



FLASH NEWS

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1. EQUIPMENT & TECHNOLOGY

Biocatalysis/Bioconversion

4429 - New discoveries about the way nitrogenases work

Researchers at the [Max Planck Institute for Terrestrial Microbiology](#) in Marburg, Germany, have identified two electron transport proteins – ferredoxins – that are essential for the catalytic activity of iron (Fe) nitrogenases. Their research shows that iron nitrogenases do not just fix nitrogen: they can also convert carbon dioxide into short-chain hydrocarbons. The researchers characterized the electron transport to the Fe-nitrogenase in the model bacterium *Rhodobacter capsulatus* and showed that two different electron transport proteins, called ferredoxins, are essential for N₂ fixation. This versatility points to the potential for nitrogenases to act as catalysts for the sustainable production of industrial bulk chemicals. Understanding the role of ferredoxins in nitrogenase catalysis marks a turning point in research into the sustainable production of ammonia and carbon compounds. By identifying these proteins as targets to optimise electron flow, the researchers are laying the foundations to improve the efficiency of nitrogenases as biocatalysts.

Next steps: continue the work to improve our understanding of the role of ferredoxins. Use synthetic biology to modify them and accelerate the turnover of the nitrogenase enzyme by providing electrons more efficiently.

Publication: Two distinct ferredoxins are essential for nitrogen fixation by the iron nitrogenase in *Rhodobacter capsulatus*. Journal: American Society for Microbiology. DOI: 10.1128/mbio.03314-23.

More information: [Mpi Marburg.mpg.de](#)
En savoir plus : [Energine.com](#), [Bionity.com](#)

4430 - A new sustainable pathway to produce proteins from methanol-derived coal

A team at the [Chinese Academy of Sciences Tianjin Institute of Industrial Biotechnology](#) used gasification to convert coal into methanol. A modified strain of the yeast *Pichia pastoris* was then used to ferment the methanol and produce a complete protein, containing vitamins, amino acids, fats, inorganic salts and carbohydrates. With a methanol-to-protein conversion rate of 92%, this method far exceeds the yields obtained from conventional sources of plant-based proteins. Proteins produced this way have superior nutritional properties to those of plant-based proteins, with a dry cell weight of 120 g/litre and a crude protein content of 67.2 %. This new pathway does not require arable land, remains unaffected by seasonal variations and climate, and is thousands of times more efficient than conventional fermentation methods.

Publication: Deciphering cell wall sensors enabling the construction of robust *P. pastoris* for single-cell protein production. Journal: Biotechnology for Biofuels and Bioproducts. DOI: 10.1186/s13068-023-02428-7.

More information: [Interesting Engineering.com](#), [FeedNavigator.com](#)
En savoir plus : [La Nouvelle Tribune.info](#), [Geo.fr](#), [Techno Science.net](#)

4431 - A new pathway to simultaneously produce carotenoids and key ingredients of plastics

Researchers at [Great Lakes Bioenergy Research Center](#) (GLBRC) at the [University of Wisconsin-Madison](#), United States, have demonstrated that it is possible to modify the bacteria *Novosphingobium Aromavorans* (sometimes just referred to as *Novo*) to simultaneously produce two high-value chemicals from lignin. In 2019, researchers engineered a strain that can produce 2-pyrone-4,6-dicarboxylic acid (PDC), a key ingredient of plastics such as nylon and polyurethane. More recently, a GLBRC team discovered another modification that allows *Novo* to make cis, cis-muconic acid (ccMA), another commodity chemical used to make plastics. The GLBRC team used genomic

modelling to compile a list of potential products that could be made from biomass aromatics. Near the top of the list was zeaxanthin, one of a group of organic pigments known as carotenoids. Researchers knew that *Novo* had the genes to produce another carotenoid with little market value. Based on the bacteria's genome sequence, they suspected that zeaxanthin was a 'stepping stone' to that less valuable carotenoid in the process that cells use to make complex molecules. By deleting or adding selected genes, they engineered strains that produced zeaxanthin as well as other carotenoids (beta-carotene, lycopene and astaxanthin) when grown on an aromatic compound commonly found in lignin. Next, the team showed that the engineered bacteria could produce the same carotenoids from a liquor made from ground and treated sorghum stems, a solution that contains a mixture of aromatics that many industrial bacteria can't digest. By combining the genetic modifications needed to produce PDC and a carotenoid in the same bacteria, the researchers obtained strains that produced both PDC and the target carotenoid, with no discernible loss to either yield. In addition, the bacteria accumulated carotenoids within their cells, which must be separated from the solution that contains the PDC.

The discovery could make it possible to produce biofuel in a more sustainable and commercially viable way.

Next steps: find out whether the engineered strains can co-produce carotenoids and ccMA. Use strain engineering to improve yields under industrial conditions.

Publication: Production of carotenoids from aromatics and pretreated lignocellulosic biomass by *Novosphingobium aromaticivorans*. Journal: Applied and Environmental Microbiology. DOI: 10.1128/aem.01268-23.

More information: Glbrc.org

En savoir plus : Enerzine.com

4432 - New funding to develop novel microbial strains to produce specific fatty acids

Swedish company AAK, an expert in the production of vegetable fats and oils, and Chalmers University of Technology, Sweden, have received a grant to fund the development of advanced metabolic engineering tools to generate novel microbial strains to produce speciality lipids. These could then be used in various application areas such as food, nutrition, health and personal care. The funding was awarded by Novo Nordisk Foundation (NNF) within the 'Industrial Biotechnology and Environmental Biotechnology' platform. It aims to boost collaboration between universities and companies to make significant contributions to the sustainability of society and the environment.

More information: Aak.com

4433 - Publication of a white paper on the valorisation of cellulosic sugars

Leaf by Lesaffre, the Lesaffre unit specialising in the development of fermentation solutions for manufacturers, has published a white paper reviewing the valorisation of cellulosic sugars, covering both existing processes and forthcoming innovations:

- Depiction of the production processes for both 1G and 2G sugars, as well as the associated market and political implications;
- Development of the technical and chemical aspects;
- Focus on the opportunities for innovation and challenges to be overcome;
- Insights and interviews from market and process experts.

More information: Leaf Lesaffre.com

Synthetic biology

4434 - Enzymes can't tell the difference between artificial DNA and real DNA

A team of researchers at Skaggs School of Pharmacy and Pharmaceutical Sciences at the University of California, United States, discovered that RNA polymerase, one of the most important enzymes involved in protein synthesis,

was able to recognise and transcribe an artificial base pair in exactly the same manner as it does with natural base pairs. The study uses a new version of the standard genetic alphabet – the Artificially Expanded Genetic Information System (AEGIS) – that incorporates two new base pairs. Originally developed by Benner, AEGIS began as a NASA-supported initiative to try to understand how extraterrestrial life could have developed. By isolating RNA polymerase enzymes from bacteria and testing their interactions with synthetic base pairs, they found that the synthetic base pairs from AEGIS form a geometric structure that resembles the Watson and Crick geometry of natural base pairs. The result is that the enzymes that transcribe DNA can't tell the difference between these synthetic base pairs and those found in nature. In addition to expanding the possibilities for synthetic biology, the findings also support the tautomer hypothesis that dates back to Watson and Crick's original discovery. This hypothesis states that the standard four nucleotides can form mismatched pairs due to tautomerization, or the tendency of nucleotides to oscillate between several structural variants with the same composition. The researchers think this phenomenon is one source of point mutations, or genetic mutations that only impact one base pair in a DNA sequence. Dong Wang, a professor at Skaggs School of Pharmacy and Pharmaceutical Sciences, said, '*Tautomerization of mispairs has been observed in replication and translation processes, but here we provide the first direct structural evidence that tautomerization also happens during transcription.*'

Their discoveries could help scientists engineer new drugs by making it possible to design custom proteins.

Publication: A unified Watson-Crick geometry drives transcription of six-letter expanded DNA alphabets by *E. coli* RNA polymerase. Journal: Nature Communications. DOI: 10.1038/s41467-023-43735-9.

More information: [ScienceDaily.com](https://www.sciencedaily.com)

En savoir plus : [Crumpe.com](https://www.crumpe.com)

4435 - Development of a synthetic biochemical cycle that directly converts CO₂ into Acetyl-CoA

A team at the [Max Planck Institute for Terrestrial Microbiology](https://www.mpg.de/1200000/terrestrial-microbiology) has developed the THETA cycle: a new pathway to fix synthetic CO₂ which comprises several central metabolites as intermediates and can directly convert CO₂ into Acetyl-CoA in one cycle. This characteristic makes it possible to divide it into modules and integrate it into the central metabolism of *E. coli*. The THETA cycle involves 17 biocatalysts, and was designed around the two fastest CO₂-fixing enzymes known to date: crotonyl-CoA carboxylase/reductase and phosphoenolpyruvate carboxylase. The researchers demonstrated the functionality of the cycle in the laboratory. Then, using machine learning-guided optimisation, they improved the Acetyl-CoA yield by a factor of 100. To test its *in vivo* feasibility, incorporation into the living cell had to be carried out step by step. The researchers divided the THETA cycle into three modules, each of which was successfully implemented into the bacterium *E. coli*. The functionality of these modules was verified through growth-coupled selection and/or isotopic labelling.

Publication: Construction and modular implementation of the THETA cycle for synthetic CO₂ fixation. Journal: Nature Catalysis. DOI: 10.1038/s41929-023-01079-z.

More information: [Press release](https://www.pressrelease.com)

En savoir plus : [Enerzine.com](https://www.enerzine.com)

4436 - Discovery of an enzyme pathway for the synthetic production of cancer medicine

The synthetic production of paclitaxel, an anti-cancer drug sold under the brand name Taxol, could be about to get easier further to research conducted by a team at the [Beijing National Laboratory for Molecular Sciences](https://www.mpl.mpg.de/), China. The team has identified the enzymes responsible for production of baccatin III, a complex precursor in the biosynthesis of the drug. Previous methods for synthesising paclitaxel in the lab have up to 30 steps, use hazardous reagents and source baccatin III from yew trees or plant cell culture. Now a team of researchers in China has reported that just nine genes are needed to produce baccatin III in tobacco plants. Biosynthesis of baccatin III is complicated because each enzyme can produce multiple substrates, but researchers were able to untangle which genes were involved in each step by expressing a sub-family of cytochrome P450 genes, called CYP725A, in cell cultures and feeding those cells known substrates. According to the researchers, the crucial missing steps for baccatin III synthesis were the enzymes responsible for oxetane ring formation and C9 oxidation. A new bifunctional enzyme the team named taxane oxetanase (TOT) was responsible for the former. The team then identified an

enzyme called T9αH which performed the C9 oxidation. In total, they identified nine genes and their enzymes required to produce baccatin III. To confirm the pathway, they expressed the genes in modified tobacco plants, producing baccatin III.

Next steps: continue work on the metabolic pathway and develop ‘a synthetic biology approach to produce baccatin III in large scale.’

Publication: Characterization and heterologous reconstitution of *Taxus* biosynthetic enzymes leading to baccatin III. Journal: Science. DOI: 10.1126/science.adj3484.

