UNIVERSITEIT GENT

FACULTY OF **BIOSCIENCE ENGINEERING**

HIGH-THROUGHPUT CUSTOMIZED PRODUCTION OF ARABINOXYLAN-OLIGOSACCHARIDES (AXOS)

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1. Why?

Processing of residual biomass as raw materials provides **economic and ecological benefits** due to its **biorenewability**.

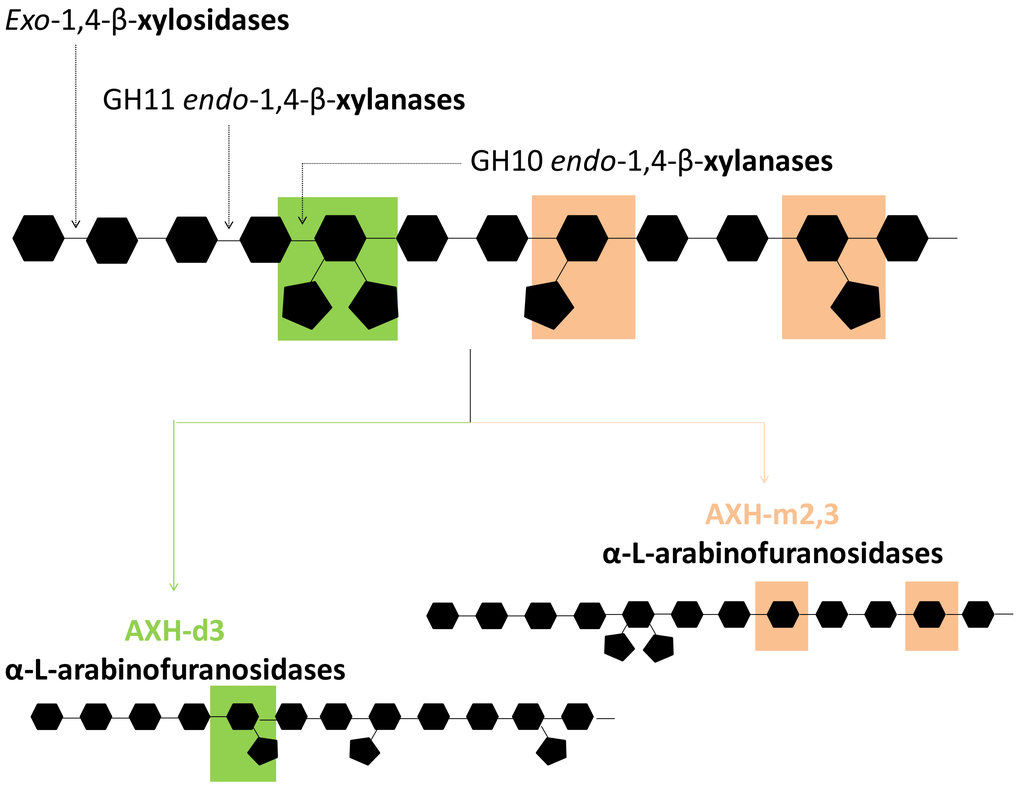
Florestal, agricultural and industrial **wastes** or **by-products** contain considerable amounts of **arabinoxylan**

Arabinoxylans are **complex substrates** and its hydrolysis require the combination of **diverse enzymatic activities.**

Arabinoxylan-oligosaccharides are potential **PREBIOTICS** that can improve the **overall intestinal health**.

2. How?

ENZYMATIC DEGRADATION OF ARABINOXYLAN:
combination of different substrate specificities



3. Experimental set-up

Engineering techniques for modular proteins — Library of multicatalytic enzymatic complexes based on dockerin-cohesin affinity active on arabinoxylan *high-throughput*

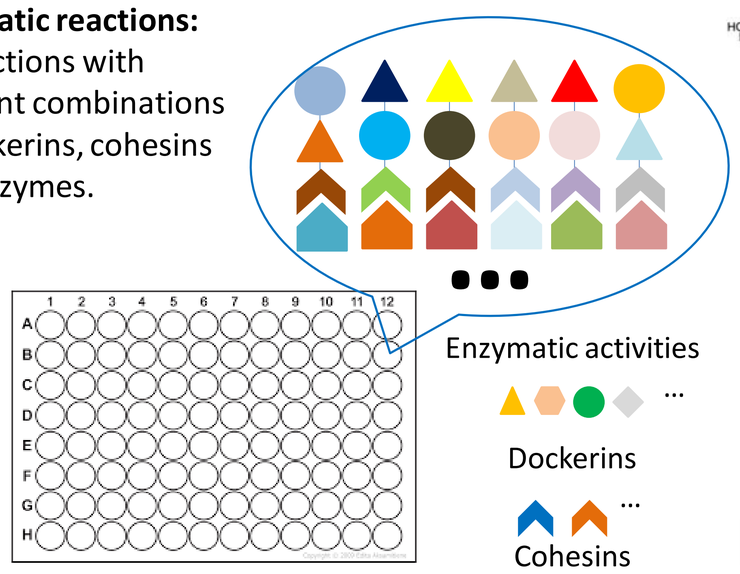
Activity test (96-well plate) — Enzymatic reactions with appropriate substrates *high-throughput*

