



FLASH NEWS

No. 55-2023 – THE BIOTECH INDUSTRY INTELLIGENCE REPORT

CONTENTS

1. EQUIPMENT & TECHNOLOGY.....	2
2. APPLICATIONS & MARKETS.....	6
3. PUBLIC POLICY & REGULATIONS	29
4. EVENTS	33

Author

Elodie Victoria – elodie.victoria@inrae.fr

Publication director

Olivier Rolland – olivier.rolland@inrae.fr

TWB - Campus de l'INSA – Bât 50 – 135 Avenue de Rangueil – 31077 Toulouse Cedex 4 / FRANCE

twb@inrae.fr / +33 (0)5 61 28 57 80
www.toulouse-white-biotechnology.com

Biocatalysis/Bioconversion

4141 - A new method for generating new enzymes with unprecedented efficiency.

Researchers at the [Weizmann Institute of Science](#) have developed an innovative technique called CADENZ – Combinatorial Assembly and Design of Enzymes – which has enabled them to produce *'more potentially usable enzymes in a single experiment than standard methods can produce in ten years.'* The team used the method to successfully produce one million enzymes in a single test tube, of which 3,000 had development potential. They did this by breaking down the enzymes into constituent fragments that could then be altered and recombined in various ways. From there, they were able to model new enzymes on a computer and assemble the fragments *'as if they were playing with Lego.'* This lab-developed artificial intelligence technique has made it possible to *'learn'* what function different combinations of fragments perform and determine which fragments to assemble to generate an enzyme for a specific purpose. The researchers claim that their work could speed up the manufacturing of new drugs, but also provide a more sustainable way to produce existing drugs, which *'are currently created not by enzymes but by inefficient and polluting processes.'* This new method could *'transform the chemical industry'* because if the team can *'stimulate the activity of these enzymes, they could then be used to break down plant compounds such as xylan and cellulose into sugars, which in turn could help produce biofuels.'*

Publication: Combinatorial assembly and design of enzymes. Journal: Science. DOI: 10.1126/science.ade9434.

More information: [Wis Wander Weizmann.ac.il](http://Wis.Wander.Weizmann.ac.il)
En savoir plus : [The Times of Israel.com](http://The.Times.of.Israel.com)

4142 - Identification and characterisation of a new catalase-peroxidase from the bacterium *Thermobacillus xylanilyticus* and investigation of its ligninolytic potential.

The production of aromatics from the biological valorisation of lignins requires the action of ligninolytic peroxidases and laccases produced by fungi and bacteria. So identifying efficient ligninolytic enzymes with high stability represents a promising pathway for lignin biorefinery. The strategy of the [AFERE](#) chair at the [Fractionation of agrosources and the environment](#) joint research unit consists of exploiting the enzymatic potential of the thermophilic bacteria *Thermobacillus xylanilyticus* to produce robust and thermostable ligninolytic enzymes. In this context, a gene encoding a putative catalase-peroxidase was identified from the bacterial genome. The study describes the production of the recombinant protein, its biochemical characterisation and its ligninolytic potential. The researchers' results show that the catalase-peroxidase of *T. xylanilyticus* is thermostable and exhibits catalase-peroxidase and manganese peroxidase activities. The electrochemical characterisation using intermittent pulse amperometry showed the ability of the enzyme to oxidise small aromatic compounds derived from lignins. This promising methodology allows the fast screening of the catalase-peroxidase activity towards small phenolic molecules, suggesting its potential role in lignin transformation.

Publication: A thermostable bacterial catalase-peroxidase oxidizes phenolic compounds derived from lignins. Journal: Applied Microbiology and Biotechnology. DOI: 10.1007/s00253-022-12263-9.

En savoir plus : Nancy.Inrae.fr

4143 - Use of electrochemistry to elucidate the mechanism of CO₂ valorisation in the enzyme formate dehydrogenase.

To elucidate the catalytic mechanism of CO₂ reduction by the enzyme formate dehydrogenase, teams from the [Laboratoire Bioénergétique et ingénierie des protéines](#) (BIP), the [Laboratoire de chimie bactérienne](#) (LCB) at CNRS/Aix-Marseille University in France, and the interdisciplinary research institute [ITQB](#) in Lisbon, Portugal, used

a kinetic method developed at BIP which is based on electrochemical measurements, to measure the activity of this enzyme and clarify several questions concerning its catalytic mechanism. The first concerns the molecule on which the enzyme acts, called the substrate: is it CO₂ or bicarbonate, the most abundant form of CO₂ under physiological conditions? Proof that the substrate is indeed CO₂ was provided by electrochemical activity experiments resolved in real time, following the slow equilibration of the CO₂/bicarbonate ratio. The second question concerns the catalytic cycle. Analysing how enzymatic activity depends on the different experimental parameters (concentration of CO₂, acidity and electrode potential) enabled researchers to determine the sequence of the steps in the catalytic cycle and to issue a decision on the hypotheses in the literature. The excellent time resolution and control over the state of the enzyme are the main advantages of the electrochemical enzyme activity measurement used here. These results provide key elements that could be used in the chemical industry to valorise atmospheric CO₂.

Publication: Formate dehydrogenases reduce CO₂ rather than HCO₃⁻: an electrochemical demonstration. Journal: *Angewandte Chemie International Edition*. DOI: 10.1002/anie.202101167.

Publication: Electrochemical Kinetics Support a Second Coordination Sphere Mechanism in Metal-Based Formate Dehydrogenase. Journal: *Angewandte Chemie International Edition*. DOI: 10.1002/anie.202212224.

En savoir plus : [Cnrs.fr](https://www.cnrs.fr), [Techno Science.net](https://www.techno-science.net)

Modelling/AI

4144 - Use of artificial intelligence based on a text generation learning model such as ChatGPT to design new functional antibacterial proteins.

US start-up [Profluent](https://www.profluent.com), in partnership with the University of California San Francisco (UCSF), has used deep generative models to 'teach the language of biology' to an artificial intelligence (AI) tool as a way to design new functional antibacterial proteins. According to Ali Madani, founder of Profluent: *'While companies are experimenting with exciting new biotechnologies like genome editing with CRISPR by repurposing what nature gave us, we are doing something different. We use AI and large language models like those that allow ChatGPT to learn the fundamental language of biology and design new proteins that have the potential to cure diseases.'* To create their model, the scientists fed the amino acid sequences of 280 million different proteins of all kinds into the machine learning model and let it integrate the information over a few weeks. They then refined the model by priming it with 56,000 sequences from 5 families of lysozymes and contextual information about the proteins. The model quickly generated one million sequences, and the research team selected 100 of them to test based on their similarity to natural protein sequences and the naturalistic nature of the underlying amino acid 'grammar' and 'semantics' of the AI-generated proteins. From this first batch of 100 proteins, the team made 5 artificial proteins to test in cells and compared their activity to an enzyme found in egg white, known as hen egg white lysozyme (HEWL). Similar lysozymes are found in human tears, saliva and milk, where they fight bacteria and fungi. The researchers found that two of the artificial enzymes were able to break down bacterial cell walls with activity comparable to HEWL, but their sequences were only about 18% identical to each other. The two sequences were approximately 90% and 70% identical to any known protein, respectively. The AI was able to learn how the enzymes should be shaped simply by studying the raw sequence data. Measured by X-ray crystallography, the atomic structures of the artificial proteins looked 'correct', although the sequences did not resemble anything already known. This new pathway could allow new drugs to be developed in a much shorter timeframe.

Publication: Large language models generate functional protein sequences across diverse families. Journal: *Nature Biotechnology*. DOI: 10.1038/s41587-022-01618-2.

More information: [Ucsf.edu](https://www.ucsf.edu)
En savoir plus : [Trust My Science.com](https://www.trustmyscience.com)

4145 - US-based Ginkgo Bioworks launches Ginkgo Enzyme Services.

This new [offering](#) is powered by ultra-high throughput screening, machine learning guided protein design and optimised proprietary bacterial and fungal host strains. It will help to solve challenges for R&D teams developing enzymes, from the discovery of new enzyme activity to the optimisation of enzyme function and large-scale manufacturing. Ginkgo Enzyme Services covers the entire enzymatic R&D process: new enzyme discovery, optimisation of enzyme function and stability, access to host strains optimised for robust expression, optimised development of the fermentation process and manufacturing scale-up, industrial production process development and technology transfer. In doing so, it creates synergies between the enzyme sequence, host strain and manufacturing processes to ensure commercial success. This new service can be used for pharmaceuticals, food and agriculture, and other fields.

More information: [Press release](#)

Processes

4146 - New process to upcycle highly resistant plant waste.

Researchers at [Northwestern](#) University in the USA have developed a sustainable, inexpensive two-step process for upcycling any type of organic waste, be it human, agricultural or industrial, including lignin. Researchers began by designing a microbial electrolysis cell (MEC). Similar to a fuel cell, the MEC exchanges energy between the anode and the cathode. But instead of a metal-based anode, Northwestern's bioanode is made up of exogenous electrogens, a type of bacteria that naturally generates electrical energy by eating organic matter. The MEC cycles waste-filled water through the bacteria, which eat up the carbon. Here, they degrade the organic carbon into carbon dioxide and then naturally respire electrons. During this process, extracted electrons flow from the bioanode to the cathode (made of a carbon cloth), where they reduce oxygen to generate water. This process consumes protons, driving up the water's pH to turn it into a caustic solution. From there, the caustic solution could be used for any number of applications, including wastewater treatment. This process enabled the researchers to convert part of the lignin into flavonoid antioxidants that can be used to design pharmaceutical products and food supplements. The rest of the lignin became carbon-based nanoparticles that could be used to encompass substances for targeted drug delivery in humans or targeted nutrient delivery in plants. These nanoparticles could also provide a sustainable plant-derived alternative to sunscreens and cosmetics.

Publication: Valorization of Lignin under Mild Conditions: Biorefining Flavonoids and Lignin Nanoparticles. Journal: ACS Sustainable Chemistry and Engineering. DOI: 10.1021/acssuschemeng.2c03667.

More information: [Northwestern.edu](#), [Science Daily.com](#)
En savoir plus : [Futur en Seine.Paris](#)

4147 - New method to synthesise artificial starch and microbial proteins from corn stover.

Researchers at the Biotechnology Research Institute of the Chinese Academy of Agricultural Sciences, in partnership with other Chinese institutions, used a multi-enzyme molecular system and baker's yeast to transform cellulose from corn stover into artificial starch, and produce microbial proteins by fermentation in aerobic conditions. The whole production process requires only a small investment in equipment, does not require coenzyme or energy input and does not lead to sugar loss, thereby enabling the low-cost production of artificial starch and microbial proteins. This method can reduce the cost of producing artificial starch and offer a new approach to producing food.

Publication: Biosynthesis of artificial starch and microbial protein from agricultural residue. Journal: Science Bulletin. DOI: 10.1016/j.scib.2023.01.006.

More information: [China Daily.com.cn](#)
En savoir plus : [French China.org.cn](#)

4148 - New findings on the biosynthesis of heparan sulfate chains.

Scientists have revealed the structure and function of the EXT1-EXT2 enzyme complex that performs the elongation phase, the key stage in the biosynthesis of heparan sulfates, large complex polysaccharides found on the surface of human cells. They did this by combining cryo-electron microscopy structural analysis with functional testing. The three-dimensional structure of these enzymes reveals that they form a closely associated heterodimeric complex. Unexpectedly, the catalytic sites are opposite each other, suggesting that chain polymerisation is a nonprocessive process. Substrate analogues were prepared by chemical synthesis which enabled scientists to perform a detailed study of the enzymatic activity of the complex and its mutants. A cell-based assay was also performed to study the functional significance of the mutated residues in EXT1 and EXT2. This data could facilitate the development of new therapeutic approaches to treat the many pathologies involving heparan sulfate protein ligands, such as cancer or viral infections.

Recap: Heparan sulfates are large, complex linear polysaccharide chains found on the surface of cells and in the extracellular matrix. They allow the interaction between different cellular factors and therefore play an important role in various biological processes, such as cell development, signalling and immune responses, but also in viral, bacterial or parasitic infections. A key stage in the biosynthesis of heparan sulfates is the polymerisation of the glycan backbone, catalysed by the two enzymes EXT1 and EXT2.

Publication: Structure of the human heparan sulfate polymerase complex EXT1-EXT2. Journal: Nature Communications. DOI: 10.1038/s41467-022-34882-6.

En savoir plus : [Cnrs.fr](https://cnrs.fr)

Miscellaneous

4149 - Launch of the Biomanufacturing Platform.

