

Vermicomposting: Step towards Sustainability

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Introduction

- Vermicomposting is a method of preparing enriched compost with the use of earthworms.
- Vermicomposting is an environmentally adopted process that changes the organic waste into vermicompost and also provides valuable nutrients for increasing the fertility of the soil.
- The word “Vermiculture” defines that’s farming or breeding of earthworms.
- The combination of vermiculture and vermicomposting is known as vermitechnology.
- It is the process of turning organic debris into worm casting.
- It is one of the easiest methods to recycle agricultural wastes and to produce quality compost.
- Earthworms consume biomass and excrete it in digested form called worm casts.
- Worm casts are popularly called as Black gold.
- The casts are rich in nutrients, growth promoting substances, beneficial soil micro flora and having properties of inhibiting pathogenic microbes.
- Vermicompost is stable, fine granular organic manure, which enriches soil quality by improving its physicochemical and biological properties.
- It is highly useful in raising seedlings and for crop production.
- Vermicompost is becoming popular as a major component of organic farming system.

Vermicomposting materials

- In general, animal dung mostly cow dung and dried chopped crop residues are the key raw materials.

- Mixture of leguminous and non-leguminous crop residues enriches the quality of vermicompost.
- There are different species of earthworms viz. *Eisenia foetida* (Red earthworm), *Eudrilus eugeniae* (night crawler), *Perionyx excavatus* etc.
- *Eisenia foetida* sps are found on the surface of the soil and *Lumbricus rubellus* sps are found in a deep layer of soil.
- Red earthworm is preferred because of its high multiplication rate and thereby converts the organic matter into vermicompost within 45-50 days.
- Since it is a surface feeder it converts organic materials into vermicompost from top.

Methods of vermicomposting

Vermicomposting is done by various methods, among them bed and pit methods are more common.

1). Bed method:

- Composting is done on the pucca / kuccha floor by making bed (6x2x2 feet size) of organic mixture.
- This method is easy to maintain and to practice

2). Pit method:

- Composting is done in the cemented pits of size 5x5x3 feet.
- The unit is covered with thatch grass or any other locally available materials.
- This method is not preferred due to poor aeration, water logging at bottom, and more cost of production

Process of Vermicomposting

- ✚ Vermicomposting unit should be in a cool, moist and shady site
- ✚ Cow dung and chopped dried leafy materials are mixed in the proportion of 3: 1 and are kept for partial decomposition for 15 – 20 days.
- ✚ A layer of 15-20cm of chopped dried leaves/grasses should be kept as bedding material at the bottom of the bed.
- ✚ Beds of partially decomposed material of size 6x2x2 feet should be made
- ✚ Each bed should contain 1.5-2.0q of raw material.
- ✚ Red earthworm (1500-2000) should be released on the upper layer of bed.

- ✚ Water should be sprinkled with can immediately after the release of worms.
- ✚ Beds should be kept moist by sprinkling of water (daily) and by covering with gunny bags.
- ✚ Bed should be turned once after 30 days for maintaining aeration and for proper decomposition.
- ✚ Compost gets ready in 45-50 days.
- ✚ The finished product is 3/4th of the raw materials used.



Harvesting

- When raw material is completely decomposed it appears black and granular.
- Watering should be stopped as compost gets ready.
- The compost should be kept over a heap of partially decomposed cow dung so that earthworms could migrate to cow dung from compost.
- After two days compost can be separated and sieved for use

Nutrient content of Vermicompost

On average 1.6 % of Nitrogen, 0.7 % of Phosphorus, 0.8 % of Potassium, 0.5 % of Calcium, 0.2 % of Magnesium, 175 ppm of Iron, 96.5 ppm of Manganese, and 24.5 ppm of Zinc are nutrient contents found in the vermicomposting.

S.N	Nutrient	Content
1	Organic Carbon	9.15 to 17.98 %
2	Total Nitrogen (N)	1.5 to 2.10 %
3	Total Phosphorus (P)	1.0 to 1.50 %
4	Total Potassium (K)	0.60 %
5	Calcium (Ca) and Magnesium (Mg)	22.00 to 70.00 m.e / 100 g
6	Available Sulphur (S)	128 to 548 ppm
7	Copper (Cu)	100 ppm
8	Iron (Fe)	1800 ppm

9	Zinc (Zn)	50 ppm
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Advantages

There are many advantages of vermicompost:

- It enhances the decomposition of organic matter in soil.
- It is a stable and enriched soil conditioner.
- It helps in reducing population of pathogenic microbes.
- It helps in reducing the toxicity of heavy metals.
- It is economically viable and environmentally safe nutrient supplement for organic food production.
- It is an easily adoptable low-cost technology.
- It is rich in all essential plant nutrients.

Doses

- The doses of vermicompost application depend upon the type of crop grown in the field/nursery. For fruit crops, it is applied in the tree basin.
- It is added in the pot mixture for potted ornamental plants and for raising seedlings.
- Vermicompost should be used as a component of integrated nutrient supply system.

<i>Crops</i>	<i>Dose/rate</i>
Field crops	5-6t/ha
Fruit crops	3-5kg/plant
Pots	100-200g/pot

Preventive measures

- 15-20 days old cow dung should be used to avoid excess heat.
- The organic wastes should be free from plastics, chemicals, pesticides and metals etc.
- Aeration should be maintained for proper growth and multiplication of earthworms.
- Optimum moisture level should be maintained
- 18-25°C temperature should be maintained for proper decomposition.

Government initiatives for the establishment of vermicomposting unit:

- Paramparagat Krishi Vikas Yojana (PKVY)
- National Mission for Sustainable Agriculture (NMSA)



- MGNREGA
- Mission for Integrated Development of Horticulture (MIDH)

