Biocomposites - Find the real alternative to plastics

Plastics can be replaced by biocomposites with wood or natural fibres

• The “8th Biocomposites Conference Cologne” is the world’s largest conference and exhibition on the topic. More than 200 participants from all over the world and 27 exhibitors are expected to benefit from the rapidly growing interest for plastic alternatives.

• Vote for the “Biocomposite of the Year 2019” at the Biocomposite Award Session. The winner will be announced in the first evening during the gala dinner.

www.biocomposites.cc.com

14–15 NOVEMBER 2019, MATERNUSHAUS, COLOGNE, GERMANY

Find the real alternative to plastics
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MATCH MAKING
Every registered participant has received a link to the match making landing page to activate the match-making tool. After you have been logged in successfully you can directly arrange meetings with other participants of your choice.

• Meet decision makers of the industry 1-on-1
• Find new networking and business opportunities
• Arrange meeting place & time with ease
• Manage all your meetings in one simple user-friendly environment
• Get email alerts for meeting requests

You are not yet registered or you have questions about the match making tool? Svenja Geerken will help you!

FREE WIFI
Network ID: nova-conference
Password: nova2019

www.biocompositescc.com

YOUR CONFERENCE TEAM

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www.biocompositescc.com
Dear experts,

Welcome to the world's largest biocomposites event, the 8th Biocomposites Conference Cologne (BCC)!

Biocomposites have never been in a better market position than they are today – established in the automotive sector, a solid player in the decking market and now also with increasing demand from the consumer goods and packaging sector. In Europe, 140,000 tons of biocomposite granulates were produced and sold last year, a new all-time record (see article page 26). At the BCC, the presentations and, above all, the nominees for the innovation award show the great variety of biocomposite materials, process technologies and applications.

In almost all possible applications, we can today replace plastics with biomaterials such as wood flour or natural and cellulose fibres. These materials can provide enhanced properties, improved haptics or simply appear more attractive and they ultimately increase the proportion of renewable carbon. In combination with bio-based or recycled plastics, even materials made from 100% renewable carbon are possible – with corresponding lower greenhouse gas (GHG) emissions.

The nova team is looking forward to the exciting conference and wishes all participants new insights, interesting discussions and strengthening of existing or development of new networks.

And don’t forget to have fun at our conference and in the vibrant city of Cologne.

Kind regards

Michael Carus (CEO) and Asta Partanen (Biocomposites Expert) and the entire nova team
Exhibition Opportunities
The fee of a booth (6 m²) is 600 EUR (excl. 19% VAT). We provide you with a table, table cloths, a pin board, a chair and a power connection. You are welcome to use your own booth system. After booking your booth (http://biocompositescc.com/exhibition-booking) please submit Mr. Dominik Vogt dominik.vogt@nova-institut.de a printable logo and a company profile.

Booth No. | EXHIBITORS
1  – BEOLOGIC
2  – Fraunhofer Institut für Holzforschung (WKI)
3  – VTT Technical Research Centre of Finland Ltd.
4  – ISCC System GmbH
5  – Coperion GmbH
6  – nova-Institut GmbH
7  – Dow Silicones Corporation
8  – Media Table
9  – Linotech / SWK
10 – Wöhler Technische Bürsten GmbH
11 – DHG Vertriebs- und Consultinggesellschaft
12 – Global Information, Inc
13 – Fachagentur Nachwachsende Rohstoffe e.V. (FNR)
14 – i-Compology Corporation
15 – Biowert Industrie GmbH
16 – Trilion AB
17 – Poster session
18 – Match Making
19 – Fibres Recherche Développement (FRD) and CODEM
20 – J. Rettenmaier & Söhne GmbH + Co KG
21 – Innovation Award
    Biocomposite Award of the Year 2019
22 – Kompetenzzentrum Holz GmbH
23 – Innovation Award
    Biocomposite Award of the Year 2019
24 – OrganoClick
nova-Institute

nova-Institute is a private and independent research institute, founded in 1994; nova offers research and consultancy with a focus on bio-based and CO₂-based economy in the fields of food and feedstock, techno-economic evaluation, markets, sustainability, dissemination, B2B communication and policy. Every year, nova organises several large conferences on these topics; nova-Institute has 35 employees and an annual turnover of more than 3 million €.

