



**A STUDY ON COMPOSTING OF HOSTEL FOODWASTE INTO ORGANIC MANURE
BY USING EFFECTIVE MICRO ORGANISM AND VERMINS**

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ABSTRACT

Solid waste generation of the city is the highest by any Indian city with more than 6256 tons a day. Rapid urbanization and fast lifestyle have modified the environment and has led to the formation of various types of toxic compounds in the nature which are less degradable and harmful to living beings. Uncontrolled and unscientific garbage disposal system with the associated problem of infiltration of solutes and accumulation at any particular depth of soil leading contamination to the ground water reserves are major problems and is expected to increase with the time, if not proper preservation and precaution is taken. Due to shortage of space for landfill in bigger cities, the biodegradable yard waste is allowed to degrade or decompose in an oxygen rich medium by composting process. A good quality nutrient rich and environmental friendly manure is formed which improves the soil condition and fertility. Food wastes coming out from various food processing industries, urban residents, hotels etc. will exclude more odor, toxic gases affects human health and results in various diseases. The best possible option to reduce the potential pollutants before entering the nature biological system is to compost them by Vermicomposting method. A nutrient rich amendment produced by biological degradation of organic material under aerobic conditions. The result of this decomposition process is compost, a crumbly, earthy-smelling, soil-like material. Here, a study is undertaken to compost the domestic solid waste collected from Sri Ramakrishna Institute of Technology Hostel, the raw waste was put to active composting without any source separation and pulverization. The biodegradation levels were analyzed by measuring temperature, pH, electrical conductivity, total solids, volatile solids and ash content. The composted materials will be analysed finally for heavy metals and nutrient levels.

KEY WORDS: Aerobic composting, Windrow, Vermicomposting, foodwaste.

1. INTRODUCTION

Disposal of solid waste is done most commonly through a open dumping, sanitary landfill or through incineration. But one of the best methods is composting. The organic portion of the solid waste however could be utilized in a very profitable way by using Vermicomposting. Vermicomposting is done with the aid of earthworms, which adds up more nutrients to the fertilizer obtained from it.

Earthworms from time immemorial played a key role in soil biology by serving as versatile natural bio reactors to harness and destroy soil pathogens, thus converting organic wastes into valuable bio- fertilizers, enzymes, growth hormones and proteinaceous worm bio-mass. Earthworms ingest, digest and excrete vermicompost with excellent nutrient content. Excretion ensures the grading of the vermicompost as opposed to any inorganic matter, which may be existing in the waste and not

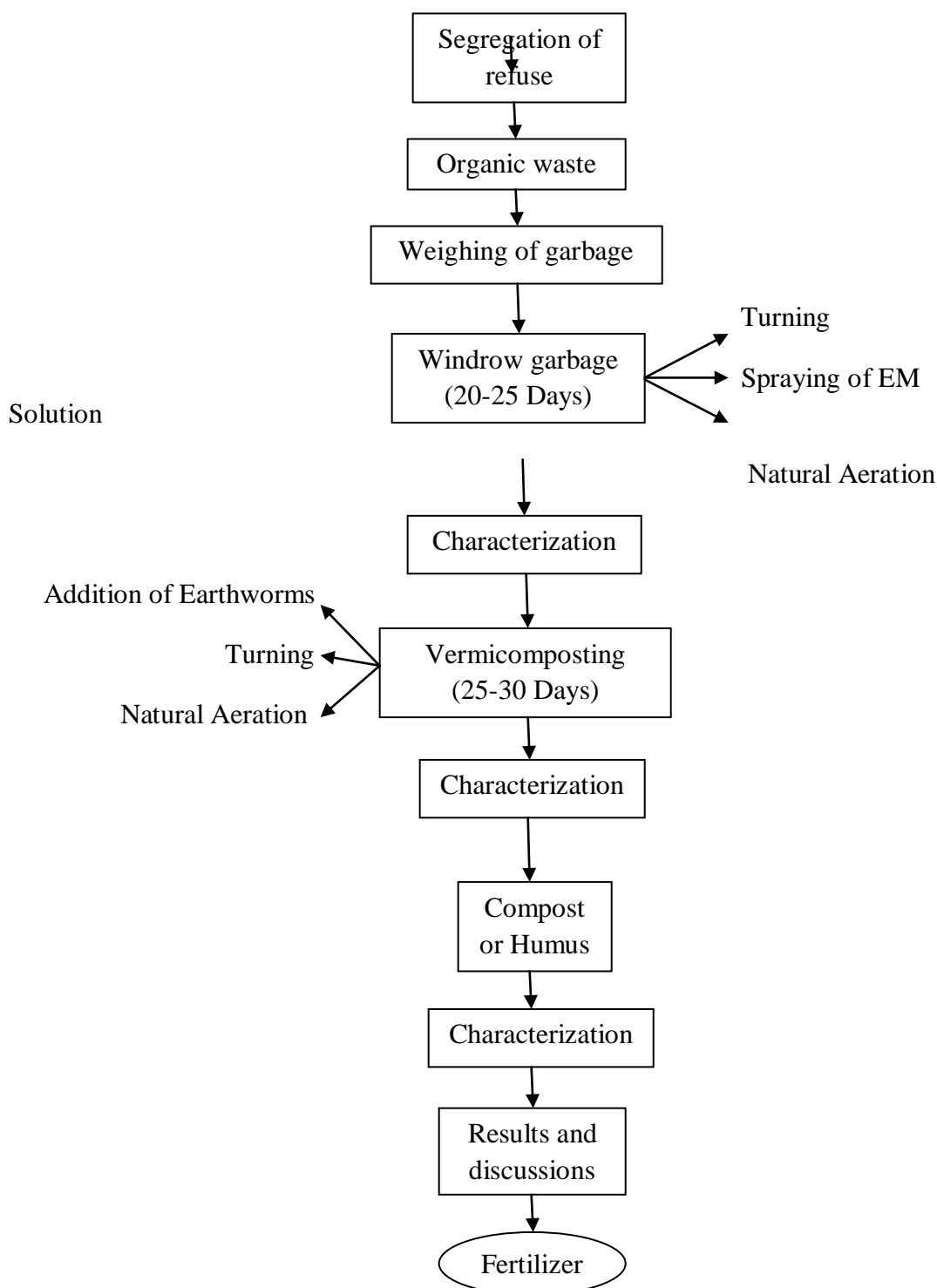
concerned with the biological activity in the earthworm gut. In this study, an attempt has been made to convert domestic food wastes into compost by Vermicomposting method. Food waste has collected from students hostel of Sri Ramakrishna Institute of Technology is situated in Perur Pacchapalayam, Coimbatore. In hostel, 936 students (both girls and boys) are staying. The quantity of food waste disposed per day is approximately 250kg. The composition of food wastes are rice, vegetable, fruit peels, etc.

