

The Bioeconomy Consultants

NNFCC 



News Review

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



Contents

Contents.....	2
Foreword.....	3
Policy.....	4
Markets.....	5
Research & Development.....	6
Polymers	7
Chemicals	11
Consumer Products.....	14
Patents.....	16
Events.....	17
Price Information.....	19

Foreword

Welcome to March's edition of NNFCC's biobased products News Review.

Around this time last year, we reported on a story that had a pleasant circularity to it: SYNlawn's announcement of their artificial grass made from plastic derived from sugarcane. This was, in effect, artificial grass made from real grass, which was an innovation that amused us in-house.

It would appear that said amusement is to repeat itself, as this month brings the announcement from LEGO of its first biobased components: plants. All of the toy brand's plant-shaped building blocks are set to be made from biobased polyethylene from 2018, once again, in effect, making plants from plants. This is part of LEGO's ambition for widespread use of sustainable materials by 2030, and with continuing development of biobased plastics, and the amount of R&D investment they're making into such materials, they won't be short of options for the rest of their products.

This month there is also big news on the European policy front, with the announcement of the new EU rules regarding waste management. The recent EU strategy on plastic waste focused very strongly on mechanical recycling of plastics, which is the right direction to take in order to promote a circular plastic economy in Europe. The new rules will set legally binding targets for member states to have achieved by 2035. The targets include 65% of municipal waste to be recycled by 2035, with a specific target for plastic packaging to be 55% recycled by 2030. How member states go about this is up to them, as long as they achieve these targets. As discussed alongside the plastic waste strategy, the solution lies across all stages of the value chain, with better design of plastic packaging required to promote recycling, as well as wider deployment of the infrastructure required to undergo this recycling. It is unclear whether the UK will be bound to these targets post-Brexit, but even if we are not, it would be worthwhile to retain similar targets, if only under our own umbrella.

In other EU policy news, the European Commission is looking to update its Bioeconomy strategy. The strategy was adopted in 2012, and has been a success, that it has raised the profile of the bioeconomy across the continent, and has gone some way to helping the bioeconomy to establish itself in Europe. However, the strategy is now over 5 years old, and the Commission feels its focus needs realigning to better reflect the current bioeconomy climate in Europe. To this end, the Commission has invited responses from members of the bioeconomy to help shape that new vision. Hopefully with this update, the strategy will continue to do good work in promoting the bioeconomy in Europe.

Read on for the latest news.

Policy

European Commission seeks to update Bioeconomy Action Plan

The 2012 EU Bioeconomy Strategy aimed "...to pave the way to a more innovative, resource-efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection". In 2017 the Commission carried out a review of its 2012 EU Bioeconomy Strategy (SWD(2017)374), which concluded that the Strategy is delivering on key actions and that the importance of the opportunities offered by the Bioeconomy is increasingly recognised in Europe and beyond.

Nevertheless, as shown in the SWD, while the objectives of the 2012 EU Bioeconomy Strategy continue to be relevant, and the accompanying Action Plan has delivered on its proposed objectives, a refocusing of the actions and assessment of the scope of the Strategy are considered necessary in light of recent policy developments.

In light of the context described above, an update of the Bioeconomy Strategy and its Action Plan is needed to ensure that its scope and framing are better focused and aligned with the EU political priorities and future challenges. This will lead to the Strategy having more impact and delivering more effectively results in all relevant policy areas, thus enabling higher policy coherence and a reinforced sustainable, circular Bioeconomy across Europe, while also becoming a model for other regions.

Ensuring a sustainable economy through the substitution of non-renewable resources with

biological and natural resources in industrial and energy processes remains a challenge that needs to be matched with the need that ecosystems are in good condition and continue to supply their services in the long term and biodiversity is not adversely impacted.

To this end, a systemic approach to future-proofing food systems in Europe, as part of a strategic, system-wide coordination across all policy areas relevant to the Bioeconomy, is essential.

Click [here](#) for more information.

New EU recycling rules agreed



Pxhere

EU ambassadors endorsed the provisional agreement on the four legislative proposals of the waste package reached with the European Parliament on 18 December 2017. The waste package will lead to more recycling of waste and contribute to the creation of a circular economy. It will improve the way waste is managed as well as encourage the re-use of valuable material embedded in waste.

The new rules establish legally binding targets for waste recycling and the reduction of landfilling with fixed deadlines. These targets will increase the share of municipal waste and packaging waste

which is recycled, with specific targets for the recycling of materials used in packaging. The rules also include targets for reducing the amount of municipal waste which is landfilled.

Member states will have to set up, by 1 January 2025, separate collection for textiles and for hazardous waste from households. In addition, they have to ensure that by 31 December 2023, bio-waste is either collected separately or recycled at source (e. g. home composting). This is in addition to the separate collection which already exists for paper and cardboard, glass, metals and plastic.

