That's a bioplastic wrap

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Bioplastics take on traditional petrochemical plastics in food packaging, with some challenges.

Producing food in a sustainable way is one thing. Making sure that it is wrapped in a sustainable packaging is another issue that also needs to be addressed. The trouble is that the plastic packaging protecting most of our food has been derived from petrochemicals. To make such packing more sustainable, it would be useful to rely on plastics that are bioresourced; in other words made from plants. One such material is polybutylene succinate (PBS), which has been developed by the EUfunded project **SUCCIPACK**.

The research consortium has developed a way to mass produce succinic acid, one of the major ingredients of PBS. To do so, they use bacteria to convert the glucose in the "feedstock", or the raw material used to produce such bioplastics, such as wheat. "The idea is to replace the succinic acid coming from petrochemicals with bio-resourced products such as plant waste and materials from plants in agriculture," says Christophe Cotillon, project coordinator and deputy manager of the French Association for the Technical Coordination of the Agrifood Industry (ACTIA), headquartered in Paris, France.

PBS has "similar qualities as existing packaging, for the interaction between the food and the packaging and in terms of texture and transparency," Cotillon tells youris.com. In tests, bio-resourced PBS was a better oxygen barrier than other bioplastics. Water barrier properties, however, need more tweaking to compete with existing packaging at keeping out water which can spoil dried food and promote microbial growth and contamination. The packaging has already been successfully tested for ricotta cheese and for beef.

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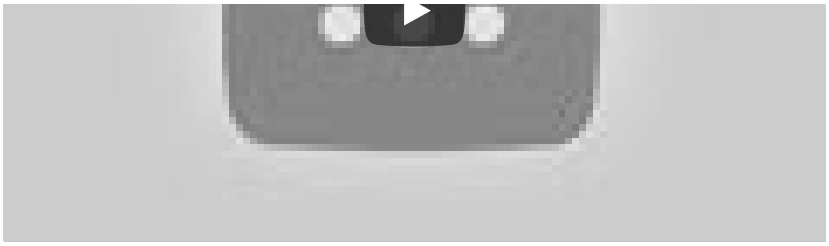

This product presents quite a few additional advantages. Bioresourced PBS can be used in existing production lines, meaning no financial penalties for manufacturers switching to greener materials. "Industry gets the same properties for approximately the same cost, and using the same machines," says Cotillon. Bio-resourced packaging also boosts brands' eco credentials. "If you tell the consumer that they are using bio-resourced packaging, they will prefer the idea to preserve nature." The manufacturing process could be made even greener by using energy from renewable resources, or by optimising the manufacturing process.

To compete against petrochemical-based plastics, bioplastics need to meet several requirements. "If we want to push this material, we have to have better properties at the same costs," says Cotillon, "A future development step will be to improve the quality by coating the surface. And we can mix the molecules with other bio-resourced molecules to make a better quality of packaging."

Bioplastics, however, could raise public concern in that it could be grown on land that would otherwise be used for food crops, and reduce food availability. "Certainly food competition is a problem," says Markus Schmidt, research associate in the Department of Materials Development, Fraunhofer Institute, in Freising, Germany. "In my opinion it would be best to use real waste products or by products from food manufacturing so there is no food competition." A statement that meets Cotillon's opinion "the biosources for PBS packaging can come from plant waste."

Consumers could also struggle to distinguish between biodegradable and bio-resourced. "The feedstock used [to produce bioplastics] has nothing to do with whether a material is biodegradable or not," says Kristy-Barbara Lange, head of communication at the industrial organisation European Bioplastics, "this is a misunderstanding often encountered. Biodegradability depends on the chemical structure of a material." The biodegradability of SUCCIPACK, explains Cotillon is "the same as petrochemical or current packaging."

Schmidt points out that even if a bioplastic is billed as compostable, some "commercial composting plants don't actually want those plastics because they reduce efficiency." His ideal is that bioplastic waste such as PBS could be incinerated to recapture energy from the plastic at its end of life, "it's much more sustainable if is done correctly," Schmidt tells youris.com. End of life management is an integral part of the SUCCIPACK project. "PBS can be treated by different routes at end of life, depending on its degradation state," says Patrice Dole, a project partner and deputy director of the east campus of the CTCPA (Technical Centre for the Conservation of Agricultural Products), in Bourg-en-Bresse, France. This is thanks to "easy depolymerisation by hydrolysis and easy recondensation by solid state polymerisation," he explains.

The project is due to be completed at the end of 2014. But Cotillon expects that the industrial partners will continue development. A wise move for business, given that the market for bioplastics will more than triple by 2017, according to estimates from European Bioplastics, a wise move for environmental sustainability.

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