Removal of toxic methyl green (MG) in aqueous solutions by apricot stone activated carbon – equilibrium and isotherms modeling

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\textbf{A B S T R A C T}

Apricot stone activated carbon (ASAC), was powdered, activated and to be used as effective adsorbent to remove the dyes from aqueous solutions through batch experiments under operational factors namely, pH, contact time, adsorbent dose, initial dyes concentration and temperature. The physico-chemical, morphological and structural properties of the adsorbents were characterized by scanning electron microscope (SEM) and X-ray diffraction (XRD) instruments. Different kinetic models indicated that the adsorption is well described by the pseudo-second order model. The isotherms of methyl green (MG) adsorption on ASAC were obtained and correlated with various models. The smaller RMSE values for the Langmuir and Dubinin-Radushkevic models indicated the best fitting; the mono layer adsorption capacity of MG was found to be 148.478 mg g\textsuperscript{-1} at 21°C and 88.11 mg g\textsuperscript{-1} at 46°C at pH 10. The thermodynamic functions showed spontaneous and endothermic MG adsorption. In conclusion, the adsorbent prepared from apricot stone (ASAC) was found to very effective and suitable adsorbent for reactive dyes removal from aquatic environment, due to its simple and cheap preparation, easy availability and good adsorption capacity.

\textit{Keywords:} Apricot stone; Methyl green; Isotherm; Adsorption; Equilibrium; Thermodynamic

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