The new cross-sectoral biomanufacturing platform launched by [EuropaBio](https://europa-bio.eu), the European association representing the interests of the biotech industry, aims to represent the biomanufacturing industry at the highest policy levels in Europe, to ensure that it is visible and recognised within the industrial strategy and Europe's green and digital transitions. Together with members and stakeholders, it will address how economic growth, employment and resilience are achieved through policy, legal frameworks and regulation at EU and national levels. The platform's activities will build an economic evidence-base for biomanufacture across sectors, reflect policy priorities from EuropaBio's Healthcare, Industrial Biotechnology and National Association Councils and build case studies to demonstrate diversity and impact of biomanufacture.

Info: The Biomanufacturing Platform will host its first policy summit on 15 March 2023 in Brussels, Belgium. It will set the vision for Europe's global innovation, competitiveness and sustainability through the lens of biomanufacturing and set a baseline for its understanding and recognition within policy.

More information: [Press release](#)

2. APPLICATIONS & MARKETS

Food and feed

4150 - Algama

The French [company](#), which specialises in the production of microalgae-based food ingredients, has announced that it has raised €13 million in a round of financing. Investment funds [Noshag](#), [Newtree Impact](#) and [Beyond Impact](#) were among the first new investors, along with international food industry groups [Grupo Bimbo](#) and [Thai Union Group](#). These new funds will enable the company to pursue its industrial development to meet market demand and to position itself as a key player in the food industry's shift towards the use of new proteins. It will allow Algama to build a manufacturing facility on a 10,000 m² industrial site in Liège, Belgium.

Recap: Algama's exclusive processes for separating and formulating microalgae means they are able to provide customised substitution solutions without the usual constraints of using microalgae. It is an ethical and sustainable solution, but also an extremely competitive one, as it is cheaper than its counterparts. Algama brought Tamalga to market, a product that replaces eggs for many industrial uses, particularly in the bakery and pastry industries (brioche, biscuits, puddings, cakes, waffles, etc.). New uses for adding texture and improving the nutritional profile of products, such as meat or fish alternatives, are also being researched.

En savoir plus : [Agro Média.fr](#)

4151 - BioVeritas

US-based company [BioVeritas](#), which has developed a proprietary upcycling process for biobased ingredients, has announced the expansion of its executive leadership team with the appointments of Pareen Shah as Senior Vice President of Business Development and Stephen Toon, PhD as Senior Vice President of Operations and Engineering. Prior to joining BioVeritas, Pareen Shah held senior management positions including Head of Product Management for Impossible Foods' US retail and food service businesses, Head of Food for Corbion's Algae Ingredients unit and Marketing Director for Del Monte Foods. With over 30 years of experience in the bioprocessing industry, Stephen Toon has successfully completed 29 product commercialisation projects from conception to full-scale production, including the opening of six new plants. Prior to joining BioVeritas, he held senior management and technical leadership positions at companies such as Cargill, National Renewable Energy Laboratory, Verenum, Gevo and OPX Bio.

These new leaders will focus on rapidly bringing BioVeritas' biobased ingredient product lines to market, building a strong customer and partnership base, and expanding the engineering operations necessary for rapid market penetration.

More information: [Press release](#)

4152 - BioZyme

The US-based [company](#) specialised in the manufacture and marketing of feed supplements for farm animals announced the launch of [AO-Biotics®](#), a range of products derived from the fermentation of *Aspergillus oryzae* (AO). This new range includes the prebiotic Amaferm® which improves digestibility. BioZyme also announced that it is *'on track to develop new products that will include both prebiotics and postbiotics.'* The first sales of postbiotics are expected to occur in the first quarter of 2023.

More information: [BioZyme Inc.com](#)

4153 - EvodiaBio

The Danish [company](#) which has used precision fermentation applied to baker's yeast to reproduce a wide range of molecules (monoterpenoids) that mimic a variety of hop flavours, has announced that it has secured 45 million Danish kroner in additional funding, equating to around €6 million. More specifically, EvodiaBio received 14 million kroner (€1.8 million) from the [BioInnovation Institute](#), a Danish accelerator funded by the [Novo Nordisk](#) Foundation, and 31 million kroner (€4.2 million) from several international industry names, including Belgian holding company [Newtree Impact](#), investment company [Thia Ventures](#), the German flavour house [Symrise](#) as a strategic investor, and [Nordic Foodtech VC](#) as lead investor. The additional funding will enable the company to scale up its production of flavours and finance its commercial development. EvodiaBio plans to start by securing its own offices, laboratories and pilot production facilities in Denmark.

In terms of application, the company has approached non-alcoholic beer manufacturers with the new flavours, although the founders ultimately intend to target the entire beverage market, followed by the food and perfume industries.

More information: [EvodiaBio.com](#)

En savoir plus : [AgroMedia.fr](#), [L'Echo.be](#), [L'Usine Nouvelle.com](#)

4154 - Green Spot Technologies

The New Zealand start-up, which has developed a process to transform fruit, vegetable and juice pomace waste into a nutrient-rich powder, has announced that it will set up its first production facility in Carpentras, France. It will move into a 1,600 m² building located at the *Marché Gare* site and will have an initial capacity of 100 tonnes per year. Green Spot Technologies chose to locate its plant in Carpentras because of the wide availability of co-products produced by a thriving local agricultural and agri-food industry but also due to the proximity of related institutions. The Regional Centre for Innovation and Technology Transfer (CRITT), the Agri-food Technical Centre (CTCPA), France's National Research Institute for Agriculture, Food and Environment (INRAE), and the business school for entrepreneurs dedicated to natural products, Isema, are all located nearby. By moving to Carpentras, the company also becomes eligible to benefit from a new scheme aimed at boosting the economic attractiveness of the area. Full-scale production is expected to get underway in the first half of 2023.

Info: Green Spot Technologies is preparing a round of Series A funding to achieve a production capacity of 600 tonnes by 2024.

En savoir plus : [L'Usine Nouvelle.com](#), [L'Echo du Mardi.com](#), [L'Echo du Mardi.com](#), [La Tribune.fr](#)

4155 - Michroma

The biotech [company](#) which produces food colours by combining a unique fungal chassis strain with precision fermentation, has announced that it has secured \$6.4 million (€6 million) in seed funding. The round was led by [Supply Change Capital](#), a food tech venture capital firm backed by [301 INC](#), the venture capital arm of [General Mills](#). Funds were invested by [Be8 Ventures](#), [CJ CheilJedang](#), [FEN Ventures](#), [Boro Capital](#), [The Mills Fabrica](#), [Portfolia's Food & Ag Tech Fund](#), [New Luna Ventures](#), [Siddhi Capital](#), [Groundswell Ventures](#) and [HackCapital](#). New investors also included angels Allen Miner, Jun Ueki and Steve Zurcher from Keiretsu Japan Forum, Guillermo Rosental, Franco Goytia, Pablo Pla and Mat Travizano, with existing investors [IndieBio](#) and [GRIDX](#) also contributing. Michroma has developed a new red dye called Red+, which is temperature resistant and stable across the food pH spectrum. These characteristics allow colours to withstand pasteurisation, baking and extrusion, which are the most intensive processes for natural food colours. The company chose to start with warm colours, which account for 90% of the food market, but is already planning to include other colours and new flavours that will be sold in combination to provide integrated solutions for businesses. The new funding will enable the company to speed up the commercialisation of sustainable natural colours, increase its R&D capabilities and expand its ingredient platform.

Info: Having created prototypes for some of the world's largest food companies, Michroma is currently negotiating agreements with ingredient suppliers for global distribution of its Red+ food colour. The company will submit colour additive applications to the Food and Drug Administration (FDA) and the European Food Safety Authority (EFSA).

More information: [Press release](#), [Food Ingredients First.com](#)
En savoir plus : [Bionity.com](#)

4156 - The Live Green Company

The US-based company has announced that it has developed a precision fermentation division to replace animal, synthetic and ultra-processed ingredients with biobased alternatives. Using its proprietary artificial intelligence (AI) software Charaka, The Live Green Company will enhance the functionality and sustainability of the products developed and expand beyond the current ingredients and fungi hosts to offer its customers more options. According to Live Green: *'Charaka's algorithms analyse intricate data – such as organoleptic, taxonomy, phytochemical compounds, bioactive molecules, nutritional profiles, physicochemical and mechanical properties and molecular analysis – of various plants using sophisticated deep machine learning systems to discover hidden and non-linear relationships and predict innovative functionalities and uses.'* This AI has been able to replace milk, eggs, emulsifiers and anti-freezing and anti-caking agents in ice cream. The company substituted these ingredients with things like sunflower protein, fibre and fat, banana flour, avocado and flax meal. They concluded that the switch did not change the product's taste, texture or mouthfeel in 90 days. This fermentation division has a laboratory with a fermentation capacity of 100 litres and partnerships with internationally renowned institutes such as the International Centre for Genetic Engineering and Biotech ([ICGEB](#)).

More information: [Food Ingredients First.com](#)

4157 - Yeasty

The [start-up](#), which has developed a process to turn brewers' leftover yeast into a protein ingredient, announced that it has raised €1.4 million in its first round of funding. Investors included [Asterion Ventures](#), [Cameleon Invest](#) and [Satgana](#) and the funds will enable the company to have its own laboratory, industrialise the production of samples for around 30 agri-food manufacturers who are interested and to attract R&D talent. Yeasty proposes an ingredient containing 50% protein, 20% fibre, and which is a source of vitamins and minerals. It meets the needs of many stakeholders in the agro-food industry and can be used as a vegetarian/flexitarian alternative to meat or in sports nutrition, health nutrition and malnutrition, as well as serving the bakery, protein starch, biscuit, cheese and egg alternatives markets.

This year, Yeasty plans to firm up its first contracts and finance its first production facility with an annual capacity of 100 tonnes. The company aims to build its first plant by 2025 with an annual capacity of 5,000 tonnes.

En savoir plus : [Process Alimentaire.com](#), [Maddyness.com](#)

4158 - Launch of a call for expression of interest on innovation for the transformation and valorisation of plant proteins.

Coordinated by [AD'OCC](#) – the economic development agency for the French region of Occitanie – and [Agri Sud-Ouest Innovation](#) as part of the region's innovation strategy, the recently-launched call for expressions of interest (EOI) aims to identify innovative projects that can help to create regional momentum in the plant protein sector. It has been launched in partnership with the water agencies, the Regional Chamber of Agriculture, the Coopération Agricole, AREA Occitanie and FILEG. The EOI sets out to encourage, identify and support innovation projects that respond to:

- an issue related to the innovative and sustainable use and/or processing of plant proteins and their co-products;
- a need to develop efficient regional value chains for plant proteins and their co-products.

This involves:

- encouraging partnerships and fostering ties between research laboratories and/or technical centres and the business world, and transferring theoretical results to the user sectors;
- creating jobs and opportunities to develop skills while helping to develop an efficient production and processing sector in the area;
- promoting the nutrition transition, including protein self-sufficiency, through innovation;

- promoting the agroecological transition of farming and agri-food systems.

The EOI applies to an array of innovative projects, regardless of how advanced they are, from feasibility to roll out. The call is open until 31 March 2023.

En savoir plus : [Agence AD'OCC.com](https://www.agence-adocc.com)

4159 - Ferments of the Future Grand Challenge: operational launch and opening of the first call for pre-competitive projects.

Ferments of the Future is a research-innovation programme coordinated by INRAE and the French food industry association ANIA. Thirty public and private players are already involved, ranging from academic researchers to cooperatives, and from start-ups to large groups. Three months after its official launch, the programme became operational on 12 December 2022 when its strategic orientation committee met for the first time. This programme, which has received €48.3 million of funding from France 2030, is designed to provide a better understanding of the mechanisms of food fermentation so they can be altered if needed, to address health issues, climate change or to adapt to consumer expectations. It will also enable the development of new fermented foods, particularly those made from cereals, legumes, fruit and vegetables. It has the highly strategic purpose of overcoming the challenges of agroecological transition, food sovereignty and reinforcing the economic supremacy of the French and European agri-food industry in a sector that drives huge international investments. The operational launch of the Ferments of the Future Grand Challenge sets out to encourage natural fermentation techniques to accelerate the agricultural and food revolution for safe, healthy and sustainable food. The first pre-competitive results are expected by the end of 2024.



Source: inrae.fr

Info: The food-focused Ferments of the Future Grand Challenge may gradually open up to other applications, particularly in the agricultural sector.

En savoir plus : [Communiqué de presse](#), [La Dépêche du Midi.fr](#), [Agri Mutuel.com](#), [Le Figaro.fr](#)

The aim of this call for projects (CfP) is to break down scientific and technological barriers that slow down innovation in the fields of ferments, fermented foods and food biopreservation. It must be clearly stated in the letter of intent how the project is relevant to at least one of the four strategic aspects of Ferments of the Future. Particular attention will be paid to the following criteria during the selection process:

- capacity of the project to lead to proof of concept or to results that can be protected (patent, trade secret, etc.) and applied at the end of the project (TRL 3 to 6);
- collaboration between several research teams; the complementarity and crossdisciplinarity of the partners will be taken into account;
- capacity of the projects to impact one or more fields – food and/or animal feed but also agriculture, health or other – and to have a transversal approach to the different axes.

