TWENTY-SECOND YOUNG RESEARCHERS' CONFERENCE

MATERIALS SCIENCE AND ENGINEERING

December 4 – 6, 2024, Belgrade, Serbia

Program and the Book of Abstracts

Materials Research Society of Serbia
&
Institute of Technical Sciences of SASA

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Aim of the Conference

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

Topics

Biomaterials
Environmental science
Materials for high-technology applications
Materials for new generation solar cells
Nanostructured materials
New synthesis and processing methods
Theoretical modelling of materials

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Results of the Conference

Beside printed «Program and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal "Tehnika – Novi Materijali". The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2025.

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Cyclodextrin Applications: Towards Emerging Trends in Green Extractions of Bioactive Natural Compounds

Milica Radan, Snežana Kuzmanović Nedeljković, Jelena Živković, Teodora Janković, Zorica Lazarević, Dubravka Bigović, Katarina Šavikin

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In recent years, there has been an increasing demand for safer, cheaper, and more eco-friendly alternatives to toxic organic solvents. Cyclodextrin-based extractions represent an emerging "green" technology of great potential to enhance stability, solubility, and therefore bioavailability of poorly dissolved bioactive compounds. Polyphenolic compounds are receiving increasing attention due to their widespread distribution in plants and their numerous benefits to human health. The use of excipients, such as hydroxypropyl-β-cyclodextrin (HP-β-CD), in the production of polyphenolic-rich extracts from buckwheat herb (*Fagopyrum esculentum* Moench) could become a promising strategy for the extraction of target compounds. The application of mathematical and statistical methods, including response surface methodology (RSM) and artificial neural networks (ANN), in optimizing green extraction procedures represents an attractive approach for implementing environmentally responsible and sustainable extraction practices. By enabling a comprehensive influence analysis of each variable, the created and validated models allowed the estimation of the extraction parameters for the maximal recovery of bioactives and their further reliable predictions. Cyclodextrins showed not only positive impact on the extraction efficiency of polyphenolic compounds from buckwheat, but also on their stability after exposure to stress conditions. The unique conical cylinder shape of HP-β-CD facilitates the formation of inclusion complexes through host-guest interactions, including hydrogen bonding and hydrophobic interactions. The application of cyclodextrins in green extraction processes opens up new perspectives for more effective exploitation of natural plant resources and broader use in the food and pharmaceutical industries.