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Lentils Responses to Cadmium Pollution from Animal Manure Compost or Metal Salt

M. R. Asgharipour[*1] and B. Rahmanian Koshki[1]

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Abstract

The aim of this study was to evaluate phytoavailability of cadmium to lentils after the application of composted animal manures. In a greenhouse experiment, two lentil (*Lens culinaris*) cultivars were grown in the soils applied with different levels of Cd from animal manure compost, and compared with Cd applied as cadmium chloride or their combination. Phytotoxicity of Cd was determined as plant growth, Cd accumulation, and the uptake of macronutrients. Addition of Cd significantly reduced plant growth and plant weight as well as plant water content. Phytotoxicity of Cd applied through manure composts was significantly less than the same rate of Cd amended with soluble $CdCl_2$, suggesting the lower potential hazard of composted manure-applied Cd. Plants accumulated substantial amount of Cd in different plant parts. Most of the Cd taken up was retained in roots, and lentil roots had higher concentrations of Cd than the stem. Phytotoxicity of applied Cd in Ziba was significantly greater than that in Zabol cultivar. Cadmium addition especially as metal salt reduced nutrient concentrations in the shoot, and caused more nutrient accumulation in roots, probably due to the inhibition of their translocation to plant shoots. The results of this experiment point to the fact that the Cd source and loading rate are important factors in evaluation of Cd phytoavailability.

Keywords: Waste, Heavy metals, Nutrients, Pot culture.

1. Dept. of Agronomy, College of Agric., Univ. of Zabol, Zabol, Iran.
*: Corresponding Author, Email: m_asgharipour@uoz.ac.ir

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