

News Review



Issue Seventy-Three

April 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.....	4
Research & Development.....	6
Polymers	8
Chemicals	11
Consumer Products.....	12
Patents.....	16
Events.....	17
Price Information.....	20

Foreword

Welcome, subscribers and non-subscribers alike, to April's Biobased Products News Review, our first free issue of the year (with a brand-new cover!)

At NNFCC we are highly fond of innovative biobased products, and as technologies continue to develop, there are ever more of these as time goes by. However, every now and again a company throws a curveball that really impresses us, as is the case this month.

Tyre manufacturers Goodyear take the spotlight this month, with the announcement of their new Oxygene tyre concept. There is no indication of when this is expected to become a released product, but if and when it does, it will be unlike anything else on the market. The tyre's design has urban air pollution in mind, and features large holes in the tread intended to absorb water from the road surface. The reason for this is that the tyres will contain living moss in their sidewalls, with the hope being that this will absorb CO₂ and release oxygen in heavily polluted cities, helping to mitigate air pollution. The tyres themselves will be made from recycled older tyres, adding to their sustainability credentials. Goodyear anticipates that in a large city this will result in a reduction of 4,000 tonnes of CO₂ per year, which is not a massive reduction, but this concept does go to show how innovation can lead to radical (and interesting) solutions to emissions problems.

Returning to the present, there has been a concerning report released here in the UK regarding plastic packaging recycling. EU targets mandate that 22.5% of plastic packaging be recycled, and the UK is proud of the fact that it achieves well over this target – around 39%. However, a new report by Eunomia alleges that the UK hugely underestimates the amount of plastic packaging waste it produces – by over 30%. If these findings turn out to be true, the report claims, then the UK might not be recycling as much as it claims. The report puts the principle cause of this as flaws in the system for recording plastic packaging waste in the UK. Hopefully, those in the plastic recycling industry can learn from this report and make improvements to the system, which will allow the UK to make further progress with plastic recycling.

Read on for the latest news.

Policy

UK consultation on single-use plastics

Government has launched a consultation on implementing taxes on single-use plastics in a bid to bring their use down.

The last section of the consultation specifically asks what are the barriers to the collection of single-use plastics, and the introduction of more environmentally friendly methods of waste treatment, including barriers to any existing technologies.

In parallel with the plastics consultation the Government announced that "Some of the money raised from any tax changes will be used to encourage the creation of new, greener products and services. In addition, £20 million from existing budgets will be given to businesses and universities to research ways to reduce the impact of plastics in the environment."

Click [here](#) for more information.

Markets

BEWi becomes particle foam specialist with Synbra acquisition



Wikimedia Commons

BEWi Group AB announced that it has submitted a binding offer to acquire Synbra Holding B.V., a leading manufacturer of particle foam products for thermal (building and construction) and technical (HVAC, protective, automotive and food) industries, from a consortium led by Gilde Buy Out Partners. The combination with BEWi would create a European particle foam specialist with strong positions in numerous countries. The relevant works councils and other employee representative bodies will be consulted prior to formal agreement. Parties have agreed not to disclose the terms of the conditional agreement. Completion of the transaction is anticipated to take place in the first half of 2018 (subject to completion of the relevant works council procedures in accordance with relevant legislation). Synbra is developer and manufacturer of particle foam products made of expanded polystyrene ("EPS"), expanded polypropylene ("EPP") and expanded poly-lactic acid ("EPLA"). Through a vertically integrated business model,

Synbra offers upstream particle foam production and downstream conversion into blockformed and cut or shape moulded products for the thermal and technical insulation markets. Founded in 1957, Synbra has established itself as a key player in its chosen geographies by leveraging continuous product innovation, operational excellence and M&A. Headquartered in Etten-Leur, the Netherlands, Synbra operates 14 strategically located production facilities in the Netherlands, Germany, Denmark and Portugal, and employs a workforce of circa 900 FTE.

Click [here](#) for more information.

Biocatalysts Ltd acquired by BRAIN



Biocatalysts Ltd

The bio-economy company BRAIN AG has announced the signing of a share purchase agreement between BRAIN and Biocatalysts Ltd. based in Cardiff, Great Britain, and active in the field of speciality enzymes. The transaction will be completed within the first quarter of 2018.

For over 35 years, Biocatalysts (and more recently Biocatalysts Inc, USA) has focused on the development, production and distribution of speciality enzymes for various industries such as food and fine chemicals. BRAIN is a leading technology company in the field of industrial biotechnology, developing microorganisms, natural substances and enzymes for the industrial use.

The strategic acquisition of a majority stake in Biocatalysts is intended to accelerate product driven growth in the fast-growing speciality enzyme market and broaden the portfolio of the enzyme business of BRAIN. This synergy, with

respect to research and development as well as production and global distribution will hugely benefit both companies and their customers. After the completion of the transaction, Biocatalysts Ltd. will continue to operate under the current company name.

