

MOBILITY RETARDATION OF CD, PB, MN IN ACID SOIL USING PHOSPHATE FERTILIZERS

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Contamination of heavy metals in soil is a major problem that causes damage to the environment. The research was carried out to study the efficiency of phosphate fertilizer, including phosphate rock, diammonium phosphate, and monopotassium phosphate at 0, 2.5, 5 and 7.5 g/kg soil to stabilize lead, cadmium, and manganese contaminated soil. The soil collected from Rayong Province which is one of the most industrialized provinces in Thailand. The stabilizers were applied to an acid sandy clay loam soil for one month. The pH value, the total concentration of heavy metals, heavy metal forms in soil by six step sequential extraction and potential to enter the biological system by single step extraction (EDTA, NH₄OAc, DTPA, and CaCl₂) were studied. The results showed that phosphate rock, diammonium phosphate, and monopotassium phosphate increase soil pH from 3.60 to 6.5, 7.0 and 5.2 respectively. Phosphate fertilizers could change unstable forms (water extractable, exchangeable, and bound to carbonates form) to more stable forms (bound to Fe and Mn-oxides, bound to organic matter, and residual form) of heavy metals. Phosphate rock (7.5 g /kg soil) has the highest potential for reducing the mobility of all three metals (about 80% for Mn, 60% for Cd, and 50% for Pb), followed by monopotassium phosphate. The results obtained from the extraction with diethylene triamine penta acetic acid (DTPA) and CaCl₂ were found closely related to the results obtained from the sequential extraction method. Phosphate rock was the best to reduce potentially toxic metals phytoavailability. Soil improvement with phosphate fertilizer was considered a good alternative for stabilizing soils contaminated with cadmium, lead, and manganese.

Recent Publications

1. Chaiyaraksa C, Jaipong T, Tamnao P and Imjai A (2017) Durian and mangosteen shell-derived biochar amendment on the removal of zinc, lead and cadmium. *Thammasat International Journal of Science and Technology* 22:87-97.

Biography

C Chaiyaraksa has completed her MSc degree in Analytical Chemistry from Bristol University, UK and PhD in Environmental Engineering from Asian Institute of Technology (AIT), Thailand. She is working as a Lecturer at King Mongkut's Institute of Technology Ladkrabang since 1998. She teaches Hazardous Waste Management, Air Pollution Control, Environmental Impact Assessment and Environmental Chemistry. In 2017, she contributed her research works in many conferences (three papers in Thailand, one paper in UK, one paper in Egypt). She is a Reviewer for Journal of Cleaner Production and Thammasat International Journal of Science and Technology. Her research grants this year are on the topic: Adsorption of copper (II) and nickel (II) by chitosan-modified magnetic biochar derived from *Eichhornia crassipes* and immobilization of cadmium in soil using magnetic biochar derived from *Eichhornia crassipes*.

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