

The Bioeconomy Consultants



News Review

Issue Sixty

March 2017

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



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Foreword

Welcome to this month's edition of NNFCC's Biobased Products News Review.

The big news with regard to biobased products this month concerns the European Parliament, specifically its Environment, Public Health, and Food Safety (ENVI) committee. In late January, the committee met to discuss amendments to the European Commission's existing Directives on Waste, Landfill, and Packaging. Many amendments were passed, a good deal of which were beneficial to the biobased products sector, including amendments regarding separate waste collection, and more significantly, a distinction for packaging made from bio-based plastic. This is potentially a big victory for the bioplastics industry, with it being warmly welcomed by the European Bioplastics Association. It should be noted, however, that these amendments are not yet set in stone: there are still at least two more legislative stages they have to survive, including the European Council and the European Parliament, but those in the industry will have their fingers crossed they pass through without a hitch.

Elsewhere in Europe, AVALON industries have announced an ambitious project to replace an increasingly maligned chemical – formaldehyde – with a non-carcinogenic, bio-based equivalent. Their top candidate is (the less snappily named) 5-Hydroxymethylfurfural, which they hope can replace formaldehyde in phenol-formaldehyde resin, a key adhesive in the furniture industry. If this is successful, it could pave the way for further uses of biobased alternative chemicals, especially if they are safer for use by people.

As we retrace the journey of the UK's terrible recent weather, back across the Atlantic, we find an increasingly happy hunting ground for Austrian company Lenzing, whose fibres are now all certified under the USA's BioPreferred program, marking them out as 99%+ biobased. This coveted certification is sure to open up new avenues for the company as the US' public sector will now be encouraged to make use of their fibres.

Read on for the latest market news

Policy

Illinois state announces bioeconomy legislation

Legislation designed to grow Illinois' bio-based economy has been introduced by Senator Andy Manar and Senator Chapin Rose. Senate Bill 1656 provides incentives to Illinois businesses to produce and sell new renewable products made from biomass and other renewable sources.

The legislation builds upon Illinois' strong agricultural base and seeks to provide new products and markets derived from grain commodities and their by-products. Universities and private companies are investing in a race with other states in research and development to introduce these products to the marketplace.

The legislation complements Senator Rose's leadership last year in securing a \$26 million research investment in the University of Illinois' Integrated Bioprocessing Research Laboratory to work with the industrial biotechnology sector to accelerate growth of this rapidly emerging biotechnology sector.

The emergence of bio-based technology represents a historic opportunity to reverse job losses in the chemicals and plastics sectors, increase energy security, replace fossil fuel-derived chemicals, reduce greenhouse gas emissions, maintain U.S. leadership in clean energy and chemistry, and build domestic renewable chemicals and biobased production facilities.

SB 1656 provides a state tax credit to Illinois companies that produce and sell new manufactured products made from manufactured

bio-based molecules of biomass feedstocks. These products represent the next generation of advanced biofuels and include renewable chemicals and food additives.

Iowa and Minnesota have already established these state incentives and legislation is pending in Congress to establish a similar credit at the federal level.

Click [here](#) for more information.

European Parliament ENVI committee approves amendments to waste legislation



European Parliament

As anticipated, EP's ENVI Committee approved the revisions of the Waste Framework Directive and the Packaging and Packaging Directive.

The measures approved included the following:

Biowaste has been redefined to include bioplastic and is now subject to mandatory separate collections. The approved amendment asks Member states to also encourage home

composting. The Committee provides the possibility for Member States to not organize a separate collection (measure also valid for other waste streams) in sparsely populated areas. A specific definition of organic recycling, taken from the PPWD, has been added and it includes both aerobic and anaerobic treatment

The amendment targets 60% recycling by 2025, and 70% by 2030.

The Committee approved a definition of biobased packaging which confirms the one given by the European Committee for Standardization (CEN). There are also measures in favour of bio-based recyclable packaging and of biodegradable compostable packaging: specifically, Member States can promote their use through the use of economic instruments, improving market conditions for such products or reviewing existing legislation hampering the use of those products. Oxo-degradable plastic packaging shall not be considered as biodegradable.

The proposals approved by the ENVI Committee will be put to a vote by the full House at the 13-16 March plenary session.

Click [here](#) for more information.

Markets

Transparency Market Research Analyse Mannosylerythritol market prospects

Applications of mannosylerythritol lipids include oilfield chemicals, personal care, food processing, household detergents, industrial, agricultural chemicals, institutional cleaners, and textiles. Household detergents is the major application area of mannosylerythritol lipids. New application areas are being discovered constantly. Rising

concern about the use of synthetic surfactants in detergents is anticipated to boost the demand for mannosylerythritol lipids, particularly due to their low toxicity. These lipids are also employed in the pharmaceutical industry. Their flexible biochemical functions include anti-tumour activity against human leukaemia cells and mouse melanoma cells. Furthermore, they can be utilized in the treatment of schizophrenia, dopamine metabolic dysfunction diseases, and microbial infections. Mannosylerythritol lipids are also employed in the preparation of anti-agglomeration agents of ice-water slurry and lectins such as Immunoglobulin G.

