in its history.

ISOPS, initiated in 1989, has successfully brought international scientists, researchers, students together from pharmaceutical sciences and related areas. This symposium was organized biannually until 1997 and then every three years.

Ankara University, Faculty of Pharmacy is the first faculty of pharmacy in Turkey and was established in nineteen sixty (1960). Since the establishment, the institution rapidly progressed and now has very advanced scientific and physical infrastructure. Pharmaceutical science refers to a category of scientific fields and has followed important development processes, mainly in line with the developments in Biotechnology, Nanotechnology and Health Technologies, which are among the priority of the technology fields of today. While realizing the modern requirements, our Faculty has a 5-year undergraduate education programme since 2005 and besides Turkish; it provides an instruction programme in English language since 2015. Our faculty has 6689 graduates since its establishment and the current number of students is 1267. Present educational and scientific resources allow a total of 138 faculty members, 45 professors, 22 associate professors, 5 assistant professors, 51 research assistants in our faculty. Moreover, 66 administrative staff members and other personnel are working at different offices.

The mission of 13th International Symposium of Pharmaceutical Sciences was to perform a broad scientific perspective by the invitation of distinguished scientists having national / international reputation in their areas, so most recent advances were discussed interactively, and to empower the knowledge-based drug research development and multidisciplinary collaborations. It was our intention to make this symposium a memorable event.

This year, scientists from 24 countries registered to ISOPS-13. Our programme consisted of 40 plenary lectures, 212 oral and 200 poster presentations. Excellent research works were presented in different sessions. The speakers in the programme were uniquely placed in accordance to their area of expertise.

I would like to refer also to other initiatives that took place in our symposium. A workshop on “Employability of the Graduates of the Faculty of Pharmacy in Europe” was held with the contribution of Prof. Luciano Saso, Prof. Claire Anderson, Prof. Lilian M. Azzopardi, Prof. Sibel Süzen, Prof. İlkay Erdogan Orhan and Pharm. Nilhan Uzman. This workshop was interesting in terms of discussing the priorities and developments on this topic from local, regional and international respects.

On June 25, our panel on “University-industry-public sector cooperation in drug and vaccine development processes” was carried out by Prof. Dr. Asuman BOZKIR. The heads and *senior representatives of relevant institutions* including; Prof. Hasan Mandal, Assoc. Prof. Tolga Karakan, Pharm. Dr. Nihan Burul Bozkurt, Prof. Erhan Akdoğan, Assoc. Prof. Rabia Çakır Koç, Prof. Mayda Gürsel, Prof. Rana Sanyal, Prof. Hülya Ayar Kayalı, Dr. Süha Taşpolatoğlu, Dr. Hasan Ersin Zeytin, and Pharm. Dr. Ferhat Farşi were with us. This event has been a great platform to discuss the existing practices and requirements, and to propose solutions.

On behalf of the Organizing Committee, I would like to mention my gratitude to the President of Ankara University who gave full support for the Symposium Organization. ISOPS-13 was organized successfully, without any professional support, with the contribution of all our faculty members, especially our symposium secretary Assoc. Prof. Zerrin Sezgin-Bayındır. I congratulate the organizing committee and all the other committees with all my heart, as well as all academic and managing personnel because of their extensive work.

Prof. Dr. Asuman BOZKIR

Chair of ISOPS-13

Honory President of the Symposium

Prof. Dr. Necdet ÜNÜVAR

President of Ankara University

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CONTENTS

PL1:	DUAL BENEFITS OF MELATONIN ANALOGUES AS AROMATASE INHIBITORS AND OXIDATIVE STRESS MODULATORS IN BREAST CANCER	2
	<i>¹Suzen, S., ²Shirinzadeh, H., ¹Öztürk-Ceylan Ö., ³İnce-Ergüç E., BR.,⁴Taşcıoğlu-Aliyev A., ⁴Entezari B., ⁵Akdemir, A., ⁴Gurer-Orhan H.</i>	
PL2:	MACHINE LEARNING MODELS FOR PREDICTING DRUG SYNERGY AND SIDE EFFECTS.....	2
	<i>Çiçek, E.</i>	
PL3:	THE ERA OF MRNA VACCINES.....	2
	<i>Diken, M.</i>	
PL4:	CYCLODEXTRIN POLYMER COATINGS FOR DRUG DELIVERY: FROM NANOPARTICLES TO HYDROGELS	3
	<i>Amiel, C.</i>	
PL5:	MESOPOROUS SILICA FOR ADVANCED DRUG DELIVERY APPLICATIONS	3
	<i>Rosenholm, JM.</i>	
PL6:	NOVEL DRUG TARGETING FOR LOCALIZED-DIRECT TREATMENT OF LUNG DISEASES	4
	<i>Yıldız-Peköz, A.</i>	
PL7:	MODULATION OF OXIDATIVE STRESS AS A PHARMACOLOGICAL STRATEGY.....	4
	<i>Saso, L.</i>	
PL8:	MODULATION OF BETA ADRENERGIC SYSTEM FOR EXACERBATED INFLAMMATION.....	5
	<i>Ibanez, B.</i>	
PL9:	DRUG DESIGN AND BIOLOGICAL ACTIVITY OF COMPOUNDS TARGETING HUMAN AND/OR PATHOGENIC PROTEASES	5
	<i>Micale, N.</i>	
PL10:	DESENSITIZATION OF β_3 -ADRENOCEPTORS: COMPARISON OF cAMP AND BIASED SIGNALING	5
	<i>Okeke, K., Michel-Reher, M. B., Michel, M. C.</i>	
PL11:	GRK2 INHIBITION FOR HEART FAILURE - NEARING TRANSLATION	6
	<i>Koch, WJ.</i>	
PL12:	NANOBIOSENSORS FOR POINT-OF-CARE DIAGNOSTICS APPLICATIONS.....	6
	<i>Merkoçi, A.</i>	
PL13:	BUILDING NEW ANALYTICAL PLATFORMS BASED ON CARBON NANOMATERIALS FOR BIOMARKERS BIOSENSING	7
	<i>Rivas, G.</i>	
PL14:	VACCINE DESIGN AND INNATE IMMUNE NETWORK.....	7
	<i>Engin, ED.</i>	
PL15:	TARGETED NANOPARTICLES FOR BRAIN DELIVERY OF DRUGS.....	8
	<i>¹Mészáros, M.,^{1,2}Porkoláb, G., ¹Szecskó, A., ¹Veszélka, S., ¹Deli, M.A.</i>	
PL16:	USE OF MAGNETIC-INDUCED HYPERTHERMIA FOR CANCER TREATMENT	8
	<i>Carvalho, F.</i>	
PL17:	PROGRESS AND TRENDS IN POTENTIAL UTILIZATION OF NATURAL COMPOUNDS AS DRUGS PRENYLATED PHENOLICS.....	8
	<i>¹Šmejkal, K., ²Mašek J.</i>	
PL18:	THE ROLE OF CHITOSAN-COLLAGEN BINDING IN DRUG TARGETING TO FIBROTIC DISEASES	9
	<i>Tammam, S.</i>	

PL19:	IN VITRO TOPICAL TOXICITY TESTING OF MEDICAL DEVICES IN LINE WITH THE NEW ISO 10993-23	10
	<i>Kandarova, H.</i>	
PL20:	PLANT CHEMOPHENETIC STUDIES FROM ASTERACEAE TO ZOSTERACEAE	10
	<i>Zidorn, C.</i>	
PL21:	THE IMPORTANCE OF BIOMONITORING OF GENOTOXICITY BIOMARKERS IN OCCUPATIONAL SETTINGS.....	10
	<i>Başaran, N.</i>	
PL22:	TOWARD MULTIOMICS BIOELECTROANALYTICAL PROFILING FOR PERSONALIZED MEDICINE.....	11
	¹ Campuzano, S., ² Barderas, R., ¹ Povedano, E., ¹ Torrente-Rodríguez, R.M., ¹ Gamella, M., ² Montero-Calle, A., ² Solís-Fernández, G., ¹ Pedrero, M., ¹ Pingarrón. J.M.	
PL23:	PRE-CONCENTRATION AND SELECTIVE ADSORPTION OF PLANT SECONDARY METABOLITES BY SOLID SORBENTS.....	11
	<i>Epifano, F.</i>	
PL24:	HYDROGEN SULFIDE PATHWAY ROLE IN CARDIOVASCULAR SYSTEM: A POTENTIAL THERAPEUTIC TARGET	12
	<i>Sorrentino, R.</i>	
PL25:	ENANTIOSELECTIVE LIQUID CHROMATOGRAPHY IN A TRANSLATIONAL CHEMISTRY PERSPECTIVE.....	13
	<i>Sardella, R.</i>	
PL26:	CANNABINOIDS AGAINST CISPLATIN NEUROTOXICITY	13
	<i>Erol, K.</i>	
PL27:	MICROSAMPLING IN BIOANALYSIS: NEW CHALLENGES AND PERSPECTIVES ...	14
	<i>Mercolini, L.</i>	
PL28:	TOWARD PHARMACOLOGICAL MODULATION OF SERCA FUNCTION: WHY AND HOW.....	14
	<i>Zaza, A.</i>	
PL29:	THE IN VITRO ANTIMICROBIAL-ACTIVITY APPROACH AGAINST MDR BACTERIA USING METAL/METAL-OXIDE NANOPARTICLES	15
	¹ Kosalec, I., ² Vukoja, D., ¹ Rak, J., ³ Rezić, I., ⁴ Vlainić, J.	
PL30:	STRATEGIES FOR RE-DISCOVERY OF CNS DRUGS FROM AFRICAN PLANTS	16
	<i>Adejare, A.</i>	
PL31:	INHIBITION OF NUCLEOSIDE DIPHOSPHATE KINASES AS A NOVEL THERAPEUTIC OPTION IN THE TREATMENT OF CARDIOVASCULAR DISEASES	16
	<i>Wieland, T.</i>	
PL32:	BACTERIOPHAGE THERAPY: PAST, PRESENT, FUTURE	17
	<i>Chanishvili, N.</i>	
PL33:	DRUG-INDUCED HYPERSENSITIVITY: OPPORTUNITIES TO EXPAND NON-ANIMAL MODEL FOR THE IDENTIFICATION OF SENSITIZATION TO DRUGS	17
	<i>Corsini, E.</i>	
PL34:	POSITIVE OR NEGATIVE EFFECTS OF RECREATIONAL SCUBA DIVING - CAN WE ADAPT TO A CHALLENGING ENVIRONMENT?.....	17
	<i>Dumic, J.</i>	

PL35:	DEVELOPING, IMPLEMENTING AND EVALUATING ADVANCED PHARMACY SERVICES WORKING WITH PRACTITIONERS AND POLICY MAKERS	18
	<i>Anderson, C.</i>	
PL36:	POTENTIAL MECHANISMS UNDERLYING THE PROTECTIVE EFFECTS OF ANTHOCYANINS IN METABOLIC SYNDROME AND RELATED DISORDERS.....	18
	<i>Cimino, F.</i>	
PL37:	ROLE OF CENTELLA ASIATICA, AEROBIC EXERCISE AND ITS COMBINATION IN WOMEN WITH MILD COGNITIVE IMPAIRMENT	18
	<i>¹Adnyana, IK., ¹Anggadiredja K., ²Fitriana, LA.,³Setiawan</i>	
PL38:	MEDICATION DYSPHAGIA: FOCUS GROUP PILOT STUDY ON PHARMACISTS' KNOWLEDGE, ATTITUDES & PRACTICES MEDICATION DYSPHAGIA: FOCUS GROUP PILOT STUDY ON PHARMACISTS' KNOWLEDGE, ATTITUDES & PRACTICES.....	19
	<i>Chan, SY., Loh, JHT., Yap, KZ.,Tan, PL.</i>	
PL39:	PROMISING INHIBITORS TARGETING MPRO: SELENIUM BASED COMPOUNDS WITH ANTI-SARS-COV-2 ACTIVITY	20
	<i>Santi, C., Mangiavacchi, F., Liviabella, D., Menichetti, E., Scimmi, C., Begnoli, L., Rosati, O., Sancineto, L., Marini, F.</i>	
PL40:	INNOVATIVE DIHYDROOROTATE DEHYDROGENASE (HDHODH) CLINICAL READY INHIBITORS AS PAN-CORONAVIRUS (SARS-COV-2) ANTIVIRALS: TARGETING THE UNEXPECTED WITH INNOVATION.....	21
	<i>M. L. Lolli*¹, S. Sainas¹, A. Luganini², A. Calistri², G. Sibille², B. Mognetti², V. Conciatori³, C. Del Vecchio³, M. Giorgis¹, A. C. Pippione¹, R. Bagnati⁵, A. Passoni⁵, P. Circosta⁴, V. Gaidano⁴, A. Cignetti⁴, G. Saglio⁴, C. Parolin³, D. Boschi¹ and G. Gribaudo²</i>	
OP001:	DEVELOPMENT AND OPTIMIZATION OF SULPHAMETHOXAZOLE NANOSUSPENSION FORMULATIONS.....	23
	<i>¹Ugur Kaplan, AB., ¹Cetin, M.</i>	
OP002:	STABILITY ENHANCEMENT OF S-ADENOSY-L-METHIONINE THROUGH NANOFORMULATION APPROACH	23
	<i>¹Ergin, AD., ²Sezgin-Bayindir, Z., ²Yüksel, N.</i>	
OP003:	MESOPOROUS SILICA-BASED NANOCARRIER FOR TARGETED CANCER THERAPY	24
	<i>¹Leggio, A., ¹De Santo, M., ¹Fava M., ¹Morelli, C., ²Pasqua, L.</i>	
OP004:	DEVELOPMENT AND <i>IN VIVO</i> EVALUATION OF A PULSATILE-RELEASE CAFFEINE FORMULATION	24
	<i>^{1,2}Arslan, A., ^{1,3}Yerlikaya, F.</i>	
OP005:	CELLULAR UPTAKE OF POLYMERIC TUBULAR NANOCARRIERS	25
	<i>¹Algan, AH., ¹Karatas, A., ²Besikci, A.</i>	
OP006:	PREPARATION AND CHARACTERIZATION OF FAST-DISSOLVING DESLORATADINE ORAL FILM FOR GERIATRIC USE	26
	<i>¹Al-Oran, AYF., ²Yenilmez, E.</i>	
OP007:	PREPARATION AND CHARACTERIZATION OF BERBERINE LOADED CHITOSAN MICROPARTICLES.....	26
	<i>¹Gungor Ak, A.,² Karatas, A.</i>	
OP008:	THE EFFECT OF GEL PROPERTIES OF CYCLODEXTRIN BASED NANOGEL ON THE RELEASE AND STABILITY STUDIES	27
	<i>^{1,2}Oktay, AN., ¹Ilbasmis-Tamer, S., ^{1,3}Celebi, N.</i>	

OP009: BSA LOADED POLY(ISOBUTYL-METHYL GLYCOLIDE) NANOPARTICLES FOR DRUG DELIVERY SYSTEMS.....	28
<i>¹Vardar, A., ²Erdebil, Ö., ^{1,2}Mert, O., ²⁻⁴Mert, S.</i>	
OP010: MICROFLUIDIC APPROACH FOR SURFACE MODIFICATION OF MESOPOROUS SILICA NANOPARTICLES	28
<i>^{1,2}Küçüktürkmen, B., ²Rosenholm, JM.</i>	
OP011: POLYELECTROLYTE COMPLEX NANOPARTICLES-FILLED ENTERIC-COATED CAPSULES FOR ORAL INSULIN DELIVERY	29
<i>¹Devrim, B., ²Arpaç, B., ¹Küçüktürkmen, B., ³Özakça, I., ¹Bozkır, A.</i>	
OP012: FORMULATION AND CHARACTERIZATION OF RESVERATROL LOADED SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEMS (SMEDDS) FOR TOPICAL DRUG DELIVERY	30
<i>¹Samancı, B., ¹Yener, FG., ²Değim, İT.</i>	
OP013: DEVELOPMENT OF A PRINTABLE COATING FILAMENT FOR 3D COLON-TARGETING TABLETS	30
<i>¹Duran, C., ¹Sarısaltık Yaşın, D., ²Takka, S.</i>	
OP014: NICLOSAMIDE LOADED NIOSOME FOR TOPICAL APPLICATIONS: DEVELOPMENT AND IN VITRO CHARACTERIZATION	31
<i>¹Yetgin, C., ²Citlak, H., ^{1,3}Coban, O.</i>	
OP015: PRECLINICAL DEVELOPMENT OF AN INJECTABLE MULTIPURPOSE PREVENTION TECHNOLOGY (MPT) FORMULATION	31
<i>^{1,2}Haeck, C.M., ¹Boyd, P., ³Dimant, N., ³Desjardins, D., ^{1,*}Malcolm, R.K.</i>	
OP016: HOW USEFUL ARE MICROSCOPIC TECHNIQUES TO PREDICT DRUG RELEASE PROFILE FROM THE LIPID MICROPARTICLES	32
<i>¹Wolska, E., ¹Sznitowska, M.</i>	
OP017: PICKERING EMULSIONS STABILIZED BY CYCLODEXTRIN DERIVATIVES FOR TREATMENT OF ATOPIC DERMATITIS: OPTIMIZATION AND <i>IN VITRO</i> CHARACTERIZATION.....	33
<i>Aydilek, N., Kahraman, E., Güngör, S.</i>	
OP018: DEVELOPMENT AND IN-VITRO IN-VIVO EVALUATION OF HYDROPHILIC GEL FORMULATIONS FOR TREATMENT OF KERATOCONUS BY NON-INVASIVE TECHNIQUE	33
<i>¹Aytekin, E., ²Polat, HK., ¹Bozdog Pehlivan, S., ¹Çalış, S.</i>	
OP019: PREPARATION AND CHARACTERIZATION OF BIGEL SYSTEMS CONTAINING CICLOPIROX AND UREA	34
<i>¹Kodan, E., ¹Tirnaksiz, F.</i>	
OP020: STABILITY STUDIES ON MEDICAL DEVICE PREPARED BY VANCOMYCIN-LOADED BONE CEMENT	35
<i>¹Zanbak Çotaoğlu, EM., ¹Köse Özkan, C., ¹Eşim, O., ²Kıymacı, ME., ²Ünal, N., ¹Savaşer A., ¹Özkan, Y.</i>	
OP021: PREPARATION AND IN VITRO EVALUATION OF APO-E MODIFIED SOLID LIPID NANOPARTICLES FOR DELIVERY OF HUMANIN PEPTIDE	35
<i>¹Topal, GR., ²Mészáros, M., ²Porkoláb, G., ²Szecsó, A., ³Küçüktürkmen, B., ³Öz, UC., ²Delj, MA., ²Veszélka, S., ³Bozkır, A.</i>	
OP022: DESIGN, FABRICATION AND CHARACTERIZATION OF SURFACE MODIFIED HALLOYSITE/POLYMER NANOCOMPOSITE AND ITS 5-FLUOROURACIL CONJUGATES.....	36
<i>¹Üner, G., ²Karakus, G., ³Kaplan Can, H.</i>	

