Effect of copper and zinc on growth characteristics, concentration of some mineral elements and translocation capacities of elements into infusion and decoction of dragon's head (*Lallemantia iberica* F. & C.M) under greenhouse conditions

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(Received: Sep. 19-2014 ; Accepted: May 22-2014)

Abstract

In order to investigate the effect of different levels of Copper (Cu) and Zinc (Zn) on morphological traits of dragon's head, concentration of Cu, Zn, Fe, Mn, P and K in root and shoot and concentration of Cu and Zn in infusion and decoction, a greenhouse experiment was conducted as factorial based on complete randomized design with three replications. Treatments consisted of three levels of Cu (0, 5 and 25 mg $CuSO_4$/kg soil), three levels of Zn (0, 10 and 50 mg $ZnSO_4$/kg soil) and their interactions. Results showed that Cu and Zn had significant effect on dry weight of root, chlorophyll (SPAD), leaf area, concetration of K and P in roots and shoots and concetration of Fe and Mn in the roots. Also, their intraction had significant effect on dry weight of shoots, plant height and concentration of Cu and Zn in roots, shoots, infusion and decoction and concentarion of Fe and Mn in shoots. The highest dry weight of shoots (3.97 g/pot) and plant height (58.02 cm) was obsevred in combined treatment of Cu5Zn10 and their minimum values (2.1 g/pot and 36.18 cm, respectively) in treatment Cu25Zn50. Application Cu25Zn50 produced maximum value of concentration of Cu, Zn, Fe and Mn in roots (58.85, 338.06, 3766.91 and 135.97 mg/kg, respectively). Maximum values of concentration of Cu in shoots, infusion and decoction (28.38, 1.49 and 4.55 mg/kg, respectively) were obtained in Cu25Zn10. In general, the results of this study showed that a negative interaction occurred between Cu, Zn, Fe and Mn when higher Cu and Zn concentrations were applied. High translocation capacity of Cu and Zn in infusion and decoction was proved in this study. So, due to the lack of required standards for these elements in medicinal plants, if this plant is grown in soils contaminated with Cu and Zn, it should be used with caution in infusion and decoction.

Keywords: Soil pollution, Herbal plants.

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[DOR: 20.1001.1.20089082.1394.6.2.15.6]
[DOI: 10.18869/acadpub.ejgcst.6.2.145]