More information: [Chemistry World.com](https://www.chemistryworld.com)
En savoir plus : [Crumpe.com](https://www.crumpe.com)

Microbial consortia

4437 - MetaPath project: improving our understanding of microbial consortia to facilitate the development of new fermented products

The project's public and private partners announced that they had reached a significant milestone: validation of omics analysis methods and the development of a first functional version of the software enabling the reconstruction of the metabolic networks involved in the production of molecules of interest. The first stage of this project was the development and validation of specific ecosystem analysis methods to generate the data on which to base the reconstruction of metabolic networks. Cheese group [Bel](#) and [Lesaffre](#), which specialises in yeast, animal feed and fermentation, have developed metagenomic or genomic, metatranscriptomic and volatilomic methods applied to sourdough (for Lesaffre) and cheese (for Bel). For its part, [MetaToul](#), Toulouse's metabolomics and fluxomics platform, has developed metabolomic analysis methods for the same two applications. At the same time, [Abolis Biotechnologies](#), through its [Microbiome Studio](#) division, has built the software's technical base and developed the algorithms needed to process the omics data that will be used to reconstruct the metabolic networks then model them. This solution will make it possible to use complementary information from these different data sets to reconstruct reliable metabolic networks, whereas current tools analyse these data individually. In the next stages, Bel, MetaToul and Lesaffre will provide data for each application. These data will enable Abolis Biotechnologies to further develop tools for processing, visualising and modelling metabolic networks on concrete industrial cases, while also drawing on public databases.

Recap: MetaPath won the ninth call for ‘strategic projects to drive competitiveness’ and is supported by the French government under the France 2030 investment plan funded by Bpifrance. The project will culminate in the design of a software product called Microbiome Studio, which will open the door to a detailed understanding of the microbial ecosystem on a molecular level. It will be both a tool to help understand microbial systems and a tool to aid innovation thanks to very accurate predictions of the complex metabolic behaviour of microbial consortia. It will serve all the applications in which such consortia are involved (fermented beverages, sourdoughs, dairy products and fermented dairy analogues, etc.) MetaPath is a four-year project launched in 2021.

En savoir plus : [Communiqué de presse](#)

Modelling/AI

4438 - Bioptimus: a new generative AI model designed specifically for biology

French start-up [Bioptimus](#) has launched following a seed funding round for \$35 million (€32 million) led by [Sofinnova Partners](#) and [Bpifrance](#) via its [Large Venture](#) fund. The following American and European investors also joined the round: [Frst Capital](#), [Cathay Innovation](#), [Headline](#), [Hummingbird](#), [NJF Capital](#), [Owkin](#), [Top Harvest Capital](#) and entrepreneur Xavier Niel. Bioptimus, which brings together an international team of scientists from Owkin and

former researchers at [Google DeepMind](#), is set on revolutionising biology using cutting-edge AI foundation model technologies that capture the various scales of biology. Bioptimus will benefit from Owkin's data generation capabilities and multimodal patient data sourced from its network of leading teaching hospitals worldwide. It will also use the scalable and secure computing environment from [Amazon Web Services](#) (AWS), a recognised leader in its field. Fuelled by an abundance of data from all scales and modalities, the system will create computational representations that are far better than those trained solely on public datasets and a single data modality. The data will then be connected to 'fuel scientific breakthroughs and accelerate innovation in biomedicine and beyond.'

More information: [Press release](#)

En savoir plus : [Bpifrance.fr](#), [L'Usine Digitale.fr](#), [Les Echos.fr](#)

4439 - A new partnership to develop novel enzyme solutions

British group [Johnson Matthey](#) (JM) and British company [Basecamp Research](#), which has developed a map of global genetic biodiversity for AI-based protein design, have entered into a partnership to accelerate the development of more sustainable, biobased catalysts for the pharmaceutical, agrochemical and fine chemistry industries. More concretely, the two partners hope that their work will 'improve the quality and scope of biocatalysts available to the market, covering the most critical chemical transformations such as asymmetric reductions of ketones and chiral reductive amination, which are used to produce the fundamental building blocks in organic synthesis.' By making it possible to understand the full genetic, evolutionary, and environmental context of each protein, the map of global genetic biodiversity developed by Basecamp Research facilitates the design of process-ready enzymes for specific reactions. The tool is critical for the expansion of JM's biocatalysis portfolio.

Info: JM has already licensed a broad substrate-scope active enzyme which was sampled from a natural source and selected by Basecamp Research. In compliance with the Nagoya Protocol on access to genetic resources and the fair and just distribution of the benefits, Basecamp has passed on royalties to a conservation organisation near the location where the enzyme was discovered.

More information: [Press release](#)

En savoir plus : [L'Usine Nouvelle.com](#)

New equipment

4440 - Bio Base Europe Pilot Plant (BBEPP) invests in new facilities to increase its purification capacity

[BBEPP](#), a service provider for process development, scale-up (laboratory level to a multi-ton scale) and custom manufacturing of biobased products and processes, announced its involvement in two new investment projects supported by the European Regional Development Fund: [Bio Base Advance](#) and [Bio Base Release](#).

The Bio Base Advance project aims to respond to the urgent need for protein diversification and the demand for the scale-up of fermentation and purification processes for sustainably produced microbial proteins. BBEPP therefore intends to accelerate the scale-up of innovative processes by investing in additional equipment for the purification of microbial proteins from the fermentation medium, as well as in infrastructure for treatment and analysis of the process waters produced.

The new infrastructure will also be automated and equipped with state-of-the-art sensors to monitor, control and model the processes and perform life cycle analyses.

The Bio Base Release project intends to help with the release, into the medium, of molecules produced during fermentation processes. The project enables BBEPP to invest in specialised equipment to, on the one hand, control and monitor fermentation processes and, on the other, perform cell lysis.

These two projects represent a total investment of almost €6 million in additional equipment, 40% of which is financed by the European Regional Development Fund and an additional 10% by Flanders Innovation and Entrepreneurship (VLAIO).

More information: [Press release](#)

Processes

4441 - Discovery of new marine bacteria that break down plastic waste

Researchers at the [University of Stirling's Faculty of Natural Sciences](#), Scotland, in collaboration with [Mons University](#), Belgium, have identified 'rare and understudied' bacteria that could play a role in plastic biodegradation. The researchers took plastic samples from Gullane Beach in Scotland. They then used state-of-the-art comparative metaproteomics and multi-omics to resolve not only which microorganisms were present on marine plastic pollution, but also which microorganisms were active. By analysing the proteins expressed by the active microorganisms, the researchers discovered enzymes actively involved in breaking down plastics. In addition, the team developed new methodologies to improve predictions in marine microbiology research.

Next steps: conduct more in-depth research to determine the function of microorganisms colonising marine plastic pollution across larger geographic areas.

Publication: Novel functional insights into the microbiome inhabiting marine plastic debris: critical considerations to counteract the challenges of thin biofilms using multi-omics and comparative metaproteomics. Journal: *Microbiome*. DOI: 10.1186/s40168-024-01751-x.

More information: Stir.ac.uk
En savoir plus : 24 Heures.ca

4442 - Design of an enzyme that breaks down silicon-carbon bonds in siloxanes (silicones)

Scientists at [California Institute of Technology](#) (Caltech) have used directed evolution to develop a bacterial enzyme named cytochrome P450. The researchers started by identifying a variant of cytochrome P450 in their collection of enzymes that had a very weak ability to break silicon-carbon bonds in so-called linear and cyclic volatile methylsiloxanes, a common subgroup of the siloxane family. They mutated the DNA of the cytochrome P450 and tested the new variant enzymes. The best performers were then mutated again, and the testing was repeated until the enzyme was active enough to enable the researchers to identify the products of the reaction and study the mechanism by which the enzyme works. The final improved enzyme does not directly cleave the silicon-carbon bond but rather oxidises a methyl group in the siloxanes in two sequential steps. Basically, this means that two carbon-hydrogen bonds are replaced with carbon-oxygen bonds, and this change allows the silicon-carbon bond to break more readily. The researchers say that while practical uses for their engineered enzyme could still be a decade away or more, its development opens the possibility that siloxanes could one day be degraded biologically. Siloxanes are found in products used in household cleaning, personal care and the automotive, construction, electronics and aerospace industries.

Publication: Directed evolution of enzymatic silicon-carbon bond cleavage in siloxanes. Journal: *Science*. DOI: 10.1126/science.adi5554.

More information: SciTechDaily.com
En savoir plus : Issues.fr

4443 - End of the Incite project to develop new processes to produce commodity and speciality chemicals through enzymatic catalysis.

Launched in September 2019 and funded by the Horizon 2020 programme, the [project's](#) specific goal was to 'build two enzymatic conversion pilot units within four years.' This goal was achieved: [Oleon](#) inaugurated an industrial demonstration unit for sustainable oleochemicals with an annual production capacity of 3,000 tonnes of esters in June 2023 in Antwerp, Belgium. In addition, a second industrial pilot, which focuses on the enzymatic synthesis of

a chiral molecule that will be used as a building block in the synthesis of crop protection products, as well as in the public health field, was commissioned in September 2023 on [Endura](#)'s site in Ravenna, Italy.

En savoir plus : L'Usine Nouvelle.com

Miscellaneous

4444 - Carnot 3BCAR: kick off for six bioeconomy projects

Nine revitalisation projects were selected at the end of 2023. They all have a link to the themes addressed by Carnot 3BCAR: biomolecules, bioenergies and biobased materials. Six of these projects began in early 2024:

- **E-Lasto**: modulation of the enzyme activity of glycoside hydrolases immobilised on elastomeric surfaces by mechanical stretching. This 24-month project aims to develop a generic approach to the controlled and directed immobilisation of enzymes on functionalised elastomeric surfaces.
- **FormuAfla**: formulation of a plant-based extract to combat Aflatoxin B1 crop contamination. This 24-month project aims to formulate a biological pest control product to combat the contamination of maize fields with moulds that are carcinogenic to humans.
- **HYMEC**: hybrid microbial electrolyser for the production of hydrogen and the valorisation of fermentation side streams. This 24-month project aims to develop a low-cost system to produce green hydrogen via a bioelectrochemical pathway.
- **TC Nanocell**: production of materials formulated with cellulose nanocrystals and nanofibrils via uniaxial thermocompression. This 24-month project aims to develop biobased packaging to replace non-biodegradable plastic packaging.
- **MethaSolCN**: Predictive methods combining potential nitrogen mineralisation and carbon stability to optimise anaerobic digestion and the return of digestate to the soil. This 24-month project aims to develop methods that will contribute to the understanding and monitoring of the future of carbon and nitrogen in the systems; analysis of synergies and conflicts and prediction of the methane potential using the IsBaMO (index for the stability and bioavailability of organic matter); and the use of near-infrared spectroscopy.
- **DUB.ME Biomethane**: biogas desulphurisation and upgrading to biomethane in a single step, via microbial synthesis. This 30-month project aims to improve purification and desulphurisation techniques for biogas produced via anaerobic digestion.

These projects will pave the way for the production of products, processes and technologies with real-world applications that can be used by businesses and therefore stimulate the bioeconomy in industry.

Info: the other three projects funded by Carnot 3BCAR are expected to launch in the coming months.