nova-Institut GmbH
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Web www.nova-institut.eu
VENUE AND ENTRANCE FEE

Venue

Maternushaus
Kardinal-Frings-Str. 1–3
50668 Köln (Cologne)
Germany

Phone: +49 (0)221 1631-0
Keyword: nova
frontoffice@maternushaus.de
www.maternushaus.de

Registration fee

Two days (14–15 November 2019) 895 €
One day (1st day, 14 November 2019), incl. dinner buffet 590 €
One day (2nd day, 15 November 2019) 530 €
Two days (14–15 November 2019) – Students 350 €
* incl. dinner buffet

The conference will take place in the Maternussaal of the Maternushaus in Cologne (Germany). https://biocompositescc.com/venue
SIDE EVENTS:

Workshops

13 NOVEMBER 2019, 14 – 16 H, MATERNUSHAUS (ROOM: ADELHEID)

Wood your mind? – WoodCircus is looking for best practices in wood-based circular economy

The main goal of the WoodCircus project is to promote wood-based value chains as a key part of the bioeconomy in Europe. To achieve this, the project aims to identify case studies with outstanding good practices in the European wood sector. During the workshop we will discuss how to investigate case studies that belong to a circular or partly-circular wood value chain. We are looking forward to diverse input from all interested stakeholders.

Participation in the workshop is free, but registration is required.

Learn more about the project: https://woodcircus.eu

14 NOVEMBER 2019, 13–17 H, MATERNUSHAUS (ROOM: GEREON)

BioMonitor Expert Workshop

BioMonitor is an EU Horizon 2020 project which plans to establish a sustainable statistics and modelling framework for the bioeconomy. In this expert workshop, various options for data collection methodologies for establishing a European bioeconomy monitoring system are presented and put up for discussion and further refinement.

Given the lack of information and statistics on emerging innovative bio-based industries, the BioMonitor framework enables different stakeholders to monitor and measure the bioeconomy and its economic, environmental and social impacts in the EU and Member States. BioMonitor engages in a dialogue with bio-based stakeholders to identify relevant indicators and drivers of the bioeconomy.

Participation in the workshop is free, but registration is required.

Learn more about the project http://biomonitor.eu
PROGRAMME
1st Day, 14 November 2019

MARKETS & SUSTAINABLE CIRCULAR ECONOMY

10:00 Michael Carus
nova-Institut
Welcome and Introduction to the Conference

10:10 Asta Partanen
nova-Institut
Market Development, Trends and Consumer Perception of Biocomposites

10:30 Joanna Bogdanska
Third Eye Design Joanna Bogdanska
How to Sell Sustainability

10:50 Ana Ibáñez Garcia
AIJU – Technological Institute for Children’s Product and Leisure
Let’s Play to be More Sustainable

11:10 Michael Carus
nova-Institut
Market trends in the Bioeconomy, Bio- and CO₂-based Polymers and Renewable Carbon

11:30 Lisa Wikström
VTT Technical Research Centre of Finland
Biocomposites in Circular Economy

11:50 Discussion with all speakers of the Session

12:05 Lunch Break
PROGRAMME
1st Day, 14 November 2019

PACKAGING
CHAIRWOMAN
Asta Partanen
nova-Institut

13:35  Sebastian Meyer
Golden Compound
Sunflower Seed Shells: a Unique Rawmaterial for Biocomposites

13:55  Maija Pohjakallio
Sulapac
Sulapac Material Innovations that Leave no Microplastics Behind

14:15  Anselm Wohlfahrt
Institut für Holztechnologie Dresden
Mushroom-based Material as a Plastic Alternative

14:35  Thomas Kristiansen
Borregaard
Sprucing up Bio-composites

14:55  Céline Barth
BIO-LUTIONS
“BIO-LUTIONS – Renaturing the World of Materials”