Increasing demand for environment-friendly products and favourable regulatory outlook in developed economies are some of the key factors driving the mannosylerythritol lipids market. Many synthetic surfactants pose risks to the environment owing to the harmful chemical compounds they contain and their incomplete degradation in soil and water. Synthetic surfactants are reported to cause long-term adverse effects. On the other hand, bio-based products degrade easily and do not harm the environment. Consumer preference for bio-based products is rising, especially in emerging economies of Asia Pacific. This is propelling the mannosylerythritol lipids industry. However, high price of mannosylerythritol lipids compared to their plant-derived and synthetic counterparts could hamper market growth. Application of mannosylerythritol lipids in bioremediation and enhanced oil recovery provide significant opportunities for the growth of the market in the next few years.

Click [here](#) for more information.

BioAmber to offer \$17.5m of shares to the public

BioAmber Inc. has announced that, due to strong demand, the underwriters have agreed to increase the size of the offering by 75% and purchase 3,684,212 shares of common stock of the Company, together with warrants to purchase 1,842,106 shares of common stock of the Company with an exercise price of US\$5.50 per share of common stock (the "Exercise Price"), at a price to the public of US\$4.75 per share and associated warrant (the "Public Price"). The warrants have a term of four (4) years, exercisable upon the date of issuance. The aggregate gross proceeds to the Company (assuming no exercise of the warrants) are US\$17,500,000, before deducting underwriting discounts and commissions and estimated offering expenses. A portion of this offering has been placed in Canada on a private placement basis. All shares of common stock issued in connection with this offering, including those placed in Canada on a private placement basis, will be listed on the New York Stock Exchange and be freely tradable on such exchange.

The Company has granted to the underwriters a 30-day option (the "Over-Allotment Option") to purchase up to an additional 552,632 shares of common stock and/or warrants to purchase 276,316 shares of common stock of the Company, for potentially additional aggregate proceeds to the Company of up to approximately US \$2.6 million (assuming no exercise of the warrants) before deducting underwriting discounts and commissions and estimated offering expenses. In the event the Over-Allotment Option is exercised in full, the aggregate gross proceeds to the Company (assuming no exercise of the warrants) will be approximately US \$20.1 million.

Rodman & Renshaw, a unit of H.C. Wainwright & Co. is acting as the sole book-running manager in connection with this offering and AltaCorp Capital,

Cormark Securities and Clarus Securities are acting as co-managers.

The closing of the offering is expected to occur on or about January 27, 2017, subject to customary closing conditions. The Company intends to use the net proceeds of the offering to fund the full or partial repayment of its corporate debt and the remainder, if any, for working capital and general corporate purposes.

Click [here](#) for more information.

BioAmber successfully clears corporate debt



BioAmber

Following on from the above, BioAmber Inc. is pleased to announce that on January 27th the Company reimbursed its CDN\$25 million loan (approximately US\$19.3 million) with Bridging Finance Inc. Following the repayment of this loan, BioAmber has no corporate debt.

On January 27th, 2017 BioAmber also closed on its previously announced public offering of 3,684,212 shares of common stock together with warrants to purchase 1,842,106 shares of common stock, at a price to the public of US\$4.75 per share and associated warrant, as well as the full exercise of the underwriters' option to purchase an additional 552,632 shares of common stock and additional warrants to purchase 276,316 shares of common stock. The gross proceeds from the offering were US\$20.1 million and the expected net proceeds are approximately US\$18.6 million, after deducting Company expenses, underwriting discounts and commissions. The warrants are exercisable at a price of US\$5.50 per share of common stock, have

a term of four years, and are exercisable upon the date of issuance. A portion of these securities was issued in Canada on a private placement basis. Rodman & Renshaw, a unit of H.C. Wainwright & Co., acted as the sole book-running manager in connection with this offering and AltaCorp Capital, Cormark Securities and Clarus Securities acted as co-managers.

Click [here](#) for more information.

Report on global bio-polyethylene market - Market Reports World

Bio-based Polyethylene is (also known as renewable polyethylene) is polyethylene made from ethanol, a renewable raw material, which becomes ethylene after a dehydration process. Bio-based Polyethylene is produced from ethanol sugarcane, while the traditional polyethylene uses fossil sourced raw materials such as oil or natural gas. Bio-based Polyethylene captures and fixes CO₂ from the atmosphere during its production, helping to reduce greenhouse gases emission.

Bio-based Polyethylene can be made from various feedstock including sugar cane, sugar beet, and wheat grain. It is first made using sugar cane from Brazil.

This report focuses on the Bio-based Polyethylene in Global market, especially in North America, Europe and Asia-Pacific, South America, Middle East and Africa. This report categorizes the market based on manufacturers, regions, type and application.

Click [here](#) for more information.

Market forecasts for biobased chemicals and polymers in Asia

New nova institute trend report "Asian markets for bio-based chemical building blocks and polymers" shows latest data and development in China, Japan, Malaysia, South Korea, Taiwan and Thailand. A global capacity of 2.4 million tonnes bio-based polymers was established in 2016, from which more than 45% of the most important bio-based polymers are produced in Asia.

