

Experiment (#4) Title: Adsorption of a Model Dye by activated charcoal Adsorbent

Principle: Rise in concentration of solutes in a solution negatively impacts its adsorption on an adsorbent when the volume of the solution is kept constant

Materials required:

- i) A packed-bed activated charcoal Adsorbent adsorbent
- ii) 5.0 mL disposable syringe
- iii) Basic Fuchsin dye solution
- iv) 2.0 mL collection tube

Procedure:

- i) A packed-bed activated charcoal Adsorbent (50 mg) will be fabricated in a 5.0 mL disposable syringe.
- ii) In separate sets, varying concentrations of a 2.0 mL aliquot of Basic Fuchsin dye solution (100, 150, 200, 250 and 300 ppm) will be made
- iii) These varying concentrations of the dye will be then added to the syringe and forced through the adsorbent bed by applying a gentle pressure on the syringe piston.
- iv) The eluted solution will be collected dropwise in a 2.0 mL collection tube and the absorbance of the collected solution will be measured at 540 nm in a spectrophotometer.

Following adsorption, the absorbance values for the collected dye solutions of varying concentrations along with the fold dilution of the samples will have to be recorded in the table shown below:

Concentration of Basic Fuchsin Dye Solution (ppm)	Volume of Dye Solution (mL)	Absorbance (A_{540})	Fold Dilution
100	2.0		
150	2.0		
200	2.0		
250	2.0		
300	2.0		

Draw a plot indicating the concentration of dye adsorbed (mg/L) as a function of the concentration of dye solution in the feed sample (mg/L). Provide a plausible explanation for the observed trend with respect to the nature of adsorption isotherm.