Ion-exchange adsorption of reactive dye solution onto quaternized palm kernel shell

ABSTRACT

Quaternized palm kernel shell was successfully prepared by reacting with N-(3-chloro-2-hydroxypropyl)trimethylammonium chloride in basic condition. Adsorption experiments of Reactive Red E (RRE) dye were carried out in single batch system studied at various initial concentration, contact time and pH at 25°C. It was found that at pH 4 quaternized palm kernel shell showed the highest dye removal percentage of 99% at 100 mg L-1 initial dye concentration. The equilibrium data were analyzed by Langmuir, Freundlich and Redlich-Peterson models and Redlich-Peterson model was best fit to describe this adsorption. Contact time data were analyzed using pseudo-first-order and pseudo-second-order kinetic models and was found that the kinetics conformed pseudo-second-order kinetic model. The maximum adsorption capacity of RRE was 183 mg g-1 for single batch system.

Keyword: Adsorption; Reactive dyes; Palm kernel shell; Quaternization