VERMICOMPOSTING OF COCONUT LEAVES

Enriched granular castings - a boon to coconut growers



Institution Village Linkage Project
(National Agricultural Technology Project)

Central Plantation Crops Research Institute
(Indian Council of Agricultural Research)
Kasaragod - 671 124, Kerala, India

INTRODUCTION

Coconut plantations have considerable potential to benefit from organic farming and sustain coconut yields with minimum external inputs. It is estimated that on an average, six to eight tonnes of dry coconut leaves are available from one hectare of well-managed coconut garden. A considerable part of the nutrient requirement of coconut palm can be met by converting these leaves into compost and recycling the same in the garden. As coconut leaves are hard, containing high amount of lignin and polyphenols, natural degradation under field conditions takes place at a slow pace. But earthworms, which survive only on organic matter, known as compost worms or manure worms can enhance the decomposition process of such organic materials and mediate humus formation. CPCRI has identified, based on the research work, a local strain of earthworm related to African Night Crawler (*Eudrilus* sp.), which is quite efficient in converting coconut leaves into granular vermicompost. About 4000 kg of such granular vermicompost can be produced from the leaves obtained from one hectare of a well managed coconut garden.

Recycling of organic wastes from gardens by converting them into stabilized decomposed products knows as compost or organic manure is the basis for sustainable crop production systems. Compost not only supplies plant nutrients, but also improves the soil physico-chemical properties and support the activities of beneficial microorganisms and soil fauna.



Vermicompost produced on large scale

BENEFITS OF VERMICOMPOST

In general, the vermicompost from coconut leaves contain 1.2-1.8 per cent nitrogen, 0.1-0.2 per cent phosphorus and 0.1-0.4 per cent potassium. It has several advantages which are as follows:

The organic material ingested by the earthworms after undergoing physical, chemical and microbiological transformations in earthworm gut is egested in the form of digested and biochemically and microbiologically enriched granular casting known as vermicompost.

- It contains plant nutrients in easily available form.
- The organic matter in vermicompost being extremely fine, becomes a part of soil very easily and supports the activity of the soil microorganisms.
- As vermicompost is a highly stabilized product, it is not bulky unlike other organic manures and hence its storage, transportation and field application become easy.
- Vermicompost contains plant growth promoting substances such as hormones and vitamins.
- It also contains higher number of beneficial microorganisms, which help in improving soil fertility.
- Because of its granular nature, the vermicompost improves soil aeration, water holding capacity of the soil and root growth of the plants.



Granular vermicastings

MULTIPLICATION OF EARTHWORMS

For multiplication of earthworms, prepare culture medium with 1:1 mixture of cow dung and decaying leaves in a cement tub, wooden box or plastic bucket with proper drainage facilities. Introduce nucleus culture of earthworms obtained from research station at the rate of 50 numbers per 10 kg of the above mixture. Provide adequate shade to the unit. Maintain sufficient moisture level by occasional sprinkling of water. Earth-worms introduced in the culture medium multiply over 300 times within 1-2 months by daily production of cocoons with 2-3 juvenile worms per cocoon. These earthworms can be used for large scale production of vermicompost.



Earthworm multiplication in cement tubs



Earthworms (*Eudrilus* sp)

Around 1000 number of earthworms are required for one tonne of organic wastes to be converted to vermicompost.

Use cocoons from fresh vermicompost as nucleus culture instead of live worms and multiply earthworms as per the procedure mentioned above. Transportation of these cocoons to long distance is also easy.



Cocoons of *Eudrilus* sp

VERMICOMPOST PRODUCTION

Select suitable site. Choose any one of the vermicomposting methods- basin, pit, tank or heap. Collect weathered coconut leaves of 2-3 months old and use them as such or chop them in to pieces. Heap the leaves facing lower side upwards in layers or put the chopped leaves uniformly spreading in basin/ pit/tank. Add fresh cow dung @ 100 kg per tonne of leaves in the form of slurry in layers. After three weeks, introduce earthworms @ 1000 numbers per tonne of coconut leaves. Mulch with locally available organic wastes like dry grass, straw, banana leaves etc. Provide shade to the worms as they are susceptible to direct sun light. Maintain adequate moisture (40-50%) by sprinkling water whenever necessary. Protect worms from predator birds, rats and ants by suitable methods like wire mesh, chemicals etc.

Vermicomposting can be done in pits, thatched sheds or cement tanks of any convenient length and breadth, but the depth should be less than one meter, with sufficient drainage facilities. Coconut gardens may also be utilized for vermicomposting and it was found successful in coconut basins, excavated pits and heaps of coconut leaves in interspaces of palms.



Vermicompost production on large scale in cement tanks

Do not use more quantity of cow dung because earthworms will prefer to feed on cow dung, leaving coconut leaves undecomposed. Use of fresh vermicompost and green manures @ 10% each can enhance decomposition rate and nutrient content of vermicompost.

After 60-75 days, 70 % of the material will be decomposed, then stop watering. From this, after two weeks, collect the worms and use them for further vermicomposting. Collect the enriched vermicastings by sieving the entire decomposed material. Dry this compost under shade, and store in proper place.



Partly vermicomposted coconut leaf



Vermicomposting of coconut petiole

A PROFITABLE ENTERPRISE

Now-a-days vermicomposting is gaining importance in organic farming. Hence, there is demand for vermicompost and earthworms. There is great potential for vermicomposting to serve as a profitable enterprise for farmers and unemployed youth on a commercial scale.

Nucleus culture of earthworms and vermicompost are available for sale at CPCRI, Kasaragod.

Production cost of vermicompost is less than Rs.2 per kg as compared to market price of Rs.7, on an average, when it is on a large scale production from coconut leaves.



Vermicompost produced from coconut leaves

Published by : V.Rajagopal, Director, CPCRI, Kasaragod-671 124, Kerala
Text prepared by : S.R.Prabhu, George V.Thomas and Murali Gopal
Designed by : B.T.Rayudu and Amaranath; Photography : K.Shyama Prasad
Extension publication No : 107 (January, 2003)