



University of Belgrade, Technical Faculty in Bor



ECOENTER

**30th International Conference Ecological Truth
& Environmental Research
2023**

Proceedings

**Editor
Prof. Dr Snežana Šerbula**





University of Belgrade, Technical Faculty in Bor



ECO-TRUTH

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& Environmental Research
2023

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PREFACE

The 30th international conference Ecological Truth & Environmental Research – EcoTER'23 kept three areas in focus: ecology, environmental protection and sustainable development. The conference will be held on Mt Stara Planina in hotel Stara Planina, Serbia, 20–23 June 2023. The monograph is published on the occasion of the 30th anniversary of the conference. On behalf of the scientific and organizing committee, it is a great honor and pleasure to wish all the participants a warm welcome to the conference.

The monograph is published on the occasion of the 30th anniversary of the conference.

We hope to convey the message of the conference, which is that a transformation of attitudes and behavior would bring the necessary changes. This is also an opportunity for the participants who are experts in this field to exchange their experiences, expertise and ideas, and also to consider the possibilities for their collaborative research.

The 30th international conference Ecological Truth & Environmental Research – EcoTER'23 is organized by the University of Belgrade, Technical Faculty in Bor, and co-organized by the University of Banja Luka, Faculty of Technology, the University of Montenegro, Faculty of Metallurgy and Technology – Podgorica, the University of Zagreb, Faculty of Metallurgy – Sisak, the University of Pristina, Faculty of Technical Sciences – Kosovska Mitrovica and the Association of Young Researchers, Bor.

These Proceedings 103 papers from the authors coming from the universities, research institutes and industries in 11 countries: Australia, USA, Brazil, Spain, Portugal, Libya, Italy, Bulgaria, Bosnia and Herzegovina, North Macedonia, and Serbia.

As a part of this year's conference, the 5th Student Session – EcoTERS'23 is being held. We appreciate the contribution of the students and their mentors who have also participated in the conference.

The support of the Gold donor and their willingness and ability to cooperate has been of great importance for the success of the EcoTER'23. The organizing committee would like to extend their appreciation and gratitude to the Gold donor of the conference for their donation and support.

We appreciate the effort of all the authors who have contributed to these Proceedings. We would also like to express our gratitude to the members of the scientific and organizing committees, reviewers, speakers, chairpersons and all the conference participants for their support to the EcoTER'23. Sincere thanks go to all the people who have contributed to the successful organization of the EcoTER'23.

Prof. Snežana Šerbula,

President of the scientific and organizing committee

TABLE OF CONTENTS

Plenary Lecture

- Lidija Mančić, M. E. Rabanal, B. Marinković*
OPTICALLY ACTIVE NANOMATERIALS FOR ENVIRONMENTAL
REMEDICATION 2

Invited Lectures

- Aleksandra A. Jovanović*
THE EXTRACTION OF ACTIVE COMPOUNDS FROM PLANT WASTE:
THE POTENTIAL IN HUMAN AND INDUSTRIAL APPLICATIONS AS
THE CONCEPT OF ZERO WASTE IN THE CIRCULAR ECONOMY 7
- Tanja Brdarić*
ELECTROCHEMICAL ADVANCED OXIDATION PROCESSES FOR
WASTEWATER TREATMENT: RECENT ADVANCES AND
PERSPECTIVES 18
- Mirjana Marković, S. Radmanović, Đ. Čokeša, N. Potkonjak*
HUMIC ACIDS IN THE ENVIRONMENT 30
- Mira Stanković, M. Prokopijević, D. Bartolić, J. Stevanović, F. Andrić, K. Radotić*
ADVANCED OPTICAL TOOLS APPLIED ON HONEY SAMPLES FOR
BEE HEALTH STATUS MONITORING 40
- Dragana Bartolić, M. Nikolić, M. Stanković, M. Prokopijević, M. Algara,
S. Stanković, K. Radotić*
ESTIMATION OF THE ANTIFUNGAL ACTIVITY OF THE TWO
DIFFERENT CARBON DOTS AGAINST *Aspergillus flavus* 47

Conference Papers

Environmental monitoring and impact assessment

- Ana Čučulović, J. Stanojković, R. Čučulović, M. Stanković*
RADIOACTIVITY IN SOIL AND MOSSES FROM THE SPECIAL
NATURE RESERVE OF ZASAVICA IN 2021 56
- Djurdja Petrov, M. Ocokoljić, N. Galečić, D. Skočajić, I. Simović*
Chaenomeles × *superba* 'PINK LADY' IN DESIGNING PRIVATE
GARDENS IN CONDITIONS OF CLIMATE CHANGE 62