En savoir plus : 3BCAR.fr

2. APPLICATIONS, MARKETS & APPLIED SCIENCES

Food and feed

4445 - Bon Vivant

The Lyon-based [start-up](#), which uses precision fermentation to produce milk proteins without cows, announced that it had joined [Club Excellence](#), the business network for growing companies supported by [Bpifrance](#). The network aims to connect companies to help them boost their businesses together. Club Excellence helps business owners

ramp up their development through networking, by offering them the perfect environment to share experiences and good practices and form two-way business relationships. Bon Vivant warmly thanked Bpifrance for *'taking a chance on alternative proteins, and supporting us with the environmental transition of the dairy sector. Joining Bpifrance's Club Excellence is far more than just another membership: it's an opportunity to join a top-notch community driven by ambition and innovation.'*

En savoir plus : [LinkedIn.com](#)

4446 - Danisco

The Danish industrial group, an expert in the production of lactic ferments and other processing aids for the agri-food industry, announced the inauguration of the global R&D centre of its owner, American group [International Flavors and Fragrances](#) (IFF), in Dangé-Saint-Romain, France, and the extension of its lactic ferments production site. The new R&D centre, which has a surface area of 3,800 m², works on *'the ferments of the future, in an agri-food industry that is constantly looking for innovative products to adapt to the tastes of its customers.'* It required an investment of €12.4 million, €1.4 million of which was from the Nouvelle-Aquitaine region, and €200,000 of which from the Grand Châtelleraut *communauté d'agglomération*. Danisco also invested €6.2 million, €800,000 of which received from the French government through the France 2030 investment plan, to expand its production unit by around 700 m². The unit will grow ferments for *'plant-based fermented products'*, otherwise known as soy, oat or almond 'dairy' products.

En savoir plus : [L'Usine Nouvelle.com](#), [Les Echos.fr](#)

4447 - Green Spot Technologies

The [start-up](#), which has developed a fermentation process to convert fruit, vegetable and cereal co-products into natural ingredients with functional and nutritional benefits, announced that it had been chosen to appear in the prestigious 2023 [FoodTech 500](#) compiled by [Forward Fooding](#). This ranking highlights innovative businesses that combine food, technology and sustainability. For Green Spot Technologies, *'it's a privilege to join the select circle of talented entrepreneurs chosen from over 1,500 applicants from more than 50 countries.'* The complete ranking was released on 13 March.

More information: [LinkedIn.com](#)

The start-up announced the launch of a pilot project with the Swiss-Swedish business [Tetra Pak](#), which specialises in food packaging and processing. The partnership, which has its roots in the [Accelerace Corporate Matchmaking](#) programme, will enable *'the creation of innovative, sustainable recipes for the agri-food industry to revolutionise the food system that we know today.'*

En savoir plus : [LinkedIn.com](#)

4448 - Imagindairy

The Israeli [start-up](#), which uses precision fermentation to produce lactoserum and casein proteins that are identical to those in cows milk, now has its own industrial-scale production lines. This new milestone, which was bolstered by a strategic investment from the Danone group, means it has a fermentation capacity exceeding 100,000 litres, though the company is already planning to expand capacity to triple this volume within the next two years. Imagindairy claims this operation positions it as *'the first company in the industry to fully own and operate its own industrial-scale production lines exclusively for animal-free milk proteins'* and will be able to offer its customers *'animal-free dairy products at cost parity to traditional dairy, all while maintaining quality.'*

More information: [Vegconomist.com](#), [FoodBusinessNews.net](#)

The United States Food and Drug Administration (FDA) has decided that the lactoserum and casein proteins produced by Imagindairy can be safely used to make dairy products, authorising American food and beverage manufacturers to work with the start-up. Imagindairy is therefore looking to team up with food businesses to 'bring basic alternative dairy products to market, such as milk, cheese, ice cream and yoghurt, without compromising on taste, price or experience.' Products made from Imagindairy's animal-free dairy products are expected to hit the shelves in America this year.

En savoir plus : [The Times of Israel.com](https://www.timesofisrael.com)
More information: [Calcalistech.com](https://www.calcalistech.com)

4449 - Kerry Group

The [Irish agri-food specialist](#) announced it had signed a definitive agreement to acquire part of the global lactase enzyme business of Chr. Hansen and Novozymes on a carve-out basis: the acquisition comprises certain trade and assets of Chr. Hansen and 100% of the share capital of Nuocheng Trillion Food, Tianjin, Co., Ltd, a Chinese subsidiary of Novozymes. The Lactase Enzymes Business which includes NOLA® Products, further enhances Kerry's biotechnology solutions capability following the acquisitions of c-LEcta and Enmex. This acquisition adds enzyme technology which helps create lactose-free and sugar-reduced dairy products, while preserving their taste. The acquisition, which required an investment of €150 million, is expected to close in the first half of 2024.

More information: [Press release](#)

4450 - Phytolon & Ginkgo Bioworks

Israeli company [Phytolon](#), which produces natural food dyes using precision fermentation-based technologies, and American company [Ginkgo Bioworks](#) announced they had successfully completed the first stage of their collaboration, the aim of which is to produce vibrant betalain pigments spanning the yellow-to-purple spectrum using cell engineering. By leveraging Ginkgo Natural Product Services, Phytolon has significantly improved the efficiency of its yeast strains to generate these vibrant, sustainable colours. Phytolon's naturally produced betalain pigments can be used throughout the food industry as safe, sustainable and viable alternatives to synthetic dyes. Having successfully reached this milestone, Phytolon is planning to bring the full palette of colours created by these two new varieties to market. Ginkgo and Phytolon will continue to work together under their existing agreement toward achieving additional milestones that further increase production efficiency.

More information: [Press release](#), [vegconomist.com](https://www.vegconomist.com), [Food Ingredients First.com](https://www.foodingredientsfirst.com)

4451 - Standing Ovation

Through the 'Agri-food Competence and Resilience' call for proposals, part of the France 2030 investment plan run by Bpifrance, the [start-up](#), which specialises in the manufacture of non-animal caseins via precision fermentation, received funding of €2 million over 20 months, 60% of which as a grant, for its CASPEX project. The aim of this project is to develop a line to purify caseins obtained via precision fermentation, becoming the first to mass produce these ingredients for dairy products. The purification module will improve process productivity and maximise the use of upstream production tools, reducing downtime for the equipment and teams. This will result in a ramp-up in production and a reduction in associated costs. The project – which paves the way for a production unit – also secures the start-up's technological progress. Standing Ovation also received a €1 million loan from French state investment bank Bpifrance as part of the [Green Invest EU Investment Loan](#). The funding will enable it to make a start on the scale-up phase for its fermented casein production process.

More information: [Eu Startups.com](https://www.eu-startups.com), [Vegconomist.com](https://www.vegconomist.com)

4452 - Vivici & Ginkgo Bioworks

Dutch start-up [Vivici](#), which uses precision fermentation to produce animal-free dairy proteins, announced that it had entered into a partnership with American biotech firm [Ginkgo Bioworks](#) to develop then sell a new generation of alternative functional proteins with the help of biotechnology. Under the terms of the agreement, Vivici will

leverage Ginkgo's extensive capabilities in strain engineering, optimisation and performance. Through the partnership, Ginkgo intends to design and build an integrated library and screen for strains with the best protein expression. It will then validate and grow the most promising strains, before transferring them to Vivici for a final assessment.

More information: [Press release](#)

En savoir plus : [L'Usine Nouvelle.com](#), [Zonebourse.com](#)

Biocontrol/Biostimulation

4453 - Amoéba

The [industrial biotech firm](#) specialised in tackling microbiological risk, which is developing an anti-ageing cosmetic ingredient, a biological pest control agent to treat crops, and a biological biocide for use in closed cooling circuits announced that, at a meeting on 14 December 2023, its Board of Directors had decided to change its mode of governance, leading to the automatic termination of Fabrice Plasson's appointments as Chairman of the Board of Directors and Chief Executive Officer. The Board of Directors unanimously appointed Benoit Villers, founder and Managing Partner of Nice & Green SA, and former General Sales Manager of the Barry Callebaut Group, as Chairman of the Board of Directors. Benoit was proposed by Nice & Green SA, which is the company's largest shareholder with a 29.4% stake. The Board of Directors also appointed Jean-François Doucet, previously Deputy Managing Director, to the position of Managing Director of the company. Jean-François has extensive experience in auditing, consulting and financial management, gained in international companies. As part of its reorientation from a research and development company to a commercial and industrial company, the new management team has established a strategy aimed at prioritising a range of highly profitable products that can be brought to market as quickly as possible. Amoéba announced it would prioritise its strategy for the biocontrol market – a '*market segment that is at the heart of its activities*' – and cosmetics market, explaining that '*to identify other markets, different uses will be tested in 2024, particularly hair (growth and regrowth) and scar treatments.*' However, Amoéba announced that it would cease its biocide activities following the European Commission's refusal to approve its product. The biocide product was, however, approved by the United States for the treatment of water in closed cooling circuits, so steps are being taken to sell this part of the business there.

More information: [Press release](#), [Press release](#)

En savoir plus : [Communiqué de presse](#), [Communiqué de presse](#)

Amoéba announced the postponement of work on its Biocontrol plant in Cavaillon pending additional funding. As discussions are still underway with several investors and business partners, Amoéba has decided to defer work on its USIBIAM industrial project in Cavaillon. The deferral will not in any way affect the company's continued progress with the various commercial initiatives already underway.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#)

4454 - FA Bio

The British [biotech company](#) specialising in the discovery and development of microbial bioproducts that can replace chemical inputs in agriculture has secured a £5.3 million (€6.20 million) investment from three European venture capital investment funds: [Clean Growth Fund](#), [Pymwymic](#) and [Ship2B Ventures](#), a Spanish venture capital fund. The new investment will support the commercialisation of its technology and fund its ongoing research work and the expansion of its team.

More information: [FA-bio.net](#)

4455 - Micropep Technologies

The Toulouse-based [start-up](#) specialising in the production of micropeptide-based biocontrol solutions announced that the United States Environmental Protection Agency (EPA) had classed its MPD-01 – a peptide-based biofungicide that controls specific plant pathogens to improve crop yield and quality – as a ‘biochemical-like’ active ingredient. Micropep Technologies can now work with the EPA to confirm data and labelling requirements to obtain a registration for MPD-01, which is required to bring this product to market. This biofungicide is a variant of a naturally occurring micropeptide discovered in tomato plants. It is inherently less toxic to humans and wildlife, more selective for the fungal pathogen, effective at lower dose rates, and rapidly biodegrades in the environment. In addition to this regulatory milestone, Micropep Technologies has conducted successful field trials of MPD-01 in various global locations, including the United States (California and North Carolina), Paraguay and France. These trials have demonstrated its efficacy in managing diseases and boosting crop production, particularly in potatoes, soybeans and grapes. The trials further indicate that MPD-01 can be an essential component in Integrated Pest Management (IPM) programmes, offering preventative and contact crop protection solutions. Depending on the crop and the environmental conditions, MPD-01 delivers up to 75% disease control, whereas most biocontrol competitors barely reach 50%. MPD-01 has a broad spectrum of activity, making it suitable to meet the challenges of disease control in countries and crops the world over.

Info: the start-up is working on two other peptides, MP594 and MP478, which show promising results and excellent efficacy during field trials.

