

J. Surface Sci. Technol., Vol 24, No. 3-4, pp. 179-193, 2008
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Removal of Rhodamine-B by Adsorption on Walnut Shell Charcoal

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Abstract — Dyes are among the priority water pollutants. In this study we report the removal of Rhodamine-B from its aqueous solutions by adsorption on walnut shell charcoal using batch technique. The effects of various experimental parameters on adsorption such as contact time, temperature, initial pH, initial dye concentration, sorbent dosage and ionic strength were examined and the optimal experimental conditions were evaluated. At initial pH of 9, the dye studied could be removed effectively in a period of 5 hours. The adsorption data were fitted to Freundlich and Langmuir adsorption isotherms for the calculation of various adsorption parameters. The adsorption results indicated that the dye, Rhodamine-B can be effectively removed from its aqueous solutions by using walnut shell charcoal as an adsorbent.

Keywords : *Langmuir and Freundlich isotherms, equilibrium time, sorbent dosage, ionic strength.*

INTRODUCTION

The presence of waste products in the environment is a world wide problem and it has been highlighted by various environmentalist groups. The organic effluents, produced in industries such as textiles, paper, plastic, cosmetics, rubber, etc., impart intense colour to the water bodies in which it is discharged. Discharging of dyes into water resources even in a small amount can affect the aquatic life and the food web. Dyes can also cause allergic dermatitis and skin irritation and may lead to carcinogenic and other disorders. Today there are more than 10,000 dyes available commercially [1], most of which are not easy to biodegrade because of their stability toward light and oxidation; also these dyes are resistant to aerobic digestion [2] due to their complex aromatic molecular structure and synthetic origin [3]. The use of dyes at

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