

Advantages of Vermi Compost in Agriculture

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ARTICLE ID: 11

Abstract:

Vermicomposting is a biological technique of converting organic wastes into a rich soil amendment. In this paper a thorough literature is done regarding the impacting factors for a vermicomposting unit followed by design of pit for a vermicomposting and the number of earthworms required for the obtained amount waste. This is further continued with selecting of optimum range for parameters such as Temperature, Potential Hydrogen, Moisture content, TAN.

Introduction

Vermicomposting or worm composting is a simple technology for converting biodegradable waste into organic manure with the help of earthworms. Earthworms are valued by farmers because, in addition to aerating the soil, they digest organic matter and produce castings that are a valuable source of humus.

Vermicompost is a type of Organic Fertilizer. It is derived by composting organic waste by using various species of earthworms. It is a mixture of decomposing vegetable or food waste, bedding materials, and most importantly worm castings. This process of producing Vermicompost is called Vermicomposting. Vermicomposting time ranges from 100 days respectively. Vermicompost can be stored for one year without loss of its quality, if the moisture is maintained at 40% level.

Vermicomposting is an organic and biological process in which earthworm species are primarily used to convert organic matter or biodegradable wastes into manure. The produced vermicomposts are rich in nutrition and thus, they are widely used as bio fertilisers in organic farming and sewage treatment plants.

Vermicompost is rich in NKP (nitrogen 2-3%, potassium 1.85-2.25% and phosphorus 1.55-2.25%), micronutrients, beneficial soil microbes and also contain 'plant growth hormones & enzymes'. It is scientifically proving as 'miracle growth promoter & also plant protector' from pests and diseases.

Advantages of vermi compost

- Develops roots of the plants: Vermicompost has a profound effect on plants. It boosts the nutrients available to plants, helping seeds to germinate more quickly, grow faster, develop better root systems and produce higher yields. That means more flowers or fresh fruits and vegetables.
- 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.
- Nurtures soil with plant growth hormones such as auxins, gibberellic acid, etc.

Vermi composting materials

Decomposable organic wastes such as animal excreta, kitchen waste, farm residues and forest litter are commonly used as composting materials. In general, animal dung mostly cow dung and dried chopped crop residues are the key raw materials.

pH of vermicompost

6–7

Earthworm is best for vermicompost

Among the epigeic earthworms, *Eisenia andrei* and *Eisenia fetida* are the species most widely used in vermicomposting and vermiculture facilities worldwide.



Process of vermi compost

Selection of site

- The site selected for the pit should be easily approachable for inspection.
- Pit should be at a comparatively higher level so that neither rain water gets into nor the water table rises and causes water stagnation in the pit during monsoon.
- It should be near the cattle shed and the source of water supply.
- It is a common site in the country that farm waste & cow dung are piled by the side of the road. Automobile exhausts containing lead get deposited in such compost. Hence compost pit should be located at a distance from the road or else compost containing toxic metal lead contaminates even food grain, affecting health of animals & human beings.

Construction of Tanks

With the help of bricks cemented tanks are constructed on the soil surface. These tanks should be located near cattle shed or on easily approachable farm sites. Size of the tank should be 10'X6'X3' with 9" inch thick brick wall. For circulation of air, proper holes of 7" inches (preferably) are left on all the four sides of the tank wall. Plastering of inner-outer wall & floor of the tank should be done by dung and mud mixture.

Materials required

- Farm residues, refuses like weeds, grasses, leaves, sugarcane trash, stubbles and aal kind of wastes, stalks, roots, stems, prunings, stalk of green manuring crops, etc. 1400 to 1500kg.
- Cattle dung 90 to 100 kg (8-10 baskets) ∞ Dry sieved-soil 1750 kg (120 baskets) (urinated earth is more effective)
- Water –according to season (less during rains and in abundance during dry spells) 1500 to 2000 litres.

Method of filling

- The tank Before filling the tank, slurry made of cow dung and water should be sprinkled on the floor and the wall
- First layer: Plant residues available on the farm are spread evenly in layers to a thickness of 6 inches (100 to 110kg)
- Second layer: Cattle dung or Gobargas-slurry, 4 to 5 kg in 125 to 150 litres of water on the first layer of the trash.
- Third layer It consists of clean dry sieved soil (keeping apart stones, pebbles, glass plastic etc.) Then 50 to 60 kg (4 to 5 baskets) of soil are spread on moist layer of farm refuses sprinkling of water is repeated. The tank is filled in this way layer by layer and it is filled till the materials is 1½ ft. above the brick level. A hut like shape may be given at the top. The whole tank is to be filled within 1 or 2 days. Eleven to twelve layers are required for filling the tank to its capacity. In case cattle dung is not available in desired quantity, collection of same is done for 8-10 days under a shade by covering it with a light layer of soil. As an alternative practice, tank can be filled 1/3 or ½ of its capacity in parts.

- Full tank should be covered and sealed by 3-inch layer of soil (300 to 400 kg). It should be pasted with a mixture of dung and soil. Cracks should not be allowed to develop on the heaps, to check gas leakages, for that the pasting can be repeated.
- Second filling After 15 to 20 days the fresh contracts and becomes more compact and goes down in the tank by 8-9 inches. The procedure described in the first filling is repeated and again sealed and pasted with mud and dung. It takes about 3 to 4 months in compost making by NADEP method. In order to maintain 15 to 20 % moisture, the compost is sprinkled with cattle dung and water. This helps in conservation of the nutrients.

Conclusion

Vermi composting a biological process which involves the interaction between earthworms and micro-organisms leading to the formation of earthworm biomass and the vermicompost. In this paper a thorough research is conducted which involves the entire parameters required for vermicomposting, the design consideration which involves the surface area of the pit required and the type of earthworms required, their criteria for selection and the number of worms required are all included in this paper. This paper provides the basis for the process of vermicomposting.

References

- Eghball B, Power JF, Gilley JE and Doran JW, Nutrient, carbon, and mass loss during composting of beef cattle feedlot manure, *Journal of Environmental Quality*, 1997, 26, 189–193.2.
- Gandhi M, Sangwan V, Kapoor KK and Dilbaghi N, Composting of household wastes with and without earthworms, *Environment and Ecology*, 1997, 15(2), 432–434.3.
- Garg P, Gupta A and Satya S, Vermicomposting of different types of waste using *Eisenia foetida*: A comparative study, *Bioresource Technology*, 2006, 97, 391-395.
- Tara Crescent, Vermicomposting. Development Alternatives (DA) Sustainable Livelihoods, ([http:// www.dainet.org/livelihoods/default.htm](http://www.dainet.org/livelihoods/default.htm)), 2003.4.