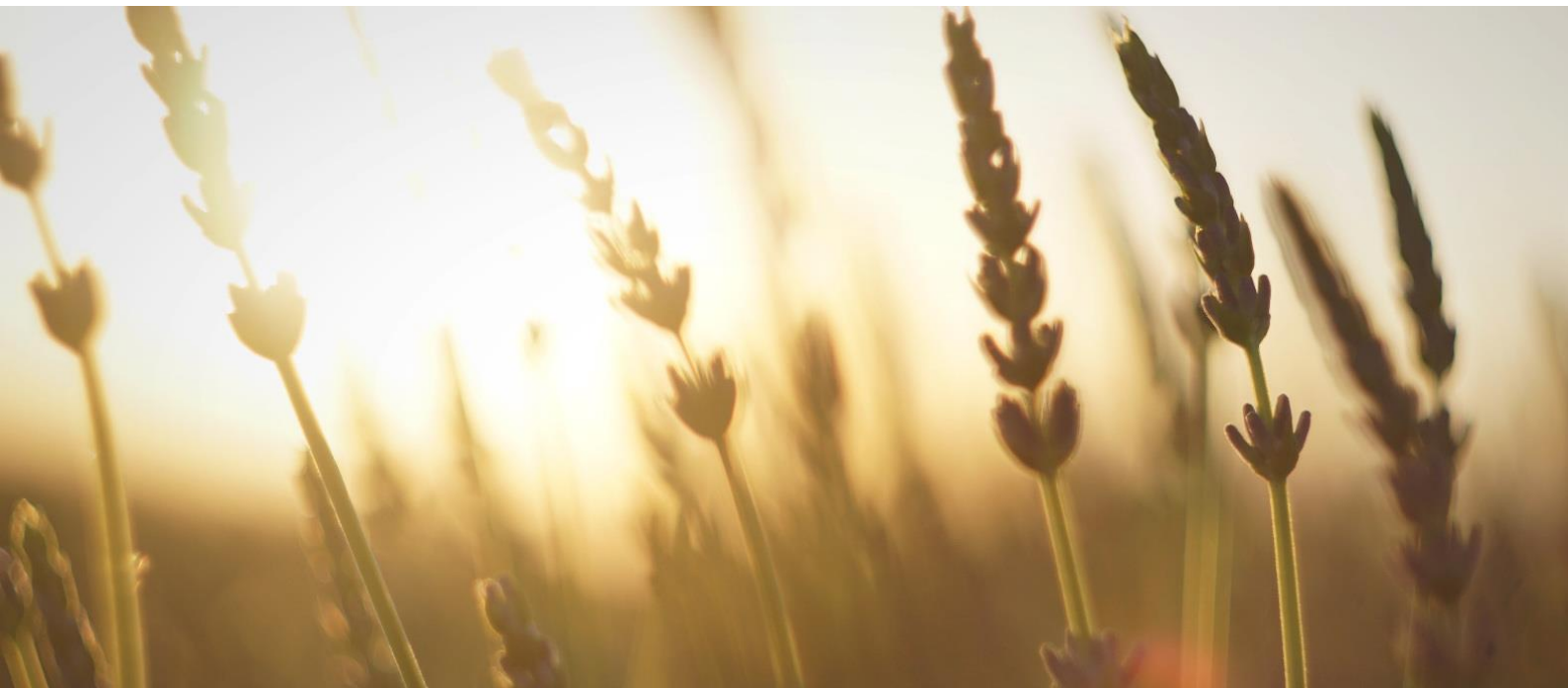


News Review



Issue Seventy-Three

May 2018

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.....	7
Polymers	11
Chemicals	13
Consumer Products.....	14
Events.....	16
Price Information.....	18

Foreword

Welcome, subscribers, to May's Biobased Products News Review.

In the bioeconomy, particularly the biobased products sector, we are plagued by misunderstanding of terminology. There is, perhaps, no bigger culprit than "bioplastic", which is a possible shorthand for two very different things - biobased plastic and biodegradable plastic – which can lead to confusion when this term is used. This is a cause for concern, as it means the layman will struggle to discern between biobased plastic and biodegradable plastic. These two properties are very distinct, and by no means interchangeable, as the term "bioplastic" would imply. To this end, the Bio-Based and Biodegradable Industries Association have published an online resource entitled "The truth about bioplastics" with the intention of dispelling public misconceptions about the terminology. The website also discusses the differences between "compostable" and "degradable", which are also often confused by members of the public. The need for this resource highlights an important point about communication from those who work in the bioeconomy: we must be clearer in the way we communicate for the public to really begin to become invested in the bioeconomy's aims of creating a more sustainable future through biomass.

