

# Temple Waste Management: A Case Study of Anand City

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## Abstract

Worshipping of any heavenly beings is part of life in India in the form of poojas, yagnas etc. People bid various offerings to the heavenly nature. Majorly, offering consists of coconuts, leaves, flowers, clothes and fruits. Flower offerings are found in huge quantity. Once the ritual is concluded, flowers along with other waste are trashed or are disposed off into some nearby pond, lake or river or discarded in the open areas as a temple waste. These wastes can cause various environmental problems. There can be different ways by which we can utilize these floral wastes to produce products with added value and thus help to save the environment from pollution caused due to inappropriate disposal of flower waste. Vermicomposting is used to manage the temple waste. In the present study mixture of cow dung and floral waste was taken and vermicompost was prepared using *E. Foetida* earthworm species. Garden soil was kept as control throughout the study. In the pot culture studies of rose plant, plant height and varied concentration of Garden soil: Vermicompost (50:50, and 70:30) was studied. The results indicate the increased growth of the plant as compared to control. Thus, vermicomposting of flower waste from temples is one of the best ways for temple waste management.

**Keywords:** Temple Waste, Vermicomposting, Degradation

## INTRODUCTION

In India, religion is a way of life. In every occasion and festivals huge amount of flowers and leafy materials are used in temples as well as at various places. Flower wastes collected from the temples are not disposed in the garbage but discarded in the water bodies due to our religious beliefs [1]. Degradation of floral waste is a very slow process compare to kitchen waste due to amount of organic content availability [2]. Therefore, it requires appropriate and environment-friendly method of disposal flower waste. Disposal of temple waste is a major problem. Temple waste causes bad odor after degradation which creates air, water and land pollution. Human health is affected by generation of pollution [3]. It is seen that organic waste disposal requires lower investment and operational expense and can generate energy. This has attracted much attention in India [4]. Biological process such as vermicomposting to convert floral waste in useful organic fertilizer would be of great benefit. Vermicompost is a process in which earthworms are utilized to degrade the organic waste and generate a useful end-product. In this process, energy rich and complex organic substances have been biodegraded and transformed into simple products [5]. Earthworms feed the organic waste materials and pass it through their digestive system and gives out in a granular form, Vermicompost. Vermicompost has several advantages such as it improves growth of plant, controls plant diseases, increases quality of soil, such as water retention, aeration etc. [6]. Vermicompost reduces the use of chemical fertilizers and decreases the volume of solid waste. Vermicompost production is gaining momentum worldwide especially in USA, Europe, Southeast Asia and Asia-Pacific [7].

The main objective of the present study is to develop efficient technology like vermicomposting for environmentally safe management of temple solid waste and also to see its outcome on quality of soil and plant growth. Vermicomposting of flower waste does not cause damages to the environment rather helps in protecting the natural resources.

## MATERIALS AND METHODS

More than 20 temples are present in the Anand town. Jalaram temple was selected to collect data of flower waste and leafy materials. The temple was collected for fifteen consecutive days. The total waste generated in Jalaram temple alone is estimated 20 kg per day. Most of these flowers are dumped into the pond nearer to the temple. After collection of flower waste, flowers were separated from leaves, coconut, etc and shredded into small pieces. The segregated floral waste was then sun dried by spreading over paper for 48 hours. *E. Foetida* was collected from Anand Agriculture University, Anand. It is the most commonly used species of earthworm for management of organic waste. It can tolerate different moisture contents with good temperature resistance when present in the soil.

## Preparation of Vermicompost

- One pot was taken and few holes were drilled for air circulation.
- First garden soil was added.
- Then cow dung was added above the garden soil. The mixture was kept for 7-8 days.
- After that flower waste and leafy materials are added.
- Earth worms (500 g) were added in the pot.
- Water was applied immediately after adding earth worms. Again flower waste and dried leafy materials were added.
- Then it was covered with gunny bags.
- The moisture content was maintained during the vermicomposting by sprinkling water.
- After 45-50 days vermicompost was ready as entire colour was changed to uniform black colour with granular structure.
- The earthworms were removed manually. The vermicompost was sun dried by keeping it in large trays.
- The plant growth study was conducted for a period of three months in pots containing vermicompost and control.

The various physical parameters such as pH, Moisture content, colour, odour and temperature of vermicompost was measured. Total Nitrogen and organic carbon was measured by Kjeldahl and rapid titration method, respectively.

## Experimental Set-up

Following experiments were performed:

2 no. of pots having similar size was taken and same height of plant was grown initially.

Height of the plants was measured at regular intervals of time.

External diameter = 26 cm

Internal diameter = 19.5 cm

Height of pot = 18.5 cm

Group 1: Control (100% Garden soil)

Group 2: Vermicompost (100% Vermicompost)

Group 3: 50%-50% (Garden soil-Vermicompost)

Group 4: 70%-30% (Garden soil-Vermicompost)

## RESULTS AND DISCUSSIONS

Black granules of the vermicompost indicate the proper decomposition of flower waste. There was no odour during the compost. Nutrients of the flower waste are converted into soluble forms through the microbial action [8]. The moisture content was maintained 60-70% by sprinkling of water intermittently. Physical and chemical parameters of the garden soil and vermicompost are shown in Table 1. The increase in organic carbon and nitrogen indicates that it can be beneficial for plant growth. Vermicomposting contains plant hormones which stimulate plant growth [9].

