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## Preparation of organic compost from kitchen and vegetable waste-Guntur, Andhra Pradesh

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### Abstract

The natural process of composting involves the decomposition of leaves and the gradual ageing of cow manure. After that, the compost is put to improve the soil and plant development. The improvement of the composting process and the analysis of ideal plant development factors are the main goals of this effort. The amount of dry leaves, cow manure, and vegetable waste in each of the seven pits was varied. Moisture and stirring were applied to the pits at various intervals. After 45 days, the pits were examined for a number of criteria. The ideal parameters for soil and plant growth were found to be 6 acidity, 0.338 gm/lit salinity, 4.9 kg/acre phosphorus concentration, and 6.1 kg/acre potassium content.

**Keywords:** Vegetable waste, compost, dry leaves, cow dung

### Introduction

In the municipal solid wastes contain the component of organic solid waste like food waste, garden waste, paper waste, etc. that disposed directly into the landfill. Composting has been used as a means of recycling organic matter back into the soil to improve soil structure and fertility and ability to improvement in crop growth. The composting process has received much attention in recent years because of pollution concerns like air, water, soil pollution and the search for environmentally sound methods for treating waste. Waste volumes is continuing to rise, which leads to loss of resources and increased environmental risks. Open dumping and sanitary landfill is a major method for waste disposal, the Land filling of biodegradable waste is proven to contribute to environmental degradation, mainly through the production of highly polluting leachate and methane gas. Composting shows that the stabilization of waste for land filling, volume and mass reduction of solid waste and return of organic substances to the natural cycle. Direct disposal to landfill can cause impacts to the environment. Composting of solid waste is seen as a waste treatment method to avoid the waste from being dumped at the landfill. The utilization of organic additives towards composting process would produce an environmental product of compost. (Pritam Pande and Dr. M.N Hedao).

**Jeevamruth:** Jeevamrutham is an organic fertilizer and a great replacement of chemical fertilizers. It is a very good source of biomass, natural carbon, nitrogen, phosphorous, calcium and other nutrients which are essential for plant growth and development. The microorganisms which are present in the soil are responsible for increasing the fertility of the soil and the productivity of the crops. In order to increase the microorganisms in the soil Jeevamrutham is used. Jeevamrit enhances microbial activity in soil and helps in the improvement of soil fertility.

### Material and Methods

#### Materials

Vegetable waste was collected from a nearby market, and dry leaves were collected from the Guntur local area. Cow dung was used as a feed, which was brought from a nearby village called Peddapalalalur, as shown in figure1. Polybags were used for covering the pits, tools like shovel were used to dig the pit, a wooden stick was used for stirring the feed, and water was used for moisture.

## Methods

### Preparation of Compost Bed

To prepare a compost pit using wet waste, you can follow these steps

- **Choose a suitable location:** Select a location that is shaded and receives some sunlight, away from trees or structures, and preferably on soil.
- **Dig a pit:** Dig a pit about 3-5 feet deep and wide enough to accommodate the waste you generate.
- **Layer the pit:** Layer the bottom of the pit with dry leaves or twigs to create an air gap between the waste and the soil.
- **Add wet waste:** Start adding wet waste to the pit. This can include kitchen waste, vegetable peels, and fruit skins.
- **Layer dry waste:** On top of the wet waste, add a layer of dry waste, such as dried leaves, grass clippings, or shredded paper.
- **Add water:** Add enough water to make the waste moist but not soggy.
- **Mix the waste:** Mix the waste thoroughly using a garden fork or shovel. This will help the waste decompose faster and prevent bad odors.
- **Cover the pit:** Cover the pit with a layer of dried leaves or a tarp to protect it from rain and sun.
- **Turn the pile:** After a couple of weeks, turn the pile over using a fork or shovel to ensure that the waste is evenly composted.
- **Harvest the compost:** After 2-3 months, the compost should be ready. You can use it as a nutrient-rich soil

amendment for your plants.

### Dimensions of Compost Bed

Height: 1.5m

Length: 2m

Width: 1m

### Preparation of Ghana Jeevamrutham

- Take drum of 50lits and fill the drum with 30lits of water.
- We need to take 10kgs of cow dung and mix the dung into cow urine.
- Mix jaggery with cow urine make that proper mixing. Mix the Bengal Gram flour with using cow urine. Now add the soil to urine and mix well. Add all mixtures to the drum, add citrus fruit peel to the mixture and stir it well. Stirring should be done for 4-5 days.

