

Characterization of chitosan nanoparticles and evaluation of antimicrobial activity

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Nanoparticles derived from chitosan have become a widely utilized material in biological experiments as an antimicrobial agent. Their application in food and health industries is also under rigorous investigation. The objective of this study was to synthesize chitosan nanoparticles (CNPs) from shrimp shell chitosan, characterize the particles and their stability and to investigate the CNPs antimicrobial activity against selected strains of fungal and bacterial species. Characterization of the CNPs was done using surface plasmon resonance activity, zeta potential analysis and particle size distribution analysis. Disk diffusion method was employed to analyze the antimicrobial activity of the CNPs. The synthesized CNPs showed good stability with 52.3 mV at 25.1 °C with a conductivity of 0.127 mS/cm. The mean particle size was 32.2 nm at 90° scattering angle under monodisperse form. Stable CNPs showed significant ($p < 0.05$) antimicrobial activity against *Streptomyces* sp., *Pseudomonas fluorescences*, *Staphylococcus aureus*, *Aspergillus niger* and *Aspergillus flavus*. It is concluded that stable nanoparticles can be synthesized from shrimp shell chitosan and effectively used as antimicrobial agents.

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