

Biosorption of Methylene Blue from aqueous solution on spent cottonseed hull substrate for *Pleurotus ostreatus* cultivation

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ABSTRACT

The work presented in this paper focuses on studying the batch adsorption of a basic dye, Methylene Blue (MB), from aqueous solution onto the spent cottonseed hull substrate (SCHS) after used for *Pleurotus ostreatus* cultivation, in order to explore its potential use as a low-cost natural biosorbent for dye removal from wastewater. The biosorbent–MB interaction mechanism was investigated using a combination of FTIR and SEM techniques. Variables of the system, including solution pH, particle size, reaction time, SCHS dosage and initial MB concentration, were adjusted to study their effects on MB biosorption. The results showed that the kinetics of dye removal by SCHS was rapid, with 90.0% sorption within the first 5 min and equilibrium attained after 180 min. Biosorption kinetics and equilibrium followed the pseudo-second-order and Langmuir adsorption models. The maximum amount of MB adsorbed on SCHS was 185.22 mg/g. As a new adsorbent, experimental study showed that vast potential capacity for adsorbing MB existed in the SCHS.

Keywords: Spent cottonseed hull substrate (SCHS); *Pleurotus ostreatus*; Biosorption; Methylene Blue; Isotherm; Kinetics

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