



FLASH NEWS

No. 54-2022 – THE BIOTECH INDUSTRY INTELLIGENCE REPORT

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1. EQUIPMENT & TECHNOLOGY

Modelling / AI

4081 - How can artificial intelligence facilitate enzyme engineering?

Researchers at Osaka University in Japan have found a way to increase the ability of enzymes to adapt to a new environment using artificial intelligence (AI). The researchers focused on the amino acids involved in the malic enzyme's specificity to the molecule that the enzyme transforms and the cofactor that assists in this transformation. After having identified the amino acid mutations that did not change during the transformation process, researchers used AI to identify the unexpected amino acid residues in the malic enzyme corresponding to the enzyme's use of different redox cofactors. Therefore, the researchers were able to figure out the substrate specificity mechanism for the enzyme, which will enable optimal engineering in a laboratory. Their work demonstrated that the reconfiguration of an enzyme's specific mode of action could be accelerated and improved without altering the function. This discovery could be used in a range of applications, such as the production of pharmaceutical products and biofuels (requiring meticulous adaptations of the versatility of enzymes to different biochemical environments), even when the crystal structures of the corresponding enzymes are absent.

Publication: Logistic Regression-Guided Identification of Cofactor Specificity-Contributing Residues in Enzyme with Sequence Datasets Partitioned by Catalytic Properties. Journal: ACS Synthetic Biology. DOI: 10.1021/acssynbio.2c00315.

More information: [Phys.org](#)

En savoir plus : [Fred Zone.org](#), [Bionity.com](#)

New equipment developed but not yet marketed

4082 - New collaboration to optimise the development of the future BioXp® DBC instrument.

The US synthetic biology companies [Telesis Bio](#) and [Cellibre](#) (which uses an organism-agnostic approach to transform cells into 'specialised factories' capable of producing sustainable high added value products at scale) have announced a collaboration for the BioXp Digital-to-Biological Converter™ (DBC) developed by Telesis Bio®. This collaboration seeks to optimise the fine-tuning and validation of the DBC to fully automate the production of the CRISPR-Cas9 guide RNA (gRNA) for genome editing. Over the last few years, the CRISPR Cas9 gRNA technology has become a promising platform for genome editing and cell engineering as it enables researchers to easily modify gene sequences. However, the rapid production of high-quality gRNAs remains challenging. It has led to a significant increase in lead times during the design-construction-test cycles in the discovery and development phases. Telesis Bio addressed these challenges by giving researchers a fast, automated solution to synthesise gRNA from a numerical sequence input. This solution reduced the construction process by a week or more, along with the iterative cycle time. By integrating Telesis Bio's short oligonucleotide ligation assembly (SOLA) enzymatic DNA synthesis (EDS) technology directly into its BioXp® 9600 system, the BioXp® DBC provides scientists with design and construction capabilities on the very same day for their guide RNAs, bypassing the need to order custom reagents. The gRNA synthesis kit is the first of several BioXp® DBC kits the company has in mind. As part of this collaboration, scientists from Cellibre will use their exclusive technology and cell database to quickly assess and validate Telesis Bio's emerging solutions for automated gRNA synthesis. At the same time, they will also use it to accelerate their cell engineering workflows for various natural product manufacturing platforms.

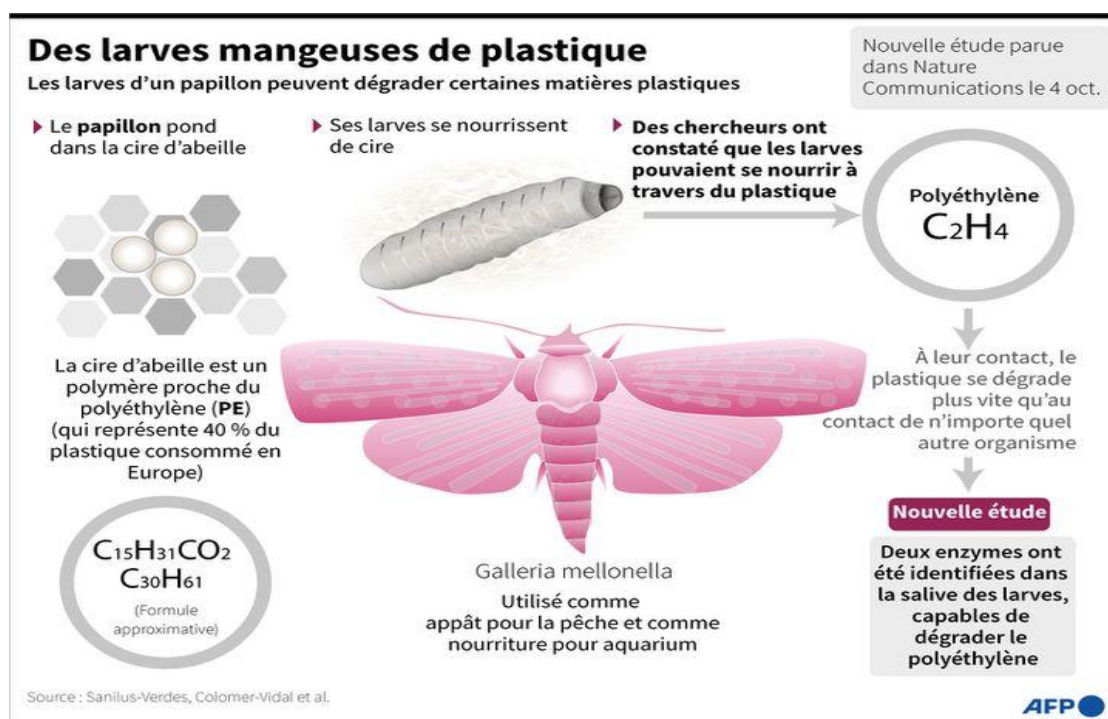
More information: [Press release](#)

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

Metabolic engineering & processes

4083 - Two enzymes discovered in the saliva of a moth's larvae that can decompose plastic at a much faster rate.

After having observed back in 2017 that wax moths (*Galleria mellonella*) – parasites that attack and destroy beehives – were capable of piercing holes in plastic bags even when closed, a team of Spanish scientists has researched the phenomenon. They discovered that the saliva of this moth's larvae (wax worms) contained two enzymes that could oxidise and depolymerise polyethylene (PE) at ambient temperature in just a few hours. This oxidation process usually only occurs at high temperatures or after prolonged exposure to the sun, taking years. According to the researchers, the larvae's ability to destroy beeswax could explain why they can break down PE. They also assert that one hour of exposure to this larva's saliva degrades plastic as much as if it had been outside for years.



Source: France TV.fr.

Next steps: Continue with the research and experiments to fully understand the process. Determine in particular if the saliva acts on the polymer or the additives used to reinforce this type of plastic before looking into practical applications.

Publication: Wax worm saliva and the enzymes therein are the key to polyethylene degradation by *Galleria mellonella*. Journal: Nature Communications. DOI: 10.1038/s41467-022-33127-w.

More information: [The Guardian.com](https://www.theguardian.com)

En savoir plus : [France TV Info.fr](https://www.france.tv), [Ca m'interesse.fr](https://www.ca-m-interesse.fr), [Ze Green Web.com](https://www.ze-green.com), [Sciences et Avenir.fr](https://www.sciences-et-avenir.fr), [BBC.com](https://www.bbc.com), [20 Minutes.fr](https://www.20minutes.fr)

4084 - N-butanol synthesis: identifying and characterising key enzymes in the metabolism of the *Clostridium acetobutylicum* bacteria.

The [PEEP](https://www.leep.fr) team at [Toulouse Biotechnology Institute](https://www.toulouse-biotechnology-institute.com) announced that it had succeeded in identifying and characterising key enzymes in the *Clostridium acetobutylicum* bacteria's metabolism and showing that these enzymes are essential for n-butanol synthesis. N-butanol is a fusel alcohol that can be used as a fuel for unmodified

petrol engines or as a base molecule for chemistry. This is because it can be used as a solvent or to produce acrylic paints, for example. These results are a key step as, in time, they should enable strains to be developed that only produce butanol, and therefore develop this alcohol via '*biological, renewable means, with the lowest possible production costs.*' The team is also seeking to develop metabolic engineering strategies to develop strains that will enable production of this butanol, as well as pursue the same type of research to produce diols (organic compounds used to produce polyesters or de-icing agents for aircraft, for example).

Publication: Molecular characterization of the missing electron pathways for butanol synthesis in *Clostridium acetobutylicum*. Journal: Nature Communications. DOI: 10.1038/s41467-022-32269-1.

En savoir plus : [Toulouse Biotechnology Institute.fr](https://www.toulouse-biotechnology.fr)

4085 - Project CarboZym: developing a new technology platform for synthetic biology without resorting to cells and the disadvantages they present.

As part of this [project](#), two scientists from the French national centre for scientific research (CNRS) – Jullien Drone and Nicolas Brun – have been working on an enzyme immobilisation technology. The technology would enable the implementation of new biocatalytic processes to manufacture high-value compounds for the chemical, pharmaceutical, cosmetics, food, flavours and fragrances industries. Their project centres on the simple, rapid and selective immobilisation of enzymes, without the need for prior purification, and a protein load size exceeding 10%. To achieve this, the two scientists are developing new highly porous biobased materials for cell-free synthetic biology. The porosity of the materials means they can fix enzymes and thus produce enzymatic reactors. The two researchers decided to produce small volumes of high-value molecules so as to expand operations slowly.

Recap: CarboZym pitched its project at the TWB Start-Up Day 2022.

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

4086 - iGEM international synthetic biology competition: Team Toulouse wins gold.

