

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

MOOC course on Organic Farming

Project II (Organic Manure Making)

Guidelines

Objective:

Per capita waste generation in India is estimated to be around 500 gram per day. A nuclear family of 4-5 members generates 2 to 2.5 kg of wastes per household. Organic wastes generated at household levels can be processed at the source itself. Decentralized waste processing is more practical and cost effective than a centralized one. It is the responsibility of each individual to process the waste generated by him/her. The present project is therefore aimed at training the Under Graduate students of Mahatma Gandhi University to familiarize with the different biotechnological means to process the household and kitchen wastes to valuable manure at household level.

Organizational chart

The students have to take up the processing of the kitchen and garden wastes generated by them at the family level, for which a processing unit has to be installed at each homestead of the respective student. The students of a particular programme in a college will be guided by a mentor who shall be a faculty member of that college. The project execution will be the responsibility of the students under the active guidance of the respective mentor. The mentors from the different programmes within a college shall be coordinated by a Coordinator, who shall be a senior level faculty member of that college. The co-ordinators and mentors from the affiliated colleges will be guided and trained by the designated faculty members at the university level.

Beneficiaries

Under Graduate students of all affiliated colleges of Mahatma Gandhi University and their family members are the beneficiaries.

Location

The location of the project shall be at the residence of the student concerned. Those students residing in hostels can implement the project at the respective college campus. Approximately one square meter area has to be set aside near the kitchen or in the backyard to install the processing unit.

Project theme

Composting is a biological process in which microorganisms of aerobic (which require air or oxygen for development) and anaerobic (which functions in absence of air or free oxygen) decompose organic matter.

Conversion of organic wastes generated at household level to useful materials like manure is the theme of the project. Kitchen wastes and garden wastes, generated on a daily basis are to be processed and converted to compost by using appropriate methods. Depending upon convenience and accessibility, the students may opt for processing of either kitchen waste or garden waste. For students who operate from their house, processing of kitchen waste may be more practical. For the others, especially those residing in hostels, processing of garden waste and leaf litter may be preferred.

Methodology

The composting process adopted for kitchen wastes and garden wastes are different. Students have the option to choose the composting of either kitchen waste or the garden waste.

A. Composting Kitchen waste

Materials required

1. Kitchen waste including vegetable waste, fish waste, food waste etc. Waste shall be devoid of plastics, oily materials, bottles and liquefied food wastes.

2. Bio Bins to hold the kitchen waste. Bio bins can be earthen made similar to garden pots, polypropylene pots or PVC pipes of 200 mm diameter. Micro pores on the bin walls ensure aeration that facilitates microbial activity. Large garden pots of one cubic feet can be an alternative, which may be less expensive. The holes of such pots in the base may be closed using

cement mortar. Different types of bio bins are distributed by the Panchayats, Municipalities and Municipal Corporations, suitable for processing kitchen waste.

3. Composting inoculums: Composting inoculums are consortia of microflora that can easily decompose vegetable and food wastes. They include bacterial and fungal strains. Talc based and coir pith based inoculums are available. The compost once produced can also be used as inoculum. The waste decomposer developed by the *National Centre of Organic Farming (NCOF)* is an effective and less expensive source of composting inoculum.

These are available from various sources. The inoculum developed by the Kerala Agricultural University is available from College of Agriculture, Vellayani, College of Horticulture, Vellanikkara, Research stations and Krishi Vignana Kendrams (KVK) under the Kerala Agricultural University. Private institutions like Agrobiotech also facilitate composting inoculums.

Composting process

A. Kitchen waste composting

1. Garden pot composting: Large garden pots (Cement/Terracota) are the simplest and cheapest containers for kitchen waste composting. The base holes of the pot are closed. At the bottom of the pot a layer of coir pith is spread at 1" thickness. Above this layer, spread the kitchen waste of the day. Over this layer, add the composting inoculum @ 5 g per kg of bio waste. The bin may be covered with a tile or wooden plank. This process of filling and addition of inoculum may be continued daily. The moisture within the bin has to be regulated by spreading coir pith or dry leaves. It may take 25 to 30 days to fill one pot. Stirring the contents of the pot for a while, accelerates the decomposition process. After 30 to 35 days of the last filling, the compost is taken out. The brown colored compost in powder form is quality manure that can be used for nourishing crops including vegetables.

