

BIOBASED PRODUCTS

Each month we review the latest news and select key announcements and commentary from across the biobased chemicals and materials sector.

April 2022



Your Partners for Business Insight and Market Intelligence

Providing clients with a strategic view of feedstock, technology, policy and marketing opportunity across the bioeconomy.

**DOUBLE
EDITION**

Contents

Contents	2
Foreword	3
Policy	4
Markets	4
Research & Development.....	11
Polymers.....	19
Chemicals	25
Consumer Products.....	28
Patents.....	32
Events.....	34
Price Information	36

Foreword

Welcome readers, to this month's Biobased Products News Review.

According to IMARC Group, the global solvents market size was approximately £34 billion in 2021 and is expected to grow at a CAGR of 4.5% from 2022 to 2027. Despite the impact of COVID-19 on the paints and coatings industry, solvent demand is expected to regularise in coming years to meet pre-pandemic forecasts. Significant growth opportunities for biobased solvents are presented when aiming to meet this boost in demand, to overcome the toxicity, emissions, and strict governmental regulation related issues with chemical-based solvents.

Recent research published in the Green Chemistry journal shows Cyrene to be a promising solvent for lignin fractionation, processing, and chemistry. Cyrene is a multi-purpose biobased solvent, often derived from lignocellulosic biomass like sawdust. This overcomes the issue of utilising DMF and DMAc solvents in the electronics sector (as a wire coating), in the chemicals sector (in polyurethane production, carbon fibre production, and chemical synthesis) and in the pharmaceuticals sector, whose fossil-based origins present toxicity issues. The French government have awarded Circa Group AS, the commercial scale renewable chemicals producer, with a £7 million grant for industrial production of green and sustainable solvents from forestry waste. As a result, towards the end of 2023, Circa's French plant in will be the first large scale manufacturer of Cyrene.

NXTLEVEL, the biobased chemicals producer, in particular biomass derived levulinic acid and its derivatives for solvents, has recently signed two major distribution agreements for their 'NXT SOLV' solvents. One is in partnership with global chemicals company Brenntag, to bolster its household and industrial portfolio in North America, for applications like surface cleaners and laundry detergents. The other is with Summit Cosmetics Corporation, experts in cosmetic ingredients, for applications like moisturising formulations. NXT SOLV solvents are said to dissolve various active ingredients and have high water loading ability.

Before they can provide an alternative option for environmentally conscious customers, biobased solvents must undergo strict testing to be deemed safe for human applications. Methyloxolane or 2-methyltetrahydrofuran, a biobased solvent derived from agricultural by-products like sugarcane bagasse, is utilised in the extraction of vegetable oils and plant proteins. Recently, the European Food Safety Authority has declared methyloxolane safe for use in the food industry, making it the only other food industry approved solvent alongside ethanol to not be partially or wholly derived from petroleum. Global beauty giant Coty has begun production, in Spain, of fragrances that utilise carbon-captured ethanol as a solvent, supplied by sustainable chemicals company LanzaTech. Their process captures, and ferments carbon emitted from industrial processes into ethanol.

Read on for the latest news.

Policy

Chemistry industry calls for consistency and policy coordination to unleash bioeconomy potential

The bioeconomy has a lot of untapped potential to contribute to the ambitions of the EU Green Deal. The European Commission's assessment of the 2018 bioeconomy strategy provides an opportunity to unleash this potential.

For the EU to become a frontrunner in this sector and further capitalise on successes achieved by the strategy so far, the chemical industry calls for more certainty, visibility, consistency, and better policy coordination. This is the main message of Cefic's recently launched position paper "Reviewing the European Bioeconomy Strategy – Enablers, lessons and 10 recommendations".

For the bioeconomy to fully deploy its benefits for society, existing challenges related to the business case, have to be overcome. Cefic calls on policymakers to consider in the current review of the Strategy and in future decision-making the enabling role of bio-based and bio-derived chemicals for the successful implementation of several EU policy initiatives, such as the Safe and Sustainable-by-Design (SSbD) approach as part of the Chemicals Strategy for Sustainability (CSS).

Europe needs enabling regulations to valorise residues and wastes from bio-based products production, so it is necessary to adapt and clarify the end-of-waste legislation and definitions accordingly.

Click [here](#) for more information.

Guidance - Packaging in and out of scope of UK Plastic Packaging Tax



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This article provides governmental guidance on which plastic items, by definition and classification, are included or excluded from certain subsections of the Plastic Packaging Tax. The following packaging is covered:

Plastic packaging designed for use in the supply chain; plastic packaging designed as single use consumer packaging; plastic packaging where the primary function is for storage; plastic packaging that is an integral part of the goods; plastic packaging to be reused primarily for presentation; plastic packaging permanently set aside for a non-packaging use; and transport packaging.

Click [here](#) for more information.

Markets

Brenntag forms distribution agreement with biobased solvents experts NXTLEVEL Biochem

Brenntag, the global market leader in chemical and ingredients distribution, has formed a distribution agreement with NXTLEVEL Biochem to expand its growing Household, Industrial, & Institution portfolio in providing

sustainable biobased solvents in North America.

This current agreement covers a new product line including the below product names and consists of levulinates and levulinate ketals. These products are all biobased solvents offering high performance and improved safety and sustainability: NXT SOLV 100, NXT SOLV 200, NXT SOLV 300, NXT SOLV 400.

These biobased products can reduce dependence on fossil fuels and play a role in reducing carbon emissions. They are used in applications such as hard surface cleaners, floor cleaners, and laundry detergents.

Click [here](#) for more information.

Summit Cosmetics Corporation signs global distribution agreement with NXTLEVVEL Biochem



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Summit Cosmetics Corporation, a global cosmetic ingredient developer and distributor, announced that it has executed a Global Distribution Agreement with NXTLEVVEL, a commercial scale manufacturer of next generation biomass derived chemicals, for the distribution of its NXT SOLV product line to the Beauty and Personal Care industry.

The agreement is for a five-year term and grants sales rights to SCC and its sister cosmetic companies, all of which are Sumitomo Corporation Group Companies. The products included in the agreement are as follows: NXT SOLV 120, NXT SOLV 220, NXT SOLV 320, NXT SOLV 420

NXTLEVVEL has developed world-leading technology in bio-solvents based on levulinic acid. As an alternative to traditional solvents, NXTLEVVEL's products offer outstanding benefits for personal care formulations, whilst addressing the needs of environmentally conscious consumers and adding value for brand owners.

Benefits of NXTLEVVEL bio-solvents include: ability to dissolve a wide range of active ingredients; allow increased concentration of actives; enables high water loading for moisturising formulations by incorporating water into anhydrous systems; expands solubility of ethanol, while retaining clarity; enhances natural formulations by reducing greasiness, providing a dry, silky after-feel.

Click [here](#) for more information.

DMC close Series B financing, total raised £30 million

DMC Biotechnologies has announced that strategic investors Continental Grain Company, through their venture arm Conti Ventures, and Toyobo have joined the Series B fundraising round, bringing the total raised to \$39 million (~£30 million).

DMC previously announced the first close of its Series B fundraising on 2 December 2021 with investment from Cibus Enterprise, Capricorn Partners, Sofinnova Partners, Breakthrough Energy Ventures, SCG, Boulder Ventures, Solvay Ventures and Michelin.

DMC is commercial with its first product, a bio-based chemical intermediate with primary applications in sustainable detergents and human nutrition. DMC has a deep pipeline of predictable, scalable, and cost-competitive products that provide sustainable and economically attractive solutions for many industries, including animal nutrition, human nutrition, personal and home care, and biobased chemical intermediates.

DMC's technology platform addresses the key barriers that have plagued the biotech industry for decades including standardisation, robustness, and predictability across scale. Addressing these challenges translates to a dramatic reduction in the time to market and the investment needed to bring products to commercialisation.

Click [here](#) for more information.

Biosynthetic® Technologies raises £5.7M led by HG Ventures

Biosynthetic® Technologies, LLC has announced that it has raised \$7.5 million (~£5.7 million) in a series A-1 funding led by HG Ventures, the corporate venture arm of The Heritage Group, headquartered in Indianapolis, Ind.

Biosynthetic Technologies is developing and marketing a new class of high-performance bio-based oil, or Estolides, that is biodegradable, non-bioaccumulative, and non-toxic. The patented Estolides can be used as a sustainable alternative to petroleum in lubricants, metalworking fluids, personal care items, and many other applications. These products also provide improved environmental, social, and governance (ESG) calculations sought after by corporations on a global scale.

Funding from this series will be used to scale operations, sales and manufacturing, support work on global regulatory compliance, and enable a deeper lifecycle assessment. The money also helped fund Biosynthetic Technologies' acquisition of Innoleo®, a distributor of quality Oleo derivatives.

HG Ventures supports the industry's innovation and growth by investing and partnering with innovative, high-growth companies who are focused on bringing impactful R&D to market.

Click [here](#) for more information.

Pyran partners with NAGASE Specialty Materials for renewable 1,5-pentanediol diacrylate (PDDA)



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Pyran and NAGASE Specialty Materials (NSM) announced they have partnered for the exclusive conversion of Pyran's bio-based 1,5-pentanediol (PDO) to renewable 1,5-pentanediol diacrylate (PDDA) and other acrylate and methacrylate derivatives. NSM, a manufacturer of chemical technologies and distributor of specialty chemicals, will produce PDDA and other derivatives in the USA and will market them in North America and Europe.

