The Synthesis of Magnetic Hydrochar from Oil Palm for Adsorption of Heavy Metals in Industrial Water

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This research was conducted to synthesize hydrochar from palm frond by hydrothermal carbonization (HTC). Magnetic property was added to the hydrochar by reaction with magnetite, to increase its absorption capacity and making it possible to be eliminated by suction with an external magnetic field. Testing the absorption of hydrochar with many heavy metals such as Cu2+, Fe3+, Cr3+,Mn2+,Ni2+ showed that the hydrochar absorbed Nickel (Ni2+) best at 77.64% and lowest percentage of absorption for Copper (Cu2+) at 18.05% . The optimum pH for absorption was at pH 5. The contact period between metal ions and magnetic hydrochar showed absorption rose rapidly and reached saturation at 60 minutes. Regeneration of hydrochar can be done by acid treatment and heat at 200 o C. Synthetic magnetic hydrochar can be reused for at least 22 times with 1.45 % lost of absorption capacity in each cycle. Thus, our synthetic hydrochar is a simple process which can be used to absorb heavy metals in wastewater using less energy and is more environmental friendly than activated carbon with compatible capacity.

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