

Alicia TESTON

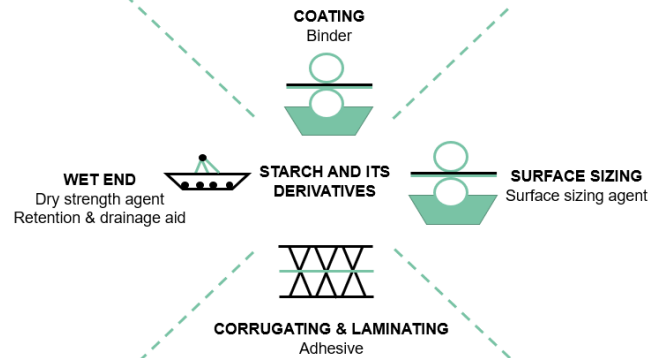
Ph.D. thesis (2023-2026)
LGP2 (C. Chirat ; N. Marlin)

Biorefinery Integrated In Paper Recycling : Starch Extraction from Recycled Paper/Cardboard and its Valorization into High Value-Added Products

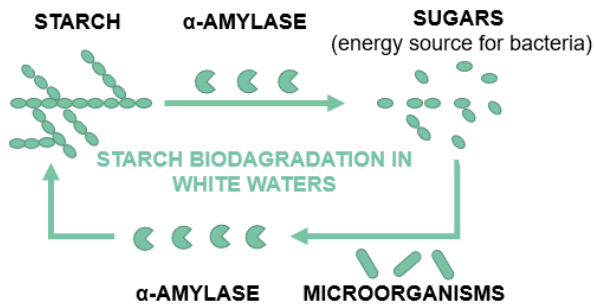
Bioraffinerie intégrée au recyclage des papiers/cartons récupérés : Extraction de l'amidon des fibres de récupération et sa valorisation en produits à haute valeur ajoutée

Context

Use of starch in papermaking : 40 – 60 kg/ton of paper



Environmental impact and runability issues related to starch release during paper recycling operations

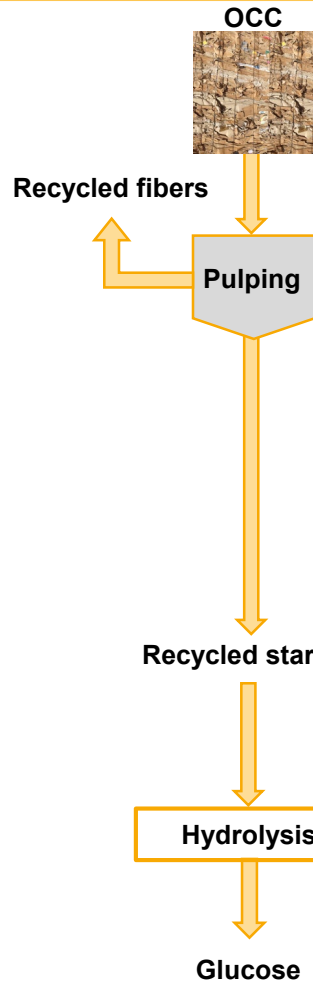


- Microorganisms growth
- Odor and scaling issues
- BOD/COD increase
- Biocides overconsumption

Funded by

In collaboration with

Objectives & Methods



1) Determination of starch content in Old Corrugated Containers (OCC)

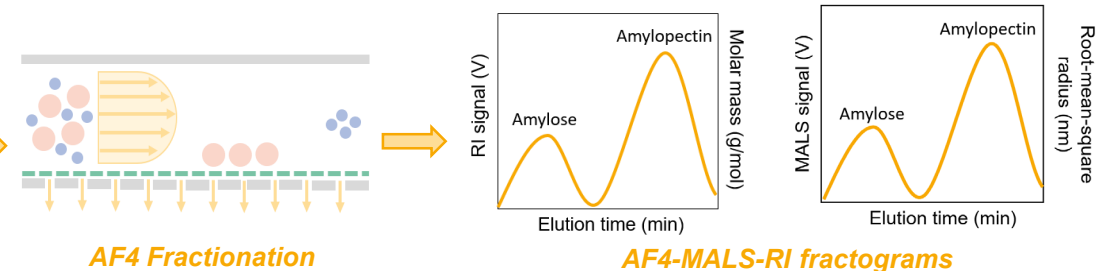
- Iodine Method (TAPPI Test Method : 419 om-91)
- Megazyme Total Starch Kit Assay : enzymatic hydrolysis of starch followed by glucose content measurement using glucose oxidase – peroxidase reagent / UV-vis.

2) Optimization of pulping operating conditions to maximize starch extraction from OCC

- pH, temperature, pulp consistency, duration, use of chemicals e.g. α -amylase.

3) Characterization of the recycled starch using Asymmetric Flow Field-Flow Fractionation with Multi-Angle Light Scattering and Refractive Index detection (AF4-MALS-RI)

- Determination of mass percentage and average weight-average molar mass of amylose (AMY) and amylopectin (AMP), AMY/AMP ratio.



4) Optimization of starch depolymerization into glucose

- Acid hydrolysis : HCl and H₂SO₄.
- Enzymatic hydrolysis : α -amylase and amyloglucosidase.

