

Proceedings of Multidisciplinary International Conference

GREEN ECONOMY INITIATIVES

PERSPECTIVES AND CHALLENGES

“Contributions to Sustainable Environment”



**JOURNAL OF
CURRENT STUDIES (JCS)**

VOLUME 01

Special Issue | ISSN: 2277-2707

Publication Divison
Centre For Research, S.N.M College, Mallankara
Ernakulam, India-683513 | www.snmcollege.ac.in

Proceedings of Multidisciplinary International Conference

GREEN ECONOMY INITIATIVES: PERSPECTIVES AND CHALLENGES

“Contributions to Sustainable Environment”

JOURNAL OF CURRENT STUDIES (JCS)

Published on: May 31, 2023

**Publication Division
Centre For Research**
S.N.M College, Maliankara
Ernakulam, India-683513
www.snmcollege.ac.in

**Special Issue
Volume 01
ISSN: 2277-2707**

CONTENTS

Page No.	Paper
▶ 79	Pharmacognostic standardization and GC-MS analysis of rhizomes of <i>Kaempferia rotunda</i> L.
▶ 89	Bio-Inspired Green Concept of Albatross Bird Wing for High Fuel Efficiency
▶ 97	A Review of Sustainable Plastic Waste Management
▶ 102	A Review on Sustainable Composting Methods in Waste Management
▶ 108	A Review on Impacts of Urban Heat Islands in Cities and the Importance of Green Buildings
▶ 113	Effect of Vertical location on Canard with three different Location to make Airplane Eco friendly
▶ 119	Measuring the Chlorophyll Content of <i>Terminalia Catappal</i> . Based on the their Leaf Ageing

A Review on Sustainable Composting Methods in Waste Management

Nimmi Babychan | Dr. Reshma J.K

Research Scholar, PG Department of Environmental Sciences, All Saints' College, Chackai Thiruvananthapuram, University of Kerala, India.

nimmideepu10@gmail.com

Assistant Professor and Head PG Department of Environmental Sciences, All Saints' College, Chackai, Thiruvananthapuram, University of Kerala, India.

reshmajk52@gmail.com

ABSTRACT

Humans induce a lot of waste; Most of them now affect the air we breathe, the water we drink, and land on which we live. According to the United Nations, about 11.2 billion tonnes of solid waste is collected worldwide, nearly all of which comes from humans alone. Shy running of bio waste is a common practice which is not safe and can be replaced with safer eco-friendly system as composting. The world is tending towards the environmental and mortal health. The thing is to reduce the amounts of natural resources consumed, reusing the products taken from nature as much as it's possible, and creating as minimal waste as possible. It's our responsibility to maintain sustainability for the benefit of our terrain as well as future generations. A well-performing sustainable system, should incorporate feedback circles, concentrate on processes, embody severity and divert wastes from the disposal. Composting is efficient in which the conversion of biodegradable products and wastes into stable products with the aid of microorganisms. Although composting is a long-accustomed technology, it has some shortcomings that have reduced its extensive operation and effectiveness. Composting can play a significant part in this sector. This review comprises different global composting styles used in the field of waste operation. And thereby, anatomize the extremity in this sector and should come up with strategies that will manage waste sustainably.

KEYWORDS: Composting, Sustainable, Environment, Eco-Friendly

1 Introduction

Indiscriminate dumping of waste is mischievous to mortal health. Piecemeal from being uncomely, it causes air pollution, affects water bodies when ditched into the water, as well as depletes the ozone film when burnt, thereby adding the impact of climate change. Wastes are frequently managed (1, 2) using conventional styles. Wastes are burnt, disposed into abysses, aqueducts, and ditched by the roadsides (3). These practices breed insects and pests, release obnoxious odors, and contribute to global warming (during combustion). (4). When treated anaerobically, biogas and can be used as biofertilizers (5). Composting is a safe system. Composting is an aerobic process where complex degradable accouterments are degraded and converted by microorganisms into organic and inorganic (6). It contains 'humic- such like' composites that separate them from those set up in native soil, coals, and peats. Composting is a means of transubstantiating different degradable wastes into products that can be used safely and beneficially as biofertilizers and soil emendations (7 – 9). The composting process helps to cover underground water from getting defiled compared to the land filling system

of waste disposal, which could pose a pollution trouble to underground water. This is because there's a reduction of the microbes and chemical adulterants during composting. These are the pathogenic microbes present in waste which are dangerous to humans.