Mirjana Đurašević, I. Čeliković, I. Kandić, T. Milanović, A. Samolov, N. Mladenović Nikolić, A. Kandić	
ACTIVITY CONCENTRATIONS OF ^{210}Pb , ^{137}Cs , AND ^{40}K IN WILD MUSHROOMS FROM SERBIA AND THEIR EFFECTIVE DOSE TO INGESTION	69
Jelena Čović, M. Z. Momčilović, M. Randelović	
LANTHANUM IMMOBILIZED ONTO GRAPHENE AS A CATALYST DESIGNED FOR ELECTROCHEMICAL APPLICATIONS	75
Jelena Čović, M. Z. Momčilović, M. Randelović	
NITROGEN DOPED CARBON MICROSPHERES SUPPORTED ONTO MWCNT AS NOVEL ELECTRODE MATERIAL	82
Aleksandra Nesic, S. Meseldzija, M. Momcilovic	
SUSTAINABLE PECTIN MONOLITH CRYOGELS	88
Daniela Djikanović, O. Prodanović, J. Dragišić Maksimović, J. Jovanović, A. Kalauzi, D. Spasojević, K. Radotić	
INVESTIGATION OF SILICA-LIGNIN INTERACTION. APPLICATION OF AFM AND FLUORESCENCE TECHNIQUES	94
Vesna Djikanović, J. Čanak Atlagić, K. Zorić, S. Andjus, M. Ilić, V. Nikolić, K. Jovičić	
COMPOSITION OF THE FISH COMMUNITY OF THE RIBNICA RIVER WITH RESPECT TO THE CONSERVATION STATUS	99
Nikola Marinković, B. Tubić, A. Atanacković, N. Popović, J. Tomović, M. Raković, M. Paunović	
INDICATIVE ECOLOGICAL STATUS ASSESSMENT OF RIBNICA RIVER (KOLUBARA BASIN) BASED ON AQUATIC MACROINVERTEBRATES	104
Tamara Petronijević, I. Kostić Kokić, T. Anđelković, B. Zlatković, K. Kitanović, D. Bogdanović, N. Stanković	
INFLUENCE OF FREEZING ON NITRATE AND NITRITE CONTENT IN RADISH, PARSLEY LEAF AND CELERY ROOT	109
Marija Matić, D. Pavlović, V. Perović, D. Sekulić, N. Radulović, M. Mitrović, P. Pavlović	
DETERMINATION OF PTEs CONTENT IN LIVESTOCK FODDER AND SOIL IN THE VICINITY OF THERMAL POWER PLANTS AND ASH DISPOSAL SITES	115
Sonja Veljović Jovanović, S. Milić Komić, B. Živanović, A. Sedlarević Zorić, N. Šušić	
LEAF NITROGEN BALANCE INDEX USED TO MONITOR STRESS RESPONSE TO AIR POLLUTION OF DECIDUOUS TREE SPECIES GROWN IN URBAN ZONE OF BELGRADE	122

Bojana Živanović, S. Milić Komić, A. Sedlarević Zorić, A. Jelušić, N. Šušić, S. Marković, S. Veljović Jovanović	
USE OF BIOCHEMICAL METHODS FOR ASSESING OXIDATIVE STRESS IN TREES IN URBAN AREA DURING GROWING SEASON	129
Nikola Šušić, S. Milić Komić, B. Živanović, A. Jelušić, S. Marković, A. Sedlarević Zorić, S. Veljović Jovanović	
ACCLIMATION OF PEDUNCULATE OAK SEEDLINGS TO DIFFERENT LIGHT CONDITIONS IN THE FIRST MONTHS AFTER GERMINATION	135
Božica Vasiljević, J. Đuknić, N. Marinković	
BENTHIC DIATOMS AS PROXY FOR THE ECOLOGICAL CONDITIONS OF THE RIBNICA RIVER, SERBIA	141
Milanka Negovanović, L. Kričak, S. Milanović, J. Marković, N. Simić, S. Ignjatović	
BLASTING MATS FOR THE PROTECTION OF PEOPLE, STRUCTURES AND THE ENVIRONMENT IN PROXIMITY TO THE BLAST SITE	147
Aleksandra Kolarski, V. Srečković, Z. Mijić	
INFLUENCES OF EXTREME SOLAR ACTIVITY ON EARTH ENVIRONMENT – CASE STUDY	154
Maja Poznanović Spahić, A. Gulan, D. Spahić, P. Tančić, S. Sakan, S. Petrović	
AVAILABILITY OF TOXIC ELEMENTS IN ROADSIDE SOILS (HIGHWAY 75, VOJVODINA, SERBIA): IS THERE ANY SIGNIFICANT CONTAMINATION RISK?	160
Tanja Kalinović, A. Radojević, J. Kalinović, J. Milosavljević, S. Šerbula	
MULTICRITERIA EFFICIENCY ASSESSMENT OF THE PINE TREE POTENTIAL FOR THE PHYTOREMEDIATION OF COPPER	167
Žaklina Tasić, M. Petrović Mihajlović, A. Simonović, M. Radovanović, M. Antonijević	
ELECTROCHEMICAL SENSING OF FOLIC ACID	173
Vanja Trifunović, S. Milić, Lj. Avramović, M. Antonijević, M. Radovanović	
POTENTIAL ENVIRONMENT POLLUTANT – INTERMEDIATE PRODUCT OF THE STEEL PRODUCTION PROCESS	179
Natalija Ognjanović, V. Nedelkovski, S. Stanković, S. Milić	
BIOPESTICIDES IN THE ENVIRONMENT	185
Urban and industrial ecology	
Goran Milentijević, M. Agatonović, M. Rančić, M. Milosavljević	
ENVIRONMENTALLY ACCEPTABLE PROCEDURE FOR THE SYNTHESIS OF TETRAETHYLTHIURAMMONOSULFIDE TETS	191

