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Ph.D. thesis (2023-2026)

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Study the Nature of Wood Oligosaccharides for their Prebiotic effects

Étude de l'effet de la nature des oligosaccharides d'hémicelluloses de bois sur leurs propriétés prébiotiques

BioChip

Context

The establishment of biorefineries is crucial for enabling integrated production of food, feed, chemicals, materials, fuels, and energy in the future.

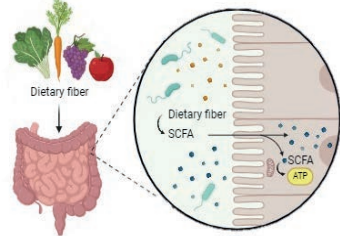
Hemicellulose valorization

valorizing hemicellulose plays a crucial role in maximizing:

- resource utilization
- diversifying product streams
- reducing waste
- promoting sustainability in biomass processing industries.

Prebiotics

Due to their structural resemblance to common dietary fibers, wood-based oligosaccharides exhibit prebiotic characteristics, providing advantageous effects on the host's health by selectively influencing the composition of the gut microbiota¹.



Funded by:

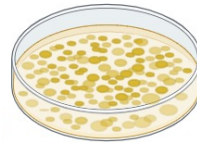


Objectives

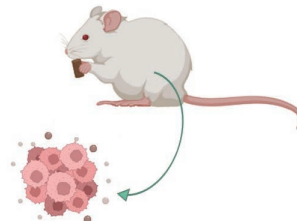
- Purification and characterization of the Oligosaccharide solution's fractions with the possibility of having an immunomodulatory effect



- Finding the most relevant microbial consortium and system to initially screen the fractions



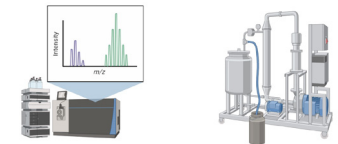
- Study the promising fractions *in vivo*, to evaluate the immunomodulatory effect of the fractions



Methods

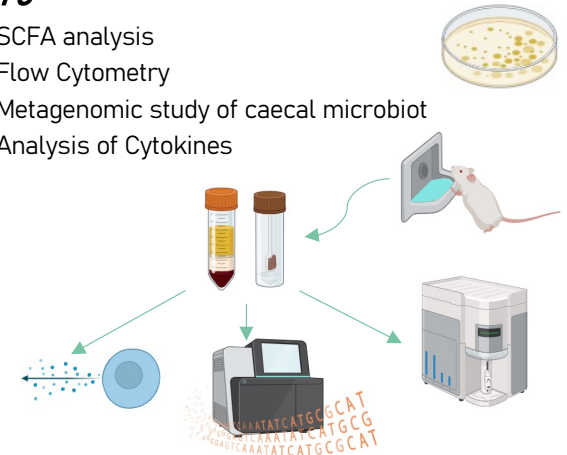
Oligosaccharides purification and characterization

- Ultrafiltration
- HPLC
- FTIR
- MALDI ToF



Prebiotic tests including *in vivo* and *in vitro*

- SCFA analysis
- Flow Cytometry
- Metagenomic study of caecal microbiot
- Analysis of Cytokines



Graphics created with BioRender.com

1.La Rosa, et al.(2019). Wood-derived dietary fibers promote beneficial human gut microbiota. *MSphere*, 4(1), 10-1128.