Desalination and Water Treatment
www.deswater.com
22 (2010) 146–155
October
1944-3994 / 1944-3986
doi: 10/5004/dwt.2010.1390

The biosorption of safranine onto *Parthenium hysterophorus* L: Equilibrium and kinetics investigation

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Received 28 November 2009; Accepted 6 April 2010

ABSTRACT

The effectiveness of adsorption for dye removal from wastewater has made it an ideal alternative to other expensive treatment options. The removal of safranine onto *Parthenium hysterophorus* L (congress grass) (CG) from aqueous solutions was investigated using parameters such as contact time, pH, adsorbent doses, and initial dye concentration. Adsorption isotherms of dye onto CG were determined and correlated with common isotherm equations such as the Langmuir and Freundlich model. Adsorption equilibrium was reached within 40 min. Parameters of the Langmuir and Freundlich isotherms were determined using adsorption data. The maximum adsorption capacity of safranine onto CG was found to be 89.3 mg/g at 400 mg/l of dye concentration. The equilibrium data satisfied Langmuir isotherm better than Freundlich isotherm. The rate constants were evaluated for initial dye concentration and adsorbent doses. The experimental data fit the pseudo-second-order kinetic model.

Keywords: Adsorption; Isotherms; Kinetics; Safranine; Parthenium hysterophorus; XRD