Optimizing the Physicochemical Properties and Antioxidant Activity of Linalool through Nanoencapsulation

Amir Makolli[1,2]
Donjeta Spahiu[1,2], Martin Reiser[2], Toskë Kryeziu[1,2], Aida Loshaj-Shala[1], Andreas Zimmer[2], Mimoza Basholli-Salihu[1*]
1 University of Prishtina, Faculty of Medicine, Bulevardi i Dëshmorëve, Prishtina, Kosovo
2 University of Graz, Institute of Pharmaceutical Science, Universitätsplatz 1/EG, Graz, Austria
ammirmakolli@gmail.com
mimoza.basholli@uni-pr.edu*

The focus of this study is the encapsulation of Linalool, the principal constituent of *L. officinalis* essential oil, using optimal liposomal nanoformulations and nanoemulsions to augment its physicochemical features and antioxidant activity.
The encapsulation was executed via the ethanol injection method for liposomal nanoformulations and a high-speed homogenizer for nanoemulsions. To quantify the antioxidant activity, the DPPH technique was used. The physicochemical properties were assessed using parameters like vesicle size, Zeta potential, polydispersity index (PDI), encapsulation efficiency, viscosity, and surface tension, with the microstructure examined through AFM.
The encapsulation of linalool led to a high encapsulation rate and significantly boosted the preservation and amplification of antioxidant activity. The resulting nanosystems showed enhanced physicochemical properties and sustained stability post 2-month storage at 4ºC and 25ºC. Conclusively, nanoencapsulation of Linalool in nanoliposomes and nanoemulsions represents a promising approach to improving stability and efficiency, thereby addressing the challenges in its application in the food and pharmaceutical industries.

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