

INSTITUTE OF TECHNICAL SCIENCES OF SASA
MATERIALS RESEARCH SOCIETY OF SERBIA

Programme and the Book of Abstracts

**TWENTIETH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING**

Belgrade, November 30 – December 2, 2022



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**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 «Programme 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 2023.

Sponsors



ANALYSIS
LABORATORY EQUIPMENT

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Bioactives preservation of everlasting (*Helichrysum plicatum* L.) flowers extract by freeze drying method and powder characterisation

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Everlasting flowers (*Helichrysum plicatum* L.), traditionally used for gastrointestinal disorders such as abdominal pain, jaundice, and hepatic disorders are a rich source of sensitive polyphenolic compounds whose preservation is of great importance. A critical point in the development of formulations with bioactive phenolic compounds, especially liquid extracts is their limited stability at elevated temperatures, pH variations, exposure to oxygen, light, and moisture. In order to overcome the extract limitations, drying method could be the optimal technique for preservation of bioactive compounds, in order to obtain stable powders with appropriate characteristics. One of the most advanced techniques based on the phenomenon of sublimation is a freeze drying, which enabling the long-term preservation of heat-sensitive compounds. In this study, extract obtained by percolation method was lyophilized by freeze drying method (firstly extract was frozen at -80 °C for 1 h, then freeze-dried at -60 °C with pressure of 0.011 mbar for 24 h, and finally main dried at -60 °C with pressure of 0.0012 mbar, for an additional hour in order to remove the capillary water residues). The obtained freeze-dried extract (FHE) was characterized by drying efficiency, the contents of total polyphenols-TPC and flavonoids-TFC. The most dominant polyphenolic compounds were determined and quantified by HPLC method. Differential scanning calorimetry (DSC) and scanning electron microscopy (SEM) analyzes were also performed. The stability of individual compounds, quantified by the HPLC method, was investigated after 30 days, whereby the sample was exposed to a temperature of 40 °C. Drying efficiency was 94.68%, while TPC and TFC were 113.22 mg gallic acid/g and 28.16 mg catechin/g od FHE, respectively. The most dominant individual compounds were naringenin (22.47 mg/g) and kaempferol (21.47 mg/g) of FHE. The DSC method confirmed the FHE stability, and the SEM analysis confirmed that the extract was successfully encapsulated, without visible deformations. The obtained powder showed excellent stability in terms of the content of the dominant individual compounds, with increasing of their content after 30 days.