



УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ  
UNIVERSITY OF BANJA LUKA

ТЕХНОЛОШКИ ФАКУЛТЕТ  
FACULTY OF TECHNOLOGY



# BOOK OF ABSTRACTS

**OCTOBER 21-22, 2022**

ACADEMY OF SCIENCES AND ARTS  
OF THE REPUBLIC OF SRPSKA,  
BANJA LUKA, REPUBLIC OF SRPSKA, B&H

INTERNATIONAL SCIENTIFIC CONFERENCE

**XIV  
CONFERENCE**

OF CHEMISTS,  
TECHNOLOGISTS AND  
ENVIRONMENTALISTS  
OF REPUBLIC OF SRPSKA

XIV CONFERENCE OF CHEMISTS, TECHNOLOGISTS AND  
ENVIRONMENTALISTS OF REPUBLIC OF SRPSKA

BOOK OF ABSTRACTS

*Publisher:*

*University in Banjaluka, Faculty of Technology*

*Editorial board:*

*Borislav Malinovic, PhD, dean*

*Design and computer processing*

*Pero Sailovic, PhD*

*Msc Branka Ruzicic*

CIP - Каталогизacija u publikaciji  
Народна и универзитетска библиотека  
Републике Српске, Бања Лука

66(048.3)(0.034.2)  
661:663/664(048.3)(0.034.2)  
677(048.3)(0.034.2)  
655(048.3)(0.034.2)  
502(048.3)(0.034.2)

CONFERENCE of Chemists, Technologists and Environmentalists of  
Republic of Srpska (14 ; Banja Luka ; 2022)

Book of Abstracts [Електронски извор] / XIV Conference of  
Chemists, Technologists and Environmentalists of Republic of Srpska,  
Banja Luka, October 21-22, 2022 ; [editorial board Borislav Malinović]. -  
Onlajn izd. - El. zbornik. - Banja Luka : University in Banjaluka, Faculty of  
Technology = Tehnološki fakultet, 2022

Sistemski zahtjevi: Nisu navedeni. - Način pristupa (URL):  
<https://savjetovanje.tf.unibl.org/>. - El. publikacija u PDF formatu opsega  
207 str. - Nasl. sa naslovnog ekrana. - Opis izvora dana 20.10.2022.

ISBN 978-99938-54-96-8

COBISS.RS-ID 137004033

***Organizing Committee:***

PhD Pero Sailovic, president, PhD Darko Bodroza, general secretary, M.Sc Maja Milijaš secretary, M.Sc Dajana Dragić, M.Sc Branka Ružičić, M.Sc Marina Rakanovic, M.Sc Maja Katic, Sanda Pilipović, M.Sc Nebojsa Gorgi, Biljana Vasić, Sanja Novakovic, M.Sc Jovanka Kotur

***Students:*** Vladimir Ivković, Jovan Savić, Nevena Janjić, Bojana Milinković, Danijela Lazić

***Scientific Committee:***

Dr Božana Odžaković, president, University of Banja Luka, **B&H**, Dr Nada Štrbac, co-president, University of Belgrade, **Serbia**, Dr Borislav Malinović, University of Banja Luka, **B&H**, Dr Vlada Veljković, University of Nis, **Serbia**, Dr Todor Vasiljević, Victoria University Melbourne, **Australia**, Dr Sanja Mahović-Poljačak, University of Zagreb, **Croatia**, Dr Csaba Horvath, University Obuda, Budapest, **Hungary**, Dr Mihail Kochubovski, University of Skopje, **Macedonia**, Dr Massimiliano Fenice, Universityt Della Tuscia, **Italy**, Dr Georgij Petriaszwili, Warshav University of Technology, **Poland**, Dr Mira Vukcevic, University of Monte Negro, **Monte Negro**, Dr Ondrej Panák, University of Pardubice, **Czech Republic**, , Dr Pospiech Matej, University of Veterinary and Pharmaceutical Sciences, Brno, **Czech Republic**, , Dr Dani Dordevic, University of Veterinary and Pharmaceutical Sciences, Brno, **Czech Republic**, Dr Iskren Spiridonov, University of Chemical Technology and Metallurgy, **Bulgaria**, Dr Laura Benea, West University of Timisoara, **Romania**, Dr Savvas G. Vassiliadis, University of Piraeus, **Greece**, Dr Helena Prosen, University of Ljubljana, **Slovenia**, Dr Srečko Stopic, RWTH University Aachen, **Germany**, Dr Maria Iosune Cantalejo, UPNA, **Spain**, Dr Jurislav Babić, University of Osijek, **Croatia**, Dr Svetozar Milosavić, University of Kosovska Mitrovica, **Serbia**, Dr Petar Uskoković, University of Belgrade, **Serbia**, Dr Mitja Kolar, University of Ljubljana, **Slovenia**, Dr Dragiša Savić, , University of Nis, **Serbia**, Dr Dragan Vujadinović, University of East Sarajevo, **B&H**, Dr Biljana Pajin, University of Novi Sad, **Serbia**, Dr Sead Čatić, University of Tuzla, **B&H**, Dr Husein Vilić, University of Bihac, **B&H**, Dr Sanjin Gutić, University of Sarajevo, **B&H**, Dr Goran Trbić, University of Banja Luka, **B&H**, Dr Milica Balaban, University of Banja Luka, **B&H**, Dr Ljiljana Vukić, University of Banja Luka, **B&H**, Dr Ljiljana Topalić-Trivunović, University of Banja Luka, **B&H**, Dr Slavica Sladojević, University of Banja Luka, **B&H**, Dr Pero Dugić, University of Banja Luka, **B&H**, Dr Zoran Kukrić, University of Banja Luka, **B&H**, Dr Slavica Grujić, University of Banja Luka, **B&H**, Dr Milorad Maksimović, University of Banja Luka, **B&H**, Dr Branka Rodić-Grabovac, University of Banja Luka, **B&H**, Dr Rada Petrović, University of Banja Luka, **B&H**, Dr Dragana Grujić, University of Banja Luka, **B&H**, Dr Svjetlana Janjić, University of Banja Luka, **B&H**, Dr Zora Levi, University of Banja Luka, **B&H**, Dr Ladislav Vasilišin, University of Banja Luka, **B&H**

**NOTE:**

**The authors have full responsibility for the originality and content of thier own papers**



УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ  
UNIVERSITY OF BANJA LUKA  
ТЕХНОЛОШКИ ФАКУЛТЕТ  
FACULTY OF TECHNOLOGY



International scientific conference

# "XIV CONFERENCE OF CHEMISTS, TECHNOLOGISTS AND ENVIRONMENTALISTS OF REPUBLIC OF SRPSKA"

under the auspices of



MINISTRY OF SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT, HIGHER  
EDUCATION AND INFORMATION SOCIETY

MINISTRY OF AGRICULTURE, FORESTRY AND WATER MANAGEMENT



ACADEMY OF SCIENCES AND ARTS OF THE REPUBLICA OF SRPSKA

## **SPONSORS**

OPTIMA GROUP and OIL RAFINERY MODRIČA

HOFSTETTER ENVIRONMENTAL SRL

SINEX LABORATORY

PREHTEH d.o.o.

DESTILACIJA ad

EAST CODE d.o.o.

MUNICIPALITY OF ČELINAC

J.P. DEP-OT

ASSOCIATION OF TECHNOLOGY ENGINEERS OF REPUBLIC OF  
SRPSKA

EM PLUS d.o.o.

KESO GRADNJA d.o.o.

MARKWAY d.o.o.

EURO-LAB V d.o.o.

EKO-EURO TIM d.o.o.

MB-IMPEX d.o.o.

TRGO FORTUNA PLUS d.o.o.

EURO-INSPEKT d.o.o.

ABC PROJEKT d.o.o.