SUSTAINABLE COMPOSTING METHODS

1. Ring Compost

It has a capability of four to five weight units of biomass (kitchen waste, theater waste etc.) shall be deposited for corruption of guck. Redundant water in the caddy ends up in decaying rather than foul smell might induce. Chlorinated water or kerosene could not be added which is suitable to have an effect on microorganism growth.

2. Triple bin system

The triple bin system jointly permits you to still compost throughout the time, whereas jointly having compost instantly accessible for formerly you want it within the theater. In a three-caddy system, the primary section of the compost container is for recent scraps. This can be once the composting gets started. Because the food and yard waste begin to intrude down, compost begins to produce. Still if you retain adding new waste on top of the compost that's in development, it takes longer to induce quality compost that you just ought to sow spring seeds, the compost begins to produce, you will be suitable to move the wares to the alternate section, simply move the finished compost to the third caddy for holding till you would like it, without concerning uncomposted waste in your compost.

3. Organic Waste Converter

A waste device could be a machine used for the treatment and employment of solid and liquid garbage material. The system of changing solid waste into compost is incredibly easy, and it saves the setting by turning waste into a solid or appertained to as a helpful-product. This machine performs its medium within the presence of air. The total medium overcomes all the walls which can have an effect on the system in a veritably unhealthy system. The input it takes is perishable waste and thus the affair it produces is a awful substance. The structure of this machine is constructed in a veritably system that it's completely different doors or openings for taking the input and for giving the affair. Composting is the resolution to our waste operation issues Associate in Nursing it's a pressing would like of the hour that must be taken care of incontinently. The application of Organic Waste bias to automatize and ease the system of composting could be a step within the right direction. The before we tend to borrow it, the advanced we're suitable to do for the setting. One should detain mind that the magnitude relation between the carbon and between the gas should be strictly handled formerly waste is being composted. However, the composting can take longer and if there is an inordinate quantum of gas, the system can emit a nasty odor, if there are tons of carbon. Indispensable necessary factors embody the stuffiness content and thus the chemical element content within the pile. All of those factors should be borne in mind once composting. Composting manually is frequently a tough system. One may, thus, suppose about the application of Associate in Nursing Organic waste composter. Before composting, the waste is constantly base up, to cut back the quantum of the waste, and might simply be transported..

4. Berkley Rapid Composting

This is a fast composting system. Then, accouterments compost briskly if the size is between 0.5 – 1.5 elevations in size. Soft, succulent apklns don't need to be diced in veritably small pieces because they putrefy fleetly. The harder the apklns, the lower they need to be diced to enhance corruption. Once a pile is started, nothing should be added because it takes a certain length of time for the original accouterments to break down, and anything added has to start from the original breakdown stage therefore dragging the corruption time for the whole pile

5. Pot compost

Pot compost is compatible, needs less area, appropriate for tiny families generating up to 2 kg waste per day. It ought to be unbroken far from rain. Make a tiny low hole within the bottom of the pots. Place the [Metric] capacity plastic vessel below the primary pot. Begin filling the sequestered bio waste (do not place slow degrading things and non-degradable things into the pots) daily into one pot and keep the pot closed. This kind of waste treatment is capable of treating one to a pair of weight units of waste per day solely. Leachate beginning of the pot gets collected within the plastic vessel placed below the pot. Place some salt powder into the plastic vessel to avoid entry of flies into the vessel. The leachate collected will be diluted with water and used as manure within the garden. - Once the primary pot is full to begin victimizing the second pot, by this time the second pot will become full of waste, within the initial pot gets revised again into compost. When the initial week of commencement, heap of worms are going to be seen within the pot. Don't try and kill them, they activate the composting method and that they die after three weeks. Throughout time of year unfold the plastic sheets over the pots and place the brick items over the sheet to shield the pots from rains. If the amount of the water within the pot is a lot, add some saw dirt to soak up the water. If an excessive amount of flies are seen round the pot, create an answer of natural resin in copra oil (dissolve a pair of tablets in 25ml of oil) and apply it on a very cheap and high cowl of the pot, by means of the comb. Sprinkling diluted rotten curd or rubbish resolution etc. into the waste can speed up the composting method.

6. Windrow composting

Windrow composting is that the most typical technology enforced in most of the ULBs within the country. Windrows area unit outlined as frequently turned elongated piles, quadrangle in cross section and up to 100 meters or additional long. Windrows composed of MSW area unit sometimes needed to be settled on AN water-repellent surface. Turning the pile provide adequate aeration into the pile and will increase consistency. The windrow dimensions ought to permit conservation of the warmth generated throughout the composting method and permit air to diffuse to the deeper parts of the pile. They will be turned as often as once per week, however additional frequent turning is also necessary, if high proportions of biosolids area unit gift within the feedstock.

