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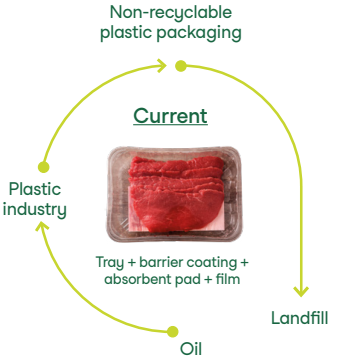
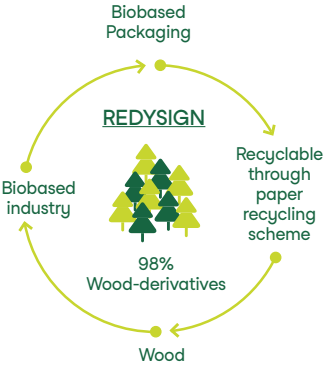
Towards a recyclable, biobased alternative for fresh meat packaging

REDYSIGN Concept

REDYSIGN aims to develop new sustainable bio-based materials to replace the non-circular plastic food packaging products. The project focuses on creating a completely bio-based, smart and recyclable fresh meat packaging solution for which every intermediate product —tray, barrier coating, absorbent pad, and transparent film— will be almost exclusively wood-based (macro-micro-nanofibres, lignin and sugars). The new packaging solution will incorporate two sensors to prevent food spoilage (one to detect early rotting, one to detect breaks in the cold chain) and an identification marker to improve sorting and thereby increase recycling efficiency.





Main project innovations

01

Efficient processes for transforming wood into Fibre-based Packaging (FBP)

- Enzymatic pretreatments on softwood chips to reduce the energy consumed in the production of TMP.
- New processes to obtain wood-derived compounds that can be integrated into different parts of fresh meat packaging.
- Technologies for fiber processing with low water consumption (high-consistency functionalization, dry thermoforming).

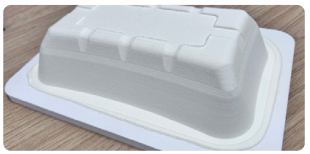
TMP Production in high-pressure Refiner

MNFC production in conical Refiner

02

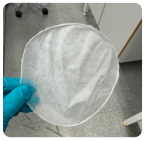
Wood-derived products for fresh meat packaging

- Develop new plastic-free, fully recyclable trays and absorbing pads.
- Create new bio-based barrier coatings able to fulfil barrier requirements.
- Design flexible (lid) films based on lignocellulosic micronanofibers (LCMNF) for FBP.

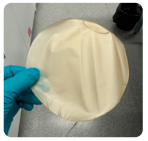


Dry-molded tray

Plastic-free absorbing pad



Nanocellulose films without lignin

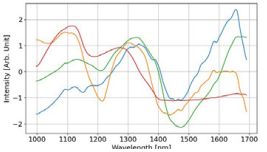


Lignin containing nanocellulose films

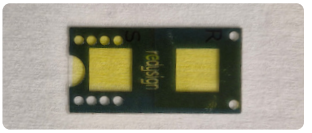
03

Smart packaging

- Develop two anti-food spoilage sensors and integrate them into the FBP product.
- Design a novel multi-spectral quality assessment system for in-line, real-time characterization of FBP waste.
- Use advanced AI techniques to analyze large data sets from the in-line quality system.



Spectra acquisition of contaminants

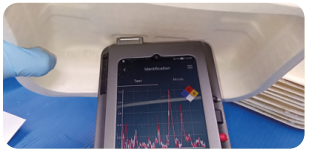


Anti food-spoilage sensor

04

More efficient recycling and upcycling technologies for contaminated FBP

- Produce new identification markers and integrate them in the package components, enabling efficient sorting of contaminated FBP.
- Develop new advanced oxidative and enzyme-assisted treatments to increase energy efficiency of recycling process, improve the properties of recycled fibres and valorize the recalcitrant fractions.



Tray with identification marker

Ozone-based advanced oxidative treatments

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Resource-efficient processes for the production and circularization of innovative Recyclable-by-Design fresh meat smart packaging from wood

13	7	5	4
PARTNERS	COUNTRIES	MILLION EUROS BUDGET	YEARS

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Video
REDYSIGN: Towards a circular-by-design, biobased alternative for fresh meat packaging.

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