OP023: CHEMOSENSITIVE EVALUATION OF METHOTREXATE LOADED NIOSOMES ON BURKITT LYMPHOMA CELLS	36
<i>¹Demirbolat, GM., ²Ergul, M.</i>	
OP024: DESIGN AND EVALUATION OF SEMI-SOLID LIPID NANOPARTICLES AS NOVEL NANOCOSMECEUTICALS	37
<i>Amasya, G.</i>	
OP025: ROBUST FORMULATION DESIGN USING COMPACTION SIMULATOR AND QBD APPROACH	37
<i>¹Özalp, Y., ¹Khamis, H., ¹Jiwa, N., ²Mesut, B., ³Aksu, B.</i>	
OP026: LIPOSOMAL ANTIAGING FORMULATION STUDIES CONTAINING SOME PROBIOTIC COMBINATION	38
<i>^{1,2,3}Aslan, I.</i>	
OP027: PRODUCTION AND CHARACTERIZATION OF OMEPRAZOLE LOADED NA ALGINATE/POLYVINYLPIRROLIDONE FILMS BY ELECTROSPINNING AND SOLVENT CASTING TECHNIQUES	39
<i>Ortasoz, JB., Uner, B., Tas, C.</i>	
OP028: DETECTION OF REACTIVE OXYGEN SPECIES IN SKIN WITH MICRONEEDLES ...	40
<i>Ozturk Atar, K.</i>	
OP029: PREPARATION OF SILK FIBROIN NANOPARTICLES FROM BOMBYX MORI COCOONS BY DOE APPROACH	40
<i>Birer, M., Yıldız, A., Acartürk, F.</i>	
OP030: <i>IN VITRO</i> INCORPORATION STUDIES OF ^{99m} Tc-IBANDRONATE SODIUM ON BONE CANCER CELL LINE	41
<i>Ekinci, M., İlem-Özdemir, D., Özgenc, E., Gündoğdu, E.</i>	
OP031: DEVELOPMENT OF THE MICELLAR BASED OCULAR <i>IN SITU</i> GELLING SYSTEMS OF POSACONAZOLE WITH QUALITY BY DESIGN (QbD) APPROACH ...	41
<i>Durgun, ME., Mesut, B., Güngör, S., Özsoy, Y.</i>	
OP032: ^{99m} Tc-LABELED, COLISTIN ENCAPSULATED, THERANOSTIC LIPOSOMES	42
<i>¹Karpuz, M., ²Ozgenç, E., ²Atlihan-Gundogdu, E., ³Senyigit, Z.</i>	
OP033: DEVELOPMENT OF PLGA NANOPARTICLES TO PROMOTE ALVEOLAR BONE REGENERATION	43
<i>^{1,2} İlhan, M., ¹Kilicarslan, M., ³Alcigir, ME., ⁴Bagis, N., ⁵Ekim, O., ⁶Orhan, K.</i>	
OP034: A NEW ORODISPERSIBLE TABLET FORMULATION OF AN ANTIHYPERTENSIVE DRUG	43
<i>^{1,2}Gultekin, Y., ³Ozturk, N., ⁴Sahin, G., ²Pezik, E., ⁵Kara, A., ²Vural, I.</i>	
OP035: DEVELOPMENT AND CHARACTERIZATION OF ERLOTINIB-RANDOMLY METHYLATED-β-CYCLODEXTRIN COMPLEX FOR THE TREATMENT OF NON-SMALL LUNG CANCER	44
<i>¹Erdoğan, N., ¹Akkin, S., ²Varan, G., ¹Bilensoy, E.</i>	
OP036: DESIGN OF DEXPANTHENOL LOADED ORALLY DISINTEGRATING FILMS	45
<i>^{1,2} Kalfa, N., ¹İnal, Ö.</i>	
OP037: EVALUATION AND COMPARISON OF β-CYCLODEXTRIN DERIVATIVES ON AQUEOUS SOLUBILITY OF DESLORATADINE	45
<i>Çakmakyapan, Ö., Tuğcu-Demiröz, F., Teksin, ZS.</i>	
OP038: OPTIMIZATION OF LIDOCAINE BASE NANOSUSPENSIONS WITH EXPERIMENTAL DESIGN	46
<i>^{1,2}Çulcu, Ö., ¹İlbasmis-Tamer, S., ¹Tirnaksiz, F.</i>	

OP039: DEVELOPMENT AND IN VITRO CHARACTERIZATION OF PREGABALIN LOADED NANOPARTICULAR SYSTEM	46
<i>Sevinc Ozakar, R., Ozakar, E.</i>	
OP040: EVALUATION OF IN VITRO PERMEABILITY OF AN ANTIVIRAL DRUG, FAVIPRAVIR, FOR BCS CLASSIFICATION	47
<i>¹Timur, SS., ²Eroglu, H.</i>	
OP041: ACE2 LOADED CATIONIC LIPOSOMES FOR COVID-19 TREATMENT	48
<i>¹Arisoy, S., ²Koçaş, M., ³Çomoğlu, T.</i>	
OP042: IMMUNOLOGICAL EFFECTS OF A NEW DEVELOPED CYCLOSPORINE A NANOSUSPENSION IN RATS FOR ORAL ADMINISTRATION.....	48
<i>^{1,2}Gülbağ Pınar, S., ³Tan, Ç., ⁴Atak Yücel, A., ^{1,5}Çelebi, N.</i>	
OP043: ORGANOTYPIC BRAIN SLICE CULTURES.....	49
<i>Gulsun, T.</i>	
OP044: DEVELOPMENT OF AN <i>IN VIVO</i> TEST METHOD FOR THE NASAL DELIVERY OF LYOSPHERES®	50
<i>^{1,2}Serim, TM., ^{2,3}Lamprecht, A.</i>	
OP045: CURCUMIN LOADED SEMISOLID SLN DISPERSIONS: FORMULATION OPTIMIZATION AND IN VIVO EVALUATION	50
<i>¹Sen, A., ²Badilli, U., ³Yegen, G., ⁴Güven, B., ³Aksu, B., ⁴Onay-Besikci, A.</i>	
OP046: DEVELOPMENT OF THYMOQUINONE LOADED NANO-FORMULATIONS VIA CENTRAL COMPOSITE DESIGN.....	51
<i>Öz, UC., Bozkır, A.</i>	
OP047: HUMAN SERUM ALBUMIN NANOPARTICLES FOR TARGETED CANCER THERAPY	52
<i>Akdag, Y., Geyik, ZM.</i>	
OP048: ELECTROSPUN NANOFIBERS AS ORAL FAST-DISSOLVING DELIVERY SYSTEM OF RISPERIDONE.....	52
<i>Turanlı, Y., Birer, M., Acartürk, F.</i>	
OP049: PREPARATION AND CHARACTERIZATION OF TENOFOVIR DISOPROXIL FUMARATE LOADED NANOFIBER FOR VAGINAL DELIVERY.....	53
<i>¹Dik, Z., ²Saar, S., ²Tuçcu-Demiröz, F.</i>	
OP050: LABEL-FREE DETECTION of miRNA-34a by CARBON NANOFIBER ENRICHED SCREEN-PRINTED ELECTRODES.....	53
<i>^{1,2}Eksin, E., ^{1,3}Congur, G., ¹Erdem, A.</i>	
OP051: POLYETHYLENEIMINE FUNCTIONALIZED CRYOGEL MEMBRANES AS A CONTROLLED RELEASE SYSTEM	54
<i>¹Çetin, K.</i>	
OP052: MULTIPLE-TARGETING LIGANDS AGAINST PROSTATE CANCER: EFFECT ON BOTH AKR1C3 ENZYME AND ANDROGEN RECEPTOR.....	55
<i>¹Pippione, AC., ²Kilic-Kurt, Z., ¹Sainas, S., ¹Rolando, B., ¹Kovachka, S., ¹Spyrakis, F., ³Buschini, A., ³Montalbano, S., ¹Oliaro Bosso, S., ¹Boschi, D., ¹Lolli, ML.</i>	
OP053: FUNCTIONALIZED NANOPARTICLES AS POTENTIAL ANTIBIOFILM AGENTS	55
<i>¹Gelain, A., ¹Mori, M., ¹Meneghetti, F., ^{2,3}Molino, P., ^{2,3}Hayes, P., ¹Villa, S.</i>	
OP054: SYNTHESIS OF NOVEL 1-BENZYL-2-SUBSTITUTED-BENZIMIDAZOLE-5-SULFONAMIDE DERIVATIVES AND INVESTIGATION OF THEIR EFFECTS ON CHOLINESTERASES AND CARBONIC ANHYDRASE ENZYMES.....	56
<i>¹Er, A., ²Eroglu Y., ³Bozbey, İ., ⁴Türkeş, C.</i>	

OP055: NEXT GENERATION MONOCLONAL ANTIBODIES: NOVEL APPROACH TO ATTAIN DIAGNOSTIC AND THERAPEUTIC IMMUNOCONJUGATES	56
<i>¹Alkhawaja, B., ²Watts, AG., ³Van Den Elsen, J.</i>	
OP056: NEW INHIBITORS OF THE INDUCIBLE NITRIC OXIDE SYNTHASE AS ANTICANCER AND ANTIINFLAMMATORY AGENTS.....	57
<i>¹Maccallini, C., ¹Gallorini, M., ²Bellezza, I., ¹Cataldi, A., ¹Amoroso, R.</i>	
OP057: NEUROMODULATORY ACTIVITY ON THE CANNABINOIDERGIC SYSTEM BY NEW PYRAZOLE STYRYLQUINAZOLINONES	58
<i>¹Plescica, F., ²Plescica, F., ²Cannizzaro, C., ¹Raffa, D.</i>	
OP058: SYNTHESIS OF NEW PYRAZOLINE DERIVATIVES AND THEIR ANTICANCER ACTIVITIES.....	58
<i>¹Tok, F., ²Çevik, Ö.</i>	
OP059: SYNTHESIS AND STRUCTURE ELUCIDATION OF NEW FENAMATE THIOSEMICARBAZIDE	59
<i>^{1,2}Coşkun, GP.</i>	
OP060: INVESTIGATION OF THE ANTIBACTERIAL EFFECTS OF SOME SCHIFF BASES COMPOUNDS CONTAINING NAPHTHALENE AND INDOLE RINGS.....	59
<i>¹Shirinzhadeh, H.</i>	
OP061: SYNTHESIS OF NOVEL HYDRAZONE DERIVATIVES AND EVALUATION OF THEIR INHIBITORY ACTIVITIES AGAINST MONOAMINE OXIDASES AND β -SECRETASE	60
<i>¹Sellitepe, HE., ¹Aksel, AB.</i>	
OP062: LIPASE INHIBITOR ACTIVITY AND MOLECULAR MODELLING STUDIES OF NEW PYRIDAZINONE DERIVATIVES	60
<i>¹Alagöz, MA., ²Doğan, İS., ³Şener, SÖ., ¹Özdemir, Z.</i>	
OP063: SYNTHESIS AND HUMAN CARBONIC ANHYDRASE INHIBITION STUDIES OF SOME 1,3,4-THIADIAZOLES	61
<i>¹Demir-Yazıcı, K., ¹Güzel-Akdemir, Ö.</i>	
OP064: SYNTHESIS AND ANTIPROLIFERATIVE ACTIVITY OF SELENIUM CONTAINING COMPOUNDS	62
<i>¹Sancineto, L., ²Krasowska, D., ²Drabowicz, J., ³Cieślak, M., ⁴Iraci, N., ¹Santi, C.</i>	
OP065: INSIGHT INTO REDOX PROPERTIES OF SOME SELENIDES AND DISELENIDES	62
<i>Mangiavacchi, F., Liviabella, D., Della Rina, L., Sancineto, L., Marini, F., Santi, C.</i>	
OP066: SYNTHESES, ANTINEOPLASTIC ACTIVITY AND MOLECULAR DOCKING STUDIES OF NOVEL INDOLE-THIAZOLIDINEDIONE DERIVATIVES.....	63
<i>¹Kisla, MM., ¹Zengin-Karadayi, F., ¹Baran, S., ²Dogan, TS., ²Mutlu, P., ¹Ates-Alagoz, Z.</i>	
OP067: THIOUREA-BASED INHIBITORS OF <i>MYCOBACTERIUM TUBERCULOSIS</i> GROWTH AND ENOYL ACYL CARRIER PROTEIN REDUCTASE	63
<i>¹Doğan, ŞD., ¹Doğan, H., ²Krishna, VS., ³Lherbet, C., ²Sriram, D., ⁴Gündüz, MG.</i>	
OP068: MANDELIC ACID-BASED NOVEL SPIROTHIAZOLIDINONES: SYNTHESIS, ANTIMYCOBACTERIAL ACTIVITY AND MOLECULAR MODELLING STUDIES	64
<i>¹Trawally, M., ¹Demir-Yazıcı, K., ^{2,3}Dingiş-Birgöl, SI., ²Akdemir, A., ¹Güzel-Akdemir, Ö.</i>	
OP069: NOVEL 1,2,4-TRIAZOLES FROM IBUPROFEN AS POTENTIAL mPGES-1 INHIBITORS: SYNTHESIS, <i>IN VITRO</i> AND <i>IN SILICO</i> STUDIES.....	65
<i>¹Kulabas, N., ²Bilgin, YN., ³Çiftçi, G., ³Yelekçi, K., ⁴Gürboğa, M., ⁴Bingöl Özakpınar, Ö., ¹Küçükgülzel, İ.</i>	

OP070: DESIGN SYNTHESIS AND IN VITRO BIOLOGICAL ACTIVITIES OF NEW 6,8,9-TRISUBSTITUTED PURINE DERIVATIVES AS PROMISING HSPs INHIBITORS.....	65
<i>¹Kul, P., ¹Tuncbilek, M., ²Ergul, M., ³Yenilmez Tunoglu, EN., ⁴Tutar, Y.</i>	
OP071: IDENTIFICATION OF A POTENT INDOLE N-OXIDE DERIVATIVE HIF PHD2 INHIBITOR THROUGH HYBRIT VIRTUAL SCREENING	66
<i>¹Sari, S., ² Tumber, A.</i>	
OP072: A NOVEL GREEN SYNTESIS OF NANO/MICRO PARTICLES DIRECTLY FROM CITRUS SINENSIS L. PEEL EXTRACTS AND THEIR USE IN BIOMEDICAL APPLICATIONS	66
<i>¹Butun Sengel, S., ²Goger, G., ³Butun, V.</i>	
OP073: DESIGN, SYNTHESIS, ADME AND MOLECULAR DOCKING STUDIES OF NOVEL UREA AND SULFONAMIDE DERIVATIVES OF ISATINE AS POTENTIAL ANTICANCER AGENTS	67
<i>¹Demirel, UU., ^{2,3}Karaman, FE., ¹Tanol, M., ³Özden, S., ⁴Göker, H., ²Ölgen, S*.</i>	
OP074: DEVELOPMENT OF NON-STEROIDAL AMINOTHIAZOLE ANALOGS ACTIVE ON MCF7 CELL LINE AND AROMATASE ENZYME	68
<i>Sahin, Z.</i>	
OP75: THE EFFECT OF SACUBITRIL/VALSARTAN ON PROTEIN EXPRESSION OF DIASTOLIC COMPONENTS IN HFD/STZ INDUCED DIABETIC RAT HEART	68
<i>^{1,3}Erdogan, BR., ^{2,3}Yesilyurt, ZE., ³Karaomerlioglu, I., ³Muderrisoglu, AE., ³Arioglu Inan, E.</i>	
OP076: THE SYNERGIC EFFECTS OF AGOMELATINE ON THE ANTICANCER POTENTIAL OF DOXORUBICIN IN MCF-7 BREAST CANCER CELLS	69
<i>¹Ozkemahli, G., ²Dincer, B.</i>	
OP077: THE ROLE OF NEBIVOLOL ON ERECTILE DYSFUNCTION IN RATS WITH HEART FAILURE	70
<i>¹Mercanoglu, G., ²Gumrukcu, G., ³Macit, Ç.</i>	
OP078: INVESTIGATION OF DRUG-DRUG INTERACTION OF FAVIPIRAVIR WITH ALLOPURINOL AND VERAPAMIL USING PHARMACOKINETIC PARAMETERS.....	70
<i>¹Askin Ozek, D., ²Keskin, Z., ³Yuce, H., ³Basak Turkmen, N., ³Unuvar, S., ³Aslan, S.</i>	
OP079: ROLE OF TOLL- LIKE RECEPTOR2 SIGNALING IN RAT MODEL OF CAVERNOUS NERVE INJURY-INDUCED ERECTILE DYSFUNCTION.....	71
<i>¹Barut, EN., ¹Engin, S., ^{1,2}Kaya Yaşar, Y., ^{1,2}Sezen, SF.</i>	
OP080: A DROSOPHILA APPROACH TO STUDY THE EFFECTS OF ATYPICAL ANTIPSYCHOTIC DRUGS	71
<i>¹Milani, D., ¹Forgiarini, A., ²Gumeni, S., ¹Comai, S., ¹Guarato, G., ¹Orso, G.</i>	
OP081: A DROSOPHILA BASED APPROACH TO DEVELOP SPECIES-SELECTIVE VERTEBRATE DRUGS	72
<i>Guarato, G., Forgiarini, A., Orso, G.</i>	
OP082: GENDER DIFFERENCES IN β 3-ADRENOCEPTOR-MEDIATED CARDIAC REMODELING	73
<i>^{1, 2}Kayki Mutlu, G.</i>	
OP083: THE CONTRIBUTION OF ADRENERGIC AND SEROTONERGIC RECEPTORS IN THE ANALGESIC EFFECT OF QUERCETIN	73
<i>¹Jafarova, Z., ¹Eken, H., ²Bektaş, N., ²Arslan, R.</i>	
OP084: INVESTIGATION OF EFFECT OF INACTIVE PARAPOXVIRUS IMMUNOMODULATOR ON LEUKOCYTE PROLIFERATION.....	74
<i>¹Zengin, H., ¹Dağoğlu, G., ¹Tanyıldızı, S., ¹Keskin, Z., ²Vezir, Y., ²Ünal, N.</i>	