This package also establishes minimum requirements for all extended producer responsibility schemes. Producers of products under these schemes must bear responsibility for the management of the waste stage of their products. Producers will be required to pay a financial contribution for that purpose. In addition, mandatory extended producer responsibility schemes for all packaging have also been introduced in Union legislation.

Landfilling of waste leads to pollution of surface water, groundwater, soil and air. Therefore, the legislation also contains a specific landfill reduction target. Member states shall endeavour to ensure that as of 2030, all waste suitable for recycling or other recovery, in particular in municipal waste, shall not be accepted in a landfill. The only exception concerns waste for which landfilling delivers the best environmental outcome. In addition, member states will ensure that by 2035 the amount of municipal waste landfilled is reduced to 10% or less of the total amount of municipal waste generated.

Overall, member states consider that these EU wide targets will create the minimum scale for EU industry to invest in new recycling techniques and technology.

Click [here](#) for more information.

Markets

BioAmber offers common stock to public



Bioamber

BioAmber Inc. announced that it has priced an underwritten public offering of an aggregate of 40 million Series A units (or equivalent Series B Units), with each Series A unit consisting of one share of common stock, one Series A warrant to purchase one share of common stock and one Series B warrant to purchase one share of common stock, and each Series B unit consisting of one pre-funded warrant to purchase one share of common stock, one Series A warrant to purchase one share of common stock and one Series B warrant to purchase one share of common stock, at a price to the public of US\$0.25 per Series A unit and US\$0.24 per Series B unit.

The Series A warrants have an exercise price of US\$0.25 and a term of six (6) months, exercisable upon the date of issuance. The Series B warrants have an exercise price of US\$0.25 and a term of five (5) years, exercisable upon the date of issuance. The pre-funded warrants have an exercise price of US\$0.25 per share, which will be pre-paid upon issuance, except for a nominal exercise price of US\$0.01 per share and, consequently, no additional payment or other consideration (other than the nominal exercise price of US\$0.01 per share) will be required to be delivered to the Company by the holder upon exercise of the pre-funded warrants. The pre-funded warrants will be exercisable upon the date

of issuance until exercised in full. The shares of common stock and the warrants will be immediately separable and will be issued separately.

The aggregate gross proceeds to the Company (assuming no exercise of the warrants) are approximately US\$10 million, before deducting underwriting discounts and commissions and estimated offering expenses.

Click [here](#) for more information.

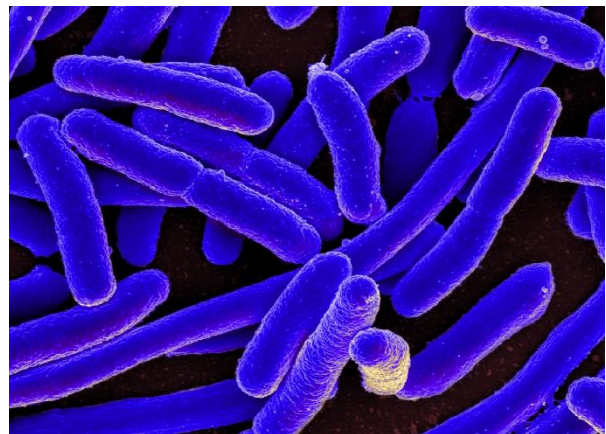
Research & Development

Paper seeks to solve E. coli isoprenoid problem

Escherichia coli has been the organism of choice for the production of different chemicals by engineering native and heterologous pathways. In the present study, the authors simultaneously address some of the main issues associated with E. coli as an industrial platform for isoprenoids, including an inability to grow on sucrose, a lack of endogenous control over toxic mevalonate (MVA) pathway intermediates, and the limited pathway engineering into the chromosome. As a proof of concept, they generated an E. coli DH1 strain able to produce the isoprenoid bisabolene from sucrose by integrating the cscAKB operon into the chromosome and by expressing a heterologous MVA pathway under stress-responsive control. Production levels dropped dramatically relative to plasmid-mediated expression when the entire pathway was integrated into the chromosome. In order to optimize the chromosomally integrated MVA pathway, we established a CRISPR-Cas9 system to rapidly and systematically replace

promoter sequences. This strategy led to higher pathway expression and a fivefold improvement in bisabolene production. More interestingly, they analysed proteomics data sets to understand and address some of the challenges associated with metabolic engineering of the chromosomally integrated pathway. This report shows that integrating plasmid-optimized operons into the genome and making them work optimally is not a straightforward task and any poor engineering choices on the chromosome may lead to cell death rather than just resulting in low titres. Based on these results, they also propose directions for chromosomal metabolic engineering.

Click [here](#) for more information.



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Polymers

UPM releases plant-based PE film

UPM Raflatac is extending its range of film face materials for the European market with a new white plant-based material that provides a sustainable alternative to fossil-based films for a wide variety of end uses.

