



21st international conference **Ružička days** TODAY SCIENCE – TOMORROW INDUSTRY September 9–11, 2026 | Vukovar, Croatia



BOOK OF ABSTRACTS

ISSN 2718-6040 (Online)

www.ruzickadays.eu

PRESERVING THE BIOACTIVITY OF ELDERFLOWER THROUGH MULTIFUNCTIONAL MICROPARTICLES

Zorana Mutavski¹, Milica Radan¹, Anna Stasiłowicz-Krzemień²,
 Jelena Mudrić¹, Tanja Stević¹, Ana Alimpić Aradski³, Katarina Šavikin¹,
 Judyta Cielecka-Piontek², Nada Čujić Nikolić¹

¹Institute for Medicinal Plants Research „Dr. Josif Pančić“, Tadeuša Košćuška 1, 11000 Belgrade, Serbia

²Poznan University of Medical Sciences, Faculty of Pharmacy, Department of Pharmacognosy and Biomaterials, Rokietnicka 3, 60-806 Poznań, Poland

³University of Belgrade Faculty of Biology, Institute of Botany and Botanical Garden, “Jevremovac”, Studentski trg 16, 11000 Belgrade, Serbia

Development of multifunctional natural bioactive systems with improved stability and biological activity is a key challenge in pharmaceutical and biomedical research. *Sambucus nigra* L. flowers are rich in polyphenols with antioxidant, antimicrobial, and antidiabetic properties; however, their application is limited by poor stability. Spray-drying microencapsulation represents an effective strategy to overcome this limitation. This study developed spray-dried elderflower extract microparticles using inulin and polydextrose as carriers, individually and in combination. The formulations were evaluated for antioxidant, antidiabetic (α -glucosidase and α -amylase inhibition), and antimicrobial activities. Microencapsulation successfully preserved biological activity. The free extract showed the highest antioxidant activity (DPPH IC₅₀ 0.27 mg/mL), while inulin-based formulations demonstrated improved α -glucosidase inhibition (IC₅₀ 3.66–3.74 mg/mL) compared to the non-encapsulated extract (IC₅₀ 4.18 mg/mL). Antimicrobial activity was also confirmed. Overall, the results indicate that inulin- and polydextrose-based microparticles represent promising multifunctional delivery systems for bioactive compounds with potential pharmaceutical applications.

Keywords: bioactive stabilization, functional carriers, spray-drying systems

