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News Review

Bio-based Products

Issue Seventy-Eight

September 2018

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

Contents

Foreword

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

How to tackle the pollution caused by irresponsible disposal of plastic packaging is one most hotly debated topics across plastic and sustainability circles. While it's widely agreed that we should reduce the use of plastic packaging this can't be at the expense of the product the packaging protects. Where packaging is needed, we must work towards making it as sustainable as possible, for example the use of renewable raw materials allows a move away from the use of environmentally damaging fossil fuels while recognising that the biobased products we produce must be integrated into an effective recovery system, to ensure that where ever possible plastics are recycled. When recycling isn't an effective option or where durable plastic contaminates biogenic waste streams, such as food waste, we can turn our attention to the potential for compostable packaging.

This month we have a several of stories in packaging space, certainly the launch of JUST Water in the UK has grabbed the media's attention. The brand, headed by actor Jaden Smith, has been a smash hit in the US, becoming the top selling brand of bottled water, thanks to its emphasis on sustainability: the bottles are made from over 80% biobased material (mostly recycled paper). Elsewhere, biobased plastic manufacturer Braskem, has announced a partnership with UNITED CAPS, a Luxembourgish company that produces lids and caps for plastic bottles. The new range is made from Braskem's I'm green biobased polyethylene, and thus is 100% biobased.

There has also been an announcement from BioLogiQ that they have produced a plastic that, in tests, is 97% biodegradable in marine conditions. One of the main issues surrounding biodegradable plastic, is that it is dependent on what conditions the plastic is in (usually requiring industrial composting conditions) as to whether the plastic degrades at a significant rate. Given the degree to which waste plastic ends up in the ocean, finding a way of producing plastic that will biodegrade in marine conditions is a priority for many in the packaging sector. BioLogiQ's polymer was tested and shown to 97% biodegrade in marine conditions within one year. These results are promising, but only thin films were tested, and the thickness of the material will play a part in the degradation rate. The degree to which this is an important step will also be determined by the range of applications for this plastic.

Obviously, the ideal solution would be for no plastic, biodegradable or otherwise, to end up in the oceans and undoubtedly the area of sustainable innovation in packaging is going to be a hot area over next few years.

Read on for the latest news.

Policy

Report into harmonising circular economy and bioeconomy

Pixnio

Europe uses natural resources unsustainably and the European Union has put in place policies on circular economy and bioeconomy in response. A new European Environment Agency (EEA) report argues that implementing these two concepts in tandem, by applying specific design principles within a systemic approach, would improve resource efficiency and reduce environmental pressures.

The EEA report 'The circular economy and the bioeconomy — Partners in sustainability' shows that the two policy agendas have similar objectives and areas of intervention, including food waste, biomass and bio-based products, and that they would benefit from stronger links, particularly in product and infrastructure design, and collaboration throughout the value chain.

According to the report, the increasing demand for food, feed, biomaterials and bioenergy resources could worsen the over-exploitation of natural resources. By extending the lifetime of products and recycling materials, a circular, bio-economy approach can help retain material value and functionality for longer time as well as avoid unrecycled biowaste.

Promising innovations and strategies for circular biomass use include biorefinery, 3D printing with bioplastics, multi-purpose crops, better use of residues and food waste, and biowaste treatment. Consumers can also contribute to bioeconomy's sustainability, for example, by eating less animal-based protein, preventing food waste and separating biowaste from other waste streams, the report says.

The report argues that biobased approaches should be tailored to the specific use context in order to maximise the benefits of biobased and biodegradable products. The technological innovation, covering product and infrastructure design, should be embedded in a wider system innovation that also tackles consumer behaviour, product use and waste management.

The bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. It includes agriculture, forestry, fisheries, food, and pulp and paper production, as well as parts of the chemical, biotechnological and energy industries.

Click here for more information.

Review of exempting "biodegradable" plastics from waste restrictions

Pixabay

Plastic litter is encountered in aquatic ecosystems across the globe, including polar environments and the deep sea. To mitigate the adverse societal and ecological impacts of this waste, there has been debate on whether 'biodegradable' materials should be granted exemptions from plastic bag bans and levies. However, great care must be exercised when attempting to define this term, due to the broad and complex range of physical and chemical conditions encountered within natural ecosystems. Here, we review existing international industry standards and regional test methods for evaluating the biodegradability of plastics within aquatic environments (wastewater, unmanaged freshwater and marine habitats). We argue that current standards and test methods are insufficient in their ability to realistically predict the biodegradability of carrier bags in these environments, due to several shortcomings in experimental procedures and a paucity of information in the scientific literature. Moreover, existing biodegradability standards and test methods for aquatic environments do not involve toxicity testing or account for the potentially adverse ecological impacts of carrier bags, plastic additives, polymer degradation products or small (microscopic) plastic particles that can arise via fragmentation. Successfully addressing these knowledge gaps is a key requirement for developing new biodegradability standard(s) for lightweight carrier bags.

