



www.bio-based-conference.com



66th International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Focus: +++ Bio-based Building Blocks & Polymers +++ Lignocellulose +++ Innovation Award +++



Organiser



www.nova-institute.eu

Award Sponsor

InfraServ
KNAPSACK

www.infraserv-knapsack.de

Silver Sponsors

BASF
We create chemistry

www.basf.com

The Biofore Company



www.upm.com

Bronze Sponsors

FKUR
plastics - made by nature®

www.fkur.com

NESTE

www.neste.com



SYNVINA
functional. sustainable. bioplastics.

www.synvina.com

CONFERENCE JOURNAL

HIGHLIGHTS OF THE WORLDWIDE BIOECONOMY

- Feedstocks for the Bio-based Economy
- Bio-based Building Blocks
- Bio-based Polymers
- Lignocellulose – Lignin & Cellulose
- Environmental Solutions
- Yeast as Platform Technology for Bio-based Chemicals
- Innovation Award “Bio-based Material of the Year 2018”



bio-based-conference.com

Programme of the 1st Day, 15 May 2018

09:00 Registration and welcome coffee



10:00 nova-Institut GmbH
Michael Carus
Conference Opening & Chairman

Policy and Strategy



10:10 BASF SE
Dr. Kerstin Ulrich
BASF's Biomass Balance Approach



10:30 AkzoNobel Specialty Chemicals
Lucy Natrass
New Tool Launched to Monitor Bio-Based Materials in the Chemical Industry

Feedstock for the Bio-based Economy



10:50 LMC International Ltd.
Dr. Sarah Hickingbottom
Market Trends, Availability and Price Development for Sugar, Starch and Plant Oils

Bio-based Building Blocks



Chairman:
Dr. Wolfgang Baltus
PRECISE Corporation



11:10 Tecnon OrbiChem
Doris de Guzman
Update on Bio-Based Building Blocks



11:40 Reverdia
Marcel Lubben
Driving the Development of the Bioeconomy



12:00 DuPont Industrial BioSciences
Christian Lenges
Enzymatic Polymerization:
Nuvolve™ Engineered PolySaccharides &
Progress in Application Development

12:20 Lunch Break



13:50 UPM Biochemicals
Dr. Okko Ringena
Evolution of Wood Utilization:
Bio-MEG and Beyond



14:10 VTT
Jonas Hartman
Muconic Acid as a Versatile Bio-based Monomer for Plastics



14:30 Haldor Topsoe A/S
Tore Sylvester Jeppesen
Demonstrating and Commercializing Bio-Based Chemicals via Catalysis



14:50 Avantium
Eelco Blum
Introducing Project Mekong: Making a Greener PET an Economic Reality

Bio-Based Polymers



Chairman:
Prof. Dr.-Ing. Jörg Müssig
Hochschule Bremen –
University of Applied Sciences



15:10 nova-Institut GmbH
Michael Carus
Update on Market Data and Forecast for Bio-based Polymers

15:40 Coffee Break



16:10 PolymerFront AB
Bjarne Högström
New Applications for Bio-based Plastics –
Examples from many Different Sectors



16:30 Neste (Suisse) SA
Dr. Lars Börger
New Developments of Traceable, Renewable Plastics for Bio-based Drop-in Solutions



International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Programme of the 1st Day, 15 May 2018

Innovation Award Session “Bio-based Material of the Year 2018”



Chairpersons:
Michael Carus &
Dr. Asta Partanen

nova-Institut GmbH 



16:50 Introduction



17:00 Warka Water Inc. 

Arturo Vittori
Warka Tower



17:10 AIMPLAS 

Dr. Pilar Villanueva

Bio-based and Biodegradable Nets
for Green Beans



17:20 Arctic Biomaterials 

Tomi Kangas

PLA Reinforced with Glass Fibre



17:30 Borregaard 

Dr. Hans Øvrebø

Exilva – World’s first Commercial Cellulose Fibril



17:40 Cardolite Corporation 

Koenraad Debouck

Cashew Nutshell Residual-based Blocking Agent



17:50 Rhenoflex 

Sebastian Ames

Rx 35 – Rice Husk Filled, Thermoplastic Material



18:00 Ohio Soybean Council,
collaborating with Roof Revivers 

Michael D. Feazel

Roof Maxx – Soybean-based Roof Material Sealer

18:10 Voting

18:15 Cold Beer on Tap in the Exhibition Space

20:00 Dinner Buffet

21:00 Innovation Award Ceremony

22:00 Live Music

23:00 German Bowling & Bar

Programme of the 2nd Day, 16 May 2018

Yeast as Platform Technology for Bio-Based Chemicals



Chairman:
Prof. Dr. Haralabos Zorbas
Industrielle Biotechnologie Bayern
(IBB Netzwerk GmbH)



09:00 University College Cork
Dr. John Morrisey
Diversifying the Yeast Biomolecule Portfolio –
from Bioethanol to Biomaterials



09:30 Biopetrolia
Dr. Anastasia Krivoruchko
Specialty Chemicals through Engineered Biology

Bio-Based Polymers



Chairman:
Prof. Dr. Ludo Diels
VITO



09:50 Covestro Deutschland AG
Dr. Anne Kutz
Alternative Feedstocks in the Polymer Industry:
Status and Perspective



10:10 Total Corbion PLA bv
Bert Clymans
75.000 Tonnes of PLA – Towards the
New Plastics Economy and Beyond

10:30 Coffee Break



11:00 Braskem Netherlands B.V.
Marco Jansen
The Role of Drop-In Bioplastics
in the Circular Economy



11:20 Arkema
Jean-Luc Dubois
Review of Bio-based Routes to Polyamides

Lignocellulose – Lignin & Cellulose



Chairman:
Gudbrand Rødsrud
Borregaard AS



11:40 VITO **Prof. Dr. Ludo Diels**
Membrane Separation Technology as a Valuable
and Efficient Tool in the Value Chain of Wood
Chemicals and Materials



12:10 Eastman Chemical Company
Dr. David Norman
A Hundred Years of Tenacious Innovation: Sustainable
and Versatile Eastman Cellulose Ester Polymers

12:30 Lunch Break



14:00 Borregaard AS
Dr. Hans Øvrebo
Experience from the First Year of Running the Exilva
Plant and Market Potentials for the Products



14:20 KaiCell Fibers Ltd.
Jukka Kantola
Forest Industry Reaching out to Textile Fibres



14:40 Wageningen Food & Biobased Research
Dr. Ing. R.J.A. (Richard) Gosselink
Zero Waste Ligno-Cellulosic Biorefineries by
Integrated Lignin and Humins Valorisation (ZELCOR)

15:00 Coffee Break

Environmental Solutions



Chairman:
Dr. Thomas Schwarz
CLIB2021



15:30 Jan Ravenstijn Consulting
Prof. Msc. Jan Ravenstijn
The Virtues and Challenges of the PHA-Platform