This CfP is open to all French public research organisations. Technical institutes belonging to the ACTIA agri-food network that are members of Ferments of the Future can also participate in pre-competitive projects alongside one or more public members of Ferments of the Future and/or third-party academic partners. The call for projects is entirely funded by Ferments of the Future. Marginal costs such as non-permanent staff costs incurred by the project, running costs, travel costs, small equipment and services will be eligible; however, permanent staff costs and related costs will not be covered. Regarding fields of application, the projects selected will primarily concern food, but may also concern, by extension, other related fields (farming, animal feed, health, etc.). The results of the winning projects are expected to be announced in mid-June 2023. The projects selected will commence no later than 15 September 2023. Ferments of the Future plans to finance six to eight projects, with a maximum duration of two years and a maximum amount of €250,000 per project.

En savoir plus : [Ferments du Futur.hub.inrae.fr](#)

Biocontrol/Biostimulation

4160 - Afyren & Cearitis

French company Afyren, which produces seven organic acids (carboxylic acids C2-C6) by fermentation, has signed an innovative partnership with the start-up [Cearitis](#), provider of agricultural biocontrol solutions, to offer tree crop growers an innovative and biodiversity-friendly alternative to insecticides. Cearitis's biomimetic Push & Pull biocontrol solution is made using biosourced acids that are produced by Afyren using innovative fermentation technology in which natural microorganisms work in synergy for improved efficiency. The solution is made from natural molecules that are non-toxic for tree-crop farmers, can be used in organic agriculture and fit the bill for the sector's profitability goals. The partnership secures Cearitis' supply of biobased and low-carbon raw materials and enables Afyren to enter a market in which it has a particular interest, in line with its farming-centric biorefinery model. The technology is currently being field tested for the third consecutive year, to validate proof of concept (POC) on olive and cherry trees with very encouraging initial results. The registration procedure is underway and the marketing authorisation is expected soon. The first commercial production is planned for this year.

More information: [Press release](#)

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

4161 - Amoéba

The industrial biotech company, which has developed a biocontrol agent to treat plants in agriculture and a biological biocide to treat industrial water, announced that it has submitted a building permit application for its new production site that will be used for the bioproduction of its biocontrol agent. The 3,000 m² production facility will be based in Cavallon in the South of France and is expected to produce up to 200 tonnes of finished products, i.e. 40 tonnes of active substance, with a view to covering the priority target markets: vines, market garden crops and aromatic plants. To secure the success of this industrial undertaking, the company is implementing a gradual scale-

up at its original site in Chassieu, where a new replicable pilot line has been introduced. This industrial project represents an investment of €45 million – €23 million in capital expenditure and €22 million in operating expenditure – covering the period 2023-2025. The facility should be up and running by early 2025 so the company can start marketing its biocontrol products as soon as marketing authorisations are delivered in Europe and the United States.

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

Having already signing a contract with [Redbridge Debt and Treasury Advisory](#) to source funding for its industrial development, Amoéba has announced that it has signed a €9 million simple bond financing contract with the Swiss company [Nice & Green](#). Nice & Green SA has agreed to support Amoéba pending its search for the finances to build its new biocontrol production facility, in the form of a simple bond debt financing framework with, as an exclusive guarantee of repayment, a commitment to issue share warrants should Amoéba fail to repay the simple bonds (SBs) at their maturity. It is further agreed between the parties that Amoéba may redeem the simple bonds at any time at their nominal value plus capitalised interest and terminate the contract without early redemption compensation. This interim financing enables the company to start its industrial project immediately and to cover its expenses until December 2023. It is intended to be automatically repaid once Redbridge Debt and Treasury Advisory has structured funding of more than €40 million.

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

Amoéba announced that the US Environmental Protection Agency (US EPA) has given its approval for the amoeba *Willarta magna* C2c Maky to be used as a biocide in closed cooling systems, for the control of microbial slime (bioslime), microbially induced corrosion and general microbial flora.

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

4162 - BASF & Cargill

The German chemist and the US food ingredients supplier have announced they have bolstered their cooperation by adding the US to their existing agreement for the development and distribution of food enzymes. Together, the two companies are committed to bringing innovative enzyme-based solutions to the market, generating distinctive value for animal feed customers. By combining the enzyme research and development strengths of BASF with Cargill's know-how in application and broad market reach, the partners will form a joint innovation pipeline for animal protein producers.

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

4163 - Bayer

The German pharmaceutical and agrochemical group and the French company [M2i Group](#), which specialises in pheromone-based biological crop protection products, have entered into a new partnership to supply pheromone-based biosolutions to fruit and vegetable growers. Under the agreement, Bayer will incorporate M2i's pheromone products into integrated pest management programmes combining digital solutions, pest monitoring and decision support tools to advise farmers on pest pressures and application timelines, as well as other conventional crop protection products and biosolutions. Bayer is particularly interested in M2i's highly innovative press application technology. The technique involves a gel that hardens once it is attached to something, then biodegrades while diffusing its active ingredients. This procedure of pheromone micro-encapsulation in natural waxes enables controlled release of the pheromone substance. The agreement positions Bayer as sole distributor of certain M2i products that target lepidoptera pests in crops such as stone and pome fruits, tomatoes and grapes.

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

Bayer and the Spanish group [Kimitec](#) have signed a strategic partnership to accelerate the development and commercialisation of biocontrol and biostimulant solutions. The partners will combine the power of Kimitec's [MAAVI Innovation Center](#) – Europe's largest biotechnological innovation hub with 15 years of experience in the research and discovery of natural molecules and compounds for agriculture and food sectors – with Bayer's product development expertise.

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

4164 - Bioprox

The food industry and biotech solutions [division](#) of the French group [Proxis Développement](#), which produces freeze-dried lactic ferments (acidifying, flavouring and bioprotection ferments) for the manufacture of dairy products (yoghurts, fermented milks, cheeses) and probiotics for food supplements, has announced that it intends to invest €20 million over four years to build a new production facility for recombinant proteins. It will produce new generation enzymes as an alternative to pesticides in agriculture and antibiotics in livestock farming. French towns being considered for the future facility include Noyant, Marseille and Toulouse. The decision should be made known by the end of the first quarter of 2023.

Info: Bioprox is one of the 18 projects selected by the French government as part of its "First factory" call for projects.

En savoir plus : [Les Echos.fr](#)

4165 - BWT & Chimie ParisTech-PSL

The [leader](#) of the European water treatment industry has entered into a partnership with the [Chimie ParisTech – PSL](#) chemistry institute. Their aim is to design, experiment, formulate and industrialise a new generation of products containing one or more biosourced and biodegradable green active ingredients to be used to treat water and protect installations against deposits and bacteria. The partners have laid out a set of criteria to achieve this. Firstly, from an environmental standpoint, the active ingredients selected must be part of a sustainable approach to limit their environmental impact. Accordingly, the origin, availability and proximity of the ingredients will be taken into account throughout the product life cycle. The green active ingredients must also comply with current regulatory and safety standards, to prevent any risk of danger for human health. Finally, the solution must have an acceptable end cost. This research partnership is also expected to substitute some of the current chemical treatments that present human, environmental and economic risks in relation to production and supply.

En savoir plus : [Agro Média.fr](#)

4166 - Mycea

The French [start-up](#) which develops biostimulation and biocontrol solutions for agriculture using the biological and biochemical properties of mycorrhizal fungi, has announced that it has raised €8 million from Montpellier-based [Vol-V](#) which specialises in renewable energy. This investment covers almost 70% of the €13 million the company needs for its development. *'This will give us peace of mind for the next five years'* said Pierre-Jean Moundy, co-director and co-founder of Mycea.

En savoir plus : [La Tribune.fr](#)

4167 - Mycophyto

The [spin-off](#) of INRAE, France's Research Institute for Agriculture, Food and the Environment and Côte d'Azur University, which develops natural biological solutions (mycorrhizal fungi) to revitalise soils and accelerate plant development, has announced that it has raised a further €4.155 million. The transaction was conducted with long-standing investors and family offices but also new investors including investment funds from Crédit Agricole's New Aquitaine and Charente-Périgord regional banks, Paris Business Angels and local entrepreneurs such as Jean-Daniel Hernandez, CEO of Botanica, and the Garotta brothers who head up Riviera Réalisation. These new funds will enable the company to accelerate its industrial and commercial development as well as its international expansion in Europe and Africa. Mycophyto aims to become the European market leader by 2025.

En savoir plus : [Le Journal des Entreprises.com](#), [Var Matin.com](#)

4168 - Seipasa

The Spanish [company](#) specialising in the development, formulation and manufacture of bioinsecticides, biofungicides, biostimulants and fertilisers, has announced the market launch in Spain of Fungisei, a biofungicide developed from a pure, high-efficacy strain of *Bacillus subtilis* that it has patented. This new product can be used to control diseases such as Botrytis, mildew, powdery mildew or mottle in a wide variety of crops. It is classified by the European Commission as a low-risk product, which certifies its low impact in all aspects of its use and application. In addition to Spain, Fungisei can also be used in Portugal, France, Turkey, Mexico, the USA, Peru, Morocco and the Ivory Coast.

More information: [Seipasa.com](#)

4169 - Identification of a new class of peptides that represent a more natural alternative to chemicals used in agriculture.

In this study, scientists identified a new class of small proteins in plants, peptides called complementary peptides (cPEPs) that can be designed to specifically increase the abundance of the targeted protein. By targeting proteins known to be involved in different processes, treatment of plants with peptides can lead to improved plant development, increased resistance to pathogenic fungi and improved heat resistance. Without modifying the genome as in the case of GMOs and CRISPR, the peptides identified make it possible to transiently modulate the development of plants or their resistance to biotic and abiotic stresses simply by watering or spraying them. Beyond basic research, for which cPEPs should facilitate the study of the role of genes, the main benefit of these peptides is their use in agronomy: a few sprinklings or sprays of peptides on plants of agronomic interest, for example, can improve tomatoes' resistance to a pathogenic fungus, or even boost the growth of soybeans without using fertiliser or make them more resistant to heat. Finally, cPEPs can provide a credible alternative to glyphosate and other herbicides by reducing the growth of highly problematic weed species such as amaranth. This technology has been patented and licensed to TWB consortium member Micropep Technologies, which seeks to identify and commercialise peptides for agronomy.

[Publication](#): Complementary peptides represent a credible alternative to agrochemicals by activating translation of targeted proteins. Journal: Nature Communications. DOI: 10.1038/s41467-023-35951-0.

En savoir plus : [Cnrs.fr](#)

Chemicals & materials

4170 - Afyren

The green chemtech company, which produces seven organic acids (carboxylic acids C2-C6) by fermentative means, and the Thai group [Mitr Phol](#), specialised in the production of cane sugar and its derivatives, have signed a Letter Agreement with a view to opening a plant to produce biobased organic acids in the vicinity of Bangkok, Thailand. The future facility, which represents an investment of nearly €100 million, will have a production capacity of around 28,000 tonnes per year and generate an annualised turnover of around €60 million at full capacity. This

agreement will enable Afyren to support its local, regional and international customers in the strategic Asian market, which accounts for a quarter of global demand for carboxylic acids. The growth of this market is driven in particular by the dynamics of the food and animal nutrition sectors. Afyren will also be able to take advantage of the country's geographical location in the heart of Southeast Asia to export some of the production from its new plant to other Asian countries. The agreement is expected to be finalised in mid-2023 for production to start in 2025, depending on the engineering studies which are scheduled for the second half of 2023.

More information: [Press release](#)

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

Afyren has announced the appointment of three new members to its management team along with new hires to support its industrial development in France and internationally and to ramp up its R&D activities. Ursula Feulner has become Director of Industrial Project Management. Ursula has joined Afyren's Operations team to lead the upstream phases of industrial projects, including the construction of new plants. Prior to joining Afyren, she worked within the Suez group, where she held various roles closely related to the management of industrial projects in Europe, North America, the Middle East and Asia, and worked in risk management for a number of strategic projects. Léa Bassegoda has been appointed Human Resources Director. After several years in France and the United States with LVMH and then Danone, Léa will use her skills and solid experience to build a global Human Resources policy within the group and structure the organisation in line with the company's culture and strong values. Christophe Dardel has been appointed Strategic Partnerships Director. Christophe has joined Afyren to identify and lay the groundwork for future international factory projects and related strategic partnerships. Christophe brings his long and solid international experience acquired in several companies and in particular within Royal DSM for more than 15 years. As a former member of the executive committee, Christophe was in charge of the development of DSM Dyneema, a company that has enjoyed strong organic growth through the establishment of several factories and key partnerships around the world. In 2022, more than 10 new employees with complementary profiles and skills joined the teams. These new hires will help the R&D team to continuously develop and optimise the best sustainable solutions for Afyren's customers and partners. New staff have also been recruited in engineering and project management to support the existing operational teams, anticipating international expansion including the design of future factories. Other recruits will reinforce the regulatory, administrative and financial teams to ensure compliance and the operational quality of products and processes.