OP085: THE EFFECT OF METHYLENE BLUE TREATMENT ON COGNITIVE FUNCTIONS IN THE D-GALACTOSE-INDUCED AGE RELATED DEMENTIA MOUSE MODEL	74
<i>Kazkayasi, I., Telli, G.</i>	
OP086: THE EFFECT OF 4-PHENYLBUTYRIC ACID ON HYPERTENSION-INDUCED CARDIAC IMPAIRMENTS.....	75
<i>¹Bal, NB., ¹Han, S., ¹Uludag, MO., ²Demirel-Yilmaz, E.</i>	
OP087: CONTRIBUTION OF CANNABINOID SYSTEM TO THE ANTIHYPERALGESIC EFFECTS OF ANTIEPILEPTIC DRUGS	76
<i>¹Bektas Turkmen, N., ¹Alyu, F., ²Okcay, Y., ¹Arslan, R.</i>	
OP088: THE EFFECTS OF HYDROGEN SULFIDE DONORS ON ERK AND WNT SIGNALING PATHWAYS IN AN <i>IN VITRO</i> LIPOPOLYSACCHARIDE-INDUCED AIRWAY INFLAMMATION MODEL IN MICE	76
<i>¹Karaman, Y., ²Kaya-Yasar Y., ¹Bozkurt, TE., ¹Sahin-Erdemli I.</i>	
OP089: EFFECT OF FLUVOXAMINE ON THE PHARMACOKINETICS OF PARACETAMOL IN MICE.....	77
<i>¹Karakoy, Z., ¹Cetin, G., ²Corum, O., ³Uney, K.</i>	
OP090: EVALUATION OF PARENTAL KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING ANTIBIOTIC USE IN ACUTE UPPER RESPIRATORY TRACT INFECTIONS IN CHILDREN IN A TERTIARY CARE HOSPITAL IN TURKEY.....	78
<i>¹Albayrak, A., ²Karakaş-Mutlu N., ³Karahalil, B.</i>	
OP091: OPINIONS OF CANCER PATIENTS TOWARDS THE COVID-19 VACCINE.....	78
<i>¹Aras Atik, E., ¹Tecen-Yucel, K., ¹Ozdemir, N., ¹Bayraktar-Ekincioglu, A., ²Akin, S.</i>	
OP092: EVALUATION OF THE PSYCHOLOGICAL BUDERN OF COVID-19 PANDEMIC ON YOUNG ADULT POPULATION	79
<i>¹Aksoy, N., ²Ongun, E.</i>	
OP093: ASSESSMENT OF THE PROPER INHALER TECHNIQUE IN ASTHMA AND COPD PATIENTS.....	80
<i>¹Durmus, M., ²Gok, S., ³Bahcecioglu, OF., ⁴Gun, ZU., ⁵Hacievliyagil, SS.</i>	
OP094: THE EFFECTS OF CARVACROL AND EPIGALLOCATECHIN GALLATE ON DRUG RESISTANCE IN NEUROBLASTOMA CELL LINE	80
<i>¹Oftulu, C., ²Bakar, E., ³Akinci, M.</i>	
OP095: THE ANTIANGIOGENIC ACTIVITY OF METFORMIN IN HT29-HUVEC CO-CULTURE: INVOLVEMENT OF miR-21 EXPRESSION	81
<i>Sevim, Ç.</i>	
OP096: COMPARATIVE CYSTEINE S-CONJUGATE β -LYASE ACTIVITIES OF DIFFERENT ORGANS TOWARDS PARACETAMOL IN MICE	81
<i>Karakuş F., Atmaca K., Aladağ B., Orhan H.</i>	
OP097: SMOKING BEHAVIORS IN COVID 19: AN ONLINE SURVEY AMONG 749 UNIVERSITY STUDENTS	82
<i>Çelik, FG., Demirel, G.</i>	
OP098: EFFECTS OF PERIOSTIN, TENASCIN-C, YKL-40, TETRAHYDROBIOPTERIN ON THE LIVER CANCER CELL LINE	82
<i>Yüce, H., Türkmen, N., Ünüvar, S.</i>	
OP099: EVALUATION OF ANTIOXIDANT, ANALGESIC, ANTI-INFLAMMATORY AND ANTISPASMODIC ACTIVITY AND GENOTOXIC EFFECT OF <i>MICROMERIA FRUTICOSA SUBSP BRACHYCALYX</i> <i>IN VITRO</i> AND <i>IN VIVO</i>	83
<i>¹Celikkol, I., ²Beceren, A., ³Kabasakal, L., ⁴Taskin, T., ⁵Aydemir, S.</i>	

OP100: EVALUATION OF THE IN-VITRO CYTOTOXIC ACTIVITY OF SUNSET YELLOW IN ACUTE AND CHRONIC DOSING SCENARIOS	84
<i>¹Sönmez, K., ¹Dural, E., ²Süzen, HS.</i>	
OP101: THE IMPACT OF THE CYTOCHROME P450 3A4 (CYP3A4*22) POLYMORPHISM ON TACROLIMUS DOSE REQUIREMENTS AND EXPOSURE DURING EARLY PERIOD FOLLOWING KIDNEY TRANSPLANTATION.....	84
<i>¹Demirbugen Oz, M., ²Keven, K., ¹Süzen, HS.</i>	
OP102: A PRELIMINARY STUDY; IN VITRO ANTICANCER ACTIVITY OF PATULIN ON HEP3B AND A549 CELLS.....	85
<i>Türkmen Başak, N., Yüce, H., Ünüvar, S.</i>	
OP103: DIRECT PEPTIDE REACTIVITY ASSAY (DPRA) FOR MEASURING SKIN SENSITIZATION POTENTIALS OF COSMETIC INGREDIENTS	85
<i>¹Kavas, P., ¹Ulker, OC., ²Gokbulut, A., ¹Esen, B.</i>	
OP104: THE EFFECTS OF DIFFERENT BISPHENOL DERIVATIVES ON OXIDATIVE STRESS, DNA DAMAGE AND DNA REPAIR IN RWPE-1 CELLS: A COMPARATIVE STUDY	86
<i>¹Kose, O., ^{2,3}Rachidi, W., ^{2,3}Beal, D., ⁴Erkekoglu, P., ⁵Fayyad-Kazan, H., ¹Kocer-Gumusel, B.</i>	
OP105: BIOCOMPATIBILITY OF PULP CAPPING MATERIALS ON L929 MOUSE FIBROBLAST CELLS	87
<i>¹Chinheya, RM., ³Yılmaz, M., ²Üstündağ, A., ²İpek, S., ²Duydu, Y., ³Aydın, C.</i>	
OP106: EVALUATION OF IN VITRO CYTOTOXIC ACTIVITY OF HYDROXYCHLOROQUINE.....	87
<i>¹Önal, Ş., ¹Dural, E., ²Süzen, HS.</i>	
OP107: GENISTEIN AND 5-FLUOROURACIL ENHANCES TRAIL MEDIATED APOPTOSIS VIA INHIBITION OF XIAP AND DCR1 IN SW480 CELLS.....	88
<i>¹Çal, T., ¹Aydın Dilsiz, S., ²Canpınar, H., ¹Ündeğer Bucurgat, Ü.</i>	
OP108: POSSIBLE EFFECT OF CHELATION TREATMENT ON METABOLOMIC AND LIPIDOMIC ANALYSIS IN LEAD EXPOSURE	89
<i>¹Çetin, T., ²Samadi, A., ³Reçber, T., ²Eser, B., ²Yalcinkaya, A., ²Öztaş, Y., ³Nemutlu, E., ²Lay, İ., ¹Sabuncuoğlu, S.</i>	
OP109: MALE REPRODUCTIVE SYSTEM TOXICITY OF DI (2-ETHYLHEXYL) PHTHALATE: A COMPARISON IN TERMS OF EXPOSURE TIME AND ROUTE	89
<i>¹Sur, U., ¹Balci, A., ^{1,2}Yirun, A., ³Ozkemahli, G., ⁴Baysal, E., ⁵Yersal, N., ⁶Tan, E., ⁴Zeybek, ND., ¹Erkekoglu, P., ⁷Kocer-Gumusel, B.</i>	
OP110: HEPATOPROTECTIVE EFFECTS OF <i>SIDERITIS CONGESTA</i> AGAINST APAP-INDUCED LIVER INJURY IN HEPG2 CELLS	90
<i>¹Özhan, Y., ²Güzelmeriç, E., ³Kan, Y., ¹Aydın, A., ¹Sipahi, H.</i>	
OP111: TAMOXYFEN AND SODIUM THIOSULPHATE THERAPEUTIC EFFECT IN RATS WITH LIVER DAMAGE CAUSED BY EXPERIMENTAL <i>Xanthium strumarium</i> POISONING.....	91
<i>¹Keskin, Z., ¹Dağoğlu, G., ²Eröksüz, Y., ¹Korkak, FA., ¹Tanyıldızı, S.</i>	
OP112: DETERMINATION OF THE ELECTROCHEMICAL BEHAVIOUR OF AN ANTICANCER DRUG IN PHARMACEUTICAL AND BIOLOGICAL SAMPLES.....	91
<i>¹Cetinkaya, A., ¹Topal BD., ²Atici, EB., ¹Ozkan, SA.</i>	
OP113: VOLTAMMETRIC DETERMINATION OF EPIRUBICIN BY A MODIFIED GLASSY CARBON ELECTRODE.....	92
<i>¹Ates, AK., ²Erk, N.</i>	

OP114: IN VITRO DNA AND BSA INTERACTION OF ANTIVIRAL DRUG TENOFOVIR BY SPECTRAL METHODS	92
<i>Oznur, A., Satana Kara, HE.</i>	
OP115: A SIMPLE AND SENSITIVE ELECTROANALYSIS OF NILOTINIB IN BIOLOGICAL SAMPLES IN THE PRESENCE OF SODIUM LAURYL SULPHATE	93
<i>Doğan-Topal, B., Sener, CE., Ozkan, SA.</i>	
OP116: DEVELOPMENT OF A NEW HPLC METHOD FOR THE DETERMINATION OF MESALAZINE IN HUMAN PLASMA AND APPLICATION TO A PHARMACOKINETIC STUDY	93
<i>¹Ceylan, B., ²Tekkeli Kepekci, E., ³Önal, C.</i>	
OP117: COMPARATIVE HPLC-PDA AND LC-MS/MS APPROACHES OSBs LEVELS OF SIMULATED ARTIFICIAL BODY FLUIDS AND SIGNIFICANCE OF RAW DATA FOR CHEMOMETRIC DISCRIMINATION OF OSBs.....	94
<i>¹Sengul, A., ²Yengin, C., ³Egrilmez, S., ¹Kilinc, E.</i>	
OP118: DESIGN OF A NOVEL NANOSENSOR FOR THE DETERMINATION OF CARDIAC INOTROPE DRUG MILRINONE.....	95
<i>¹Unal, DN., ¹Selcuk, O., ²Süslü, İ., ¹Uslu, B.</i>	
OP119: ASSESSMENT OF ANTIOXIDANT AND ANTICANCER ACTIVITIES OF <i>ACHILLEA PHRYGIA</i> EXTRACT LOADED CHITOSAN NANOPARTICLES	95
<i>¹Taşkın, D., ²Doğan, M.</i>	
OP120: ELECTROCHEMICAL ANALYSIS OF DAPAGLIFLOZIN USING BORON-DOPED DIAMOND ELECTRODE	96
<i>^{1,2}Ozkan, E., ³Ozcelikay, G., ³Cetinkaya, A., ¹Nemutlu, E., ¹Kır, S., ³Ozkan, SA.</i>	
OP121: A NOVEL DESIGN OF GRAPHENE-BASED ELECTROCHEMICAL NANOSENSOR FOR THE DETECTION OF ANTIMETABOLITE ANTICANCER AGENTS	97
<i>Er, E.</i>	
OP122: POLY (HPBAs) FOR VOLTAMMETRIC DETERMINATION OF FLUORIDE IN DENTAL FORMULATIONS (DFs); PCA APPROACH.....	97
<i>¹Der, FG., ²Yalcin, G., ³Ozcan Bulbul, E., ⁴Ileri, H., ¹Kilinc, E.</i>	
OP123: ELECTROCHEMICAL DETERMINATION OF ANTINEOPLASTIC DRUG IN HUMAN PLASMA BY MODIFIED GLASSY CARBON ELECTRODE	98
<i>¹Mehmandoust, M., ¹Erk, N., ²Tiris, G.</i>	
OP124: AN ELECTROCHEMICAL PLATFORM BASED ON MAGNETIC/CHITOSAN NANOMATERIALS FOR DETERMINATION OF THE DAPAGLIFLOZIN IN DIFFERENT MATRICES	98
<i>¹Ozcelikay, G., ^{2,3}Ozkan, E., ¹Cetinkaya, A., ²Nemutlu, E., ²Kır, S., ¹Ozkan, SA.</i>	
OP125: A SENSITIVE ELECTROCHEMICAL NON-ENZYMATIC HYDROGEN PEROXIDE SENSOR USING AuNPs-ERGO/POLY(INDOLE-5-CARBOXYLIC ACID) NANOCOMPOSITE	99
<i>¹Aydoğdu Tiğ, G., ²Zeybek, B.</i>	
OP126: FABRIC PHASE SORPTIVE EXTRACTION FOLLOWED BY HPLC-PDA DETECTION FOR THE MONITORING OF PIRIMICARB AND FENITROTHION PESTICIDE RESIDUES.....	99
<i>¹Ulusoy, Hİ., ¹Koseoglu, K., ²Kabir, A., ³Ulusoy, S., ⁴Locatelli, M.</i>	
OP127: A NOVEL METHOD FOR ANALYTICAL DETERMINATION OF COVID-19 DRUG, FAVIPRAVIR, IN TABLETS	100
<i>¹Evcil, I., ¹Caglar-Andac, S., ²Pehlivanoglu, H.</i>	

