

The Bioeconomy Consultants



News Review

Issue Sixty-Nine

November 2017

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



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Foreword

It's hard to believe that we've come to the end of 2017, but here it is: welcome to the final issue of Biobased Products News Review for this year.

In the bioeconomy we have a mixed relationship with lignin, the complex structural polymer that binds cellulose chains together in plant matter. In many respects it serves as a barrier to the production of biobased products, as it requires a great deal of energy to remove in order to leave behind the cellulose for processing. Development is continuing all the time into processes that extract cellulose from biomass efficiently, and a commercial-scale breakthrough would be a massive boon for the bioeconomy, but that is not the focus here. This month we have a story from Sweetwater Energy, who have developed a process to in-effect do the opposite: extract the lignin from biomass by dissolving the surrounding cellulose. Lignin is in itself a useful material, if perhaps for more specific applications: it is a source of activated carbon, which has a myriad of uses across a range of sectors from metalworking to medicine. Sweetwater claim that the carbon produced from the extracted lignin is superior to more traditionally extracted carbon in a vast majority of tests.

Elsewhere, the football world cup kicks off next summer. Despite having employees from many countries, we are only represented by England, Spain, and France at the tournament, but the bioeconomy is being represented in a big way. The official world cup match ball will feature biobased synthetic rubber manufactured by ARLANXEO. The rubber is between 50% and 70% biobased, and has been chosen specifically for its performance in cold weather – an essential trait for a tournament held in Russia. This will hopefully end up as a talking point at the tournament (aside from the matches themselves) and provide some global publicity for the potential of the bioeconomy.

We also feature two stories from the microbial biopolymer industry. As the shift away from fossil-based plastics continues, novel ways of manufacturing plastics from sustainable materials need to be found. Bio-on have taken a big step towards this, having now opened the world's biggest microbial fermenter for producing PHA plastics. The plant has a capacity of 1000 tons per annum, with the potential for this to double. Keeping within PHA production, there has also been research published wherein a "consortium" of different bacteria has been discovered that efficiently produces polyhydroxybutyrate, one particular PHA. These developments are very encouraging for a future shift towards more sustainable plastic production.

Read on for the latest news.

Markets

TIPA's compostable plastic packaging to see first applications



TIPA

TIPA Sustainable Packaging, a developer and manufacturer of breakthrough bio-based, fully compostable, flexible packaging, announced today it has secured \$11M in series B financing. The new investment round will enable the company to expand its sales in new territories and further develop new generations of its unique packaging solutions for a wider variety of food and non-food goods.

Leading this Series B financing is Austin Hearst, an owner and director of the media conglomerate Hearst Corporation. In this round of financing, Austin and Gabriela Hearst have joined existing TIPA investors GreenSoil Investments and Horizons Ventures.

Gabriela Hearst is the founder and creative director of the eponymous fashion brand GH. Gabriela Hearst will be the first company to have all of its plastic packaging using TIPA's innovative products.

TIPA is an award-winning innovative packaging solutions provider offering novel flexible packaging that is fully compostable and returns back to nature post-usage, just like an orange peel. In comparison to regular plastic that will last for hundreds of years, TIPA's packaging will

decompose within just 180 days in compost conditions.

TIPA's packaging solutions emulate the robust properties of conventional plastic, while allowing complete biodegradability of packages after use. Its solutions include compostable packaging for foods such as: snack food, confectionary, grains, dried foods, vitamins and coffee. Other packaging solutions for non-food categories include: apparel packaging, zipper bags and stand-up pouches.

TIPA recently won the Silver Award at the internationally renowned Edison Awards for its innovative flexible packaging solutions, following seven years of experience developing high-end, bio-based, compostable films.

Click [here](#) for more information.

New joint venture to operate Brazilian ethanol storage site

BP Biofuels and Copersucar have announced that they have agreed to form a joint venture to own and operate a major ethanol storage terminal in Brazil, better and flexibly connecting ethanol production with the country's main fuels markets.

Copersucar is the world's leading sugar and ethanol trader, with the largest sugar and ethanol storage capacity in Brazil. BP Biofuels, part of BP's Alternative Energy business, is a significant producer of ethanol from sugarcane in Brazil.

The 50/50 joint venture will own and operate the Terminal Copersucar de Etanol in Paulínia in the state of São Paulo, which is currently solely owned by Copersucar. Joint ownership of the terminal will support the strategies of both companies - connecting important ethanol production with flexible storage capacity close to the main ethanol consumer markets in Brazil.

In addition to the shareholders' business, the terminal will continue providing services to its current customers.

In operation since September 2014, the Paulínia terminal has ten tanks with a total storage capacity of 180 million litres of ethanol and moves around 2.3 billion litres per year, with the possibility of further expansion. The terminal is located in one of Brazil's main fuels hubs and operates in a multimodal way, connected to important transport networks, pipelines, and will soon be connected to the railway as well.

Click [here](#) for more information.

Amyris sells Brazilian division to DSM



Amyris

Royal DSM, a global science-based company active in health, nutrition and materials and Amyris, Inc., the industrial bioscience company, have announced that they have enhanced their strategic alliance through the sale of Amyris Brasil Ltda to DSM and the establishment of a long-term manufacturing partnership for Amyris' high-volume products.