More information: [Press release](#)

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

4171 - Avantium

The Dutch chemicals company and **Origin Materials**, a carbon-negative materials company, have entered into a partnership to accelerate the mass production of furandicarboxylic acid (FDCA) and polyethylene furanoate (PEF) for use in the manufacture of chemicals and plastics. To this end, the partners have signed a non-exclusive industrial technology licence agreement to combine Avantium's proprietary YXY® technology, which converts plant-based sugars into FDCA, with Origin's patented technology platform, which turns carbon found in sustainable wood residues into building-block chemicals such as chloromethylfurfural (CMF). Following signature of the licence agreement, Avantium will receive an additional fee of €7.5 million and may receive additional payments if it reaches certain milestones. Under the agreement, Origin Materials and Avantium have also entered into a conditional offtake agreement (COA), enabling Avantium to sell the FDCA produced at its pilot plant in Geleen, the Netherlands, in 2023 and the PEF produced at its flagship plant in Delfzijl, also in the Netherlands, from 2024. Origin Materials is committed to buying a gradually increasing minimum annual volume of FDCA throughout the term of the agreement.

More information: [Press release](#)

Avantium and the German adhesives company **Henkel** have signed an offtake agreement for the sale of the furandicarboxylic acid (FDCA) made by Avantium from plant-based sugars at its flagship unit (currently under

construction in Delfzijl, the Netherlands). Henkel initially intends to use the FDCA to produce innovative polyurethane (PU) adhesives for electronics applications. The German group also plans to use it in packaging, wood construction and textile lamination further down the line.

Recap: Henkel and Avantium's partnership dates back to 2019, when Henkel joined the [PEference](#) consortium. The consortium aims to establish a functioning supply chain for FDCA and polyethylene furanoate (PEF), a derivative of FDCA.

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

4172 - Braskem

The Brazilian biopolymers specialist announced it was considering building a new biobased polypropylene production facility in the United States. The planned facility would use Braskem's proprietary technology to convert bioethanol into physically segregated polypropylene. According to Mark Nikolich, Braskem CEO, *'This new US-based project would not only serve a growing market for sustainable solutions but also reduce Braskem's reliance on fossil feedstock.'* Braskem also chose the United States because the country is the world's leading ethanol producer, in addition to having ample technology, infrastructure and supply availability for a project in the polymers value chain. Braskem went on to announce it was exploring partnership opportunities for this project with several customers, brand owners and suppliers.

Recap: Braskem is aiming to produce one million tonnes of biopolymers by 2030 and be carbon neutral by 2050.

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

4173 - Carbios

The French specialist in the enzymatic recycling of plastic polymers and textiles announced that, in late 2022, it held 336 titles worldwide divided into 53 patent families. These cover its innovative enzymatic recycling process for PET plastics and fibres and its PLA biodegradation technology. This is double the number of issued patents since the last review published at the end of 2020. Carbios is expanding its Intellectual Property (IP) portfolio in regions and countries where demand is high for disruptive technologies, including:

- In Europe: 40 European titles, which could be granted in the 39 member states of the European Patent Organisation;
- In North America: 41 titles in the United States and 23 in Canada;
- In Asia: 152 titles, including 37 in China, 27 in Japan and 24 in India.

Carbios also has 14 patent applications that may be extended to other countries or regions of the world in the coming years.

Info: The Intellectual Property team at Carbios includes a Director (who is also a member of the Executive Committee) and two patent engineers specialised in the fields of biotechnology and polymer chemistry, one of whom is a representative before the European Patent Office. They are supported by two external Intellectual Property consulting firms ([Becker & Associés](#) and Franck Tetaz Intellectual Property). Last, an Intellectual Property Committee reports regularly to Carbios' Board of Directors.

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

Carbios announced that it had signed an agreement with leading American fashion group [PVH](#), which holds brands such as Calvin Klein and Tommy Hilfiger, welcoming it to the textile consortium founded with On, Patagonia, PUMA and Salomon. The consortium's aim is to accelerate the textile industry's transition to a circular economy. The consortium partners are collaborating with Carbios to test its biorecycling technology on their own products (clothes, underwear, footwear and sportswear) and improve it. In addition to providing raw materials for the demonstrator

plant, the consortium members intend to create new products using the r-PET fibres produced through Carbios' biorecycling process. The ultimate aim is to prove 'fibre-to-fibre' closed circularity using the biorecycling process at industrial scale. Carbios and its partners will work together for two years to achieve the biological recycling of polyester articles in large volumes. They will also study effective sorting and dismantling technologies for complex textile waste. The existing members voted unanimously for PVH Corp. to join the consortium.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Le Journal Du Dimanche.fr](#)

Carbios announced the appointment of four new board members:

- Karine Auclair, Professor of Chemistry at McGill University;
- Sandrine Conseiller, former CEO of Aigle;
- Amandine De Souza, General Manager of BHV MARAIS, Eataly, and Home, DIY and Leisure Purchasing at Galeries Lafayette Group;
- Mateus Schreiner Garcez Lopes, Global Director for Energy Transition and Investments at Raizen.

Three of the new members have strong, proven expertise in various industries covering fashion, retail and energy, as well as business development and change management in high-growth markets and sectors around the world. The new scientific expertise will help advance Carbios' research into biological solutions for the life cycle of plastics and textiles. These appointments mean Carbios has met its CSR objective of 60% independent directors ahead of the 2024 target date, and has increased the number of women on the board.

More information: [Press release](#)

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

Carbios announced that it had successfully validated the final key step of its CE-PET research, co-funded by the French government as part of the Investments for the Future Programme, now integrated into France 2030, and operated by the French agency for the environment and energy management, ADEME. Carbios coordinated the research alongside its academic partner INRAE via the TWB joint service unit and TBI joint research unit. The four-year project started by confirming the PET enzymatic recycling process at pilot scale in order to then scale up to the industrial demonstrator. The demonstrator, which opened in September 2021, is now capable of processing PET plastic waste. The initial feasibility of the process, both environmentally and economically, has propelled it further forward towards its industrialisation. The other major success of the project was validating the technology on textile waste at pilot scale: a considerable feat, as textiles represent about 60% of the global PET market. To date, PET bottles are the main raw material used to manufacture recycled polyester fibre. Being able to use Carbios' technology on textile waste increases its application possibilities, especially in view of new European regulations on the separate collection of textile waste, which will become mandatory from 1 January 2025. Textile PET waste will be included in the demonstrator in 2023, within the framework of the LIFE Cycle of PET project co-funded by the European Commission, specifically. The last key step of the CE-PET project was approved without reservation by ADEME.

Info: For the validation of the whole project, Carbios will have received a total of €4,136,000 (€1,034,000 in grants and €3,102,000 in repayable advances) and its partner INRAE-TWB €3,416,000.

More information: [Press release](#)

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

Carbios announced the appointment of Martine Brisset to the position of Senior Vice President from 1 January 2023. She will manage the Biodegradation Division and supervise the Human Resources, Legal, Regulatory, Project Management, and Quality, Health and Safety departments. In her new role, her main mission will be to successfully roll out the commercial deployment of the biodegradation technology, facilitate the international expansion of Carbios' activities, and organise the recruitment and training of the Group's employees. Martine Brisset joins the Group's Executive Committee, as does Delphine Denoizé, who remains Innovation Programs Funding, Regulation and LCA Director with an expanding team.

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

Carbios has recently invested over €20 million in a new demonstrator plant on the site of the Cataroux innovation cluster in Clermont-Ferrand, France. The new facility will enable it to continue research into improving the efficiency of its proprietary technology. Emmanuel Ladent, Carbios' chief executive officer, said the company was *'currently achieving 90% PET depolymerisation. We need to keep working to quickly reach 95%, as well as decrease our water consumption, speed up treatment of the polyester fibres used in textiles, and continue to improve the efficiency of our enzyme.'* The demonstrator plant will also make the first recycled plastic products.

Info: Carbios believes that the recycled plastics market will reach 60 to 80 million tonnes in 2035.

En savoir plus : [Le Journal des Entreprises.com](#), [Les Echos.fr](#)

Carbios and the Danish enzyme specialist **Novozymes** announced that they had strengthened their collaboration with a long-term exclusive strategic partnership to ensure the production and supply of the PET-degrading enzymes Carbios will need for its own plants as well as those of its licensees. Carbios and Novozymes partnered up in 2019 to develop enzymes both for PET recycling and PLA biodegradation. Building on the current Joint Development Agreement, the two partners will extend their collaboration to develop, optimise and produce enzymes that will subsequently be supplied by Novozymes to all future licensees of Carbios' technology. The French company hopes to sign the first licences *'late 2023-early 2024'*.

Recap: Carbios will start the year with construction of the world's first PET biorecycling plant. Located in Longlaville, France, and costing €200 million, the new unit will be able to process 50,000 tonnes of waste each year. It is expected to go on line in 2025 and generate its first revenue in 2026.

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

4174 - Deinove

As no takeover offer was submitted to the receiver before the deadline expired, the biotechnology company specialising in the development of antibiotics from bacteria announced that the trade court of Montpellier, France, had on 23 January 2023 issued a ruling converting the receivership proceedings, begun on 7 November 2022, into court-ordered liquidation proceedings. Maître Christine Dauverchain was appointed as judicial liquidator. The Deinove share listing (FR0010879056) will remain suspended until the end of the delisting procedure, which is expected to take place shortly, after consultation with Euronext Paris. If the court-ordered liquidation proceedings do not result in the distribution of a liquidation surplus to shareholders, Deinove will inform its shareholders that their shares are worthless.

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

4175 - Fairbrics

The French green chemistry [start-up](#), which has developed a technology to produce polyester fibres from CO₂, announced that it had completed a €22 million fundraising round to speed up the market entry of its technology. More specifically, Fairbrics received €17 million from the European Union through its Horizon 2020 research and innovation programme, and €5 million from its project partners. The additional funds will primarily enable it to build its first pilot unit in Anvers, Belgium, with a daily production capacity of 100 kg of polyester fibres. Entry into service is scheduled for 2024. Fairbrics is also planning to build a demonstration plant with a 1 tonne/day capacity by 2026. It will use the CO₂ pumped out by the chemical industry. In terms of applications, the French start-up is mainly targeting apparel, as well as the sports equipment, automotive and packaging industries. It also plans to license its technology for the United States and Asia.

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

4176 - Futerro

The Belgian PLA producer announced that it wanted to build the first fully integrated European biorefinery dedicated to PLA production and recycling in the Port-Jérôme-sur-Seine industrial zone in Northern France. The project would comprise a lactic acid unit transforming raw materials of agricultural origin, a unit converting lactic acid to PLA, and a unit dedicated to molecular recycling of the polyester. The facility could ultimately produce 75,000 tonnes per year. Futerro had begun negotiations with Caux Seine Agglo and its economic development agency Caux Seine Développement to find a location, and has put an option on a 26.5-hectare plot of land in the municipality of Saint-Jean-de-Folleville. The ecological and environmental analyses of the plot have already begun and a consultation phase will be launched sometime this year. The project would require a €500 million investment.

More information: [Press release](#)
En savoir plus : [L'Usine Nouvelle.com](#), [Actu.fr](#), [La Tribune.fr](#)

4177 - Ginkgo Bioworks & Bioweg

The American industrial biotech company and the German [start-up](#), which uses waste and side streams from the food industry as biobased feedstock to produce alternative bacterial cellulose-based ingredients, have entered into a partnership to optimise Bioweg's production methods. They also hope to develop novel cellulose variants with improved performance to serve a wide range of markets. Prateek Mahalwar, Bioweg CEO, said: *'We believe Ginkgo's strain engineering and screening capabilities can enable us to deliver our biobased solutions at scale and competitive pricing.'* The Bioweg product portfolio has already been tested and implemented by businesses as a substitute for synthetic polymers such as acrylates, polyethylene and polystyrene. Its products can be used in personal care, cosmetics, seed and fertiliser coating, and the food industry.

