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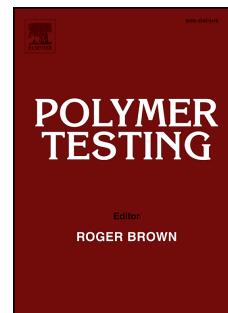
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Characterization of scaffolds based on chitosan and collagen with glycosaminoglycans and sodium alginate addition

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Abstract

Scaffolds based on chitosan (CTS), collagen (Coll), and glycosaminoglycans (GAGs) cross-linked by sodium alginate (SA) were obtained with the use of the freeze-drying method. They were characterized by different analyses, e.g. infrared spectroscopy, SEM images and differential scanning calorimetry. Furthermore, biomechanical properties of the scaffolds were determined in a biomimetic bioreactor

The results showed that the scaffolds based on chitosan, collagen, and glycosaminoglycans cross-linked by sodium alginate are stable in aqueous environment. The infrared spectroscopy analysis showed the hydrogen bond formation between polymers. Scaffolds presented open-pores structures even after a 3-day long analysis in a perfusion bioreactor. The obtained results indicate that the addition of sodium alginate slightly modified biomechanical properties.

Key words: chitosan, collagen, glycosaminoglycans, scaffolds, perfusion bioreactor

Introduction

Cartilage is the elastic tissue which covers and protects bones. It is also the main component of joints. Cartilage is composed of specialized cells called chondrocytes [1]. It does not contain blood vessels or nerves and the nutrients supply the cells by the diffusion process [2]. It is necessary to apply functionalized materials to replace the damaged cartilage

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