Watcharobon Sittiwilai 2011: Phytoremediation Potential of Siam Weed (*Chromolaena odorata*) on Lead Contaminated Soil and Application of Remediated Plant for Controlling Root-knot Nematode (*Meloidogyne* spp.). Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Savaporn Supaphol, Ph.D. 102 pages.

Lead mining activities cause distribution of high quantity lead and long time that affect to accumulate lead in soil and water resource up to pollution. Phytoremediation can be potentially used to remove heavy metals from metal contaminated areas. This technology is cost effective and environmentally friendly, and can be applied successfully on a large scale. A field survey on the KEMCO lead mining area, Thongphapum district, Kanchanaburi province was conducted to identify plant species which accumulated high concentrations of lead. Siam Weed (*Chromolaena odorata*) was found as a potential lead hyperaccumulator from the field survey. In a greenhouse experiment, Siam Weed in two types (stem cutting type and digging type) from a non contaminated site were grown in lead contaminated soil for 90 days after planting. The digging type of Siam Weed accumulated a higher concentration of lead than the stem cutting type. The highest lead concentration of the digging type in shoots and roots were found at 19.54 mg plant^{-1} and 22.57 mg plant^{-1}, respectively, 90 days after planting. In general, the lead concentration in Siam Weed increased with increased times of planting. In addition, phytoremediation technology has restrictions on time harvesting plants to study selecting harvesting time of Siam Weed. The digging type of Siam Weed was harvested at 30, 45, 60, 75 and 90 days after planting at the appropriate harvesting time. Siam Weed, 45 days after planting had a high lead concentration both in the shoots and the roots of the plants. The digging type of Siam Weed 45 days after planting and harvesting is the most effective phytoremediation technique for lead contaminated areas. In addition, Siam Weed after remediated lead contaminated soil both shoot and root were extracted for controlling root-knot nematode (*Meloidogyne* spp.). The crude extract from shoot and root of Siam Weed concentration 10% affect to mortality of root-knot nematode juvenile 2 high than 90%, at 24 hour. The assay lead concentration in Siam Weed after extracted crude extract found that high lead concentration accumulated in residue of Siam Weed which affect to in crude extract of Siam Weed concentration 1, 5 and 10% had low lead concentration (1.4, 1.7 and 3.0 mg kg^{-1} in shoot and 1.7, 1.8 และ 2.9 mg kg^{-1} in root, respectively).

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