Andela Stojić, D. Tanikić, E. Požega	
TECHNOLOGICAL PROCESSES AS SOURCES OF POLLUTION IN THE ENVIRONMENT	198
Aleksandar Lisica, N. Stojanović, M. Veselinović, J. Petrović, N. Stavretović, M. Tešić	
LONDON PLANE (<i>Platanus × acerifolia</i> (Aiton) Willd.) IN THE STREET TREE LINES OF THE OLD TOWN IN BELGRADE	203
Djordja Petrov, M. Ocokoljić, N. Galečić, D. Skočajić	
APPLICATION OF SPECIES OF THE GENUS <i>Parthenocissus</i> L. IN URBAN GREEN INFRASTRUCTURE – STATE AND PERSPECTIVES	210
Djordja Petrov, M. Ocokoljić, N. Galečić, D. Skočajić, I. Simović	
SECOND FLOWERING OF <i>Philadelphus coronarius</i> L. IN GREEN-BLUE INFRASTRUCTURE OF BELGRADE	216
Dragana Pavlović, M. Matić, V. Perović, O. Kostić, D. Sekulić, M. Mitrović, P. Pavlović	
EFFECTS OF SO ₂ AND NO ₂ ON THE PHOTOSYNTHETIC EFFICIENCY AND CATALASE ANTIOXIDATIVE ENZYME ACTIVITY IN <i>Betula pendula</i> Roth	222
Ermenegilda Vitale, P. Napoletano, C. Arena, A. De Marco	
PLANT-SOIL RELATIONSHIPS IN MEDITERRANEAN SPECIES GROWN ON TECHNOSOLS ENRICHED WITH COMPOST	228
Air, water and soil pollution, prevention and control	
Milica Blažić, M. Milovanović, T. Sekulić, V. Stupar, Z. Živković	
IMPACTS OF PESTICIDE APPLICATION ON THE ENVIRONMENT	235
George Vuković, D. Kovačević, N. Đorđević, M. Perić, S. Knežević, M. Nikolić, B. Vlahović, V. P. Pavlović, G. Rašić, S. Nenadović, M. Ivanović, M. Mirković, V. B. Pavlović	
GREEN SYNTHESIS OF GEOPOLYMER-POLYURETHANE COMPOSITES FOR EM SHIELDING	241
Ana Vukmirović, B. Obrovski, S. Vukmirović, I. Mihajlović	
APPLICATION OF STATISTICAL METHODS FOR THE ANALYSIS OF WASTEWATER TREATMENT PLANT EFFICIENCY	247
Ivana Mihajlović, A. Hgeig, N. Živančev, M. Petrović, M. Novaković	
COMPARISON OF DIFFERENT SORBENTS IN THE HERBICIDE REMOVAL FROM WATER	251
Aleksandar Krstić, I. Bracanović, D. Vasić Anićijević, A. Kalijadis	
VALLME PREPARATION METHOD FOR THE DETERMINATION PHARMACEUTICALS IN WATER	256

Marija Koprivica, J. Petrović, J. Dimitrijević, M. Ercegović, M. Simić, M. Grubišić	
REMOVAL EFFICIENCY OF HEAVY METAL IONS FROM AQUEOUS SOLUTION WITH WASTE TREE BIOMASS HYDROCHARS	261
Nevena Surudžić, D. Spasojević, M. Stanković, M. Spasojević, R. G. A. Elgahwash, R. Prodanović, O. Prodanović	
HORSERADISH PEROXIDASE IMMOBILIZATION WITHIN MICRO-BEADS OF OXIDIZED TYRAMINE-ALGINATE FOR PHENOL REMOVAL FROM WASTEWATER	267
Dragica Spasojević, O. Prodanović, N. Surudžić, D. Djikanović, J. Simonović Radosavljević, K. Radotić, R. Prodanović	
WASTEWATER TREATMENT BY AMINATED PEROXIDASE IN ALGINATE HYDROGEL	272
Branislava Matić, M. Milić	
CONTRIBUTION OF INSTITUTE OF PUBLIC HEALTH OF SERBIA IN MONITORING TRAFFIC-INDUCED AIR POLLUTION IN BELGRADE	276
Nenad Malić, U. Matko, M. Trbić, R. Pijunović, M. Marković	
ALTERNATIVE METHODS OF REHABILITATION (SOIL RECOVERY), RECLAMATION AND REMEDIATION OF MINE TECHNOSOLS	283
Snežana B. Simić, K. A. Markeljić	
PRELIMINARY ECOLOGICAL STATUS ASSESSMENT OF THE GROŠNICA RIVER BASED ON PHYTOBENTHOS	289
Snežana B. Simić, N. B. Đorđević	
AN ASSESSMENT OF THE ECOLOGICAL POTENTIAL OF ŠUMARICE RESERVOIRS (CENTRAL SERBIA) BASED ON PHYTOPLANKTON	295
Miloš Prokopijević, M. Stanković, D. Bartolić, A. Lj. Mitrović, K. Radotić	
FLUORESCENCE CHARACTERISATION OF BISPHEENOL A IN VARIOUS SOLVENTS AND DRINKING WATER	302
Slobodan Ničković, L. Ilić, S. Petković, G. Pejanović, A. Huete, Z. Mijić	
NOVEL APPROACH IN AIRBORNE POLLEN DISPERSION MODELLING	306
Nena Velinov, S. Najdanović, M. Petrović, M. Radović Vučić, M. Kostić, J. Mitrović, A. Bojić	
THE APPLICATION OF SORBENT SYNTHESIZED USING ULTRASOUND FOR REMOVAL OF TEXTILE DYE	312
Milica Petrović, S. Najdanović, N. Velinov, S. Rančev, D. Radivojević, M. Radović Vučić, A. Bojić	
ATMOSPHERIC PRESSURE CORONA PLASMA DEGRADATION OF REACTIVE ORANGE 4 IN DEIONZED AND RIVER WATER	318