RafBio PE White performs just like standard PE film, and its excellent flexibility makes it ideal for the squeezable bottles and contoured containers that are widely used in home and personal care applications. Part of the RafBio family of bio-based labelling solutions, RafBio PE White and Clear are the ideal choices for customers who are looking for sustainable film face materials that will reduce greenhouse gas emissions during their life cycle, compared to conventional PE, while still keeping products looking their very best.

Made from sugarcane ethanol, the films contain more than 80% renewable plant-based raw material and are recyclable within the same recycling streams as fossil-based PE. RafBio PE films are combined with our RP37 adhesive for multi-purpose labeling applications.

Furthermore, UPM Raflatac's RafCycle(TM) program offers significant benefits to label printers and end users by turning waste into valuable resources.

Click [here](#) for more information.

Middle-East's first bio-nylon plant planned



Max Pixel

Sebacic Oman SAOC plans to build a bio-based nylon project as forward integration of its soon-to-be-commissioned sebacic acid project in the Duqm free zone.

The 10,000-tonne per annum-capacity project, which is expected to produce two grades of bio-nylon (nylon 6-10 and nylon 10-10), will have an estimated capital expenditure of \$250 million.

This is going to be the first project to produce bio-based nylon in the entire Middle East region.

Bio-based nylon, which will have applications in aerospace and in engineering polymers, will use sebacic acid from the company and benzene and sulphur from Sohar-based Oman Oil Refineries and Petroleum Industry (Orpic) as raw materials.

The entire production from the project will be for export to the United States, Japan and Europe. At present, only few countries in the world, such as China, the United States and Europe, produce bio-nylon.

Meanwhile, Indian and Omani investors are promoting the state-of-the-art export-oriented sebacic acid project with a capital expenditure of \$62.7 million. Sebacic acid is manufactured from castor oil. The project has a capacity to produce 30,000 tonnes of sebacic acid per annum and it is

used to make high performance engine oil and lubricants, adhesives, engine coolants, biodegradable packaging, sub-sea pipe/cable coatings, aerospace polymers, anti-corrosion applications and bio-plastics.

The Oman government's tax-free incentives in Duqm and good port connectivity were some of the advantages considered before locating the project there. The demand for sebacic acid is growing due to a ban on plastics to package food products for children in several developed countries and due to increasing aerospace applications.

Click [here](#) for more information.

OK Compost passes into new hands



OK Compost

TUV AUSTRIA Group has taken over the OK compost label from the independent Belgian testing institute Vincotte and integrated these activities into TUV AUSTRIA Belgium. Plans are underway to expand the product certification service, which labels bio-based, biodegradable and compostable products.

TUV AUSTRIA pays constant attention to the CEN during the development of the European standards. Hence it also kept abreast of the process for developing a European standard for compostable packaging (EN 13432). Under this heading, the OK compost certification was consistent with EN 13432 as soon as it was adopted in 2000. All OK compost certified

products are therefore completely in step with the requirements of the European standard EN 13432.

OK compost is a guarantee of compostability in an industrial composting plant. But what about guarantees for home compostable products? Or products that can decompose in earth or water? TUV AUSTRIA's OK environment product verification marks are the only ones of their kind to offer a customised certification label for each biodegradation environment. These labels both consistently complement each and are extendible.

TUV AUSTRIA is a certification body authorised by European Bioplastics and may therefore award the Seedling logo to products that are in compliance with EN 13432. By awarding both the OK compost and the Seedling logo, Vincotte's certificate holders have a way to give their compostable products recognition throughout the entire European market.

Via the "OK biobased" certification system, innovative manufacturers can have their declarations regarding the use of renewable raw materials officially confirmed by an independent "OK biobased" certification.

Click [here](#) for more information.

Discussion of new EU biodegradable mulch-film standard



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EN 17033 is the new product standard for biodegradable mulch films for use in agriculture and horticulture and specifies the necessary requirements and test methods. The standard is designed to be a clear reference for farmers, distributors, and stakeholders, and to be the basis for further certification and according labels for biodegradable mulch films. EN 17033 is likely to replace other pre-existing national standards in Europe.

EN 17033 specifies test methods and evaluation criteria regarding the biodegradation, ecotoxicity, film properties, and constituents of the biodegradable mulch films. The responsible European Committee CEN/TC 249/WG 7 (Thermoplastic films for use in agriculture) decided to use the pre-existing and well-established certification "OK Biodegradable soil" as basis for the new standard, which requires 90% CO₂ conversion within 24 months in a soil biodegradation test. Additionally, the standard includes a new, more comprehensive ecotoxicity testing and evaluation scheme taking into account relevant terrestrial organism groups such as plants, invertebrates (e.g. earthworm), and microorganisms (e.g. nitrification inhibition test); important ecological processes that are critical due to their role in maintaining soil functions by

breaking down organic matter and formulating soil structure and ecologically recycling of materials; and relevant exposure pathways of degradation products such as soil pore water, soil pore air and soil material. Moreover, the standard strictly defines use restrictions regarding different potentially harmful constituents, such as regulated metals and substance of very high concern.

