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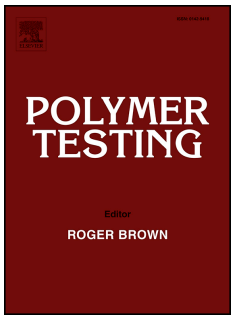

Carrageenan-based hydrogels: Effect of sorbitol and glycerin on the stability, swelling and mechanical properties

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Carrageenan-based hydrogels: effect of sorbitol and glycerin on the stability, swelling and mechanical properties

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Abstract

The kappa carrageenan (κ- carrageenan) polysaccharide is a water soluble biopolymer extracted from various species of red marine algae (*Rhodophyta*) which has an excellent gel forming ability. Compositions of four different formulations of carrageenan-based hydrogels with various sorbitol and glycerin concentrations were prepared. Mechanical properties, swelling properties and resistance to degradation of hydrogels were analysed. All samples had high resistance to degradation and were capable of absorbing a large quantity of water. However, the most optimal formulation was that containing 20% sorbitol and 1.5% glycerin. Hydrogels containing 20% sorbitol and 1.5% glycerin had the highest values of Young's modulus and the lowest water uptake ratio. The obtained carrageenan-based hydrogels have a high potential for the application in the cosmetic or dermatological areas.

1. Introduction

Over the years hydrogels have been defined in many different ways. Hydrogels are three-dimensional, cross-linked networks made of natural or synthetic polymers. Their unique properties are high flexibility and biocompatibility. [1, 2]. Hydrogels are capable of absorbing large amounts of water or biological fluids and have a soft rubbery consistence similar to living

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