More information: [Press release](#), [iGrow News.com](#), [AgriBusiness Global.com](#)
En savoir plus : [L'Usine Nouvelle.com](#), [Toulouse.La Tribune.fr](#)

Micropep Technologies announced the appointment of Jeff Bell as Chief Financial Officer. Jeff’s career spans more than 30 years, and he has extensive experience in financial leadership and innovation. His career, which began in Australia in 1990, includes the creation of Sterilis and raising \$14 million (€13 million) in equity investments, as well as key roles at Norwood Abbey Ltd and Norwood Immunology Ltd. In his new role at Micropep, Jeff will lead the company’s financial planning, analysis and reporting and will play a vital role in setting out its strategic direction. He will work closely with CEO Thomas Laurent, and his expertise will be essential to steer Micropep’s financial strategy, which is focused on delivering sustainable, cost-effective solutions to agricultural markets.

More information: [Press release](#)

Chemicals & materials

4456 - Avantium

The Dutch [chemicals company](#) announced it would raise €50 million to fund the development of its plant in Delfzijl, the Netherlands, specialising in the production of furandicarboxylic acid (FDCA), a monomer required to produce polyethylene furanoate (PEF), which can replace polyethylene terephthalate (PET). Avantium is counting on the participation of several long-standing investors as well as new shareholders including Pieter Kooi and Senfi. In addition to finalising construction of the plant, the fresh funds will go towards accelerating the sale of licences for the YXY and Volta technologies, while ensuring the company has the cash flow required to run operations. The Delfzijl unit, which will make 5,000 tonnes of FDCA annually, is expected to come online at some point this year.

En savoir plus : [L'Usine Nouvelle.com](#)

4457 - Balrampur Chini Mills Limited (BCML)

Indian group [BCML](#) announced it would invest over €220 million to build India’s very first industrial polylactic acid (PLA) plant. The new unit, which is ‘*expected to be completed within 30 months*’, will have an annual production capacity of 75,000 tonnes. It will use a sugar fermentation process and will be located near one of the group’s ten sugar mills, all in the state of Uttar Pradesh, India.

Info: There are now five major industrial-scale PLA producers in the market: BCML, Futerro, LG Chem, NatureWorks and TotalCorbion PLA.

More information: [The Economic Times.indiatimes.com](https://www.theeconomicstimes.com)
En savoir plus : [L'Usine Nouvelle.com](https://www.usine-nouvelle.com)

4458 - Carbios

The [French expert](#) in the enzymatic recycling of plastics and textiles announced that [CARBIOS Active](#), its enzymatic solution for 100% compostable polylactic acid (PLA), had been added to the United States Food and Drug Administration (FDA) Inventory of Food Contact Substances (FCS), with Assigned Food Contact Notification (FCN) 2325, effective since 29 February 2024. CARBIOS Active can now be used to make food contact materials for the United States, including rigid and flexible packaging, and other applications. CARBIOS Active is integrated directly into plastic conversion processes, creating a new generation of 100% compostable PLA, even at ambient temperature, without leaving toxic residues or microplastics. PLA plastic which includes this unique enzymatic solution is certified for industrial and home composting.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#)

Carbios and German group [Landbell](#), a global operator of more than 40 producer responsibility organisations (PROs) and a leading provider of closed-loop recycling solutions, have signed a memorandum of understanding for the sourcing, preparation and recycling of post-consumer polyethylene terephthalate (PET) waste at the world's first PET biorecycling plant, located in Longlaville, France. The partnership will leverage Landbell Group's expertise and network in the sourcing of PET packaging and textile waste. Thanks to Carbios' enzyme, less sorting and washing are required compared to current recycling technologies, offering savings in energy and water use. From 2026, Landbell Group will supply Carbios with 15 kt/year of prepared PET flakes, ensuring a steady supply chain for sustainable PET production. These flakes will be feedstock for production of food-grade PTA and MEG, which will be further repolymerised into PET.

Info: Through the partnership with Landbell Group, the supply of multilayer trays through the Citeo tender in France, and the memorandum of understanding with Indorama Ventures, the French company will have sourced over 70% of the feedstock required for the 50 kt/year capacity when its first commercial plant is fully operational.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](https://www.usine-nouvelle.com), [Actu Environnement.com](https://www.actu-environnement.com)

Carbios and the world-class provider of engineering, procurement and construction services in the biotech and agro-processing industries [De Smet Engineers & Contractors](#) have signed an agreement for the construction of the world's first PET biorecycling plant, in Longlaville, France. Under the agreement, De Smet has been entrusted with the project management and detailed engineering, including procurement assistance and management of Carbios' partners, to ensure the execution of the plant's construction. Over 70 members of De Smet's expert team have been assigned to the project and are working alongside the Carbios teams to ensure the project remains on-track in terms of timeline and budget, while upholding stringent quality, safety, health, and environmental standards. Construction is currently under way and on schedule. Entry into service is planned for 2025.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](https://www.usine-nouvelle.com)

The company announced that [CARBIOS Active](#), its PLA-based enzymatic solution to break down plastics, had been BPI-certified by the [Biodegradable Products Institute](#) (BPI), North America's leading authority for compostable packaging and products. Rhodes Yepsen, Executive Director of BPI, said 'BPI is pleased to have CARBIOS Active's

material certified to provide a solution to the growing number of brands working to adopt compostable food packaging.’

Recap: CARBIOS Active is designed to be directly integrated into the heart of plastic during the conversion process, at a concentration of 5%, to create a new generation of PLA that is 100% compostable, even at ambient temperature, with no toxic residues or microplastics.

En savoir plus : [LinkedIn.com](https://www.linkedin.com)

Carbios announced that it had moved into new premises in Paris’ eighth *arrondissement*. The offices are located within a co-working space, and will make it easier for Carbios to pursue its commercial development and public relations on an international level. The French specialist in the enzymatic recycling of plastics and textiles now has a ‘*strong roots across France*’, with:

- Its original office, laboratory, pilot plant and demonstrator plant in Clermont-Ferrand, Puy-de-Dôme;
- Its enzymatic research lab in Toulouse, Haute-Garonne.

Carbios will also soon have the world’s first PET biorecycling plant, in Longlaville, Meurthe-et-Moselle.

En savoir plus : [LinkedIn.com](https://www.linkedin.com)

During an interview at the Oddo BHF Forum, Carbios CEO Emmanuel Ladent announced that the company would begin selling licences to petroleum-based plastics manufacturers this year. The royalties will represent 4 to 5% of the amount invested. For example, for a 50,000-tonne plant and €200 million, Carbios would receive €5 million upon closing the deal, then €5 million once the plant is operational. Royalties will then be a minimum of €250 per tonne sold. Carbios, which believes that the bulk of its revenues will initially come from the 2026 entry into service of the world’s first PET biorecycling plant, in Longlaville, France, is expecting to receive more substantial royalties in 2030.

En savoir plus : [Investir Les Echos.fr](https://www.investirlesechos.fr)

Carbios announced the publication of its second [Sustainability Report](#). The new report, which the company is under no obligation to publish, confirms its commitment and dedication to transparency when it comes to environmental, social and governance (ESG) initiatives. By acting beyond the industrial development of its innovative technologies, the business shares its progress and ambitions for the future. Multiple targets were met in 2022, including:

- Strengthening the place of independent directors on our Board of Directors;
- Performing the first carbon assessment to act sustainably to reduce greenhouse gas emissions;
- Consolidating the life cycle analysis (LCA) of our PET enzymatic depolymerisation process;
- Continuing training for our employees, particularly in safety and environmental issues.

These initiatives help establish the foundations of its Corporate Social Responsibility (CSR) approach, which is one of the pillars of its strategy, on an equal footing with R&D and industrial and commercial development.

En savoir plus : [Communiqué de presse](#)

Last December Carbios announced that it had received the first instalment of €1.2 million (of the €11.4 granted) from the ADEME for the collaborative R&D project OPTI-ZYME. The project is investigating the technical and scientific levers for improving the competitiveness and profitability of the enzymatic PET depolymerisation process, optimising the necessary investments and reducing its environmental footprint. Conducted in partnership with the INRAE, INSA and CNRS via the TWB joint service unit and TBI joint and research unit, the OPTI-ZYME project is co-funded by the French state as part of the France 2030 investment plan run by the ADEME. It is expected to last four years.

Info: the first Monitoring Committee meeting with the ADEME for the first key stage of the project will be held in February 2024 to release the second instalment of funding.

En savoir plus : [Communiqué de presse](#)

4459 - Covestro

The German [speciality chemicals company](#) announced that its pilot plant for the production of biobased aniline, located on its site in Leverkusen, Germany, was up and running. The unit will use its patented process, which employs microorganisms to ferment sugars followed by chemical catalysis, to obtain aniline that contains 100% plant-based carbons. The new plant will produce large quantities of biobased aniline so the new technology can be further developed to an industrial scale.

More information: [Covestro.com](#)

En savoir plus : [L'Usine Nouvelle.com](#)

4460 - European Bioplastics (EUBP)

The [association](#) representing the European bioplastics industry has published a [Policy Manifesto](#) in which it calls on the European Union to develop a comprehensive Biopolymers Industrial Action Plan to accelerate the growth of the bioplastics industry in Europe. In its manifesto, the EUBP calls on the EU to implement an actionable bioeconomy strategy, supporting a strong industrial base for biopolymers, and make it one of the most important elements of the next EU policy cycle. EUBP encourages the Commission and co-legislators to develop an action plan prioritising the following six key points:

- Harmonise bioeconomy regulations across the EU;
- Encourage access to sustainable biomass;
- Enhance financial support for technological innovation;
- Close infrastructure gaps and promote food waste collection;
- Incentivize biopolymer adoption by the market;
- Increase consumer awareness.

More information: [European Bioplastics.org](#)

En savoir plus : [L'Usine Nouvelle.com](#), [La Gazette du Laboratoire.fr](#)

4461 - GreenLab & Ginkgo Bioworks

Start-up [GreenLab](#), which has developed a technology to grow proteins of interest in corn kernels, and American company [Ginkgo Bioworks](#) have signed a partnership agreement for the development of a biobased solution to break down per- and polyfluoroalkyl substances (PFASs), also known as 'forever chemicals'. To achieve their goal, GreenLab will leverage Ginkgo Biowork's technological platform to develop an enzyme fit for this purpose.

[Info] GreenLab has already developed two transformative proteins with its technology: manganese peroxidase (an environmental remediation solution) and brazzein (which delivers a high-intensity sweetness).

More information: [Press release](#)

En savoir plus : [L'Usine Nouvelle.com](#)

4462 - Lallemand Biofuels & Distilled Spirits (LBDS) & Braskem

The Lallemand group [subsidiary](#) and the Brazilian [petrochemicals company](#) have entered into a new partnership to jointly develop biobased alternatives to traditional fossil fuel-based chemicals. Using LBDS's biotechnology as a basis, the two partners want to develop biobased chemicals for Braskem's technological and commercial partners, starting with products for the solvents market. The vision for the partnership is to develop commercial-scale, low-carbon chemicals with the following attributes:

- 100% renewable with full compatibility with legacy chemical counterparts;
- Sustainably produced and sourced bio-origin feedstocks;

- Portfolio diversification for ethanol producers;
- Negative carbon footprint products.

LBDS and Braskem are now in the pilot-scale development phase of the collaboration.

