



## FLASH NEWS

### No. 58-2023 – THE BIOTECH INDUSTRY INTELLIGENCE REPORT

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### Biocatalysis/Bioconversion

#### # 4373 - A new way to produce enzymatic foams

Researchers at [Karlsruhe Institute of Technology \(KIT\)](#) have developed monodisperse all-enzyme foams of 'tremendous stability and activity'. The new foams are three-dimensional porous networks consisting exclusively of biocatalytically active proteins. The stable hexagonal honeycomb structure of the foams has a mean pore diameter of 160  $\mu\text{m}$  and a lamellae thickness of 8  $\mu\text{m}$ . It is formed by uniform spherical bubbles after a few minutes. In contrast to theoretically expected results, the new foams show strikingly high enzyme durability, mechanical resistance and catalytic activity, which had not previously been achieved in foaming proteins. The researchers assume that the stability results from the matching junctions of the enzymes. They enable the enzymes to self-assemble and form a new material network of unmatched stability during drying. These discoveries open up many opportunities for innovations in industrial bioengineering, materials sciences and food technology. The new foams could be used in biotechnological processes to produce valuable compounds more efficiently and sustainably. For example, the researchers used the foams to produce tagatose: a promising alternative to refined sugar. They have already filed a patent application on the enzyme foam production process.

**Publication:** Biocatalytic Foams from Microdroplet-Formulated Self-Assembling Enzymes. Journal: *Advanced Materials*. DOI: 10.1002/adma.202303952.

More information: [Kit.edu](#)

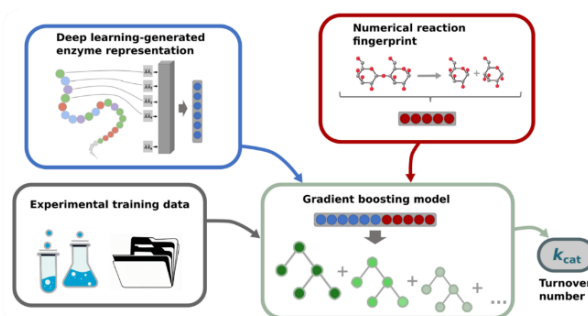
### Modelling/AI

#### # 4374 - A new tool to predict the turnover number ( $k_{\text{cat}}$ )

The [Computational Cell Biology](#) research group at the [Heinrich Heine University Düsseldorf \(HHU\)](#) has converted data on enzymes and catalysed reactions into numerical vectors using deep learning models to develop the Turnover Number Prediction (TurNuP) tool. These numerical vectors served as the input for a machine learning model – known as a gradient boosting model – which can predict the maximum speed at which a specific enzyme can convert its substrates into high-value molecules. According to Alexander Kroll, one of the study's main authors, 'TurNuP outperforms previous models and can even be used successfully for enzymes that have only a low similarity to those in the training dataset. Previous models have not been able to make any meaningful predictions unless at least 40% of the

enzyme sequence is identical to at least one enzyme in the training set. By contrast, TurNuP can already make meaningful predictions for enzymes with a maximum sequence identity of 0 to 40%.'

The tool is available [here](#).



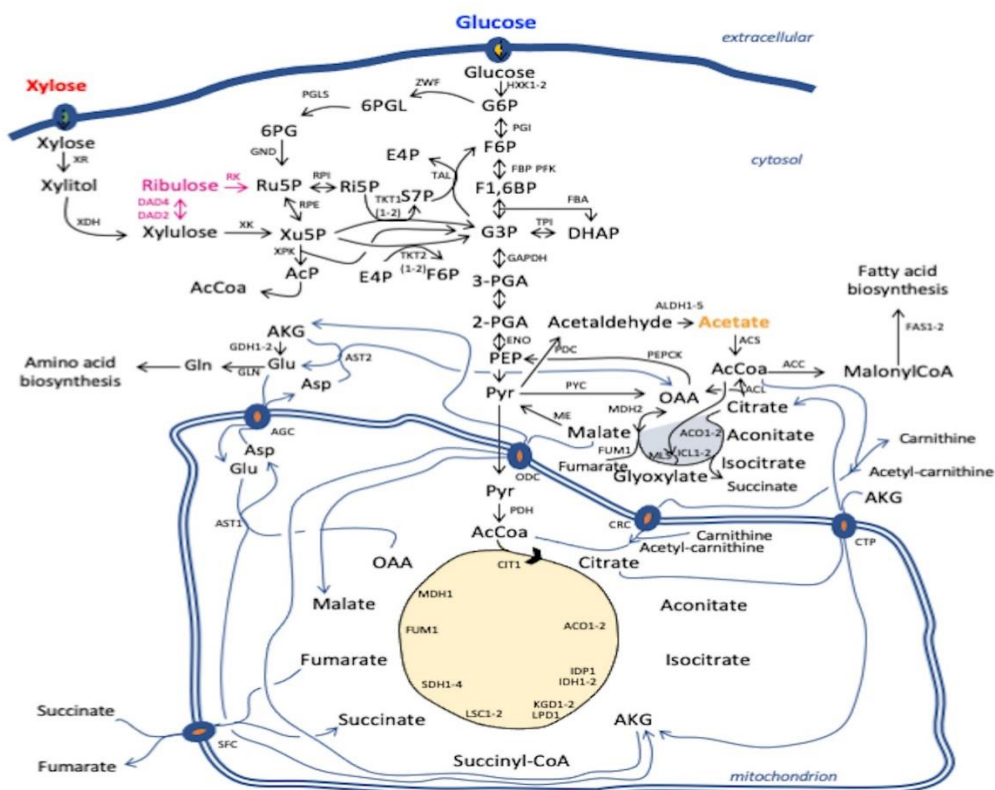
Source: [hhu.de](#)

**Publication:** Turnover number predictions for kinetically uncharacterized enzymes using machine and deep learning. Journal: *Nature Communications*. DOI: 10.1038/s41467-023-39840-4.

More information: [Hhu.de](#)  
En savoir plus : [Crumpe.com](#)

## # 4375 - A new computer model can predict yeast metabolism based solely on protein concentrations

Researchers at [Tallinn University of Technology](http://www.taltech.ee), Estonia, have developed a new model named ecRhtoGEM, the first of its kind to predict the metabolism of the red yeast *Rhodotorula toruloides* in the recovery of local organic waste. The scientists worked out a way to computationally predict metabolic processes in *R. toruloides*, which naturally has the genes required to process C5 sugars and can therefore 'consume' mixtures of hemicellulosic sugar mixtures and waste when grown in economically sustainable conditions. Their approach revealed metabolic processes, which are most important for lipid biosynthesis, as well as metabolic trade-offs. The study highlighted the importance of using reliable computational methods to figure out the dynamical properties of yeast metabolism. The new model predicts metabolism development based solely on the protein concentrations, even when the enzyme dynamic parameters are missing. According to Alina Reķena, PhD candidate and junior researcher at Tallinn University of Technology, 'it is not possible to guarantee that the use of each new substrate will be correctly predicted, but it is possible to get correct predictions on three different carbon sources present, for example, in wood sugars produced by the Estonian company Fibenol.' The researchers now hope to increase the model's predictive power. To do so, they plan to apply the latest machine learning algorithms that predict the kinetic parameters of enzymes based on their structural and substrate information, so users can obtain more accurate metabolic predictions even in the absence of proteomics data. The new computer model can be accessed [here](http://www.taltech.ee).



Main metabolic pathways present in *R. toruloides*.  
Source: taltech.ee

**Publication:** Genome-scale metabolic modeling reveals metabolic trade-offs associated with lipid production in *Rhodotorula toruloides*. Journal: PLOS Computational Biology. DOI: 10.1371/journal.pcbi.1011009.