Click [here](#) for more information.

Biobased agrichemicals company raises funding

Sofinnova Partners, a leading European venture capital firm specialized in life sciences, has announced that Micropep Technologies, a biotech company focused on biological alternatives to agrochemicals, raised €4M. Sofinnova Partners becomes the company's leading shareholder, next to IRDInov and Toulouse Tech Transfer. Sofinnova Partners invested with its recently closed €125M fund dedicated to the sustainable transition of the chemical industry, Sofinnova IB I, which is the largest European fund dedicated to this fast-growing new area.

After Agrosavfe, which focuses on biological molecules to replace chemical fungicides and insecticides, Micropep is Sofinnova IB1's second investment in Ag-Biotech, and third overall. Sofinnova Partners has been investing in industrial biotech since 2009 and today has a portfolio of 11 companies, in Europe and North America, at different stages of maturity. They range from companies at proof of concept, such as Enobraq in Toulouse (France) developing micro-organisms using CO₂ as source of carbon, all the way to commercial stage like Avantium in Amsterdam (The Netherlands) developing a brand-new type of plastic using renewable raw material.

Micropep, founded in 2016 in Toulouse, focuses on bioherbicides and biostimulants. The company uses plants' natural molecules, called "micro-peptides", to temporarily control expression of their genes and regulate plant growth but leaving

their DNA intact. The company currently works on four development programs: germination, flowering, growth, and weed control. The proceeds of the financing will be used to strengthen its technology platform, further its R&D programs to proof of concept, and initiate its commercial growth with a strong international focus.

Click [here](#) for more information.

Research & Development

UK overestimates plastic recycling levels

A new Eunomia report reveals how the UK consistently overestimates how much of the plastic packaging waste it produces gets recycled.

Official statistics say that in 2015 UK households and businesses produced 2.26m tonnes of plastic packaging waste. Almost 39% was claimed to have been recycled, well above the current EU target of 22.5%. However, by analysing what is known about the composition of waste in the UK, the new report Plastic Packaging – Shedding Light on the UK Data finds that the real amount of plastic packaging waste produced is much higher – around 3.5m tonnes.

If the amount reported as recycled is correct, it seems the real recycling rate may be 9-10 percentage points lower than the government claims. The UK may well have failed to meet its recycling targets under the EU Directive in the years 2008-2012.

The report goes on to identify where problems occur in the system. One major issue highlighted is that when material is 'placed on the market' it is clean, dry and free from extraneous material such as labels. However, when the quantity collected for recycling is measured, the weight is likely to be inflated by the inclusion of moisture and contaminants. That might be the source of some of the over-reporting.

Another problem highlighted is that the UK packaging producer responsibility system is designed simply to deliver compliance with recycling target at the lowest possible cost to industry. In some other European countries, producers meet the full cost of household recycling systems: the report suggests that the UK system means that businesses cover at most 10% of the cost of providing the household recycling service they rely on to deliver compliance.

In the UK, official data on the quantity of plastic packaging placed on the market is derived from data from producer "compliance schemes" rather than being produced independently. The report points out that the lower the figure for the packaging placed on the market is, the lower the amount of material that needs to be recycled in order to meet the targets, keeping down the costs of compliance to industry.

Click [here](#) for more information.



Wikimedia Commons

Lactone monomers from biocatalysis

Monoterpenoids offer potential as bio-derived monomer feedstocks for high performance renewable polymers. This paper describes a biocatalytic route to lactone monomers menthide and dihydrocarvide employing Baeyer-Villiger monooxygenases (BVMOs) from *Pseudomonas* sp. HI-70 (CPDMO) and *Rhodococcus* sp. Phi1 (CHMOPhi1) as an alternative to organic synthesis. The regio-selectivity of dihydrocarvide isomer formation was controlled by site-directed mutagenesis of three key active site residues in CHMOPhi1. A combination of crystal structure determination, molecular dynamics simulations and mechanistic modelling using density functional theory (DFT) on a range of models provides insight into the origins of discrimination of wild type (WT) and a variant CHMOPhi1 for producing different regio-isomers of the lactone product. Ring-opening polymerizations of the resultant lactones using mild metal-organic catalysts demonstrate their utility in polymer production. This semi-synthetic approach utilizing a biocatalytic step, non-petroleum feedstocks and mild polymerization catalysts, allows access to known and also to previously unreported and potentially novel lactone monomers and polymers.

Click [here](#) for more information.

Dupont Tate & Lyle expand production capacity in Tennessee

DuPont Tate & Lyle Bio Products, LLC, a joint venture between DuPont and Tate & Lyle, announced an expansion to their world-class manufacturing facility in Loudon, Tennessee, to increase annual production of bio-based 1,3-propanediol by 35 million pounds.

