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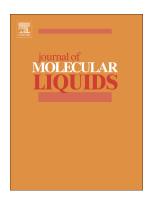
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ACCEPTED MANUSCRIPT

Adsorptive behavior of rice bran-based composites for malachite green dye: Isotherm, kinetic and

thermodynamic studies

Haq Nawaz Bhatti^{a,*}, Asma Jabeen^a, Munawar Iqbal^{b,*}, Saima Noreen^a and Zubera Naseem^a

^aEnvironmental and Material Chemistry Laboratory, Department of Chemistry, University of

Agriculture, Faisalabad, Pakistan

^bDepartment of Chemistry, The University of Lahore, Lahore, Pakistan

*Corresponding Author E-mail: bosalvee@yahoo.com (M. Iqbal), hnbhatti2005@yahoo.com (H. N. Bhatti)

Abstract

Rice bran (RB) composites were prepared polyaniline, starch, polypyrrole, chitosan aniline

and chitosan pyrrole and employed for the adsorption of Malachite green (MG) dye.

Composites doses, pH, contact time, MG initial concentration and temperature effects on GM

dye adsorption were studied. Native RB, polyaniline, starch, chitosan pyrrole, polypyrrole

and chitosan aniline composites showed the maximum MG dye adsorptions of 143.17,

147.47, 140.85, 122.5, 145.03 and 55 (mg/L) for 200 mg/L dve initial concentration, 50 0 C

temperature, 50-60 min contact time, 0.05 g/L adsorbent doses in the pH range of 5-7,

respectively. Pseudo-second-order kinetic model and Freundlich isotherm fitted well to the

adsorption data and intraparticle diffusion was the dye adsorption rate limiting step.

Thermodynamic study revealed the endothermic and energetically stable adsorption nature

MG dye onto RB composites. Results showed that composites have potential for MG

adsorption and are potential candidates for the adsorption of dyes from textile wastewater.

Keywords: Composites; Rice bran; Malachite green dye; Kinetics; Isotherms

1. Introduction

Water pollution is one of the serious global issues and among pollutants, dyes from

textile industry are the major sources of pollution [1-3]. The wastewater treatment is a

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