Click here for more information.

Research & Development

Plastic fully metabolised by microbes

Researchers at ETH Zurich and the Swiss Federal Institute of Aquatic Science and Technology (Eawag) succeeded in an interdisciplinary study to demonstrate that soil microorganisms metabolically utilised the carbon in the PBAT polymer both for energy production and also to build up microbial biomass. The researchers used the biodegradable polymer PBAT (Polybutylenadipatterephthalat) labelled with a carbon isotope. This isotope label enabled the scientists to track the polymer-derived carbon along different biodegradation pathways in soil. It showed that the carbon from PBAT was not only converted into carbon dioxide (CO2) as a result of microbial respiration but also incorporated into the biomass of microorganisms colonizing the polymer surface. The researchers are the first to successfully demonstrate where the carbon of a polymer ends up and that a plastic material is effectively biodegrading in soils.

The tested PBAT polymer is a fossil-based, biodegradable polymer, which is used amongst others for the production of biodegradable, certified compostable bio-waste bags (according to EN 13432) or biodegradable in soil certified mulch films (according to EN 17033).

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Assessing consumer preferences regarding biobased plastic sports equipment

Within sports industry a lot of plastic is used. A rapid diffusion of new products causes a lot of plastic waste and substantial environmental problems, which could be reduced in part through the use of bio-based plastics produced from renewable biomass raw materials. Consumer interest in bio-based plastics is currently limited by the small range of bio-based plastic products, a lack of experience with bio-based plastics and high prices. In this study the preferred attributes of a bio-based plastic drink bottle for bicycles and a running shoe with a bio-based sole were identified using a choice-based-conjoint analysis (CBC). Members of a German online panel were surveyed in November 2014. The analysis of seven attributes for both of the products revealed that origin of the raw materials was the most important factor, with respondents having a clear preference for the use of raw materials cultivated in Germany. Respondents also preferred products containing a high percentage of bio-based plastic, products associated with a large reduction of CO2-emissions and products not involving the use of plastic softeners. A general interest in the bio-based sample products could be identified, but the respondents rejected a high price premium. The importance of domestically cultivated raw materials is consistent with findings of previous studies investigating primarily foodstuff. The insights of this study could form the basis of a promising strategy to promote consumer products made of bio-based plastic.

Click here for more information.

Polymers

SECOS resin plant goes live

SECOS GROUP
Changing the world of packaging

SECOS

The Board of sustainable and eco-friendly bioplastics developer SECOS Group Limited is pleased to announce that its new Malaysian resin plant has successfully gone live on 31 July 2018. The Company has delivered initial production of SECOS resin to local customers and trials of the resin have been fully approved for commercial supply. SECOS plans to ramp up production at the new facility over the coming months to meet growing demand for the Company's proprietary resins while maintaining the highest levels of quality control.

Click here for more information.

97% marine-biodegradable plastic

BioLogiQ, Inc., a bioplastic resin manufacturing company specializing in sustainable plastic products made from renewable resources, has announced that test results show its NuPlastiQ MB BioPolymer, produced by blending NuPlastiQ GP with PBAT (polybutylene adipate terephthalate), is marine biodegradable. Performed by Eden Research Laboratory, results show 97% biodegradation of a GP/PBAT film in ocean water within a one-year period, according to ASTMD6691 standards for marine biodegradability. The key to this innovative new plastic compound is BioLogiQ's NuPlastiQ GP General Purpose BioPolymer. GP is a 100% natural, renewably-resourced, plant-based resin that has been certified by TUV Austria to marine biodegrade in 28 days. When PBAT is mixed with NuPlastiQ GP, it will also biodegrade in marine environments.

Click here for more information.

Kaneka to up capacity for biobased plastic manufacturing

Kaneka Corporation has determined to expand its manufacturing facility of biodegradable polymer. The production capacity will be about 5,000 ton per year with an investment amount of 2.5 billion yen and will be operational in December 2019.