Through this agreement, NAGASE will be the first to derivatise Pyran's sustainable PDO for use in UV-cured formulations from coatings to 3D printing. Pyran is a fast-growing company that produces innovative 5-carbon products from renewable resources.

Pyran uses renewable feedstocks from crop resources, such as corn cobs, to make 1,5-pentanediol (PDO). This essential material enhances the performance of everyday products, such as paints, coatings, adhesives and more. The company's renewable 5-carbon products replace expensive, petroleum-based chemicals, which are limited in supply.

In addition to its recent partnership with NAGASE, Pyran is actively moving to the next level of commercialisation by scaling production near Houston, Texas, and producing tonnes of product to meet qualification requirements and increased customer demand.

Click [here](#) for more information.

Danimer Scientific and Hyundai Oilbank drive global growth of sustainable alternatives to plastics

Danimer Scientific, Inc., a leading next generation bioplastics company focused on the development and production of biodegradable materials, has announced it has signed a memorandum of understanding with Hyundai Oilbank, the oil refinery unit of Hyundai Heavy Industries Holdings, to jointly develop global new market opportunities and applications for polyhydroxyalkanoate ("PHA"), a sustainable biopolymer that serves as a biodegradable alternative to traditional plastic.

The near-term focus of this collaboration is on providing Nodax®, Danimer's signature PHA, and other PHA-based compounds produced by Danimer to commercial customers in South Korea and other Asian markets for sustainable single-use packaging and other applications. Over time, the companies aim to drive global growth opportunities for PHA manufacturing.

Click [here](#) for more information.

EU-initiated impact fund oversubscribed with £252 million



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Originally set for €250 million (£210 million), the EU-backed fund raised around €300 million (£252 million) to finance growth companies in the bioeconomy and biobased circular economy. The new renowned investors include: Landwirtschaftliche Rentenbank, Allianz France, Invest NL, GCV, Firmenich and others.

The money flows exclusively into growth companies in the bioeconomy and the biobased circular economy that commits with Environmental, Social, and Governance (ESG) integration.

According to the experts of the impact fund European Circular Bioeconomy Fund (ECBF), after digitalisation, the next global wave of transformation is rolling in - the Bio

Revolution. This means a change from a linear, fossil-based economy to a sustainable, bio-based economy within which the European bioeconomy will play a decisive role. While visionary founders often lack the necessary growth capital to scale their solutions internationally, the ECBF closes this financing gap in cooperation with private and public investors.

Click [here](#) for more information.

Origin Materials and Minafin Group partner to industrialise carbon-negative chemicals and materials

Origin Materials, Inc., the world's leading carbon negative materials company with a mission to enable the world's transition to sustainable materials, and the Green Chemistry Division of the Minafin Group, a global specialty chemical company, are entering into a strategic partnership to industrialise high-value specialty materials based on Origin's carbon-negative materials.

The partnership includes multiple collaboration areas and is an important milestone for bringing cost-competitive biobased products to the market, with applications in the pharmaceutical, agricultural, cosmetics and personal care, and automotive industries.

As part of the partnership, Minafin affiliate Pennakem aims to develop new technologies with Origin to further expand the market for Pennakem's biobased products. Through this partnership, Origin aims to develop and industrialise additional high-value products based on its core technology platform, leveraging the proprietary technologies, manufacturing know-how and customer relationships of Minafin.

In addition, Minafin business unit EcoXtract® is in discussions with Origin to commercialise its revolutionary biobased extraction process using sustainable carbon-negative materials produced by Origin. The EcoXtract® process efficiently extracts useful plant oils for food, cosmetics, and other applications.

Click [here](#) for more information.

Croda and Genesis Biosciences partner



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Croda International Plc, the speciality chemical company that uses smart science to create high performance ingredients and technologies that improve lives, has announced a global sales and marketing agreement with Genesis Biosciences. This new partnership further expands Croda's existing portfolio of safe and sustainable cleaning raw materials.

Genesis Biosciences is a global company that uses its leading capability to ferment bacteria strains to develop safe and natural microbial and antimicrobial products.

The first phase of the partnership will see the launch of two innovative probiotic ingredients, Evogen GP 50x for use in hard surface

cleaning products and Evogen ON 50x for use in odour neutralising products, both of which will be available from the end of January. The superior cleaning power of the two ingredients uses application-specific bacteria strains to degrade a wide range of organic matter, providing not only extensive cleaning applications but also offering several sustainability benefits.

These natural probiotic ingredients continue to be effective several days after application, reducing the need for chemical-based cleaners. The ingredients also support good health and wellbeing by creating and restoring healthy microbiome on surfaces.

Click [here](#) for more information.

Perstorp and Project Air renew EU application for major green methanol chemistry investment

Sweden's leading chemistry group Perstorp, and partner companies Fortum and Uniper, submitted a €97 million (£82 million) application to the EU Innovation Fund for Project Air. This unique project aims to build a production facility for sustainable methanol in Stenungssund, Sweden, which could reduce global CO₂ emissions by 400,000 tonnes, equivalent to approximately 1% of Sweden's territorial emissions.

The ambition is to already by 2026 achieve large-scale production of sustainable methanol, which in turn can be used in making chemical products with thousands of applications, enabling an improved climate footprint in several value chains. The project is possible thanks to an innovative usage of biogas, hydrogen from electrolysis and residue streams, as well as carbon dioxide recovered from Perstorp's own facilities, to produce the methanol. This means the project will utilise

carbon atoms that would otherwise become CO₂ emissions.

Perstorp believes that Project Air with a modified application is well positioned to receive support from the EU Innovation Fund, but the company is also investigating alternate modes of future funding. The total investment in Project Air is expected to be €236 million (£198 million).

Click [here](#) for more information.

PepsiCo Europe aim to eliminate virgin fossil-based plastic in all its crisp and chip bags by 2030



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As seen prior in this News Review, PepsiCo have selected France to trial their new plant-based packaging. In relation, this article sees further details about their target regarding elimination of virgin fossil-based plastic.

Following the introduction of PepsiCo Positive, the company's strategic end-to-end transformation with sustainability at the centre, PepsiCo Europe announced that by 2030, it plans to eliminate virgin fossil-based plastic in all its crisp and chip bags. This ambition will apply to brands including Walkers, Doritos, and Lay's and will be

delivered by using 100% recycled or renewable plastic in its packets.

Consumer trials of the packaging will begin in European markets in 2022, starting with renewable plastic in a Lay's range in France in the first half of the year. Later in the year, a range from the Walkers brand in the UK will trial recycled content. The recycled content in the packs will be derived from previously used plastic and the renewable content will come from by-products of plants such as used cooking oil or waste from paper pulp. PepsiCo estimates it may achieve up to 40% greenhouse gas emissions reduction per ton of packaging material by switching to virgin fossil-free material.

PepsiCo uses flexible plastic for its snack packaging – the soft wrapping used to make its crisp and chip bags because it is lightweight compared to alternative packaging and therefore has a low carbon footprint. It is also highly effective at keeping food fresh thereby reducing food waste. PepsiCo Europe will focus its packaging work on three strategic pillars: the right design; the right infrastructure and the right new life for flexible packaging.

Click [here](#) for more information.

Sustaintech leader Renewcell initiates early capacity expansion due to strong customer interest

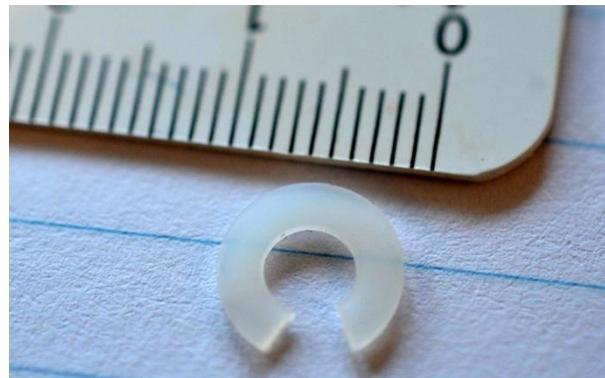
On the basis of strong customer interest for Renewcell's unique 100% recycled product Circulose®, the Board of Directors of Renewcell has decided to initiate an expansion of the company's Renewcell 1 (Ortviken, Sundsvall) plant from 60,000 to 120,000 tonnes of total annual capacity ahead of plan.

The decision does not affect the commissioning planned for mid this year for the initial 60,000 tonnes. The Board has also decided to review the company's operational and financial goals, evaluating the opportunity to bring forward the operational goal of reaching 360,000 tonnes of annual capacity to 2025 from 2030 as was originally planned.

The Board will also consider how much to increase the long term operational goal in order to strengthen Renewcell's market leading position. BNP Paribas and Carnegie have been retained by the company to explore the financing for raising the operational goals.

Click [here](#) for more information.

Genomatica and Asahi Kasei partner on renewably-sourced nylon 6,6



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Sustainable materials leader Genomatica and Japan-based diversified global manufacturer Asahi Kasei announced a strategic partnership to commercialise renewably-sourced nylon 6,6 made from Genomatica's bio-based HMD (hexamethylenediamine, also abbreviated as HMDA) building block. Asahi Kasei looks to this partnership to support its goal to be first-to-market with a more sustainable nylon 6,6 for the automotive and electronics industries, based on plant-based HMD, and to accelerate

the achievement of its corporate sustainability objectives.