16:00 RWTH Aachen University
Univ. Prof. Dr.-Ing. Lars M. Blank
P4SB – From Plastic Waste to Plastic Value Using
Pseudomonas Putida Synthetic Biology



16:20 University of York
Dr. Thomas J. Farmer
Sustainable Solvent Selection: Tools and
Techniques for Bio-based Solvent Substitution



**16:40 Fraunhofer-Institut f. Fertigungstechnik
und Angewandte Materialforschung IFAM**
Katharina Haag
Biopolymer Blend With Advanced Cost-Performance
Ratio for Packaging and Agricultural Applications



17:00 AIMPLAS
Dr. Pilar Villanueva
From Orange Juice Waste to New Biopolymers:
A New Source for PBS

17:20 End of Conference

66th International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany



Exhibitors

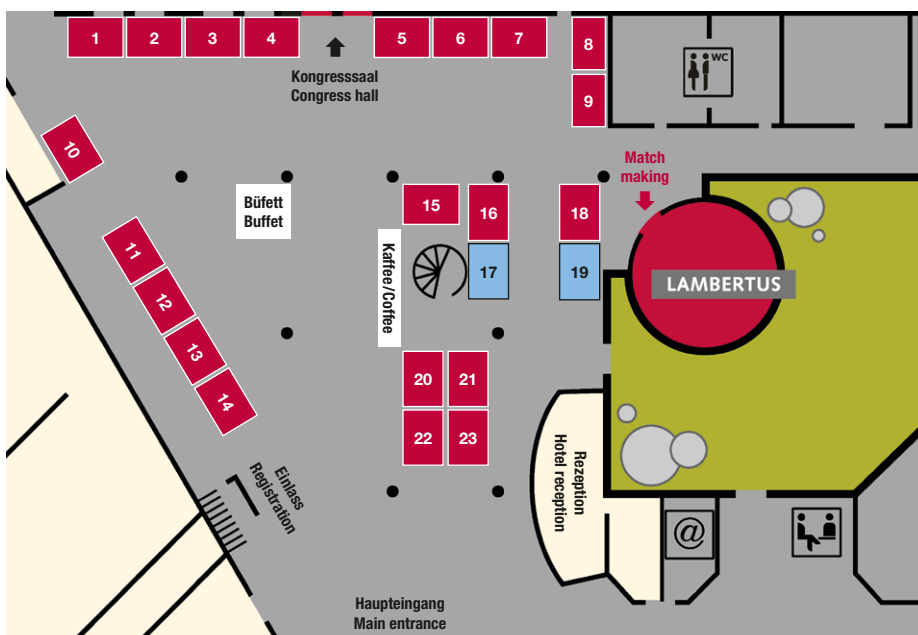
Booth No.

- 1) European Industrial Hemp Association (EIHA)
- 2) DIN CERTCO Gesellschaft für Konformitätsbewertung mbH
- 3) Fachagentur Nachwachsende Rohstoffe e.V. (FNR)
- 4) Tecnon OrbiChem Ltd
- 5) Fraunhofer UMSICHT
- 6) BASF SE
- 7) Bio Base Europe Pilot Plant
- 8) Media Table
- 9) Flanders Investment & Trade
- 10) Synvina
- 11) Arctic Biomaterials Oy
- 12) Forschungszentrum Jülich GmbH
- 13) FKur Kunststoff GmbH
- 14) nova-Institut GmbH
- 15) Total Corbion PLA bv
- 16) TECNARO GmbH
- 18) Cortec/EcoCortec/Bionetix
- 20) InfraServ GmbH & Co. Knapsack KG
- 21/23) Innovation Award “Bio-based Material of the Year 2018”
- 22) Cosun Biobased Products B.V.

Booth Opportunities

The fee of a booth (6m²) is 500 EUR (excl. 19% VAT). We provide you a table, table cloths, a pin board, a chair and a power connection. You are welcome to use your own booth system.

Please submit your preferred booth number, a printable logo and company profile to **Mr. Dominik Vogt** (dominik.vogt@nova-institut.de)



11th International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Innovation Award “Bio-based Material of the Year 2018” “Top 6” candidates nominated!

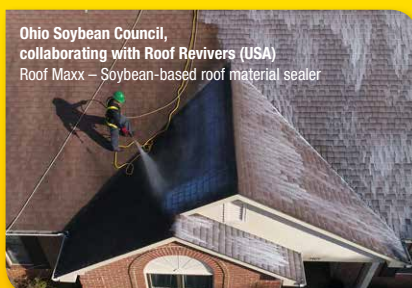
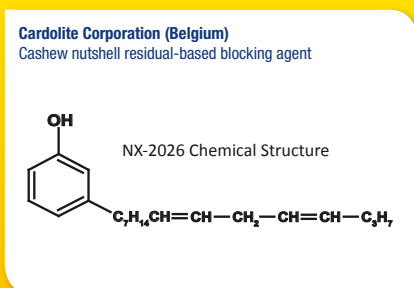
For the 11th year in a row, the Innovation Award “Bio-based Material of the Year” will be granted to the young, innovative bio-based chemicals and materials industry for finding suitable applications and new markets for their products.

The winners will be elected at the “11th International Conference on Bio-based Materials”, 15–16 May 2018 in Cologne, Germany. Six new materials and products from six different countries out of thirteen applications have been nominated for the innovation award by the members of the advisory board.



The three winners will be elected by the participants of the conference and awarded with a prize, sponsored by InfraServ GmbH Knapsack, at the festive dinner buffet.

Nominees for the Innovation Award “Bio-Based Material of the Year 2018”



www.bio-based-conference.com

Award Sponsor
InfraServ
KNAPSACK

Organiser
NOVA Institute
for Energy and Environment



The “Top 6” candidates are:

AIMPLAS :

Bio-based and biodegradable nets for green beans

A packaging material which is more than 80% bio-based and more sustainable than conventional polyethylene nets, but has similar linear weight and mechanical properties. The innovative product is a biodegradable net suitable for green beans packaging. A compound has been developed through reactive extrusion and the combination of different biodegradable materials and additives. Chemical modification was made by grafting low molecular weight units, such as oleic alcohol, obtained by the fermentation of sugars extracted from vegetable waste (watermelon).

More information: www.aimplas.es

Arctic Biomaterials :

PLA reinforced with glass fibre that erodes back to harmless minerals in composting environment

ArcBiox™ BGF30-B1 is a Polylactic Acid (PLA) that is reinforced using LFT (long fibre) technology with glass fibres. This innovation makes it possible that bio-based plastics can be used in technically demanding durable applications and still have the option of compostability at the end of life. The reinforcement is a glass fibre developed by Arctic Biomaterials Oy (ABM) and can also be used for several other bio-based polymers. This composite material reduces the carbon footprint and use of non-renewable energy of a composite product drastically compared to fossil-based reinforced plastics. This reinforced PLA is compostable and certified by the seedling mark from DIN CERTCO.

