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Influence of co-applying biochar, compost, and inorganic nitrogen on growth, nutrient uptake, and nitrate and riboflavin content in turnips

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In the pursuit of sustainable vegetable farming methods, the effect of co-application of compost, biochar, and a reduced amount of inorganic nitrogen on growth and the quality of turnips was studied in a greenhouse pot experiment. The experiment was carried out with five treatments: unfertilized soil, compost + biochar, compost + 0.5g N/pot, biochar + 0.5 g N/pot, compost + biochar + 0.5 g N/pot. Municipal organic compost (150 g/pot), collected selectively, and biochar (15 g/pot) were mixed with the top 10cm of soil. Nitrogen, as ammonium nitrate nitrogen (16.9% NO3–N and 16.7% NH4-N), was applied weekly in equal amounts. The experiment was arranged in a randomized complete block design with five replicate pots per treatment. All treatments led to an increase in shoot and root macronutrient and micronutrient uptake relative to unfertilized soil. The higher nutrient uptake by shoots and roots occurred in treatments C + 0.5 g N/pot and C + B + 0.5g N/pot. In these treatments, the fresh (root and shoot) of the plant were similar. Shoot nitrate level increased with nitrogen addition but was not affected by the presence of biochar, compost, or compost plus biochar. Root and shoot riboflavin decreased with nitrogen application but were also not affected by the application of compost, biochar, or compost and biochar. The findings of this work indicate that the combined application of compost, biochar, and nitrogen maintains fresh yield and quality, and contributes to carbon sequestration.

Keywords: *Brassica rapa* L., biochar, municipal compost, nitrates, carbon sequestration, sustainable vegetal farming