"Kaneka Biodegradable Polymer PHBH™," which is a 100% plant-derived polymer with superior biodegradability, is now actively getting applied to fruits and vegetable bags or compost bags in Europe where the restrictions have been tightened to reduce disposable plastic bags. Furthermore, while microplastics pollution emerges as a global concern, PHBH is not only certified as biodegradable in seawater but also registered as "Food Contact Substance" from FDA in March this year. Kaneka expects an increase in demand for a broad application of PHBH such as to sea material or food package in the future.

Global demand for biodegradable plastic is predicted to be over a million ton in 2022 with huge market expansion. By the manufacturing capacity reinforcement of this time, Kaneka will establish a production facility which meets rapidly growing demands and at the same time develop further applications. For the next step, a feasibility study has started to consider a commercial plant to realize the full-scale business expansion.

Click here for more information.

Kaneka

Chemicals

Cortec releases biobased general purpose lubricant

EcoLine® ELP (Extreme Lubricant Penetrant) is a high-performance biodegradable soy-based lubricant and penetrant. It is formulated from natural seed oils and select additives that offer lubricity and performance superior to conventional lubricants. Its excellent performance, biobased nature, and low environmental impact make EcoLine® ELP a highly desirable option for industrial and household applications. EcoLine® ELP can be used on all types of metal for multiple purposes around the shop, plant, or home. Whether lubricating moving parts, loosening rusty bolts, or cooling/lubricating basic metal cutting operations, EcoLine® ELP serves as an excellent all-purpose lubricant for general maintenance

needs. In addition to providing lubrication and protection against rust and corrosion, EcoLine® ELP repels water and allows higher equipment operating speeds by cooling moving parts and reducing smoke. EcoLine® ELP has high flash and fire points, is not toxic to plants, and is chlorine-free. It contains 95% USDA certified biobased content and is a qualified product under the mandatory federal purchasing initiative of the USDA BioPreferred® Program.

Click here for more information.

Gevo ups production with Shockwave process

Gevo

Gevo, Inc. has announced that it has entered into two separate operating leases and service agreements with Shockwave LLC to install Shockwave's Thermodynamic Corn Fractionation Process as well as related technology and equipment at Gevo's production facility in Luverne, MN, whereby Shockwave is financing its equipment required for this multi-million-dollar project and is providing certain performance guarantees for the Shockwave Process. The Shockwave Process is expected to improve profitability of Gevo's Luverne Facility by lowering the cost of ethanol and isobutanol production, increasing the number and value of feed and protein products, producing corn oil for food use, and helping to lower the overall carbon footprint for the facility.

The Shockwave Process is expected to be operational during the first quarter of 2019. Gevo's deployment of this process is an important step of its previously announced strategy to deploy capital at its Luverne Facility, and to make certain changes and improvements to produce low-carbon ethanol side-by-side with low-carbon isobutanol. In addition to the Shockwave Process, Gevo also plans to debottleneck production and optimize the Luverne Facility's energy and equipment infrastructure to use lower amounts of fossil-based energy sources to fully implement its strategy to produce low-carbon intensity ethanol.

Shockwave's Thermodynamic Corn Fractionation Process, is a front-end corn fractionation platform that uses high velocity air and pressure changes to fractionate solid materials, providing an innovative, low-cost approach to separating the corn kernel into the various fractions including a higher-starch feed for fermentation as well as germ and fibre. After successful pilot and demonstration-scale testing, Shockwave announced in June 2018 the commercial release of its corn fractionation platform. In addition, Shockwave's proprietary particle size reduction technology has been commercially deployed in several other applications including value-added products for the agricultural, post-consumer waste and mining industries.

Click here for more information.

Testing novel catalysts for lactide production

Different Ti-Si catalysts, viz. TiO2 supported on amorphous SiO2 or Si-MCM-41, TiO2-SiO2xerogels, and Ti zeolites (TS-1 and Ti-beta), were compared in terms of activity and selectivity for the direct conversion of methyl lactate to lactide in the gas phase. Except for Ti-beta, all catalysts exhibit a high lactide selectivity of 88–92% at conversions below 50%. From DR UV–vis spectroscopy, it is evidenced that the catalytic activity of tetrahedral TiO4 sites is higher than those of polymerized TiO5 or the octahedral TiO6 counterparts, irrespective of the catalyst structure, an analysis supported by ToF-SIMS measurements. A kinetic analysis shows that the catalytic activity is proportional to the number of vacant sites on the catalyst surface. Thus, the activity increase observed for tetrahedral TiO4 sites may be attributed to an increased number of vacant sites (e.g., two for TiO4, zero for TiO6). Lactide productivity thus highly benefits from an increased dispersion of Ti sites on the catalyst surface and could be increased by a factor of 2.5 (up to 10 gLD gcat–1 h–1) when TiO2 is dispersed on a Si-MCM-41 support, with higher surface areas in comparison to amorphous SiO2 gels.

