

## Nanoencapsulated essential oils potency to extend dairy product shelf life

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This work was focused on examining the ability of *Thymus capitatus*, *Rosmarinus officinalis*, *Juniperus oxycedrus* and *Callitris articulata* essential oils to extend the shelf life of a well-known dairy product "Ricotte" after their encapsulation at a nano-scale level. Essential oil encapsulation into a nanoemulsion based delivery system was made using high pressure homogenization and obtained nanoemulsions were subjected to physical characterization. The nanoencapsulation effect on the antibacterial efficiency of each essential oil was assessed against *E. coli* and *B. subtilis* bacteria. Only nanoemulsions with demonstrated antimicrobial efficacy were used to evaluate their potency to extend the shelf life of Ricotte. The effect of incorporating nanoencapsulated essential oils to resist Ricotte alteration was compared to negative control by enumerating the total viable count of each sample after 0; 7; 14 and 21 days of storage at 4°C. Finally, a sensorial hedonic test was conducted to evaluate the nanoencapsulation effect on consumer acceptability. Obtained results revealed that essential oil nanoencapsulation produced homogenous nanoemulsions with similar droplet diameters around 100 nm. Nanoencapsulated *T. capitatus* essential oil presented the highest antibacterial activity, with inhibition zone diameter

generated exceeding 14 mm, while other nanoemulsion were inactive. Thus, only nanoencapsulated *T. capitatus* essential oil was incorporated in Ricotte to seek its conservative potency. The total viable count of Ricotte exhibited that after 21 days of storage, Ricotte treated with *T. capitatus* essential oil presented the lowest bacterial load (<10 UFC/g of product). Moreover, the sensory evaluation revealed similar acceptances for control milk used for the preparation of Ricotte with the one treated by nanoemulsion, while milk supplemented with bulk essential oil was found unacceptable by panelist. In conclusion, results suggested that the supplementation of nanoencapsulated *T. capitatus* essential oil to Ricotte can present an alternative to preserve its quality and to extend its shelf life.

### Speaker Biography

Mariam Ben Jemaa studied biology engineering at the National School of Engineers of Sfax, accomplished master's degree specialized in Food Science at National Agronomic Institute of Tunisia and completed her PhD at the laboratory of Aromatic and Medicinal Plants at the Center of Biotechnology of Borj Cedria Tunisia. In addition to over 20 publications specialized in food sciences, she is the author of the book "Food Preservation: Essential oil approach". Research areas: valorization of natural compounds in food Industries.

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