

EVALUATING THE LEVELS OF HEAVY METALS IN SOILS AND CROPS GROWN IN INDUSTRIALLY POLLUTED SELECTED AREAS OF BANGLADESH

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Executive Summary

This study was performed through a net house experiments at Soil Science Department, SAU Dhaka. Tomato and okra were grown in the net house during 2021-22 in five industrially polluted and one non-polluted soils. The soils were collected from Bhaluka industrial areas where industrial waste water deposited continuously. The experiment was conducted by using 54 pots (6 Soils: S₀-Non-polluted soil, S₁-polluted soil 1, S₂-polluted soil 2, S₃-polluted soil 3, S₄- polluted soil 4, S₅: polluted soil 5; × 3 fertilizer treatments: T₀: Control T₁: 100% recommended dose of fertilizer T₂: 50% recommended dose of fertilizer plus 50% nutrient from manure × 3 replications). The tomato and okra yields and yield parameters were significantly affected by industrially polluted soils and fertilizer treatments. Among the soils, the highest tomato yield (330.8 g pot⁻¹) and okra yield (98.55 g pot⁻¹) were found in S₁ and S₅ soils lowest tomato and okra yields were found in S₄ and S₀ soils, respectively. The yield increased in polluted soils may be due to increase of plant nutrient dposition through industrial waste water but toxic metals accumulation were higher in polluted soils. The highest tomato yield (322.0 g pot⁻¹) was recorded in T₂ treatment and lowest in T₀ treatment. The highest level of tomato (0.585%) and okra (0.343%) fruit dry matter P concentrations were recorded in S₄T₀ and S₀T₂ treatment combinations. The highest level of tomato (3.963%) and okra (2.130%) fruit dry matter K concentrations were recorded in S₂T₁ and S₃T₂ treatment combinations, respectively. The higher levels of Fe and Pb accumulated in tomato fruits from industrially polluted soils. The highest tomato fruit dry matter Pb (1.359 mg kg⁻¹) and Cd (0.759 mg kg⁻¹) concentrations were found in T₀ treatment and lower levels were obtained in T₁ and T₂ treatments. In maximum cases, lower levels of Pb and Cd concentrations in tomato were recorded in different soils with 50 % recommended dose of chemical fertilizer plus 50% nutrient from manure (T₂). Similarly higher okra dry matter Pb (0.625 mg kg⁻¹) was obtained in fertilizer control treatment compared to fertilizer applied treatments. The higher levels of tomato and okra fruit Cu, Pb and Cd concentrations were recorded in polluted soils with different fertilizer treatments. The highest tomato fruit Pb concentration (1.656 mg kg⁻¹) was obtained in S₄T₁ and lowest (0.501 mg kg⁻¹) in S₃T₂ treatment combinations. The highest tomato fruit Cd concentration (1.149 mg kg⁻¹) was obtained in S₅T₀ and lowest (0.097 mg kg⁻¹) in S₂T₂ treatment combinations. The highest okra Pb concentration (1.182 mg kg⁻¹) was found in S₁T₀ and lowest Pd (0.053 mg kg⁻¹) accumulation was observed in S₃T₀. The highest okra dry matter Cd concentration (0.523 mg kg⁻¹) was found in S₄T₁ treatment combinations and lowest Cd accumulation was observed in S₂T₀. The higher levels of toxic metals accumulated in fertilizer control treatment and lower accumulation was found in contaminated soil with 50% inorganic fertilizer plus 50% nutrient from manure.

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