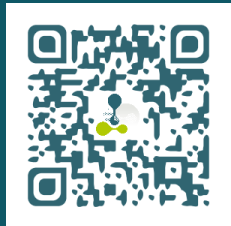


Coupling of process steps for the microbial production of glutamate and xylitol from wheat bran

-  FRACTIONATION & BIOREFINERY
SYNTHONS & FUNCTIONALIZATION
-  Pretreatment – Main treatment –
Separation & purification



SUGARMIX

> Involved Components



> Contacts

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Context

The agri-food sector generates significant volumes of co-products, including wheat bran, which remains under-utilized despite being an abundant, renewable, sugar-rich resource. In the context of ecological transition and the search for sustainable solutions, these lignocellulosic biomasses represent a strategic resource for the production of high-value bio-based molecules.

SUGARMIX addresses this opportunity by proposing an integrated biorefinery scheme. The goal is the simultaneous production of two platform molecules from wheat bran: Glutamic acid (an amino acid used in nutrition, animal feed, and green chemistry), and Xylitol (a natural sweetener with agri-food, pharmaceutical, and cosmetic applications).

This approach optimizes biomass valorization while reducing costs associated with preliminary separation steps.

Description

The technology developed within SUGARMIX relies on coupling three complementary process units:

1. Enzymatic hydrolysis of wheat bran, generating hydrolysates rich in fermentable sugars, with adjustable C5/C6 sugar ratios to suit specific needs.
2. Mixed-culture fermentation, combining a glutamate-producing bacterium and a xylitol-producing yeast, without prior sugar separation.
3. Membrane separation processes (such as electrodialysis and nanofiltration) to isolate and purify the two target molecules.

This innovative coupling demonstrates the feasibility of an integrated, modular process that can be transferred to other agricultural co-products.

Scientific and Technological Outcomes

- Develop fine control of hydrolysis conditions to adjust the composition of sugar hydrolysates
- Demonstrate the feasibility of co-production of glutamate and xylitol on real hydrolysates
- Confirm the potential of membrane processes for selective purification
- Establish a long-term scientific collaboration between partners, paving the way for new projects

Advantages

- Integrated and innovative approach coupling hydrolysis, fermentation, separation
- Flexibility with respect to raw materials and wheat bran compositions
- Transferability to other lignocellulosic biomasses

Potential Applications

- Sustainable production of bio-based molecules (glutamate, xylitol)
- Design of more competitive multi-product biorefineries
- Reduction of waste and carbon footprint in existing agricultural value chains

Target audience / Transfer intention

The SUGARMIX technology is intended for industries in the agri-food, green chemistry, and biotechnology sectors seeking to develop new value-added valorization pathways for by-products, through collaborative partnerships.

Development Stage

1 2 3 4 5 6 7 8 9