ŠTAMPARIJA PETROGRAF

CSK PRINT

# CONTENTS

<b>PLENARY LECTURES.....</b>	<b>13</b>
THE MOST RELEVANT ROUTES OF BISPHENOL A EMISSION INTO FOOD AND THE ENVIRONMENT.....	14
Vesna Antić	
HYBRIDISATION OF OZONE-BASED ADVANCED OXIDATION PROCESSES WITH HYDRODYNAMIC CAVITATION: PROBLEMS AND BENEFITS IN WATER TREATMENT APPLICATIONS.....	15
Andreja Žgajnar Gotvajn	
ECO FRIENDLY PRODUCTION OF EDIBLE/BIODEGRADABLE PACKAGING.....	16
Dani Dordevic, Simona Dordevic, Bohuslava Tremlova	
<b>GENERAL AND APPLIED CHEMISTRY.....</b>	<b>17</b>
LUMINESCENT LIQUID CRYSTALLINE MATERIALS BASED ON LOW-MELTING PALLADIUM(II) AND PLATINUM(II) COMPLEXES.....	18
Viorel Cîrcu, Monica Iliş, Doina Manaila-Maximean	
SYNTHESIS AND ANTIPROLIFERATIVE ACTIVITY OF NITRO AND AMINO SUBSTITUTED BENZIMIDAZOLES AND BENZOTHAZOLES.....	19
Marijana Hranjec, Livio Racané, Ida Boček, Leentje Persoons, Dirk Daelmans	
THEORETICAL PREDICTION OF MAGNETIC AMINOFUNCTIONALIZED POLYMER SORBENT PERFORMANCE USING MOLECULAR MODELING METHODS.....	20
Ljiljana Suručić, Aleksandra Nastasović, Bojana Marković, Tamara Tadić, Antonije Onjia, Goran Janjić	
PHOTOLYSIS OF NADOLOL IN THE AQUATIC ENVIRONMENT: INSIGHTS INTO THE EFFECT OF BICARBONATES.....	21
Andrijana Vukojević, Maria M. Savanović, Stevan Armačević, Svetlana Pelemiš, Sanja J. Armačević	
SYNTHESIS, CHARACTERIZATION AND CRYSTAL STRUCTURE OF THE 2-QUINOLONE DERIVATIVE ..	22
Lidija Radovanović, Jelena Lađarević, Bojan Božić, Marijana Kasalović, Nebojša Pantelić, Dušan Mijin, Jelena Rogan	
CAN E-CIGARETTES BE A THREAT TO ENVIRONMENT: HEAVY METALS ANALYSIS IN E-CIGARETTES FILTERS .....	23
Dijana Mihajlović, Nemanja Lončar, Ana Đurić, Bojana Đekanović, Dijana Jelić	
COMPARISON OF THREE EXTRACTION PROCEDURES FOR QUANTIFICATION OF Cu, Mn, Ni, Pb AND Zn IN THE PLANTS .....	24
Dijana Mihajlović, Vesna Antunović	
THERMAL STABILITY OF NEW COPPER(II) CYCLAM COMPLEX WITH AMINOCARBOXYLATE CO-LIGAND.....	25
Branka Dražić, Mirjana Antonijević-Nikolić, Milena Martinović-Cincović, Slađana Tanasković	
INFLUENCE OF COMPOSITIONAL VARIATION ON PHYSICO-CHEMICAL AND THERMAL PROPERTIES OF SAMPLES IN THE As <sub>2</sub> Se <sub>3</sub> -GeTe-CdTe AMORPHOUS SYSTEM .....	26
Ina Karadashka, Veronika Karadjova, Valeri Jordanov	
CORRELATION OF THE GLASS TRANSITION TEMPERATURE AND MEAN BOND ENERGY IN NETWORK OF CHALCOGENIDE GLASSES.....	27
Ina Karadashka, Veronika Karadjova, Valeri Jordanov	
ANTIPROLIFERATIVE AND ANTIBACTERIAL ACTIVITY <i>IN VITRO</i> OF AMIDINO SUBSTITUTED 2-NAPHTHYLBENZAZOLES .....	28
Livio Racané, Lucija Ptiček, Marijana Hranjec, Leentje Persoons, Dirk Daelmans, Mihailo Banjananc, Vedrana Radovanović	
EFFECT OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF CERTAIN ZEOLITES ON ADSORPTION OF SYNTHETIC ORGANIC DYE RHODAMINE B.....	29
Marina Rakanović, Slavica Sladojević, Sanja Armačević	

BIOSYNTHESIS OF AgNPs USING ELDERBERRY MACERATE ( <i>SAMBUCUS NIGRA</i> ) AND ANALYSIS OF THEIR ANTIBACTERIAL AND ANTIOXIDANT ACTIVITY <i>IN VITRO</i> .....	30
Emir Horozic, Erna Begic, Rijad Kovačević, Mensud Alić	
BIOSYNTHESIS OF SILVER NANOPARTICLES USING MACERATE <i>ACHILLEA MILLEFOLIUM</i> L. ....	31
Emir Horozic, Vanja Srebro, Šejla Mešanović, Maid Omerović, Dženana Mehmedović	
SOLVATOCHROMIC PROPERTIES OF NEWLY SYNTHESIZED ARYL AZO PYRIDONE DYES .....	32
Borko Matijević, Gorana Mrđan, Dušan Mijin, Jelena Lađarević, Suzana Apostolov, Đendi Vaštag	
ELECTROCHEMICAL POTENTIAL OF POLY(VINYL ALCOHOL) MODIFIED BACTERIAL NANOCELLULOSE AS PLATINUM NANOPARTICLES SUPPORT .....	33
Marijana Ponjavic, Sanja Stevanovic, Sanja Jeremic, Jasmina Nikodinovic-Runic, Vladan Cosovic, Vesna Maksimovic	
SIGNIFICANCE OF SELECTION REPRESENTATIVE PARTS OF THE CANNABIS PLANT FOR FORENSIC ANALYSIS .....	34
Vesna Matić, Ljiljana Simurdić, Mirjana Dragoljić	
ASSESSMENT OF THE PRESENCE SOME ORGANIC POLLUTANTS IN AGRICULTURAL SOIL BY CHROMATOGRAPHIC ANALYSIS .....	35
Aleksandra Mikić, Adriana Modrušan, Nina Savić, Dejana Savić, Sanja Pržulj, Milica Balaban	
DETERMINATION OF DISSOCIATION CONSTANTS AND QSAR STUDY OF SOME AROMATIC BENZOYLHYDRAZONES.....	36
Mirjana S. Jankulovska, Vesna Dimova, Milena Jankulovska-Petkovska	
CHEMICAL DEFENSE AGAINST PREDATION IN THE GEOPHILOMORPH CENTIPEDES (CHILOPODA: GEOPHILOMORPHA).....	37
Bojan Mitić, Ljubodrag Vujisić, Ljubica Vasiljević, Vele Tešević	
DESIGN OF NANOPLATFORMS FOR ELECTROCHEMICAL SENSING OF BIOMOLECULES .....	38
Miloš Ognjanović, Biljana Dojčinović, Željko Jaćimović, Dalibor Stanković, Bratislav Antić	
ADSORPTION OF MALACHITE GREEN FROM AQUEOUS SOLUTION BY ACTIVATED CARBON .....	39
Rada Petrović, Jovana Tenić, Darko Bodroža	
SPECTROPHOTOMETRIC OBSERVATION OF ADSORPTION OF METHYL VIOLET FROM AQUEOUS ENVIRONMENT ON MORDENITE.....	40
Slavica Sladojević, Marina Rakanović, Sanja Armaković, Darko Bodroža	
<b>CHEMICAL ENGINEERING .....</b>	<b>41</b>
BIOBASED UNSATURATED POLYESTER RESINS REINFORCED WITH NATURAL FILLERS .....	42
Olga Pantić, Vesna Panić, Sanja Savić, Maja Marković, Melina Kalagasidis Krušić, Pavle Spasojević	
EFFECT OF NEUTRALIZATION DEGREE OF METHACRYLIC ACID ON HYDROGEL SWELLING AND DRUG RELEASE .....	43
Olga J. Pantic, Rada V. Pjanovic, Vesna V. Panic, Sanja I. Savic, Pavle M. Spasojevic, Maja D. Markovic	
POSSIBILITIES OF CROSSLINKING SILICONE MATERIALS IN EXCESS OF CROSSLINKER WITH TWO TYPES OF FILLERS .....	44
Darko Manjenčić, Marko Paić, Vesna Cvijetinović, Vladan Mičić, Anja Manjenčić, Duško Kostić, Pero Dugić	
PHOSPHATE GLASSY FERTILIZERS .....	45
Vladimir S. Topalović, Jelena D. Nikolić, Srdjan D. Matijašević, Veljko V. Savić, Marija S. Djošić, Ana M. Vujošević, Snežana R. Grujić	
PRODUCTION OF DISTILLATE – GRAPE BRANDY FROM THE MERLOT BRAND.....	46
Miljojka Mijailović, Miljana Krstić, Dejan Pilčević, Svetomir Milojević, Vladimir Pavičević	
BINARY MIXTURES OF SUBSTANCES WITH DOUBBLE AND SINGLE BONDS .....	47
Milana Zarić, Ivona Radović, Mirjana Kijevčanin	

