

Heavy metal uptake and translocation in *Strobilanthes crispus* for phytoremediation of sewage sludge contaminated soil

ABSTRACT

Heavy metals have been excessively released into the environment due to rapid industrialization and have created a major global concern. They are harmful to humans, animals and tend to bioaccumulate in the food chain. An experiment was conducted to evaluate the potential of *Strobilanthes crispus* as a phytoremediator to absorb heavy metals from sewage sludge contaminated soils. The experiment was conducted in a glasshouse at Universiti Putra Malaysia. Treatments (soil+sludge) were: T0 (100% soil, control), T1 (80% soil+20% sludge), T2 (60% soil+40% sludge), T3 (40% soil+60% sludge), T4 (20% soil+80% sludge) and T5 (100% sludge). The heavy metals were analyzed using ICP-MS (Inductively Couple Plasma Mass Spectrometry). Soil particle size distribution was analyzed using the pipette gravimetric method. Soil pH and total carbon were determined using glass electrode pH meter and loss on ignition method, respectively. Chromium (Cr) was highly concentrated in the stems while copper (Cu) in the roots and Zinc (Zn) in the leaves. Cadmium (Cd) and lead (Pb) accumulated in both leaves and stems. *Strobilanthes crispus* seems to have a high potential to absorb high amounts of Cu, Zn, Cr and Pb in the leaves, stems and roots. It was able to tolerate and accumulate high concentrations of heavy metals and has high translocation factor and low bioconcentration factor values in soil at higher metal concentrations. This species therefore, can be used as a potential phytoremediator for sewage sludge contaminated soils and to mitigate soil pollution.

Keyword: Heavy metal accumulation; Phytoremediation; Sewage sludge; *Strobilanthes crispus*; Translocation