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CHEMICALLY MODIFIED PALM KERNEL SHELL BIOCHAR FOR THE REMOVAL OF HEAVY METALS FROM AQUEOUS SOLUTION

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ABSTRACT

Worldwide escalated domestic, agricultural, and industrial operations have resulted in the discharge of toxic disadvantageous heavy metals into the water bodies. Toxic heavy metals eradication from water is a complicated subject, therefore a viable, resilient, and green technology is imperative. Heavy metal removal can be accomplished through easy access, economical, and efficient sorbents. In the current study, Waste Palm Kernel Shell was gathered cleaned, transformed into biochar, and acid-base modification was performed to refine its adsorption capabilities. Batch experiments were conducted to explore the adsorption capability for heavy metals aqueous removal involving Chromium, Nickel, and Copper. The surface area was expanded from 112.934 m2/g to 149.670 m2/g by chemical modification. In the batch adsorption, Palm Kernel Shell biochar exhibited 98.62%, 97.10%, and 48.98% Copper, Nickle, and Chromium ion removal respectively while modified Palm Kernel Shell biochar resulted in 99.29% Copper, 96.77% Nickle, and 42.97% Chromium ion elimination. These results are proportionate to already reported in the studies of different agricultural materials-based sorbents. Adsorption by both Palm Kernel Shell biochar and modified Palm Kernel Shell biochar were well defined by Langmuir isotherm and pseudo-second-order kinetics. This research's findings will present new understandings for heavy metals elimination from the wastewater system.