

A Review on Effect of Physicochemical Properties of Biochar on Heavy Metal Remediation in Soil †

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Abstract: Biochar is a low-cost, environment-friendly carbonaceous material. It is attained by pyrolysis of biological materials in the absence of oxygen. Biochar has recently been considered as an effective adsorbent of heavy metals in contaminated soils and water. High metal waste disposal, use of fertilizers, pesticides, smelting activities, and atmospheric deposition are major sources of heavy metal contamination in soils. These heavy metals remain in the soil for a long time and cannot be degraded. Therefore, its removal from contaminated soils is necessary for the prevention of the ecological environment. The physicochemical properties of biochar play a crucial role in immobilizing heavy metal contaminated soil. Biomass feedstock, temperature, and residence time in the pyrolysis process for biochar production are the key factors affecting the properties of biochar. The main properties of biochar like elemental composition, pH, CEC, specific surface area, functional groups, ash content, and porosity have a major impact on the performance of biochar as an adsorbent in polluted soils. So, it is important to study the effect of production conditions and biochar properties to find the optimum parameters for biochar to be used to remediate heavy metal contaminated sites. This paper reviews the recent research articles where biochar is used in heavy metal remediation of soils. The performance of biochar based on its production conditions and physicochemical properties is critically reviewed.

Keywords: heavy metals; biochar; pyrolysis.

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Conflicts of Interest

The authors declare no conflict of interest.