Commentary
Volume 15:03, 2024

Global Journal of Technology and Optimization

ISSN: 2229-8711 Open Access

Current Practices and Possible Improvements for Composting as a Sustainable Solution for Organic Solid Waste Management

Cavallo Tufail*

Department of Science, National Institute of Agricultural Botany (NIAB), Cambridge CB3 0LE, UK

Introduction

Composting is a crucial method for managing Organic Solid Waste (OSW) and converting it into valuable compost, a nutrient-rich soil amendment. This process not only reduces the volume of waste sent to landfills but also provides environmental and agricultural benefits. Despite its advantages, composting practices face challenges related to efficiency, contamination and scalability. This paper examines current composting practices, explores their strengths and limitations and proposes possible improvements to enhance composting as a sustainable solution for organic waste management. Organic Solid Waste (OSW) constitutes a significant portion of the total waste generated globally. It includes food scraps, yard trimmings and other biodegradable materials. Effective management of OSW is essential for reducing landfill use, minimizing greenhouse gas emissions and promoting resource recovery. Composting, the aerobic decomposition of organic materials by microorganisms, has emerged as a sustainable solution for managing OSW. It converts organic waste into compost, which can be used as a soil conditioner and fertilizer, thus closing the loop in waste management. Despite its benefits, composting practices face several challenges that impact their effectiveness and scalability. This paper provides an overview of current composting practices, their limitations and potential improvements to enhance composting's role in sustainable waste management [1].

Description

Aerobic composting is the most common method used for composting organic waste. It involves the decomposition of organic materials in the presence of oxygen. Key processes and practices in aerobic composting include, pile or Windrow Composting: Organic waste is piled in long rows or windrows. These piles are turned regularly to provide aeration, promote microbial activity and control temperature. The decomposition process typically takes several months, depending on factors such as temperature, moisture content and the carbon-to-nitrogen in this method, organic waste is placed in a static pile with forced aeration provided by blowers or fans. This approach reduces the need for manual turning and maintains optimal oxygen levels for microbial activity. It is often used for large-scale composting operations. Organic waste is composted in a closed vessel or container that controls environmental conditions such as temperature, moisture and aeration. In-vessel composting allows for faster composting and is suitable for urban and industrial applications where space is limited. Vermicomposting uses earthworms to decompose organic waste. The worms feed on the organic material, breaking it down and producing nutrient-rich vermicomposting. Common species used in vermicomposting include Eisenia fetida and Eisenia hortensis, which are well-suited for decomposing organic waste. The quality of feedstock, affects the efficiency of vermicomposting [2,3].

The feedstock should be balanced to avoid toxicity and ensure optimal worm growth and activity. Vermicomposting is highly valued for its nutrient content, microbial diversity and soil conditioning properties. It is often used in organic farming and gardening. Community composting involves small-scale composting operations managed by local communities or organizations. This practice promotes local waste management, reduces transportation costs and provides educational opportunities. Community composting systems can include backyard composting, neighbourhood compost bins, or community composting centers. Community composting initiatives often involve educational programs to raise awareness about composting benefits and techniques. These programs help residents learn how to manage organic waste and produce high-quality compost. Community composting provides benefits such as reduced waste disposal costs, improved soil health and strengthened community engagement [4].

Contamination of organic waste with non-organic materials (e.g., plastics, metals, glass) is a significant issue. Contaminants can hinder the composting process, reduce compost quality and complicate waste separation. Educating the public about proper waste segregation and reducing contamination at the source. Implementing advanced sorting technologies in waste management facilities to separate contaminants from organic waste. Composting operations, particularly large-scale ones, can produce odours and attract pests if not managed properly. Odor issues and pests can be managed through, Regular aeration and turning of compost piles help control odour and maintain aerobic conditions. Scaling up composting operations to handle large volumes of organic waste can be challenging. Adopting advanced composting technologies (e.g., in-vessel systems, aerated static piles) to improve efficiency and reduce processing time. Investing in infrastructure such as composting facilities, equipment and waste collection systems [5].

Conclusion

Composting is a sustainable solution for managing organic solid waste, offering environmental, economic and agricultural benefits. Current practices, including aerobic composting, vermicomposting and community composting, provide valuable methods for converting organic waste into useful compost. However, challenges such as contamination, odour management and scalability impact the effectiveness of composting. To enhance composting practices, several improvements can be made, including better feedstock management, adoption of advanced technologies, increased public engagement. Integrating composting with other waste management strategies, such as recycling and waste-to-energy. Using in-vessel composting systems and aerated static piles to improve efficiency and reduce processing time implementing policies and regulations to support composting, including waste separation requirements and compost quality standards.

Acknowledgement

We thank the anonymous reviewers for their constructive criticisms of the manuscript.

***Address for Correspondence:** Cavallo Tufail, Department of Science, National Institute of Agricultural Botany (NIAB), Cambridge CB3 0LE, UK; E-mail: ca.tufail55@gmail.com*

***Copyright:** © 2024 Tufail C. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.*

Received: 01 June, 2024, Manuscript No. gjto-24-143517; **Editor assigned:** 03 June, 2024, Pre QC No. P-143517; **Reviewed:** 15 June, 2024, QC No. Q-143517; **Revised:** 22 June, 2024, Manuscript No. R-143517; **Published:** 29 June, 2024, DOI: 10.37421/2229-8711.2024.15.391

Conflict of Interest

The author declares there is no conflict of interest associated with this manuscript.

References

1. Mannaa, Mohamed, Abdelaziz Mansour, Inmyoung Park and Dae-Weon Lee et al. "Insect-based agri-food waste valorization: agricultural applications and roles of insect gut microbiota." *Environ Sci Ecotechnology* 17 (2024): 100287.
2. Swati, Ankita and Subrata Hait. "A comprehensive review of the fate of pathogens during vermicomposting of organic wastes." *J Environ Qual* 47 (2018): 16-29.
3. Policastro, Grazia and Alessandra Cesaro. "Composting of organic solid waste of municipal origin: the role of research in enhancing its sustainability." *Int J Environ Res Public Health* 20 (2022): 312.
4. Read, Adam D., Mark Hudgins and Paul Phillips. "Perpetual landfilling through aeration of the waste mass; lessons from test cells in Georgia (USA)." *J Waste Manag* 21 (2001): 617-629.
5. Youngquist, Caitlin P., Shannon M. Mitchell and Craig G. Cogger. "Fate of antibiotics and antibiotic resistance during digestion and composting: A review." *J Environ Qual* 45 (2016): 537-545.

How to cite this article: Tufail, Cavallo. “Current Practices and Possible Improvements for Composting as a Sustainable Solution for Organic Solid Waste Management.” *Global J Technol Optim* 15 (2024): 391.