Click here for more information.

Forestry waste for 2,3-butanediol

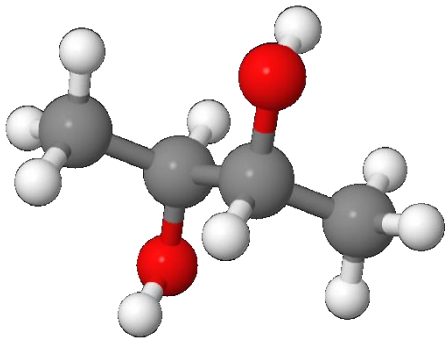
An EU project is using forestry waste to make 2,3-butanediol, a chemical with a wide range of industrial applications, from perfumes to synthetic rubber and food additives.

Rehap, an EU project, has found a way to produce 2,3-butanediol, a chemical building block used in a range of industrial applications, using sugars purified from forestry waste. The news demonstrates that 'recycled' sugars could be used as a viable alternative to sugars produced from standard processing methods. To develop the technology, Rehap is partnering with the investor Tecnalia and its portfolio company Biosyncaucho.

The chemical building block is produced in two steps. First, starch-like residues purified from poplar, a waste product of woody material, are broken down into its constituent sugars. Then, a fermentation process is used to synthesize 2,3-butanediol from these simple sugars. The compound is usually produced using chemical hydrolysis, however, Rehap's approach gives a comparable product.

2,3-butanediol has a wide range of uses, from pharmaceuticals to cosmetics, food additives, plastics and flowering agents, and the industry is estimated to be worth around €3.5M. In 2016, Novamont an Italian biotech, opened the first industrial plant in Italy dedicated to the eco-friendly production of the butanediol from genetically engineered E. coli in Italy. By using forestry waste, Rehap's technology could provide a more sustainable addition to existing methods used to produce the chemical.

Click here for more information.



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Consumer Products

First Reebok plant-based shoe

Global fitness brand Reebok has launched the first product from its highly-anticipated "Cotton + Corn" sustainable products initiative, which was announced last year.

The Cotton + Corn program aims to produce footwear with "things that grow" in order to create sustainable products. The sneaker, the NPC UK Cotton + Corn, is constructed from an upper made of 100% cotton, and a corn-based sole. The shoe has insoles that are derived from castor bean oil and comes in packaging that is 100% recycled.

For the Cotton + Corn initiative, Reebok partnered with DuPont Tate & Lyle Bio Products, a leading manufacturer of high-performance biobased solutions. DuPont Tate & Lyle has developed Susterra® propanediol, a pure, petroleum-free, non-toxic product that contains 100% USDA certified biobased content, derived from field corn. Susterra® propanediol is used to create the sole of the NPC UK Cotton + Corn footwear.

The Reebok Future team is Reebok's innovation department dedicated to creating new technologies, ideas, techniques and prototypes.

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Kennedy Space Centre gets biobased artificial lawn

Pxhere

SYNLawn, the only artificial grass manufacturer with a complete plant-based surfacing system, was installed at Kennedy Space Center Visitor Complex specifically in the rocket launch viewing area.

SYNLawn is soy, bio-based, patent-pending backing formula is manufactured in the U.S. and utilized EasyGrass as the installer for these high-traffic areas.

The idea for the inclusion of SYNLawn at the visitor complex grew from talks at its 2015 Earth Day Celebration.

Other stimulating factors for SYNLawn's use include its 100 percent recyclable and water conservation properties and the fact it's made in the USA with soybeans grown in the USA. Installing SYNLawn has a positive impact on multiple facets of the U.S. economy.

