

A REVIEW ON FOOD PRODUCE WASTE INTO FERTILIZER**¹Rahul B Ingle, ² Dr. Anoop D Shirbhate**Research Scholar at JJTU Rajasthan¹, Associate Professor at PRMITR Amravati²rahul4ingle@gmail.com¹, adshirbhate@gmail.com²**ABSTRACT**

Food waste can be regarded as a significant impact on achieving sustainability goals and can also be a critical aid for resolving the gap in global food supplies and distribution. This paper seeks to summarize the international, national, and community scenarios for food waste based on available data.

A study carried out by students from the local community to classify and measure avoidable food wastes at a market level, focusing on food waste as a high potential cause for reduction and behavioral factors as barriers to the sustainability objective. User-level and indicates the awareness of sustainable living patterns as a daunting aim.

Keywords: Food Waste, Solar Energy, Renewable Energy, Organic Fertilizer.

INTRODUCTION

India has about 1.38 billion population, which is 17.7 % of the total world population. India has the second- largest population in the world. Solid waste is nearly about 1.5 lakh metric tons per day. In Today's age, Municipal solid Waste creates major pollution in the city. A major part of MSW is Kitchen waste. Generally, it throws into the dustbin. Kitchen waste creates major pollution after burning. It creates a bad smell after storing it in the dustbin. For Controlling this MSW, We required Transportation, Men, Space, and Money. Kitchen Waste creates a bad smell to the surrounding; the rest of MSW can be reused or sold in the market. As per the Zero waste Concept and 5Rs Technique Refuse, Reduce, Reuse, Recycle, and Rot (Compost), we can convert Kitchen waste into Fertilizer. For Zero waste, we have to concentrate on the utilization of kitchen waste in less space, time, and money. Kitchen waste can be converting into Fertilizer. We are using some traditional methods to make Fertilizer from kitchen waste. These traditional methods are time-consuming and not user-friendly. Composting is one of the processes in which we can convert food waste into organic Fertilizer. Following are some composting method for food waste:

COMPOSTING USING KAMBHA

It consists of 3 units which can interchange. The middle Unit and the top Unit are interchangeable. The bottom Unit is for storing plastic woven wire and is close at the bottom. It always remains at the bottom. The bottom Unit C should be layered with 4 inches of dried leaves that act as a bed for the water discharged during decomposition. Place a paper or newspaper in unit A to cover the weave. It is done to prevent waste from falling through the plastic weave to the bottom-most units.

COMPOST USING A PLASTIC BUCKET OR A POT

Take a bucket or pot and make a small hole in it. This Arrangement should be at some height for proper air circulation, and it helps for aeration and proper water drainage. A tray should be at the bottom to collect the water discharged during decomposition. Waste Water can supply to plants. The bucket/terracotta consists of a layer of soil at the bottom. Now add your kitchen waste (green matter) and cover it with sawdust or dry leaves

(brown matter). Add a little buttermilk or semi-composted material or even a little cow dung to start the decomposition process. Keep it covered to prevent smell and to keep off insects. You can use any old wooden board or anything to cover it. Mix the pile once or twice a week for aeration. If you find the pile dry, sprinkle some water and mix it well. If it is soggy, add more dry leaves or sawdust and give a good mix. Make sure the pile is damp. It should not be too dry nor too wet. Keep adding a mix of greens and browns every day until bucket A is full.

COMPOSTING BY DIGGING A PIT

Dig a small pit in the ground. Keep the pit covered to keep away pests. The same rule mentioned under “maintenance for any compost bin” applies to this also. You have to maintain the correct moisture level, turn the pile for aeration, and add a mix of browns and greens. You can add cow dung to start the decomposition process.

COMPOSTING BY FOOD BIO DECOMPOSER

In 40 days, all recyclable products, such as biomass residues, animal waste, kitchen waste, urban waste, decompose. Waste microorganism seed treatment reveals 98 percent early and uniform germination and safeguards the emergence of seedling. Waste decomposer foliar spray efficiently manages all bacterial, fungal, and viral diseases in various crops. Without using chemical fertilizers and pesticides, farmers can decompose with the use of waste farming.

COMPOSTING BY VERMI-COMPOSTING AND COMPOSTING PITS

Composting with earthworms has also been undertaken. The worms eat away the wet waste and produce usable compost. A suitable environment provides for vermin composting to take place. However, such composting processes take a huge amount of land and time consuming as well. Such type of composting produces by entities, which have ample space or property to use such techniques.

COMPOSTING BY ELECTRIC FOOD WASTE MACHINE

Food processing waste of all sorts, including the curry, rotating, pizza, egg and crab shells, chicken, mouth-fish, vegetable and fruit pelts, leftover food, kitchen waste, and garden waste, including dry leaves and little twinges. 75-80 percent volume reduction of noiseless and odorless food waste to moderate compost In 24 hours, food waste is reduced by more than two-thirds of its original quantity, resulting in homemade fertilizer that is ready to be used. Remove the production bin and scatter your 1/4 inch of homemade fertilizer over your grass, greenhouse, or potted plant soil outdoors.