Engineering and construction is scheduled to start immediately, and the expansion is expected to be complete mid-2019. The expansion will bring additional construction and engineering jobs to the region and reinforces DuPont Tate & Lyle's commitment to providing customers higher-performing ingredients from a petroleum-free, more sustainable and renewable source.

Formed in 2004, DuPont Tate & Lyle utilizes a proprietary process that uses plant-based feedstocks to produce bio-based 1,3-propanediol. Today, the joint venture provides solutions for a wide variety of markets and applications through its bio-based performance brands Susterra® and Zemea® propanediol in addition to Bio-PDO™, the key ingredient for DuPont™ Sorona® high-performance polymers.

Sorona® is a polymer that brings unique performance-based benefits to fibres used in apparel and carpet markets.

Zemea® propanediol is a multifunctional, preservative-boosting humectant and ingredient that delivers high performance in a variety of consumer applications from personal care, flavours and pharmaceuticals to laundry and household cleaning.

Susterra® propanediol is the building block that delivers high performance in polyurethanes, fluids and other industrial applications.

Click [here](#) for more information.

Polymers

Engineers make lightweight composites from agricultural wastes



Flickr

Engineers at Portsmouth University have been experimenting with agricultural biomass to create new types of composites for the transport industry.

Using flax, hemp, jute and waste biomass date palm fibres, the researchers have been able to manufacture lightweight non-structural components such as car bumpers and door linings. With so much agricultural waste going to landfill or being burnt, repurposing these products could simultaneously help reduce CO₂ emissions across both agriculture and transport.

Click [here](#) for more information.

VELOX releases biobased PETG with enhanced transparency

VELOX GmbH, one of Europe's leading solution providers of raw material specialities for the plastics, composites, additives and paint & coatings industries, is offering a new, enhanced range of Polyethylene Terephthalate Glycol (PETG) for injection moulding and film extrusion applications. VELOX' long-term partner SK

Chemicals (South Korea) has recently modified its bio-based ECOZEN co-polyester lines, significantly improving their transparency and performance. Especially the cosmetic packaging industry, the food as well as household and consumer goods markets will benefit from the new development. Besides, ECOZEN is an eco-friendly solution, containing an appropriate amount of bio-mass and is free of Bisphenol A. Further benefits of the material are easy processing, energy efficiency, high printability, excellent recyclability as well as impact strength. VELOX provides the new range in nearly all European countries.

Click [here](#) for more information.

Bio-On develops new fertiliser application for PHA

Bio-on has launched a revolutionary new use for its 100% natural and biodegradable PHAs bioplastic. Bio-on researchers have developed a solution for the controlled release of Urea fertilisers, an enormous market with global annual production of 180 million tons and 4% annual growth. The advantage is more effective dosage and lower fertiliser consumption. This means less pollution and a positive impact on people and the planet.

Bio-on, listed on the AIM segment of Borsa Italiana and operating in the high-quality bioplastics sector, has developed an innovative technology to coat Urea for fertiliser and has set up a NEWCO called U-COAT (Urea Coating).

This new company 100% owned by Bio-on S.p.A. has exclusive rights to use the technologies developed by Bio-on for coating fertilisers with a natural product such as PHAs, the biopolymer developed by Bio-on, which is natural and biodegradable without leaving any trace on the environment. U-COAT will pay running royalties to Bio-on for every quantity produced or sub-licensed on the fertilisers market. Bio-on owns

100% of the technology licensed or sub-licensed through U-COAT to international manufacturers.

U-COAT brings to this major market a technology that will create a revolution in the use of fertilisers, particularly Urea. This type of fertiliser is usually sold in white crystals, pellets or granules. It is a very concentrated nitrogen-containing feed that is highly water-soluble so rapidly degrades and disperses in the subsoil. Urea can be used as a fertiliser at the sowing stage or on the surface, but should not come into contact with the seed. This is where the innovation proposed by U-COAT comes into play. With varying percentages depending on the characteristics of the soil, PHAs bioplastic coats the UREA granule which, thanks to PHA's natural biodegradation, will then release the fertiliser into the soil in a controlled way as and when required, leaving no trace and protecting the fertiliser from being washed away by rainfall and therefore being less effective.

The innovative solution proposed for the fertilisers sector will reduce the quantities of urea used in the soil and eliminate any excess, with a consequent reduction in costs and environmental impact on the subsoil. The future possibility of applying the same technology to both other higher value fertilisers and agricultural pesticides and other complementary products will play a major part in reducing environmental impact and costs in the agricultural sector.

Click [here](#) for more information.

