ABSTRAK

Pencemaran zat warna tartrazin berdampak buruk bagi kesehatan dan lingkungan. Salah satu metode pengolahan zat warna tartrazin adalah adsorpsi. Hidrotalsit merupakan adsorben dengan kapasitas adsorpsi yang besar. Hidrotalsit adalah lempung anionik berlapis dengan muatan positif pada permukaan yang terbentuk atas hidroksi logam-logam yang mempunyai tingkat oksidasi campuran, biasanya +2 dan +3 melalui *sharing* oktahedral. Penelitian ini bertujuan untuk menghasilkan hidrotalsit Zn/Al-Fe, mengetahui kondisi optimum hidrotalsit Zn/Al-Fe dalam mengadsorpsi zat warna tartrazin serta mengetahui model kinetika dan isoterm adsorpsi. Hidrotalsit Zn/Al-Fe berhasil disintesis menggunakan metode kopresipitasi dengan dilanjutkan proses hidrotermal pada suhu 120℃ selama 20 jam. Karakteristik hidrotalsit Zn/Al-Fe dapat diketahui melalui spektrum FTIR dan XRD. Kondisi optimum hidrotalsit Zn/Al-Fe dalam mengadsorpsi zat warna tartrazin dapat diketahui melalui metode *batch* dengan menggunakan variasi pH, waktu kontak, berat adsorben dan konsentrasi tartrazin. Berdasarkan hasil penelitian, diperoleh kondisi optimum pada pH 4, waktu kontak 60 menit, berat adsorben 50 mg, dan persentase adsorpsi terbesar pada konsentrasi tartrazin 80 ppm sebesar 98,28%. Mekanisme adsorpsi zat warna tartrazin menggunakan hidrotalsit Zn/Al-Fe terjadi melalui interaksi elektrostatik. Kinetika adsorpsi tartrazin menggunakan hidrotalsit Zn/Al-Fe mengikuti model kinetika pseudo orde dua dengan nilai R^2 sebesar 0,9998 dan isoterm adsorpsi Langmuir dengan nilai R^2 sebesar 0,9981.

Kata kunci: hidrotalsit, adsorpsi, tartrazin, kinetika adsorpsi, isoterm adsorpsi

ABSTRACT

Tartrazine dye contamination has a negative impact on health and the environment. One method of processing tartrazine dyes is adsorption. Hydrotalcite is an adsorbent with a large adsorption capacity. Hydrotalcites are layered anionic clays with a positive surface charge formed by hydroxy metals having mixed oxidation states, usually +2 and +3 through octahedral sharing. This study aims to produce hydrotalcite Zn/Al-Fe, determine the optimum conditions for hydrotalcite Zn/Al-Fe in adsorption of tartrazine dyes and determine the kinetic model and adsorption isotherm. Hydrotalcite Zn/Al-Fe was successfully synthesized using the coprecipitation method by continuing the hydrothermal process at 120℃ for 20 hours. The characteristics of the Zn/Al-Fe hydrotalcite can be determined by FTIR and XRD spectra. The optimum condition of Zn/Al-Fe hydrotalcite in adsorption of tartrazine dyes can be determined through the batch method using variations in pH, contact time, adsorbent weight and concentration of tartrazine. Based on the research results, the optimum conditions were obtained at pH 4, contact time 60 minutes, adsorbent weight of 50 mg, and the greatest percentage of adsorption at 80 ppm tartrazine concentration of 98.28%. The adsorption mechanism for tartrazine dyes using Zn/Al-Fe hydrotalcite occurs through electrostatic interactions. The adsorption kinetics of tartrazine using hydrotalcite Zn/Al-Fe followed a pseudo second order kinetic model with an R^2 value of 0.9998 and a Langmuir adsorption isotherm with an R^2 value of 0.9981.

***Keywords**: hydrotalcite, adsorption, tartrazine, adsorption kinetics, adsorption isotherm*