DSM will continue existing supply-agreements to Amyris and other parties. DSM will also supply Amyris with specialty compounds until it realizes its Brotas 2 specialties production facility. Amyris is accelerating the construction of its second facility dedicated to specialty products while maintaining the manufacturing process development and business support capability located in Campinas, Brazil.

With the acquisition of the Brotas 1 facility, DSM adds a state-of-the-art biotechnology-based production site in Brazil to its global network, with abundant availability of sustainable raw materials (sugar cane), securing production capacity for its rich pipeline of sustainable and bio-based solutions. Having broad experience in operating large-scale fermentation plants, DSM will optimize the operational performance of the site.

The sale of the Brotas 1 facility, which was designed to produce high volumes of farnesene, together with the creation of a long-term production relationship for high-volume farnesene-based intermediates will enable Amyris to focus on its core strength of developing breakthrough bioscience technologies through a portfolio approach that continues to target key markets, as well as the production of specialty products.

Click [here](#) for more information.

Bio-On and AkzoNobel to continue partnership

Bio-On and partners AkzoNobel obtained excellent and promising results during the implementation of the SEAFRONT Project.

They have decided to continue R&D activities in order to further demonstrate the already developed systems and initiate work on new formulations.

Thanks to excellent results achieved within the Synergistic Fouling Control Technologies-SEAFRONT project (Grant Agreement 614034), funded by the 7th Framework Programme of the European Commission; Bio-on and International Paint Ltd. (AkzoNobel) have agreed to continue their relationship beyond the close of the Project.

The aim of the collaboration is to continue to investigate the use of Bio-on's biodegradable and

bio-based polymers as components in fouling control coatings designed to prevent the undesirable accumulation of marine organisms on boats, ships, tidal power plants and other aquatic installations.

Bio-on is a leading Italian biotechnology company in the bioplastic sector and listed in the AIM segment of the Borsa Italiana, while AkzoNobel, is a worldwide leader in the Marine, Protective Coatings, and Yacht markets.

Click [here](#) for more information.

Research & Development

New process produces pure lignin for activated carbons

Sweetwater Energy's biomass conversion technology produces the first-ever native lignin that can be easily carbonized and activated to make high-end powdered activated carbons for the municipal potable water and home water filters markets. The company is commercializing its biomass conversion technology first on hardwoods in Minnesota, and is in discussions with multiple parties for that location's lignin. Long term, however, Sweetwater plans to deploy facilities around the world using multiple feedstocks, including corn stover, wheat straw, soft woods and sugar cane bagasse to create this unique lignin.

In an independent study, the new carbon was compared to three bituminous coal-based activated carbons, coconut shell-based activated carbon, and a wood-based activated carbon, and was found to be superior in 34 of 36 tests.

Activated carbon derived from Sweetwater's lignin was compared in adsorption per unit weight of carbon to three bituminous coal-based activated carbons made by a leading U.S. manufacturer; coconut shell-based activated carbon; and a wood-based activated carbon, in six different types of applications — regenerable heavy loading, heavy loading, moderate loading, regenerable trace loading, trace loading, and ultra-trace loading. In a matrix of 36 results, Sweetwater's lignin-based activated carbon outperformed the others by a significant margin in 34 of the 36 tests.

The process solubilizes 94% of the hemicellulose and cellulose fractions of hardwood, leaving a lignin that is non-sulfonated, has low carbohydrate content, and can be easily charred and simply steam activated.

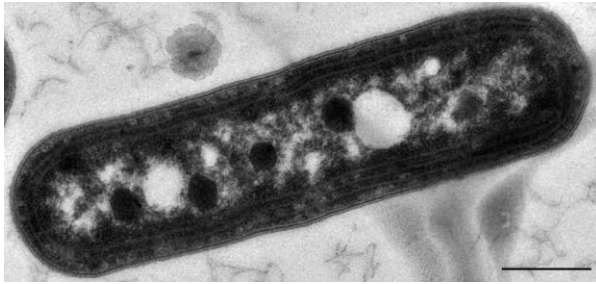
Sweetwater's technology is scalable. Sweetwater is commercializing the technology first utilizing hardwood. Sweetwater systems can be deployed using many feed stocks, across the world, to create lignin for high-end powdered activated carbons (PAC) production.

Click [here](#) for more information.



Wikimedia Commons

"Consortium" of bacteria produces polyhydroxybutyrate



Wikimedia Commons

Synechococcus elongatus PCC 7942, engineered with the sucrose transporter CscB, can export up to 85% of its photosynthetically-fixed carbon as sucrose and shows considerable promise as an alternative carbohydrate source. One approach to effectively utilize this cyanobacterium is to generate synthetic, light-driven consortia in which sucrose-metabolizing heterotrophs catalyse the conversion of the low-value carbohydrate into higher-value compounds in co-culture. Here, authors report an improved synthetic photoautotroph/chemoheterotroph consortial design in which sucrose secreted by *S. elongatus* CscB directly supports the bacterium *Halomonas boliviensis*, a natural producer of the bioplastic precursor, PHB. They show that alginate encapsulation of *S. elongatus* CscB enhances sucrose-export rates ~2-fold within 66 h, to ~290 mg sucrose L⁻¹ d⁻¹ OD750=1 and enhances the co-culture stability. Consortial *H. boliviensis* accumulate up to 31% of their dry-weight as PHB, reaching productivities up to 28.3 mg PHB L⁻¹ d⁻¹. This light-driven, alginate-partitioned co-culture platform achieves PHB productivities that match or exceed those of traditionally engineered cyanobacterial monocultures. Importantly, *S. elongatus* CscB/*H. boliviensis* co-cultures were continuously productive for over 5 months and resisted invasive microbial species without the application of antibiotics or other chemical selection agents.

