

Research Article

Accelerated composting technique for municipal solid wastes recycling in India

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Summary

Rapid urbanization, industrialization and agricultural intensification are accompanied with generation of huge amounts of rural and urban wastes. The estimated annual production of agricultural byproducts/wastes of field crops, fruits and vegetable crops waste are 679, 83.34 and 173 Mt, respectively out of which surplus available for processing are estimated at 233, 41.67 and 86.50 Mt. Annually, most of the metropolitan cities of India are generating about 64.8 million tonnes of city refuse during the year 2010 with a potential of 9.1 million tonnes of compost per annum. Present study have been carried out to evolve efficient ways to ensure improvement in available nutrient status of composts through microbial enriched compost. The objective of the study was to accelerate the decomposition process, improvement of nutritional quality and minimize the heavy metals in end product. To evolve efficient ways cellulolytic organisms viz., *Aspergillus heteromorphus*, *Aspergillus terrus*, *Aspergillus flavus* and *Rhizomucor pusillus* along with mineral nitrogen was used to accelerate the process of decomposition and its maturity indices and the manurial value was compared with existing farmers practices. Results showed that the microbial enriched compost proved better to produce higher quality manure, shorten the usual period of composting from 6 months to 2.5 months.

Key words : Compost, Municipal solid waste, Maturity indices, Cellulolytic organisms, Microbially enriched compost

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Introduction

A waste is only a waste unless it is recycled or made use of as a value added product. Then, it becomes a valuable resource, rather a form of wealth. In addition there are the benefits of a cleaner environment, a healthier habitat and an intelligent use of all available recyclable resources without condemning them as wastes. Towards this end urban solid waste compost could serve as a valuable organic matter source given the shortage of organic nutrient source. Annually, most of the metropolitan cities of India are generating about 64.8 million tonnes of city refuse during the year 2010 with a potential of 9.1 million tonnes of compost per annum. It is expected to increase to 107 million tonnes per year during 2030 (Manna and Rao, 2011). These wastes contain about 40 per cent biodegradable matter, but only 14 per cent (9.1 million tonnes) of the municipal solid wastes are composted during

the year 2010, which will be about 15 million tonnes during the year 2030. The chemical analysis of the municipal solid wastes showed that the total amount of N, phosphorus and K is about 0.1322 million tonnes currently and that would be about 0.2175 million tonnes during 2030. All these wastes generally serve as good source of nutrients, organic carbon and energy. Their conversion into compost is desired to serve firstly, augmenting the supplies of organic manures and secondly, cleaning up the environment and thirdly minimize the ground water pollution in long-run.

Defining quality standards for organic manures is a very difficult task given the heterogeneity of residues that occur in city wastes and processing methods adopted. Integrated nutrient management combining both inorganic and organics resulting in wholesome improvement of the soil. Faced with such situation utilizing valuable urban resources for manure production would be viable alternative given the ever