

Assessing biochar and compost from the organic fraction of municipal solid waste on nutrient availability and plant growth of lettuce

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Biochars have a high variability in chemical composition, which is determined by types of feedstock and pyrolysis conditions. Inorganic compounds, such as N, P, K and Ca, retained in biochar could be released and become available to plants. The aim of this study was to understand the effect of biochar and compost addition, derived from the organic fraction of municipal solid wastes at two different pyrolysis temperatures 3000C (BC300) and 6000C (BC600), on phosphorus availability and plant growth of lettuce (*Lactuca sativa* L.) grown in an alkaline loam soil. This type of soil is widely available in Greece, leading us to investigate ways to increase its fertility. A 39 d growth period of lettuce was studied in a greenhouse in triplicate. Treatments comprised of control soils (no addition of biochar or compost), soils treated only with compost (5%) or biochar (5%), and combinations of biochar (5%) plus compost (5%). No fertilization was added to any of the treatments. One biomass cut was obtained. Plant shoot yield and height were determined along with elemental concentration (N, P, K, Ca, Mg, Mn, Fe, Zn, Cu) and uptake of shoots. Results showed that BC300 combined with compost significantly increased P uptake of lettuce. On the other hand, BC600 plus compost, along with the two biochar-only treatments, significantly decreased Ca and Mg uptake of lettuce. N, K, Fe, Zn, Mn and Cu uptakes were not affected by the application of biochar, compost or the combined treatments. Despite the significant increase of P uptake, plant height and shoot yield were not significantly influenced by any of the treatments.