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Electro-spinning as a novel encapsulation method for food applications

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The main objective of this work was to better understand the procedure of electro-spinning as a one-step encapsulation approach to acquire active component loaded nanostructured biopolymeric fibers. The impact of solution and processing parameters to the fabrication of zein electro-spun fibers were investigated. Gallic acid was used as the model active component to determine the performance of loaded fibers using electro-spinning as an encapsulation technique. The fabricated gallic acid loaded zein (Ze-GA) fibers were appraised for various physicochemical characterizations including morphology, distribution of gallic acid in the electrospun fibers and thermal analyses. Results obtained indicated that interactions occurred between gallic acid and zein at the molecular level. Nevertheless, gallic acid preserved its phenolic character and antioxidant activity after electrospinning. Evidence for the efficacy and effectiveness of gallic acid in the fiber mat for food contact applications was determined by evaluating its release performance, mechanism of action, cytotoxicity and antimicrobial abilities. The fast release profile of gallic acid from the electro-spun fibers is due to the large surface area and its localization on the fiber surface. The Ze-GA electrospun fibers are not cytotoxic and exhibited antimicrobial properties. Heat-curing improved the morphological stability of Ze-GA fibers to strengthen their structure and physical properties. All the electro-spun fiber mats exhibited characteristic of α -helix rich protein. Overall, electro-spinning has proven to be a versatile and promising approach that is capable of generating functionalized nano-fibers suitable for food applications.

Biography

Conrad O Prera received his PhD from Oregon State University and has many years of work experience in the food industry research institutes and academia. His main research area is Chemistry and Technology of Processing of food products, with special emphasis on dehydration and functional foods. Currently he is working on Vitamin D stability in foods and bioactive peptides from food waste.

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