INFLUENCE OF NATURAL ZEOLITES ON THE THERMAL DECOMPOSITION OF MULTI-LAYERED PLASTIC WASTE .....	48
Milica Durdevic, Sasa Papuga, Irma Kremer, Darko Bodroza	
ANALYSIS OF THE THERMAL BEHAVIOR OF A FIXED BED REACTOR DURING THE PYROLYSIS PROCESS.....	49
Milica Durdevic, Sasa Papuga, Aleksandra Kolundzija	
THERMODYNAMIC AND TRANSPORT PROPERTIES OF BINARY SYSTEM GUAIACOL+EUGENOL.....	50
Gorica Ivaniš, Ivona Radović, Mirjana Kijevčanin	
HETEROGENEOUSLY CATALYZED TRANSESTERIFICATION OF OIL BLENDS.....	51
Milica Z. Petković, Marija Miladinović, Ivana B. Banković-Ilić, Olivera S. Stamenković, Vlada B. Veljković	
THE INFLUENCE OF THE CONFIGURATION OF THE INERTIZATION SYSTEM ON PYROLYSIS IN A FIXED-BED REACTOR.....	52
Sasa Papuga, Milica Djurdjevic, Aleksandra Kolundzija	
<b>CHEMICAL TECHNOLOGY .....</b>	<b>53</b>
MINEROLOGICAL AND CHEMICAL CHARACTERIZATION OF CLAY FROM THE ZAGONI SITE MUNICIPALITY OF BRATUNAC .....	54
Dragana Kešelj, Dragica Lazić, Zoran Petrović, Nebojša Vasiljević	
STABILITY AND BIO-ACTIVITY OF HYDROGELS BASED ON SILVER NANOPARTICLES STABILIZED BY AQUEOUS EXTRACTS OF WILD BLACKBERRY ( <i>RUBUS SPP.</i> ) LEAVES .....	55
Marija Stevanović, Sanja Petrović, Bojana Danilović, Ljiljana Stanojević, Jelena Zvezdanović, Jelena Stanojević, Dragan Cvetković	
DETERMINATION OF THE MINERAL CONTENT OF <i>CENTAURIUM ERYTHRAEA</i> EXTRACTS BY ICP-OES.	56
Valentina G. Nikolić, Sanja M. Petrović, Saša R. Savić, Ivan M. Savić, Ivana M. Savić Gajić, Ina B. Konstantinović, Sandra S. Konstantinović	
UHPLC-DAD-ESI-MS ANALYSIS OF WASTE AS HERBAL TEA PRODUCTS FROM <i>Malus sylvestris</i> (WILD APPLE).....	57
Slađana V. Dončić, Jelena B. Zvezdanović, Dragan Troter, Ina B. Konstantinović Sandra S. Konstantinović	
THE PHOTOSTABILITY AND DYEING ABILITY OF SOME ANTHRAQUINONE REACTIVE DYES FOR COTTON AND PAPER.....	58
Polya Miladinova, Dimitrina Todorova	
SYNTHESIS AND INVESTIGATION OF 1,8-NAPHTHALIMIDE DERIVATIVE WITH SENSOR ACTIVITY .....	59
Polya Miladinova	
OXALINE AS "GREEN" SOLVENT AND CATALYST FOR SYNTHESIS OF 5-NITROISATIN-3-SEMICARBAZONE .....	60
Natalija T. Colić, Dragan Z. Troter, Bratislav Ž. Todorović, Zoran B. Todorović, Sandra S. Konstantinović	
INVESTIGATING INTO THE ADSORPTION MECHANISM OF HEAVY METALS ONTO GRAPHENE OXIDE	61
Jovana Pešić, Jasmina Nikić, Jasmina Agbaba, Marijana Kragulj Isakovski, Marko Šolić, Marija Ćurčić, Aleksandra Tubić, Malcolm Watson	
THE INFLUENCE OF CROSS-LINKER ON THE SWELLING PROCESS OF POLY( <i>N</i> -ISOPROPYLMETHACRYLAMIDE-CO- <i>N</i> -ISOPROPYLACRYLAMIDE) .....	62
Maja Urošević, Ljubiša Nikolić, Vesna Nikolić, Ivana Gajić, Ana Dinić, Snežana Ilić-Stojanović, Marijana Vladimirov, Natalija Tošić, Vojkan Miljković	
CHARACTERIZATION OF SYNTHESIZED THERMOSENSITIVE HYDROGELS .....	63
Maja Urošević, Ljubiša Nikolić, Vesna Nikolić, Ivana Gajić, Ana Dinić, Snežana Ilić-Stojanović, Marijana Vladimirov, Natalija Tošić, Vojkan Miljković	



