School of Energy Resources
Center for Carbon Capture and Conversion

ENHANCING CORN YIELD & SOIL QUALITY

IN IRRIGATED SEMIARID REGION

WITH COAL CHAR & BIOCHAR AMENDMENTS

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WHAT THIS STUDY IS ABOUT

This study evaluates the Zea mays L. corn grain yield and selected soil properties in soil amended with coal char (CC) and biochar (BC) at two rates with farmyard manure (FM) and without FM addition.

WHY IT WAS NEEDED

Modern agricultural practices for increasing crop productivity to feed the growing human population can adversely impact soil health and the environment. Intensive tillage in cropping systems, substantial use of inorganic fertilizers and pesticides, and rigorous use of heavy equipment in farmland are some major factors causing soil health degradation worldwide.[1] The continued likelihood of soil organic matter loss due to certain farming practices can seriously threaten soil properties and long-term sustainable cropping systems.[2] Crop production without degrading soil health or harming the environment is a critical concern for sustainable agriculture.[3,4] The low soil organic carbon content is challenged to achieve optimum productivity, especially in semiarid agroecosystems.

WHAT THE RESEARCH TEAM CONCLUDED

Results from this two-year field study in irrigated corn indicate that a moderate rate application of CC and BC could provide a positive impact on corn grain yield than a high application rate when co-applied with FM. Soil organic matter increase in the char-added plots signifies the long-term soil health benefits of using CC and BC as soil amendments, which may enhance soil physical, chemical, and biotic properties over time, resulting in higher plant growth and crop yield. A more significant amount of nitrate in chars with FM treatments may reflect the nitrate absorbed within the microporous structure of CC and BC. Though it might take several years to understand the influence of stable carbon from char materials on soil health, some enhanced soil properties, such as increased organic matter and increased water-holding capacity within a short application period, shed light on the potential use of CC as a soil amendment.

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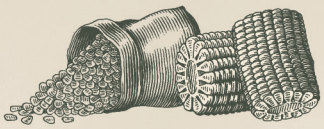

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