

Synthesis, characterization, and morphology study of coco peat-grafted-poly(acrylic acid)/NPK slow release fertilizer hydrogel

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ABSTRACT

Coco peat-grafted-poly(acrylic acid)/NPK [CP-g-P(AAc)/NPK] slow release fertilizer hydrogel (SRFH) was prepared by grafting coco peat fiber onto acrylic acid in the presence of NPK 15–15-15 fertilizer using in-situ solution polymerization technique. Commercial super absorbance polymer (CSAP) was used to compare the properties of SRFH. The hydrogels were characterized by fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (SEM), differential scanning calorimetry (DSC) and ultraviolet-visible spectroscopy (UV-Vis). The grafting reaction is approved by the disappearance of peak at 973 cm^{-1} of FTIR spectrum. DSC results revealed that SRFH had high glass transition temperature, T_g compared to CSAP. SEM images showed that SRFH had low porosity and compact structure than CSAP. Fertilizer release study showed that the amount of nutrient release is greatly improved by SRFH.

KEYWORDS:

Coco peat; Grafting; Hydrogel; Fertilizer; Acrylic acid; Crosslinked

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