Slobodan Najdanović, M. Petrović, N. Velinov, M. Kostić, J. Mitrović, D. Bojić, A. Bojić	
THE INFLUENCE OF TYPE OF SOLVENT ON THE ELECTROCHEMICALLY SYNTHESIZED SORBENTS BASED ON BASIC BISMUTH NITRATES	324
Milena Dimitrijević, S. Kovačević, U. Jovanović, M. Stanić, M. Opačić, I. Santrač, M. Tanović, V. Čurić, I. Spasojević	
APPLICATION OF MICROALGA <i>Chlorella sorokiniana</i> IN WASTEWATER BIOREMEDIATION – CASE OF LAKE ROBULE	330
Milan Gorgievski, M. Marković, N. Štrbac, V. Grekulović, M. Zdravković	
ADSORPTION ISOTHERMS FOR COPPER IONS BIOSORPTION ONTO ONION PEELS	335
Sonja Stanković, V. Nedelkovski, M. Radovanović, S. Milić	
MECHANISM AND KINETICS OF ELECTROCATALYTIC OXIDATION OF PHENOL	341
Jelena Milosavljević, S. Šerbula, A. Radojević, T. Kalinović, J. Kalinović	
ECOENZYMATIC STOICHIOMETRY AS AN EMERGING METHOD IN THE ASSESSMENT OF SOIL HEAVY METAL POLLUTION	348
Protection and preservation of natural resources	
Mihajlo Stanković	
ORCHIDS OF THE ZASAVICA SPECIAL NATURE RESERVE	354
Gordana Šekularac, M. Aksić, T. Dimitrijević (ex. Ratknić), M. Vranešević, N. Gudžić, M. Ratknić	
CLIMATIC BALANCE OF THE WATER FOR THE SOIL OF THE KRUŠEVAC REGION IN CENTRAL SERBIA	361
Gordana Šekularac, M. Aksić, T. Dimitrijević (ex. Ratknić), M. Vranešević, S. Gudžić, N. Gudžić, M. Ratknić	
INFLUENCE OF IRRIGATION METHOD ON THE OCCURRENCE AND INTENSITY OF THE GRAY MOLD OF LETTUCE	367
Aleksandar Stevanović, T. Sekulić, M. Blažić, N. Radić, A. Popović, V. Stupar	
THE IMPACT OF IRRIGATION ON THE QUALITY OF THE ENVIRONMENT AND WATER RESOURCES	373
Aleksandar Stevanović, M. Saulić, M. Blažić, V. Stupar, D. Stojićević, Z. Živković	
BIOPREPARATIONS IN THE FUNCTION OF ORGANIC AGRICULTURE IN FRUIT GROWING AND VITICULTURE	379
Vladanka Stupar, T. Sekulić, M. Blažić, N. Radić, A. Popović, A. Stevanović	
IRRIGATION – IMPACT ON SOIL AS AN ENVIRONMENTAL FACTOR	385

Milan Nedeljković, S. Mladenović, J. Petrović	
A RENEWABLE ENERGY SOURCES AND SUSTAINABLE DEVELOPMENT EQUATION	391
Ecological ethics and environmental education	
Tatjana Miljojčić	
FORGING A SUSTAINABLE FUTURE: THE CIRCULAR ECONOMY IN THE FASHION INDUSTRY	396
Ecotoxicology and environmental safety	
Darko Anđelković, M. Branković	
CITRATE BUFFERED QuEChERS vs SIMPLIFIED SAMPLE PREPARATION METHOD: COMPARATIVE LC/MS ANALYSIS OF PESTICIDES IN APPLES	402
Darko Anđelković, M. Branković	
APPLICABILITY OF THE QuEChERS IN NON-CHROMATOGRAPHY-BASED PESTICIDE ANALYSIS IN APPLES	407
Darko Anđelković, M. Branković	
ESI vs APCI IN SELECTED PESTICIDES MS DETECTION IN APPLES	413
Tamara Petronijević, I. Kostić Kokić, Dj. Milošević, M. Stojković Piperac, N. Stanković, T. Anđelković	
DIFFERENT GROWTH RESPONSES OF SELECTED REPRESENTATIVES OF PHYTOPLANKTON TO THE PRESENCE OF THE ANTIBIOTIC VANCOMYCIN	420
Tamara Petronijević, I. Kostić Kokić, T. Anđelković, B. Zlatković, D. Stajić, D. Bogdanović, N. Stanković	
DETERMINATION OF SEVEN ANIONS IN WATER LETTUCE GROWN IN A NATURAL UNPOLLUTED HABITAT BY ION CHROMATOGRAPHY	426
Milica Zdravković, V. Grekulović, N. Štrbac, J. Suljagić, I. Marković, M. Gorgievski, M. Marković	
THE COPPER CORROSION IN CHLORIDE MEDIUM WITH ADDITION OF BLACKBERRY LEAF EXTRACT	432
Hazardous materials and green technologies	
Aleksandra A. Jovanović, M. R. Elferjane, M. Gnjatović, B. Bugarski, A. Marinković	
PHOSPHOLIPID LIPOSOMES AS A CARRIER FOR ALOE VERA WASTE EXTRACT	438