For the ninth time in nine iGEM competitions, Team Toulouse took home gold in this international synthetic biology event. This year, the [DAISY project](#) (Darpin-Allergen-IgE-Screening for immunotherapY) focused on a fast new method to screen and treat allergies. The DAISY system relies on bacteria designed to bind specifically to the antibodies (IgE) responsible for allergies, forming easily identifiable aggregates. This kind of system, together with flow cytometry and microfluidics methods, will ultimately make it possible to determine any patient's allergy risks and offer a custom desensitisation programme. The team was made up of eight students from the Toulouse III – Paul Sabatier university (Master's Degree course in Biotechnology) and INSA Toulouse (Department of Biochemical Engineering). After three days of competition, the Toulouse-based team was awarded a gold medal, honouring the most successful projects, and received three nominations for special awards: best diagnostics project, best effort in educating and popularising science, and best business approach. They were mentored by researchers, research professors and PhD students at Toulouse Biotechnology Institute (TBI – CNRS / INRAE / INSA Toulouse) and the Centre for Integrative Biology of Toulouse (CBI – CNRS / UT3).

En savoir plus : [Toulouse Biotechnology Institute.fr](https://www.toulouse-biotechnology.fr)

2. APPLICATIONS & MARKETS

Food and feed

4087 - Calysseo

The joint venture between [Adisseo](#), an industrial group specialised in animal nutrition, and [Calysta](#), a US biotech firm that develops industrial processes which use microorganisms to convert methane into proteins for seafood, cattle feed and other food ingredients, announced the entry into service of the first industrial facility to produce [FeedKind®](#). FeedKind® is a non-GMO protein ingredient produced using a patented fermentation process that needs no animal or plant matter and little water. Located in Chongqing, China, the unit is initially expected to produce 20,000 tonnes of alternative protein per year. More specifically, the site will produce FeedKind Aqua®, an ingredient that can be used in fish farming. It should enable aquaculture companies to replace fishmeal from wild fishing and soybean with a high-quality ingredient. FeedKind Aqua® has been successfully tested in sea bass, sea bream, salmon and prawn farming. The facility's production will be solely for the Chinese market to begin with. However, the partners are already looking to increase their production capacity to meet the strong demand from the Asian market as a whole.

Info: The Calysta technology can also be used to manufacture cattle feed and pet food.

More information: [Press release](#)

4088 - BioVeritas

The US [company](#), which developed a patented process to transform agrifood industry by-products into short- and medium-chain fatty acids using microorganisms, announced that its main shareholder, [Ara Partners](#) (a venture capital company specialised in funding decarbonisation projects) had injected a further \$65 million (€62 million) of capital into the company. These new funds mean BioVeritas can accelerate scaling up and marketing for its process to deliver more high-quality food samples to its clients and partners by the first quarter of 2023. These funds should also enable it to build its first commercial production facility with a possible output of up to 20 kilo tonnes per year. Engineering works are in progress, and the facility is scheduled to enter into service in 2025.

More information: [Press release](#), [Biofuels Digest.com](#)

4089 - BRAIN Biotech & Bonumose

The industrial biotech [firm](#) and the [start-up](#) (which has patented enzymatic solutions used in food supplement production, crop protection, animal nutrition and other industries) today announced that they had reached the first milestones in their project. The project aims to improve the performances of several enzymes that catalyse cascade reactions in the continuous production of low-calorie, ultra-low glycaemic natural sweeteners. Bonumose has patented a tagatose and allulose production process that does away with several processing stages and considerably increases output during the production process. The company uses several enzymes in its process, and BRAIN Biotech optimises several of these enzymes using enzyme engineering. The partners aim to make Bonumose's sugar production method even more profitable.

More information: [Press release](#)

4090 - Fermentalg

The French expert in microalgae announced that it had started to produce the first industrial batches of its natural blue food colouring. It has taken its first order from its partner DDW, a Givaudan Group subsidiary, as part of the pre-sales of this new natural ingredient from the Blue Origins® programme. This first order, for a maximum of €750,000, will enable DDW/Givaudan to supply the main players in the agrifood business with samples, particularly those in the flagship beverage industry. The partnership between Fermentalg and DDW was concluded in June 2020. The first phase entailing technological development and scaling up ended in June 2022 once the lead times set out in the technical milestone objectives had been met. Since then, Givaudan moved on to the product marketing phase under the name [Galdieria Blue Extract](#). The innovative nature of the product – the only naturally blue food colouring that is stable in an acid environment and resistant to heat treatments – paves the way into the sports drinks and confectionery sectors primarily, as these industries are on the lookout for alternatives to chemical food colourings. Fermentalg has planned up to three production runs in this pre-sales phase with a top-tier German toller. This number will be adjusted according to the output and needs of the commercial teams. The first production run, carried out between the start of November and January 2023, equates to a turnover of €250,000. Moreover, the regulatory submission process with the European and US authorities (European Food Safety Authority and the Food and Drug Administration) is continuing to schedule, and marketing authorisation for this natural and sustainable alternative to synthetic food colourings is expected to arrive in the second half of 2023.

En savoir plus : [Boursorama.com](https://www.boursorama.com)

4091 - Kalsec & Willow Biosciences

Kalsec, a US [company](#) specialised in creating natural products and solutions for the agrifood industry, and Willow Biosciences, a Canadian [company](#) that develops and manufactures fermented functional ingredients for the health and well-being, food and beverage and personal care markets, have signed a framework service agreement to develop and produce functional ingredients using precision fermentation. To achieve this, the two partners decided to concentrate their efforts on the brewer's yeast *Saccharomyces cerevisiae*, an 'ideal host to express and design metabolic pathways to several products of interest for the food and beverage industry.' According to the terms of the agreement, which includes R&D and scaling-up phases, Willow will receive revenue from research fees and milestone payments. The partners intend to sign a licensing agreement to share the profits if their work reaches a successful conclusion and can be marketed.

More information: [Press release](#)

4092 - Seminal Biosciences

The American [company](#) announced that it had developed a cocoa butter prototype, via precision fermentation, without using cocoa beans. According to Seminal Biosciences, its new product has the same properties as traditional chocolate and has already been successfully used to make dark chocolate. The company will now focus on improving the prototype and scaling up production. It hopes to be able to market its cocoa butter in early 2024.

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

4093 - Willow Biosciences

The Canadian biotech [company](#) announced that it has started to optimise yeast strains and build on its technology to commercially produce astaxanthin, a powerful natural antioxidant compound that is part of a group of chemical products known as carotenoids. Astaxanthin is used in many industries, such as animal feed, human food, nutrition and cosmetics. Using its fully integrated FutureGrown™ technology platform and the strains previously developed as part of its cannabinoids programme, Willow succeeded in developing a natural high-purity astaxanthin produced sustainably using an organic yeast identical to what can be found in nature. According to Willow Biosciences, its process 'should be sufficiently cost-effective to rival the chemically produced product.'

More information: [Press release](#)

Biocontrol / Biostimulation

4094 - Amoéba

Amoéba, the manufacturer of an organic biocide that is capable of eliminating bacterial risks in water and human wounds and a biocontrol product to protect plants (still in test phase), announced that the US Environmental Protection Agency (EPA) has authorised the use of its lysate of the amoeba, *Willaertia magna* C2c Maky, in the US in agriculture to tackle plant fungal diseases. The EPA also confirmed that this lysate was exempt from maximum residue limits and pre-harvest intervals when products are applied in accordance with the instructions for use and good agricultural practices. On the back of this good news, Amoéba announced that the formulations (products) containing this lysate would be the subject of an EPA authorisation request in 2023 with marketing authorisation due in 2024.

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

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

Amoéba announced that it had conducted field trials over the winter 2021 – summer 2022 period, ‘its largest ever’, totalling more than 120 tests conducted or ongoing in Europe, the United States, Brazil, Costa Rica and Asia. The primary aims of these tests, conducted by external independent service providers in small plots as per good laboratory practice (GLP), are as follows:

- generate effectiveness data for future marketing authorisation (MA) applications in Europe, Brazil and California;
- test the company’s formulations on new targets, in particular diseases that affect tropical crops, apple trees and certain market crops;
- conduct positioning tests in parallel with other fungicides (particularly on vines, potatoes, wheat, market crops, and soybeans) as a prelude to practice-based experiments.

During this testing, two main formulations were tested according to the culture: a suspension concentrate and an oil dispersion.

To conclude, Amoéba considers that the four years of field testing, with more than 300 tests conducted in several countries, have provided it with a solid grounding in *Willaertia magna* C2c Maky lysate-based products. With its broad spectrum, ability to check a range of diseases for both specialist and large-scale crops in temperate climates and tropical zones, and a performance that exceeds those of the biofungicides available on the market, Amoéba’s products can be positioned as an alternative or a complement to chemical fungicides. In particular, it can be marketed as a direct substitute for the two main contact fungicides used in the world: mancozeb and chlorothalonil (both of which are already banned in Europe), on a certain number of crops.

More information: [Press release](#)

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

Amoéba announced the publication of a second peer-reviewed scientific article that presents for the first time to the international scientific community the effectiveness of its lysate of the amoeba *Willaertia magna* C2c Maky biocontrol products on potato late blight. The paper also demonstrates the lysate’s dual mode of action to control potato late blight:

- the indirect effect, by stimulating the plant’s natural defences;
- the direct fungicide effect in relation to the *Phytophthora infestans* pathogen responsible for potato late blight.

It also presents the data collected during greenhouse and field trials by independent service providers (2020 and 2021 seasons). They prove that the lysate of amoeba *Willaertia magna* C2c Maky, which is a natural product, protects plants with no additional treatment by up to 77% when the disease is minimal (28% of the surface of untreated plants affected) and up to 49% when the untreated plants are completely destroyed. The yield also improved with up to 30% more potatoes.