The standard also specifies the dimensional evaluation of the films as well as the optical properties for weed control, and mechanical properties.

While biodegradable mulch films only have to be strong enough to be laid out on the field, conventional mulch films have to be strong enough to be recovered. Accordingly, a recommendation to only use conventional mulch film thicker than 25 μ was added into the scope of the relevant standard EN 13655 when revised to make sure they can be collected after use.

Furthermore, the standard recommends to clearly mark biodegradable mulch films and their packaging and to include a reference to the standard, in order to allow farmers to be certain the mulch films will disintegrate and biodegrade without leaving harmful residue in the soil. EN 17033 also contains nine annexes including detailed specifications on how to perform different tests mentioned in the standard, and providing relevant information on the classification of films depending on the crops, as well as relevant recommendations for farmers on the application of biodegradable mulch films.

Click [here](#) for more information.

Construction begins on Parma PHA plant



SECI

The company SECI, holding belonging to the Maccaferri family, announced the launch of the bioplastics project to be carried out at the San Quirico production site using the Bio-on technology. The project will be carried out by the company Sebiplast s.r.l., a controlled company of the SECI Group, in the production site where today stands the sugar factory managed by the operating company of the SECI Group, Sadam S.p.A.

The choice of the San Quirico (PR) production site will guarantee the bioplastics project to benefit from synergies and common services with the sugar factory, but without interfering with the latter's production activity.

During the first part of the year there will be carried out the detailed engineering activities and the purchase of critical equipment as well as the site preparation works and the demolitions necessary to make ready the area on which the PHA plant will be built up. The project is expected to enter into production in approximately 24 months with an initial production capacity of 5,000 tons / year. The design activities, scheduled to start in the coming days, will take into account the possibility to expand the production capacity up to 10,000 tons / year and possible future additions with other industrial activities related to green chemistry which are part of the development and diversification plans of the Group.

The PHAs (polyhydroxyalkanoates) are bioplastics that can replace several conventional polymers currently made with petrochemical processes using hydrocarbons. The PHAs developed by Bio-on guarantee the same thermo-mechanical properties as conventional plastics with the advantage of being 100% naturally biodegradable.

The two companies, already active in sustainable bio-chemistry and in the industrial development of the Levulinic Acid production with Sadam, will work together to take a further step towards the construction of the platform for the production of the bioplastic of the future.

Click [here](#) for more information.

Partnership to seek biobased plastic additives

Biomass magazine reports that Meridian Waste Solutions Inc., an innovative technology and integrated, non-hazardous solid waste services company, recently announced a strategic partnership with Genarex FD LLC to develop a broader range of bio-additives for the plastics market.

Genarex extracts otherwise low-value materials from corn ethanol by-products and uses these materials as bio-additives in plastics.

The U.S. corn ethanol industry produces about 50 million tons of a low-value by-product referred to as distillers dried grains, or DDGS. Genarex's technology removes a portion of the DDGS and converts it into a polymerized material branded as Bylox. This material has proven to have a high value as a functional filler in numerous plastic formulations.

Attis Innovations, a wholly owned subsidiary of Meridian Waste Solutions, recovers lignin from the by-product stream of biomass processing industries, such as pulp and paper and cellulosic

ethanol. Attis' recovered lignin is unique in that it is a melt flowing biomaterial that is low cost and acts as a highly functional polymerized biofiller in applications such as plastics, adhesives and transportation fuels.

The combination of the two offerings adds value to a vast array of plastics conversion technologies, including blown and cast films, injection moulding, profile and sheet extrusion, thermoforming, and rotational moulding. Bioplastics including PLA, PBAT, PBS, and traditional plastics including PE, PP, PVC, and PS are just a few of the resin systems which can be extended or improved with the combined portfolio of products. The products offered by both companies are entirely biobased and offer resin extension at cost parity or cost savings to existing fossil fuel-derived feedstocks.

Click [here](#) for more information.

Chemicals

Stora Enso releases lignin alternative to fossil-phenols

The launch of Lineo™ by Stora Enso is another important step on the way to replacing fossil-based materials with renewable solutions. Lineo is available to companies seeking more sustainable, bio-based alternatives.

Lignin is one of the main building blocks of a tree and makes up 20-30% of the composition of wood. Yet it has traditionally been discarded by the pulp and paper industries. However, Stora Enso has recognised the potential of this versatile raw material, which can be used in a range of applications where fossil-based materials are currently used.

Lignin is a renewable replacement for oil-based phenolic materials which are used in resins for plywood, oriented strand board (OSB), laminated veneer lumber (LVL), paper lamination and insulation material.

Stora Enso has been producing lignin at industrial scale since 2015 at its Sunila pulp mill in Finland. The mill's capacity is 50 000 tonnes of lignin per year, making Stora Enso the largest kraft lignin producer in the world. Stora Enso is already selling Lineo to replace phenol, and the company is also looking at many other applications for this very versatile material.