HMD is a key component of nylon 6,6 (also known as polyamide 6,6) and multiple other types of nylon, with a global market of 2 million tonnes per year. Conventional HMD is made starting from fossil fuels, such as crude oil or natural gas. Renewably-sourced HMD made with Genomatica's technology is derived from renewable feedstocks, such as plant-based sugars, and can improve the sustainability of the many materials made from it.

Building upon Genomatica's recently-announced breakthrough to successfully produce significant volumes of plant-based HMD, Asahi Kasei intends to apply the GENO™ HMD process technology to make more sustainable materials for use in products such as high-temperature automotive parts, electronics, or yarns to produce airbags.

Click [here](#) for more information.

Del Monte Foods is growing good for the planet through earth-friendly packaging

Del Monte Foods aim to reduce the footprint of their packaging by investing in new materials and redesigning existing materials. Since 2009, they have been reducing their use of plastics and metal. As of late January 2022, only 4% of their packaging by weight contains any plastics; the rest is fully recyclable steel, glass or paper based.

Additionally, despite increasing sales volume, Del Monte foods has eliminated the use of 11.4 million pounds of plastic and 34.5 million pounds of metal since 2009. They are also currently working to develop a compostable

fruit cup as well as beverage and fruit cups that contain post-consumer recycled content.

Additionally, Del Monte Foods aim to by 2025: include 25% recycled content into plastic packaging once recycled polypropylene supply is available and FDA approval is received; add How2Recycle® icons to 100% of their packaging. And by 2030: convert plastic packaging to 100% recyclable, reusable or compostable.

Click [here](#) for more information.

Research & Development

France chosen as a pilot market for the roll-out of the PepsiCo group's first plant-based packaging



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As part of PepsiCo Europe's announcement to stop all use of virgin plastic in its chip and snacking packaging by 2030, France has been chosen as the pilot market for the deployment of the PepsiCo Group's first plant-based packaging.

Composed of 30% ISCC-certified vegetable materials, this new packaging, an unprecedented innovation in the chip and snack departments in France, will be offered from April 2022 and will concern all of Lay's

two flagship ranges, "A l'Ancienne" and "Paysanne", i.e. nearly 45,000,000 packets of chips.

This unique sachet, made from 30% vegetable materials, uses residual oil from the forestry industry that until now was considered waste and burned. In fact, this notorious advance in terms of packaging makes it possible to significantly reduce the use of virgin plastics and therefore fossil fuels.

ISCCPepsiCo wanted to have an ISCC-certified vegetable oil and support a developing sector by applying the principle of mass balance. In concrete terms, PepsiCo and its Lay's brand purchase an amount of ISCC certified plant-based materials equivalent to 30% of the materials in the 45,000,000 packages sold annually. A way to launch a dynamic to reach 100% of plant-based material on the entire Lay's portfolio by 2030.

Click [here](#) for more information.

DPS Skis teams up with Checkerspot to develop custom biomanufactured materials for their Pagoda Series



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The engineers at Salt Lake City-based DPS Skis have taken a leap forward on low impact, high

performance products with the development and commercialisation of renewably derived, algae-based sidewalls into all DPS Skis beginning in 2022.

The collaboration between one of the largest U.S. ski manufacturers and materials innovation company Checkerspot, Inc. has produced a material and a fabrication technique that increases ski performance and decreases petroleum reliance while supporting the local Wasatch business ecosystem.

The WING™ Platform capabilities allowed for both companies to rapidly iterate on the formulation designed for DPS' performance specifications, which optimises damping, impact resistance, and hardness. Over the course of a year, the Checkerspot and DPS product teams trialed multiple formulations in the Checkerspot Design Lab, the DPS R&D Lab, and on-snow in the Wasatch Mountains and New Zealand.

The result is an algae oil-derived sidewall with 62% bio content per ASTM D6866 and exceptional bonding characteristics, resulting in a stronger ski that is more resistant to delamination than a petroleum based ABS sidewall. Checkerspot's WING™ Platform combines biotechnology, materials science, advanced fabrication techniques, and consumer engagement to develop application-specific materials, designed specifically around the performance demands of the end user.

Click [here](#) for more information.

Study shows Naia™ cellulosic fibers fully disintegrate and biodegrade in the ocean within months



Pixabay

Eastman, producer of sustainably sourced Naia™ cellulosic fiber, has received further scientific evidence that the cellulose diacetate (CDA)-based material disintegrates and biodegrades in the ocean within months.

Researchers from the Woods Hole Oceanographic Institution (WHOI), the world's leading, independent non-profit organisation dedicated to ocean research, exploration and education, led the study, which was published in December and demonstrated that "CDA-based materials disintegrate and biodegrade in the ocean orders of magnitude faster (months) than previously reported (decades)."

CDA is largely derived from wood pulp, making it biobased. Naia™ cellulosic fiber is responsibly sourced from sustainably managed pine and eucalyptus forests, and it is produced in a safe, closed-loop process where solvents are recycled back into the system for reuse.

The study showed the comparative disintegration of similarly constructed fabrics under identical seawater conditions. Fabric that is 100% Naia™ completely disintegrated at 13 weeks, compared to 100% cotton at 11 weeks and 100% polyester, which showed no

visual signs of disintegration throughout the 25-week incubation period.

Click [here](#) for more information.

Cyrene™ as a versatile biobased solvent for lignin fractionation, processing, and chemistry

The solubility of technical lignins is a complex issue that depends on many parameters, such as the lignin structure governed by the botanical origin and the extraction process. Only polar aprotic solvents, such as dimethylsulfoxide (DMSO), N,N-dimethylformamide (DMF) or N,N-dimethylacetamide (DMAc), are able to fully dissolve a large range of technical lignins. However, DMF and DMAc are fossil-based and present serious toxicity issues.

In this study, they evaluated the potential of a biobased, non-cytotoxic and non-mutagenic solvent, dihydrolevoglucosenone (Cyrene™) as an alternative polar aprotic solvent for lignins.

This study shows that Cyrene is a promising and versatile green solvent for lignin fractionation, processing and chemistry, to ensure greener processes when solvents are mandatory.

Click [here](#) for more information.

Biodegradation of novel bioplastics in soil environment



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Plastic pollution is recognised as a major environmental problem in many countries. Over the last decade, academics have embraced research on bioplastics to discover newer high-end green materials. However, the end-of-life environmental fate of such materials is not adequately understood. Non-isocyanate polyhydroxyurethanes (PHUs) are green engineering materials with huge potential to replace traditional polyurethanes. Despite this immense potential, a number of questions about their environmental fate remain unanswered.

The present study investigated the extent and mechanisms underlying soil biodegradation of PHUs and determined whether the deterioration of PHUs within starch bioplastics (ST) can improve the biodegradation of starch (ST)-PHU hybrids.

The findings suggested the positive environmental implications of PHU in improving the bioplastic's degradation and their potential for future applications.

Click [here](#) for more information.

Xampla and Croda/Incotec to work on biodegradable seed coatings

Croda International Plc has announced a partnership with Cambridge University-backed Xampla to develop next generation, biodegradable, microplastic-free seed coatings. Backed by the UK government and the National Institute of Agricultural Botany, the £640,000 project trial of Xampla's plastic-free seed coatings, will bring biodegradable replacements for seed coating polymers.

Seed coatings are used in agriculture to protect seeds from pests and diseases and increase germination, helping increase crop yield with minimal use of additional plant protection products. However, some seed coatings rely on petroleum-derived polymers, which are not fully degradable in agricultural soils. This innovative trial will see the development of next generation microplastic-free seed coatings that are fully biodegradable.

Through its Seed Enhancement specialists Incotec, Croda has already established itself as an industry leader in microplastic-free replacements for traditional seed coatings, including sunflower, corn, and vegetable seeds. Its partnership with Xampla now paves the way for completely natural, coatings that leave no residue and disappear without trace as seeds grow.

This collaboration also takes Croda one step closer to achieving its ambition to be Land Positive, specifically enhancing the company's focus on using crop science innovation to support crop and seed enhancement to mitigate the impact of a changing climate and land degradation.

Click [here](#) for more information.

Nordic Bioproducts Group successfully spin new plant-based textile fibre

The demand for sustainable and responsible textile fibres is constantly growing. Current methods have a detrimental impact on the environment. Resource-intensive cotton production is already at an extreme, and polyester, in turn, is a major source of microplastic emissions. And, the production of wood-based viscose fibre requires dissolution with toxic carbon disulfide.

New and sustainable alternatives from wood and plant-based feedstock are required to address the sustainability challenges of the textile industry. The market for sustainable man-made cellulosic fibres is expected to grow above 10% within the next decade.

Competition in the field of new textile fibres is accelerating and the first players in the industry are already commercialising their products and approaching industrial-scale production. Many of these innovations are Finnish, such as Aalto University's Ioncell fibre, Metsä Spring Oy's Kuura fibre, Spinnova Oy's fibre and Infinited Fibre Company's Infinna fibre.

In the Nordic Bioproducts' method, the cellulose is first hydrolysed in an environmentally friendly and cost-effective manner, after which the fibre is further processed into a viscose-like textile fibre. The inventor of the AaltoCell™ method, Professor Olli Dahl at Aalto University, was convinced from early on that the method, developed by Nordic Bioproducts, could be applied in the production of plant-based textile fibres.

Click [here](#) for more information.

