Biosorptionof Methylene Blue dye using low cost Azadirachtaindicaadsorbent in Batch Process

VibhaGoswami, RenuUpadhyaya*, Sumanta Kumar Meher

Department of Chemistry, Amity University Rajasthan (India)
[3]Department of Chemistry, Malaviya National Institute of Technology Jaipur(India)

Abstract: In the present study, methylene blue (MB) dye was removed by *Azadirachtaindica*which was prepared using raw Neem leaves through successive unit operation in a batch process. The effect of various operating parameters like inlet concentration of MB dye, adsorbent dose, pH of solution, and contact time were studied on percentage removal of MB dye. It was observed that the percentage removal increased on increasing the adsorbent dose, pH and contact time. However, it decreases on increasing the dye concentration. The maximum removal was found to be 93.11 % at 1 gmof NLP dose under 180 minute of contact time for 10 mg/l MB dye solution. Moreover, various isotherm models*viz*Langmuir, Freundlich and Temkin were fitted through regression on batch experimental data and it was found that Freundlich isotherm model best fits since the value of R^2 (0.996) is maximum as compare R^2 value of other models. Further, the unsteady state kinetic models were fitted on experimental data for understanding the phenomena of type of adsorption and it was observed that Pseudo second order model was in close agreement with experimental data .The theoretical equilibrium adsorption capacity was also found to be well validated with experimental equilibrium adsorption capacity. The maximum adsorption capacity of NLP adsorbent was found to be 5.7 mg adsorbate adsorb/gm of adsorbent.The SEM images of new brand prepared adsorbent and used adsorbent after 180 minute of contact time shows that the NLP is an effective adsorbent for MB dye removal.
Keywords: Methylene Blue, Isotherm models, equilibrium, kinetic models, adsorption capacity , SEM.

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