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PREPARATION, RELEASE PATTERN AND ANTIBACTERIAL ACTIVITIES OF CHITOSAN-SILVER NANOCOMPOSITE FILM

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ABSTRACT

The present study examined the preparation of chitosan-silver nanocomposite film as carriers for silver release pattern. Chitosan, a biopolymer having immense structural possibilities for chemical and mechanical modifications to generate novel properties, functions and applications. Chitosan – silver nanocomposite has been synthesized by simple chemical reduction method, which is a simple and an inexpensive method. The chitosan-silver (crosslinked) nanocomposite film was characterized in terms of their surface plasmon resonance and crystalline structure by using UV-Visible spectroscopy, X-ray diffraction, Fourier transform infrared and Scanning electron microscope. Swelling and release studies were carried out on the nanocomposite film. Antibacterial activities of chitosan-silver nanocomposite film were investigated on human pathogens: *Staphylococcus aureus*, *Shigella dysenteriae*, *Escherichia coli*, *Salmonella typhi* and *Klebsiella pneumonia* using agar well diffusion method. Chitosan-silver (crosslinked) demonstrated a slower release pattern relative to silver-chitosan (uncrosslinked); both became dislodged and completely released at 120 minutes and 90 minutes respectively. The results of the antibacterial activities revealed that the cross-linked nanocomposite film has higher antibacterial properties than the close component. This study provides novel nanocomposite film potentially useful for drug delivery.

Keywords: Biopolymer, Carrier, Chitosan, Nanocomposite, Antibacterial