From Brewery Waste to Biobased, Circular Packaging: BioSupPack brings on innovation for PPWR Compliance

At a demonstrative scale and in real operational, BioSupPack has developed and validated 6 key innovations that address critical challenges in the packaging industry.

18 partners, coordinated by AIMPLAS, have joined efforts to transform brewery waste into high-value packaging materials and to enable the recycling of this packaging through cutting-edge recycling technologies.

The results of the BioSupPack project are now available for industry adoption, offering innovative solutions for biopolymer producers, biorefineries, packaging manufacturers, and brand owners in the food, cosmetics, and consumer goods sectors.

Valencia (26-3-2025).- The EU-funded BioSupPack project has successfully demonstrated that brewery waste can be transformed into high-performance bioplastics for sustainable packaging. Over five years, the consortium has developed and validated innovative polyhydroxyalkanoate (PHA and PHB) materials and production processes that offer viable alternatives to fossil-based plastics while supporting compliance with the EU Packaging and Packaging Waste Regulation (PPWR).

The BioSupPack project concludes today its activities with an online event, bringing together 18 high-level organizations across the PHA and PHB-based bioplastics supply chain. The project has been funded by the Circular Bio-based Europe Joint Undertaking (CBE JU, formerly BBI JU) with 7.6 million euros under the European Union's Horizon 2020 research and innovation programme (Grant Agreement No. 101023685).

The 18 partners have joined forces under the coordination of AIMPLAS, the Plastics Technology Centre based in Valencia, Spain.

Rosa González Leyba (AIMPLAS), project coordinator, emphasises: "*BioSupPack has demonstrated that we can create a true circular economy by turning brewery waste into valuable packaging materials and by recycling the packaging waste through innovative recycling technologies like enzymatic recycling. Our consortium has successfully scaled up innovative biorefinery processes and developed biobased materials for rigid packaging*

for food and non-food applications, obtaining packaging prototypes which are very close to the current counterparts on the market."

Six Key Innovation Results Achieved

At a demonstrative scale and in real operational environments, BioSupPack has developed and validated key innovations that address critical challenges in the packaging industry:

1. Biorefinery Process for PHB Production from Brewery Spent Grains: BioSupPack has developed a scalable bioprocess that efficiently converts brewery spent grains into high-purity PHB through an innovative plasma pretreatment and microbial fermentation. This innovation transforms a low-value waste stream into a functional biopolymer while creating industrial symbiosis between breweries and bioplastics producers. The process has reached TRL 6, demonstrating feasibility in industrially relevant environments.

2. PHA-Based Coating Formulations and compostable Fibre-based Packaging: BioSupPack has developed PHA plastisol coatings that are 99% biobased and fully biodegradable. These coatings can be applied to paperboard as alternatives to PE coatings, as well as to textiles as replacements for PVC. The innovation is protected by Centexbel's patent and has reached TRL 6, ready for licensing to coating manufacturers.

3. Compostable Fibre-Based Packaging: The consortium has created industrially compostable, fibre-based packaging with barrier properties comparable to fossil-based plastics. Applications include ice cream cups and trays. This solution enables companies to meet sustainability goals while offering dual end-of-life options. The innovation has reached TRL 7.

4. PHB-Based Formulations for Rigid Packaging: SABIOMATERIALS has developed PHB-based materials optimised for rigid packaging applications such as bottles and displays for retail applications. The materials are produced from renewable waste streams, are fully biodegradable, both mechanically and enzymatically recyclable, and have been specifically formulated for improved processability by extrusion blow moulding and injection moulding. The innovation has reached TRL 7, with industrial-scale production.

5. Rigid Packaging for different sectors: ILAB has obtained bottles for dressings and personal care products and AIMPLAS has developed and produced a beer bottle display for the retail sector.

6. Sorting prototype for the novel biobased and enzymatic recycling process: The sorting prototype for the packaging waste from IRIS, will allow the recovery of the new

packaging waste streams for the subsequent enzymatic recycling, which has shown to be an effective end-of-life for these packaging materials, due to the development of novel selective enzymes.

Market Relevance and Industrial Impact

BioSupPack's innovations directly address the packaging industry's transformation driven by the EU Packaging and Packaging Waste Regulation (PPWR). With the requirement that all packaging must be recyclable by 2030, and growing demands for sustainability from consumers and regulators, the project's results provide validated pathways for industry to transition from fossil-based to biobased, circular packaging solutions. The technologies developed can be integrated into existing manufacturing infrastructure, reducing technical and economic barriers to adoption.

The project provides critical evidence for European policy frameworks including the European Green Deal, the EU Bioeconomy Strategy, and the Clean Industrial Deal. By demonstrating that high-performance bioplastics can be produced from industrial waste streams at scale, BioSupPack supports Europe's industrial resilience, resource autonomy, and climate objectives while creating new value chains and economic opportunities in the circular bioeconomy. The results achieved by BioSupPack are now available for uptake by industry stakeholders, including biopolymer producers, biorefineries, packaging manufacturers, and brand owners in the food, cosmetics, and consumer goods sectors.

For more information:

Project website: www.biosuppack.eu

Open-access documents: https://zenodo.org/communities/biosuppack

LinkedIn: https://www.linkedin.com/company/biosuppack-project/

About AIMPLAS

At AIMPLAS, the Plastics Technology Centre, we are committed to building a better world by promoting sustainable innovation in the field of plastics. Our goal is to support companies in creating wealth and employment, while helping to address major societal challenges.

We provide comprehensive, tailored solutions that include R&D&I projects, training, competitive and strategic intelligence, technical and legal consultancy, as well as technological services such as analysis and testing.

We are firmly committed to sustainability and actively contribute to the 17 United Nations Sustainable Development Goals (SDGs) through both our operations and our social responsibility initiatives.

As a member of the Network of Technological Institutes of the Valencian Region (REDIT), we are further empowered to deliver value and foster knowledge transfer within the business community.

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