More information: www.abmcomposite.com

Borregaard :

Exilva – World’s first commercially available cellulose fibril

Exilva is a completely natural and sustainable three-dimensional network of cellulose fibrils, that improves rheology and stability, as well as enhancing structure in your product formulations. Due to the fibril’s flexible aggregates creating ultra-high surface area and water retention capability – that will retain their crystallinity features even after the production process – Exilva increases the formulation efficiency, reduces the CO₂ footprint and creates exciting opportunities for greener innovation. Exilva also improves product stability (anti-settling) and versatility, alongside controlling dry-out time, improving barriers and enhancing uptake of active ingredients. More information: www.exilva.com

Cardolite Corporation :

Cashew nutshell residual-based blocking agent

NX-2026 is an ultra-high purity 3-pentadeca-dienyl-phenol recently developed by Cardolite through advanced proprietary process technology. 3-pentadeca-dienyl-phenol is the main component distilled from cashew nutshell liquid, a renewable and non-edible resin extracted from the honeycomb structure of the cashew nut. NX-2026 has been successfully introduced to the coating and adhesive market as a non-toxic isocyanate (NCO) blocking agent that is a suitable replacement for petrochemical phenols. NCO systems blocked with NX-2026 provide lower viscosity and deblocking temperature than equivalent systems blocked with phenols. Moreover, NX-2026 blocked NCO prepolymers can be used in 2K epoxy systems to improve bond and T-peel strengths while maintaining good cure properties. More information: www.cardolite.com




International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

**Ohio Soybean Council, collaborating
with Roof Revivers :
Roof Maxx – Soy-bean-based roof material sealer**

Roof Maxx is a bio-based, renewably sourced shingle sealer-rejuvenator that is spray-applied to asphalt-based roofing materials to extend their service life up to 15 years. Roof Maxx resaturates dried, curled, leaky shingles or modified bitumen roofing material, restoring pliability and flexibility, and enhances adhesion of the protective mineral granules. A biodegradable, green chemical that uses oil from soybeans as chemical feedstock, Roof Maxx contains no solvents, volatile organic compounds (VOCs), or toxic ingredients. Overspray is not harmful to homeowners, sealant applicators, pets, plants, building materials, or vehicles. By extending the lifespan of roofs, Roof Maxx ultimately reduces the production of asphalt roofing materials and landfill waste, and improves the roofing industry's environmental footprint.

More information: www.roofmaxx.com

**Rhenoflex :
Rx 35 – rice husk filled, thermoplastic material
for easy handicraft work**

Rx 35 is a biodegradable and partly bio-based thermoplastic sheet material with 35 weight-% rice husk filler. One side of Rx 35 sheets has smooth leather-like haptics and is mostly used in the visual field of final products. The other side is laminated with a fine mesh offering high strength and resilience properties. It is non-toxic, solvent-free and recyclable. Its unique properties allow for easy handicraft work by heating the material up to 90°C. It is mainly used for tinker and fashion accessories as well as toys production, model making, theatre and many more. The utter uniqueness of Rx 35 is its versatility. More information: www.rhenoflex.de





Bio-based News

BIO-BASED ECONOMY
BIO-BASED CHEMICALS AND MATERIALS
INDUSTRIAL BIOTECHNOLOGY
CARBON CAPTURE AND UTILIZATION

www.bio-based.eu/news

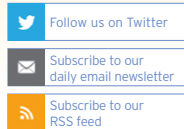


Stay Up-to-Date with Daily News from the Bio- and CO₂-based Economy

- » Bio-based News has been covering the bio-based economy for over 15 years
- » More than 20,000 reports on more than 10,000 companies make Bio-based News the central point for information for the international bio- and CO₂-based economy
- » The perfect place for your company news: send your press release to news@bio-based.eu



nova-Institut GmbH
Chemiepark Knapsack
Industriestr. 300
50354 Hürth, Germany



Bio-based News – Daily news on Bio-based and CO₂-based Economy worldwide

- 20,000 reports
- 10,000 companies
- 160,000 readers monthly
- >1,500 Twitter followers: @Biobased_News



www.bio-based.eu/news



COMPOSITES EUROPE

13th European Trade Fair & Forum for Composites,
Technology and Applications

WE CONNECT – MATERIALS AND EXPERTS



**Sustainable Lightweight Construction Solutions –
Be part of the Bio-based Pavilion Hall 5/A45**

**06 – 08 November 2018
Messe Stuttgart, Germany**

www.composites-europe.com

Organised by
 Reed Exhibitions

Partners



Composites Germany




International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Ten valuable comments on bio-based materials





Pilar Villanueva, AIMPLAS : “New biopolymers for the railway sector and orange juice packaging, and also the latest innovations regarding PBS synthesis by using monomers extracted from orange juice waste.”



Eelco Blum, Avantium : “Avantium will present project Mekong: a one-step hydrogenolysis process for making a drop-in renewable mono-ethylene glycol (MEG) from glucose. The process is competitive with fossil-based MEG and will address the need for making a greener PET an economic reality.”




Marco Jansen, Braskem  / : “Circular thinking is all about turning waste into resource, avoiding spillage of waste into the environment and finding more sustainable sources of raw materials. Drop in recyclable bioplastics have an important role to play in this. Braskem will show the contributions biobased plastics can make to the circular economy.”




Katharina Haag, Fraunhofer IFAM : “By using bio-based fillers, we can not only adjust the material properties and their morphology, but can also achieve an optimum cost-performance ratio for applications such as, e.g. mulch films.”




Jan Ravenstijn, Jan Ravenstijn Consulting : “Today there is a lot of confusion in the market about PHA. It is no product or polymer, it is a new polymer-platform consisting of many polymers with entirely different structures, which together can cover a large range of applications. After 25 years it’s about time that people become more specific when they talk about “PHA”.”



Marcel Lubben, Reverdia : “Looking at the previous decade of bio-based chemicals, commercialisation has been a significant challenge and initial expectations need to be revised. By linking the bioeconomy to the circular economy, the sector can continue to create business growth and transform the chemical industry as we know it to move successfully into the next decade.”



Lars Blank, RWTH Aachen : “Plastic waste to plastic value—a novel biotechnological recycling route exploiting the synthesis capacities of nature.”




Bert Clymans, TOTAL Corbion : “After the successful start-up of our pilot plant in Rayong, Thailand, we are eagerly anticipating the start-up of our 75 kTpa PLA polymerisation plant in the second half of 2018. This increase in global PLA production capacity will further improve PLA market attractiveness, application potential and supply reliability.”



Ludo Diels, VITO : “Biobased aromatic chemicals offer new opportunities to develop green, safe and performing new materials.”