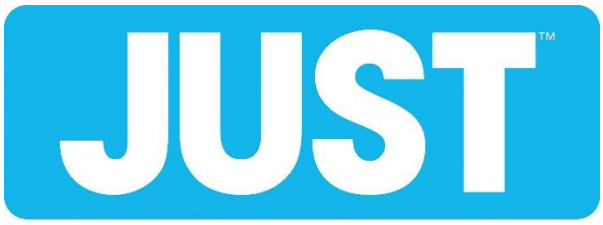
U.S. soybean farmers have invested millions of dollars to research, test and promote bio-based products. Much of this work was done through the United Soybean Board (USB), which is composed of 73 U.S. soybean farmers appointed by the U.S. Secretary of Agriculture to invest soybean checkoff funds.

SYNAugustine 547 is a new USDA Certified bio-based product that uses plant-based polyethylene thatch fibres made from sugarcane polymers in

addition to soy polymers used in the turf backing. This ground-breaking, environmentally friendly artificial grass meets the heavy foot-traffic demands of the visitor complex. The 20,000 square feet of turf covers the equivalent of more than four basketball courts.

Click here for more information.

JUST Water launches in UK



JUST

JUST Goods, Inc. has launched its JUST Water brand, an eco-friendly bottled water company founded by Jaden Smith, in Boots stores in the UK, the first step in a major global expansion.

The launch sees the product initially stocked in 800 Boots UK stores nationwide and all Whole Foods Market locations in the UK and comes in response to growing consumer demand for sustainable packaged products to minimise plastic pollution.

The packaging is comprised of 82% renewable resources, made mostly of paper from FSC managed forests and is recyclable in nine out of ten UK communities where roadside or bottle bank collecting is available.

JUST contains still spring water, sourced from the firm's UK bottling partner in Ballymena, Northern Ireland.

Entry into the UK market comes after rapid growth in the US since its 2015 launch, with JUST becoming the number one selling branded bottled water in its category at Whole Foods Market.

The firm aims to become the most prominent, well-recognised sustainable bottle of water in the UK, offering consumers an alternative to the default plastic packaging for water. Long term, JUST plans to launch a number of socially and environmentally impactful products in both the beverage and non-beverage categories.

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Chicken litter plastic and grape waste leather

A fashion collection made from the remains of grapes from the wine industry and plastic made from chicken feathers are two new twists on the practice of making new products from waste, and a growing demand for sustainability from consumers mean there could be a ready market for this type of innovation.

Food waste isn't just the result of groceries that have gone off or uneaten meals. As food is processed for consumption, huge amounts of waste are generated. The European poultry industry, for example, generated about 3.1 million tons of discarded feathers in 2014. And during wine production, around 25% of the weight of grapes, such as the skins and seeds, are wasted.

There are challenges involved in using feathers as a raw material. First and foremost, they need to be sanitised before processing to remove any pathogens. Since feathers are very light, it can also be hard to get them to flow through machinery.

One-and-a-half years into the three-year project, the KARMA2020 team has so far figured out how to pre-treat feathers so that they are clean and safe to handle, and how to turn them into a raw material. They have also created samples of feather-based materials that could be used for

packaging, using a process where heated material is injected into a mould to shape it.

Through a project called WineLeather, Vegea is producing bio-leather using grape marc – the solid parts of grapes that are waste products from wine production. The team has been focusing on the development of natural textiles to satisfy the demand for sustainable alternatives in the clothing and apparel industry.

To make their fabric, leftover grapes are first dried in order to preserve them so that the raw material is available year-round and not just during wine-making season. Then the feedstock is processed in different ways depending on its end use.

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UNITED CAPS and Braskem collaborate for biobased plastic caps

UNITED CAPS

UNITED CAPS, an international manufacturer of caps and closures, and Braskem, a leading Brazilian petrochemical company, reported they have collaborated to deliver to the market GREENER bio-sourced plastic caps and closures made from sugar cane as an addition to the UNITED CAPS product portfolio.

Bio ethanol, the feedstock for I'm green™ Polyethylene, the basis for UNITED CAPS GREENER bioplastic caps, is derived from sugarcane, a renewable alternative to traditional fossil feedstocks. Being a renewable feedstock, sugarcane captures and fixes CO2 from the atmosphere with every growth cycle, which occurs annually. This means that the production of I'm green™ Polyethylene contributes to the reduction of greenhouse gas emissions when compared to conventional polyethylene, made from fossil materials.

As a result, the carbon footprint of I'm green™ Polyethylene is negative, when considering our life cycle analysis. This means that every kilogram of I'm green™ Polyethylene used in UNITED CAPS products results in 3.09 kilograms of CO2 being sequestered from the atmosphere.

