



# WMCEES 2025

9<sup>th</sup> WORLD MULTIDISCIPLINARY  
CONGRESS ON EARTH AND  
ENVIRONMENTAL SCIENCES

# ABSTRACT BOOK

Czech Republic, Ostrava | September 8-12, 2025

[WWW.WMCEES.ORG](http://WWW.WMCEES.ORG)



## Scientific Committee

**Prof. Dr. Mario Parise**, University of Bari Aldo Moro, Italy

(Associate Editor, NATURAL HAZARDS)

(Member of the Editorial Board, NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT, MEDITERRANEAN GEOSCIENCE REVIEWS, CARBONATES AND EVAPORITES, GEOSCIENCE, JOURNAL OF CAVE AND KARST STUDIES, JOURNAL OF MOUNTAIN SCIENCE)

**Prof. Dr. Bing Yan**, Guangzhou University, China

(Co-Editor-in-Chief, ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY)

**Prof. Dr. Marek Widera**, Adam Mickiewicz University, Poland

(Co-Editor, GEOLOGOS)

**Prof. Dr. Nikoloz Chikhradze**, Lepl G. Tsulukidze Mining Institute, Georgia

(Director, LEPL GRIGOL TSULUKIDZE MINING INSTITUTE OF GEORGIA)

(Editor in Chief, MINING JOURNAL OF GEORGIA)

(Member of the Editorial Board, CIVIL ENGINEERING JOURNAL)

**Prof. Dr. Fang Wang**, Chinese Academy of Sciences, China

(Co-Editor-in-Chief, ENVIRONMENTAL TECHNOLOGY & INNOVATION)

**Prof. Dr. Konstantinos C. Makris**, Cyprus University of Technology, Cyprus

(Editor, CURRENT POLLUTION REPORTS)

**Prof. Dr. Hyunjung Nick Kim**, Hanyang University, Republic of Korea

(Editor-in-Chief, CRITICAL REVIEWS IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY)

**Associate Prof. Dr. Dariusz Popielarczyk**, University of Warmia and Mazury in Olsztyn, Poland

(Dean, FACULTY OF GEOENGINEERING, INSTITUTE OF GEODESY AND CIVIL ENGINEERING)

**Prof. Dr. Jun Li**, China University of Geosciences, China

(Editor-in-Chief, IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING)

**Prof. Dr. Ramesh P. Singh**, Chapman University, USA

(Editor-in-Chief, GEOMATICS NATURAL HAZARDS & RISK)

**Prof. Dr. Daniela Ruberti**, University of Campania Luigi Vanvitelli, Italy

(E' Reviewer Board Member, MDPI)

**Prof. Dr. Piernicola Lollino**, University of Bari Aldo Moro, Italy

(Member of the Editorial Board, ENGINEERING GEOLOGY, FRONTIERS IN EARTH SCIENCES, GEOSCIENCES)

**Associate Prof. Dr. Teresa A. P. Rocha-Santos**, University of Aveiro, Portugal

(Co-Editors-in-Chief, JOURNAL OF HAZARDOUS MATERIALS ADVANCES;

Executive Editor, JOURNAL OF HAZARDOUS MATERIALS)

**Prof. Dr. Roberto Moretti**, University of Campania Luigi Vanvitelli, Italy

(Editor, GEOSCIENCES, FRONTIERS IN EARTH SCIENCE (SECTIONS EARTH AND PLANETARY MATERIALS))



