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IMPROVING DEGRADATION OF ORGANIC WASTE BY THE HELP OF MICROORGANISM

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Abstract

With an optimal environmental condition of moisture content, adequate proportion of both the dry and wet material to meet the required Carbon/Nitrogen (C/N) ratio, and an appropriate volume of air in the pore spaces of the compost pile and microbial decomposition was initiated. At the end of the decomposition, a stabilized organic matter which can be used as fertilizer supplement by horticulturists, landscapers, orchardists, Farmers etc., was obtained.

Keywords: Composting, Microbes, Vermicelli, Moisture Content, NPK.

Introduction: Composting process helps to accumulate the present nutrients in a less volume matter and the application of this matter to land fight against nutrients deficiency declination and worked as a refilling of nutrients to the land as well as the soil erosion. The application of composted to land complete a circle where exhausted nutrients and organic matter from the soil were restored to the soil again. This complete cycle of composted to the land is a method of restoring or maintaining the soil nutrients and it is just because of organic matter present in them improve the fertilizing quality.

Moreover, it also participates to carbon sequestration and also helps in replacing fertilizer along with Peat. The application of compost to the agricultural land must be done as manure that gestures that guarantee of its sustainable development. Management system of compost has to be developed in such a way that it could provide maximum well-being for Agro normally with keeping environmental protection in mind. The main parameter for efficient compost for the use of agriculture are nitrogen. Availability of high nitrogen content in manure makes the much fertile and does it provide high yield mean while increasing the content of Nitrogen increases the efficiency of fertilizers and it also require the further research. Vermicomposting is a process of composting in which organic degradable substance are converted into compost with highly nutritional and totally chemical free and this is done with the help of earthworm. It can also be referred as composting is round use of organic substance by the help of bacterial consumption.

Earthworm has played a very crucial role in biological in Biology working as bioreactor and break down the organic pathogens and convert degradable waste into nutrients containing fertilizers enzymes and hormones that help in the growth of plants and pretentious warm Biomass the won't can do this by consuming all degradable substance such as wood, leaves, domestic waste etc.

Materials & Methods

Material: The prime material that was required in the present study is the organic waste. Organic waste is that waste which include organic substance such as vegetables peels, green or dry leaves, animal waste, paddy, domestic waste, industrial waste and municipal waste. These substances are highly rich in nutrients as well as carbon and nitrogen which plays a very crucial role in composting.

Methods

The methodology that was adopted in the study was the standard method of composting but the methods was divided into three stages and they are sampling and preparation of sample, Inoculum preparation and the mixing in the prepared sample and Analysis of the prepared compost.

After the sampling of solid waste, they are directly bought to the laboratory for sample preparation. Total of 5 sample were prepared in tray which include the green and dry leaves, vegetable peel etc. C:N ratio has been maintained over here by mixing dry leaves which are rich in Carbon content and green leaves which are rich in Nitrogen content. Maintaining this ratio is very important for the microorganism. When the sample got prepared then Inoculum was prepared by mixing rice, water, milk and Black strap molasses. Beside inoculum industrial microbe, microbes from compost and microbes from biogas are used for composting. All four tray of organic compost are mixed with above mention microbes and one tray is kept for natural composting then all the five trays are kept for composting for 8 weeks and they are covered which jute sack and water is spray over it on interval of 2 weeks. After 8 weeks the matured compost was taken out for the analysis. The parameter that was analyzed are pH, Electrical conductivity and Moisture Content these parameters were also analyzed before composting which will ultimately help in comparing of results. After the composting Nitrogen, Phosphorus and Potassium were also analyzed.



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Results

Testing Before Composting

The standard methods were followed to calculate the pH, E.C., Moisture Content, Nitrogen, Phosphorus and potassium.

pH

Inoculum Name	pH
Industrial Microbes	6.8
Microbes for Composting	7.8
Natural Composting	8.5
Molasses	7.6
Bio-Gas	6.6

Electrical Conductivity

Inoculum Name	EC
Industrial Microbes	1.42
Microbes for Composting	1.61
Natural Composting	1.21
Molasses	1.42
Bio-Gas	1.79

Moisture Content

Inoculum Name	MC
Industrial Microbes	38.026
Microbes for Composting	40.137
Natural Composting	37.029
Molasses	39.367
Bio-Gas	42.031

Testing After Composting

The standard methods were followed to calculate the pH, E.C., Moisture Content, Nitrogen, Phosphorus and potassium.

pH

Inoculum Name	pH
Industrial Microbes	7.9
Microbes for Composting	8.19
Natural Composting	9.49
Molasses	8.91
Bio-Gas	7.28

Electrical Conductivity

Inoculum Name	EC
Industrial Microbes	1.45
Microbes for Composting	1.70
Natural Composting	1.52
Molasses	1.49
Bio-Gas	1.92



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Moisture Content

Inoculum Name	MC
Industrial Microbes	54.9
Microbes for Composting	45.29
Natural Composting	40.02
Molasses	45.0
Bio-Gas	45.28

Result of Nutrient Content

Treatment Name	Organic Matter	Nitrogen	Phosphorous	Potassium
Industrial Microbes	20.4	1.306	0.41	0.90
Microbes for Composting	22.7	1.203	0.42	0.95
Natural Composting	23.8	1.013	0.41	0.88
Molasses	15.7	1.408	0.44	0.92
Bio-Gas	23.2	1.102	0.43	0.99

4. Conclusions

On comparing all the values at last, the tray T4 added with Microbes for Composting was more efficient among all the samples because the parameters like organic carbon value was less compared to remaining samples and also plants would grow better when we provided ambient nutrients to them. Nutrients were rich in Sample T4, incorporated with Microbes for Composting while compared to other four samples. So that we can conclude that the compost which was done by Microbes for Composting was better with compared to Industrial microbes, bio-microbes, molasses, and natural.

It was expected that the work would result in better and low-cost option for the composting of solid waste and it would help the players in the field of waste management and plant growth promotion. The self-prepared Em can be used at larger scale. The self-prepared Em has potential for large production.

The tray without any inoculum showed satisfactory result in terms of rate of composting but other trays with inoculum added had advantage of achieving thermophilic phase early.

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