

## **Vermicomposting Process Steps: Pit Method, Bed Method, Diagram**

The process of converting organic waste into worm castings is known as vermicomposting. Worm castings are extremely beneficial to soil fertility. Nitrogen, potassium, phosphorus, calcium, and magnesium are abundant in the castings. Castings have five times the accessible nitrogen, seven times the available potash, and twelve times the calcium of healthy topsoil. Let's check out Vermicomposting process steps.

Earthworm castings have been shown to have good aeration, porosity, structure, drainage, and moisture-holding capacity by several researchers. The permeability of water in the soil is improved by the content of earthworm castings, as well as the natural tillage provided by the worms' digging movement. In water, worm castings may hold up to nine times their weight.

For a long time, "vermiconversion," or the use of earthworms to convert the trash into soil additives, has been used on a limited scale. Vermicompost application should be done at a rate of 15-20%. The excreta of earthworms, which is rich in humus and nutrients, is known as vermicompost. We can artificially breed earthworms in a brick tank or near tree stems and trunks. We can create the appropriate quantities of vermicompost by feeding these earthworms biomass and carefully monitoring their meals.

### **What are the benefits of Vermicompost in agriculture?**

#### **Suppression of pathogens**

Vermicompost, according to research, does not destroy pathogens in the soil; rather, it prevents harmful microorganisms from becoming severe and harming your plants.

#### **Delivery of nutrients**

Vermicompost often has higher quantities of plant-available nutrients, notably nitrogen and phosphate, than ordinary compost.

#### **Retention of water**

Due to its amazing water retention qualities, you'll be astonished at how thick vermicompost is. Adding vermicompost or worm castings to the soil in places with depleted – or diminishing – water sources and/or soil rich in sand or clay can assist keep the water in the soil and saving that valuable resource.

#### **Microorganism population growth**

Vermicompost may support a healthy microbial population by including beneficial fungus and bacteria. Organic material in healthy soil is thought to make up roughly 5%, but in over-farmed soil, that figure has dropped to 1%. The addition of vermicompost to the soil can aid in the restoration of that equilibrium.

## **Elimination of pests**

Vermicompost, like diseases, can not kill or repel pests, but it can assist them to avoid the assault.

## **plant growth control and increased yields**

Several studies suggest that applying vermicompost or worm castings to crops such as strawberries, tomatoes, peppers, and other vegetables increases production. Hormones that govern and encourage plant development can be found in some vermicomposts.

## **Remediation of polluted soils**

It's beyond the scope of this essay to describe how, but several studies have demonstrated that earthworms and the bacteria present in living vermicompost can repair soil polluted with hydrocarbons, agricultural pollution, heavy metal-free radicals, and other contaminants.

## **Materials for Vermicomposting**

Composting materials include decomposable organic wastes such as animal excreta, kitchen trash, farm leftovers, and forest litter. The main source components are animal excrement, mostly cow dung, and dried chopped crop leftovers. The quality of vermicompost is improved by mixing leguminous and non-leguminous agricultural leftovers.

Earthworms come in a variety of shapes and sizes, including red earthworms, nightcrawlers, and others. Because of its fast multiplication rate, the red earthworm is selected because it turns organic waste into vermicompost in 45-50 days. It turns organic materials into vermicompost from the top since it is a surface feeder.

## **Vermicomposting methods**

### **Bed method**

Composting is done by making a bed (6x2x2 feet) of organic material on the pucca / kachcha floor. This strategy is simple to follow and put into practice.

### **Pit method**

Composting takes place in concrete pits measuring 5x5x3 feet. Thatch grass or any other locally accessible materials are used to cover the unit. Due to inadequate aeration, water clogging at the bottom, and higher production costs, this approach is not recommended.

## **Vermicomposting process steps and procedure**

### **Earthworm selection for Vermicomposting**

The surface-dwelling earthworm should be utilized only for vermicompost production. The earthworm, which lives underground, is unsuitable for vermicomposting. African earthworms, red worms, and composting worms are all potential vermicomposting worms. For vermicompost production, all three worms can be combined.

The African worm is chosen above the other two species because it generates more vermicompost in a shorter amount of time and produces more young worms during the composting process.

### **Site selection for Vermicomposting**

Vermicompost may be made everywhere there is shade, high humidity, and a cool temperature. Unused buildings, such as an abandoned cow or poultry shed, can be repurposed. If it is to be made outdoors, a shaded location is chosen. To shield the procedure from direct sunshine and rain, a thatched roof might be installed. Wet gunny bags should be used to cover the garbage heaped for vermicomposting.

### **Containers for Vermicomposting process**

A cement tub with a height of 212 feet and a width of 3 feet may be built. Depending on the size of the space, the length may be set to any level. The tub's bottom is sloped like a building to drain excess water from the vermicompost unit. To collect the drain water, a small sump is required.

