



Adsorption of Textile Dye onto Activated Carbon Prepared from Industrial Waste by ZnCl₂ Activation[#]

Hakan Demiral*, İlknur Demiral, Belgin Karabacakoğlu, Fatma Tümsük,

Eskişehir Osmangazi University, Faculty of Engineering and Architecture, Eskişehir, Turkey.

Abstract: Activated carbon was prepared from hazelnut bagasse by chemical activation with ZnCl₂ as activating agent at 600 °C and 3/1 impregnation ratio. Bagasse was obtained from oil factory in Karadeniz Region. The surface area of activated carbon was 1489 m²/g. Prepared activated carbon was used to remove Acid blue 350 (Sandolan Blue) from aqueous solutions and adsorption behaviour of dye onto the porous carbon was studied by varying the parameters such as pH, agitation time, dye concentration and temperature. Acidic pH was favourable for the adsorption of Sandolan Blue. The amounts of dye adsorbed increased with increase in both dye concentration and temperature. The kinetic data and equilibrium data on batch adsorption studies were carried out to understand the adsorption process. To investigate the mechanism of dye adsorption characteristic, adsorption constants were determined using pseudo first-order, pseudo second-order and intraparticle diffusion model. Adsorption isotherms of Acid blue 350 (Sandolan blue) on activated carbon were determined and correlated with common isotherms equations. It was found that the Langmuir model appears to fit the isotherm data better than the Freundlich model. The maximum adsorption capacity of dye was 450 mg/g at temperature of 45 °C and pH value of 2. The present study shows that the activated carbon derived from hazelnut bagasse is an effective low-cost adsorbent for the removal of Sandolan Blue from aqueous solution.

Keywords: Adsorption; acid blue 350; activated carbon; hazelnut bagasse.

*Corresponding, E-mail address: hdemiral@ogu.edu.tr, Tel: +90 222 2393750, Fax: +90 222 2393613

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