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Synthesis and antibacterial efficacy of chitosan-stabilized calcium peroxide nanomaterials

Presently, there is a significant focus on synthesizing antibacterial nanomaterials for various antibacterial applications, necessitating modifications to the chemical processes involved. In this study, we present the synthesis of chitosan-stabilized calcium peroxide (CCP) nanomaterials (NMs) using a facile precipitation technique with varying reaction temperatures. The crystalline structure and composition formation of the synthesized NMs were confirmed through X-ray diffraction studies, Fourier Transform Infrared spectroscopy, and Energy-dispersive X-ray spectroscopy. Additionally, the shape and size of the NMs synthesized at different temperatures were analyzed using scanning electron microscopy (SEM), nanoIR3 and transmission electron microscopy (TEM). Finally, the prepared CCP NMs exhibited antibacterial activity, as assessed by the inhibition zone method against both Gram-negative and Gram-positive bacteria. The antimicrobial results demonstrated a higher inhibition zone for the CCP NMs, suggesting their potential utility in antibacterial and antibacterial-based coating applications.

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