SKILL ENHANCEMENT COURSE (SEC)

Four Years Zoology B.Sc. Honors Course

COURSE CODE: **SEC Z-1**

COURSE NAME: **VERMICULTURE**

SEMESTER: I

LECTURE 2

VERMICOMPOSTING METHODS

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BED METHOD: The bed technique of vermicomposting is a popular approach to compost organic materials using earthworms in a designated area on the soil. Below are some instructions for implementing the bed method:

1. Arrange the bedding: Construct a platform using wood or bricks on the floor.
2. Create layers: Start with a layer of coarse sand, followed by a layer of loamy soil, and then introduce earthworms.
3. Add organic matter: Add chopped dry leaves, hay, and other biomasses.
4. Ensure the soil remains damp, but avoid over-saturation.
5. Lay banana leaves over the bed to allow it to remain untouched for 2–3 days.
6. After two to three days, aerate the top 10 cm of the bed and then re-cover it.
7. Reiterate the process of loosening and covering, taking out the vermicomposted manure and gathering it.
8. When the bed reaches a height of approximately 10 cm, incorporate fresh manure and organic materials, then begin the process again.
9. Strain the gathered manure to eliminate worms and any unprocessed materials.

Source: Website of DoAH

Fig. 1: Bed Method

PIT METHOD:

The pit technique for vermicomposting involves creating vermicompost in a pit or tank. It consists of following steps:

1. Create a shallow hole or container using either a wooden box or cement rings. Lay a mesh across the base.
2. Layer cow dung slurry and dried, chopped green waste in a ratio of 1:3.
3. Introduce earthworms into the pit and let them consume the material for a duration of 60 to 80 days.
4. Regularly water the pit to maintain moisture.
5. Rotate the compost on a regular basis.
6. Continue the procedure to create additional compost.

Source: Website of DoAH

Fig. 2: Pit Method

NADEP METHOD:

This is a method of composting that relies on aerobic processes. The resultant product is achieved through composting within a time frame of 90 to 120 days. This composting system utilizes top soils that harbor soil

microbes, which play a key role in the decomposition process, as cow dung lacks these specific microbes. Additionally, it facilitates aeration among the compost materials. In this approach, only a small amount of cattle dung is required.

The following steps should be taken with utmost importance during this vermicomposting method:

1. The chosen location for the pit should be easily accessible for examination.
2. The pit needs to be positioned at a higher elevation to prevent rainwater from entering and to avoid issues with the water table rising, which could lead to water stagnation in the pit during the monsoon season.
3. The dimensions of the tank should be 10 feet by 6 feet by 3 feet, constructed with a brick wall that is 9 inches thick. To ensure adequate air circulation, appropriate openings of about 7 inches should be created on all four sides of the tank wall. The inner and outer walls, as well as the floor of the tank, should be plastered using a mixture of dung and mud.
4. It ought to be close to the livestock barn and the water source.

Materials Required:

(i) Agricultural byproducts, including unwanted plants such as weeds, grasses, leaves, sugarcane waste, stubble, and all types of refuse—such as stalks, roots, stems, prunings, and remnants of green manure crops—amount to approximately 1400 to 1500 kg.

(ii) Cattle manure weighs between 90 to 100 kg (8-10 baskets).

(iii) Dry sieved soil weighs 1750 kg (equivalent to 120 baskets) (soil treated with urine is more effective).

(iv) Water availability varies by season, with less during the rainy season and more during dry periods, amounting to 1500 to 2000 liters.

The method comprises of following step:

1. Before refueling the tank, a mixture of cow dung and water ought to be applied to the floor and walls.

2. Plant residues found on the farm are distributed uniformly in layers with a thickness of 6 inches (100 to 110 kg).
3. Using 4 to 5 kg of cattle dung or Gobargas-slurry, mix it with 125 to 150 litres of water to apply on the initial layer of trash.
4. The process begins with clean, dry, sieved soil, ensuring that stones, pebbles, glass, plastic, and other debris are set aside. Next, 50 to 60 kg (around 4 to 5 baskets) of soil is distributed over a moist layer of farm refuse, with water being sprinkled repeatedly. The tank is filled using this method, layer by layer, until the material reaches 1½ feet above the level of the bricks. A hut-like shape can be created at the top. It is important to complete filling the entire tank within 1 or 2 days. A total of eleven to twelve layers are necessary to fill the tank to its full capacity. If cattle dung is not readily available in the needed amount, it can be gathered for 8-10 days, stored under a shade, and covered with a thin layer of soil. Alternatively, the tank can be filled to one-third or half of its capacity in separate sections.
5. The complete tank must be protected and sealed with a 3-inch layer of soil (weighing between 300 to 400 kg). It should be coated with a blend of dung and soil. It's important to prevent cracks from forming on the heaps to avoid gas leaks; therefore, the coating can be reapplied as necessary.
6. After a period of 15 to 20 days, the fresh contracts become denser and settle down in the tank by about 8-9 inches. The process outlined during the initial filling is repeated, followed by sealing and covering with mud and dung once more. The NADEP method requires approximately 3 to 4 months for compost production. To maintain a moisture level of 15 to 20%, the compost is regularly sprinkled with a mix of cattle dung and water, aiding in the preservation of nutrients.

Manure obtained by this method of vermicomposting have following contents of nutrients:

Nitrogen (N) : 0.5 to 1.5%

Phosphate (P) : 0.5 to 0.9%

Potash (K) : 1.2 to 1.4%