

عنوان مقاله:

Eco-Friendly Synthesis, Characterization, and Antimicrobial Study of Chitosan/Bi (OH)³ Nanocomposites

محل انتشار:

میکروبیولوژی بالینی و عفونت، دوره 10، شماره 1 (سال: 1402)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Background: Nowadays, antimicrobial resistance is one of the most important concerns caused by the extensive use of antibiotics. Efforts to find new materials with antimicrobial effects have been continued more seriously than before. Nanoparticles (NPs) with very small dimensions and extraordinary properties have the potential to overcome antimicrobial resistance, so the use of previous antimicrobial substances at the nanometer dimensions to investigate physicochemical and antimicrobial effects could help overcome these universal concerns. Methods: In this study, NPs were synthesized by hydrothermal-assisted microwave technique. Scanning electron microscopy (SEM), dynamic light scattering (DLS), and atomic force microscopy (AFM) were carried out to investigate the physicochemical properties. Further, energy dispersive spectroscopy and Fourier-transform infrared spectroscopy analyses were carried out to analyze the chemical composition of nanocomposites. Then, their minimum inhibitory concentration was measured on seven bacterial isolates. Results: The majority of NPs were in the range of ۴۰-۱۰۰ nanometers which is the well-optimized size for our purpose. Antimicrobial analysis revealed the effect of synthesized nanocomposites on every seven microbial isolates, including three gram-positive isolates (i.e., *Staphylococcus aureus*, *Micrococcus luteus*, *Bacillus subtilis*) and four gram-negative isolates (i.e., *Serratia marcescens*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*). Conclusion: Synthesized nanocomposite revealed a good antimicrobial effect on all bacterial isolates. It is suggested to investigate the cellular toxicity of synthesized nanocomposite in the next studies.

کلمات کلیدی:

Microbial resistance, Antibacterial, Bismuth hydroxide/chitosan, Nanocomposite

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