

# Municipal Solid Waste Composting in Balewadi

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**Abstract-** Pune city is one of the rapidly expanding metropolitan city in West region of Maharashtra state. The expanding industrial area is directly responsible for increasing population of Pune city and ultimately resulted in the increase in quantity of solid waste generation. The present investigation was carried out at Balewadi waste dumping site. In order to process the collected waste from city area the commonly used method for waste disposal is land filling. The present study is an effort to assess the feasibility of aerobic composting technique for degradable fraction of solid waste from Baner-Balewadi area. We generated the method named Aeration decomposition method which hardly takes 1 month to generate complete compost which overcome the traditional method named land-filling.

## I. INTRODUCTION

The dumping site is trapezoidal in section. The area of dumping site is 4988 meter square. We have to leave space upto 10% to 15% of total area for daily collection of the waste. Daily collection of the wet waste at the site is 7.2tonnes/day. Aeration decomposition method at this site will prove to be effective.

### Introduction to methodology:

(on site methodology)

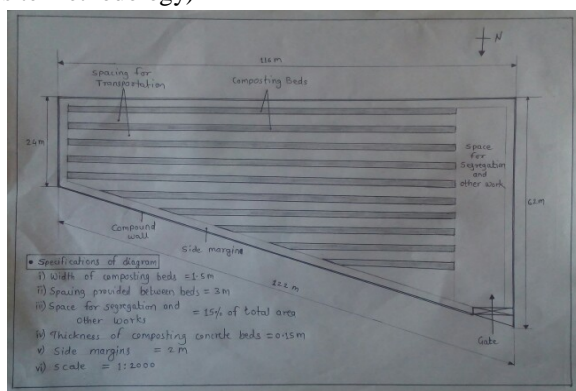


Fig.1- Line plan of site with applied methodology

Metallic container is coated with oil paint in order to avoid corrosion. The thickness of concrete bed is 0.15m. Wiremesh container overlies this concrete bed.

## II. RESEARCH ELABORATION AND FINDINGS

### Small Scale Experiment:

**Equipments:** Wire mesh of size including length and breadth 1.88 m and 0.6 m respectively, oilpaint, painting brush, hand gloves for handling of waste, spray and thermometer.

**Chemicals:** 3 different composting cultures with their properties as follows.

- 1) Compost culture – It has ability to compost biodegradable waste fastly.
- 2) Deodorant culture- It avoids spreading of bad odour.
- 3) Anti-insect culture- It prohibits the growth of fungi and insects.

### Arrangement for experiment:

- Construction of cylindrical container by using wire mesh.
- To avoid corrosion the container was painted by black oil paint.
- Container constructed on flat impermeable surface.
- Construction of cylindrical container by using wire mesh.
- To avoid corrosion the container was painted by black oil paint.



Fig.2- Wire mesh container used for experiment

### Model procedure:

- Cylindrical container of wire mesh having height and diameter of 0.6 m (24 inch) and 0.6m(24 inch) respectively.

- Wire mesh is used for maintain the aerobic condition.
- Experimental design as shown in fig.
- The biodegradable waste was kept in container for composting (25kg).
- All three composting cultural were spread separately two times in a day on the waste.
- Mix proportion of composting culture kept was 2 spoons per 250 ml fresh water for each culture.
- Container was placed in such a way that there was availability of sufficient sunlight and air.
- Leachate formation was observed after few days of starting of experiment.
- The temperature of composting was monitored at interval of five days till completion of process.
- 150 mm bed of concrete is provided on ground for preventing percolation of leachate.
- construction of wire mesh wall around the bed and fix it by means of rods-respective distance between two beds kept 3m depending on available space.
- Provide concrete bed of 1.5m width and 0.15m thickness with lengths depends on space available.
- we know the quantity of solid waste generated in Balewadi area.
- we know the area of dumping ground.
- By using this information actual site is designed .
- Keep 10% to 15% area for segregation purpose of waste.
- Provision of compound wall to avoid unpleasant view and bad odour.
- Use proportion of culture as 1kg per 1 tonne of wet waste.

### Observation:

The following observation throughout the process was taken out:

- Temperature of composting wet waste was increased rapidly in few days of starting of process and then goes on decreasing upto surrounding temperature.
- No more leachate formation observed after few days of starting of process.
- Moisture control and sunlight makes important role in leachate formation.
- Bad odour of waste effectively destroyed by using de odouring culture.
- No insects formation observed.

### Case1: Without use of mechanical aeration

- Upto height half of the container height(0.3m),there is no need of mechanical aeration.
- Max. volume of waste should be composted =  $(\pi/4d^2)(h/2)$   
=  $0.39d^2h$

### Case 2: With use of mechanical aeration.

- Above the 50% height of container, we can't fill it upto 100% practically. But it is suitable upto 70% of total height for the composting aerobic decomposition.
- Max. volume of waste should be composted  
=  $(\pi/4d^2)(0.7h)$   
=  $0.55d^2h$

### On Site Implementation:

- At the site we can't use cylindrical container, large size rectangular net can replace the cylindrical container.

### • Compost culture-

- Dark brown colour powder form.
- Increases composting speed
- About 1 kg of culture per 1 tonne of wet waste at a time.



Fig.3- Compost culture

### • Deodorant culture-

- Liquid form which is colourless
- Surprisingly destroyer of the bad odour of waste.
- About 1000ml per 1 tonne at a time.

### • Anti-insect culture-

- Light brown in colour and in powder form.
- Prohibits the growth of unwanted insects in waste.
- Proportion about 1 kg of culture per 1 tonne of wet waste at a time.



Fig. 4- Anti-insect culture

### III. RESULT

- After completion of process composted waste sample was tested from laboratory
- N, P, K test was carried out giving following results.

Sr.no	Specification as per FCO	Composition as per analysis
1	Total Nitrogen	0.28%
2	Total phosphate	0.77%
3	Water soluble potash	3.74%

### IV. CONCLUSION

This method gave good result in rapid decomposition of the wet waste. Traditional method generally requires 4 to 5 month for decomposition whereas in open air decomposition took only 30 days to compost the waste. It also gave good results concerning with appropriate percentages of nitrogen, phosphates, potash. This method proves to be good in the aspect of more composting with less area requirement. The magnificent benefit of this method is it gives us good quality of compost which will be useful for ground improvement. We are providing concrete bed which will prohibit the leachate to percolate in ground that will be helpful in ground water improvement.