COmité
Technique de
Recyclage des
Emballages
Plastiques

GENERAL NOTICE
Technical Sheet

SUBJECT

This technical sheet is intended to assess the impact of polylactic acid (PLA) bottles on the French PET stream in the reclaiming, bottle recycling and fibre recycling stages.

GENERAL NOTICE

This General Notice follows on from the introductory sheet on PLA (FT 34) as packaging body.

A. Reclaiming trial

A.1 Automatic sorting

The infrared spectrum of PLA is easy to identify, so PLA bottles could be detected and ejected with similar efficiency rates to the other undesirable materials encountered (90-98% efficiency according to the bottle shape and the intended type of stream).

A.2 Crushing and washing stages

- ⇨ **The PLA flake obtained has a yellowish appearance,**
- ⇨ **No significant change in colour from the PET control flake.**

A.3 Blending and drying test: [tested concentrations: 2% and 5% PLA]

- ⇨ **Problems of agglomeration and sticking to dryer walls were observed with both blends containing PLA.**

B. Bottle-to-bottle study

B.1 Viscosity build-up test [tested concentration: 2% PLA]

After granulation, the samples went through a condensation polymerization stage:

- ⇨ No problems were observed as regards viscosity build-up

B.2 LAB test on slab [tested concentrations: 0.01%, 0.1%, 0.3%, 2.5% and 5% PLA]

- ⇨ **Significant opacification of material from 0.1% PLA (no anomaly observed at 0.01%)**
- ⇨ **Significant yellowing of material from 0.3% PLA.**

C. Bottle-to-fibre recycling test

- PLA Concentrations tested: 0% (control), 1%, 2.5% and 5% in a post-industrial PET stream
- No problem during granulate and fibre extrusions
- No loss of fibre's mechanical properties
- No yellowing phenomenon related to the presence of PLA

D. Study overview

- The transparent PLA bottles would be channelled into the PET stream (as long as they only represent a marginal flow). Nevertheless, the bottles could be detected and removed at the automatic infrared sorting stage.

Recycling stages	Impact	Description	Consequences
Tri sur bouteilles	⚠	1 PLA bottle detected (sorting efficiency approx. 95%) ⇒ up to 3 PET bottles ejected	• Higher losses ➢ **Increase in waste to be processed**
Broyage	Ø		
Lavage	Ø		
Flottation	Ø		
Drying	⚠	PLA becomes sticky and causes agglomeration	**Sticking to walls, bridges formed** ➢ **Equipment plugged**
Granulation *optional* and Recyclage	⚠	• Bottle and sheet applications: ⇒ yellowing and opacification • Fibre applications: ⇒ no impact recorded in production with the characteristics of the studied fibre type	Either undesirable bottles are ejected upstream: • Higher losses ➢ **Increase in waste to be processed** Or applications are limited: • System is made less economical.

⚠ Caution Ø No impact ➢ **Environmental consequences**

GENERAL OPINION

The PLA bottles present in the PET stream will be eliminated by reclaimers in the bottle sorting stage, within the limits of the sorting technology's efficiency:
- to limit the risks of agglomeration and plugging in their reclaiming equipment
- with a concern for keeping up acceptable quality levels in their flake production, particularly in order to recycle that flake in bottle and sheet applications.

In the current state of equipment and techniques used and available in Europe, the appearance of PLA bottles in the stream will lead to a significant increase in losses.

Given the consequences on recycling in the current French system for collection and sorting, COTREP advises against using this type of material for bottle applications.