**WMCEES**

# **Abstract Collection 2025**

CIRCULAR ECONOMY FOR ADVANCING SUSTAINABILITY IN RESOURCE EXTRACTION .....	29
DEEP LEARNING AT TWO TIMESCALES: DUAL NEURAL NETWORKS FOR PREDICTING FAST URBAN AND SLOW KARSTIC FLOODS. ....	30
DEVELOPMENT OF HIGH EFFICIENT SOLAR ENERGY PHOTO-CONVERTING ELEMENT BASED ON SILICON-GRAPHENE NANOSYSTEM.....	31
DIFFERENT METHODS FOR DETERMINING OF THE ROUGHNESS COEFFICIENT IN LOWLAND STREAMS OVERGROWN WITH AQUATIC VEGETATION .....	32
DOPING OF GAN WITH SILICON USING LAYER BY LAYER MAGNETRON SPUTTERING TECHNOLOGY .....	33
ECONOMIC POTENTIAL FOR BASE METAL MINERALIZATION IN THE SUB-OPHIOLITIC METAMORPHIC ROCKS OF NORTHEASTERN UNITED ARAB EMIRATES .....	34
ECOTOXICITY FINDINGS IN AGRICULTURAL SOILS OF THE SUBURBAN AND INDUSTRIAL AREAS OF KOŠICE .....	35
EFFECT OF BACTERIOSTATIC ADDITIVES ON POLYSACCHARIDE-BASED BIODEGRADABLE FILMS.....	36
EFFECT OF SURFACE MODIFICATION ON MINERAL WASTE DISSOLUTION USING MICROORGANISMS: PHYSICOCHEMICAL ASPECTS.....	37
EFFECT OF URBAN GREEN INFRASTRUCTURE ON COMBINED SEWER OVERFLOW VOLUMES .....	38
ENVIRONMENTAL IMPACT OF PRODUCED WATER: TOXICITY TESTING AND REGULATORY FRAMEWORKS.....	39
EVALUATION OF THE EFFECT OF COMBINED COLLECTOR APPLICATION IN THE PROCESS OF FLOTATION OF POOR ORES CONTAINING PRECIOUS METALS .....	40
EVALUATION OF THE LEVEL OF ORGANIC POLLUTION OF SURFACE WATER (CASE: OUED MELOUK DAM IN AIN DEFLA – ALGERIA N) .....	41
EXPLORING MUGWORT BIOMASS AS A NOVEL CATALYST SUPPORT FOR GREEN CHEMISTRY .....	42
FABRICATION OF FIBER REINFORCED AL-POLYMERIC COMPOSITES AND TESTING UNDER LOW INTENSITY SHOCK.....	43
GEOCHEMICAL MARKERS IN THE DETECTION AND IDENTIFICATION OF FOSSIL FUELS IN WASTE MATERIAL FROM AN ILLEGAL LANDFILL FIRE.....	44
HIGH-DEFINITION 3-D SHORELINE MAPPING WITH INTEGRATED UAV–SBES/MBES BATHYMETRY AND IMMERSIVE XR VISUALIZATION .....	45
IMAGE PROCESSING FOR SEISMIC INTERPRETATION .....	46
IMPACT OF AGRICULTURAL CROP PRODUCTIVITY ON PM2.5 AND PM10 POLLUTION LEVELS IN ROMANIA .....	47



**EXPLORING MUGWORT BIOMASS AS A NOVEL CATALYST SUPPORT FOR GREEN CHEMISTRY**Inna Pitak <sup>1</sup>, Arūnas Baltušnikas <sup>1</sup>, Rita Kriūkienė <sup>1</sup><sup>1</sup> Laboratory of Materials Research and Testing, Lithuanian Energy Institute, Breslaujos st. 3, LT-44403 Kaunas, Lithuania**ABSTRACT**

Mugwort (*Artemisia vulgaris*) is a widely available yet underutilised biomass that holds great promise as a sustainable precursor for catalyst support materials. This study investigates the feasibility of converting mugwort biomass for novel catalyst support in green chemistry applications. The research is motivated by the need to develop renewable, cost-effective, and environmentally benign alternatives to conventional catalyst supports, typically derived from non-renewable, fossil-based sources.

This work's primary objective is to optimise mugwort's conversion into a high-performance activated carbon through controlled carbonisation and activation processes. In this study, mugwort biomass is subjected to pyrolysis under an inert atmosphere at moderate temperatures to initiate carbonisation. Subsequent chemical activation uses appropriate activating agents to enhance the material's surface area, porosity, and surface functionality. These structural characteristics are critical to ensuring effective dispersion and stabilisation of active catalytic species.

A comprehensive physicochemical characterisation of the prepared material is performed using several analytical techniques. The Brunauer-Emmett-Teller (BET) method is employed to determine the surface area and pore size distribution, while X-ray diffraction (XRD) provides insights into the crystalline structure of the carbon matrix. Scanning electron microscopy coupled with energy-dispersive spectroscopy (SEM-EDS) examines the morphology and elemental composition, and thermogravimetric analysis (TGA) assesses the thermal stability.

The catalytic performance of the mugwort-derived activated carbon is evaluated in model reactions, specifically oxidation and hydrogenation, which serve as benchmarks for green chemistry applications. The study further explores modifications of the catalyst support to enhance the interaction between the active phase and the support, thus improving catalytic efficiency and longevity.

This scientific novelty lies in the first systematic exploration of mugwort biomass as catalyst support. The study addresses both environmental and economic challenges associated with conventional catalyst production by repurposing an abundant and renewable resource. This innovative approach promotes waste valorisation and sustainable resource management and aligns with the principles of a circular economy and green chemistry by reducing reliance on synthetic materials.

Preliminary results indicate that mugwort-derived activated materials have a high surface area, well-developed porosity, and favourable chemical properties comparable to traditional catalyst supports. The findings suggest that this material can be tailored for specific catalytic applications with further optimisation, ultimately contributing to cleaner and more sustainable industrial processes.

This research demonstrates that mugwort biomass has significant potential as a novel catalyst support for green chemistry, paving the way for developing eco-friendly catalysts and advancing the sustainable utilisation of biomass resources.

Corresponding Author: Inna Pitak