

Turninning garbage in to gold : For ecofriendly environment by vermiculture technology

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Industrialization, urbanization and population of our nation is increasing at an alarming rate. Technological development has increased in human impact on the ecosystem but a new technology, aimed at solving the pollution problem being made to develop it. In the field of environmental technology, new method of purification and recirculation of pollutants are being made to change existing technology to reduced pollution, utilize waste material for beneficial purposes and fulfill the need of increasing population.

In one hand, we concern about protecting human health and preventing the quality of the environment made. Every day tones of solid waste is generated in India, most of which entered into the river, streams and roadside, they further contaminate the environment. So effective waste management is the need of today.

Recycling is the best way of the disposal of organic waste. Raddy and Rao (1998) estimated that about 377 million tons of crop residues are available in the country. Sidhu (1998) surveyed among the farmers of the Punjab and estimated that out of 28.8 million tons of wheat and paddy straw produced annually, about 17.0 million ton wheat and paddy straw were burned by the farmers, sugarcane trash is either burnt in the field or used as fuel as it is hard to decompose. Chinnamani (1992) reported that burning of agricultural waste and dung cake produced higher quantities of CO (20-114gm/kg) and total suspended particles (2.1-11.4gm/kg) as smoke in comparison to burning of fuel wood (13-68gmCO/kg and 1.1 to 3.8gm TSP/kg), creating greater environmental pollution.

The practice of burning also causes a great loss of organic carbon and some nutrient like N, S etc., result in the loss of the soil fertility. Nutrient worth Rs. 233crore are destroyed in Punjab every year due to burning of rice

(Anonymous, 1999).

Dumping of organic wastes pose serious environmental problem as it stinks, helps in the multiplication of harmful microorganism, flies and mosquitoes. These microorganisms pollute the environment and spread diseases like tuberculosis, cholera, malaria etc. so composting on the other hand is a safe nonpolluting and microbiological method for disposal and recycle of biodegradable waste by converting them in to compost, a balance organic fertilizer(Gaur, 1987). A large amount of the nutrient removed by the crops can be safely returned to the soil by vermicomposting.

Classification of the waste :

- Domestic waste (nontoxic waste)
- Industrial waste (toxic / hazardous waste)
- Hospital waste (pathogenic waste)
- Agriculture waste (nontoxic waste)
- Animal waste (nontoxic waste or toxic waste)

On the other hand to fulfill the need of growing population, it essential to increase agriculture production with the same rate. In modern agriculture, chemicals (pesticides, fertilizers) are being used for increasing production.

Chemical based agriculture is not sustainable because of the following reasons:

- Uses of chemicals leads to degradation of soil.
- Surface and ground water pollution.
- Chemicals (pesticides and fertilizers) are costly.
- Chemically treated soil will create water and environmental pollution.

Vermiculture, vermicomposting, vermiculture and vermiculture are fast becoming familiar terms in the farming as well as organic

waste recycling for both industrial and domestic use.

Vermiculture :

Vermiculture means scientific method of raising and breeding of earthworms in controlled condition for different uses. It aims at creating improved conditions artificially so that earthworms multiply in shortest time and space. Earthworms are known to ingest huge quantities of organic matter and void it in the form of vermicast which has superior chemical, physical and biological quality in comparison to the organic debris ingested.

Precaution during culture maintaining:

- Light
- Humidity
- Temperature
- pH

Vermicompost as ideal biofertilizers:

- Vermicasting have immobilized enzymes like protease, lipase, amylase, cellulase, lichenase and chitinase which keep on their function of biodegradation of macromolecules of the agricultural residual in the soil so that further microbial attack is speeded up.
- Vermicastings are rich in vitamins, antibiotics and growth hormones.
- Vermicastings are free from pathogens.
- Vermicastings have immobilized microflora which function in the soil to produce useful product.
- Vermicastings have earthworms cocoon and promote earthworm population in the soil, thus ensuring continuous production of vermicastings in the soil itself.
- Give structural stability to soil.
- Absorb moisture from the air.

By this fertilized soil, the yielding capacity is higher than normal manure by different data. Much research work is available on the beneficial effects of vermicompost on various field crops

Benefits of vermiculture:

- Environmental Cleanliness in village, by utilization of waste through vermiculture technology the environmental pollution and health hazard will be reduced.
- N, P, K % is more than normal heap manure.
- Weeds are minimal compared to heap manure.
- Once applied, its impact lasts far 3 years.
- Soil texture and aeration improves.
- Soil remain loose compared to chemical fertilizers, this improve water holding capacity, hence more useful in dry farming, it also helps in easy root

extension/spreading.

- Attack of pests is minimal compared to chemical fertilizers and heap manure.
- In any system, production per unit of land is more by use of compost.
- It has potential for self employment.
- Compost is more useful for long time maturing crops like cotton, banana, etc.
- Soil turnover (Atlavinyte *et al.*, 1975; Barley and Jennings, 1959).
- Increased rate of humification (Darwin 1881).
- As protein source for poultry and fisheries etc.
- Earthworm's ability to eliminate offensive odor.
- Assimilation of nematodes (Dash *et al.*, 1980)

Conclusion:

- Effective environmental protection by any kind of degradable organic waste.
- Optimum utilization of land, labour and water in agriculture.
- Effective utilization of nontoxic wastes as resources in meeting agricultural objectives.
- No foreign exchange outflow as the technology is available in India.
- Has a potential to reduce dependence on non renewable input like chemical fertilizers, pesticides which also cost petro-dollars to the country.
- Potential for conversion of wasteland into productive land.
- The nutrients of vermicompost are taken up through the roots where as the foliar spray of vermiwash make the nutrients directly available to the plants. Hence the application of vermicompost along with foliar spray of vermiwash is likely provide improved nutrition to the plants, as well as when we spray this liquid directly to the soil it improves the microbial flora of the soil and after that soil will become alive.
- By the above conclusion we can say that vermitechnology is the best option in the field of organic waste management.

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