David Thomas, VTT : “Muconic acid, the versatile sugar-based platform chemical for bio-based nylon-6,6.”



11th International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Partners



www.avk-tv.de



www.bcnp-consultants.com



www.bio.org/events/bio-world-congress



C.A.R.M.E.N.

www.carmen-ev.de



www.clib2021.de



<http://nrw.enterprise-europe-germany.de>



www.european-bioplastics.org



www.fnr.de



www.ibbnetzwerk-gmbh.com



www.kunststoffland-nrw.de



www.nnfcc.co.uk



www.polycomply-hoehchst.com



www.stoffstroeme.de



www.3-n.info

Media Partners



www.biobasedpress.eu



www.bioplasticsmagazine.com



www.chemanager-online.com



www.eurobiotechnews.com



<http://greenchemicalsblog.com>



www.heise.de/tr



<https://ilbioeconomista.com>



www.inicop.org



www.k-zeitung.de



www.liebertpub.com



www.macplas.it



<http://plasticker.de>



www.plastixportal.co.za



www.plattform-lifesciences.de



www.renewablematter.eu



www.thebiojournal.com



www.bio-based.eu/news



International Conference of the European Industrial Hemp Association (EIHA)

www.eiha-conference.org

12–13 June 2018

Maternushaus, Cologne (Germany)



++ Cultivation ++ Processing ++ Economy ++ Sustainability ++ Innovation ++



More than 300 participants from 40 countries are expected – don't miss the biggest industrial hemp event in 2018 worldwide!

Applications

- Bio-Composites
- CBD as Food Supplement and Pharmaceutical
- Construction
- Fibres & Shives
- Hemp Seeds, Oil and Proteins
- Insulation
- Textiles

Spectrum of Participants

- Cultivation Consultants
- Engineers
- Hemp Food and Feed Industry
- Natural Fibre Industry
- Pharmaceutical Industry
- Research and Development
- Traders and Investors



Organiser



www.nova-institute.eu

BASF's Biomass Balance Approach: A groundbreaking way of using renewable resources in production

BASF offers a variety of products for which fossil resources were replaced by a sustainably produced renewable feedstock at the beginning of the value chain. As our Verbund includes over 160 production plants connected by thousands of kilometers of pipes, it cannot be traced where the biomass will exactly end up. Therefore, our Biomass Balanced Products are most likely not bio-based. However, Biomass was used at an early process step of the chemical production and attributed to the respective product. This system can for example be compared to the one of green electricity.

The Biomass Balance approach was developed by BASF in cooperation with an external certification partner (TÜV Süd) and published as Standard CMS71. Regular audits ensure that the feedstock needed for our Biomass Balanced Products is indeed replaced by a respective amount of renewable feedstock. Furthermore, customers receive a certificate proving their fossil resource savings and a declaration on CO₂ reduction.



Find out more at:
basf.com/biomassbalance

We lead the forest-based bioindustry into a sustainable, innovation-driven and exciting future.

Bioeconomy is a forest of opportunities

We create value by seizing the limitless potential of bioeconomy and respond to consumer demand growth with sustainable and safe solutions. Our talented people bring our vision to life today and in the future.



Synvina is a Joint Venture of Avantium and **BASF**, located in Amsterdam. Operating a pilot plant in Geleen, the Netherlands, Synvina produces and markets furandicarboxylic acid (FDCA) from **renewable resources** on pilot plant scale and markets the new polymer polyethylenefuranoate (PEF).

Synvina aims to commercialize their activities in the future. FDCA is a building block for various products. Most significantly the polyester PEF, which is **suitable for food and beverage packaging** and for fibers for carpets and textiles. For the packaging industry, PEF offers superior characteristics like **improved barrier properties** and a **higher mechanical strength** enabling **thinner packaging**. PEF is recyclable. Our strength lies in the combination of our mother companies' expertise.

We merge technology leadership with market leadership. **Creativity** with reliability. Innovative spirit with production excellence. Together, we aim to become market leaders in FDCA and PEF.

Please find further information at www.synvina.com.



www.fkur.com

TAKE WHAT YOU NEED FROM THE BIOPLASTIC SPECIALIST:

-  Technical support
-  Marketing advice
-  Tailor-made formulations



Global 100:
Neste – the world's
2nd most sustainable company



neste.com

NESTE
The only way is forward



WE FIND THE BEST ROUTE

Process development with InfraServ Knapsack

Process development is the link between a product idea and its industrial production. The aim is to develop a reliable, efficient and thus profitable production process. We guide you along the way. We provide you with in-depth studies regarding all feasible process alternatives with their pros and cons. Or to put it in a different way. We find the best route for your success.

WWW.INFRASERV-KNAPSACK.DE/12FB



ENGINEERING AND CONSTRUCTION | PLANT SERVICES | SITE OPERATION

InfraServ
KNAPSACK

Strong growth in bio-based building blocks and moderate growth in bio-based polymers

New comprehensive market and trend report “Global Markets and Trends of Bio-based Building Blocks and Polymers 2017–2022” published by German nova-Institute

The capacities of bio-based polymers continue to grow at around 3 to 4% per annum, i.e. at about the same rate as petrochemical polymers. Therefore, the market share of bio-based polymers in the total polymer market remains constant at around 2%. But the individual development of different bio-based polymers varies considerably. While

some are virtually collapsing compared to previous forecasts (e.g. bio-PET), many are showing constant or slightly increasing capacities and a few are even showing significant growth (like PLA). Additionally, for some bio-based polymers such as PHA, PEF, bio-PE and bio-PP, the prospects for the future are quite positive. Overall, the market environment remains challenging with low crude oil prices, little political support and partially underutilized capacities. Until now, the biodegradability of some bio-based polymers has not yet been able to generate a real advantage. The new report is more than just an

update, it differs from the previous versions in structure and content. It contains comprehensive information on capacity development from 2011 to 2022, per building block and polymer as well as information on 102 individual polymer producers. A total of 17 bio-based building blocks and 15 polymers are covered in the report. In addition, the new issue includes analyses of market developments per building block and polymer, so that readers can quickly gain an overview of developments that go far beyond capacity figures.