15:15  Discussion with all speakers of the Session

15:30  Coffee Break
# PROGRAMME

1st Day, 14 November 2019

## PARALLEL SESSION: LATEST SCIENTIFIC RESEARCH ON BIOCOMPOSITES (ROOM: ADELHEID)

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<tr>
<th>Time</th>
<th>Speaker</th>
<th>Institution</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>13:35</td>
<td><strong>Arne Schirp</strong></td>
<td>Fraunhofer WKI</td>
<td>How Durable are Extruded Wood-polymer Composite (WPC) Sidelings with Fire-retardants? – Reaction-to-fire Performance of WPC before and after Artificial Weathering</td>
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<tr>
<td>13:55</td>
<td><strong>Jürgen Leßlhumer</strong></td>
<td>Kompetenzzentrum Holz</td>
<td>Weathering-resistant Powder Coating of WPC – Challenges and Results</td>
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<tr>
<td>14:15</td>
<td><strong>Victor Agbakoba</strong></td>
<td>Nelson Mandela University</td>
<td>3D Printable Bio-based Nanocomposites Filaments Containing Nanocellulose Derived from Forestry Waste Residues: Production and Analysis</td>
</tr>
<tr>
<td>14:35</td>
<td><strong>Henry Chinedu Obasi</strong></td>
<td>Federal University of Technology, Owerri</td>
<td>Exploring the Tensile and Physical Properties of Polypropylene Bio-composites Filled with Carbonised Coconut Shell Particles</td>
</tr>
<tr>
<td>14:55</td>
<td><strong>Hanaa Dahy</strong></td>
<td>BioMat at ITKE/University of Stuttgart</td>
<td>Re-thinking Sustainability in the Building Industry: BIO-Materialisation &amp; Digitalisation</td>
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<tr>
<td>15:15</td>
<td><strong>Discussion with all speakers of the Session</strong></td>
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<tr>
<td>15:30</td>
<td><strong>Coffee Break</strong></td>
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SUSTAINABILITY

CHAIRWOMAN
Inna Knelsen
ISCC System

16:00  Michael Carus
nova-Institut
Sustainability of Natural Fibres and Biocomposites

16:20  Hans Korte
DR. HANS KORTE Innovationsberatung
Holz & Fasern
How the Environment Benefits from a Wood-based Composite Nail Compared to a Steel Nail

16:40  Inna Knelsen
ISCC System
Sustainability Certification Solutions for Biocomposites with ISCC

17:00  Discussion with all speakers of the Session
## PROGRAMME

### 1st Day, 14 November 2019

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<td>17:15</td>
<td>Introduction and moderation by Michael Carus and Asta Partanen (nova-Institut)</td>
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<td>17:25</td>
<td>Levin Batschauer (Coperion) Processing of Bio-based and Biodegradable Products – Sustainable Compounding Co-rotating Twin Screw Extruders</td>
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<td>17:35</td>
<td>Christian Fischer (Bcomp) PowerRibs™ – Sustainable Lightweighting</td>
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<td>17:45</td>
<td>Sebastian Meyer (Golden Compound) HOMEcap – Home Compostable Coffee Capsules</td>
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<tr>
<td>17:55</td>
<td>Mårten Hellberg (OrganoClick) A Burial Coffin made with OrganoComp® and 3D Fibre Moulding</td>
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<tr>
<td>18:05</td>
<td>Erik Pijlman (KNN Cellulose) Recell® Biocomposite – The Competitive Alternative</td>
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<tr>
<td>18:15</td>
<td>Elaine Chow (Lingrove) Lingrove makes Ekoa® Veneer Plant Fibers and Plant Resins</td>
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<tr>
<td>18:25</td>
<td>Jeremiah Dutton (Trifilon) Trifilon BioLite – Market-tested Biocomposites made with Hemp Fibres</td>
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<td>18:35</td>
<td>Coming together Beer on tap</td>
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<tr>
<td>20:00</td>
<td>Dinner Buffet and Life Music</td>
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<tr>
<td>21:00</td>
<td>Innovation Award Ceremony with presentation by Peter von Hoffmann, Coperion</td>
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<tr>
<td>22:00</td>
<td>Traditional German Bowling</td>
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</table>
PROGRAMME
2nd Day, 15 November 2019

HIGH-PERFORMANCE APPLICATIONS AND LATEST INNOVATIONS

CHAIRMAN
Peter Ooms
Lorenz Kunststofftechnik

9:00  Kirsi Immonen
VTT Technical Research Centre of Finland
Improving the Performance of Wood Fibre Reinforced PLA Biocomposites

9:20  Martin Zahel
Papiertechnische Stiftung (PTS)
Functionalisation of Cellulosic Fibres via Reactive Extrusion