More information: [Press release](#)
En savoir plus : [La Gazette du Laboratoire.fr](#)

4178 - Goodyear

Following its presentation in January 2022 of a tyre composed of 70% sustainable materials (i.e., made from biobased/renewable, recycled material or materials that may be produced using or contributing to other sustainable practices for resource conservation and/or emissions reductions), the American group announced that it had developed a tyre made from 90% sustainable materials. The prototype contains a total of 17 ingredients, including carbon black, which is used in compound reinforcement and to help increase tyre life, and is traditionally made by burning petroleum products. The new model features four different types of carbon black that are produced from methane, carbon dioxide, plant-based oil and end-of-life tyre pyrolysis oil feedstocks. It also contains soybean oil, which helps keep the tyre's rubber compound pliable in changing temperatures. Other ISCC-certified polymers in this tyre come from biobased materials. The new tyre, which has passed regulatory tests and Goodyear's internal tests, was designed to have lower rolling resistance when compared with tyres made with traditional materials. This reduces the fuel consumption and carbon footprint of combustion vehicles.

Recap: Goodyear's target is to launch the first 100% sustainable tyre by 2030.

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

4179 - NatureWorks

The American company specialising in polylactic acid (PLA) production organised a cornerstone laying ceremony to celebrate the construction of its new Ingeo™ PLA manufacturing facility in Thailand. The new facility at the Nakhon Sawan Biocomplex (NBC) in Nakhon Sawan province will be fully integrated and produce lactic acid, lactide

and polymers. It will have an annual capacity of 75,000 tonnes, and will produce the full portfolio of Ingeo™ biopolymer grades. Entry into service is scheduled for the second half of 2024.

More information: [Press release](#)

4180 - Novozymes

The Danish biotech group announced that it had merged with one of the companies in its group, [Chr. Hansen](#). Although the main activity of both companies is enzyme production, Chr. Hansen focuses on enzymes and microbes for the food sector, while Novozymes' largest business areas include enzymes for household products, food and beverages, and biofuels. The combined group is expected to achieve annual revenue of around €3.5 billion and annual revenue synergies of around €200 million within the next three or four years. The new group will initially be known as Novozymes and its Chief Executive and Chief Financial Officer will retain their positions. The merger, which is contingent on the approval of the extraordinary general meetings of both companies, as well as regulatory approval from the authorities, should be finalised in the last quarter of 2023 or the first quarter of 2024.

More information: [Reuters.com](#)

En savoir plus : [Le Figaro.fr](#)

Novozymes announced the launch of [Frontia® Prime](#), a new enzymatic solution made from a brand new xylanase component. It enables corn starch and sweetener manufacturers to further increase their yields and energy savings, and slash their CO₂ emissions. It does this by reducing the starch left in the fibres by up to 60% and increasing protein release by up to 30% compared to mechanical separation. It also helps reduce fibre moisture by 20% which enables customers to save on natural gas. The impact is significant in terms of CO₂ and energy savings, with a reduction of up to 12 kg CO₂/MT corn.

More information: [Press release](#)

4181 - Pili

Pili, which has developed a hybrid process that combines industrial fermentation and green chemistry to produce dyes and pigments, announced that it had successfully raised €14.5 million with the participation of long-standing investors, PSL Innovation Fund, Elaia Partners, SOSV, German business angel network Startupangels, and the Ecotechnologies 2 fund, managed for the French government by Bpifrance as part of the France 2030 initiatives. The fundraising round also saw investment holding company Famille C Participations and a private Italian firm join the investors. With the new funds, Pili will accelerate the scale-up of its processes to produce the first few tonnes of high-performance biobased indigo. The company is planning to begin building its new production unit in 2025, with entry into service in 2027.

Info: The business has already secured several million euros in turnover with preorders for biobased dyes and pigments from the textile, inks and paints sectors.

More information: [Press release](#)

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

4182 - Bioplastics: global production is set to rise in the coming years.

According to data compiled by the German research institute [nova-Institute](#) and published by the association [European Bioplastics](#), which represents the interests of the bioplastics industry in Europe, after the global slowdown in plastic production in 2020 (mainly because of the challenges posed by the Covid-19 pandemic), global bioplastics production is growing once again. Production capacity is expected to jump considerably, from around 2.23 million tonnes in 2022 to around 6.3 million tonnes in 2027. Production capacity will continue to increase significantly and diversify within the next five years due to a strong development of polymers, such as polyhydroxyalkanoates

(PHAs), polylactic acid (PLA) and biobased polyamides (PAs), as well as a steady growth of biobased polypropylene (PP). Packaging remains the largest field of application for bioplastics, with 48% (1 million tonnes) of the total bioplastics market in 2022. The data also confirm that bioplastics are already being used in many other sectors, and the portfolio of applications continues to diversify. Industrial segments, such as automotive and transport, agriculture and horticulture as well as electrics and electronics are expected to continue to increase moderately in their relative share over the coming years. Asia maintains its position as a major production hub with slightly over 40% of bioplastics currently being produced in the region. A quarter of production capacity is currently located in Europe. However, Europe's share and the share of other world regions is expected to significantly decrease within the next five years. In contrast, Asia is predicted to have exceeded 60% by 2027. The land used to grow the renewable feedstock for the production of bioplastics is estimated to be 0.8 million hectares in 2022 and continues to account for only just over 0.01% of the global agricultural area of 5 billion hectares. Over the next five years, the land use share for bioplastics production will increase, but will remain below 0.06%.

More information: [Press release](#)

4183 - Publication of the first comprehensive life cycle analysis of plastics and microplastics in the environment.

By studying the wealth of data published on the subject, a team of French researchers including scientists from the [Laboratoire Géosciences et environnement de Toulouse](#) (GET/OMP) and the [Laboratoire écologie fonctionnelle et environnement](#) has mapped out the life cycle of plastics, with 2015 as the reference year. The team went on to devise a mathematical model of the life cycle of plastics to simulate the progression of their dispersal in the land-ocean-atmosphere system since 1950. The model shows that even if we drastically reduce plastic production in the coming decades, microplastics are likely to circulate in our ecosystems for millennia. By simulating remediation scenarios, the study recommends more sustainable management of old and new waste in urban, industrial and agricultural environments, in order to limit the future dispersal of microplastics.

Info: The results will support the next United Nations Environment Programme global assessment of plastic pollution and the creation of a new global treaty.

Publication: A mass budget and box model of global plastics cycling, degradation and dispersal in the land-ocean-atmosphere system. Journal: *Microplastics and Nanoplastics*. DOI: 10.1186/s43591-022-00048-.

En savoir plus : [CNRS.fr](#)

Energy

4184 - Elyse Energy

The European [low-carbon fuel specialist](#) announced the launch of the BioTJet project to produce sustainable aviation fuel, in partnership with Avril, Axens, Bionext and IFP Energies Nouvelles, back in July 2022. The company, specially created for the BioTJet project, is capitalising on the BioTfuel® process developed and approved in the context of the European project of the same name conducted from 2010 to 2021. The project partners agreed on the financial structure of the BioTJet company in late December 2022. Five shareholders have confirmed their presence on the board: Elyse Energy, Avril, Axens, Bionext and IFP Investissements (the investment subsidiary of IFP Energies Nouvelles). Further to the operation, Elyse Energy will hold more than two thirds of the capital, with the main partners – Avril, Axens and IFPI – sharing the remainder equally. In addition to its private funding, the BioTJet project received support from the French agency for the environment and energy management (ADEME) as part of the 4th Investments for the Future programme - France 2030 through the 'Development of a French sustainable aviation fuel production sector' call for proposals. ADEME is providing funding for the initial research phase, consisting of €4.9 million in grants and €3 million in repayable advances.

Recap: By 2027, the BioTJet project hopes to produce 110,000 tonnes per year of sustainable aviation fuel and sustainable naphtha, for the aerospace and industrial sectors.

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

4185 - Emirates

The airline based in the United Arab Emirates announced that it had completed its first demonstration flight of a Boeing 777-300ER powered by 100% sustainable aviation fuel (SAF), in collaboration with GE Aerospace, Boeing, Honeywell, Virent and Neste. The test flight took off from Dubai International Airport and flew over the coastline, without passengers, for more than one hour. It is the first of its kind to use 100% SAF in the Middle East and Africa, and the first to use a Boeing 777 equipped with a GE engine with 100% SAF. According to Adel Al-Redha, Emirates' Chief Operating Officer: *'It would be a big step forward if, by 2030, 50% of fuel comes from SAFs, but this will depend on the capacity of businesses to produce it and deliver it to airports. Producers also need to offer affordable prices, as high costs will pose an obstacle for airlines and businesses.'* Emirates also took the opportunity to announce that it wanted to incorporate 50% sustainable fuel in all its flights by 2030.

More information: [Press release](#)

En savoir plus : [Connaissance des Energies.org](#), [Air Cosmos.com](#), [La Tribune.fr](#)

4186 - Global Bioenergies

The French industrial biotech firm announced that it had passed a major milestone in the renewable road fuels research agreement signed with **Shell** last November. The two partners have, therefore, signed an extension to the initial agreement to pursue further research and start developing innovative solutions based on Global Bioenergies' process.

More information: [Press release](#)

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

Global Bioenergies announced that [ASTM International](#), the materials, products, systems and services standardisation body, would open up the balloting process for the certification of its sustainable aviation fuel (SAF) production technology. There are three steps to the certification process:

- 2018-2023: evaluation of fuel performance by the US Federal Aviation Administration, the two main aircraft manufacturers (Airbus and Boeing) and the five main engine manufacturers (Rolls Royce, GE Aviation, Safran, Pratt & Whitney, and Honeywell);
- Starting on 27 February 2023 and ongoing over several weeks: balloting process at ASTM D02 subcommittee J for petroleum products, liquid fuels and lubricants, bringing together the key aviation industry stakeholders. Unanimous agreement on the proposed changes to the standard are required for the certification to be granted;
- June 2023: If the above subcommittee voting round is positive, final consensus at the ASTM D02 main committee is sought through a second ballot session.

More information: [Press release](#)

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

4187 - Goldman Sachs

The investment bank announced the launch of Verdalia Bioenergy, a biomethane production venture. The new company will focus on *'the development, acquisition, construction and operation of biomethane plants'* across the European continent, by investing *'in both early-stage biomethane development projects as well as existing assets.'* The company kicked things off by signing an agreement to buy a portfolio of biomethane projects with a total capacity of around 150 gigawatt hours per year (GWh/year) in mid-stage development in Spain. The American group also announced that it was planning to invest over €1 billion to develop biomethane production in Europe over the next four years.

More information: [Reuters.com](#)

4188 - LanzaTech

The New Zealand-based company specialising in using biotechnology to recycle carbon announced that it had received a £25 million (€28.2 million) grant for its Dragon (Decarbonizing and Reimagining Aviation for the Goal Of Netzero) project, the aim of which is to convert waste gases into sustainable aviation fuel (SAF). The grant, awarded to LanzaTech by the UK Department for Transport as part of its Advanced Fuels Fund competition, will enable LanzaTech and its partners Fluor Corporation and Technip Energies to finalise engineering and the project development required to reach a final investment decision. The proposed plant would convert waste gases from neighbouring industry into ethanol via LanzaTech's gas fermentation platform. The ethanol would then be turned into SAF using the LanzaJet Alcohol-to-Jet (ATJ) process, which incorporates Technip Energies' 'ethanol to ethylene' Hummingbird technology. This would be the world's first commercial scale integration of gas fermentation and ATJ to produce SAF, with greenhouse gas reductions expected to be greater than 70% relative to conventional jet fuel. Located in Port Talbot, United Kingdom, it would have an annual production capacity of 102 million litres of ATJ synthetic paraffinic kerosene. This would represent about 1% of UK jet fuel demand.

More information: [Press release](#)
En savoir plus : [L'Usine Nouvelle.com](https://www.usinenouvelle.com)

4189 - TotalEnergies

The broad-energy group announced that it had commissioned BioBéarn, France's '*largest anaerobic digestion unit*' with a maximum capacity of 160 gigawatt hours (GWh), equivalent to the average annual consumption of 32,000 people. Located in Mourenx, south-west France, the new unit will be fed with 220,000 tonnes of organic waste (from farming and agri-food activities in the local area) to produce biomethane then digestate, a natural, hygienised fertiliser, that will be sprayed on farmland within 50 km of the unit.

This year, BioBéarn is expected to produce 69 GWh of biomethane (the equivalent of the annual consumption of 14,000 people), use 95,000 tonnes of farming waste, and produce 89,000 tonnes of digestate. The plant required a €38 million investment and will prevent the emission of 32,000 tonnes of CO₂ annually. BioBéarn will enable the Lacq basin, a long-standing gas user, to pursue its local and sustainable growth strategy.

