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Initial Greenhouse Observations

on use of

Coal Char *as a* **Soil Amendment**



*Influences on plant
growth and soil water
holding capacity*



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»» What This Study Is About

This greenhouse study begins testing the use of coal char as a soil amendment. The objectives of this preliminary trial were to evaluate the impacts of different concentrations of coal char added to the soil (0% (control), 1, 5, and 10% (v/v)) on plant biomass yield and soil water holding capacity. The study was designed with ten replications using alfalfa as the test plant in two different soils: Uncultivated rangeland soil and cultivated agricultural soil.

»» Why It Was Needed

Agricultural and soil management practices, such as intensive tillage and cultivation, alter the soil environment and negatively impact soil health by reducing soil organic matter and soil structure, which can diminish soil nutrient and water holding capacities and overall soil productivity (Al-Kaisi et al., 2014). Reducing the negative impacts of intensive soil management and crop production, while meeting the world's food demands, is a critical challenge facing the global agricultural community (UNEP, 2012). Adding organic materials to the soil, such as manure, crop residues, and green manure, has long been practiced to increase soil organic matter and improve soil productivity due to its beneficial effects on soil properties (Steiner, 2009). The use of low-ranked coal, such as sub-bituminous coal, and its derivatives as a source of humic materials for agricultural soils has shown a wide range of benefits on the physical, chemical, and biological functions of soil (Akimbekov et al., 2021).

»» What The Research Team Concluded

A significant increase ($p < 0.05$) in soil water holding capacity was observed at 5 and 10% coal char concentrations in both soils compared to their respective controls. Therefore, adding coal char at optimal rates may increase plant growth and soil water holding capacity in dryland soils.



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