UPTAKE OF CADMIUM AND NICKEL BY SELECTED PLANT SPECIES UNDER LABORATORY CONDITIONS

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Heavy metal pollution is one of the major environmental problems in Sri Lanka. Over the past century, industrial activities and urban activities have contributed to extensive soil contamination by these heavy metals. Among these heavy metals, cadmium and nickel are the most important elements and have been found in many vegetables and plant tissues in trace amounts. When these elements are consumed accidentally, in the long term, it may result in many human illnesses. Therefore there is an urgent need to undertake low cost clean–up measures by using plants to treat the contaminated areas. This technique, phytoremediation, is one of the low cost options to treat heavy metal contaminated soil. This technique uses hyperaccumulator plants to accumulate heavy metals in its biomass (root, shoot, and organs).

Fimbristylis ovata and *Ageratum conizoides* are two plant species of Sri Lanka. These two species were screened to study their hyperaccumulating efficiencies of nickel and cadmium respectively in their roots and shoots. The plants were screened for a period of fourteen days by hydroponic culture and soil culture system. *Ageratum conizoides* was grown in soil culture with cadmium sulphate treatment. The ranges of cadmium sulphate used were control, 400μM, and 600μM. The plants exposed to 400μM and 600μM exhibited substantial dry weight reduction ($p<0.001$). The cadmium concentrations in roots and shoots of *Ageratum conizoides* increased with increasing concentrations and there were significant differences among the treatments. The roots in plants exposed to 600μM accumulated a large amount of cadmium, approximately 600 times the control and the shoots accumulated less amount of cadmium, approximately 100 times the control.

Similarly the sedge *Fimbristylis ovata* from serpentine region (Ussangoda) of Sri Lanka were cultured hydroponically for 14 days and treated with nickel chloride solution. The treatments were control, 100μM, 300μM and 500μM. The plants exposed to 500 μM accumulated large amount of nickel in its root and shoot. There was significant difference ($p<0.001$) among treatments in accumulation of nickel. The highest accumulated concentration was observed in plant shoots exposed to 500μM. The accumulated concentration in shoots was 1489 ppm and in the roots it was 603 ppm which is approximately equal to the nickel concentration in serpentine soil of Ussangoda. These findings suggest that *Fimbristylis ovata* and *Ageratum conizoides* have potential ability to accumulate nickel and cadmium respectively, without being overly sensitive to nickel and cadmium toxicity and can be used to remediate soil contaminated with these heavy metals.