5-Hydroxymethylfurfural and furfural chemistry toward biobased surfactants



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The use of 5-hydroxymethylfurfural (HMF), furfural, and furan as scaffolds for designing alternative surfactants is a rapidly developing research area. This review gathers recent examples highlighting the variety of methods for grafting the necessary polar and non-polar appendages, exploiting the specific chemical reactivity of each of these platform molecules.

While the furan (or tetrahydrofuran) backbone is maintained in some targeted amphiphiles, alternatives using rearranged HMF or furfural such as cyclopentanols or furanones have also been reported. This topic is an illustration of the diversification of the use of HMF and other biobased furanic platform molecules in the field of fine and specialty chemicals.

The surfactants sector, which concerns some of the most largely consumed chemicals in everyday life, and still mostly produced from fossil resources, will benefit from such alternatives enabling increased renewable carbon content and structural innovation.

Click [here](#) for more information.

Sustainable supply chain: ALBIS receives ISCC PLUS Certification

ALBIS, one of the leading distributors worldwide, has received ISCC PLUS certification for bio-circular plastics following a successful audit by certification specialist DQS CFS GmbH. This is a prerequisite for supplying companies that are also certified and makes sustainable commitment visible and measurable throughout the whole supply chain.

With the new ISCC PLUS certification in France and Germany, ALBIS is certified for the distribution of Circulen Renew® from LyondellBasell, Makrolon® RE, Bayblend® RE and Makroblend RE® from Covestro, Styroflex® ECO, Styrolux® ECO, Luran® ECO and NAS® ECO from INEOS Styrolution, Durethan® Scopeblue from LANXESS as well as Arbofill® from Tecnar. Further countries across the ALBIS organisation will be certified during 2022.

Click [here](#) for more information.

Carbon-negative production of acetone and isopropanol by gas fermentation at industrial pilot scale

Many industrial chemicals that are produced from fossil resources could be manufactured more sustainably through fermentation. This piece describes the development of a carbon-negative fermentation route to producing the industrially important chemicals acetone and isopropanol from abundant, low-cost waste gas feedstocks, such as industrial emissions and syngas.

Using a combinatorial pathway library approach, they first mined a historical industrial strain collection for superior

enzymes that they used to engineer the autotrophic acetogen *Clostridium autoethanogenum*. Next, they used omics analysis, kinetic modelling and cell-free prototyping to optimise flux. Finally, they scaled-up their optimised strains for continuous production at rates of up to ~3 g/L/h and ~90% selectivity.

Life cycle analysis confirmed a negative carbon footprint for the products. Unlike traditional production processes, which result in release of greenhouse gases, their process fixes carbon. These results show that engineered acetogens enable sustainable, high-efficiency, high-selectivity chemicals production. They expect that their approach can be readily adapted to a wide range of commodity chemicals.

Click [here](#) for more information.

Effect of polylactic acid trays on the optical and thermal properties of recycled polyethylene terephthalate



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To progress towards a more sustainable plastic system, multiple interventions are required, including the decoupling from fossil feedstock. Biobased plastics therefore have to be integrated in plastic waste management systems. This should, however, not hamper the

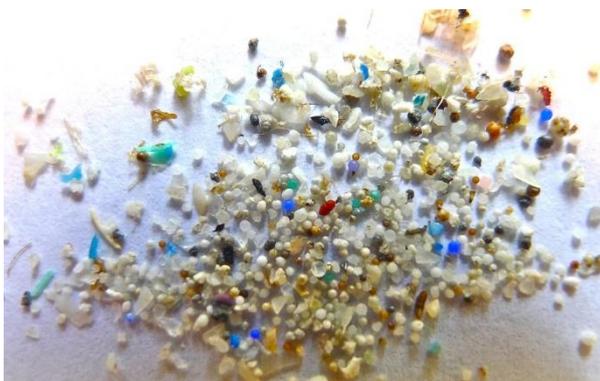
performance of current recycling systems. Several studies have previously suggested that the uptake of polylactic acid (PLA) in this system would endanger polyethylene terephthalate (PET) recycling.

This study reports the estimated concentration of PLA in recycled PET and the effect of the presence of this impurity on the optical and thermal properties of recycled PET.

This study contravenes previous studies on the impact of PLA on the quality of recycled PET. The difference between this study and the previous studies is that within this study, recycled PET has been processed in agreement with industrial methods. Therefore, in case the sorting and recycling facilities maintain their current careful operation, no negative impact of PLA on PET recycling can be foreseen, and further integration of biobased plastics in the plastic waste management system can be pursued.

Click [here](#) for more information.

Microplastics identification and quantification in the composted Organic Fraction of MSW



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Composted Organic Fraction of Municipal Solid Waste (OFMSW) is used in agricultural soils as a source of organic matter and

nutrients. Besides, its use avoids landfilling or incineration following the principles of circular economy. It is well established that source separated OFMSW is suitable for compost production, but its quality depends on their content in non-compostable materials.

Their results showed that smaller plants, with OFMSW door-to-door collection systems produced compost with less plastic of all sizes. Compost from big facilities fed by OFMSW from street bin collection displayed the highest contents of plastics. No debris from compostable bioplastics were found in any of the samples, meaning that if correctly composted their current use does not contribute to the spreading of anthropogenic pollution.

Their results suggested that the use of compostable polymers and the implementation of door-to-door collection systems could reduce the concentration of plastic impurities in compost from OFMSW.

Click [here](#) for more information.

MOU regarding development of a bio-based products and renewable energy business in Thailand

Marubeni Thailand which is a wholly-owned corporate subsidiary of Marubeni Corporation, and Mitr Phol Sugar Corporation which is world class sugar producer, have signed a Memorandum of Understanding regarding the related businesses of bio-based products and renewable energy in the Kingdom of Thailand.

The purpose of this MOU is to develop raw materials for the manufacture and sales of bio-based wrapping, packaging and food container products by utilising all the agricultural-derived resources, including agricultural residues, owned by Mitr Phol,

which is the largest sugar manufacturing company in Thailand, and also to develop and introduce renewable energy.

Based on this MOU, Marubeni Thailand and Mitr Phol will consider the realisation of such various decarbonised businesses as fossil fuel-based plastics reduction through bio-based product development and the introduction of renewable energy by utilising Marubeni Group's knowledge, technology, and sales network, together with Mitr Phol's economic advantages on fully integrated agribusiness model and innovative technology.

Furthermore, Marubeni Thailand and Mitr Phol will also contribute to the Bio-Circular-Green (BCG) Economy which is an important policy of the Thai government.

Click [here](#) for more information.

Bolt Threads teams up with Mycelium Materials Europe (MME)



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Bolt Threads is teaming up with Mycelium Materials Europe (MME) to bring Mylo – its mycelium-based alternative to animal-derived leather – to commercial scale.

MME, based in Hedel in the Netherlands, has successfully demonstrated the ability to grow mycelium materials on a large mechanical

scale at a higher quality and with a more efficient harvest, using the Dutch Shelf System. This reinforces the Bolt Threads target to scale Mylo material to millions of square metres of production at a cost and quality that is competitive with other bio-based alternative leather materials.

MME is the first company to use the Dutch Shelf System in a converted mushroom farm, filling the shelves with substrates made in the farm itself to grow large mats to increase efficiency when growing mycelium material at scale.

MME has adapted the Dutch Shelf System – recognised worldwide as the superior grow system for white button mushrooms – to make it suitable for growing mycelium materials. The company uses its patent-pending system in its converted mushroom farm located in the Netherlands. MME has converted this traditional mushroom farm into a well-controlled mechanised operation that is now able to efficiently produce mycelium material on a larger scale.

Click [here](#) for more information.

Paboco joins 4evergreen Alliance

Paboco has announced that it is joining the 4evergreen Alliance aimed at improving the circularity of fibre-based packaging. Paboco joins other companies including Amcor, BASF, Danone, Ferrero, L'Oréal, Mars, Nestlé and P&G, which are just some of the members of 4evergreen's cross-industry initiative. The 4evergreen Alliance brings together actors across the value chain, ranging from producers and converters to research organisations, with a particular focus on European packaging systems.

By 2030, 4evergreen is aiming to reach a 90% recycling rate for fibre-based packaging. The group has also set out intermediary targets to be met by 2025, including industry recognition of the 4evergreen recyclability evaluation protocol and the introduction of separate collection streams for all fibre-based packaging types.

Paboco started as a joint venture between paper packaging materials developer BillerudKorsnäs and bottle manufacturing specialist ALPLA. In 2020, Coca-Cola revealed a first-generation prototype paper bottle developed with Paboco, with a European trial launched the following year. The prototype is 100% recyclable, but it is not yet entirely fibre-based – it consists of a paper shell made using sustainably sourced wood, with a rPET lining and bio-based material barrier suitable for liquid contents.

Procter & Gamble collaborated with Paboco on a paper bottle for its Lenor brand, which features a similar structure of an outer layer of paper and an inner layer of plastic.

Click [here](#) for more information.

Polymers

SABIC's biobased LNP™ ELCRIN™ copolymer resin helps achieve consumer electronics carbon targets



Pixabay

SABIC has introduced LNP™ ELCRIN™ EXL7414B copolymer, the company's first bio-based polycarbonate copolymer to help advance the consumer electronics industry's net-zero carbon emissions goals. The new copolymer is the first grade in an expanding portfolio to secure the International Sustainability and Carbon Certification Plus (ISCC+) designation.

