With realization of harmful effects of heavy application of chemical fertilizers and harmful pesticides in the commercial agriculture in the modern era, there is an increasing inclination of the farmers to prefer organically grown crops.

The government is also supporting the organic agriculture through different schemes and facilitating for its marketing. Various governmental and non-governmental organisations conduct training programmes to impart vermicomposting skill among the farmers. With increasing awareness among consumers, the genuine organic produce gets higher price than the conventional non-organic produce. Farmers may dedicate a portion of their farm for cultivation through organic means by usage of vermicompost. There would be challenges for sustaining the production levels in organic crop production during initial years. However in due course of time, the organic content of the soil would be restored to support profitable agricultural production. Vermicomposting is a highly efficient method to convert waste organic matter into compost amenable for assimilation by plants. In coming days, the vermicomposting process needs to be integrated with all farmlands irrespective of their sizes, besides promoting animal husbandry as a source of farm yard manure.

(* These authors belong to ICAR-IIHR-CHES, Bhubaneswar)

Vermicomposting for Quality Farm Produce

Farmer FIRST
Enriching Knowledge - Integrating Technology

NRRI Farmer FIRST Programme (EAP-228)
Technical Bulletin No-12, March-2018

Phone: +91-671-2367757; PABX: +91-671-2367768-783; Fax: +91-671-2367663;
Email: director.nrri@icar.gov.in | directorcrricuttack@gmail.com

Photograph: B. Behera and P. Kar
Typesetting: ICAR-National Rice Research Institute, Cuttack - 753006, Odisha
Published by: The Director, ICAR-National Rice Research Institute, Cuttack - 753006, Odisha
Printed at: Printtech Offset (P) Ltd., Bhubaneswar

VERMICOMPOSTING
for Quality Farm Produce

P. Srinivas*, Lipi Das, G. C. Acharya*, S.K. Mishra, Meenu Kumari*,
R.K. Behera and S. Lenka

Doubling and sustaining farm income would not be possible if we continue to indiscriminately exploit our natural resources. Continuous and indiscriminate use of chemical fertilizers and pesticides in such intensive crop production has created serious environmental hazards globally. Commercial cultivation concentrated on mainly on application of nitrogen, phosphorus and potash to the cultivated farmlands, but conveniently ignored other 13-14 major and micronutrients required for healthy plant growth. The basic rule of natural nutrient cycle is to ensure the complete soil nutrition in proportion to the volume of harvests. The cultivation land would require quicker bio-degradation and disintegration of the biomass for its quicker incorporation in nutrient cycle. It is possible only through composting processes.

Composting based on microbial bio-disintegration of the complex organic material takes long time. In this method, dry and fresh organic material is placed in a pit for 4-5 months. With intermediate turning and moistening the compost is ready for harvest in about 4-5 months. However it has some disadvantages like caking, some foul smell, non-uniform texture and lower nutrient content. Vermicomposting which is a quicker method of composting solves all these problems. It is not only cost effective method to quickly convert organic waste into useful nutritious manure. The vermicomposting method is a user friendly method that can easily be adopted by the farmers and farm women.

VERMICOMPOSTING

Earthworms have been regarded as friends of farmer. Mere presence of a healthy population of earthworms in a soil describes its fertility and excellent health. The earthworms are also hailed for its capacity to turn the soil through its movement in the soil and making it more porous reducing soil compaction. Hence, they aid to maintain and improve soil aeration, drainage, temperature and moisture. Improvement in water retention capacity of soil and improvement in soil texture and fertility due to earthworm activity help in faster reclamation of waste lands through promotion of better root growth and nutrient absorption. The quality of the farm produce grown through application of compost or vermicompost is known to be far better than that grown through use of chemical fertilizers. The fruits are more lustrous, tasty, with better flavour and longer shelf life. The incidence of pests and diseases is also reduce over a period of time. Though different types of earthworms are used for vermicomposting as per their availability, the best worms are red wigglers or *Eisenia foetida*. These worms eat about half of their body weight as food in a day. The soils once populated with earthworms, they multiply every year in the soil which reduces the recurring cost of cultivation.

Vermicomposting involves breaking down of complex organic materials into nutritious compost by earthworm by its ingestion and digestion. In this process worms help in transforming complex organic waste materials into high quality fertilizer with ample amounts of nutrients which in turn can easily be assimilated by the plants. Vermicomposting is being used worldwide as an easy and effective way to quickly recycle agricultural waste, city solid organic waste and kitchen waste. The ability of vermicomposting to eliminate offensive odour and non-sticky flowing property of the vermicompost are added advantages over conventional composting. The process is very simple and can be easily executed even by small and marginal farmers in their backyards. It is helpful in sustainable agriculture production without any pollution hazards to soil, water and environment. It is also useful for kitchen gardens and urban horticulture.

PREPARATION

- A thatched roof shed preferably open from all sides is required for making vermi beds.
- The sheds should be erected in East-West direction length wise to protect the site from direct sunlight.
- The base of the site is raised at least 6 inches above the ground to protect it from flooding during the rains.
- The length of shed can be increased/decreased depending upon the quantity of waste to be treated and the availability of space.
- An area of 12 ft x12 ft would be enough for three 10 ft x 3 ft vermibeds with 1ft space in between the beds.
- The height of roof can be kept at 7-8 feet from the centre and 5-6 feet from the sides.
- A water channel should be made around the shed to deter ants from entering the beds.
- For preparing bed 4-6 inch layers of biodegradable agricultural residue such as dried water soaked leaves/straw/ trash etc. is laid over alternated with 1 inch layer of farm yard manure. Around one kg earthworm is released in each bed.
- The bed can finally be covered with a jute bag or mat to protect earthworms from birds and insects.
- Water needs to be sprinkled daily on the vermi beds according to the requirement and season to keep them moist.
- The appearance of black granular crumbly vermicompost on top of the vermi beds indicates maturity of the compost.
- The mature vermicompost is light in weight and does not emit any foul smell. The pH of the mature vermicompost remains in neutral range.
- Watering is stopped for at least 5 days before final harvest from the top layers. Generally harvesting can be done after 2.5 to 3 months.
- The harvested vermicompost has to be sieved, shade dried for a couple of hours, packed and stored in shade.

With increase in awareness of the organic farming in rural and urban areas, the demand for quality vermicompost is increasing. There is also a demand for vermiwash for agricultural application as fertilizer. Vermiculture can also be adopted to produce earthworms which are in demand as protein source for poultry, fishery, pigs, pets etc. Earthworm body contains approximately 70% crude protein which is higher than fish meal (65%), meat and bone meal (50%), and soybean meal (45%). Hence production of Vermicompost can be developed as an enterprise for the source of supplementary income.

PRECAUTIONS

- Care should be taken to avoid any non-biodegradable components in the compost mixture like plastic, iron or glass pieces.
- The vermi beds should be protected under the roof. The temperature of the bed should not exceed 35°C.
- Chemical fertilisers should not be added in Vermicompost beds. The vermi beds should be protected from insecticide sprays.
- The worms should be protected from ants, frogs, rats and birds.
- Moisture level of the beds should be monitored regularly and water should be sprayed on the beds as and when required.
- Vermicompost pit should be protected from direct sun light, rains and water stagnation.