Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

ADSORPTION OF RHODAMINE B ONTO OLIVE POMACE: ISOTHERMS, KINETICS AND INFRARED STUDIES

Imène-Moufida Boukerzaza, Besma Boulhouchet, Brahim Kebabi, Ammar Mennour*

Laboratory Pollution and Water Treatment, Mentouri Brothers University, Constantine, Algeria

Abstract

Olive pomace, an agricultural by-product obtained from an extraction olive oil plant, is tested as a low-cost adsorbent to remove the hazardous rhodamine B dye from aqueous solution. Brunauer-Emmett-Teller (BET) surface area determination and Fourier transform infrared spectroscopic (FTIR) analysis characterized the adsorbent material. The point of zero charge (PZC) was determined (6.3) using a salt addition method. The influence of some operating parameters, namely, initial dye concentration, contact time, solution temperature and solution pH, affecting adsorbent performance is investigated. Maximum adsorption capacity, obtained from the Langmuir isotherm model, was reached in 120 minutes having the value of 86.2 mg g−1. The process is endothermic and the optimum pH was equal to pKa of rhodamine B (around pH 4). The result of the kinetics study indicated that the adsorption obeys the pseudo-second order model. The FTIR study shows that the main adsorption sites are the surface hydroxyl, carboxyl, and amine functional groups. The results of this study support the assumption that the olive pomace can be used as green adsorbent for rhodamine B in place of some commercial products such activated carbon.

Key words: adsorption, isotherm, kinetics, olive pomace, rhodamine B

Received: October, 2020; Revised final: June, 2021; Accepted: October, 2021

*Author to whom all correspondence should be addressed: e-mail: mennourammar@yahoo.fr; Phone: +213 771200504