



Removal of reactive dye from aqueous solutions by adsorption onto activated carbons prepared from oak sawdust

Mona Mahmoud Abd El-Latif^{a*}, Amal Mozarei Ibrahim^b

^a*Fabrication Technology Department, Institute of Advanced Technologies and New Materials, Mubarak City for Scientific Research and Technology Applications, P.O. Box 21934, Alexandria, Egypt
Tel. +20 (3) 4593414; Fax +20 (3) 4593414; email: amona1911@yahoo.com*

^b*Surface Chemistry and Catalysis Laboratory, Physical Chemistry Department, National Research Center, El-Tahrir St., Dokki, Cairo, Egypt
Tel. +20 (2) 3335977; Fax +20 (2) 3370931; email: amozarei@yahoo.com*

Received 19 May 2009; Accepted in revised form 11 January 2010

ABSTRACT

Activated carbons prepared from oak sawdust, a timber industry waste, have been examined for the removal of remazol brilliant blue (RB) dye from aqueous solutions through batch adsorption technique. Activated carbons were prepared from oak sawdust by chemical activation with 10% HNO₃ (AC1) followed by pyrolysis at 500°C in the absence of air and by physical activation at 500°C in the absence of air (AC2). Activated carbons were characterized by SEM, BET and FTIR. Also pH_{pzc} was followed by pyrolysis at 500°C in the absence of air and by physical activation at 500°C in the absence of air for both activated carbons was determined. The effect of pH, adsorbent dose, agitation speed, contact time and initial dye concentration on remazol blue (RB) adsorption were studied. Equilibrium data were fitted to Langmuir, Freundlich and Temkin isotherm models. The equilibrium data were best represented by the Langmuir isotherm model. The kinetic data were fitted to pseudo-first-order, pseudo-second-order, Elovich and intraparticle diffusion models, and it was found to follow closely the pseudo-second-order model.

Keywords: Adsorption; Isotherms; Kinetics; Reactive dye; Sawdust; Activated carbon

* Corresponding author.