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Vermicompost Preparation

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Vermicompost is the product of decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials and vermicast. This process is called vermicomposting, while the rearing of worms for this purpose is called vermiculture. It is used in farming and small scale sustainable, organic farming. It is one of the easiest methods to recycle agricultural wastes and to produce quality compost. Earthworms consume biomass and excrete it in digested form called worm casts. Worm casts are popularly called as Black gold. The casts are rich in nutrients, growth promoting substances, beneficial soil micro flora and having properties of inhibiting pathogenic microbes. Vermicompost is stable, fine granular organic manure, which enriches soil quality by improving its physicochemical and biological properties. It is highly useful in raising seedlings and for crop production. Vermicompost is becoming popular as a major component of organic farming system.

Materials for Preparation of Vermicompost

Any types of bio-degradable wastes-Crop residue, Weed biomass, Vegetable waste, Leaf litter, Hotel refuse, Waste from agro-industries, Bio-degradable portion of urban and rural wastes. In general, animal dung mostly desi cow dung and dried chopped crop residues are the key raw materials. Mixture of leguminous and non-leguminous crop residues enriches the quality of vermicompost. There are different species of earthworms viz. *Eisenia foetida* (Red earthworm), *Eudrilus eugeniae* (night crawler), *Perionyx excavatus* etc. Red earthworm is preferred because of its 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 top.

Important characteristics of red earthworm (*Eisenia foetida*)

Characters	***Eisenia foetida***
Body length	3-10cm
Body weight	0.4-0.6g
Maturity	50-55days
Conversion rate	2.0 q/1500worms/2 months
Cocoon production	1 in every 3 days
Incubation of cocoon	20-23days

Methods of vermicomposting

Various methods of vermicompost production.

(1) Bed method:- Composting is done on the kachcha pucca / floor by making bed (6x2x2 feet size) of organic mixture. This method is easy to maintain and to practice.

(2) **Pit method:-** Composting is done in the cemented pits of size 5x5x3 feet. The unit is covered with thatch grass or any other locally available materials. This method is not preferred due to poor aeration, water logging at bottom, and more cost of production.

Process of vermicomposting

- To prepare compost, either a plastic or a concrete tank can be used. The size of the tank depends upon the availability of raw materials.
- Cow dung and chopped dried leafy materials are mixed in the proportion of 3: 1 and are kept for partial decomposition for 15 – 20 days.
- A layer of 15-20cm of chopped dried leaves/grasses should be kept as bedding material at the bottom of the bed.
- Now prepare fine bedding by adding partially decomposed cow dung, dried leaves and other bio-degradable wastes collected from fields and kitchen. Distribute them evenly on the sand layer.
- Red earthworm (1500-2000) should be released on the upper layer of bed.
- Sprinkle water regular basis to maintain the moisture content of the compost.
- Beds should be kept moist by sprinkling of water (daily) and by covering with gunny bags/polythene to prevent the entry of ants, lizards, mouse, snakes etc. and protect the compost from rainwater and direct sunshine.
- Bed should be turned after 30 days for maintaining aeration and for proper decomposition.
- Compost gets ready in 45-50 days.

Harvesting

Harvesting of vermicompost typically done when the raw material is fully decomposed and the compost appears black and granular. Watering is stopped as the compost matures and the worms are encouraged to migrate to fresh material. The compost is then separated, often by sieving, and stored.

Nutrient content of vermicompost

A fine worm cast is rich in N,P,K besides other nutrients. Nutrients in vermicompost are readily available form and are released within a month of application.

Parameters	**Content**
OM%	20.46
C/N ratio	11.64
Total Nitrogen (%)	1.02
Available N (%)	0.50
Available P (%)	0.30
Available K (%)	0.24
Ca (%)	0.17
Mg (%)	0.06

Preventive measures

- The floor should be compact to prevent earthworm's migration into the soil.
- 15-20 days old cow dung should be used to avoid excess heat and CH_4.
- The organic wastes should be free from plastics, chemicals, pesticides and metals etc.
- Aeration should be maintained for proper growth and multiplication of earthworms.
- Optimum moisture level (30-40 %) should be maintained.
- 18-25^{o}C temperature should be maintained for proper decomposition.

Advantages

- Improved Soil Structure, aeration and water retention.
- Nutrient-rich and readily available.
- Beneficial microbial activity and disease suppression.
- Boosts plant growth and crop yield.
- Faster decomposition and efficient use of space.
- It provides efficient conversion of organic wastes/crop/animal residues.
- It helps in reducing the toxicity of heavy metals.

Doses

Crops	**Dose/rate**
Field crops	5-6t/ha
Fruit crops	3-5kg/plant
Pots	100-200g/pot