# Biochar as a Strong Adsorbent for Multiple-Metal Removal from Contaminated Water

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**Abstract :** In the past few years, biochar - a highly carbon-rich material produced from agro-wastes by pyrolysis process - was used as an effective adsorbent for heavy metals removal from polluted water. In this study, different types of biochar (rice straw 'RSB', corn cob 'CCB', and Jatropha shell 'JSB' were used to evaluate the adsorption capacity of heavy metals removal from multiple-metal solutions (Cu, Mn, Zn, and Cd). Kinetics modeling has been examined to illustrate potential adsorption mechanisms. The results showed that the potential removal of metal is dependent on the metal and biochar types. The adsorption capacity of the biochars followed the order: RSB > JSB > CCB. In general, RSB and JSB biochars presented high potential removal of heavy metals from polluted water, which was higher than 90 and 80% after 2 hrs of contact time for all metals, respectively. According to the kinetics data, the pseudo-second-order model was agreed strongly with Cu, Mn, Zn, and Cd adsorption onto the biochars ($R2 \geq 0.97$), indicating the dominance of specific adsorption process, i.e., chemisorption. In conclusion, this study revealed that RSB and JSB biochar have the potential to be a strong adsorbent for multiple-metal removal from wastewater.

**Keywords :** adsorption, biochar, chemisorption, polluted water

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