

Finished compost is dark coloured, light and free from any unpleasant odour.

- After ascertaining that the composting process is complete, watering has to be stopped. The heap begins to dry out from the top and worms congregate at the bottom of the heap where there is still some moisture. At that time, the material in the heap has to be arranged into a cone. Compost has to be slowly removed from the top of the cone, screened and filled into bags. Material remaining on the screen, including undecomposed organic material and earthworms, and worms remaining at the bottom of the heap can be used for another round of compost preparation.



A few precautions need to be followed in vermicompost preparation

- Adequate moisture should be maintained in the compost heap. Too little or too much moisture can harm the earthworms and slow down the composting process.
- Care should be taken to see that there are no plastic, rubber, glass or metal objects in the organic wastes used for composting.
- Earthworms should be protected from predatory animals such as frogs, rats, garden lizards, poultry birds, ants, etc.
- Earthworms have soft bodies and are easily injured. Therefore care has to be taken while turning the heap. Sharp objects should not be employed for turning the heap, and turning should be done gently.

Vermicompost can be used for any crop. However, its use is most profitable in case of commercial crops like flowers, fruits and vegetables.

Recommended quantity and time of application of vermicompost

| Crop | Quantity to apply per acre | Time to apply |
|--|--|---|
| Rice | 1 tonne | After transplanting |
| Sugarcane | 1 1/2 tonnes | Last ploughing |
| Cotton | 1 tonne | Last ploughing |
| Chilli | 1 tonne | Last ploughing |
| Groundnut | 1/2 tonne | Last ploughing |
| Sunflower | 1 1/2 tonnes | Last ploughing |
| Maize | 1 tonne | Last ploughing |
| Turmeric | 1 tonne | Last ploughing |
| Grape | 1 tonne | June-July |
| Citrus, pomegranate, ber, guava | 2 kg per tree | At planting time and before flowering in 1-2 year old trees |
| Mango, coconut | 2 kg per tree 5 kg per tree 10 kg per tree 20 kg per tree | At planting time 1-5 year old trees 6-9 year old trees Trees older than 10 years |
| Onion, garlic, tomato, potato, bhendi, brinjal, cabbage, cauliflower | 1-1 1/2 tonnes | Last ploughing |
| Teak, red sandalwood, mangium | 3 kg per tree | At planting time |

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Vermicompost from Wastes



200 National Research System Programme



In rural areas, agriculture, animal husbandry and related activities generate large quantities of organic wastes. Considerable quantities of tender twigs, dry leaves, grass, weeds, etc., are also available. These organic wastes contain organic carbon and plant nutrients in appreciable amounts. Organic wastes are safer and more useful when composted and applied, rather than when they are directly applied. The process of composting organic wastes using earthworms is called 'vermicomposting'. Earthworms ingest organic matter and excrete valuable 'vermicompost'. Vermicompost has many good qualities and its application to soil has many benefits.

- Vermicompost is rich in organic carbon, which plays a key role in soil fertility, and contains all essential plant nutrients in appropriate proportions. Thus it is a complete and balanced plant food. It also contains biochemical substances that promote plant growth and fight plant diseases.

Nutrient value of vermicompost

| Nutrient | Content |
|----------------|--------------|
| Organic carbon | 20-25% |
| Nitrogen | 1.5-2.0% |
| Phosphorus | 0.5-1.5% |
| Potassium | 0.5-1.0% |
| Calcium | 0.4-0.8% |
| Magnesium | 0.3-0.6% |
| Sulphur | 100-500 ppm* |
| Iron | 6.7-9.3 ppm |
| Copper | 2.0-9.5 ppm |
| Zinc | 5.7-11.5 ppm |

*ppm - parts per million

- The use of vermicompost not only increases the rate of water intake into soil but also improves the soil's ability to hold water.
- Its use enhances colour, smell, taste, flavour and keeping quality of flowers, fruits, vegetables and foodgrains and helps the growers to sell their products at a higher price in the market.
- The making of vermicompost provides livelihood support to the unemployed in rural areas. Enterprising villagers can take up commercial production of vermicompost and earn good profits by selling the compost in the market, which is constantly growing.

- Earthworms convert waste materials, that would otherwise pose disposal problems, into valuable compost. Thus vermicomposting prevents environmental pollution and helps in keeping the surroundings clean and free of garbage.

Earthworms, organic wastes and water are the three major requirements for vermicomposting.

1. **Earthworms:** Non burrowing, organic debris consuming species of earthworms, such as *Eisenia foetida*, *Eudrilus eugeniae*, *Feretima elongata*, *Perionyx excavatus* are ideal for vermicomposting. These are available with many krishi vigyan kendra's, agricultural research centres, non-government organizations and private companies. They can also be obtained from villages where vermicomposting is already being done.
2. **Organic wastes:** The following organic wastes can be utilized for vermicomposting.
 - ★ Crop based waste materials such as straw, stubble, chaff, husk, etc., tree leaves and twigs, weeds
 - ★ Animal based wastes such as cattle dung, sheep and goat dung, poultry wastes
 - ★ Household wastes such as vegetable and fruit wastes, leftover and spoiled foods
3. **Water:** Adequate water is essential for maintaining moisture in the compost heap.

Vermicompost can be prepared in pits dug below the ground, in raised heaps above ground, in cement rings or any such containers, and in walled enclosures called vermicompost 'beds'. The bed method is more suitable for large-scale production of vermicompost and for preventing soil from mixing with the compost. The procedure for vermicomposting in beds is described below.

- Since earthworms have to be protected from heat and excess water, a place that is shielded from sun and rain has to be chosen. Alternatively, a shed can be erected. The size of the shed will be determined by the scale of vermicomposting.
- In the shed, walled enclosures of 2 feet height, 3 to 4 feet width and required length are to be constructed using brick and mortar. The floor of the bed also has to be paved with bricks and mortar. For producing vermicompost round the year, two or more enclosures



should be prepared, or one large enclosure should be partitioned into compartments.

- On the floor of the bed one layer of broken bricks are to be spread and on top of these a 2-3 inch layer of soil and sand has to be applied uniformly.
- To discourage ants and termites from entering the bed, a layer of neem or pongamia leaves has to be applied.
- A 3-4 inch layer of bedding material such as dry banana leaves, straw or weeds has to be applied.
- A 3-4 inch layer of dry cow dung has to be applied on top of the bedding material.
- On the layer of cow dung, earthworms have to be released at the rate of 1 kg worms for square metre.
- Finally, decomposable organic wastes mixed with cow dung have to be stacked to a height of one foot and the beds have to be covered with gunny bags.
- Water has to be sprinkled on the beds regularly to keep the heap moist.
- Once every 15-20 days, the heap of organic wastes has to be turned upside down and has to be covered with gunny bags again.
- In 2-3 months-time all the organic waste material will be converted into vermicompost. When worms are found sticking to the under surface of the gunny bags, it is an indication that the composting process is complete.