

## Preparation of Functional Yogurt Fortified With Omega-3 Rich Oils

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### Abstract

This work proposed to prepare multi-functional omega-3 oil based microencapsules enriched with efficient natural antioxidants. Such microcapsules were incorporated into yogurt as a food candidate to increase its bioavailability and functionality. Extraction of the active compounds from selected natural herb (rosemary, *Rosmarinus officianlis* L.) were carried out using traditional extraction with solvents of different polarities (hexane, methanol and distilled water) as well as ultrasonic-assisted water extraction (UAE) technique. Yield percentage, total phenolic content (TPC) and radical scavenging activity (RSA%) have been determined at a solid to solvent ratio of 1:10 g/ml and ambient temperature. Results demonstrated that although methanol gave the maximum yield percentage, water extract showed the highest total phenolic content as well as highest RSA% followed by methanol extracts while n-hexane revealed the least yield, total phenolic and RSA%. Compared with the antioxidative potentials of the reference synthetic antioxidant (BHT), results showed that the decreasing order of RSA% was water extract > BHT > methanol extract >> hexane extract. However, the potency of ultrasonic-assisted water extract as radical scavenger was greatly enhanced specifically at a temperature of 45°C and 30 min extraction time. The antimicrobial activity of both water and methanol extracts of rosemary leaves were tested against some pathogenic bacteria (Gram negative and Gram positive), some fungi, as well as against some beneficial probiotic bacteria (some *Lactobacilli* species) to select the extract that will be the proper one to proceed with for preparing the microcapsules that can be used for preparing yogurt as a functional food. Results indicated that although water extract gave highest total phenolics and highest radical scavenging activity, but, it had no antimicrobial activity against both Gram negative or Gram positive bacteria (at concentration range 0.25–15%) while methanol extract revealed inhibitory activity against all tested pathogens at concentration of 5% or higher. Fortunately, results indicated that the methanol extract had no effect on the survivability of the beneficial bacteria of *Lactobacilli* strains. Finally, microencapsulation of fish and flaxseed oils were prepared by extrusion and spray drying techniques to determine the best methods for encapsulation. Results revealed the superiority and more efficient behavior of the microcapsules prepared by spray drying method either for its oxidative stability or its capability to be incorporated in yogurt. This work let the door open to investigate the effect of different wall materials on the functionality and stability of microcapsules.

### Biography:

Said Fatouh Hamed has completed his PhD at the age of 40 years from Ain-Shams University and postdoctoral studies from Food Industries and Nutrition Division, National Research Centre, Egypt. He is the head of Fats and Oils Department, Food Industries and Nutrition Division, National Research Centre. He has published more than 27 papers in reputed journals and 2 Book Chapters and has been serving as an editorial board member of reputed Journals