Click [here](#) for more information.

DuPont unveils new fermentation system

DuPont Industrial Biosciences (DuPont) has announced the launch of SYNERXIA® THRIVE Fermentation System, the newest innovation in the company's synergistic fermentation system technologies. The new fermentation system will deliver higher ethanol yields, incomparable robustness during thermal excursions and improved performance.

DuPont™ SYNERXIA® THRIVE Fermentation System consists of a new active dry yeast (ADY), SYNERXIA® THRIVE ADY and SYNERXIA® THRIVE LC, a glucoamylase liquid complement. The new system blends the right combination of yeast and enzymes to deliver up to 4 percent additional ethanol versus a conventional yeast and glucoamylase combination.

SYNERXIA® THRIVE ADY incorporates a patent pending, carbon-efficient pathway that redirects a portion of the carbon that would go into CO₂ and glycerol into ethanol production. In lab and plant results, the SYNERXIA® THRIVE Fermentation System outperformed conventional yeasts during thermal excursions and demonstrated increased robustness in the presence of organic acids.

Click [here](#) for more information.

Danish research into protein animal feed from biorefining

Aarhus university has published a review of the potential to utilise biorefining to deliver valuable protein for the EU animal feed market for monogastric animals, while reducing the environmental footprint of protein production, typically through cereal production.

Interest focussed on grass and grass clover leys, with potential to reduce GHG emissions compared to conventional wheat or maize production.

It was estimated that utilising present technologies for bio-refining, 45% of the protein present in green biomass can be recovered in a protein concentrate paste having protein content in the range of 47% of dry matter, similarly to the protein content of soya bean meal. In addition, a fibre fraction containing 17% protein in dry matter can be produced and used for ruminant feed or energy production or even further bio-refined into chemical blocks or used for bio-materials.

The protein concentrate is expected to be able to replace traditional protein sources for monogastrics, like pigs and poultry. Likewise, based on the chemical composition of the fibre fraction this seems suitable for ruminant feeding replacing other types of silage, but further research is required on these aspects.

The economics of the approach remain uncertain, particularly around biorefinery running costs. An essential ingredient will be finding a market for by-product sugars in the energy or higher value sectors.

Click [here](#) for more information.



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Polymers

Bio-On completes world's biggest biopolymer-producing fermenters

Bio-on announced the completion of the fermenters that are at the heart of the production technology for 100% biodegradable and natural bioplastic at the Bio-on plant set to open next year. This big technological challenge has enabled the world's largest fermenters to be built with a capacity of over 100 thousand litres and a height of over 13 metres. These large "silos" will house the fermentation process in which bacteria "produce" PHAs bioplastic.

The new fermenters have been designed by Bio-on's technical staff (ENG Business Unit) in collaboration with RAF, the in-house team of scientists that developed the various stages of aerobic fermentation over the last 4 years. The two fermenters, which have just been delivered, will be transported and installed at the Bio-on Plants site in Castel San Pietro Terme, Bologna and will contribute towards the upcoming production of biopolymers for cosmetic use.

The new plant, which will be located in Castel San Pietro Terme near Bologna over an area of 30,000 m², thanks to a 20 million Euro investment, 3,700 of which is covered and 6,000 land for development. When it becomes operational, in the first half of 2018, it will have a production capacity of 1,000 tons per year, rapidly expandable to 2,000. The plant will be equipped with the very latest technologies and the most advanced research and development laboratories. New carbon sources from agricultural waste will be continuously tested to produce new types of biodegradable bioplastic and increase the range of technologies offered by Bio-on. The company has begun to recruit the 40 people who will work at the new facility.

Click [here](#) for more information.

Braskem's plastic to package sugar

Braskem's Green Plastic will be used for the first time in packages of refined sugar in Brazil. The pioneer in the use will be Caravelas Sugar, one of the country's most important companies in this segment. The 100% renewable raw material will be applied in the packaging of refined sugar and glass. The products will be available for sale as of October.

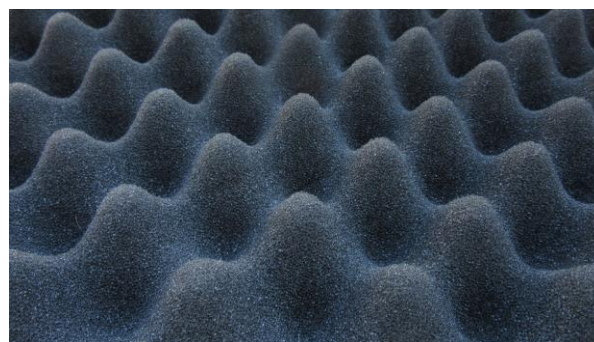
Currently, the Caravelas brand consumes 140 tons of packaging per month and will be the only one in the segment that has sugarcane in its production cycle from start to finish. Consumers will be able to identify the new packaging through the "I'm green™" seal, visible on the product front. The seal is the identification of Braskem for packaging made with Green Plastic.