ANTIOXIDANT ACTIVITY OF COMMERCIAL AND ISOLATED ESSENTIAL OIL OF INDIAN FRANKINCENSE ( <i>Boswellia serrata</i> ).....	64
Natalija Tošić, Ljubiša Nikolić, Vesna Nikolić, Ljiljana Stanojević, Ivana Gajić, Maja Urošević, Ana Dinić, Marijana Vladimirov	
COMPARATIVE GC/MS ANALYSIS OF COMMERCIAL AND ISOLATED ESSENTIAL OIL OF INDIAN FRANKINCENSE ( <i>Boswellia serrata</i> ).....	65
Natalija Tošić, Vesna Nikolić, Ljubiša Nikolić, Jelena Stanojević, Ljiljana Stanojević, Maja Urošević, Ana Dinić, Ivana Gajić	
CHARACTERISATION OF THE ELECTROSPUN POLY(LACTIDE) NANOFIBERS WITH BIOCHANIN A .....	66
Ivana Gajić, Ana Dinić, Maja Urošević, Vesna Nikolić, Ivan Ristić, Aleksandra Nešić, Branka Pilić, Stevo Najman	
IN VITRO RELEASE OF BIOCHANIN A FROM THE ELECTROSPUN POLY(VINYLPYRROLIDONE) NANOFIBERS .....	67
Ivana Gajić, Ana Dinić, Maja Urošević, Ljubiša Nikolić, Natalija Tošić, Marijana Vladimirov, Ivan Ristić, Ljiljana Stanojević	
ANTIOXIDANT ACTIVITY OF BETULIN, BETULINIC ACID AND WHITE BIRCH BARK EXTRACT ( <i>Betula pendula</i> ).....	68
Marijana Vladimirov, Vesna Nikolić, Ljiljana Stanojević, Ana Dinić, Maja Urošević, Ivana Gajić, Natalija Tošić, Ljubiša Nikolić	
GC-MS ANALYSIS OF THE WHITE BIRCH BARK EXTRACT ( <i>Betula pendula</i> ) .....	69
Marijana Vladimirov, Vesna Nikolić, Jelena Stanojević, Ana Dinić, Maja Urošević, Ivana Gajić, Ljubiša Nikolić	
EFFICIENCY OF "BRITA" HOME WATER FILTER FOR WATER PURIFICATION .....	70
Dijana Drljača, Dajana Dragić, Sanja Banjac	
THE INFLUENCE OF POLY(N-ISOPROPYLMETHACRYLAMIDE) HYDROGELS CROSSLINKING ON THEIR SWELLING CAPACITY.....	71
Snežana Ilić-Stojanović, Ljubiša Nikolić, Stevo Najman, Djordje Petrović, Maja Urošević, Vesna Nikolić, Suzana Cakić	
DECOMPOSITION OF POLY(N-ISOPROPYLMETHACRYLAMIDE) HOMOPOLYMER NETWORK .....	72
Snežana Ilić-Stojanović, Ljubiša Nikolić, Djordje Petrović, Jelena Stanojević, Maja Urošević, Vesna Nikolić, Suzana Cakić	
BRILLIANT GREEN DYE BIOSORPTION USING IMMOBILIZED SPENT BREWER'S YEAST.....	73
Tanja Ž. Krunic, Marica B. Rakin, Marko P. Rakin	
PRETREATMENT OF BIOMASS PELLETS BY ACID WASHING IN ORDER TO REDUCE ALKALINE COMPONENTS .....	74
Tatjana Botić, Dijana Drljača, Petar Gvero, Dajana Dragić, Aleksandra Borković, Slobodan Rakulj	
CONTEMPORARY STATE AND POSSIBILITIES OF FURTHER DEVELOPMENT OF COAL MINE PLJEVLJA .....	75
Biljana Zlatičanin, Sandra Kovačević	
ASH COMPOSITION OF MONTENEGRO COAL .....	76
Biljana Zlatičanin, Sandra Kovačević	
COMPARATIVE ANALYSIS OF BLEACHING OF SUNFLOWER OIL WITH COMMERCIAL BLEACHING EARTH AND BENTONITE POWDER ACTIVATED WITH SULFURIC ACID .....	77
Zoran Petrović, Jelena Mihajlović, Sabina Begić, Dragana Kešelj, Zorica Stojanović, Amir Fazlić	
MOUNTAIN GERMANDER (TEUCRIUM MONTANUM L.) - CHARACTERIZATION AND DETERMINATION OF TOTAL PHENOLS AND FLAVONOIDS IN THE EXTRACT OBTAINED BY THE CONVENTIONAL METHOD .....	78
Zoran Petrović, Nataša Stojanović, Tatjana Botić, Pero Dugić, Nebojša Vasiljević	

<b>BIOTECHNOLOGY .....</b>	<b>79</b>
ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES STABILIZED OF EXTRACT <i>Fumaria officinalis</i> L. ....	80
Slobodan Glišić	
CHARACTERIZATION OF CRUDE GLYCEROL FROM BIODIESEL INDUSTRY IN REPUBLIC OF SERBIA ..	81
Ida Zahović, Jelena Dodić, Ivana Pajčin, Jovana Grahovac, Zorana Trivunović	
XANTHAN BIOSYNTHESIS ON CRUDE GLYCEROL-BASED MEDIUM BY CULTIVATION OF <i>Xanthomonas</i> ISOLATE IN LABORATORY BIOREACTOR.....	82
Ida Zahović, Jelena Dodić, Damjan Vučurović, Siniša Dodić, Bojana Bajić, Zorana Trivunović	
THE CHARACTERISATION OF SILYMARIN AND SILIBININ LOADED LIPOSOMES .....	83
Aleksandra A. Jovanović, Svetlana Dinić, Aleksandra Uskoković, Jelena Arambašić Jovanović, Nevena Grdović, Melita Vidaković, Mirjana Mihailović	
THE IMPACT OF pH VALUE AND TEMPERATURE ON POLYPHENOL RECOVERY, ANTIOXIDANT CAPACITY AND PHYSICAL PROPERTIES OF SERPYLLI HERBA'S WASTE EXTRACTS.....	84
Aleksandra A. Jovanović, Predrag M. Petrović, Mina Volić, Nataša Obradović, Bojana Balanč, Radoslava Pravilović, Branko M. Bugarski	
THE POSSIBILITY OF ANTIBIOTIC AZALOMYCIN B PRODUCTION BY COMBINING BENZOYL HYDRAZONE DERIVATIVES AND WASTE RAPESEED OIL GLYCEROL .....	85
Jovan Ćirić, Slavica Ilić, Sandra Konstantinović, Đorđe Lazarević, Marko Živković, Nikola Stanković	
ANTIMICROBIAL ACTIVITY OF KOMBUHA BEVERAGE FROM BASIL WASTE MATERIAL .....	86
Dragoljub Cvetković, Aleksandra Ranitović, Ana Tomić, Olja Šovljanski, Siniša Markov, Milica Aćimović	
INHIBITION OF ALDO-KETO REDUCTASE 1C4 ACTIVITY BY A-RING FUSED PYRIDINE D-MODIFIED STEROIDS .....	87
Sofija Bekić, Marina Savić, Jovana Ajduković, Edward Petri, Anđelka Čelić	
BIOLOGICAL ACTIVITY EVALUATION OF STEROIDAL D-HOMO LACTONES .....	88
Sofija Bekić, Ivana Kuzminac, Andrea Nikolić, Marija Sakač, Edward Petri, Anđelka Čelić	
<b>FOOD TECHNOLOGY .....</b>	<b>89</b>
RESEARCH IN THE FIELD OF PACKAGING AND DISTRIBUTION OF PRODUCTS IN THE FOOD INDUSTRY .....	90
Slobodan Glišić	
THE ROLE OF NANOTECHNOLOGY IN PACKAGING AND MAINTENANCE OF FOOD PRODUCTS .....	91
Slobodan Glišić	
WASTEWATER IN THE FOOD INDUSTRY .....	92
Slobodan Glišić	
THE IMPORTANCE AND USE OF FOOD ADDITIVES AND THEIR EFFECT ON HEALTH .....	93
Slobodan Glišić	
APPLICATION OF BIODEGRADABLE POLYMERIC MATERIALS FOR FOOD PACKAGING.....	94
Slobodan Glišić	
COMPARATIVE ANALYSIS OF THE CHEMICAL COMPOSITION OF WILD CARROT ( <i>Daucus carota</i> L.) ESSENTIAL OILS OBTAINED BY STEAM AND HYDRO-DISTILLATION .....	95
Ljiljana Stanojević, Aleksandra Milenković, Slobodan Glišić, Jelena Stanojević, Dragan Cvetković, Jovana Milutinović, Dragana Pavlović	
RED WINE COLOR AND STABILITY AS FUNCTION OF SIZE AND CONTENT OF SILICA GEL PARTICLES.....	96
Tanja Šaran, Dragan Vujadinović, Zoran Petković, Milan Vukić, Vesna Gojković, Vladimir Tomović	