UNITED CAPS is initially bringing to market two standard closures manufactured using bioplastic resin from Braskem, including the VICTORIA closure, a 30/25 screw closure designed for still drinks, and PROFLATSEAL, ideal for dairy products and still drinks, both pressurized and non-pressurized.

Innovative caps and closures for the food and drink industry are the core business of the Luxembourg-based family company UNITED CAPS. Its custom-designed caps and closures solutions have been one of the most sought-after solutions in the packaging industry for years. The company has experience growth in the high single digits since its 2015 rebranding, with a significant percentage of production being bespoke products that are uniquely designed to meet customer needs for exceptional appearance and ease of use, both in the filling line and for the consumer.

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Patents

Cellulose platelet compositions, methods of preparing cellulose platelet compositions and products comprising same

A composition and method of preparing a composition is presented wherein the composition comprises cellulose platelets and the cellulose platelets comprise at least 60 % cellulose by dry weight, less than 10 % pectin by dry weight and at least 5 % hemicellulose by dry weight. The composition can be concentrated to at least 25 % by weight solids content by pressing under low pressure, whilst retaining the ability to be re suspended within an aqueous medium. The resulting aqueous medium obtains the desired properties of the composition, such as increased viscosity or increased dispersion of pigment particles, for example, to the same extent as the composition before pressing.

Click here for more information.

Copper-containing multimetallic catalysts, and method for using the same to make biobased 1,2-propanediol

Copper-containing, multimetallic catalysts with either a zirconia or carbon support are described which have improved utility for the hydrogenolysis of a glycerol or glycerol-containing feedstock to provide a biobased 1,2-propanediol product. specially, improved carbon-supported examples of such catalysts are described for this reaction as well as for other processes wherein hydrogen is used, with methods for maintaining the activity of these catalysts. Related treatment methods in the preparation of these improved catalysts enable the use of carbons with a desired mechanical strength but which previously lacked activity, for example, for the conversion of a glycerol or glycerol-containing feed to produce 1,2-propanediol, so that copper-containing, multi-metallic catalysts may be employed for making a biobased propylene glycol using carbon supports that previously would have not been suitable.

Click here for more information.

Biobased production of functionalized alpha-substituted acrylates and c4-dicarboxylates

The description provides, inter alia, recombinant microorganisms, engineered metabolic pathways, chemical catalysts, and products produced through the use of the described methods and materials. The products produced include functionalized alpha substituted C4 dicarboxylic acids and functionalized acrylic acids and salts, esters and lactones thereof.

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Biodegradable polyols having higher biobased content

The present invention is directed to biodegradable polyester polyol polymers having high bio-based content and methods for producing biodegradable polyester polyol polymers having high bio-based content. In preferred embodiments, β-lactone monomers may be produced from epoxide and carbon monoxide having high bio-based content. In certain preferred embodiment, the β-lactone is β-propiolactone produced from ethylene oxide and carbon monoxide. In certain embodiments, β-lactones may be polymerized with diols, triols, and polyols to form the biodegradable polyester polyol polymers having high bio-based content. In some embodiments, the biodegradable polyester

polyol polymers having high bio-based content may be terpolymers formed from a first β-lactone, a diol, triol, or polyol, and a second β-lactone. In some other embodiments, the biodegradable polyester polyol polymers having high bio-based content may be copolymers formed from a polylactone oligomer and a diol, triol, or polyol.

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Biodegradable sanitary articles with higher biobased content

The present invention is directed to sanitary articles such as disposable diapers, adult incontinent pads, feminine hygiene products, and sanitary napkins comprised of biodegradable polymers with higher biobased content. The sanitary articles include a topsheet, an absorbent core, and a backsheet. The topsheet is comprised of biodegradable polyester polyol polymer foam which may be configured to wick liquid away from a wearers body and may be impregnated with superabsorbent polymer. The absorbent core may be comprised of superabsorbent polymer including a cross-linked and/or partially neutralized polyacrylic acid polymer, cross-linked polyacrylic acids or cross-linked starch acrylic acid graft polymers. The backsheet may be comprised of poly-lactone polymers having generally hydrophobic characteristics. In preferred embodiments, the polymeric materials comprising the topsheet, absorbent core, and backsheet are formed from raw materials with high biobased content.

Click here for more information.

