What is Vermicomposting?

It is an art and technology of rearing earthworms to convert organic wastes into rich and useful manure with numerous advantages. It can be easily done as a household / colony activity or can be pursued as a small scale enterprise to bring handsome returns to the owner by disposing off and utilizing waste in a eco friendly manner.

Species:

Earthworms are broadlydivided into three classes namely surface feeders (Epigeic), deep burrowers (Endogeic) and the intermediate species(Anaciec). In vermiculture, mostly surface feeders are widely used. Some of the efficient species used in vermiculture are: *Eisenia foetida, Perionyx excavates and Eudrillus euginae*.



Krishi Vigyan Kendra recommends *Eudrillus euginae* due to it's better adaptability, high conversion rate, high fecundity and superiority in comparison to other species followed by *Eisenia foetida* under the agro-climatic condition of Goa.

Requirements:

To start vermiculture, one should get culture from reliable source. Vermiculture can be done in any container with drainage hole. The ideal feed consists of 80 % bio degradable agro waste/biomass and at least 15-20% fermented cowdung for rapid conversion of the waste.

Precautions:

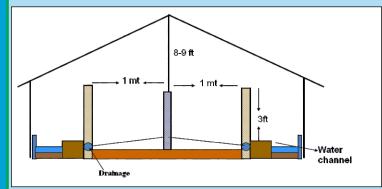
Care however should be taken to protect the earthworms from it's enemies like ants, lizards, cockroaches, termites, rats etc. by providing barrier of water channel around the unit. Other pre requisites like shade, moisture and continuous feed stock with 15-20% fermented cow dung for rapid bio conversion should be ensured.

Procedure:

Start filling the container or tank installed in a shady place with

- » Basal layer of gravel followed by sand and soil each of 2-3 cm and profuse watering
- » Thick layer of slowly degrading material like coconut husk and cow dung slurry and well rotted cow dung.
- » Introduce the earthworm culture @ 0.5-1 kg for every running meter of the tank. For small containers, 150-200gm culture is sufficient.
- » It is advisable to pre-digest the waste by keeping it in sun and watering intermittently. Never feed fresh waste as it may generate heat and cause earthworm mortality.
- » Gradually fill the container or the tank by layers and ideally keep a ratio of 4:1 (Plant: animal waste) which will ensure quality compost.

For outdoor units, a twin tank of convenient length and 2.5 to 3 ft height and 0.9mt width is ideal for harvesting the compost. It is advisable to plaster the ground and provide water channel all around the unit to ward off chances of infestation with ants and other nocturnal enemies. A shade is provided to the entire unit to protect it from sunlight. Normally, height of 8 ft at the centre is suggested.







Population Dynamics:

Earthworms are hermaphrodites and prolific breeders. After mating, each worm lays a capsule containing on an average three juveniles. The cocoons hatch in 13-17 days and turns into adult in 4-6 weeks time. Each earthworm on an average may give rise to 250-300 young ones/year depending on the temperature and other local factors



Earthworm Cocoons

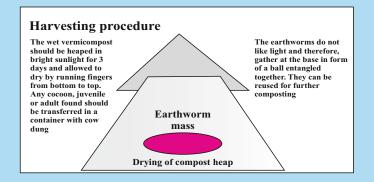
Stages in Vermicomposting:

The stages in vermicomposting are predigetion, feeding, harvesting, vermicomposting, sieving and bagging. The earthworms voraciously feed on the bio degradable waste material and convert it into black mass within a period of 35-45 days under idea conditions. Formation of granular vermicast on the surface of the filled tank is an indication of full conversion of waste into value added vermicompost.

For a ideal unit the conversion rate of 65% is achived during this period. (i.e 100kg of waste turns into 60-65 kg of quality vermicompost.

Harvesting:

It is necessary to separate the earthworms/juveniles and cocoons from the compost and this is achieved during harvesting stage. The wet vermicompost should be heaped for 3-5 days and allowed to dry by running fingers from bottom to top. Any cocoon, juvenile or adult found should be transferred in a container with cow dung. The earthworms do not like light and therefore gather at the base in form of a ball entangled together. They can be reused for further composting



Composition:

The quality of vermicompost depend on the raw material used for feeding. The nutrients present in the vermicompost are easily soluble in water and easily available to the plants. It is a rich source of not only nitrogen, phosphorous and potash but also a store house of many micronutrients, vitamins, antibiotics, enzymes like Protease, Amylase, Lipase, Cellulose, Chitinase, which help in disintegrating organic matter, it also contains Calcium humate, which stabilizes the soil and check erosion Growth promoting hormones like cytokines and auxins and other useful micro flora, which is so vital for healthy plant growth. It also contains Vitamins of B group or pro-vitamins D or free Amino acids besides antibiotic and anti-bacterial substances.

What does vermicompost do?

- * Helps to aerate the soil.
- ★ Improves water holding capacity of soil.
- ★ Higher cation exchange capacity helps in nutrients uptake
- Release antibiotic and anti-bactarial substances which gives disease and pest resistance to the crop.
- ★ Improves intake rate of water by 50 % and water holding capacity of soil by 17 %
- * Supplies micro-nutrients in available form.

How to use Vermicompost?

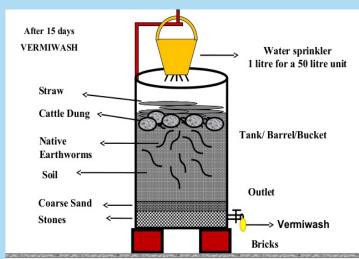
Household plants 250-300 gm/pot Horticultural crops/ orchard 5- 10 kg/plant Field crops like vegetables/ flowers... 2-3 t/ha

How to know genuineness?

To test the spurious product, dissolve some vermicopost in a glass beaker containing water and stir it. Leave it undisturbed for 5- 10 minutes. Two distinct layers of water and vermicast can be seen without turbidity. In case of spurious material water becomes turbid.

Vermiwash preparation:

Vermiwash unit can be prepared in any container or drum for which an outlet is provided at the bottom with a tap. The layers in the unit are same as that of vermicomposting unit. The unit is moistened every day keeping the tap open for 20-25 min. The unit is ready on 16th day. The tap is closed and on top of the unit a 5 lit vessel water with perforations is allowed to gradually sprinkle water. The tap is opened next day to collect Vermiwash.



Day 16, suspend a drip bucket on top and add water (1 litre for 50 litres of container size), & close outlet. Open outlet next morning and collect vermiwash. Continue every day. Add feed when required.

Vermiwash is a potent plant nutrient as well as bio pesticide with many beneficial enzymes, hormones, bacteria, calcium humate and other microflora which can be used as soil drench and spray after diluting it in the ratio 1:50 for big plants and 1:100 for small plants. Plant growth promoters like cytokinins and auxins, vitamins of B group or pro-vitamin D or free amino acids, antibiotic and anti-bacterial substances.

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Vermicomposting

Creating Wealth from waste





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