ANTIOXIDANT ACTIVITY OF ESSENTIAL AND FATTY OIL ISOLATED FROM CORIANDER ( <i>Coriandrum sativum</i> L.) SEEDS.....	97
Ljiljana Stanojević, Jelena Stanojević, Aleksandra Milenković, Slobodan Glišić	
AROMA PROFILE OF CIDER ENRICHED BY FOOD INDUSTRY BY - PRODUCTS - A GC/MS STUDY.....	98
Dragan Cvetković, Jelena Stanojević, Stojan Mančić, Sandra Stamenković Stojanović, Natalija Đorđević, Bojana Danilović, Ivana Karabegović	
THE SEASONAL VARIATIONS OF BIOCHEMICAL COMPOSITION OF COW'S MILK ON THE SOUTHERN SERBIA TERRITORY.....	99
Jovan Ćirić, Slavica Ilić, Aleksandar Veličković, Ivan Stojković, Dragana Stanisavljević, Nebojša Milosavljević	
BREAD WITH THE ADDITION OF FLAX SEED AS A FUNTIONAL FOOD .....	100
Gordana Jovanović, Ana Vasić, Ljubica Mijić, Ana Matić, Bojan Damjanović	
COMPARATIVE ANALYSIS OF OIL CONTENT IN ALTERNATIVE OIL SPECIES.....	101
Dajana Uletilović, Nada Grahovac, Snežana Kravić, Ana Đurović, Ana Marjanović-Jeromela, Žarko Kevrešan, Zorica Stojanović	
ICP-OES ANALYSIS OF REISHI AND CORDYCEPS ETHANOLIC EXTRACTS .....	102
Sandra Konstantinović, Dragan Stojiljković, Sanja Petrović, Saša Savić, Ina Konstantinović	
ISOLATION OF JUNIPER BERRY ( <i>Juniperis communis</i> L.) ESSENTIAL OILS BY MODERN AND CONVENTIONA HYDRODISTILLATION.....	103
Milena Terzić, Jelena Bajac, Igor Antić, Gökhan Zengin, Branislava Nikolovski, Marija Radojković	
LEGUME AUTHENTICATION METHOD BASED ON FATTY ACID COMPOSITION: A CASE OF GREEN BEAN AND PEAS.....	104
Marko Ilić, Kristian Pastor, Mirjana Vasić, Đura Vujić, Marijana Ačanski	
ANTIOXIDANT ACTIVITY OF ESSENTIAL OIL AND HYDROLATE FROM ANISI FRUCTUS ( <i>Pimpinella anisum</i> L.).....	105
Jelena Stanojević, Nataša Simonović, Ljiljana Stanojević, Aleksandra Milenković, Jelena Zvezdanović, Dragan Cvetković	
THE INFLUENCE OF <i>LACTOBACILLUS RHAMNOSUS</i> AND <i>LACTOBACILLUS HELVETICUS</i> ADMINISTRATION ON C57BL/6J MICE BODY WEIGHT.....	106
Gordana Zavišić, Slavica Ristić, Saša Petričević, Milena Rikalović	
EFFECT OF INCORPORATION OF THE PLANT EXTRACTS IN NATURAL CASING ON THE COLOR OF FERMENTED SAUSAGES.....	107
Ana Velemir, Snježana Mandić, Danica Savanović	
IMPACT OF FERMENTATION AND CARRIER COMPOSITION ON PROBIOTIC VIABILITY AND EFFICIENCY OF SPRAY DRY IMMOBILIZATION TECHNIQUE .....	108
Tanja Ž. Krunić, Marica B. Rakin	
THE EFFECT OF WILD THYME BY-PRODUCT EXTRACTS ON THE OXIDATIVE STABILITY OF COOKED HAMS WITH REDUCED LEVEL OF SODIUM NITRITE.....	109
Jovo Savanović, Branislav Šojić, Danica Savanović, Branimir Pavlić, Vladimir Tomović, Snežana Škaljac, Marija Jokanović	
CONTENT OF MACRO - AND MICROELEMENTS IN CHEESES PRODUCED WITH THE ADDITION OF DIFFERENT SPICES.....	111
Danica Savanović, Ana Velemir, Jovo Savanović, Jelena Sekulić	
POSSIBILITIES OF PRODUCTION OF FRESH CREAM CHEESE IN SEMI-INDUSTRIAL CONDITIONS .....	112
Danica Savanović, Jovo Savanović, Ana Velemir, Dijana Arsenić	
VALORIZATION OF FOOD INDUSTRY BY-PRODUCTS AS INGREDIENTS IN CIDER PRODUCTION.....	113
Bojana Danilović, Stojan Mančić, Sandra Stamenković Stojanović, Natalija Đorđević, Jelena Stanojević, Miodrag Lazić, Ivana Karabegović	
APPLICATION OF CHITOSAN COATING WITH THE ADDITION OF FREE AND NANOENCAPSULED <i>Satureja montana</i> L. ESSENTIAL OIL IN BEEF PRESERVATION.....	114

Bojana Danilović, Natalija Đorđević, Stojan Mančić, Jelena Stanojević, Dragan Cvetković, Ivana Karabegović, Dragiša Savić

INFLUENCE OF COLD MACERATION TREATMENT ON QUALITY AND AROMATIC PROFILE OF CHARDONNAY WINE ..... 115

Ivana Karabegović, Marko Malićanin, Sandra Stamenković Stojanović, Stojan Mančić, Miodrag Lazić, Bojana Danilović

EFFECT OF NATIVE YEAST STRAINS ON THE VOLATILE CHEMICAL PROFILE OF TAMJANIKA WINES ..... 116

Ivana Karabegović, Stojan Mančić, Sandra Stamenković Stojanović, Miodrag Lazić, Jelena Stanojević, Marko Malićanin, Bojana Danilović

HABITS OF FLUID INTAKE WITH STUDENTS..... 117

Dragana Ilić Udovičić, Ana Matić, Danijela Damnjanović, Aleksandra Vasić

EFFECT OF WHOLEGRAIN BUCKWHEAT FLOUR ADDITION ON CHEMICAL COMPOSITION AND SENSORY QUALITY OF NUTRITIVE ENRICHED WHEAT SCONES..... 118

Nataša Lakić-Karalić, Ladislav Vasilišin, Slavica Grujić, Božana Odžaković, Tanja Marić

## **QUALITY CONTROL AND FOOD SAFETY ..... 119**

EFFECT OF FORMULATION VARIABLES ON SENSORY QUALITY OF THERMO-REVERSIBLE FRUIT FILLING FOR FROZEN SEMI-FINISHED BAKERY PRODUCTS: MODELLING AND OPTIMIZATION ..... 120

Slavica Grujić, Božana Odžaković, Goranka Atelj

ASSESSMENT OF ALIMENTARY INTAKE OF LEAD AND CADMIUM IN THE ADULT POPULATION IN THE REPUBLIC OF NORTH MACEDONIA..... 121

Ana Mitrova Rudovska, Gordana Ristovska

DETERMINATION OF THE TOTAL PHENOLIC CONTENT AND THE ANTIOXIDANT ACTIVITY OF PLUM KERNEL OIL..... 122

Biljana S. Đorđević, Milan D. Kostić, Olivera S. Stamenković, Zoran B. Todorović, Vlada B. Veljković

TESTING OF THE SENSORY QUALITY OF FRESH WHEAT BREAD ON THE TERRITORY OF THE TOWN OF ŠABAC..... 123

Gordana Jovanović, Ljubica Mijić, Ana Vasić, Aleksandra Krsmanović, Bojan Damnjanović

CONCENTRATIONS OF HEAVY METALS IN DOMESTIC HONEY FROM THE WIDER AREA OF BOSNIA AND HERZEGOVINA ..... 124

H. Nanić, E. Pehlić, A. Džaferović, A. Šapčanin, A. Baltić, M. Halilović, M. Čejvan, M. Toromanović

ANTIMICROBIAL ACTIVITY OF COMMERCIAL CITRUS ESSENTIAL OILS..... 125

Nataša Simonović, Bojana Danilović, Ljiljana Stanojević, Dragan Cvetković, Jelena Zvezdanović, Jelena Stanojević

EVALUATION OF ANTIOXIDANT CAPACITY OF ONION EXTRACTS USING UV-VIS SPECTROSCOPY... 126

Mirjana S. Jankulovska, Lenche Velkoska-Markovska, Viktorija Sokolovska

THE CONTENT OF TOTAL IRON IN *Urtica dioica L.* FROM DIFFERENT LOCALITIES IN SERBIA..... 127

Jelena Đuričić Milanković, Kosana Popović, Mirjana Antonijević Nikolić, Bojana Milutinović, Danijela Damnjanović, Dragana Ilić Udovičić