Braskem's Green Plastic is 100% recyclable, captures and fixes 3.09 tons of CO₂ from the atmosphere for each ton of resin of renewable origin produced, collaborating to reduce the emissions of greenhouse gases. The product also has the same characteristics of traditional polyethylene and can be recycled in the already existing chain.

The transformation of green resin into sustainable packaging is made by Zaraplast, the leader in flexible packaging solutions, which from the onset has partnered with Caravelas in the creation of all products. "We are happy to be partners in another project. As suppliers of flexible packaging 50 years ago, we have noticed that every day consumers are looking for products that offer more sustainable solutions; and managing to combine Braskem's renewable raw material, our transformation expertise and Caravelas product was rewarding", comments, Eli Kattan, director of Zaraplast.

Click [here](#) for more information.

Biobased polyols for foam



Max Pixel

Emery Oleochemicals, through its Eco-Friendly Polyols platform, offers EMEROX® renewable content polyols for flexible foam applications. EMEROX polyols are produced from dibasic acids that are a product of the company's proprietary ozonolysis technology. These polyols possess all the structural design freedom of a petrochemical-based polyol, but with a high renewable content and often with superior performance properties.

EMEROX 14060, a bio-based azelate (C9) ethylene glycol polyester polyol developed by Emery Oleochemicals, targets "click-able" flexible ester foams and CASE applications. In a recent technical article, the Eco-Friendly Polyols Product & Application Development group compared flexible foam performance properties of EMEROX 14060 versus an adipate (C6) diethylene glycol polyester polyol in 32 kg/m³ (2 pcf) foam formulations. Foam "click-ability" (i.e. smooth cut as opposed to a pinched foam edge when die cut) and polyol/polyurethane hydrophobicity aspects are compared as well. Overall EMEROX 14060, an azelate (C9) ethylene glycol polyester polyol, exceeds the performance criteria for typical adipate (C6) diethylene glycol polyester polyols for many applications and should be considered an attractive renewable alternative.

Click [here](#) for more information.

Leaf collection bags from Braskem plastic



Public Domain Pictures

Braskem announced it has partnered with ProAmpac's Trinity Packaging Division to use Braskem's I'm green™ polyethylene (PE) to help Maryland's Montgomery County Department of Environmental Protection (DEP) and Maryland Environmental Service (MES) to achieve their carbon reduction and environmental preservation objectives.

Maryland's Montgomery County DEP, with the assistance of its contractor MES, led the initiative to find a carbon reduction packaging alternative for their composting program in order to support their core mission. As part of the County's annual composting of leaves and grass, that would have otherwise been disposed of, MES converts the organic wastes into a valuable soil conditioner resource for sale under the registered Leafgro® brand. Last year, MES sold approximately 650,000 bags of Leafgro® in fossil fuel based polyethylene packaging. Under the leadership of Maryland's Montgomery County DEP, in direct partnership with MES, Braskem and ProAmpac's Trinity Packaging Division, Leafgro® packaging will be converted to Braskem's I'm green™ sugarcane based bioplastic, a carbon negative product, that will help Montgomery County reduce its carbon footprint.

Click [here](#) for more information.

Novamont's biopolyester capacity doubles

On completing the acquisition of 100% of Mater-Biopolymer from the Mossi & Ghisolfi group in 2016, Novamont launched the second phase of the project to redevelop the Mater-Biopolymer plant in Patrica (FR), doubling the production capacity of the ORIGO-BI family of biopolyesters, used to improve the technical, economic and environmental properties of MATER-Bi® biodegradable and compostable bioplastics. Together with the development of new chemicals and production processes, this has given a strong new impetus to upstream integration of the Novamont production line.

In 2011, the first continuous plant for production of ORIGO-BI – biodegradable polyesters obtained from monomers from vegetable oils – was inaugurated. It has since become a flagship plant and a link to the Novamont biorefinery. By the end of the first quarter of 2018, when the process to convert the second line will be completed, and taking full advantage of the technological advances made possible by the experience gained from the first line, Novamont will double production capacity of the ORIGO-BI biopolyester range, from 50,000 to 100,000 tonnes per year and achieving a higher content of renewable raw materials.

The Novamont circular bioeconomy model is one of the soundest in Europe in terms of investments and new industry-driven technologies, with €500 million invested in plants, directly or in joint ventures, €200 million in research and development, 700 direct and 2,000 indirect employees, 1,000 employees involved in construction of 4 new world-class plants, 6 abandoned sites in 6 different regions re-industrialised, developments and impacts for agriculture.

Click [here](#) for more information.

Chemicals

Emery achieves 100% biobased status for herbicide

Emery Oleochemicals, a world-leading, natural-based specialty chemicals producer, has earned the U.S. Department of Agriculture (USDA) Certified Biobased Product label for its weed control solutions.

The company's EMERION™ Herbicide products, EMERION™ 7000 Concentrate, EMERION™ 7030 Concentrate and EMERION™ 7020 Concentrate, have each been certified by the USDA as being a 100% biobased product; thus, earning the right to display a unique label that highlights its percentage of biobased content. In addition, the EMERION™ 7020 and 7030 Concentrate products are also OMRI® Listed for Organic Production and Organic Garden Use, respectively.

