SCHVPMR GOVERNMENT DEGREE COLLEGE, GANAPAVARAM

INCUBATION CENTER

PROPOSAL FOR VERMICOMPOST UNIT IN THE CAMPUS

12.12.2019

In the Incubation Center meeting held on 21.10.2019 in the department of Zoology, students came up with an idea for starting a vermicompost unit in the college campus. The faculty in the meeting appreciated the students. The objectives of setting up a vermicompost and its uses were discussed at length in the meeting; later, it was decided in the meeting held on 11.12.2019 to submit a detailed proposal to the principal.

Introduction:

Vermicomposting is a method of using worms to transform organic waste into a nutrient-rich fertilizer. The main objective of Vermicomposting is to produce organic manure of exceptional quality for the organically starved soil by using agricultural wastes, garden wastes and animal farms waste are usually dumped into at places resulting in a foul mess. It is a healthy and clean way to eliminate wastes going into our landfills, which improves the environment. Vermicomposting attracted a lot of interest in recent years due to increasing environmental concerns and use of sustainable fertilizers. Vermicomposting is becoming very popular due to a way to treat organic wastes more quickly. It is the Eco-friendly method of converting organic waste into nutrient rich fertilizer.

Composition of Vermicompost Nitrogen-1.5 to 3% Phosphorous-1.05 to 2.20% Potash- 1.10 to1.75% Calcium-0.9-1 to 10% Magnesium-0.4 to 0.5% Sulphur-0.15 to 2.9% Copper-2.2% Iron-135 ppm Manganese-90 to 118 ppm Zinc- 40 to 77 ppm Molybdenum-0.2 ppm Baron-0.3 ppm Organic Carbon-14.8 to 26%. Vermicompost is the product of the composting process by various species of Earthworms. Beside the above composition, Vermicompost also contains biologically active substances such as plant growth regulators and microbes. Vermicomposting can be done on a large scale at a farm and small scales at home. The beneficiaries can understand the recycling process. The exotic earthworm species used are Eisenia foetida (Red Worms) and Eudrilids eugenia (Nightcrawler).

Objectives:

1. To Maintain a Vermicomposting Unit in college in order to maintain an eco-friendly college campus.
2. To utilize waste of campus plants and gardens by using earthworms and vermicomposting.
3. To use chemical free Vermicompost as an organic fertilizer for agriculture.
4. To provide its own Vermicompost to college horticulture and gardens at free of cost.

Benefits

- Improves soil aeration
- Enriches soil with microorganisms (adding enzymes such as phosphatase and cellulase)
- Microbial activity in worm castings is 10 to 20 times higher than in the soil and organic matter that the worm ingests
- Attracts deep-burrowing earthworms already present in the soil
- Improves water holding capacity

Plant growth

- Enhances germination, plant growth, and crop yield
- It helps in root and plant growth
- Enriches soil organisms (adding plant hormones such as auxins and gibberellic acid)

Economic

- Biowaste conversion reduces waste flow to landfills.
- Elimination of bio-wastes from the waste stream reduces contamination of other recyclables collected in a single bin (a common problem in communities practicing single-stream recycling)
- Creates low-skill jobs at the local level
- Low capital investment and relatively simple technologies make Vermicomposting practical for less-developed agricultural regions

Environmental

- Helps to close the "metabolic gap" through recycling waste on-site
- Large systems often use temperature control and mechanized harvesting; however other equipment is relatively simple and does not wear out quickly
- Production reduces greenhouse gas emissions such as methane and nitric oxide (produced in landfills or incinerators when not composted).

Vermicomposting materials

Decomposable organic wastes such as kitchen waste, garden residues, and tree litter are commonly used as composting materials. In general, animal dung mostly cow dung and dried chopped crop residues are the key raw materials. A mixture of leguminous and non-leguminous crop residues enriches the quality of vermicompost. There are different species of earthworms viz. Eisenia foetida (Red earthworm), Eudrilids eugenia (nightcrawler), Perionyx excavatus etc. Red earthworm is preferred because of their high multiplication rate and thereby converts the organic matter into vermicompost within 45-50 days. Since it is a surface feeder it converts organic materials into vermicompost from the top.

Pit Method

The four square (Chamber) pit composting is an ideal system of preparing organic manure i.e., compost which replaces chemical fertilizers & enhances the crop yield with the activity of earthworm.

Materials: Cow dung, biomass, waste of plants & animals, earthworms, brick, cement, sand, green grass or leaves, water.

Size: 10'×10'×1.5

Construction:

Under the shade of a tree four square pit (Chamber) was constructed by laying a lattice of wall of bricks. It divided the area of the pit from the base into four roughly equal parts or sections with a brick wall. Made a ventilation hole in the dividing walls to ensure adequate supply of air during composting. Out of which two chambers (Pits) were filled with the mixture of biomass & cow dung with water to maintain a moisture between 60-75% & two chambers remained vacant, after 10 days earthworms were introduced in the pit. This material was turned after 15 days & thereafter at an interval of 30 days. After each turning water is sprinkled to maintain sufficient moisture. Compost (dark soil like granular substance) becomes ready within 3-4 months. After 45 days earthworms move from one chamber to another (second) chamber. Thus one chamber provides about 5-6 quintals of compost.

Financial Benefits

It is assumed that there will be around 2-3 cycles of production in the first year and 5 – 6 cycles in the subsequent years with a duration of each cycle at around 65-70 days. Further, taking into account various limitations and operational problems, the capacity utilization is further assumed at 50% in the 1st year and 90% from 2nd year onwards. Benefits include the income from sale of vermicompost @ `4500 per MT and worm @ `200/- per kg. The net income from the 2nd year onwards would be about Rs.6,48,000 annually. 6.2 Project Cost Vermicomposting could be taken up on any scale starting from 10 MT per annum (TPA) to 1000 TPA and above. As the production is proportional to the vermi-bed space, it is advantageous to start with less capacities and later expand the unit 5 after gaining production experience and developing assured markets for the product. A bed volume of 324 m 3 spread over 24 beds - 15 m long, 1.5 m wide and 0.6 m high is estimated to produce vermicompost of 200 TPA over 6 cycles/crops of 65- 70 days each annually. Total of 24 such beds may be housed under 2 to 4 different open sheds

Therefore, as the Coordinator of the Incubation Center, SCHVPMR Govt. Degree College, I hereby submit this proposal for setting up a vermicompost unit in the college campus. You are requested to grant permission and encourage the students in their endeavour.

V. Sandhya

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22/12/18
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