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REMOVAL OF CONGO RED FROM AQUEOUS SOLUTIONS BY SPENT BLACK TEA AS ADSORBENT

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Herein we present spent black tea as an adsorbent for the removal of Congo red dye from aqueous solutions. The effects of various parameters such as pH, time, temperature, adsorbent dosage and adsorbate dosage on dye adsorption were investigated. Batch experiments were conducted using different amount of adsorbent material (2.5 – 1000 mg) at varying amounts of adsorbate (5 – 500 mg/L) at 35°C and different pH (1 – 13). A maximum dye removal of >80% was achieved with an adsorbent dose of 100 mg, adsorbate concentration of 5 mg/L under pH range of 6 within 5 min at room temperature. The experimental data were modeled by Langmuir, Freundlich and Temkin isotherms and conforms to both Langmuir and Freundlich isotherms but not to Temkin isotherm. The proposed spent black tea can be effectively used as a low cost adsorbent for the removal of Congo red dye.

Keywords: adsorption, spent black tea, congo red dye, langmuir isotherm, waste water.

Introduction

Water contaminated by synthetic dyestuffs through the discharge of industrial wastewater is a worldwide problem. Textile dyeing produces large volumes of wastewater which are left as a major waste in these industries. They dyes being non-biodegradable are difficult to be decolorized once released into the aquatic environment [1]. The discharge of these dye effluents in the environment is perturbing for both toxicological and aesthetical reasons and

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