Pigment Removal of Waste Water by Bagasse Ash

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ABSTRACT

There were three stages in the study. Firstly, bagasse ash (BA) was used as adsorbent for the removal of methyl blue solution being as colored wastewater. Batch studies were performed to address various experimental parameters like pH, temperature, adsorbent dose and initial concentration for the removal of methyl blue soloution. Modification of BA with acid and heat treatment was also studied for color removal. Secondly, bagasse ash were testes as sorbents for the dye removal of RB-5, DY-86 and DR-243. Additionally, BA was applied to textile wastewater and waste molasses for decoloration. Thirdly, it was investigated the kinetics of color removal by continuous model and adsorption mechanism by desorption experiments.

Number of particle pore and surface area were increased with bigger particle size of BA. The most part of element was carbon with 62.38%. Mental element content was about 18 ~ 21%. The larger particle size of BA was with higher mental element content. The rate of color removal would decrease with the increase of dye solution concentration. Concentration of methyl blue solution was 20 ~ 500 mg/L, there were no significant differences in color removal for different particle size of BA. While concentration of dye solution was 1000 ~ 4000 mg/L, rate of color removal for particle size < 0.125 mm BA was significantly lower than others. Effect of color removal for 0.1 g adsorbent dose was significant less than other dosages (1-20 g). The rate of decoloration would not increase with the increase of adsorbent dose. However, factors of temperature and pH value of solution did not significantly affect rate of decoloration.

Acid-treated BA would not increase effect of color removal. It was addressed that acid treatment could not change functional groups of BA. However, heat-treated BA was less effect of decoloration than untreated BA. Color removal of BA in RB-5, DY-86 and DR-243 dye solution was not as good as in methyl blue solution. Application of BA in textile wastewater and waste molasses, particle size 0.177-0.250 mm BA had a great effect on decoloration, the rate of color removal was 33% and 45%, respectively.

Furthermore, results of column experiments showed that more proportion of activated carbon and dose of adsorbent would increase color removal. Effect of desorption with 50% (v/v) acetic acid solution was significantly better than those. The study showed BA exhibited its potential to be used as an adsorbent for the removal of colored wastewater. Consequently, it would be further re-utilized waste produced in agriculture.

Keywords : Adsorption、Desorption、Dye、Bagasse ash、Color removal、Waste water treatment

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