9:40  Nina Graupner
HSB – City University of Applied Sciences
Natural Fibre-reinforced Composites for Structural Applications Based on Novel Low Twisted Bast Fibre Yarns

10:00 Elizabeth Eaves
Avantium Renewable Polymers
Humins – A Novel and Versatile Raw Material for Bio-based, Sustainable Composites

10:20 Discussion with all speakers of the Session

10:35 Coffee Break

HIGH-PERFORMANCE APPLICATIONS AND LATEST INNOVATIONS

CHAIRMAN
Hans Korte
DR. HANS KORTE Innovationsberatung
Holz & Fasern

11:05 Werner Klusmeier
Yanfeng Automotive Interiors
Application of Natural Fibre Materials in the Interior of a Car – Status and Development

11:25 Daniel Lang
Cordenka
Dirk Punke
BÜFA Thermoplastic Composites
Cordenka Cellulose Fibres – Properties and Opportunities in Plastic Reinforcements
PROGRAMME
2nd Day, 15 November 2019

HIGH-PERFORMANCE APPLICATIONS AND LATEST INNOVATIONS

11:45  Per Brynildsen
Kebony
Kebony – A Sustainable Technology for Exterior Wood Products

12:05  Peter Ooms
Lorenz Kunststofftechnik
Newly Developed Thermosets with Natural Fibre Reinforcement Lower Production Costs

12:25  Discussion with all speakers of the Session

12:40  Lunch Break

WPC AND NFC GRANULATES FOR INJECTION MOULDING, EXTRUSION AND 3D PRINTING

CHAIRMAN
Arne Schirp
Frauenhofer WKI

14:10  Ralf Ponicki
UPM Biocomposites
UPM Formi; Successful Replacement of Fossil Based Plastics by Using Sustainable Formi Products Based on Cellulose Fibre

14:40  Dirk Zimmermann
Amorim
Biocomposite Innovation with Natural Cork – Natural Born Technology with AMORIM.

15:00  Jeremiah Dutton
Trifilon
BioLite, This Swedish Company is Calling it a ‘Second Generation Biocomposite

15:35  Coffee Break
WPC AND NFC GRANULATES FOR INJECTION MOULDING, EXTRUSION AND 3D PRINTING

CHAIRMAN
Jeremiah Dutton
Trifilon

16:05 Florian Graichen
Scion
Biobased Composites – the Good – the Bad and the Ugly – Lessons Learned over the last 15 Years

16:25 Andreas Haider
Kompetenzzentrum Holz
PLA/PHA Bio-based Blends for Injection Moulding and 3D Printing Process

16:45 Amélie Tribot
Université Clermont Auvergne, CNRS
Valorization of Kraft Lignin and Corn Cob by-Products into PLA-Matrix based Biocomposites: Characterisation of Injected-moulded Specimens

17:05 Marc Thometschek
Beologic
Beograde, Biodegradable Compounds with a Matching Look

17:25 Discussion with all speakers of the Session

17:40 Final come together
Six candidates are nominated for the innovation award “Biocomposite of the Year 2019” – Biocomposites are highly versatile: the choice is yours!

For the seventh year in a row, the innovation award “Biocomposite of the Year” will be granted to producers and inventors of innovative, new applications for biocomposites – Natural Fibre Composites (NFC) and Wood-Plastic Composites (WPC).

The winners of the innovation award “Biocomposite of the Year 2019” will be chosen at the “8th Biocomposites Conference Cologne”, in Cologne. Out of 15 applications, six new materials and products have been nominated for the innovation award by the conference advisory board. After a ten minutes presentation at the conference from each of the six candidates, the three winners will be elected by the participants and honoured with the innovation award, sponsored by Coperion GmbH, at the festive dinner buffet.
The “Top 6” candidates

**Bcomp**

**PowerRibs™ – Sustainable Lightweighting**
The Swiss company Bcomp has developed proprietary light-weighting solutions for high performance applications by applying the latest composites knowledge to natural fibres. Thanks to powerRibs™ technology, a reinforcing grid inspired by the thin veins in leaves that provides maximum stiffness at minimum weight, natural fibres can achieve the performance of carbon fibres in a motorsport body and thus replace them. The result is a 75% lower CO₂ footprint, 30% lower costs and improved safety without toxic dust and sharp shattering, as well as viable end-of-life options. The powerRibs™ are also used to make automotive interior panels up to 40% lighter.