OP128: SIMULTANEOUS DETERMINATION OF FEBUXOSTAT AND MONTELUKAST IN HUMAN PLASMA BY USING FABRIC PHASE SORPTIVE EXTRACTION AND HIGH PERFORMANCE LIQUID CHROMATOGRAPHY	101
<i>¹Gazioglu, I., ¹Kepekci Tekkeli, SE., ²Kabir, A., ¹Aslan, C.</i>	
OP129: SYNTHESIS OF COBALT OXIDE NANOPARTICLES FROM PLANT EXTRACT OF DURANTA RIPENS FOR THE SENSITIVE ELECTROCHEMICAL DETERMINATION OF TRAMADOL IN PHARMACEUTICAL FORMULATION	101
<i>¹Palabiyik, İM., ²Memon, SA., ²Hassan, D., ²Buledi, JA., ²Solangi, AR., ³Memon, SQ.</i>	
OP130: BIOINSPIRED DESIGN OF POROUS MOLECULARLY IMPRINTED NANOFILM FOR SELECTIVE AND SENSITIVE SENSING OF AN ANTICANCER DRUG RUXOLITINIB.....	102
<i>^{1,2}Corman, ME, ¹Cetinkaya, A., ¹Ozcelikay, G., ³Ozgür, E., ⁴Atici, EB., ⁵Uzun, L., ¹Ozkan, SA.</i>	
OP131: QUANTITATIVE PYRROLIDONYL ARYLAMIDASE ASSAY FOR GROUP A <i>STREPTOCOCCUS PYOGENES</i> DETECTION WITH IMAGE ANALYSIS	103
<i>¹Eryilmaz, M., ²Boyaci, İH., ¹Tamer, U.</i>	
OP132: MICROSAMPLING AND HRMS FOR THE ANALYSIS OF TRYPTOPHAN-DERIVED BIOMARKERS IN A MURINE MODEL OF AMYOTROPHIC LATERAL SCLEROSIS.	103
<i>¹Protti, M., ²Volpi, C., ¹Mercolini, L.</i>	
OP133: FABRICATION OF 2D-G-C ₃ N ₄ /SDS/GNPS AS AN ELECTROCHEMICAL SENSOR FOR BIOMEDICAL APPLICATION.....	104
<i>Mehmandoust, M., Erk, N.</i>	
OP134: QSRR-ANN MODELLING IN β -CD-MODIFIED RP-HPLC	104
<i>Djajić, N., Krmar, J., Otašević, B., Malenović, A., Protić, A.</i>	
OP135: ELECTROCHEMICAL INVESTIGATION OF SURFACTANT EFFECT ON THE ETODOLAC AND THIOCOLCHICOSIDE SIGNALS	105
<i>Selcuk, O., Erkmen, C., Bozal-Palabiyik, B., Uslu, B.</i>	
OP136: USE OF NOVEL BIOCHAR-DERIVATIZED MAGNETIC NANOCOMPOSITE AS MAGNETIC SOLID-PHASE EXTRACTION ADSORBENT FOR PRECONCENTRATION AND DETERMINATION OF SDZ BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY	106
<i>Avci, NR., Oymak, T.</i>	
OP137: NEW SCHIFF BASE LIGAND-COMPLEXES AS CARBONIC ANHYDRASE AND CHOLINESTERASE ENZYME INHIBITORS: SYNTHESIS, CHARACTERIZATION AND <i>IN VITRO</i> / <i>IN SILICO</i> EVALUATION.....	107
<i>¹Tuna Yıldırım, S., ²Gügercin, RS., ³Duran HE., ⁴Türkeş, C.</i>	
OP138: SPECTROPHOTOMETRIC and HPLC DETERMINATION OF NAFTIFINE HCL	107
<i>Dermis, S., Civelek, Z.</i>	
OP139: LC-MS/MS AND LC-DAD METHODS FOR ROBUST DETERMINATION OF GLYCEROL PHENYLBUTYRATE IN BIOLOGICAL FLUIDS AND HIGH-RESOLUTION MASS SPECTROMETRIC IDENTIFICATION OF FORCED DEGRADATION PRODUCT	108
<i>^{1,2}Özcan, S., ^{1,2}Can, NÖ.</i>	
OP140: DETAILED ELECTROCHEMICAL BEHAVIOR AND THERMODYNAMIC PARAMETERS OF ANTICANCER DRUG REGORAFENIB AND ITS SENSITIVE ELECTROANALYTICAL ASSAY IN BIOLOGICAL AND PHARMACEUTICAL SAMPLES	108
<i>^{1,2}Doulache, M., ^{3,4}Kaya, Sl., ⁴Cetinkaya, A., ³Bakırhan, KN., ²Trari, M., ⁴Ozkan, SA.</i>	

OP141: EFFECT OF GEOGRAPHICAL DIFFERENCES ON THYMOQUINONE CONTENT AND CYTOTOXICITY OF BLACK CUMIN SEEDS	109
<i>1İşik, S., 2Yurdakok-Dikmen, B., 1Garba Usman, A., 2Turker, E., 3Aslan Erdem, S., 1Altuntemir Erkan, S.</i>	
OP142: MICROWAVE-ASSISTED <i>IN SITU</i> SYNTHESIS OF A NOVEL DEEP EUTECTIC SOLVENT FOR THE LIQUID-LIQUID MICROEXTRACTION OF BETA BLOCKERS .	110
<i>1Yıldırım, S., 2Sellitepe, HE.</i>	
OP143: INHIBITION OF TYROSINASE BY NON-STEROIDAL ANTI-INFLAMMATORY DRUG: AN ELECTROCHEMICAL APPROACH.....	110
<i>Kurbanoglu, S., Erkmen, C., Demir, Y., Uslu, B.</i>	
OP144: CHROMATOGRAPHIC DETERMINATION OF IRINOTECAN RESIDUES IN URINE SAMPLES BY USING A NEW SYNTHESIZED SORBENT MATERIAL.....	111
<i>1Ulusoy, S., 2Tartaglia, A., 3Kabir, A., 4Ulusoy, Hİ., 2Locatelli M.,</i>	
OP145: DEVELOPMENT OF ANALYTICAL METHOD FOR SENSITIVE SIMULTANES DETERMINATION OF AMITRIPTYLINE AND VENLAFAXINE BASED ON MAGNETIC PHASE EXTRACTION.....	111
<i>1,2 Morgül, U., 1Ulusoy, Hİ., 2Palabıyık, İM.</i>	
OP146: THE PRELIMINARY ETHNOBOTANICAL STUDY OF GÖKÇEADA/ÇANAKKALE	112
<i>1Kızılarıslan-Hançer, Ç., 1Sevgi, E., 2Eyi, H., 3Sancaklı, G.</i>	
OP147: ESSENTIAL OIL COMPOSITION AND ANATOMICAL STRUCTURE OF <i>FERULA TINGITANA</i> L. (APIACEAE).....	112
<i>Ekşi Bona, G.</i>	
OP148: COMPARATIVE LEAF ANATOMY OF SOME <i>OPOPANAX</i> SPECIES.....	113
<i>Gümüřok, S., Kılıç, CS..</i>	
OP149: DEVELOPMENT OF A CELLULAR MEMBRANE AFFINITY CHROMATOGRAPHY COLUMN CONTAINING IMMOBILIZED TRKB RECEPTORS FOR THE IDENTIFICATION OF PHYTOCHEMICALS MIMICKING THE EFFECTS OF BDNF ..	113
<i>1Artuluk, ZC., 2Maitra, U., 2Ciesla, L.</i>	
OP150: <i>IN VITRO</i> BIOLOGICAL EFFECTS OF ENDEMIC ANATOLIAN SPOTTED NEWT DERMAL VENOM: A POTENTIAL ACTIVE PHARMACEUTICAL INGREDIENT (API) FOR DRUG DELIVERY SYSTEMS	114
<i>1,2Karıř, M., 3Çimik, A., 4Gürel-Gürevin, E., 5Öztürk, AA., 6Kıyan, HT..</i>	
OP151: PHYTOCHEMICAL ANALYSIS AND BIOLOGICAL ACTIVITY OF <i>NEPETA CADMEA</i> BOISS.....	115
<i>1Gökbulut, A., 1Kalender, S., 2Deliorman Orhan, D., 2Özüpek, B., 3Yılmaz, G.</i>	
OP152: METABOLOMICS AND ACETYLCHOLINESTERASE INHIBITORY ACTIVITY STUDIES ON <i>DACTYLIS GLOMERATE</i> L. AND <i>HORDEUM MURINUM</i> L.	115
<i>1Gonulalan, EM., 2Kahraman, C.</i>	
OP153: A COMPARATIVE ANALYSIS ON ANTIOXIDANT PROPERTIES, PHENOLIC COMPOSITION AND HPTLC EXAMINATION OF <i>SIDERITIS SCARDICA</i> SPP. <i>SCARDICA</i> INFUSION AND HYDROALCOHOLIC EXTRACT	116
<i>1Bardakcı, H., 2Yıldırım, EB., 1Barak, TH.</i>	
OP154: <i>SAMBUCUS EBULUS</i> L. VERSUS <i>S. NIGRA</i> L.: COMPARATIVE ASSESSMENT OF THE PHENOLIC COMPOSITIONS AND BIOACTIVITY PROFILES OF FLOWERS, LEAVES AND FRUITS.....	117
<i>Guzelmeric, E., Celik, C., Yeřilada, E.</i>	
OP155: THE RADICAL SCAVENGING ACTIVITIES AND ENZYME INHIBITION EFFECTS OF THE EXTRACTS FROM <i>ORIGANUM ONITES</i> L.	117
<i>Ayaz, F., Eruygur, N.</i>	

OP156: IN THE FIGHT AGAINST BACTERIA: AERIAL PARTS OF <i>PEGANUM HARMALA</i> L.....	118
<i>¹Guragac Dereli, FT., ²Onem, E., ³Ozaydin, AG.</i>	
OP157: INVESTIGATION OF <i>in vitro</i> ANTIMICROBIAL EFFECTS OF <i>TRIPLEUROSPERMUM CALLOSUM</i> (BOÏSS. & HELDR.) E. HOSSAIN EXTRACTS ON URINARY SYSTEM PATHOGENS and <i>in vivo</i> TOXICITY IN <i>Caenorhabditis elegans</i> MODEL.....	118
<i>¹Göger, G., ²Aksoy, D., ³Göger, F., ⁴Köse, YB., ^{3,5}Demirci, F.</i>	
OP158: LAMIACEAE MEMBERS USED IN ANATOLIA TRADITIONALLY FOR RESPIRATORY DISEASES FROM THE PERSPECTIVE OF BACTERIAL AND VIRAL INFECTIONS.....	119
<i>Zare, G., Diker NY., Tatlı Çankaya, İİ</i>	
OP159: COMPARATIVE STUDY OF ANTIHYALURONIDASE ACTIVITIES OF HYBRID NANOFLOWERS OF <i>ROSMARINUS OFFICINALIS</i> METHANOL PLANT EXTRACT.....	119
<i>Durbilmez, GD., Koca Çalışkan, U.</i>	
OP160: 5-LIPOXYGENASE ENZYME INHIBITORY ACTIVITY OF <i>ORIGANUM MINUTIFLORUM</i> O. SCHWARZ ET P.H. DAVIS VARIOUS EXTRACTS.....	120
<i>¹Yildiz, G. ²Temel, HE., ³Kirimer, N.</i>	
OP161: THE IMPORTANCE OF <i>DROSOPHILA MELANOGASTER</i> AS A MODEL ORGANISM IN PHYTOCHEMICAL ACTIVITY BIOASSAY FOR NEUROLOGICAL DISEASES.....	121
<i>Emecen, G.</i>	
OP162: <i>NEPETA TRANSCAUCASICA</i> GROSSH.: CHEMICAL COMPOSITION AND ALPHA GLUCOSIDASE INHIBITORY ACTIVITY OF ESSENTIAL OIL AND ANATOMICAL PROPERTIES OF DIFFERENT PARTS OF THE PLANT.....	121
<i>¹Yuca, H., ²Karakaya, S., ³Yılmaz, B., ¹Güvenalp, Z.</i>	
OP163: <i>IN VIVO</i> ANTI-ANGIOGENIC AND ANTI-INFLAMMATORY POTENTIALS OF R(+) OR S(-) LIMONENE LOADED EUDRAGIT® RS 100 NANOPARTICLES.....	122
<i>¹Kıyan, HT., ²Öztürk, AA.</i>	
OP164: SEARCH OF POTENTIAL MARINE NATURAL PRODUCTS AGAINST COVID-19....	123
<i>¹Uras, IS., ^{2,3}Ebada, SS., ^{4,5}Konuklugil, B.</i>	
OP165: THREE NEW ANTIMICROBIAL NATURAL COMPOUNDS FROM <i>Scorzonera aucheriana</i>	124
<i>¹Erik, İ. ¹Yaylı, N., ²Coşkunçelebi, K., ³Karaoğlu, ŞA.</i>	
OP166: CYTOTOXIC ACTIVITY AND PHYTOCHEMICAL PROFILE of <i>PIMPINELLA ISAURICA MATTHEWS</i> ssp. <i>ISAURICA</i>	124
<i>¹Taban Akça K., ¹Süntar İ., ²Emerce E., ¹Gök HN., ³Tugay O., ⁴Gürbüz P.</i>	
OP167: POTENTIAL PHYTOCHEMICALS FOR THE TREATMENT OF PULMONARY ARTERIAL HYPERTENSION.....	125
<i>Yüzbaşıoğlu Baran, M.</i>	
OP168: A SURVEY ON PRACTICE OF DIETARY SUPPLEMENTS AND AROMATHERAPY DURING COVID-19 PANDEMIC IN TURKEY.....	125
<i>Mancak Karakus, M., Koca Çalışkan, U.</i>	
OP169: BIOACTIVITY-GUIDED ISOLATION OF CYTOTOXIC COMPOUNDS FROM THE UNDERGROUND PARTS OF <i>VALERIANA ALLIARIIFOLIA</i> ADAMS.....	126
<i>¹Erdoğan, M., ²Aru, B., ³Taygun, U., ³Şimşek C., ¹Yeşilada, E., ²Yanıkaya Demirel G., ¹Kırmızıbekmez, H.</i>	

OP170: IDENTIFICATION AND CHARACTERIZATION OF DESCHLORO- CHLOROTHRICIN OBTAINED FROM A LARGE NATURAL PRODUCT LIBRARY TARGETING AURORA A KINASE IN MULTIPLE MYELOMA.....	127
<i>^{1,2}Özenver, N., ²Abdelfatah, S., ³Klinger, A., ³Fleischer, E., ²Efferth T.</i>	
OP171: ANTIMICROBIAL EVALUATION OF JUNIPER BERRY (<i>Juniperus communis</i> L.) ESSENTIAL OIL COMBINATION WITH STANDARD ANTIMICROBIAL COMPOUNDS	127
<i>¹Besirik, NS., ²Goger, G.</i>	
OP172: CONSTITUENTS AND BIOLOGICAL ACTIVITY OF ENDEMIC <i>CYNOGLOTTIS</i> <i>CHETIKIANA</i>	128
<i>¹Gündoğdu, S., ²Yüzbaşıoğlu Baran, M., ¹Kuruüzüm-Uz, A.</i>	
OP173: DETERMINATION OF CAFFEINE CONTENT IN WORLD COFFEES BY A NEW, VALIDATED HPLC METHOD AND INVESTIGATION OF THE RELATIONSHIP BETWEEN CAFFEINE CONTENT AND LIPASE INHIBITION.....	129
<i>Sener, SO., Ozgen, U.</i>	
OP174: ENZYME INHIBITORY AND PHYTOCHEMICAL STUDIES ON <i>Pistacia terebinthus</i> COLLECTED FROM DIFFERENT LOCATIONS	129
<i>Pekacar, S., Deliorman Orhan, D.</i>	
OP175: QUALITY-CONTROL OF <i>HYPERICUM PERFORATUM</i> L. PREPARATIONS SOLD IN HERBAL DROGSTORES AND PHARMACIES OF ADANA AND INVESTIGATION OF THEIR HYPERICIN AND HYPEROSIDE CONTENT BY HPLC.....	130
<i>¹Şerbetçi, T., ²Yüzbaşıoğlu Çepni, E.</i>	
OP176: QUANTIFICATION OF FATTY ACIDS IN CHIA SEED OILS OBTAINED WITH SFE- CO ₂ AND COLD PRESS TECHNIQUES	130
<i>¹Darı, Y., ^{2,3}Yur, S., ⁴Özek, G., ⁵Uysal, Ü.D., ^{3,4}Özek, T.</i>	
OP177: QUALITATIVE AND QUANTITATIVE ANALYSIS OF ISOORIENTIN IN <i>LINUM</i> <i>ARBOREUM</i> AND <i>LINUM FLAVUM</i> SSP. <i>SCABRINERVE</i>	131
<i>¹Torun, Z., ^{1,2}Konuklugil, B.</i>	
OP178: CYTOKINE-BASED ANTI-INFLAMMATORY STUDIES ON <i>Acanthus spinosus</i> -L.	132
<i>Dogan, Z., Sarikaya-Aydin, S., Saracoglu, I.</i>	
OP179: ESSENTIAL AND FIXED OILS OF SICILIAN PLANTS AS PHYTOTHERAPEUTIC SOURCES	132
<i>¹Badalamenti, N., ^{1,2}Maurizio, B.</i>	
OP180: ISOLATION OF SALMONELLA BACTERIOPHAGE IN POULTRY AND ITS CHARACTERIZATIONS	133
<i>¹Unverdi, A., ²Erol, HB., ²Kaskatepe, B.</i>	
OP181: THE COMBINATORY ANTIFUNGAL ACTIVITY OF CURCUMIN AND QUERCETIN ON <i>CANDIDA</i> SPP.	134
<i>Simsek, D., Altanlar, N.</i>	
OP182: DETERMINATION OF VIRULENCE AND TRIAZOLE DRUG SUSCEPTIBILITY OF WILD TYPE AND FLUCONAZOLE ADAPTED STRAINS OF <i>MAGNUSIOMYCES</i> <i>CLAVATUS</i>	134
<i>Kaplan, E.</i>	
OP183: ANTIBIOFILM ACTIVITY OF TWO NEW GENERATION DISINFECTANTS	135
<i>¹Sad Eldin, E., ¹Gurpinar, SS., ²Kart, D., ¹Eryilmaz, M.</i>	
OP184: ANTIBIOFILM AND ANTIBACTERIAL EFFECTS OF METABOLITES OF <i>BACILLUS</i> <i>SP.</i> ISOLATED FROM SOIL.....	135

