ABSTRAK

Telah disintesis biohidrogel berbahan dasar DYT-PVA dengan *crosslinker* glutaraldialdehid (GA) untuk aplikasi *controlled release fertilizer* (CRF). Penelitian ini bertujuan untuk menghasilkan biohidrogel yang *biocompatible* dan *biodegradable* serta mengetahui karakteristik dan kinerjanya sebagai agen CRF. Kondisi optimum dalam persiapan biohidrogel diperoleh pada rasio komposisi (DYT : PVA : GA = 10:10:18) dan suhu pengeringan 25^{o}C. *Swelling ratio* (%SR) dan *water retention* (%WR) dari biohidrogel yang disintesis adalah 548% dan 8,7% secara berturut-turut. Morfologi struktural biohidrogel diidentifikasi dengan menggunakan *Fourier Transform Infrared Spectra (*FTIR*)* spektroskopi, *Scanning Electron Microscopy (*SEM*),* dan metode *X - Ray Diffraction (*XRD. Uji kinerjanya dilakukan melalui parameter *swelling ratio, water retention, release behavior,* kemampuan biodegradasi dan uji tumbuh. Karakterisasi biohidrogel menunjukkan bahwa biohidrogel memiliki struktur berpori dan kristalinitas tinggi dengan sifat hidrofilik yang dominan. Penyisipan nutrisi kedalam biohidrogel secara signifikan menurunkan kristalinitas biohidrogel ditunjukkan oleh pengurangan % SR dan %WR dari biohidrogel menjadi sekitar 141 % dan 1,44 %, masing-masing. Sebaliknya, biodegradabilitas biohidrogel meningkat dengan adanya penyisipan nutrisi. Hasil uji kinerja ini menunjukkan bahwa biohidrogel yang disintesis berpotensi sebagai agen CRF.

Kata kunci : Biohidrogel, CRF, DYT-PVA-GA, *swelling ratio, water retention.*

ABSTRACT

We synthesized biohydrogel based DYT-PVA with crosslinker of glutaraldialdehid (GA) for controlled release fertilizer (CRF) application. The aim of study is to prepare a biocompatible and biodegradable biohydrogel, to characterize the morphological structure of biohydrogel, and to determine the capacity of biohydrogel as a CRF agent. The optimum condition for preparation of biohydrogel was obtained at the composition ratio of DYT: PVA: GA equals to 10:10:18 and the drying temperature of 25^{o}C.The swelling ratio (% SR) and water retention (% WR) of the synthesized biohydrogel were 548 % and 8.7 %, respectively.The structural morphology of biohydrogel was identified by Fourier Transform Infrared Spectra (FTIR) spectroscopy, Scanning Electron Microscopy (SEM), and X-Ray Diffraction (XRD) methods. The performance test was carried out to determine the swelling ratio, water retention, release behavior, biodegradability and growing ability of biohydrogel. The characterization of biohydrogel indicated that biohydrogel has a porous structure and high crystallinity with predominantly hydrophilic properties. The insertion of nutrient into biohydrogel significantly decreased the crystallinity of biohydrogel indicated by the reduction of % SR and % WR of biohydrogel approximately to 141 % and 1,44 %, respectively. In contrast, the biodegradability of biohydrogel was increased with the nutrient encapsulation. The performance test of biohydrogel showed that the synthesized biohydrogel is applicable for controlled release nutrient.

Keywords : Biohydrogel, CRF, DYT-PVA-GA, swelling ratio, water retention.