After preparing the compost bed, we added Jeevamruth to it three times, with three-day gaps in between. Jeevamruth is a natural fertilizer that contains microorganisms that help break down organic matter and enhance soil fertility. By adding Jeevamruth to the compost bed, we aimed to increase the microbial count and improve the quality of the compost. The microorganisms in Jeevamruth help to speed up the decomposition process, resulting in a nutrient-rich compost that can be used in gardening and agriculture. We carefully followed the instructions for applying Jeevamruth to ensure that it was evenly distributed throughout the compost bed.



Fig (a): Preparation of Compost beds



Fig (b): Preparation of Compost Bed



Fig (c): Preparation of Compost Bed



Fig (d): Preparation of Jeevamruth

**Fig (e):** Preparation of Jeevamruth**Fig (f):** Preparation of Jeevamruth**Fig (g):** Application of Jeevamruth to Compost bed

## Results

We are pleased to report that the final results from Agricultural College Bapatla and ARS (Agricultural Research Station) Amaravathi, have been received and they are very satisfactory. The results have met our expectations in terms of quality and accuracy. According to Ayush, it was expected that the microbial count in the compost bed with Jeevamruth would be higher. However, our results have shown that the addition of Jeevamruth has increased the microbial content practically. The findings of the experiment indicate that the addition of Jeevamruth has a positive impact on the microbial count in the compost bed. This is a significant finding in the field of agriculture, and it has the potential to contribute to the development of more effective and efficient composting techniques.

Overall, our results have demonstrated that the addition of Jeevamruth to the compost bed has produced a desirable outcome. This outcome has important implications for future

research and practical applications in the field of agriculture.

| S. No | Sample                        | Bacteria                  | Fungi                     |
|-------|-------------------------------|---------------------------|---------------------------|
| 1.    | Compost bed                   | $6.0 \times 10^8$ CFU/gm  | $5.0 \times 10^4$ CFU/gm  |
| 2.    | Dhrava Jeevamrutham           | $9.0 \times 10^9$ CFU/ml  | $6.0 \times 10^5$ CFU/ml  |
| 3.    | Compost bed with Jeevamrutham | $12.0 \times 10^9$ CFU/gm | $10.0 \times 10^5$ CFU/gm |
| 4.    | Jeevamrutham                  | $9.0 \times 10^9$ CFU/ml  | $6.0 \times 10^5$ CFU/ml  |

Parts of Hydrogen (pH):12

For identifying pH values we used pH Strips.

Temperature:

For every 0.5m depth we took the reading by using a Laboratory thermometer

Top layer: 49°C

Middle layer: 43°C

Bottom layer: 35°C

**Table 1:** Variation of Parameters

| Pit No. | Feed                                 | Cow Dung (G) | Moisture (ml/2days) | Stirring Time (days) |
|---------|--------------------------------------|--------------|---------------------|----------------------|
| 1       | Veg Waste (500g) + dry Leaves (500g) | 0            | 0                   | 0                    |
| 2       | Veg Waste (500g) + dry Leaves (500g) | 750          | 750                 | After 5 days         |
| 3       | Veg Waste (500g) + dry Leaves (500g) | 750          | 750                 | After 10 days        |
| 4       | Veg Waste (500g) + dry Leaves (500g) | 1500         | 1500                | 0                    |
| 5       | Veg Waste (500g) + dry Leaves (500g) | 1500         | 1500                | After 5 days         |
| 6       | Veg Waste (500g) + dry Leaves (500g) | 1500         | 1500                | After 10 days        |

**Table 2:** Initial Sampling of soil

| S. No. | Parameters                    | Value |
|--------|-------------------------------|-------|
| 1      | Acidic Content (pH)           | 8.7   |
| 2      | Salinity Content (g/l)        | 0.745 |
| 3      | Phosphorous Content (kg/acre) | 3.9   |
| 4      | Potassium Content (kg/acre)   | 4.9   |

**Table 3:** Standards of Analysis

| S. No. | Contents            | Values       |
|--------|---------------------|--------------|
| 1      | Salinity            | Good         |
|        |                     | <0.8         |
| 2      | Carbon Content      | White Colour |
|        |                     | >0.8         |
|        |                     | Low          |
|        |                     | <0.4         |
| 3      | Phosphorous Content | Medium       |
|        |                     | 0.4-0.75     |
|        |                     | High         |
|        |                     | >0.75        |
|        |                     | Low          |
| 4      | Potassium Content   | Low          |
|        |                     | <5           |
|        |                     | Medium       |
|        |                     | 5 to 9       |
| 5      | Acidic Content      | High         |
|        |                     | 9 to 20      |
|        |                     | Too High     |
|        |                     | >20          |
|        |                     | Low          |
| 5      | Acidic Content      | High         |
|        |                     | >5.5         |
|        |                     | Good         |
|        |                     | 6.5 to 8.7   |
| 5      | Acidic Content      | Medium       |
|        |                     | 9.0 to 9.3   |
|        |                     | Black Colour |
| 5      | Acidic Content      | >9.3         |

The initial sampling of the soil was done, as shown in Table 2. The pits were analyzed after 45 days for Carbon content, phosphorus content, Potassium content, salinity, and acid content analyzed. The standards of analysis are shown in Table 3. The result of the analysis of the pits containing the feed is

shown in Table 4. Pit no.11 contained 8.2 acid content, 0.325 gm/l salinity, 5% carbon content, 5.8 kg/acre phosphorus content and 5.9 kg/acre potassium content and hence, was found to be best suited for plant growth.