Biobased products are cost-comparative, readily available and perform as well as, or better than, their conventional counterparts. Biobased products, through petroleum displacement, have played an increasingly important role in reducing greenhouse gas emissions that exacerbate global climate change.

EMERION™ Herbicide is a natural-based non-selective, contact weed control for burn down of weeds and grasses.

Click [here](#) for more information.

First biobased ingredient shipped to L'Oréal

Global Bioenergies announced delivery of a first batch of sustainable cosmetic ingredients to L'Oréal. It was produced as part of the ISOPROD project, supported by the French State's Investments for the Future Program.

Using proven technologies, Global Bioenergies condensed isobutene molecules to produce a cosmetic ingredient used in numerous formulations for its texturing properties. The ingredient is one of the six main components used in cosmetics.

Global Bioenergies' innovation produces the ingredient based on plants as an alternative to the fossil resources used in the industry today. Our bio-isobutene was first converted by the Fraunhofer Institute in Germany and then purified before delivery to L'Oréal. This is a test batch. L'Oréal will use the new ingredient in its cosmetic formulations and check that the results meet their specifications.

Click [here](#) for more information.

Successful scale up of Lygos' malonic acid production

Lygos, a leading innovator in the development of sustainable high-value specialty chemicals, announced a breakthrough in scaling Lygos' proprietary process for making Bio-malonic acid products from sugar and yeast at the National Renewable Energy Laboratory (NREL) Integrated Biorefinery Research Facility (IBRF), using a state-of-the-art biochemical pilot plant established by the United States Department of Energy (DOE) and operated by NREL to facilitate the rapid transfer of innovative biotechnology processes from the laboratory to marketplace.

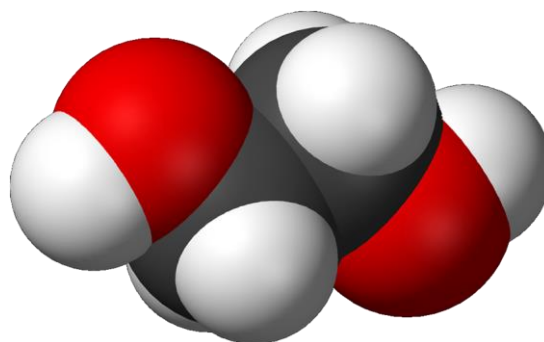
The technical milestone - successful scaling of the process in a facility intended to mimic much larger-scale commercial operations - was achieved at the NREL IBRF, established and run with DOE support.

The process operated successfully in the largest fermentation vessels available at the IBRF. Lygos used downstream purification processes to make the desired high purity malonic acid end product, as well as derivative malonate ester products, including bio-dimethyl^(TM) and bio-diethyl^(TM) malonates.

Malonic acid is a high-value, highly versatile, "Tri-Functional" specialty chemical used for the production of a variety of performance materials, coatings, adhesives, sealants, flavours, fragrances, pharmaceuticals and electronics manufacturing. Existing petrochemical processes for producing malonic acid require costly, toxic, and environmentally hazardous intermediates and chemistry. All malonic acid in the world today is produced in China, largely as a result of these factors. Lygos' innovative and proprietary technology uses sugar, yeast, and water instead of toxic chemicals; has a smaller CO₂ footprint; and can scale to commercial output that enables the Bio-malonic acid products to be produced cost-competitively with any petrochemical based process.

Click [here](#) for more information.

Braskem to produce monoethylene glycol



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Braskem, the Americas' leading producer of thermoplastic resins, and Danish-based Haldor Topsoe, a world leader in catalysts and surface science, have signed a technological cooperation agreement to develop a pioneering route to produce monoethylene glycol (MEG) from sugar. The agreement calls for the construction of a demonstration plant in Denmark, with operation slated to begin in 2019.

MEG is a key component of PET resin, the main man-made raw material used by the textile and packaging industries that is also widely used to make bottles. The project is based on a two-step process developed at Topsoe's labs along with its own catalysts, and focuses on the conversion of sugar into MEG at a single industrial unit, which will reduce initial investment in the production and boost the competitiveness of the process.

The demonstration plant will conduct tests to validate the technology and confirm its technical and economic feasibility, which is a critical step before launching production on an industrial scale and commercial operations. The unit will be flexible to validate the technology in different raw materials such as sucrose, dextrose and second-generation sugars.

Click [here](#) for more information.

Collaboration seeks to produce chemicals from empty fruit bunches



Wikimedia Commons

Leaf Resources and Verdezyne Inc. will collaborate to evaluate the use of Leaf's Glycell™ sugars prepared from empty fruit bunch (EFB) as a raw material for large scale production of biobased chemicals in Verdezyne's proprietary yeast fermentation processes.

Large scale production of biobased chemicals using Glycell sugars will take place at Verdezyne's biobased chemicals manufacturing facility in Johor Bahru Malaysia. The facility is expected to be completed in 4Q18. The parties previously evaluated the use of Glycell sugars to manufacture biobased dodecanedioic acid using Verdezyne's proprietary yeast fermentation manufacturing process at small scale with successful results. The goal of the large-scale evaluation is for Verdezyne to qualify a local source of fermentable sugar such as the Glycell sugars for use in commercial manufacturing.

