

Polymeric materials

Synthesis and flocculation properties of gum ghatti and poly (acrylamide-co-acrylonitrile) based biodegradable hydrogels

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Abstract

This article reports the development of biodegradable flocculants based on graft co-polymers of gum ghatti (Gg) and a mixture of acrylamide and acrylonitrile co-monomers (AAM-co-AN). The hydrogel polymer exhibited an excellent swelling capacity of 921% in neutral medium at 60 °C. The polymer was used to remove saline water from various petroleum fraction-saline water emulsions. The flocculation characteristics of the hydrogel polymer were studied in turbid kaolin solution as a function of the amount of polymer and the solution temperature and pH. Biodegradation studies of hydrogel polymer were conducted using the soil composting method, and the degradation process was constantly monitored using scanning electron microscopy and Fourier transform infrared spectroscopy techniques. The results demonstrated an 89.47% degradation of the polymer after 60 days. Finally, the hydrogel polymer adsorbed 98% of cationic dyes from the aqueous solutions.

Keywords

Gum ghatti; Hydrogel; Swelling; Flocculation; Biodegradation; Adsorption