**Table 4:** Analysis of different pits

| Pit. No. | Acidic Content (pH) | Salinity Content (g/l) | Carbon Content% | Phosphorous Content (kg/acre) | Potassium Content (kg/acre) |
|----------|---------------------|------------------------|-----------------|-------------------------------|-----------------------------|
| 1        | 8.2                 | 0.545                  | 0.5             | 5.4                           | 5.6                         |
| 2        | 8.3                 | 0.53                   | 0.48            | 5.6                           | 5.8                         |
| 3        | 8.2                 | 0.61                   | 0.52            | 5.6                           | 5.6                         |
| 4        | 8.4                 | 0.78                   | 0.5             | 5.2                           | 5.4                         |
| 5        | 8.3                 | 0.52                   | 0.49            | 5.8                           | 5.9                         |
| 6        | 8.4                 | 0.79                   | 0.56            | 5.3                           | 5.5                         |

Figure 2 shows the graph of the acid content of all the 6-compost formed. The acid content (pH) of the compost from all the pits lied in the range of 8.2 to 8.4, which shows that the soil

is most necessary in nature. Pit no.2 was found to have a pH of 8.2.

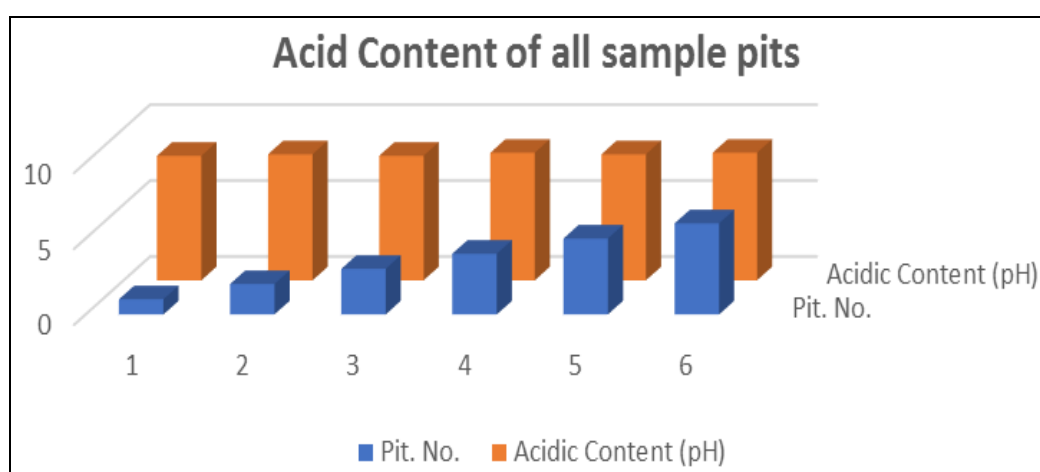


**Fig 2:** Acid Content of all sample pits

The graph between the carbon content of the pits lies in the medium range, which is 0.4-0.75. This range is required to maintain the quality compost and the growth of the plant. Whereas Salinity tells us about the saline nutrients present in the soil, and it also tells us about the white color present in the soil.

Due to the presence of white color in soil, logging takes place. It has been observed that pit no. 2 has a low value of salinity content, and Salinity should be low for the soil. It has also been observed that the Salinity of the soil has been decreased in comparison to that of the initial sample of soil (Fig. 3).