THE PRESENCE OF PHOSPHATE IN MEAT PRODUCTS FROM THE MARKET OF REPUBLIC OF SRPSKA 128

Biljana Pećanac, Dragan Brenjo

CHEMICAL composition, BIOACTIVE COMPONENTS AND ANTIOXIDANT ACTIVITY OF WILD AND CULTIVATED BLACKBERRIES (*Rubus fruticosus L.*) ..... 129

Zoran Kukrić, Ladislav Vasilišin, Goran Vučić, Božana Odžaković, Pero Sailović

## **TEXTILE ENGINEERING ..... 130**

DYNAMICAL MODEL OF YARN REWINDING ..... 131

Nina Djapic

OPTIMIZATION OF THE CLASSICAL DYEING PROCESS OF PES KNITWEAR.....	132
Marija Kodrić, Suzana Đorđević, Nevena Tomić, Dragan Đorđević	
ANISOTROPY OF MECHANICAL PROPERTIES OF WOVEN TEXTILE MATERIALS IN PLAIN WEAVE.....	133
Jovana Stepanović, Tatjana Šarac, Dušan Trajković, Jovan Stepanović	
INFLUENCE OF KNIT PATTERN ON DIMENSIONAL STABILITY OF KNITTED FABRICS.....	134
Sandra Stojanović, Dušan Trajković, Jelka Geršak, Miodrag Đorđević	
DYEING OF POLYESTER FABRIC WITH SALICYLALDEHYDE-PHENYLHYDRAZONE.....	135
Milena Nikodijević, Milica Zlatković, Dragan Đorđević, Marija Kodrić, Sandra Konstantinović	
MECHANICAL CHARACTERISTICS ANALYSIS OF SEAMS IN KNITTED FABRICS.....	136
Nataša Stamenković, Nenad Ćirković, Dušan Trajković, Jovan Stepanović, Tatjana Šarac, Jovana Stepanović, Sandra Stojanović	
TESTING OF AIR AND WATER VAPOR PERMEABILITY IN FABRICS, NONWOVEN TEXTILES AND BLANKETS.....	137
Čedomir Dimić, Nenad Ćirković, Anita Sadiković, Ivana Petrović, Milena Nikodijević, Tatjana Šarac, Nataša Stamenković	
ANALYSIS OF DELAYS AND LOSS OF PRODUCTION TIME WHEN SEWING A WORKING BLOUSE.....	138
Nenad Ćirković, Ivana Petrović <sup>1</sup> Tatjana Šarac, Nataša Stamenković, Anita Sadiković, Čedomir Dimić	
CALCULATION OF THE NUMBER OF LAYERS WHEN LAYING KNITWEAR FOR THE PURPOSE OF PRODUCTION RATIONALIZATION IN PRODUCTION OF CHILDREN'S SWEATSHIRT.....	139
Nenad Ćirković, Tatjana Šarac, Nataša Stamenković, Jovan Stepanović, Dušan Trajković, Jovana Stepanović	
ANALYSIS OF ELASTIC PROPERTIES OF RIGHT-LEFT KNITTED FABRICS.....	140
Ivana Petrović, Nenad Ćirković, Tatjana Šarac, Nataša Stamenković, Anita Sadiković, Čedomir Dimić	
EFFECT OF HYDROGEN-PEROXIDE TREATMENT ON THE PHYSICO-MECHANICAL PROPERTIES OF FLAX FIBERS.....	141
Biljana Lazic, Svjetlana Janjic, Vesna Ivanovic, Mirjana Kostic	
ANTIMICROBIAL TREATMENT OF LEATHER LINING FOR FOOTWEAR WITH THE EXTRACTS OF <i>Picea omorika</i> AND COPPER (I) OXIDE.....	142
Dragana Grujić, Aleksandar Savić, Ljiljana Topalić-Trivunović, Blanka Škipina, Branka Ružičić, Milica Jovanić, Mitja Kolar, Boštjan Novak	
TEXTILE INDUSTRY SUPPLY CHAIN: FINISHED GOODS INVENTORY MANAGEMENT.....	143
Miroslav Dragic	
SORPTION OF LIDOCAINE ON CHEMICALLY TREATED WOOL.....	144
Svjetlana Janjić, Milanka Kačar, Srđan Ristić, Pero Sailović	

## **GRAPHIC ENGINEERING AND DESIGN..... 145**

A METHOD OF RANKING RESPONDENTS ACCORDING TO SENSE OF COLOR DIFFERENCES.....	146
Zoran Gazibarić, Predrag Živković, Vladimir Cviljušac, Miloš Ljubojević	
AN OVERVIEW OF VARIOUS POSSIBILITIES OF 3D PRINTING TECHNIQUES IN THE PRODUCTION OF FLEXOGRAPHIC PRINTING PLATES.....	147
Sandra Dedijer, Nemanja Kašiković, Magdolna Pal, Živko Pavlović, Gojko Vladić, Ivana Tomić, Bojan Banjanin	
CONTEMPORARY APPLICATIONS OF PULP MOULDED PACKAGING.....	148
Gojko Vladić, Nemanja Kašiković, Sandra Dedijer, Teodora Gvoka, Gordana Bošnjaković	
INFLUENCE OF THE SUBSTRATE ON THE PERMANENCE OF PRINTING INK.....	149
Branka Ružičić, Mladen Stančić, Đorđe Vujčić, Milijana Milić	
REMARKS ABOUT PRINTING AUTOMATION.....	150

Thomas Hoffmann Walbeck, Živko Pavlović

COMPARISON OF COLORIMETRIC RESULTS OBTAINED BY SPHERICAL AND SPECTROPHOTOMETER WITH DIRECTIONAL GEOMETRY ON SAMPLES WITH EXTREME UV VARNISH APPLICATION..... 151  
Đorđe Vujčić, Sandra Dedijer, Mladen Stančić, Branka Ružičić, Igor Majnarić

## **ENVIRONMENTAL ENGINEERING AND ECOLOGY ..... 152**

ADSORPTION OF BEMACID RED DYE FROM AQUEOUS SOLUTIONS ON COAL FLY ASH MODIFIED WITH HCl ..... 153  
Dragana Raca, Ljiljana Vukić, Dijana Drljača, Dajana Dragić

ANALYSIS OF THE PHYSICO-CHEMICAL PARAMETERS OF VARDAR RIVER WATER FROM 2018 TO 2021 ..... 154  
Tamara Jovanovska, Aleksandra Petrova, Donka Doneva-Sapceska, Mihail Kocubovski, Rejhan Muhamed Xumkar

DEPOSITION OF GOETHITE AND FERRIHYDRITE ONTO EXPANDED VERMICULITE SURFACE: CHEMICAL PROPERTIES AND POTENTIAL APPLICATION ..... 155  
Mladen Bugarčić, Aleksandar Jovanović, Aleksandar Marinković, Jovana Bošnjaković, Miroslav Sokić, Ana Radosavljević Mihajlović, Milan Milivojević

CARBOHYDRATE-COATED CERIUM OXIDE NANOPARTICLES AFFECT THE GERMINATION OF *Sinapis alba* AND *Chenopodium rubrum* SEEDS THROUGH THE GENERATIONS ..... 156  
Ivana Milenković, Slađana Z. Spasić, Ksenija Radotić

ANTIBACTERIAL AND ANTIFUNGAL EFFECT OF S- AND N- CDs@AgMOFs NANOCOMPOSITES..... 157  
Ivana Milenković, Manuel Algarra, Kristina Joksimović, Vladimir Beškoski, Teresa J. Bandosz, Enrique Rodríguez-Castellón, Ksenija Radotić

CIRCADIAN ACTIVITY OF THE WELLS CATFISH (*SILURUS GLANIS*) IN THE DANUBE RIVER ..... 158  
Slađana Spasić, Marija Smederevac-Lalić, Mirjana Lenhardt, Stefan Hont, Marian Paraschiv, Ion Iani Marian, Iulian Nichersu, Cristian Trifanov, Miroslav Nikčević, Peter Klimley, Radu Suci

