

Vermicompost: An Overview

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Vermicompost, often referred to as worm compost, is a nutrient-rich organic fertilizer produced through the decomposition of organic materials by earthworms. This natural process, known as vermicomposting, has gained popularity in recent years due to its numerous environmental and agricultural benefits. Unlike traditional composting methods, vermicomposting involves the use of specific types of earthworms, such as red wigglers (*Eisenia fetida*) or redworms (*Lumbricus rubellus*), to break down organic waste materials into a valuable soil amendment.

Process of Vermicomposting

Vermicomposting begins with the preparation of a suitable environment for earthworms to thrive. This typically involves providing a container or bin filled with bedding material such as shredded newspaper, cardboard, or compost. The bedding material serves as both a habitat for the worms and a carbon source for the composting process.

Once the bedding is established, organic waste materials such as kitchen scraps, yard trimmings, and coffee grounds are added to the bin. These materials provide the earthworms with a source of food, which they consume and break down into nutrient-rich castings through digestion. The castings, also known as worm poop, contain a balanced blend of essential nutrients, enzymes, and beneficial microorganisms that promote soil health and plant growth.

As the earthworms feed on the organic matter, they aerate the compost pile through their movement and burrowing activities. This aeration helps to speed up the decomposition process and create optimal conditions for beneficial microorganisms to thrive. Over time, the organic waste is transformed into dark, crumbly vermicompost that is ready to be used as a natural fertilizer in gardens, landscaping, and agricultural settings.

Vermicomposting comprises two methods:

- A. Bed Method:** This is an easy method in which beds of organic matter are prepared.
- B. Pit Method:** In this method, the organic matter is collected in cemented pits. However, this method is not prominent as it involves problems of poor aeration and waterlogging.

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.

The nutrients profile of vermicompost's are:

- 1) 1.6 per cent of Nitrogen.
- 2) 0.7 per cent of Phosphorus.
- 3) 0.8 per cent of Potassium.
- 4) 0.5 per cent of Calcium.
- 5) 0.2 per cent of Magnesium.
- 6) 175 ppm of Iron.
- 7) 96.5 ppm of Manganese.
- 8) 24.5 ppm of Zinc.

Materials Required

- 1) Water.
- 2) Cow dung.
- 3) Thatch Roof.
- 4) Soil or Sand.
- 5) Gunny bags.
- 6) Earthworms.
- 7) Weed biomass
- 8) A large bin (plastic or cemented tank).
- 9) Dry straw and leaves collected from paddy fields.
- 10) Biodegradable wastes collected from fields and kitchen.

Procedure

- 1) To prepare compost, either a plastic or a concrete tank can be used. The size of the tank depends upon the availability of raw materials.
- 2) Collect the biomass and place it under the sun for about 8-12 days. Now chop it to the required size using the cutter.
- 3) Prepare a cow dung slurry and sprinkle it on the heap for quick decomposition.
- 4) Add a layer (2 - 3 inch) of soil or sand at the bottom of the tank.
- 5) Now prepare fine bedding by adding partially decomposed cow dung, dried leaves and other biodegradable wastes collected from fields and kitchen. Distribute them evenly on the sand layer.
- 6) Continue adding both the chopped bio-waste and partially decomposed cow dung layer-wise into the tank up to a depth of 0.5-1.0 ft.
- 7) After adding all the bio-wastes, release the earthworm species over the mixture and cover the compost mixture with dry straw or gunny bags.
- 8) Sprinkle water on a regular basis to maintain the moisture content of the compost.
- 9) Cover the tank with a thatch roof to prevent the entry of ants, lizards, mouse, snakes, etc. and protect the compost from rainwater and direct sunshine.
- 10) Have a frequent check to avoid the compost from overheating. Maintain proper moisture and temperature.

Benefits of Vermicompost

Vermicompost offers a multitude of benefits for both the environment and agricultural practices. One of the primary advantages is its ability to improve soil structure and fertility. The organic matter and microorganisms present in vermicompost help to enhance soil aeration, water retention, and nutrient availability, leading to healthier and more productive plants. Additionally, vermicompost contains higher levels of essential nutrients such as nitrogen, phosphorus, and potassium compared to traditional compost. These nutrients are released slowly over

time, providing a sustained source of nourishment for plants and reducing the risk of nutrient leaching.

Furthermore, vermicomposting helps to divert organic waste from landfills, thereby reducing greenhouse gas emissions and mitigating environmental pollution. By recycling kitchen scraps and yard waste into valuable fertilizer, vermicomposting contributes to the conservation of natural resources and promotes sustainable waste management practices.

The major benefits of vermicomposting are:

- 1) Develops roots of the plants.
- 2) Improves the physical structure of the soil.
- 3) Vermicomposting increases the fertility and water-resistance of the soil.
- 4) Helps in germination, plant growth, and crop yield.
- 5) Nurtures soil with plant growth hormones such as auxins, gibberellic acid, etc.

Applications of Vermicompost

Vermicompost can be used in a variety of applications to improve soil quality and plant growth. In agriculture, vermicompost can be incorporated into soil mixes for potting plants, added to garden beds and raised beds, or used as a top dressing for lawns and landscapes. Its slow-release nutrients and beneficial microorganisms make it an ideal fertilizer for promoting healthy root development and enhancing crop yields.

In addition to agricultural uses, vermicompost is also utilized in horticulture, landscaping, and urban gardening projects. It can be applied to ornamental plants, trees, and shrubs to enhance their overall health and vitality. Vermicompost tea, a liquid extract made from steeping vermicompost in water, is often used as a foliar spray or soil drench to deliver nutrients directly to plant roots and foliage.

Conclusion

In conclusion, vermicompost is a valuable organic fertilizer that offers numerous benefits for soil health, plant growth, and environmental sustainability. Its ability to recycle organic waste, improve soil fertility, and enhance crop yields makes

it an essential component of sustainable agriculture and waste management practices.

Looking ahead, the widespread adoption of vermicomposting holds great potential for addressing global challenges such as soil degradation, food

security, and climate change. By harnessing the power of earthworms to convert organic waste into nutrient-rich compost, we can create healthier ecosystems, reduce our reliance on chemical fertilizers, and build a more resilient agricultural system for future generations.

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