More information: [Press release](#)
En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](https://www.usinenouvelle.com), [Agri Mutuel.com](https://www.agrimutuel.com), [Le Monde.fr](https://www.lemonde.fr)

4190 - Versalis & DSM

The subsidiary of Italian petroleum group Eni announced that it had acquired the enzyme production technology developed by Dutch chemicals company DSM, used to produce second-generation ethanol. This will enable Versalis to improve the competitiveness and yield of its Proesa® technology, which is used to produce bioethanol and chemicals from lignocellulosic biomass. Implemented at the plant in Crescentino, Italy, the first step of the technology involves the saccharification of biomass, followed by use of a fermentation process to transform the sugars into cellulosic ethanol. The bioethanol produced at the plant will be used to formulate renewable fuels. Although DSM's technology has already successfully optimised enzymes to improve the saccharification yield, Versalis is planning to continue research to ensure future development in this field.

More information: [Press release](#)
En savoir plus : [L'Usine Nouvelle.com](https://www.usinenouvelle.com)

4191 - Biofuels: 2022 annual report on Superethanol-E85 consumption.

In 2022 in France, the consumption of Superethanol-E85 jumped by 83% (against 33% in 2021). It accounts for 6.5% of the petrol market (compared with 4% in 2021). In 2022, the distribution network swelled, with over 550 new sales points: up 20% in one year. Superethanol-E85 is now available at 3,300 service stations in France (36% of stations). During the year, 5,000 new ethanol conversion boxes were installed (against 30,000 in 2021 and 15,000

in 2020). According to [La Collective du Bioéthanol](#), 220,000 petrol vehicles are currently equipped with ethanol conversion boxes enabling them to run on Superethanol-E85. The sale of new flex-fuel-compatible cars also shot up, with almost 35,000 sold in 2022: six times more than in 2021. Of these flex-fuel vehicles, over two thirds are hybrids. By the end of 2022, there were 81,000 cars on the road with built-in flex-fuel capacity. The car manufacturer Ford, which sells six E85-compatible models in France, saw its sales increase by 7.6% in 2022, reaching 47,000 vehicles. Like all sectors, the bioethanol sector has suffered from the increase in farming and energy costs, particularly gas. Despite this increase – which affects all fuels – drivers can still make substantial annual savings compared with fossil fuels.

En savoir plus : [Communiqué de presse](#), [Dossier de presse](#), [20 Minutes.fr](#), [L'Usine Nouvelle.com](#), [La Tribune.fr](#)

4192 - Biofuels: IFP Energies Nouvelles publishes its annual dashboard.

In 2021 in the road transport sector, the share of alternative fuels and powertrains to oil-based petrol and diesel fuels (biofuels, LPG, NGV and electricity) increased by over 6% on 2020 and 2% on 2019. It now represents 8.8% of fuel consumed, i.e. nearly 185 Mtoe. Among these alternatives, biofuels accounted for 91 Mtoe, i.e. a market share of 49.3% of these alternatives and 4.3% of all fuels consumed. Bioethanol began to show growth again, as did petrol consumption, which has not quite recovered its pre-crisis level. Global ethanol consumption reached almost 51 Mtoe in 2021 (compared with 54.7 in 2019). Biodiesel substitutes for diesel have, for their part, started climbing again, reaching a record level of 40 Mtoe, despite the consumption of fossil diesel remaining below the level of 2017. In 2021, France incorporated a total of 4.5 million m³ (or 3.16 Mtoe) of liquid biofuels in the fuels distributed throughout the country, up 8% on 2020. Most of these biofuels are diesel substitutes (2.37 Mtoe), followed by petrol substitutes (0.77 Mtoe) and, for the first year, a share of jet fuel substitutes (0.013 Mtoe). In 2021, SP95-E10 fuel became the leading fuel consumed in France in petrol vehicles, with a market share of 51%.

In the air travel sector, IFP Energies Nouvelles found nine ASTM-certified alternative (bio)kerosenes, of which some value chains are already mature or close to industrial maturity, such as HEFA-SPK, coproduct of HVO biodiesel units; FT-SPK, coproduct of the BtL and e-fuel processes for the production of Fischer-Tropsch synthetic biodiesel; and ATJ-SPK, derived from the conversion of ethanol or isobutanol into synthetic kerosene. These alternative fuels are currently approved for incorporation in traditional kerosene, making up no more than 50% of the blend. Only a few hundred kilotonnes of sustainable aviation fuel (SAF) were sold to airlines in 2021. Although the latter have been particularly active in terms of partnership agreements and incorporation targets, the cost premium between SAF and conventional jet fuel is still high (by a factor of 2 to 2.5). All market players are waiting for an incentive-based, stable and long-term regulatory framework to secure market deployment.

Last, IFP Energies Nouvelles presents an overview of perspectives in terms of investments, incentives and the roll-out of industrial biogenic CO₂ capture/storage solutions.

En savoir plus : [IFP Energies Nouvelles.fr](#), [Actu Environnement.com](#)

4193 - Decarbonisation of the aviation industry: stakeholders in France's Occitanie region push to accelerate the development of sustainable aviation fuels.

Etienne Guyot, prefect of the Occitanie region and the Haute-Garonne, Carole Delga, president of the Occitanie region, Guillaume Faury, CEO of Airbus, Nathalie Tarnaud-Laude, CEO of ATR, Philippe Crébassa, CEO of Toulouse-Blagnac airport, and Bruno Darboux, CEO of the Aerospace Valley competitiveness cluster, have signed a [joint commitment](#) to accelerate the development, production and use of sustainable aviation fuel (SAF) in the Occitanie region and contribute to the decarbonisation of the aviation industry. Although European regulations do provide for the gradual integration of a growing percentage of sustainable fuels into the kerosene used by aircraft, Occitanie's stakeholders have committed to going one step further, doubling the European targets. They will also explore the possibility of mobilising regional resources and skills for local SAF production in the longer term. The commitment is part of actions already rolled out to make Occitanie the green aircraft region.

Info: Carole Delga, president of the Occitanie region, announced that on a regional level, '€100 million has been earmarked for green aircraft, €10 million of which for the call for expressions of interest in SAFs, aiming for the creation of a regional value chain.'

En savoir plus : [Communiqué de presse](#), [Le Journal des Entreprises.com](#)

4194 - Decarbonisation of the aviation industry: sector stakeholders deliver their road map to the French government.

A detailed decarbonisation road map has been drawn up in the context of article 301 of France's 'climate and resilience' law, by the [Fédération Nationale de l'Aviation et de ses Métiers](#) (FNAM), the [Groupement des Industries Françaises Aéronautiques et Spatiales](#) (GIFAS) and the [Union des Aéroports Français](#) (UAF), in close collaboration with the main sector stakeholders and representatives from the energy industry. It sets out the actions that must be put in place to meet the CO₂ emissions targets in France's national low-carbon development strategy (SNBC). The road map, which is based on scientific research, shows that these targets are realistic, credible and achievable if several wheels are set in motion, including the design and deployment of innovative aircraft that are quieter and use less energy, and the widespread use of new decarbonised fuels. The signatories believe that *'the government's investment support is essential. We also need to carry out essential operational efforts in terms of air navigation, and adapt airport infrastructure.'* They also recommend the quick implementation of this road map, which *'is essential if the French aviation industry – which plays an indisputable role in the independence and growth of the French economy – is to stay competitive.'*

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

Health & Cosmetics

4195 - Abolis Biotechnologies

The [start-up](#), which develops microorganisms that can produce industry-essential molecules via fermentation with a low environmental impact, was awarded first prize by France's industrial property institute, INPI, in the 'responsible innovation' category. The first products employing Abolis technologies are expected to hit the shelves by late 2024, primarily in the health, nutrition and cosmetics sectors.

En savoir plus : [lnpi.fr](#), [Les Echos.fr](#)

4196 - Amolyt Pharma

The French [biotech company](#) specialising in the development of therapeutic peptides for rare endocrine disorders announced it had raised €130 million through a Series C funding round. The round was conducted by Sofinnova Partners and co-led by Intermediate Capital Group (ICG). Also taking part were new investors, with funds managed by Tekla Capital Investment LLC and CTI Life Sciences, and existing investors Andera Partners, Novo Holdings (Novo Ventures), Kurma Partners, EQT Life Sciences, Innobio 2 (managed by Bpifrance Investissement), Sectoral Asset Management, Pontifax, Orbimed, Mass General Brigham Ventures, ATEM, Crédit Agricole Création and Relyens Innovation Santé/Turenne Capital. Amolyt plans to use the funds to further development of its product portfolio for rare endocrine disorders, specifically AZP-3601, now known as eneboparatide, for the treatment of hypoparathyroidism, and AZP-3813, for the treatment of acromegaly. Cédric Moreau, partner at Sofinnova Partners, and Toby Sykes, managing director at ICG, join Amolyt's board of directors.

Recap: Last September and October, Amolyt presented the positive results of two cohorts in phase 2 clinical trials for AZP-3601 (now known as eneboparatide), a treatment for hypoparathyroidism. It hopes to begin a phase 3 trial this year.

More information: [Press release](#)

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

4197 - EuroAPI

The [fine chemicals group](#) announced plans to invest €40 million in a new vitamin B12 production technology at its site in Saint-Aubin-lès-Elbeuf, France. The plans will enable it to increase its production capacities by 2025, while

reducing its environmental footprint. In addition to the expansion of its plant, the project includes the deployment of a next-generation fermentation technology, combining an improved bacterial strain derived from the original strain, a fermentation medium without molasses, and a more powerful extraction process. The innovative process has, moreover, been designed to reduce the number of steps needed to make the product. The new technology, which will increase site production by 60%, will give EuroAPI the means to develop a more robust, nitrite-free manufacturing process, reduce waste, and cut water consumption by around 50%. Vitamin B12 production is expected to reach full capacity by 2027. Financial support of €7.9 million is being provided by the French government under the France Relance recovery plan, Seine-Normandie water agency (AESN), and the Normandy region.

More information: [Press release](#)

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

4198 - Ginkgo Bioworks & Namuh

The American industrial biotech company and the [infant nutrition start-up](#) have entered into a partnership to develop and optimise yeast strains to produce functional oligosaccharides that are structurally identical to those found in human breast milk. Although Namuh's proprietary technology currently provides a cost-effective source of a family of human milk oligosaccharides (HMOs) via yeast fermentation, the start-up is counting on Ginkgo's expertise in yeast strain engineering and fermentation process development to improve its production. The goal is to make infant formula more nutritionally robust and much closer to human breast milk.

More information: [Press release](#)

4199 - Givaudan & Amyris

The Swiss flavours and fragrances group has signed an agreement with the American biotechnology group to buy its cosmetic ingredients, specifically Neossance® Squalane, a high-performance emollient, Neossance® Hemisqualane, a plant-based silicone alternative, and CleanScreen™, a sustainable sun protector. The two companies have also signed a long-term partnership agreement under which Amyris will continue to manufacture cosmetic ingredients for Givaudan and provide access to its innovation capabilities. Givaudan will become the commercial partner for Amyris' future sustainable beauty ingredients. The agreement comprises both an upfront cash payment and an additional performance-based earnout, as well as a long-term manufacturing agreement. Givaudan plans to fund the transaction with its existing resources. The transaction – of an undisclosed amount – will be finalised in the first half of 2023.

More information: [Press release](#)

En savoir plus : [Fashion Network.com](#), [L'Usine Nouvelle.com](#), [Premium Beauty News.com](#)

4200 - Lallemand Health Solutions

[Lallemand Health Solutions](#), one of the business units of the Lallemand group, which develops, produces and sells yeasts and bacteria, announced the launch of *'the first and only organic version of probiotic yeast Saccharomyces boulardii to mark the hundredth anniversary of its discovery.'* According to Romane Maillet, product manager for the gut health portfolio at Lallemand Health Solutions and probiotic yeast expert, *'Lallemand Health Solutions offers organic S. boulardii as a powder, available as pure organic ingredient for use in organic dietary supplements. Our research and development team has done all the necessary pilot scale tests to ensure a shelf-life stability of 24 months at 25° Celsius with a concentration set at 20 billion CFU/gram.'*

More information: [Lallemand Health Solutions.com](#)

En savoir plus : [Lallemand Health Solutions.com](#)

4201 - LVMH Beauty & Dow

The beauty division of luxury group LVMH and the American chemicals company have entered into a partnership to hasten the use of sustainable packaging across LVMH perfume and cosmetic brands. The aim is to integrate

biobased and circular plastics into LVMH Beauty product packaging, without compromising on functionality or quality. Biobased and circular plastics, which are made from biobased feedstocks and waste plastics respectively, will be used to produce sustainable SURLYN™ Ionomers, polymers that are almost as transparent as glass and used to manufacture premium perfume caps and cosmetic cream jars. By late 2023, some of LVMH Beauty's perfume packaging will include both biobased SURLYN™ and circular SURLYN™. The sustainable SURLYN™ portfolio will deliver the same crystalline transparency and freedom of design as the rest of Dow's SURLYN™ range, with a low carbon footprint. The biobased feedstocks used to produce biobased SURLYN™ include raw materials such as used cooking oil.