Aleksandra A. Jovanović, M. R. Elferjane, M. Milošević, M. Gnjatović, A. Marinković Vaccinium myrtillus LEAF WASTE EXTRACTS WITH NATURAL DEEP EUTECTIC SOLVENT	444
Danijela Kovačević, N. Đorđević, S. Glišić, B. Vlahović, V. B. Pavlović MORPHOLOGICAL INVESTIGATION OF PVDF/MAGNETITE@NC/BaTiO ₃ SEMI-SPHERICAL COMPOSITE MATERIALS FOR OIL REMOVAL	450
Branislava Savić, D. Aćimović, M. Ječmenica Dučić, M. Simić, D. Vasić Anićijević, T. Brdarić DEGRADATION OF PHENOL AND SUBSTITUTED PHENOLS: INFLUENCE OF APPLIED POTENTIAL	456
Marija Ječmenica Dučić, D. Aćimović, B. Savić, M. Simić, A. Krstić, D. Vasić Anićijević, T. Brdarić DEGRADATION OF DYES MIXTURE BY ELECTROCHEMICAL OXIDATION USING STAINLESS STEEL ELECTRODE	460
Marija Simić, D. Aćimović, B. Savić, M. Ječmenica Dučić, I. Perović, D. Vasić Anićijević, T. Brdarić THE OXYGEN EVOLUTION REACTION AT TIN DIOXIDE-CARBON-BASED ELECTRODES	465
Drita Abazi Bajrami, M. Marinkovski, K. Lisichkov, S. Kuvendziev OPTIMIZATION OF THE <i>Helichrysum arenarium</i> EXTRACT OBTAINED WITH ULTRASOUND-ASSISTED EXTRACTION	469
Berina Sejdinović VIBRATION ISOLATION	475
Uroš Stamenković, I. Marković THE INFLUENCE OF AGEING ON THE THERMAL PROPERTIES AND MICROSTRUCTURE OF THE EN AW-6082 GREEN ALUMINIUM ALLOY	482
Ljubiša Balanović, D. Manasijević, I. Marković, U. Stamenković, M. Petrić MICROSTRUCTURAL AND THERMAL CHARACTERIZATION OF Bi-Sb-Sn ALLOYS FOR ECOLOGICAL APPLICATION	488
Vladan Nedelkovski, S. Stanković, M. Radovanović, Ž. Tasić, S. Milić OPTIMIZATION OF PHENOL ELECTROCHEMICAL OXIDATION USING MODIFIED Ti/SnO ₂ -TYPE ANODES	494
Aleksandar Cvetković, Ž. Tasić, M. Petrović Mihajlović, A. Simonović, M. Radovanović, M. Nujkić, M. Antonijević INFLUENCE OF SUBSTITUTES ON THE EFFICIENCY OF ORGANIC CORROSION INHIBITORS	500

Sonja Stanković, M. Nujkić, Ž. Tasić, D. Medić, A. Papludis, S. Milić	
MODIFIED MEMBRANES WITH GRAPHENE OXIDE – REMOVAL OF DYES FROM WASTEWATER	506
Human and ecological risk assessment	
Olga Kostić, D. Pavlović, M. Marković, Z. Miletić, N. Radulović, M. Mitrović, P. Pavlović	
HUMAN HEALTH RISK ASSESSMENT OF PTE _s IN ELECTROFILTER ASH AND CHRONOSEQUENCE FLY ASH FROM “TENT A” DISPOSAL SITES	512
Agriculture: nutrition, organic food and health impacts	
Markola Saulić, V. Trajić, D. Stojićević, A. Stevanović, Z. Živković	
EFFECT OF EXTRACT <i>Ecklonia maxima</i> ON CONDITION OF AGRICULTURAL CROPS	519
Metodi Mladenov	
SUITABILITY OF THE SOILS IN THE MUNICIPALITY OF KOVACHEVTSI, BULGARIA FOR GROWING ON EINKORN WHEAT (<i>Triticum monococcum</i>)	524
Gorica Cvijanović, V. Stepić, M. Bajagić, V. Cvijanović, J. Marinković, N. Đurić	
INFLUENCE OF EFFECTIVE MICROORGANISMS ON THE BASIC PARAMETERS OF SOIL BIOGENICITY IN THE PRODUCTION OF WHEAT AND CORN	529
Vojkan Miljković, R. Ljupković, M. Miljković	
APPLICATION OF CLASSIC THIN LAYER CHROMATOGRAPHY METHOD FOR QUALITATIVE DETERMINATION OF SYNTHETIC FOOD COLORS	535
Alternative energy: efficiency and environmental policy	
Snežana Brković, N. Zdolšek, I. Perović, G. Tasić, M. Seović, S. Mitrović, J. Georgijević	
NOVEL CARBON MATERIAL FOR OER IN VARIOUS ELECTROLYTE SOLUTIONS	540
Nikola Zdolšek, I. Perović, S. Brković, M. Seović, J. Georgijević, S. Mitrović, P. Laušević	
THE EFFECT OF DIFFERENT TYPE OF ELECTROLYTES ON THE DISCHARGE CAPACITY OF Zn-AIR BATTERIES	545
Jelena Georgijević, J. Milikić, N. Zdolšek, I. Perović, S. Brković, S. Mitrović, B. Šljukić	
IRON, COBALT DUAL DOPED CARBON ELECTROCATALYST FOR EFFICIENT WATER SPLITTING	550