More information: www.bcomp.ch

**Golden Compound**

**HOMEcap – Home Compostable Coffee Capsules**
HOMEcap is the world’s first and only home compostable capsule successfully introduced in the market that is ‘OK compost HOME’ certified. Biodegradation in home compost avoids considerable waste streams. The capsule was successfully launched on the market in the spring of this year. It is made from a unique compound comprising PTTMCCs PBS and PBSA mixed with sunflower seed shells and inorganic fillers. It comes with a paper and cellulose based lid, sealable to the capsule without additional glue, home compostable as well. The material composition results in low oxygen transmission rates, which allows to avoid additional barrier packaging and is therefore saving waste. A VDI 4605 sustainability assessment showed that this capsule outperforms current state of the art capsules, like deep-drawn PP EVOH multilayer capsules, in terms of sustainability.

More information: www.golden-compound.com

**KNN Cellulose**

**Recell® Biocomposite – The Competitive Alternative**
Recell® biocomposite is a granulate at competitive pricing and with low environmental impact. The biocomposite is made from recovered toilet paper (a tertiary cellulose source) mixed with a variety of polymers like bio-resins, PLA or PHA. So, the cellulose-based product therefore fits ideally in the circular economy. The granulate is suitable for standard injection moulding and extrusion operations. Current applications are e.g. flowerpots, cladding, fencing, decking and crates. The product taking part in the competition is a picnic table produced by EcoDeck. The Recell® cellulose fibres are efficiently produced from Sewage Treatment Plants (STPs) with Cellvation® technology. STPs thereby benefit from lower operational cost, an increase in processing capacity and the fibres are reused instead of incinerated, benefiting their environmental impact dramatically.

More information: www.recell.eu
Lingrove Ekoa® Veneer
Lingrove builds high-performance veneers for composites – such as the Ekoa® product line with flax fibres and vegetable resins. The veneer has a higher stiffness/weight ratio than steel, is lighter than carbon fibre and has the look of vintage wood. Accordingly, Luttwak guitars made of Ekoa® look like wood, but are not made of wood – they are even better than wood. Lingrove is currently scaling veneer and panel production to meet demand from commercial and residential real estate markets.
More information: www.lingrove.com

OrganoClick
A Burial Coffin made with OrganoComp® and 3D Fibre Moulding
A burial coffin Saga made of Swedish company OrganoClick’s biocomposite, was launched in May 2019. OrganoComp® is a patented, 100% bio-based material made of Swedish wood fibres. The binder is based on biopolymers from side streams in the food and pulp industry, such as orange peels and shrimp shells. OrganoComp® is produced with a patented production technology for 3D fibre moulding and is replacing particle boards used in burial coffins that contain synthetic glues. The strength of OrganoComp® enables 50% raw material reduction of the coffin while maintaining the appearance of traditional coffins. OrganoComp® is also used to replace fossil-based plastics and other applications include containers, acoustic panels, and furniture.
More information: www.organoclick.com

Trifilon
Trifilon BioLite – Market-tested biocomposites made with Hemp Fibres
With BioLite, Trifilon offers a green alternative to plastics. BioLite is a polypropylene reinforced up to 30% hemp fibres. Trifilon BioLite is a hemp fibre, polypropylene composite that is delivered in granulates for injection moulding machines. Hemp is one of the strongest natural fibres in the world, which makes BioLite products strong, light and durable. The use of hemp fibres in BioLite optimises the material properties for many applications – The DOMETIC COOLFUN SC 30B thermoelectric cooler is just one example. This technology gives manufacturers the opportunity to make sensible use of renewable raw materials, and an excellent one is hemp. The cooler housing is the world’s first to be manufactured with biocomposite material.
More information: www.trifilon.com
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Science Review
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www.renewablematter.eu

Rosflaxhemp
www.roslaxhemp.ru

Plasticker
www.plasticker.de

www.biocompositescc.com

Find the real alternative to plastics
"The bioplastics industry is becoming more present in the children’s sector, from toys to childcare products."

"One t cork granulate has a negative carbon footprint of -73 t CO₂!"