REMOVAL OF XENOBIOTICS FROM WASTEWATERS USING PHOTOLYSIS UNDER SUN-LIGHT IRRADIATION: EXPERIMENTAL APPROACH AND PROCESS DESIGN ..... 159  
Aleksandar Jovanović, Mladen Bugarčić, Nataša Knežević, Jovana Bošnjaković, Jelena Lukić, Antonije Onjia, Aleksandar Marinković

PHYSICO-CHEMICAL TREATMENT OF HAZARDOUS COAL TAR WASTE BY THE SOLIDIFICATION PROCESS FOR THE PURPOSE OF ITS FINAL DISPOSAL ..... 160  
Siniša Cukut, Nebojša Knežević

GHG EMISSIONS IN THE CURRENT AND FUTURE MSW MANAGEMENT SYSTEM IN ZVORNIK, B&H... 161  
Draženko Bjelić, Borislav Malinović, Dragana Nešković Markić, Brankica Gegić

SOLAR STABILITY OF COMMERCIAL PESTICIDES THAT CONTRIBUTE TO THE QUALITY OF GRAPES AND FRUITS..... 162  
Maria M. Savanović, Aleksandra Jovanoski Kostić, Andrijana Vukojević, Stevan Armaković, Jelena Kalajdžić, Biserka Milić, Mladen Kalajdžić, Svetlana Pelemiš, Sanja J. Armaković

COMPARATIVE ASSESSMENT OF ZINC IONS SORPTION AND RETENTION BY PROSPECTIVE UNCONVENTIONAL SOIL ADDITIVES ..... 163  
Ivana Smičiklas, Marija Egerić, Mihajlo Jović

PERSPECTIVES OF CONSTRUCTION WASTE MANAGEMENT ..... 164  
Zorica Eraković, Ivana Mladenović-Ranisavljević, Stanko Žerajić

A TRIETHANOLAMINE-BASED DEEP EUTECTIC SOLVENT IN THE CALCIUM OXIDE CATALYZED ETHANOLYSIS OF *Brassica nigra* L. SEED OIL ..... 165  
Biljana S. Đorđević, Milan D. Kostić, Olivera S. Stamenković, Zoran B. Todorović, Ljiljana M. Veselinović, Vlada B. Veljković

DRY-WASHING PURIFICATION OF CRUDE BIODIESEL OBTAINED BY ALKALI-CATALYZED TRANSESTERIFICATION ..... 166

Ivan J. Stojković, Vladimir P. Pavićević, Vlada B. Veljković	
REUSABLE Fe <sub>2</sub> O <sub>3</sub> /TiO <sub>2</sub> /PVC PHOTOCATALYSTS SYNTHESIS AND APPLICATION FOR THE REMOVAL OF METHYLENE BLUE IN PRESENCE OF SIMULATED SOLAR RADIATION .....	167
Ivana Jagodić, Nemanja Banić	
A GREEN ADSORBENT BASED ON WHEAT STARCH FOR REMOVAL OF SELECTIVE ORGANIC POLLUTANTS FROM AQUEOUS SOLUTIONS .....	168
Nataša Karić, Marija Vukčević, Marina Maletić, Mirjana Ristić, Aleksandra Perić-Grujić, Katarina Trivunac	
EFFECT OF ALKALI MODIFICATION ON ADSORPTION EFFICIENCY OF FLY ASH .....	169
Nataša Karić, Sara Živojinović, Marija Vukčević, Marina Maletić, Aleksandra Perić-Grujić, Katarina Trivunac	
USE OF AGRICULTURAL WASTE AS RAW MATERIALS FOR OBTAINING GLASS AND GLASS-CERAMICS: A REVIEW .....	170
Vladimir S. Topalović, Jelena D. Nikolić, Veljko V. Savić, Srdjan D. Matijašević, Marija S. Djošić, Snežana N. Zildžović, Snežana R. Grujić	
PHOTOCATALYTIC DECOMPOSITION OF DIFENOCONAZOLE FROM WASTEWATERS .....	171
Jovana Bošnjaković, Nataša Knežević, Srećko Manasijević, Aleksandar Jovanović, Mladen Bugarčić, Aleksandar Marinković	
UTILIZATION OF CONSTRUCTION MATERIAL AND UNSATURATED RESIN FROM WASTE PET AS A STABILIZER FOR DESORBED METAL ION Pb <sup>2+</sup> .....	172
Nataša Knežević, Jovana Bošnjaković, Aleksandar Jovanović, Mladen Bugarčić, Srećko Manasijević <sup>2</sup> Aleksandar Marinković	
ANALYSIS OF ARSENIC MONITORING IN GROUNDWATER OF THE REPUBLIC OF SERBIA FOR THE PERIOD 2018-2020 .....	173
Dunja Plavšić, Dimitrije Isoski, Ana Vidaković	
ECOLOGICAL RISKS FROM THE EMITTED HARMFUL GASES IN CASE OF FIRE ACTIONS ON STONE WOOL .....	174
Veronika Karadjova, Hristo Serbezov, Stefan Parvanov, Detelin Spasov	
GHG EMISSIONS FROM ROAD TRANSPORT IN THE REPUBLIC OF SRPSKA ACCORDING TO COPERT V MODEL .....	175
Ranka Radic, Svjetlana Borojevic, Ajda Seranic, Darko Sipka	
SLOW PYROLYSIS – TOOL FOR IMPROVEMENT OF FUEL PROPERTIES OF LIGNOCELLULOSIC WASTE. 176	
Zorica Lopičić, Anja Antanasković, Tatjana Šoštarić, Vladimir Adamović, Marina Orlić, Jelena Milojković, Milan Milivojević	
BIOCHAR AS EFFICIENT TOOL FOR SOIL AMMENDMENT .....	177
Zorica Lopičić, Anja Antanasković, Tatjana Šoštarić, Vladimir Adamović, Marina Orlić, Jelena Petrović, Jelena Avdalović	
ANTIBACTERIAL ACTIVITY OF SURFACE AMINE-FUNCTIONALIZED SILVER-ENRICHED ZEOLITE ....	178
Sanja Jevtić, Jelena Dimitrijević, Jelena Petrović, Jelena Dikić	
SYNTHESIS AND APPLICATION OF HYDROXYAPATITE/ZEOLITE COMPOSITE FOR ADSORPTION OF HEAVY METAL IONS FROM WATER MATRICES .....	179
Sanja Jevtić, Katarina Sokić, Jelena Dikić	
A STUDY OF PV SYSTEM APPLICATION ON THE SUSTAINABLE DEVELOPMENT IN SERBIA .....	180
Dragana Todorović, Slavica Jovanović, Tijana Kevkić, Marija Stojanović Krasić, Nenad Milojević, Branko Drljača	
FROM ELECTROOXIDATIONS TO MULTIANALYTICAL EVALUATION OF PHENOL DEGRADATION.....	181
Aleksander Kravos, Tijana Đuričić, Gabriela Kalčikova, Borislav N. Malinović, Helena Prosen	
THE ENVIRONMENTAL STATE OF THE DANUBE RIVER NEAR POWER PLANT "KOSTOLAC", SERBIA	182
Gordana Devic, Marija Pergal, Miodrag Pergal	
POLLUTION INDICES AS A USEFUL TOOL FOR MONITORING SEDIMENT CONTAMINATION IN THE LAST TWO DECADES IN BOKA KOTORSKA BAY, ADRIATIC SEA .....	183
Milena Radmirović, Bojan Tanaskovski, Nevenka Mijatović, Chiara Cantaluppi, Federica Ceccotto, Antonije Onjia, Slavka Stanković	

