PLACATING THE DOUBTERS

The future is recycling for one PLA and lactic acid producer. **Dominique Huret** visited the company's plant in Belgium to find out why

Predicting the future can be an unforgiving activity at times in the plastics industry, but one Belgian company is hedging its bets on legislative progress for polylactic acid (PLA) in France, with ambitions to establish a specific recovery process there.

At the end of 2022, Futerro announced plans to create a 75,000-tonne PLA plant, which will include a molecular recycling unit for this bio-sourced polyester and take supply of waste material from closed loops in neighbouring European countries. The objective is to demonstrate that the process works and is efficient.

Hosting *Eco-plastics in Packaging* at Futerro's plant in Escanaffles, Belgium, business development and marketing manager Geoffroy Delvinquier is happy to discuss the projected timetable.

"The site has been chosen and is located close to Port-Jerome in Seine-Maritime, an area where bio-based innovations have been developing these past years," he explains. "We are in the authorisation phases of fauna and flora diagnosis, and are waiting for feedback from the French authorities. On our side, we have launched the engineering studies. If all goes well, the French site will be ready in 2025 for a start-up in mid-2026."

Part of the Galactic Group, Futerro was founded in 2007 in Escanaffles – a plant that specialises in fermenting sugar into lactic acid (monomer), but has absolutely no function in producing PLA.

"Remember that lactic acid, in addition to being used for the production of PLA, is traditionally used as a natural food additive and preservative, which is Galactic's core business," Delvinquier says.

In 2016, the Walloon Region helped Futerro with Marshall Plan funding for a €9 million ($9.8m) pilot unit for lactic acid polymerisation in Escanaffles. It had capacity for 1,500t of PLA per year, but is no longer in operation.

"We have built a factory in China, where there are fewer legal constraints," Delvinquier adds. "With a PLA capacity of 100,000t, it is the second-largest plant of its kind in the world and has been in operation for a year. Our products from China will be on the European market very soon."

Futerro claims that its Renew PLA is the only biodegradable polymer made from natural renewable raw materials

But, with the focus historically on the compostability of PLA, why is Futerro going down the route of PLA recycling? Delvinquier explains that the company intentionally waited for the publication of the draft EU Packaging and Packaging Waste Regulation before announcing the construction of the new plant.

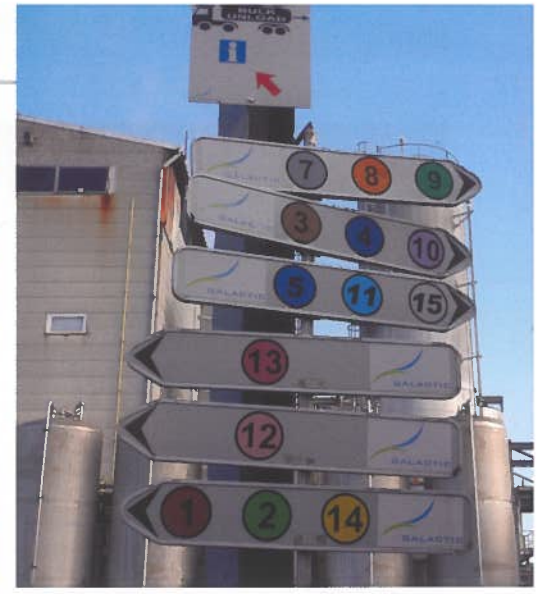
"This text aims to promote the recycling and use of biopolymers," he maintains. "We are therefore perfectly aligned with the regulation. For recycling, we officially started R&D in 2009, almost 14 years ago. Loopla is the chemical recycling technology we have been working on. It is an efficient and inexpensive molecular recycling technology compared with that used for polyolefins such as PE or PP, or for polystyrene."

He points out that those plastics are made up of tightly welded molecules and require a lot of energy to recycle, whereas polyesters such as PLA and PET have bonds that are easier to break. This, Delvinquier suggests, makes recycling less expensive.

"It is even simpler with PLA than with PET, because the latter is composed of two different molecules – monoethylene glycol and terephthalic acid – whereas the former is made up of a single monomer – lactic acid. And last but not least, the product is also non-toxic."

Despite this, PLA remains largely absent from the French market, limiting the amount of material available for recycling. It is an issue Futerro is well aware of, and in this case Delvinquier believes the saying, 'what came first: the chicken or the egg?' rings truer than ever.

"We decided to move forward, instead of just waiting for the supply to be created," he says. "We are going to start our recycling unit immediately. Initially, it will be supplied with controlled PLA waste from closed-loop circuits, such as cups from events or floor coverings from trade fairs. However, we also want to deal with less pure material that is more difficult to process. For this reason, we will also use waste from other European countries."



Above: *In 2007, Futerro opened a PLA demonstration plant at the Escanaffles site with capacity for 1,500 tonnes. It's now gearing up to build an industrial Loopla plant*

Left and below: *Geoffroy Delvinquier (far left in red hat) leads visitors on a tour of the Escanaffles site in Belgium*

The aim is to launch the process in order to prove that molecular recycling of PLA works and is efficient. In the years to come, the stock of material will build up in France and in neighbouring countries, he explains, as packaging waste grows from use of this material.

"In the near future, we believe that we will have recyclers Suez and Veolia at our table for discussion."

As for the production of virgin PLA, Futerro calls its bio-refinery 'unique' and states that it will be powered by locally-produced biomass. "You have to be aware that the business model for industries processing agricultural products such as wheat, corn or potatoes is changing," explains Delvinquier. "In the past, they processed these resources to extract starch to produce sugar. Everything else, such as fibre and protein, was considered a by-product and sold at a low price. Today, the opposite is true. The market wants protein, not sugar. On Futerro's side, we need starch."

As such, producing PLA from lactic acid is more interesting economically to the company. But the project goes much further because Futerro believes that it is possible to build a new green chemistry around agricultural waste, which is cheap in the part of France where the plant will be located, as it is in Belgium.

"We are also betting on ethanol," Delvinquier adds. "Today, the production capacity of this fuel is important, but it should progressively decrease with the increasing demand for electric vehicle motors. We will be able to attract biomass for this industry. Tomorrow, carbon dioxide will be the raw material for this new chemistry and we are already working on that."

With all of that in mind, was Futerro surprised to hear that Citeo, the packaging scheme in France covering household packaging, has dismissed PLA due to the small amount of material available in the market? There has even been rumour of a possible ban. Delvinquier admits that Citeo's attitude has surprised his company.

"We believe it is a mistake to forecast that PLA will never exceed 4 or 5 per cent of post-consumer waste," he argues. "For [Citeo], the material is a disrupter of sorting and should therefore be banned. Recyclers in France are more or less of the same opinion; they concentrate on the large masses for profitability and are uninterested in the rest.

"In Europe, there are at least 35 polymers used on the market, and current technologies – such as near-infrared – can perfectly separate all these resins. We have conducted very conclusive tests on this basis in Italy.

"Europe wants to move from fossil carbon by requiring 20 per cent renewable carbon in all plastics. It is also urgent to move towards bio-based carbon instead of petro-based. In any case, this is what the market is calling for. Moreover, forecasts indicate a threefold increase in the supply of bioplastics in the next five years on a global scale."

A move into PLA recycling may seem like a gamble for many, but with legislators in Europe intent on a shift away from virgin polymer production, Futerro may well find itself well ahead of a burgeoning market in no time at all.

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