DeliSoil

Delivering soil improvers from circular food production processes to boost soil health

Practice Abstract 12

Solid-state fermentation (SSF) to turn agri-food side-streams into exopolysaccharide(EPS)-based biostimulants for stress-resilient crops

Summary

Solid-state fermentation (SSF) was tested in the Spanish Living Lab (Catalonia) as a practical way to upgrade local agri-food by-products into an agronomic input, using very little free water and equipment that can be scaled from small batches to cooperative or industrial level units.

Several by-products and bacteria were compared, and the most promising case was a sugar-rich juice-processing side-stream, especially ginger juice waste, fermented with an EPS-producing bacterium, because it combined good process stability with consistent formation of the targeted biopolymer (EPS) with biostimulant potential. This means that side-streams that are often a management cost for processors can become a feedstock for a biostimulant added-value product that can be reintegrated into the same regional value chain.

Practical Recommendations

For farmers and value-chain actors, the easiest implementation pathway is a local partnership: a juice/food processor supplies a suitable, fresh food processing side-stream, while a cooperative or service provider runs SSF in controlled batches. In practice, this relies on simple operational rules that are easy to apply on SSF site: keep the material uniformly moist and aerated, avoid compaction and overheating, and use clean handling to ensure product safety and repeatability.

Author:

Enric Garcia Muchart, Pedro Federico Rizzo, Yasmina Chourak, Zbigniew Emil Blesa.
UVic-UCC

Country:

Catalonia, Spain

Keywords:

SSF
Crop resilience
Biostimulants

Stakeholders:

Farmers
Agronomists
Fertiliser companies
Food waste generators

DeliSoil

Delivering soil improvers from circular food production processes to boost soil health

The resulting EPS-rich liquid extract can be formulated and tested first in straightforward uses such as seed treatment or low-dose irrigation, especially where salinity and water stress reduce early establishment and crop uniformity. The main added-value is turning a local by-product into a higher-value, bio-based input with a clear sustainable complete value-chain, while creating opportunities for new services and local circular business models and reducing waste management pressure. If commercialised, practitioners should align the product with the applicable biostimulant legislative requirements and basic safety/quality checks (currently the EU regulation 2019/1009 and the Spanish regulation RD 506/2013).

Coordinator:

Ansa Palojärvi
Luke
ansa.palojarvi@luke.fi

Contact:

Enric Garcia Muchart
UVic-UCC
enric.garcia.muchart@uvic.cat

Needs addressed by the practice

Helping local food-chain actors valorise their side-streams through SSF into EPS-based biostimulants that farmers can use to improve crop performance under stress.

About DeliSoil

The EU-funded DeliSoil project is a four-year initiative that aims to transform food industry byproducts into safe, sustainable, and tailored soil improvers. This project addresses two pressing challenges: the poor recycling of industrial food processing byproducts and the degradation of soil health.

By harnessing a circular approach, DeliSoil will contribute to improving soil health and productivity, supporting the EU Mission "A Soil Deal for Europe" and the Farm to Fork Strategy, as well as other Circular and Bioeconomy Strategies and Plans.

Funded by the European Union

Funded by the European Union under the Horizon Europe Programme, Grant Agreement No. 101112855 (DeliSoil). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them. Swiss partners (FiBL) have received funding from the Swiss State Secretariat for Education, Research and Innovation (SERI).

Designed by ERINN Innovation