[Publication](#): A New Biocontrol Tool to Fight Potato Late Blight Based on *Willaertia magna* C2c Maky Lysate. Review: Plants special edition – “Plant Bioprotection”. DOI: 10.3390/plants11202756.

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

4095 - Bayer

The German pharmaceutical and agrochemistry group announced the arrival of [ChemIntelligence](#), a start-up specialised in chemistry digitalisation at its LifeHub Lyon, Bayer's innovation and dialogue centre in France. This centre is in turn housed in Bayer's La Dargoire Research Centre (CRLD). ChemIntelligence has developed a software package based on artificial intelligence technologies. It uses R&D laboratory data to propose the most suitable experiments to conduct when developing a product. For example, its platform can predict the result of a reaction or optimise a molecule's synthesis, thereby suggesting the most appropriate experiments according to the required specifications. According to ChemIntelligence, its technology enables *'a 25–80% reduction in the number of experiments needed to develop products among the projects accompanied.'* The ChemIntelligence teams will have access to their own office space at LifeHub and will benefit from mentoring and close contact with CRLD scientists. The teams will *'be able to talk with the scientists about their needs, their vision of chemistry digitalisation, their opinions about the software we have developed, their suggestions, etc. It could also perhaps lead to joint projects if the opportunity arises.'* With this new partnership, Bayer plans on accelerating the local innovation ecosystem to design crop protection products that are even safer and more effective.

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

The German group and the US biotech firm **Ginkgo Bioworks** announced that they had signed a multi-year strategic partnership designed to accelerate R&D in organic crop protection products intended for agriculture. According to the terms of the agreement, Ginkgo will buy Bayer's 16,260 m² R&D site located in West Sacramento, USA, and the internal process discovery and optimisation platform for \$83 million (€84.4 million). This agreement also includes the sale of Bayer's assets in the Joyn Bio R&D platform, a joint venture between Ginkgo and Leaps by Bayer launched in 2017. However, the German group retains the right to commercialise Joyn Bio's technology to complement the use of synthetic fertilisers over the years to come. In making this announcement, Ginkgo revealed that its aim was to develop and build on microbial solutions in agriculture for all crops and geographical regions using extensive technical platforms that meet the varied needs of the market. To do so, the US company is ready to work independently with different partners in discovering microbial derivative products for farming.

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

Bayer announced that it had inaugurated three new packaging lines dedicated to biocontrol solutions on its site in Marle, France. The new packaging unit, which called for a €6 million investment, now has a surface area of 1,000 m² and packaging capabilities of up to 1,300 tonnes per month. With 750 packaging designs, 8,600 references, 1,600 finished products and 140 tests and packaging tracking operations per year, Bayer's Marle site is the most diverse packaging platform in the Crop Science division in Europe. It was chosen to become the new hub for biosolutions for the EMEA region.

Info: Bayer aims to have biosolutions represent 15% of its Bayer Crop Science sales (including seeds, chemical pesticides and digital products) in 2030, compared to the 1% of sales it represents today.

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

4096 - BioConsortia

The US biotech company specialised in sustainable solutions for agriculture announced that it had made *'rapid progress in developing microbial products and had considerably consolidated its pipeline of solutions.'* These solutions will reduce the need for nitrogen fertilisers, control soil-dwelling pests and plant diseases for increased, higher-quality crop yields, and protect crops after harvesting to avoid food waste. All while minimising the impact

on the environment and protecting the planet. After showcasing these innovations, the company now says it is 'ready to move to the marketing phase for several key products with marketing partners.'

More information: [Press release](#)

4097 - Biotalys & Novozymes

The Belgian biotech [company](#), specialised in solutions for agriculture, and the Dutch group have announced that they have obtained proof of concept for a new manufacturing process that offers significant potential cost and scaling benefits for the production of Evoca™, Biotalys' first protein-based biofungicide. Last June, the partners concluded a partnership in which Novozymes undertook to look into additional avenues to scale up and produce the Evoca™ bioactive protein by using other production hosts to those currently used by Biotalys. This discovery could also help Biotalys widen the commercial reach of Evoca™ to the primary markets of fruits and vegetables in the USA and the EU currently included in the marketing plan and to other geographical regions, crops and diseases. Following the success of greenhouse and field tests, Evoca™ is expected to obtain US Environmental Protection Agency (EPA) approval at the start of 2023.

After successfully completing this key stage, the two companies are now entering the next phase of their partnership. They are looking into strategic supply and marketing agreements for the next generation of Evoca™. Novozymes and Biotalys are also considering an R&D collaboration besides Evoca™ to address the need for effective, more sustainable protein-based biocontrol solutions on new markets and indications thanks to the portfolio of Novozymes solutions and Biotalys' pipeline of candidate products.

[Info] Evoca™ is the first innovative protein-based biofungicide developed by Biotalys on its [AGROBODY Foundry™](#) platform. With this technology platform, Biotalys can discover and develop new biological protection solutions for foodstuffs that combine effectiveness, compliance and safety with new modes of action.

More information: [Press release](#), [AgriBusiness Global.com](#)
En savoir plus : [Zone Bourse.com](#)

4098 - Green Impulse

This [start-up](#), specialised in developing and marketing biocontrol solutions, announced that it had received €5 million in funding from the Ecotechnologies 2 fund, managed on behalf of the French government by Bpifrance as part of actions spearheaded by France 2030, Go Capital, Pays de la Loire Développement and the GwenneG crowdfunding platform. The new funds mean it will be able to finance two of its new 'hit' molecules right through to their launch (expected in 2025 in the US and 2027 for Europe).

[Info] Green Impulse is also looking at new Series B funding of over €10 million to support its development.

En savoir plus : [Green Impulse.fr](#), [Agence API Ouest-France.fr](#)

4099 - Micropep Technologies & FMC Corporation

The Toulouse-based biotech firm, which develops organic intrants using micropeptides (small natural proteins capable of tweaking a plant's intrinsic capabilities, from germination to reproduction) and the US chemical [group](#) FMC Corporation have announced that they have concluded a strategic partnership. The aim is to accelerate the development of new bioherbicides designed using micropeptides to tackle herbicide-resistant weeds that lower crop yields. As part of this exclusive multi-year agreement, the partnership will focus on developing solutions to tackle the main herbicide-resistant weeds in corn and soybean crops. The companies will pool their respective R&D capabilities by leveraging Micropep's technology to accelerate and improve the success rate in identifying new organic herbicides.

More information: [Press release](#)
En savoir plus : [Biotechinfo.fr](#)

Chemistry & materials

4100 - Afyren

The French company that produces seven organic acids by fermentation (carboxylic acids (C2-C6)) has announced that it has signed a new multi-year agreement in which it has committed to providing its biobased organic acids to a US manufacturer of synthetic lubricants. The client is a manufacturer specialised in the polyol esters used to formulate synthetic lubricants. Carboxylic acids are one of the main components in polyol esters and are traditionally manufactured using petroleum derivatives. Afyren is proposing 100% biobased carboxylic acids to replace them, which have a carbon footprint five times smaller than their petroleum-based equivalent. By procuring biobased carboxylic acid, the US manufacturer will reduce its Scope 3 emissions, also known as value chain emissions, and get one step closer to achieving its carbon-neutral objectives.

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

4101 - BASF

During a press conference, the German chemical group presented some of its ongoing research projects and examples of innovation, the common thread being that they use white biotechnologies, an increasingly important area in its R&D strategy. Regarding research projects, BASF stated that it is working with Lanzatech, a company specialising in carbon recycling technology, to develop special processes in which bacteria use gas carbon sources such as carbon monoxide and carbon dioxide as a raw material. BASF also indicated that it had considerably extended the scope of its R&D activities in biodegradability over the last ten years as it believes that *'a basic understanding of chemistry and biological processes enables faster development of sustainable materials.'* It also asserted that digital tools are a crucial part of its work. Using its biodegradability data, BASF can develop IT models capable of predicting a product's development at a very early stage, its properties, and the biodegradability of the molecules and materials, thus enabling it to adapt its structures accordingly.

As for innovations, BASF presented the ecovio® mulch film as a concrete example of the group's work in biodegradability. It helps farmers obtain higher yields and can simply be ploughed after harvesting, with the mulch film decomposed by the microorganisms in the ground. Another major application in its work on biodegradability relates to the ingredients for detergents (washing machines and dishwashers) and cosmetics that end up in water purification stations at the end of their life cycle. Continuing on the innovation front, BASF presented the Inscalis™ insecticide that *'effectively'* combines traditional chemistry with biotechnology. The first stage in the production of this insecticide is fermentation; the intermediate product is then transformed into a finished crop protection product in a subsequent production process based on conventional chemistry. According to the German group, *'this hybrid process will enable us to produce a highly effective and long-lasting product in a cost-effective manner.'*

In terms of figures, BASF indicated that it had invested around €2.2 billion in developing sustainable products and new fields of technology in 2021. It also indicated that over 3,000 products are associated with biotechnology and biodegradability in the following fields: chemical products, materials, industrial solutions, nutrition and treatments, and farming solutions. In all, they yielded more than €3.5 billion in turnover. Last, BASF reported that 45% of its patent applications in 2021 were for innovations with a particular focus on sustainability.

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

4102 - Bolt Threads & Ginkgo Bioworks

The two US industrial biotech firms announced a collaboration to increase the production efficiency and performance of Bolt's current portfolio and expand it by developing new proteins for biomaterials. The first programme in this collaboration aims to optimise production efficiency for the Mylo™ material developed by Bolt Threads. Mylo™ is a sustainable alternative to traditional leather, manufactured using animal skin (hides), and synthetic leather derived from oil, as it is manufactured using mycelium, a vegetative body of fungi. Mylo™ can be used for shoes, handbags, wallets, mobile phone cases, and other products. It has been chosen by the likes of brands such as Adidas, Stella McCartney, GANNI and lululemon. As part of this collaboration, Ginkgo plans to increase the growth rate of Bolt Threads' mycelium, which would reduce the overall production costs of Mylo™.

