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Impacts of Biochar Treatments on Some Soil Properties and Micronutrient Availability in the Farmland of Misau, Bauchi State, Nigeria

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Abstract

The application of biochar as a soil amendment has been recognized as an environmentally friendly and highly efficient strategy for restoring the fertility of the soil and increasing agricultural productivity. In this study, the impacts of *Senna tora* biochar treatments on soil properties and micronutrient availability in the farmlands of Misau, Bauchi State, Nigeria, were investigated. A complete randomized design replicated three times, which included control soil (no biochar/0 day), 30 days, and 60 days of biochar treatments, was adapted. After treatments, the biochar was removed and the soil samples from each treatment were analyzed for pH, soil bulk density (BD), cation exchange capacity (CEC), organic carbon (OC) and micronutrient levels using various analytical methods. The results of the analysis show pH, OC and CEC values increased significantly ($p \leq 0.05$) from 6.66 to 7.89, 3.40 to 3.90 g/kg and 5.16 to 7.29 cmol/kg respectively, while BD decreased significantly from 1.56 to 1.48 g/cm³ after 60 days of biochar treatment. The levels of Mn, Cu and Zn increased from 188.25 to 286.12 mg/kg, 14.38 to 41.88 mg/kg and 68.63 to 140.19 mg/kg respectively, while levels of Fe decreased from 9460.00 to 4782.73 mg/kg after 60 days of biochar treatments. Application of *Senna tora* biochar has generally led to a significant improvement in the fertility of the soil. It is therefore recommended that *Senna tora* biochar be used in the field to demonstrate its practical application.

Keywords: Biochar, Misau, *Senna tora*, soil amendments, Treatments