More information: [Taltech.ee](http://www.taltech.ee), [Err.ee](http://www.err.ee)

## # 4376 - Ginkgo Bioworks and Google Cloud join forces to develop an artificial intelligence platform in the biological engineering and biosecurity field

The American biotech firm [Ginkgo Bioworks](http://www.ginkgobioworks.com), which is building a biosecurity and cell programming platform, and [Google Cloud](http://www.google.com/cloud), Google's cloud computing platform which offers solutions using Google technology and tools to accelerate the ability of each organisation to digitally transform its business and industry, have entered into a

strategic five-year partnership in cloud computing services and artificial intelligence (AI) to enable Ginkgo Bioworks to develop and deploy AI tools for biology and biosecurity. Through this partnership, Ginkgo Bioworks will work on developing new, state-of-the-art Large Language Models (LLMs) using Google Cloud's [Vertex AI](#) platform in the genomics, protein function, and synthetic biology fields. This will help Ginkgo Bioworks customers accelerate innovation and discovery in fields as diverse as drug discovery, agriculture, industrial manufacturing and biosecurity. Ginkgo Bioworks intends to make Google Cloud its primary cloud services provider, significantly increasing its next-generation cloud computing resources as the need for cloud computing expands. Under the terms of the agreement, Google Cloud will release funding of up to \$56 million (€52 million) as Ginkgo Bioworks reaches certain milestones over the next three years. For its part, Ginkgo Bioworks will make minimum annual payments amounting to \$289 million (€271 million) over five years for the use of cloud hosting services in exchange for various discounts on these services. Through this partnership, Ginkgo Bioworks plans to build a number of interconnected models for both internal use on customer programmes and external release on Google Cloud Marketplace. Ginkgo Bioworks anticipates its first model to be a foundation model for proteins. Once this foundation model has been successfully developed, it is expected to set the stage for several applications, including generative protein design, protein sequence optimisation, and class-specific protein functional engineering that could have broad commercial potential across therapeutics, small molecule production, gene therapy capsid engineering, and more.

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

#### **# 4377 - A new tool to create novel, completely original protein structures**

The new tool, developed by researchers at the [Computer Science and Artificial Intelligence Laboratory \(CSAIL\)](#) at [Massachusetts Institute of Technology \(MIT\)](#), is called FrameDiff and can create novel protein structures 'beyond what nature has produced.' The machine learning approach generates 'frames' that align with the inherent properties of protein structures, enabling it to construct novel proteins independently of preexisting designs, facilitating unprecedented protein structures. According to Jason Yim, a PhD student at MIT CSAIL, *'the aim, with respect to this new capacity of generating synthetic protein structures, opens up a myriad of enhanced capabilities, such as better binders. This means engineering proteins that can attach to other molecules more efficiently and selectively, with widespread implications related to targeted drug delivery and biotechnology, where it could result in the development of better biosensors. It could also have implications for the field of biomedicine and beyond, offering possibilities such as developing more efficient photosynthesis proteins, creating more effective antibodies, and engineering nanoparticles for gene therapy.'*

More information: [Csail.mit.edu](#)  
En savoir plus : [Futur en Seine.paris](#)

#### **# 4378 - Launch of deCYPher: a project to decipher cytochrome P450 enzymes (CYPs) using digital tools to boost flavonoid and terpenoid production**

The deCYPher project will develop and use artificial intelligence and machine learning tools to understand and improve the function of P450 cytochrome enzymes in microbes, the aim being to advance the precision fermentation of flavonoids and terpenoids. The project is expected to considerably expand our knowledge of P450 enzymes and their workings in biosynthetic pathways, furthering the capacities of facilities that produce microbial cells and their use in industrial biotech. The project, which is fully funded by the European Union through the Horizon Europe programme to the tune of €5,968,686.25, began on 1 September 2023 and is expected to last four years. It is being coordinated by the University of Ghent, Belgium, and includes nine partners from six different countries.

**Info:** LantanaBio, a member of the TWB consortium, is a project partner.

More information: [Cordis.Europa.eu](#)



## # 4379 - What does the future hold for artificial intelligence in biotechnology?

According to a report by [DataHorizzon Research](#), the market share of artificial intelligence (AI) in biotechnology is expected to reach a compound annual growth rate of 29.7% between 2023 and 2032. The market is fragmented and offers lucrative opportunities for industry stakeholders. In addition, in these post-pandemic times, the demand for novel drugs and treatments has grown since 2021, on account of the wider adoption of machine learning tools to identify specific diseases. Biotech companies are also making impressive progress in the industry with the help of AI models dedicated to drug and vaccine development.

More information: [Press release](#)

## Processes

### # 4380 - Discovery of a new deep-sea enzyme that breaks down PET

While studying a sample of deep-sea water, a team of scientists at [Kiel University](#) came across an enzyme from a non-cultured deep-sea microorganism for the first time. Using a metagenomic approach, the research team identified and biochemically described the enzyme, named PET46. They found that this new enzyme has many unusual properties, as, unlike previously discovered PET-degrading enzymes, PET46 can break down both very long-chain PET molecules, known as polymers, and short-chain PET molecules, known as oligomers, which means that degradation can be continuous. Among others, PET46 uses a completely different mechanism for substrate binding than previously known PET-degrading enzymes. The researchers describe an unusual 'lid' of 45 amino acids above the enzyme's active centre as crucial for binding. In other PET enzymes, aromatic amino acids close to the active site are typical. At the molecular level, PET46 is very similar to another enzyme: ferulic acid esterase. Compared to the best-characterised PET-degrading enzymes from bacteria and composting plants, PET46 is more efficient at 70°C than these reference enzymes at their respective optimum temperatures. The discovery could have important implications in the fight against plastic pollution and pave the way for new biotechnological applications.

**Publication:** An archaeal lid-containing feruloyl esterase degrades polyethylene terephthalate. Journal: Communication Chemistry. DOI: 10.1038/S42004-023-00998-Z.

More information: [Uni Kiel.de](#)

En savoir plus : [Enerzine.com](#), [Bionity.com](#)

### # 4381 - Fresh discoveries about oil-eating bacteria

As part of an international project involving [Tsukuba University](#), Japan, the [Centre de physique théorique](#) (CPT, CNRS / Aix-Marseille University / Toulon University), the [Processus d'activation sélectif par transfert d'énergie uni-électronique ou radiatif](#) laboratory (PASTEUR, CNRS / ENS-PSL / Sorbonne University), the Institut Pierre-Gilles de Gennes (PSL University) and the [Physico-chimie Curie](#) laboratory (PCC, CNRS / Institut Curie / Sorbonne University), a team of scientists isolated specimens of the bacteria *Alcanivorax borkumensis* under laboratory conditions, fed them crude oil, then observed how they work together to eat the oil as quickly and efficiently as possible. The scientists' research involved immobilising oil droplets on a microfluidic chip. The droplets were gradually consumed by the bacteria, and the scientists followed their growth over time under a confocal microscope. The team was able to observe and quantify the entire process, from initial colonisation to complete consumption of the oil droplets. While bacteria exposed to an insoluble carbon source for a short length of time form biofilms that increase in volume while maintaining a spherical droplet, bacteria exposed to the oil for longer form thin biofilms where a large number of tubes appear. Through this study, the authors show that the speed at which the bacteria break down the droplets depends on the morphology of the biofilm: because of the larger surface area in contact with the bacterial biofilm and the water/oil interface, dendritic biofilms are much more efficient at quickly degrading oil. However, rather than being caused by an increase in individual metabolic throughput, the acceleration is the consequence of the collective organisation of the biofilm at the interface. Over the course of their work, the researchers also looked at the presence of surfactants in the culture medium. In the context of their experiments, the scientists show that the surfactants lessen the bacteria's adhesion to the petrol droplets, preventing the formation of the tubes and therefore compromising the oil degradation by these bacteria. However, the researchers

believe additional work is needed before reaching any final conclusions. Their work does help us better understand the biodegradation process of oil spills.

**Publication:** *Alcanivorax borkumensis* Biofilms Enhance Oil Degradation By Interfacial Tubulation. Journal: Science. DOI: 10.1126/science.adf3345.

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

### # 4382 - A new way to optimise production of high-value molecules from lignocellulosic biomass

A group of researchers at the [Dalian Institute of Chemical Physics](https://www.dicp.cas.cn) (DICP) of the Chinese Academy of Sciences (CAS) has developed a microbial platform to improve the co-fermentation of sugar during production of high-value molecules from lignocellulosic biomass. Their process can efficiently synthesise acetyl-CoA derivatives, such as fatty acids (FFA) and 3-hydroxypropionic acid (3-HP), owing to the enhanced supply of precursor acetyl-CoA and cofactor NADPH by rewiring the cellular metabolism of *Ogataea (Hansenula) polymorpha*. The researchers managed to use glucose and xylose simultaneously. To do so, they introduced a hexose transporter mutant and the xylose isomerase, and overexpressed the native xylulokinase to enhance xylose catabolism and import. The engineered strain produced 7.0 g/L FFA from real lignocellulosic hydrolysates in shake flasks and 38.2 g/L FFA from simulated lignocellulose in a bioreactor. The process was further improved using a metabolic transforming strategy to obtain 79.6 g/L of 3-HP from simulated lignocellulose.

**Publication:** Engineering co-utilization of glucose and xylose for chemical overproduction from lignocellulose. Journal: Nature Chemical Biology. DOI: 10.1038/s41589-023-01402-6.

