

Preparation and evaluation of the chitosan composite films containing nitrofurazone as a burn wound dressing material

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Background and Aims: Nitrofurazone (NF) is one of the drugs that is released from its dosage form as soon as administration. The goal of this study is to design a burn wound dressing material composed of chitosan (CH) and poly vinyl alcohol (PVA) as it can decrease NF releasing rate and increase its maintenance time in the scar.

Methods: CH and CH/PVA films containing determined amount of NF and drug free CH films were prepared using casting/solvent evaporation technique. Then different characteristics of the films such as mechanical properties, drug release profiles and antibacterial activity against *pseudomonas aeruginosa* were investigated.

Results: NF decreased mechanical strength of CH films significantly. But addition of PVA increased the tensile strength and elongation of films containing drug. In the early phase of NF release profile, the rate was fast and then continued with gradual drug release. PVA slightly slowed drug release rate in this phase. NF was ineffective against *pseudomonas aeruginosa* while CH films and also the composite films containing NF showed a good activity which was higher than drug-free CH films.

Conclusions: The composite films containing NF showed a good elasticity and was able to prevent the growth of *pseudomonas aeruginosa*. On the other hand the drug polymer interaction affected the release of NF from the films resulted in sustained release action. Hence these films can be used as wound dressing to increase its residence time in the scar and promote wound healing.

Keywords: Chitosan film; Poly vinyl alcohol; Drug release; Antibacterial activity; Wound dressing