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

4202 - Biopharmaceuticals: official launch of the association France BioLead.

Created by 15 public and private members representing every biomanufacturing value chain, the association brings together all the sector stakeholders – manufacturers (pharmaceutical and biotech businesses, CDMOs, CROs, equipment manufacturers and suppliers of technical solutions and consumables), academic researchers, training providers, the government and competitiveness clusters, and professional clusters, associations and federations – under one umbrella organisation. Its goal is to turn France into Europe's leading biomanufacturer by accelerating the development of the manufacturing base and technological innovations, in addition to restoring the independence and sovereignty of France in the sector. To do so, France BioLead intends to double the share of biopharmaceuticals produced in France by 2030. It also hopes to double the number of jobs provided by the sector, rising from 10,000 today to 20,000 in 2030.

En savoir plus : [Merck Group.com](#), [Leem.org](#), [Biotechinfo.fr](#), [Les Echos.fr](#)

Others

4203 - Bioenzymatic Fuel Cells (BeFC)

This [start-up](#) makes biobatteries, also known as enzymatic biofuel cells, made up of layers of cellulose and carbon paper which can electrify low-power disposable electronics. Two electrodes, the bioanode and biocathode, are carried by these carbon papers, which also contain enzymes. Their role is to transform substrates such as sugar and oxygen into electricity. The compound glucose is added to the paper, while oxygen comes from the air. In real terms, the enzymes oxidise the glucose at the bioanode, producing gluconolactone, and this oxidation creates electrons. On the other side of the circuit, at the biocathode, the enzymes reclaim these electrons, reducing the oxygen to water. The movement of electrons creates an electric current of about one milliwatt per cm². These biobatteries are lightweight, flexible and completely biodegradable, and do not contain chemicals harmful to the environment. BeFC, which makes 1,000 biofuel cells per day with a robotic arm that assembles the cells layer by layer, hopes to produce 1 million per day in 2024. In terms of applications, these biobatteries are intended for the Internet of Things (IoT) market, which gives everyday objects the power to communicate with each other or via the cloud.

En savoir plus : [Techniques de l'Ingénieur.fr](#)

4204 - Ginkgo Bioworks & Zymtronic

The American industrial biotech company and compatriot [Zymtronic](#), which has developed a cell-free process technology, have entered into a partnership to optimise the enzymes used in Zymtronic's proprietary cell-free platform to produce ingredients for use in food, agriculture, cosmetics and pharmaceuticals.

More information: [Press release](#)

4205 - SilicoLife

The Portuguese [biotech firm](#), which combines artificial intelligence, precision fermentation and microorganism optimisation to sustainably produce a range of ingredients of high added value, announced that it had raised €4.9 million during the first of two Series A fundraising rounds, thanks to investments from venture capital firm [BlueCrow](#). BlueCrow has promised to secure a second, similarly sized investment round in SilicoLife, in line with the programme approved by the two parties and based on the goals for the next 24 months. In total, the two fundraising rounds are expected to bring in €9.8 million and enable it to advance and develop its economic model over the next three to five years.

More information: [Press release](#)

4206 - Synbio Powerlabs

The Finnish [biotech firm](#) announced that it had obtained €6.6 million in funding to build a pilot plant that will combine biomass pre-treatment and precision fermentation. The planned '*state-of-the-art*' unit in Hämeenlinna, Finland, will have bioreactors with a 10,000 litre (10 m³) and 15,000 litre (15 m³) capacity, which should enable businesses and researchers to scale their biotech innovations up to pre-commercial stage. The plant is also part of a broad collaborative project to promote the next-generation circular bioeconomy through biotechnology. Synbio Powerlabs received €2.99 million from [Business Finland](#), an organisation run by the Finnish Ministry of Economic Affairs and Employment, and €3.61 million from [Nutrecon](#), an American investment company. Synbio Powerlabs also announced that it wanted to start working closely with [Häme University of Applied Sciences](#) (HAMK) on educational development and joint research projects.

More information: [Press release](#)

Industrial biotechnology services

4207 - TWB

TWB announced that two new members had joined the consortium at a meeting of its Strategic Steering Committee (SSC) last November:

- [Bon Vivant](#), a Lyon-based start-up that employs precision fermentation to produce milk proteins. It will use this alternative production method to provide companies in the cheese and dairy industry with milk proteins. It could also lead to the market launch of healthier foods that do not contain lactose and cholesterol. The new production method will sidestep environmental issues, as well as the animal welfare concerns associated with intensive farming.
- [Premier Tech](#), a Canadian group with a presence in 28 countries which aims to improve crop yields by bringing soils back to life. Their original, environmentally friendly solutions integrate biological pest controls and biostimulants to help enrich soils and increase plant disease resistance. The Premier Tech Life Sciences (PTLS) business unit, which focuses on biotechnologies and has been based in France since 2020, aims to identify and develop new ingredients and formulae with unique biological activity that can act as natural replacements for antibiotics used in the human and animal nutrition field.

The TWB consortium now has 51 public and private members.

En savoir plus : [Toulouse White Biotechnology.com](#)

TWB and Canadian firm [Premier Tech](#) have entered into a strategic partnership to accelerate the development of new natural ingredients and formulae with unique biological activity that can act as natural replacements for antibiotics used in the animal health and nutrition field, then as functional solutions in the human health and nutrition field. Ten or so team members from the Premier Tech Life Sciences business unit will be based on TWB premises

full time by late 2023. They will be able to take full advantage of its cutting-edge technology platforms and process development expertise.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Le Journal des Entreprises.com](#)

Since its creation in 2012, TWB has conducted 285 R&D projects, brought together 51 key biotech players around a consortium supporting innovation, and invested €8.1 million in 41 pre-competitive projects led by external laboratories to promote breakthrough innovation. TWB – which has an average annual turnover of €9 million – has also signed industrial contracts worth over €50 million. It is striving to become the partner of choice in France and the European leader in industrial biotechnology by 2025. It has set the following targets to move towards its goal:

- Continue to expand its integrated offer of service packages to conduct ambitious projects: strengthen its capacity to scale up with the French Bio-Industries regional centres for innovation and technology transfer (CRITTs) and establish partnerships with academic research laboratories worldwide;
- Increase its support for innovation transfer: double the financial resources deployed for pre-competitive projects and consolidate its start-up support capacity (on- and off-site);
- Retain its network of partners and develop it further;
- Become France's benchmark innovation platform via the France 2030 investment plan: assist project developers with the development of technologies and new production methods, in all markets (agriculture, health and food, etc.).

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Touleco.fr](#), [Le Journal des Entreprises.com](#), [L'Usine Nouvelle.com](#), [POC Media.fr](#)

Cross-disciplinary reports

4208 - Carbios

Carbios, one of the leading French companies specialised in enzymatic recycling of plastic polymers and textiles, has published its first [sustainability report](#) using 2021 as the reference year. The report emphasises the company's commitment to developing environmental, social and governance (ESG) initiatives that go beyond the industrial development of its innovative technologies. Although Carbios is not subject to the EU's Non-Financial Reporting Directive (NFRD), the company has nevertheless structured its report in line with NFRD requirements. It has set out several objectives in its 2021 Sustainability Report, including:

- Environmental objectives: (1) Use the Life Cycle Assessment (LCA) method to maximise circularity and strive for its technologies to have the lowest possible carbon footprint; (2) commit to depolymerising 60 tons of PET in 2023 at the demonstration plant in Clermont-Ferrand, which is the equivalent of around 3.2 million plastic bottles or 4 million food trays;
- Social objectives: (1) Contribute to local economic development in France, with the world's first industrial-scale enzymatic PET recycling plant in Longlaville, Meurthe-et-Moselle, which will create 150 direct and indirect jobs; (2) against a background of strong growth, promote employee well-being and safety by developing training and by ensuring that psychosocial risks are managed and prevented; (3) strengthen the company's commitment to supporting international research through academic partnerships and scientific publications;
- Governance objectives: (1) Ensure that 40% of Board members are women by end 2023 and that 40% of Executive Committee members are women by end 2024, (2) ensure that 60% of Board members are independent by end 2024, (3) structure RSE governance by creating a CRS committee and integrate sustainability objectives into executive pay from fiscal year 2023.

More information: [Press release](#), [2021 Sustainability Report](#)

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

3. PUBLIC POLICY & REGULATIONS

In France

4209 - Launch of a working group to promote the development of sustainable aviation fuel.

The working group, chaired by EU Ministers responsible for Energy, Transport and Industry, was created in order to regularly bring together all the high-level stakeholders in the aviation, aeronautics and energy sectors so that they can share common goals as regards producing sustainable fuel, effectively integrating biofuels, and building aircraft certified to fly with 100% sustainable fuel. The main concerns raised during the launch meeting included developing a French sustainable aviation fuel production sector to make the country less dependent on imports and to ensure its energy independence while creating jobs in areas connected to the French farming and waste management industries. The group's work should help the aviation sector achieve its goal of reducing greenhouse gas emissions and decarbonising the power sector by 2050. The creation of the working group was announced at the same time as the successful tenderers to the call for projects 'Development of a French sustainable aviation fuel production sector', which was launched in 2021 as part of the national strategy 'Biobased products and industrial biotechnologies - sustainable fuels', part of the France 2030 plan. The winners include projects such as REUZE (ENGIE THERMIQUE France in collaboration with ArcelorMittal, Infinium and Institut Mines-Télécom), Avebio (Consortium Elyse Energy and Khimod) and BioTJet (developed by the company of the same name whose shareholders include Elyse Energy, Avril, Axens, Bionext, and IFP Investissements). To move to the scale-up phase and create biofuel production units, a quick stakeholder consultation was launched to identify any obstacles and develop appropriate support procedures before the Paris Air Show in June.

En savoir plus : [Ecologie.gouv.fr](https://ecologie.gouv.fr), [La Tribune.fr](https://www.la-tribune.fr)

4210 - Launch of new Fund of Funds to support the European Tech Champions Initiative (ETCI).

Together with five EU Member States, the EIB Group, made up of the [European Investment Bank](https://www.eib.org) (EIB) and the [European Investment Fund](https://www.eif.europa.eu) (EIF), signed the European Tech Champions Initiative (ETCI) mandate, a Fund of Funds that will channel late-stage growth capital to promising European innovators. ETCI will pool public resources from participating Member States and the EIB Group to make significant investments into large-scale Venture Capital funds, which will in turn provide growth financing to European tech champions. ETCI will deepen Europe's scale-up venture capital markets by bridging gaps in financial availability, especially for companies seeking to raise amounts of over €50 million. It will help plug financing gaps that make Europe's most promising young innovators dependent on non-EU capital. The goal is to prevent such start-ups from being acquired by foreign competitors, which would be a net loss for the European economy. Managed by the EIF, ETCI secured commitments worth €3.25 billion from Spain, Germany, France, Italy and Belgium during the initial 18-month subscription period. The EIB Group deployed an additional €500 million, bringing the grand total to €3.75 billion. France has committed to contributing €1 billion. The size of the fund is expected to grow further with future commitments.

En savoir plus : [Communiqué de presse](https://www.eif.europa.eu/press-releases)

4211 - France 2030: the French government steps up its measures to encourage the creation of research start-ups.

To achieve its goal, the French government has decided to strengthen existing measures and launch new ones:

- Create 25 university innovation clusters (PUIs) to share a collective commitment framework. The goal is to foster the reflex to innovate behind every scientific breakthrough, by working closely with research

teams at the scale of a university. To do so, the latter will be given an innovation strategy, a unique governance model and flexible resources. A total of €160 million will be mobilised to maximise the potential for further development. PUIs build on existing structures without the need for an additional legal structure to improve coordination, in line with university policies developed elsewhere;

- Speed up France's deeptech plan by strengthening existing initiatives (i-Lab, French Tech Émergence grant, support for deeptech development) and taking additional measures (creation of the French Tech Lab grant). The French government has allocated an additional €65 million;
- Step up the further development of work stemming from research and priority research programmes and equipment (PEPRs). A total of €275 million has been mobilised across 17 projects selected under the 'Maturation/Pre-maturation' call for projects to structure, within national strategies, the ability to detect and promote the further development of research. The successful tenderers draw on support from local stakeholders and roll out specific actions as well as open up their portfolio (i.e. patent portfolio, standardisation, and regulatory support) to take into account the specific features of each sector.

These three measures, carried out by Bpifrance and the French national research agency (ANR), represent an investment of €500 million, as part of the France 2030 plan and the research programming law (LPR). The measures will create a link between academic research and social and economic parties as well as offer solutions to the difficulties of our time and the challenges faced by France in 2030. In addition, creating a €100-million fund dedicated to deeptech specifically will allow the government to provide equity support to the start-ups in question at various stages of their development.

