

Dye removal using carbonized biomass, isotherm and kinetic studies

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Abstract

Effect of thermal treatment on green tea dredge, an abundant waste, for dye removal was investigated in the present study. Variable temperature (800 and 900°C) and residence time in furnace (10 min, 1 and 2 h) were used to prepare six adsorbents which were characterized for surface morphology. The adsorption study was carried out using methylene blue as a model molecule and the effect of shaking time, pH and concentration was determined. Adsorbents prepared at 900°C were found to be more effective than those prepared at 800°C while longer residence time in furnace yielded adsorbents with higher adsorption capacity. The maximum adsorption capacity achieved in this case study was 71.4 ± 4.6 mg/g which is better than many activated carbons derived from other materials. Langmuir model was a better fit in isotherm studies while the sorption process followed pseudo-second-order kinetics.

Keywords : Pyrolysis, Methylene blue, Tea dredge, Lagergen model, [Intraparticle diffusion](#)

Ahmad, M., Bachmann, R. T., Khan, M. A., Edyvean, R. G. J., Farooq, U., & Athar, M. M. (2013). Dye removal using carbonized biomass, isotherm and kinetic studies. *Desalination and Water Treatment*, 1–10. doi:10.1080/19443994.2013.867818