Teijin develops gasoline-resistant biobased film for car door handles



Pixabay

Teijin Limited announced that it has developed a formable gasoline-resistant film made of PLA NEXT® bioplastic to replace chrome plating, which Honda Lock Mfg. Co., Ltd. has now adopted for nonconductive door handles integrated with smart-entry systems. Teijin developed the innovative film using a special metal-evaporation technology from a processing-manufacturer partner. Teijin is currently developing other automotive applications in addition to mass producing the film for door handles. This new film is made with PLANEXT® SN4600, an improved grade of Teijin's PLA NEXT® bioplastic, which is made from a bio-origin chemical compound called isosorbide. In addition to original PLANEXT® properties such as chemical resistance, transparency and surface hardness, polymer reforming is used to give PLANEXT® SN4600 important new properties including gasoline resistance, formability, UV resistance. Teijin's gasoline-resistant film is ideal for vehicle doors, which of course have the possibility of coming into contact with gasoline. Optimized heat resistance and filming technology enable high formability for fashioning into complicated shapes. UV protection helps to shield the base material and prevent discoloration. Vehicle door handles are increasingly being integrated with secure smart-entry systems that enable doors to be locked and unlocked by simply placing one's

hand on a handle sensor. The material surrounding the sensor, however, must be nonconductive to avoid sensor malfunctions, so conventional door handles made of electroconductive chrome plating coated on a resin base are not suitable. Plastic films made with a metal-evaporation process are nonconductive and already being used as metal substitutes for automotive exteriors, but they are not suitable for door handles because Honda Lock's door handle of smart entry system they are neither gasoline resistant nor highly formable.

Click [here](#) for more information.

UPM to produce recyclable plastics from naphtha



Elo Pak

UPM has joined forces with Norwegian packaging company Elo Pak and chemical producer Dow to convert its renewable naphtha into cartons.

Alongside renewable diesel, the Finnish company's UPM Lappeenranta Biorefinery produces naphtha, an excellent raw material for bioplastics. The naphtha can be converted into renewable resins which can be used in the packaging industry.

According to a statement from UPM, using renewable polyethylene for the plastic coating of cartons reduces the carbon footprint of producing liquid food packaging.

Elo Pak produces 15 billion cartons each year. By joining forces with UPM and Dow, they can now offer 100% renewable cartons that are both recyclable and responsibly sourced.

In February, it was announced that UPM had commenced an environmental impact assessment for a possible biorefinery in Mussalo, Kotka, in the southeast of Finland. The proposed facility would use a different raw material base and technology to UPM Lappeenranta. If built, the Kotka Biorefinery would produce 500,000 tonnes of advanced biofuels for transportation.

Click [here](#) for more information.

Thai PLA pilot plant successfully started-up

Total Corbion PLA, global technology leader in Poly Lactic Acid (PLA) and lactide monomers, announces that it has successfully started up its 1 kTpa PLA pilot plant in Rayong, Thailand. The pilot plant started up in December 2017 and over the past two months has produced a broad range of Luminy® PLA resins. In addition, the pilot plant is being used to train operators and to get a head start on the required product certifications and regulatory needs. In future, Total Corbion PLA will also be able to use the pilot plant for product development.

With the start-up of the pilot plant, Total Corbion PLA is gearing up to become a world scale producer of PLA: on the same site, Total Corbion PLA's Lactide plant is being expanded to 100 kTpa and a 75 kTpa PLA polymerization plant is under construction.

Upon completion, Total Corbion PLA's production facility in Thailand will produce a broad portfolio of Luminy® PLA neat resins: from standard PLA to innovative, high heat resistant PLA, to satisfy customer requirements for a wide range of markets from packaging to consumer goods, fibres and automotive.

Click [here](#) for more information.

Chemicals

Siemens and Evonik launch Rheticus project to produce chemicals from CO₂

Siemens and speciality chemicals leaders Evonik have announced plans to use electricity from renewable sources and bacteria to convert carbon dioxide (CO₂) into specialty chemicals. The two companies are working on electrolysis and fermentation processes in a joint research project called Rheticus. The project was launched in January and is due to run for two years. The first test plant is scheduled to go on stream by 2021 at the Evonik facility in Marl, Germany which produces chemicals such as butanol and hexanol, both of which are feedstocks for special plastics and food supplements. The next stage could see a plant with a production capacity of up to 20,000 tonnes a year. There is also potential to manufacture other specialty chemicals or fuels. Some 20 scientists from Evonik and Siemens are involved in the project.

Click [here](#) for more information.

Renovia's California plant closes

Biofuels digest comments that in California, Renovia has ceased operations, after the company failed to raise sufficient financing from investors and/or strategic partners to advance its pilot-scale technology to first commercial production. The bulk of the IP assets have been sold and the company's physical assets are currently in liquidation. The company had developed what is widely considered to be transformative catalyst and process technology.

In 2013 Renovia developed world's first 100% bio-based nylon-6,6 polymer for prospective partner ADM (and subsequent investor), under Renovia's RENNOL brand, made from Renovia's

renewable monomers, RENNOL adipic acid and RENNOL hexamethylenediamine.

