

SYNERGISTIC EFFECTS OF ATMOSPHERIC DEPOSITION AND ORGANIC AMENDMENT ON METAL ACCUMULATION IN *SPINACIA OLERACIA* L.

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Abstract: Pot-culture experiments were conducted to study the accumulation of heavy metals as influenced by atmospheric deposition in organic farming system, in which spinach (*Spinacia oleracea* L.) was grown in earthen pots containing soil and farm yard manure (4:1) at three sites in Varanasi. Heavy metal accumulation in spinach showed synchrony with atmospheric deposition, the values being maximum at Bypass and minimum at BHU site. Concentration of metals in spinach ranged from 0.095 to 5.860 $\mu\text{g g}^{-1}$ for Cd; 0.189 to 13.96 $\mu\text{g g}^{-1}$ for Cr; 0.160 to 23.49 $\mu\text{g g}^{-1}$ for Cu; 0.059 to 6.42 $\mu\text{g g}^{-1}$ for Ni and 0.57 to 18.81 $\mu\text{g g}^{-1}$ for Pb. About 75%, 75% and 33% of vegetable samples contained Cd, Ni and Zn above their safe limits respectively. Our study suggests that atmospheric deposition at Varanasi have reached to the level to substantially elevate heavy metal accumulation in vegetables with a sizable increase in the dietary intake of toxic metals to local residence.

Keywords: Agricultural sustainability, Atmospheric deposition, Metal accumulation, Organic farming, Pot-culture

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