

Investigation of the optimum ratio of rice straw-derived biochar/alginate composite with melamine sponge for removal of methylene blue in water

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The biochar is attracting a lot of attention as an adsorbent that effectively removes dyes from water due to the characteristics of its surface functional group (oxygen containing group), porous structure and large surface area. However, biochar in powder form is difficult to recover after removing dye from aqueous solution, and it has a disadvantage of low adsorption capacity compared to activated carbon. To solve this problem, rice straw residue was used as raw material for biochar and alginate, an eco-friendly polymer, were coated on Melamine sponge. The swelling problem of alginate which makes difficulty to recovery was solved by making the weight ratio of biochar and alginate 1:1. In addition, biochar/alginate composite, the kinetic model is suitable for the pseudo-second order model ($R^2 = 0.9981$) and the Langmuir isotherm model ($R^2 = 0.9967$). In the Langmuir isotherm model, the maximum adsorption capacity of the dye by the adsorbent is 89.2857 mg/g.