A stable, free-flowing brown powder, Stora Enso's lignin is separated during the kraft pulping process of Nordic softwood. Lineo has a high dry content, superior dispersibility and long storage time. With a higher reactivity and purity, Lineo is consistent from batch to batch and Stora Enso can supply different levels of dryness, according to customer demand.

Click [here](#) for more information.



Stora Enso

Rotterdam plant to produce methanol from waste

A consortium of companies comprising Air Liquide, AkzoNobel Specialty Chemicals, Enkema and the Port of Rotterdam has signed a project development agreement covering initial investments in an advanced waste-to-chemistry facility in Rotterdam.

The facility will be the first of its kind in Europe to provide a sustainable alternative solution for non-recyclable wastes, converting waste plastics and other mixed wastes into new raw materials.

The initial investments, which cover detailed engineering, the setup up of a dedicated joint venture and completing the permitting process, will be worth €9 million. The consortium aims to take the final investment decision (FID) for the estimated €200-million project later in 2018.

Realization of the project is supported by the Dutch Ministry of Economic Affairs & Climate policy, which have agreed to develop mechanisms and regulation that will help bring this new technology to full scale to support the low-carbon transition of the Dutch economy. The waste-to-chemistry project is also supported by the city of Rotterdam, the Province of Zuid-Holland and InnovationQuarter, the regional development agency.

The facility will convert up to 360,000 tons of waste into 220,000 tons (270 million litres) of "green" methanol. As an equivalent, this represents the total annual waste of more than 700,000 households and represents a CO₂ emission savings of about 300,000 metric tons.

The facility will be built within the Botlek area of the Port of Rotterdam using Enkema's proprietary technology, and will convert non-recyclable mixed waste, including plastics, into syngas and then into clean methanol for use in the chemical industry and for the transportation sector.

Today, methanol is generally produced from natural gas or coal. The plant will have two production lines, or twice the input capacity of Enkema's commercial-scale plant in Edmonton, Canada. It will benefit from the state-of-the-art infrastructure available within the Port of Rotterdam, as well as synergies with Air Liquide (large industries) for supplying the required oxygen and together with AkzoNobel, the raw material hydrogen. AkzoNobel also acts as a customer for the methanol.

Click [here](#) for more information.

New company founded to produce algal omega-3 fatty acids



Pixabay

DSM and Evonik have established a new company, Veramaris V.O.F., for the production of omega-3 fatty acids EPA and DHA from natural marine algae for animal nutrition. The 50:50 joint venture is headquartered at the DSM Biotech Campus in Delft (Netherlands).

Veramaris's breakthrough innovation – an algal oil – will, for the first time, enable the production of the omega-3 fatty acids EPA and DHA for animal nutrition without using fish oil from wild-caught fish, a finite resource. DSM and Evonik announced their intention to start this joint venture in March 2017. Since then, all necessary approvals have been received.

Construction of the US\$200 million production facility at the Evonik site in Blair, Nebraska (United States), has commenced and is proceeding according to plan. Commercial quantities of the algal oil rich in the essential omega-3 fatty acids EPA and DHA will be ready for sale in 2019. Pilot quantities for market development purposes are already available. The initial annual production capacity will meet roughly 15% of the total current annual demand for EPA and DHA by the salmon aquaculture industry.

Until recently, the omega-3 fatty acids EPA and DHA added to animal feed have been almost exclusively from marine sources such as fish oil and fishmeal, which are finite resources. Currently, a total of 16 million metric tons of wild fish are caught for the production of fish oil and fishmeal. By using natural marine algae, Veramaris contributes to closing the omega-3 EPA and DHA supply-demand gap, while helping to conserve marine life and biodiversity in the oceans.

Click [here](#) for more information.

New process improves efficiency of biobased MEG production

The U.S. Patent and Trademark Office published a new patent application (U.S. 62/345,399) from the Iowa Corn Promotion Board (ICPB) adding to a previously issued U.S. patent on a proprietary production method using corn in the industrial manufacturing of a raw material called monoethylene glycol (MEG). MEG is an industrial chemical used in the manufacture of antifreeze, plastic bottles for pop or bottled water, and polyester clothes. Today, MEG makes up about 30 percent of the bottles and polyester. The patent covers an improvement in the process conditions to increase efficiency from approximately 60 percent to 85 percent yield.

The current way bio-MEG is made is through a conversion of sugarcane ethanol, which is usually

sourced from Brazil, to ethylene, but still the majority of MEG comes from fossil fuels. ICPB's patented process can eliminate the added costs of bio-MEG by going from corn sugar to MEG in one step.

Most MEG currently goes into making polyethylene terephthalate (PET), a plastic used for beverage bottles, polyester textiles, and films, but MEG can also be used as anti-freeze, coolants, aircraft de-icers and industrial solvents. Plastic companies are currently making limited quantities of bottles utilizing biobased MEG made from sugarcane-based ethanol imported from South America. In 2016, 62 billion pounds of MEG were sold. The market continues to grow at the rate of about four percent a year and that four percent equates to about 94 million bushels of corn.