In other, similar news, the Netherlands has announced a ban on "oxo-degradable" plastics. These plastics are not biodegradable (but may possibly be biobased), but their manufacturers claim that they are degradable in natural conditions when exposed to UV light. However, a report published in January of this year refuted these claims, finding that the plastics do not, in fact, degrade in these conditions, but rather disintegrate. The Netherlands has thus concluded that this distinction means that the plastics entirely remain when released into the environment, simply breaking into smaller particles. With the increasing awareness of the harm microplastics cause to the environment, they argue that these "oxo-degradable" plastics do much more harm than good. Laws have been passed elsewhere in Europe limiting the production of these plastics, but the Netherlands is the first nation to go a step further and ban them. This may seem like a drastic step, but the Dutch government believes this provides the best protection for the public, who may be misled by the terminology, and end up causing environmental damage, despite their best intentions.

All this goes to show just how important effective communication is in any industry, but particularly in one as nuanced as the bioeconomy.

Read on for the latest news.

Policy

Netherlands to ban "oxo-degradable" plastics

After France and Spain implemented actions in 2017 to limit the production, distribution, sale, provision and utilization of packaging or bags made from oxo-degradable plastics – conventional plastics that falsely claim to biodegrade – the Netherlands now, too, has announced plans for a complete ban of oxo-degradable plastics.

The announcement followed a report by the European Commission earlier in January this year announcing plans to restrict the use of these materials in Europe.

The use of oxo-degradable plastics for bags, bottles and labels is on the rise in different areas of the world. Made from conventional, fossil-based polymers to which chemical additives are added to promote degradation, these plastics disintegrate at an accelerated rate following exposure to UV-light, oxygen or heat.

The key word in this context is 'disintegrate': rather than undergoing biodegradation, these materials fragment into tiny pieces that can accumulate as microplastics in the environment.

Click [here](#) for more information.



Flickr

Europe passes circular economy package

The Renewable Energy Association reports that MEPs in Strasbourg have voted in favour of the Circular Economy Package. The package includes headline targets that member states are to recycle 55% of business and household waste by 2025, rising to 60% by 2030 and 65% by 2035.

It also includes specific targets relating to different materials, such as 65% of packaging materials to be recycled by 2025, rising to 70% by 2030 and cutting food waste by 30% by 2025 and 50% by 2030. This is also combined with new requirements for the separate collection of textiles and hazardous waste by 2025 and to see only 10% of waste going to landfill by 2035.

The package will now go back to the EU Council for final approval before becoming law, so will likely pass before the UK formally leaves the EU. It remains the expectation that these targets will be copied into UK law through the Withdrawal Bill, but then could be amended by the UK in the subsequent years following Brexit.

Click [here](#) for more information.

Foundation of UK Plastics Pact



Wikimedia Commons

BBIA is happy to announce itself as a founding member of the UK Plastics Pact, a new joint initiative from the Waste and Resources Action Programme (WRAP) and the Ellen MacArthur Foundation.

While plastics have a vital role to play in society, they are wreaking untold damage on our natural environment, which is why BBIA supports the aims and objectives of the Pact.

The UK Plastics Pact, led by WRAP, is the first of a global network of such pacts, enabled by the Ellen MacArthur Foundation's New Plastics Economy initiative, and represents a bold and unique initiative that will transform the UK's plastic system. By bringing together the entire plastics value chain behind a common set of ambitious targets, it will move us towards a system which keeps plastic in the economy and out of the environment by 2025.

It aims to achieve this by getting members to make the following commitments: taking actions to eliminate problematic or unnecessary single-use packaging items through redesign, innovation or alternative delivery models (e.g. reuse); 100 per cent of plastic packaging to be reusable, recyclable or compostable; 70 per cent plastic packaging effectively recycled or composted; 30 per cent average recycled content across all plastic

packaging; BBIA and its members have long been committed to advancing the bioeconomy and developing bio-based alternatives to plastics. From compostable catering produced by Vegware, which recently ranked 77th in The Sunday Times Lloyds SME Export Track 100, the list of SMEs with the fastest growing international sales of the last two years, to Woolcool's innovative use of wool instead of plastic in thermal control packaging, BBIA members have been at the forefront of innovation in the bioeconomy.

Click [here](#) for more information.

Markets

Survey into GreenPremium prices

A new survey conducted by nova-Institute within the framework of the European BIOFOREVER project, explores the practice of GreenPremium pricing along the biobased value chain.

The survey asked about differences along the value chain; differences between the various applications and sectors, whether the issue of whether second or third generation feedstock is used is at all relevant; and what market participants expect in terms of how long GreenPremium prices for their products are going to last.

All 50 respondents were active in the biobased field, either producing or trading in bio-based products (or intermediates), or as consultants.

Almost 70% of these experts report GreenPremium prices for bio-based products. Most of the participants (42%) considered the GreenPremium to range between 10-20%, 22% indicated a price premium of 20-40%. About 4% of the respondents see a willingness to pay even

more than 50%. 32% of the participants report no GreenPremium prices.

These results differ little from previous surveys conducted on this issue.

The most important driver for paying GreenPremium prices according to 41% of respondents was the positive green image associated with these. Other relevant drivers were: the touch of innovation (23%), enhanced attention in the media from using bio-based materials instead of standard materials (18%) and an expectation of higher prices (18%).

