



## Vermicompost and Its Importance in Organic Agriculture

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Chemical fertilizers though played a significant role in Indian agriculture facilitating green revolution and making the country self reliant in crop production. Its continuous use led to soil degradation, through a combined effect of acidification, micro nutrient depletion, ground and surface water pollution, and reduced soil microbial activity etc. In view of this, vermicomposting offers immense scope to small and marginal farmers in creating their own organic manure resources and ways to generate not only alternative income but maintain the soil health of their farm.

### Introduction

The organic matter when subjected to decomposition with the help of earthworms the resultant product is 'vermi compost' and the process is known as vermicomposting. Thus it is a simple cost effective waste management technology, wherein the earthworms are used to consume and digest organic waste to obtain excreta in the form of granules is called vermicompost." which is rich in humus and nutrients

### Materials for Preparation of Vermicompost

Vermicompost can be made from any material but it should be so soft and fine so as not to damage the digestive systems of verms. Raw material like crop residues, hotel refuse, weed biomass, waste from agro-industries, vegetable waste, leaf litter etc. can be used for vermicomposting.

**Efficient Species of Earthworm:** *Eisenia foetida*, *Amyanthes diffrigens*, *Eudrillus engineac*

### Methods of Preparation of Vermicompost

- The vermicompost can be prepared in concrete tank. The size of the tank should be around 10 ft. in length or more depending upon the availability of land and raw materials, 3- 5ft. in width and 3 ft. in height. The floor of the tank should be constructed with stones or bricks.

- The available bio-wastes are to be collected and heaped under sun about 7-10 days and be chopped if necessary.
- Sprinkling of cow dung slurry to the heap may be done.
- A thin layer of half decomposed cow dung (1-2 inches) is to be placed at the bottom.
- Place the chopped weed biomass and partially decomposed cow dung layer wise (10-20 cm) in the tank / pot upto the depth of 2 ½ ft. The bio waste and cow dung ratio should be 60: 40 on dry wt. basis.
- Release about 2-3 kg earthworms per ton of biomass or 100 nos. earthworms per one sq. ft. area.
- Place wire net / bamboo net over the tank to protect earthworm from birds.
- Sprinkling of water should be done to maintain 70-80 % moisture content.
- Provision of a shed over the compost pit is essential to prevent direct entry of rainwater and sunshine.
- Sprinkling of water should be stopped when 90% bio-wastes are decomposed. Maturity could be judged visually by observing the formation of granular structure of the compost at the surface of the tank.
- Harvest the vermicompost by scrapping layer wise from the top of the tank and heap under shed. This will help in separation of earthworms from the compost. Sieving may also be done to separate the earthworms and cocoons.

#### Nutrient Content of Vermicompost

The balance nutrition is essential for every kind of organisms either plants or animal origin. The Vermicompost supplies all the essential micro and macro nutrients in rational proportional throughout the life of the plants. In general, vermicompost contains following nutrients but nutrient content may vary with organic matter supplied or conditions under which prepared.

Nitrogen- 1.5 – 2.5 %	Calcium- 0.5 – 1.0 %
Phosphorus- 0.9 – 1.7 %	Magnesium- 0.2 – 0.3 %
Potash- 1.5 – 2.4 %	Sulphur- 0.4 - 0.5 %

The other materials supplied by vermicompost are vitamins, enzymes and hormones.

### Advantages of Vermicompost

- Vermi-compost is rich in all essential plant nutrients.
- Provides excellent effect on overall plant growth, encourages the growth of new shoots / leaves and improves the quality and shelf life of the produce.
- It is free flowing, easy to apply, handle and store and does not have bad odour.
- It improves soil structure, texture, aeration, and water holding capacity and prevents soil erosion.
- It is rich in beneficial micro flora such as N fixers, P- solubilizers, cellulose decomposing etc. improve soil environment.
- It contains earthworm cocoons which multiply in the soil.
- It prevents nutrient losses and increases the fertilizer use efficiency.
- It is free from pathogens, toxic elements, weed seeds etc.
- It minimizes the incidence of pest and diseases.
- It enhances the decomposition of organic matter in soil.
- It contains valuable vitamins, enzymes and hormones like auxins, gibberellins etc.

### Vermi Wash - A Plant Growth Regulator

Vermi wash is a liquid plant growth regulator, which contains high amount of enzymes, vitamins and hormones like auxins, gibberellins etc along with macro and micronutrients used as foliar spray.

### Methods of Preparation of Vermi Wash

- Take one big bucket and one mug.
- Set up one stop cork on the lower most part of the bucket.
- Put a layer of broken bricks, pieces of stones having thickness of 10-15 cm in the bucket.
- Over this layer put another layer of sand having thickness of 10-15 cm.
- Then put a layer of partially decomposed cow dung having 30-45 cm thickness over it.
- Then put another layer of soil having 2-3 thicknesses.
- Now open the stopcock of the bucket and when the materials taken in the bucket.
- Then put 100-200 nos. of earthworms in the bucket.
- After that, a layer of paddy straw having 6 cm thickness is given.
- Now open the stopcock of the bucket and spray water regularly for a period of 7-8 days.
- After 10 days the liquid vermi wash will be produced in the bucket.

- Hang one pot with a bottom hole over the bucket in such a way so that waterfalls drop by drop.
- Every day 4-5 litres of water is to be poured in the hanging pot.
- Keep another pot under stop cork to collect the vermi wash. Every day 3-4 litres vermi wash can be collected.

#### **Application of Vermi Wash**

- Mix 1 liters of vermi wash with 7-10 liters of water and spray the solution on the leaf (upper and lower side) of the growing crop in the evening.
- Mix 1 liter of vermi wash with 1 liter of cow urine and then add 10 liters of water to the vermi urine solution and mixe thoroughly and keep it over night before spraying. 50-60 litres of such solution is to be sprayed in one bigha (0.4 ha) of land to control various crop diseases.

#### **Conclusion**

Vermicompost being a low cost input is cost effective and environmentally safe for sustainable agriculture. The use of such low cost technologies saves a huge amount of the nation's currency for importing raw material to prepare chemical fertilizers. Also chemical fertilizers supplies only limited numbers of nutrients with low use efficiency. So vermicompost and vermiwash are best alternatives for these high cost fertilizers.