The worldwide capacity is expected to reach 3.6 million tonnes in 2021, nearly 52% of this volume will be installed in Asia. This equals an increase of installed capacities of 71% in the next five years. The Asian region has a 100% share in production capacities of PBS(X) and cyclic aliphatic polycarbonate (APC) since several years as is shown by Figure 1.

For bio-based building blocks, the report sees an increase of the implementation of biorefineries and bio-hubs in South-East Asian countries to strengthen their competitiveness. Stronger emphasis on cooperation and partnership along the value chain and with R&D providers becomes a key factor to success.

Additionally, biorefinery concepts are emerging in Asia. It will allow producers to diversify economic risks by broadening existing marketing possibilities into additional complementary market segments including the bio-based plastics industry. Current new developments in South-East Asia are even targeting the establishment of large scale bio-hubs, bio-clusters or bio-based polymer parks like in Thailand or Malaysia.

The future focus in Asia will be most likely more on bio-based building blocks such as organic acids, diols or bio-based monomers such as bio-based ethylene, rather than only on bio-based polymers, by integrating the available agriculture resources into the process.

Click [here](#) for more information.

Grand View Research - Significant growth expected in Bio-PET market

The global bio-based polyethylene terephthalate (PET) market size was estimated at 790.4 kilo tons in 2015 and is likely to witness substantial growth on account of increasing consumer demand for environment-friendly products. The growing demand for bio-PET for manufacturing various packaging solutions including bottles is expected to drive demand.

Bio-based PET is a naturally derived polyester resin that is used for the production of numerous products including bottles, packaged goods, automotive interiors, construction goods, and electronic. The growth of these sectors coupled with rising number of supporting regulations is expected to drive the demand for bio-based products.

Growing concerns regarding greenhouse gasses coupled with the emergence of bioplastics as an alternative in the packaging and automotive industry are expected to play a major role in driving growth in the near future. Furthermore, increasing importance of sustainable packaging, especially in China and India, is expected to have a positive impact on market demand over the next nine years.

Over the past few years, the majority of bio-based PET consists of 70% petroleum-based PTA and 30% bio-based MEG. However, companies have been investing heavily in research for the development of 100% bio-based PET comprising bio-based MEG and naturally derived PTA.

The emergence of substitutes such as PEF is expected to hamper industry growth in the near future. In December 2011, The Coca-Cola Company signed an agreement with Avantium for the development of PEF, which has high glass transition temperature and thermal stability as compared to bio-based PET. This factor is

expected to result in other companies utilizing PEF thus, hampering growth over the next nine years.

Click [here](#) for more information.

Research & Development

AVALON begins search for bio-based replacement for formaldehyde

AVALON Industries

AVALON

In conjunction with the Institute for Materials and Wood Technology at the Bern University of Applied Sciences, AVALON Industries is launching a research project to replace formaldehyde in phenol-formaldehyde (PF) resins with bio-based, non-toxic platform chemical 5-HMF (5-Hydroxymethylfurfural). Government-sponsored by the Swiss Commission for Technology and Innovation (CTI), the project will build on the positive results in a similar research project, run by AVALON Industries parent company AVA-CO2, to develop non-toxic urea-HMF resins.

The formaldehyde-based resin manufacturing industry has been facing an increasing challenge since formaldehyde was classified as carcinogenic and mutagenic in the 6th adaptation to technical and scientific progress of the CLP (Classification, Labelling and Packaging) EU directive in June 2014. This classification has far-reaching and immediate consequences for a variety of business sectors, especially in the furniture industry.

Formaldehyde is a key material for the chemical industry, serving as the source for many chemical compounds. The EU produces approximately 10 million tonnes per year and 47 million tonnes of formaldehyde are produced worldwide. A large proportion of synthesised formaldehyde is used in the production of glues and impregnating resins for wood-based materials. Adhesive resins are used in the manufacture of particle boards, plywood panels and chipboards, where the furniture industry is one of the main users.

The research project, 'Development of a formaldehyde-free phenol type adhesive system for the manufacturing of plywood', aims to come up with a formaldehyde-free, sustainable and non-toxic adhesive for industrial use in the wood-processing industry. The project will also investigate the replacement of phenol with lignin in order to develop 100% bio-based lignin-HMF resins.

Click [here](#) for more information.

ASLEE to establish algal pilot plants in Scotland

New uses for electricity in areas that are currently grid constrained would enable an increase in both renewable energy use and industry – creating community resilience, income generation and employment. The ASLEE project was one of 9 chosen for funding support from Scottish Government in the 2016 Local Energy Challenge Fund competition.

This ground-breaking £2 million, 2-year R&D project will build experimental and industrial scale algal pilot units whilst investigating a number of further sites in the north and west of Scotland for potential future scale up.