Click [here](#) for more information.

Gevo continues work towards balancing isobutanol sales with production costs

In the third quarter of 2017, Gevo produced approximately 100,000 gallons of isobutanol at its Luverne Facility, and approximately 200,000 gallons thus far in 2017. Consistent with Gevo's Luverne Facility production guidance, isobutanol production this quarter was focused on producing sufficient volumes to provide enough inventory to support market and customer development efforts in the future, as well as to continue to optimize Gevo's technology and to generate data that is expected to help decrease operating and capital costs associated with the Luverne Facility Expansion. Gevo's current isobutanol production goals are not to maximize production, but rather to align such production with isobutanol sales and technology efforts. As a result, during certain periods of the third quarter of 2017, Gevo only produced ethanol at the Luverne Facility. Given the Luverne Facility has only one production line suitable for isobutanol, Gevo's current isobutanol production costs are higher than its expected sales price. As a result, the cash flow profile of the Luverne Facility is improved by dedicating production to ethanol, rather than co-producing isobutanol and ethanol.

Click [here](#) for more information.

Circa agrees distribution for Cyrene in Northwest Europe

Circa Group Pty Ltd. and Will & Co B.V. have entered into an exclusive distribution agreement in Benelux for commercial quantities of Circa's bio-based solvent and platform molecule Cyrene®.

In response to tightening regulations on the use of chemicals e.g. through REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) in Europe and similar regulatory forms across most major economies, high-performance bio-based chemicals, like Cyrene® is becoming increasingly sought-after by industry. For instance, the Dutch paint and coatings industry, which accounts for more than 20% of the world's coating production, is aiming for 50% bio-based materials by 2030.

Cyrene® is made from waste sources of cellulose such as sawdust, with promising data showing it can outperform existing solvents. As well as being highly functional, Cyrene® is a safer alternative to petrochemical based solvents such as DMF and NMP which are under severe regulatory pressure in both the European Union and North America. These solvents are currently used in a wide variety of applications including polymers, membranes, lithium ion battery production, printing ink and coating formulations, pharmaceuticals, agrochemicals and electronic chemicals. This latest distribution deal, complements existing agreements with Merck Sigma for research and development quantities world-wide.

Click [here](#) for more information.

Consumer Products

Official World Cup ball to feature biobased synthetic rubber



Wikimedia Commons

The new official soccer ball of the World Cup 2018 contains the bio-based EPDM rubber Keltan Eco from ARLANXEO, one of the world's leading suppliers of synthetic rubber.

The EPDM rubber (ethylene-propylene-diene monomer) Keltan Eco 6950 is the rubber basis for a sponge rubber layer directly underneath the "Telstar 18" ball's outer cover. It serves as a mouldable cushion for the ball and supports optimal bounce characteristics during games. Materials that are used in this layer must meet strict requirements in properties such as density, hardness and weight, and they must also demonstrate good processability. The most important performance characteristic, however, is the elasticity and resilience of the layer.

Keltan Eco is the world's first EPDM rubber manufactured using bio-based ethylene extracted from sugarcane. Depending on the ethylene content of each rubber grade, the proportion of bio-based material ranges between 50 and 70 percent.

Keltan Eco 6950 – the type used by adidas – is characterized by its amorphous structure and high crosslinking density. This leads to good low-temperature properties and meets the requirements for the best possible elasticity and resilience.

With six different grades of Keltan Eco rubber currently on the market, ARLANXEO is supporting the move towards more sustainable products and matching the ever-stricter environmental requirements to help reduce its carbon footprint, whether in the sporting goods industry or the automotive industry. In the latter, Keltan Eco is used, for example, in profiles for auto body seals, window profiles and other seals. Other areas of application include artificial turf and athletics tracks.

Click [here](#) for more information.

Bio-On's cosmetic microplastics certified "100% natural"

The international organisation NATRUE, which promotes and certifies natural and organic cosmetics and ingredients, has issued "100% Natural" certification to Bio-on for its Minerv Bio Cosmetics micro plastics, the new type of PHAs bioplastic designed and developed by Bio-on for the cosmetics of the future. NATRUE certification is a guarantee for human health and the environment and is based on rigorous standards that have demonstrated the completely natural origin of the microbeads contained in Minerv Bio Cosmetics biopolymers which, like all the bioplastics developed by Bio-on, are 100% biocompatible and biodegradable.

The NATRUE certification standard, designed to enable consumers to recognise truly natural and organic cosmetics, is set out by an independent scientific committee and verified by certifiers known for their restrictive, rigorous approach, whose assessment does not stop with the raw

materials but checks the entire origin and supply chain. Minerv Bio Cosmetics has been certified by NATRUE as a 100% natural product.

All the PHAs bioplastics (polyhydroxyalkanoates) developed by Bio-on are made from renewable plant sources with no competition with food supply chains. They guarantee the same thermo-mechanical properties as conventional plastics with the advantage of being 100% eco-sustainable and naturally biodegradable. Minerv Bio Cosmetics will be manufactured by Bio-on at its new plant, under construction in Castel San Pietro Terme outside Bologna over an area of 30,000 m². It will have 3,700 m² covered space and 6,000 m² land for development. When it becomes operational, in the first half of 2018, it will have a production capacity of 1,000 tons per year, rapidly expandable to 2,000. The plant, in which Bio-on is investing 20 million Euro, will be equipped with the very latest technologies and the most cutting-edge laboratories to meet the requirements of cosmetics companies around the world.