Click [here](#) for more information.

BASF joins RSB



RSB

The Roundtable on Sustainable Biomaterials is incredibly pleased to welcome multinational chemicals company BASF as the latest organisation to join our member community. BASF brings a wealth of experience in the biochemicals sector to our vibrant and multi-disciplinary membership, and we anticipate relevant impact from their input on our collaborative and innovative platform.

BASF wants to contribute to a thriving world that turns residues and wastes into value through innovation in technology and the circular economy. That commitment is supported by their expertise in converting residues into chemical building blocks, the development of standards and the use of renewable raw materials in an integrated production system; and we know that

partnering with them represents a leap forward for closing the loop of product life cycles. With their focus on environmental protection and social responsibility, alongside a track record of innovation and contributing to economic prosperity in the communities in which they operate, BASF is well positioned to support its fellow members and the RSB in building a sustainable bioeconomy.

By choosing to join the RSB, BASF is engaging in advanced standard setting to support the circular economy, as well as in sustainable development across the supply chain. Known for taking leadership on sustainability issues, as well as their expertise in major growth areas for the bioeconomy – particularly in mass balance approaches – and huge market reach and influence, BASF is a perfect partner to support RSB as we work to develop a sustainable circular economy. Within the RSB membership, BASF will be able to work with other members and partners to find practical and long-term solutions to the big challenges in the bioeconomy, across many sectors and industries. Through collaboration and the sharing of expertise and experience, all our members are supporting the development of our Standard and the vital work we do to ensure that sustainability is the foundation of the global bioeconomy and circular economy.

Click [here](#) for more information.

Ecovia partners with Seppic to develop health & beauty polymers

Ecovia Renewables Inc. has announced that the company has signed a multi-year joint-development agreement with Seppic Inc, a member of the Seppic Group, a leading designer and manufacturer of specialty ingredients. Under the agreement, the two parties will co-develop a suite of high-performing, biobased and biodegradable polymers for topical applications in the health and beauty markets. Similarly, Seppic

will have exclusive marketing rights to products made using Ecovia's technology, a proprietary fermentation platform.

Seppic has been a global supplier of premium specialty ingredients for more than 70 years and is recognized worldwide for reliably delivering quality products to its customers. They are uniquely positioned to add significant value to Ecovia's commercialization efforts within the health and beauty segment. Demand for renewable ingredients has increased dramatically in the last ten years, especially in Europe and North America.

Separately, Ecovia has raised an initial \$1 million seed round to fund near-term R&D, product development, and bioprocess scale-up activities. Seppic is also an investor in this round.

In addition to health and beauty, Ecovia™ Biopolymers offer distinct performance advantages over competing materials. Applications under investigation range from soil additives for water retention to super-absorbent cores for infant diapers to dispersants for detergents, among many others.

Click [here](#) for more information.

Research & Development

Paper biomass used in Lithium-Sulphur batteries



Wikimedia Commons

Researchers at Rensselaer have developed a patented method to use cheap and abundant paper biomass to make lithium-sulphur batteries.

A major by-product in the papermaking industry is lignosulfonate, a sulfonated carbon waste material, which is typically combusted on site, releasing CO₂ into the atmosphere after sulphur has been captured for reuse.

Now researchers at Rensselaer Polytechnic Institute have developed a method to use this cheap and abundant paper biomass to build a rechargeable lithium-sulphur battery. Such a battery could be used to power big data centres as well as provide a cheaper energy-storage option for microgrids and the traditional electric grid.

Rechargeable lithium-ion batteries currently are the dominant battery technology. In recent years,

however, much interest has grown around developing lithium-sulphur batteries, which can have more than double the energy of their lithium-ion counterparts of the same mass.

The research team has so far created a lithium-sulphur battery prototype that is the size of a watch battery, which can cycle about 200 times. The next step is to scale up the prototype to markedly increase the discharge rate and the battery's cycle life.

Click [here](#) for more information.

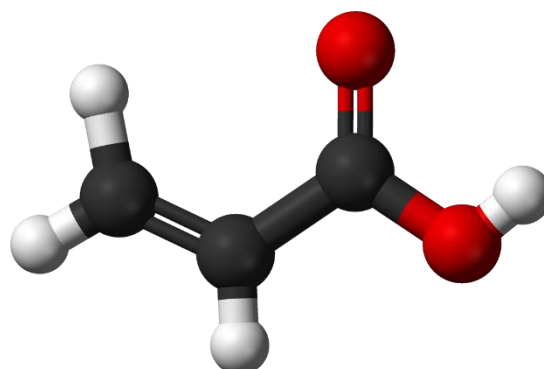
BBI JU looking to build map of European bioeconomy projects

The BBI JU funded BioCannDo project has a mission to promote the huge potential of bio-based research results and raise public awareness of bio-based products, using a variety of communication techniques and through public engagement activities and the development of educational tools and materials.

