

## THE EFFECT OF ACRYLIC ACID AND ACRYLAMIDE GRAFT-COPOLYMERIZATION ON THE PROPERTIES OF SODIUM ALGINATE-BASED SUPERABSORBENT POLYMER

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### ABSTRACT

Sodium alginate (NaAlg) copolymers were prepared by free radical grafting of acrylic acid (AA) and acrylamide (AM) onto NaAlg with the presence of ammonium persulfate (APS) initiator. The copolymers were then cross linked with N, N-methylenebisacrylamide (NMBA) to produce an interpenetrating network. The superabsorbent polymer (SAP) hydrogel was then dropped into  $\text{Ca}^{2+}$  solution to produce spherical copolymer beads. The main objective of the work is to study the effect of different ratio of AA and AM (85:15, 70:30, 55:45, 40:60 and 25:75) on the characteristic and performance of the SAP. Infrared (IR) spectroscopy proves successful grafting of AA and AM onto NaAlg backbone and formation of  $\text{Ca}^{2+}$  layer onto SAPs. Biodegradability and water absorbency decreases as AM concentration increases. Moreover, SEM study shows that the surface of copolymer beads with higher concentration of AM is compact with less cracks and pin holes. In addition, thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC) also show that all the copolymer beads are thermally stable and the glass transition temperature ( $T_g$ ) increases as AM concentration increases respectively.

**KEYWORDS:** Biodegradability Grafting Superabsorbent Swelling