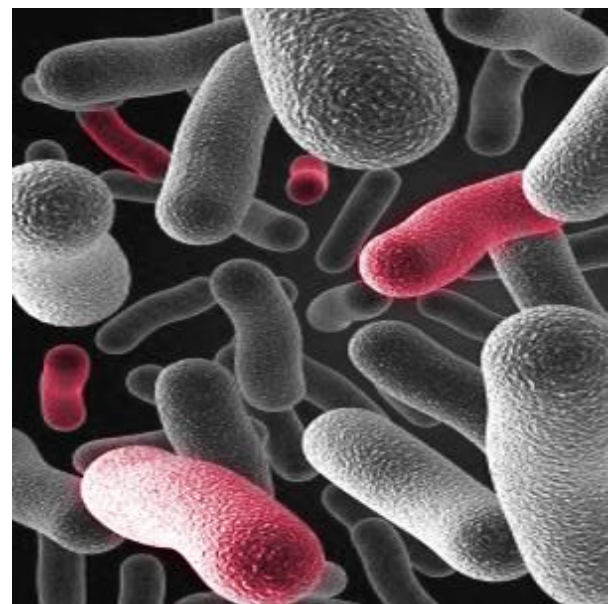
The project will determine the economic and technical feasibility of using renewable energy and transactive load management to reduce the costs

of algal biomanufacturing and enable grid balancing, and will investigate the wider economic and social impact that implementation of this technology could have in rural Scotland and beyond.

This is the first study of its kind in the world, giving Scotland a valuable technical lead in this field. The project will deliver 40,000l of internally-lit photobioreactor capacity, making it the largest facility of its type in the UK and provide a valuable facility for investigating the potential of novel algal products at industrial scales.

Click [here](#) for more information.

Wild bacterial strain identified with high succinate yield from biomass



Flickr

Bio-based succinic acid production from lignocellulosic biomass is one of the attractive and prominent alternative technologies to overcome issues associated with the utilization of fossil sources. In this context, it is necessary to find new microorganisms that are able to efficiently ferment this recalcitrant feedstock. The ecological approach developed in this study enabled the

isolation of *Basfia succiniciproducens* BPP7 from a complex rumen ecosystem. This new wild-type strain was able to synthesize up to 6.06 ± 0.05 g/L of succinate (corresponding to 0.84 ± 0.017 g of succinate per gram of consumed glucose + xylose and to 0.14 ± 0.001 g of succinate per gram of glucans + xylans present in the biomass before hydrolysis) from *Arundo donax* hydrolysate in separate hydrolysis and fermentation (SHF) experiments. Higher titres of succinic acid were obtained through the optimization of growth conditions. The optimal medium composition identified on the smaller scale was then used for 2.5-L batch experiments, which used *A. donax* hydrolysate and yeast extract as the main C and N sources, respectively. A maximal titre of 9.4 ± 0.4 g/L of succinic acid was obtained after 24 h. The overall results clearly demonstrate the potential of *B. succiniciproducens* BPP7 for succinate production.

Click [here](#) for more information.

High value enzymes produced by fungi on food waste



Max Pixel

Proof-of-concept experiments were performed to determine the suitability of recombinant *Aspergillus niger* strains for producing useful enzymes on three bio-based waste streams (apple pomace, grape waste and potato waste). The ability of the recombinant strains to produce

enzymes under these cultivation conditions was assessed. Analytical tests were performed to determine the properties of the waste samples and how these properties were altered due to the growth of the fungal strains. Potato waste proved the best bio-based waste stream for growth of the recombinant *A. niger* strains and the heterologous expression of endoglucanase, endomannanase and endoxylanases. In addition, bioethanol production using *S. cerevisiae* was also achieved using potato wastes for the fermentation feedstock. The waste water, together with the potato waste can also be used for bio-ethanol production through fermentation and the addition of amylase enzymes. *Trametes pubescens* was capable of growing, and producing laccase, on apple and potato wastes without the addition of other nutrients or inducers. The laccase obtained was similar to a purified *T. pubescens* laccase that was produced under optimized media, environment and inducer conditions. Due to the diverse potential applications of laccases, the ease of growth of *T. pubescens* and the lack of additional supplementation, this could be a very valuable value-added product for the biorefinery and warrants further investigation. Biochemical characterization of the enzymes was performed to further assess their fitness for use in waste stream reclamation and lignocellulosic conversion. The three enzymes, endo β 1,4 glucanase, endo- β -1,4-mannanase and endo- β -1,4-xylanase, showed great potential for being used as key enzymes for lignocellulose degradation. The multi-functionality of the enzymes for different substrates such as carboxymethyl cellulose, locust bean gum and Beechwood xylan indicate that they will play important roles in synergistically degrading the cellulosic and hemicellulosic components of lignocellulosic biomass. The biochemical characteristics of the three enzymes indicated that they are very suitable for application in the biorefinery sectors of the bioeconomy.

Click [here](#) for more information.

Polymers

Croda to market Revolmyer (Itaconix)'s ZINADOR



Itaconix

Revolmyer is pleased to announce that its wholly owned US subsidiary, Itaconix Corporation, has signed an exclusive global supply and joint marketing agreement with Croda Inc. in respect of its polymer-based odour removal additive Itaconix® ZINADOR™ 22L.

Using its patented itaconic acid polymer technology, Itaconix is delivering a major cost-effective breakthrough to a global odour neutralisation industry that is seeking new high-performance solutions. As a 100% bio-based product that is readily soluble in water and does not leave any residual materials, ZINADOR meets key unmet customer needs in the growing consumer and industrial markets for odour control.