"Humins are a novel plant-based raw material, capable of many applications due to their multiple functionalities … Join us to learn more about how sustainable “all-green” biocomposites with a range of mechanical properties can be made using this 100% biobased thermoset resin."

"Thomas Kristiansen from Borregaard will talk about how you can spruce up bio-composites with ultra-pure cellulose."

"Processing of bio-based and biodegradable products – Sustainable compounding with co-rotating twin-extruders."

"Tough by nature: Improve the impact strength with Cordenka Rayon."

"To use wood-polymer composites (WPC) as sidings (facades) for buildings, it is important to determine how durable fire-retardant treatments for WPC are. We investigated the reaction-to-fire performance of co-extruded WPC before and after artificial weathering, and will show our latest results at the conference."

"Mycelium Materials are a competitive alternative to polystyrene packaging, insulation materials and petrochemical foams and enable designers, architects and engineers to integrate a new, sustainable, natural, completely biodegradable material into their projects."

"Tough by nature: Improve the impact strength with Cordenka Rayon."

"Bio-based furan polymers – a route to wood enhancement developed industrially by Kebony."

"Reduce to the max."

"Sustainable solutions with circular raw materials for the making of BMC/SMC/CIC thermosets."
“3D printable bio-nanocomposites – the astute eco-friendly alternative.”

“Omya “Stabifiller” to boost performance of biopolymer Biocomposites.”

“The ability to simplify means to eliminate the unnecessary so that the necessary may speak.”

“Sulapac wood composites leave no trace behind – they are a lot like traditional plastic, but biodegradable and microplastic-free and suitable for several application such as packaging, straws and hangers.”

“Reports clearly show that consumers care about environmental factor in their path to purchase, but there is a big gap between what people claim and how they behave when it comes to buying sustainable products. So how to sell sustainability?”

“How can one of nature’s toughest fibers help make products are stronger, lighter and greener?”

“Within this study, injected-molded PLA-based biocomposites were characterized, aiming to evaluate the influence of Kraft lignin and corn cobs by-products on biocomposites properties.”

“The presentation is about latest product innovations of UPM Formi Biocomposites, on the example of realized 3D printing, extrusion and injection molding applications.”

“The presentation highlights the most significant improvements and important factors affecting the performance of wood fibre reinforced poly(lactic acid) biocomposites, thus broadening their use in industrial products.”

“The presentation gives examples of different biocomposite solutions and the possible routes in the circular economy.”

“I want to give an overview about the use and the future of natural fibers in the interior of cars, which are in use for door panels and door panel inserts.”

Nelson Mandela University
Victoe Agbakoba

Omya International
Franck Baradel

Papiertechnische Stiftung
Martin Zahel

Sulapac
Maija Pohjakallio

Third Eye Design
Joanna Bogdanska
Joanna Bogdanska

Trifilon
Jeremiah Dutton

Université Clermont Auvergne,
CNRS
Amélie Tribot

UPM
Ralf Ponicki

VTT Technical Research Centre of Finland Ltd
Heidi Peltola

Lisa Wikström

Yanfeng
Werner Klusmeyer
230 participants from 25 countries and 25 exhibitors at the conference 2017

Attendees of the Conference 2017

- 48% SME & Startup
- 21% Larger companies
- 24% Academia
- 7% Others

Our Conference – a Guarantee for Satisfied Customers

- Networking Success: 79% Good & Very Good
- Venue Satisfaction: 90% Good & Very Good
- Overall Satisfaction: 92% Good & Very Good

Networks of nova-Institute

- Bio-based News: news.bio-based.eu (Visitors per Month: 160,000)
- International Directory for Bio-based Businesses: bio-based.eu/iBIB (Downloads per Year: 50,000)
- LinkedIn: Business Networks (Contacts: 10,500)
- XING: Industry Contacts (Contacts: 2,000)
- Twitter: Mailing list with 17 topics to choose from (subscribe at bio-based.eu/email)
UNDERSTANDING YOUR CUSTOMER
In-depth psychological market research on bio-based products

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140,000 t of biocomposite granulates are available for greening in Europe. World’s largest biocomposites conference in November in Cologne (Germany).

