Effect of biochar on yield and quality of tomato grown on a metalcontaminated soil

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Abstract:

Metal contamination of soils is a main source of hazard materials in food chain. Biochar is a promising agriculture tool to improve plant yield and enhance quality of vegetable crops. Three rates of biochar (C =0, BC1 = 5 and BC2 = 10 ton ha⁻¹) were added to a metal-polluted soil before the cultivation of tomato (Solanum lycopersicum cv Super). The non-edible part of tomato accumulated 80 and 84 % of Cu and Zn, while 20 and 16 % was transferred to the fruit. Whereas the non-edible part of tomato kept 99.9 and 99.8 % of Pb and Cd, less than 0.1 and 0.2 % were moved to tomato fruit. Metal concentrations in tomato tissues as affected by biochar application found to decrease in the order: C>BC1>BC2. BC1 and BC2 significantly increased the tomato fruit yield by 20 and 30 %, respectively, above C treatment. BC2 increased the total acidity, TSS, vitamin C and lycopene in the juice of tomato by 33, 29, 39 and 24 % compared to the control. Biochar increased essential nutrient availability and uptake and minimized those of the toxic element. For improve tomato quality and productivity, it is recommended to apply biochar to metal-contaminated soils.

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