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Manures , Fertilizers and Soil Fertility Management

03. Composting

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03.1

Composting is a process of allowing organic materials to decompose more or less controlled conditions to produce stabilized product that can be used as a manure or soil amendment. Composting is basically a microbial process, which change the property of the organic material or mixtures.

Essential requirements for composting

- A bulky organic manure
- A suitable starter
- Addition of enough water
- Aeration



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Main systems of composting

- ADCO process (Hutchinson and Richards of England)
- Activated compost process (Fowler and Rege)
- The Indore process (Howard and Wad)
- The Bangalore process (C.N.Acharya)
- The coimbatore method



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Benefits of composting:

- * Enables clean environment
- * Absorbs odors, degrade toxic substances and heavy metals
- * Avoids un-necessary dumping of wastes
- * Supply valuable organic manure



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Composting technologies :

1. Crop residue composting

Crop residue composting

Collect the available crop residues and weeds

Shred them to a size of 2 to 2.5 cm length

Mix these wastes with green residues (freshly collected), if available

Form the compost heap (4 feet height)

Add the bio-inoculants (2 kg of bio-mineralizer or 40 kg of cowdung for 1 tonne of waste)

Properly aerate the compost either by providing perforated PVC pipes or by mechanical turning

Maintain the moisture at 60 % by regular watering

The compost will mature in 60 days



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2. Vermicomposting

Vermis is a Latin word for worms, and the composts prepared with the help of these earthworms are called “Vermicompost”. The process by which it is prepared is called Vermicomposting.

The species like *Eisenia foetida* and *Eudrilus eugeniae* are effective in converting the agricultural wastes into compost.

The various steps involved in making vermicompost are as follows

Methods followed:

- **Heap method**
- **Pit method** – aboveground and belowground
 - Belowground method pit size : 10 X 1 X 0.3 m
 - Each layer : 6-7cm thick
 - Sprinkle water once in 8-10 days
 - Release : 2-2.5 kg worms / pit



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Eisenia foetida



Eudrilus eugeniae



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Steps of vermicomposing :

Collect the pre-digested wastes and mix cattle dung @ 30 %.

Place it in the pit/container layer by layer

Moist the residues at 60 % moisture

After 7 days allow the vermis in to the feed material / residues @ 1 kg/ tonne of residue

Protect the pit or container from ants and rats (which are the enemies of vermis)

The compost of residue will be started from 30 to 40 days

Remove the composted materials layer by layer at a weekly interval so as

To avoid any damage /disturbance to the feeding vermis



Plastic sheet placed below the ring



Layer of raw material placed on polythene sheet



Rock phosphate powder sprinkled on organic material



Cow dung slurry



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Characteristics of Good Vermicompost

Fully decomposed and matured org. manure with **C: N = 15: 1**

❁ Granulated

❁ Contains essential **plant nutrients**

❖ Rich in secondary minerals especially **Ca**

❖ Rich in millions of beneficial bacteria, particularly **N-fixer**

❖ Rich in humus (**Humic acid**)

❖ Rich in vitamins and growth regulators (**Gibberalic acid**)

Enzymes : Protease ,Lipase ,Amylase , Cellulose

❖ Nutrients In **assimilable form** and suitable for any type of soil

❖ Non-toxic, environmental friendly and ecologically compatible

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Vermi-Wash

Vermiwash is a watery extract of compost, the wash of earthworms present in the medium. Earthworm body is filled up with Celomic fluid. Celomic fluid is always secreted from the body of earthworms and always keeps the body of wet. We can collect Celomic fluid of earthworms and this is called vermiwash.