More information: [Dicp.cas.cn](https://www.dicp.cas.cn)

En savoir plus : [Issues.fr](https://www.issues.fr)

### # 4383 - Launch of a new CO<sub>2</sub> capture solution based on enzymatic technology

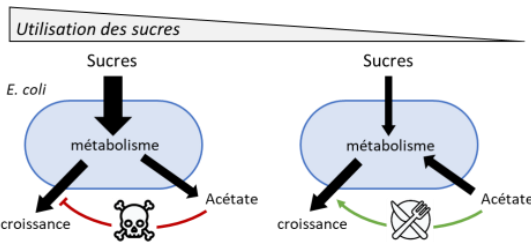
Launched by the engineering firm [Saipem](https://www.saipem.com), Bluenzyme™ is an innovative plug-and-play solution based on the proprietary enzymatic technology [CO<sub>2</sub> Solutions by SAIPEM](https://www.saipem.com/co2-solutions). The latter uses a non-toxic, non-volatile solvent based on the use of the carbonic anhydrase enzyme, the most powerful natural catalyst for the capture of CO<sub>2</sub>. After an in-depth analysis of this natural enzyme's workings, Saipem developed a high-performance industrial solution for CO<sub>2</sub> capture that has a lower environmental impact, and is therefore more sustainable, than traditional processes. The first product in the new range is Bluenzyme™ 200, a ready-to-use package designed for small and medium emitters, which has a nominal capture capacity of 200 tonnes of CO<sub>2</sub> per day. Bluenzyme™ 200 can be used in new and existing facilities.

More information: [Press release](https://www.saipem.com/press-release)

### # 4384 - New acetate findings

Teams at [Toulouse Biotechnology Institute](https://www.toulousebiotech.com) (TBI – INRAE / INSA Toulouse / CNRS) have shown that acetate – long considered toxic for bacteria – can in fact be a beneficial nutrient under certain conditions. This is especially true when the use of sugars by glycolysis is less efficient, for example, because the sugars are less accessible in the environment. In this case, the bacteria *Escherichia coli* (*E. coli*) will compensate for the drop in nutrients by simultaneously using acetate to produce its energy and ensure its growth. So, far from being toxic, acetate proves to be beneficial for the growth of *E. coli*. The two teams also showed that it is the same

genes that are responsible for its role as toxic waste or beneficial nutrient by ensuring both its production and its consumption. The work shines new light on the mystery of the production of molecules previously considered toxic waste for cells. It also opens the door to better use of acetate as a sustainable resource for biotechnologies: acetate is present in all sorts of plant biomass products and can be obtained from CO<sub>2</sub>. Improved use of acetate by *E. coli* could therefore improve the sustainable biomanufacturing of numerous molecules of interest, such as biodegradable plastics, while lowering the environmental footprint of biotechnologies.



Source: Inrae.fr

**Publication:** Acetate is a beneficial nutrient for *E. coli* at low glycolytic flux. Journal: The EMBO Journal. DOI: 10.15252/embj.2022113079.

En savoir plus : [Inrae.fr](https://www.inrae.fr)

### # 4385 - BioImpulse project: validation of the third milestone

Signed off by ADEME, the French agency for the environment and energy management, in the context of France's Investments for the Future programme, this third milestone involved:

- The development of a new purification process and validation of its operation on a pilot scale. This purification process had been undergoing testing since the beginning of the project in separate technological blocks. This year, the project teams succeeded in linking the various elementary purification approaches to obtain a complete process, enabling them to isolate the biosourced raw materials needed to design the resins.
- The scale-up of fermentation, with a significant increase in production capacity from 2 m<sup>3</sup> last year to 10 m<sup>3</sup> and 30 m<sup>3</sup> this year. The project team succeeded in implementing the complete fermentation and purification chain at an external service provider. This progress confirms the robustness of the entire process in a representative industrial environment.
- Work on innovative metabolic pathways to increase yields and differentiate biomass feed sources. By exploring new approaches, the team has achieved proof of concept for a metabolic pathway enabling the molecule of interest to be produced from second-generation (2G) biomass.
- The validation of industrial trials on the production of plywood panels, with production of up to one tonne of resin.
- Laboratory-scale production of plywood samples at FCBA using the project's biobased resin, incorporating the molecule of interest developed and produced as part of BioImpulse.

**Recap:** These results are the fruit of the joint efforts of all the BioImpulse teams (ResiCare, INSA Toulouse, TWB, Leaf / Lesaffre and FCBA institute of technology).

En savoir plus : [BioImpulse.fr](https://www.bioimpulse.fr)

## Miscellaneous

### # 4386 - iGEM competition 2023: TWB supports the CALIPSO project

The Cell-targeting Advanced LIPosomes for Selective Oncotherapy, or CALIPSO, project is led by the eight students in the iGEM Toulouse INSA-UPS team. It aims to improve existing cancer treatments by making them less invasive and to limit the side effects of chemotherapy. The project is based on the use of liposomes to destroy cancer cells in a more specific, targeted way. The liposomes are decorated with receptors that can recognise cancer cells and anchor the liposomes to the cell surface. Once in an environment containing cancer cells, an internal liposome mechanism is triggered, enabling the production and release of an anti-cancer molecule. The project also has the advantage of being modular. By changing the receptors on the liposome and the internal system, the technology can be used for several types of cancer, and even extended to other diseases that require certain cells to be targeted. The competition will take place between 2 and 5 November 2023 at Porte de Versailles in Paris. You can contribute to the [online fundraiser](#) if you would like to support the students with their project.

En savoir plus : [Toulouse White Biotechnology.com](https://www.toulousewhitebiotechnology.com), [France3 régions.francetvinfo.fr](https://www.france3regions.fr), [La Dépêche du Midi.fr](https://www.ladepeche.com)

## # 4387 - Publication of the 2023 European Innovation Scoreboard and the twice-yearly Regional Innovation Scoreboard

The [European Innovation Scoreboard](#) highlights a substantial improvement in innovation performance of approximately 8.5% since 2016. The innovation performance of 25 countries improved during this period, although at a slower pace in more recent years, and 20 Member States saw a significant rise in their innovation capabilities over the past year, while only 7 recorded a decline. Denmark has wrested first place from Sweden for this 2023 edition. The latter remains in a comfortable second place, however, ahead of Finland, the Netherlands and Belgium. These five countries belong to the 'innovation leaders' group, with an overall performance 125% higher than the European average. The figures show that France, Austria, Germany, Luxembourg, Ireland and Cyprus have very high innovation performance, with results higher than the EU average. France and Luxembourg did, however, see a small drop in their relative performance on 2016 levels.

The [Regional Innovation Scoreboard](#) shows an increase in innovation performance in most EU regions since 2016. Although innovative regions tend to be located in the most innovative countries, some regional 'pockets of excellence' are in countries where innovation performance is relatively low. Globally, the EU boasts slightly better results than China and has reduced its performance gap with Australia, although the gap with Canada, the Republic of Korea and the United States has widened.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Representation.ec.europa.eu](https://ec.europa.eu/representation), [Les Echos.fr](https://www.lesechos.fr), [POC MEDIA.fr](https://www.pocmedia.fr)

## 2. APPLICATIONS, MARKETS & APPLIED SCIENCES

### Food and feed

#### # 4388 - Aviwell

The [start-up](#), which has developed a hybrid platform based on AI and biology to develop new sustainable nutritional feed solutions, announced that it had raised €9 million through a seed round both in venture capital and non-dilutive funding. The seed investment was co-led by [Elaia Partners](#) and MFS Impact Investment Development while the non-dilutive grants are the result of a highly competitive call for projects led by the European Innovation Council (EIC) and France's investment bank (BPIFrance). According to Mouli Ramani, President and CEO of Aviwell, *'The funds will help us accelerate the development of our revolutionary hybrid AI-based Discovery Platform to identify and commercialise unique insights into animal health, growth, and performance. Ultimately, we intend to develop innovative feed solutions and platform services that significantly improve animal growth and health for the agri-food industry worldwide in a natural and sustainable manner.'* Aviwell also received €2.5 million in funding from the EIC Accelerator through the European Commission's Horizon Europe programme. The EIC Accelerator is a highly competitive funding programme that offers support to start-ups that have an innovative, game-changing product, service or business model that promises to shake up existing markets in Europe and worldwide.

More information: [Press release](#)

En savoir plus : [Communiqué de presse](#), [Maddyness.com](https://www.maddyness.com)

#### # 4389 - Lesaffre & Yeap

The [French group](#) specialising in yeast, animal feed and fermentation announced that it had taken a 10% shareholding in [Yeap](#), an Israeli start-up specialising in yeast-based functional alternative proteins. The two partners want to make yeast the go-to protein source in the growing plant-based protein market by producing the market's most versatile upcycled protein with one of the lowest environmental impacts. The investment will benefit Lesaffre's



food flavour and enjoyment business unit, [Biospringer by Lesaffre](#), a major player in and global producer of natural-origin yeast extracts and other microbial derivatives for the food industry.

