

# Transforming Climate Change with Composting Technology: A Sustainable Solution

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## Abstract

When people think about fighting climate change, composting may not be the first thing that comes to mind. But composting is actually one of the climate solutions that can immediately make a significant impact, reducing greenhouse gas emissions. However, composting can be accomplished in two distinct ways: anaerobically and aerobically. Anaerobic composting generates biogas which can be harnessed and used as a valuable energy source, while aerobic composting enhances soil fertility and waste reduction. This paper will explain the two ways in which composting can be achieved.

## Keywords:

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### **Background to the Study**

One remarkable technique making a significant impact is Anaerobic Digestion (AD). Through this natural process, organic materials are broken down by microorganisms, resulting in nutrient-rich compost that enriches the soil and benefits the environment, while also generating a source of clean, renewable energy. While based on ancient processes, AD coupled with cutting-edge technology stands as an innovative, scalable environmental solution that recycles organic waste, contributing to climate change mitigation and advancing sustainability efforts.

### **Composting**

At its core, composting is a simple yet powerful process that harnesses the power of nature to break down biodegradable materials into nutrient-rich compost. This eco-friendly method has been embraced worldwide for its efficiency in recycling organic waste and promoting soil health. Composting can be done on a small scale, such as in backyard compost bins, or on a larger scale in commercial composting facilities. AD takes the benefits of composting to a more advanced and impactful level because of its scalability for commercial uses. It is well-proven that, like composting, it harnesses the power of microorganisms to naturally break down biodegradable materials in the absence of oxygen. This eco-friendly technology serves as a sustainable recycling solution, converting organic waste such as food processing waste to two valuable products: clean, renewable energy and reusable digestate, which provides a nutrient-rich boost for soils. The AD process occurs within sealed containers called digesters, where controlled conditions foster the efficient decomposition of organic matter.

AD offers a green pathway towards combating climate change and reducing greenhouse gas emissions. By redirecting organic waste from landfills and decomposing it in an oxygen-free environment, AD sequesters the release of methane, a potent greenhouse gas with a considerable impact on global warming. The biogas generated during the process, comprised of methane and carbon dioxide, can be captured and utilized as a sustainable energy source. Advanced technologies enable the purification of biogas, making it suitable for replacing natural gas to heat homes, power vehicles and generate electricity. This clean, renewable energy can reduce our reliance on fossil fuels and contribute to a cleaner environment. Additionally, AD promotes a circular economy by transforming waste into valuable resources by diverting that very waste from landfills, where its inevitable decomposition releases methane, one of the most prevalent and harmful greenhouse gases. With widespread adoption and support, AD stands as a proven solution in the fight against climate change, providing a greener and more sustainable future for generations to come. Composting also presents a smart alternative by breaking down these organic materials in an oxygen-rich environment, which significantly reduces methane emissions. Instead of being discarded, these wastes become valuable resources, while mitigating potential negative environmental impacts.

Among the significant benefits of composting is the production of nutrient-rich compost, often referred to as "black gold" for its ability to improve soil health and fertility. When

compost is added to the soil, it enhances its structure, water retention capacity and nutrient content. This, in turn, promotes healthier plant growth, reduces the need for synthetic fertilizers and minimizes soil erosion. Additionally, compost helps to sequester carbon in the soil, further contributing to climate change mitigation.

The adoption of composting and AD offers multifaceted environmental benefits that extend beyond climate change mitigation. In addition to significantly reducing greenhouse gas emissions, particularly from landfills, it also supports biodiversity by creating a healthy soil ecosystem that fosters beneficial microorganisms and reduces the need for harmful pesticides.

### **Conclusion**

Composting and AD are gaining traction, as they begin to take center stage as effective and immediate solutions in the battle against climate change. These sustainable solutions stand out as simple and powerful techniques that turn organic waste into nutrient-rich compost and renewable energy while utilizing readily available materials that would otherwise contribute further damage to the environment. As more individuals, communities and businesses embrace composting and AD, we move closer to reducing greenhouse gas emissions, healthier soils, improved water quality and building a sustainable future for generations to come.

### **Reference**

*<https://eponline.com/articles/2023/10/27/transforming-climate-change-with-composting-technology-a-sustainable-solution.aspx?admgarea=ht.ecosystemsecology>*