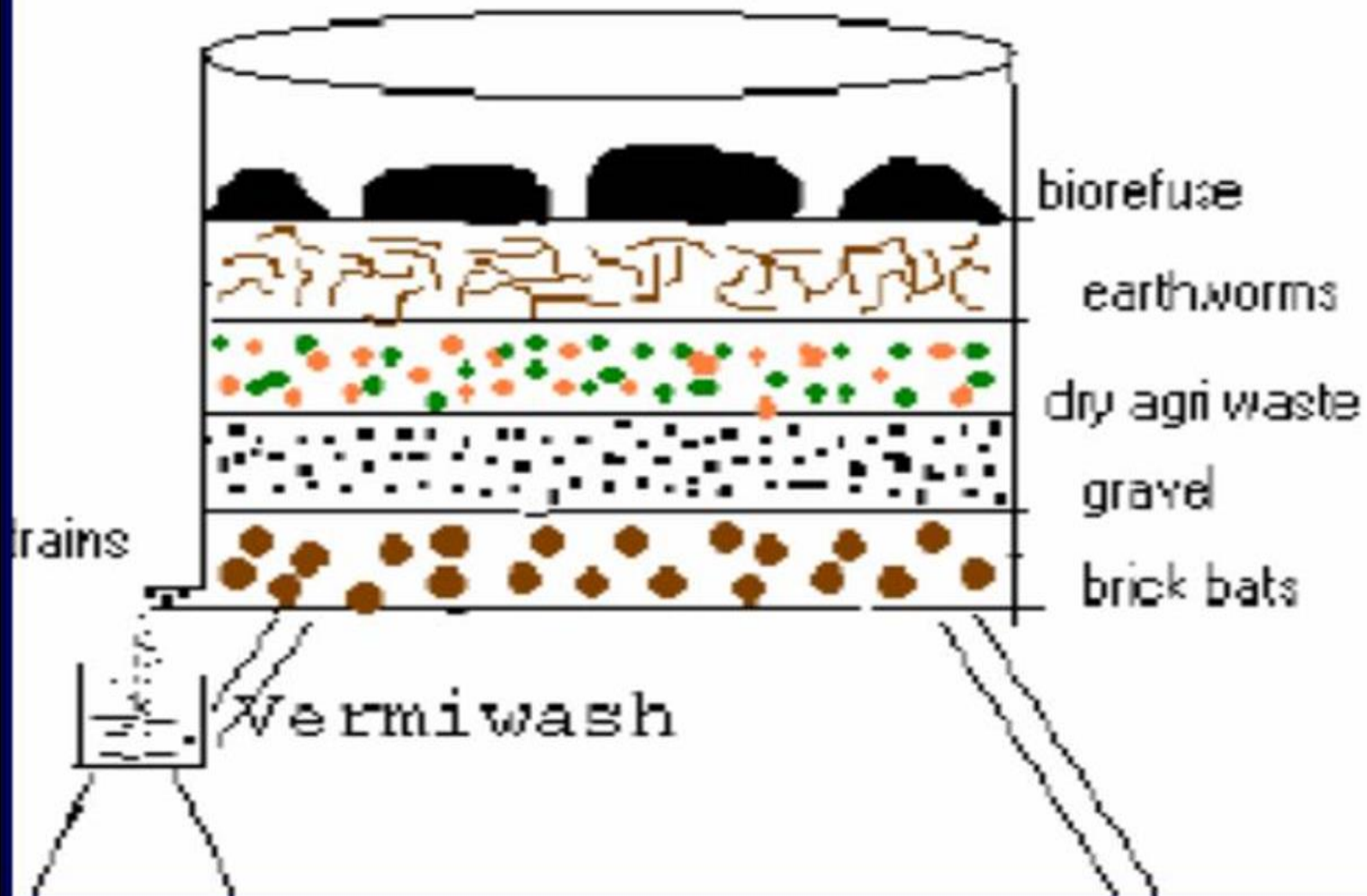
Vermi-Compost

Vermicompost is the product or process of composting utilizing various species of worms, to create a heterogeneous mixture of decomposing vegetable or food waste, bedding materials, and vermicast

Vermi-Castings

Vermicast, similarly known as worm castings, worm humus or worm manure, is the end-product of the breakdown of organic matter by a species of earthworm.

Transverse section of vermibed



A close-up photograph of a hand completely covered in dark, rich soil. The hand is resting inside a reddish-brown terracotta pot. The soil is thick and clings to the skin, with some areas where the skin's texture is visible. The background shows the inner rim of the pot and a glimpse of a green-painted metal structure.

Thank you