Process for producing 1,2-propanediol from glycerol

A process is described for producing biobased 1,2-propanediol, comprising reacting a glycerol-containing feed containing less than 5 weight percent of water with hydrogen in the presence of a catalyst, to partially convert glycerol in the glycerolcontaining feed to a crude reaction product mixture including 1,2-propanediol, removing 10 water from the crude reaction product mixture, recovering a portion but not all of the 1,2-propanediol from the crude reaction product mixture, and recycling the remainder of the 1,2-propanediol with unconverted glycerol and combining these with makeup glycerol to provide additional of the essentially anhydrous, glycerol-containing feed.

Click here for more information.

Novel biobased amines

The present invention relates to a method for producing an amidoamine by reacting a triacid derivative (I) with at least one amine (A), the at least one amine (A) being selected from diethylene triamine and a diamine (II). The molar ratio of the triacid derivative (I) to the at least one amine (A) is in the range of 1 : 2 to 1 : <3. The present invention further relates to the amidoamine as such,and to the use of said amidoamine as a cross-linking agent.

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Methods for coproduction of terephthalic acid and styrene from ethylene oxide

The invention discloses methods for the 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% biobasedfeedstocks (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.

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.

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Events

Biomass for Industrial Applications Amsterdam, 26th-27th September 2018

The VDI conference Biomass for Industrial Applications focuses on the industrial utilization of biomass. The presentations consider both the energy-related as well as the material usage of biomass. Discuss the newest technical, economic and political developments in the industry with leading experts and find out what's in store for the biomass market in the future. This knowledge will help you to make the right strategic decisions for your company and to clear the way of implementation barriers.

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International Forum on Industrial Biotechnology and Bioeconomy Torino, 27th-28th September 2018

The 8th edition of IFIB - International Forum on Industrial Biotechnology and Bioeconomy is organized by Assobiotec, the Italian Association for the development of biotechnology, which is part of the national Federation of Chemical Industry (Federchimica), together with Innovhub-SSI, the Italian Green Chemistry Cluster SPRING, Regione Piemonte and University of Turin – aimed at strengthening the bioeconomy network in the Euro-Mediterranean area and to promote partnerships.

Click here for more information.

International conference on bioinspired and biobased chemistry & materials
Nice, 14th-17th October 2018

The scientific and international N.I.C.E (Nature Inspires Chemistry Engineers) Conferences are organized with the objective to share new developments in the growing field of bioinspired chemistry and materials and to understand new challenges that are being faced in this field of research.

The NICE conference encompasses chemistry, biology and physics and gives a multi-disciplinary overview of biomimetic approaches to engineering new materials and systems.

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, 17thand 18th of October.

Click here for more information.

International Conference on Green Chemistry and Technology
Edinburgh, 12th-13th November 2018

EuroSciCon invites all the participants from all over the world to attend "21st Edition of International Conference on Green Chemistry and Technology'' during November 12-13, 2018 at Edinburgh, Scotland which includes prompt keynote presentations, Oral talks, Poster presentations, Workshops and Exhibitions.

Green Chemistry and Technology 2018 is a global overview the Theme: "Endorsing the Importance of Sustainable World by Academic and Industrial Forum: Driving Waste towards Zero" is designed for professionals at all levels and career phases of the Chemical industry, Pharmaceutical industry and Petroleum industry, who want to improve their understanding of what will drive and shape the future of the market. This will include senior executives, sales and marketing personnel, strategic planners, who will be benefit from a broad overview of the Chemical, Pharmaceutical and petroleum industry. The strength of the Conference is that the participants tend to include all phases of the value chain as well as individuals from a wide variety of sector and countries. This experience helps the conference to be an interactive forum and encourages a strong level of dialogue and discussion, thus maximising the benefits of attendance. This conference surely provides better information and insight into the development of the world Chemical industry, which in turn has enabled attendees to make better and more profitable decisions.

Click here for more information.

European Bioplastics Conference
Berlin, 4th-5th December 2018

The European Bioplastics Conference is the leading business and discussion forum for the bioplastics sector in Europe and worldwide. As the major industry association in this field, the hosts at European Bioplastics are committed to representing the interests of stakeholders along the entire value chain. The diversity of the delegation – 330 strong in 2017 and expected to grow – reflects that, and the trend towards a pan-industry gathering is set to continue as the event embraces the inclusion of political and other non-private sector actors. With more and more brands and manufacturers waking up to the potential of bioplastics, and with policy makers increasingly streamlining their efforts to install frameworks that benefit the growth of sustainable bio-industries, this is the time to put bioplastics high up on the agenda of a bio-based circular economy in Europe and beyond.

