Green Waste Management Practices: sustainable solutions for a healthier planet.

Abdul Wu*

Department of Chemical and Biological Engineering Monash University Clayton, Australia

Introduction

In an era of rapid urbanization, industrialization, and increasing environmental challenges, waste management has become one of the most critical issues facing communities worldwide. Green waste—comprising organic materials such as grass clippings, leaves, branches, and other plant-based refuse—is a significant component of municipal solid waste (MSW). If improperly managed, green waste contributes to landfill overcrowding and the production of harmful greenhouse gases like methane. However, green waste can also be a valuable resource if managed sustainably [1].

Green waste management involves a variety of practices aimed at reducing, reusing, recycling, and recovering organic waste to create environmental, economic, and social benefits. These practices are integral to promoting sustainability, reducing the environmental footprint of waste, and contributing to a circular economy. This article explores the various green waste management practices that can help communities manage organic waste more efficiently while benefiting the environment and society [2].

Composting is one of the most effective green waste management practices, offering a natural way to decompose organic materials into nutrient-rich compost that can be used to enhance soil quality. This process involves the aerobic breakdown of green waste (such as grass, leaves, and food scraps) by microorganisms, fungi, and bacteria. When done correctly, composting produces a dark, crumbly, and nutrient-dense material that can be used to improve soil health, reduce the need for chemical fertilizers, and increase plant growth. Composting helps reduce the amount of organic waste sent to landfills, mitigating the release of methane—a potent greenhouse gas. Additionally, the resulting compost improves soil structure, enhances water retention, and provides essential nutrients to plants, making it a sustainable alternative to synthetic fertilizers [3, 4].

Mulching involves spreading organic materials like grass clippings, leaves, and wood chips over the soil surface to protect it and promote healthy plant growth. Instead of collecting green waste and sending it to landfills or composting facilities, mulching helps recycle it back into the soil.Mulch helps conserve soil moisture, suppresses weed growth, regulates soil temperature, and reduces erosion. It also improves soil structure by gradually breaking down into organic matter, adding valuable nutrients to the soil.Mulching is commonly used in lawns, gardens, and landscapes to improve the health of plants. Lawn mowers with mulching capabilities can recycle grass clippings back into the lawn, reducing the need for disposal [5, 6].

Municipalities worldwide have implemented green waste collection and diversion programs as part of their broader waste management strategies. These programs are designed to collect organic waste separately from general household waste and divert it away from landfills. Once collected, the green waste is typically processed into compost, mulch, or biogas, which can be reused or sold.Many cities offer kerbside green waste collection services, where residents place their yard waste in separate bins for curbside pickup. This makes it easier for households to participate in green waste recycling efforts without the need for additional labor or infrastructure. Green waste collection programs are often linked to large-scale composting facilities or green waste processing plants that transform organic waste into valuable products like compost, mulch, and bioenergy [7, 8].

Anaerobic digestion (AD) is a biological process in which microorganisms break down organic matter in the absence of oxygen. This process generates biogas, primarily methane, which can be used as a renewable energy source. The solid by-product, known as digestate, can be used as a fertilizer or soil conditioner.Organic waste, including green waste, food scraps, and agricultural residue, can be processed through anaerobic digestion to generate renewable energy and reduce the volume of waste sent to landfills. AD facilities are becoming increasingly common in urban and agricultural areas, helping to manage green waste while producing both energy and useful by-products.Anaerobic digestion provides a sustainable method for managing organic waste, reducing greenhouse gas emissions, and producing renewable energy. It offers a cleaner alternative to traditional waste management methods like incineration or landfilling [9].

Green waste-to-energy technologies, such as biomass combustion, gasification, and pyrolysis, convert organic waste into energy. These methods involve the combustion of green waste or its transformation into biogas or biofuels that can be used to generate electricity or heat.As urban areas continue to grow, managing green waste in cities becomes increasingly important. Urban green waste management strategies focus on reducing, reusing, and recycling organic waste in metropolitan

***Correspondence to**: Abdul Wu, Department of Chemical and Biological Engineering Monash University Clayton, Australia. E-mail: wabdul@123Abdul.edu

***Received:** 03-Mar -2025, Manuscript No. AAEWMR-25-163284; **Editor assigned:** 05- Mar -2025, Pre QC No. AAEWMR-25-163284(PQ); **Reviewed:** 11-Mar -2025, QC No. AAEWMR-25-163284; **Revised:** 25-Mar -2025, Manuscript No. AAEWMR-25-163284(R); **Published:** 31-Mar -2025, DOI: 10.35841/aaewmr-8.2.259*

***Citation:** Wu. A. Green Waste Management Practices: sustainable solutions for a healthier planet. 2025; 8(2):259*

settings, where space constraints and large populations make waste management particularly challenging [10].

Conclusion

Green waste management practices are critical components of a sustainable waste management system. From composting and mulching to advanced technologies like anaerobic digestion and green waste-to-energy systems, these practices reduce the amount of organic waste sent to landfills while offering numerous environmental, economic, and social benefits.

References

1. Baena LM, Calderon JA. Effects of palm biodiesel and blends of biodiesel with organic acids on metals. Heliyon. 2020;6(5):e03735.
2. Ghosh S, Roy S. Novel integration of biohydrogen production with fungal biodiesel production process. Bioresour Technol. 2019;288:121603.
3. Bitire SO, Jen TC. Performance and emission analysis of a CI engine fueled with parsley biodiesel–diesel blend. Mater Renew Sustain Energy. 2022;11(2):143-53.
4. Ristovski ZD, Miljevic B, Surawski NC, et al. Respiratory health effects of diesel particulate matter. Respirol. 2012;17(2):201-12.
5. Pathak D, Whitehead PG, Futter MN, et al. Water quality assessment and catchment-scale nutrient flux modeling in the Ramganga River Basin in north India: an application of INCA model. Sci Total Environ. 2018;631:201-15.
6. Rosenboom JG, Langer R, Traverso G. Bioplastics for a circular economy. Nat Rev Mater. 2022;7(2):117-37.
7. Xanthos D, Walker TR. International policies to reduce plastic marine pollution from single-use plastics (plastic bags and microbeads): A review. Mar Pollut Bull. 2017;118(1-2):17-26.
8. Maurya A, Bhattacharya A, Khare SK. Enzymatic remediation of polyethylene terephthalate (PET)–based polymers for effective management of plastic wastes: an overview. Bioeng Biotechnol. 2020;8:602325.
9. Raddadi N, Fava F. Biodegradation of oil-based plastics in the environment: Existing knowledge and needs of research and innovation. Sci Total Environ. 2019;679:148-58.
10. Inderthal H, Tai SL, Harrison ST. Non-hydrolyzable plastics–an interdisciplinary look at plastic bio-oxidation. Trends Biotechnol. 2021;39(1):12-23..

Citation: *Wu. A. Green Waste Management Practices: sustainable solutions for a healthier planet. 2025; 8(2):259*