

Comparison of indoor and outdoor windrow composting methods of MSW in relation to final product quality

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Karadiyana, one of the biggest municipal solid waste (MSW) dumping sites in the Western Province of Sri Lanka practices windrow composting by constructing piles outdoor for one month and shifting them under a shed for the rest of the process. However, construction of a shed has become a considerable constrain to the management. If the whole process could be done outdoor without any adverse impacts to the quality of compost, this high cost would be saved in future site planning. The present study was planned to evaluate the resultant compost qualities between indoor (prevailing method) and totally outdoor maintained windrows. Pre-sorted and pre-weighed biodegradable waste, were heaped up on the prepared floor up to a height of 1 m at the middle with the dimensions of 1.5 m width and 3 m length. Three replicates from each treatment were maintained for three months. Sufficient moisture and oxygen were provided for the degradation process by adopting squeeze test and turning, respectively. The pile settlement, pH, volatile solid content, nitrogen content, carbon to nitrogen ratio and electrical conductivity were monitored once a week while temperature was measured thrice a week. In addition, moisture content, particle size, sand content, Phosphorous, Magnesium and Calcium contents were determined at the end of the composting process. The data were subjected to two sample t test in MINITAB version 14.0. Results revealed that the parameters tested for the resultant compost between both methods were not significantly different and compatible with Sri Lanka Standard 1246: 2003. Results further revealed that the highest mass reduction ($63.2\% \pm 1.3$) and the lowest compost production ($31.7\% \pm 1.7$) were achieved from indoor method. Although a high initial cost has been observed for constructing of a shed, the indoor windrows showed better results in managing MSW.