Analysis of AXOS formed — By DSA-FACE: DNA sequencer-aided fluorophore-assisted carbohydrate electrophoresis *high-throughput*

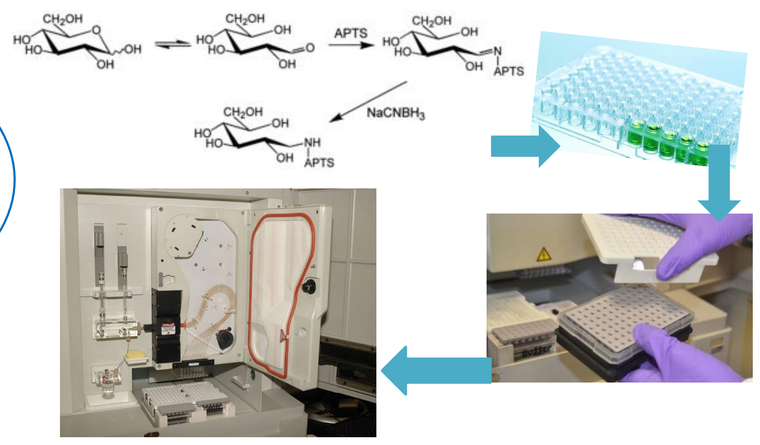
4. In the L.A.B. …

A. Looking for suitable multicatalytic complexes depending on the AXOS needed.

Enzymatic reactions:
96 reactions with different combinations of dockerins, cohesins and enzymes.



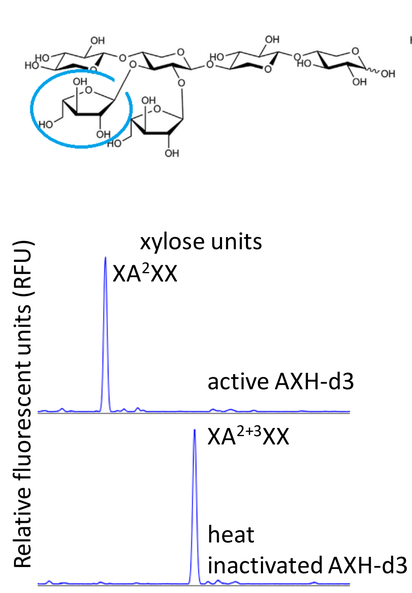
B. DSA-FACE (fluorescent detection)



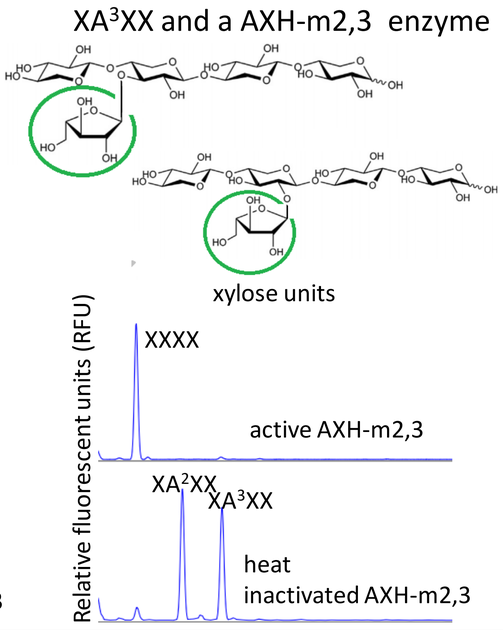
Resolution	good separation for AXOS
LOD	from 38 pM to 55 pM for the AXOS studied
Analysis time	1 plate in approximately 15 h

DSA-FACE electropherograms:

1. Reaction with $XA^{2+3}XX$ and a AXH-d3 enzyme



2. Reaction with $XA^{2}XX$ and $XA^{3}XX$ and a AXH-m2,3 enzyme



Laboratory of Applied Biotechnology (L.A.B.)

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Focuses on synthetic biology of **modular proteins**

- Modular proteins: each module folds autonomously and has a dedicated function

Design and development of **tailor-made modular proteins** for customized applications in **medical and industrial biotechnology**.

- Engineering of the specific protein modular composition

Novel engineering and selection methods are developed to pursue these goals

PhD students & Research

Agnieszka Łątka
Agnieszka.Latka@ugent.be
'I am trying to figure out how single phage proteins influence host specificity of whole bacteriophages.'

Hans Gerstmans
hans.gerstmans@ugent.be
'My research is about developing high-throughput screening assays for modular enzymes.'

Julie Vanderstraeten
julie.vanderstraeten@ugent.be
'I am developing designer cellulosomes to efficiently convert waste material into second generation sugars and other valuable end products.'

Maria Fonseca
MariaJoao.Fonseca@ugent.be
'I aim to develop enzymatic complexes for the high-throughput production of arabinoxylan-oligosaccharides (AXOS) originated from waste material.'

Silke Vlyminck
Silke.Vlyminck@ugent.be
'I am developing new enzymatic treatment methods for fungal infections.'