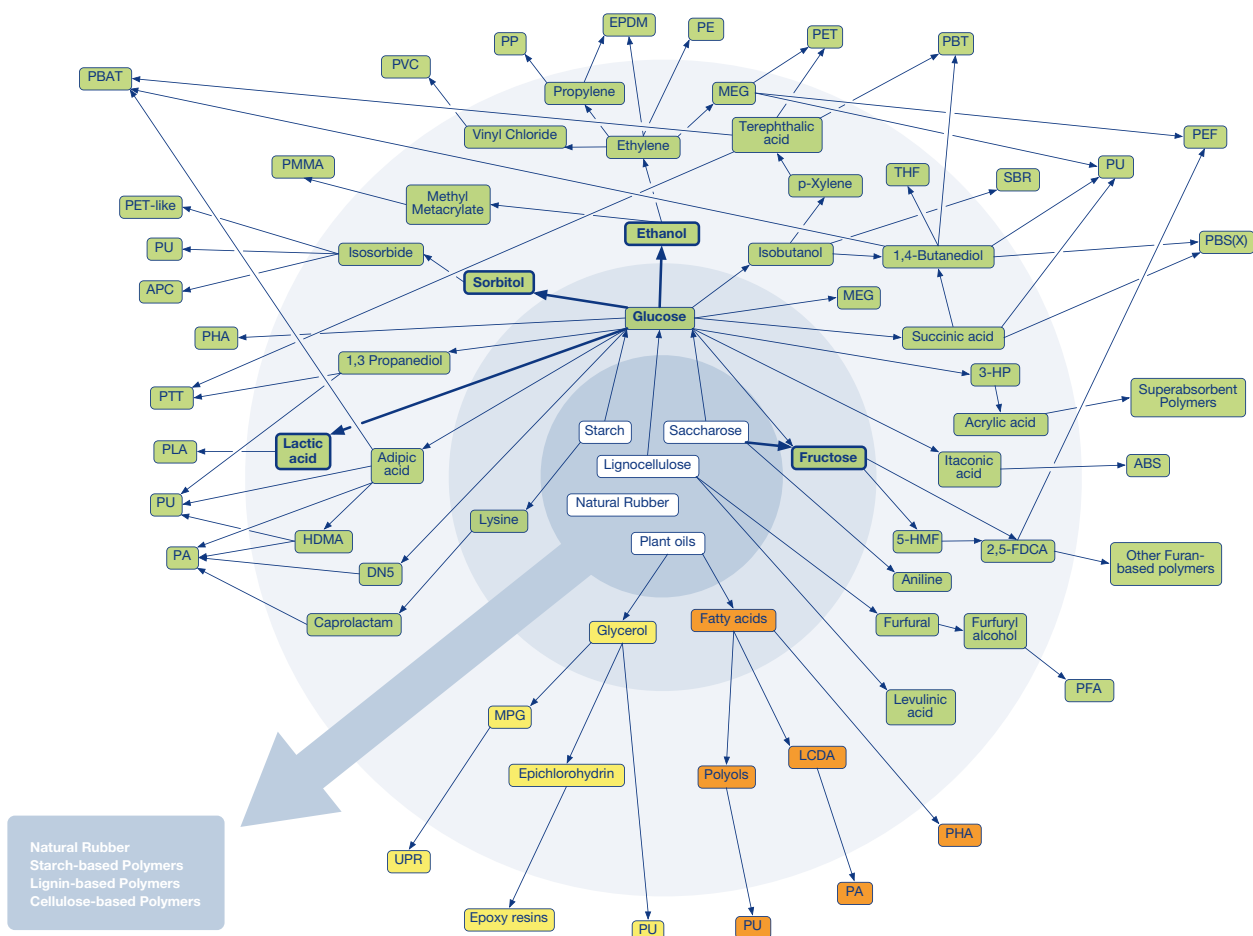


Figure 1: Pathways to bio-based polymers (nova 2018)

Figure 1 shows all commercially realized pathways from biomass via different building blocks and monomers to bio-based polymers. As in previous years, several pathways and some new intermediates have been added. In 2017, the world-wide capacities for bio-based polymers reached 4.6 million tonnes (including hard-to-estimate bio-based PUR this number goes up to 6.4 million t). The forecast for 2022 shows 5 million tonnes (including bio-based PUR: 7.5 million t).

Figure 2 shows the development of the capacities based on data from 2011 to 2017 and includes a forecast for all bio-

based polymers until 2022. All in all, after strong growth between 2011 and 2014, we see less growth with a CAGR of 3 to 4% from 2014 to 2017. According to the latest forecasts, this trend will continue until 2022 and is approximately in line with expected growth in the petrochemical polymers and overall polymer market. Only higher oil prices, better support from governments or technological breakthroughs will make it possible for growth to rise again. With a CAGR of 10% between 2017 and 2022, Europe has the highest growth of bio-based polymer capacities compared to other regions of the world.

Figure 3 shows the capacity development for the sub-group of dedicated bio-based polymers. These polymers have no direct counterpart in the petrochemical world, therefore price pressure from cheap crude oil is lower than for other groups. Moreover, they are offering new properties and functionalities. The polymers in these groups show a higher CAGR compared to other groups, a trend already visible in 2011 that will continue to 2022. Bio-based polymers such as PLA become more and more established, additional capacities are created and new polymers such as PHA and PEF are introduced to the market.

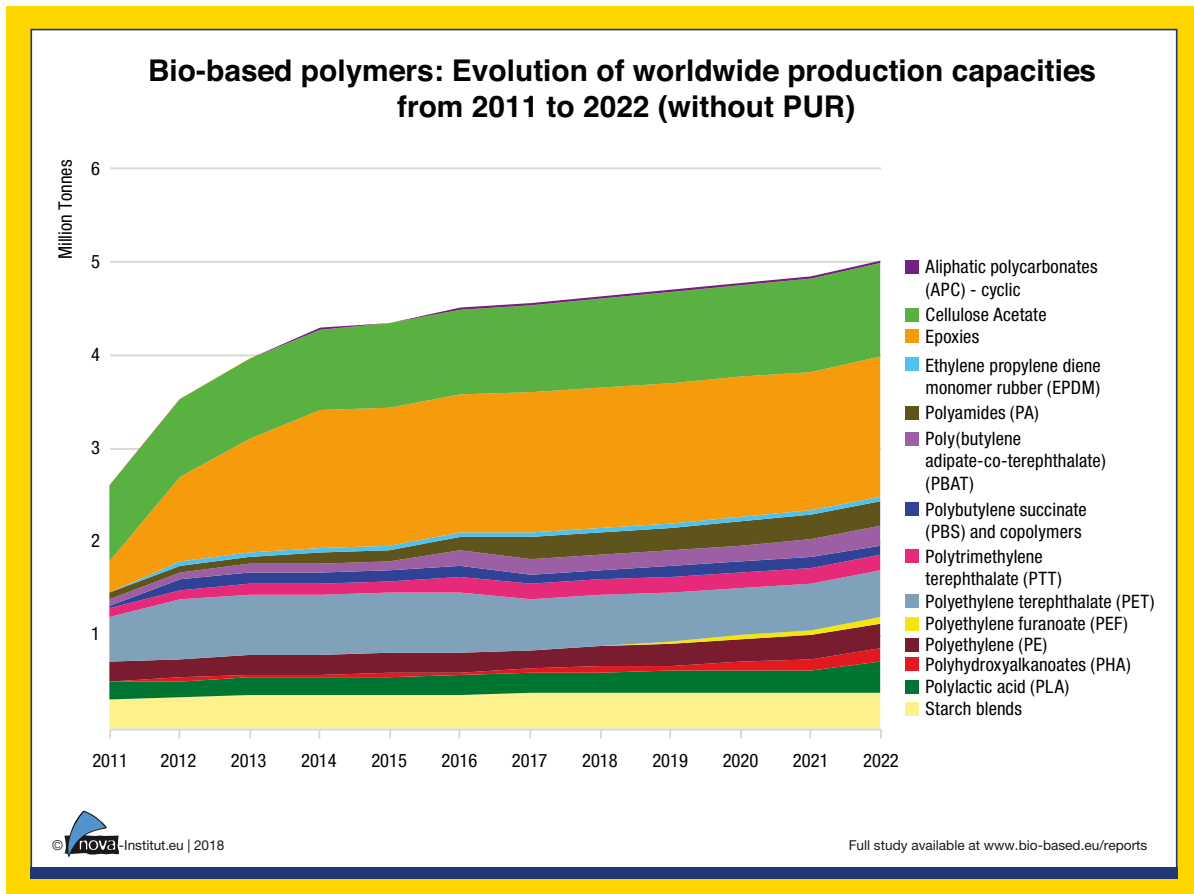
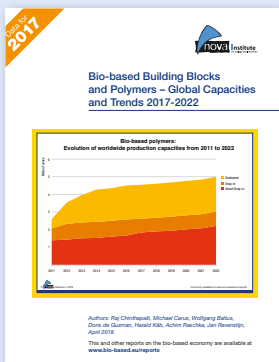