STATISTICAL ANALYSIS OF POLLUTION INDICES IN THE LAST TWO DECADES FOR THE BOKA KOTORSKA BAY, ADRIATIC SEA.....	184
Milena Radomirović, Bojan Tanaskovski, Nevenka Mijatović, Milica Vasić, Lato Pezo, Antonije Onjia, Slavka Stanković	
TIME AND SEASONAL VARIATIONS OF PARTICULATE MATTER (PM) AND GASEOUS POLLUTANTS CONCENTRATIONS IN AMBIENT AIR OF VALJEVO, SERBIA .....	185
Jelena Đuričić Milanković, Dragana Đorđević	
CONDITIONING OF WASTE SLUDGE FROM THE BIOLOGICAL WASTEWATER TREATMENT PLANT OF THE COKE INDUSTRY GIKIL.....	186
Mirnesa Zohorović, Abdel Đozić, Vedran Stuhli, Ljilja Bojanović, Adisa Halilčević Kovač, Edisa Papračanin, Emra Halilović, Jasmin Pandurović	
HISTOLOGY OF THE DIGESTIVE TRACT OF THE ENDEMIC AND ENDANGERED <i>SALMO OBTUSIROSTRIS</i> (TELEOSTEI: SALMONIDAE) FROM THE RIVER BUNA (NERETVA RIVER BASIN, BOSNIA AND HERZEGOVINA) .....	187
Ingrid Wolf Stefan, Ivana Markotić	
ORGANIC BIO-DEGRADABLE WASTE IN FRUIT PRODUCTION .....	188
Milica Đeković Šević, Zoranka Malešević, Milan Šević, Tamara Bartošek	
BIOFUELS AS A CHALLENGE OF SUSTAINABLE DEVELOPMENT .....	189
Saša Papuga, Aleksandra Kolundžija, Milica Đurđević	
ADSORPTION OF METHYLENE BLUE ON WASTE NEWSPAPER .....	190
Sanda Pilipović, Dijana Drljača, Tatjana Botić, Dajana Dragić, Aleksandra Borković	
<b>MATERIAL SCIENCE AND METALLURGY .....</b>	<b>191</b>
MANGANESE-PYROMELLITATE COMPLEX AS A PRECURSOR FOR PREPARATION OF SPINEL $Mn_3O_4$ ..	192
Lidija Radovanović, Željko Radovanović, Aleksandar Kremenović, Bojana Simović, Milica V. Vasić, Jelena Rogan	
DETERMINATION OF THE OPTIMAL THICKNESS FOR PROTECTION OF FIRE-RESISTANT AIR DUCTS ..	193
Veronika Karadjova, Nelly Simeonova, Stefan Parvanov	
OPTICAL LIGHT BEAM PROPAGATION CONTROL TROUGHT THE DEFECT IN ONE-DIMENSIONAL PHOTONIC LATTICE .....	194
Slavica Jovanović, Dragana Todorović, Marija Stojanović-Krasić, Tijana Kevkić, Nenad Milojević, Branko Drljača	
SURFACE CHARACTERISTICS OF POLYURETHANE/ORGANOCLAY NANOCOMPOSITES .....	195
Milena Rašljčić-Rafajilović, Dana Vasiljević-Radović, Milena Špírková, Gordana Gojgić-Cvijović, Marija V. Pergal	
CHARACTERIZATION OF POLY(DIMETHYLSILOXANE)/LASER-INDUCED GRAPHENE COMPOSITES...	196
Milena Rašljčić-Rafajilović, Dana Vasiljević-Radović, Teodora Vičentić, Marko Spasenović, Marko Bošković, Igor Pašti, Marija V. Pergal	
FLOWER-SHAPED MAGNETIC NANOPARTICLES FOR THERANOSTIC APPLICATIONS .....	197
Miloš Ognjanović, Marija Mirković, Željko Prijović, Sanja Vranješ-Đurić, Bratislav Antić	
THERMODYNAMIC PROPERTIES OF COMPOUND CRYSTALLINE NANOSTRUCTURES .....	198
Siniša M. Vučenović, Jovan P. Šetrajčić	
SIMULATION OF THE IMPACT OF PREHEATING TEMPERATURE ON RAILWAY ALUMINOTHERMIC WELDING .....	199
Gvozden Jovanović, Vaso Manojlović, Miroslav Sokić, Alen Delić, Milorad Gavrilovski	
THE INFLUENCE OF COMPOSITION ON THE PROPERTIES OF THERMOPLASTIC POLYURETHANE NANOCOMPOSITES.....	200
Gordana Dević, Milena Špírková, Miloš Steinhart, Sanja Ostojić, Dana Vasiljević-Radović, Ivan Stefanović, Marija V. Pergal	
<b>OTHERS.....</b>	<b>201</b>



STUDY OF ISOTHERMAL, KINETIC, AND THERMODYNAMIC PARAMETERS FOR SORPTION OF VANADIUM.....	202
Tamara T. Tadić, Bojana M. Marković, Aleksandra B. Nastasović, Ljiljana T. Suručić, Zvezdana P. Sandić , Antonije E. Onjia	
REMOVAL OF LINDANE FROM AQUEOUS SOLUTION BY GLYCIDYL METHACRYLATE BASED CHELATING MACROPOROUS COPOLYMER: KINETICS AND MECHANISM.....	203
Tamara T. Tadić, Bojana M. Marković, Mila V. Ilić, Aleksandra B. Nastasović, Antonije E. Onjia	
THE USE OF SOFT FOOD AS A VEHICLE FOR DRUG DELIVERY TO PEDIATRIC POPULATION – EFFECTS ON DISSOLUTION OF PROPRANOLOL .....	204
Maja Mirjanić, Aneta Stojmenovski, Biljana Gatarić, Nataša Bubić Pajić, Anđelka Račić	
BIOMONITORING ARSENIC SPECIES USING HONEY BEES .....	205
Nenad Zaric, Simone Braeuer, Walter Goessler	
EXPERIMENTAL DETERMINATION OF FIRE RESISTANCE OF STEEL ELEMENTS (X-BRACE) PROTECTED WITH INTUMESCENT PAINT .....	206
Neli Simeonova	
EXPERIMENTAL DETERMINATION OF FIRE RESISTANCE OF STEEL ELEMENTS (X-BRACE) PROTECTED WITH ROCK WOOL.....	207
Neli Simeonova	

## ANTIBACTERIAL ACTIVITY OF SURFACE AMINE-FUNCTIONALIZED SILVER-ENRICHED ZEOLITE

Sanja Jevtić<sup>1</sup>, Jelena Dimitrijević<sup>2</sup>, Jelena Petrović<sup>2</sup>, Jelena Dikić<sup>3</sup>

<sup>1</sup>Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia

<sup>2</sup>Institute for Technology of Nuclear and Other Mineral Raw Materials, Belgrade, Serbia

<sup>3</sup>Innovation Centre of the Faculty of Technology and Metallurgy, University of Belgrade, Belgrade, Serbia  
Corresponding author e-mail: sanja@tmf.bg.ac.rs

### Abstract

Natural zeolite-clinoptilolite (from Vranjska Banja deposit in Serbia) and synthetic Beta zeolite, were amin-functionalized using (3-aminopropyl)-triethoxysilane (APTES). The results of the Fourier transform infrared spectroscopy and thermogravimetric analysis confirmed the presence of amino groups derived from APTES onto the modified zeolite surface. APTES-enriched zeolite was further used as an adsorbent of silver ions from aqueous solutions. Natural zeolite-clinoptilolite showed a higher adsorption capacity (96 mg Ag/g), compared to beta zeolite (54 mg Ag/g) which is attributed to the presence of exchangeable cations in the structure of clinoptilolite. The kinetic data follows the pseudo-second-order model which indicates a chemical interaction between silver ions and functional amino groups on the surface of the zeolite. Ag-APTES and APTES-enriched zeolites further were studied as antibacterial agents toward the pathogenic bacteria Gram-negative *Escherichia coli* DSM 498 and Gram-positive *Staphylococcus aureus* ATCC 25923. Based on the results, it was concluded that the APTES-zeolites do not exhibit antibacterial activity while Ag-APTES enriched zeolites shows antibacterial effect toward both examined bacterial strains. Antibacterial activity is attributed to the presence of silver ions.

**Keywords:** clinoptilolite, beta zeolite, aminosilane, silver ions, antibacterial activity.