Investment of checkoff dollars in research and business development allows for a direct return on Iowa corn farmer investments. Consequently, ICPB research programs have continued to grow. ICPB research programs aim to find new and innovative uses of corn, such as plastics and industrial chemicals. ICPB develops and licenses intellectual property to partner with companies; this strategy will increase the commercialization of new products related to corn and create new opportunities for corn farmers.

Click [here](#) for more information.

Consumer Products

New LEGO plants to be made from... plants



Flickr

LEGO® botanical elements such as leaves, bushes and trees will be made from plant-based plastic sourced from sugarcane in the future and will appear in LEGO boxes already in 2018.

Production has started on a range of sustainable LEGO® elements made from plant-based plastic sourced from sugarcane. The new sustainable LEGO 'botanical' elements will come in varieties including leaves, bushes and trees.

The move is part of the LEGO Group's commitment to use sustainable materials in core products and packaging by 2030.

The new sustainable LEGO elements are made from polyethylene, which is a soft, durable and flexible plastic, and while they are based on sugarcane material, they are technically identical to those produced using conventional plastic. The elements have been tested to ensure the plant-based plastic meets the high standards for quality

and safety that the LEGO Group has, and consumers expect from LEGO products.

The unique LEGO brick design, and the LEGO Group's uncompromised focus on quality and safety during the past 60 years ensures that two LEGO bricks produced decades apart can still fit together. As the LEGO Group is working towards using sustainable materials in its core products and packaging, it will remain strongly rooted and driven by the uncompromised focus on high product quality and safety.

The LEGO Group has partnered with WWF to support and build demand for sustainably sourced plastic, and has joined the Bioplastic Feedstock Alliance (BFA), an initiative of WWF, to secure fully sustainable sourcing of raw material for the bioplastics industry. The plant-based plastic used to make the botanical LEGO elements is certified by the Bonsucro Chain of Custody standard for responsibly sourced sugarcane.

Click [here](#) for more information.

Biobased Tetra-Pak delivery passes half-billion mark

Tetra Pak has now delivered more than half a billion packs of Tetra Rex® Bio-based, the world's first beverage carton to be manufactured entirely from renewable materials. The landmark event was announced at the Museum of Brands, in London, where the package, is featured in a new sustainability display, opening to the public today.

Tetra Rex® Bio-based, which was launched in October 2014, is manufactured solely from Forest Stewardship Council™ (FSC™) certified and controlled sources paperboard, together with plastics derived from sugar cane, all traceable to their origins.

Packages made from renewable materials are essential for preserving the environment for future

generations. Renewable resources can be replenished naturally over time and enable a move away from fossil fuel-based materials, reducing the environmental impact as well as improving resource efficiency.

The Sustainable Packaging display opens today at the Museum of Brands, and will be showing a selection of initiatives that help reduce the burden of packaging on the environment.

Click [here](#) for more information.

Evonik to debut biobased children's glasses



Evonik

They're lightweight, colourful, and absolutely safe: a cute pair of children's glasses that Evonik will be presenting at this year's MIDO Eyewear Show in Milan. A sophisticated combination of materials—TROGAMID® Terra, a transparent, microcrystalline biopolyamide, and VESTAMID® Care, a medically approved polyamide 12 elastomer—unites unlimited freedom in design with uncompromising safety and health.

The outer frame of the children's glasses is made of TROGAMID® Terra. This biopolymer is manufactured from up to 50 percent renewable raw materials, such as palm kernel and coconut oils. Its rigidity, low weight, and considerable resistance to abrasion, heat, and chemicals are what make the plastic so impressive.

The inner frame and nose pads of these glasses were designed with VESTMID® Care ME, a polyether block amide (PEBA) that weighs very

little and is unusually soft to the touch, which maximizes comfort for the wearer. "When we selected the materials, we switched over to a medical product class, because we also wanted the inner frame of the glasses to prevent injury and slippage—two properties that are especially important in children's glasses," says Eric Chen, General Manager from Chinese eyewear manufacturer Hwa Mao Optical (Xiamen).

Another grade of VESTAMID® Care ME is the material of choice for the temple elements. This high-performance plastic is hard enough for the glasses to sit well, yet at the same time feels pleasant against the skin. The material makes it possible to avoid the use of metal for connecting the temple arms to the front of the frame, and allows for child-appropriate temple designs that can be changed with very little effort. The use of a medically approved product class rules out the possibility of irritation or other allergic responses in sensitive children's skin.

Its over 50 years of experience make Evonik a leader in the development and manufacture of high-performance plastics for a variety of applications. In addition to PA 12, PEBA, and PEEK, the specialty chemicals company also offers its "Terra" product line of biopolyamides, which closes the gap in the spectrum of polyamide properties that could previously be attained.

Click [here](#) for more information.

