

ABSTRAK

Zat warna *methyl orange* merupakan zat warna yang dapat menyebabkan pencemaran lingkungan apabila dibuang ke badan air tanpa dilakukan pengolahan terlebih dahulu. Pengolahan zat warna *methyl orange* dapat dilakukan dengan metode adsorpsi. Hidrotalsit adalah senyawa dengan lapisan positif yang terdiri dari logam divalen, trivalen dan anion pada antar lapis. Hidrotalsit digunakan sebagai adsorben karena kemampuan kapasitas adsorpsinya besar. Penelitian ini bertujuan mensintesis hidrotalsit Ni/Al-Kitosan dan mengetahui kondisi optimum adsorpsi *methyl orange* yang meliputi parameter pH, waktu kontak, berat adsorben dan konsentrasi serta model kinetika dan isoterm adsorpsi dari zat warna *methyl orange* dengan hidrotalsit Ni/Al-Kitosan. Hidrotalsit Ni/Al-Kitosan berhasil disintesis dengan metode kopresipitasi secara hidrotermal selama 20 jam pada suhu 120 °C. Hasil sintesis dikarakterisasi menggunakan *Fourier Transform Infra Red* (FTIR) dan *X-Ray Diffraction* (XRD). Berdasarkan penelitian ini diperoleh kondisi optimum adsorpsi *methyl orange* oleh hidrotalsit Ni/Al-Kitosan pada pH 6, waktu kontak 60 menit, berat adsorben 30 mg, dan konsentrasi *methyl orange* 10 mg/L. Persamaan kinetika adsorpsi mengikuti model kinetika pseudo orde dua dengan nilai R^2 sebesar 0,9992, konstanta laju adsorpsi sebesar 0,0635 mg/g.menit dan nilai q_e sebesar 18,53 mg/g. Isoterm adsorpsi mengikuti model isoterm Freundlich dengan nilai R^2 sebesar 0,9902; n sebesar 1,70; K_F sebesar 3,56 mg/g dan E sebesar 3,11 kJ/mol.

Kata kunci: hidrotalsit Ni/Al-Kitosan, adsorpsi, *methyl orange*, kinetika, isoterm

ABSTRACT

Methyl orange dye is a dye that can cause environmental pollution if it is discharged into water bodies without prior processing. Processing of methyl orange dye can be done using the adsorption method. Hydrotalcite is a compound with a positive layer consisting of divalent, trivalent metals and anions in the interlayer. Hydrotalcite is used as an adsorbent because of its large adsorption capacity. This research aims to synthesize Ni/Al-Chitosan hydrotalcite and determine the optimum conditions for methyl orange including parameters pH, contact time, adsorbent weight and concentration as well as kinetic models and adsorption isotherms of methyl orange dye with Ni/Al-Chitosan hydrotalcite. Ni/Al-Chitosan hydrotalcite was successfully synthesized using the hydrothermal coprecipitation method for 20 hours at a temperature of 120 °C. The synthesis results were characterized using Fourier Transform Infra Red (FTIR) and X-Ray Diffraction (XRD). Based on this research, the optimum conditions for adsorption of methyl orange by Ni/Al-Chitosan hydrotalcite were obtained at pH 6, contact time 60 minutes, adsorbent weight 30 mg, and methyl orange concentration 10 mg/L. The adsorption kinetic equation follows a pseudo second order kinetic model with an R^2 value of 0.9992, an adsorption rate constant of 0.0635 mg/g.minute and a q_e value of 18.53 mg/g. The adsorption isotherm follows the Freundlich isotherm model with an R^2 value of 0.9902, n of 1.70, K_F of 3.56 mg/g and E of 3.11 kJ/mol.

Keywords: Ni/Al-Chitosan hydrotalcite, adsorption, methyl orange, kinetics, isotherm