Production costs for Renovia's bio-based AA and HMD were projected to be 20-25% below that of conventional petroleum-based AA and HMD, with a significantly lower per-pound capital cost. Additional projected benefits included an 85% reduction in greenhouse gas emissions compared to conventional petroleum-derived AA, and a 50% reduction in GHG emissions compared to conventional petroleum-derived HMD.

Competitor pathways include butadiene, a key intermediate chemical used by INVISTA for the production of adiponitrile (ADN), which in turn is a critical intermediate chemical used in the manufacture of nylon 6,6. Genomatica, LanzaTech and even Global Bioenergies have looked at butadiene. Renovi had the direct drop in replacement benefit.

In 2015, Renovia developed glucaric acid from glucose and 1,6-HDO as a platform intermediate.

However, the crash in oil price wiped away margins, the high risks remained, and the real market value of the carbon benefit was exposed as a 'nice to have' rather than a 'willing to pay for'. Similarly, retrenchment of key investor companies after the financial crash also squeezed cash flow. In the end Renovia were not able to move fast enough to commercialisation.

Click [here](#) for more information.

Consumer Products

Goodyear announces tyre incorporating living moss



Goodyear

Goodyear's latest concept tyre, introduced at the 2018 Geneva International Motor Show, quite literally brings the future of mobility to life as a visionary solution for cleaner, more convenient, safer and more sustainable urban mobility.

The concept, named Oxygene, has a unique structure that features living moss growing within the sidewall. This open structure and the tyre's smart tread design absorb and circulate moisture and water from the road surface, allowing photosynthesis to occur and therefore releasing oxygen into the air.

According to the World Health Organization (WHO) more than 80 percent of people who live in air pollution-measured urban areas are exposed to air quality levels that exceed WHO limits.

Inspired by the principles of the circular economy, with emphasis on reducing material waste, emissions, and energy loss, Goodyear's Oxygene concept is designed to integrate seamlessly into future cityscapes, featuring several performance solutions:

Cleaning the Air We Breathe: Oxygene absorbs moisture from the road through its unique tread and inhales CO₂ from the air to feed the moss in its sidewall and release oxygen via photosynthesis. In a city similar in size to greater Paris with about

2.5 million vehicles, this would mean generating nearly 3,000 tons of oxygen and absorbing more than 4,000 tons of carbon dioxide per year.

Recycling Worn Tires: Oxygene features a non-pneumatic construction that is 3D-printed with rubber powder from recycled tires. The lightweight, shock-absorbing structure provides a long-lasting, puncture-free solution intended to extend the life of the tire and minimize service issues, delivering worry-free mobility. Additional safety is ensured by the tyre's open structure, which improves wet grip by helping absorb water from the tread.

Click [here](#) for more information.

DuPont releases biobased pollution-resistant skincare products

DuPont Industrial Biosciences announced the launch of GENENCARE® OSMS PRO – a new product for the personal care industry that helps protect skin from pollution, while contributing to the natural cellular defence process. Unlike other products on the market, GENENCARE® OSMS PRO is made from natural and pure ingredients, satisfying growing consumer demand for transparency. This novel natural skin protection product is based on the principle of osmoprotection. Osmolytes have the ability to manage water balance in cells and, in skin, they are part of the natural moisturization factor (NMF). With the exponential rise in global urbanization comes increased pollution. Consumers are concerned about the link between exposure to pollutants and health issues, including premature skin aging, pigmentation and worsening of inflammatory skin diseases. By improving the skin barrier function and helping the natural skin defence, GENENCARE® OSMS PRO will help consumers better protect their skin – all while using a combination of natural, pure ingredients.

Click [here](#) for more information.

World's first biobased plastic fridge

Electrolux has developed a refrigerator prototype where all the visible plastic parts are made of bioplastics from renewable sources. The bioplastic for the refrigerator has a more than 80% lower carbon footprint compared to the conventional plastics used today. The prototype is the world's first refrigerator made of bioplastic and part of Electrolux strategy to create more sustainable home appliances.

Unlike ordinary plastics that are oil-based, bioplastics such as those used in the newly developed prototype refrigerator come directly from renewable resources, such as corn or sugarcane. The bioplastics used in the refrigerator are recyclable.

Over the last several years, the Electrolux Global Connectivity & Technology Centre (GC&T) has explored and tested how bioplastics can be applied in Electrolux products and packaging. Together with the Electrolux Purchasing and R&D departments for food preservation, GC&T has successfully developed a refrigerator prototype where all the visible plastic parts are made of bioplastics. The material used in the refrigerator has been provided by NatureWorks, a world-leading supplier of biopolymers. The bioplastic for the refrigerator has 80% lower CO₂ equivalent emissions compared to the conventional plastic used in current fridges.

