

Effect of heavy metals on soil microbial activity as measured by carbon mineralization

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Abstract

Heavy metals are natural components of the environment. In recent decades there has been increasing interest in heavy metals, because of toxicity to all living creatures. The purpose of this study was to assess effect of heavy metals on carbon mineralization. Soil belongs to Red Yellow Podzolic great soil group collected from the Faculty farm was treated with heavy metals (Cd, Cr, Zn and Pb) at the rate of 10 $\mu\text{mol/g}$ soil. Determination of carbon mineralization was carried out at 3, 7, 14, 21, 28, 42 and 56 days after metal treatments and completely randomized design (CRD) was used with four replicates. The amount of $\text{CO}_2\text{-C}$ released from heavy metal treated soils was found to be decreased at an increasing rate during the first 14 days, followed by decreasing rates as incubation progressed. No significant ($P \geq 0.05$) variation was found among the treatments during the first 3 days of incubation. However, from day 7 onwards, amounts of $\text{CO}_2\text{-C}$ released from Cd and Cr treated soils were continued to be significantly ($P < 0.05$) different from that of the control. Furthermore, C mineralization of soils treated with different heavy metals showed significant ($P < 0.05$) differences during the period between day 14 to day 56 of incubation. Since then, significant ($P < 0.05$) differences were no longer observed for any treatment. The highest and the lowest variation were observed respectively from Cd and Pb treated soils. It could be concluded that heavy metals have adverse impacts on C mineralization of soils. However, inhibition of $\text{CO}_2\text{-C}$ released from soil depends on the type of toxicity of the heavy metals.

Key words: carbon mineralization, heavy metals, incubation, toxicity