



Faculty of Food Technology and Biotechnology

**The 4th International Congress on
“Green Extraction of Natural Products”
(GENP2022)**

Book of Abstracts

Poreč, Croatia, 27. - 28.10.2022.



**Application of natural deep eutectic solvents coupled
with ultrasound-assisted extraction for the attainment of
Lavandula stoechas extracts**

*Vladić, Jelena¹; Simić, Siniša²; Kovač, Martina³;
Duarte, Ana Rita¹; Jerković, Igor⁵*

¹ School of Science and Technology, NOVA University Lisbon, Caparica, Portugal

² Faculty of Technology, University of Novi Sad, Novi Sad, Serbia

³ Faculty of Food Technology, University of Osijek, Osijek, Croatia

⁴ Faculty of Chemistry and Technology, University of Split, Split, Croatia

Keywords: Lavandula stoechas, green solvents, deep eutectic solvent, extraction

Lavandula stoechas L. is an evergreen shrub widely applied in ethnomedicine worldwide. This herbal specie is a rich source of bioactive components which represent significant ingredients and materials in the food, cosmetic, and pharmaceutical industries. Therefore, the potential of *L. stoechas* is confirmed, as well as its application in various areas. However, continuous research is necessary to establish efficient and environment-friendly procedures for the attainment of high-quality and safe *L. stoechas* products.

In this study, alternative extraction solvents, the natural deep eutectic solvents (NaDES), and ultrasound-assisted extraction (UAE) were applied to obtain extracts of *L. stoechas* abundant in bioactive components. Three different NaDES mixtures were used: betaine:ethylene glycol (Bet:EG) (1:3), betaine:glycerol (Bet:Gly) (1:2), and glycerol:glucose combination (Gly:Glu) (4:1), while the UAE was conducted at the temperature of 30 and 60°C and constant extraction time of 60 min. The content of polyphenolic compounds in obtained extracts was determined by high-performance liquid chromatography (HPLC) analysis with UV detection. Moreover, antioxidant activity was measured using three assays: DPPH (2,2-diphenyl-1-picrylhydrazyl), ABTS 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid), and FRAP (ferric reducing antioxidant power assay). Also, UAE was conducted with conventional solvents (water and 96% ethanol) for comparison.

The most dominant compound in the extracts was flavonoid rutin (78.17-355.34 µL/mL), followed by herniarin (5.63-81.35 µL/mL). In addition, coumarin and phenolic acids (ellagic, caffeic, ferulic, syringic, and sinapic acid) were detected. Furthermore, the highest polyphenolic content was recorded in extracts obtained by using the Bet:EG mixture. Additionally, extracts obtained with the same NaDES mixture exhibited the highest antioxidant activity (DPPH: 0.351174 µL/mL; ABTS: 0.500329 µL/mL; FRAP: 0.697028 µL/mL). Conversely, the extracts obtained with conventional solvents had significantly lower antioxidant activity and polyphenolic content.



The obtained results demonstrated that new generation solvents can provide extracts rich in bioactive components with high antioxidant activity and represent a promising alternative to the conventional solvents.

Acknowledgements:

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101003396.