Greenhouse effect and global climate change

- Tatjana Dimitrijević, G. Šekularac, M. Ratknić, M. Aksić**
EFFECTS OF CLIMATE CHARACTERISTICS ON THE DIAMETER INCREMENT OF RED OAK IN THE CITY OF BELGRADE (SERBIA) 555
- Milica Blažić, T. Sekulić, V. Stupar, Z. Živković**
GREENHOUSE EFFECT AND GLOBAL CLIMATE CHANGE – IMPACT ON AGRICULTURE 561
- Vojkan Miljković, I. Gajić, Lj. Nikolić**
GLOBAL CLIMATE CHANGES: GREENHOUSE GASSES, CITIES AND PLASTICS 567

Sustainable development and green economy

- Zlata Živković, M. Saulić, D. Stojićević, M. Jevtić, V. Stupar**
ROLE OF NUTRIENTS IN CONTROLLING PLANT DISEASES AND PATHOPHYSIOLOGICAL ALTERATIONS IN PLANTS IN SUSTAINABLE AGRICULTURE. A REVIEW 572
- Zlata Živković, M. Saulić, D. Stojićević, M. Jevtić**
THE WAY OF MANAGING PLANT DISEASES IN SUSTAINABLE AGRICULTURE 578
- Dragan Ugrinov, M. Nikolić**
THE ROLE OF PLANTS IN BIOECONOMY AND CIRCULAR ECONOMY 584
- Vojkan Miljković, I. Gajić, Lj. Nikolić**
AGRICULTURAL WASTE IN SUSTAINABLE AGRICULTURE 589
- Ana Radojević, J. Milosavljević, S. Šerbula, T. Kalinović, J. Kalinović**
RECYCLING OF Li-ION BATTERIES FROM THE END-OF-LIFE VEHICLES: OPPORTUNITY OR LIABILITY IN THE FUTURE? 593

Environmental biology

- Vladimir Topalović, S. Matijašević, V. Savić, J. Nikolić, J. Stojanović, S. Zildžović, S. Grujić**
CRYSTALLIZATION CHARACTERISTICS OF BIOACTIVE POLYPHOSPHATE GLASSES 599

Environmental and material flow management

- Isidora Berežni, T. Marinković, B. Batinić**
ASSESSING THE COMPOSITION OF MUNICIPAL SOLID WASTE IN ŠID 605

Ivan Bracanović, A. Krstić, A. Kalijadis

SYNTHESIS AND CHARACTERISATION OF CARBON NANOMATERIAL USING HYDROTHERMAL CARBONISATION METHOD

612

Hamid Husić, S. Čerčić, V. Aganović

RETROSPECTIVE OF THE PLANNED ACTIVITIES FOR THE REHABILITATION OF THE DAMAGED AREA OF THE FORMER SURFACE MINE ČUBRIĆ

617

Student Section

Students: Ana Smiljković, Isidora Sujić (Serbia)

Mentor: Maja Nujkić (Serbia)

ENVIRONMENTAL AND HEALTH RISK OF CO₂ IN INDOOR ENVIRONMENTS

624

Student: Avram Kovačević (Serbia)

Mentor: Uroš Stamenković (Serbia)

ANTHROPOGENIC MERCURY IN THE ENVIRONMENT: GLOBAL EMISSIONS AND RECYCLING POSSIBILITIES

626

Student: Petar Milanović (Serbia)

Mentors: Uroš Stamenković, Avram Kovačević (Serbia)

THE INFLUENCE OF COOLING RATE ON MECHANICAL PROPERTIES AND MICROSTRUCTURE OF C45 CARBON STEEL

628

Student: Milica Denić (Serbia)

Mentor: Jelena Kalinović (Serbia)

AIR POLLUTION WITH CARCINOGENIC SUBSTANCES

630

Student: Gordan Mišić (Serbia)

Mentor: Jelena Kalinović (Serbia)

ACID RAIN AND SMOG – CHEMICAL REACTIONS

632

Student: Milica Denić (Serbia)

Mentor: Ana Radojević (Serbia)

MEDICAL WASTE MANAGEMENT

634

Student: Gordan Mišić (Serbia)

Mentor: Ana Radojević (Serbia)

ENVIRONMENTAL POLLUTION BY PET PACKAGING

636

Student: Marija Stanković (Serbia)

Mentor: Ana Simonović (Serbia)

COPPER CORROSION IN ARTIFICIAL ACID RAIN SOLUTION IN PRESENCE OF 5-PHENYL-1-TETRAZOLE

638

TECHNOLOGICAL PROCESSES AS SOURCES OF POLLUTION IN THE ENVIRONMENT

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Abstract

This paper explores the impact of technological processes on environmental pollution. Technological processes are crucial elements of industrial activities, but at the same time, they can be a source of various types of pollution, including air, water, and soil pollution. The aim of this research is to analyze different technological processes and their impact on the environment, as well as to propose possible strategies for reducing negative effects.

Keywords: technological processes, environment, pollution.