Under the terms of the agreement, the parties will work together to grow and supply worldwide demand for ZINADOR. Itaconix will produce ZINADOR for Croda and Croda will market and sell ZINADOR in household, municipal, animal and industrial applications, subject to certain terms and conditions. Itaconix will continue providing its technical and marketing expertise to jointly expand applications and geographic opportunities for ZINADOR with Croda.

Click [here](#) for more information.

Lenzing achieves BioPreferred status on all of its fibres

Lenzing Viscose® and Lenzing Modal® fibres including all their product families were awarded the Biobased Product Label granted by the U.S. Department of Agriculture (USDA). The prestigious certification is further proof that all standard types of fibres produced by Lenzing are fully derived from the natural and renewable raw material wood. The company's Lyocell fibre TENCEL® has already been certified as 100 percent biobased content since 2011. Lenzing FR® has now also been certified as 99 percent biobased. The residual amount is for material used to make the fibre fire-resistant.

Even more, Lenzing fibres are not only derived 100 percent from nature, but they are also returned to nature at the end of their life cycle. Standard Lenzing fibres are demonstrably 100 percent biodegradable and even compostable. Lenzing proves this with a series of certificates.

Accordingly, Lenzing is in tune with the growing trend towards ecology and sustainability. Global customers in the textile and nonwovens industry are increasingly turning to raw materials which do not unnecessarily harm the environment when they are produced or disposed of.

The certification of biobased products is part of the BioPreferred program implemented by the USDA. It is designed to motivate government institutions and companies to purchase biobased products or those which largely consist of biological materials.

Click [here](#) for more information.

AkzoNobel partners with Revolymer (Itaconix) to produce biopolymers



AkzoNobel

AkzoNobel

AkzoNobel has signed a framework joint development agreement with speciality chemicals company Itaconix to explore opportunities for the production of bio-based polymers.

With this agreement, AkzoNobel will pursue the development and commercialization of bio-based polymers. Itaconix will contribute a proprietary polymerization technology to turn itaconic acid – obtained from sugars through fermentation – into polymers.

Itaconix is a US subsidiary of Revolymer, which is also working with AkzoNobel on a marine coatings project.

Earlier this month, the company launched Imagine Chemistry, an open innovation challenge aimed at start-ups and chemistry professionals to find new opportunities for innovation and sustainable growth.

Click [here](#) for more information.

Chemicals

License agreed for Biobased Glucaric Acid production

Johnson Matthey, a global specialty chemicals company and provider of advanced process technologies, and Rennovia Inc., a privately held company that develops novel catalysts and processes for the cost advantaged production of chemical products from renewable feedstocks, have signed a licence agreement with Archer Daniels Midland Company to provide catalyst and process technology for catalytic production of bio-based glucaric acid.

The licensed process, jointly developed between Johnson Matthey and Rennovia, combines the efficiency and selectivity of heterogeneous catalytic process technology with the use of renewable feed stocks to produce bio-based glucaric acid.

Glucaric acid is an emerging platform chemical which has a wide range of applications in detergents and cleaners, concrete formulations, de-icing and anti-corrosion markets.

Click [here](#) for more information.

Croda continues investment in Hull, UK

Croda International Plc, the specialty chemicals company that creates high performance ingredients and technologies relied on by industries and consumers everywhere, today reinforced its commitment to UK manufacturing by announcing a major capital expansion at its Hull facility in Yorkshire.

The £27 million investment is in line with the Group's strategy of investing in faster growth markets. Croda will be able to satisfy growing

demand for its renowned polymer additives. This technology is used by global polymer manufacturers to address issues such as friction, scratch resistance and stability of plastic materials used in multiple industries including automotive and packaging.

The investment will nearly double existing capacity and enable Croda to meet growing demand for slip additives through to 2030. The initiative further reaffirms Croda's commitment to the global polymer market and enhances its position as the market leader in this technology. Furthermore, it will support continued innovation in this fast growth market, helping to build on the recent success of products such as Incroslip™ SL, a patented technology that is used to improve the slip and stability in polymer products.

The Hull site is one of three polymer additive manufacturing plants in Croda, with the others located in Gouda, Netherlands and Mianyang, China. Work on the plant extension will start shortly and the new capacity will come on stream in late 2018.

Click [here](#) for more information.

Sustainable Palm Oil certification for more Evonik products



Wikimedia Commons

Evonik has again substantially expanded its range of cosmetic ingredients certified in accordance with the standard of the Roundtable on Sustainable Palm Oil (RSPO - MB). Customers in the cosmetics industry now have available more than 50 certified palm-oil based raw materials, including several specialties.

All of Evonik's Personal Care products based on pure palm or palm-kernel oil are already certified in Europe under the segregated supply chain model (RSPO-SG). This was done despite the fact that supply of RSPO-certified palm-oil derivatives on the market still lags far behind demand.

