Desalination and Water Treatment
www.deswater.com

36 (2011) 374–382
December

1944-3994/1944-3986
doi: 10.5004/dwt.2011.2247

Orange-II removal from simulated wastewater by adsorption using *Annona squamosa* shell – A kinetic and equilibrium studies

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A B S T R A C T

Adsorbent prepared from *Annona squamosa* (Custard apple) fruit shell (CAS) were successfully used to remove Orange II from aqueous solution in a batch process. The influence of contact time, initial dye concentration, adsorbent dose and pH has been determined. The optimum contact time and pH for removal of dye was 40 min and 4, respectively. Kinetic parameters of adsorption such as Lagergren pseudo-first order, pseudo-second order, Elovich and intraparticle diffusion model were determined. The experimental data fitted well to the pseudo-second-order kinetic model $r^2 > 0.9854$ for all concentrations (5–40 mg/L) tested. Both Freundlich and Langmuir isotherms could be used to describe the adsorption dye, with the former yielding somewhat better fits. In addition, adsorbent was characterized by FTIR, XRD and SEM analysis.

Keywords: Annona squamosa; Orange II; Colour removal; Adsorption Isotherms; Kinetics; Batch study

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