Authors: Michael Carus and Asta Partanen

Your customers today expect you to reduce plastics in your products. But this is difficult without compromising performance and processability. Biocomposites can be the solution: 30 to 80% of plastics are replaced by biogenic fillers such as wood flour or cork, or by natural fibres for reinforcement. The advantage is that these granulates can be processed on your existing machines without major modifications, whether by injection moulding, extrusion or additive production (3D printing). At the same time, the products differ from normal plastic products in their very pleasant feel and unusual appearance. Also, mechanical properties change, the products become stiffer and more tensile and bend-resistant due to the natural fibres. nova-Institute has now published a list of all European producers and suppliers of biocomposite granulates.

The list includes 35 producers from nine different countries. The amount of granulates produced and sold in 2018 was almost 140,000 t. This is a considerable increase compared to previous years and double-digit growth is expected also in the next few years.
**Major producers and suppliers of wood and natural fibre filled and reinforced plastic granulates with their production quantities in Europe in 2018**

<table>
<thead>
<tr>
<th>Granulate Producer</th>
<th>Country</th>
<th>Polymers</th>
<th>Fibres</th>
<th>Production range 2018 in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMORIM</td>
<td>PT</td>
<td>PP, TPE/TPS, Rubber</td>
<td>Cork</td>
<td>50,000 – 100,000</td>
</tr>
<tr>
<td>Beologic</td>
<td>BE/AT</td>
<td>PP, ABS, PBS, PC, PE, PHA, PLA, PMMA, PS, PVC, SAN, TPE</td>
<td>Wood and natural fibres and others</td>
<td>10,000 – 20,000</td>
</tr>
<tr>
<td>Advanced Compounding</td>
<td>DE</td>
<td>PP, PA, PE, Biopolymers</td>
<td>Wide range of natural fibres, pine</td>
<td>5,000 – 10,000</td>
</tr>
<tr>
<td>Tecnaro</td>
<td>DE</td>
<td>PP, PBAT, PBS, PE, PLA, Lignin</td>
<td>Wood and natural fibres</td>
<td>5,000 – 10,000</td>
</tr>
<tr>
<td>Actiplast</td>
<td>FR</td>
<td>PVC, rPVC</td>
<td>Wood, natural fibres</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>AOMajoris</td>
<td>FR</td>
<td>PP, Biopolymers</td>
<td>Wood and natural fibres and others</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>APM</td>
<td>FR</td>
<td>PP, rPP, PBS, Biopolymers, ABS, PVC, TPE</td>
<td>Natural fibres</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>Golden Compound</td>
<td>DE</td>
<td>PP, PBS, PBSA</td>
<td>Fibres from sun flower shells</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>Jelu Werke</td>
<td>DE</td>
<td>PP, Biopolymers</td>
<td>Wood and natural fibres and others</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>Naftex</td>
<td>DE</td>
<td>PA, PP, PLA, Biopolymers</td>
<td>Wood, bamboo, natural fibres</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>PlasticWOOD</td>
<td>IT</td>
<td>PP, Biopolymers</td>
<td>Wood</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>Stora Enso</td>
<td>SE/FI</td>
<td>PP, rPP, PS, Biopolymers</td>
<td>Wood and cellulose fibres</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>UPM</td>
<td>FI</td>
<td>PP, Biopolymers</td>
<td>Wood and cellulose fibres</td>
<td>1,000 – 5,000</td>
</tr>
<tr>
<td>Addiplast</td>
<td>FR</td>
<td>PP</td>
<td>Wood and natural fibres, cellulose fibres</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>Biowert</td>
<td>DE</td>
<td>PP, PE, PLA</td>
<td>Grass fibres, flax</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>FKuR</td>
<td>DE</td>
<td>PP, Bio-PE, Bio-PET, PBS, PHA, PLA</td>
<td>Wood, bamboo, cork, natural fibres</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>Hexpol</td>
<td>SE/BE</td>
<td>TPE</td>
<td>Corn cob, wood, rice husks, straw</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>Rhenoflex</td>
<td>DE</td>
<td>PP, Polyester, PLA, PP, TPU, EVA</td>
<td>Cork</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>Transmare</td>
<td>NL</td>
<td>PP, PE, PLA</td>
<td>Wood, flax and hemp fibres</td>
<td>500 – 1,000</td>
</tr>
<tr>
<td>Several small producers (see second table)</td>
<td></td>
<td></td>
<td></td>
<td>about 3,500</td>
</tr>
<tr>
<td><strong>Total (EU)</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>140,000</strong></td>
</tr>
</tbody>
</table>

*Note: If your company is missing in the list or ranked incorrectly, please contact Asta Partanen (asta.partanen@nova-institut.de).*
What are the reasons for this success?

