
EXPERIMENT 7 COMPOSTING AND VERMI-COMPOSTING THROUGH RECYCLING OF SERICULTURAL FARM RESIDUE

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7.1 INTRODUCTION

The mulberry cultivation can be made sustainable and economical by recycling all the organic residues of sericultural origin as compost and vermicompost, for improving the soil fertility and to boost the mulberry leaf production.

Objectives

After studying and performing this experiment, you should be able to:

- utilize the organic farm residue for preparation of nutrient rich organic manure;
- use earthworms in preparing vermicompost;
- increase soil fertility by the application of compost and vermicompost; and
- increase the leaf and cocoon yield by application of compost and vermicompost.

7.2 EXPERIMENT

7.2.1 Principle

Mulberry is a perennial plant cultivated mainly for its leaf/foliage. In order to achieve this, the soil health and fertility is to be maintained. Organic Manure is one such input, which makes the soil fertile. Mulberry cultivation becomes more economical by recycling all the organic residues of sericultural origin as compost and vermicompost. Earthworms also play an important role in converting the waste into organic rich compost. Use of compost and vermicompost improves the soil fertility and boosts the mulberry leaf production, making sericulture a profitable business.

7.2.2 Requirements

- Sericultural farm residues including silkworm litter.
- Farm implements like Spade, Hoe (kolgudali), Iron pans or Plastic basins and Garden rakes etc.

- Compost pit / Compost or Vermicompost shed or Plastic or Cemented or concrete Tanks or Drums for vermicomposting.
- Earthworms

7.2.3 Procedure

a) Compost Preparation

- Composting can be carried out in ordinary pits or simply on a flat ground making windrows. However, for sericultural wastes, pit system is suitable to avoid spread of silkworm diseases.
- A compost pit of 15' L x 5' W x 3'D should be prepared.
- The pit should be invariably covered with a thatched shed to protect from direct sunlight and rain.
- The organic residue comprising of silkworm litter, bed refuse and weeds should be spread layer by layer in the pit.
- A thin layer of cow dung / biogas spent slurry should be spread after every layer of residue of about 1 foot.
- To improve the quality of the compost, for every tonne of residue, 20 kg rock phosphate, 100–150 g lime and 5 - 6 kg ash can be added.
- After filling the compost pit, it should be closed and plastered with mud mixed with cow dung slurry.
- The plastered pit should be sprinkled with water from time to time to hasten the composting process.
- To enhance the decomposition process, lignocellulose decomposing fungi like *Aspergillus awamori*, *Trichoderma* / *Pleurotus* sp. can also be added along with organic residues.
- For better results, it is suggested to turn the residues upside down at least 2-3 times.
- It is possible to harvest 4 –5 tonnes of compost annually from one such compost pit.



Fig.7.1: A Compost pit filled with seri-farm residue



Fig.7.2: Composting in progress by fungus *Pleurotus*



Fig.7.3: Windrow method of composting

b) Vermi - Compost Preparation

- Vermi-composting is a rapid method of conversion of any organic residue into nutrient rich organic manure by earthworms.
- In this process, the manure will be ready by two and half to three months.
- Organic residue comprising of silkworm litter, bed refuse and farm weeds etc. are treated in a open pit charging with sufficient amount of water mixed with cow dung or biogas spent slurry and left for 10 – 15 days for semi-decomposition. This will serve as feed for earthworms.

- One or two below ground trenches (Fig.7.5) measuring 8’L x 2’ W x 0.5’ D each lined with black polythene sheet are prepared and covered with a thatched shed.
- Each trench is then filled with 400-500 kg of semi-decomposed residue as feed.
- It is possible to carry out vermicomposting in earthen pots, concrete tanks or in plastic drums or basins also.
- Mixed culture of earthworms (*Eudrillus eugineae*, *Eisenia foetida* and *Perionyx excavatus*) in young stage @ 1.5 kg/tonnes of residue is released into the trenches.
- Water is sprinkled once in every 2-3 days to maintain sufficient moisture (30 - 40%) and covered with coconut fronds or green leaves to prevent drying and left undisturbed for at least 2 weeks.
- All care should be taken to prevent predators like rats, termites, ants etc.
- Worms start depositing brown to black coloured vermicasts on the top of the feed in a few days.
- Once the vermicast is detected, watering is stopped for drying and easy collection of vermicasts.
- The vermicasts are collected from each trench by scraping the top layer (6 inches) with the help of a garden rake after every 2-3 weeks.
- In a span of 60 – 70 days, the earthworms will convert all the organic waste into vermicasts and new feed can be loaded to the trench.
- It is possible to harvest 3–4 tonnes of vermicompost annually from two such trenches.



Fig.7.4: Vermicompost shed

Fig.7.5: Vermicompost

Fig 7.6: Earthworms in action ready for harvest in trenches

7.2.4 Observations

Observe different types of farm residues available in a sericultural farm and separate them into different components and note down in the field book.

Observe how to make a compost pit and a shed with locally available materials.

- a) Analyze various chemicals in the farm residues.
- b) Observe carefully composted material with fresh or raw materials.
- c) Observe a vermicomposting unit and its structure carefully.
- d) Distinguish adult and young earthworms of different types including their cocoons.

- e) Study the structure of earthworms through naked eyes and under a magnifying glass and note down the details in a field book.
- f) Measure the size of the earthworms and take weight.
- g) Examine the colour, odour and other details of vermicasts.
- h) Study the effect of vermicompost on mulberry plants or any potted plants.

7.2.5 Results

This experiment will allow you to know how to utilize any organic farm residue for the preparation of nutrient rich organic manure (compost and vermicompost) as food for mulberry plants. This will allow to increase the soil fertility due to release of plant nutrients to the soil from applied compost and vermicompost. It will also make a farmer self sufficient to produce organic manure by utilizing available farm resource and make sericulture a more remunerative practice.

7.3 PRECAUTIONS

Composting

- While composting, the sericultural farm residues should be covered with soil to avoid the spread of disease due to houseflies.
- During composting, the farm residues should not be allowed to dry due to lack of watering. Hence, watering in every 2-3 days is a must for quick result.

Vermicomposting:

- Earthworms should not be released in the hot fermenting organic wastes.
- The feed should be free from insecticide and/ or pesticide residue.
- The moisture content of the feed should be maintained at 30-40 % level.
- The earthworms should be protected from predators, direct sunlight and rain by covering with a shed.