

Development and Utilization of Keratin-Fibrin-Gelatin Composite Films as Potential Material for Skin Tissue Engineering Application

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Abstract : The goal of the present study was to develop and evaluate composite film for tissue engineering application. The keratin was extracted from bovine horn and used for preparation of keratin (HK), physiologically clotted fibrin (PCF) and gelatin (G) blend films in different stoichiometric ratios (1:1:1, 1:1:2 and 1:1:3) by using solvent casting method. The composite films (HK-PCF-G) were characterized physiochemically using Fourier Transform Infrared Spectroscopy (FTIR), Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA) and Scanning Electron Microscopy (SEM). The mechanical properties of the composite films were analyzed. The results of tensile strength show that ultimate strength and elongation were 10.72 Mpa and 4.83 MPA respectively for 1:1:3 ratio combination. The SEM image showed a slight smooth surface for 1:1:3 ratio combination compared to other films. In order to impart antibacterial activities, the composite films were loaded with Mupirocin (MP) to act against infection. The composite films acted as a suitable carrier to protect and release the drug in a controlled manner. This developed composite film would be a suitable alternative material for tissue engineering application.

Keywords : bovine horn, keratin, fibrin, gelatin, tensile strength

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