A second pot may be prepared and filled as above subsequently. Care should be taken to fill the waste on the same day of its generation as the delay may cause egg laying by flies and contamination by its larvae.



2. Bio bin Composting

This three layered bin biocomposter can be used for composting waste in terrace gardens and household in urban areas where space there may be space constraints. Either Terracotta or Polypropylene bins with micro pores and top covered with holed lid can be used. This is Ideal for a family of 3 to 4 generating up to 1kg /day of organic waste and to convert kitchen & organic waste to compost in 4-6 weeks. Coir pith and microbial inoculum can be used for composting.



3. Pipe Composting

This method, using polyvinyl chloride (PVC) pipes placed over ground within households can store degradable kitchen waste for a period of time to break down the waste into manure. In a straight line, drill holes along the pipe at a distance of about 7-8 cm between each to ensure air

ventilation. Drill about 4-5 holes on the end cap too. Add brown matter such as crushed dry leaves, wood chippings, coco peat etc., at the bottom and put kitchen waste above this. When we begin the composting process we pore in little bit of jaggery and cow dung along with two litres of water and start filling the pipe with wet waste. Two or more PVC pipes (about 4inch diameter & 5-6 feet height) can be temporarily erected with two feet in the ground or on a plant pot. Once the available volume in a pipe is filled and concealed thoroughly, waste stored in pipe would become manure in about 30-35 days which can be used as nutrients in garden.



B. Composting Garden waste

The National Centre for Organic Farming developed an inoculum that is capable of quick decomposition of organic wastes. It is a consortium of microorganisms extracted from cow dung and is available as 'waste decomposer' in 30 gm. packets. It is available from National Centre for Organic Centre, Ghaziabad. It is also available online from <https://krushikendra.com> and <https://www.amazon.in>

Preparation of composting inoculum

A solution of waste decomposing inoculum can be prepared by mixing 2 kg jaggery in 200 liters of water to which the content of a bottle of the waste decomposer is added. Mix it properly with a stick. Cover the drum with a cardboard and repeat the stirring every day once or twice. After five days, the solution turns creamy and ready for use.

Composting tonic available from the Kerala Agricultural University outlets can also be used as inoculums. Cow Dung slurry prepared from cow dung can substitute the composting inoculum.

Composting process

Garden wastes collected may be spread at 20 cm thickness on a plastic sheet placed under shade. Wet the waste with a solution of the waste decomposing inoculum. Another 20 cm layer of waste may be spread over it and wet with the inoculum solution again. The process is repeated till the pile goes up by 50 cm. Turn over the pile at one week intervals and add composting inoculum at each stirring. Maintain the moisture content of the pile at around 60 percent. The compost will be ready for use in about two months.

Training programmes

The co-ordinators will be imparted training on the project work at the university level. The Co-ordinators have to train the mentors and they in turn will train the students under their control.

Observations and data collection

The students have to closely monitor the compost making process. They have to make a record of the process of initial preparation to final compost extraction. The materials required are to be procured and their photos are to be taken. The source of procurement of the inputs, especially the inoculum, should be genuine and to be recorded. The quantity and kind of waste materials filled are to be recorded on a daily basis. The quantity of compost produced after the specified period is to be quantified. The quality of the produce may be assessed by applying it to vegetable or garden plants. A record of all the events during the project period is to be maintained and submitted to the mentor for evaluation.

College level assessment

There are two components for student assessment. One is project report which carries 80 marks. The Other is a viva voce examination which carries 20 marks. Mentors have to conduct Viva voce of the students, under their control. The total mark for this project is 100.