

Application of Coaxial Electrospinning for the Encapsulation of Omega-3 Fatty Acids

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Abstract : Regular consumption of omega-3 fatty acid-rich lipids is said to provide a wide range of health benefits, including prevention of inflammation, cardiovascular disease, diabetes, arthritis, and ulcerative colitis. Because of their potential nutritional and health benefits, the omega-3 PUFAs are increasingly being supplemented in functional food products meant to improve human health and wellbeing. However, dietary fortification with PUFAs is difficult due to their low water solubility, tendency to oxidize quickly, and inconsistent bioavailability. These issues can be solved through application of modern encapsulation technologies, which typically entail integrating omega-3 oils into well-designed matrices made from food-grade components. Electrospinning, for example, is an effective encapsulation method for producing sub-micron or nano-scale polymer fibers. For this purpose, various combinations of hydroxypropyl- β -cyclodextrin and cellulose nanocrystals/ nanofibers were assessed for the encapsulation of omega-3 fatty acids through the innovative technology of electrospinning. The encapsulation yield was evaluated through GC-analysis, and the morphology of the final products was assessed through SEM analysis.

Keywords : electrospinning, encapsulation, omega-3 fatty acids, cellulose nanocrystals / nanofibers

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