Figure 2: Bio-based polymers – Evolution of worldwide capacities 2011–2022 (without PUR)

As a consequence, the highest innovation takes place in this group, and a number of new developments are still to be expected. Success also depends on how quickly the new polymers can be integrated into the marketplace and how quickly their new properties can become added value for politicians and society.

Figure 4 shows the development of capacities for bio-based building blocks, the core of the new bio-economy. Between 2017 and 2022, the CAGR of 5 to 6% is significantly higher than that of bio-based polymers (3 to 4%) as a whole. There are two main reasons for this development: Bio-based building blocks usually lead to dedicated bio-based polymers, which already show a higher growth rate, and the building blocks can be used in structural polymers as well as in functional polymers and also in many other applications.

Global Markets and Trends of Bio-based Building Blocks and Polymers 2017 – 2022” and other reports are available at www.bio-based.eu/reports



All reports are available at nova-Institute's booth (no. 14). Take the opportunity to get a sneak peek at the full studies.

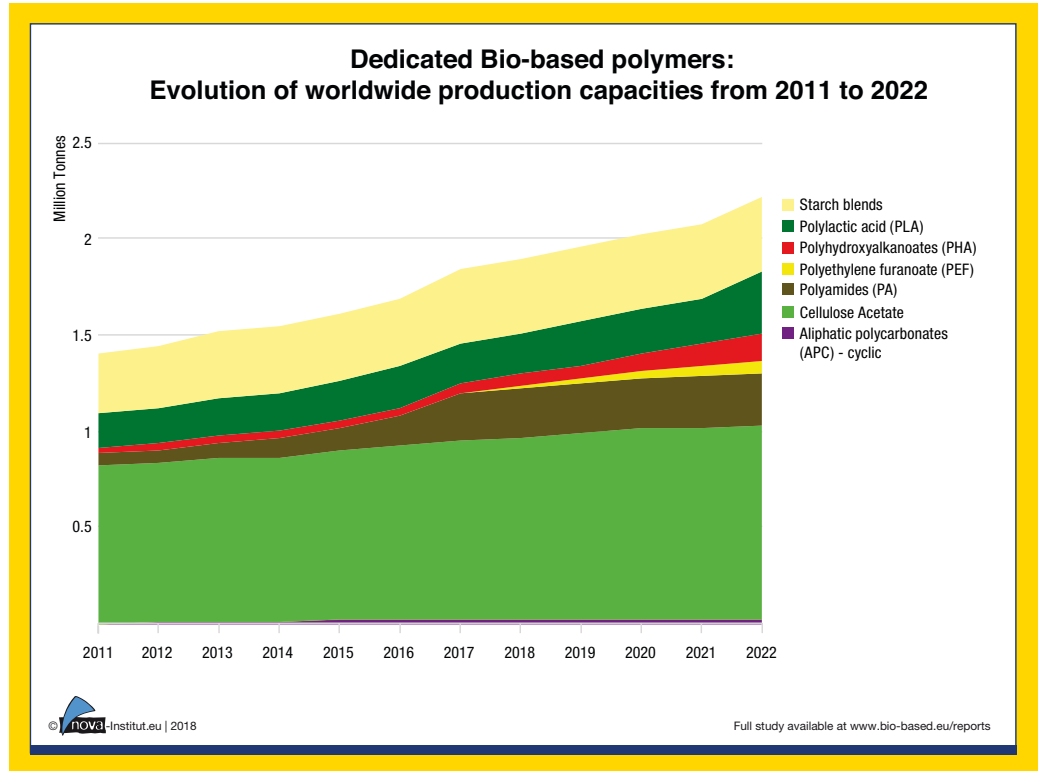


Figure 3: Dedicated bio-based polymers – Evolution of worldwide capacities 2011–2022