More information: [Biomass Magazine.com](https://www.biomassmagazine.com)

4463 - Michelin, IFPEN & Axens

The three partners inaugurated the first industrial-scale demonstrator of a plant producing biobased butadiene in France, at Michelin's site in Bassens, Gironde. The demonstrator plant, with an annual production capacity of 25 tonnes, was built within the framework of the BioButterfly project supported by the French agency for the environment and energy management (ADEME) with the aim of developing and commercialising a butadiene production process from bioethanol derived from agricultural waste streams (corn, beets) or wood biomass, to replace butadiene from fossil fuel-based feedstocks. The demonstrator paves the way for commercialisation of the new process – which can be used to make novel synthetic rubbers without using fossil-based resources – on a global scale, and the development of a new biobased butadiene industry. Axens will commercialise this technology: an important step in delivering significant volumes of sustainable butadiene.

Recap: butadiene, a C4 diolefin, is an important chemical intermediate in the production of numerous polymers used for a whole range of applications: 40% of butadiene is used to produce elastomers for the tyre market, while the other 60% is primarily used to produce varnish, resin, ABS plastic, nylon for automobile applications, textiles and in construction.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Connaissance des Energies.org](#), [L'Usine Nouvelle.com](#), [Les Echos.fr](#)

4464 - Pili

French company Pili, which has developed a hybrid process that combines industrial fermentation and green chemistry to produce biobased dyes and pigments, inaugurated its new offices and chemical laboratories in Kremlin Bicêtre in Paris, France. Primarily, these new premises will:

- Bring the management teams and chemicals R&D teams together on the same site in Paris;
- Give Pili the option of tripling the size of its organic chemistry research team to develop its product portfolio;
- Join a flourishing ecosystem with other innovative biotech firms working in research and production on the same site.

Next up is the entry into service of its industrial-scale demonstrator plant in late 2025. Currently under construction on the chemicals platform in Roches-Roussillon, France, the plant will have an annual dye production capacity of several tonnes. The company is planning to build a plant in France further down the line.

En savoir plus : [L'Usine Nouvelle.com](https://www.usinenouvelle.com)

4465 - Plastalliance & the Association Française des Compostables Biosourcés (AFCB)

Professional organisation [Plastalliance](https://www.plastalliance.org), which covers the plastics, composites, bioplastics and additive manufacturing sectors, announced that the [French association for biobased compostables \(AFCB\)](https://www.afcb.org) had joined its network. The AFCB was created back in 2006 under the name Club Bio-plastiques and represents all the parties involved in the French biobased and biodegradable/compostable resins sector. According to the two organisations, *'Teaming up means we can ensure the voices of the businesses involved in this pioneering sector – a vital part of the circular economy – are heard loud and clear, especially on a European level.'*

En savoir plus : [Plastalliance.org](https://www.plastalliance.org), [L'Usine Nouvelle.com](https://www.usinenouvelle.com)

4466 - Samsara Eco & Iululemon

Australian company [Samsara Eco](#), which has developed a new enzymatic technology (patent pending) that can recycle nylon 6,6 sourced from end-of-life textiles, and Canadian sportswear company [lululemon](#) have launched the 'world's first' enzymatically recycled nylon 6,6 product. Lululemon used over 90% recycled nylon 6,6 to create prototypes of its long-sleeve Swiftly Tech top. These new samples offer the same fit, feel and quality as other clothing produced by lululemon.

More information: [Press release](#)

4467 - Spiber

The Japanese [start-up](#), which has developed a fermentation process to convert agricultural waste streams and end-of-life biobased and biodegradable textiles into polymers, announced that it had entered into partnerships with [Kering](#), [Eileen Fisher](#), [Johnstons of Elgin](#) and [DyStar](#) for a project to build a circular economy system to transform end-of-life biobased and biodegradable materials into new materials. Spiber's new partners have agreed to supply samples for lab-scale tests and explore the impact of textile chemicals on material bioconversion. Results from these tests will be compiled into a database for designing materials that are increasingly easy to recycle. The Japanese start-up said it was 'looking forward to building further partnerships with others in the industry to shape a more sustainable future.'

Info: Spiber's new structural proteins could be used in a range of industrial sectors such as apparel, transport, construction, artificial hair and medical devices.

More information: [Press release](#), [Spiber.inc](#)

4468 - TotalEnergies Corbion

The [joint venture](#) between broad-energy group TotalEnergies and the Dutch chemicals company has published the life cycle analysis (LCA) for recycled PLA Luminy®. The study, titled [Life Cycle Assessment of PLA through Advanced Recycling - Utilizing Waste Streams as Feedstock for a Biobased Polyester](#), concludes that the advanced recycling of PLA as a production process has a lower impact compared with its production from virgin feedstock. Specifically, the Global Warming Potential (GWP) of Luminy 30% rPLA, considering its biogenic carbon content, is 0.19 kgCO₂/kg of PLA, whereas virgin Luminy PLA emits 0.51 kgCO₂/kg of PLA. Recycling PLA allows a longer storage of this biogenic carbon which is originally from the atmosphere. Notably, when factoring in biogenic carbon content, the GWP of 30% recycled PLA is reduced by 300 kgCO₂/tPLA compared with virgin PLA, marking a significant step towards achieving global climate targets.

More information: [Press release](#)

4469 - ZymoChem

The American [company](#), which has developed fermentation processes that convert sugars into polymer precursors with help from microbes equipped with new enzymatic pathways, minimising carbon loss from the sugar in the form of CO₂, announced it had raised \$21 million (€19.4 million) through a Series A funding round. The investment was led by [Breakout Ventures](#) with participation from [lululemon Athletica](#), [Toyota Ventures](#), [GS Futures](#), [KdT Ventures](#), [Cavallo Ventures](#), [ACCELR8](#), [Alexandria Venture Investments](#), [Bricks Fund Tokyo](#), [Dudley Fund](#), [Fashion for Good](#), [Litani Ventures](#), [SOSV Investments](#) and the [Vermont Center for Emerging Technologies \(VCET\)](#). By pairing this financing with existing revenues from commercial partnerships and funding from the U.S. Department of Energy, ZymoChem will launch its first high-performance material and advance its first partnered product to commercial scale.

More information: [Press release](#)

4470 - What do the next few years hold for biobased chemistry?

Private research institute [Xerfi](#) has published a [study](#) (in French) setting out some predictions for the biobased chemistry sector and the increase in bioplastics production capacity globally between now and 2026. Their predictions are based on a detailed analysis of the main demand drivers. The study closely examines around 70 biobased chemistry firms, categorising them by profile and market segment, with a detailed presentation of the leaders of all the profiles (agro-processing, chemicals groups and specialists). It also includes a map of the main biorefineries (operational or under construction) in mainland France and decrypts the companies' main areas of development, illustrated with multiple case studies. Xerfi uses the data to assess the business perspectives of biobased chemistry specialists between now and 2026, grasp the growth of the sector and the challenges it faces, and understand the development by the chemistry heavyweights of the mass balance approach, which enables them to produce biobased products without having to use resources sourced entirely from biomass. According to the study, the sector's revenue growth is expected to pick up speed, increasing to 8% between 2023 and 2026 (compared with 6.5% between 2016 and 2023). It also finds that the cosmetics market offers the greatest prospects. In France, the natural and organic cosmetics market is expected to be worth €1.3 billion in 2025 (compared with €1 billion in 2021).

En savoir plus : [L'Usine Nouvelle.com](https://www.usine-nouvelle.com)

4471 - Biofuels: IFPEN publishes its annual dashboard

In 2022, the share of alternative fuels to oil-based petrol and diesel fuels (biofuels, LPG, NGV and electricity) increased by 2.7%, representing 8.4% of fuels consumed, or over 180 Mtoe, the highest level ever reached. Among these alternatives, biofuels accounted for 94 Mtoe, i.e. a market share of almost 51% of these alternatives and 4.3% of all fuels consumed. After tumbling more than 7% between 2019 and 2020, biofuel consumption bounced back by 3.2% between 2021 and 2022. These consumption levels and market shares are also very similar to the situation observed in 2019 (94.4 Mtoe in 2019). Among the biofuels available in 2022, bioethanol, the main substitute for gasoline, continued its post-COVID recovery, with annual growth of 3%, but without returning to its pre-crisis level. The global consumption of ethanol thus reached 52.5 Mtoe in 2022, a level similar to that of 2018. As for biofuels that replace diesel, their overall consumption remained relatively unaffected by the crisis and continued to grow, reaching a record level of 41.5 Mtoe worldwide.

After a period of relative stagnation, global investment in liquid biofuels is seeing a clear upturn, reaching nearly 5 billion dollars in 2022 and an estimate of nearly 10 billion dollars for 2023 according to S&P Global. This investment could represent an increase in global biofuel production capacity of 7 Mt, bringing total production capacity to 230 Mt. Based on existing announcements, the global biofuels market could grow by 23% over the next 5 years, reaching 160 Mt by 2028. HVO and ethanol account for two-thirds of this growth, with FAME and biokerosene accounting for the remaining third. While there is still room for growth with conventional biofuels (up to a total of around 150 Mtoe), advanced biofuels will take over from 2030 onwards, and will become the mainstay by 2050. For the entire French transport sector, biofuels are expected to increase from 7.7 to 10.5 Mtoe by 2050, with an analysis of biomass requirements based on availability trajectories defined at the national level. While the transport sector alone does not appear to pose a risk of pressure on national biomass resource potential, meeting the biomass needs of all energy sectors will require the implementation of specific supply chain deployment measures, particularly when it comes to mobilising lignocellulosic resources (wood residues, harvest residues, or even fast-growing dedicated crops).

En savoir plus : [IFP Energies Nouvelles.fr](https://www.ifp-energies-nouvelles.fr)

Energy

4472 - Airbus & TotalEnergies

European aircraft manufacturer Airbus and broad-energy group TotalEnergies have entered into a strategic partnership to address the challenges of aviation decarbonization with sustainable aviation fuels (SAFs). The partnership will cover two main areas:

- Supply by TotalEnergies of more than half Airbus' SAF needs in Europe;

- A research and innovation programme to develop 100% sustainable fuels tailored to the design of current and future aircraft. The impact of the composition of sustainable aviation fuels on the reduction of CO₂ emissions and non-CO₂ effects, such as contrails, will also be studied.

The financial particulars of the agreement have not been released.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Les Echos.fr](#)

4473 - Air France-KLM

The air transport group announced that in 2023 its airlines incorporated around 80,000 metric tons of sustainable aviation fuel (SAF) – nearly double the volume incorporated in 2022 – making it the world's largest SAF user for the second year in a row. Throughout the year, the group continued to secure future SAF supplies to meet its target of a minimum of 10% incorporation of SAF by 2030 by signing offtake agreements and memorandums of understanding (MoUs) with SAF producers around the world, and by investing directly in SAF production units. These long-term, strategic investments confirm the group's commitment to supporting the emergence of a SAF sector in Europe and worldwide.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#)

4474 - Global Bioenergies

The French biotech firm has signed a new development contract with Anglo-Dutch petrochemicals company Shell Global Solutions to further develop low-carbon road fuels. While the previous phases of the collaboration explored different potential options based on Global Bioenergies' proprietary technology, the current aim is to focus on one specific route. According to Marc Delcourt, co-founder and CEO of Global Bioenergies, *'This work paves the way for a potential commercial exploitation of Global Bioenergies' process for this specific application.'*

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#)

4475 - LanzaJet

[LanzaJet](#), an expert in harnessing biotechnology to recycle carbon, announced the official opening of the LanzaJet Freedom Pines Fuels plant, the world's first ethanol to sustainable aviation fuel (SAF) production facility. The new plant in Soperton, United States, will produce 10 million gallons of SAF and sustainable diesel annually from a variety of sustainable feedstocks, such as agricultural waste, municipal solid waste, energy crops and carbon captured from industrial processes. LanzaJet Freedom Pines Fuels is fully funded and has committed offtake agreements for all fuel produced at the plant within the next 10 years.