The new collaboration builds on their previous work looking at optimising the longevity, effectiveness and profitability of Bolt Threads' b-silk™ protein manufacturing process.

More information: [Press release](#)

4103 - Braskem

The Brazilian petrochemicals company announced the construction of a new R&D centre in Lexington, USA, which should speed up renewable chemical product design innovations and sustainable materials innovations. This future 3,251 m² installation will enable the group to build on its know-how in industrial biotechnologies, catalysis, process engineering and other innovations. Braskem will focus in particular on science and engineering, particularly for the conversion of biomass-based raw materials, including sugars, cellulose, vegetable oils and lignin in chemical products and long-lasting materials. The work carried out in this new centre will complement the research currently conducted in Campinas and Triunfo, Brazil and Pittsburgh, USA. Braskem, which expects to invest around \$20 million (€19.5 million) to build the centre, anticipates delivery in the second half of 2023.

More information: [Press release](#)

Braskem announced that it intends to invest a total of \$60 million (€57 million) to increase its 'I'm green™' biopolymer production capacity by 30%. These polymers are made using sugar cane. While Braskem currently produces around 200,000 tonnes of biopolymers a year in Brazil, the group wants to see this figure rise to 260,000 tonnes, then to a million tonnes in 2030. To achieve this goal, the company is also looking into building a new 'I'm green™' biopolymer production facility in Thailand with [SCG Chemicals](#), a leading player in the chemical industry in this South-East Asian country. Following a memorandum of understanding (MoU) reached in 2021, the two groups are currently working on feasibility studies and studies to determine the optimal location of this new production facility. This partnership alone could help double the existing capacity for 'I'm green™' products. In addition, to achieve its production targets for new biobased materials, Braskem is working with [Lummus Technology](#) to licence biopolymer technologies, thus contributing to increased development of new biobased products. The Brazilian group can also count on its joint venture with the Japanese supplier [Sojitz](#) to produce bioMEG (monoethylene glycol) for PET and bioMPG (monopropylene glycol) for a range of applications, including cosmetics. Both groups intend to build three industrial units, one of which should enter into service in 2025. Last, Braskem announced that it has begun discussions with its clients and suppliers about offsetting Scope 3 emissions (which take into account the direct and indirect greenhouse gas emissions from a company's entire operations) to provide sustainable solutions to its supply chain partners. These discussions are based on the acquisition of carbon credits from certified high-quality products on the international voluntary market. To achieve this, Braskem set up a Carbon Trading Desk at the start of 2022, which should enable it to support sales teams worldwide by offering solutions to offset emissions generated from the transport of products to clients.

Recap: Braskem plans to become carbon neutral by 2050.

More information: [Press release](#)

Braskem announced the launch of Wenew, its new system created to stimulate efforts to promote a circular economy by highlighting Braskem's initiatives. The new ecosystem, consisting of four pillars – products, education, technology and circular design – will also inspire people to work together for a better world. Braskem created a logo to accompany Wenew's launch.



Source: braskem.com.br

More information: [Press release](#)

4104 - Carbios

The French specialist in the enzymatic recycling of plastic polymers and textiles hosted the first global summit on PET biorecycling in Paris on 7 and 8 December 2022. The event attracted more than 100 international attendees from scientific, academic and industrial sectors to talk about the progress in biological recycling and the solutions marketed for these innovations geared to improving the circular economy. The two-day conference brought together renowned scientists from various university institutions to share their latest research on enzymatic depolymerisation of PET. Bertrand Piccard, the driving force and President of the [Solar Impulse Foundation](#), was the keynote speaker for the last session on PET circularity. He particularly welcomed Carbios' contribution to reducing plastic pollution. L'Oréal, Salomon and McKinsey also participated in the event as stakeholders in strategic partnerships. The summit closed with a tour of Carbios' industrial demonstrator in Clermont-Ferrand, unveiled in September 2021, which is the last key step in scaling up Carbios' technology. Following its demonstrator's success, the French recycling specialist is on the right track to build and operate the world's first PET enzymatic recycling facility (capable of treating 50,000 tonnes of PET waste a year) in Longlaville, France, by 2025. Carbios will then start to market its technology around the world.

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

Carbios asked [Strategic Research](#) to conduct a series of surveys to have a better understanding of what consumers think about their patented biorecycling and biodegradation technologies. After having conducted 6,000 interviews in Europe and the US, the results of this comprehensive survey show that consumers overwhelmingly support the industrial biotechnologies developed by Carbios to address plastic pollution. Most people surveyed see this new enzymatic recycling technology, which can recycle all types of polyethylene terephthalate (PET) plastic waste, as truly unique and far more innovative than conventional PET recycling techniques (that is, thermomechanical recycling). Those surveyed across all geographical regions think this biorecycling technology best addresses their concerns and recycling challenges.

A second study in the USA revealed that 64% of respondents generally prefer biodegradation technology, which uses an enzyme directly integrated into the PLA during manufacturing. In all, 93% describe the concept as innovative, unique, easy to understand (49%) and believable (43%). Amongst the most environmentally engaged respondents, 82% declared that they would buy more products that contain the biodegradation technology developed by Carbios. Nonetheless, even though there is a clear desire to reduce their consumption of plastics, the vast majority of respondents from all regions believe that, all too often, there are no suitable alternative solutions that are as practical, light and inexpensive. Ideally, consumers would like all plastic waste to be collected and all plastics currently ending up in landfills or oceans to be reused and recycled.

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

Carbios announced changes to its company organisation to '*successfully embark on the sale of the technologies developed by the company.*' Stéphane Ferreira became Chief Business Officer and a member of the Executive Committee on 10 October 2022. As such, he will be responsible for Carbios' business development on an international scale and will steer relations with all industrial and sales partners. Stéphane Ferreira's team is also expanding with the arrival of Frédéric Alarcon as Licensing Manager. Frédéric's mission will be to devise and deploy the process licensing model (the core of the Carbios business model). Stéphane Ferreira can also count on the expertise of Arnaud Tillon, who was appointed to the Group's marketing division. Arnaud is responsible for defining and deploying the marketing strategy that bolsters Carbios' development, and is also charged with strengthening the customer culture within the organisation. Carbios also announced the departure of Martin Stephan who stepped down from his role as Deputy CEO on 15 October 2022 after more than six years with Carbios.

Recap: Last June, Carbios announced that it had appointed Mathieu Berthoud as the Strategic Sourcing and Public Affairs Director, Lionel Arras as Industrial Development Director, and Pascal Bricout as Chief Strategy and Financial Officer. On 1 December 2021, Emmanuel Ladent replaced Jean-Claude Lumaret as CEO.

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

4105 - Ginkgo Bioworks & Lygos

The US industrial biotechnology company and Lygos, the American [manufacturer](#) of sustainable chemicals obtained by chemical and biotechnological means, have concluded a partnership agreement to optimise and scale the production of biobased ingredients (organic acids in particular). Under the terms of the agreement, the two partners plan to set up two R&D programmes over approximately two years. Ginkgo will leverage its expertise in developing strains and metabolic engineering to rapidly design and optimise microorganisms capable of converting sugar into high-value chemical products to achieve the two companies' objectives.

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

4106 - Michelin

In a world first, the French group unveiled two tyres – one for cars, the other for buses – that contain 45% and 58% sustainable materials respectively. The tyres are certified for road use and have performance levels that are strictly identical to existing tyres. Michelin owes this progress to the increased use of natural rubber and the inclusion of recycled carbon black, sunflower oil and biobased resins, silica from rice husk, and even recycled steel in its tyres. With the launch of these new models, the group is moving one step closer to the pre-production and marketing of new ranges within the next two to three years that will include high levels of sustainable materials. It is, therefore, on the right track to meet its commitments to an overall production made using 100% biobased, renewable or recycled materials by 2050, with a 40% stage in 2030.

Recap: Michelin is involved in a programme of targeted partnerships that enables it to accelerate the development of disruptive innovations, particularly in transformation and recycling. Examples of this include Pyrowave (recycled styrene), Carbios (recycled PET), Enviro (recycled carbon black), IFPEN/Axens with the participation of ADEME (bio-butadiene), and the Empreinte project with ADEME, not forgetting the BlackCycle and WhiteCycle circular economy projects that Michelin is steering with various European partners, with European Union backing, to transform end-of-life tyres into ultra-high quality raw materials that can be reincorporated into new tyres.

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

4107 - MycoWorks

The US [start-up](#) producing materials using mycelium has announced that it has opened an office in Paris. The office should enable it to meet the demand from fashion professionals for its Fine Mycelium™, a material manufactured from a mushroom's root system that has been presented as an alternative to traditional or synthetic leather. MycoWorks, which has many partners in the world of luxury in Europe, now wants to 'offer a personalised service to our partners.'

More information: [Press release](#)
En savoir plus : [Fashion United.fr](#)

4108 - Solugen

The US [company](#) that designs and cultivates enzymes to transform sugars into high-value chemical products that are then used in a variety of industrial applications announced that it had raised over \$200 million (€192 million) as part of Series D funding. For this operation, Solugen had the backing of [Kinnevik](#), [Lowercarbon Capital](#), [Refactor Capital](#), [Temasek](#), [Baillie Gifford](#) and the main investors already involved in the previous fundraising round, such as [Fifty Years](#). With these additional funds, it can develop and build on its new biobased molecule product pipeline to offer its clients an even greater array of negative- and low-emissions solutions. After this fundraising round, Solugen is now valued at more than \$2 billion (€1.9 billion).

