

INTISARI

EFEK TAUT SILANG GLUTARALDEHIDA PADA KOMPLEKS POLIELEKTROLIT KITOSAN-KARBOKSIMETIL SELULOSA TERHADAP ADSORPSI BIRU METILEN

Telah dilakukan pembuatan film kompleks polielektrolit kitosan-karboksimetil selulosa (kitosan-CMC) dan kitosan-karboksimetil selulosa tertaut silang glutaraldehida (kitosan-CMC-GA) untuk pengujian pengaruh penambahan glutaraldehida sebagai agen taut silang terhadap sifat mekanik film dan sifat adsorpsi desorpsi biru metilen. Film yang terbentuk dikarakterisasi dengan FTIR, SEM, *Tensile Strength Tester*, uji kestabilan dalam medium asam basa dan uji penyerapan air. Uji aktifitas adsorpsi film terhadap biru metilen meliputi pengaruh komposisi film, waktu, pH, konsentrasi biru metilen, kinetika adsorpsi dan isoterm adsorpsi serta dilakukan uji desorpsi film pada larutan NaCl.

Hasil karakterisasi FTIR dan SEM menunjukkan film berhasil disintesis dengan adanya perubahan permukaan film setelah dan sebelum ditambah glutaraldehida. Sifat mekanik film meningkat seiring bertambahnya jumlah glutaraldehida dan film stabil pada kondisi pH 3. Kondisi optimum adsorpsi diperoleh pada pH 8 dengan konsentrasi optimum 125 mg/L. Adsorpsi optimum film 7:3 (rasio volume CMC:kitosan) diperoleh sebesar $3,15 \times 10^{-4}$ mol/g di menit ke 45 dengan persentase desorpsi sebesar 52,95% dan pada film 6:1 (rasio mol kitosan:GA) diperoleh sebesar $2,68 \times 10^{-4}$ mol/g di menit ke 30 dengan persentase desorpsi 42,23%. Kinetika adsorpsi biru metilen mengikuti orde dua semu dan isoterm adsorpsi biru metilen mengikuti model Langmuir.

Kata kunci: Kitosan, CMC, glutaraldehida, adsorpsi-desorpsi, biru metilen.

ABSTRACT

THE EFFECT OF GLUTARALDEHYDE CROSSLINKED OF CHITOSAN-CARBOXYMETHYL CELLULOSE POLYELECTROLYTE COMPLEX IN THE METHYLENE BLUE ADSORPTION

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The chitosan-carboxymethyl cellulose polyelectrolyte complex film and chitosan-carboxymethyl cellulose crosslinked with glutaraldehyde (Chitosan-CMC-GA) have been synthesized. This films was used to study the effect of glutaraldehyde as crosslinker towards mechanical properties and adsorption-desorption process of methylene blue. The films were characterized with FTIR, SEM and Tensile Strength Tester. The stability of films in the acid-base medium and the ability to absorb water were tested. The adsorption activities of films towards methylene blue also was studied including the effect of films composition, time, pH, concentration of methylene blue, adsorption kinetics and adsorption isotherm. The desorption activities of films has been conducted in NaCl solution.

The FTIR results showed that the film have been successfully synthesized and the surface morphology of film was changed after glutaraldehyde addition as shown in SEM image. The mechanical properties of film increased as glutaraldehyde increased and has stability at pH 3. The optimum condition of methylene blue adsorption occurs at pH 8 with a concentration of 125 mg/L. Optimum adsorption of film 7:3 (ratios volume CMC:kitosan) was 3.15×10^{-4} mol/g at 45 minutes and the percentage of desorption was 52.95%. The optimum of mol ratios of chitosan:GA was 6:1 with adsorption capacity at 2.68×10^{-4} mol/g at 30 minutes and desorption percentage was 42.23%. Adsorption kinetics followed the pseudo second order with Langmuir isotherm.

Keywords: Chitosan, CMC, glutaraldehyde, adsorption-desorption, methylene blue.