



SISTERS



Improving PLA Compounds with Enzymes for Eco-Friendly Packaging

SISTERS Project
Practice Abstracts

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The problem & opportunity

Producing compounds with enzymes for sheet and thermoforming plastics poses challenges due to enzyme sensitivity to heat and pressure.

GAIA BioMaterials aims to scale up and study practices for continuous production with enzyme additives, offering a solution to enhance biodegradability in rigid PLA-based applications.

The solution

Mineral-filled compounds, proven to accelerate PLA-based compound degradation in preliminary tests, present a key to maximizing enzyme effectiveness.

To achieve this, enzymes must be introduced in the sheet extrusion process, minimizing exposure to heat and pressure.

Benefits



100% Biobased Carbon



High Stiffness



Food Contact Safe



**Exceptional Biodegradability
(Up to 3.5 mm!)**



**Mature Product with
Customizable Properties**

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PRACTICAL RECOMMENDATIONS



Cons

-  **Brittle**
-  **Poor Heat Stability**
-  **Pre-drying Required**
-  **Non-local EU Production**
-  **Low Ambient Biodegradability**

Successfully addressing biodegradability makes PLA a top choice for rigid packaging, with solutions for brittleness, heat stability, and pre-drying, alongside increasing EU production and multiple end-of-life options.

Recommendations for sustainable food packaging and waste reduction during processing:

- Use PLA compounds with 20% mineral filler.
- Introduce enzymes during sheet extrusion.
- Maintain low but sufficient temperature and pressure.
- Apply similar principles in thermoforming.



About SISTERS and this Practice Abstract

This practice abstract was elaborated in the framework of the SISTERS project, based on the EIP AGRI practice abstract format. © 2023

Project dates: from November 2021 to April 2026.

Goal: to systemically reduce food loss and waste in the main stages of the food value chain in Europe through innovations targeted to each stage of the chain.