Info: Solugen obtained \$357 million (€343 million) in funds during a previous fundraising round last year.

More information: [Solugen.com](https://www.solugen.com)

4109 - SPHERE

To contribute to the upcycling of organic waste into biogas, the French manufacturer of household packaging announced that it wanted to develop partially biobased compostable bags to carry organic waste from homes to future collection points. These bags will then power methanation units. According to John Persenda, SPHERE's CEO, 'our teams are developing a new biodegradable material from potato starch that will degrade in an anaerobic environment in two to three days.' Marielle Cayron His, the group's Director of Communications, confirmed that 'the resin used to produce these bags is in the R&D phase at Biotec (SPHERE's laboratory in Germany specialised in producing bioplastics).' These new bags are expected to go on sale in 2024.

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

SPHERE inaugurated a brand-new plastic bag manufacturing facility in the region of Aragon, Spain, in mid-September. The new 32,000 m² facility (for the time being), requiring a €32 million investment, should enable the group to meet the growing demand from the market and shape its low-carbon strategy. The facility, capable of transforming different types of plastics (virgin and petrochemical-based; recycled fossil-based; biobased; biobased and compostable plastics), represents 15% of the group's total production and should enable it to achieve a turnover of around €100 million by the end of the year. From 2023, the facility should also be able to produce rolls of aluminium foil, cling film and greaseproof paper for the Spanish and Portuguese markets. In addition to producing bags, in time the product range will include freezer bags and aluminium foil trays. Annual production will increase from 32,000 to 38,000 tonnes of plastic products.

Info: SPHERE announced that its new facility in Spain will stop using virgin fossil-based plastics by 2025.

More information: [Press release](#)

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

4110 - TotalEnergies Corbion

The joint venture between the French group TotalEnergies and the Dutch chemicals firm Corbion announced the publication of a [white paper](#) on the recycling potential of PLA bioplastic titled *Stay in the cycle: Rethinking recycling with PLA bioplastics*. The white paper takes stock of the current PLA recycling market, regulations and technologies. It provides 'a complete perspective and vision of how PLA recycling can be viable, economically feasible, and routinely used as an end-of-life solution for PLA bioplastics.'

More information: [Press release](#)

To encourage the collection, sorting and treatment of polylactic acid (PLA) waste and grow a market for PLA recycling flows, TotalEnergies Corbion announced that it is buying PLA waste to recycle it into Luminy® rPLA. For TotalEnergies Corbion, this new material has exactly the same properties and certifications as virgin Luminy® PLA. In Asia, Sansu water bottles are made of Luminy® PLA. After use, the bottles are collected, sorted and cleaned, and the PLA obtained is recycled into Luminy® rPLA.

More information: [Press release](#)

Last August, TotalEnergies Corbion and [TOMRA Recycling](#) (a plastics and paper recycling machine manufacturer) conducted a trial at the TOMRA centre in Mülheim-Kärlich, Germany, to determine the extent to which the sorting of objects produced using polylactic acid (PLA) contained in municipal mixed plastic waste is possible. Using a near infrared (NIR) sorting machine, the PLA trays mixed with other post-consumer plastic products were fully retrieved

with very high levels of purity. What's more, when the polyethylene terephthalate (PET) bottles were sorted from the flow of mixed plastic waste, no PLA trays were found in the PET flow. This industrial test shows that sorting PLA mixed with other plastic waste is straightforward and will not affect other recycling flows.

More information: [Press release](#)

4111 - ANSES recommends keeping biodegradable or compostable plastics out of household food waste.

The French agency for food and environmental and occupational health and safety (ANSES) believes that the complete degradation of 'biodegradable' or 'compostable' single-use plastic bags is not guaranteed in household compost bins. And all the more so as it is difficult to control conditions. As such, contamination of the surroundings or local crops cannot be ruled out when an individual spreads compost onto their vegetable plot to grow vegetables, for example. According to Stéphane Leconte, coordinator of the expert assessment at ANSES: *'This contamination could come from different material components, or microplastics resulting from their degradation. The components in question could be polymers, residual monomers, additives or inorganic loads that present potential dangers both for human health and the environment.'* To keep environmental contamination to a minimum, ANSES recommends that used biobased, biodegradable and compostable plastic materials be handled by the industrial sectors responsible for collecting, sorting and/or treating them, as is the case for all other forms of packaging. Moreover, ANSES recommends that the regulations be modified to ban any suggestion or invitation to place plastic materials in a household compost bin. It is also calling for a review of industrial and household composting systems. It proposes setting up a single standard that includes a biodegradability assessment in all environments and setting more demanding criteria such as the absence of endocrine disruptors or carcinogenic, mutagenic or reprotoxic substances. ANSES recommends that this new standard for composting plastic products and items claiming to be biodegradable or compostable be mandatory for all sectors using them, not only for the packaging industry.

En savoir plus : [Anses.fr](#), [Le Monde.fr](#), [ConsoGlobe.com](#)

Energy

4112 - Airbus

The European aeronautical manufacturer and **Neste**, a Finnish renewable fuels manufacturer, have signed a memorandum of understanding to advance the production and use of sustainable aviation fuel (SAF) in the aviation industry. This collaboration aims to accelerate the aeronautical industry's transition to SAFs. To achieve this, the partners plan to explore commercial opportunities together and jointly promote the production and use of SAF. The focus will be on the technical development of SAF, type certification for this fuel, and testing of current and future production technologies. The groups also intend to determine how to implement '100% SAF'.

More information: [Press release](#)

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

Airbus announced that an A320neo for **China Eastern Airlines** had taken off from its Tianjin delivery centre in China. This aircraft was powered with a blend containing 5% sustainable aviation fuel (SAF) for the first time. The SAF used for delivery flights in China is made from used cooking oil produced by SINOPEC Zhenhai Refining & Chemical Company, a Chinese state-owned manufacturer. It is the first batch of Chinese SAF manufactured by the only Chinese facility certified to do so.

Recap: All Airbus commercial aircraft can fly with a blend of kerosene and SAF (up to 50%) and should be capable of using 100% SAF by the end of the decade.

More information: [Press release](#)

En savoir plus : [Air Journal.fr](#)

4113 - Air France-KLM

The Franco-Dutch aviation group and **TotalEnergies** have signed a memorandum of understanding in which the multi-energy group has committed to providing more than one million cubic metres (800,000 tonnes) of sustainable aviation fuel (SAF) to airlines in the Air France-KLM group as of 2023 over ten years. TotalEnergies will produce this SAF in its biorefineries, and the fuel will be made available to airlines in the Air France-KLM group primarily for flights leaving France (in accordance with French legislation) and The Netherlands.

Recap: Air France-KLM has introduced a strict procurement policy and pledged to only buy SAF that: i) does not compete with food or feed supplies, ii) has RSB or ISCC certification for sustainability, and iii) is not produced from palm oil.

More information: [Press release](#)

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

Air France-KLM announced that it had signed a series of purchase agreements to cover its airlines' sustainable aviation fuel (SAF) needs over the years to come. These agreements are for the supply of a total volume of 1.6 million tonnes of SAF between 2023 and 2036, thus preventing the emission of 4.7 million tonnes of CO₂ compared to the use of fossil fuels for the entire life cycle. Air France-KLM's primary partners are the Finnish group Neste, which has committed to supplying 1 million tonnes of SAF from 2023 to 2030, and DG Fuels, which has committed to supplying 600,000 tonnes from 2027 to 2036. The agreements are the first major step, as they will enable the group to have blends with approximately 3% SAF out of the 10% it wants to obtain by 2030. Air France-KLM also announced that discussions were underway with other suppliers to progressively set up a diverse network that is able to meet sustainable fuel needs worldwide.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Air Cosmos.com](#)

4114 - BP & Archaea Energy

The British petroleum company announced that it paid \$4.1 billion (€3.9 billion) – \$800 million (€769 million) of which as net debt – to buy the US [company](#) that produces methane from livestock or food waste for the equivalent of 6,000 barrels of oil per day. Once the transaction is complete, this production should enable BP's biogas supply volumes to increase immediately by 50%. With this acquisition, BP hopes to '*significantly increase its bioenergy activities*' and '*sustain (its) progress towards achieving (its) goal of carbon neutrality.*' BP expects to be carbon neutral by 2050 or earlier.

Info: BP estimates that the necessary investments for its energy transition will reach more than 40% of its total annual investment expenditure by 2025, and the aim is to increase this percentage to around 50% by 2030.