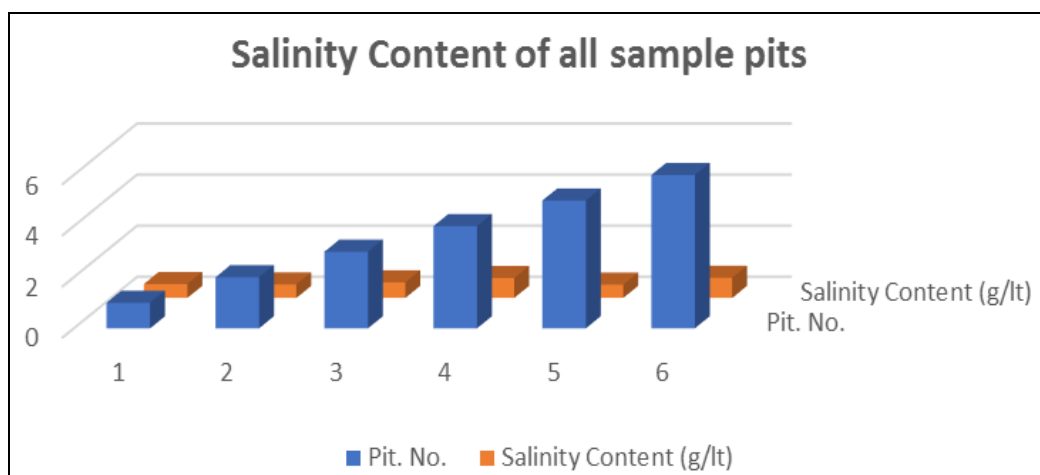


**Fig 3:** Carbon content of all sample pits

Phosphorous controls flowering in plants involving flowering or fruiting plants and phosphorous is often added to the soil before or during the flowering and fruiting life cycle stage to increase agricultural yield. It has been observed that pit no. 11 has high

phosphorous content than other pits, which is the better result for quality compost. It has also been observed that there is an increase in the phosphorous content in the soil than in the initial sample of the soil. Potassium is involved in catalyzing many

chemical reactions required to plant life, including drought, tolerance, and moisture regulation. Low potassium soil will likely need to be irrigated if soil amendment is not possible. It has been observed that pit no. 11 contains a high amount of

potassium content than the other pits, which is the better result for quality compost. It has also been observed that potash value has been increased than that of the initial sample of soil (Figure 4).

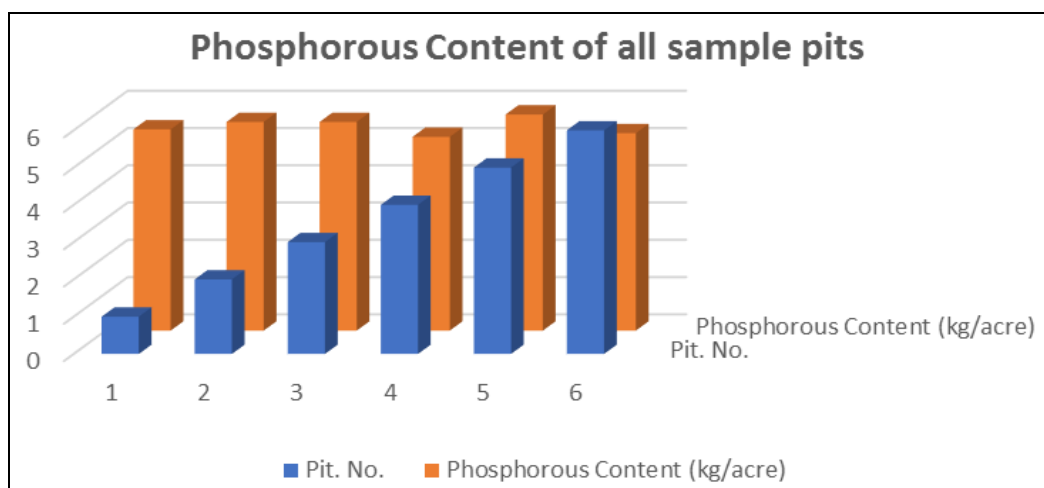


**Fig 4:** Phosphorous Content and Potassium Content of all sample pits

India produces about 3000 million tons of waste annually, out of which 40.50% is compostable. Compost quality plays a very important role in making MSW compost a marketable product as they are tested for fertilizing parameters, heavy metal parameters, and harmful pathogens. Parameters like carbon content, phosphorus content, Potassium content, salinity, and acid content of the soil and all 6 pits were analyzed. In this work, the preparation of compost with variation in cow dung quantity, moisture level, and the stirring effect was done, and the study was conducted for 45 days. It has been observed that compost of pit no. 2, which was having a feed containing 500 gm of each vegetable waste, dry leaves, and cow dung with no moisture added while periodical stirring provided after every five days showed the optimum results. Pit no.11 contained 8.2 acid content, 0.325 gm/lit salinity, 0.5% carbon content, 5.8 kg/acre phosphorus content and 5.9 kg/acre potassium content. These conditions were found to be most suitable for the soil and growth of plants.

### Conclusion

This study has shown that jeevamruth can significantly increase microbial counts in compost. This enhanced microbial activity suggests that jeevamruth-amended compost may be particularly beneficial for plant growth. These findings underscore the potential value of jeevamruth as a natural compost enhancer in sustainable agricultural systems. Additionally, our results conclude that jeevamruth can reduce the time required for compost bed preparation, offering potential logistical benefits for compost production.

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