

The Study Of Vermicompost By Optimization Of Organic Waste

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Abstract— Vermicomposting is a process of a decomposition of organic waste with the help of earth worms yielding a better end product called vermicast. Vermicompost is considered an organic fertilizer as it is rich in nutrient and acting as soil conditioner. The results we obtained are low as per FCO since the process mainly depends on the weather conditions the time, we did was in summer but the temperature the good the compost rate will be The yield can be enriched by maintaining low temperature and by adding kitchen waste and also effective utilization of verms we can produce more amount of organic waste.

Keyword—Decomposition, Vermicast, Organic fertilizer, Soil conditioner

1. INTRODUCTION

- Generation of solid waste has a universal problem which are facing by most of the countries in present scenario
- Vermicomposting is a sample biotechnological process involves the stabilization of organic solid waste through earth worms



Fig 1 Materials Collection

1.1 TYPES OF VERMICOMPOST:

- Vermicomposting in bin
- Vermicomposting in vermicomposting pile

1.2 VERMICOMPOST BYPRODUCTS:

- Vermicompost manure: Vermicompost manure is a main outcome of vermicomposting which is eco-friendly with almost zero chemicals content and rich the contents of necessary for the growth of plants or for agriculture



Fig 2 Vermicompost manure

- Vermicompost wash: Vermicompost wash is the byproduct which can be obtained by cultivating vermicomposting in large scale that is in piles. It is also acts a pesticide with zero chemical content. And it also helps in good yield



Fig 3 Vermicompost wash

- Worms: Vermicomposting worms are the main source of the whole process without them whole process without them whole terminology is nil



Fig 4 Worms

2. OBJECTIVE

- To convert the waste into organic manure
- To prepare vermicompost from the dry leaves available in the JIT campus
- To obtain NPK test (nitrogen, phosphorus and potassium) on the obtained compost and to compare the obtained N, P and K values with standard value as per FCO (Foreign and Common Wealth Office)

3. MATERIALS AND METHODOLOGY

3 1 MATERIALS

- Organic waste-dry leaves
- Earthworms
- Cow dung
- Soil
- Plastic vermicompost bag
- Eggshells



Fig 12 Cow Dung

3 2 MATERIALS USED

3 2 1 ORGANIC WASTE-DRY LEAVES

- It provides raw materials in form of forage and fodder, leaf litter for both animal bedding and composting with dung to provide manure We used the different types of leaves available in local villages in davangere around We used shredded leaves



Fig 10 Organic Waste-Dry Leaves

3 2 2 EARTHWORMS

- Eisenia fetida, also termed as banded worms, are the most widely used species for the degradation and stabilization of different types of organic wastes, including neem leaves, dung of cow, market waste, wheat straw, kitchen waste and institutional institutional and industrial wastes, cow manure, and textile mill sludge mixed with poultry dropping Generally, Eisenia fetida is widely used all over the globe



Fig 11 Earthworms

3 2 3 COW DUNG

- We use cow dung available near villages and use it in the slurry formation

3 2 4 SOIL

- Soil is commonly used for management of organic wastes by decomposed and humification of biodegradable organic waste carried out by microbes present in the soil and gut of earthworm



Fig 13 Soil

3 2 5 PLASTIC VERMICOMPOST BAGS

- Vermicomposting bags are made up of plastic material according to IS standards of different sizes, we are conducting composting
- Size – 4x4x2 ft
- Price – 1850/- Rs
- Source – amazon (online shopping)
- holding capacity and prevents soil erosion



Fig 14 Plastic Vermicompost Bags

3 2 6 EGG SHELLS

- Egg shells are useful to vermicomposting bins because they help increase the pH of the entire bin contents to make it less acidic



Fig 15 Egg Shells

3 3 METHODOLOGY

- Vermicompost will be prepared in a plastic bag (Size: 4x4x2)
- Collected the dried biomass (dry leaves) and chopped them
- Mixed the chopped dry material with cow dung in a 50:50 ratio and will be kept them aside for 15-20 days for partial decomposition
- Added a thin layer of soil/sand (2-3 inches) at the bottom of tank
- Released the earthworms in the tank (2kgs) Covered the mixture with green leaves
- Monitoring the bin and added egg shells
- Watered regularly to maintain moisture (15litres/week)
- Sample was collected and submitted for npk test at Amruth organic fertilizers industries

