

SINTESIS HIDROGEL SUPERABSORBEN BERBASIS ASAM MALEAT DAN KARBOKSIMETIL SELULOSA SEBAGAI PELEPAS UREA

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INTISARI

Sintesis hidrogel superabsorben berbasis asam maleat dan karboksimetil selulosa untuk pelepas urea telah dilakukan. Penelitian ini bertujuan untuk melakukan sintesis hidrogel dengan monomer asam akrilat (AA), akrilamida (AM), dan asam maleat (MA) serta polimer karboksimetil selulosa (CMC) yang menghasilkan hidrogel superabsorben CMC-*g*-poli(AA-*co*-AM-*co*-MA). Pengaruh penambahan CMC pada kemampuan serap air hidrogel kemudian dibahas. Sintesis hidrogel yang sama juga dilakukan dengan penambahan urea untuk mengetahui aktivitas pelepasan urea. Metode yang digunakan untuk melakukan sintesis hidrogel adalah polimerisasi radikal bebas terinduksi kimia. Hidrogel superabsorben CMC-*g*-poli(AA-*co*-AM-*co*-MA) disintesis dengan variasi penambahan jumlah CMC yaitu 0; 0,1; 0,2; 0,4; dan 0,5 g. Hidrogel CMC-*g*-poli(AA-*co*-AM-*co*-MA)/Urea disintesis dari variasi CMC optimum yaitu penambahan sebanyak 0,2 g. Hidrogel dikarakterisasi dengan spektrofotometer FTIR, SEM, dan TGA. Aktivitas pelepasan urea diuji dengan spektrofotometer UV-Vis.

Hasil penelitian menunjukkan bahwa hidrogel superabsorben CMC-*g*-poli(AA-*co*-AM-*co*-MA) telah berhasil disintesis yang dibuktikan lewat karakterisasi FTIR, SEM, dan TGA. Penambahan polimer CMC pada hidrogel dengan monomer asam akrilat, akrilamida, dan asam maleat mampu meningkatkan kapasitas serapan air hidrogel yaitu 718 g/g (tanpa CMC) dan 1031 g/g (dengan CMC). Hidrogel CMC-*g*-poli(AA-*co*-AM-*co*-MA) dengan penambahan urea menunjukkan aktivitas pelepasan urea yang lambat dalam air setelah 24 jam.

Kata kunci: asam maleat, hidrogel, karboksimetil selulosa, kopolimer

SYNTHESIS OF MALEIC ACID AND CARBOXYMETHYL CELLULOSE-BASED SUPERABSORBENT HYDROGEL FOR UREA RELEASER

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ABSTRACT

Synthesis of maleic acid and carboxymethyl cellulose-based superabsorbent hydrogel for urea releaser has been conducted. This study aims to synthesize hydrogels with acrylic acid (AA), acrylamide (AM), and maleic acid (MA) as monomers and carboxymethyl cellulose (CMC) as polymer that produced CMC-g-poly(AA-co-AM-co-MA) superabsorbent hydrogels. The influence of CMC addition on the water absorption ability of the hydrogels was then studied. The same hydrogel was also synthesized with the addition of urea to determine the urea release activity. The method used to synthesize the hydrogels was chemical induced free radical polymerization. CMC-g-poly(AA-co-AM-co-MA) superabsorbent hydrogels was synthesized with variations in the addition of CMC amounts of 0, 0.1, 0.2, 0.4 and 0.5 g. CMC-g-poly(AA-co-AM-co-MA)/Urea hydrogel was synthesized from the optimum CMC variation of 0.2 g addition. The hydrogels were characterized by FTIR spectrophotometer, SEM, and TGA. The urea release activity was studied with UV-Vis spectrophotometer.

The results showed that CMC-g-poly(AA-co-AM-co-MA) superabsorbent hydrogels have been successfully as evidenced through FTIR, SEM, and TGA characterization. The addition of CMC polymers to hydrogels with acrylic acid, acrylamide, and maleic acid monomers was able to increase the water absorption capacity of the hydrogels, 718 g/g (without CMC) and 1031 g/g (with CMC). CMC-g-poly(AA-co-AM-co-MA) hydrogels with urea addition showed slow release activity in water after 24 hours.

Keywords: carboxymethyl cellulose, copolymer, hydrogel, maleic acid