

Vermi-Composting: An Alternate Manure Over Chemical Fertilizer for Healthy Soil Environment

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Vermicompost

It is the product of the decomposition process using various species of Earthworms.

Principle

This process is mainly required to add nutrients to the soil. Compost is a natural fertilizer that allows an easy flow of water to the growing plants. The earthworms are mainly used in this process as they eat the organic matter and produce castings through their digestive systems which will become highly nutritious manure.

Site Selection for Vermicomposting

Preferably in rural area with predominance of Agriculture and peri-urban area where availability of large scale organic material and marketing of the produce vermin-compost. It may be located in areas with concentration of fruit and vegetable growers and floriculture units.

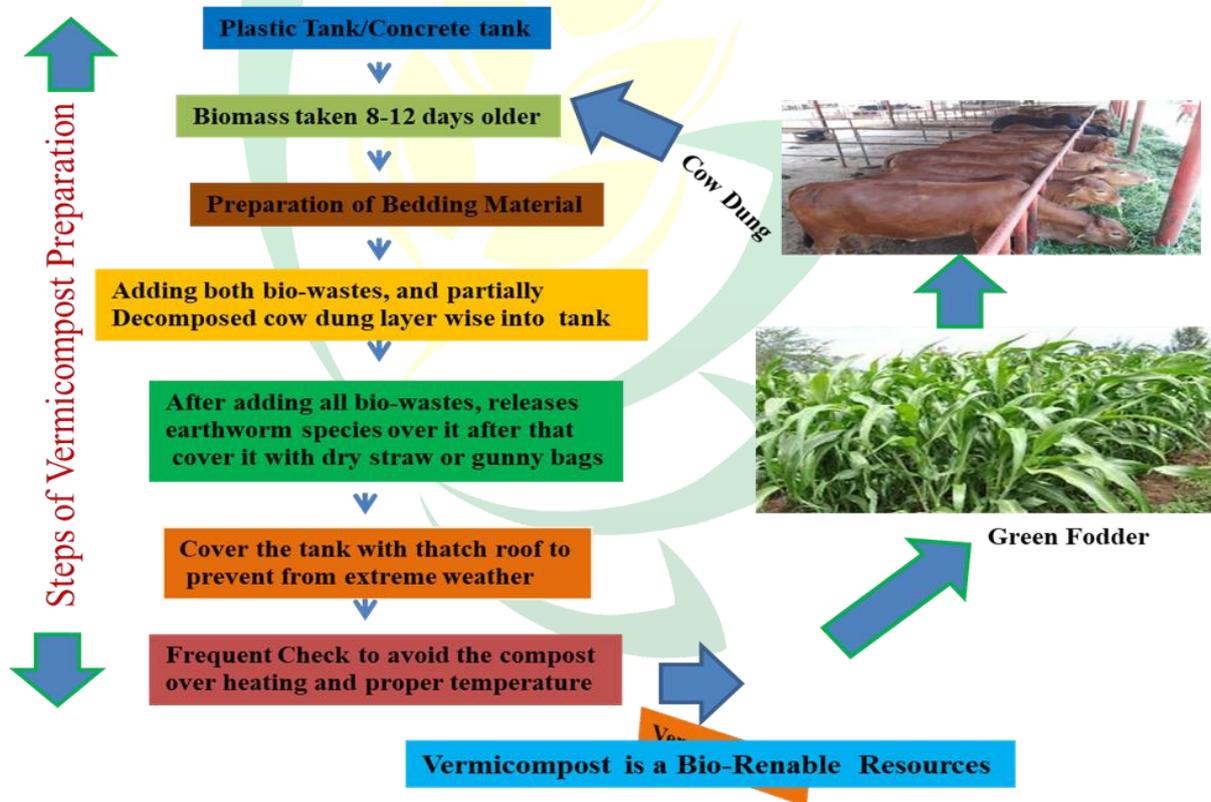
Requirement of size of pit

The process consists of constructing brick lined beds generally of 0.9 to 1.5 m width and 0.25 to 0.3 m height are constructed inside a shed open from all sides but may vary according to farmer's choice. For commercial production, the beds can be prepared with 15 m length, 1.5 m width and 0.6 m height spread equally below and above the ground. While the length of the beds can be made as per convenience, the width and height cannot be increased as an increased width affects the ease of operation and an increased height on conversion rate due to heat built up.

Optimum Condition for Vermicompost Preparation

The bedding used must be able to hold sufficient moisture if the worms are to have a livable environment. They breathe through their skins and moisture content in the bedding of less than 50% is dangerous. With the exception of extreme heat or cold worms grow faster than in normal soil. To enable earthworms to transform the material relatively faster a temperature of around 30 °C is maintained. The beds are maintained at about 40-50% moisture content and a temperature of 20–30 °C by sprinkling water over the beds. Oxygen is requires for aerobic worms so environment surrounding having free from high level of grease. This is because high levels of grease in the feedstock or excessive moisture combined with poor aeration conspire to cut off oxygen supplies, areas of the worm bed, or even the entire system, can become anaerobic. This will kill the worms very quickly. Not only are the worms deprived of oxygen, they are also killed by toxic substances (e.g., ammonia) created by different sets of microbes that bloom under these conditions.

Process of Vermicompost



- **Bed Method:** This is an easy method in which beds of organic matter are prepared.
- **Pit Method:** The organic matter is collected in cemented pits.



• Bed Method



•Pit Method

Table 1*: Farm soil properties under organic fertilizer and chemical fertilizer

Sr. no.	Chemical and biological (Properties of soil)	Availability of Nutrient	
		Organic farming (Use of composts)	Chemical farming (Use of chemical fertilizers)
1.	Availability of nitrogen (kg/ha)	256	185
2.	Availability of phosphorus (kg/ha)	50.5	28.5
3.	Availability of potash (kg/ha)	489.5	426.5
4.	Azatobacter (1000/gm of soil)	11.7	0.8
5.	Phospho bacteria (100,000/kg of soil)	8.8	3.2
6.	Carbonic biomass (mg/kg of soil)	273	217

***Curtesy-Source:** Suhane, R.K. (2007) Vermicompost. Rajendra Agriculture University, Pusa, 88.

Mostly use species of earthworms

- *Eisenia foetida* (Red earthworm)
- *Eudriluse eugenia* (Nightcrawler)
- *Perionyx excavates* etc.

Benefit of Vermi-compost

- ✓ Vermicomposting offer potential to Organic Farmers as sources of supplemental income.
- ✓ Improves the physical structure of the soil.
- ✓ Vermicomposting increases the fertility and water-resistance of the soil.
- ✓ Helps in germination, plant growth, and crop yield.
- ✓ This is a powerful crop nutrient over the conventional compost & protective soil conditioner against the destructive chemical fertilizers for food safety and security

Constrains in Vermi-composting

- ✓ It requires high maintenance.
- ✓ The feed has to be added periodically and care should be taken that the worms are not flooded with too much to eat.
- ✓ The bin should not be too dry or too wet.
- ✓ The moisture levels need to be monitored periodically.
- ✓ They nurture the growth of pests and pathogens such as fruit flies, centipede and flies.