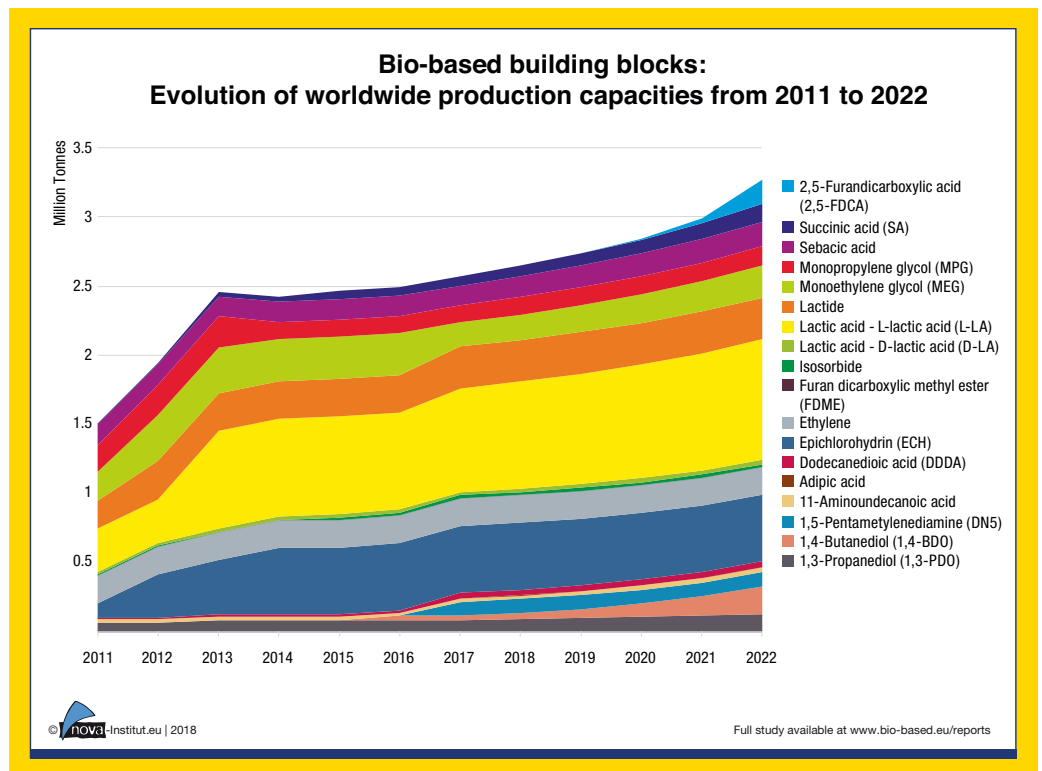


Figure 4: Bio-based building blocks – Evolution of worldwide capacities 2011–2022



Revolution in Food and Biomass Production (REFAB)

www.REFAB.info

High-tech strategy for a future food and biomass supply
New conference, 1 – 2 October 2018, Maritim Hotel Cologne (Germany)



More than 500 participants expected

The conference “**Revolution in Food and Biomass Production (REFAB)**”, 1 – 2 October 2018, Cologne (Germany) will for the first time bring together forward-thinking experts from companies, start-ups and research institutions to have a look at the future of food and biomass production. Join the future!

- Precision farming, robotics, drones and Artificial Intelligence (AI)
- Biostimulants – nitrogen fixation, mycorrhiza, biopesticides
- Home, urban and vertical farming
- Agriculture under extreme conditions (desert, ice, outer space) and in combination with solar energy
- Improved plant varieties for the future
- Alternative protein sources – insects, bacteria, artificial meat and CO₂ utilization
- Future of organic and smallholder farming
- Mariculture or marine farming, algae and aquaculture
- Biorefineries for food, chemicals, materials and fibres

Entrance Fee

Conference incl. Catering plus 19% VAT

Both Days	1-2 October 2018	1,475 €
1st Day	1 October 2018	880 €
2nd Day	2 October 2018	780 €

Get your **Early Bird ticket now** and save 30% by end of May with the discount code **REFAB18**.

We offer **60% discount for participants from developing countries** (by end of May, then 50%), please use the discount code **DEV18** when you register online. Members of the media, students and groups, please contact Dominik Vogt to receive your voucher.



Programme
Tatevik Babayan
+49 (0)2233 - 48 14 76
tatevik.babayan@nova-institut.de



Conference Manager
Dominik Vogt
+49 (0)2233 - 48 14 49
dominik.vogt@nova-institut.de

Organiser
nova-Institut GmbH
Industriestraße 300
50354 Hürth, Germany
www.nova-institut.eu



www.REFAB.info

11th International Conference on Bio-based Materials

15–16 May 2018, Maternushaus, Cologne, Germany

Your Conference Team



Michael Carus
CEO
michael.carus@nova-institut.de



Dominik Vogt
Conference Manager,
Exhibition
+49 (0)2233 4814-49
dominik.vogt@nova-institut.de



Guido Müller
Innovation Award
+49 (0)2233 4814-44
guido.mueller@nova-institut.de



Jutta Millich
Media & Partnerships
+49 (0)561 503580-44
jutta.millich@nova-institut.de



Dr. Asta Partanen
Sponsoring
+49 (0)151 1113 0128
asta.partanen@nova-institut.de



Vanessa Kleinpeter
Contact, Registration
+49 (0)2233 4814-40
vanessa.kleinpeter@nova-institut.de

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. The conference builds on successful previous conferences: 250 participants and 30 exhibitors are expected.



Selected winners of the past Innovation Awards „Bio-based Material of the Year“:

- Bayer Material Science
- Bio-Lutions
- Covestro
- Ecovative Design
- Evonik
- Fischerwerke
- FKuR
- HIB Trim Part Solutions
- Newlight Technologies
- Omodo
- Orineo
- Paptic
- Phytowelt
- Qmilk
- Staedtler Mars.

Venue & Accomodation

Maternushaus Cologne
Kardinal-Frings-Str. 1–3
50668 Cologne, Germany
+49 (0)221 163 10
info@maternushaus.de

Entrance Fee

Conference incl. Catering
plus 19% VAT

1 st Day 15 May 2018	2 nd Day 16 May 2018
545 €	495 €
845 €	

Advisory Board

Dr. Wolfgang Baltus, PRECISE Corporation

Christiaan Bolck, Wageningen University

Prof. Dr. Ludo Diels, Flemish Institute for Technological Research (VITO)

Doris de Guzman, Tecnon OrbiChem Ltd.

Prof. Dr. Jörg Müssig, Hochschule Bremen

Prof. Jan Ravenstijn, Jan Ravenstijn Consulting

Gudbrand Rødsrud, Borregaard

Dr. Thomas Schwarz, CLIB2021

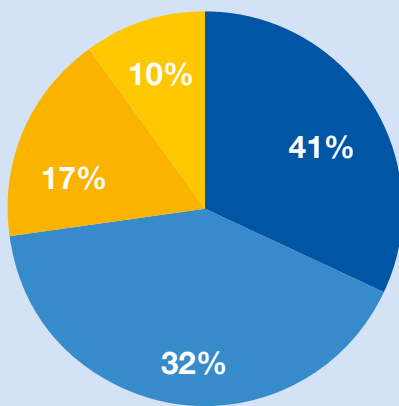
Prof. Dr. Haralabos Zorbias, IBB Netzwerk



International Conference on Bio-based Materials

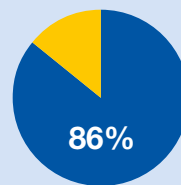
15–16 May 2018, Maternushaus, Cologne, Germany

Attendees of the Conference 2017

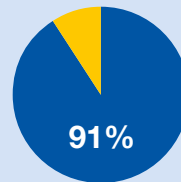


- Larger companies
- SME & Startup
- Academia
- Others

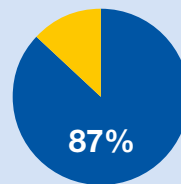
Our Conference – a Guarantee for Satisfied Customers