It is formulated with over 50% bio-based content from waste materials, which do not compete with the food chain, according to the mass balance approach. A preliminary SABIC internal assessment indicates that each kilogram of the new bio-based resin provides two kilograms of CO₂ reduction as compared to the fossil-based alternative.

realme was the first consumer electronics brand to adopt the incumbent version of this material, LNP™ ELCRIN™ EXL7414 resin, which was used to mould the battery cover of its C25 smartphone. The new SABIC copolymer provides the same outstanding properties and processing as its predecessor, enabling a seamless transition for realme.

In addition to lowering carbon footprint by reducing the use of fossil-based feedstocks, LNP ELCRIN EXL7414B copolymer resin delivers exceptional performance for demanding electronics applications. It uses a non-brominated, non-chlorinated flame retardant formulation that meets the UL 94 V0 standard at 0.6 mm.

Click [here](#) for more information.

Arkema to increase its global Pebax® elastomers production capacity by 25%



Pixabay

To support its customers' strong growth in the sports and consumer goods markets, Arkema will increase its global manufacturing capacity for Pebax® elastomers by approximately 25% through an investment at its Serquigny plant in France.

This new capacity will produce a variety of highly specialised grades to meet growing demand in numerous demanding applications thanks to the lightweight, flexibility and excellent energy return of these materials. These properties are particularly appreciated in sports equipment, such as soles for running shoes, ski boots or technical textile, in consumer goods such as smartphones and

flexible screens, as well as in other markets such as medical equipment.

Derived from renewable castor seeds, Pebax® Rnew® advanced bio-circular materials offer a sustainable solution to their customers who are increasingly driven by sustainability and social responsibility. Compared to other elastomers on the market, these materials have a carbon footprint that is up to 50% lower and can be fully recycled.

In addition, this investment, which is scheduled to come on stream mid-2023, will lower the water consumption of the site by 25% thanks to process optimisation.

Click [here](#) for more information.

Toray commercialises Ecodear™ N510, a 100% plant-based nylon fiber

Toray Industries announced that it has developed a nylon 510 (N510) fiber that incorporates 100% 'biobased synthetic polymer content' as defined under section 3.1.5 of ISO 16620-1: 2015, the international standard for the biobased content of plastics. Ecodear™ N510, will be the first 100% plant-based nylon fiber in Toray's Ecodear™ lineup.

The company has created diverse potential applications for Ecodear™ N510 as a sustainable offering for high-end markets. While primarily for sports and outdoor fabrics they extend to lightweights, cut-and-sew fabrics through innerwear lace materials.

Toray plans to begin Ecodear™ N510 textiles sales for fall/winter 2023. Initial production volume to be 200,000m by the end of March 2023 and growing to 600,000m in March 2026.

Toray developed Ecodear™ N510 by polymerising Sebacic acid from castor-oil plant and pentamethylenediamine from corn and spinning. Unlike other wholly plant-based nylons, Ecodear™ N510 has a high melting point and outstanding dimensional stability. It is as strong and heat-resistant as Nylon 6. Companies can thus create products that are sustainable without compromising performance.

Toray looks to combine various proprietary technologies to drive further fiber advances. These would include making fibers thinner and lighter or adding functionality by changing cross-sectional shapes.

Click [here](#) for more information.

Lotus effect: Self-cleaning bioplastics repel liquid and dirt



Pixabay

Inspired by the always immaculate lotus leaf, researchers have developed a self-cleaning bioplastic that is sturdy, sustainable and compostable. The innovative plastic developed at RMIT University repels liquids and dirt – just like a lotus leaf – then breaks down rapidly once in soil.

While biodegradable plastics are a growing market, not all bioplastics are equal. Most biodegradable or compostable plastics require

industrial processes and high temperatures to break them down. The new bioplastic does not need industrial intervention to biodegrade, with trials showing it breaks down naturally and quickly in soil.

The design of the self-cleaning bioplastic was inspired by the lotus leaf, which effortlessly repels water and dirt. Lotus leaves are renowned for having some of the most water-repellent surfaces on earth and are almost impossible to get dirty.

The secret lies in the leaf's surface structure, which is composed of tiny pillars topped with a waxy layer. Any water that lands on the leaf remains a droplet, simply rolling off with the help of gravity or wind. The droplets sweep up dirt as they slide down, keeping the leaf clean. To make their lotus-inspired material, the RMIT team of science and engineering researchers first synthetically engineered a plastic made of starch and cellulosic nanoparticles.

The surface of this bioplastic was imprinted with a pattern that mimics the structure of lotus leaves, then coated with a protective layer of PDMS, a silicon-based organic polymer.

Click [here](#) for more information.

Kemira celebrates breakthrough in the production of biobased water-soluble polymers

Kemira has further strengthened its position as the leading provider of sustainable chemistry solutions for water-intensive industries by starting the first worldwide full-scale production of its newly developed polymer based on biobased feedstock. The first commercial volumes are shipped to one of the

wastewater treatment plants of the Helsinki Region Environmental Services (HSY) for trials.

These polymers can be used in various industries, such as the water and energy industry, and potentially also in particularly demanding papermaking applications.

The novel polymers are manufactured according to the principles of biomass-balance, in which the majority of fossil based raw materials are replaced by ISCC Plus certified biobased and renewable mass-balanced feedstocks. They are produced in Kemira's ISCC certified manufacturing facilities in San Giorgio di Nogaro, Italy and Bradford, UK, and supplied globally to customers in water-intensive industries.

Click [here](#) for more information.

PepsiCo uses innovative plastic alternative that prevents GHG emissions into the atmosphere

PepsiCo has announced the use of UBQ™ material. The material, developed by the Israeli startup of the same name, will be used in the creation of a sustainable pallet that includes unsorted household waste – including organics – in its composition.

During the manufacturing process of UBQ™ material, waste is diverted and greenhouse gas (GHG) emissions are prevented. In this initial project alone, the material implementation saves the equivalent of more than 6,500 kg of GHG emissions – the equivalent of the annual carbon sequestration of 534 trees*. More than 739 kg of mixed waste will be redirected from landfills, looped back into the material as a valuable resource. The pallets are developed by PepsiCo's partner Ecoboxes Embalagens Plásticas, which

specialises in solutions focused on sustainability and circular economy.

The UBQ™ material is a bio-based thermoplastic converted from 100% unsorted municipal solid waste, including mixed plastics, paper, cardboard, and organics, and is suitable to substitute conventional polymers in various durable applications.

Click [here](#) for more information.

OrthoLite introduces Cirql midsole foam solution to drive sustainability in the footwear industry



Pxfuel

OrthoLite, the 25-year industry leader of branded, high performance, comfort footwear solutions, has unveiled its first-ever midsole foam innovation to elevate sustainability in the footwear industry: Cirql. OrthoLite Cirql is the first-ever EVA plastics-free, recyclable, compostable midsole foam with an end of life solution.

OrthoLite Cirql is the critical solution needed to achieve true circularity within the footwear industry, and is the world's first EVA plastics-free, recyclable, biodegradable and industrially compostable foam. Powered by plants, Cirql offers a pure foam alternative to conventional

plastics and is made from responsibly-sourced plants and biodegradable materials.

The GMO-free, plant-based material utilised in Cirql is free from any "forever chemicals," and is created through a zero-waste, chemical-free foaming process. The patented ground-breaking process ensures unmatched sustainability in a midsole that delivers on OrthoLite's highest standards of performance, comfort, and sustainability.

Click [here](#) for more information.

Sumo & Kelheim Fibres develop sustainable and high-performance absorbent washable diaper pad



Pxfuel

Up to the age of three, a baby uses around 5,000 diapers – and although common disposable diapers score points with their convenient handling, parents are increasingly looking for a healthy and sustainable alternative to these products, which are in most cases synthetic. After all, they cause an enormous amount of plastic waste – in Germany alone, 10 million diapers are disposed of every day.

There are two ways to solve this dilemma: Either disposable products are made from bio-based or biodegradable materials, or reusable

products with a longer life span replace disposable products.

Founding team Luisa Kahlfeldt and Caspar Böhme go even further and combine both with their "Sumo Diapers." They have created a reusable cloth diaper that is made entirely of sustainable materials while offering high performance and innovative design. The Sumo Diaper is a fitted cloth diaper that consists of a waterproof cover and absorbent inserts. The cover is sewn in such a way that a pocket is formed: this is where the absorbent pad is inserted to prevent slipping.

Click [here](#) for more information.

Avient launches Nymax™ BIO low water absorption and bio-based polyamides

Avient has launched Nymax™ BIO Formulations, a line of bio-based polyamide materials that help customers reach their sustainability goals. These new materials also solve the long-standing problem of undesirable water absorption levels in other bio-derived polyamide materials available today.

Formulated in glass fiber-filled and unfilled options, Nymax BIO materials include between 16 and 47 percent natural filler from renewable plant sources, including corn, straw, and wheat. Renewable, plant-based raw materials, have been shown to offer significantly lower product carbon footprint values than typical petroleum-based feedstock.

Compared with traditional PA66 glass fiber-filled materials, these bio-derived solutions offer lower warpage plus excellent surface appearance and colorability. Nymax BIO low-water-absorption polyamide formulations

deliver excellent dimensional stability and property retention after conditioning, providing a solution to the problem of water uptake (hygroscopy) for finished parts.

Click [here](#) for more information.

SABIC collaborates with Kraton to produce certified renewable styrenic block copolymers



Pixabay

SABIC, a global leader in the chemical industry has announced a new collaboration with Kraton, a leading global sustainable producer of specialty polymers and high-value biobased products derived from pine wood pulping co-products, to deliver certified renewable butadiene from its TRUCIRCLE™ portfolio for use in Kraton's certified renewable styrenic block copolymers (SBC).

