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THANACHIT SOADSING : A STUDY OF HEAVY METALS IN BOTTOM ASH FROM
MEDICAL WASTE INCINERATORS IN PHUKET. THESIS ADVISORS : USANEE UYASATIAN, M. Eng.,
SITTIPONG DILOKWANICH, Ph.D., 138 p. ISBN 974 - 663 -177 - 2

The objectives of this research were to study the quantities of heavy metals in the residual bottom ash from incineration of medical waste. Furthermore the toxicity of bottom ash leachate with respect to heavy metals was investigated in three particle sizes. These result can be used to evaluate suitable ways for disposing of bottom ash from medical waste incineration.

Samples from four medical waste incinerators on Phuket were taken over a period of two weeks. The bottom ash was partitioned into three sizes. A sample of each size was digested and extracted according to the extraction procedure in accordance with guidance of the Ministry of Industry. The amount of heavy metals concentrations were observed and compared with heavy metal concentration standards.

The concentration of barium, lead, chromium, silver, selenium, and cadmium in the bottom ash were 2,602.41, 1,130.00, 559.91, 245.27, 39.48, 13.18 mg/kg respectively. Concentrations of mercury and arsenic were found to 1,965.64 and 14.73 $\mu\text{g/kg}$ respectively. The concentration of heavy metals increased as bottom ash particle size decreased. This trend was found for barium, lead, silver, selenium, cadmium, and chromium all in multiple chamber incinerator ash, except chromium in local incinerator bottom ash. The remaining metals showed no observable trend.

The extraction of leachate showed ranges concentrations of barium, lead, chromium, cadmium, selenium, silver, mercury and arsenic at 14.30, 2.71, 2.23, 0.44, 0.23, 0.08 mg/kg and 96, 2.76 $\mu\text{g/kg}$ respectively. The concentrations of all heavy metals in the bottom ash leachate were below the limit values set in guidance of the Ministry of Industry.

The bottom ash from two medical waste incinerators in Phuket was disposed in sanitary landfills. Bottom ash from the other two incinerators was disposed by dumping on land or in a hole next to the incinerators, which is incorrect.

There are heavy metals in the bottom ash content, although a low concentration of heavy metals was in the leachate of the bottom ash. The most suitable way of disposal was found to be sanitary landfills.