Click [here](#) for more information.



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Braskem's plastic used in skincare packaging

The first men's skincare brand in the world to use Sugarcane as a raw material, Bulldog have chosen to go green with their updated flexible tube line up, which features Moisturisers, Face Washes and Face Scrubs, with multiple variations of each product focusing on different skin types which includes sensitive skin, mature skin and oily skin.

The 'Green' polyethylene is created by Braskem in Brazil, thousands of kilometres from the Amazon rainforest.

The Green Plastic is then used by RPC M&H Plastics instead of fossil fuel sourced material to create Bulldog's Flexible Tubes while maintaining the performance characteristics of traditional Polyethylene.

However, the environmental positives do not stop there, the Sugarcane is often planted on degraded pasture land which in turn helps to recover the soil for future use as general farmland or to simply plant another crop of Sugarcane.

RPC M&H Plastics is continually seeking alternative environmentally-responsive products as we believe that a small change can make a big difference while continually striving towards a business that has minimal impact on the environment.

Click [here](#) for more information.

Report discusses potential for circular fashion economy

Fashion is a vibrant industry that employs hundreds of millions, generates significant revenues, and touches almost everyone, everywhere. Since the 20th century, clothing has increasingly been considered as disposable, and the industry has become highly globalised, with garments often designed in one country, manufactured in another and sold worldwide at an ever-increasing pace. This trend has been further accentuated over the past 15 years by rising demand from a growing middle class across the globe with higher disposable income, and the emergence of the 'fast fashion' phenomenon, leading to a doubling in production over the same period.

A new textiles economy would lead to better outcomes.

Beyond laudable ongoing efforts, a new system for the textiles economy is needed and this report proposes a vision aligned with circular economy principles. In such a model, clothes, fabric, and fibres re-enter the economy after use and never end up as waste. This vision relies on four ambitions that would lead to better economic, environmental, and social outcomes, capturing opportunities missed by the current linear textiles system.

Click [here](#) for more information.

Patents

Specific method for preparing biobased polyesters

The present invention relates to a method for preparing a linear or branched hydroxylated and/or carboxylated polyester resin that is free of unsaturated fatty acids, comprising reacting an acid component with an alcohol component, said acid component comprising at least one C4 to C6 polycarboxylic acid or anhydride, and at least one C8 to C54 polycarboxylic acid or anhydride, and said alcohol component comprising at least one biobased polyol having a functionality of at least 2 bearing a 1,4:3,6-dianhydrohexitol unit, and at least one of two polyols b2) and b3).

Click [here](#) for more information.

Process for making biobased propylene glycol from lactic acid esters

A process is described for making a biobased propylene glycol product at least in part from a carbohydrate-derived feed, wherein a feed comprised of a lactic acid ester is reacted with hydrogen in the presence of a catalyst, in a non-aqueous solvent in which lactide may be essentially wholly solubilized at the conditions under which the reaction is carried out, so that lactide does not precipitate out to an extent whereby plugging of the reactor or fouling of the hydrogenation catalyst is observed.

Click [here](#) for more information.

Derivatives of 1,3-propanediol

The present invention relates to products that are derived from renewable biobased 1,3-propanediol ("1,3-PDO"). In this regard, aspects of the present invention involve the use of "green chemistry" in that products of the present invention are capable of being made from a renewable source of raw material.

Click [here](#) for more information.

Events

CLIB International Conference Düsseldorf, 17th-18th January 2018

Since 2010, the CLIB International Conference is the meeting place for the industrial biotechnology community. Being the first symposium of the year, it brings together international experts from all over the world in Düsseldorf, Germany. The conference

discusses technical, commercial and political implications of novel value chains based on innovative biotechnological processes and alternative feedstocks.

Click [here](#) for more information.

IBioIC's 4th Annual Conference Glasgow, 25th-26th January 2018

Now in its fourth year, IBioIC's annual conference has established itself as the 'go to' event for the biotech industry in Scotland. This two-day event attracted over 400 biobased professionals, academics and students from across the UK and Europe in 2017, and 2018's event is set to be even bigger.

The conference will celebrate the success of the biotechnology industry in Scotland to date, look ahead to the future and the challenges still to be overcome, and provide delegates with the networking opportunities needed to drive new collaborations.

Click [here](#) for more information.

ECO-BIO 2018 Dublin, 4th-7th March 2018

ECO-BIO 2018 will highlight the latest research and innovation towards developing industrially viable, safe and ecologically friendly biobased solutions to build a sustainable society.

A topical and comprehensive programme will include plenary and invited speakers, forum discussions, contributed oral presentations, a large poster session and exhibition.

The conference will bring together all concerned with the biobased economy to review industrial, academic, environment and societal approaches, discuss the latest research and progress, and encourage new research partnerships to enable new cascaded biobased value chains.

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 Berlin, 19th-20th April 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.

It is now time to come together again and to re-visit the strategies for future international cooperation in a next Global Bioeconomy Summit!