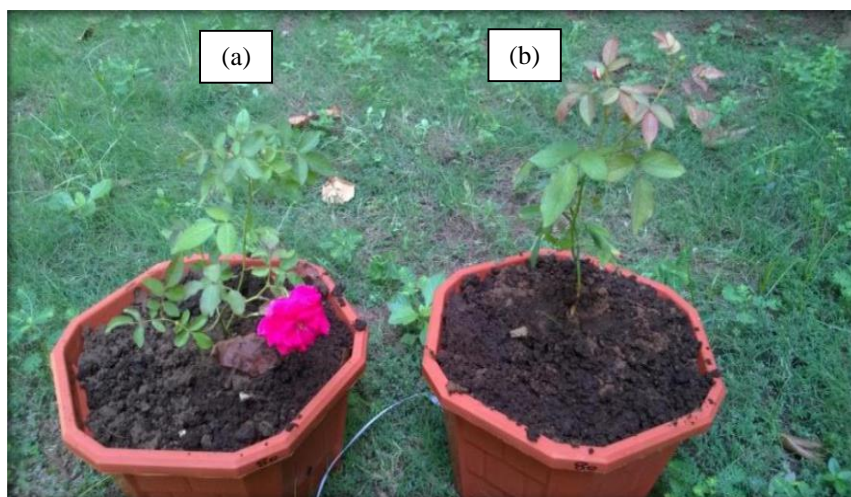
**Table 1:** Physical and Chemical Parameters of Garden Soil and Vermicompost

Parameters	Garden Soil	Vermicompost
Colour	Dark Brown	Black
Odour	Odourless	Odourless
Moisture content	23.8%	28.4%
pH	7.00	7.92
Total Nitrogen	0.8	1.5
Organic Carbon	15	20.1

The results of the plant growth are shown in Table 2. The height of the plant is more when only vermicompost was used. Soluble nutrients of the vermicompost helped in growth of the rose in the pot as shown in Fig. 1 when vermicompost was used alone.

**Table 2: Height of the Plant**

Days	Garden soil only	Vermicompost only
00	23	23
15	25	25
30	25.5	26
45	26.5	28
60	27.5	30

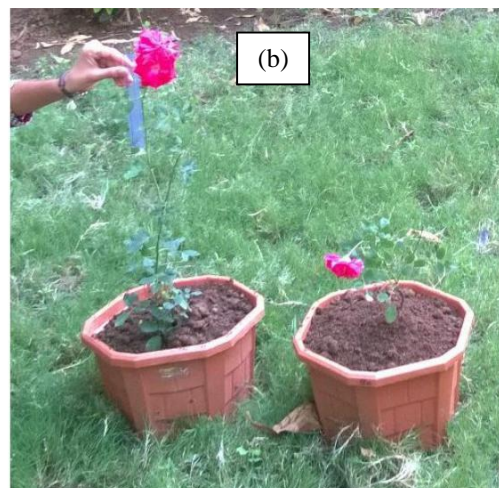
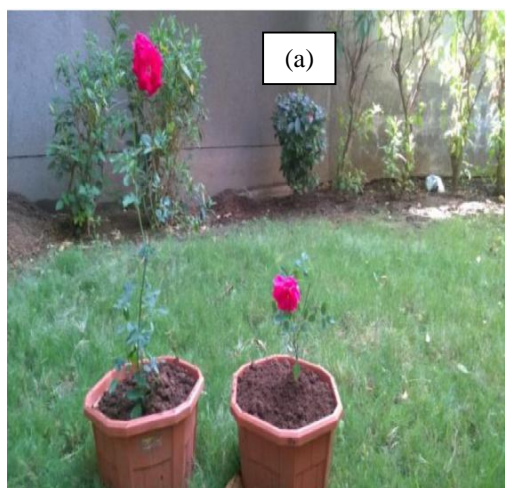


**Fig. 1: Growth of Plant Using Vermicompost (a) and Garden Soil (b)**

It was observed from the Table 3 that the growth of the plant is more in 50:50 composition of Soil:Vermicompost.

**Table 3: Height of the Plant Using Various Compositions**

Days	50:50 (Garden soil: vermicompost)	70:30 (Garden soil: vermicompost)
00	28	28
15	30	30
30	32.5	30.2
45	37	30.2
60	42.5	30.2



**Fig. 2: Plant Growths Using 50:50 (a) & 70:30 (b) Composition of Garden Soil And Vermicompost**

## CONCLUSIONS

The present study helps in reducing the solid waste thus help in indirectly reducing land pollution. It uses flower waste in the preparation of Vermicompost. It also proved that the mixture of garden soil and vermicompost prepared from flower waste (50:50) appears to be good value bio-fertilizer. The vermicompost generated is cost effective and pollution free. Thus, vermicompost technology can be successfully applied in temples as a solid waste management strategy with flower as the major organic waste.

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