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RATTIKAN CHANTIWAS: STABILIZATION OF TOXIC METALS IN SOLID WASTE FROM A ZINC REFINERY. THESIS ADVISORS: JUWADEE SHIOWATANA Ph. D., DUANGJAI NACAPRICHA Ph. D. 109 P. ISBN 974-662-013-4

The stabilization of toxic metals (Zn, Pb, Cu and Cd) in a solid waste from a zinc refinery was studied by the addition of either synthetic adsorbent (zeolite A) or an organic adsorbent (dried water hyacinth and rice hull carbon). The stabilization ability of an adsorbent was evaluated by means of sequential extraction, which separated the metals into six fractions. Metals extracted in the first three fractions by relatively weak solvents are considered as mobile. The metal contents provide an estimation of the amount available for plant uptake or so-called Fav. Metals extracted in the last three fractions are considered to be immobile. Stabilization ability of an adsorbent when mixed with solid waste can be considered as the transformation of a metal from mobile to immobile form.

In this work an index, the 'stabilization dose' (SD), is defined as a measure of the stabilization ability of an adsorbent for a metal. For example, SD_{50} value is the percentage amount (w/w) of an adsorbent which, when added to solid waste, can reduce 50% of a metal formerly in the Fav fractions. Thus, the lower the SD_{50} value the greater is the stabilization ability of the adsorbent. Although SD_{50} value is preferable, in some cases where this value could not be measured, SD_{15} values have been employed.

By comparing the SD values for all metals, zeolite and dried water hyacinth are found to be more effective than rice hull carbon. The SD_{50} values of zeolite were 6.9, 18.6, 25.5 and 30.0 (%w/w) for Pb, Cd, Zn and Cu, respectively. The SD_{50} values of dried water hyacinth were 23.8 and 46.4 (%w/w) for Cu and Zn. The SD_{15} values of dried water hyacinth were indicated instead with being 2.7, 4.0, 21.1 and 30.1 (%w/w) for Pb, Cu, Zn and Cd, respectively. Only copper could be stabilized by rice hull carbon with SD_{50} value of 45.1 (%w/w).