



SINTESIS MANIK ASAM HUMAT/KARBON AKTIF/ALGINAT SEBAGAI ADSORBEN METILEN BIRU

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INTISARI

Manik asam humat/karbon aktif/alginate telah berhasil disintesis. Manik digunakan untuk mengetahui kemampuan adsorpsi terhadap metilen biru, serta mempelajari kinetika dan model isoterm adsorpsinya. Penelitian ini diawali dengan sintesis manik asam humat/karbon aktif/alginate, kemudian dilakukan karakterisasi menggunakan *Fourier Transform Infrared* (FTIR), dan *Scanning Electron Microscopy* (SEM), serta uji kestabilan manik pada medium asam basa dan uji penyerapan air. Manik kemudian digunakan untuk studi adsorpsi metilen biru dengan pengaruh variasi komposisi pH, waktu kontak, dan konsentrasi awal larutan. Hasil penelitian yang didapatkan pada pengaruh waktu kontak dan konsentrasi awal digunakan untuk mempelajari kinetika dan isoterm adsorpsi.

Hasil karakterisasi menunjukkan bahwa manik memiliki gugus aktif antara lain $-COOH$ dan $-OH$, stabil pada pH 2-10. Studi adsorpsi menunjukkan manik mencapai kapasitas adsorpsi optimum pada perbandingan komposisi 1:1:1 (b/b/b), pada pH 5, waktu kontak 60 menit dan konsentrasi awal larutan 350 mg L^{-1} . Adsorpsi metilen biru oleh manik mengikuti model kinetika orde kedua semu dan pola isoterm mengikuti model isoterm Freundlich.

Kata kunci: adsorpsi, asam humat, karbon aktif, alginate, metilen biru



SYNTHESIS OF HUMIC ACID/ACTIVATED CARBON/ALGINATE BEADS AS ADSORBEN OF METHYLENE BLUE

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ABSTRACT

Humic acid/activated carbon/alginate beads were prepared for adsorption and desorption of methylene blue, and to study of adsorption kinetics and isotherm adsorption models. This research was begun with preparation of humic acid/activated carbon/alginate beads. Molecular interaction, structure and surface morphology of the beads were characterized by FTIR and SEM, respectively. Stability test in acid-base medium and swelling test in the water. The effect of variation mass of beads, pH, contact time, and initial concentration were investigated. The optimum contact time was used to study of adsorption kinetics and the optimum initial concentration of methylene blue was used to study of isotherm adsorption models.

The result showed that beads have functional group including $-\text{COOH}$ and $-\text{OH}$ and stable at pH 2-10. The optimum adsorption capacity at ratio composition 1:1:1 (b/b/b), pH 5, contact time 60 min, and initial concentration 350 mg L^{-1} . Furthermore, the adsorption kinetics illustrated the suitability of employing the pseudo-second-order kinetic model. The equilibrium adsorption data fitted the Freundlich isotherm well.

Keywords: adsorption, humic acid, activated carbon, alginate, methylene blue