3 3 1 SAMPLE COLLECTED AREA:

- **Shiramagondanahally**



Fig 6 Shiramagondanahally

- **Hosabelavanuru**



Fig 7 Hosabelavanuru

- **Naganur**



Fig 8 Naganuru

- **Shamnur**



Fig 9 Shamnur

3.3.2 IMPORTANCE OF VERMICOMPOSTING

- Vermicomposting converts material into worm casting called Vermicompost. Earthworms consume various types of organic wastes such as sewage sludge, animal wastes,
- crop residues and industrial refuse and reduce its volume by 40-60%. Leaf waste is one of the types of organic waste which is processed through earthworm
- Several researchers have succeeded to convert leaf litter into vermicompost and used either
- alone or with biofertilizer or inorganic fertilizer on several crops

3.3.3 ADVANTAGES OF VERMICOMPOSTING

- Vermicompost is an eco-friendly biofertilizer
- It is also rich in beneficial microflora such as N-fixer, P-solubilizers and cellulose decomposer
- Vermicompost is richer in micro-nutrients than other composites
- It enhances the decomposition of organic matter in soil and also minimize the incidence of pests and diseases in crop
- It improves soil structure, aeration, texture, water

4. ANALYSIS OF RESULTS

4.1 TEST RESULTS ON COLLECTED SAMPLES

TABLE 1 HOSABELVANURU

SL NO	PARAMETRS	VERMICOMPOST TEST RATING	ANALYSIS OF RESULTS	STATUS
1	PH	7.5-8.4	7.55	NEUTRAL
2	NITROGEN	1.0	3.51	HIGH
3	PHOSPHORUS	0.8	0.75	LOW
4	POTASSIUM	0.8	0.89	HIGH

TABLE 2 NAGANNUR

SL NO	PARAMETRS	VERMICOMPOST TEST RATING	ANALYSIS OF RESULTS	STATUS
1	PH	7.5-8.4	7.73	NEUTRAL
2	NITROGEN	1.0	0.55	LOW
3	PHOSPHORUS	0.8	1.23	HIGH
4	POTASSIUM	0.8	0.92	HIGH

TABLE 3 SHAMANNUR

SL NO	PARAMETRS	VERMICOMPOST TEST RATING	ANALYSIS OF RESULTS	STATUS
1	PH	7.5-8.4	7.55	NEUTRAL
2	NITROGEN	1.0	3.51	HIGH
3	PHOSPHORUS	0.8	0.75	LOW
4	POTASSIUM	0.8	0.89	HIGH

TABLE 4 SHIRMANHALLI

SL NO	PARAMETRS	VERMICOMPOST TEST RATING	ANALYSIS OF RESULTS	STATUS
1	PH	7.5-8.4	7.51	NEUTRAL
2	NITROGEN	1.0	1.20	HIGH
3	PHOSPHORUS	0.8	0.48	LOW
4	POTASSIUM	0.8	0.69	LOW

TABLE 5 SOIL ANALYSIS RESULTS

SL NO	PARAMETRS	SOIL TEST RATING	ANALYSIS OF RESULTS	STATUS
1	PH	6.5-7.5	6.62	NEUTRAL
2	NITROGEN	280-560	143.503	LOW
3	PHOSPHORUS	22.5-56.0	76.94	HIGH
4	POTASSIUM	141-336	425	HIGH

CONCLUSION

We did the project on Vermicomposting at Shamnur, Naganur, HosaBelavnur, Shiramagondanahalli to convert waste into best since our villages is filled with lot of trees. We took a step to do vermicomposting only with the leaves available in the village's, soil and cow dung. We avoided kitchen waste and turning of compost regularly to avoid the odour smell. The results we obtained are low as per FCO since the process mainly depends on the weather conditions the time, we did was in summer but the temperature the good the compost rate will be. The yield can be enriched by maintaining low temperature and by adding kitchen waste.

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