2. OBJECTIVES OF THE STUDY

- To study the disposal methods of waste in college campus
- To utilize the food waste from hostel block.
- To Analyze the characteristics of solid waste.
- To convert the food waste into organic manure by Vermicomposting.

3. METHODOLOGY

Overview of the composting process undergone in our college hostel is given below:



4. RESULTS AND DISCUSSION

Experiments were conducted for both windrow garbage and vermicomposting process of food waste under natural aeration for maximum of 50 days. The parameters like temperature, pH, EC, bulk density, MC, TS, AC and VS were measured and tabulated to determine the biodegradation levels. When the garbage becomes half decomposed material (it usually takes 20 to

25 days) and by maintaining the moisture content in a well balanced condition i.e., from 60% to 75%, it is ready to introduce in vermicomposting pit for further process. The stabilized compost was ascertained by blackish brown color and decline in temperature with no odor. Vermicomposting process was undergone for disposing the food wastes from our college hostel. The refuse was kept for windrow garbage until the garbage

reaches the half decomposition process. Tests were conducted for various characteristics such as temperature, pH, electrical conductivity, moisture

content, total solids, ash content, volatile solids, carbon and nitrogen content and bulk density.

Table 1. Bio degradation levels of domestic solid waste during windrow garbage process

Parameters	Principle	Unit
Temperature	Compost thermometer	°C
pH	Glass Electrode	-
Electrical Conductivity	Conductivity Cell	mmhos/cm
Moisture Content	Oven Heating at 105°C	%
Total Solids	Calculation	%
Ash Content	Ignition at 550°C	%(day basis)
Volatile solids	Calculation	%(day basis)
Carbon Content	Calculation	%(day basis)

Table 2. Bio degradation levels of domestic solid waste during windrow garbage process

S.No.	Parameters	Days Units	0	2	6	9	13	16	22
1	Ambient Temperature	°C	30	30	32	31	31	32	33
2	Temperature	°C	40	41	42	47	53	44	42
3	pH	-	6	6.01	6.05	6.12	6.15	6.19	7.10
4	Bulk density	kg/m ³	-	667.54	-	-	-	-	600.23
5	EC	mmhos/cm	0.515	0.523	0.624	0.782	0.835	0.717	0.635
6	Moisture Content	%	46.05	47.76	48.15	50.47	53.11	56.44	59.16
7	TS	%	53.95	52.24	51.85	49.53	46.89	43.56	40.84
8	AC	%	35.43	38.26	42.53	46.73	49.56	52.34	56.89
9	VS	%	64.57	61.74	57.47	53.27	50.44	47.66	43.11
10	Carbon content	%	35.87	34.30	31.93	29.59	28.02	26.48	23.95

After 24 days the windrow garbage was introduced into the pit for vermicomposting process. In this process, the above mentioned characteristics were observed weekly once. For vermicompost, nutrient values are also tested. After the half decomposition of windrow garbage, it was

introduced into the pit for vermicomposting process at the initial moisture content of 60.82%. In vermicomposting, the characteristics of wastes were analyzed and tabulated as biodegradation levels of half decomposed garbage in table.

Table 3. Bio degradation levels of half decomposed vermicomposting

S.No.	Parameters	Units	Days		
			24	35	49
1	Ambient Temperature	°C	33	34	34
2	Temperature	°C	35	33	32
3	pH	-	7.85	7.53	7.01
4	Bulk density	kg/m ³	529.89	-	-
5	EC	mmhos/cm	0.537	1.235	1.410
6	Moisture Content	%	60.82	60	18.60
7	TS	%	39.18	40	81.40
8	AC	%	57.34	58.67	60
9	VS	%	42.66	41.33	40
10	Carbon content	%	23.70	22.96	22.22

CONCLUSION

Finally, the observed characteristics values of composting material and compost are found to be comparable with the standards. With this view, we proposed a proper solution for the disposal of our college hostel food waste as well as it was suggested to utilize composted material as an organic fertilizer through the windrow and vermicomposting processes.

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