Optimal conditions of Dye Removal from Textile Dyeing Industrial Wastewater by Adsorption Process

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Abstract

The study was focused on optimal condition (pH, dosage and contact time), kinetic, and adsorption isotherm of dye removal from textile dyeing industrial wastewater by rice husk and water hyacinth as adsorbents. The results revealed that the maximum dye removals in both of rice husk and water hyacinth were occurred at initial pH 2.0 with the percentages of 95% and 93%, respectively. Optimal dosages of rice husk (50 g/L) and water hyacinth (10 g/L) were suitable contact time interval for adsorption equilibrium at 360 min. The kinetics followed a pseudo second-order. Correlation coefficient (R^2) of rice husk adsorbent used in both Langmuir's equation isotherm and Freundlich's equation isotherm (0.9946, 0.9445) were higher than R^2 of water hyacinth adsorbent (0.8043, 0.8109). Rice husk was the best adsorbent followed Langmuir's equation isotherm and adsorption mechanism was a chemisorption. Moreover, the characteristics of textile dyeing industrial wastewater using rice husk adsorbent were decreased from 178 to 85 mg/L (TSS), 1,883 to 1,430 mg/L (TDS), 95 to 48 mg/L (BOD) and 445 to 292 mg/L (COD), respectively. Hence, rice husk and water hyacinth could be applied for dye removal in wastewater treatment.

Keywords: Adsorption, Dye removal, Industrial wastewater, Rick husk, Water hyacinth (*Eichhornia crassipe* (C.Mart) Solms)

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