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- Abstract

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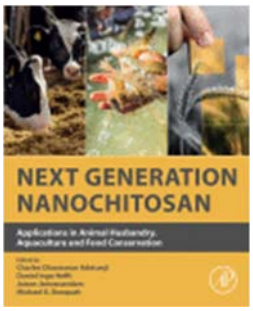

Chapter 12 - Nanochitosan derived from marine bacteria

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Abstract

Nanochitosans are polysaccharides produced by the alkalescent deacetylation of chitin and comprise a series of 2-deoxy-2 (acetylamino) glucose linked by ß-(1-4) glycosidic linkages. These are naturally formed from the deacetylation of shellfish shells and the exoskeleton of aquatic arthropods and crustaceans. Reports of chitosan production from unicellular marine bacteria inhabiting the sea, and possessing distinct animal- and plant-like characteristics abound. This capacity to synthesize chitosan from chitin arises from response to stress under extreme environmental conditions, as a means of survival. Consequently, the microencapsulation of these nanocarriers results in new and improved chitosan nanoparticles, nanochitosan. This nontoxic bioactive material which can serve as an antibacterial agent, gene delivery vector as well as carrier for protein and drug release as compared with chitosan, is limited by its nonspecific molecular weight and higher composition of deacetylated chitin. This chapter highlights the biology and diversity of nanochitosan-producing marine bacteria, including the factors influencing their activities, survival, and distribution. More so, the applications of marine bacterial nanochitosans in transfection and gene delivery; wound healing and drug delivery; feed supplement development and antimicrobial activity are discussed.

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