Electrolux has already committed to materials efficiency through the use of post-consumer recycled plastics, such as Carborec®, a plastic compound based on recycled polypropylene, extending the lifetime of plastic coming from non-renewable resources. The bioplastic refrigerator is still in development and there is currently no timeframe set for when the product will be officially launched on the market.

Click [here](#) for more information.

Biobased luxury fabric unveiled

Luxury Jersey, a high-quality Italian product that benefits from the textile culture of the Boselli family, announces the debut of two unique sustainable fabrics intended for stylists and fashion houses in the luxury segment. The new Luxury Jersey fabrics are made using GOTS-certified organic cotton and EVO® by Fulgar bio-based polyamide, and the pierced net effect is obtained through the use of the polyamide interwoven with cotton threads, creating the structure of the mesh.

Luxury Jersey has chosen its established partner Fulgar, an Italian company that is world leader in the production of man-made fibre, to create these innovative bio-based fabrics through the use of EVO® by Fulgar, a fibre obtained from castor oil. These naturally-occurring plants are not used for food – they are a totally renewable resource that does not require large amounts of water or take up land that can be used for agricultural purposes

Click [here](#) for more information.

German agency provides guide to biobased office supplies

With the newly published booklet: "Office - Equipment, Material, Design", the Agency for Renewable Resources (FNR), gives carriers and procurers an overview of bio-based office products and their possible applications.

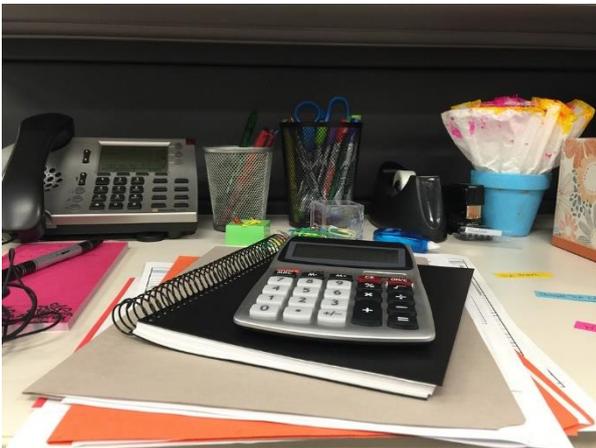
Apart from paper, the office supplies sector has traditionally been heavily influenced by petroleum-based plastic products. For the workplace in the office and its environment, however, there are a lot of bio-based product alternatives that are climate-friendly and reusable.

Years ago, the federal government decided to change from a fossil to a bio-based economy. A change that has long since begun in the office

sector: Creative manufacturers are already offering innovative, sustainable products made from renewable raw materials, from the computer keyboard and mouse made of bamboo to furniture, floor coverings and wall elements made from wood, linoleum and goat hair, as well as highlighters, foils and holes from bioplastics.

The guide now presented increasingly refers to renewable, climate-friendly alternatives for office equipment. In addition, the booklet provides information on recognized quality labels, as well as assistance for service descriptions and offer evaluations.

Click [here](#) for more information.



Pixabay

PG Tips release biodegradable plant-based teabags

PG tips tea bags will be made with new plant-based material that is 100% renewable and biodegradable.

PG tips is announcing the latest step in its journey to improve the impact of products on the environment by moving to fully biodegradable, plant-based material in the nation's favourite tea bag, PG tips, over the course of 2018.

As part of an initial run, the new tea bags have been made using a new material that is 100% plant-based and 100% renewable. Unlike

polypropylene the new material is made from corn starch and is fully biodegradable. The aim is that all tea bags manufactured will use the new material by the end of 2018.

PG tips pyramid bags are currently made mostly with paper, with a small amount of polypropylene used to seal the tea bag, a method used widely across the industry. R&D scientists at Unilever have been actively exploring plant-based alternatives for PG tips for some time and have already converted some ranges in Canada, Poland and Indonesia.

This is the latest move from PG tips and Unilever to reduce the environmental impact of the way products are manufactured and used. PG tips was the first major UK tea brand to sell fully Rainforest Alliance certified black and green teas.

Unilever's tea brands, including PG tips, are continually finding new ways to make a difference to products. The announcement today provides another option for people who may have concerns about the sustainability of the material used to produce tea bags.

Click [here](#) for more information.



FreeStockPhotos

Starbucks to develop compostable coffee cups

Each year, an estimated 600 billion paper and plastic cups are distributed globally and though Starbucks cups only account for an estimated 1 percent of that total, the company is not leaving the problem-solving to others.

Starbucks is committing \$10M in partnership with Closed Loop Partners and its Centre for the Circular Economy to establish a ground-breaking consortium to launch the NextGen Cup Challenge. This is the first step in the development of a global end-to-end solution that would allow cups around the world to be diverted from landfills and composted or given a second life as another cup, napkin or even a chair – anything that can use recycled material.

