

ADSORPSI Au(III) PADA BIOMASSA DARI KULIT SALAK HASIL PERLAKUAN TAUT SILANG DAN EKSTRAKSI

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INTISARI

Telah dipelajari adsorpsi Au(III) pada biomassa dari kulit salak hasil perlakuan taut silang dan ekstraksi. Tujuan penelitian ini untuk mempelajari isoterm adsorpsi logam emas dan membandingkan kemampuan adsorpsi Au(III) oleh kedua adsorben.

Penelitian ini diawali dengan preparasi kulit salak melalui metode taut silang dan ekstraksi. Kedua adsorben yang sudah terbentuk ditentukan isoterm adsorpsi dan pada variasi konsentrasi 1, 2, 4, 6, 8, dan 10 mM serta variasi suhu 28, 40, 50, dan 60 °C. Adsorben selulosa taut silang dikarakterisasi dengan FTIR, XRD, dan foto mikroskop. Adsorben ekstrak kulit salak dikarakterisasi dengan FTIR dan foto mikroskop.

Hasil analisis dengan FTIR menunjukkan bahwa adsorben memiliki beberapa kandungan gugus fungsional diantaranya –OH alkohol, C-O-C eter, dan C=C aromatis. Karakteristik adsorben selulosa taut silang dari kulit salak dengan XRD menunjukkan sifat amorf, sedangkan difraktogram adsorben selulosa taut silang dari kulit salak setelah interaksi dengan Au(III) menunjukkan beberapa puncak khas yang berhubungan dengan refleksi Bragg berdasarkan struktur **fcc** nanopartikel emas. Hasil penentuan isoterm adsorpsi menunjukkan bahwa adsorpsi mengikuti model isoterm Freundlich. Nilai ΔG adsorben selulosa taut silang dari kulit salak dan adsorben ekstrak kulit salak pada suhu 28, 40, 50, dan 60 °C berturut-turut -0,96, -2,74, -1,05, -2,16 kJ mol⁻¹ dan -0,07, -0,86, -0,07, -1,02 kJ mol⁻¹. ΔG bernilai negatif menandakan reaksi berjalan spontan. Nilai ΔH pada adsorben selulosa taut silang dari kulit salak dan ekstrak kulit salak sebesar 5,76 kJ mol⁻¹ dan 4,86 kJ mol⁻¹. Nilai ΔS sebesar 19,74 J mol⁻¹ K⁻¹ dan 20,85 J mol⁻¹ K⁻¹. Dari hasil parameter termodinamika membuktikan adsorben selulosa taut silang dari kulit salak lebih baik mengadsorpsi Au(III) daripada ekstrak kulit salak.

Kata kunci: adsorben, Au(III), isoterm adsorpsi, parameter termodinamika.

Au(III) ADSORPTION OF BIOMASS FROM ZALACCA PEEL TREATMENT WITH CROSS-LINKED AND EXTRACTION

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ABSTRACT

Au(III) adsorption of biomass from zalacca peel treatment with cross-linked and extraction have been studied. The purpose of this research was to study adsorption isotherm Au(III) and compare the capability of Au(III) adsorption by two adsorbents.

This research was started with the preparation of zalacca peel with cross-linked and extraction method. Both Adsorbents were determined adsorption isotherm at variations of concentration 1, 2, 4, 6, 8, and 10 mM and variations of temperature 28, 40, 50, and 60 °C. Cellulose cross-linked from zalacca peel adsorbent was characterized using FTIR, XRD, and photomicroscope. Zalacca peel extract adsorbent was characterized using FTIR, and photomicroscope.

FTIR analysis result showed that the adsorbents have several functional groups including –OH alcohol, C-O-C ethers, and C=C aromatics. XRD of cellulose cross-linked from zalacca peel adsorbent was amorphous, while diffractogram adsorbent after interaction with Au(III) shows some typical peaks associated with Bragg reflection by the **fcc** structure of gold nanoparticles. The result shows that the adsorption follows adsorption Freundlich model. The values of ΔG cellulose cross-linked form zalacca peel adsorbent and zalacca peel extract adsorbent at the variations of temperature 28, 40, 50, 60 °C consecutive were -0.96, -0.27, -1.05, -2.16 kJ mol⁻¹ and -0.07, -0.86, -0.07, -1.02 kJ mol⁻¹. The values of ΔG were negative indicates that adsorption proceeds spontaneously. The values of ΔH cellulose cross-linked form zalacca peel and zalacca peel extract were 5.76 kJ mol⁻¹ and 4.86 kJ mol⁻¹, and the values of ΔS were 19.74 J mol⁻¹ K⁻¹ and 20.85 J mol⁻¹ K⁻¹. From the result of thermodynamic parameter showed cellulose cross-linked adsorbent from zalacca peel was better to Au adsorption than zalacca extract adsorbent.

Keywords: adsorbent, Au(III), adsorption isotherm, thermodynamic parameter.