

عنوان مقاله:

Evaluation of Antimicrobial Effects of Nisin/Chitosan Composite on Cotton Fabric Textile

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خلاصه مقاله:

Background: The spread of nosocomial infections may be caused by contact between the patient's body and textile materials used in medical practices. Therefore, it is necessary to use effective antimicrobial textiles to prevent the transmission of pathogenic bacteria and the occurrence of infections. Methods: In this research, chitosan was utilized to bind nisin to the surface of cotton fabric. The binding properties of nisin on the fabric were explored using Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) techniques. The antibacterial effectiveness of fabrics against *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Bacillus cereus*, *Listeria monocytogenes*, and *Enterococcus faecalis* was measured. The durability of the antimicrobial properties of these fabrics was checked after 10 washing cycles. Additionally, the toxicity of this fabric on fibroblast cells was determined using the MTT colorimetry after 7 days. Results: Chitosan-nisin formed a homogeneous and colorless layer on the cotton fabric. Antibacterial results showed that nisin improved the antibacterial effect of coated fabrics against all tested bacteria. The antimicrobial properties of the fabric coated with chitosan-nisin were maintained at approximately 100%, 17.26%, 8.55%, 2.98%, 1.38%, and 17.4% efficacy against *B. cereus*, *S. aureus*, *E. faecalis*, *L. monocytogenes*, *E. coli*, and *P. aeruginosa*, respectively. Furthermore, the chitosan-nisin coating demonstrated no significant toxic effect on fibroblast cells even after 1 week. Conclusion: The results suggest that the chitosan-nisin coating could be utilized in the production of medical textiles and underwear. Moreover, it offers an innovative solution to protect human health and the environment.

کلمات کلیدی:

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