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IRON DECORATED BIOCHAR FROM MANGO KERNEL FOR THE ADSORPTION OF PHENOL

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ABSTRACT

IRON DECORATED BIOCHAR FROM MANGO KERNEL FOR THE ADSOPRTION OF PHENOL

Phenol contamination in water poses serious environmental and health risks, necessitating the development of sustainable and cost-effective treatment methods. This study investigates the development of mango kernel biochar (MKB) that was going through pyrolysis process, aimed at enhancing the adsorption of phenol from aqueous solutions. MKB was synthesized and subsequently modified with iron (Fe-MKB) through an impregnation process, and both materials were thoroughly characterized using FTIR, XRD, SEM-EDX, CHNS, AAS, and UV-Vis spectroscopy. The successful incorporation of iron into the biochar matrix was confirmed through increased iron content and the appearance of iron-related features in both elemental and structural analyses. Although the iodine number of Fe-MKB indicated some reduction in microporosity due to partial pore blockage, morphological analysis showed a more developed pore structure. Importantly, Fe-MKB demonstrated superior phenol adsorption performance compared to unmodified MKB, with the capacity increasing from 18.70 mg/g to 35.00 mg/g. This enhancement is attributed to improved surface interaction and catalytic properties introduced by the iron species. The findings suggest that Fe-MKB offers a sustainable and efficient solution for removing phenol from water, with potential for broader environmental remediation applications.

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