

VERMICOMPOSTING TECHNOLOGY: AN ALTERNATIVE APPROACH IN WASTE MANAGEMENT

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WHAT IS VERMICOMPOSTING?

Vermicomposting is the biological process of preparing manure from all kinds of organic residues with the help of earthworms. The prepared manure by this process is known as vermicompost. Vermicomposting is an effective way to increase organic matter of the soil and productivity of crops.

WHY VERMICOMPOSTING?

Vermicompost is an important component of organic farming and it has the following advantages.

- It leaves no chance of environmental pollution.
- It provides all essential macro and micro nutrients.
- It helps in reducing heavy metals toxicity in soil.
- It is economically viable and easily adopted low cost technology.
- It improves quality of agricultural produce.

SELECTION OF EARTHWORMS FOR COMPOSTING-

Earthworms which lives and work below the soil is not suitable for vermicomposting. The epigeic earthworms like *Eisenia foetida* (Red earthworm), *Eudrilus eugeniae* (African night crawler), *Perionyx excavates* (Blues or Indian blues) etc. are used for vermicomposting. *Eisenia foetida* is commonly used worms for vermicomposting in many parts of India because of its high multiplication rate and thereby converts the organic matter into vermicompost within 45-50 days.

STEPS IN VERMICOMPOSTING-

The vermicompost unit should be made in a cool, moist and shady place. Collected cow dung and chopped leafy materials are mixed in the proportion of 3:1 and left for partial decomposition for 15-20 days.

1. Spread a layer (15-20 cm thick) of partially decomposed material.
2. Sprinkle rock phosphate on this layer for enrichment depending upon need.
3. Sprinkle cow dung slurry as a layer.
4. Fill the bed completely with the material.
5. Release earthworms on the bed (for a 6'x2'x2' size of bed, 1500-2000 worms are required).
6. Cover the bed with wire mesh or gunny bags or green nets to prevent birds from picking the earthworms.
7. Sprinkle water at 3 day intervals during winter and rainy season and daily at summer season to maintain adequate moisture level and body temperature of the earthworms.
8. Bed should be turned once after 30 days for maintaining aeration and proper decomposition.
9. Check compost after about 2 months. It is ready in 2-2.5 months. It is black, light and has no smell.



Fig 1. Vermicompost bed



Fig 2. Sieving of compost



Fig 3. Collection of earthworm after separation from compost



Fig 4. Putting of worms into new culture bed

APPLICATION OF TO CROPS

Vermicompost should be used always as a part of integrated nutrient supply system. Vermicompost can be used in field crops, ornamentals, vegetables and fruit crops. But generally vermicompost is recommended for high value vegetables and fruits crops.

Crops	Dose of vermicompost
Field crops	5-6 t/ha
Fruit crops	3-5 kg/plant
Vegetables	10-12 t/ha
Pots (for flowers)	100-200 g/pot

HARVESTING OF VERMICOMPOST

The harvesting of vermicompost involves manual and mechanical separation of worms from the castings. For this purpose, the prepared compost are dumped on the polythene sheet in the form of mound for few hours. In this process, most of the worms move towards bottom of the mound to avoid light. The cocoons, adult and young worms collect at the bottom and used for seeding the new culture beds. The collected compost passed through a 3 mm sieve to recover the cocoons, young worms and unconsumed organic wastes.

STORING AND PACKING OF VERMICOMPOST

To avoid sunlight, the harvested vermicompost should be stored in dark and cool place. Loss of moisture and nutrient content will take place in presence of sunlight. One important thing is that the harvested material is openly stored rather than packed in over sac. Packing should be done at the time of selling. If it is stored in open place, periodically sprinkling of water may be done to maintain moisture level beneficial microbial activities. Vermicompost can be stored for 1 year without loss of its quality, if the moisture is maintained at 40 per cent level.

CONCLUSION

Vermicompost is a valuable input for sustainable agriculture and wasteland management in India and abroad. In India, there are many progressive farmers experiences of using this technology from various climatic zones and there will be lot of demand for vermicompost in future for developing cultivable land.



Fig 5. Harvested compost



Fig 6. Packing and selling of vermicompost

NUTRIENT VALUE OF VERMICOMPOST

The content of nutrients in vermicompost depends upon the source and quality of the raw material. The worm casting contains higher percentage (nearly two fold) of nutrients as compared to garden compost (Table 1)

Table 1. Nutrient composition of vermicompost and compost

Nutrient element	Vermicompost (%)	Compost (%)
Organic carbon	10-14	12
Nitrogen	0.51-1.6	0.8
Phosphorus	0.19-1.02	0.4
Potassium	0.15-0.73	0.5
Calcium	1.18-7.61	2.2
Magnesium	0.093-0.568	0.5
Sodium	0.06-0.16	<0.01
Zinc	0.0042-0.011	0.0012
Copper	0.0026-0.0048	0.0017
Iron	0.2050-1.3313	1.1690
Manganese	0.0105-0.2038	0.0414

Source: (Srinivasrao *et al.* 2011)