



University of Novi Sad
**INSTITUTE
OF FOOD
TECHNOLOGY
IN NOVI SAD**

feed
congress

16-18 October, 2024
Novi Sad, Serbia

5th

**INTERNATIONAL CONGRESS
FOOD TECHNOLOGY,
QUALITY AND SAFETY**

e-ABSTRACT BOOK

ISBN 978-86-7994-063-6

V INTERNATIONAL CONGRESS “FOOD TECHNOLOGY, QUALITY AND SAFETY”, 16-18 OCTOBER 2024, NOVI SAD, REPUBLIC OF SERBIA

Publisher

University of Novi Sad
Institute of Food Technology in Novi Sad
Bulevar cara Lazara 1
21000 Novi Sad
Republic of Serbia

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- Food and Feed Research, Journal of the Institute of Food Technology in Novi Sad, University of Novi Sad, Republic of Serbia

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OPTIMISATION OF OREGANO ESSENTIAL OIL ENCAPSULATION USING FLUIDIZED BED GRANULATION

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The essential oil (EO) from the aerial parts in the flowering phase of *Origanum heracleoticum* L. (OEO), has been traditionally used in treating urinary tract infections, bronchitis, rheumatic diseases, and gastroenteritis. It also has important applications in the food industry due to its significant antimicrobial potential such as anti-fungal, bactericidal, and antiviral. Beyond antimicrobial properties, OEO, rich in phenols thymol and carvacrol, showed also antioxidant properties. Food industries are looking for natural antimicrobial agents and antioxidants to replace synthetic ones due to health reasons. EOs are natural products that can satisfy that need, but their composition and activity could change during thermal storage conditions. The process of encapsulation protects against the evaporation of volatile components from EO and minimizes unwanted changes in chemical composition. The aim of this study is to optimize the process of OEO encapsulation using fluidized bed granulation (FBG). FBG is a process that involves the conversion of atomized liquids like suspensions and emulsions into free-flowing granular solids including processes such as wetting, drying, particle size enlargement, and homogenization into a single step of processing. Our study monitored the effects of various factors (type of carrier, temperature in the fluid bed, and flow rate of the sprayed o/w emulsion of OEO with carrier solids) on the yield and encapsulation efficiency. In all samples, lactose monohydrate was used to form the fluidized bed. The highest yield and encapsulation efficiency were obtained with carboxymethylcellulose sodium as a carrier, average temperature of less than 35° C, and a 10 ml/min flow rate of OEO emulsion. The number of total phenols in prepared samples was determined using GC-MS and spectrophotometrically at 275 nm after FBG, and in selected samples after nine months of storage at ambient temperature. It was observed that fluidized bed granules had good stability. Our results showed that FBG, as a one-step drying process with gentle treatment of temperature-sensitive substances, is suitable for volatile substances such OEO.

Keywords: *Origanum heracleoticum*, essential oil, encapsulation, fluidized bed granulation

Acknowledgments: Ministry of Science, Technological Development, and Innovation (451-03-66/2024-03/200003).