Assessment on the modelling of the kinetic parameter for the removal of crystal violet dye using Ag-soil nanocomposite: linear and non-linear analysis

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ABSTRACT

In recent decades, handling of bio-hazardous dyes such as crystal violet in various discharges is a growing concern which can affect the global aquatic scenario. A low-cost environment-friendly nanocomposite was synthesized for the removal of crystal violet dye from industrial effluent solution. The efficacy of plant(\textit{Azadirachta indica})-mediated synthesized silver nano soil composite as an adsorbent was evaluated in a batch reactor. A composite model system was introduced linear and non-linear responsiveness towards the kinetics of adsorption of crystal violet onto Ag-nano soil composite during batch experimental study. The equilibrium kinetics was analysed using pseudo-second-order kinetic model system. The coefficient of determination and chi-square tests were implemented to explore the best fit of the equation. The experimental data were better represented by non-linear model system than that of linear model system.

Keywords: Crystal violet; Clay; Adsorbent; Ag-NP; Composite model system; Linear and non-linear model