UP cycle

SUstainable PlastiC biorefinerY for reCyclable and biodegradabLE packaging

Turning non-recyclable mixed plastic waste into next-generation biodegradable and recyclable packaging.

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BACKGROUND

- Over 460 million tonnes of plastics are produced every year, yet only 9% are recycled globally.

- Plastic packaging represents 40% of plastic demand and 60% of plastic waste in Europe.

- Two-thirds of packaging is single-use; half is discarded within a year. Most are made from recalcitrant plastics that persist for centuries, losing 95% of their material value after first use.

- In 2022, only 37.8% of post-consumer packaging waste collected in Europe was recycled (multilayer and contaminated materials remain the main barriers.)

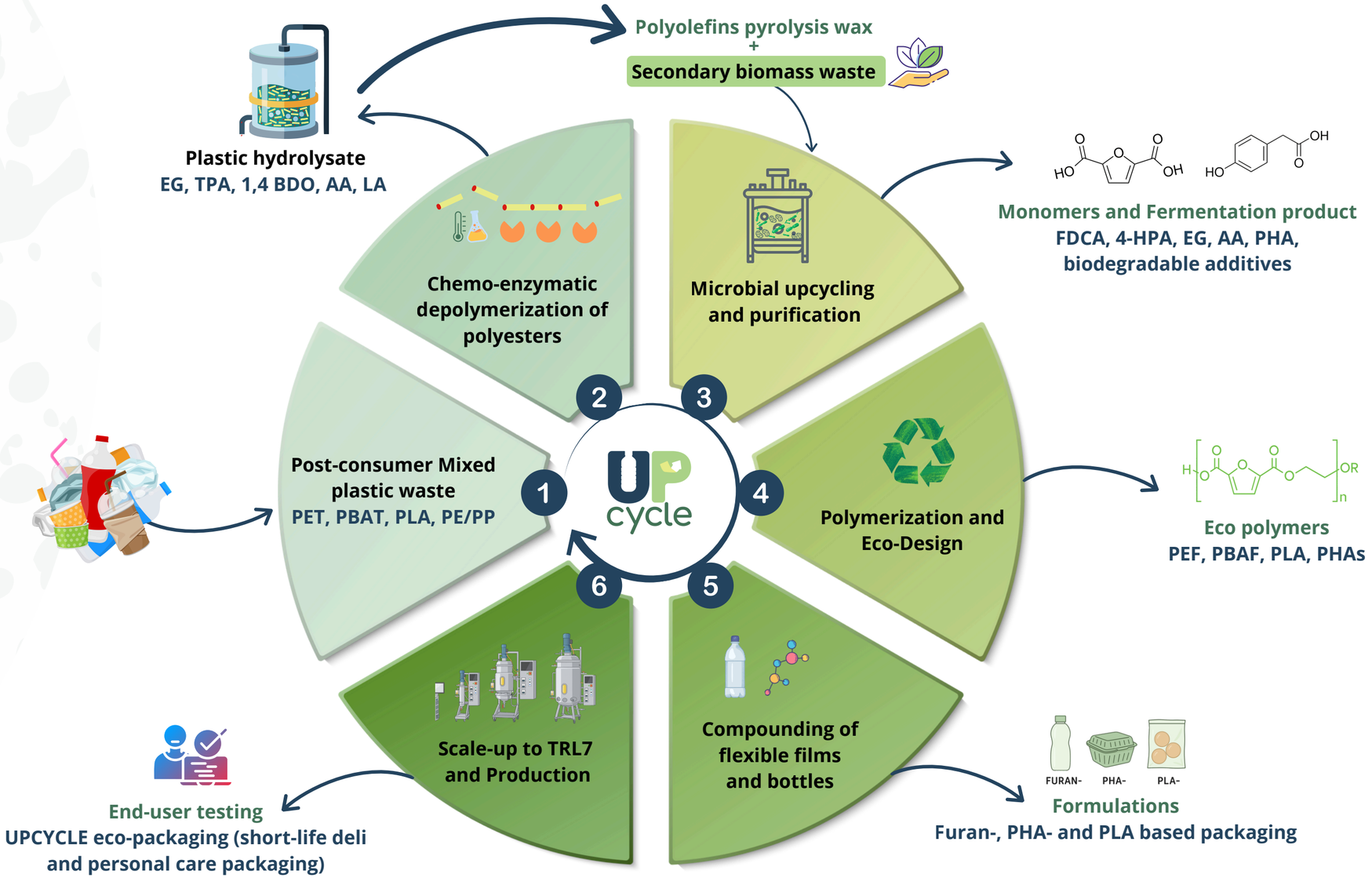
WHAT'S UPCYCLE?

UPCYCLE is a Horizon Europe project that turns non-recyclable mixed plastic waste into next-generation highly recyclable and/or biodegradable packaging materials.

Building on the H2020 UPLIFT results, which reached TRL5-6 (small pilot scale), UPCYCLE advances these technologies to TRL7, addressing key challenges in scalability, process intensification, and industrialisation.

19	10	48	4	7.9
PARTNERS	COUNTRIES	MONTHS	USE CASES	MILLIONS

UPCYCLE BIOREFINERY CONCEPT



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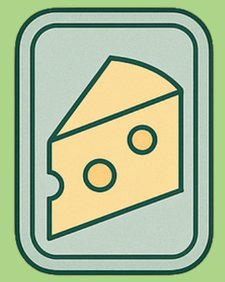
TARGETED APPLICATIONS

Vegetable flexible packaging (salads)



Short-lifetime deli packaging (cheese)

Beverage bottles (e.g, liquid kefir)

Personal care bottles (shampoo)

IMPACT

1. A versatile plastic biorefinery process to valorise mixed plastic waste (both fossil- and bio-based) and secondary biomass residues;

2. AI-powered fast-track innovation for process intensification and scale-up to TRL7

3. A smart polymerisation and formulation strategy using bio-based, degradable additives to tune recyclability/biodegradability and enhance technical performance for four selected packaging use-cases (furan-, PHA- and PLA-based formulations)

4. A Safe-and-Sustainable-by-Design framework to ensure safety (i.e., non- toxic additives), a reduction in GHG emissions (-30%), and economic viability (<40% selling price).

CONSORTIUM PARTNERS

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Pack4Food

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SUSTAINABLE SOLUTIONS

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THANK YOU

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