

INTISARI

PENGEMBANGAN MANIK KITOSAN TERLAPIS NATRIUM ALGINAT (KTNA) UNTUK ADSORPSI BIRU METILENA

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Telah dilakukan sintesis manik kitosan terlapis natrium alginat (KTNA) sebagai adsorben biru metilena. Penelitian ini bertujuan untuk mensintesis dan mengkarakterisasi manik KTNA, mengetahui pengaruh variasi konsentrasi natrium alginat terhadap nilai kapasitas adsorpsi biru metilena, dan mengetahui pola isoterm adsorpsi dan kinetika yang sesuai dengan adsorpsi biru metilena oleh manik KTNA. Manik dibuat dengan melarutkan kitosan dalam asam asetat kemudian ditetaskan dalam larutan NaOH. Manik kitosan selanjutnya direndam ke dalam larutan natrium alginat. Manik KTNA yang terbentuk dikarakterisasi menggunakan FTIR, SEM, uji penyerapan air dan uji kestabilan manik dalam medium asam basa. Pengaruh pH, waktu kontak, konsentrasi awal larutan biru metilena, dan kinetika adsorpsi desorpsi juga dipelajari.

Hasil karakterisasi FTIR dan SEM menunjukkan bahwa manik KTNA berhasil disintesis dengan adanya pergeseran pita serapan pada spektra FTIR. Hasil SEM menunjukkan adanya perubahan morfologi permukaan manik sebelum dan sesudah berinteraksi dengan biru metilena. Manik KTNA stabil pada pH 4-12. Kondisi optimum adsorpsi diperoleh pada pH 8 dengan konsentrasi larutan optimum 600 mg/L. Adsorpsi optimum oleh manik KTNA diperoleh pada perbandingan konsentrasi kitosan:natrium alginat (4:1)% (w/v) dengan nilai kapasitas adsorpsi diperoleh sebesar 74,1 mg/g di menit ke 480 dengan persentase desorpsi sebesar 48,0%. Kinetika adsorpsi biru metilena mengikuti kinetika reaksi orde dua semu dan isoterm adsorpsi biru metilena mengikuti model Langmuir.

Kata kunci: Manik KTNA, adsorpsi, biru metilena

ABSTRACT

DEVELOPMENT OF SODIUM ALGINATE-COATED CHITOSAN BEADS FOR ADSORPTION OF METHYLENE BLUE

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Sodium alginate coated chitosan beads have been synthesized as an adsorbent of methylene blue. The aims of the research were to synthesize and characterize sodium alginate coated chitosan beads, to determine the effect of sodium alginate concentration variation on the adsorption's capacity of methylene blue and to determine adsorption isotherm and kinetics that fits adsorption process of methylene blue by sodium alginate coated chitosan beads. Beads were prepared by dissolving chitosan in acetic acid and then sprayed into NaOH solution. Then, chitosan beads were immersed in a sodium alginate solution. FTIR, SEM, water adsorption, and stability test of beads in acid-base medium were performed for beads characterization. This research also studies the effect of pH, contact time, the initial concentration of methylene blue solution and the kinetics of the adsorption-desorption.

The FTIR and SEM results showed that the beads have been successfully synthesized that indicated by adsorption band shifted. The SEM image showed that the surface morphology of the beads was changed before and after interaction with methylene blue. Sodium alginate coated chitosan beads were stable at pH 4-12. The optimum condition of methylene blue adsorption occurs at pH 8 with a concentration of 600 mg/L. Optimum adsorption of sodium alginate coated chitosan beads was found in the beads with concentration ratio chitosan:sodium alginate (4:1)% (w/v) was 74.1 mg/g at 480 minutes, and the percentage of desorption was 48.0%. Adsorption kinetics has been found to follow the pseudo-second order reaction, and the adsorption fits Langmuir isotherm.

Keywords: Sodium alginate coated chitosan beads, adsorption, methylene blue