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WARAPORN SOM-AUM: STUDY ON PLANT UPTAKE OF TOXIC HEAVY METAL
FROM SOLID WASTE BEFORE AND AFTER STABILIZATION. THESIS ADVISORS:
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Efficiency of two adsorbents, zeolite and dried water hyacinth (DWH), to stabilize toxic heavy metals in solid waste of a metal refinery had previously been studied within the same laboratory. Sequential extraction was used as the tool for the evaluation of adsorbent efficiencies in forms of the reduction in available concentration of the toxic metals. This work confirmed the effect by investigating the plant uptake of heavy metals (Cd, Pb, Zn, Cu and Mn) from the stabilized solid waste. Two test plants, green gram and morning glory, were used for testing.

Addition of zeolite could stabilize all of the studied metals but it was found to affect plant growth strongly by increasing the salinity of the waste with increasing percentage of addition and only up to 10%(w/w) of zeolite could be applied. Addition of DWH did not affect plant growth. Experimental results have shown that all metals contents uptaken by the two test plants decreased following the increase of percentage of adsorbents. The content of Cu and Mn could be reduced to the normal level. However, the contents of Cd, Pb and Zn in leaves of the two test plants were still higher than in those references plants grown on normal soils. In addition, the accumulation degrees of metal in plants measured by Concentration Factor (CF) showed the decreasing tendency when available metal contents were in the highly toxic levels for both test plants indicating exclusion mechanism. This uptake characteristic of the plants for all metals studied was confirmed by measurement of metal uptake of the same plants in hydroponic culture.

The metal uptake of some plants naturally grown in the solid waste landfill site was also investigated. The result indicated the lower CF values with plants grown on polluted site as compared to normal soils. High degree of metal translocation from roots to aerial parts for takhop farang and grass were observed whereas only slight degree of translocation was observed in fern. Translocation could be clearly identified when metal contents were at elevated levels.