Click here for more information.

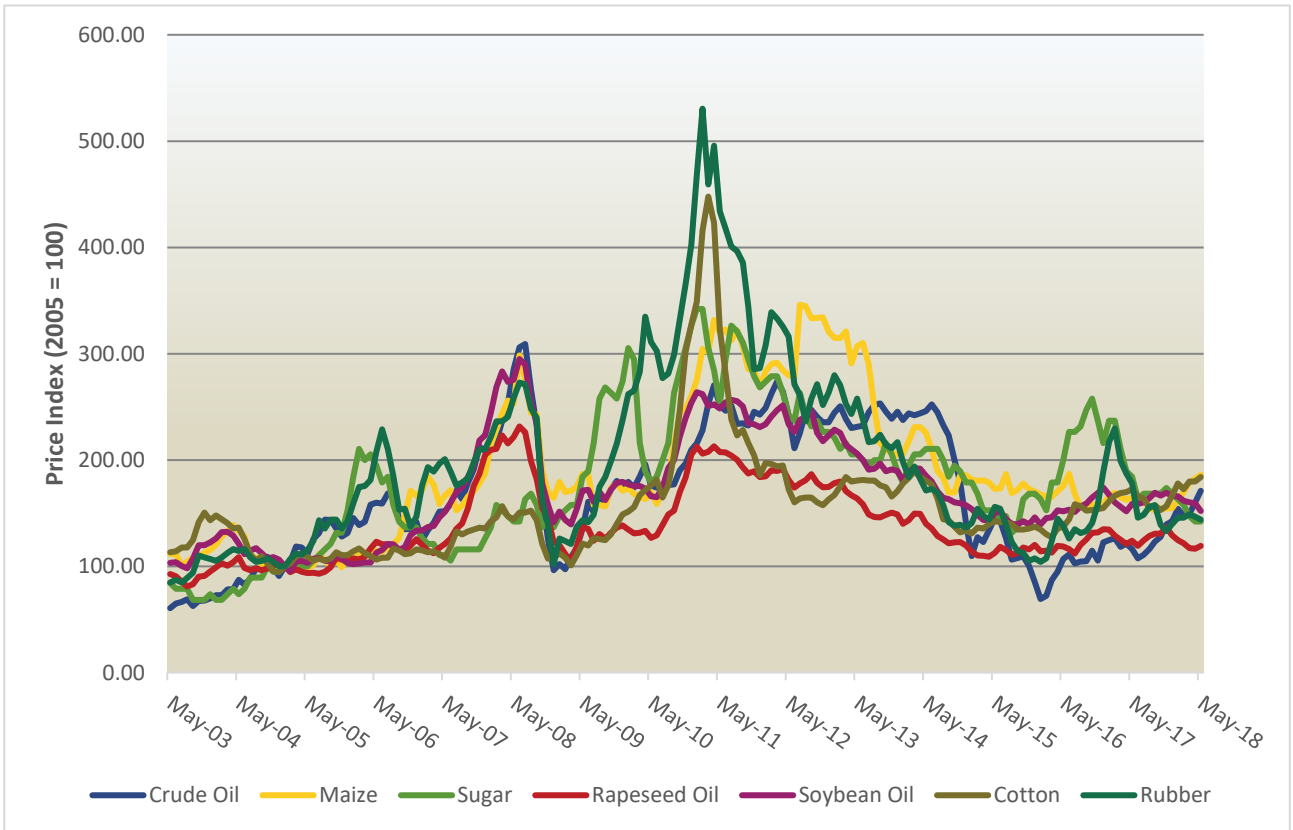
Price Information

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$ (May 13)	Price, US$ (Apr 18)	Price Change
Crude oil (petroleum, barrel)	99.74 (↑)	73.43 (↑)	-26%
Maize (corn, metric ton)	298.41 (↑)	179.09 (↑)	-40%
Sugar (kilogram)	0.38 (↓)	0.27(–)	-29%
Rapeseed oil (metric ton)	1,078.00 (↓)	812.00 (↑)	-25%
Soybean oil (metric ton)	1,041.00 (↓)	793.00 (↓)	-24%
Cotton (kilogram)	2.05 (↑)	2.08 (↑)	+1%
Rubber (kilogram)	2.81 (↓)	1.70 (↓)	-40%

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 NNFCC.

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