Amyris and NIKKOL release pharmaceutical-grade biobased squalane

Amyris, Inc., the industrial bioscience company, announced that Aprinova, its joint venture with NIKKOL GROUP, has launched pharmaceutical grade Neossance® Squalane USP. This new material meets the industry standards required by the United States Pharmacopeia (USP) and the National Formulary (NF) for drug actives and pharmaceutical excipients, which are used by regulatory agencies and manufacturers to ensure products have the appropriate identity, quality, purity, and consistency. As a result, Aprinova is now able to supply these industries with FDA-regulated sugarcane-derived squalane, which was previously unavailable to these markets since shark-derived squalane was the only source reference in the regulatory monograph for squalane.

Amyris's Aprinova cosmetic ingredients joint venture has now delivered over 50% annual revenue growth since the joint venture was announced and is the leading source of one of the world's leading natural skin nourishment ingredients. This approval enables significant expansion of this business across numerous product applications. These include topical and dermal cosmetic applications such as therapeutic skin creams and ointments.

Click [here](#) for more information.

Patents

Polyhydroxyalkanoate copolymer compositions and methods of making the same

A polyhydroxyalkanoate copolymer composition is provided. The composition comprises a plurality of polyhydroxyalkanoate copolymer molecules. The polyhydroxyalkanoate copolymer molecules (i) comprise 3-hydroxybutyrate monomers and 4-hydroxybutyrate monomers, (ii) have a monomeric molar percentage of 4-hydroxybutyrate monomers of 23.5 to 75%, and (iii) have a biobased content of $\geq 80\%$. Also provided is a method of making a polyhydroxyalkanoate copolymer composition. The method comprises culturing an organism in the presence of one or more carbon raw materials under conditions under which (a) the one or more carbon raw materials are converted to 3-hydroxybutyryl-CoA and 4-hydroxybutyryl-CoA and (b) the 3-hydroxybutyryl-CoA and the 4-hydroxybutyryl-CoA are polymerized to form the polyhydroxyalkanoate copolymer molecules, thereby forming the composition. The organism has been genetically engineered to comprise particular enzymatic activities, and to not comprise other particular enzymatic activities. The one or more carbon raw materials, taken together, have a biobased content of $\geq 80\%$.

Click [here](#) for more information.

Events

Communicating Sustainability – BioBase4SME Training Brussels, 14th March 2018

The bioeconomy is a concept many people are still confused by or unaware of. However, consumers are increasingly willing to spend money on products with strong environmental credentials. Bio-based alternatives with a strong sustainability narrative can help to meet growing demand for these solutions.

You are invited to join a training workshop tailored to bioeconomy SMEs on the benefits of sustainability communications and how to develop strategies to boost the marketability of your products.

Click [here](#) for more information.

World Bio Markets Amsterdam, 20th-22nd March 2018

With governments committed to reducing emissions and consumers becoming more educated about where their products come from, there are opportunities for the bio-based sector to become a true contender to fossil oil. Yet long development times, lack of investment, and challenges in attaining a secure and sustainable supply chain have made it difficult for the bio-economy to achieve commercial success.

This event provides a platform for the entire global value chain, from feedstock producers to consumer brands, to work together to overcome these challenges.

Click [here](#) for more information.

Global Bioeconomy Summit 2018

The first Global Bioeconomy Summit was held in 2015 and brought together more than 700 bioeconomy stakeholders from over 80 countries. Since then, Bioeconomy has taken a steep and exciting way forward. Many notable initiatives and collaborative efforts have been initiated by the bioeconomy community in order to drive the development of sustainable bioeconomies in their countries and regions.

The 2nd GBS will focus on emerging concepts and future trends in bioeconomy, the latest on challenges and opportunities related to ecosystems, climate action and sustainable development along with the bioeconomy innovation agendas and global governance initiatives to manage them.

Click [here](#) for more information.

EUBCE Copenhagen, 14th-18th May 2018

We look forward to the 26th EUBCE in 2018 in Denmark and to the many vibrant topics that will be included in the agenda. The core of the traditional EUBCE conference will be held over 4 days.

Members of the national organising committee will organise special technical visits to sites in the centre of the country where biomass is the key renewable feedstock into processes producing renewable energy, biofuels, biochemicals and biomaterials as well as integrating bioproducts into traditional established fossil-based systems.

Click [here](#) for more information.

International Conference on Bio-based Materials Köln, 15th-16th May 2018

The 11th International Conference on Bio-based Materials is aimed at providing international major players from the bio-based building blocks, polymers and industrial biotechnology industries with an opportunity to present and discuss their latest developments and strategies.

Click [here](#) for more information.

RRB 14 Ghent, 30th May - 1st June 2018

The 14th edition of the International Conference on Renewable Resources & Biorefineries will take place in Ghent, Belgium from Wednesday 30 May until Friday 1 June 2018. Based on the previous RRB conferences, this conference is expected to welcome about 350 international participants from over 30 countries.

Delegates from university, industry, governmental and non-governmental organizations 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.