More information: [Press release](#)

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

### # 4390 - Symrise & Bonumose

The [German chemicals company](#) announced it had signed a minority investment agreement with [Bonumose](#), an American start-up specialising in the enzymatic production of rare, high-purity sugars, particularly tagatose and allulose, alternatives to saccharose. The transaction will enable Symrise to forge ahead with its sugar reduction initiatives: a priority for its Taste, Nutrition & Health segment in the North America region. According to Nick Russell, Senior Vice President of Symrise's Business Incubation Group, *'combining our technologies will enable us to offer our customers new pathways to sugar reduction and taste balancing solutions. In turn, this will allow them to reduce sugar while optimising the taste of better-for-you products for their consumers. This applies especially in the beverage and ice-cream categories.'* The investment amount was not announced.

More information: [Press release](#)

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

## Biocontrol/Biostimulation

### # 4391 - Amoéba

The [industrial biotech](#) specialising in the treatment of microbiological risk, which is developing a biocontrol agent for the treatment of plants in agriculture and a biological biocide for the treatment of industrial water, confirmed that the regulatory timetable was on track for approval of its active biological pest control substance.

More information: [Press release](#)

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

### # 4392 - Bayer

The [German pharmaceutical and agrochemicals group](#) announced plans to invest €220 million to build an R&D centre for its Crop Protection business on its site in Monheim, Germany. At this new 28,000 m<sup>2</sup> complex, Bayer intends to use IT tools that integrate artificial intelligence and data science to develop a new generation of sustainable products to protect crops. The new unit will generate an overarching understanding of the effects of exposure to agrochemical products on the environment and biodiversity. In addition to residue analytics and metabolism studies in target crops, rotational crops and livestock, Bayer intends to carry out exposure studies in different environmental compartments (water, air, soil, etc.) as well as safety studies on non-target organisms such as wild birds and mammals, and pollinators such as honey bees and bumble bees. The new R&D centre is scheduled to open by 2026.

More information: [Press release](#)

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

### # 4393 - iMEAN & Novobiom

[iMean](#), a biotech company specialising in the *in silico* modelling of living organisms, and the [Belgian company](#) specialising in the development and commercialisation of ecological solutions to treat complex soil pollution using fungi agreed to develop innovative bioremediation solutions to combat soil pollution. Novobiom's technology is based on mycoremediation, a bio-mimicking technology alternative to physical, chemical and thermal soil treatments. Under the partnership, Novobiom will be able to use iMEAN's *in silico* design and optimisation platform to optimise its process and reduce the initial work required to adapt to a specific soil and contaminant type.

## **Chemicals & Materials**

### **# 4394 - BASF & Qore**

German chemicals company [BASF](#) and [Qore](#), the joint venture between American food and feed specialist Cargill and the German group Helm, have entered into an agreement for the long-term supply of biobased 1,4-butanediol (BDO) marketed as Qira®, produced by Qore on Cargill's biotech campus in Iowa, United States. Qira® will expand BASF's existing BDO derivatives offer, with biobased variants of, for instance, tetrahydrofuran (THF) and polytetramethylene ether glycol (polytetrahydrofuran, PolyTHF). The first commercial quantities are expected to hit the shelves in Q1 2025.

**Recap:** THF is primarily used as a solvent or monomer to produce pharmaceuticals. PolyTHF is an essential starting material for elastic spandex and elastane fibres that are used for a wide range of textiles, and thermoplastic polyurethanes (TPUs).

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

### **# 4395 - Braskem**

The Brazilian biopolymer specialist and the petrochemical company [SCG Chemicals](#), a leader in Thailand and South-East Asia, have agreed to create a joint venture, Braskem Siam Company Limited. The new entity will produce sugar-cane derived bioethylene in Thailand and sell biobased 'I'm green™' polyethylene (PE). The future Thai facility will almost double the existing biobased 'I'm green™' PE production capacity and therefore meet growing global – and especially Asian – demand for biopolymers.

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

Braskem announced it would invest \$87 million (€80 million) to increase the production capacity of its biobased ethylene production plant in Triunfo, Brazil, by 30%. By moving from 200,000 to 260,000 tonnes per year, the Brazilian group is making significant progress towards its goal of achieving a biopolymer production capacity of 1 Mt/year by 2030 and carbon neutrality in 2050.

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

### **# 4396 - Carbios**

The specialist in the enzymatic recycling of plastics and textiles announced the inauguration of its textile preparation line at its industrial demonstration plant in Clermont-Ferrand, France, in the presence of Mr Lescure, French minister of industry. To streamline the textile preparation phase, which is currently carried out by hand or on several lines, Carbios has developed a fully integrated and automated line that transforms textile waste from used garments or cutting scraps into raw material suitable for depolymerisation with its enzymatic biorecycling process. The patented line, which can process 300 kg of textiles per hour in a continuous process, integrates all preparation stages (shredding and extraction of hard points such as buttons or fasteners). The line will help validate the biorecycling technology for textiles at demonstration plant scale (by 2024), and provides Carbios with expertise in working with collection and sorting operators to specify the quality of textiles and the preparation steps needed to make them suitable for enzymatic recycling. This expertise will also be invaluable to brands in the eco-design of their products.

**Recap:** European regulations on the separate collection of textile waste will come into force on 1 January 2025. By 2030, the European Union plans to set a minimum recycled fibre content for textiles.

More information: [Press release](#)

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

Carbios announced a successful capital increase with maintenance of preemptive rights for a gross amount of around €141 million following full exercise of the extension clause. Of this sum, 85% of the new funds will go towards construction of the first polyethylene terephthalate (PET) biorecycling plant, in Longlaville, France. The plant, which will require a total investment of around €230 million, will also be financed by Indorama Ventures to the tune of €110 million, as well as grants from the French government (€30 million) and the Grand Est region (€12.5 million). Approximately 15% of the net proceeds of the issue, topped up by the net proceeds of the full exercise of the extension clause, will be used by Carbios to fund PET-specific R&D activities and ramp up deployment of its research activities for other polymers and/or other applications for its technologies.

En savoir plus : [Zone Bourse.com](#), [Les Echos.fr](#)

### # 4397 - Cascade Biocatalysts

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The American [start-up](#), developer of Body Armor for Enzymes™, a patent-pending proprietary technology which drives more cost-effective and sustainable chemical reactions by improving enzyme performance, announced it had raised \$2.6 million (€2.4 million) in a pre-seed funding round. It was led by [Ten VC](#) with the participation of [Amplify.LA](#), [Boost VC](#), [Range Ventures](#), [Spacecadet](#) and [Cool Climate Collective](#). The start-up has so far worked on 15 enzymes and managed to improve their stability under tough industrial conditions at laboratory scale. The new funds will enable it to move to pilot scale and to support its first customers. The company's projects span diverse applications, including carbon dioxide capture, fragrance manufacturing and wastewater treatment.

More information: [Press release](#)

### # 4398 - Conagen

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The American [start-up](#) announced it had developed a debondable adhesive sourced from sustainable and natural biomolecules using its precision fermentation technology. The new adhesive promises to offer a practical, low-cost solution to optimise production processes in the clothing industry. It allows for materials to be debonded and reworked during manufacture, making it quicker and more efficient to correct errors without having to discard or waste materials. Adjustments can be made by simply debonding the adhesive and the fabric components can be seamlessly reworked, resulting in improved production efficiency, reduced material waste, and significant cost savings for manufacturers. Last, the new adhesive makes it easier to separate fabric components during recycling. The new adhesive is as strong as conventional adhesives, with the added benefit of transitioning to a flowable material after heating. It can be used for garments as well as accessories and other soft goods applications. It is compatible with natural and synthetic materials and fibres.

More information: [Conagen.com](#)

### # 4399 - Eni & LG Chem

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The Italian energy supplier and LG Chem, South Korea's leading chemicals company, have signed a collaboration agreement to look into the possibility of building and operating a new biorefinery at the LG Chem chemical complex in Daesan, South Korea. The two partners are examining the project's technical and economic feasibility. The new unit will be designed to handle around 400,000 tonnes of bio-feedstocks annually using Eni's Ecofining™ process, developed in collaboration with Honeywell UOP. It will also have the flexibility to process renewable bio-feedstocks and produce multiple products, including sustainable aviation fuel (SAF), hydrotreated vegetable oil (HVO) and bio-naphtha. The final investment decision is expected by 2024, with entry into service in 2026.

