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Original Article

Removal of Methylene Blue Dye from Synthetic Wastewater with Bone Char

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Abstract:

Backgrounds and Objectives: Dyes are organic materials with complex structures, toxic, carcinogenic, teratogenic,nonbiodegradable properties andthe most!important pollutants of textile industrial wastewaters. The goal of this study was to survey the feasibility application of bone char (BC) as a sorbent for the of methylene blue (MB) from synthetic wastewater.The sub goals of the research!were to determine!the adsorption isotherm, !effects of primary concentration of dye, adsorbent!dose, contact!time, and pH for the adsorption of MB with BC.

Materials and Methods: BC was prepared under laboratory conditions by using of electrical furnace at 400°C for 2h. The prepared BC was crushed and pulverized by standard ASTM sieves with range of 10-16mesh(1.18-2mm).The chemical composition and solid structure of BC was analyzed using X-ray diffraction(XRD) and scanning electronic microscopy (SEM). Measurement of the surface area was carried out by N2 gas via BET isotherm and Belsorb software. The concentration of dye was measured by photometric!method (663nm).

Results: Predominant!compositionof BC is calcium hydroxyl apatite (Ca5 (PO4)3OH with 14m2/g surface area. The results of this study showed that increasing of primary concentration of dye, adsorbent dose and pH (5 to12) would lead to increasing of adsorption/removal of MB dye.Equilibration of dye adsorption was reached at lapse of 2h andoptimum pH for adsorption of MB with BC found in the rage of 8.5-12.Adsorption of MB witht BC complies witht freundlich isotherm(R2:0.99).

Conclusion: Bone char is a cheap component that can be used as an adsorbent in water and wastewater treatment. Based on optimum pH of 8.5-12 found for the removal of MB and the fact that many of textile!industrial wastewaters have an alkaline pH, this adsorbent can belused for the removal of dyes from these wastewaters.

Keywords:

Bone char , Methylene blue , adsorption , dye , wastewater

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