Networking Success
Good/Very Good

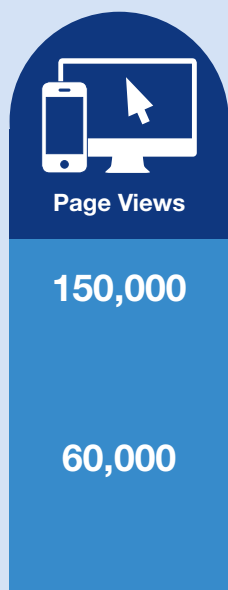


Venue Satisfaction
Good/Very Good



Overall Satisfaction
Good/Very Good

Networks of nova-Institute



(Social) Media Connections

LinkedIn

XING



Monthly nova-Newsletter

Save the Date: nova-Institute Events in 2018



European Industrial Hemp Association (EIHA)

15th International Conference | 12th - 13th June 2018



12 - 13 June 2018
Maternushaus, Cologne, Germany
www.eiha-conference.org

nova Session on technology of the future:
Carbon Capture and Utilization (CCU)
18 September 2018, Airport Cologne/Bonn



18 September 2018
Airport Cologne/Bonn, Germany
www.bio-based.eu/nova-sessions



Revolution in Food and Biomass Production (REFAB)

High-tech strategy for a future food and biomass supply



1-2 October 2018
Maritim Hotel, Cologne, Germany
www.REFAB.info

7th Conference on



CO₂

Carbon Dioxide
as Feedstock for
Fuels, Chemistry
and Polymers

20-21 March 2019, Maternushaus, Cologne (Germany)



20-21 March 2019
Maternushaus, Cologne, Germany
www.co2-chemistry.eu



Bio-based News - Daily news on Bio-based and CO₂-based Economy worldwide

- 20,000 reports
- 10,000 companies
- 160,000 readers monthly
- > 1,500 Twitter followers:
@Biobased_News



www.bio-based.eu/news



International Directory for Bio-based Businesses (iBIB)

Easy and direct access to producers,
suppliers and experts in the Bio-
based Economy worldwide.

Upload your company profile now
for free, get visible for thousands
of customers!



www.bio-based.eu/iBIB

Keep up to date with nova-Institut's events, publications and services. Subscribe to our new mailing lists (www.bio-based.eu/email) and get information on your topic of interest. Or course, you can unsubscribe or change your subscription at any time.

Contact: Mr. Dominik Vogt, +49 (0) 2233 48 14 49, dominik.vogt@nova-institut.de

All conferences at www.bio-based.eu

Bio-based Polymers & Building Blocks

The best market reports available



Data for 2017

Bio-based Building Blocks and Polymers – Global Capacities and Trends 2017-2022

Bio-based polymers: Evolution of worldwide production capacities from 2011 to 2022

Authors: Raj Chinthapalli, Michael Carus, Wolfgang Baltus, Doris de Guzman, Harald Kaeb, Achim Raschka, Jan Ravenstijn, April 2018

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Carbon dioxide (CO₂) as chemical feedstock for polymers – technologies, polymers, developers and producers

Authors: Achim Raschka, Barbara Dommermuth, Jan Ravenstijn and Michael Carus, nova-Institut GmbH, Germany, March 2018

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Succinic acid: New bio-based building block with a huge market and environmental potential?

Pharmaceutical/Cosmetic	Industrial
<ul style="list-style-type: none"> Acidic ingredient for denture cleanser/toothpaste Acidic Calcium succinate is anticarcinogenic Effervescent tablets Intermediate for perfumes Pharmaceutical intermediates (antibiotics, antiparasitic drugs, antineoplastic, anticancer) Preservative for tablets Removes fish odour Used in the preparation of vitamin A 	<ul style="list-style-type: none"> Di-ester Engineering plastics and epoxy casting agents/hardeners Hydrolysis, saponification, regulators of plant growth Intermediate for lacquers + photographic chemicals Plasticizer (replaces phthalates, adipic acid) Polymers Solvents, lubricants Surface cleaning agent (metal-electronic-/semiconductor-industry)
Food	Other
<ul style="list-style-type: none"> Bread softening agent Flavour enhancer Flavouring agent and acidic seasoning in beverage/food Microcapsulation of flavouring oils Preservative (cheeses, soy, milk) Protein stabilisation and in dry gelatine (desserts/cake flavourings) Used in synthesis of modified starch 	<ul style="list-style-type: none"> Avoiding Aluminium Chemical metal plating, electroplating baths Coatings, inks, pigments (powder/radiation-curable coating, inks for rubber-based cast) die intermediates, photocurable ink, toners Fabric finish, dyeing and for fibres Part of antiseptic treatment for barley seeds Preservative for cut flowers Self-cleaning agent

Authors: Raj Chinthapalli, Kerstin Hiltand, Florence Aeschelmann, Achim Raschka, Michael Carus, nova-Institut GmbH, Germany, February 2018

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Commercialisation updates on bio-based building blocks

Selected bio-based building blocks: Evolution of worldwide production capacities from 2011 to 2021

Author: Doris de Guzman, Tecnon OrbChem, United Kingdom, July 2017

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Standards and labels for bio-based products

Authors: Lara Dammer, Michael Carus and Dr. Asta Partanen, nova-Institut GmbH, Germany, May 2017

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Bio-based polymers, a revolutionary change

Comprehensive trend report on PHA, PLA, PUR/TPU, PA and polymers based on FDCA and SA: Latest developments, producers, drivers and lessons learnt

Bio-based polymers, a revolutionary change

Jan Ravenstijn 2017

Picture: Geier Kunststoffwerk

E-mail: j.ravenstijn@novainstitut.nl
Mobile: +31.6.2247.8593

Author: Jan Ravenstijn, Jan Ravenstijn Consulting, the Netherlands, April 2017

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Policies impacting bio-based plastics market development and plastic bags legislation in Europe

Bioeconomy: More than Circular Economy

Authors: Dirk Carrez, Clever Consult, Belgium, Jim Philip, OECD, France, Dr. Harald Kaeb, naroon Innovation Consulting, Germany, Lara Dammer & Michael Carus, nova-Institute, Germany, March 2017

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Asian markets for bio-based chemical building blocks and polymers

Share of Asian production capacity on global production by polymer in 2016

Author: Wolfgang Baltus, Wobelt Expedition Consultancy, Thailand

This and other reports on the bio-based economy are available at www.bio-based.eu/reports

Market study on the consumption of biodegradable and compostable plastic products in Europe 2015 and 2020

A comprehensive market research report including consumption figures by polymer and application types as well as by geography, plus analyses of key players, relevant policies and legislation and a special feature on biodegradation and composting standards and labels

Bestsellers

Disposable tableware, Biowaste bags, Carrier bags, Rigid packaging, Flexible packaging

Authors: Harald Kaeb (naroon, lead), Florence Aeschelmann, Lara Dammer, Michael Carus (nova-institute), April 2016

The full market study (more than 300 slides, 3,500€) is available at bio-based.eu/top-downloads.

All reports are available at nova- Institute's booth (no. 14). Take the opportunity to get a sneak peek at the full studies.

www.bio-based.eu/reports

