



Longan seed and mangosteen skin based activated carbons for the removal of Pb(II) ions and Rhodamine-B dye from aqueous solutions

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ABSTRACT

Agricultural biomass wastes of longan seed and mangosteen skin were collected as precursors to prepare activated carbons (LS-AC-5 and MS-AC-5, respectively) through carbonization at medium temperature and KOH activation at high temperature. Their pore structures, structural properties and surface morphologies were characterized by X-ray diffractometer, Brunauer–Emmett–Teller surface measurement system, and scanning electron microscopy, respectively. Effects of contact time and pH on adsorption performances of samples were investigated by removal of Pb(II) ions and Rhodamine-b from aqueous solutions. Experimental adsorption isotherms of Rhodamine-b and Pb(II) ions on LS-AC-5 and MS-AC-5 fitted well with the Langmuir model. Results further showed that MS-AC-5 exhibited a larger surface area of 2960.56 m²/g and larger portions of micropores and mesopores (pore volume of 1.77 cm³/g) than LS-AC-5 (surface area: 2728.98 m²/g; pore volume: 1.39 cm³/g). Maximum monolayer adsorption capabilities of 1265.82 and 117.65 mg/g for Rhodamine-b and Pb(II) ions on MS-AC-5 were higher than those on LS-AC-5 (1000.20 and 107.53 mg/g), respectively.

Keywords: Activated carbon; Adsorption; Agricultural waste; Pb(II) ions; Rhodamine-b dye

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