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UPTAKE OF SULPHUR, PHOSPHORUS AND GROWTH OF SPINACH, TURNIPS AND TOMATOES IN A LEAD TREATED SOIL

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ABSTRACT

Lead entering the soil system through various sources influence the growth of plants. Lead was applied @ 0 and 5 mg/kg as Pb $(NO_3)_2$ to Rawal series (Udic Ustochrept). Impact of Pb was studied on spinach, turnips and tomatoes under green house conditions. Dry matter yield of the three vegetables decreased to a varied extent by Pb application. Maximum reduction in biomass accumulation was observed in tomatoes which seemed sensitive to Pb application. But there was a significant ($p < 0.01$) interactive effect of Pb on S and P uptake by the three plant species. An antagonistic effect of Pb on S uptake by spinach and turnip was observed. Uptake of S by tomato was also inversely related to Pb application at later stages of plant growth. Further studies on S and Pb relationship under alkaline calcareous soils are suggested to avoid accumulation of this important toxic heavy metal (Pb) especially in leafy vegetables.

MATERIALS AND METHODS

Bulk surface (0-15 cm) soil sample of Rawal Series (Udic Ustocherpt) was collected from the experimental fields of National Agricultural Research Centre, Islamabad. The soil was air dried and ground to pass through a 2mm sieve. It was analysed for various physico-chemical characteristics. The soil was silty clay loam, with pH 8.3, organic matter 0.49% and $CaCO_3$ 4.9 %. The AB-DTPA extractable P, S and Pb were 2.92, 13.50 & 1.03 mg kg^{-1}, respectively. Sulphur extracted by $NaHCO_3$ was 13.50 mg kg^{-1}. Five kg soil taken in various pots in green house received uniform dose of N, P and K @ 150, 50 and 100 mg kg^{-1} as ammonium sulphate, potassium dihydrogen phosphate and potassium sulphate. Two levels of lead i.e. 0 and 5 mg kg^{-1} as Pb $(NO_3)_2$ were imposed in triplicate. The three vegetables grown were spinach *(Spinacia oleracia L* cv. Desi), tomato *(Lycopersicon esculentum L.* cv: Indian Dwarf) and turnip