We are pleased that with support of the German Ministry of Education and Research, the GBS2018 will take place in Berlin on April 19 - 20, 2018.

We would be delighted to welcome you at the summit. Registration is now open.

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.

We hope you will consider participating and join us at the GBS2018 in Berlin.

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.

There will however be an extension to the core conference and exhibition in order to showcase the many achievements in the field of full scale biomass utilisation in Denmark that are an integral and major part of the country becoming fossil-free by 2050. 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.

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

PHA (Poly-Hydroxy-Alkanoates or polyhydroxy fatty acids) is a family of biobased polyesters. As in many mammals, including humans, that hold energy reserves in the form of body fat there are also bacteria that hold intracellular reserves of polyhydroxy alkanoates. Here the micro-organisms store a particularly high level of energy reserves (up to 80% of their own body weight) for when their sources of nutrition become scarce. Examples for such Polyhydroxyalkanoates are PHB, PHV, PHBV, PHBH and many more. That's why we speak about the PHA platform.

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.

Click [here](#) for more information.

EFIB 2018

Toulouse, 16th-18th October 2018

The 11th European Forum for Industrial Biotechnology and the Bioeconomy (EFIB) travels to Toulouse in October 2018 and will attract industry executives committed to a shift towards renewable, biologically-based manufacturing. EFIB is organised by EuropaBio, Europe's largest and most influential biotechnology industry group.

Click [here](#) for more information.

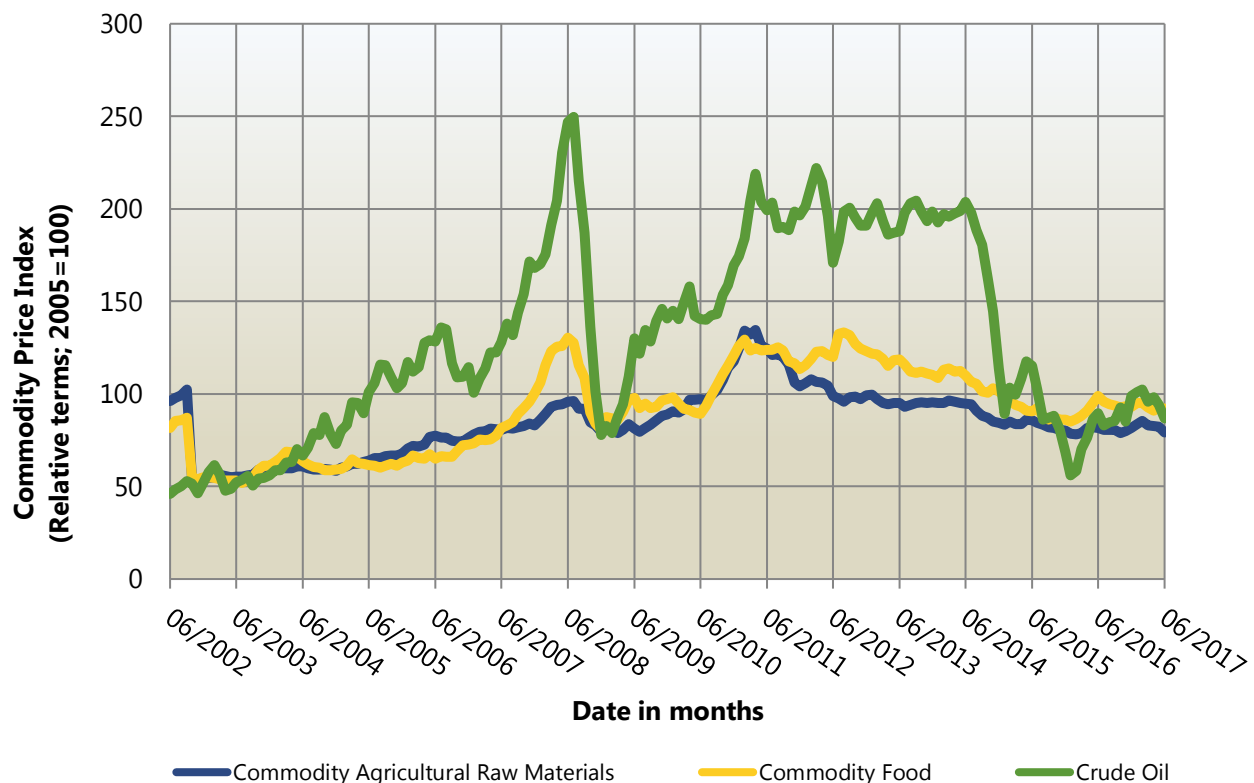
Price Information

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\$ (Oct 12) | Price, US\$ (Oct 17) | Price Change |
|-------------------------------|----------------------|----------------------|--------------|
| Crude oil (petroleum, barrel) | 101.17 | 54.92 | -46% |
| Maize (corn, metric ton) | 321.64 | 148.62 | -54% |
| Sugar (pound) | 0.43 | 0.32 | -26% |
| Rapeseed oil (metric ton) | 1,188.00 | 888.00 | -25% |
| Soybean oil (metric ton) | 1,135.00 | 866.00 | -24% |
| Ethanol (gallon) | 2.48 | 1.19 | -52% |

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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