

ABSTRAK

Rhodamin B adalah zat warna yang banyak dipakai sekaligus sebagai limbah terbanyak pada industri tekstil. Penelitian ini dilakukan untuk mengetahui kemampuan adsorpsi ampas teh hijau untuk mengurangi zat warna rhodamin B dengan melakukan studi termodinamika dan kinetiknya. Kondisi optimum penyerapan terjadi pada waktu kontak 10 menit, pH 4 dan pada suhu 70 °C. Ditentukan pula orde pseudo 2, orde 1 dan 2 untuk mengetahui mekanisme adsorpsi. Adsorpsi ini mengikuti kinetika orde pseudo 2 dan, mengikuti orde 2. Proses adsorpsi ini berlangsung mengikuti Isoterm Freundlich, dengan kapasitas adsorpsi sebesar 0,05 mg g⁻¹. Nilai entalpi adsorpsi negatif, $H_{ads} = -9556 \text{ kJ mol}^{-1}$ menunjukkan bahwa proses adsorpsi berlangsung secara eksoterm, nilai energi bebas gibbs positif, $G = 8542,94 \text{ J mol}^{-1}$ menerangkan bahwa proses adsorpsi berlangsung baik pada temperatur tinggi.

Kata-kata kunci: adsorpsi, kinetika adsorpsi, termodinamika, rhodamin B, ampas teh hijau.



ABSTRACT

STUDY OF THERMODYNAMIC AND KINETICS ADSORPTION OF RHODAMIN B ON USED GREEN TEA

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Rhodamin B is the most common dye and the most common pollutant in effluents of textile industries. This study was carried out to evaluate applicability of used green tea for the adsorptive removal of Rhodamin B by investigating the adsorption thermodynamic and kinetic process. The optimum condition were obtained for adsorbent in contact time of 10 minutes, at pH 2 and at a temperature of 70 °C. First-, second-, and pseudo-second order kinetic equation were used to investigate the adsorption mechanism. The adsorption followed second order and pseudo second order kinetic. The isotherm that was appropriate for this adsorbent was Freundlich Isotherm with linear ($R^2=1$), and the maximum adsorption capacity was found to be 0,05 mg g⁻¹. The negative value of enthalpy of adsorption, $H_{ads} = -9556 \text{ kJ mol}^{-1}$, suggested that the adsorption is an exothermic process. The positive value of G of adsorption ($8542,94 \text{ J mol}^{-1}$) suggested that the adsorption is spontaneous in high temperature.

Keywords: adsorption, adsorption kinetics, thermodynamics, rhodamin b, used green tea.

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