More information: [Press release](#)

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

#### # 4400 - FunCell (Functionalization for Cellulosic materials)

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The French [start-up](#) specialising in developing biobased additives for the paper and packaging industries using a natural polymer extracted from the residues of a plant-based raw material, which is modified through a green chemistry process, announced it had raised €4.8 million. FunCell received support from [Obratori](#) (L'Occitane group's seed investment fund), private equity firm [Iron Hands Capital](#), two family offices, business angels from the industrial papermaking field, and [Lita.co](#), an investment platform that gives private individuals the opportunity to invest in environmental and social projects. The new funds will enable it to push forward with its development by embarking on the scale-up of BioWet™, as well as R&D for BioGraft™. In concrete terms, FunCell plans to build an initial pilot unit at the end of the year to produce a few kilograms of BioWet™ per day and serve its first customers. FunCell plans to build an industrial pilot plant in 2024 or 2025 for bigger customers, following a fresh fundraising operation. Production would then be expected to reach approximately 100 kg/day. At the same time, the business intends to step up development of BioGraft™, a second additive that gives added functionality to the material by forming a barrier against water and grease, primarily.

**Recap:** BioWet™ is an additive produced from agri-food waste that strengthens the mechanical properties of paper when wet, namely by preventing wet paper from tearing. Biograft™ is an additive that gives added functionality to the material by forming a barrier against water and grease, in particular.

En savoir plus : [L'Usine Nouvelle.com](https://www.LUsineNouvelle.com), [PoleSocietes.com](https://www.PoleSocietes.com), [Le Journal des Entreprises.com](https://www.LeJournaldesEntreprises.com)

#### # 4401 - Ginkgo Bioworks

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The American biotech [Ginkgo Bioworks](#) and fellow firm Ensovi, which has invented a cell-free biomanufacturing platform that transforms waste CO<sub>2</sub> into organic chemicals, entered into a new partnership that will enable Ensovi to use the [Ginkgo Enzyme Services](#) platform to help optimise its cell-free transformation of CO<sub>2</sub> into Acetyl-CoA. The latter can then be converted into many other products, such as precursors to flavourings, supplements, pharmaceuticals or even fuels. Under the terms of the agreement, Ginkgo will support the discovery and development of the enzymes needed to bring Ensovi's cell-free biomanufacturing platform to market. By partnering with Ginkgo to discover and design bioengineered market-ready enzymes, Ensovi anticipates being able to extend its cell-free biomanufacturing system broadly into fine and commodity chemical manufacturing.

More information: [Press release](#)

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

Ginkgo Bioworks and the Japanese chemicals and pharmaceuticals firm [Sumitomo Chemical](#) announced that they would expand their existing biomanufacturing partnership with the launch of a new programme to develop functional chemicals with synthetic biology. Through the new project, Ginkgo Bioworks intends to use its strain design technology to develop a microbial strain and related fermentation process to produce the target molecule, while Sumitomo Chemical will develop the manufacturing process and its scale-up for commercialisation.

More information: [Press release](#)

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

#### # 4402 - Global Bioenergies

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Instead of building a 2,000 t/year unit by 2025 followed by a 30,000 t/year unit by 2028, the French company, which has developed an isobutene production process via sugar fermentation, announced that it had raised its industrial ambitions. It has decided to adjust its roadmap to focus as of now on a project to build a plant that can produce 10,000 tonnes of isobutene and its derivatives per year. The new plant, which will initially produce products for the cosmetics industry, followed by the sustainable aviation fuel industry, is expected to be built in France, on an existing Seveso-classified chemicals platform. Entry into service is scheduled for late 2027. To mark this announcement, Marc Delcourt, co-founder and CEO of Global Bioenergies, also said that *'at the same time, we are*



already starting to deploy our technology in other regions and using other feedstocks alongside international industrial groups.’

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

### # 4403 - MycoWorks

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The American [start-up](#) which produces materials from mycelium announced the opening of its first commercial-scale production plant in September. Located in North Carolina, United States, and with a surface area of 12,500 m<sup>2</sup>, this facility will enable MycoWorks to supply its luxury partners with several tonnes of Reishi™ per year. Reishi™ is a new category of premium, natural material that features the strength, durability and hand-feel of the finest animal leathers. An inauguration ceremony has been organised for October.

More information: [Press release](#)

### # 4404 - Origin Materials

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The [American company](#) specialising in carbon negative materials announced that at the end of July, it had successfully incorporated biobased furandicarboxylic acid (FDCA) into polyethylene terephthalate (PET) to produce a hybrid polymer: PET/F. In partnership with [Husky Technologies](#), the PET/F was moulded into preforms that were then blown into bottles. This step proved that the FDCA could be integrated into existing PET production systems. The success of this hybrid polymerisation clears the way for the market adoption of FDCA for the production of high-quality polymers, from biomass, in a cost-efficient way.

Origin Materials also announced that it had signed a strategic partnership with [Sustainea Bioglycols](#), a joint venture between Braskem and Sojitz Corporation, to synthesise biobased products using the Origin Materials technology platform and Sustainea's biobased glycols. Under the partnership, Sustainea signed two multi-year capacity reservation agreements with Origin Materials, for biobased purified terephthalic acid (PTA) and biobased FDCA. One is used to make PET, the other PEF, combined with monoethylene glycol (MEG).

Last, Origin Materials announced that it had joined forces with [Terphane](#), a subsidiary of American group [Tredegar](#), to produce sustainable, high-performance biopolymer films. Through this partnership, Origin Materials will supply the PEF which will be used to produce food and beverage packaging as well as in high-value industrial applications, such as biaxially oriented films.

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

### # 4405 - Pili

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[Pili](#), which has developed a hybrid process that combines industrial fermentation and green chemistry to produce biobased dyes and pigments, announced that it had created an Operations department and recruited two industrial chemistry experts:

- Alain Pinchart, former CEO of Novéal (formerly Chimex), the development and manufacturing subsidiary of L'Oréal, as Director of Operations;
- Yves Combret, former Director of Strategic Projects at Adionics and R&D Project Manager at SEQENS (formerly PCAS), as Production Manager.

The Operations department will be responsible for completing the industrialisation of Pili's processes and managing the production of its product portfolio. The project to build a large-scale manufacturing site combining industrial fermentation and organic chemistry will also be handled by this department.

Pili raised €14.5 million in the first quarter of 2023, which will enable it to accelerate the scale-up of its processes and prepare for delivery of the first tons of indigo to its customers.

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

## # 4406 - Pyran

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Having secured \$1.5 million (€1.4 million) in a series A fundraising round, the [American company](#) announced that it had 'achieved critical milestones necessary to begin operating its commercial plant to produce the first batches of biobased 1,5-pentanediol (PDO).' Pyran already has buyers ready to receive the first batches and perform initial testing on them, but has said that it can provide samples on request. This biobased PDO is mainly destined for use in polycarbonate polyols, UV-cure acrylates, and polyester polyols, making it suitable for use in paints, coatings and adhesives. Market launch is planned for 2026.

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

## # 4407 - Samsara Eco

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The [Australian start-up](#) announced it would build a new R&D lab to develop enzymes capable of breaking down plastic waste to be recycled into new materials. The new plant will be located at Poplars Innovation Precinct in Queanbeyan, Australia. It will enable Samsara Eco to scale its patented enzymatic capabilities and achieve its goal of recycling 1.5 million tonnes of plastic per annum by 2030. Currently, Samsara Eco's enzymatic library can break down coloured, multi-layered and mixed plastics and textiles such as polyester and nylon 6,6. The Australian company will continue to partner with the [Australian National University](#) (ANU) as it commercialises its existing enzymatic library and develops new enzymes capable of breaking down different plastics. The new R&D unit is expected to be operational by late 2024.

More information: [Samsara Eco.com](#), [Au Manufacturing.com.au](#)

## # 4408 - SATT Sayens & Catsalyze

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The tech transfer acceleration company (SATT) [Sayens](#) announced that it had acquired a stake in [Catsalyze](#) following the transfer of a biocatalysis technology. The product of joint research by the structural and molecular enzymology teams of the [Ingénierie Moléculaire et Physiopathologie Articulaire \(IMoPA\)](#) unit and the [Ingénierie - Biologie – Santé en Lorraine \(IBSLor\)](#) platform, the technology used by Catsalyze focuses on a process to improve enzyme efficiency and consists in a protein ring on which enzymes are grafted. This improves their efficiency without changing their genetic characteristics. The enzymes act as catalysts to accelerate the synthesis, modification or breakdown of molecules. Patented in 2020, the invention underwent proof of concept by the SATT Sayens with the support of the Grand Est region. The proof-of-concept programme primarily made it possible to confirm the efficiency of the process in the recycling of biodegradable plastics. The technology increases both the capacities and the spectrum of recycled plastics in a 'greener' way, thus increasing the quality of the recycled products and shifting the focus towards infinite recycling. The acquisition price was not disclosed.