Thanks to the introduction of the CAREtain system, which determines product-related sustainability parameters, these requirements are being taken into account already during the development phase. As a result, nearly 90 percent of Evonik's Personal Care products are now based on sustainable raw materials, and more than 50 percent of these have been subjected to life cycle assessments. Over 80 percent of the products make a significant contribution to resource efficiency within the supply chain and during use.

The current RSPO-certified product range includes surfactants such as TEGO® Betain P 50 C, required in large quantities in, for example, shower gels and shampoos, as well as highly efficient emulsifiers like TEGO® CARE PBS 6, used in a large number of body and face creams.

As an RSPO member, Evonik has since 2010 advocated the use of sustainably produced palm-oil derivatives in cosmetics. To obtain oleochemical raw materials in the most socially acceptable manner possible, Evonik systematically monitors its suppliers using sustainability standards and strict criteria in relation to land grabbing and conservation of natural habitats. Evonik's aim is to be able to monitor the supply chain down to the oil mill. Founding membership of TfS (Together for Sustainability) makes it easier for the company to take sustainability aspects into

consideration during procurement: TfS has already reviewed about 7,000 suppliers, for example.

Evonik's own production plants that process palm-oil derivatives for Personal Care are now all certified under the RSPO's Mass Balance and Segregated supply chain models.

Click [here](#) for more information.

Avantium announces partnership for Biorefinery Plant



Avantium

Avantium, a leading chemical technology company and forerunner in renewable chemistry, has announced a partnership with AkzoNobel, Chemport Europe, RWE and Staatsbosbeheer for the development of a reference plant at the Chemie Park Delfzijl. This important step marks the next stage of a collaborative effort to determine the feasibility of a wood to chemicals biorefinery in Delfzijl.

The new reference plant in Delfzijl will be based on a new technology that has been developed by Avantium. This Zambezi process aims for a cost-effective process for the production of high-purity glucose from non-food biomass such as forestry residue, pulp or agricultural by-products. This breakthrough technology converts woody biomass into sugars and lignin. It is particularly suited for making high purity glucose required for the production of a wide range of biobased

chemicals and materials for the chemical industry of tomorrow.

RWE will supply feedstock and use bio-lignin residue from the Zambezi process for the generation of renewable energy. Chemport Europe brings strategic support from the Northern Netherlands Region working via a range of initiatives to facilitate the project. Further synergistic partnerships and collaborations are currently under development.

The partnership expects, together with the geographical, technical and logistical benefits of the Delfzijl area, to enable the cost competitive production that will help accelerate the roll out of the biobased economy. The reference plant will be constructed with an expansion-ready footprint enabling rapid increase of capacity after demonstration.

Avantium's Zambezi process is a biorefinery technology to produce sugars for the production of chemicals and fuels from non-food materials. The proprietary process is highly feedstock-flexible allowing use of forestry residues (e.g. woodchip), corn-stover, bagasse, sugar beet residue and produces a high purity 2G glucose product and lignin for energy and other applications; all in near quantitative yield.

Click [here](#) for more information.

Consumer Products

US Air Force to trial bio-based grease

The 733rd Logistics Readiness Squadron Vehicle Management Flight was chosen to participate in a 12-month long experimental testing of a new bio-based grease to lessen the base's impact on the environment.

The 441st Vehicle Support Chain Operations Squadron and representatives from the Defence Logistics Agency briefed the vehicle management flight about the impact of the bio-based grease on the three vehicles chosen to test the grease Jan. 31.

Members of the 441st VSCOS will also partner with the Navy, Marine Corps, NASA and the Kennedy Space Centre to test the bio-based grease in their vehicles.

After the testing is complete, if the bio-based grease proves to be just as capable as the current grease being used, it will be substituted and used Air Force-wide and possibly Defence Department-wide. According to Moss, the environmentally-friendly bio-based grease aligns with the Air Force's initiative to utilize more renewable or green materials and resources.

To keep the integrity of the experiment, JB Langley-Eustis was not the only base selected for testing. The other bases selected include Patrick Air Force Base, Florida, Davis-Monthan AFB, Arizona, and Hill AFB, Utah. Each base was selected based on its diverse climates, unique mission capabilities and vehicle usage.

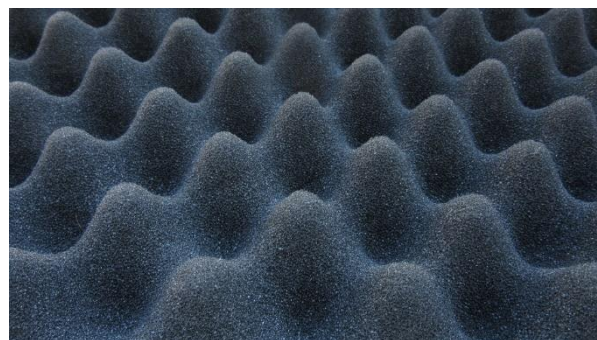
Along with ensuring the positive impact on the environment, this test could potentially show if the maintainers are affected by the shift to eco-

friendly products. By changing from a petroleum-based to a non-petroleum-based product, the research team expects vehicle maintenance life will extend, as well as decreasing the time between needed maintenance and the amount of work maintainers put in.

