Biochar effects on nitrogen and phosphorus use efficiencies of zucchini plants grown in a calcareous sandy soil

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Abstract:

Biochar (B) application to sandy soils improves its productivity and mitigates climate change. A pot experiment was conducted to investigate the potential effects of maize stalks biochar applied to a zucchini (Cucurbita pepo L. var. Hybrid fadwa) grown on a calcareous sandy soil. Plastic pots were filled with three kilograms of the studied soil and amended by the biochar at levels of 0 (control, unamended soil), 6.3 (B1), 12.6 (B2), and 25.5 (B3) g pot⁻¹. The pots were planted with zucchini plants and designed in a complete randomized design with three replications. Amending the soil with the biochar significantly increased the soil organic matter, fresh fruit yield, nitrogen use efficiency (NUE) and agronomic efficiency of applied nitrogen (AEN) of zucchini plants. Biochar additions improved the fresh fruits by 26.7, 55, and 195.0% for B1, B2 and B3 treatments respectively, over the control. The NUE of the plants increased owing to the application of biochar to the soil from 69.2 mg fruit/mg N at the control treatment to 77.1, 84.3 and 131.4 mg fruit/mg N for B1, B2 and B3 treatments, respectively. So, it is recommended to apply biochar as an amendment to the calcareous sandy soil in order to improve its fertility.

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