

Phytoremediation of Metal Polluted Soils by *Ipomoea aquatica* and *Colocasia esculenta*

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Heavy metals are one of the major means of environmental pollution, which heavily affect human health via ingestion through plants, foods, contamination of water bodies and other nutrient supplements. Various sources of heavy metal pollution include agro-chemicals, industrial waste, mine extraction operations, paints, lubricants, industrial wastes, etc. Phytoremediation is the use of plants to clean-up contaminated, hazardous waste sites. It is an economical, biocompatible, passive process which is faster than other natural processes. This study was executed in order to quantify the heavy metal contamination in soils near ten selected painting and motor repair industrial sites in and around Kandy, and accumulation of heavy metals in the plant species which are predominantly found in such areas.

Kankun (*Ipomoea aquatica*) and Habarala (*Colocasia esculenta*) were found to be the most predominant, common species in the sites selected. Plant (*I. aquatica* and *C. esculenta*) and soil samples were collected from four different places, downstream of each site. Plants of the same species were also collected from places in close vicinity, from a similar land, but cultivated or from a place where no apparent contamination was observed, as the control. The soils were air-dried and sieved using 1 mm sieve. The plants were oven dried at 95°C and finely ground. 500 mg of each sample was digested using 10 ml of 67% concentrated HNO₃ in a block digester for 8 hours and once cool, the solution was filtered and made to 50 ml volume. The concentrations of Pb, Fe, Mn, Zn, Cu and Cr were analysed using an atomic absorption spectrophotometer.

Both soil and plant samples were highly contaminated with Pb, Cu, Mn and Cr, compared to the control samples. In the soil, the concentrations of Pb, Cu, Mn, Cr, Zn and Fe were 7.57±2.49, 78.4±18.7, 445.9±86, 70.5±14.5, 109.2±18.6, 31214±8089 ppm respectively. In plant samples too, the concentrations of these metals were significantly higher than those in the control. In *I. aquatica*, concentration of Pb, Cu, Mn, Cr, Zn and Fe were 3.68±1.45, 126.8±31.2, 500±105, 45.93±6.24, 127.3±45.1, 18809±5689 ppm respectively. Absorption of Fe was significantly high in *I. aquatica* than in *C. esculenta*. However, the concentrations of Pb and Cr were significantly higher in *C. esculenta* than in *I. aquatica*. In *C. esculenta*, concentrations of Pb, Cu, Mn, Cr, Zn and Fe were 6.70±2.33, 147.0±37.6, 418±129, 49.50±7.46, 134.2±47.9, 17294±10610 ppm respectively. Although the concentrations of these metals were significantly high in these two species, toxicity symptoms were not shown by *I. aquatica* and *C. esculenta*. Therefore, it can be inferred that *I. aquatica* than *C. esculenta* are suited as potential phytoremediant species in Sri Lanka. However, if cultivated for food purposes, heavy metal contamination of soil has to be considered.