

Chitosan-coated nanoliposomes as capsaicin carriers

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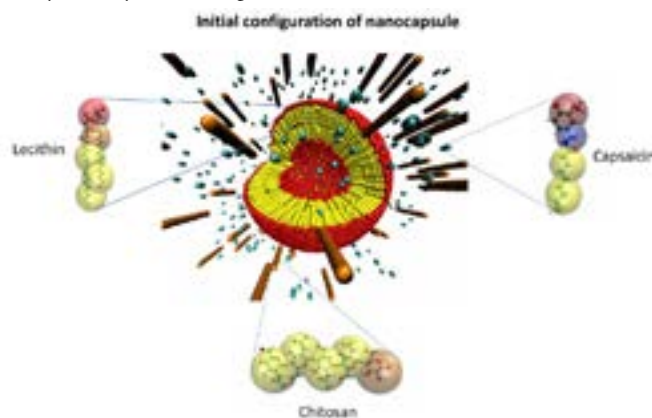
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Transport of hydrophobic drugs in human body presents several complications. One of them is the low drug absorption due to their low solubility. In order to enhance the biodistribution of these drugs, recent investigations have proposed the use of amphiphilic molecules, such as phospholipids, to synthesize nanoparticles or nanocapsules, given that phospholipids can self-assemble in micellar or liposomes structures. Thus, they are ideal candidates to function as nanocarriers of hydrophobic drugs. In this work, molecular simulations of nanoliposomes at the mesoscopic scale are performed. These nanostructures were constituted of lecithin, chitosan and capsaicin. The stability of the liposome and the efficiency of capsaicin encapsulation, as well as the internal and superficial distribution of capsaicin and chitosan molecules in the nanoliposome were analyzed. Characterization of the system was done through density maps in the xy-plane and the potentials of mean force (PMF) for interactions between lecithin-chitosan, lecithin-capsaicin and capsaicin-chitosan. The molecular simulation showed that chitosan is distributed on the surface of the nanoliposome. It was also observed that in spite of the fact that the nanoliposome had a diameter approximately of 18 nm, it was stable under a 24 microsecond window. The sizes obtained experimentally usually are among 100 nm and 200 nm.



Biography

Inocencio Higuera-Ciapara has worked and directed three research centers in México; CIAD, CICY and CIATEJ. His main line of research has dealt with chitin and chitosan applications in the food and health sectors. His early work dealt with chitin and chitosan extraction from shrimp byproducts and their application in wound healing. More recently, he has also become interested in the molecular interactions between chitosan and various bioactive compounds. He is currently working on the chitosan-capsaicin interactions with the aim of developing functional bioconjugates.

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