Through the NextGen Cup Challenge, the consortium will award accelerator grants to entrepreneurs working on ideas that could lead to the development of more sustainable cup solutions and, invite industry participation and partnership on the way to identifying a global solution.

As the NextGen Challenge kicks off, internal research continues as Starbucks Research and Development team initiates a trial of a new bio-liner, made partially from plant-based materials for its paper cup. The internal trial, expected to take six months, will test not only for environmental impact, but whether the cup's liner can stand up to stringent safety requirements and quality standards when filled with a hot liquid. This trial marks the 13th internal test of its kind in the last year alone as part of continued efforts to deliver on its goal for a Greener Cup.

Click [here](#) for more information.

Unilever reaffirms commitment to plastic waste reduction

Biobased World Quarterly reports on an interview with Unilever CEO, one year after Unilever made its commitment to ensure 100% of its plastic packaging was fully reusable, recyclable or compostable by 2025.

Unilever believes there are four key actions the consumer goods industry should take to create the systemic change required and accelerate the transition to a circular economy: for companies to invest in innovation towards new delivery models that promote reuse; for more companies to commit to 100% reusable, recyclable or compostable packaging by 2025 and set stretching targets for using post-consumer recycled content; for a Global Plastics Protocol setting common agreed definitions and industry standards on what materials are put into the marketplace, to ensure our packaging is compatible with existing and cost-effective recycling infrastructures; for companies to engage positively in policy discussions with governments on the need for improvements to waste management infrastructure, including the implementation of Extended Producer Responsibility schemes.

Since 2010, the waste associated with the disposal of its products has decreased by 28% and the weight of its packaging has reduced by 15%. The company also stopped sending non-hazardous waste to landfill from its manufacturing sites in 2015. Alongside its commitment to 100% reusable, recyclable or compostable plastic packaging by 2025, Unilever pledged to source 25% of its resin from post-consumer recycled content by 2025, and to publish its full plastics palette before 2020.

Click [here](#) for more information.

Patents

Biobased carbodiimides method for their manufacture and application thereof

Biobased carbodiimide obtained by reacting at least one carbodiimide (C) and hydrogen-acidic compounds having a functionality of greater than 1 and/or their 2-24C-hydroxycarboxylic acid ester isolated or produced from renewable materials, is new.

Click [here](#) for more information.

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.

Novel biobased polyester

A novel linear polyester resin is made by condensation of one or more aliphatic or cycloaliphatic polyols with one or more aliphatic or cycloaliphatic polyfunctional acids derived from biobased materials or a biological feedstock. Coating compositions and coated substrates using the novel linear polyester resin are also described.

Click [here](#) for more information.

Polymer compositions produced from biobased ethanol

The present invention provides terephthalic acid in which two of the aromatic ring carbons are derived from ethanol. The present invention also provides PET, PTT, and PBT polymer compositions, and plastic moulding compositions and manufactured goods thereof, wherein each repeat unit in a polymer composition can comprise four ethanol-derived carbon atoms.

Click [here](#) for more information.

Methods for coproduction of terephthalic acid and styrene from ethylene oxide

The present invention provides methods for the production of terephthalic acid and derivatives thereof using ethylene oxide, carbon monoxide and furan as feedstocks. The process is characterized by high yields and high carbon efficiency. The process can utilize 100% biobased feedstocks (EO via ethanol, CO via biomass gasification, and furan via known processes from cellulosic feedstocks). In one aspect, processes of the invention coproduce biobased terephthalic acid and biobased styrene.

Click [here](#) for more information.

Methods for production of terephthalic acid from ethylene oxide

The present invention provides methods for the production of terephthalic acid and derivatives thereof using ethylene oxide, carbon monoxide and furan as feedstocks. The process is characterized by high yields and high carbon efficiency. The process can utilize 100% biobased feedstocks (EO via ethanol, CO via biomass gasification, and furan via known processes from cellulosic feedstocks).

Click [here](#) for more information.

Events

Scale Me Up Scotty: Pilots4U Workshop Brussels, 18th April 2018

Pilots4U aims to set up one very visible and easily accessible network of open access pilot and multipurpose demonstration infrastructures for the bioeconomy*. The background and mission of the open access facilities included in the network is quite diverse (technology centre, private company, university...), hence various cooperation models with respect to innovation approach and intellectual property rights exist.

This workshop will present and discuss different open access cooperation models and highlight common agreements regarding Intellectual property rights. The workshop intends to inform (and discuss with) pilot infrastructure owners and users on how open access works in practice.

Registration is free but mandatory. Spaces are limited, therefore a no-show fee of 50€ will be charged.

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.

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.

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 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.

