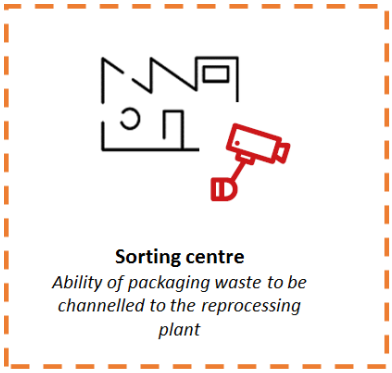
COTREP

Flexible packaging
Packaging body

General Notice

Compostable flexible packaging – recycling potential

Conclusions



Sorting centre
Ability of packaging waste to be channelled to the reprocessing plant

Reprocessing
Ability of packaging waste to be converted into ready-to-use flakes or granulate

Use of recycled material
Ability of flakes or granulate to be converted into new products

Given the technologies currently used in France and Europe, the compostable flexible packaging items that end up in the selective sorting bin are mostly channelled as rejects in sorting centres.

Near infrared optical sorting technologies can separate compostable films from LDPE films without noticeable differences in efficiency compared with other materials.

However, compostable film residue is present in LDPE bales generated by selective collection. The impact of these materials on the current LDPE film recycling stream will be determined by a further study.

CONTEXT – COMPOSTABLE FLEXIBLE PACKAGING

Compostable flexible packaging[1] has taken off in France since the 2015-992 law was passed to regulate the use of "fruit and vegetable" bags and films for mailing newspapers, magazines and advertisements. It is estimated that the French flexible household packaging market represented 290,000 tonnes in 2018, including 110 to 120,000 tonnes of LDPE and 15 to 20,000 tonnes of compostable flexible packaging.

The compostable flexible packaging on the French market is made up of different resins – starch-based plastic, PBAT/PLA, PBS or cellulose acetate.

[1] *The term "flexible packaging" generally means packaging under 250/300 microns thick (European Ceflex definition).*

With the gradual extension of sorting guidelines to all packaging from 2012 to 2022, French people are required to recycle all their packaging in the selective sorting bin. This compostable packaging can therefore find its way into this collection and be sent to sorting centres, responsible for producing uniform packaging waste streams for recycling. Regarding flexible packaging, sorting centres which implement the extended sorting guidelines to all packaging produce an LDPE stream. Other flexible packaging, including compostable packaging, is rejected and sent for energy recovery.

It is in this context that Cotrep questioned the capability of sorting centres with near infrared optical sorting technologies to maintain PE flexible packaging and film bale quality, and the ability of LDPE packaging recyclers to manage this compostable packaging so that it does not impact their process and/or recycled material.

This notice does not cover the household biowaste collection and recovery stream or the theoretical possibility of forming compostable flexible packaging bales in sorting centres. **It focuses on the recycling potential of compostable flexible packaging in a sorting centre.**

During the publication of this notice in June 2019, Cotrep only performed tests on the recycling potential of packaging in sorting centres and plans to carry out additional tests on the recycling potential of residual compostable packaging at LDPE recycling operators in 2020.

RECYCLING POTENTIAL

Cotrep worked with resin producers and packaging manufacturers to obtain the samples for its tests:

- PBAT/PLA bag sample,
- Starch bag sample (potato starch-based),
- Starch bag sample (maize and oilseed-starch based),
- PBS mailing film sample.

A cellulose acetate film sample was received after the tests were carried out and was only subjected to a static test, which was deemed sufficient for drawing conclusions.

In sorting centres, compostable flexible packaging (like all films) is mainly channelled to the flat materials stream by a ballistic separator.

On the flat material line, near infrared optical sorting technologies are used to separate flexible PE from other packaging. In modern sorting centres, it is this stage which is used to channel compostable packaging as rejects.

Cotrep conducted static and dynamic sorting tests with near infrared optical sorting technology suppliers to ensure correct recognition of the various compostable resins in relation to LDPE.

Static test

The compostable packaging was positioned in front of the optical sorting machine sensors. The signal from each packaging item was compared with the LDPE signal and the results obtained show that:

- LDPE has a very different signal from the 5 samples tested.
- Compostable packaging can be separated from LDPE films using current optical sorting machines.
- The optical sorting signal is slightly different between the various samples of compostable film tested.

Additional observations:

- The two starch-based bags have an almost identical signal.
- The cellulose acetate signal is close to the paper signal.

Dynamic test

Cotrep provided a pilot line with a packaging stream from French sorting centres. This stream was collected at the ballistic sorting outlet stage, before optical sorting. It was made up of LDPE packaging (approximately 35%), PP, composite packaging and cardboard.

All the compostable bags were mixed with this stream and together they were sorted dynamically in conditions representative of optical separation equipment operation in sorting centres. Cotrep characterised the sorted LDPE films and rejects to identify the recycling potential of compostable packaging.

➔ Most of the compostable packaging items were channelled as rejects.
➔ For this test, the residual amount of compostable film in the LDPE film stream is on average 0.8%.
➔ The produced LDPE stream has an average purity similar to the results obtained in sorting centres, before the manual filtering stage.
➔ The capture rate for LDPE films channelled into the dedicated stream is also similar to the results observed in sorting centres.

Cotrep notes that, given the efficacy of sorting centre equipment, a small amount of compostable packaging remains in the LDPE stream sent for recycling, and most of this packaging is removed by infrared sorting technologies. **So, the make-up of compostable packaging does not affect sorting performance.**

Compostable packaging residue in the LDPE stream will need to be assessed in flexible LDPE packaging and film recycling conditions.

RECYCLING POTENTIAL OF FLEXIBLE LDPE PACKAGING AND FILMS

Cotrep will test the recycling potential of residual compostable packaging in the LDPE film recycling line by the end of June 2020.

Cotrep has examined several studies on the impact (or lack of impact) of recycling compostable packaging blended with LDPE films. Although these studies provide an insight into the recycling potential of certain compostable materials blended with PE, Cotrep notes that they generally focus on a limited number of end-of-life stages of packaging for recycling (extrusion of granules and characterisation of one or more outlets) and need to be developed further for conclusions to be drawn.