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

Biorefinery integrated in paper/board recycling : extraction of starch from recycled cellulosic fibers and its valorization into high value-added products

Bioraffinerie intégrée aux recyclage des papiers et cartons : extraction de l'amidon des fibres cellulosiques de récupération et sa valorisation sous forme de produits à haute valeur ajoutée

BioChip

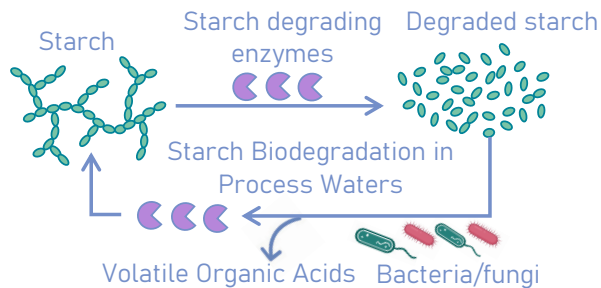
Context

Use of Starch in Papermaking

- Versatile additive : dry strength agent, retention aid, coating binder, adhesive for corrugated boards
- The paper industry consumed 1.6 million tons of starch in Europe in 2023, according to CEPI

Issues Related to Starch

- When recycled papers/boards are used to produce new paper/board grades, part of the starch contained in them ends up in the process waters, leading to microbiological, process and environmental issues



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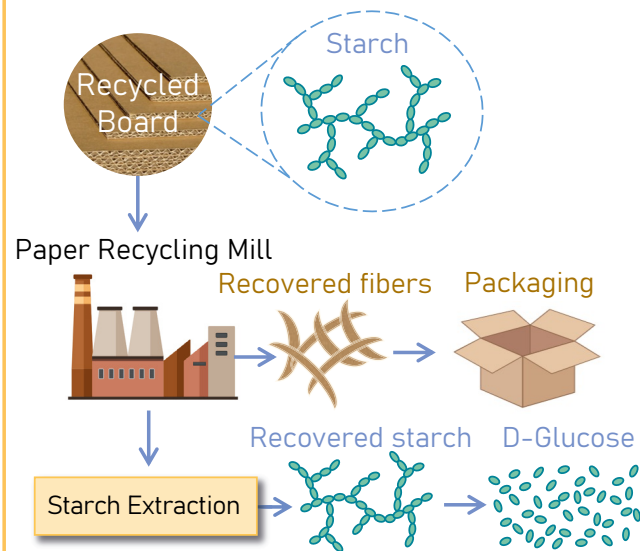


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Objectives

Development of a Starch Extraction Process at the Beginning of Paper/Board Recycling Operations

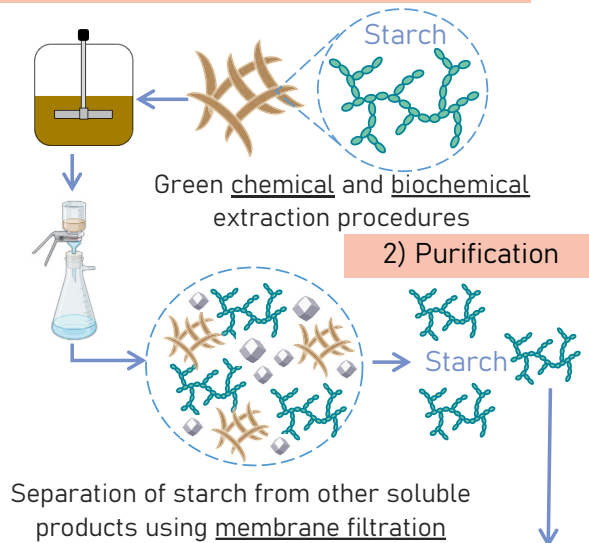


Development of a bioeconomy-compliant approach to :

- ✓ Minimize the amount of starch released in process waters during papermaking operations
- ✓ Valorize starch (considered up to now as a contaminant) into high value-added products

Methods

1) Extraction of Starch from Recycled Fibers



3) Characterization

Determination of the macromolecular features of the recovered starch using AF4-MALS-dRI

4) Depolymerization

Enzymatic hydrolysis of starch into D-Glucose