More information: [Press release](#)

Health & cosmetics

4476 - Alganelle by Seqens

Majority-held by fine chemicals group [Seqens](#) since July 2022, start-up [Alganelle](#) is part of the Seqens Biotech Hub, which groups together all the chemicals group's biotech skills. In addition to Alganelle by Seqens, the hub includes Protéus, a specialist in biocatalysis and enzyme engineering, and is supported by the [Seqens' Lab](#) R&D centre. Seqens hopes this acquisition will accelerate its development in industrial fermentation by targeting the production of polypeptides, proteins, polysaccharides and various metabolites directly in bacteria, yeasts and microalgae modified by genetic and metabolic engineering. Alganelle by Seqens is one of the few companies in

the world to perform genetic and metabolic engineering on microalgae. While Alganelle by Seqens is currently concentrating on cosmetics and pharmacy, there are prospects in biomaterials, agri-food and agri-chemicals. Since its creation, the start-up has focused on the development of proprietary products offered as pharmaceutical or cosmetic active ingredients, but is also pursuing a contract development and manufacturing strategy.

En savoir plus : [L'Usine Nouvelle.com](https://www.usine-nouvelle.com)

4477 - Givaudan Active Beauty

The [division](#) of Swiss fragrances, perfumes and cosmetic active ingredients manufacturer [Givaudan](#) announced the market launch of PrimalHyal 50 Life, a novel low molecular weight hyaluronic acid designed through microbial strain engineering and precision fermentation. According to Givaudan Active Beauty and their volunteer testers, PrimalHyal 50 Life delivers several skincare benefits, in particular deep skin penetration (up to 120 µm), stimulation of tight junctions, prevention of insensible water loss, boosting skin hydration up to 72 hours after application, a reduction in skin roughness by 66% in 1 month, and discernible benefits in skin texture, firmness and hydration.

More information: [Press release](#), [Cosmetics Business.com](#)
En savoir plus : [Premium Beauty News.com](#)

4478 - Global Bioenergies

The French industrial biotech firm announced that the provisional schedule for the construction and commissioning of its new plant was taking shape. The new plant will be the first in the world to convert plant-based resources into isobutene derivatives with specific high-performance properties on a large scale. The production technology will be based on the 'direct pathway' process, with total integration of the production chain and minimisation of input requirements. The finalisation of the basic engineering design, concurrent with the signing of the first tranche of financing for the plant, is expected in summer 2024. This first tranche will include part of the €16.4 million financing awarded by Bpifrance as part of the France 2030 investment plan. Once completed, the front-end engineering design (FEED) will be carried out in order to finalise preparation for the construction of the plant in France between 2025 and 2027. Products manufactured at the plant will be sold under the Isonaturane™ brand name in the cosmetics market, with applications ranging from make-up to skin care.

Info: the plant will also kick-start the production of sustainable aviation fuels (SAFs), a market for which Global Bioenergies obtained ASTM certification last June and will open the door to the construction of multiple larger plants focused on this application.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](#)

4479 - Willow Biosciences & Enterin

[Willow Biosciences](#), a company that has developed AI- and precision fermentation-based processes to produce functional ingredients for the health, wellness, personal care, food and beverage markets, and clinical-stage biopharmaceutical company [Enterin](#), which has developed new treatments targeting neurodegenerative and metabolic disorders, have signed a partnership agreement on the development of new ways to sustainably produce the key intermediates and active pharmaceutical ingredients (APIs) produced by Enterin. Enterin recognised the need to employ more sustainable methods to manufacture its products and sought Willow Bioscience's expertise in the field. The initial programme will focus on developing a biobased pathway and, if successful, advance development toward implementation at commercial scale. The development phase is expected to last approximately three months.

More information: [Press release](#)
En savoir plus : [Zonebourse.com](#)

Others

4480 - Global Bioenergies

The French biotech firm announced the co-optation of Jean-Claude Lumaret, former Chief Executive Officer of Carbios, as an independent director. He replaces Alain Fanet, who resigned to pursue other professional interests. Jean-Claude was the co-founder of Carbios and its CEO for almost 10 years. He led its development and launched the scale-up of genuinely sustainable breakthrough technologies to reinvent the life cycle of plastics and textiles. The Global Bioenergies board of directors currently has seven members: six directors and one observer; three of whom are women and four of whom are men.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#)

4481 - Novonesis

Novonesis is the name of the [new company](#) born of the merger between two Danish groups specialising in enzymes and ferments: [Novozymes](#) and [Chr. Hansen](#). The portmanteau combines the Latin word 'novo', meaning new, and the Greek word 'genesis', meaning origin or beginning. Half of the Novonesis portfolio will focus on improving health and producing better foods, while the other half will seek to reduce chemical use and target climate-neutral practices. Novozymes supplied enzymes and microbial technologies while Chr. Hansen produced ingredient systems for the food, nutritional, pharmaceutical and agricultural industries. The new entity has 10,000 employees and a global network of R&D and application centres and is active in 30 sectors. The new company's annual revenue is estimated at around €3.7 billion.

More information: [Press release](#), [Food Business News.net](#), [Food Navigator.com](#), [World Bio Market Insights.com](#)
En savoir plus : [Process Alimentaire.com](#), [L'Usine Nouvelle.com](#)

4482 - Start Industrie

Created at the initiative of [France Industrie](#) in June 2022 to represent industrial start-ups and scale-ups and bring together an initial 15 sector-specific organisations, [Start Industrie](#) has strengthened its structure and is expanding its sphere of activity by becoming a registered association. The change will enable it to begin a new phase of activity under the banner of strengthening its advocacy actions, coordinating the ecosystem, and creating reference tools for fledgling industrial companies. In the coming months, Start Industrie will continue striving to support the trajectory of new industrial projects led by its 1,900 start-up members. It will:

- Continue monitoring the deployment of the France 2030 investment plan, France's green industry law, and Tibi 2 (a French €7 billion plan to fund green tech start-ups and deep tech);
- Strengthen its advocacy work for funding by mobilising private funds and its support for struggling start-ups;
- Get involved in work on the second green industry draft law and in discussions conducted on the competitiveness of the European economy, as well as those that will prefigure a France 2040 plan;
- Step up its actions in favour of collaboration between large businesses and start-ups in terms of procurement (via the 'Je choisis la French Tech' initiative, which encourages French companies to work together, primarily), the circulation of talent, funding and the provision of surplus land;
- Contribute to the creation of national, regional and European assistance and support initiatives, the development of mentoring programmes for the managers of fledgling industrial businesses, and the adaptation of services provided by engineering specialists to start-ups.

With this new chapter, it is now possible for businesses, alongside sector-specific organisations, to join Start Industrie. It will be governed by two colleges going forward – one for the organisations and another for the businesses – which appoint their representatives from the board of directors. In addition to its advocacy actions, Start Industrie is stepping up the coordination of its ecosystem by including partners (in R&D and innovation, in financing and taxation, intellectual property, environmental impact, territorial coverage and land, human resources, etc.) in its work to share expertise and the keys to success and create the data repositories businesses and their investors are calling out for.

En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](#)

4483 - French Tech Toulouse: start-ups in Haute-Garonne raised more money, more frequently in 2023

According to the Toulouse Tech Index (TTI) published by [French Tech Toulouse](#), start-ups in the Haute-Garonne *département* raised €220.7 million in 2023 through 26 different funding rounds, i.e. an increase of 1.2% on 2022, when €218 million was raised through 21 rounds. Six rounds raised €55 million in the last quarter. Space (€73 million; 3 rounds), biotechnology (€48.5; 3 rounds) and aviation (€39.6 million; 2 rounds) were the 3 most active sectors. According to Clément Bauguil, director of venture capital at hybrid capital investment firm [M Capital](#), *'The Toulouse-based tech ecosystem did better in 2023 than the rest of France, overall. Nationally, we saw a sharp fall in fundraising rounds (€8.5 billion in 2023 compared with €14.7 billion in 2022). This is in part due to a smaller number of large rounds. The Toulouse area, however, continues to develop, as we are lucky to have a large number of research centres in the territory, both in industry and health, meaning we see deep tech projects emerge on a regular basis.'*

Looking to the future, the ecosystem's experts and players expect to see this positive trend continue in 2024.

Recap: Created in 2019, each quarter and each year the TTI lists fundraising rounds exceeding €300,000 carried out by businesses with their head office, or at least a significant share of their employees, in Haute-Garonne or a neighbouring *département*. It ingests data for all the territory's innovative businesses with turnover under €100 million.

En savoir plus : [ToulEco.fr](#), [La Gazette du Midi.fr](#), [Entreprises Occitanie.com](#)

4484 - Investment in France: a solid first place for the GreenTech sector in 2023

According to the [barometer](#) published by audit and consulting firm [Ernst & Young](#) (EY), in 2023 green industry start-ups raised €2.7 billion of a total €8.3 billion and carried out 105 fundraising rounds. The industry is going from strength to strength in terms of both volume and value, which increased by 44% and 30% respectively. By way of comparison, in 2021 green industry start-ups attracted just 80 investments, totalling €760 million.

In 2023, the venture-capital ecosystem had a dud year for all sectors combined: after over a decade of investment growth, just 715 companies managed to raise €8.3 billion in 2023, i.e. a drop of 38% in value and 3% in volume. In addition, it is helpful to analyse investments by size: fundraising rounds for over €50 million fell the furthest both in value (€3.8 billion, a 53% decrease) and in volume (31 rounds, a 47% decrease), while those for less than €50 million fell less significantly in value (€4.5 billion, a 15% decrease) but increased in volume (684 rounds, a 1% increase). France held on to its spot as the leading start-up ecosystem in the European Union in 2023, ahead of Germany which raised €6.6 billion. The United Kingdom, however, with €16 billion invested in its early-stage companies, still attracts twice as much venture-capital funding as France.

Looking to the future, EY believes *'2024 will be an interesting year, with the combination of an increase in sector-specific demand drivers (AI, Greentech) and an announced drop in lending rates. We expect this to secure a ramp-up in investment for French Tech.'*

En savoir plus : [L'Usine Nouvelle.com](#)

Industrial biotechnology services

4485 - TWB: looking back at Start me up!

The sixth Start me up! event (formerly known as TWB Start-Up Day) attracted almost 180 professionals in the industrial biotechnology field, including more than 50 start-uppers. The participants were treated to the new event format, which included the Biotech Tour – an opportunity to visit Biotech Alley (TWB and the Bio-Industries CRITT (French regional centre for innovation and technology transfer)) and the Pierre Potier centre (at the Oncopole

cancer research campus). These are Toulouse's flagship biotech centres. They also watched the start-up pitches during round tables.

The **Fast Track it!** competition for fledgling companies in the growth stage created less than eight years ago was won by Danish synthetic biology company [Biomia](#) for its project to develop natural, plant-inspired therapeutics. Their products are designed to address unmet medical needs in pain, addiction and mental health. Biomia uses proprietary bioprocesses formulated with modified microbes and fermentation to produce molecules of interest. It offers a new, scalable model to search for natural-origin products for clinical purposes, which are usually obtained via costly chemical processes and are difficult to scale. The start-up won the equivalent of €50,000 in services on TWB's technology platforms. It will also benefit from marketing opportunities offered by Bioeconomy For Change & Agri Sud-Ouest Innovation.

