Pitchaya Somkliang 2007: Identification of Methanotrophs in Landfill Cover Soil Effecting Methane Oxidation. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Wilai Chiemchaisri, D.Tech.Sc. 117 pages.

Methanotrophs are aerobic bacteria commonly found in landfill final cover soils. They can assimilate methane, a greenhouse gas, as a carbon source consequencely in reduction of methane emission from landfills. In this study, we have aims to investigate methane oxidation rates at various depths of the Ladlumkaew landfill cover soil at Prathumthani province. Besides, methanotrophic types and populations in soil samples were identified and enumerated by the fluorescent in situ hybridization techniques (FISH) and the most probable number (MPN) method, respectively.

The results showed that methane oxidation rates of the cover soils were low (0.35-0.61 μmol/g soil.day) especially in the extreme acid soils (0-30 cm). In addition, methanotrophs Type II was found in more numbers than methanotrophs Type I significantly at all soil depths, which corresponding to the soil methane oxidation rates (MOR). Moreover, high numbers of the acidophilic methanotrophs, *Methylocella palustris* and *Methylocapsa aciphila*, were found particularly at the soil depths of 31-60 cm. However, it was found that methanotrophic population enumerated by the MPN method was significantly lower than that by FISH technique especially in the extreme acidic soil samples. This was because the inappropriate pH of cultural media that employed in the conventional MPN method might be an important factor. Besides, moderate numbers of nitrifying bacteria i.e. *Nitrosomonas spp*. and *Nitrobacter spp.* were found in all soil depths indicating available nitrate for the growth of methanotrophs in the landfill cover soil.

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