

عنوان مقاله:

Development of antimicrobial chitosan based nanofiber dressings for wound healing applications

محل انتشار:

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خلاصه مقاله:

Objective(s): Chitosan based composite fine fibers were successfully produced via a centrifugal spinning technology. This study evaluates the ability of the composites to function as scaffolds for cell growth while maintaining an antibacterial activity. Materials and methods: Two sets of chitosan fiber composites were prepared, one filled with anti-microbial silver nanoparticles and another one with cinnamaldehyde. Chitosan powder was dissolved in trifluoroacetic acid and dichloromethane followed by addition of the fillers. The fiber output was optimized by configuring the polymer weight concentration (7, 8, and 9 w/w% chitosan) and applied angular velocity (6000-9000 RPM) within the spinning process. Results: Scanning electron microscopy revealed fiber diameters ranging from 800-1500 nm. Cinnamaldehyde and silver nanoparticles helped to improve and control the anti-bacterial activity. Through a verified cell counting method and disk diffusion method, it was proven that the chitosan based composite fibers possess an enhanced anti-bacterial/microbial activity against gram-positive *Staphylococcus aureus*. Both composite systems showed anti-bacterial activity, inhibition zones fluctuating between 5 to 10 mm were observed depending on the size of the fiber mat and no bacteria was found within the mats. The developed fiber scaffolds were found to be noncytotoxic serving as effective three-dimensional substrates for cell adhesion and viability. Conclusion: These results provide potential to use these scaffolds in wound healing and tissue regeneration applications.

کلمات کلیدی:

Anti-microbial, Cell adhesion, Chitosan, Cinnamaldehyde, Forc spinning, Silver nanoparticles, Wound dressing

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