

Survey of contaminated soil and phytoremediation study in Thailand

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In Japan, many contaminated sites have been remediated in these two decades mainly by physical and chemical methods. Also, in Southeast Asian countries, typically in Thailand, there are some problems of soil and groundwater contamination, however, few remediation works have been done yet mainly due to financial problem. For the prevention of soil and groundwater pollution in Southeast Asian region, more economical and more suitable method using its biologically high activity must be developed.

Our team is doing the joint research work about the remediation technologies of contaminated soil and groundwater suitable for Southeast Asian region. To reduce the environmental risk of soil and groundwater pollution, the most important and most effective method is to find out and to remove the hot spot, which is the most polluted portion, with the detailed and well planned site survey. Recently, phytoremediation technology which uses green plants and their purification ability with detailed monitoring is also performed, because positive remediation of the contaminated groundwater is recently recognized to consume enormous time and fund.

In this study, phytoremediation technology using specific Thai plants is investigated at a specific contaminated site where is 150km northeast from central Bangkok with a collaboration team between Japanese side and Thai side. The members of Thai side are Asian Institute of Technology, Khonkaen University, and Department of Industrial Works under Ministry of Industry. The members of Japan side are Shimizu Corporation, National Institute of Advanced Industrial Science and Technology, Inter-Risk Co., Ltd., Polytech ADD, and Yamanashi University.

In fiscal year 2007, we found out several hot spots of the study site using surface gas monitoring method, soil sampling, and contaminants analysis in soil. At the site, oily wastes were placed and leaked down to the ground. Surface soil (1m deep) was removed and new soil was placed 3 years ago, but still there are some chemicals left. Surface soil is mainly Laterite (1-5m deep) and the foundation is made by limestone. Contaminants content in soil from all the sampling points were below the Thai soil standard, but there is some trace contaminants detected by in-situ leaching test. Contaminated soil was used for further both phytoremediation and bioremediation tests.

Plant species at the site were surveyed before making test field. We selected several species like Signalgrass, Napiergrass, Guineagrass, Bitter bush, Lantana, Paper mulberry which have shallow root zone. We also found out Horse tamarind, Acacia mangium which have deep root zone. Napiergrass and Guineagrass, Horse Tamarind, and Acacia mangium were selected for phytoremediation test. Vetiver grass was also selected because of its characteristic which has big volume of roots and is good for preventing soil erosion. Sunflower and physic nut is also selected because they can produce bio fuel. From the site test and pot tests results, oil can be decomposed by plants and microbes in a short period. We will monitor phytoremediation effect at the test field until the end of fiscal year 2008.

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