



## **Evaluation of Adsorbents for Removal of Phenol and Methylene Blue from Wastewater**

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**Abstract:** The adsorption of phenol onto activated carbon and methylene blue dye onto Amberlite XAD4 in a fixed bed column were investigated. The effect of various influent adsorbates concentrations, flow rates, and bed depths on the performance of fixed bed was studied. Batch type experiments were carried out to study the equilibrium isotherm data, external mass transfer coefficient and interparticle diffusion coefficient by fitting the experimental data with theoretical model. The interparticle diffusion coefficient was obtained using pore diffusion model for batch adsorber by matching the experimental data with the model predicted data. The equilibrium isotherm data were fitted with five theoretical models. A mathematical model was formulated to describe the mass transfer kinetics in the fixed bed adsorbent bed's column for both adsorbents. The results show that the mathematical model includes external mass transfer and pore diffusion using nonlinear isotherms, provides a good description of the adsorption process for phenol and methylene blue onto fixed bed adsorbent bed.

**Keywords:** *Adsorption, fixed bed, activated carbon, Amberlite XAD4, phenol, methylene blue, mathematical model, mass transfer coefficient.*

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