

OP-47 ADSORPTION PROPERTIES OF OAK SAWDUST FOR Cd(II) IONS REMOVAL FROM
AQUEOUS SOLUTIONS

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Cd(II) is a common toxic metal which spread into the environment as a result of various industrial processes including milling, textile, metal plating, stabilizers, battery manufacturing, metallurgical alloying and mining operations. The accumulation of Cd(II) in human body affects kidney, bones, and causes acute and chronic metabolic disorders, such as itai-itai disease, renal dysfunction, lung damage, emphysema, hepatic injury, hypertension and testicular atrophy and teratogenic effects. Because of its high toxicity, the Cd(II) levels in drinking water and wastewater should be reduced to below the maximum permissible concentration ($5.0 \mu\text{g L}^{-1}$).

Therefore in the present study we aimed to test the ability of natural (NOS) and H_2SO_4 modified oak (*Quercus petraea* L.) sawdust (AMOS) to remove Cd(II) ions from waters and wastewaters through batch adsorption process. The NOS and AMOS were characterized with different techniques. For adsorption tests, 10 mL of Cd(II) solutions in the concentration range of $50\text{--}650 \text{ mg L}^{-1}$ at initial pH 4.0 were added into the polyethylene centrifuge tubes. Then 50 mg of NOS and AMOS (5.0 g L^{-1} suspension) were transferred into the solutions, separately and then the mixture was shaken on a mechanical shaker at 400 rpm. After reaching the equilibrium (120 min), the suspension was centrifuged at 3000 rpm for 10 min, and the concentration of the dilute phase was analyzed for the Cd(II) concentration using a flame atomic absorption spectrometer. The effects of solution pH, contact time, initial Cd(II) concentration, and adsorbent concentration were evaluated upon the Cd(II) adsorption onto NOS and AMOS. The influences of foreign ions were evaluated by using different concentrations of BaCl_2 and NaCl solutions. The experimental data were analysed by different isotherm and kinetics model.

Taking into account of the findings of this study, it can be concluded that the natural and H_2SO_4 modified oak sawdust can be used as an effective, economical and easily available adsorbents in removal of Cd(II) ions from aqueous solutions.

Keywords: Adsorption, Removal, Oak, *Quercus petraea* L., Cadmium, Kinetics, Isotherm

References

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