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Effect of ethylene diamine tetra-acetic acid (EDTA) and citric acid on the uptake of nickel from serpentine soil by *Fimbristyllis ovata*

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Serpentine soils are derived from the weathering of serpentinite and ultramafic rocks that are rich in metals such as iron, nickel and chromium. Plants growing on serpentine soils tolerate heavy metals in their tissues and are potential species for phytoremediation. Bioavailability of metals in the soil and the translocation of metals from root to shoot are important requirements for metal phytoextraction. Synthetic chelates enhance the accumulation and translocation of heavy metals in plants.

We determined the effect of EDTA and citric acid on the uptake of Ni by *Fimbristyllis ovata* growing on the Ussangoda serpentine soil, and its translocation from roots to shoots. Morphologically similar *F. ovata* plants were grown on sieved (2.0 mm sieve) serpentine soil in pots of pH = 5.6, treated with different concentrations of the disodium salt of EDTA and citric acid (2 mmol/kg, 5 mmol/kg, 7 mmol/kg) in the root zone. Each pot was treated with the same volume of deionized water every day. Each pot contained one plant and each treatment was replicated five times. After the treatment period, plants were harvested and thoroughly washed in running water, followed by 10 mM disodium salt of EDTA solution and deionized water. Shoots and roots of each plant were digested separately and analysed by atomic absorption spectrophotometer, using air-acetylene flame at the wavelength of 232.0 nm, with the background correction to determine the Ni content. The total amount of Ni in the serpentine soil was 1800.0 µg/g of which 0.008% was available. The accumulation of nickel in shoots increased with increasing concentration of EDTA. In the presence of EDTA in the soil, the percentage of absorbed Ni translocated from root to shoot was 55 % whereas that of the control plants (without chelate) was 30 %. Nickel uptake was not affected by the citric acid treatment. However, the presence of other ions in the soil can also affect Ni uptake, but this was not included in this study. EDTA enhanced the uptake and translocation of nickel from roots to shoots in *F. ovata*.

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