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Chitosan-based nanosystems and their exploited antimicrobial activity

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Abstract

Chitosan is a biodegradable and biocompatible natural polysaccharide that has a wide range of applications in the field of pharmaceuticals, biomedical, chemical, cosmetics, textile and food industry. One of the interesting characteristics of chitosan is its antibacterial and antifungal activity, and together with its excellent safety profile in human, it has attracted considerable attention in various research disciplines. The antimicrobial activity of chitosan is dependent on a number of factors, including its molecular weight, degree of deacetylation, degree of substitution, physical form, as well as the structural properties of the cell walls of the target microorganisms. While the sole use of chitosan may not be sufficient to produce an adequate antimicrobial effect to fulfil different purposes, the incorporation of this biopolymer with other active substances such as drugs, metals and natural compounds in nanosystems is a commonly employed strategy to enhance its antimicrobial potential. In this review, we aim to provide an overview on the different approaches that exploit the antimicrobial activity of chitosan-based nanosystems and their applications, and highlights the latest advances in this field.

Keywords: polysaccharide; polycation; nanoparticles; nanocomposites; wound healing; food packaging.

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