The **Go for It!** competition, designed for entrepreneurs at the ideas and creation stage, was won by Lyon-based start-up [inLux Biotech](#) for its innovative agriculture project which searches for alternatives to pesticides. Its technology is based on the development of a tool to visualise plant pathogens, living or quasi-living organisms (bacteria, viruses, etc.) that can infect plants and cause diseases. It obtains real-time data using bioluminescence, which is the production and emission of light by a living organism via a chemical reaction. It can be used to accelerate the development of biological pest control products by increasing the efficiency of treatments before they are applied to crops. The start-up wins three days of mentoring by TWB and its ecosystem of industrial companies and investors, as well as opportunities to expand its network via the competition partners, namely Agri Sud-Ouest Innovation, ShakeUpFactory and Bioeconomy For Change.

The **people's choice award** for best presentation went to the start-up [InSpek](#) for its project to generate biological and chemical monitoring systems using integrated photonics (a technology that can generate, control and detect light particles known as photons). InSpek is developing a non-invasive detection system using Raman spectroscopy, a technique that sends monochromatic light to the sample and analyses the light diffused. The system can be used to detect bioprocesses in real time by delivering improved control and preventing process variations. InSpek is pioneering the integration of Raman technology into optical chips.

At this sixth event, three round tables provided an opportunity to discuss the issues facing Biotech and their impact in other fields, such as health. One of them, focused on chemistry, polymers and materials, turned the spotlight on [Carbios'](#) breakthrough innovation, which renders PET – the world's second most popular plastic – biodegradable. Another example is [Electric Skin'](#)s innovation, a new material that produces electricity from moisture in the air. Another round table on deep tech and technologies to improve productivity addressed the question of the place of AI in biotech, among other things.

Info: The 2024 event was promoted by partners Agri Sud-Ouest Innovation, Hello Tomorrow, La French Tech Toulouse, Maddyness, ShakeUp Factory and TMIE, grants from La Région Occitanie, Toulouse Métropole and EU project SYNBEE, as well as sponsorship from Adisseo, Lallemand and Bioeconomy For Change.

En savoir plus : Touleco.fr, LinkedIn.com

3. PUBLIC POLICIES & REGULATIONS

In France

4486 - France 2030 investment plan: launch of the third generation of the national seed fund (FNA)

Introduced by the French general secretariat for investment (SGPI) and Bpifrance, €400 million has been invested in this third generation of the national seed fund (FNA), bringing FNA actions to €1.5 billion in total. By consolidating the growth of this tried-and-tested programme, FNA 3 will continue with its work, which involves strengthening seed investment funds to improve equity funding for start-ups, especially those created in the technology sectors and which are in line with France 2030 investment plan priorities. The funds subscribed to by the FNA have invested in

the first fundraising rounds of almost 800 start-ups, 63% of which are deep tech companies and 49% of which are based outside Paris. Via its partner funds, companies receiving FNA investment have successfully raised €14.6 billion, an impressive ripple effect. This proves not only the FNA's capacity to encourage third party co-investors to put money into seed capital funds, but also the quality of the chosen projects and the ability of entrepreneurs to ramp up their development with Series A and B funding rounds, and beyond. The positive impacts of the FNA at the close of its first ten years in existence are many: on an economic level, overall the funded companies generated over €2.2 billion in turnover in 2023 and now employ almost 21,000 people. The FNA has also contributed to the filing of 3,500 patents.

En savoir plus : [Communiqué de presse](#)

4487 - French Tech Next40/120: the 2024 call for applications is under way

Launched in 2019 by [Mission French Tech](#), [French Tech Next40/120](#) is a support programme run by the French government reserved for the 120 highest achieving French start-ups with the potential to become international leaders. They receive support with issues affecting their development in France and internationally over the course of one year. There are five components to this support:

- A dedicated start-up manager;
- Increased visibility;
- Support with issues associated with regulations and standards;
- Events to share their experiences and receive expert advice;
- A custom support offering from the French Tech correspondents network.

Following recommendations made by the French Tech Finance Partners, the selection criteria have been partly altered to account for the increasing maturity of the Tech ecosystem, adapt to the new funding landscape, and make the programme more accessible to the different innovation models. The French Tech Next40/120 selection will be divided equally between a revenue growth criteria and a fundraising criteria. Unicorns are no longer admitted automatically. The selected companies must also fulfil certain environmental and societal commitments to be eligible. Applications can be submitted until 12 April 2024 via this [link](#). The programme will begin next May when the winners are announced.

En savoir plus : [Economie.gouv.fr](#)

4488 - Launch of a new platform facilitating access to deep tech: Tech-365.fr

Launched by the network of [tech transfer acceleration companies](#) (SATTs) and available on subscription, the [Tech-365.fr](#) platform gives industrial companies and businesses of all sizes direct access to innovative products born of French state-funded research. The initial selection includes over 400 technologies from more than 80 experts in SATTs. The aim of the platform is to boost innovation within companies and make it easier for them to choose new technological opportunities. The portal offers a catalogue of the newest technological advances, at different maturity levels, de-risked through investment in SATT maturation. These patented innovations are ready to be scaled to meet the innovation requirements of industrial companies, or are available for co-development or co-construction. They cover all the research fields and industrial application sectors, distributed across four main strategic sectors: Greentech, Numtech, Biotech and Medtech. For each innovation, the platform offers a summary of the technology, the envisaged fields of application and a possible leveraging model (typically, licensing or co-development). The entries are referenced via key words and thematic filters so users can quickly and easily identify applicable technologies in the database. Accessible 24/7, throughout the year, and regularly updated, the new platform offers the best experience possible. It is a dynamic go-to marketplace, encouraging businesses looking for an innovative product to get in direct contact with technology transfer players in SATTs. There are three platform-access subscription packages available (6, 12 and 18 months). These include access to the innovative technologies catalogue, their update, and support provided by SATT experts.

En savoir plus : [Communiqué de presse](#), [SATT.fr](#), [La Gazette du Laboratoire.fr](#)

4489 - France 2030 investment plan: update on France's 'Biotherapy and biomanufacturing of innovative therapies' strategy

Coordinated by the French health innovation agency (general secretariat for investment) in association with the ministries of economics, finance and industrial and digital sovereignty; health; labour; and higher education and research, France's 'Biotherapy and biomanufacturing of innovative therapies' acceleration strategy aims to develop and produce biotherapies (recombinant proteins, antibodies, etc.) and drugs for innovative therapies (gene therapy drugs, somatic cell therapy drugs, drugs based on cell or tissue engineering, and advanced therapy medicinal products) in France. This update reviews the progress made with the actions instigated and lists the concrete actions taken over the last two years. To date, the acceleration strategy lists 19 actions that are part of the 'health' component of the France 2030 investment plan to support the development and production of biotherapies in France. These actions involve over 250 players across the territory. In concrete terms, the actions undertaken have led to 86 funded projects, representing state investment of €338 million. The strategy mobilises four areas: training and skills, scale-up, regulation and market access, structuring the sector to address the four challenges.

Two years after the launch of this acceleration strategy, France, which initially ranked third in Europe, is now in second position behind the United Kingdom and before Germany and Switzerland, with 584 biopharmaceuticals in development, compared with 885 in the United Kingdom. France has the second largest pipeline of products in the pre-clinical development phase, and the fourth for products in the clinical phase. It is developing 20% of Europe's biopharmaceuticals. While the commercialisation of biopharmaceuticals is mainly the purview of large businesses, SMEs and microenterprises are developing over 70% of biopharmaceuticals. Breaking this down further, 84 microenterprises are developing 33% of biopharmaceuticals and 47 SMEs are developing 39%. A [study](#), conducted by [Mabdesign](#) for the French health innovation agency, [France BioLead](#) and [France Biotech](#), paints a picture of France's position among its European competitors for the development and production of biotherapies.

In addition to this review, the update has highlighted new prospects for the 'Biotherapies - Biomanufacturing' acceleration strategy road map. Workshops have been conducted to define the issues and challenges to overcome by capitalising on the concrete progress made since the strategy was launched, in collaboration with all the (diverse) players:

- Identify new areas for research to further accelerate the development of new biotherapies and their production, by mobilising new technologies (AI, fabrication of RNA, microfluidics, digitalisation, synthetic biology, and so on) and drawing on multidisciplinary skills;
- Adapt biomanufacturing capacities, in particular those of CDMOs, to ensure the value chain is intact, without any limiting factors, and by securing an optimal supply rate between upstream and downstream processes;
- Establish France as the frontrunner in the creation of a European biotherapies and biomanufacturing sector: combine our efforts to diversify and maximise developments across Europe;
- Generate interest in the French biotech industry from private investors by capitalising on concrete achievements;
- Increase the visibility and draw of the French sector: its position as one of the top two in Europe should be leveraged.

En savoir plus : [Economie.gouv.fr](https://economie.gouv.fr)

4490 - Launch of the first iteration of the Accélérateur International Occitanie

As part of their partnership, the Occitanie region and Bpifrance are launching the first iteration of the [Accélérateur International Occitanie](#), a customised support programme for the managers of SMEs in the Occitanie region who want to develop their international strategy and get a strong understanding of good practices in their target markets. The Occitanie region is committed to the international expansion of businesses, and as such, alongside Bpifrance and with the financial support of the European Regional Development Fund (ERDF), it is offering a high-quality support and training service for regional businesses. For this first iteration, 15 high potential businesses in the region will receive support for 12 months to help them formulate their international expansion strategy and search for export growth drivers. This will include a 'custom-made' programme combining a tailor-made consultancy offering, a group dynamic to encourage healthy competition, and a personalised follow-up tailored to international development. There are three pillars to the Accélérateur International Occitanie for businesses that join up:

- Consultancy, to strengthen their strategy and build a robust international development model via a ten-day International Strategy assignment carried out by a consultant;
- In-person seminars, developed in partnership with Toulouse Business School, to create a strategic international road map and share good practices. An e-learning platform is provided so businesses can prepare for the training days or go into more depth;
- Networking, with the creation of a local managers collective and, beyond that, joining the community of all the businesses accelerated by Bpifrance in France.

En savoir plus : [Communiqué de presse, Les Echos.fr](#)

4491 - Green transition: 16 French organisations sign a declaration of commitments

The French ministry of higher education and research has prepared a climate and biodiversity plan to help each organisation with this transition, to meet the expectations of the French people. Specifically, the plan stipulates that French research organisations should work together to identify the levers and implement the conditions for a successful green transition in their establishments. As such, each research organisation must make its contribution to collective efforts to achieve the ambitious goals that France has set itself in terms of the reduction of its carbon, energy and environmental footprints, through the deployment of their 'sustainable development - environmental and social responsibility' road map. The research programmes also contribute to the exploration and development of solutions for a successful green transition. At the end of a day of discussions and critical thinking organised with the support of the ministry of higher education and research on 22 January 2024, the heads of 16 French organisations (the national research agency (ANR), the geological survey (BRGM), the atomic energy commission (CEA), the international agricultural research and cooperation organisation (CIRAD), the national centre for space studies (CNES), the national centre for scientific research (CNRS), the institute for ocean science (IFREMER), the institute for higher studies in science and technology (IHEST), the national demographic studies institute (INED), the national research institute for agriculture, food and the environment (INRAE), the national institute for research in digital science and technology (INRIA), national institute of health and medical research (INSERM), the research institute for development (IRD), the institute for radiation protection and nuclear safety (IRSN), the national natural history museum (MNHN) and Universciences) collectively committed to contributing, through their research activities and in changes to the way they operate, to address the challenges of the green transition, for more sustainable development. The [declaration](#) (in French) commits the signatories to:

- Planning and implementing a research strategy that accounts for all its social and environmental impacts;
- Supporting the production and distribution of knowledge and innovations that convey solutions consistent with the societal issues;
- Devising and upholding a social responsibility policy for France's organisations;
- Steering the transformation of France's organisations by rallying its labour collectives;
- Being exemplary in the implementation of goals for the government's ecological plans by its establishments;
- On an annual basis, sharing the progress and transition actions implemented within its establishments;
- Developing international partnerships and multidisciplinary work on the challenges of sustainability.

