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Oxidative processes for recycled fibers upcycling

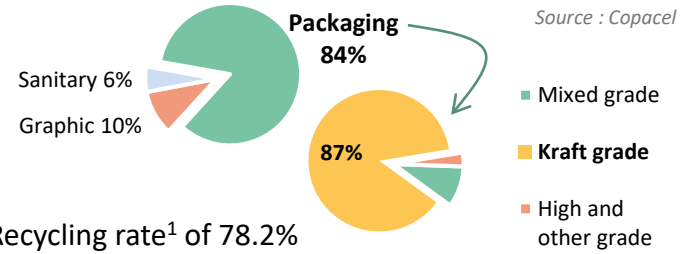
Procédés oxydants pour la valorisation des fibres recyclées

Biochip

Context

- **EU laws on reduction of the impact of plastic products on the environment**
- **Paper and Board recycling in France in 2022**

Consumption of recovered paper and board



Recycling rate[1] of 78.2%
Recovery rate[2] of 70.2% and of 89.3% for packaging

Increased demand for recycled fibers ⇨ Lower fibers quality ⇨ Reduction of packaging strength properties

[1]*Collection/Consumption*
[2]*Consumption of recovered papers/Production*

- **PEPR PAC3R project**

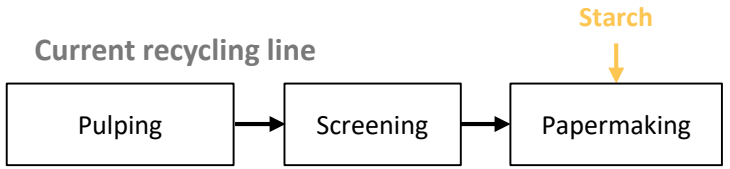
PACkaging, Recycling, Recyclability, Re-use of papers and carboards

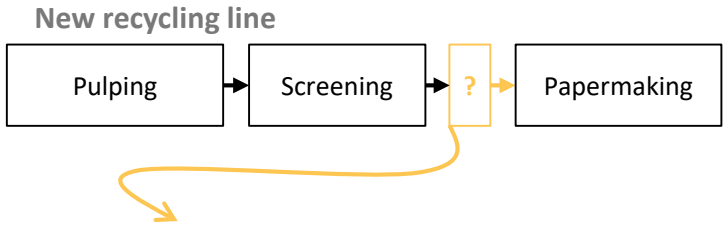
Funded by: anr agence nationale de la recherche — France 2030 Programme de recherche Recyclage

Objectives

To develop new sustainable chemical process to upcycle recycled fibers for packaging applications

To improve the fiber properties originating from the recycling of cardboards



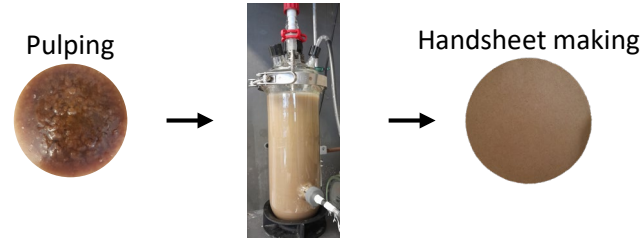


Fiber upcycling using chemical processes

- To increase the fiber bonding potential and water resistance
- To limit the use of additives (starch for example), responsible for process and wastewater treatment issues

Methods

Carboxyl groups creation on lignin and carbohydrates by oxidative process of the lignified recycled fibers



⇨ Promote the interfiber hydrogen bonds by increasing the lignin hydrophilic character and reducing its stiffness

Fiber hydrophilization by grafting process

Mechanical and chemical characterizations

Raw materials

Real recycled paper	Model paper
Industrial recycled corrugated paper - with contaminants	Unbleached refined kraft pulp - free of contaminant