A new web site identifies and maps projects by target market sector and by broad categorisation of bio-based products (e.g. 'chemicals', 'rubber', 'solvents and surfactants' etc). The project is looking for information on additional projects that can be listed.

Click [here](#) for more information.

Method for biobased acrylic acid developed



Wikimedia Commons

Researchers at the Friedrich-Alexander-University Erlangen-Nürnberg have developed a new process for the recovery of acrylic acid based on the liquid-phase dehydration of lactic acid obtained by fermentation. It promises advantages over today's standard production from propene: milder reaction conditions, a simpler reactor technology and a bio-based source of raw materials.

The process development took place in cooperation with the industrial partner Procter & Gamble (P & G). The project was funded by the Federal Ministry of Food and Agriculture (BMEL) via the project agency Fachagentur Nachwachsende Rohstoffe e. V. (FNR).

Every year more than 5 million tonnes of acrylic acid are processed into consumer goods worldwide. For example, acrylate polymers play an important role in the production of paints, coatings, adhesives, and as liquid absorbers in personal care products such as diapers. Today, acrylic acid is produced by a two-stage oxidation process from fossil propene. The manufacturing technology is comparatively complicated and expensive. Researchers have now developed a promising alternative to liquid-phase dehydration of lactic acid.

Based on the developed NADA technology, the researchers built and optimized a continuously working miniplant laboratory system. Currently, the economically most promising variant of the possible NADA process operating modes is validated technically and economically by industrial partner P & G. P & G is also seeking a technology partner for further development of the process on an industrial scale.

Click [here](#) for more information.

Microbial synthesis of toluene

Microbial toluene biosynthesis was reported in anoxic lake sediments more than three decades ago, but the enzyme catalysing this biochemically challenging reaction has never been identified. Here we report the toluene-producing enzyme PhdB, a glycol radical enzyme of bacterial origin that catalyses phenylacetate decarboxylation, and its cognate activating enzyme PhdA, a radical S-adenosylmethionine enzyme, discovered in two distinct anoxic microbial communities that produce toluene. The unconventional process of enzyme discovery from a complex microbial community (>300,000 genes), rather than from a microbial isolate, involved metagenomics- and metaproteomics-enabled biochemistry, as well as in vitro confirmation of activity with recombinant enzymes. This work expands the known catalytic range of glycol radical enzymes (only seven reaction types had been characterized previously) and aromatic-hydrocarbon-producing enzymes, and will enable first-time biochemical synthesis of an aromatic fuel hydrocarbon from renewable resources, such as lignocellulosic biomass, rather than from petroleum.

Click [here](#) for more information.

Assessment of viable CCS technologies for biorefineries



Pexels

Carbon dioxide removal through the permanent sequestration of biogenic CO₂ is a critical technique for climate change mitigation, but most bioenergy with carbon capture and sequestration (CCS) technologies are technically immature or commercially unavailable. In contrast, examples of CCS of biogenic CO₂ resulting from fermentation emissions already exist at scale. Here, the authors evaluate low-cost, commercially ready sequestration opportunities for existing biorefineries in the United States. They find that existing and proposed financial incentives suggest a substantial near-term opportunity to catalyse the growth of CCS infrastructure, improve the impacts of conventional biofuels, support development of carbon-negative biofuels, and satisfy low-carbon fuel policies.

Capture and permanent geologic sequestration of biogenic CO₂ emissions may provide critical flexibility in ambitious climate change mitigation. However, most bioenergy with carbon capture and sequestration (BECCS) technologies are technically immature or commercially unavailable. Here, they evaluate low-cost, commercially ready CO₂ capture opportunities for existing ethanol biorefineries in the United States. The analysis combines process engineering, spatial optimization, and lifecycle assessment to consider the technical, economic, and institutional feasibility of near-term carbon capture and

sequestration (CCS). Our modelling framework evaluates least cost source–sink relationships and aggregation opportunities for pipeline transport, which can cost-effectively transport small CO₂ volumes to suitable sequestration sites; 216 existing US biorefineries emit 45 Mt CO₂ annually from fermentation, of which 60% could be captured and compressed for pipeline transport for under \$25/tCO₂. A sequestration credit, analogous to existing CCS tax credits, of \$60/tCO₂ could incent 30 Mt of sequestration and 6,900 km of pipeline infrastructure across the United States. Similarly, a carbon abatement credit, analogous to existing tradeable CO₂ credits, of \$90/tCO₂ can incent 38 Mt of abatement. Aggregation of CO₂ sources enables cost-effective long-distance pipeline transport to distant sequestration sites. Financial incentives under the low-carbon fuel standard in California and recent revisions to existing federal tax credits suggest a substantial near-term opportunity to permanently sequester biogenic CO₂. This financial opportunity could catalyse the growth of carbon capture, transport, and sequestration; improve the lifecycle impacts of conventional biofuels; support development of carbon-negative fuels; and help fulfil the mandates of low-carbon fuel policies across the United States.

Click [here](#) for more information.