They have also committed to working together to:

- Strengthen the dialogue between science and society;
- Improve society's confidence in science;
- Provide scientific insight to support public policies for ecological planning in France, Europe and internationally.

This public commitment marks the acceleration of a trajectory that France was already on, on the scale of each establishment. This trajectory will be strengthened throughout 2024 to usher in the green transition.

En savoir plus : [Communiqué de presse](#)

4492 - Bpifrance unveils its new brand image

To remain as relevant as ever to entrepreneurs and support them through every stage of their development, Bpifrance has updated its brand image with the addition of signifiers that better reflect the challenges of tomorrow. Bpifrance has a public-interest mission when it comes to entrepreneurs. It encourages them to reach higher and

become champions of France, and has been celebrating them for the last ten years with optimistic, energising messages. As part of an ongoing process, the yellow and taupe Bpifrance brand, bringing to mind the sun and the land, has been updated. It now includes a chlorophyll-green photon in motion, a visual reflection of the values of energy and optimism, and the bank's climate ambitions. The photon's trajectory is a mirror-image of the non-linear pathway of the entrepreneur, of their influence, adaptability and agility. Bpifrance worked closely with the agency Saguez & Partners, its long-standing partner for over 10 years, to create its new brand image. They have created a strong, powerful brand unlike any other, for a bank that thinks outside the box and continues to inspire modernity and embody the avant-garde. Their collaboration has thrust Bpifrance forward as a brand that contributes to society and knows how to meet businesses' requirements and respond to the issues they will face in the future, all while remaining simple and accessible. The brand image update contributes clarity and simplicity to Bpifrance's missions to find and shape entrepreneurs, and a driver for the transformation of the French economy.

En savoir plus : [Bpifrance.fr](https://www.bpifrance.fr)

4493 - INRAE kick starts the EXPLOR'AE programme

One of the major strategic inflection points for French research announced by the President of the French Republic last December is the early detection of research ideas that could lead to scientific innovations and disruptive technologies. Against this backdrop, INRAE, the French national research institute for agriculture, food and the environment, which is responsible for setting up the 'sustainable food and agriculture, forests, and associated natural resources' programme agency, presented EXPLOR'AE. An adaptation of the 'high-risk research' programme to its fields of expertise, €20 million has been invested in EXPLOR'AE for a one-year experimental phase. It is targeted at the entire agriculture, food and environment scientific community. The programme's aim is to create the right conditions to generate conceptual or technological breakthroughs and thus contribute to overcoming major societal challenges and the associated transitions (agroecological, energy, digital and health). It is a response to the need to detect ideas and talent early, through a process combining 'top down' and 'bottom up' approaches. The main areas tackled by EXPLOR'AE include:

- Agriculture and forests;
- Food, nutrition, food systems and food-health connections;
- The transformation of biomass and biotechnologies for the circular bioeconomy;
- The environment and natural resources associated with agriculture, in terms of preservation, sustainable management, services delivered and associated risks.

The programme has three pillars and is part of a 'fast track' pathway from acculturating scientific communities to high-risk research to accompanying them towards value creation and innovation. It relies on detecting ideas and talent and supporting projects. Over the course of 2024, the aim is to select and launch:

- Around 60 EXPLORATION projects that are novel and/or nascent, with a share of the risk assumed in order to explore 'original' ideas at the frontier of knowledge;
- Six to eight TRANSFORMATION projects: large-scale, cross-disciplinary research projects, of international calibre, with an identified potential for innovation.

Philippe Gillet, president of INRAE's scientific advisory board, will be the director of the project's steering committee, which will include representatives from the academic and socio-academic community. Beyond the deployment of the programme, the steering committee will have an advisory role as regards the possibilities offered by the scientific progress stemming from these projects. The steering committee will be backed up by a programme committee, which will be responsible for implementing the programme.

En savoir plus : [Communiqué de presse](#)

4494 - Bpifrance is classed as one of the world's leading management companies in 2023

According to the ranking produced by [PitchBook](#), a platform providing information on the private capital market that releases data, research and news on venture capital, private equity, and mergers and acquisitions, Bpifrance was the leader in investment capital in Europe and the second most active body globally in the third quarter of 2023, with 31 transactions performed. In 2023, Bpifrance's venture capital activity managed €50 billion in assets and a portfolio of over 700 companies ranging from small to large in market value. This enabled Bpifrance to rank among

the world's top-tier management firms, with assets of over \$5 billion under management, and among management companies executing buy-back operations (tied with KKR for the third quarter of 2023).

En savoir plus : [Bpifrance.fr](https://bpifrance.fr)

4495 - Initiatives will be rolled out in agricultural schools to increase the development and use of biological pest controls

As part of France's national biological pest control strategy, the Ecophyto plan (the aim of which is to reduce pesticide use by 50% within ten years) has funded the 'Action Biocontrôle' initiative. By placing learners at the heart of the project, its aim is to make biological pest control practices more appealing and ensure far greater numbers of farmers and future professionals use them. Two agricultural schools have been selected to start with:

[Yvetot Naturapôle Campus](#) in Seine-Maritime will implement six initiatives for farmers and student farmers on mixed farming (crops and livestock). In 2024, farmers and students studying for advanced vocational training certificates and vocational high school diplomas will be treated to demonstrations of fermented extracts and biological pest control products on soft winter wheat, flax and sugar beet. They will observe symptoms of the diseases and share experiences. A partner farmer will then open up his fields to the students to share his extensive experience in biological pest control, which is central to his vegetable farming methods. A poster and a guide titled '*Comment mettre en place et utiliser son local biocontrôle sur l'exploitation*' (in French) will be produced by the students with their professors.

[Campus Vert d'Azur](#) in Antibes, Alpes-Maritimes, will hold five events for its students and all its technical and educational partners focused on ornamental horticultural farming and vegetables. On the agenda is redesigning the campus' plots, using and growing companion plants, visiting farms that combine several biological pest control solutions, introductory workshops from partner start-ups, and seminars for teachers.

In addition, several technical sessions, such as webinars and projects by agricultural schools outside Paris, are expected to take place in 2024. An institutional event will be organised in Paris in the autumn of 2024.

En savoir plus : [Agriculture.gouv.fr](https://agriculture.gouv.fr)

4496 - Sustainable aviation fuels: launch of a new call for proposals to support mass production projects

This new call for proposals was announced by Agnès Pannier-Runacher, minister for the energy transition, Roland Lescure, minister for industry, Clément Beaune, minister for transport, and Bruno Bonnell, secretary general for investment, who is in charge of the France 2030 investment plan. It focuses on support for the production of biofuels from feedstock authorised under European regulation (RED III) or synthetic sustainable fuels. The support will cover the essential engineering work required to implement a project in the industrial investment phase, namely Front-End Engineering and Design (FEED) studies. These projects can be put forward by single companies, or companies grouped together within a consortium of key players in the value chain. The new call for proposals has a provisional budget of up to €200 million. It closes on 28 June 2024.

En savoir plus : [Communiqué de presse](#)

4497 - Launch of Mercato, an innovative skills transfer programme designed for deep tech start-ups

Launched by [Bpifrance](#) and [France Industrie](#), the professional organisation representing industry in France, as part of the Deeptech plan, the Mercato programme will enable experienced professionals employed by large groups to use their skills to help deep tech start-ups. They will perform high-value assignments and build key functions for the start-up. The programme thus enables fledgling teams – made up almost entirely of scientists – to benefit from complementary skills primarily in scale-up and business development, for durations varying from a few days to a few months, and a maximum of two years. It is based on France's secondment law, which allows for employees at large groups (>5,000 employees) to be loaned for a variable duration, while ensuring they can return to their original role at the end of the loan. In the context of a large group seconding a worker to a start-up/SME, the parties can agree on the employee's salary distribution. Ultimately, it is hoped that at least 50% of deep tech start-ups in the

pre-scale-up phase will use the Mercato programme.

Recap: the Deeptech plan rolled out by Bpifrance aims to create 500 deep tech start-ups and 50 industrial sites annually by 2030.

En savoir plus : [Communiqué de presse](#)

4. EVENTS

MARCH 2024

IBioIC's Annual Conference

13-14 March 2024. Glasgow, United Kingdom.

More information: [Website](#)

ICBME 2024: 18. International Conference on Biocatalysis and Metabolic Engineering

18-19 March 2024. Doha, Qatar.

More information: [Website](#)

World Agri-Tech Innovation summit

19-20 March 2024. San Francisco, United States.

More information: [Website](#)

Bioket

19-21 March 2024. Reims, France.

More information: [Website](#)

Bioprocessing Summit Europe

19-21 March 2024. Barcelona, Spain.

More information: [Website](#)

Hello Tomorrow Global Summit

21-22 March 2024. Paris, France.

More information: [Website](#)

APRIL 2024

In-Cosmetics Global

16-18 April 2024. Paris, France.

More information: [Website](#)

SynCell2024

17-19 April 2024. Toulouse (France).

More information: [Website](#)

MAY 2024

Global Bioprocessing Summit & Exhibition

15-17 May 2024. Berlin, Germany.

More information: [Website](#)

Viva Technology

22-25 May 2024. Paris, France.

More information: [Website](#)

JUNE 2024

ICBME 2024: 18. International Conference on Biocatalysis and Metabolic Engineering

3-4 June 2024. Tokyo, Japan.

More information: [Website](#)

2024 Synthetic Biology: Engineering, Evolution & Design (SEED)

24-27 June 2024. Atlanta, United States.

More information: [Website](#)

European Congress on Biotechnology

30 June-3 July 2024. Rotterdam, the Netherlands.

More information: [Website](#)

JULY 2024

3rd Fermentation-Enabled Alternative Protein Summit Europe

2-4 July 2024. Amsterdam, the Netherlands.

More information: [Website](#)

AUGUST 2024

International Summit on Metabolomics and Systems Biology (ISMSB2024)

26-28 August 2024. Valencia, Spain.

More information: [Website](#)

OCTOBER 2024

ICMESB 2024: 18. International Conference on Genome Engineering and Synthetic Biology

17-18 October 2024. Istanbul, Turkey.

More information: [Website](#)

ICMESB 2024: 18. International Conference on Genome Engineering and Synthetic Biology

28-29 October 2024. Lisbon, Portugal.

More information: [Website](#)

DECEMBER 2024

International Conference on Genome Engineering and Synthetic Biology

9-10 December 2024. New York, United States.

More information: [Website](#)