	<i>¹Benli, G., ²Gurpinar, SS., ¹Baltaci, N., ²Eryilmaz, M.</i>	
OP185:	ANTIBACTERIAL AND ANTIBIOFLIM ACTIVITY OF NISIN AGAINST METHICILLIN RESISTANT <i>STAPHYLOCOCCUS AUREUS</i> ISOLATES.....	136
	<i>¹Savluk, M., ¹Kıymacı, ME., ²Kaskatepe, B.</i>	
OP186:	ANTIBACTERIAL ACTIVITY OF SOME ANTIDEPRESSANT ACTIVE SUBSTANCES AGAINST CLINICAL <i>ACINETOBACTER BAUMANNII</i> ISOLATES.....	136
	<i>¹Gurpinar, SS., ²Kart, D., ¹Eryilmaz, M.</i>	
OP187:	IN VIVO EFFECT OF <i>Origanum majorana</i> L. ESSENTIAL OIL ON <i>Galleria mellonella</i> LARVAE	137
	<i>¹Ozturk, S., ²Erdem, SA.</i>	
OP188:	ROLE OF EXOSOMAL miRNAS IN IMATINIB RESISTANCE OF CHRONIC MYELOID LEUKEMIA.....	137
	<i>¹Karabay, AZ., ²Özkan, T., ¹Koç, A., ³Karadağ, A., ²Hekmatshoar, Y., ²Sunguroglu, A., ¹Aktan, F., ¹Buyukbingol, Z.</i>	
OP189:	EVALUATION OF THE EFFECTS OF SIRT5 MODULATORS ON THE APOPTOSIS OF K562 CELLS AND SIRT5 AND CYTOCHROME C PROTEINS	138
	<i>¹Koc, A., ²Ozkan, T.</i>	
OP190:	INVESTIGATION OF CYTOTOXIC AND APOPTOTIC EFFICACY OF ORCINOL IN SW480 HUMAN COLORECTAL CANCER CELLS	138
	<i>Yanik, B., Bakar-Ates, F.</i>	
OP191:	INVESTIGATION OF <i>IN VITRO</i> PHOTODYNAMIC THERAPY EFFECTS OF WATER SOLUBLE Zn (II) PHTHALOCYANINE ON HCT-116 CELLS.....	139
	<i>¹Barut, B., ²Yalçın, CÖ.</i>	
OP192:	ANGIOTENSIN II INDUCES NLRP1 INFLAMMASOME ACTIVATION IN HCN-2 CELL LINE	139
	<i>Birim, D., Armagan, G.</i>	
OP193:	DEVELOPMENT OF LABEL-FREE ELECTROCHEMICAL IMMUNOSENSOR FOR LEPTIN DETERMINATION.....	140
	<i>Kaman G., Koyuncu Zeybek, D.</i>	
OP194:	PRENATAL STRESS MAY INCREASE THE RISK OF DEVELOPING ALZHEIMER-LIKE NEUROPATHOLOGY IN THE HIPPOCAMPUS OF RATS	141
	<i>Turunc Ozoglu, E.</i>	
OP195:	DETERMINATION OF THE FIBRINOGENOLYTIC ACTIVITY OF <i>MONTIVIPERA RADDEI</i> (RADDE'S MOUNTAIN VIPER) VENOM BY POLYACRYLAMIDE GEL ELECTROPHORESIS.....	141
	<i>Atasoy, F., İgci, N.</i>	
OP196:	PROPHYLACTIC EFFECT OF MYRICETIN AND APIGENIN AGAINST LIPOPOLYSACCHARIDE-INDUCED ACUTE LIVER INJURY.....	142
	<i>¹Berköz, M., ¹Unal, S., ²Karayakar, F., ³Yunusoğlu, O., ²Ozkan-Yılmaz, F., ²Ozluer-Hunt, A., ^{1,4}Aslan, A.</i>	
OP197:	TOLUIDINE BLUE O DECREASES TAU PHOSPHORYLATION AT THR181 AND SER202/THR 205 IN N2A MOUSE NEUROBLASTOMA CELLS STABLY EXPRESSING THE HUMAN SWEDISH MUTANT APP695	142
	<i>¹Onder, S., ¹Biberoglu, K., ¹Yuksel, M., ¹Tacal, O.</i>	
OP198:	INVESTIGATION OF <i>IN VITRO</i> ANTIOXIDANT, CYTOTOXIC AND MUTAGENIC ACTIVITIES OF ESSENTIAL OIL DERIVED FROM <i>Lavandula angustifolia</i> CULTIVATED IN TURKEY	143

¹Biltekin, SN., ²Omurtag-Özgen, PS., ³İduğ, T.,⁴Macit, Ç., ⁵Ayran, İ., ⁵Çelik, SA. ⁵Kan, Y.,
⁶Omurtag GZ.

OP199:	BRAIN-DERIVED NEUROTROPHIC FACTOR LEVELS IN BREAST CANCER	144
	<i>¹Taskan, T., ²Kurukahvecioglu, O., ³Karaman, N., ²Noori, F., ¹Gonenc, A.</i>	
OP200:	THE EFFECT OF NEOPTERIN ON EPITHELIAL MESENCHYMAL TRANSITION DRIVING GENE EXPRESSIONS AT HCC.....	144
	<i>²Subashi, Y., ¹Najjar, M., ¹Kunter, I.</i>	
OP201:	HEALTHCARE SERVICES AND EMPATHY: EXAMPLE OF PHARMACY STUDENTS.....	145
	<i>¹Yaman, U., ²Sözen-Şahne, B.</i>	
OP202:	A STUDY ON PATIENT EXPERIENCE IN COMMUNITY PHARMACIES: ISTANBUL PROVINCE SAMPLE.....	145
	<i>¹Akalgan, D., ²Ozcelikay, G..</i>	
OP203:	THE STATE OF QUALITATIVE RESEARCH IN PHARMACY LITERATURE: A FOCUSED MAPPING REVIEW AND SYNTHESIS.....	146
	<i>Gülpinar, G.</i>	
OP204:	IS THERE ANY DIFFERENCE SINCE 2012: WEB SITES OF PHARMACY SCHOOLS.....	147
	<i>Yumrukaya, L., Sözen-Şahne, B., Yeğenoğlu, Y.</i>	
OP205:	CINCHONA BARK AND ITS ALKALOIDS IN THE 4TH PORTUGUESE OFFICIAL PHARMACOPOEIA	147
	<i>^{1,2}Semedo, M., ^{1,2}Pita, J.</i>	
OP206:	DETERMINATION OF PRESCRIBED MEDICINE BORROWING BEHAVIOR OF INDIVIDUALS.....	148
	<i>Başak H., Arslan, M.</i>	
OP207:	COVID-19 ANXIETY OF THE STUDENTS AND ACADEMICIANS OF PHARMACY SCHOOLS IN TURKEY AND ITS EFFECTS ON THEIR PSYCHOLOGICAL WELL- BEING	148
	<i>Çalikuşu, M., Özçelikay, G.</i>	
P001:	HPLC METHOD DEVELOPMENT AND VALIDATION OF CHLORHEXIDINE GLUCONATE AND BENZYDAMINE HCL FOR BUCCAL DELIVERY	151
	<i>Arpa, MD., Yağcılar, AP.</i>	
P002:	EVALUATION OF BERBERINE PHYTOSOME STABILITY IN SIMULATED BODY FLUIDS BY HPLC METHOD	151
	<i>¹Gungor Ak, A.,² Karatas, A.</i>	
P003:	THE EVALUATION OF THE POTENTIAL EUDRAGIT-BASED DELAYED RELEASE NANOFIBERS FOR COLON TARGETING	152
	<i>Yıldırım, E., Yıldız, A., Saar, S., Tuğcu-Demiröz, F., Acartürk, F.</i>	
P004:	EFFECTS OF PRODUCTION METHOD VARIATIONS ON PARTICLE SIZE DISTRIBUTION OF ETHYL CELLULOSE NANOPARTICLES.....	152
	<i>Tas, B., Akdag, Y., Aytakin, E., Bozdağ Pehlivan, S., Oner, L.</i>	
P005:	A NOVEL RP-HPLC METHOD TO DETERMINE IRBESARTAN AND HYDROCHLOROTHIAZIDE IN FIXED DOSE COMBINATIONS: METHOD DEVELOPMENT AND VALIDATION.....	153
	<i>^{1,2}Kaval, B., ^{3,4}Özcan, S., ^{2,5}Kaynak, MS.</i>	
P006:	PREPARATION AND EVALUATION OF LYSOZYME LOADED POLYCAPROLACTONE MICROPARTICLES USING THE FULL FACTORIAL DESIGN	153

	<i>¹Devrim, B., ²Erdinç, N.</i>	
P007:	EVALUATION OF IN VITRO-IN VIVO RELATIONSHIP: BOSENTAN-LOADED LIPID BASED FORMULATION VERSUS COMMERCIAL PRODUCT.....	154
	<i>^{1,2}Timur, B., ¹Yılmaz Usta, D., ¹Teksin, ZS.</i>	
P008:	DoE BASED APPROACH FOR THE DESIGN OF PIROXICAM LOADED POLYMERIC NANOPARTICLES.....	155
	<i>¹Bayram, B., ²Sengel-Turk, CT.</i>	
P009:	ATORVASTATIN-ENCAPSULATED CORE-SHELL TYPE HYBRID NANOCARRIERS FOR LOCAL THERAPY OF BREAST CANCER: FORMULATION AND OPTIMIZATION STUDIES	155
	<i>¹Sengel-Turk, CT., ²Bakar-Ates, F.</i>	
P010:	DEVELOPMENT AND OPTIMIZATION OF AN ANTIHYPERTENSIVE FIXED-DOSE COMBINATION USING PLACKETT-BURMAN DESIGN	156
	<i>¹Sarisaltik-Yasin, D., ²Teksin, ZS.</i>	
P011:	DEVELOPMENT AND OPTIMIZATION OF SELF-NANOEMULSIFYING DRUG DELIVERY SYSTEM OF BOSENTAN USING BOX BEHNKEN DESIGN.....	156
	<i>Yılmaz Usta, D., Teksin, ZS.</i>	
P012:	COMPARISON OF BIORELEVANT DISSOLUTION OF MEDIUM CHAIN MONO AND DIGLYCERIDES BASED BOSENTAN-LOADED SELF-NANOEMULSIFYING FORMULATIONS.....	157
	<i>Yılmaz Usta, D., Teksin, ZS.</i>	
P013:	POLYMERIC MICRONEEDLES FOR NASAL DRUG DELIVERY	158
	<i>^{1,2}Aykaç, K., ¹Başaran, E.</i>	
P014:	PREPARATION AND OPTIMIZATION OF B-CYCLODEXTRIN INCLUSION COMPLEXES OF ATOMOXETINE HYDROCHLORIDE	159
	<i>^{1,2}Ozyilmaz, ED., ²Comoglu, T.</i>	
P015:	PREPARATION OF LAMOTRIGINE SOLID DISPERSIONS WITH DIFFERENT POLYMERIC AND SURFACTANT CARRIERS TO ENHANCE SOLUBILITY	159
	<i>¹Pezik, E., ^{1,2}Gultekin, Y., ¹Gulsun, T., ¹Sahin, S., ¹Vural, I.</i>	
P016:	DEVELOPMENT AND VALIDATION OF AN HPLC METHOD FOR DETERMINATION OF LAMOTRIGINE.....	160
	<i>¹Pezik, E., ^{1,2}Gultekin, Y., ¹Gulsun, T., ¹Sahin, S., ¹Vural, I.</i>	
P017:	POSACONAZOLE LOADED EUDRAGIT® FS 100 NANOPARTICLES	161
	<i>^{1,2}Aykaç, K., ¹Başaran, E., ¹Yenilmez, E., ¹Demirel, M.</i>	
P018:	CAFFEINE LOADED CHITOSAN GEL: FORMULATION AND IN-VITRO EVALUATION	161
	<i>¹Karapınar, B., ²Yenilmez, E.</i>	
P019:	ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS QUANTIFICATIONS OF BRUSATOL IN DRUG LOADED LIPOSOMES.....	162
	<i>¹ Bilgili, G., ²Sezgin Bayındır, Z.</i>	
P020:	INCREASING RIBOFLAVIN SOLUBILITY WITH SULFOBUTYL ETHER-B-CYCLODEXTRIN AND FORMATION OF DRUG- CYCLODEXTRIN INCLUSION COMPLEXES.....	163
	<i>¹Polat, HK., ²Aytekin, E., ²Kurt, N., ²Bozdog Pehlivan, S., ²Çalış, S.</i>	
P021:	THERMODYNAMIC STABILITY TESTING OF KETOCONAZOLE AND CAFFEINE LOADED NANOEMULSION FORMULATIONS FOR DERMAL APPLICATION	163

	<i>¹Gulpinar, HE, ²Tirmaksız, F.</i>	
P022:	DEVELOPMENT&VALIDATION OF HPLC METHOD FOR TOPICAL DELIVERY OF FINASTERIDE USED IN HAIR LOSS TREATMENT.....	164
	<i>¹Arpa, MD., ²Seçen, İM.</i>	
P023:	LACOSAMIDE LOADED MICRONEEDLES AS NASAL DRUG DELIVERY SYSTEMS.....	164
	<i>^{1,2}Aykaç, K., ¹Başaran, E.</i>	
P024:	DEVELOPMENT OF OROMUCOSAL FORMULATIONS - EVALUATION OF THE STRUCTURAL AND MECHANICAL PROPERTIES.....	165
	<i>Centkowska, K., Płaczek, M., Sznitowska, M., Stawecka, M.</i>	
P025:	VALIDATION OF AN HPLC METHOD FOR THE DETERMINATION OF CARFILZOMIB AND NILE RED FROM PLGA NANOPARTICLES	166
	<i>¹Kaya, MZ., ²Ozturk, M., ¹Bozdog Pehlivan, S.</i>	
P026:	A NOVEL UV/VIS SPECTROSCOPY METHOD FOR THE DETERMINATION OF ATEZOLIZUMAB: METHOD DEVELOPMENT AND VALIDATION.....	166
	<i>¹Ekinci, M., ²Akbaba, H., ³Santos-Oliveira, R., ¹İlem-Özdemir, D.</i>	
P027:	DEVELOPMENT AND OPTIMIZATION OF R-HPLC METHOD OF OXICONAZOLE NITRATE FOR TOPICAL DRUG DELIVERY	167
	<i>Arpa, MD., Ünükür, MZ.</i>	
P028:	FORMULATION AND CHARACTERIZATION OF TEDIZOLID PHOSPHATE LOADED LIPOSOMAL GEL FORMULATIONS FOR TOPICAL TREATMENT ABSSSIS.....	168
	<i>¹Kuru, HH. ²Karpuz, M. ¹Şenyigit, Z.</i>	
P029:	PREPARATION AND CHARACTERIZATION OF CREAM-GELS BASED ON HYDROXYETHYL ACRYLATE / SODIUM ACRYLOYLDIMETHYL TAURATE COPOLYMER INCORPORATED WITH FIXED OR ESSENTIAL OILS	168
	<i>Ilhan, M., Gultekin, HE., Senyigit, Z.</i>	
P030:	DEVELOPMENT OF BIODEGRADABLE NANOPARTICLES FOR THE BRAIN DELIVERY OF FLURBIPROPHENE	169
	<i>Kurt, N., Çopur, T., Bozdog Pehlivan, S., Öner, L.,</i>	
P031:	PREPARATION AND <i>IN VITRO</i> CHARACTERIZATION OF LIPID-COATED NANOPARTICLES CONTAINING CARBOPLATIN AND DECITABINE.....	170
	<i>¹Eşim, O., ²Hascicek, C.</i>	
P032:	DEVELOPMENT AND CHARACTERIZATION OF BUCCAL FILM CONTAINING HYDROCORTISONE NANOSUSPENSIONS	170
	<i>^{1,2}Çulcu, Ö., ¹Saar, S., ¹Tuğcu-Demiröz, F., ¹Tirmaksız, F.</i>	
P033:	MODELING AND COMPARISON OF <i>IN VITRO</i> DISSOLUTION PROFILES OF NAPROXEN SODIUM TABLETS IN BIORELEVANT MEDIA	171
	<i>¹Olgac, S., ¹Yılmaz Usta, D., ²Demirdaş, B., ²Erman, NA., ¹Teksin, ZS.</i>	
P034:	VALIDATED HPLC METHOD FOR THE DETERMINATION OF TENOFOVIR AND ITS APPLICATION FOR <i>IN-VITRO</i> AND <i>EX-VIVO</i> INVESTIGATIONS OF TENOFOVIR LOADED DOUBLE NANOEMULSION	172
	<i>¹Olgac, S., ¹Yılmaz Usta, D., ²Erman, NA., ¹Incecayir, T., ¹Teksin, ZS.</i>	
P035:	EVALUATION OF POLYVINYL ALCOHOL NANOFIBERS AS VAGINAL DRUG DELIVERY SYSTEM.....	172
	<i>Saar, S., Tuğcu-Demiröz, F.</i>	