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

## # 4409 - Solvay

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The Belgian [chemicals company](#) announced the inauguration of a new research building in its R&I centre at its technology park in Shanghai, China. The new building, named Magnolia, will enable Solvay to accelerate targeted innovation for the development of sustainable solutions, to better meet the ever-changing needs of local clients. To achieve its goal, the Belgian group has equipped its new building with several 'cutting-edge' laboratories, including a pilot hall dedicated to advanced materials applications, purpose-built spaces customised for both industrial applications and consumer goods research, and automation and robotics labs. According to Howard Hao, Solvay's R&I manager in China, 'By enhancing infrastructure and shoring up our R&I centre in China, we will also be able to enhance open innovation partnerships with leading Chinese universities, international research institutions and other stakeholders, to incubate breakthrough technologies.'

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

## # 4410 - TotalEnergies

Following Corbion's withdrawal from their shared project to build a bioplastics manufacturing unit at the Grandpuits zero-crude platform in Seine-et-Marne, France, TotalEnergies announced that it would build a new mechanical recycling unit for plastic waste on the site. The new unit will produce 30,000 tonnes of high-value compounds containing up to 50% recycled plastics. In addition to the recycling unit, a centre will be opened to provide technical assistance to customers and work on new product development, in order to provide sufficient support for the commercialisation of the new range of hybrid compounds for the high-performance packaging market, in particular for pharmaceuticals and cosmetics. The new unit is expected to open in 2026. The amount invested was not announced.

More information: [Press release](#)

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

## # 4411 - Launch of a second call for volunteers to take part in PlastiZen, a citizen science project on the degradation of plastics in soils

Started back in 2021 by two scientists at the [Laboratoire écologie fonctionnelle et environnement](#) (LEFE/OMP), which is supervised by three scientific bodies (CNRS/INPT/UT3), [PlastiZen](#)'s aim is to analyse the degradation of certain plastics in different environments with help from hundreds of volunteer 'research assistants' who are in fact members of the French general public. In May 2021, the two scientists sent 330 kits to the volunteers, containing a sample of a 'biodegradable' plastic bag (like a supermarket vegetable bag), a 'traditional' plastic bag to act as the control, and two teabags. The volunteers were asked to bury these samples a few centimetres under the soil for three months, and to visually inspect them once a month. According to Arthur Compin, a researcher at the LEFE/OMP, this initial experiment showed that *'about one-third of the plastics broke down completely, meaning they were no longer visible to the naked eye. One-third partially degraded, and one-third didn't degrade at all. I'm referring to the biodegradable plastic, there. Nothing at all happened to the traditional plastic: it wasn't attacked at all, and we weighed it before and after, and it didn't lose any weight.'* The two researchers have decided to recruit a new cohort of at least 300 volunteers to try and explain the difference in degradation, especially the influence of temperature and biometrics and so on. This cohort will include schoolchildren, so they can learn about the use of these new plastics from a young age. By contributing data on the reality of the degradation of plastics in the environment, the PlastiZen project could also help change standards and other regulations to better protect the general public from potentially harmful pollution, while caring for the environment.

En savoir plus : [Cnrs.fr](#), [France3 régions.francetvinfo.fr](#), [20 Minutes.fr](#), [La Dépêche.fr](#)

## Energy

### # 4412 - Engie & Ixora Energy

The industrial French energy group announced that it had acquired [Ixora Energy](#), one of the main biogas producers in Great Britain, for £64.8 million (€74.6 million). The acquisition was made from investment manager [Downing LLP](#) and marks the addition of three sites with an annual overall biomethane production capacity of 160 GWh. The purchase has also enabled it to consolidate its project portfolio in this key market. As France's biomethane leader, with an installed annual production capacity of 670 GWh as of 30 June 2023, the French group is continuing its expansion in Europe and accelerating its development in the United Kingdom, a fast-growing market. The purchase of Ixora Energy is just the start of Engie's expansion strategy in Europe: the group has said it will invest €3 billion by 2030 to achieve its goals. According to Camille Bonenfant, CEO of Engie Gaz renouvelables Europe, the new Engie subsidiary for European biogas, *'We have set ourselves an extremely ambitious annual production target of 10 TWh in Europe in 2030. To reach it, we are going to target a certain number of countries [...] which are at different biomethane development levels.'* Next, the group will target the Netherlands, Germany, Poland, Belgium, Spain and Italy.

More information: [Press release](#)

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

### # 4413 - LanzaJet and Technip Energies

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The specialist in harnessing biotechnology to recycle carbon and the French expert in engineering and project management signed an agreement to strengthen their exclusive collaboration to support the global deployment of the LanzaJet® Alcohol-to-Jet (ATJ) technology. LanzaJet will continue to integrate the Technip Energies' Hummingbird® Technology for converting ethanol to ethylene into the overall LanzaJet ATJ Process to produce sustainable aviation fuel (SAF).

More information: [Press release](#)

## Health & Cosmetics

### # 4414 - Amyris

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The American biotech firm [Amyris](#) and some of its American subsidiaries have begun voluntary restructuring proceedings in the US bankruptcy court for the District of Delaware to facilitate the commercial and financial restructuring of Amyris. Amyris intends to streamline its business portfolio to focus on its core competencies: the development, scale-up and commercialisation of sustainable ingredients derived through biofermentation. Amyris is therefore planning to exit its consumer brands and will start selling them off. Amyris' consumer brands portfolio includes Biossance, Costa Brazil, JVN, Olika, Onda Beauty, Menolabs, Pipette, Purecane, Rose Inc., Stripes, Terasana and 4U by Tia. It has secured a commitment from an entity affiliated with Foris Ventures for \$190 million (€178 million) of debtor-in-possession financing to support continued day-to-day operations as Amyris works with its key stakeholders to negotiate a consensual go-forward plan.

**Info:** In a document filed with the Delaware bankruptcy court, the company declares assets estimated at between \$500 million (€469 million) and \$1 billion (€939 million) and liabilities at between \$1 billion (€939 million) and \$10 billion (€9.39 billion).

More information: [Press release](#)

En savoir plus : [Premium Beauty News.com](#), [Zonebourse.com](#)

### # 4415 - Conagen

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The American biotech firm [Conagen](#) has developed a class of retinol-derived ingredients that can be used in cosmetic formulations or personal care products. The retinol is produced with a 100% renewable carbon source through a precision fermentation process. The retinoid derivatives are created by covalently binding retinoids with another cosmetic active ingredient into a single molecule. Through the fusion of retinol and a second complementary ingredient, the technology offers consumers functionalities that extend beyond wrinkle reduction and anti-ageing benefits. Conagen's ingredients can help with the formulation of low-irritation retinol products. They are compatible with other compounds, such as squalene, bakuchiol, and pomegranate extract, maximising delivery and effectiveness while minimising potential off-target effects. The new retinoid ingredients are expected to hit the shelves in 2024.

More information: [Press release](#)

### # 4416 - GTP Bioways

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[GTP Bioways](#), a contract development manufacturing organisation (CDMO), announced that it had opened a brand-new microbial production unit that extends over 350 m<sup>2</sup> and is equipped with a 350 l bioreactor. Its Toulouse site now has three biomanufacturing lines in operation, two of which are used to manufacture biotherapies in mammalian cells. With the launch of this new line, the CDMO claims it is now able to support the pre-clinical and clinical development of any type of therapeutic protein. The company announced that 'several agreements have already been signed for the manufacturing of proteins for therapeutic and vaccine applications,' although it did not



give details of the customers or candidate drugs in question. Among these, GTP Bioways has signed an agreement with a French biotech firm that wants to manufacture recombinant proteins. The first batches will be produced this autumn.

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

#### # 4417 - Willow Biosciences

[Willow Biosciences](#), developer of a precision fermentation technology to produce functional ingredients for the health, well-being and personal care industries, as well as the food and beverage industries, announced that it had successfully completed the R&D phase of its programme to produce ursodeoxycholic acid (UDCA), an active pharmaceutical ingredient (API) used in nutraceutical and pharmaceutical products. Through its partnership with the pharmaceutical company [Sandhill One](#), Willow Biosciences has now optimised a proprietary enzyme vital to the development of UDCA while solving for selective C-H hydroxylation at industrial scale. This breakthrough was made possible by Willow's BioOxi™ technology. UDCA has applications as a medication for the management and treatment of cholestatic liver disease and gallstone conditions, and as an intermediate for the production of tauroursodeoxycholic acid (TUDCA), a key API in a combination therapy recently approved in Canada and the United States for treatment of amyotrophic lateral sclerosis (ALS). With R&D now complete, Willow anticipates receiving milestone payments and revenue upon commercialisation by Sandhill.

