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Synthesis of pH – Thermosensitive gum arabic based hydrogel and study of its salt-resistant swelling behavior for saline water treatment

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ABSTRACT

An experimental protocol was developed to synthesize *GA-cl-poly(AAm)* hydrogel which was found to be pH as well as temperature sensitive. The polymer was synthesized by optimizing different reaction parameters including initiator, monomer and crosslinker concentration along with the basic reaction conditions like reaction temperature, reaction time, amount of solvent and pH. The graft copolymerization was carried out in the presence of potassium persulphate-hexamethylene tetramine initiator-cross linker system. Characterization of candidate polymer was carried out by FTIR spectroscopy, SEM and TGA/DTA/DTG techniques. Synthesized polymer was studied for its salt-resistant swelling efficiency in different salt solutions: NaCl, $MgCl_2$, $CaCl_2$, $FeCl_3$, $ZnCl_2$ and $BaCl_2$ as a function of salt concentration, temperature and pH. It was observed that optimized polymer exhibits maximum swelling in 1% NaCl solution (1428.32%) at 35°C.

Keywords: Gum arabic; hydrogel; acrylamide; pH-thermosensitive; salt-resistant swelling

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