For info: The successful tenderers to the 'Maturation/Pre-maturation' call for projects include the BioScale project 'Biobased products and industrial biotechnologies – sustainable fuels'. The project is being carried out by INRAE Transfert and Toulouse Tech Transfer, a technology transfer acceleration office (SATT), and is meant to speed up the transfer of innovation from research to the market launch of biobased products and sustainable fuels by using industrial biotechnology and green chemistry and to promote the creation of start-ups. TWB and IFP Energies Nouvelles are two of the partners involved in the project.

En savoir plus : [Communiqué de presse](#), [Dossier de presse](#), [Satt.fr](#), [AEF Info.fr](#)

4212 - France 2030: launch of the Fonds National de Venture Industriel (FNVI).

The goal of the new initiative – the national industrial venture fund –, which is being managed by Bpifrance and has been allocated €350 million as part of the France 2030 plan, is to promote the emergence and structuring of early-stage venture capital funds for industrial purposes, i.e. investments in small industrial companies. The FNVI will complement the tools deployed as part of France 2030 to promote the development of innovative industrial start-ups and SMEs, namely public investment funds (Industrial Project Fund 2, i.e. SPI2), subsidies (including the 'First Factory' call for projects) and loans ('New Industry' loan). The FNVI is the first of these tools that specifically target industrial venture capital between the start-up phase and late-stage investments. It will mainly help raise funds between €80 million and €250 million.

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

4213 - France 2030: €435 million to help the aviation sector decarbonise air transport.

As part of the civil aviation research council (Corac) ministerial meeting that took place at the Airbus site in Toulouse, Haute-Garonne, on 9 December 2022, French transport minister Clément Beaune announced, together with French industry minister Roland Lescure, that the aviation industry would spend €435 million in 2023 to decarbonise the sector. The amount should help meet the objectives set by the French president, namely to produce the first low-carbon aircraft in France in 2030, maintain the momentum built up since 2020 as part of the plan to support the aerospace industry, and help the sector make even more progress in research and technology projects that are essential for decarbonising the industry. Asked by Agence France Presse (AFP) about what plans were being considered and how the budget would be divided, Beaune said that '*plans are being decided together with industry stakeholders.*'

Recap: In 2022, the French government announced that it would grant €800 million to the civil aviation research council (Corac), made up of industrial groups in the sector and government representatives, to develop the first

low-carbon aircraft by 2030. Of the €800 million, €300 million were to be allocated in 2022, another €300 million in 2023 and €200 million in 2024. This means that the total for 2023 has been increased by €135 million.

En savoir plus : [Communiqué de presse](#), [Air Journal.fr](#), [Le Figaro.fr](#)

4214 - New 'green industry' law to be proposed this year.

The goal of the law proposed by French finance minister Bruno Le Maire is to 'promote the decarbonisation of the industry so that France becomes the leading decarbonised nation in Europe' and to 'speed up the process of authorising new industrial sites in France.' The law 'is intended to create a strong green industry in France through hydrogen production, electrolysis, nuclear power and renewable energy.' More specifically, Le Maire wants to 'take advantage of climate change, which should change industrial behaviour and choices and relocate industry to France'. To this end, among other things Le Maire is planning to 'make France more appealing through regulations, tax law and mobilising private capital (with a green industry savings account)', to 'shorten deadlines and simplify procedures', but also to 'prepare skills for the green industry'. The law should include 'tax, regulatory and legislative provisions that should be set out based on dialogue, as was done with the Pacte law.' Five working groups have been created and will underpin the future law in five areas: taxation, simplifying regulations, production methods, funding, and training for green industry jobs.

[This just in:] On 22 February 2023, the French finance minister announced: 'Consultations will end at the end of March, the draft bill will be finalised in April, and the law will be validated in May and presented in June so that the parliamentary discussion of this proposal can start.'

En savoir plus : [L'Usine Nouvelle.com](#), [L'Info Durable.fr](#), [Europe 1.fr](#), [Actu Environnement.com](#), [La Tribune.fr](#), [Les Echos.fr](#)

4215 - French Tech Finance Partners: objectives and composition.

This new body was created because French tech investors do not have a dedicated representative body that allows them to make concrete proposals and have a structured dialogue with the government. The aim of the French Tech Finance Partners is threefold:

- Identify the obstacles to business financing in France and offer solutions;
- Help develop public policies;
- Make France more appealing to international investors.

In the short term, the French Tech Finance Partners will focus on three priority areas:

- Financing start-ups in the regions;
- Financing deeptech;
- The selection criteria for French Tech programmes.

Led by Reza Malekzadeh (from the venture capital fund [Partech](#)) and placed under the leadership of the French Tech mission, the joint body has 16 members who represent the financing ecosystem, with stakeholders involved in all industries at all stages of maturity. The work of this body will be reported in early spring and will help inform future government decisions.

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

4216 - French Council of State scraps the list of fruit and vegetables that can still be sold in plastic packaging.

Although the French law against waste and on the circular economy banned the sale of fruits and vegetables in plastic packaging from 1 January 2022, it had provided for certain exceptions, including fruit and vegetables that could spoil when sold loose, leaving the government with the task of specifying which ones. In its decree of 8 October 2021, the government set out a list of around 40 fruits and vegetables that could still be sold in plastic packaging, specifying for each one until when they could be sold in that packaging. The list, challenged before the Council of State by several professional unions, was scrapped on 9 December 2022. The Council of State decided that the State had exceeded the mandate set by the law against waste and on the circular economy. The law had

'entrusted the government with the task of listing only fruit and vegetables that could spoil if they were sold loose to permanently exempt them from the ban on plastic packaging.' Yet in the implementing legislation, the government had not only 'included in its list fruits and vegetables that were not necessarily at risk of spoiling' but also 'set, for each of the fruits and vegetables, the period during which they could continue to be sold in plastic packaging after 1 January 2022.' The government has also been accused of having listed products for which there is no alternative to packaging made entirely or partly from plastic. A new decree will be published as soon as possible to maintain the ban on using plastic packaging for everyday fruit and vegetables that can be sold loose without any concerns about their fragility. The new decree will also foresee exceptions for more fragile products, as specified in the law.

En savoir plus : [Conseil d'Etat.fr](https://www.conseil-etat.fr), [Ecologie.gouv.fr](https://www.ecologie.gouv.fr), [Agri Mutuel.com](https://www.agri-mutuel.com), [France TV Info.fr](https://www.france-tv.info), [20 Minutes.fr](https://www.20minutes.fr), [Le Parisien.fr](https://www.leparisien.fr), [Les Echos.fr](https://www.lesechos.fr)

4217 - INRAE and Institut Agro sign their first national framework agreement for scientific cooperation.

By signing the partnership agreement for five years, the two institutes are bringing together their skills and expertise in the fields of agriculture, food and the environment to speed up the sustainable transformation of agriculture and food systems. The agreement is intended to help with the following:

- Identify the skills to develop in the coming years to support transitions through research and innovation;
- Train and support stakeholders, both private (especially within the sector) and public, in regions that play a key role in agroecological and food transitions;
- Revive the agricultural and food sectors and trades and make them more appealing;
- Enlighten the government's decision-making as regards agroecological and food transitions. Ensure greater visibility internationally for training and research in the fields of agriculture, food and the environment;
- Build and strengthen relationships between higher education, research and technical education in the field of agriculture;
- Undertake joint scientific mediation activities for the general public.

Through shared research topics, INRAE and Institut Agro want to strengthen the links between research, training, innovation and knowledge transfer (including by involving scientists – engineers, holders of master's degrees, holders of PhDs – in training courses through and for research), and the introduction of specific coordinated actions for PhD students (tutoring, summer schools, graduate schools, etc.). The two institutes have committed to coordinating with each other, depending on the challenges that arise, and together build new partnerships with a wider scope in France and beyond (associated international laboratory, international research network, international training, etc.).

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

Outside Europe

4218 - Unites States: new funding for biofuel and bioproduct production.

The US Department of Energy (DOE) announced \$118 million (€111 million) in funding for 17 projects to accelerate the production of sustainable biofuels and bioproducts for America's transportation and manufacturing needs. The selected projects are located at universities and private companies and will advance biorefinery development, from pre-pilot to demonstration phase. Award amounts range from \$500,000 (€471,000) to €80 million (€75 million), with most receiving at least \$2 million (€1.8 million). Selected projects will contribute to meeting the DOE's goal to achieve cost-competitive biofuels and at least a 70% reduction in greenhouse gas (GHG) emissions by 2030. They will also support the US Sustainable Aviation Fuel Grand Challenge goal of enabling the production of three billion gallons of sustainable aviation fuel annually by 2030 and 35 billion gallons annually by 2050. Funding for this opportunity supports President Biden's Decarbonisation and Climate Agenda that aims to put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050.

For info: Over the past two years, the DOE has invested more than \$500 million (€472 million) in bioenergy and biorefinery research and development through its Bioenergy Technologies Office (BETO).

More information: [Energy.gov](https://www.energy.gov)

4. EVENTS

MARCH 2023

Hello Tomorrow Global Summit 2023

9-10 March 2023. Paris, France.

More information: [Website](#)

Forum Recherche-Industrie 2023 on biofuels and bioproducts from Carnot 3BCAR.

14 March 2023. Paris, France.

More information: [Website](#)

World Agri-Tech Innovation summit

14-15 March 2023. San Francisco, United States.

More information: [Website](#)

IBioIC's 9th Annual Conference

15-16 March 2023. Glasgow, United Kingdom.

More information: [Website](#)

BIO-Europe Spring

20-22 March 2023. Basel, Switzerland.

28-30 March 2023. Online.

More information: [Website](#)

French-English conference presenting the foresight study on European Chemical Pesticide-free Agriculture in 2050

21 March 2022. Paris, France.

More information: [Website](#)

In-Cosmetics Global

28-30 March 2023. Barcelona, Spain.

More information: [Website](#)

MAY 2023

World Bio Markets

10-11 May 2023. The Hague, Netherlands.

More information: [Website](#)

Global Bioprocessing Summit

10-12 May 2023. Berlin, Germany.

More information: [Website](#)

BIOKET (BIOeconomy Key Enabling Technology)

23-25 May 2023. Trois-Rivières, Canada.

More information: [Website](#)

SynBioBeta

23-25 May 2023. Oakland, United States.

More information: [Website](#)

17th International Conference on Synthetic Biology and Metabolic Engineering

24-25 May 2023. Barcelona, Spain.

More information: [Website](#)

JUNE 2023

18th Renewable Resources & Biorefineries (RRB)

1-3 June 2022. Bruges, Belgium.

More information: [Website](#)

Trade show for sustainable packaging

7-8 June 2023. Paris, France.

More information: [Website](#)

BIO 2023 (BIO International Convention).

5-8 June 2023. Boston, United States.

More information: [Website](#)

EUBCE 2023 - 31st European Biomass Conference & Exposition

5-8 June 2023. Bologna, Italy.

More information: [Website](#)

Metabolic Engineering Conference

11-15 June 2023. Singapore.

More information: [Website](#)

Plant Based Summit

13-15 June 2023. Lille, France.

More information: [Website](#)

5th International Conference on Bio-Based Building Materials

21-23 June 2023. Vienna, Austria.

More information: [Website](#)

16th International Symposium on Biocatalysis and Biotransformations (BIOTRANS)

25-29 June 2023. La Rochelle, France.

More information: [Website](#)

Soil microbiology for sustainable agriculture: innovative solutions and diagnoses

27-28 June 2023. Paris-Romainville, France.

More information: [Website](#)

JULY 2023

COSM'ING

5-7 July 2023. Saint-Malo, France

More information: [Website](#)

17th International Conference on Synthetic Biology and Metabolic Engineering

19-20 July 2023. Paris, France.

More information: [Website](#)

17th International Conference on Industrial Biotechnology and Synthetic Biology

19-20 July 2023. Toronto, Canada.

More information: [Website](#)

AUGUST 2023

15th annual Bioprocessing summit

14-17 August 2023. Boston, United States.

More information: [Website](#)

OCTOBER 2023

9th NutrEvent

17-18 October 2023. Rennes, France.

More information: [Website](#)

Les rendez-vous Carnot

17-18 October. Lyon, France.

More information: [Website](#)

Cosmetic 360

18-19 October 2023. Paris, France.

More information: [Website](#)

Annual Biocontrol Industry Meeting

23-25 October 2023. Basel, Switzerland.

More information: [Website](#)

European Forum for Industrial Biotechnology and the Bioeconomy (EFIB)

24-25 October 2023. Rotterdam, Netherlands.

More information: [Website](#)

ENZYNOV2. Unleashing the power of Enzymes and Biocatalysis for industrial applications

26-27 October 2023. Paris-Romainville, France.

More information: [Website](#)

JUNE 2024

European Congress on Biotechnology

30 June-3 July 2024. Maastricht, Netherlands.

More information: [Website](#)