7. Vermicomposting

Vermi composting could be a changed and specialized technique of composting, and it's the tip product of the breakdown of organic matter by some species of angleworm. Vermicompost could be a nutrient-made, natural fertilizer and soil conditioner. The angleworm species most ordinarily used are the area unit *Eudrilus eugeniae*, *Eisenia foetida* or *Lumbricus rubellus*. A by-product of vermi composting referred to as vermiwash (which are often collected if there's a faucet at the bottom of the vermicompost tank) conjointly serves an equivalent purpose. Tiny scale vermicomposting is finished in bins of variable sizes and elegance and 3 different kinds of practices like non-continuous, continuous vertical flow and continuous horizontal flow area unit adopted. The ways for big scale vermicomposting area unit windrow and raised-bed or flow through systems. Flows through systems area unit similar temperament to indoor facilities, creating them the well-liked alternative for operations in colder climates. Room wastes except oily and spicy things are area units appropriate for worms. However an excessive amount of room waste ends up in purification before worms will method it and becomes harmful to the worms. Within the usual method vermin composting is practiced now could be labor-intensive and needs some infrastructure. However, at the family level it's found terribly effective. The study allotted by Center for surroundings and Development showed that plastic tumbler and Ferro-cement boxes are often used effectively for vermin composting at family level. The solid waste at family level shall be managed by taking compost pits or by (wherever land is available) establishing vermi composting pit/bins. The vermin composting needs very little care.

The following aspects got to be taken into thought whereas designing a vermi composting program.

- The Vermi composting plant ought to be protected against flies, ants etc., by providing a metal web covering.
- Extreme wet and dry conditions can damage the worms and care ought to be taken to manage warm temperature by sprinkling water or swinging a wet burlap bag higher than the plant particularly throughout summer season.
- The Composting plant won't cause any smell, odour, or any unhealthful atmosphere, thus it is often placed within the house presumably in work space or perhaps in a very corner of the room.

8. Black Soldier Fly Composting

It is naturally occurring industrious insects mostly seen in farmyards with a chicken coop. Its larvae feed on rotten food. Place a container outside the yard. Add dry waste in the bottom layer and kitchen waste (both including the meat and dairy products) is regularly in 1:2 proportionality to ensure the heap is moist and purchase the black soldier fly larvae from the farm supply stores. Duration of compost depends upon the number of larvae and quantity of waste. Compost duration will be taken according to the number of larvae and One larvae consumes twice its own body weight

9. Bokashi Bucket

A bokashi bucket system which was developed in Japan is a very ancient form of food waste conversion. It can be kept indoors if needed. Add bio waste including both dairy and meat products into the bucket and sprinkle a layer of bran over the waste and repeat the process until it's full and within one month the residue will be ready to move out. Then remove the residue and cool or dry it under the sunlight for further processing. Twice a week the leftover liquid can be collected from the spigot and can be used as a fertilizer. After ten days, dig up the cured compost and it is ready for harvest

10. Food Recyclers

Most modern version of food waste composting and highly expensive model. Turn on the food recycler machine and add the bio waste including both meat and dairy products. No additives are required for the decomposition of waste. Within 4-6 hours the residue will be ready for further treatment. The collected residue can be transferred to the soil for further composting. The filter used in the food recycler machine should be replaced within 3-4 months.

RESULT AND DISCUSSION

Composting is an important and sustainable way to reduce the amount of waste that ends up in the landfill. Composting allows us to recycle our waste by breaking down into a nutrient rich soil perfect for growing plants and crops. Windrow method have the flexibility to handle changing feed characteristics and peak loads, require relatively simple mechanical equipment, and are simple to operate. Rather than, bokashi bucket and food recyclers require relatively small areas and have the ability to control odors. In the case of Organic waste converters which are an environmentally friendly technology. Its solution is an alternative to traditional methods of organic waste disposal such as landfill dumping and incineration. Vermicomposting creates nutrient-rich compost in an eco friendly nature to reduce waste and it does not release any harmful gases into the environment. Vermicomposting also reduces the amount of solid waste sent to landfills. whereas, in windrow composting which is labour intensive method it is not suitable for small amount of waste and can be difficult to monitor temperature and moisture levels and ensuring proper aeration and oxygenation of the material could be a difficult task. Berkley rapid composting is a fast composting method but if any intermediate materials are added has to start from the initial breakdown stage and thus lengthening the decomposition time for the whole pile. Triple compost bin which is time consuming to build and cannot compost meat and dairy products. Whereas, excess water in the ring compost bin ends up in decaying rather than decomposition and foul smell might generate. Meanwhile in the black soldier fly method Meat and dairy will attract other pests which are a risk of pathogens. The byproducts are not technically