More information: [Press release](#)

En savoir plus : [Connaissance des Energies.org](#), [Capital.fr](#), [Les Echos.fr](#)

4115 - Global Bioenergies

The industrial biotech firm announced that it had delivered 200 litres of sustainable aviation fuel (SAF) to the French Ministry for the Armed Forces so that it could be tested as part of the GENOPTAIRE project. The project, financed by the French defence procurement agency (DGA), aims to advance the state-of-the-art by designing and exploiting military platforms that use the deployment of electromobility and alternative fuels. One of the aims is to identify and assess the impact that biobased components blended with conventional jet fuels have on how engines in French army land vehicles function. As it currently stands, jet fuel is used both for aircraft and land vehicles to simplify logistics within the armed forces. According to the DGA and defence staff representatives involved in this project: '*The fuel provided by Global Bioenergies will first undergo testing as a blend with fossil-based kerosene by the project stakeholders (IFPEN, ONERA and SEO) for physicochemical analysis. After that, the defence staff operational energy service (EMA/SEO) plans to perform engine tests.*'

More information: [Press release](#)

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

After delivering test batches for two bio-isobutene derivatives to Shell, Global Bioenergies concluded a new collaboration agreement with the Anglo-Dutch oil firm to develop low-carbon fuels for road transport. The first phase of this agreement will be to assess new concepts based on high-octane fuel components derived from biobased raw materials. As part of this collaboration, the two companies will conduct a joint study to identify and develop manufacturing methods to produce the molecules needed to create high-octane components. The agreement also provides for a period of exclusivity to continue developing these new concepts in the future. According to Marc Delcourt, CEO of Global Bioenergies: *'We're looking forward to working with Shell on this important study. Whilst adoption of EV's continues to accelerate, it's clear there is still a role for internal combustion engines for many years to come. We expect the future of road transportation will be based on an energy mix maximizing the role of decarbonised sources, in which biofuels will be critical.'*

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [L'Usine Nouvelle.com](#), [Le JDD.fr](#), [Les Echos.fr](#)

4116 - Suez

The French water and waste management company announced that it had acquired the French start-up [BioEnTech](#), a trailblazer in optimising methanation units. BioEnTech was founded in 2013 and is the fruit of a collaboration with the French national research institute for agriculture, food and the environment (INRAE). It developed a series of software and analysis solutions to optimise the performance of methanation facilities and maximise biogas production. With this acquisition, Suez is accelerating its innovation drive in two major areas of its R&D strategy: producing biogas and digitalising the processes used in its waste and water management activities. The BioEnTech teams will join the hundred-strong team of experts from Suez's international waste and environmental research centre (CIRSEE) to contribute to the Group's research and technical support. They will be based on the BioResourceLab premises in Narbonne, France: an innovation hub specialised in upcycling organic waste.

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

4117 - TUI & Cepsa

The travel and tourism [company](#) and the Spanish energy [company](#) have signed a partnership agreement to promote the production and use of sustainable aviation fuel (SAF). Following this agreement, TUI's aeroplanes will use SAF produced by Cepsa from raw materials sourced from the circular economy that do not compete with food resources. These include used cooking oils, non-food animal waste or biodegradable waste from various industries. This measure will reduce aircraft emissions by up to 80% compared to conventional kerosene. The two partners are also looking to broaden their collaboration to other areas in TUI's tourism value chain, such as buses and cruise ships, to tackle climate change and limit greenhouse gas emissions.

[Info] TUI has set itself the objective of organising net-zero emissions trips by 2050 at the latest. Cepsa, meanwhile, aspires to be the leading producer of biofuel in Spain and Portugal by 2030. It also hopes to produce 2.5 million tonnes of biofuel per year, 800,000 tonnes of which will be SAF.

More information: [Press release](#)

Health & Cosmetics

4118 - Afyren & Excellentia

The French company, which produces seven organic acids by fermentation (carboxylic acids (C2-C6)), has signed a distribution agreement with Excellentia, a leading distributor of natural ingredients on the North American flavours and fragrances market. According to the terms of the agreement, it will distribute the complete range of FLAVYREN™ natural organic acids produced by the Afyren Neoxy facility. For Nicolas Sordet, Afyren's CEO:

'Excellentia is at the nerve centre of the North American flavours and fragrances market and is well established and known for its distribution capabilities and its expertise in using high quality, natural ingredients like ours.'

[Info] According to this [report](#), the global market for natural flavours and fragrances represented \$9.15 billion (€8.76 billion) in 2021 and should see an annual growth rate of more than 6% between 2022 and 2029.

More information: [Press release](#)

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

4119 - C16 Biosciences

The US [start-up](#), which has developed a fermentation process that enables it to transform food waste into synthetic palm oil containing as many fatty acids as the plant-based substance, announced that it had succeeded in producing a first industrial-scale batch of around 50,000 litres. On the back of this success, it also announced that its *'palm oil-free palm oil'* will be sold under the brand name [Palmless™](#) from early 2023. While this new substitute can be used in an extensive range of applications, particularly in the food or household products sectors, C16 Biosciences plans to target the beauty sector as a priority.

More information: [Press release](#), [Premium Beauty News.com](#)

En savoir plus : [Premium Beauty News.com](#), [Ca m'intéresse.fr](#)

4120 - Ginkgo Bioworks & Merck

The US industrial biotech firm announced that it had signed a collaboration agreement with the German group to improve the production of active pharmaceutical ingredients. The aim is to design up to four enzymes that will be used as biocatalysts in Merck's active pharmaceutical ingredient. To achieve this, Ginkgo will draw on its experience in cell engineering and enzyme design and its capabilities in high-throughput automated screening, production process development/optimisation, bioinformatics and analysis to provide optimal strains to express target biocatalysts.

According to the terms of the agreement, Ginkgo will receive initial R&D payments and be eligible for R&D milestone payments based on the collaboration's success.

More information : [Press release](#)

4121 - Global Bioenergies

The French industrial biotech company announced that its first commercial-scale facility, in Pomacle, Marne, was now fully operational. All the sub-units (biological isobutene production, purification, condensation and packaging) are now up and running, a few weeks earlier than expected. Global Bioenergies' Chief Technical Officer Frédéric Ollivier said they were *'now producing about 1 tonne of isobutene per week.'* Global Bioenergies plans to sell purified isobutene for use in cosmetics and high value-added fuel, applications that are able to cover what remains a very high production cost. The company will also convert some of the isobutene produced, via an established chain of tollers, into cosmetic-grade isododecane for sale to major cosmetic companies under the trademark Isonaturane® 12. This downstream chain was scaled up in parallel to the start of operations at the Pomacle facility. According to Marc Delcourt, CEO of Global Bioenergies, *'The primary purpose of this unit is to generate revenue. Its secondary purpose is to pave the way in commercial, technical and regulatory terms for the 2025 launch of a new unit to produce 2,000 tonnes of isobutene and derivatives per year.'* Investment of between *'€50 and €80 million'* will be needed in the coming months, said Marc Delcourt, who went on to say, *'we plan to complete the funding round by the end of the first quarter of 2023, through a combination of capital investment, debt and public funding.'*

More information: [Press release](#)

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

The biotech company announced that its product Isonaturane® 12, the world's first biosourced isododecane, had received the SILVER Award at the prestigious In-Cosmetics™ Asia trade show. This is the Asian edition of the

world's largest cosmetic ingredients trade show, welcoming exhibitors and visitors from over 70 countries and showcasing the sector's latest developments right in the centre of the region. The new cosmetic ingredient can be used to make natural longwear make-up. It is also used extensively in the skincare, haircare and toiletries sectors.

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

4122 - Kao Corporation, Genomatica & Unilever

The [Japanese company](#) specialising in the cosmetics and chemicals sector announced that it had joined the consortium formed by American biotech firm Genomatica and the Unilever group as a founding member. The aim of the consortium is to scale and commercialise plant-based alternatives to palm oil and ingredients made from fossil fuels. The consortium had \$120 million (€116 million) in funds before Kao joined, and is working on applications in the home and personal care industries. Using the biotechnology platform developed by Genomatica, the partners believe they can reduce the carbon footprint of ingredients derived from palm oil by up to 50%. With this new collaboration Kao hopes to eliminate its carbon dioxide emissions by 2040 and become a carbon-negative enterprise by 2050. The investment amount was not announced.

More information: [Press release](#)

4123 - Microphyt

French biotechnology company [Microphyt](#) announced that it had completed a funding round for €15 million. The company has developed a low-carbon-impact process to produce a wide variety of microalgae on a controlled, industrial scale, and also employs an integrated platform to process these microalgae to develop natural, sustainable ingredients suitable for the nutrition, well-being and beauty markets. The funding round was led by L'Oréal, through its venture capital fund BOLD (Business Opportunities for L'Oréal Development), together with existing Microphyt investors, namely Bpifrance via the SPI fund, Sofinnova Partners, IXO-Private Equity, Supernova Partners, IRDI and Sofilaro. The new funds will enable it to accelerate the development of new ingredients and the commercialisation of existing ranges, as well as expand production capacity at its industrial platform in Baillargues, Hérault, and meet demand from its clients in the nutrition and well-being fields.

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

Microphyt and French cosmetics manufacturing group **L'Oréal** entered into a strategic partnership under which the L'Oréal BOLD (Business Opportunities for L'Oréal Development) investment fund would acquire a minority stake in Microphyt. The new partnership will enable them to build a technology platform and pool human and material resources to develop feedstocks from microalgal biomass. The two partners hope to establish a long-term partnership to develop new cosmetic solutions.

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

4124 - Naturamole

The French biotech company specialising in scaling bioprocesses (enzymatic biocatalysis and fermentation), which produces and commercialises natural molecules for fragrances, flavours and cosmetics formulators, announced that it had invested €1.5 million to expand its plant in Susville, Isère. The investment – part-funded by the French State under the Résilience arm of the 'France Relance' recovery plan – will help it respond to growing demand for natural fragrances in the perfume sector.

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

Others

4125 - Association Chimie du Végétal (ACDV)

The ACDV, an association which supports and represents manufacturers that design, produce or use biobased materials and products, announced four new members:

- [GFBiochemicals](#), a French company that makes levulinic acid derivatives – specifically green solvents – from agricultural biomass waste such as bagasse, a sugar cane by-product, and corncob waste;
- [DIF](#) (Détergence Industrielle Française), part of the [Novarc](#) group, which is positioning itself as a specialist in the manufacture of products designed for the cleaning, automotive and construction sectors in the industrial maintenance and detergence field;
- [Prodirox](#), an industrial company specialising in the R&D, manufacture and commercialisation of surface treatment products, biocides, oils and varnishes, and paints. The company has been committed to an environmentally friendly and sustainable approach since the early 2000s. It switched its focus to biobased products, creating a comprehensive range for the construction and decoration industries;
- [Groupe LICEF](#) (Industrielle de Chimie Élaborée Française), which designs, develops, makes and sells solutions for the construction and industrial sector to strip, clean and protect façades using innovative chemistry that is gentle on the environment, humans and materials. It sells several product ranges for façades of all kinds that do not require any neutralisation, and protection for all types of material found on building façades and interiors.

