315/C

Removal of reactive dye from wastewater using coir pith based adsorbent

B M W P K Amarasinghe
Department of Chemical and Process Engineering, University of Moratuwa, Sri Lanka

Adsorption of reactive dye, cibacron blue onto coir pith from aqueous solutions was studied to enable comparison with alternative commonly available absorbents. Coir pith was treated with hydrochloric acid to enhance adsorption properties. Batch experiments were conducted to determine the factors affecting adsorption and kinetics of the process. Fixed bed column experiments were performed to study practical applicability and breakthrough curves were obtained. Coir pith is capable of binding appreciable amounts of cibacron blue dye from aqueous solutions. The adsorption capacity was highest at solution pH range 2 to 3. The adsorbent to solution ratio and adsorbent particle size affect the degree of dye removal. The equilibrium data were satisfactorily fitted to Langmuir and Freundlich isotherms. Highest dye uptake of 66 and 46 mg/g were observed for hydrochloric acid treated coir pith and granular activated carbon respectively. Kinetic studies revealed that rate of adsorption increases with temperature. The kinetic data fits to pseudo first order model and the intra-particle diffusion model. The intra-particle diffusion is not the only rate limiting step. Fixed bed adsorption capacities were lower compared to batch experiments. Coir pith is a suitable adsorbent for cibacron blue dye removal from wastewater.

*padma@cheng.mrt.ac.lk Tel: 011-2640474