Methodology to develop EF in waste sector in Thailand : A case of MBT

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Abstract

Mechanical Biological Treatment (MBT) process is well known in European countries. Thailand, a tropical climate country applied MBT to use. Nevertheless, waste composition in Thailand is different from European zone as well as meteorological condition. The tropical climate, which annually high precipitation rate and high humidity are presented. Three MBT techniques were selected in this study. "MBT windrow type", municipal solid waste (MSW) was placed over palate plate in rectangular shape. Palate plate rules to allow ambient air penetrate into waste layer. After 9 months, degraded MSW transfers to separation facility and plastic RDF send to cement company. "MBT Bunker type", MSW was transferred to bunker zone for 10 channels. Each bunker received a one-day waste amount. MSW was mixed by a set of 4 large screws for introducing the aeration. The mixing process enable for aerobic degradable activity. After 7 days, processed waste was transferred to cement company to utilize as RDF. "MBT. thin layer", MSW was spread and compacted with controlling the height of 0.5 – 1.0 m. for one layer of waste with no daily cover. This waste was placed for 8-12 months after that the landfill mining operation was implemented for plastic waste recovery. The characteristics of all waste in these study sites were investigated. The methane emission investigations were conducted in year 2015 by using the static chamber technique.

The preliminary results of this study showed that methane emission from MBT windrow (11.53 $g/m^2/d$) was lower than that from landfill phase (14.45 $g/m^2/d$) about 20.5%. A seven days operation process from MBT Bunker promoted very low methane emission (0.34 $g/m^2/d$). However, this short time process consumed the electricity and fuel which should be considered further. The results from thin layer landfill were varied from 8.25 to 131.37 $g/m^2/d$. However, the results also showed methane emission 12.53 $g/m^2/d$ at day 41 after the waste were placed then this rate increases until day 111 (26.88 $g/m^2/d$). After that, it decreased to 8.25 $g/m^2/d$ at day 286. It indicated that thin layer landfill could accelerate organic carbon degradation process by reducing moisture content in waste (Heyer et al, 2013). The total results indicate that MBT has advantages to reduce greenhouse gas emission and operate with a short period. However, seasoning, electric power and fuel consumption also issues that should be determine.

References

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