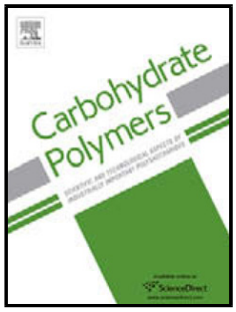

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Design and development of guar gum based novel, superabsorbent and moisture retaining hydrogels for agricultural applications

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HIGHLIGHTS

- Synthesis of novel, EGDMA cross-linked guar gum superabsorbent hydrogels
- Characterization with FTIR, surface morphology, thermal and water absorption studies
- Biodegradation studies of the synthesized hydrogel and half-life period determination
- Evaluation in agricultural applications as follows-
- Effect of hydrogel on maximum water holding capacity (MWHC) of soil
- Effect on water retention capacity of soil
- Effect on density and porosity of soil

Abstract

The novel hydrogels were synthesized by grafting guar gum with acrylic acid and cross-linking with ethylene glycol di methacrylic acid (EGDMA). The synthesis of hydrogel was confirmed by characterization through ^{13}C – NMR, FTIR spectroscopy, SEM micrography, thermo-gravimetric analysis and water absorption studies under different solutions. Synthesized hydrogel (GG-AA-EGDMA) was confirmed to be biodegradable with half-life period of 77 days through soil burial biodegradation studies. The effects of hydrogel treatment on soil were evaluated by studying various physico-chemical properties of soil like bulk density, porosity, water absorption and retention capacity etc. The hydrogel which could absorb up to 800 ml water per gram, after addition to soil,