

From Orange Juice Waste to New Biopolymers: A New Source for PBS

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Spain is the world's fifth manufacturer of oranges and juices and the first within the European Union. This activity is performed mainly in the Valencian Community, where three million tonnes of citrus fruits are produced each year, approximately the 60 % of the national production. In Andalusia region, the citrus activity is also very important, since it is the third most important agricultural sector of the region, with surface of 62,000 hectares and an increase of more than 70 % over recent decades.

This important producing activity of the orange juice sector also generates a considerable volume of waste. In particular, 1,2 million tonnes per year in a relatively concentrated way. This waste is intended mainly for the manufacturing of pellets for animal feed or landfilled. The first solution is costly from the energy point of view on an industrial scale and in both cases some problems arise for the environment.

The Spanish project MIPLASCOE is focused on the recovery of this waste by means of the extraction of different monomers by microbial fermentation and the synthesis of biopolyesters that, after a subsequent modification, are expected to have the suitable properties for its use in profile extrusion and production of bottles by injection blow moulding. MIPLASCOE aims at producing bioplastics for the railway sector and orange juice packaging from wastes of the juice industry.

At this stage efforts have been focused on conservation of waste to maximize concentration of fermentable sugars and minimize the presence of inhibitors of the fermenting process.

In parallel, the consortium has been working on the synthesis of polybutylene succinate (PBS) from succinic acid and 2,3 butanediol, by polycondensation, achieving at lab scale a molecular weight (Mw) from 15.000-45.000.

