

ABSTRAK

Telah disintesis hidrogel *controlled release fertilizer* (CRF) berbahan dasar akrilamida (AAM) dan *crosslinker* N,N'-Metilenbisakrilamida (MBA) dengan penambahan ekstrak SDT. Penelitian ini bertujuan untuk mensintesis hidrogel CRF dan mengetahui karakteristik serta kinerjanya. Penyiapan hidrogel CRF dilakukan melalui penyisipan nutrisi (Zink nitrat) ke dalam hidrogel yang disintesis pada kondisi optimum. Morfologi struktur dari hidrogel CRF diidentifikasi dengan menggunakan *Fourier Transform Infrared Spectra* (FTIR) spektroskopi dan metode *X-Ray Diffraction* (XRD). Kinerja hidrogel CRF ditentukan melalui pengukuran *swelling ratio*, *water retention*, dan *release behavior*. Hasil karakterisasi menunjukkan bahwa penyisipan nutrisi meningkatkan kristalinitas hidrogel dan hasil FTIR menunjukkan dalam hidrogel CRF terdapat puncak serapan gugus fungsi -OH/-NH, C=O, C-O, dan -NO. *Swelling ratio* (%SR) dan *water retention* (%WR) dari hidrogel CRF yang disintesis adalah 60,63% dan 9,62% secara berturut-turut. *Release behavior* yang disisipkan pada hidrogel bergantung pada jumlah nutrisi yang terabsorpsi pada hidrogel, dengan nilai optimum yang terjadi pada penyisipan nutrisi 4,987 ppm per 0,3313 gram hidrogel. Hasil uji kinerja ini menunjukkan bahwa hidrogel CRF yang disintesis berpeluang untuk diaplikasikan sebagai agen *controlled release nutrient* dalam bidang pertanian.

Kata kunci : Hidrogel CRF, AAM, MBA, SDT, *swelling ratio*, *water retention*.

ABSTRACT

We have successfully been synthesized the hydrogel based on Acrylamide (AAM) with addition of SDT extract and the cross-linker of *N,N'*-methylenebisacrylamide (MBA) for controlled release fertilizer (CRF) material. The aim of study was to synthesis the CRF hydrogels and to determine their characteristics and performance. Preparation of CRF hydrogel was determined through the insertion of nutrient (Zink nitrate) into hydrogel synthesized at optimum condition. The morphological structure of CRF hydrogel was identified by Fourier Transform Infrared Spectra (FTIR) spectroscopy and X-ray diffraction (XRD) method. Performance of CRF hydrogel was determined by measured swelling ratio (%SR), water retention (%WR), and release behavior. The characterization results indicated that insertion of nutrient increased the crystallinity of the hydrogel and the result of FTIR showed in CRF hydrogel existed absorption peak of functional group – OH/-NH, C=O, C-O, and –NO . The synthesized CRF hydrogel has the swelling ratio (% SR) and water retention (WR%) of the synthesized hydrogels were 60,63% and 9,62%, respectively. The release behavior of nutrient was influenced by the amount of nutrients absorbed in the hydrogel with inserted nutrient/hydrogel = 4.987 ppm / 0.3313 gram. The performance study indicated that the CRF hydrogels was applicable to be used as CRF agent in agriculture practices.

Keywords : Hydrogel CRF, AAm, MBA, SDT, swelling ratio, water retention.