



A Comparative Investigation on Biosorption Performances of Non-viable *Vaucheria* sp. and *Chara* sp. for a Hazardous Basic Dye-Methylene blue

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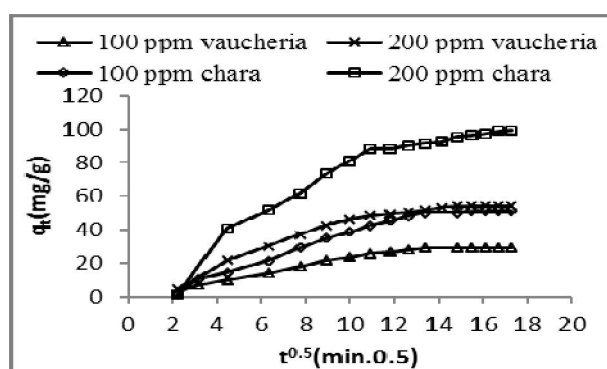
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ABSTRACT

In this paper, a comparative account of biosorptive ability of a Xanthophyta yellow green alga *Vaucheria* sp. and a Charophyta green alga *Chara* sp. for Methylene blue, a basic dye, from synthetic wastewater is given. Various operational parameters such as contact time, biosorbent dose, pH, and temperature that affect the biosorption of Methylene blue onto algal biomass have been studied. Langmuir, Freundlich, Temkin and Dubinin-Radushkevich (D-R) isotherms were applied for equilibrium studies and the experimental data were found best fit for Langmuir isotherm model. The higher biosorption capacity was found to be 200 mg g^{-1} for *Chara* sp. as compared to 166.66 mg g^{-1} for *Vaucheria* sp. under the studied optimum conditions. The kinetic data was best described by pseudo-second-order model and the thermodynamic studies showed the endothermic nature of biosorption. Characterization part were performed to explore the physical and chemical properties of algae, the surface area calculation was done using BET method, surface morphology by scanning electron microscope images and surface functionality by FTIR. The stability and efficiency of both the algal biomass in the long term repetitive operations up to five repeated batches were also investigated. The disposal method of the used biomass is also proposed in the present study in order to retain the process eco-friendly. The present work suggests that non-viable *Vaucheria* sp. and *Chara* sp. biomass are suitable biomass for MB dye removal from synthetic wastewater.

Graphical Abstract



Intra-particle diffusion plot for the biosorption of MB on to algal biomass *Vaucheria* sp. and *Chara* sp.

Keywords: Biosorption, Methylene blue, *Vaucheria* sp., *Chara* sp.