

**SINTESIS HIBRID SELULOSA-ALGINAT DAN
APLIKASINYA SEBAGAI ADSORBEN LOGAM Co(II)**

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INTISARI

Penelitian berjudul sintesis hibrid selulosa alginat dan aplikasinya sebagai adsorben ion Co(II) dari larutan telah dilakukan. Penelitian ini bertujuan mensintesis adsorben hibrid selulosa-alginat (S-ECH-A), menentukan pH optimum, kinetika adsorpsi, dan isoterm adsorpsi ion Co(II) pada S-ECH-A, serta mempelajari kemampuan desorpsi S-ECH-A-Co. Eceng gondok kering diberi proses hidrolisis, delignifikasi dan pemutihan untuk mendapati selulosa. Selulosa ditaut silang dengan alginat menggunakan penaut silang epiklorohidrin. Adsorben hasil sintesis dikarakterisasi menggunakan FTIR, SEM-EDX dan XRD.

Identifikasi gugus menggunakan FTIR menunjukkan terdapat puncak lebar pada 3410 cm^{-1} yang berasal dari ulur alkohol intermolekuler. Analisis kristalinitas dengan XRD menunjukkan bahwa adsorben S-ECH-A memiliki kristalinitas rendah. Analisis morfologi menunjukkan S-ECH-A memiliki permukaan gabungan selulosa dan alginat. Aplikasi adsorpsi ion Co(II) menggunakan S-ECH-A menunjukkan pH optimum adsorpsi 8, model isoterm adsorpsi adalah Langmuir dengan $K_L = 4,05 \times 10^3\text{ L mol}^{-1}$; $q_{\max} = 54,93\text{ mg g}^{-1}$; $\Delta G = -20,92\text{ kJ mol}^{-1}$, model kinetika adsorpsi adalah orde dua semu dengan $k = 5,67 \times 10^{-1}\text{ g mg}^{-1}\text{ min}^{-1}$, pelarut desorpsi yang baik adalah NH_4OCl , KNO_3 dan Na_2EDTA .

Kata kunci: adsorpsi, desorpsi, isoterm, kinetika, S-ECH-A

***SYNTHESIS OF CELLULOSE-ALGINATE HYBRID AND
ITS APPLICATION AS A Co(II) METAL ADSORBENT***

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ABSTRACT

Research entitled Synthesis of Cellulose-Alginate Hybrid and its Application as a Co(II) Ion Adsorbent from Solutions has been conducted. The purpose of this research is to synthesize a selulose-alginate hybrid adsorbent(S-ECH-A), study the optimum pH, isotherm, and kinetics of Co(II) adsorption on S-ECH-A as well as study the desorption capability of saturated S-ECH-A. Dried water hyacinth goes through the process of hydrolysis, delignification, and bleaching to extract cellulose. Cellulose is then crosslinked with alginate with Epichlorohydrin as the crosslinker. The synthesized adsorbent is then characterized with FTIR, SEM-EDX, and XRD.

Functional group identification with FTIR shows a wide peak at 3410 cm^{-1} that originates from the stretching of alcohol in intermolecular bonds. Crystallinity analysis with XRD shows adsorbent S-ECH-A having low crystallinity. Morphology analysis with SEM-EDX shows S-ECH-A has the combined surface of cellulose and alginate. Application of S-ECH-A in adsorbing Co(II) ions shows an optimum adsorption pH of 8, the adsorption isotherm model is Langmuir with $K_L = 4.05 \times 10^3\text{ L mol}^{-1}$; $q_{\max} = 54.935$; $\Delta G = -3.468\text{ kJ mol}^{-1}$, the adsorption kinetic model is pseudo second order with $k = 5.67 \times 10^{-1}\text{ g mg}^{-1}\text{ min}^{-1}$, the good desorption agent is NH_4OCl , KNO_3 and Na_2EDTA .

Keywords: adsorption, desorption, isotherm, kinetics, S-ECH-A