As the Air Force increases the use of sustainable products throughout everyday operations, Airmen gain the knowledge and opportunity to raise awareness of the benefits of going green.

Click [here](#) for more information.

Synbra to release Carbon Neutral foam



Pixabay

Synbra Technology bv is currently finalizing the certification of the world's first particle foam to receive a Carbon Neutrality verification in compliance with the PAS 2060 standard. BioFoam® is a fully bio-based particle foam made from renewable resources. BioFoam® is a PLA based foam. Already starting up in 2006, Synbra Technology invented, developed and patented this unique material. Through its converting companies, Synbra Group wants to become the leading supplier of sustainable and biodegradable particle foam.

Synbra Group companies, such as IsoBouw, Synprodo, Plastimar and Styropack, are already using the BioFoam material in series production for the white goods sector, ice cream packaging and the pharmaceutical sector, amongst others.

Besides its own production facilities, Synbra is setting up a network of pioneering partner companies in the USA, the UK, Italy and in other European countries and is seeking coverage in strategic markets. The existing distribution and production network already offers BioFoam® moulded products as a valuable and sustainable addition to the existing range of particle foam products.

Click [here](#) for more information.

Biobased paint for trains



Wikimedia Commons

The transportation industry is always looking for ways to enhance sustainability and reduce its carbon footprint. Vehicle manufacturers use lightweight construction concepts to reduce fuel consumption and emissions. Railway system operators contend that the mass transportation of people and goods by rail is significantly more sustainable to begin with. But these factors are not enough in the long run.

Polish railway vehicle manufacturer Newag SA broke new ground in resource-efficient coatings when he coated two diesel locomotives with a paint based on renewable resources. Lankwitzer Lackfabrik of Berlin supplied the coating, which it developed in close collaboration with Covestro using the biobased coating hardener Desmodur® eco N 7300.

At Newag's headquarters in Poland, the EVOClear® 294 / PH 94-0000 coating system from Lankwitzer was sprayed just like a standard clearcoat. Joint testing conducted by Lankwitzer Lackfabrik and Covestro confirms the high performance of the clearcoat: It is on par with polyurethane systems of petrochemical provenance.

The abrasion resistance and gloss stability of the coating were even 70 percent higher compared with standard coatings, as the partners demonstrated with the Amtec Kistler car wash test. Next they are planning a joint long-term weathering test.

The biobased clearcoat also fulfils the specific requirements of the railway vehicle industry, of course. For example, it displays very good resistance to cleaning agents, particularly those used to remove graffiti (DB standard "Blatt 39"). Tests confirm that graffiti can be removed easily and gently.

Click [here](#) for more information.

IKEA releases kitchen units made from recycled PET

IKEA has further expanded its portfolio of green products with the launch this week of a new range of sustainable kitchen fronts made using recycled plastics and wood.

The KUNGSBACKA range has been manufactured from recycled PET bottles and reclaimed wood.

Around 25 half litre PET bottles are used to make the plastic foil that coats the range's wooden kitchen fronts.

IKEA said the range had been developed in order to create a "sustainable kitchen without compromising on quality, design or price".

The new products will be available from this month in matte-look anthracite with new colours planned for the coming months.

The launch is part of a long running push from IKEA to deliver more sustainable products and curb its environmental impact. The multinational retailer has previously switched its entire lighting range to energy efficiency LEDs and has announced a multi-billion Euro investment plan to source clean energy for its operations.

Click [here](#) for more information.

Patents

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.

Events

Technology Transfer in Bioeconomy - BioBase4SME Workshop, 8th March, Düsseldorf, Germany



This forum event aims to introduce innovative approaches in technology transfer for the bioeconomy, taking into account the specific requirements of life sciences. Therefore the forum will compare different approaches in Germany and the Netherlands and will not only focus on the transfer from lab to industry, but will also take a broader view on open innovation approaches to create favourable conditions to stimulate collaboration between companies.

Click [here](#) for more information.

ORG Conference 2017, 23rd March 2017, Rocester, United Kingdom



Organics Recycling 2017 is the most important meeting place for anyone working in, or associated with, the organics recycling sector. This established one day conference, exhibition and

Gala Dinner will once again bring the sector together to foster debate and interaction with peers and key decision makers.

This event, now its 23rd year, provides a unique opportunity for anyone involved in the collection, treatment or use of biodegradable resources, to learn about the latest developments in policy, technical innovation and regulatory change.

The conference this year has a particular focus on providing practical advice and solutions to improving bottom-line profitability as well as reviewing cutting-edge solutions from the continent.

With a panel debate and plenty of networking opportunities throughout the day, this is a 'must attend' event for anyone who is involved in the world of biodegradable resource management. The conference will be followed by the infamous Gala Dinner, renowned for its high quality entertainment, fundraising and 'good fun'.

With new political masters at the helm, 2017 will inevitably bring further change. Your attendance at this event will provide you with an up-to-date insight into the important 'must know' information and is the ideal opportunity to meet like-minded individuals that share your passion and interest for organics recycling.

Click [here](#) for more information.