This effort forms part of SABIC's 2025 strategy, which includes a Sustainability Development Goal roadmap spanning the organisation's entire value chain and addressing 10 goals to help drive meaningful sustainable change.

SABIC's certified renewable butadiene is derived from animal-free and palm oil-free 'second generation' renewable feedstock, such as tall oil, a by-product from the wood pulping process in the paper industry. This feedstock is

not in direct competition with human food and animal feed production sources.

According to the cradle-to-gate lifecycle analysis, from sourcing the raw feedstock to producing the polymers, each kilogram of the company's bio-based butadiene reduces CO₂ emissions by an average of 4 kilograms compared to fossil-based virgin alternatives. Additionally, each ton of the butadiene also cuts fossil depletion by up to 80%.

Click [here](#) for more information.

Stora Enso accelerates growth in formed fiber by expanding its production capacity in Europe

Stora Enso has chosen to invest €8 million (~£6.8 million) to double its production capacity of formed fiber in Europe. With new machinery in Hylte, Sweden, Stora Enso will meet the increasing demand for formed fiber.

Stora Enso's formed fiber products are currently being used in food packaging such as bowls, trays and lids. The technology is also being used for the development of fiber bottles. After the investment is completed, the Hylte site's annual formed fiber capacity will grow from 50 to approximately 115 million units of product, making Stora Enso one of Europe's leading suppliers of formed fiber.

Formed fiber is renewable, recyclable, and biodegradable, and can be used to replace plastics in a wide range of applications. PureFiber™ by Stora Enso is a range of formed fiber products that contain no per- and polyfluoroalkyl substances (PFAS) and has up to 75% lower CO₂ footprint compared to alternative packaging materials such as plastic or bagasse.

The raw material is pulp made from wood from sustainable sources in Sweden and Finland. Stora Enso will manufacture the raw material at its mills in Sweden and Finland and do the converting at Hylte site. Along with the investment, Stora Enso will recruit more than ten employees for formed fiber production in Sweden.

Click [here](#) for more information.

the second half of 2019 and proceeded largely according to plan, despite the challenges arising from the COVID-19 pandemic. The recruiting and onboarding of new employees has been successful. Investments (CAPEX) amounted to approx. €400 million (£336 million).

Click [here](#) for more information.

Lenzing successfully opens world's largest lyocell plant in Thailand



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The Lenzing Group, the world's leading supplier of wood-based specialty fibers, has announced the successful completion of its key lyocell expansion project in Thailand. The new plant, the largest of its kind in the world with a nameplate capacity of 100,000 tonnes per year, started production on schedule and will help to even better meet the increasing customer demand for TENCEL™ branded lyocell fibers.

For Lenzing, the project also represents an important step towards strengthening its leadership position in the specialty fiber market and into a carbon-free future.

The construction of the plant located at Industrial Park 304 in Prachinburi, around 150 kilometers northeast of Bangkok, started in

Chemicals

Asahi Kasei to produce acrylonitrile using biomass derived raw material

Asahi Kasei, a diversified Japanese multinational company has announced that Tongsoh Petrochemical Corporation, a wholly owned subsidiary in South Korea, acquired the widely recognised international certification ISCC PLUS1 for its acrylonitrile (AN) as a sustainable product, and production of AN using biomass propylene was scheduled to begin in February 2022.

AN is used as a raw material to make ABS resin, acrylamide, acrylic fiber, and various other chemical products. Recent demand growth has been particularly robust in the applications of carbon fiber as a material to reduce the weight of wind turbine blades, etc., and nitrile rubber for medical gloves whose use is expanding due to heightened awareness for hygiene.

In order to achieve carbon neutrality by 2050, measures to reduce CO₂ emissions throughout the product chain of fossil fuel-derivatives are gaining momentum, and AN customers are increasingly seeking to manufacture products using AN with low CO₂ emissions in order to contribute to GHG reduction.



Under these circumstances, Asahi Kasei and TSPC sought to reduce CO₂ emissions across the AN supply chain, and in October 2021, TSPC became the first AN manufacturer in Asia to acquire ISCC PLUS certification. The certification system enables TSPC to produce and sell AN using biomass raw material allocated by the mass-balance method. TSPC is scheduled to begin producing AN using biomass propylene in February 2022.

Click [here](#) for more information.

JM award-winning ethyl acetate technology to help CropEnergies AG reduce carbon footprint of products

Johnson Matthey and CropEnergies AG, a specialist in biomass-based sustainable chemicals and a leading European producer of ethanol, have entered into an engineering, license and technical services agreement for a plant to allow CropEnergies AG to produce renewable ethyl acetate from sustainable ethanol.

Johnson Matthey's award-winning commercial ethyl acetate technology has a proven track record for process improvement, engineering expertise and licensee support. Johnson Matthey's green technology minimises carbon emissions and produces ethyl acetate widely regarded as having the highest product quality on the market.

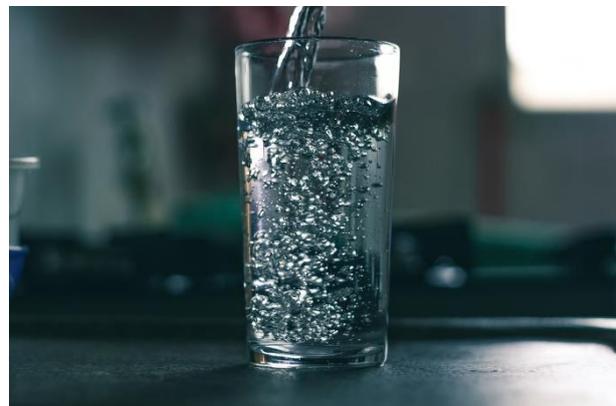
Ethyl acetate is widely used in the production of cosmetics, flexible packaging and coatings, paints and adhesives, as well as in food, beverage and pharmaceutical applications. Using Johnson Matthey technology, the renewable ethyl acetate produced by CropEnergies will reduce the fossil carbon footprint of these everyday products and will offer CropEnergies' customers the opportunity

to source locally in Europe, providing greater security of sustainable supply.

The plant will be designed to produce 50,000 tonnes per year of renewable ethyl acetate from renewable ethanol feedstock using renewable energy to drive the process. The plant will also generate renewable hydrogen as a co-product that, together with biogenic CO₂ from the CropEnergies fermentation process, will be the basis for further conversion of renewable energy into PtX (power-to-X) downstream routes, to produce e.g. e-fuels.

Click [here](#) for more information.

NREL use renewables to replace petroleum-based materials in commercial filtration systems



Pixabay

When Americans turn on a faucet, they rely on public treatment systems to ensure the water is safe to drink. Public water systems pump more than 27 million filtered gallons each minute to U.S. homes and businesses. Chemicals called flocculants play an important role in removing sediments from the water.

Until now, most flocculants have been petroleum-based. New patented technology from the U.S. Department of Energy's (DOE's)

National Renewable Energy Laboratory (NREL) makes it possible to produce flocculants from biomass, providing an environmentally sustainable and cost-competitive alternative. Recently, Mars Materials was granted an option for an exclusive license to use NREL's renewable acrylonitrile (ACN) technology in producing polyacrylamide flocculants for commercial use.

Mars, a startup that produces low-cost, carbon-negative chemicals and materials, will use NREL's ACN technology to produce acrylamide from captured carbon dioxide (CO₂) and corn-based biomass. In addition to benefiting the environment through the use of renewable feedstocks, the renewable nitrilation process also delivers higher yields and is safer and more energy efficient than methods used to produce petrochemical-based acrylamide.

Click [here](#) for more information.

EFSA approves biobased methyloxolane solvent for use in food industry

Methyloxolane is a bio-based solvent for the extraction of vegetable oils, plant proteins and natural ingredients. It is produced from agricultural by-products (e.g., sugarcane bagasse). Its carbon footprint is only 10% that of the petrochemical solvents it replaces.

The EFSA Panel of experts reported that methyloxolane is a safe solvent for use in the food industry. EFSA's positive opinion is based on its expert panel's review of a full application dossier including state-of-the-art scientific studies performed under OECD's latest standards. The dossier and the expert opinion show that methyloxolane provides unprecedented safety for the consumer.

This allows methyloxolane to be added to the 20 solvents approved for food use in Europe (Directive 2009/32/CE). This is a breakthrough with world-wide impact. Except for ethanol, all the other solvents approved for use in food production are totally or partially produced from petroleum.

Click [here](#) for more information.

Circa awarded £7M grant by French government 'Relance' programme for biobased solvent production



Pixabay

Sustainable biochemicals company Circa Group AS has been awarded €8.2 million (~£7 million) from the French government for the development of its ReSolute plant in Eastern France as part of the 'France Relance' programme.

'France Relance' is a €100 billion (~£85 billion) initiative to relaunch the French economy and help France emerge stronger from the Covid crisis. The programme's three pillars are ecology, competitiveness, and cohesion.

The ReSolute project near Carling in Eastern France is an ideal recipient as it is focussed both on manufacturing biochemicals from sustainable feedstocks as well as repurposing

the site of a former coal-fired power plant for new low-carbon technologies.