To have a speedy harvest, hollow blocks or bricks can be put in compartments to a height of one foot, breadth of three feet, and length to a specified level above the hand floor. Moisture assessment will be simple using this procedure. There will be no draining of surplus water. Vermicompost can also be made in wooden boxes, plastic buckets, or any other container with a bottom drain hole.

### **Vermiculture bed preparation**

After sawdust, husk, coir waste, or sugarcane garbage has been placed in the bottom of the tub/container, a vermiculture bed or worm bed (3 cm) can be produced. Over the culture bed, a layer of fine sand (3 cm) should be applied, followed by a surface of garden soil (3 cm). Water must be sprayed on all layers.

Shredded paper or cardboard is a good bedding material, especially when paired with common organic agricultural resources like straw and hay. However, organic producers must make sure that such elements are not prohibited by their organic certification criteria. For certification reasons, paper or cardboard fiber collected in municipal trash programs is

not acceptable. However, in some circumstances, fiber resources from specified generators may be found and allowed.

Another item in this category is paper-mill sludge, which has a high absorbency and tiny particle size that works so well with the high C: N ratios and bulking qualities of straw, bark, shipping brush, and wood shavings. If the user has organic certification, the sludge must be certified once more.

In general, the reader should be aware that bedding material selection is critical to effective vermiculture or vermicomposting. When conditions are favorable, worms may be extremely productive; nevertheless, when their fundamental needs are not supplied, their efficiency rapidly declines. Good bedding combinations are an important part of satisfying those requirements. They provide protection from temperature extremes, the required moisture levels and uniformity, and an appropriate supply of oxygen.

Good bedding combinations are often not difficult to come by on farms, given their crucial role in the process. Absorption is probably the most challenging condition to achieve, as most straws and even hay are poor at keeping moisture. Adding some aged or composted cow or sheep manure with the straw will readily solve this problem. The bedding properties of the finished product are comparable to that of old horse dung.

Mixing beddings does not have to be a time-consuming activity; it can be done by hand using a pitchfork, a tractor bucket, or an agricultural feed mixer. Please keep in mind that the latter is only suitable for big commercial vermicomposting operations that demand great efficiency and constant product quality.

### **Food for worms for Vermicomposting process**

Compost worms devour a lot of food. They may ingest more than their body weight per day under optimal conditions, yet the common rule of thumb is 12 times their body weight per day. They will consume practically anything organic, although they do have preferences for some foods. With the probable exception of rabbit dung, manures are the most often utilized worm feedstock, with dairy and beef manures typically regarded as the greatest natural diet for Eisenia. The former is the more commonly utilized feed since it is more frequently accessible in big amounts.

### **Selection for Vermicompost production**

Farm wastes, crop leftovers, vegetable market trash, flower market waste, agro-industry waste, fruit market waste, and any other biodegradable waste are all ideal for vermicompost manufacturing. Before using cattle dung to make vermicompost, it should be dried out in the sun. Other trash must be predigested for 20 days with cow dung before being placed in a vermibed for composting.

## **Waste disposal in containers**

Mud with 30 percent cattle dung, either by weight or volume, should be used as a predigested waste material. The combined garbage is piled to the brim in the tub/container. It is recommended that the moisture level be kept at 60%. The selected earthworm is uniformly placed over this substance. 1 kilogram of worm is required for a one-meter length, one-meter breadth, and 0.5-meter height. There is no requirement to include earthworms in the garbage. The earthworm will enter on its own.

## **Watering the beds**

Vermibed does not require daily watering. However, a moisture level of 60% should be maintained during the time period. Water should be sprayed over the bed rather than poured if it is necessary. Before harvesting vermicompost, the watering should be stopped.

## **Harvesting of Vermicompost**

The raw material appears black and grainy when it has completely disintegrated. As the compost matures, the watering should be reduced. So that earthworms can migrate from compost to partly decomposed cow dung, the compost should be stored over a pile of partially decomposed cow dung. Compost can be separated and isolated for use after 2 days.

## **Precautions to be taken for Vermicomposting**

To restrict earthworm migration into the soil, the floor of the unit should be packed. To avoid excessive heat, use cow dung that is 15-20 days old. Plastics, chemicals, insecticides, and metals should not be present in organic waste. For earthworms to thrive and multiply properly, aeration must be maintained. It's important to keep the moisture level at its optimum (30-40%). For proper decomposition, keep the temperature between 18 and 25°C.

## **Storing and packing of Vermicompost**

The vermicompost should be kept in a dark, cool area after harvesting. It should have a minimum moisture content of 40%. The composted material should not be exposed to direct sunlight. Moisture and nutritional content will be lost as a result. It is recommended that the collected composted material be stored openly rather than in over-sacs. Packing can be done when the item is sold.

If it's kept out in the open, spraying it with water regularly can help to keep the moisture level up as well as it is beneficial for the microbial population. If it becomes necessary to keep the material, a laminated over sac is employed. Moisture evaporation will be reduced as a result. If the moisture level is kept at 40%, vermicompost can be stored for a year without losing its quality.