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VERMICOMPOSTING : A GIFT BY NATURE'S PLOUGHMAN

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ABSTRACT

This study sets out to explore all about using vermicompost. The uses benefits, Methods and status of vermicomposting in present scenario has been depicted. Most of the informations and photographs have been collected from the vermicompost unit of ICAR Plandu Ranchi. Vermicomposting is a simple Biotechnological Process of composting, In which certain species of Earthworms are used to enhance the process of waste conversion and produce a better end product. These earthworms serves as 'Nature's Ploughman' and form nature's gift to produce good humus, which is the most precious material to fulfill the nutritional needs of crops.

Keywords—*Vermi, Compost, Ploughman, Waste, Biodegradable, Earthworm.*

I. INTRODUCTION TO VERMICOMPOSTING

Vermicomposting is a process of utilizing microorganism and earthworms that are active at 10-32 C temperature. The vermicompost is the use of earthworms for composting organic residues. Earthworm can consume practically all kinds of organic matter. Earthworm have the capacity to eat as much matter as their own weight and produce the same amount of manure per day in the form of castings. This is a fast process because the material passes through the Gut of the earthworm resulting in earthworm casting that is worm manure, Which are rich in microbial activities and are plant growth regulators. These earthworms are called nature's ploughman because they are capable of transforming garbage into gold.

II. NEED OF BIO-WASTE MANAGEMENT

Now a days the environmental degradation is a major problem in front of the world. Excessive use of chemical fertilizers contribute largely to the degradation of the environment through depletion of fossil fuels, generation of carbon dioxide and contamination of water recourses. The fertility of the soil is caused due to improper use of fertilizers that has adversely effected the agricultural productivity and causes degradation of soil. To overcome all these problems, vermicomposting can be used. It is a natural process for the economic prosperity of the farmers. It can convert 1 thousand tons of moist organic matter into 400 tons of high value compost. these castings or excreta of earthworms are rich in nutrients and also helpful for environment.

III. IMPORTANCE OF VERMICOMPOST

Vermicompost plays an important role in upgrading the growth and wield of different field crops, vegetables, flowers, and fruits crops. From earlier studies it is evident that vermicompost provides all nutrients in readily available form and also enhances the uptake of nutrients by plants. The crops that can be benefited through vermicompost are mung dal , peas, rice , tomato, coriander and similar vegetables.

Vermicomposting converts household waste into compost within 30 Days. this process can help in improving the productivity under GREEN REVOLUTION.

IV. TYPES OF EARTHWORMS

Earthworms are invertebrates. There are nearly 3600 types of earthworms in the world and they are mainly divided into two types.

i) Burrowing
ii) Non Burrowing

The Burrowing types live deep in the soil. on the other hand, the non burrowing types live in the upper layer of soil surface. The burrowing types are pale, 20-30 cm long and live for 15 Years. The non burrowing types are red of purple and 10-15 cm long but their life span is only 28 months.

The non burrowing earthworms eat 10 percent soil and 90 percent organic waste materials, They convert the organic waste into vermicompost faster than burrowing earthworms.

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V. METHODS OF VERMICOMPOSTING

1. **Making Pits below the ground:** Pits made for vermicomposting are 1 meter deep and 1.5 meter wide. The waste material like dried leaves, domestic wastes, rotten flowers and fruits can be decomposed in it and can be used after a month.
2. **Heaping above the ground :** The waste material is spread on a polythene sheet placed on the ground then cattle dung is diluted with water and spread on waste material as it increases the microbial activity which helps in decomposition of the waste material faster. after 10-15 days when the waste heap is semi decomposed and the temperature of the semi decomposed waste lowers than the semi decomposed waste is put into vermi beds of 5 *1 * 0.6 meter. Various layers of this methods is repeated and entire heap is covered by wet GUNNY BAG or POLYTHENE SHEETS.

This heap method is better than the pit method because earthworm population, biomass production and consequently production of vermicomposed is higher in the heap method

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VI. VERMI WASH :- AN EFFECTIVE BIO-PESTICIDE

Vermi wash is the brown colored bio-liquid fertilizer collected after the passage of water through a column or worm culture. It is very useful as a foliar spray for all crops. It is a collection of excretory products and excess secretions of earthworms along with micronutrients from soil organic molecules. Vermi wash is alkaline in nature and contains nitrogen, phosphorus, potash, calcium, magnesium and zinc in appreciable quantities.

VII. MATERIALS REQUIRED FOR VERMICOMPOSTING

A range of agricultural residues, all dry wastes, for example sorghum straws and rice straws, dry leaves of crops and tress groundnut husk, soybean residues, vegetables wastes, weed plants before flowering, fibers from coconut trees and sugar cane trash can be converted into vermicomposed

VIII. 3-D REQUIREMENTS OF EARTHWORM

The requirement of earthworms are very minimal for vermicomposting . they require 3 D's that is DAMP, DARK, and DINNER.

1. Worm bin bedding should be damp, like a wet sponge, but not soggy or else worms will die or try to escape if the bin is too wet or dry.
2. Worms are sensitive to light and should be kept in a dark environment. If worms are trying to escape, it is a signal that conditions are not favorable inside the bin .
3. And finally dinner- worms love to eat. Spread the feedings around to encourage worm population growth. worms eat best when the bin system is well maintained.

IX. BENEFITS OF VERMICOMPOST

1. Increases soil fertility and bacterial activity in the soil.
2. Increases micro grains in the soil and enhances water absorption capacity.
3. Helps the plant root get air easily.
4. Increases plant resistance to pests, fungus and other diseases.
5. Vermicompost is rich in organic carbon which plays a key role in soil fertility and contains all essential plant nutrients in appropriate proportion.
6. The use of vermicompost not only increases the rate of water intake into soil but also improve the water holding capacity.
7. It also enhance color, smell, taste, flavor and keeping quality of flowers, fruits, vegetables and food grains and help the farmers to sell their products at higher price in market.

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X. PRECAUTIONS IN THE PROCESS

1. The African species of earthworms, **Eisenia fetida** and **Eudrilus eugenae** are ideal for preparation of vermicomposed. most Indian species are not suitable for this purpose.
2. Material of animal origin such as egg shell, meat, bone, chicken droppings etc are not suitable for preparing vermicomposed.
3. Adequate moisture should be maintained in the process, stagnant water or lack or moisture could kill the earthworms .
4. After completion of the process, the vermicomposed should be removed from the bed and replaced by fresh waste materials.

XI. PRESENT ACHIEVEMENTS OF VERMICOMPOSTING UNITS

Till now thousands of domestic vermicompost units have been installed. Financial supports have been achieved from CAPART, a Government of India organization and is continuing with VER revenues.

XII. DIFFERENCE BETWEEN VERMICOMPOST AND OTHER FERTILIZERS

1. Plants die from over-use of chemical fertilizers on side effect. whereas in Vermicompost plants have no side effect.
2. Chemical deteriorate the fertility of soil whereas Vermicomposts enhance the fertility and does not harm the soil.
3. Foul smell, High content of chemicals and detergents can seen in chemical fertilizers whereas Vermicompost has no smell, no detergents or chemicals.

XIII. CONCLUSION:

The production of degradable organic wastes and its safe disposal has becomes the current global problem. Mean while the rejuvenation of degraded soil by protecting top soils and sustainability of productive soils is a major concern at the international level. The utilization of vermicompse will result in several benefits to farmers, Industries, environment and overall national economy.

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