More information: [Press release](#)

Willow Biosciences announced that it had entered into a partnership with a biopharmaceutical company in order to develop new sustainable manufacturing methods for key intermediates and active pharmaceutical ingredients (APIs). Willow's partner – whose name hasn't been disclosed due to the competitive nature of the targeted ingredient applications – recognised the need to employ more sustainable methods to manufacture intermediates and APIs at reduced cost and with less waste. The initial programme will focus on the feasibility of developing a biobased pathway and, if successful, advance development toward implementation at commercial scale. The R&D phase of this collaboration is expected to last around two months.

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

## Others

#### # 4418 - 3BCAR publishes its 2022 annual report

*In the words of Nathalie Turc, director of Carnot 3BCAR, '2022 was another successful year, and saw the consolidation of the activities which picked up again in 2021. In addition to our fantastic quantitative indicators, our researchers are regularly lauded for their quality, which is illustrative of their success in their research and teaching activities, and in their collaborative research with socioeconomic partners. While large-scale projects are conducted by our units, we also support smaller projects, helping them eliminate risk step by step: we have 337 contracts under way in contractual research with the socioeconomic environment alone. Last, 2022 also gave us the opportunity to prepare for the future with a special internal seminar for new 3BCAR researchers. New links between all our units, whether research laboratories or technological resource centres, grew out of these meetings, which were led by new arrivals who didn't yet know each other.'*

En savoir plus : [3BCAR.fr](http://3BCAR.fr), [Rapport d'activité](#)

## 3. PUBLIC POLICIES & REGULATIONS

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### In France

#### # 4419 - Kick-off for the third Deeptech Tour

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The Deeptech Tour, organised by Bpifrance, will visit each campus of the 29 university innovation clusters to celebrate the regional collective dynamic driving innovation and entrepreneurship with everyone involved in deeptech. Each stopover will bring together the world of academia, local innovation and economy stakeholders, and future project developers (students, PhD students, researchers, and more). The format will be dynamic and interactive, featuring pitches, case studies, spotlights on the support regional players provide, networking sessions, and a film detailing the particulars of French deeptech.

**Recap:** Over 20,000 people attended the first two editions of the Deeptech Tour between 2019 and 2022 over the 35 tour dates.

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

#### # 4420 - Deeptech Plan: launch of the first deeptech interactive dashboard

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Launched by Bpifrance in association with [Dealroom](#), a global platform that compiles data on start-ups and investment strategies, the Deeptech [dashboard](#) is designed to provide a database and an overview of the deeptech panorama in France. It is intended as an informational tool to help the deeptech ecosystem by offering greater transparency. National and international stakeholders will find it easier to interpret the information presenting deeptech start-ups, their activities and growth dynamics. The platform has become a point of reference for data thanks to the filters available. Users can also map the investors in the top deeptech deals and track trends in the capital investment market, a rapidly growing sector for deeptech start-ups.

Last, it paves the way for collaborations between start-ups and between regions and helps simplify sourcing for investors and SMEs/corporate groups.

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

#### # 4421 - France 2030: INPI signs partnership agreement with SGPI

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The agreement between the French Patent Office (INPI) and the General Secretariat for Investment (SGPI) has two aims. First, to strengthen awareness of industrial property by notifying potential beneficiaries of the France 2030 investment plan, and second, to contribute to assessing the plan through indicators tied to the use of industrial property. In short, the partnership focuses on two aspects:

- Supporting coordinators and beneficiaries of the France 2030 investment plan. The aim is to encourage these players to include industrial property in their strategic road maps and operational priorities. The successful tenderers of the French Tech 2030 programme will benefit from dedicated comprehensive support.
- Assessing the impact of industrial property on the France 2030 plan, namely incorporating the use of industrial property as a tool to detect and guide France 2030 strategies and measuring the number of industrial property titles (particularly patents) filed by beneficiaries (companies, research laboratories, and more) owing to the support from the plan.

In parallel, INPI will propose new industrial property actions to maximise the impact of France 2030 and consolidate France's standing.

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

## **# 4422 - France 2030: Green industry bill adopted by National Assembly at first reading**

Having been adopted by the Senate by a clear majority, the green industry bill went to the National Assembly for examination at an open session on Monday, 17 July 2023. Five days later, the National Assembly adopted the bill at first reading. Many amendments from all sides were adopted during the Senate and National Assembly debates, including:

- An amendment to Article 9 to ensure local representatives are more involved in addressing industrial concerns. This amendment requires the prior approval of the municipality and, if applicable, the public establishment for cooperation between local authorities (EPCI) concerned with the industrial project of major national interest before any commitment to harmonising the urban planning document. As this approval is obtained upstream, local authorities are involved in the entire process. Once complete, the relevant State authority discloses the results, and the local authorities will formulate an opinion accordingly.
- An amendment that awards green industrial operations (ones that reduce greenhouse gas emissions), particularly those following business relocations, with energy savings certificates as per conditions defined by decree.

A joint committee meeting will be held in October 2023 to discuss the bill. Ministers are confident that senators and deputies will reach an agreement and that the text will be enacted before the end of October to respond to France's industrial and ecological challenges.

**Recap:** The green industry bill includes 15 measures designed to decarbonise today's industry (18% of the current CO<sub>2</sub> emissions in France) and accelerate the production of new green technologies that will help decarbonise French industry and the economy as a whole.

En savoir plus : [Communiqué de presse](#), [20 Minutes.fr](#), [Les Echos.fr](#), [Le Monde.fr](#)

## **# 4423 - France 2030: Launch of the second year of the *Accélérateur Agroécologie* programme**

Bpifrance and the French Ministry of Agriculture and Food have launched the *Accélérateur Agroécologie* agroecology accelerator programme with the backing of [Axema](#), [IBMA](#) and [Proteines France](#). This 12-month support programme accompanies 14 companies with solutions to accelerate the agroecology transition by helping them revisit their business and put them on a sustainable path to growth, in light of the challenges posed by the green and energy transitions. For one year, these companies will benefit from an intensive, tailored programme, both as a group and individually, to accelerate their transition. The programme focuses on three areas:

- Consultancy: a 360° diagnosis to test the company and its business model and identify the key areas of growth, followed by ten days of guidance to determine and leverage areas of growth.
- Training: the Kedge Business School programme will get companies to build on their skills and further discussions on their strategic thinking.
- Networking: joining a business collective that includes the 18 companies that graduated from the first year of the accelerator programme, with business meet-ups and dedicated agroecology days.

**Info:** This future value chain brings together companies specialising in agro equipment, precision agriculture, bio-solutions and plant protein production.

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

## **# 4424 - France 2030: List of successful university innovation clusters and funding**

After a constructive experimentation phase at the end of 2021 focused on five sites, and a call for proposals opened on 7 December 2022, the selection committee comprising six qualified experts selected 24 [successful tenderers](#) and chose five more projects to embark on a preliminary structuring process. In light of the funds received during the pilot phase and the likelihood of funding requests, the selection committee used a ranking system to determine the maximum funds allotted to each university innovation cluster (PUI). The funding for the start-up projects selected will be conditional upon a mid-term assessment of their ability to become a PUI. This assessment will take place at the end of 2024. Each PUI will receive an assessment of its project, with remarks about the different aspects of its

action plan. The assessment will help the PUI adjust its road map according to the maximum allocated funds. Bpifrance and the French National Research Agency (ANR), which are government entities, will also be on hand to assist those involved in PUIs throughout the process of preparing and delivering the programme to encourage information exchanges and share best practices. Following the success of this programme, the selection committee agreed to continue to work for the French government and contribute to following up on PUI setup and deployment. With the same jury continuing to follow the PUIs, the support needed to ramp up projects over several years remains consistent.