Circa's ReSolute plant will produce green and sustainable solvents at industrial scale by utilising local forest biomass waste to replace conventional harmful solvents traditionally made from petrochemicals. The plant will be the first of its kind to produce the solvent Cyrene™ at 1,000 tonne commercial scale. It will come online at the end of 2023, creating 40 to 50 new direct jobs.

Click [here](#) for more information.

Consumer Products

Acatel launches collection of carbon positive and traceable fabrics made with bio-based finishing processes

Acatel, an advanced vertical finishing mill headquartered in Barcelos, Portugal, has partnered with Fibretrace and Good Earth Cotton to launch a collection of carbon positive and traceable fabrics made with bio-based finishing processes.

The partnership enables Acatel, which provides the global fashion industry with sustainable, low impact knitted fabrics for garment dyeing, printing and finishing, to provide added value to its customers by combining fully traceability and carbon positive fibres with its sustainable finishing approach.

The new Acatel collection debuts two biodegradable finishing products – Eco-Print is the first compostable pigment printing system with Cradle to Cradle Platinum certification, made from a water-based printing paste and compostable colours, while the Good Earth Cotton knit uses a bio-based

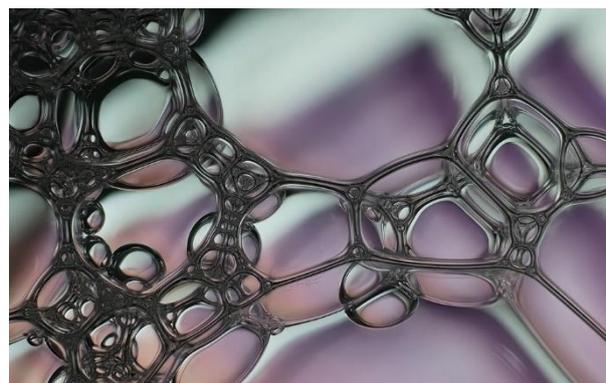
finishing process made from 85% vegetable ingredients.

Good Earth Cotton is the world's first carbon positive cotton which sequesters more carbon than it emits across its entire growth lifecycle in Australia.

The core of FibreTrace technology, meanwhile, is a patented luminescent pigment that is embedded in raw fibres (or optionally at the yarn spinning stage) and is traced, verified and audited in real time at each step of the global textile supply chain. This is achieved via a proprietary handheld Bluetooth scanner that identifies and quantifies pigments in fibres, yarns, fabrics and finished goods that send encrypted data into secure blockchain and software that was specifically designed and engineered for the textile and apparel supply chain.

Click [here](#) for more information.

Clariant launches 100% bio-based surfactants range driving the transition towards renewable carbon



Pixabay

Clariant has unveiled its new Vita 100% bio-based surfactants and polyethylene glycols (PEGs) to help directly address climate change

by helping remove fossil carbon from the value chain.

The introduction of 100% bio-based surfactants and PEGs significantly expands Clariant's Vita designated ingredients. Vita products are based on renewable feedstocks and have at least 98% Renewable Carbon Index (RCI).

Designed for natural formulations targeting a high Renewable Carbon Index (RCI), the new Vita products support manufacturers in maximising the bio-based carbon content of consumer goods such as detergents, hair and body shampoo, paint, industrial lubricants, and crop formulations.

Clariant uses 100% bio-ethanol derived from sugar cane or corn to create the ethylene oxide for its innovative new surfactants and PEGs. The bio-based material is fully segregated along the value chain from the field to the final consumer product.

Because only bio-based feedstocks are used, the ingredients have significantly lower carbon footprints than their fossil-based counterparts. The Vita surfactants are CO₂ emissions savers: they can help save up to 85% of CO₂ emissions compared to their fossil analogues.

Click [here](#) for more information.

Milkweed produces natural high-performance insulation

Vegeto, a Canada-based leader in the sustainable production and processing of plant textile fibers, has launched a high-performance milkweed insulation material. This new product represents an eco-friendly solution for the outdoor clothing and equipment market, notably jackets, handwear and sleeping bags. The nonwoven laminated

textile insulation is a mix of milkweed and kapok fibers, and a biopolymer made from cornstarch.

Testing conducted at an independent laboratory (CTT Group) confirms the product's thermal insulation properties. The CLO value ranges from 2.5 to 4.5, depending on the weight of the chosen product (100 g/m², 150 g/m², 200 g/m² and 250 g/m²). This weight range meets the insulation needs for mild spring weather, as well as for winter's frigid temperatures.

Vegeto has succeeded in developing a "field to fiber" transformation process that meets the ever-growing demand for green raw materials. Although widely common in Canada, milkweed and its virtues remain rather unknown. Vegeto is actively working with Canadian farmers wishing to harvest a stable milkweed crop meeting textile-grade standards.

Click [here](#) for more information.

Parkside develop loose tea pouches and pyramid teabags



Creative Commons

Sustainable flexible packaging specialist, Parkside, has announced it has extended its

collaboration with award-winning tea company, Bird & Blend.

After creating a range of innovative compostable packaging for Bird & Blend's selection of single-serve tea bags in 2021, Parkside has been working closely with the brand to extend the sustainable packaging solution across the company's range of larger loose tea pouches and pyramid teabags.

Parkside's new compostable packaging range for Bird & Blend follows suit from the previous collaboration helping protect natural resources without compromising performance. During the composting process, the packaging breaks down entirely within 26 weeks, and the materials then return to the soil, leaving no adverse effects on the environment.

Click [here](#) for more information.

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Click [here](#) for more information.

New range of beauty innovation from CHANEL with sustainable Sulapac material



Pixabay

CHANEL has launched an innovative and eco-responsible approach to beauty combining skincare, makeup and a fragrance mist: N°1 de CHANEL.

Its formulas honor ingredients of natural origin that are renewable and have reduced environmental impact. They contain up to 97% ingredients of natural origin without compromising effectiveness, safety or sensory quality. The eco-design packaging includes sustainable Sulapac material, and faithful to

the House of CHANEL's exacting standards, every detail was considered.

The full range of packaging for the N° 1 de CHANEL is eco-designed and includes lids that contain bio-based materials. They are the result of a collaboration that began in 2018 between the CHANEL Fragrance and Beauty Packaging Innovation Department and Finnish material innovation start-up Sulapac.

Click [here](#) for more information.

Casio to release PRO TREK with bio-mass plastics



Pixabay

Casio Computer Co., Ltd., announced the latest addition to the PRO TREK line of outdoor watches. The new PRW-61 is the first Casio watch to be made with biomass plastics sourced from renewable organic substances. Produced from regenerable resources, biomass plastics are attracting attention as a material that can help reduce environmental impact by curbing CO₂ emissions.

For the first time in any Casio watch, the PRW-61 uses biomass plastics in the case, band, and case back. The environmentally friendly biomass plastics are produced using materials derived from castor seeds and corn, as well as other raw materials. Casio is proud of this new

material application for its line of outdoor tools, PRO TREK, for nature lovers.

As part of its focus on the Sustainable Development Goals, Casio is pursuing a number of environmentally friendly initiatives, including a shift from plastic to recycled paper in packaging for the PRW-61. Moving forward, Casio will also contribute to efforts to build a circular economy by expanding its use of sustainable materials in the design of other watch models, as well.

Click [here](#) for more information.

Bio-based engineering plastic "DURABIO™" adopted for use in pilot ballpoint pens

Mitsubishi Chemical Corporation announced that MCC's bio-based engineering plastic "DURABIO™" has been adopted as the main body part (rear shaft) of Pilot Corporation's ballpoint pen "Acroball T Series Biomass Plastic" and "FRIXION Ball Knock 05 Biomass Plastic." These products have been offered for sale by Pilot since 3rd February 2022.

DURABIO™ is a bio-based engineering plastic made from the renewable plant-derived raw material "isosorbide," a highly durable material. In addition, the plastic can be applied to various design parts because it has excellent color development during coloring and moldability during processing. These excellent characteristics have been highly evaluated, which has led to its adoption. This is the first case for using DURABIO™ in a stationery application.

The use of biomass plastic made from plant-derived materials such as DURABIO™ can reduce petroleum consumption, which is an exhaustible resource. It can also contribute to the reduction of greenhouse gases that are

said to be the cause of global warming because the plant that makes up the raw material absorbs carbon dioxide during the growth process. MCC will continue to focus on the development of DURABIO™ toward the realisation of carbon neutrality.

Click [here](#) for more information.

Coty starts production of first globally distributed fragrances made using carbon-captured ethanol



Pxfuel

Coty, one of the world's largest beauty companies with a portfolio of iconic fragrance brands, has announced it has started production of the world's first globally distributed fragrances made using carbon-captured ethanol. Production began at the Company's manufacturing facility in Granollers, Spain in mid-January 2022.

Coty is making these fragrances using CarbonSmart™ ethanol produced by partner LanzaTech, a leading supplier of sustainable ingredients that manufactures ethanol by capturing and fermenting carbon emitted by industrial activity before it is released to the atmosphere.

Coty's Granollers plant received over 20 metric tonnes of LanzaTech's carbon-captured

ethanol in mid-January, ahead of schedule; the first delivery under a partnership announced between the two companies in March 2021.

Ethanol is a key ingredient in the production of fragrances and is Coty's top fragrance ingredient by volume. By transforming carbon into a new source of ethanol, Coty and LanzaTech are progressing innovative solutions to reduce the beauty industry's environmental impact.

Carbon-captured ethanol involves nearly zero water consumption and reduces the need for agricultural land, in turn limiting Coty's impact on biodiversity and lowering the Company's carbon emissions related to fragrance production.

