ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 01 | January - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ORGANIC WASTE MANAGEMENT BY AEROBIC COMPOSTING METHOD AT SOLAPUR(MH), INDIA

Environmental Science

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ABSTRACT

Vermicompost has been arising as an innovative eco-technology for the conversion of various types of organic waste into vermicompost. Vermicompost is soil conditioner which can reintegrate the organic matter to the agriculture soil. The exponential growth of urbanization leads to increase in solid waste generation and problem associated with waste disposal. The problem of availability of space required to dispose it has become a concern for planner and municipal administrators of urban local bodies. The improper disposal of waste is hazards to environment. The present paper attempts to study the feasibility of aerobic composting technique by using metallic container for small scale kitchen organic waste generated in every house. The study was carried out for 60 days, with monitoring of selected parameters as per international standards. The time required for conversion of kitchen waste into compost of better quality requires 30-35 days. The success of the process depends upon several parameters like quality of raw material, pH, temperature, moisture, NPK and aeration type of vermicomposting system and earthworm species used.

KEYWORDS

Aerobic composting, Kitchen waste and metallic container and NPK.

INTRODUCTION

Vermicomposting is the process by which earthworms are used to convert organic materials into vermicompost. Vermicomposting refer to composting or natural conversion of biodegradable garbage into high quality manure with the help of earthworms. The introduction of vermiculture is the global recognition of the need to recover organic material and return this to the natural cycle. The biological activity of earthworms provides nutrient rich vermicompost for plant growth thus facilitating the transfer of nutrients to plants. The earthworm species most commonly utilized for the conversion of organic wastes are *Eisenia foetida* and its related species *Eudrilus eugeniae* . Dominguez and Edwards 1997[1] studied biological requirements of these earthworm species. Vermicomposting also can be classified as a simple biotechnology process of composting by using certain earthworms to enhance the process of waste conversion and to produce better end product that is vermicompost.

Composting using worms, known as vermicomposting gives a better end product than composting due to the enzymatic and microbial activity that occur during the process (Bajsa et al., 2003)[2]. Zero waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or buy them. (Waste, 2015)[3].In the present study an effort has been made to check efficiency of *Eisenia fetida* in vermicomposting. Moisture containing aerobic container is maintained by spreading water over it and to cover with moist gunny bag . The temperature was monitored every week.

MATERIALAND METHOD:

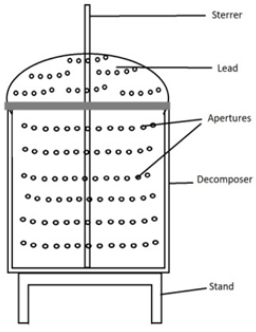
The kitchen waste collected from Sir Vishweshwarayya Society, Jule Solapur and decomposed in aerobic container using Decomposing culture for 30 days. The decomposed kitchen waste was vermicomposted by using *Eudrilus eugeniae* for 30 days. The vermicompost thus produced was analyzed for physic- chemical properties using standard methods. The moisture content of set up was kept around 60-70% throughout the study period by sprinkling adequate quantities of water. pH was measured by a portable pH-meter. Each experiment replicated thrice and results were averaged.

All the samples were analyzed in triplicate and results were averaged. The samples were used on dry weight basis for chemical analysis. The pH was determined using a double distilled water suspension of each vermicompost in the ratio of 1:10 (w/v). Total organic carbon (TOC) was measured using the method of Nelson and Sommers (1982)[4]. Total N by Kjeldahl method (Theroux *et al*., 2001)[5], total P was determined by means of spectrophotometer. Total K, was determined by means of atomic absorption spectrophotometer.

STATISTICALANALYSIS

The data in this study are presented as the mean ±SE. One way ANOVA was used to analyze the significant difference between the initial and final product for the proposed parameters. The probability levels used for statistical significance were $p \leq 0.05$ for the tests.

Fig.1.Aerobic composting pot



RESULTS AND DISCUSSION

Table No.1. Physico chemical analysis of kitchen waste

S.No	Decomposed kitchen waste Control	physicochemical properties of vermicompost
Ph	8.27±0.02	7.98±0.01
Carbon	3.80%	4.39%
nitrogen	132.05 Kilo/hectare	140.2 Kilo/hectare
Potassium	159.67 Kilo/hectare	175.80 Kilo/hectare
phosphorus	1074.08 Kilo/hectare	1682.4Kilo/hectare

From our experimentation it was observed variations in Ph, Organic carbon ,Potassium and Phosphorus. When compared with control group (Ph 8.27) vermicompost the ph was decreased. Vermicompost showed a progressive increase in organic carbon .Potassium is one of the major nutrient also showed progressive increase when compared to control . Phosphorus also showed similar increasing trend as potassium. Garg et.al. (2006)[6]stated that the percentage of nitrogen, phosphorous and potassium in vermicompost was found to increase while pH and total organic carbon declined as a function of the vermicomposting period (Liu, et al.2007)[7].

CONCLUSIONS

Aerobic composting replicates the natural decomposition process. The temperature and moisture of the compost regularly monitored. The compost should have a good air circulation . However, the process itself works fair quickly. Aerobic composting is more suitable for outdoor as well as indoor. Appropriate ventilation is provided, aerated and it is suitable for all kinds of organic waste, including waste having high nitrogen. This method does require a high end investment. The vermicompost is one of the important source for enriching the soil. This method is odorless. It also prevent acidification of soil. In the

present study vermicompost showed increase in all the major nutrients. This clearly indicates that soil sustainability vermicompost application is highly recommended. However further investigations are needed for understanding .

Acknowledgement:
We are thankful to Dr. V. P. Ubale, Principal, D. B. F. Dayanand College of Arts and Science, Solapur for providing permission for conducting vermicomposting of leaf waste. The author also wishes to express her warm gratitude to the Department of zoology for accompanying this experiment

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