INTRODUCTION

Technological processes are an integral part of modern industrial development and play a crucial role in the production of various goods and services. However, while these processes are vital for societal progress, they also have a significant impact on the environment. Environmental pollution has become one of the greatest challenges facing humanity today, and technological processes have been recognized as one of the main sources of this pollution. The aim of this research is to analyze in detail the impact of technological processes on environmental pollution. By studying different industrial sectors and their technological processes, we will investigate how these processes contribute to the emissions of harmful gases, wastewater, toxic substances, and other forms of pollution. This analysis will enable us to gain a better understanding of the scope of the problem and identify key areas where efforts need to be focused to reduce negative impacts. Through a comprehensive overview of the topic, this paper aims to raise awareness about the importance of recognizing technological processes as sources of environmental pollution. We also want to highlight the need for the development and implementation of strategies and practices that will mitigate the negative impacts of technological processes on the environment. Only through such a holistic approach we can build a more sustainable future where technological advancements go hand in hand with environmental protection.

THE IMPACT OF TECHNOLOGICAL PROCESSES ON THE ENVIRONMENT

The development of industrialization worldwide and in our country is achieving increasing results, but at the same time, it is causing harmful consequences to the environment. Technological processes have undeniably transformed the way we live and have brought

significant advancements in various industries [1]. However, these processes also come with a profound impact on the environment. The extensive use of energy and resources, coupled with the release of pollutants and waste, has resulted in various forms of environmental degradation. It is crucial to examine and understand the consequences of these technological processes on the environment to develop sustainable strategies for mitigating their negative effects. One of the primary impacts of technological processes is the emission of greenhouse gases, contributing to climate change. Industries heavily rely on fossil fuels for energy generation, leading to the release of carbon dioxide, methane, and other harmful gases into the atmosphere [2].

These emissions trap heat and disrupt the Earth's climate system, causing rising global temperatures, altered weather patterns, and more frequent extreme weather events. Air pollution is a primary problem in areas where industrialization is developed. It particularly occurs in cities with heavy traffic, where combustion products from motor vehicles contribute to nearly 50% of pollution. Worldwide, there are millions of passenger cars on the roads, each emitting around 600 kg of harmful substances into the atmosphere annually [1].

This pollution poses serious risks to ecosystems, biodiversity, and human health. It can lead to the depletion of natural resources, contamination of drinking water sources, and the disruption of delicate ecological balances. In addition to direct pollution, technological processes also contribute to resource depletion. The extraction and consumption of raw materials, such as minerals, metals, and fossil fuels, for manufacturing and energy production, lead to habitat destruction and loss of biodiversity. Deforestation, mining activities, and unsustainable extraction practices further exacerbate the negative impacts on ecosystems and wildlife. To address these issues, it is crucial to implement sustainable practices and technologies that minimize the environmental footprint of technological processes. This includes transitioning to cleaner and renewable sources of energy, adopting circular economy principles to reduce waste generation and promote recycling, and implementing stricter regulations and standards for emissions and waste management. Additionally, promoting awareness and education about the environmental impact of technological processes can encourage responsible decision-making and drive innovation towards more sustainable practices. In the end, the impact of technological processes on the environment is undeniable. It is imperative to recognize and address these impacts to ensure a sustainable future. By adopting environmentally conscious practices, embracing clean technologies, and promoting responsible consumption and production, we can strive towards a harmonious balance between technological progress and the preservation of our environment.

THE IMPACT OF THE CHEMICAL INDUSTRY ON ENVIRONMENTAL POLLUTION

The chemical industry plays a critical role in driving economic growth and providing a wide range of essential products. However, it also has a significant impact on environmental pollution. The production, use, and disposal of chemical substances can result in various forms of pollution that pose serious risks to ecosystems and human health. One of the primary concerns associated with the chemical industry is the release of toxic substances into the environment. Chemical manufacturing processes often involve the use of hazardous materials,

which, if not properly managed, can contaminate air, water, and soil. Accidental spills, leaks, and inadequate waste management practices can lead to the release of pollutants that have long-lasting effects on ecosystems and can accumulate in the food chain.

Air pollution is a major consequence of chemical industry activities. Emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x), and sulfur dioxide (SO₂) from manufacturing plants contribute to the formation of smog, acid rain, and the deterioration of air quality [3].

These pollutants have detrimental effects on human health, respiratory systems, and contribute to the greenhouse effect and climate change. Water pollution is another significant concern associated with the chemical industry. Effluents from chemical manufacturing facilities may contain various toxic substances, heavy metals, and other pollutants that, if discharged untreated, can contaminate water bodies. This contamination poses a threat to aquatic ecosystems, disrupts the balance of aquatic life, and affects the quality of drinking water sources. Furthermore, the improper disposal of chemical waste can have long-term consequences. Hazardous chemicals that are not adequately managed or disposed of can seep into the soil, contaminate groundwater, and persist in the environment for extended periods. This contamination not only affects the immediate vicinity of the waste site but can also spread through water systems, leading to far-reaching ecological and health implications.

To mitigate the environmental impact of the chemical industry, it is crucial to prioritize sustainable practices and technologies. This includes implementing stricter regulations and standards for waste management and emissions, promoting the use of cleaner and greener production processes, and investing in research and development of safer alternatives to hazardous chemicals [3].