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

4126 - Lesaffre

The French group specialising in fermentation opened the Lesaffre Campus in the municipalities of Marcq-en-Baroeul and Marquette-lez-Lille, Nord. Located on a 19-hectare site, the new campus can host all 700 of the group's workers based in the city of Lille in one place. It has a surface area of 23,000 m², 60% of which is earmarked for research laboratories and industrial pilots. The new campus will also be home to the Biofonderie, a set of robots used for the simultaneous, high-throughput, miniaturised workflows needed to screen and analyse microorganisms and establish their profile and functional potential to accurately select them for their energy content or for their fermentative, gustatory, nutritional or physiological properties for humans, animals or plants. This cutting-edge platform, which is the only one of its kind in France, will, together with the Campus's other facilities (analysis of genes and/or metabolites, bioprocesses, physiological models of the digestive tract, etc.) accelerate innovation at Lesaffre. Every day, it tests thousands of targets through the use of robotics and the analysis of advanced data: it can now perform 10,000 tests per day instead of 10,000 per month. By drawing on the collaborative possibilities offered by its new campus, the Lesaffre R&D department plans to address worldwide food and environmental challenges by developing innovative solutions in the area of baking, food taste and enjoyment, human, animal and plant health, and industrial biotechnologies. The campus will also enable the group to further its knowledge on bacteria. These ambitions will be facilitated by the increased digitisation of R&D. It will be the group's flagship site, and as such will help visitors and clients better understand and explore its '*cutting-edge know-how*' in fermentation-based research and innovation.

Info: The group intends to increase its R&D budget by 10 to 15% each year over the coming years.

More information: [Press release](#)

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

Industrial biotechnology services

4127 - California Biomanufacturing Center (CBC)

The [non-profit organisation](#), a public-private partnership that aims to advance the bioeconomy in the United States, announced the launch of the [BioProcess to Product \(BioP2P\)](#) network. The goal of this national programme is to

foster interactions between industrial partners and developers of biobased products, so the latter can move from pilot to commercial production more quickly. One of BioP2P's top priorities will be to draw up a national inventory of commercial scale-up facilities. This open-access inventory will help developers find partners and therefore accelerate the scale up of biobased products. The BioP2P network is supported, among others, by [Schmidt Futures](#), a philanthropic initiative founded by Eric and Wendy Schmidt that *'bets early on exceptional people solving hard problems in science and society.'*

[Info] The CBC has been engaged in the bioeconomy for more than two decades, from first-generation industrial enzymes to the current new generation of precision fermentation.

More information: [Press release](#)

4128 - Ginkgo Bioworks

The American group announced that it had acquired the French start-up ALTAR, which has developed an Adaptive Laboratory Evolution (ALE) platform that can adapt cells through natural selection, without having to resort to genome editing technology. The start-up previously offered its technology as a service to industrial companies in the food and beverage, animal feed, agriculture, chemicals and materials sectors. With this acquisition, the American group will have its own ALE facilities, incorporated into its Boston-based cell programming platform, Ginkgo's Foundry. By doing so it hopes to be able to streamline the identification and development of phenotypes that meet its customers' specifications.

Ginkgo Bioworks also announced the acquisition of Circularis, a biotechnology company with a proprietary circular RNA and promoter screening platform. The acquisition will strengthen its ultra-high-throughput circular RNA and promoter screening capacities so it can develop new solutions in bioproduction, RNA therapeutics, cell therapy, and gene therapy.

With these two acquisitions, Ginkgo Bioworks intends to *'offer new solutions to customers across multiple industries and further bolster our capabilities across the full stack of biological engineering.'*

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

4129 - MicroBioGen

The [Australian company](#) specialising in the development of biocatalysts derived from yeasts announced that it had opened a new R&D centre in Sydney, Australia. The 1,250 m² centre houses fermentation labs, a genetics lab and large preparation rooms, all equipped with the latest technology including robots, high performance liquid chromatography, and minus 80°C freezers. The new facilities will enable it to extend its research capabilities and develop microorganisms to produce biofuels, biochemicals, pharmaceuticals, nutraceuticals and human foods and animal feed. MicroBioGen wants to create a leading industrial biotechnology centre in Australia, and put the country on the map when it comes to world-leading biotechnologies and sustainable innovation. The investment amount was not announced.

More information: [Press release](#)

Cross-disciplinary reports

4130 - Croda International

The British speciality chemicals group announced it would publish a series of reports to *'help other forward-thinking companies leverage the opportunities offered by biotechnology.'* For each market, the reports will cover innovation opportunities, barriers to wider adoption and solutions to overcome these barriers. Croda has chosen, for its [first publication](#), to focus on biotech opportunities in the personal care sector, where *'biotechnology can help meet sustainability goals, and generate new effects to make personal care brands even more appealing and differentiated for consumers.'* According to Croda, *'biotechnology capabilities have continued to develop, but the approach still remains niche and subject to various challenges including performance, cost, production at scale, and sustainability.'*

Where these barriers can be overcome, personal care companies will be able to find smarter ways to meet the growing performance and sustainability requirements of their consumers, through new biotechnology-derived ingredients and biotechnology-derived replacements for those already in use.¹
Upcoming reports will look into agriculture and home care.

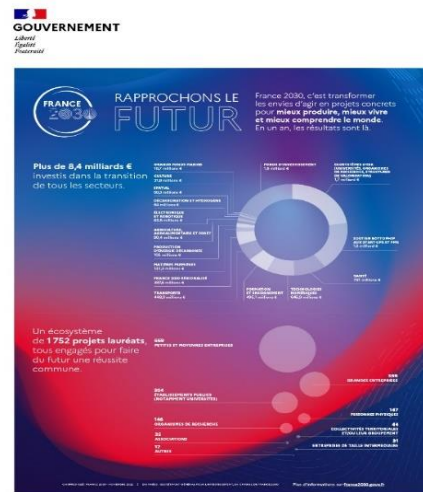
More information: [Press release](#)
En savoir plus : [Premium Beauty News.com](https://www.premiumbeautynews.com)

3. PUBLIC POLICIES & REGULATIONS

In France

4131 - France 2030: taking stock and looking ahead one year in.

In the investment plan's first year, €8.4 billion was invested in 1,752 innovative projects across France through around fifty calls for projects. Conducted by businesses of all sizes, the projects include the energy efficiency of processes, waste sorting and recycling, agroecology, and deep tech in the health sector, among others. The French prime minister announced that France 2030 would account for almost €10 billion in projects by late 2022.



Source: france2030.gouv.fr

Looking to the future, the prime minister announced that France 2030 would account for almost €20 billion by late 2023. Half of the successful projects will continue to focus on the green transition and the roll-out of France Nation Verte, a new government plan. The prime minister also announced that France 2030 would provide extensive support towards creating tech start-ups and developing research. In addition, some projects will receive extra support: breakthrough innovation projects will receive special support, with €5 billion of France 2030's €54 billion earmarked to help them. As to training, an additional envelope of €180 million will be added to the €300 million already set aside in this first year to support new projects. The new funds will make it possible to secure training in the jobs of the future for over one million new talents by 2030. In addition, call for proposal processes will be simplified to make them quicker and more streamlined, while ensuring projects continue to be carefully selected. Thorough assessment processes will continue, to make sure the money disbursed is used efficiently. This will have the knock-on effect of mobilising private funds. To this end, Bruno Le Maire, minister for the economy, finance and industrial and digital sovereignty, and Jean-Noël Barrot, minister delegate for the digital transition and telecommunications, are tasked with kick-starting the mobilisation of private funds (inspired by the Tibi initiative, which raised €6 billion) by steering such private funding towards the priorities of France 2030 and the green transition. Last, the prime minister announced the deployment of 'France 2030 and investments sub-prefects', who will relay the plan and, most importantly, be in charge of helping support the industrial projects together with local authorities.

En savoir plus : [Communiqué de presse](#), [Dossier de presse](#), [L'Usine Digitale.fr](https://www.usinedigitale.fr), [Les Echos.fr](https://www.lesechos.fr)

4132 - National strategy to accelerate the uptake of biobased products and industrial biotechnologies: favouring public sector procurement for biobased products.

On 24 November 2022 at the 'Salon des Maires', an event for France's mayors and local authorities in partnership with the directorate-general for business of the minister for the economy, finance and industrial and digital sovereignty, the industrial sector presented the actions put in place to encourage public procurement for paints and biobased detergents. This experiment is part of the strategy for the accelerated uptake of 'biobased products and sustainable fuels' announced by the French government on 10 December 2021. To reach this goal, manufacturers of decorative paints and detergents have worked on making it easier to follow the public procurement process for biobased products. The experiment should make it easier to accelerate the decarbonisation of public procurement by encouraging the adoption of biobased products for these two product categories. In coordination with the directorate-general for business, in 2022 the biobased sector developed communication materials, technical sector guides, and a register of biobased products via a dedicated platform on [AgroBioBase](#). The information will be shared on the sustainable purchases community, [RAPIDD](#).

Press release (in French): [Communiqué de presse](#)

4133 - France 2030: launch of the 4th i-PhD competition and the 25th i-Lab competition.

