Desalination and Water Treatment
www.deswater.com
29 (2011) 110–118
May
1944-3994 / 1944-3986
doi: 10.5004/dwt.2011.2091

Adsorption of boron from aqueous solutions using activated carbon prepared from olive bagasse

T. Ennil Köse*, Hakan Demiral, Neşe Öztürk

Department of Chemical Engineering, Engineering and Architecture Faculty, Eskişehir Osmangazi University, 26480 Meşelik-Eskişehir, Turkey
Tel. +90 (222) 2393750/3659; Fax +90 (222) 2393613; email: ennilb@ogu.edu.tr

Received 14 June 2010; Accepted in revised form 16 November 2010

ABSTRACT

In this study, activated carbon was prepared from olive bagasse by physical activation. The pore properties including the BET surface area, pore volume, pore size distribution and average pore diameter were characterized. BET surface area of the activated carbon was determined as 803 m^2g^{-1}. In this study, boron removal from aqueous solutions by adsorption was investigated. In the batch mode adsorption studies, the effects of initial pH of solution, contact time, temperature and initial boron concentration of solution were examined. A comparison of kinetic models applied to the adsorption of boron onto activated carbon was evaluated for the pseudo-first order, pseudo-second order, intraparticle diffusion, Elovich and Bangham's kinetic models. The experimental data fitted the pseudo-first order and intraparticle diffusion kinetic model. The thermodynamic parameters were also calculated. In the isotherm studies, the Langmuir, Freundlich and Dubinin –Radushkevich (DR) isotherm models were applied. The results indicate that Freundlich and DR equations are well described with the adsorption data for boron adsorption.

Keywords: Boron; Adsorption; Kinetic model; Activated carbon; Olive bagasse

* Corresponding author.