

**STUDI ADSORPSI MALASIT HIJAU PADA
ADSORBEN SELULOSA-ASAM GLUTAMAT TERTAUT SILANG
EPIKLOROHIDRIN**

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INTISARI

Adsorpsi Malasit Hijau pada adsorben SEL-TSE-GLU telah dilakukan. Penelitian ini bertujuan untuk menentukan pH optimum, model isoterm dan kinetika adsorpsi malasit hijau pada adsorben SEL-TSE-GLU. Selulosa diisolasi dari mahkota nanas melalui proses hidrolisis, delignifikasi, dan *bleaching*. Adsorben SEL-TSE-GLU disintesis dengan menaut silangkan selulosa tersebut dengan asam glutamat menggunakan epiklorohidrin sebagai agen penaut silangnya. Hasil sintesis dikarakterisasi menggunakan FT-IR dan SEM-EDX setelah itu diaplikasikan ke dalam larutan malasit hijau untuk menentukan pH optimum, model isoterm dan kinetika adsorpsi, serta uji desorpsi malasit hijau dari adsorben SEL-TSE-GLU menggunakan akuades, etanol 40 dan 60%, HCl 0,1 mM; dan NaCl 0,1 serta 1 M.

Hasil karakterisasi menggunakan FT-IR menunjukkan bahwa adsorben SEL-TSE-GLU memiliki puncak serapan bilangan gelombang yang mirip dengan selulosa. Morfologi SEM-EDX menunjukkan bahwa adsorben SEL-TSE-GLU mengandung unsur C, O, N, dan Cl. Adsorben SEL-TSE-GLU relatif stabil pada pH 2-8, adsorpsi optimum malasit hijau menggunakan adsorben SEL-TSE-GLU terjadi pada pH 5. Model isoterm adsorpsi malasit hijau menggunakan adsorben SEL-TSE-GLU mengikuti model isoterm adsorpsi Freundlich dengan nilai K_F dan $1/n$ sebesar 1,1678 L mol⁻¹ dan 0,8504, sedangkan model kinetika adsorpsi malasit hijau menggunakan adsorben SEL-TSE-GLU mengikuti model kinetika adsorpsi Ho dan McKay dengan nilai konstanta laju adsorpsi sebesar $5,25 \times 10^{-4}$ g mg⁻¹ menit⁻¹. Larutan NaCl 1 M memiliki kemampuan paling kuat dalam mendesorpsi malasit hijau dari adsorben SEL-TSE-GLU.

Kata kunci: adsorben SEL-TSE-GLU, adsorpsi, desorpsi, malasit hijau

STUDY ON THE ADSORPTION OF MALACHITE GREEN ON EPICHLOROHYDRIN CROSSLINKED CELLULOSE-GLUTAMIC ACID ADSORBENT

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ABSTRACT

Adsorption of Malachite Green on the SEL-TSE-GLU adsorbent has been carried out. The purpose of this research is to determine the optimum pH, isotherm model and kinetics adsorption of malachite green on the SEL-TSE-GLU adsorbent. Cellulose was isolated from pineapple crown using hydrolysis, delignification, and bleaching process. The adsorbent synthesis was started with crosslinking the cellulose with glutamic acid using epichlorohydrin as crosslinker agent. The results of the synthesis were then characterized using FT-IR and SEM-EDX after that the adsorbent was applied to the malachite green solution to determine the optimum pH, isotherm model and kinetics adsorption, and the malachite green desorption test using aquadest, ethanol 40 and 60%, HCl 0,1 mM; and NaCl 0,1 and 1 M.

The results of characterization using FT-IR showed that the SEL-TSE-GLU adsorbent had a wave number absorption peak similar to that of cellulose. The SEM-EDX morphology showed that the SEL-TSE-GLU adsorbent contained C, O, N, and Cl elements. The synthesized SEL-TSE-GLU adsorbent was relatively stable at pH 2-8, optimum adsorption of malachite green using the SEL-TSE-GLU adsorbent occurred at pH 5. The malachite green adsorption isotherm model using the SEL-TSE-GLU adsorbent followed the Freundlich adsorption isotherm model with K_F and $1/n$ values of $1.1678 \text{ L mol}^{-1}$ and 0.8504, while the adsorption kinetics model of malachite green using the SEL-TSE-GLU adsorbent followed the Ho and McKay adsorption kinetics model with adsorption rate constant of $5.25 \times 10^{-4} \text{ g mg}^{-1} \text{ minute}^{-1}$. NaCl 1 M solution has the strongest ability to desorb malachite green from the SEL-TSE-GLU adsorbent.

Keywords: adsorption, desorption, malachite green, SEL-TSE-GLU adsorbent