



Chapter

Properties and Applications of Chitosan-Based Nanocomposites

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ABSTRACT

Chitosan is a polycationic polymer and waste product from the seafood-processing industry. Chitosan is produced from crustacean shells mainly by removal of proteins and by dissolution of calcium carbonates. The biocompatible and non-toxic nature of chitosan is much suitable for the synthesis of nanoparticles for pharmaceutical and medical applications. Chitosan-based nanoconjugates usually show enhancement in mechanical and biological properties compared to chitosan. Enhancement of properties generally includes increased thermal stability and better biodegradability. Inorganic chitosan-based nanocomposites have been prepared by biomineralisation, which forms nanocomposites with clays, silica, silver and calcium carbonate. Chitosan also shows unique liquid crystalline behaviour and macromolecular conformations. Chitosan-silver nanocomposites have been used as antimicrobial agents and in wound healing. Chitosan is an abundant biopolymer widely distributed in nature, and several studies have been carried out in utilising chitosan as a biomaterial, including the synthesis of chitosan-based nanocomposites. This approach provides a new platform for enhanced properties than those obtainable by chitosan alone.

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