PEMBUATAN MANIK KITOSAN/ƙ–KARAGINAN SEBAGAI ADSORBEN BIRU METILENA

Pramita Riawati

14/373267/PPA/04773

INTISARI

Telah dilakukan pembuatan manik (*beads*) kitosan/ƙ–karaginan dan digunakan untuk adsorpsi-desorpsi biru metilena. Manik yang terbentuk dikarakterisasi menggunakan FTIR, SEM, uji kemampuan penyerapan air dan uji kestabilan manik terhadap variasi pH. Uji kemampuan adsorpsi manik terhadap biru metilena dilakukan pada berbagai variasi perbandingan komposisi kitosan dan ƙ–karaginan, pH, waktu kontak dan konsentrasi awal biru metilena. Selanjutnya dilakukan studi kinetika adsorpsi, isoterm adsorpsi dan uji desorpsi.

Hasil karakterisasi FTIR menunjukkan adanya interaksi antara kitosan dan ƙ–karaginan, karakterisasi SEM menunjukkan adanya perubahan pada permukaan manik sebelum dan sesudah adsorpsi, kemampuan penyerapan air maksimum pada manik dengan komposisi kitosan:ƙ–karaginan 60:40 dan manik stabil pada pH 3–12. Pada proses adsorpsi, manik dengan komposisi kitosan:ƙ–karaginan 60:40 menunjukkan kemampuan adsorpsi tertinggi. Kondisi optimum adsorpsi diperoleh pada pH 8 dengan konsentrasi 800 mg L^{-1} di menit ke 450. Kinetika adsorpsi mengikuti orde kedua semu dan mengikuti isoterm Langmuir. Kapasitas adsorpsi sebesar 158,73 mg g^{-1}, nilai konstanta kesetimbangan adsorpsi (K) sebesar $6{,}60\times10^{3}$ L mol^{-1} dan energi adsorpsi 21,94 kJ mol^{-1}. Desorpsi biru metilena dengan NaCl 1 M terlarut dalam etanol/air 50/50(v/v) memiliki persentase desorpsi lebih besar dibandingkan NaCl 1 M dan etanol/air 50/50(v/v). Konstanta laju (k) desorpsi sebesar $1{,}30\times10^{-3}$ $menit^{-1}$.

Kata kunci: Manik, kitosan, ƙ–karaginan, adsorpsi, biru metilena

PREPARATION OF CHITOSAN/ƙ–CARRAGEENANBEADS FOR AS ADSORBENT FOR METHYLENE BLUE

Pramita Riawati

14/373267/PPA/04773

ABSTRACT

A research on the preparation of chitosan/ƙ–carrageenan beads and the study of the adsorption and desorption of methylene blue has been conducted. The beads were characterized by FTIR, SEM. The stability of beads in a variation of pH and ability to absorb water were analyzed. Adsorption capabilities were studied by varying the chitosan and ƙ–carrageenan composition ratios, pH, time contacts, the concentration of methylene blue, and also adsorption kinetics, adsorption isotherm, and desorption activities.

The interaction between chitosan and ƙ–carrageenan proved by the FTIR spectra, the surface morphology of beads was changed before and after adsorption as shown in SEM results, the beads with 60:40 ratio of chitosan and ƙ–carrageenan has the highest ability to absorb water and stability of beads at pH 3–12. The methylene blue uptake of the beads with 60:40 ratio of chitosan and ƙ–carrageenan was the highest. The optimum of methylene blue adsorption occurs at pH 8 with a concentration of 800 mg L^{-1} with a time of 450 minutes. Adsorption kinetic followed the pseudo second order with Langmuir isotherm. The adsorption capacity is 158.73 mg g^{-1}, the adsorption equilibrium constant (K) is 6.60×10^{3} L mol^{-1} and adsorption energy is 21.94 kJ mol^{-1}. Desorption studies for methylene blue showed that desorption with 1 M NaCl in 50/50 (v/v) of ethanol/water mixture has the higher percentage compared to those of 1 M NaCl and 50/50(v/v) ethanol/water mixture. Desorption rate constant is 1.30×10^{-3} min^{-1}.

Keywords: Beads, chitosan, ƙ–carrageenan, adsorption, methylene blue