P036:	PREPARATION AND EVALUATION OF ALPHA TOCOPHEROL/ CYCLODEXTRIN COMPLEXES.....	173
	<i>^{1,2}Adatepe, Ş., ¹Demirel, M.</i>	
P037:	IN SILICO PREDICTION OF INTESTINAL DISSOLUTION AND ABSORPTION OF CARBAMAZEPINE IN HUMANS	174
	<i>Incecayir, T., Benli, S.</i>	
P038:	EVALUATION OF A BIPHASIC IN VITRO DISSOLUTION TEST FOR LAMOTRIGINE IMMEDIATE RELEASE TABLETS AND CORRELATION TO HUMAN IN VIVO PERFORMANCE.....	174
	<i>Incecayir, T., Demir, ME.</i>	
P039:	DESIGN OF KETOROLAC TROMETHAMINE LOADED NANOPARTICLES AND EVALUATION OF IN VITRO EFFICIENCY FOR BRAIN TUMOR TREATMENT.....	175
	<i>¹Copur, T., ²Yalcin, D., ¹Kurt, N., ¹Pezik, E., ¹Bozdag Pehlivan, S., ¹Oner, L.</i>	
P040:	THE EFFECT OF FREEZE DRYING WITH DIFFERENT CRYOPROTECTANTS ON THE CHARACTERISTICS OF KETOROLAC TROMETHAMINE LOADED NANOPARTICLES.....	176
	<i>¹Copur, T., ²Yalcin, D., ¹Kurt, N., ¹Pezik, E., ¹Bozdag Pehlivan, S., ¹Oner, L.</i>	
P041:	SEMISOLID NLC FORMULATIONS FOR COSMETIC USE: EVALUATION OF MECHANICAL PROPERTIES	176
	<i>¹Cakir, K., ²Inal, Ö., ²Badilli, U.</i>	
P042:	BUDESONIDE LOADED CONTROLLED-RELEASE POLYCAPROLACTONE NANOPARTICLES.....	177
	<i>Turanlı, Y., Acartürk, F.</i>	
P043:	EFFECT OF POLYMER ON ONDANSETRON HCl LOADED POLYMERIC NANOPARTICLES.....	177
	<i>^{1,2}Ozdal, ZD., ¹Takka, S.</i>	
P044:	BIOPHARMACEUTICS CLASSIFICATION SYSTEM (BCS) BASED BIOWAIVER APPROACH IN TURKEY.....	178
	<i>Koksal, T., Teksin, ZS.</i>	
P045:	EVALUATIONS OF FASTED AND FED BIOAVAILABILITIES OF SELF DOUBLE EMULSIFYING DRUG DELIVERY SYSTEM OF TENOFOVIR.....	179
	<i>Bektas, D., Tuğcu-Demiröz, F., Teksin, ZS.</i>	
P046:	CHARACTERISATION AND FORMULATION OF MELATONIN INTRANASAL DELIVERY SYSSYEM	179
	<i>Görür, FŞ., Uzuner, YY.</i>	
P047:	DETERMINATION OF EFFECTIVE SURFACE MODIFICATIONS OF SILICA NANOPARTICLES AS VEGF-TARGETED SIRNA CARRIERS.....	180
	<i>^{1,2}Ultav, G., ¹Tonbul, H., ²Salva, E.</i>	
P048:	INVESTIGATION OF THE EFFECTIVENESS OF GLYCOPOLYMER BASED THERANOSTIC NANOSISTEMS IN BREAST CANCER.....	181
	<i>¹Yiğit-Erdem, G., ²Omurtag-Özgen, PS., ³Dağ, A.</i>	
P049:	SYNTHESIS OF CISPLATIN AND/OR GEMCITABINE CONTAINING POLYMERIC NANODRUG FORMULATIONS FOR BREAST CANCER TREATMENT	181
	<i>¹Gençoğlu, T., ²Cetin, B., ¹Yiğit-Erdem, G., ³Omurtag-Özgen, PS., ⁴Dağ, A.</i>	

P050:	TRANSCRIPTOMIC CHARACTERIZATION OF THE USNIC ACID (UA) EFFECTS ON TRIPLE NEGATIVE BREAST CANCER (TNBC) WITH NEXT GENERATION SEQUENCING TECHNOLOGY	182
	<i>¹Tanman, Ü., ²Türktaş Erken, M. ¹Cansaran Duman, D.</i>	
P051:	DETERMINATION THE USNIC ACID (UA) THERAPY EFFECTS ON TRIPLE NEGATIVE BREAST CANCER (TNBC) BY PROTEOMIC APPROACHES.....	182
	<i>¹Tanman, Ü., ¹Cansaran Duman, D. ²Türktaş Erken, M.</i>	
P052:	SOME NEW 3,5-DISUBSTITUTED 1,3,4-OXADIAZOLE DERIVATIVES WITH IN VITRO ANTI-INFLAMMATORY ACTIVITY	183
	<i>¹Dedeoğlu-Erdoğan, A., ^{1,2}Dagliyan, İ., ³Sipahi, H., ¹Köksal, M.</i>	
P053:	A MONTMORILLONITE CLAY AS AN EFFICIENT AND GREEN CATALYST FOR FUNCTIONAL POLYETHER SYNTHESIS	184
	<i>Belbekiri, H., Meghabar, R., Belbachir, M.</i>	
P054:	SYNTHESIS AND STANDARDIZATION OF AN IMPURITY OF ACETAMINOPHEN, DEVELOPMENT AND VALIDATION OF RELATED ULTRA-HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC METHOD	184
	<i>¹Arkan, CC., ²Küçükgülzel, İ.</i>	
P055:	DEEP EUTECTIC SOLVENTS AS POWERFUL CATALYSTS AND SOLVENTS FOR THE SYNTHESIS OF AMIDES	185
	<i>¹Procopio, D., ²Nardi, M., ²Oliverio, M., ²Procopio, A., ¹Di Gioia, ML.</i>	
P056:	AFFINITY OF THE POLYETHER IONOPHORE MONENSIN A TO BIND MONOVALENT METAL IONS: A DFT/PCM STUDY.....	185
	<i>Pantcheva, I., Dudev, T., Cheshmedzhieva, D., Stamboliyska, R.</i>	
P057:	FOCUSING ON C-4 POSITION OF 1,4-DIHYDROPYRIDINE RING: SYNTHESIS AND L-/T-TYPE CALCIUM CHANNEL BLOCKING ACTIVITY	186
	<i>¹Akman, D., ²Huang, S., ²Zamponi, GW., ¹Gündüz, MG.</i>	
P058:	THE EFFECT OF COX-2 INHIBITORS ON ACETYLCHOLINE ESTERASE IN TREATMENT OF ALZHEIMER'S DISEASE	186
	<i>¹Kahvecioglu, D., ²Yilmaz, S., ²Yenice-Cakmak, G., ¹Kocyyigit-Kaymakcioglu, B.</i>	
P059:	NEW INSIGHTS INTO COVALENT ENZYMATIC INHIBITION MEDIATED BY ELECTROPHILIC SELENIUM COMPOUNDS: THE CASE OF THE SARS-CoV-2 MAIN PROTEASE.....	187
	<i>Scimmi, C., Liviabella, D., Mangiavacchi, F, Sancineto, L., Santi, C.</i>	
P060:	SYNTHESIS OF BENZIMIDAZOLE, BENZOTHAZOLE, BENZOFURANE AND NAPHTOFURANE DERIVATIVES OF AMINOTHIAZOLES	187
	<i>¹Akgun, E., ¹Tok, BI., ²Caskurlu, A., ¹Sahin, Z., ³Yurttaş, L., ¹Berk, B., ¹Demirayak, S.</i>	
P061:	PREPARATION OF SOME PURINE DERIVATIVES: USE OF THE 2D NMR ¹ H, ¹⁵ N & ¹ H, ¹³ C HMBC TECHNIQUES AND X-RAY CRYSTALLOGRAPHY IN ASSIGNING REGIOCHEMISTRY	188
	<i>¹Doganc, F., ²Sahin, E., ¹Goker, H.</i>	
P062:	SYNTHESIS AND MOLECULAR MODELING STUDIES OF SOME NOVEL BENZOTIAZOLE DERIVATIVES AS ANTI-CANCER AGENTS.....	189
	<i>¹Yenice-Cakmak, G., ¹Yilmaz, S., ²Yildiz, I.</i>	
P063:	SYNTHESIS AND ANTICANCER ACTIVITY OF ETODOLAC HYDRAZONES.....	189
	<i>¹Koc, HC., ²Atlihan, I., ³Mega-Tiber, P., ³Orun, O., ⁴Kucukguzel, SG.</i>	
P064:	CRYSTAL STRUCTURE OF LITHIUM(I) COMPLEX OF THE ANTIBIOTIC LASALOCID	190

	<i>¹Pantcheva, I., ¹Stamboliyska, R., ²Ugrinov, A.</i>	
P065:	SYNTHESIS OF SOME NOVEL 4-(1 <i>H</i> -BENZIMIDAZOL-1-YL)- <i>N'</i> -BENZYLIDENEBENZOHYDRAZIDE DERIVATIVES	190
	<i>Alp, M., Alp, AS.</i>	
P066:	INDOLE-BENZIMIDAZOLE DERIVATIVES AS ANTIBACTERIAL AGENTS AGAINST HOSPITAL INFECTIONS AND THEIR DOCKING PROFILES.....	191
	<i>¹Zengin-Karadayi, F., ¹Kisla, MM., ²Kaskatepe, B., ¹Ates-Alagoz, Z.</i>	
P067:	SYNTHESIS AND <i>IN VITRO</i> EVALUATION OF THE ANTIOXIDANT ACTIVITY OF IMINES.....	192
	<i>¹Memmu, F., ²Benmehdi, H., ¹Tounsi, A., ²Fellah, Kh.</i>	
P068:	SYNTHESIS OF PLATINUM(II) COMPLEXES WITH 2-SUBSTITUTED BENZIMIDAZOLE LIGANDS	192
	<i>¹Özçelik, AB., ¹Akdağ, M., ²Utku, S.</i>	
P069:	1,4-DIHYDROPYRIDINE-AZOLE HYBRIDS: SYNTHESIS, COMPUTATIONAL STUDIES AND ANTIMICROBIAL ACTIVITY.....	193
	<i>¹Gunduz, MG., ²Dengiz, Ç., ¹Kocak-Aslan, E., ³Skaro-Bogojevicogojevic, S., ³Nikodinovic-Runic, J.</i>	
P070:	SYNTHESIS OF DIHYDROPYRIMIDINE DERIVATIVES WITH L-/T-TYPE CALCIUM CHANNEL BLOCKING ACTIVITIES.....	193
	<i>¹Gündüz, MG., ²Dengiz, Ç., ³Huang, S., ³Zamponi, GW.</i>	
P071:	DESIGN, SYNTHESIS AND ANTIMICROBIAL EVALUATION OF NOVEL ISOQUINOLIN-UREA HYBRIDE MOLECULES	194
	<i>¹Han, Ml., ²Dengiz, Ç., ³Doğan, ŞD., ⁴Gündüz, MG., ⁵Özkul, C.</i>	
P072:	STUDIES ON ANTIMICROBIAL PROPERTIES OF SOME BENZOXAZOLES	194
	<i>¹Faydali, N., ²Temiz Arpacı, O., ³Kuyucuklu, G., ⁴Salan, AS.</i>	
P073:	SYNTHESIS AND STRUCTURE ELUCIDATION OF SOME BENZOXAZOLE DERIVATIVES	195
	<i>¹Faydali, N., ²Temiz Arpacı, O.</i>	
P074:	MONONUCLEAR COPPER(II) COMPLEX OF MACROLIDE ANTIBIOTIC TILMICOSIN.....	196
	<i>¹Stamboliyska, R., ¹Petkov, N., ¹Pantcheva, I., ¹Stoykova, S., ²Stoyanova, R., ²Kukeva, R., ³Simova, S.</i>	
P075:	DINUCLEAR COPPER(II) COMPLEXES OF MACROLIDE ANTIBIOTIC TILMICOSIN.....	196
	<i>¹Stamboliyska, R., ¹Petkov, N., ¹Pantcheva, I., ¹Stoykova, S., ¹Tadger, A., ²Stoyanova, R., ²Kukeva, R., ³Simova, S.</i>	
P076:	SYNTHESIS OF SOME NOVEL SCHIFF BASES INCORPORATED WITH INDAZOLE MOIETY	197
	<i>Kayikci-Pasa, N., Gurkan-Alp, AS.</i>	
P077:	SYNTHESIS OF SOME NOVEL <i>N'</i> -((ARYL)METHYLENE)-1 <i>H</i> -INDOLE-5-CARBOHYDRAZIDES	197
	<i>Gurkan-Alp, AS., Avuka, OF.</i>	
P078:	IN SILICO DESIGN AND SYNTHESIS OF NOVEL 2-ACYLHYDRAZONO-5-ARYLMETHYLENE-4-THIAZOLIDINONES AS enoyl-acyl carrier protein reductase INHIBITORS.....	198
	<i>¹Dingiş Birgül, Sl. ¹Küçükgül, İ. ¹Akdemir, A.</i>	

P079:	SYNTHESIS OF SOME NEW 2-PHENOXYACETAMIDE AND 3-PHENOXYPROPANAMIDE DERIVATIVES AND EVALUATION OF THEIR CHOLINESTERASE INHIBITOR ACTIVITIES.....	198
	<i>¹Shakıla, S., ¹Kılıç, B., ²Aksakal, F., ¹Doğruer, DS.</i>	
P080:	PREPARATION OF MICROPARTICLES FROM LAVENDER EXTRACT WITH HYDRO/SOLVOTHERMAL SYNTHESIS: CYTOTOXIC AND GENOTOXIC EFFECT ON CANCER CELL LINES	199
	<i>¹Butun Sengel, S., ²Sengel, T., ³Butun, V.</i>	
P081:	MOLECULAR DOCKING AND SYNTHESIS OF NOVEL BIPHENYL-CHROMONE DERIVATIVES AS AMPK ACTIVATORS	200
	<i>²Güney, S., ¹Ceylan-Ünlüsoy, M.</i>	
P082:	DETERMINATION OF NOVEL UREA AND SULFONAMIDE DERIVATIVES OF ISATIN SCHIFF BASES AS POTENTIAL RECEPTOR TYROSINE KINASE INHIBITOR BY MOLECULAR DOCKING STUDIES	200
	<i>¹Demirel, UU., ²Ölgen, S.</i>	
P083:	INVESTIGATION OF POSSIBLE PROTECTIVE EFFECTS OF MOMORDICA CHARANTIA (BITTER MELON) IN LUNG DAMAGE CAUSED BY METHOTREXATE.....	201
	<i>¹Ediz, Ç., ¹Ede, S., ²Özbeyli, D., ¹Albayrak, Ö., ³Çevik, Ö., ⁴Şener, G.</i>	
P084:	INTEGRATING NANOPARTICLE COATED MICROPARTICLES IN THE FIELD OF ELECTROPHYSIOLOGY.....	201
	<i>Alyu, F.</i>	
P085:	OPTOGENETICS COMBINED WITH THE PATCH CLAMP TECHNIQUE	202
	<i>Alyu, F.</i>	
P086:	ANTIHYPERALGESIC EFFECTS OF LEVETIRACETAM INJECTED INTRA-VPL ON CHRONIC CONSTRICTION INJURY MODEL.....	202
	<i>Alyu, F., Ozturk, Y.</i>	
P087:	PROBIOTICS AND EXPERIMENTAL HYPERLIPIDEMIA	203
	<i>¹Radeva-Ilieva, M., ¹Hvarchanova, N., ¹Georgieva, M., ¹Stoeva, S., ²Stefanova, N., ¹Georgiev, K.</i>	
P088:	ANTI-ULCER POTENTIAL OF CATECHIN FRACTION OBTAINED FROM <i>INONOTUS NIDUS-PICI</i> IN RATS.....	203
	<i>¹Radeva-Ilieva, M., ¹Georgieva, M., ²Zhelev, I., ¹Georgiev, K.</i>	
P089:	THE IMPACT OF ANTIMICROBIAL USE ON POTENTIAL MAJOR DRUG-DRUG INTERACTIONS IN THE PEDIATRIC INTENSIVE CARE UNIT PATIENTS	204
	<i>¹Albayrak, A., ²Akkuzu, E., ³Karahalil, B.</i>	
P090:	THE CLINICAL OUTCOMES OF KIDNEY TRANSPLANT PATIENTS USED EITHER AZATHIOPRINE OR MYCOPHENOLATE.....	204
	<i>¹Selcuk, A., ¹Pehlivanli, A., ²Eyupoglu, S., ³Ozcelikay, AT., ²Sengul, S.</i>	
P091:	PATIENT ENGAGEMENT IN THE MANAGEMENT OF MULTIPLE SCLEROSIS.....	205
	<i>¹Goncuoglu, C., ²Bayraktar-Ekincioglu, A., ³Acar-Ozen, P., ⁴Tuncer, A.</i>	
P092:	PERCEPTION OF COVID-19 VACCINATION AMONGST PHYSICIANS: AN ONLINE SURVEY	206
	<i>¹Dogan, CZ., ¹Tecen-Yucel, K., ¹Kara, E., ²Kutsal-Kaynar, E., ¹Demirkan, K., ³Unal, S.</i>	