Genetic modification boosts yeast growth on xylose

Nutrient assimilation is the first step that allows biological systems to proliferate and produce value-added products. Yet, implementation of heterologous catabolic pathways has so far relied on constitutive gene expression without consideration for global regulatory systems that may enhance nutrient assimilation and cell growth. In contrast, natural systems prefer nutrient-responsive gene regulation (called regulons) that control multiple cellular functions

necessary for cell survival and growth. Here, in *Saccharomyces cerevisiae*, by partially- and fully uncoupling galactose (GAL)-responsive regulation and metabolism, we demonstrate the significant growth benefits conferred by the GAL regulon. Next, by adapting the various aspects of the GAL regulon for a non-native nutrient, xylose, we build a semi-synthetic regulon that exhibits higher growth rate, better nutrient consumption, and improved growth fitness compared to the traditional and ubiquitous constitutive expression strategy. This work provides an elegant paradigm to integrate non-native nutrient catabolism with native, global cellular responses to support fast growth.

Click [here](#) for more information.

Braskem expands R&D operations



Braskem

Braskem, the largest thermoplastics resins producer in the Americas and the worldwide leader in bio-polymers, has announced its expanded focus on the research, development and commercialization of chemicals and materials sourced from renewable feedstocks. Braskem started a new operation in Boston focused on leveraging ground-breaking developments in biotechnology and advanced materials. The activities will include biotechnology and material science R&D, business and market development as well as technology scouting for key strategic partnerships.

Click [here](#) for more information.

Polymers

The "truth" about bioplastics

The Bio-Based and Biodegradable Industries Association (BBiA) has published a new information resource "The truth about bioplastics" to help the press, stakeholders, and policy makers separate the bioplastics facts from fictional accounts of what this ground-breaking sector can and cannot do. The new guide attempts to dispel some of the common misconceptions the sector has faced.

Click [here](#) for more information.

Biobased FDME polymer shows superior performance in bottles

DuPont Industrial Biosciences and Archer Daniels Midland Company have announced the opening of the world's first biobased furan dicarboxylic methyl ester (FDME) pilot production facility in Decatur, Illinois. The plant is the centerpiece of a long-standing collaboration that will help bring a greater variety of sustainably sourced biomaterials into the lives of consumers.

Nearly one-tenth of the world's oil is used to make the plastic products we use every day. From shampoo bottles to frozen food containers, fossil-fuel-based plastics are virtually impossible to avoid because of a lack of commercially available alternatives — a significant gap in the marketplace that DuPont and ADM's new biobased FDME will help address.

FDME is a molecule derived from fructose that can be used to create a variety of biobased chemicals and materials, including plastics, that are ultimately more cost-effective, efficient and sustainable than their fossil fuel-based counterparts.

One of the first FDME-based polymers under development by DuPont is polytrimethylene furandicarboxyate (PTF), a novel polyester also made from DuPont's proprietary Bio-PDO™ (1,3-propanediol). PTF is a 100 percent renewable polymer that, in bottling applications, can be used to create plastic bottles that are lighter-weight, more sustainable and better performing.

Research shows that PTF has up to 10-15 times the CO2 barrier performance of traditional PET plastic, which results in a longer shelf life. With that better barrier, companies will be able to design significantly lighter-weight packages, lowering the carbon emissions and significant costs related with shipping carbonated beverages.

Click [here](#) for more information.



Public Domain Pictures

"Biomass-balanced" polystyrene packaging

BASF's customer Schaumaplast GmbH & Co.KG, an internationally active manufacturer of moulded parts made from particle foams, is now offering packaging made from biomass-balanced Styropor®. The Styropor MB used is the first EPS (expandable polystyrene) on the market to be produced using BASF's biomass balance approach. Following special balancing, the TÜV SÜD-certified method can be used to replace the fossil resources needed to manufacture Styropor entirely with renewable resources right at the start

of the production process. Each biomass balance product thus helps to conserve fossil resources and reduce greenhouse gas emissions. The formulation and quality of Styropor MB is unchanged compared to its fossil counterpart.

Schaumaplast is thus able to meet the high sustainability requirements of its customer: The young start-up company IceGuerilla.de GmbH & Co. KG sends ice cream right across Germany fresh and with excellent thermal insulation in Styropor packaging.

BASF now also offers other EPS grades as part of the biomass balance concept. These include other Styropor brands, but also some of the grey EPS versions from the Neopor® range for insulation applications.

In a similar way to feeding green electricity into the power grid, the biomass balance concept incorporates renewable resources in the existing Production Verbund. The method permits biomass – for example in the form of biogas or bio-naphtha from certified sustainable production – to be used instead of fossil resources right at the start of the value chain and later to be allocated to the respective sales products in a defined way. This does not result in any change to the formulation and quality of the product. TÜV SÜD has now issued certificates for BASF products such as superabsorbers, engineering plastics, dispersions and a number of intermediates.

Click [here](#) for more information.