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

### **# 4425 - Deeptech Plan: launch of BFT Lab**

This new structure, the Bourse French Tech Lab (BFT Lab), was rolled out by Bpifrance to unleash the market potential of deeptech projects from newly certified university innovation clusters (PUI). It adds to the range of funding currently available for deeptech by supporting projects before the creation of a start-up, and it is a powerful driving force for these PUIs. Its aim is not to fund companies but to encourage the development of a deeptech project with business in mind. These kinds of projects have already received proof-of-concept (POC) or pre-POC funding for the technology phase from a founding member of the university innovation cluster (SATT\*, OTT\*\*, incubator, lab, teaching hospital or other). The plan aims to lift the socioeconomic constraints from projects as early as the pre-POC phase to shore up the economic potential of these projects and give impetus to technology transfer and the creation of start-ups. It is also in line with the French government's desire to improve the quantity and quality of deeptech start-up projects to ensure they endure. In practice, the BFT Lab will be set up in one of Bpifrance's 50 regional sites, for which the funding will be paid out to the entity accompanying the project. This entity must be a founding member of a university innovation cluster. The grant will add to the existing support from long-standing stakeholders in technological enhancement as it will rely on external experts and entities for various topics such as finding joint founders, marketing, legal and regulatory services, market research, and more. To date, around 100 eligible projects have been identified in France – illustrating the keen interest in BFT Lab and the opportunities it offers deeptech project developers.

\*SATT = Tech transfer acceleration companies (Sociétés d'Accélération du Transfert de Technologie),

\*\*OTT = technology transfer entities (organismes de transfert de technologies)

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

### **# 4426 - Grand Est region: Signature of the industrial biotechnologies and plant chemistry industry agreement**

This agreement for 2024–2028 should enable the Grand Est region to create an '*effective living economy to secure the future of its local areas and contribute to building on the production, transformation and upcycling of regional biomass resources.*' The goals set out following the consultation and co-construction with 52 stakeholders in the regional bioeconomy complement the five regional priorities for the bioeconomy strategy, which aim to double the production of biobased ingredients from industrial biotechnologies or plant chemistry by 2030 and halve the environmental footprint. The goals are as follows:

- Set up and develop a sustainable value chain that takes environmental, social, economic and farming concerns into account.
- Contribute to creating technical, scientific, financial and support tools to promote the advent of new biobased molecule production projects for the chemical, cosmetics and pharmaceutical industries.
- Assess the ability of biobased products to enter new markets.
- Structure the industry and assist with its development using the skills of each stakeholder in the spirit of cooperation across the entire value chain.
- Consolidate skills across the Grand Est region through suitable training methods.
- Ensure that the use of agricultural resources is balanced and consistent with the premise of a circular economy with different sustainable supply chains.
- Promote and strengthen regional value chains to secure procurements and ensure greater autonomy.



- Raise awareness of the quality of regional value chains and their economic, ecological and societal value on a national, European and international level.

With this agreement, the Grand Est region has its sights firmly set on becoming the leading European region in industrial technologies and plant chemistry.

En savoir plus : [Grand Est.fr](https://www.grand-est.fr)

## In Europe

### **# 4373 - Decarbonising air transport: RefuelEU plan approved by the European Parliament**

Under the text approved by MEPs, from 2025 the EU's airports and fuel suppliers must ensure that at least 2% of aviation fuel is sustainable. This share will increase every five years: 6% in 2030, 20% in 2035, 34% in 2040, 42% in 2045 and 70% in 2050. In addition, a specific proportion of the fuel mix (1.2% in 2030, 2% in 2032, 5% in 2035 and progressively reaching 35% in 2050) must comprise synthetic fuels like e-kerosene. Under the new rules, the term 'sustainable aviation fuels' will include synthetic fuels, certain biofuels produced from agricultural or forestry residues, algae, bio-waste, used cooking oil or certain animal fats. Recycled jet fuels produced from waste gases and waste plastic will also be considered 'green'. MEPs decided that feed and food crop-based fuels and fuels derived from palm and soy materials would not be classified as green as they do not meet the sustainability criteria. They also managed to include renewable hydrogen as part of a sustainable fuel mix, a promising technology that could progressively contribute to the decarbonisation of air transport. To promote decarbonisation in the aviation sector and to better inform the public, MEPs ensured that, as of 2025, there will be an EU label for the environmental performance of flights. The eco label will indicate the carbon footprint per passenger and the expected CO<sub>2</sub> efficiency per kilometre. It will allow passengers to compare the environmental performance of flights operated by different airlines on the same route. Once Council has approved them, the new rules will apply as of 1 January 2024 and some provisions as of 1 January 2025.

More information: [Europarl.europa.eu](https://www.europarl.europa.eu)

En savoir plus : [Europarl.europa.eu](https://www.europarl.europa.eu), [La Tribune.fr](https://www.la-tribune.fr), [Les Echos.fr](https://www.les-echos.fr)

### **# 4374 - Bioethanol: retroactive surveillance of EU imports confirmed**

The European Commission decided to take this measure because bioethanol imports into the EU went up by 45% between 2021 and 2022, with the trend continuing over the first five months of 2023 (up 43.5% on the same period in 2022). In light of the situation, the Commission believes this increase in imports '*could soon threaten to cause injury to Union producers.*' To support its decision, the Commission pointed out that imports from the United States and Brazil, the two leading exporters, climbed by 96% and 37% respectively between 2021 and 2022. It explained that '*the increase in imports coincides with a 10% drop in the industry's market share. The ratio of imports to production in the Union jumped from 21% in 2021 to 39% in 2022.*' Retroactive surveillance will enable the Commission to '*rapidly access data on business transactions to find a solution to the vulnerability of the Union's market for sustainable ethanol for fuels, and identify sudden changes in global markets.*'

En savoir plus : [La France Agricole.fr](https://www.lafranceagricole.fr)

### OCTOBER 2023

#### **9<sup>th</sup> NutrEvent**

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17-18 October 2023. Rennes, France.

More information: [Website](#)

#### **Les rendez-vous Carnot**

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18-19 October. Lyon, France.

More information: [Website](#)

#### **11<sup>th</sup> Conference on Recombinant Protein Production**

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17-19 October 2023. Girona, Spain.

More information: [Website](#)

#### **Cosmetic 360**

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18-19 October 2023. Paris, France.

More information: [Website](#)

#### **12<sup>th</sup> symposium of the Association Française des Biotechnologies Végétales (AFBV)**

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19 October 2023. Paris, France.

More information: [Website](#)

#### **Annual Biocontrol Industry Meeting**

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23-25 October 2023. Basel, Switzerland.

More information: [Website](#)

#### **European Forum for Industrial Biotechnology and the Bioeconomy (EFIB)**

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24-25 October 2023. Rotterdam, Netherlands.

More information: [Website](#)

#### **ENZYN0V2. Unleashing the power of Enzymes and Biocatalysis for industrial applications**

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

More information: [Website](#)

## NOVEMBER 2024

### **13<sup>th</sup> World Congress on Green Chemistry and Technology**

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23-24 November 2023. Amsterdam (Netherlands).

More information: [Website](#)

### **Biostimulants World Congress**

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28 November - 1 December 2023. Milan, Italy.

More information: [Website](#)

## DECEMBER 2024

### **Applied Biocatalysis Summit**

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5-7 December 2023. Philadelphia, United States.

More information: [Website](#)

## JANUARY 2024

### **Bio360**

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24-25 January 2024. Nantes, France.

More information: [Website](#)

## FEBRUARY 2024

### **8<sup>th</sup> European Chemistry Partnering (ECP 2024)**

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06 February 2024. Frankfurt (Germany).

More information: [Website](#)

### **ICIBB 2024: International Conference on Industrial Biotechnology and Biocatalysis**

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19-20 February 2024. Paris, France.

More information: [Website](#)

### **CLIB International Conference (CIC2024)**

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21-22 February 2024. Düsseldorf, Germany.

More information: [Website](#)

## **MARCH 2024**

### **IBioIC's Annual Conference**

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13-14 March 2024. Glasgow, United Kingdom.

More information: [Website](#)

### **Bioket**

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19-21 March 2024. Reims, France.

More information: [Website](#)

### **Hello Tomorrow Global Summit**

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21-22 March 2024. Paris, France.

More information: [Website](#)

### **ICIBB 2024: International Conference on Industrial Biotechnology and Biocatalysis**

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25-26 March 2024. Sydney, Australia.

More information: [Website](#)

## **APRIL 2024**

### **In-Cosmetics Global**

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16-18 April. Paris, France.

More information: [Website](#)

## **MAY 2024**

### **Global Bioprocessing Summit & Exhibition**

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15-17 May 2024. Berlin, Germany.

More information: [Website](#)

## JUNE 2024

### **European Congress on Biotechnology**

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30 June-3 July 2024. Rotterdam, Netherlands.

More information: [Website](#)

## AUGUST 2024

### **International Summit on Metabolomics and Systems Biology (ISMSB2024)**

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26-28 August 2024. Valencia, Spain.

More information: [Website](#)

## DECEMBER 2024

### **International Conference on Genome Engineering and Synthetic Biology**

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

More information: [Website](#)