P093:	SUPPORTIVE THERAPY-INDUCED POLYPHARMACY AND DRUG-RELATED PROBLEMS IN CANCER PATIENTS.....	206
	<i>Bayraktar, I., Aras Atik, E., Bayraktar-Ekincioglu, A.</i>	
P094:	IMPROVEMENT OF IMMUNOSUPPRESSIVE MEDICATION ADHRENCE IN NEW RENAL TRANSPLANT PATIENTS.....	207
	<i>¹Tecen-Yucel, K., ¹Aras, E., ¹Ozdemir, N., ¹Bayraktar-Ekincioglu, A., ²Yildirim, T., ¹Demirkan, K., ²Erdem, Y.</i>	
P095:	NEPHROLOGISTS' OPINION ON THE MANAGEMENT OF ASYMPTOMATIC HYPERURICAEMIA IN PATIENTS WITH CHRONIC KIDNEY DISEASE.....	208
	<i>¹Kurtaran, M., ¹Tecen-Yucel, K., ¹Bayraktar-Ekincioglu, A., ²Erdem, Y.</i>	
P096:	EVALUATION OF DRUG BURDEN IN GERIATRIC PATIENTS: A POINT PREVALENCE STUDY.....	208
	<i>¹Kurtaran, M., ¹Gokcay, H., ¹Demirkan, K., ²Halil, M.</i>	
P097:	COLISTIN INDUCED NEPHROTOXICITY: EXPERIENCE FROM A UNIVERSITY HOSPITAL.....	209
	<i>¹Bakir Ekinci, P., ¹Kurtaran, M., ¹Kara, E., ²Avci, H., ¹Demirkan, K., ³Metan, G.</i>	
P098:	PSYCHOMETRIC PROPERTIES OF TURKISH VERSION OF IDENTIFICATION OF MEDICATION ADHERENCE BARRIERS QUESTIONNAIRE IN PATIENTS WITH CHRONIC DISEASES: PRELIMINARY FINDINGS.....	210
	<i>¹Yağmur, M., ²Sancar, M., ³Ay, P., ⁴Okuyan, B.</i>	
P099:	EVALUATION OF COMMUNITY PHARMACISTS' PRACTICES REGARDING SUPPLYING AND STORAGE OF THE VACCINES.....	210
	<i>Ozdemir, N., Kara, E., Tecen-Yucel, K., Aras Atik, E., Celiker, A., Bayraktar-Ekincioglu, A., Demirkan, K.</i>	
P100:	EVALUATION OF RENAL DRUG DOSING IN HOSPITALIZED PATIENTS WITH RENAL IMPAIRMENT.....	211
	<i>¹Memis, H., ¹Cakir, A., ¹Guzel, S., ²Ozdemir, N., ¹Gun, ZU.</i>	
P101:	INFLUENZA VACCINATION COVERAGE AMONG PHYSICIANS AND NURSES IN ONCOLOGY SETTINGS.....	211
	<i>¹Ozdemir, N., ¹Aras Atik, E., ¹Tecen-Yucel, K., ¹Bayraktar-Ekincioglu, A., ²Kilickap, S.</i>	
P102:	EFFECTS OF ACRYLAMIDE, HYDROXYMETHYL FURFURAL AND CAFFEIC ACID ON DNA DAMAGE IN V79 CELLS.....	212
	<i>Babacanoğlu, C., Çal, T., Aydın Dilsiz, S., Ündeğer Bucurgat, Ü.</i>	
P103:	INVESTIGATION OF THE CYTOTOXICITY OF BISPHENOL A AND ITS ANALOGS (BPS, BPF, BPAF, BPZ) IN MCF-7 AND HSeC CELL LINES.....	212
	<i>¹Erdogmus, E., ²Ipek, S., ³Iyigundogdu, I., ²Ustundag, A., ²Duydu, Y.</i>	
P104:	PROTECTIVE ROLE OF SELENOCOMPOUNDS AGAINST DNA DAMAGE AND OXIDATIVE STRESS CAUSED BY BISPHENOL A IN HUMAN PAPILLARY THYROID CANCER CELL LINE.....	213
	<i>¹Tan, E., ²Ozkemahli, G., ³Bacanlı, M., ⁴Balci, A., ⁵Baysal, E., ⁶Zeybek, ND., ⁴Erkekoglu, P., ⁴Başaran, N., ⁶Koçer-Gümüşel, B.</i>	
P105:	POTENTIAL HAZARD IN THE METFORMIN PRODUCTS, NITROSAMINES.....	214
	<i>¹Tan, E., ²Baysal, E., ³Coşkun, M., ³Yetkin, İ.</i>	
P106:	DETERMINATION OF CYP1B1'3 (LEU432VAL) POLYMORPHISM IN A TURKISH POPULATION.....	214
	<i>¹Kargın Solmaz, FÖ., ²Ada, AO.</i>	

P107:	SOME GENE POLYMORPHISMS AFFECTING DIABETES MELLITUS TYPE 2 DEVELOPMENT	215
	<i>Ates, I., Gumus Kus, CA.</i>	
P108:	POSSIBLE RELATIONSHIPS BETWEEN SOME GENE POLYMORPHISMS AND DIABETES MELLITUS TYPE 2 IN A TURKISH POPULATION	215
	<i>Ates, I., Arazi Erdem, S.</i>	
P109:	IDENTIFYING POTENTIAL GENETIC BIOMARKERS OF THE CARDIOTOXICITY INDUCED BY ANTHRACYCLINES.....	216
	<i>Demirbugen Oz, M.</i>	
P110:	COMPUTATIONAL MODEL FOR INVESTIGATING THE TOXICITY OF CHEMICALS USED MAINLY IN COSMETIC PRODUCTS.....	216
	<i>¹Ulker, OC., ²Banerjee, P.</i>	
P111:	CYTOTOXIC AND GENOTOXIC EFFECTS OF ALUMINUM COMPOUNDS IN ANTIPERSPIRANTS <i>IN VITRO</i>	217
	<i>¹Ipek, S., ²Cebe, G., ¹Ustundag, A., ¹Duydu, Y.</i>	
P112:	ASSESSMENT OF CYTOTOXICITY AND ANTIOXIDANT PROPERTY OF METHANOL AND AQUEOUS EXTRACTS OF <i>SMILAX EXCELSA</i>	217
	<i>¹Yilmaz Sarialtin, S., ²Çiçek Polat, D., ³Yalçın, CÖ.</i>	
P113:	SIMULTANEOUS DETERMINATION OF SOME ANTIFUNGAL PESTICIDES FROM HUMAN BIOLOGICAL SAMPLES BY HPLC.....	218
	<i>Barut, BB., Erkmen, C., Uslu, B.</i>	
P114:	A GQDS@PEDOT NPS-BASED ELECTROCHEMICAL TYROSINASE ENZYME BIOSENSOR FOR ADRENALINE DETECTION	219
	<i>Erkmen, C., Demir, Y., Kurbanoglu, S., Uslu, B.</i>	
P115:	VOLTAMMETRIC STUDIES ON THE ANTIBIOTIC DRUG CEFPROZIL USING A GLASSY CARBON ELECTRODE	220
	<i>Öztürk, G., Kul, D., Kiraz, B., Yartaşı, B., Ağın, F.</i>	
P116:	EFFECTIVENESS OF <i>ACHILLEA GONIOCEPHALA</i> LOADED NANOPARTICLE ENCAPSULATION ON ANTIOXIDANT AND CYTOTOXIC PROPERTIES	220
	<i>¹Taşkın, D., ²Doğan, M., ³Ermanoğlu, M., ⁴Arabacı, T.</i>	
P117:	SIMULTANEOUS QUANTITATION OF SULFUR METABOLITES IN CELL EXTRACT BY LC-MS/MS	221
	<i>^{1,2}Gök Topak, ED., ¹Eylem, CC., ³Baysal İ. ³Yabanoğlu-Çiftçi S. ¹KIR. S., ¹Nemutlu, E.</i>	
P118:	DEVELOPMENT AN ANALAYTICAL METHODOLGY FOR ANALYSIS OFNAPROXEN SODIUM AT TRACE LEVELS in BIOLOGICAL SAMPLES BY HPLC-DAD.....	221
	<i>Şahin, E., Alamdar, NB., Morgül, U. Ulusoy, Hİ.</i>	
P119:	ELECTROANALYTICAL ANALYSIS OF GUAIFENESIN ON POLY(ACRIDINE ORANGE) MODIFIED GLASSY CARBON ELECTRODE AND ITS DETERMINATION IN PHARMACEUTICALS AND SERUM SAMPLES.....	222
	<i>Işık, H., Ağın, F., Öztürk, G., Kul, D.</i>	
P120:	DEVELOPMENT AND VALIDATION OF HPLC METHOD FOR THE DETERMINATION OF IMIDUREA IN CREAM FORMULATION	223
	<i>¹Ergin Kızılcay, G., ¹Ertürk Toker, S., ²Matur D.</i>	
P121:	DEVELOPMENT OF CE-MS METHOD FOR ANALYSIS OF TRIPTORELIN.....	223
	<i>¹Čižmarová, I., ¹Matušková, M., ¹Chalová, P., ^{1,2}Mikuš, P., ³Galba, J., ^{1,2}Piešťanský, J.</i>	

P122:	APPLICATION OF MAGNETIC SOLID PHASE EXTRACTION FOR PARABEN RESIDUES IN COSMETIC SAMPLES	224
	<i>¹Çakir, K., ²Gürbüzer, A., ¹Morgül, U., ¹Ulusoy, Hl.</i>	
P123:	DEVELOPMENT OF A NOVEL HPLC-DAD-FLD-MS METHOD FOR THE SIMULTANEOUS DETERMINATION OF FIVE ANTICANCER DRUGS.....	224
	<i>¹Turković, L., ²Silovski, T., ³Kostešić, M., ³Radić, I., ¹Nigović, B., ¹Sertić, M.</i>	
P124:	DEVELOPMENT OF FABRIC PHASE SORPTIVE EXTRACTION METHOD FOR DETERMINATION OF AZINPHOS-METHYL AND CHLORFENVINFOS PESTICIDES BEFORE HPLC-DAD ANALYSIS	225
	<i>^{1,2}Sattari Dabbagh, M., ¹Ulusoy, Hl., ¹Morgül, U., ³Tartaglia, A., ⁴Kabir, A., ³Locatelli, M.</i>	
P125:	DETERMINATION OF ORNIDAZOLE IN PHARMACEUTICAL DOSAGE FORMS USING BSA COATED FLUORESCENT COPPER NANOCLUSTER	226
	<i>Bilkay, M., Satana Kara, HE.</i>	
P126:	2D-ITP-CZE-MS/MS METHOD FOR ANALYSIS OF SEROTONIN IN URINE	226
	<i>¹Matušková, M., ¹Čižmarová, I., ¹Chalová, P., ^{1,2}Mikuš, P., ³Kováč, A., ³Majerová, P., ⁴Galba J., ^{1,2}Piešťanský, J.</i>	
P127:	DETERMINATION AND POSSIBLE MECHANISMS OF FORMATION LUMACAFITOR DEGRADATION PRODUCTS WITH USING LCMS-IT-TOF	227
	<i>^{1,2}Özcan, S., ¹Erdoğan, Ü., ^{2,3}Levent, S., ^{1,2}Can, NÖ.</i>	
P128:	THE NOVEL APPROACH TOWARDS GRADIENT ELUTION HPLC METHOD DEVELOPMENT	227
	<i>Milenković, M., Djajić, N., Krmar, J., Rašević M., Malenović, A., Otašević, B., Protić, A.</i>	
P129:	CHEMOMETRICALLY SUPPORTED OPTIMIZATION OF RP/WCX-HPLC METHOD.....	228
	<i>Svrkota, B., Krmar, J., Djajić, N., Protić, A., Otašević, B.</i>	
P130:	SIMULTANEOUS DETERMINATION OF SULFACETAMIDE, BETAMETHASONE, METHYL PARABEN AND PROPYL PARABEN IN PHARMACEUTICAL EYE DROP USING RP- HPLC	229
	<i>¹Demir, O., ¹Kanbeş Dindar, Ç., ²Erkmen, C., ²Uslu, B., ¹Günden Göçer, N.</i>	
P131:	SIMULTANEOUS DETERMINATION OF A BINARY MIXTURE IN A DOSAGE FORM BY CHEMOMETRIC METHODS.....	230
	<i>Üstündağ, Ö., Dinç, E.</i>	
P132:	APPLICATION OF CHEMOMETRIC TECHNIQUES TO THE CHROMATOGRAPHIC DATA FOR DETERMINATION OF ACTIVE COMPOUNDS IN TABLETS.....	230
	<i>Üstündağ, Ö., Dinç, E.</i>	
P133:	STUDY OF SPONTANEOUS REGRESSION OF CANCER AND SUBSEQUENT USE OF ADVANCED ANALYTICAL METHODS.....	230
	<i>^{1,2}Chalová, P., ¹Matušková, M., ¹Čižmarová, I., ¹Mikuš, P., ²Minichová, L., ²Škultéty, L., ²Lakota, J., ¹Piešťanský, J., ²Galba, J.</i>	
P134:	SPRAY DRYER OPTIMIZATION OF TEA (<i>Camellia sinensis</i> L.) EXTRACT FROM DUST CHAMBER RESIDUES AND OVEN FIBERS COUPLED WITH ARTIFICIAL INTELLIGENCE	231
	<i>¹Işık, S. ¹Usman, AG. ²Aslan Erdem, S.</i>	
P135:	DETERMINATION OF THYMOQUINONE FROM BLACK CUMIN USING HPLC TECHNIQUE: A CHEMOMETRICS BASED APPROACH.....	232
	<i>Işık, S., Usman, AG.</i>	

P136:	SENSITIVE DETERMINATION OF KETOPROFEN AND IBUPROFEN IN URINE SAMPLES	232
	<i>¹Temiz, Ş., ²Durgun, E. ¹Morgül, U., ³Ulusoy, S., ¹Ulusoy, Hİ.</i>	
P137:	STABILITY-INDICATING RP-HPLC METHOD FOR ROBUST DETERMINATION OF LUMACAFTOR IN THE PRESENCE OF IVACAFTOR AND ANALYSIS OF ITS PHARMACEUTICAL FORMULATION.....	233
	<i>^{1,2}Özcan, S., ¹Erdoğan, Ü., ^{2,3}Levent, S., ^{1,2}Can, NÖ.</i>	
P138:	ANATOMICAL EXAMINATION OF <i>FERULAGO PAUCIRADIATA</i> BOISS. & HELDR.	233
	<i>Cumhur Türker, B., Kılıç, CS.</i>	
P139:	ESSENTIAL OIL COMPOSITION OF ROOTS AND AERIAL PARTS OF <i>FERULAGO GLAREOSA</i> KANDEMİR & HEDGE	234
	<i>¹Kilic, CS., ²Demirci, B., ^{2,3}Kirci, D., ⁴Duman, H., ⁵Gurbuz, I.</i>	
P140:	EVALUATION OF <i>AEGOPODIUM PODAGRARIA</i> EXTRACTS IN TERMS OF CYTOTOXICITY AND ANTIOXIDANT PROPERTIES.....	234
	<i>¹Çiçek Polat, D., ²Yılmaz Sarıaltın, S., ³Yalçın, CÖ.</i>	
P141:	INVESTIGATION OF ANATOMICAL STRUCTURE OF <i>PRIMULA VERIS</i> L.	235
	<i>¹Yuca, H., ²Aydın, B., ³Karakaya, S., ¹Guvenalp, Z.</i>	
P142:	CHEMICAL COMPOSITIONS OF ESSENTIAL OILS OF <i>OPOPANAX HISPIDUS</i> AND <i>OPOPANAX PERSICUS</i>	236
	<i>¹Gümüşok, S., ²Kırcı, D., ³Demirci, B., ¹Kılıç, CS.</i>	
P143:	STEM AND LEAF ANATOMY OF FIVE <i>ARTEMISIA</i> L. SPECIES THAT GROW IN TURKEY.....	236
	<i>¹Osmanlioglu Dag, SR., ²Kursat, M., ³Gençler Ozkan, AM.</i>	
P144:	THE EFFECT OF CONTROLLED ATMOSPHERE COMPOSITION ON CHANGES OF TRITERPENIC COMPOUNDS OF APPLE PEEL SAMPLES DURING STORAGE.....	237
	<i>¹Butkevičiūtė, A., ^{1,2}Liaudanskas, M., ²Viškelis, J., ²Viškelis, P., ²Bobinas, Č., ¹Janulis, V.</i>	
P145:	ANTIOXIDANT CAPACITY AND PHENOLIC COMPOSITION OF WHEAT GENOTYPE	237
	<i>¹Aydın, B., ²Ozbek, H., ²Kasil, HG., ³Ozturk, A., ³Kodaz, S., ⁴Aydın, M., ³Akkus Ekinci, S., ²Guvenalp, Z.</i>	
P146:	ANATOMICAL CHARACTERIZATION OF <i>CERINTHE MINOR</i> L. (BORAGINACEAE).....	238
	<i>¹Aydın, B., ²Yuca, H., ³Karakaya, S., ²Guvenalp, Z.</i>	
P147:	ESSENTIAL OIL ANALYSIS OF <i>HELICHRYSUM ITALICUM</i> (ROTH) G.DON WHICH IS CULTIVATED IN TURKEY	238
	<i>Yardımcı Buran, B., Aslan, M.</i>	
P148:	BIOLOGICAL ACTIVITIES OF <i>PHLOMIS NISSOLII</i>	239
	<i>¹Eryugur, N., ¹Kırcı, D., ¹Bosdancı, G., ¹Doğru, T., ¹Ayaz, F., ²Bağcı, Y.</i>	
P149:	MICROBIAL TRANSFORMATION OF HESPERIDIN VIA HUMAN PROBIOTICS	239
	<i>^{1,2} Kirci, D., ³Demirci, B.</i>	
P150:	EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF FOUR <i>HERACLEUM</i> TAXA.....	240
	<i>¹Kurtul, E., ²Karpuz, B., ¹Yaylacı, B., ²Küpelı Akkol, E., ¹Bahadır Acıkara, Ö.</i>	
P151:	IN VITRO CARBONIC ANHYDRASE ACTIVITY OF <i>PAEONIA MASCULA</i> (L.) MILLER SUBSP. <i>ARIETINA</i> (ANDERS.) CULLEN ET HEYWOOD EXTRACTS	241

