Formation of chitosan–cashew gun hydrogel with UV radiation

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ABSTRACT

Chitin, obtained from lobster, shrimp and crab shell waste, is the second most abundant polysaccharide found in nature. In the 21st century, chitin and its derivative (chitosan) face new opportunities to contribute functional materials and environmentally friendly materials to meet the diverse needs of today's society because of their nontoxic, biodegradable, biocompatible, antibacterial, etc.

UV Radiation processed chitosan cashew gun hydrogels have been observed to be suitable for producing transparent, flexible, mechanically strong, biocompatible, effective and economical hydrogel. No additives were used and different formulations containing chitosan and cashew gun selected from combinations also with agar, were used to make the hydrogels. Chitosan formulations containing the cashew gun and agar show significantly different pre-gel viscosities behavior. Increasing the concentration of agar in the formulation, it converts the sheet gel to paste gel useful for filling wound cavities. For characterization, the hydrogels were dried until constant weight and analyzed by infrared spectra (IR), thermal analyses, Scanning electron microscopy and UV absorption spectra The results indicate that pre irradiation network structure of the formulation plays an important role in properties of the irradiated gel dressing. Scanning electron micrographs show highly porous structure of the gel. To observe swelling response of the chitosan/PEG hydrogels when exposed to different pH conditions, the hydrogels were emerged until equilibrium in an aqueous medium of pH 2, 4, 7 and 9 at 25^{o}C. The hydrogels presented higher swelling content in acid medium. The hydrogels will be observed to be useful in treating burns, non-healing ulcers of diabetes, drug controlled deliver and other external wounds.

Keywords: Hydrogel; Radiation processing; chitosan; Agar; cashew gum