# Management practices for compostable plastic packaging waste: Impacts, challenges and recommendations.

This study compares three compostable plastic waste management scenarios using environmental ($kgCO_2$/eq) and economic (€/t) metrics. The study models a mixture of PBAT, TLS, PLA, PHA, and TPA in proportions that reflect their current market shares.

The first scenario involves the collection of compostable plastic waste alongside conventional plastic waste, and the mechanical recycling of compostable plastic. Most commercially available compostable plastic packaging is made of thermoplastics, and it can be melted and recycled. This scenario saves approximately 306 kg $CO_2$eq. $t^{-1}$, and provides a net income of 3.7 EUR $t^{-1}$.

The second option is to collect compostable plastic packaging with bio-waste, followed by biological treatment (composting and anaerobic digestion). This scenario saves ca. 69 kg $CO_2$eq. $t^{-1}$ and costs of 197 EUR $t^{-1}$.

The third scenario analysed the collection of compostable plastic waste alongside conventional plastics, followed by sorting and biological treatment. This scenario costs 296 EUR $t^{-1}$ and emits 51 kg $CO_2$eq. $t^{-1}$

For comparison, the average cost of waste management across the EU27 is 310 EUR $t^{-1}$. The climate impact is 218 kg $CO_2$eq. $t^{-1}$

The study notes that although the modelled scenario for mechanical recycling achieves the highest scores, in practice, this would require significant changes in infrastructure and behaviour; therefore, although less beneficial, treating compostable plastics with the organic waste stream is a more probable scenario, still offering environmental benefits and utilising their compostable properties.

This study is part of our five-part Bio-based LCA Blog series. We will explore other topics in the upcoming blog posts. If you have any particular topic, you would like us to cover, please reach out at lca@recoup.org

Disclaimer: *The summary reflects the article's findings, which apply only to the products or systems studied and are based on the data and assumptions used by the research team. A single LCA study's results do not represent a comprehensive comparison of materials or processes and are specific to the scenario analysed. For questions about these findings, consult the article and contact the research team directly. Always cite the original study when referencing it. BPF and RECOUP support independent research and recommend reading the full study.*

Link: Management practices for compostable plastic packaging waste: Impacts, challenges and recommendations - ScienceDirect

# Choosing the Right Path: The Impact of Compostable Plastic Waste Management

Evaluating environmental ($CO_2$ savings) and economic (cost/revenue) outcomes of disposal pathways for compostable plastics.

**Compostable plastic waste**

This analysis evaluates three waste-management scenarios for compostable plastics (including PBAT, PLA, and PHA) using climate impact and cost metrics. It highlights which pathways offer material recovery and carbon savings versus those that create environmental and financial burdens.

## SCENARIO A: MECHANICAL RECYCLING

**−306** kg $CO_2$-eq per tonne

**Largest Climate Savings**
Substitutes virgin plastic production.

**+3.7 €** Net Revenue per tonne

The only scenario that generates profit through high material recovery.

**BEST OVERALL OPTION**
Requires efficient sorting technology (NIR) and clean waste streams for success.

## SCENARIO B: BIOLOGICAL TREATMENT (BIO-WASTE)

**−69** kg $CO_2$-eq per tonne

**The Second-Best Option**
Collecting with bio-waste saves $CO_2$.

**197 €** Net Cost per tonne

**KEY FINDING: High Costs of Biological Processing**
Biological pathways range from 197 € to 296 € in net costs per tonne.

## SCENARIO C: BIOLOGICAL TREATMENT (PLASTIC-BIO)

Compostable plastics collected with regular plastic waste and transported to mixed waste waste biological treatment facility.

**+51** kg $CO_2$-eq per tonne (Burden)

**The Least Favourable Option**
Collecting with plastics creates a net carbon burden.

**296 €** Net Cost per tonne