BioBase4SME Innovation Biocamp Easingwold, 3rd-8th June 2018

Apply now for €7000 worth of fully funded, specialist training for your business.

New, high-growth, bio-based businesses can benefit from an intensive, week-long course giving them the tools they need to commercialise their idea and their company. Includes follow-on coaching for a year after the workshop. This event is part of the EU-funded project BioBase4SME and builds on last year's successful Biocamp.

Click [here](#) for more information.

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

PHA 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

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.

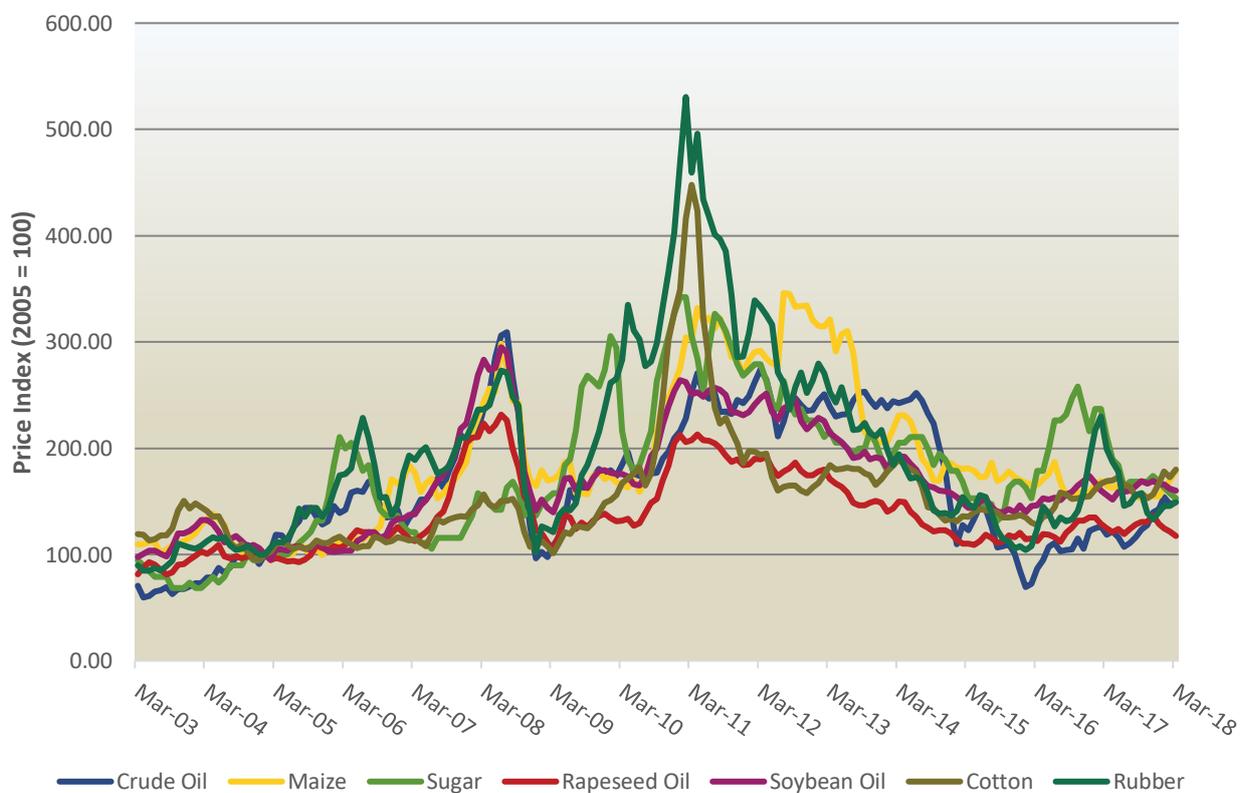
Price Information

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

Item	Price, US\$ (Mar 13)	Price, US\$ (Feb 18)	Price Change
Crude oil (petroleum, barrel)	102.52	63.46	-38%
Maize (corn, metric ton)	309.04	163.36	-47%
Sugar (kilogram)	0.41	0.3	-27%
Rapeseed oil (metric ton)	1,162.00	829	-29%
Soybean oil (metric ton)	1,116.00	842	-25%
Cotton (kilogram)	2.08	2.03	-3%
Rubber (kilogram)	2.98	1.76	-41%

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

Raw materials 15-year Price Indices



Credits and Disclaimer

NNFCC News Review is edited by Bob Horton for NNFCC subscribers. Feedback is welcome. The Review has been compiled in good faith and NNFCC does not accept responsibility for any inaccuracies or the products or services shown.



NNFCC
Biocentre, York Science Park
Innovation Way
Heslington, York
YO10 5DG

Phone: +44 (0)1904 435182
Fax: +44 (0)1904 435345
Email: enquiries@nnfcc.co.uk
Web: www.nnfcc.co.uk
Twitter: @NNFCC