

Effect of different levels of municipal solid waste compost and sewage sludge on yield and concentration of some heavy metals in green pepper plant (*Capsicum annuum* var robustin)

M. Boroumand^{1*} and M. A. Bahmanyar¹

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Abstract

To investigate the effect of applying different amounts of municipal solid waste compost (MSWC) and sewage sludge (SS) on yield and concentration of some heavy metals including nickel (Ni), chromium (Cr), cadmium (Cd) and lead (Pb) in organs of green pepper plant, a pot experiment was conducted as a completely randomized design with seven treatments and four replications. Treatments included control, 5% MSWC, 10% MSWC, 5% SS, 10% SS, 5% MSWC+SS, and 10% MSWC+SS. Results showed that addition of MSWC and SS increased the yield of pepper (fresh and dry weights). The highest amount of fruit fresh weight was in 10% MSWC+SS treatment and the highest amount of fruit dry weight was in 5% SS treatment, such that this increase was about 3.5 times in fresh weight and about 3 times in dry weight, as compared to the control. The shoot yield showed significant increase in fresh and dry weight, too. Application of these fertilizers increased plant height as compared to control. The highest increase was about 28% in 5% SS, as compared to control. Also, adding MSWC and SS caused significant increase in concentration of heavy metals in fruits, leaves, shoots and roots of pepper plant. Increasing the level of fertilizers caused an increase in concentration of heavy metals in the plants. Concentration of Ni of fruits was maximum in all the treatments, except in control and 5% MSWC, and concentration of Cd exceeded the critical level for human in all the treatments, except in control, 10% MSWC and 5% SS. Calculation of transfer index showed that accumulation of heavy metals in pepper plants is mainly in roots and not in the shoots. Cadmium, with transfer index of 0.52, has more mobility in plants, as compared to Pb (index of 0.44) and Ni (index of 0.14).

Keywords: Compost, Lead, Nickel, Cadmium, Chromium.

1. Dept. of Soil Sci., Sari Univ. of Agric. Sci. and Nat. Resour., Sari, Iran.

* Corresponding Author, Email: mehri.boroumand@gmail.com