

AFTER-BIOCHEM: A EUROPEAN FLAGSHIP PROJECT COMES TO A CLOSE, PAVING THE WAY FOR SUSTAINABLE INDUSTRIAL GREEN CHEMISTRY

CIRCULAR BIOECONOMY | LOCAL | FLAGSHIP | AFTER-BIOCHEM PROJECT

The AFTER-BIOCHEM project, a major initiative funded by the European Union's Horizon 2020 programme and the Bio-Based Industries Joint Undertaking (BBI JU, predecessor of CBE JU), officially came to an end on April 30, 2025. Over the last five years, the project has delivered on its promise to demonstrate an innovative, sustainable and scalable biorefinery model for converting biomass residues into high-value bio-based building blocks.

Led by AFYREN, the consortium has succeeded in creating a first-of-its-kind industrial plant that transforms sugar industry byproducts and organic waste into carboxylic acids and esters, providing greener alternatives to fossil-based products in a wide array of sectors. The partners and CBE JU officials met on June 25 in Metz and Carling Saint-Avoid (France) to reflect on this successful journey and visit the plant.

Five years of technical and industrial achievements

Over the project's 60-month duration (May 2020 – April 2025), AFTER-BIOCHEM mobilized 12 partners and a total budget of €33 million, including €20 million EU funding. The primary ambition to build and operate a flagship biorefinery capable of producing 16,000 tons per year of bio-based acids was achieved and led to the creation of close to 80 industrial jobs in Carling Saint Avold, France, to operate the biorefinery (estimation of 250 indirect jobs contribution).



Plant visit during the closing event on June 25th, 2025

In the life of the project coordinated by AFYREN, the AFTER-BIOCHEM partners proved their dedication to this innovative development. These combined efforts helped AFYREN's team to build the biorefinery (with the support of engineering group TECHNIP), reach continuous production in June 2025 and demonstrate command of all key stages of the AFYNERIE® process, an anaerobic biomimetic fermentation-based process.

Nicoló Giacomuzzi-Moore, CBE JU Executive Director commented: *“The successful completion of the AFTER-BIOCHEM project marks a significant milestone for Europe's bioeconomy. Led by the innovative company AFYREN, this project puts sustainability and circularity at the heart of industrial transformation, demonstrating how cutting-edge bio-based solutions can make our industries greener and more resilient. Its success is a testament to the power of combining CBE JU funding with regional and local support, and it showcases how strong public-private collaboration can drive real, long lasting impact.”*

Valorisation of non-food biomass residues

AFTER-BIOCHEM led to deeper industrial collaboration and knowledge on the valorization of biomass residues as feedstocks for chemistry. The project allowed optimized fermentation of sugar beet byproducts from Südzucker AG and a long-term contract has been established between the 2 companies to ensure a regional sourcing of sustainable renewable raw materials for the plant AFYREN NEOXY. The partnership allowed also the exploration of alternative feedstocks such as biowaste from SUEZ, for the bio-based acids production.

Acceptance of the market: Excellent commercial prospect

By achieving plant continuous production, AFYREN will be able to provide the food, feed, flavors & fragrances, lubricants, life sciences and materials markets' actors with sustainable alternatives to traditional ingredients. During AFTER-BIOCHEM, AFYREN agreed supply contracts representing total cumulative revenue over €165 million to be recognized in upcoming years.

The market success was also driven by several industrial leaders in the project, especially: CELANESE, KEMIN, FIABILA, and FIRMENICH. The valuable expertise of the partners on key markets defined the best practices for the collection of relevant feedback data on the bio-based acids' quality and efficiency in the industrial production process.

Sidestream valorization and environmental gains

Beyond the core production, all the AFTER-BIOCHEM partners had high expectations about the environmental performance of the production process to deliver bio-based acids with a better environmental impact than traditional ingredients. Another important focus was the valorization of byproducts to achieve a zero-waste process target. This was done by leveraging TERRIAL's expertise. Several valorization routes were investigated, including composting and direct field application, ensuring zero-waste strategies, and thus reinforcing the project's commitment to circular bioeconomy models.

On the sustainability front, SPHERA led an in-depth Life Cycle Assessment (LCA), Life Cycle Costing (LCC), Material Circularity Indicator (MCI) evaluation and a Social Life Cycle

Assessment (s-LCA). The analysis confirmed the biorefinery model developed by AFTER-BIOCHEM contributes significantly to reducing environmental impact (*i.e. environmental impact reduced by 5 compared to fossil-base benchmarks*), improving resource circularity, and supporting regional socio-economic development.

What is next?

By closing the loop between biomass valorization, green chemistry, and market integration, AFTER-BIOCHEM has successfully delivered a scalable and replicable model of industrial green chemistry. As short to medium term objectives, AFYREN expects to ramp-up production, deliver products to its customers on a regular basis and reach the plant's financial breakeven. Longer term objectives include the replication of new plants through partnerships, relying on local supply of biomass coproducts for the production of the bio-based acids.

Nicolas Sordet, AFYREN's CEO said: *"The past 5 years have been an outstanding experience: building teams of diverse experts, tackling major industrial challenges and meeting the needs of our clients. AFTER-BIOCHEM has proven a business model for the future which will improve the environmental impact of many final products. We are deeply thankful to our partners and the European Commission for their support in making this possible"*

ABOUT AFTER-BIOCHEM

AFTER-BIOCHEM is a unique opportunity to turn agricultural processing co-products into new product streams. The project core technology is based on 10 years of R&D at AFYREN. The technology can turn biomass into high added-value and natural products using its all-in-one cutting-edge fermentation process based on natural micro-organisms (100% GMO-free process and products). The project will also implement a "zero waste" strategy based on an optimised production process; all the fermentation outputs are valorised into valuable products: seven organic acids and one mineral co-product that can be used respectively as ingredients and fertiliser. The bio-based and natural compounds will have applications in various markets such as food and feed, fragrances and flavors, personal care, pharmaceuticals, and industrial chemicals.

12 European project partners

4 SMEs:



7 large companies:



1 innovation cluster:



Duration: 60 months (From May 2020 to April 2025) | Total subvention: €20 million | Total budget: €33 million

AFTER-BIOCHEM has been granted €20 million funding from the Bio-based Industries Joint Undertaking (BBI JU) under grant agreement No 887432. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

AFTER-BIOCHEM website: <https://after-biochem.eu/>

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