1st PHA Platform World Congress Köln, 4th-5th September 2018

This PHA-platform is made up of a large variety of bioplastics raw materials made from many different renewable resources. Depending on the type of PHA, they can be used for applications in films and rigid packaging, biomedical applications, automotive, consumer electronics, appliances, toys, glues, adhesives, paints, coatings, fibres for woven and non-woven and inks. So PHAs cover a broad range of properties and applications.

This congress will address the progress, challenges and market opportunities for the formation of this new polymer platform in the world. Every step in the value chain will be addressed. Raw materials, polymer manufacturing, compounding, polymer processing, applications, opportunities and after-use or end-of-life options will be discussed by parties active in each of these areas. Progress in underlying technology challenges will also be addressed.

When there is sufficient interest there will be a workshop on the basics of the PHA-platform in the afternoon of September 3rd, preceding the conference.

Click [here](#) for more information.

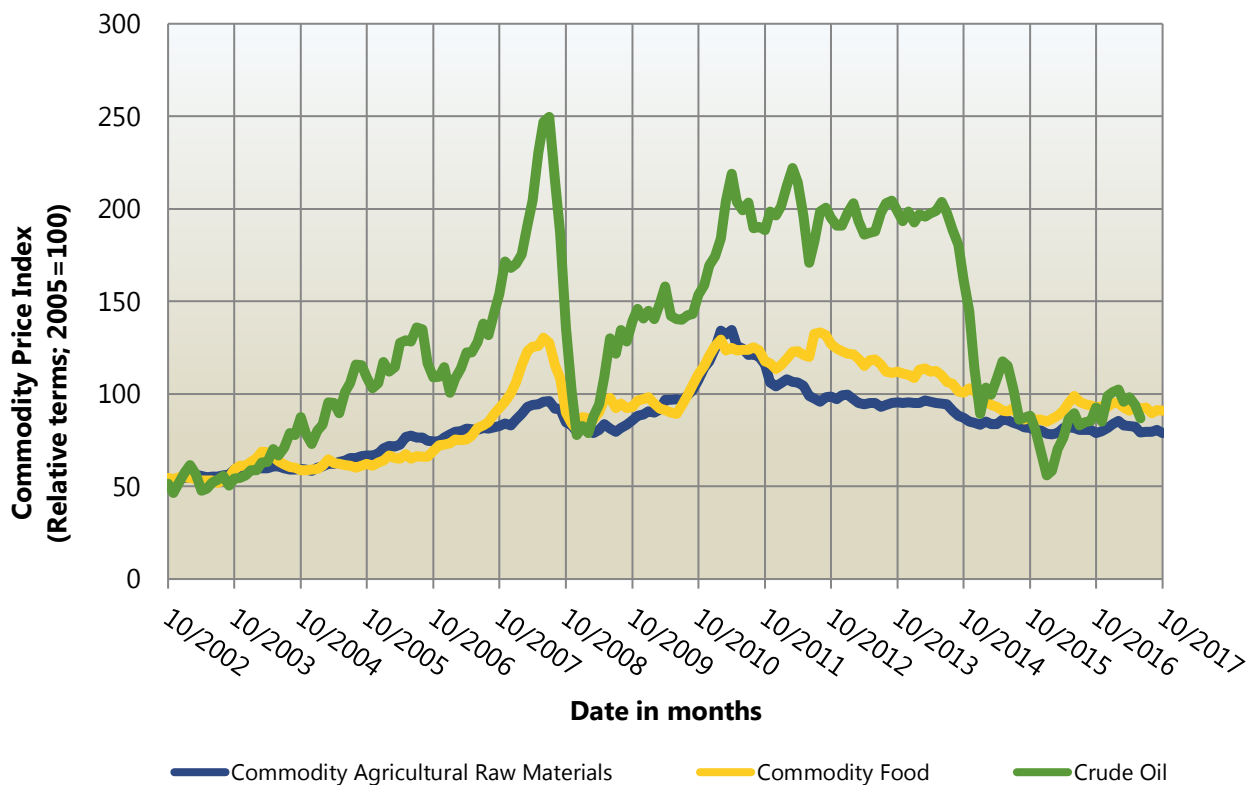
Price Information

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\$ (Feb 13)	Price, US\$ (Feb 18)	Price Change
Crude oil (petroleum, barrel)	107.64 (↑)	66.23 (↑)	-38%
Maize (corn, metric ton)	302.74 (↓)	155.84 (↑)	-49%
Sugar (pound)	0.4 (↓)	0.31 (↓)	-23%
Rapeseed oil (metric ton)	1,225.00 (↑)	847 (↓)	-31%
Soybean oil (metric ton)	1,175.00 (↑)	865.25 (↑)	-26%
Ethanol (gallon)	2.45 (↑)	1.11 (↑)	-55%

For details on indexes please see www.indexmundi.com/commodities; Ethanol prices from Govt of Nebraska at www.neo.ne.gov/

Raw materials 15-year Price Indices



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

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