REDUCTION OF METHANE EMISSION FROM BIODEGRADABLE MUNICIPAL SOLID WASTE BY WINDROW COMPOSTING: A CASE STUDY

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Global warming induced by greenhouse gases emissions has become a reality, and cutting down GHG are becoming more urgent than ever before to combat global warming. However, composting was recognized as one of important anthropogenic sources for greenhouse gases, and it was far from attention. Composts, in particular intensive composting, would produce considerable amount of CO_2, CH_4 and some N_2O. This study was conducted to evaluate the methane gas emission and to compare the windrow composting with forced aerated composting. Four windrows were made from manually sorted municipal solid waste. One windrow was not aerated. But remaining three windrows were aerated by installing a blower. Non aerated windrow was installed with three sets of gas extraction tubes that each set consisted of three extraction tubes with a length of 1.6m, 1.1m and 0.6m respectively. Parameters analyzed on daily basis were pH, temperature, moisture percentage, percentage of Methane, Carbon dioxide, Ammonia, Hydrogen Sulphide. Volume reduction of windrow was measured once a week. Approximately 83% of pilot scale windrows were consisted of organic waste and 10% was consisted of non degradable and long-term degradable waste. pH value of aerated windrows was fluctuated in-between 5.3 and 8.8, while pH value of non-aerated windrow varied within the range of 5.0 to 8.5. Temperature of aerated windrow within the range of 28^0C to 69^0C, aerated composting process fluctuated in between 25^0C and 62^0C. Maximum methane gas emission percentage recorded was 60%, from the longest tube at the center of the non-aerated pile that reached the core of the windrow. Methane gas emission from forced aerated windrow was negligible relative to non-aerated windrow. Therefore methane gas emission could be minimized and Clean Development Mechanism can be achieved through application of forced aeration mechanism Elevated levels of Ammonia gas emission was recorded when pH value was above eight and while peak temperature values were recorded. Increasing the turning frequency up to three times per week with simultaneous application of intermittent flow of ambient air through the compost pile is an efficient method for reducing the methane gas emission.