Click [here](#) for more information.

Patents

Anaerobic fermentative production of furandimethanol and enzymatic production of FDCA

The present disclosure provides recombinant microorganisms and methods for the anaerobic production of 2,4-furandimethanol from one or more carbon sources. The microorganisms and methods provide redox-balanced and ATP positive pathways for co-producing 2,4-furandimethanol with ethanol and for co-producing 2,4-furandimethanol with ethanol and acetone and/or isopropanol.

The method provides recombinant microorganisms that express endogenous and/or exogenous nucleic acid molecules encoding polypeptides that catalyse the conversion of a carbon source into 2,4-furandimethanol and that couple the 2,4-furandimethanol pathway with an additional

metabolic pathway. The present disclosure further provides enzymatic production of 2,4-furandicarboxylic acid.

Click [here](#) for more information.

USPTO publishes two key Kraig Biocraft Laboratories patent applications



Pixabay

Kraig Biocraft Laboratories, the biotechnology company focused on the development and commercialisation of spider silk, announces that the United State Patent and Trademark Office (USPTO) has recently published two key patent applications filed by the company. These two USPTO patent applications build on Kraig Labs' innovative recombinant spider silk technologies.

These USPTO patent applications are based upon three provisional patents filed in July of 2020. The two consolidated applications were filed in July of 2021. This is the first opportunity for the public to take a look under the hood to see what this powerful intellectual property encompasses and the opportunities they may unlock.

The first of these USPTO applications, titled "Synthesis of High Molecular Weight Proteins Using Inteins", reinvents the company's

approach to manufacturing large-format spider silk protein. This new technology allows for the automated self-assembly of target proteins within the silkworm. This process allows for the opportunity to reach beyond the limits of current protein synthesis technologies.

The second of these USPTO applications, titled "Synthesis of Non-Native Proteins in Bombyx Mori by Modifying Sericin Expression", moves beyond the heavy chain fibroin and creates opportunities for co-production of non-fibrous proteins within sericin. Sericin is the stick glue-like protein holding the silk fibers together, making up roughly 20% of the cocoon, and is broadly considered a waste product.

Click [here](#) for more information.

A biodegradable heat-absorbing hydrogel composition

This invention relates to a biodegradable heat-absorbing hydrogel composition, wherein the heat-absorbing hydrogel composition comprises a seaweed extract in an amount of 1-10% by weight and water in an amount of 85-99% by weight, based on the total weight of the composition.

The invention also relates to: products, including heat-absorbing pads, formed from the composition, a method of dissolving, composting and biodegrading the composition or the products, a method of producing the composition and the products, and a method of cooling using the composition.

Click [here](#) for more information.

Events

Rethinking Materials Summit London, 4th-5th May 2022

The Rethinking Materials summit presents new opportunities for partnerships and investment in the changing landscape of plastics, bio-based alternatives, and circular solutions.

With an emphasis on packaging and performance materials, this year's event provides pivotal insights into the challenges facing C Suite and Director-level stakeholders in tackling plastic waste both upstream and downstream; the viability of new technologies and 'next generation' materials; routes to scaling up; and cross-sector applications in packaging, food & beverage, personal care, pharmaceuticals and more.

Click [here](#) for more information.

Renewable Materials Conference Cologne/*Online*, 10th-12th May 2022

For the second time, nova-Institute presents numerous market highlights from bio- and CO₂-based chemicals and materials as well as from chemical recycling: All material solutions based on renewable carbon. Together, there is sufficient potential to completely replace petrochemicals by 2050. To tackle climate change at its roots, all additional fossil carbon from the ground must be substituted with renewable alternatives.

Click [here](#) for more information.

CHEMUK 2022 Birmingham, 11th-12th May 2022

A brand new 'feature area' for CHEMUK 2022 sees the introduction of the 'Bio-based Chemicals & Processing' INNOVATION ZONE. Bringing together illuminating 'poster displays', from across the rapidly evolving 'biochemical/industrial biotech' landscape, together with on-site responsible key personnel, the zone provides a hugely valuable showcase of some of the most exciting breakthrough innovation in this sector.

Click [here](#) for more information.

RRB 2022 Bruges, 1st-3rd June 2022

Delegates from university, industry, governmental and non-governmental organisations, and venture capital providers will present their views on industrial biotechnology, sustainable (green) chemistry and agricultural policy related to the use of renewable raw materials for non-food applications and energy supply.

The conference further aims at providing an overview of the scientific, technical, economic, environmental, and social issues of renewable resources and biorefineries in order to give an impetus to the biobased economy and to present new developments in this area.

Click [here](#) for more information.

IBioIC's 8th Annual Conference Glasgow, 6th-7th June 2022

This conference will focus on how sustainable development in industrial biotechnology can secure Scotland's path to Net Zero.

IBioIC's annual conference is the largest industrial biotechnology conference in the UK and attracts an ever-growing cohort of key figures across policy, industry, and research and academia.

Delegate registration, exhibition and sponsor opportunities have been launched.

Click [here](#) for more information.

EFIB 2022 Vilnius, 6th-7th October 2022

Europe's leading event on industrial biotechnology and the bioeconomy.

Click [here](#) for more information.

European Biosolids & Bioresources Conference & Exhibition Birmingham, 22nd-23rd November 2022

The conference provides an essential annual update on the latest innovations, best practice, cutting-edge technology and research in the biosolids and resource management industries.

The 2021 programme included a great line-up of speakers, and included sessions on Anaerobic Digestion, Resource Recovery, Sludge Planning and Landbank Issues, and Pre and Post Digestion Processes.

Following the success of last year's hybrid event, both live and online attendance will be available again this year. Hear from 40+ speakers, meet exhibitors face-to-face and network with 250+ attendees.

Click [here](#) for more information.

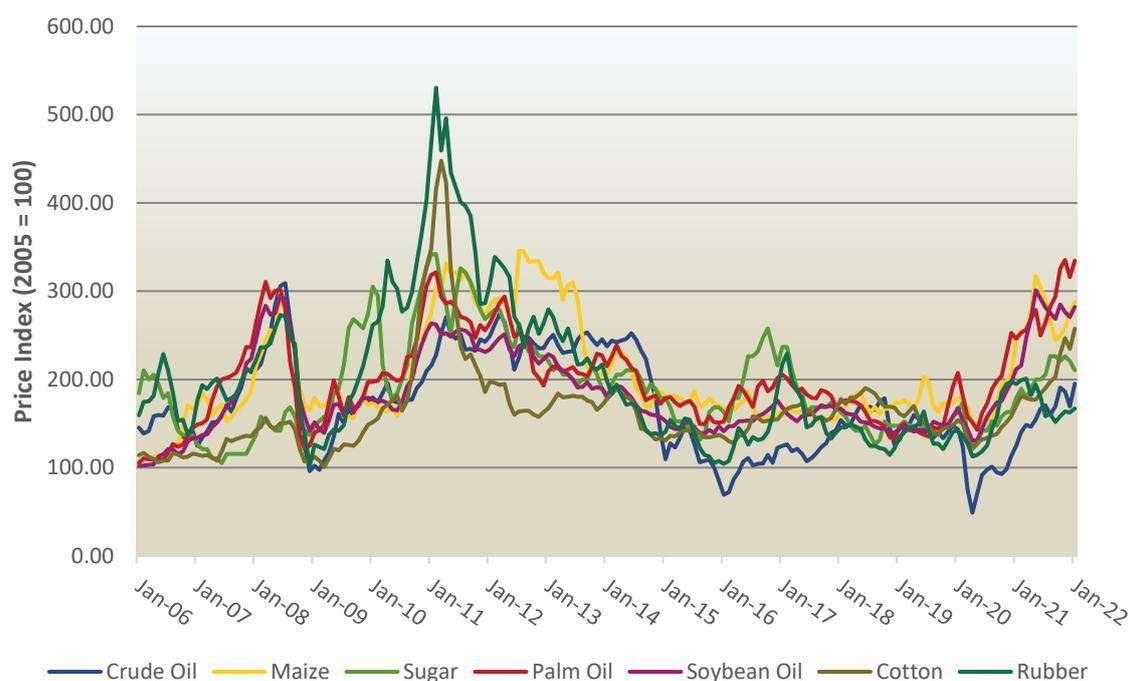
Price Information

Spot Prices of feedstocks as of today and five years ago, and percentile price change. Arrows indicate rise (↑), constant (-) or fall (↓) from previous month.

Item	Price, US\$ (Jan 22)	Price, US\$ (Jan 17)	Price Change
Crude oil (petroleum, barrel)	83.92 (↑)	53.59 (↑)	57%
Maize (corn, metric ton)	276.62 (↑)	159.99 (↑)	73%
Sugar (pound)	0.40 (↓)	0.45 (↑)	-11%
Palm oil (metric ton)	1,344.79 (↑)	825 (↑)	63%
Soybean oil (metric ton)	1,469.56 (↑)	876.85 (↓)	68%
Cotton (kilogram)	2.91 (↑)	1.82 (↑)	60%
Rubber (kilogram)	1.97 (↑)	2.56 (↑)	-23%

For details on indexes please see www.indexmundi.com/commodities

Raw materials 16-year Price Indices



For details on the nature of these commodities please see www.indexmundi.com/commodities

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NNFCC is a leading international consultancy with expertise on the conversion of biomass to bioenergy, biofuels and biobased products.

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