Additionally, fostering transparency and accountability within the industry is essential to ensure responsible and environmentally conscious practices throughout the supply chain. In the end, chemical industry has a significant impact on environmental pollution. It is imperative to address these issues through proactive measures that prioritize sustainable practices, pollution prevention, and the development of safer alternatives. By promoting responsible chemical management and investing in greener technologies, we can strive for a more sustainable and environmentally friendly future.

THE IMPACT OF THERMAL POWER PLANTS ON ENVIRONMENTAL POLLUTION

The impact of thermal power plants on environmental pollution is a significant concern. These power plants play a crucial role in electricity generation, but their operations often result in various forms of pollution that pose risks to the environment and human health. One of the primary concerns associated with thermal power plants is air pollution.

The combustion of fossil fuels, such as coal, oil, and natural gas, releases harmful emissions into the atmosphere. These emissions include sulfur dioxide (SO₂), nitrogen oxides (NO_x), particulate matter, and greenhouse gases like carbon dioxide (CO₂). They contribute to the formation of smog, acid rain, and climate change, and have detrimental effects on air quality and respiratory health [2].

Thermal power plants also generate large quantities of ash and other solid waste as byproducts. These wastes often contain toxic substances, heavy metals, and other pollutants that can contaminate soil and water when not properly managed. Improper disposal and inadequate treatment of these wastes can lead to soil degradation, groundwater pollution, and the contamination of nearby ecosystems. Water pollution is another significant concern associated with thermal power plants. The cooling processes used in these facilities often involve withdrawing large amounts of water from nearby water bodies, such as rivers or lakes, for cooling purposes [2].

This withdrawal can disrupt aquatic ecosystems and harm fish and other aquatic organisms. Additionally, the discharge of heated water back into the source can lead to thermal pollution, affecting the temperature balance and ecological health of the water bodies. The extraction, transportation, and storage of fossil fuels for thermal power plants also have environmental consequences. These activities can result in habitat destruction, deforestation, and biodiversity loss. The exploration and extraction of fossil fuels can disrupt ecosystems, impact wildlife habitats, and contribute to the depletion of natural resources. To mitigate the environmental impact of thermal power plants, various measures can be implemented. These include adopting cleaner and more efficient technologies, such as advanced pollution control systems, to reduce emissions and improve air quality. Increasing the use of renewable energy sources, such as solar and wind power, can help reduce reliance on fossil fuels. Additionally, implementing proper waste management practices, including the safe disposal or recycling of ash and other solid waste, is crucial to minimize soil and water contamination. Furthermore, strict regulations, monitoring, and enforcement mechanisms are necessary to ensure compliance with environmental standards and promote responsible practices within the industry. Investing in research and development of innovative technologies and promoting energy conservation and efficiency can also contribute to reducing the environmental impact of thermal power plants. In conclusion, thermal power plants have a significant impact on environmental pollution. It is essential to address these concerns through the adoption of cleaner technologies, proper waste management practices, and the promotion of renewable energy sources. By prioritizing environmental sustainability and minimizing the negative impacts of thermal power generation, we can strive for a cleaner and healthier environment.

MEASURES TO REDUCE POLLUTION CAUSED BY TECHNOLOGICAL PROCESSES

Measures to reduce pollution caused by technological processes are essential in promoting sustainable development and preserving the environment. Several strategies can be implemented to minimize the negative impact of these processes on air, water, and soil quality [3]. One effective measure is the adoption of cleaner production technologies. This involves implementing innovative techniques and equipment that minimize the generation of pollutants and waste during the manufacturing and production processes. By optimizing resource utilization and reducing emissions, cleaner production technologies can significantly reduce environmental pollution. Another crucial measure is the implementation of stringent environmental regulations and standards. Governments and regulatory bodies can establish and enforce strict guidelines to limit the release of pollutants into the environment. These

regulations can cover emissions control, waste management, and the use of hazardous substances. Compliance with these standards can help mitigate pollution and ensure that technological processes are conducted in an environmentally responsible manner. Promoting the use of renewable energy sources is another effective measure. By transitioning from fossil fuels to clean and renewable energy sources like solar, wind, and hydroelectric power, the reliance on environmentally harmful energy generation methods can be reduced. This shift not only helps in combating air pollution but also contributes to mitigating climate change. Additionally, waste management plays a crucial role in reducing pollution from technological processes. Implementing proper waste disposal and recycling practices ensures that hazardous materials and byproducts are handled safely and do not contaminate the environment.

Recycling and reusing materials can also reduce the extraction of raw resources and minimize waste generation. Furthermore, fostering awareness and education about the environmental impact of technological processes is essential. By promoting sustainable practices and providing information on the consequences of pollution, individuals and organizations can make informed decisions and take steps to reduce their ecological footprint. In conclusion, implementing measures to reduce pollution caused by technological processes is crucial for preserving the environment. By embracing cleaner production technologies, enforcing stringent regulations, promoting renewable energy, implementing proper waste management, and raising awareness, we can strive for a cleaner and more sustainable future [2].

CONCLUSION

Technological processes are significant sources of pollution in the environment. The extensive use of energy, the release of harmful emissions, and improper waste management contribute to air, water, and soil pollution. To mitigate these negative impacts, it is crucial to adopt cleaner technologies, enforce stricter regulations, promote renewable energy sources, and prioritize responsible waste management. By doing so, we can strive towards a more sustainable future where technological progress and environmental preservation go hand in hand.

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