

Ag⁺ Assisted Poly(vinyl alcohol)/Chitosan Gel for Wound Dressing

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We prepared silver nanoparticles (AgNP) and dispersed into polyvinyl alcohol/chitosan (PVA/CS) solution, and the mixture was dried into a film to prepare silver loaded gel film dressing with excellent antibacterial properties through a simple one-pot method. The tensile test of the sample showed that the prepared film dressing has good mechanical properties and can prevent fracture caused by external forces. This feature avoids frequent dressing changes and reduces the risk of bacterial infection. Protein adsorption experiments have shown that they have good protein adsorption properties and can adsorb microorganisms on the outer surface of dressings (less than 22.03 mg/g). By utilizing the antibacterial mechanism of AgNP, the dressing achieved effective antibacterial effects. In addition, the dressing prepared by this method has good transparency up to 77.94%, which facilitates routine observation of the wound area without removing the dressing, and maintains a sterile environment for over 6 months. In addition, the cytotoxicity and antibacterial tests of silver loaded gel dressings showed that the prepared dressings had good biocompatibility and antibacterial properties, which helps to observe the wound area routinely without removing the dressing and maintaining a sterile environment for a longer period. This study provides new insights into the clinical application of multifunctional silver loaded wound dressings.

Keyword: hydrogel, wound healing , antimicrobial