

VITAMIN C CONTAINING XANTHAN-GELATIN BASED HYDROGELS FOR WOUND DRESSING APPLICATIONS

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Gelatin has been widely used in tissue scaffolds due to its excellent biocompatibility, low antigen property, controllable biodegradability, hemostatic property and ability to stimulate cell adhesion/ growth. In literature, xanthan, a water-soluble natural gum produced by fermentation of sugar, is used as adjuvant hydrogel in tissue engineering as well as drug delivery applications. In this study, the potential of vitamin C containing oxidized xanthan (OX) and gelatin (GEL) composite hydrogels of different OX:GEL ratios was investigated as a wound dressing for the first time in the literature. Borax, a non-toxic, inexpensive and readily available cross-linker were used for preparing the composite hydrogels. Also, $CaCl_2$ was used as a crosslinker alongside borax to increase the degree of crosslinking and to make hydrogel durable for treatment time. Initially, concentration of crosslinkers ,boraks (Bo): $CaCl_2$ (Ca), then ratio of OX:Gelatin (1:3, 2:3, 1:1 wt:wt) was optimized. Among groups with different crosslinker ratios (2Bo:1Ca, 1Bo:2Ca and 1Bo:1Ca wt:wt), the hydrogel crosslinked with 2Bo:1Ca wt:wt ratio had the highest structural stability. Vitamin C was used to improve skin regeneration and due to its antioxidant properties. Hydrogel groups with different OX:Gelatin ratios (1:3, 2:3, 1:1 wt:wt) were compared through study. In vitro studies were conducted with fibroblast (L929) cell line. Cell proliferation was highest on OX:Gelatin(1:3 wt:wt) hydrogel. In order to solve the problems encountered in the current dressing applications; Physicochemical, mechanical and in vitro biocompatibility properties of composite hydrogels containing vitamin C are under investigation. The authors acknowledge METU BIOMATEN for financial support and laboratory facilities.

Biography

Gizem Çiğdem Demir has received her BSc degree in the Department of Biological Sciences at Middle East Technical University. She is an MSc candidate at Middle East Technical University, Department of Biotechnology. She is currently focused on wound dressings and skin tissue engineering.

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