Efficient Removal Of Toxic Bromothymol Blue And Methylene Blue From Wastewater By Polyvinyl Alcohol

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ABSTRACT

Removal of bromothymol blue (BTB) and methylene blue (MB) from wastewater using polyvinyl alcohol (PVA) has been elucidated in the present work. PVA exhibited high adsorption capacity and more active sites for the highly efficient removal of these toxic dyes. The impact of several variables such as concentration, contact time, pH and temperature were studied. The optimum pH and contact time for the high efficient removal were found to be 6 and 10 min, respectively. The adsorption isotherms were well interpreted by Freundlich and Langmuir models. The maximum adsorption capacities obtained from Langmuir model were 276.2 and 123.3 mg g⁻¹ for BTB and MB, respectively. In addition, the removal efficiencies for both adsorbates respectively, were found to be 98.65 and 61.32%. Several adsorption kinetic models were used to fit the experimental data, such as simple first-order, the pseudo-first-order, pseudo-second-order and intraparticle diffusion models. The adsorption process concurrently adapted to the pseudo-second-order kinetics and it was found to be the best fitting model with the obtained experimental data.

KEYWORDS: Adsorption; Kinetic models; Polyvinyl alcohol; Bromothymol blue; Methylene blue; Wastewater treatment

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