	¹ Aydın, FG., ² Türkoğlu, EA., ³ Taşkın, T.	
P152:	INHIBITORY EFFECT OF SOME MEDICINAL PLANT EXTRACTS ON THIOREDOXIN REDUCTASE	241
	¹ Aydın, FG., ² Türkoğlu, EA., ³ Kuzu, M., ⁴ Taşkın, T.	
P153:	CHEMICAL COMPOSITION OF <i>HYPERICUM SCABRUM</i> L. ESSENTIAL OIL	242
	¹ Yildiz, G., ² Kurkcuoglu, M., ³ Kose, YB., ⁴ Baser, KHC.	
P154:	ANTIOXIDANT CAPACITY AND PHENOLIC COMPOSITION OF HUSKED BARLEY GENOTYPE	242
	¹ Ozbek, H., ¹ Kasil, HG., ² Aydın, B., ³ Ozturk, A., ³ Kodaz, S., ⁴ Aydın, M., ³ Akkus Ekinci, S., ¹ Guvenalp, Z.	
P155:	ESSENTIAL OIL COMPOSITION OF DIFFERENT PARTS OF <i>ASPHODELUS AESTIVUS</i> BROTT. FROM TURKEY	243
	Servi, H.,	
P156:	ANALYSIS OF VOLATILE COMPOUNDS OF HAWTHORN TEA	243
	¹ Servi, H., ² Yıldırım Servi, E.	
P157:	ESSENTIAL OIL COMPOSITION OF <i>ONOPORDUM TAURICUM</i> WILLD. FROM TURKEY	244
	¹ Servi, H., ² Yıldırım Servi, E., ³ Doğan, A.	
P158:	VOLATILE AND PHENOLIC COMPONENTS OF <i>Anthemis tinctoria</i> ssp. <i>tinctoria</i> GROWING IN TURKIYE	244
	¹ Erik, İ., ¹ Kılıç G., ¹ Şener, SÖ., ² Terzioğlu S., ¹ Yaylı, N.	
P159:	BIOLOGICAL ACTIVITY GUIDED INVESTIGATION OF ANTIOXIDANT EFFECTS OF <i>TANACETUM ARMENUM</i> (DC) SCH. BIP. EXTRACTS	245
	¹ Ayçiçek, K., ² Yur, S., ¹ Göger, F., ^{2,3} Yaylaci, ÖK., ¹ Özek, G.	
P160:	ANATOMICAL CHARACTERIZATION AND ESSENTIAL OIL COMPOSITION OF <i>HYPERICUM SCABRUM</i>	245
	¹ Nalkıran Ergin, K., ² Karakaya, S., ³ Demirci, B.	
P161:	ESSENTIAL OIL AND FATTY ACIDS INVESTIGATION OF <i>SCABIOSA PSEUDOGRAMINIFOLIA</i> HUB.- MOR.	246
	¹ Ogut K., ¹ Ozek G., ² Tekin M., ^{1,3} Ozek T.	
P162:	QUALITATIVE AND QUANTITATIVE COMPOSITION OF ANTHOCYANINS IN THE FRUIT OF AMERICAN CRANBERRY (<i>VACCINIUM MACROCARPON</i> AITON)	246
	¹ Urbštaitė, R., ^{1,2} Liaudanskas, M., ³ Stackevičienė, E.	
P163:	BIOLOGICAL ACTIVITIES OF THE EXTRACTS AND ESSENTIAL OIL FROM <i>ANTHEMIS KOTSCHYANA</i> VAR. <i>GYPSICOLA</i> (ASTERACEAE)	247
	¹ Özek, G., ¹ Tüysüz, T., ¹ Göger, F., ^{1,2} Yaylaci, ÖK., ³ Yur, S., ^{1,3} Özek, T.	
P164:	BIOLOGICAL ACTIVITIES OF <i>MALABAILA NYDEGGERI</i> (YILD. & DİNÇ) MENEMEN	248
	¹ Ayaz, F., ² Bağcı, Y., ¹ Eryugur, N., ¹ Bosdancı, G., ¹ Kırcı, D., ¹ Doğru, T.	
P165:	BIOLOGICAL ACTIVITIES METHANOL EXTRACTS OF <i>SMYRNIUM CONNATUM</i> BOISS. AND KOTSCHY	248
	¹ Eryugur, N., ¹ Ayaz, F., ² Bağcı, Y., ¹ Doğru, T., ¹ Kırcı, D.	
P166:	ANNUAL OUTLINING OF NEUROBIOLOGICAL EFFECT OF THE LEAF AND BERRY EXTRACTS AND ESSENTIAL OIL OF <i>MYRTUS COMMUNIS</i> L.	249
	¹ Erkan, N., ² Alım, E., ¹ Erdogan Orhan, I.	

P167:	ANTIOXIDANT AND PROOXIDANT PROPERTIES OF <i>Citrus bergamia</i> Risso et Poiteau (BERGAMOT) USED FOR THE MANAGEMENT OF HYPERLIPIDEMIA 249 ¹ Akyildiz, ZI., ² Kose, FA., ¹ Unver-Somer, N..
P168:	ANTIOXIDANT AND PROOXIDANT PROPERTIES OF SELECTED HERBS USED FOR THE MANAGEMENT OF HYPERLIPIDEMIA 250 ¹ Akyildiz, ZI., ² Kose, FA., ¹ Unver-Somer, N.
P169:	AN EVALUATION ON THE KNOWLEDGE LEVEL OF PATIENTS AND FAMILY PHYSICIANS ABOUT HERBAL PRODUCTS 251 Erten, T., Aslan, M.
P170:	ANTIBACTERIAL ACTIVITY OF <i>TANACETUM PARTHENIUM</i> (L.) SCH. BIP. ESSENTIAL OIL..... 251 ¹ Yıldırım Servi, E., ² Servi, H., ³ Doğan, A.
P171:	CHEMICAL COMPOSITION AND ANTIBACTERIAL ACTIVITY OF ESSENTIAL OIL OF <i>CENTAURIUM ERYTHRAEA</i> RAFN. 252 ¹ Yıldırım Servi, E., ² Servi, H.
P172:	THE <i>IN VITRO</i> ANTIBACTERIAL EVALUATION OF COMMERCIAL ESSENTIAL OIL OF <i>HELICHRYSUM ITALICUM</i> FROM SERBIA..... 252 ¹ Yıldırım Servi, E., ² Servi, H.
P173:	THE SUSCEPTIBILITY OF ESBL POSITIVE KLEBSIELLA SPP. STRAINS TO A NEWLY ISOLATED VB_K1 BACTERIOPHAGE 253 Erol, HB., Kaskatepe, B.
P174:	EXAMINATION OF IMMATURE GRANULOCYTE (IG) VALUES COMPLETE BLOOD COUNT IN PATIENTS WITH ACTIVE PULMONARY TUBERCULOSIS..... 253 ¹ Yaltır, A., ¹ Yalın, S., ² Tamer, L., ³ Aslan, G.
P175:	PRODUCTION OF THE HEMAGGLUTININ SURFACE ANTIGENIC PROTEIN OF INFLUENZA A VIRUS AS A SOLUBLE FORM IN MICROORGANISMS..... 254 ¹ Gül, AA., ² Turan, K.
P176:	EVALUATION OF SERUM DEATH RECEPTOR 4 AND CCL5 LEVELS IN BREAST CANCER 254 ¹ Demirdogen, KK., ¹ Taskan, T., ² Noori, F., ³ Karaman, N., ² Kurukahvecioglu, O., ¹ Gonenc, A.
P177:	LACK OF ASSOCIATION BETWEEN VARIATIONS ON TOLL-LIKE RECEPTOR GENES AND BREAST CANCER IN MERSİN, SOUTHERN TURKEY 255 ¹ Topal, K., ¹ Akkapulu, M., ² Erçolak, V., ² Sezer, E., ¹ Yalın, AE.
P178:	CHEMICAL, ANTIOXIDANT AND ANTIMICROBIAL PROPERTIES OF <i>Alburnus tarichi</i> ROE PROTEIN HYDROLYSATE 256 ¹ Berkoz, M., ² Yunusoğlu, O., ³ Ozkan-Yılmaz, F., ³ Ozluer-Hunt, A., ⁴ Yıldırım, M., ⁵ Yalın, S., ¹ Turkmen, O.
P179:	PROTECTIVE EFFECTS OF CURCUMIN AND NARINGENIN ON LIVER DAMAGE CAUSED BY COPPER NANOPARTICLES..... 256 ¹ Lalou, H., ² Yıldırım, M., ¹ Akkapulu, M., ¹ Yalın, S., ¹ Yalın, AE.
P180:	AN INVESTIGATION ON THE ASSOCIATION BETWEEN ATP DEPENDENT POTASSIUM CHANNELS AND CORONARY ARTERY DISEASE..... 257 ¹ Seçer, D., ¹ Akkapulu, M., ² Yıldırım, M., ³ Çelik, A., ⁴ Vezir, Ö., ⁵ Sucu, N., ¹ Yalın, AE.
P181:	INVOLVEMENT OF GENETIC VARIANTS ASSOCIATED WITH PRIMARY OPEN-ANGLE GLAUCOMA PATHOGENESIS 258 ¹ Çifçti, İF., ¹ Akkapulu, M., ² Demirci, Y., ³ Argın, MA., ⁴ Hatungil, ZE., ¹ Yalın, AE.

P182:	INVESTIGATION OF BIOACTIVE PHYTOCHEMICALS OF <i>MATRICARIA CHAMOMILLA</i> L. AND <i>MATRICARIA DECIPIENS</i> K. KOCH AND THEIR <i>IN VITRO</i> BIOLOGICAL ACTIVITIES.....	258
	¹ Zorlu, N., ² Cakmar-Hatipoglu, SD., ¹ Ogan, A.	
P183:	<i>IN VITRO</i> ACETYLCHOLINESTERASE INHIBITORY ACTIVITY OF COUMARIN-SELENOPHENE HYBRID COMPOUNDS.....	259
	¹ Yildirim, M., ² Ersatir, M., ³ Akkapulu, M., ² Sultan-Giray, E., ³ Yalın, S.	
P184:	INVESTIGATION OF BIOCHEMICAL ACTION MECHANISMS OF SOME 2-HYDRAZINOTHIAZOLE DERIVATIVES.....	259
	¹ Çiyancı, ZŞ., ² Evren, AE., ² Yurttaş, L., ¹ Akalın Çiftçi, G.	
P185:	THE EFFECT OF PHARMACIST IN RATIONAL ANTIBIOTIC USE: A META ANALYSIS STUDY	260
	Aydin Guldur, E., Ozcelikay, G.	
P186:	CANNABIS IN PORTUGAL: THE REBIRTH OF THE ONE THAT WAS ALREADY THE MOST IMPORTANT CULTURE IN THE COUNTRY.....	260
	¹ Paiva, C., ² Pereira, AL., ³ Pita, JR.	
P187:	PROFESSIONAL EXPERIENCES OF ENTREPRENEUR COMMUNITY PHARMACISTS	261
	¹ Yalim, İD., ² Sözen-Şahne, B.	
P188:	THE ROLE OF PHARMACIST JOAQUIM DOS SANTOS E SILVA (1842-1906) IN CINCHONA BARK AND QUININE RESEARCH IN PORTUGAL	262
	^{1,2} Semedo, M., ^{1,2} Pita, J., ^{1,3} Pereira, A.	
P189:	DETERMINATION OF PHARMACY STUDENTS' READINESS FOR INTER-PROFESSIONAL LEARNING.....	262
	¹ Baykan, RB., ² Sözen-Şahne, B.	

ORAL PRESENTATIONS

obtaining promising results in terms of sensitivity, extraction yields, precision and accuracy

Conclusions: The developed analytical platform represents a promising and versatile tool allowing the evaluation of a broad panel of Trp-related compounds in miniaturised biosamples. The methodology is being applied for the analysis of miniaturised samples and will allow to evaluate specific TRP metabolites that could potentially have a role in the onset and progression of ALS.

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OP133: FABRICATION OF 2D-G-C₃N₄/SDS/GNPS AS AN ELECTROCHEMICAL SENSOR FOR BIOMEDICAL APPLICATION

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Introduction: Doxorubicin is a famous anticancer drug with many side effects that make it crucial to determine it in an actual sample. Doxorubicin (DOX) is commonly used to treat childhood solid tumours, lymphoma, ovarian, lung, and bladder cancer (1). It is significant because cancers cause many deaths each year worldwide. Most cancers are treated with antineoplastic drugs such as doxorubicin and 4'-epidoxorubicin (Epirubicin), which have many side effects. Therefore, monitoring these drugs in real biological samples has great importance in clinical diagnosis.

Materials and Methods: Doxorubicin, melamine (C₃H₆N₆), graphene nanoplatelets (GNPs), sodium dodecyl sulfate (SDS) were purchased from Sigma Aldrich company, and screen printed electrodes (SPE) were purchased from Metrohm DropSens. All of these substances are analytical grade, and water di-ionized were utilized. Britton-Robinson buffer (B-R) was used in all steps. Firstly, 2D-g-C₃N₄/SDS/GNPs as a novel sensor was synthesized and characterized. Then, The SPE electrode was modified with a certain concentration of nanocomposite. The electrochemical properties of the developed were observed by several methods such as differential pulse voltammetry (DPV), cyclic voltammetry (CV), and

chronoamperometry (CA) under optimal conditions.

Results: The 2D-g-C₃N₄/SDS/GNPs was characterized by XRD, SEM, TEM, EDX and FT-IR, and 2D-nanostructure confirmed. The developed sensor exhibited excellent electrochemical performance, such as a wide dynamic range from 0.08-1.1 and 1.1-12.8 μM, a low limit of detection (LOD) of 0.06 μM, and good reproducibility and repeatability. The modified electrode was utilized to detect DOX in biological samples and showed appropriate recovery and RSD.

Conclusions: The 2D-g-C₃N₄/SDS/GNPs/SPE were found to be excellent for the determination of DOX. The principal advantage of the 2D-g-C₃N₄/SDS/GNPs/SPE is sensitivity and selectivity in the presence of interfering agents. An enhanced oxidation current was observed in the case of 2D-g-C₃N₄/SDS/GNPs/SPE. The possibility of monitoring the DOX in human plasma makes the voltammetric method useful for biological purposes.

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OP134: QSRR-ANN MODELLING IN β-CD-MODIFIED RP-HPLC

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Introduction: Cyclodextrin (CD) added to RP-HPLC mobile phase interacts with analytes, solvent components and stationary phase surface. Therefore, the retention is influenced by the analyte's distribution between CD dissolved in the mobile phase, free CD and formed inclusion complex adsorbed onto the stationary phase, and stationary phase itself (1, 2). The research goal was to reveal the structural characteristics affecting the inclusion complexation and retention in these kinds of chromatographic systems by employing QSRR-ANN models.

Materials and Methods: Mixed QSRR model included large pool of molecular descriptors, complex association constants and experimental parameters towards the retention factor of risperidone, olanzapine and structurally related impurities. The experimental space was adequately covered with central composite design, while experiments were conducted on Dionex Ultimate 3000 (U) HPLC. QSRR-ANN modelling was performed in STATISTICA Neural Networks.

Results: To evaluate the individual influence of each of the descriptors, the difference in the highest and lowest retention factor value across the investigated range of the descriptor's values was calculated. The highest ratios were associated with the following descriptors RDF075m, UE, Mor04v and CATS2D_08_PL, making them the most contributing towards the selected output. RDF075m descriptor shows the three-dimensional mass distribution calculated at a distance of 7.5 Å from the geometrical centre of the molecule and it refers to steric factors at the same distance. Groups approximately 7.5 Å distant from the geometrical centre of risperidone, olanzapine and related compounds in their optimized conformations were determined. These groups were the same ones involved in the complexation process according to previously performed NMR study. Identified groups and their steric factors are the most important for the formation of inclusion complexes, and, in this way, the value of RDF075m contributes to the retention of the selected compounds. The importance of Mor04v confirms the influence of molecular size and shape in retention in these kinds of chromatographic systems, while CATS2D_08_PL accounts for lipophilicity.

Conclusions: The current study resulted in development of QSRR-ANN with remarkable performances, which enabled the elucidation of the molecular features significantly influencing the retention in β -CD-modified RP-HPLC. The pronounced effect of molecular structure on retention was best described through RDF075m, followed by UE, Mor04v and CATS2D_08_PL. Retention behaviour is also highly affected by molecular size and shape, as well as lipophilicity of the investigated compounds. Moreover, the size and polarity of the chosen CD should not be neglected, due to the consequent structural fit.

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OP135: ELECTROCHEMICAL INVESTIGATION OF SURFACTANT EFFECT ON THE ETODOLAC AND THIOCOLCHICOSIDE SIGNALS

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Introduction: Etodolac (ETO) and Thiocolchicoside (TCC) are used in combined form in order to provide a rapid analgesic effect on especially serious pain cases such as vertebral colon syndrome, severe trauma, and surgery operations. The combined form does not change the pharmacokinetic properties of both drugs. It has also a synergetic effect on the analgesic feature. Therefore, it is very important to determine the concentration of each drug found in pharmaceutical preparations for quality control studies (1). The main purpose of the present study is to demonstrate a novel approach based on electrochemical oxidation of ETO and TCC at modification-free glassy carbon electrode (GCE) in the presence of sodium dodecyl sulphate (SDS). This study is the first electrochemical method which is used for the simultaneous determination of ETO and TCC.

Materials and Methods: A conventional three-electrode cell was connected to PalmSens EmStat 3 potentiostat (DropSens, Metrohm, Turkey) with PStace 5.5 software for electrochemical measurements. For voltammetric measurements, the required concentration of ETO and TCC were taken and diluted with Britton-Robinson (BR) buffer (pH 6.0 including 20% methanol and 70 μ M SDS). Recovery studies have been carried out to examine the accuracy of the proposed method and to check interference of common excipients using Etotio[®] tablets (each film-coated tablet containing 400 mg ETO and 8 mg TCC). The standard addition method was used for the recovery studies.

Results: In this study, the voltammetric response of TCC was improved almost 2-fold when SDS was present in the electrolyte solution at pH 6.0. Moreover, the oxidation signals at around +0.63 V for ETO and +1.37 V for TCC allowed simultaneous determination of ETO and TCC with differential pulse voltammetry (DPV). The calibration curves were linear for both drugs over concentration ranges of 1–80 μ M, with detection limits of 0.11 μ M for ETO and 0.20 μ M for TCC. In order to test the precision of the developed method, the relative standard deviation values of peak currents were