The study of phosphorus adsorption efficiency of activated carbon from disposable bamboo chopsticks

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Abstract: The preparation of activated carbon from disposable bamboo chopsticks by chemical activation using phosphoric acid was studied. The parameters affected on moisture and iodine number were optimized. It was found that activated carbon prepared by activation using 40%v/v phosphoric acid at room temperature for 60 minutes showed the lowest moisture about 0.54%. While the activated carbon prepared by activation using 70%v/v phosphoric acid at room temperature for 30 minutes showed the highest iodine number about 2,012 mg/g. The surface morphologies of activated carbon were observed using a scanning electron microscopy (SEM). The pore size of activated carbon was approximately 3.33 micrometers categorized as mesopores. After that, the parameters affected on phosphorus adsorption efficiency in artificial waste water with 0.5 mg P/L were studied. The activated carbon prepared by activation using 70%v/v phosphoric acid at room temperature for 30 minutes showed the highest adsorption efficiency when the ratio between activated carbon weight and artificial waste water volume was 1:100 and adsorption time about 16 hours. In addition, the Freundlich model was found to be the adsorption isotherm of phosphate in artificial waste water on the activated carbon.

Keywords: Activated carbon; Bamboo; Chopsticks; Phosphorus