The i-PhD competition, which is run by Bpifrance for the French government, was created to galvanise the business acumen of young PhD holders and improve support for the development of deep tech start-ups together with public research establishments and their acceleration ecosystem. The competition is open to second-year PhD students onwards who expect to defend their thesis no more than two years before the start of the competition, or PhD holders who defended their thesis less than five years ago. Candidates must be supported by their laboratory and mentored by a *Structure de Transfert de Technologie* [technology transfer organisation] or a public research incubator. Each winner receives exposure and a one-year support programme enabling them to ramp up their project and work on the situation of their business (mentoring, special access to the French Tech grant with a more attractive assistance threshold, involvement in major events in the deep tech ecosystem, and promotional tools for the top prize-winners). Applications can be submitted until 30 March 2023 at midnight (Paris time) on the [démarches simplifiées](#) website.

The i-Lab competition builds on the results of publicly funded research by creating innovative technology businesses. Run by Bpifrance for the French government, it provides funding (up to €600,000 depending on the project) and tailor-made support for the best R&D projects looking to finalise an innovative technology service, process or product. I-Lab has become a rite of passage for developers of innovative projects in the 24 years it has been running. It is sign of quality recognised by deep tech investors across the board, with 3,707 winners, €526 million paid out, and 2,224 innovative technology companies created. The 2023 i-Lab competition is open to project developers who have not yet created their company and companies less than two years old, in a sector seeing intense technological change.

Applications can be submitted until 1 February 2023 at midday (Paris time) on the Bpifrance [website](#).

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

4134 - Closure of France Brevets and decision to reorganise the coordination of industrial property policy.

Further to the publication of two reports by the Cour des Comptes in 2018 and 2022 stating that [France Brevets](#) (France's patents investment organisation) needed to revise its economic model by broadening its scope, the latter began to diversify its activities and had planned to work more closely with other organisations including Bpifrance and INPI. It did not, however, have the financial stability or capacity to keep operating and the French government was obliged to ask it to cease operations. This decision was approved by the company's board of directors at a meeting on 20 October 2022.

Following the closure the government announced it intended to reorganise the coordination of its industrial property policy. The government is well aware of the strategic importance of protecting industrial property – in particular in terms of economic intelligence – if it is to regain independence and develop the leadership of economic stakeholders. It therefore wants to increase its involvement, and strengthen and marshal the initiatives and key players in industrial property so it has the means to match its ambitions, particularly those of the France 2030

investment programme. This will involve, for instance, boosting industrial property support for businesses (especially SMEs and start-ups, which still don't hold enough titles) by building on and expanding the role of Bpifrance and INPI in this field. The reinforcement of the government's actions in terms of industrial and technological start-ups must integrate these challenges so business growth and creation objectives can be reached. In addition, the government wants to ensure industrial property plays a bigger role in each of the sectors targeted by France 2030. To do so it will create overviews, step up the involvement of research organisations and universities in these challenges, and strengthen the role of industrial property in the allocation of France 2030 grants and in the selection of the fields and challenges it wants to invest in. The details of the plan will be presented as part of France 2030, together with all the parties involved.

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

4135 - Signature of a new framework agreement to support the transformation of agrifood systems.

Signed by the Food and Agriculture Organization of the United Nations (FAO), INRAE, CIRAD and IRD, this cooperation agreement covers 2022 to 2027 and underlines a strong desire to develop international partnerships to address the challenges of climate change, biodiversity, the sustainable management of natural resources and the transformation of agrifood systems. The collaboration is a significant contribution to the Paris Agreement and to achieving the sustainable development goals of the 2030 Agenda. It also aligns with the FAO Strategic Framework 2022–31 and supports its very first Science and Innovation Strategy adopted at the most recent FAO Council meeting in June 2022. The framework agreement opens the door to new collaborations in connection with intellectual property rights, publications and personal data management. It proposes five priority areas of collaboration:

- Improving the coherence of food security and nutrition policies and their implementation by EU member states;
- Supporting the transition towards multiple action areas (economic, social and environmental) for agrifood systems and territories;
- Strengthening health security and the prevention and response to diseases in the plant, animal and food fields, to contribute to the improvement of global health in a 'One Health' approach;
- Enhancing the resilience of vulnerable populations and improving crisis prevention and management, in particular for food crises;
- Contributing to the implementation of the FAO's climate change strategy for the implementation of the Paris Agreement and the FAO biodiversity strategy.

More information: [Press release](#)

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

4136 - Launch of the 'Je décarbone'* platform.

Industrial companies in the [Nouveaux Systèmes Energétiques](#) [new energy systems] sector have teamed up to launch the [online platform](#) as part of the strategy to accelerate industrial decarbonisation. Set in motion on 4 February 2022, the aim of the strategy is to support the emergence and scale up of French decarbonisation technology. To this end, the new tool should improve the link between supply and demand (with its directory and networking module) and the offer's visibility (with project and solution showcases, etc.). It is accompanied by B2B networking workshops for 'integrators' (large industrial companies tasked with coordinating the efforts of smaller companies), advisers, assistants to contracting authorities, and solutions providers. The project is a joint effort between several integrators (including Dalkia, EDF, Engie, TotalEnergies and GRDF), which are providing financial support and coordination assistance.

The platform launch is accompanied by the signature of a [pact](#) named 'Je Décarbone'* by Roland Lescure, minister delegate for industry, François Jacq, Chairman of the CEA, Sylvie Jéhanno, CEO of Dalkia, and Stéphane Michel, President of Gas, Renewables & Power of TotalEnergies. The latter two are co-chair of the sector-specific strategy committee Nouveaux Systèmes Energétiques. The pact reaffirms the shared goal to develop a French sector for decarbonisation and energy efficiency, to attain carbon neutrality by 2050 and save 10% of energy in industry.

**Let's decarbonise*

En savoir plus : [Communiqué de presse](#), [Economie.gouv.fr](#)

4137 - Will France decide to make private jets fly on sustainable aviation fuel?

While an amendment to align the taxation of kerosene used by private jets with that of fuel used by cars was tabled by the presidential majority at the start of October, the minister for public action and accounts, Gabriel Attal, said that he wanted to be more 'ambitious' and 'make private jets fly on biofuel.' He is well aware that the measure would 'cost a great deal', but 'would prefer that users pay more for their ticket and consume less than pay a tax that they can afford and continue to pollute.' To be continued...

En savoir plus : [Le JDD.fr](#), [TF1 Info.fr](#)

In Europe

4138 - Proposal for a regulation to increase the use of reusable packaging.

On 30 November 2022, the European Commission proposed an amendment to EU legislation to combat the increase in packaging waste, especially plastic waste. It released a draft 118-page [regulation](#) which homes in on three objectives: promote reusable packaging; make all packaging in EU markets recyclable; and increase the use of recycled plastics. The objective is a reduction of 10% per country and per inhabitant by 2035 on figures for 2018, and of the volume of packaging waste in each country by 15% by 2040. To reach its goal, the European Commission has opted for a binding regulation, as a simple 'recommendation' to Member States, or another European action plan, would not have been sufficient. The proposed regulation will now be examined by the European Parliament and the Council of the European Union.

More information: [Environment.ec.europa.eu](#)

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

Outside Europe

4139 - UNITED STATES: world's first PLA-based facemask authorised for sale.

The United States Food and Drug Administration (FDA) has granted an Emergency Use Authorization (EUA) to the Canadian group PADM Medical, which specialises in the manufacture and supply of medical devices, for the sale of Precision Eco™. The plant-based surgical mask is approved for use in medical and healthcare establishments in the US. Made with the Luminy® PLA produced by TotalEnergies Corbion, this mask is a USDA-certified product under the USDA BioPreferred Program with a plant-based content of 82%.

More information: [Press release](#), [Vegconomist.com](#), [Chemical Industry Digest.com](#)

4140 - UNITED STATES: California has adopted a law to significantly reduce non-recyclable plastic packaging and expanded polystyrene within ten years.

The new law states that at least 30% of plastic packaging sold or used in the State must be recyclable by 2028, climbing to at least 65% by 1 January 2032. The State of California also decided to enact new recycling laws prohibiting the incineration of such waste and its conversion into fuel. The new law also covers expanded polystyrene food packaging, commonly used in the United States to make takeaway cups and plates. Unless producers can prove that at least 25% of this type of packaging is being recycled by 2025, it will be totally banned in the State.

Last, the new Californian law makes manufacturers directly responsible for the implementation and funding of these measures. Those wanting to use plastic packaging in California will be required to collectively raise \$5 billion (almost €4.8 billion) over ten years to fund these efforts and contribute to cleaning up the zones worst affected by this pollution. Businesses or 'entities' that do not comply with this law could receive a fine of \$50,000 (€47,000) per day.

Info: In California, approximately 85% of plastic waste is not recycled. In 2021, the rate was 95% across the United States.

En savoir plus : [L'Usine Nouvelle.com](https://www.usinenouvelle.com), [Le Monde.fr](https://www.lemonde.fr)

FEBRUARY 2023

5th International Conference on Industrial Biotechnology and Bioprocessing

13-15 February 2023. Rome, Italy

More information: [Website](#)

CLIB International Conference (CIC2023)

14-15 February 2023. Düsseldorf, Germany.

More information available soon.

7th European Chemistry Partnering (ECP)

22-23 February 2023. Düsseldorf (Germany).

More information: [Website](#)

MARCH 2023

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](#)

In-Cosmetics Global

28-30 March 2023. Barcelona, Spain.

More information: [Website](#)

MAY 2023

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](#)

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](#)

16th International Symposium on Biocatalysis and Biotransformations (BIOTRANS)

25-29 June 2023. La Rochelle, France.

More information: [Website](#)

JULY 2023

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](#)

JUNE 2024

European Congress on Biotechnology

30 June-3 July 2024. Maastricht, Netherlands.

More information: [Website](#)