

Adsorptive removal of crystal violet dye from aqueous solutions using natural resource systems

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ABSTRACT

The need for alternative wastewater treatment methods with wide scale applicability led to a new area of interest: the green technology, which dealt with technological interventions for environmental sustainability by focusing on minimizing pollution and use of non-renewable resources. Crystal violet is typical cationic dye which belongs to an important class of commercial dyes and it acts as a mitotic poison, potent carcinogen and a potent clastogene, promoting tumor growth in some species of fish. Therefore, there is an important need to develop eco-friendly and cost-effective treatment methods, which can effectively remove this dye from industrial wastewaters. Modified clinoptilolite was used in this study as a low-cost adsorbent to evaluate its ability to remove crystal violet dye from effluents. The influence of initial dye concentration, sorbent dose, adsorption time and temperature has been analyzed in detail with crystal violet dye. Fit of the sorption experimental data was tested on Langmuir, Freundlich and Temkin isotherm models. It was found that the Langmuir and Temkin models fitted well. The present study demonstrated that modified clinoptilolite has the potential of application as an efficient sorbent for the removal of crystal violet dye from aqueous solutions.

Keywords: Crystal violet; Dye sorption; Zeolites; Isotherm

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