

Effects of humic acid, compost and phosphorus on growth characteristics of basil herb and concentration of micro elements in plant and soil

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Abstract

Organic matters are important soil components which have considerable effects on phytoavailability of nutrients and improvement of soil physical, chemical and biological properties. The increasing demand for medicinal plants necessitates extensive research on them for sustainable agricultural development. In order to assess the effects of different levels of humic acid, compost and phosphorus (P) on growth traits and some micronutrients' uptake by basil medicinal plant (*Ocimum basilicum* L.) a factorial experiment was conducted in 2011 using a completely randomized design with three replications. Treatments consisted of three levels of humic acid (0, 10 and 20 mg/kg of soil; H₁, H₂ and H₃, respectively), three levels of urban waste compost (0, 5 and 10 ton/ha; C₁, C₂ and C₃, respectively) and three levels of P (0, 10 and 20 mg/kg of soil, as triple super phosphate, P₁, P₂ and P₃, respectively). After harvesting the plants, parameters such as dry weight of aerial parts, number of lateral branches, plant height and concentration and uptake of Fe, Mn, Cu and Zn in aerial parts were measured. Results showed that the effects of humic acid (at H₂ and H₃ levels) and compost (at C₂ and C₃ levels) were significant on height, number of lateral branches and shoot dry weight, as compared to control; but these two levels did not have significant difference. Interaction of humic acid and compost, along with P, on plant height, number of lateral branches and dry weight of shoots was not significant. Application of humic acid and compost increased significantly the concentration of Fe, Mn, Zn and Cu in plant shoots, and availability of Fe, Mn, Zn and Cu in soil was increased with the application of organic fertilizers. Interaction of humic acid and compost on concentration of Fe, Mn, Zn and Cu in plant and soil was significant. In interaction of humic acid and compost with P, the application of P reduced concentration of Fe, Mn, Zn and Cu in plant and their availability in soil. But, study of these interactions showed that application of organic fertilizers can somehow improve the negative effects of P on availability of these elements, and therefore, application of these fertilizers is recommended for improving soil chemical conditions and enhancement of growth traits of basil plant.

Keywords: Medicinal plants, Organic fertilizers, Phytoavailability, Chemical fertilizers.

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