Adsorptive Capacity on Methylene Blue of Thermochemically Activated Biochar Derived from Rice Husks and Other Agricultural Wastes

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Abstract: Novel adsorbent was produced from rice husks and agricultural waste derived biochar. The adsorbent was synthesized by subjecting to pyrolysis agricultural waste and activated the product with thermochemical treatments to enhance its properties. The effects of alkali concentration, process temperature and reaction time on the agricultural waste derived biochar were assessed and results showed that the activation of biochar enhanced its specific surface area by 58.5 to 220.8 square meter per gram. The total pore volume of the biochar also increased from 0.33 cm3 per gram to a maximum of 0.45 cm3 per gram upon activation. The adsorptivity of the biochar before and after thermochemical treatment were compared using methylene blue and for concentrations up to 20 milligram per liter, 80% of dye were removed when biochar was treated and only 35 % was when not treated thermochemically.

Keywords: Biochar, rice husks, agricultural waste, pyrolysis, thermochemical