

Last December, France's Total and Intraplás, a Portuguese plastics extruder for the food industry, demonstrated the feasibility of incorporating chemically-recycled polystyrene (PS) into yoghurt pots for brand owner Yoplait. The collaborative initiative was a crucial development in the sustainable recycling of PS in France – and internationally.

This was a significant step in its own right, but stakeholders are already asking how long it might take to ramp up the pilot test to full commercialisation.

Anabela Ferreira, co-owner and executive board member at Intraplás, points out that full commercialisation depends on the quantity and quality of the recycled polymers available on the market. This, in turn, depends on the effectiveness of the collection, sorting and processing of post-consumer recycled (PCR) material.

"Polymer suppliers established a 2025 roadmap to develop and optimise the recycling infrastructure, including chemical recycling, so that the supply of high-quality, certified-circular polymers meets the market demand," Ferreira tells *Plastics in Packaging*. "The construction of new recycling plants, planned for 2023, will result in sufficient quantities of recycled polymers. There is already rPS in the market that we are offering to our clients, but not enough to meet market requirements, as yet."

Intraplás has produced enough material for the pilot tests – around 1,000kg – and the company is also conducting several approval processes with multiple clients, with an additional 60 tonnes converted.

There are two separate processes involved with this project. From the supplier side, rPS is obtained by means of a chemical recycling technology under a mass-balance concept.

"This is not our area of expertise but, in the broadest terms, chemical recycling of PS takes the polymer back to its original monomer, and it works with post-consumer, post-commercial, and post-industrial waste feedstock," Ferreira says.

As a converter, Intraplás does not have to change its industrial processes, as the behaviour of rPS is said to be exactly the same as virgin PS throughout the entire production process – extrusion, thermoforming and form-fill-seal (FFS) phases – so, there is no additional capital expenditure required.

"We do not have any technical difficulties or differences when comparing recycled with virgin polymers (in terms of conversion cost), which is very encouraging," explains Ferreira. "This is a huge advantage because there is no cost increase [resulting from this type of differential]. Also, in terms of productivity, we found the same efficiency as virgin PS."

"One more crucial advantage relates to our clients. With the adoption of this new material,

A new road for sustainable PS

Three partner companies have made a joint step forward to support the development of sustainable PS recycling. But are they ready for a big leap forward, or is it baby steps? **Dominique Huret** finds out



Total, Intraplás and Yoplait use PS from chemical recycling in yoghurt pots

they won't have to perform any adjustments or changes to their production lines. Hence, the use of the material in clients' FFS lines will not create additional costs or cause any productivity change. Film produced using recycled polymers is a perfect drop-in solution for our clients.

"However, we do have a 'cost' in terms of the need to wait for the supply of rPS to catch up with demand," says Ferreira. "The value chain is restructuring, and, in a short period of time, we will have sufficient volumes to make PS one of the most sustainable polymers."

Sustainable or not, the inevitable question that dogs this market is the more basic one of whether PS has already lost its way in terms of brand-owner and consumer perceptions.

Ferreira points to misinformation, or at least a lack of clarity, as to what can or cannot be recycled.

"PS is fully recyclable and reusable due to its intrinsic properties," she stresses. "It allows for the right recycling solution for all applications via depolymerisation, dissolution or mechanical recycling. It's among the most easily-sorted polymers, and one that has already successfully demonstrated high purity levels, exceeding 99.9 per cent using existing technology. Additionally, and due to its low diffusion, PS (virgin or recycled) maintains its high machinability properties during the converting and FFS processes.

"Finally, it is the most suitable for contact with food products, because it increases shelf-life and helps maintain the quality and freshness of the packaged food."

Meanwhile, at Total, senior vice president for polymers Valérie Goff is clear about the significance of these developments. "This project is a great illustration of innovation and collaboration with Intraplás and Yoplait, which demonstrates our common commitment to make PS circular for food-grade packaging," she says. "This marks a further milestone in addressing the challenge of the circular economy and achieving Total's ambition of producing 30 per cent recycled polymers by 2030."

Ferreira believes that brands and consumers will understand that PS is a sustainable polymer and one that is truly circular for food-contact packaging. It is for these reasons, perhaps, that manufacturers of fresh dairy products reaffirmed in mid-February the need to create a circular economy for PS. They warned about the impact of substituting the polymer, from both environmental and economic points of view.

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