BioLogiQ announces 3 new biobased polymer grades



BioLogiQ

BioLogiQ, Inc., a bioplastic resin manufacturing company specializing in environmentally friendly plastic products made from renewable resources, has announced that it is launching three new grades of its plant-based plastic, NuPlastiQ® BioPolymers. The new grades are: NuPlastiQ XP High Performance BioPolymers for packaging applications; NuPlastiQ XD High Durability BioPolymers for durable goods applications; and NuPlastiQ BC Biodegradable/Compostable BioPolymers for foodservice and other packaging applications.

Using a proprietary process, BioLogiQ produces NuPlastiQ GP BioPolymers (GP) from natural, renewable resources – plants. GP resins contain 100% USDA Certified Biobased Content, and are ASTM D6400 and EN 13432 certified for compostability. When combined with traditional plastics to produce the new XP, XD, and BC grades, the resulting resins are stronger and more durable; reduce fossil fuel-based plastic usage and greenhouse gas generation; and maintain the recyclability, compostability, or biodegradability of that traditional polymer.

When GP is combined with traditional packaging plastics such as polyethylene (PE), polypropylene (PP), and polystyrene (PS), the strength of NuPlastiQ XP leads to down-gauging and reductions in the use of fossil fuel-based plastics. Applications include flexible bags & pouches, jugs, handle bags, grocery sacks, and trash bags. The recyclability of the partner resins is maintained or potentially enhanced.

For durable goods, NuPlastiQ XD BioPolymers made with ABS, recycled HDPE, TPE or similar resins maintain or improve the physical properties of these resins and reduce the use of fossil fuel-based plastics. Depending on the application, they may also allow for the reduction of materials used. Applications include casings for mobile phones and other consumer electronics, hand tools, footwear, rigid containers, and power tools.

Click [here](#) for more information.

ecoflex and ecovio to be available again



BASF

On April 3, 2018, BASF was able to remove the remaining amounts of contamination from the ecoflex plant. The contamination has led to a longer plant shut down and declaration of Force Majeure for the products ecoflex® and ecovio® last fall. BASF now lifts the Force Majeure for these two products with immediate effect. As inventory levels are still very low, incoming orders cannot be fulfilled at the requested time in every case.

On October 13, 2017, BASF detected a technical flaw in the ecoflex plant at its Ludwigshafen site. Due to a defect in the heating circuit of the plant, a small amount of a thermal oil has entered the production process. To repair the defect, the plant was shut down. In addition to ecoflex®, the derived product ecovio® was also impacted. For this reason, BASF declared Force Majeure for the compostable bio-plastics ecoflex® and ecovio®.

Click [here](#) for more information.

Chemicals

Commercial release of Elevance's biobased emollient

Elevance Renewable Sciences, Inc., which creates novel, high-performing specialty chemicals from renewable feedstocks, has announced the commercial availability of Elevance Soft CG-200, a new plant-based emollient. Made from certified non-GMO coconut oil and Elevance's soy-based polymer, Elevance Soft CG-200 expands the company's line of bio-based personal care products.

As part of the Elevance Soft product line, Elevance Soft CG-200 is a low viscosity gel, allowing formulations with a luxurious feel and smooth, creamy texture. Moreover, it enables customers to make formulations without silicone, petrolatum, PEG, or paraben and is appealing for vegan and gluten-free formulations. Additionally, CG-200 may enable some customers to obtain GMO-free product certifications.

Elevance Soft CG-200 is a low-melting gel with an improved moisture barrier compared to coconut oil, translating into longer lasting moisturization benefits for skin. CG-200 can be used as a creamy alternative to coconut oil, offering various benefits for hair products such as frizz control. The product is well suited for use in pomades, styling gels, creams, lotions, body washes, soaps, lip care and colour cosmetics.

Click [here](#) for more information.

D3MAX technology to debut at Ace Ethanol

D3MAX, LLC and Ace Ethanol, LLC have announced that Ace Ethanol will be the first ethanol plant to integrate the patented D3MAX technology with its existing corn dry mill. Ace Ethanol has received approval from its board of directors and members to proceed with the design and construction of the corn kernel fibre-to-ethanol plant. The integrated facility will also employ membrane-based ethanol recovery technology supplied by Whitefox Technologies, resulting in significant energy savings for the integrated facility. Ace has selected Fagen Inc. to build the new D3MAX facility. Construction is scheduled to begin this summer, pending final negotiations and signing of the contract with Fagen.

Based on the results of pilot testing, Ace and D3MAX selected DSM to supply enzymes for the D3MAX process, and Lallemand Biofuels & Distilled Spirits has been selected to supply the yeast. The existing Ace plant and the new D3MAX process will be fully integrated for maximum energy efficiency and ethanol yield. Selection of the companies who will work together to build the first D3MAX plant marks another major milestone for D3MAX on its path to commercialization.

The D3MAX process is the only corn kernel fibre-to-ethanol process that will not require an independent engineer to validate the cellulosic ethanol production every 500,000 gallons of cellulosic ethanol produced. With the D3MAX process, cellulosic ethanol gallons can be measured directly avoiding the cost of re-certification required by EPA for in-situ corn kernel fibre processes and processes that mix corn starch or sugar with the cellulosic sugars. Currently, all other corn kernel fibre technologies require costly re-certification every 500,000 gallons.