Bio-Based Live, 31st May - 1st June 2017, Amsterdam, The Netherlands



We understand that in an emerging industry the journey from lab innovation to commercialisation can be a difficult one. It is a convoluted ecosystem

and all actors are required to collaborate and work together to ensure a productive future for the bio-based industry.

The 2nd annual meeting of our European community offers an interactive and intimate environment to make bio-based innovations a key part of future sustainable strategies. Bringing together the CEOs, senior R&D, Process Heads, and BD Heads, with the sustainable professionals brand marketing specialists and end users, we create a unique platform to do business and create practical takeaways to ensure long-term success.

Click [here](#) for more information.

13th International Conference on Renewable Resources and Biorefineries, 7-9th June 2017, Wrocław, Poland

Delegates from university, industry, governmental and non-governmental organizations and venture capital providers will present their views on industrial biotechnology, sustainable (green) chemistry and agricultural policy related to the use of renewable raw materials for non-food applications and energy supply.

Click [here](#) for more information.

EFIB 2017



The 10th European Forum for Industrial Biotechnology and the Bioeconomy (EFIB) returns

to Brussels October 2017 and will attract industry executives committed to a shift towards renewable, biologically-based manufacturing. EFIB is organised by EuropaBio, Europe's largest and most influential biotechnology industry group and Smithers Rapra, global leader in rubber, plastics, polymer and composites information products.

Click [here](#) for more information.

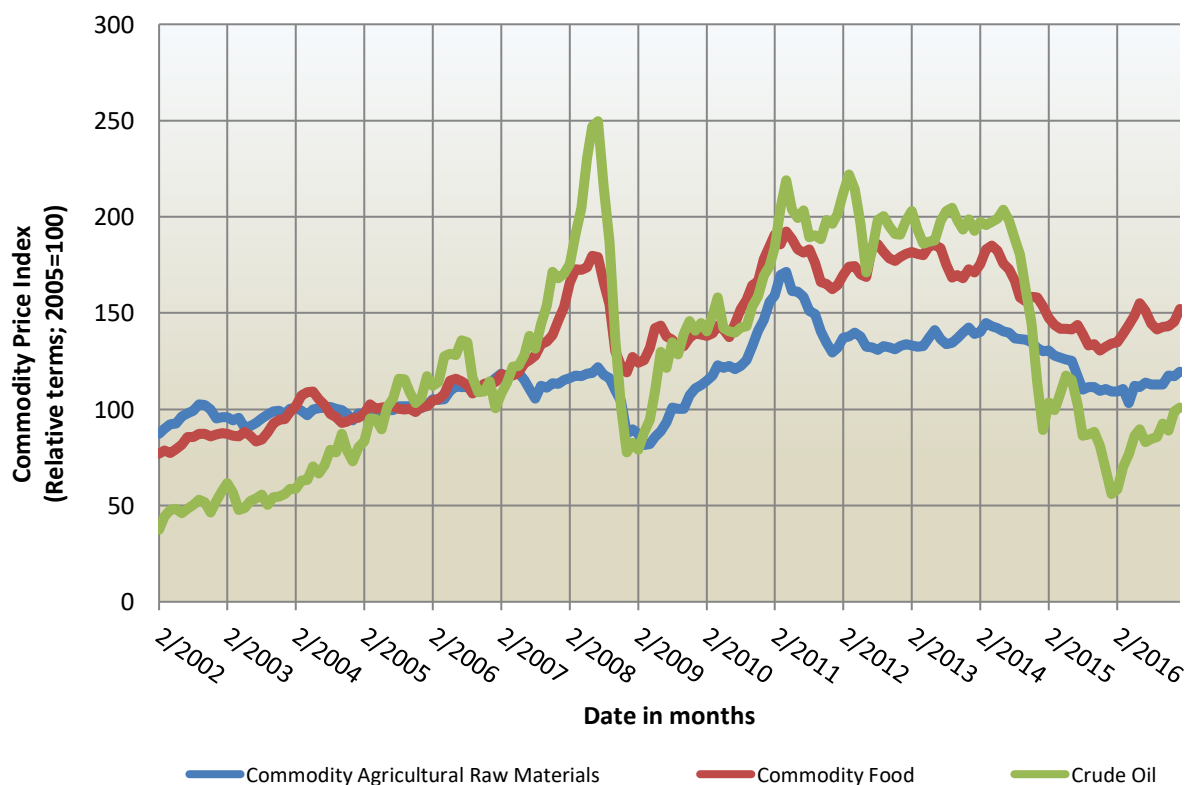
Price Information

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\$ (Jan 12)	Price, US\$ (Jan 17)	Price Change
Crude oil (petroleum, barrel)	106.89	53.63 (↑)	-50%
Maize (corn, metric ton)	272.85	159.99 (↑)	-41%
Sugar (pound)	0.2402	0.2054 (↑)	-14%
Rapeseed oil (metric ton)	1,253.12	917.37 (↑)	-27%
Soybean oil (metric ton)	1,131.77	771.88 (↓)	-32%
Ethanol (gallon)	2.21	1.52 (↓)	-31%

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

Raw materials 15-year Price Indices



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

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NNFCC News Review is edited by Bob Horton for NNFCC members. 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.

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