compost in the case of bokashi bucket and food recyclers and both requires additional curing period in soil. Regular additives are needed for bokashi bucket and filters are essential for eliminate the odors in food recyclers. Taking too much time for composting and also flies get attracted towards the bin is another issue in the case of pot composting. Composting helps to conserve energy otherwise used to transport and dispose of solid waste. . It is an easy and inexpensive way to recycle organic material such as fruit and vegetable scraps, grass clippings, leaves, and other organic materials. Meanwhile, composting process can emit unpleasant odors if not managed properly. And also it cannot be suitable for some types of waste, such as plastics, metals, and other inorganic materials. And also composting can also attract pests and rodents if not done cautiously.

CONCLUSION

The composting process has been shown to be a largely effective technology for turning organic waste into a usable agrarian product. Numerous dangerous substances, heavy essence from organic waste during the composting process, can be reduced by the composting fashion. It has been successfully demonstrated throughout our country, as well as the world. It's economically competitive with other waste operation styles. With the continued reduction of available tip

space and anticipated high collection and disposal freights demanded to cover the cost of the garbage disposal installations being erected moment, In addition, compost is an environmentally salutary product.(10)While large scale composting operations will be decreasingly important, the most cost-effective way of handling yard, kitchen and theater waste is in our own neighborhoods, avoiding trucking and energy costs.(11) An attempt is made to compare the colorful composting styles for waste operation and after reviewing them it's observed that whatever composting system we borrow, it can be used according to the consumer's time, yard space and plutocrat. Eventually, further exploration should be carried out to discover how to enhance the duration of composting. Though the Berkley system was discovered in the history and is still the fastest composting system, the discovery of faster styles will help to sustain the composting process.

ACKNOWLEDGEMENT

The Authors are grateful to the principal of our Institution, teaching staffs and colleagues for their extreme support for this research work

REFERENCE

1. Aruna, G.; Kavitha, B.; Subhashini, N.; Indira, S. *An observational study on practices of disposal of waste Garbages in Kamakshi Nagar at Nellore. Int. J. Appl. Res.* 2018, 4, 392–394.
2. Alam, P.; Ahmade, K. *Impact of SolidWaste on Health and The Environment. Int. J. Sustain. Dev. Green Econ.* 2013, 2, 165–168.
3. Bai, J.; Shen, H.; Dong, S. *Study on eco-utilization and treatments of highway greening waste. Proc. Environ. Sci.* 2010, 2, 25–31.
4. Gonawala, S.S.; Jardosh, H. *Organic Waste in Composting: A brief review. Int. J. Curr. Eng. Technol.* 2018, 8, 36–38.
5. Khan, M.; Chniti, S.; Owaid, M. *An overview on properties and internal characteristics of anaerobic bioreactors of food waste. J. Nutr. Health Food Eng.* 2018, 8, 319–322.
6. Kumar, S.; Mukherjee, S.; Chakrabarti, T.; Devotta, S. *Hazardous Waste Management System in India: An Overview. Crit. Rev. Environ. Sci. Technol.* 2007, 38, 43–71.
7. Lasaridi, K.-E.; Manios, T.; Stamatiadis, S.; Chroni, C.; Kyriacou, A. *The Evaluation of Hazards to Man*

and the Environment during the Composting of Sewage Sludge. Sustainability 2018, 10, 2618.

8. Ogwueleka, T.C. *Municipal solid waste characteristics and management in Nigeria. Iran. J. Environ. Health Sci. Eng.* 2009, 6, 173–180.

9. Sharholy, M.; Ahmad, K.; Mahmood, G.; Trivedi, R. *Municipal solid waste management in Indian cities - A review. Waste Manag.* 2008, 28, 459–467.

10. *Waste: Influence of the operational variables on the odorous impact. Waste Manag.* 2018, 76, 266–274.

11. Yu, H.; Xie, B.; Khan, R.; Shen, G. *The changes in carbon, nitrogen components and humic substances during organic-inorganic aerobic co-composting. Bioresour. Technol.* 2019, 271, 228–235.