Click [here](#) for more information.

Consumer Products

LEGO's fresh commitment to sustainable packaging



Wikimedia Commons

In 2015 the LEGO Group announced its ambition to use 100% sustainable materials in both its bricks and packaging by 2030. They have now announced that they are aiming for 100% sustainable packaging by 2025.

Currently, the majority of LEGO® packaging, by weight, is cardboard or paper-based which is recyclable, sustainably sourced and certified by the Forest Stewardship Council.

The LEGO Group has taken several steps to improve the sustainability of its packaging. In 2018, the company began using recycled plastic in packaging 'blisters' - the transparent plastic windows which allow consumers to have a sneak peek into some LEGO boxes. This year, LEGO boxes in the US and Canada started to feature the How2Recycle® label promoting packaging recycling and providing US and Canadian consumers with clear guidance to responsibly recycle their LEGO packaging. In 2017, plastic trays used in Advent Calendars were replaced with recyclable paper-pulp trays, saving up to 1 million

plastic trays from going to the landfill. Approximately 75% of cardboard used to make LEGO boxes comes from recycled material. The average size of a LEGO box has been reduced by 14% over the past four years, improving transport efficiency, saving on average every year over 3,000 truckloads and 7,000 tonnes of cardboard. All paper and cardboard used in LEGO products and product packaging is recyclable, sustainably sourced and certified by the Forest Stewardship Council.

Click [here](#) for more information.

Biobased 3D-printed mouthguards

Royal DSM, a global science-based company active in health, nutrition, and materials, today announced a partnership with 3Dmouthguard. The companies will develop custom-made and instantly printed 3D mouthguards to protect teeth and mouth injuries in any type of sport that involves bats, balls, sticks or person-to-person contact. Together with Carestream Dental and NHL Stenden Hogeschool, the companies have developed a new technology to print custom-made mouthguards in 3D on the spot.

According to the Centres for Disease Control and Prevention (CDC), sports-related dental injuries account for more than 600,000 emergency room visits each year in the USA alone. And an average of 26% of all dental injuries are sports-related. In over 20 sports, basketball, hockey, martial arts and boxing carry the highest risk.

By scanning the upper jaw with video technology and digitally capturing all curves and shapes of mouth and teeth, a perfectly fitted mouthguard can be printed on the spot using fused filament technology. The additive manufacturing (AM) process uses a continuous filament of DSM's Arnitel®, a bio-based material that meets all strength, flexibility and health requirements. The new AM technique, combined with the 3D

filament material characteristics, completely automates and digitizes the process of producing customized mouthguards and prints them instantly.

In the coming months, the first 3D printed mouthguards will be thoroughly tested by athletes of Dutch field hockey clubs. The partners' scientists and developers will use the data captured to further finetune and scale-up the AM process, combining the extensive materials, technology, marketing and scientific knowledge of DSM, 3Dmouthguard, Carestream Dental and NHL Stenden Hogeschool.

Click [here](#) for more information.

Bio-On launches biodegradable cosmetic sun protection ingredients



PxHere

Bio-on is proud to present a brand-new line of cosmetic ingredients for sun protection made from its revolutionary, 100% natural and biodegradable bioplastic.

The new products are part of the minerv bio cosmetics family of bioplastic micro powders presented in spring 2017 and designed for cosmetics that respect the environment and human health.

This latest innovation is a series of ultra-green, high-performing SPF (Sun Protection Factor) Boosters designed to improve sun protection products.

The minerv bio cosmetics portfolio, which already includes texturizing powders for skin care and make-up, mattifiers, scrubs, and micro capsules for the controlled release of active substances, ideal for anti-ageing treatments, is now extended to include: minervPHB RIVIERA an SPF Booster suitable for all solar formulations, and minervPHB RIVIERA PLUS an innovative SPF Booster, enriched with antioxidants, ideal for total care products (skin care, make-up, hair care).

The new line of SPF Boosters is the result of the innovative R&D done by Bio-on CNS, the Business Unit specialised in the development of cosmetic ingredients.

Click [here](#) for more information.

Iceland shifts away from plastic packaging to paperboard

Iceland Foods, the UK's leading specialist retailer in the frozen food category, is refreshing the ready meals market with two new major product ranges launched in February and packed in paperboard trays.

With its 900 stores, Iceland Foods accounts for 30% of frozen ready meal sales in the UK, and the business is growing. The ready meal is improving in quality and becoming more diverse, with food trends arriving from around the world – and it is convenient to cook very quickly from frozen. Until now, ready meal trays have been mostly made of black plastic, which is currently not recycled and is one of the plastics potentially entering our food stream from the oceans.

Besides being sustainable, the board for ready meal packaging must be formable to different

shapes and sizes, food-safe and suitable for cooking at high temperatures in ovens and microwaves. Trayforma™ by Stora Enso proved to be the right choice for Iceland Foods. The trays are manufactured by Southern Cross Packaging, who are known for fast and innovative packaging development for retailers.