METHODOLOGY

A 12 V DC fan runs by using Solar Panels. A black body of solar collector is used to supply heat energy to the food waste box. Additional heat is also supply by using the heating coil. Approximately after 06 days, food waste is converted into organic fertilizer. Hot air is continuously supplied to the food waste box

RESULT

After a detailed study of various methods for Converting food waste into organic fertilizer, we conclude as follows

COMPARISON OF SOLAR FERTILIZER WITH OTHER FERTILIZATION PROCESS

CONSTRAIN	Kambha (3 POT)	Plastic Bucket or a Pot	Digging A Pit	VERMICOM POSTING	Bio Decomposer	Electric	SOLAR
SPACE	5 feet	3 feet	8 feet	8 feet	5 feet	8 feet	8 feet
COST (RS)	1000	500	2000	6000	500	60000	20000
TIME	2 to 3 Month	2 to 3 Month	2 to 3 Month	5 to 6 Month	40 days	1 Day	3 to 5 Days
Material	Easy Decomposer material is required					Any Material (Grinder is Required)	Any Material (Grinder is Required)
SMELL	Bad to surrounding	Bad to surrounding	Bad to surrounding	Bad to surrounding	Less bad to surrounding	Odorless	Odorless
PH VALUE	6 to 8	6 to 8	6 to 8	7.5 – 8.1	6 to 8	6 to 8	7 (Decrease with high T)
N2 (%)	1 -2.5 %	1 -2%	1-2 %	2 -3 %	1 -2 %	2 -3 %	Above 3 % (Continues supply of air)
Temperature	Same as Surrounding	Same as Surrounding	Same as Surrounding	Same as Surrounding	Same as Surrounding	50 to 70 °C	40 to 50 °C
Location	Outside Home	Outside Home	Outside Home	Outside Home	Outside Home	Inside Home / No External Water, Moisture	Anywhere but sunlight is required
SEASONAL	Difficult in Winter and Rainy Reason					All time	Slow rate in Winter and rainy season
OTHER PARAMETER	1) Pre Watering is required 2) Mixing of fertilizer	1) Mixing of fertilizer & Alternation of pot is done by manually	1) Difficult to mix Fertilizer 2) Not Easy for Handling	1) Species of earthworms are required 2) Not Easy for Handling	1) Difficult to add 2) Chemical is required	1) High Cost 2) Maintenance is required	1) All process is natural 2) Mixing is done by Handle 3) Solar energy is used for heating and operating fan

CONSENT FOR PATENT PUBLICATION

This topic is published in author name in patent of India having Issue No. 44/2020 dated 30/10/2020

ACKNOWLEDGEMENTS

Author acknowledges the computing resources utilized in the Mechanical department of Manav School of Engineering & Technology under Shri Jagdishprasad Jhabarmal Tibrewala University, Rajasthan

CONCLUSION

The Machine utilizes solar energy for the heating and aerobic ventilation of the compost machine. After inserting waste into the compost tumblers for six days, it will result in a semi compost with a high temperature of 40-50 degrees. This product is transferred into the curing section for the cooling of the material. The curing section will decrease the compost's temperature and remove excess moisture, resulting in good quality compost, safely stored for further use. The Machine works even during Monsoon season. The Machine has a design to operate even in heavy rainfall without any damage to its Mechanism

REFERENCES

- [1] Achara Taweesan, 2016. Effective Measures for Municipal Solid Waste Management for Cities in Some Asian Countries, Expo Health, Springer Science Business Media Dordrecht, Volume No: 9, Page No: 125–133
- [2] Animesh Dutta, 2018. Municipal Food Waste to Biome thane and Bio fertilizer : A Circular Economy Concept, Biogas and Organic Fertilizer from Kitchen Waste Based Biogas, Springer Science Business Media, Volume No: 09, Page No: 601–611
- [3] Christine Costello, 2017. Achieving Sustainability beyond Zero Waste: A Case Study from a College Football Stadium, Sustainability Volume No: 09, Issue: 07 Page No: 1236, <https://doi.org/10.3390/su9071236>
- [4] D. Sarpong, 2019. Biodegradation by composting of municipal organic solid waste into organic fertilizer using the black soldier fly (*Hermetia illucens*) (Diptera: Stratiomyidae) larvae, International Journal of Recycling of Organic Waste in Agriculture S45–S54, Volume No: 08, Page No: 45–54
- [5] Dr. Raveesh Agarwal, 2015. WASTE MANAGEMENT INITIATIVES IN INDIA FOR HUMAN WELL BEING, European Scientific Journal edition ISSN: 1857 – 7881 (Print) e - ISSN 1857- 7431
- [6] G. L. Mullins, 1995. Effect of soil pH on the requirement for water-soluble phosphorus in triplsuperphosphate fertilizers, Fertilizer research Volume No: 40, Page No: 207–214
- [7] Hussein I, 2018. Solid waste issue: Sources, composition, disposal, recycling, and valorization Egyptian Journal of Petroleum, Volume No: 27, Page No: 1275–1290
- [8] Irene M. C. Lo, 2015. Food waste collection and recycling for value-added products: potential applications and challenges in Hong Kong, Volume No: 23, Page No: 7081–7091
- [9] Jonathon Hannon, 2018. Exploring the Phenomenon of Zero Waste and Future Cities Volume No: 02, Issue: 03 Page No: 90, <https://doi.org/10.3390/urbansci2030090>
- [10] Kh. Zoroufchi Benis, 2018. Municipal solid waste characterization and household waste behaviors in a megacity in the northwest of Iran, International Journal of Environmental Science and Technology Volume No: 16, Page No: 4863–4872
- [11] K.R. Atalia, 2015. A Review on Composting of Municipal Solid Waste, IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) e-ISSN: 2319-2402, p-ISSN: 2319-2399, Volume No: 09, Page No: 20–29