For Iceland Foods, this is just the beginning. The company will continue to look for non-plastic options for packaging, not just the board but also coatings and films. The potential extends into the chilled, produce and grocery areas, in addition to frozen food.

Click [here](#) for more information.

Events

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.

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.

The conference will provide a forum for leading political, corporate, academic and financial people to discuss recent developments and set up collaborations.

The three-day international conference will consist of plenary lectures, oral presentations, poster sessions and an exhibition. Companies and research organizations are offered the opportunity to organize a satellite symposium.

Click [here](#) for more information.

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

The 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.

Click [here](#) for more information.

EFIB 2018 Toulouse, 16th-18th October 2018

Join over 650 bio-based leaders in 2018 for the 11th edition of EFIB in Toulouse, France, on the 16th, 17th and 18th of October.

Click [here](#) for more information.

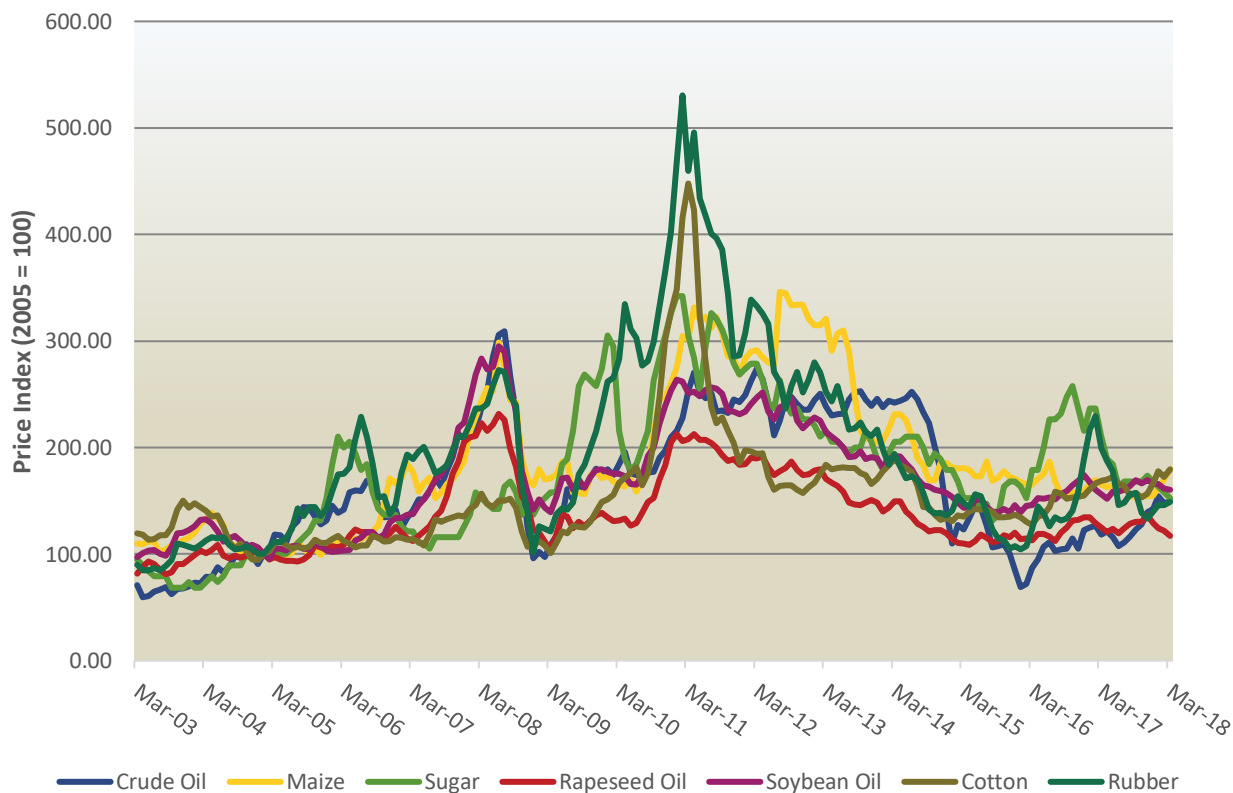
Price Information

Spot Prices of feedstocks as of today and five years ago, and percentile price change.

Item	Price, US\$ (Apr 13)	Price, US\$ (Mar 18)	Price Change
Crude oil (petroleum, barrel)	98.95	64.17	-35
Maize (corn, metric ton)	279.91	172.00	-39
Sugar (kilogram)	0.39	0.29	-26
Rapeseed oil (metric ton)	1,136.00	798	-30
Soybean oil (metric ton)	1,095.00	834	-24
Cotton (kilogram)	2.03	2.03	0
Rubber (kilogram)	2.87	1.76	-39

All prices from World Bank data.

Raw materials 15-year Price Indices



All prices from World Bank data, for details on index methodology, please contact NNFFCC.

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