For one thing, there has never been a greater demand for alternatives to classic plastic products. For another thing, larger quantities of high quality granulates are available on the market for the first time. The manufacturers – often active for more than 10 years already – have used the time to further optimize their granulates. The larger volumes in turn allow for lower prices. Never before has it been so inexpensive to make your production greener without compromising on performance and processability.

Today, there are biocomposites for virtually every application: consumer goods, toys, handles and shoes, façade and terrace elements, floors, automotive interiors, and even space applications.

The Portuguese cork manufacturer AMORIM is the largest producer of such granulates with over 50,000 tons per year. Nearly everyone has products such as shoes, handles for sports equipment or bathroom floors, which are made from those cork materials. Next comes Beologic from Belgium (>10,000 t/year) and Advanced Compounding and Tecnaro from Germany with over 5,000 t/year each. These three companies offer a wide range of polymers as well as a wide variety of wood and natural fibres as fillers and reinforcers. Even recycled toilet paper (KNN Cellulose) or blue jeans fibres or wine residues (Beologic) can now be processed into plastics. In the meantime, UPM (Finland), Sappi (South Africa) and Stora Enso (Sweden/Finland), large companies from the wood-based products and pulp sectors, have also entered into the production of biocomposites. The two tables give a comprehensive overview of the 35 biocomposite granulate manufacturers in Europe.

Among the biocomposite granulates, cork granulates account for the largest share with approx. 60%. Wood and cellulose fibre granulates account for slightly more than 25% and natural fibre granulates for 15%.
The use of biogenic fillers and reinforcing materials greatly reduces the proportion of fossil carbon in the granulate and increases the proportion of renewable carbon accordingly. This makes it possible to leave more fossil resources in the ground and consequently to protect the climate. If one wants to have even more renewable resources in the product, bio-based and/or recycled plastics can be used. This makes it possible to produce materials that completely dispense with fossil carbon and are based purely on renewable carbon. Most biocomposite granulate producers therefore also offer different bio-based plastics as well as recycled PP and PE.

### Further biocomposite granulate producers and suppliers

<table>
<thead>
<tr>
<th>Granulate Producer</th>
<th>Country</th>
<th>Polymers</th>
<th>Fibres</th>
<th>Production range 2018 in tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqvacomp</td>
<td>FI</td>
<td>PP, PBS, Biopolymers</td>
<td>Cellulose fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Artplast</td>
<td>PL</td>
<td>PP, PE</td>
<td>Wood</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Biofibre</td>
<td>DE</td>
<td>PP, PBAT, PBS, PE, PLA, rPP</td>
<td>Wood, natural fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Fasal</td>
<td>AT</td>
<td>PP, ABS, Biopolymers</td>
<td>Wood, cellulose fibres, paper, natural fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Fortum</td>
<td>FI</td>
<td>PP, PE, rPP, rPE</td>
<td>Cellulose</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>GreenGran</td>
<td>NL</td>
<td>PP, Biopolymers</td>
<td>Natural fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>HempFiax</td>
<td>NL</td>
<td>PP, PLA</td>
<td>Natural fibres, wood, cellulose, agricultural waste fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>KNN Cellulose</td>
<td>NL</td>
<td>PP, PE, PHA, PHB, PLA</td>
<td>Cellulose</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Lactips</td>
<td>FR</td>
<td>Casein</td>
<td>Wood, natural fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Linotech</td>
<td>DE</td>
<td>PP, PLA</td>
<td>Wood and natural fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>MAIP</td>
<td>IT</td>
<td>PHP, PP</td>
<td>Wood, sisal</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>PC Paper Compound</td>
<td>DE</td>
<td>Biopolymers</td>
<td>Paper fibre</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>PolyOne</td>
<td>USA/EU</td>
<td>PP</td>
<td>Wood, MDF fibres</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Sappi</td>
<td>SA/DE</td>
<td>PP, PBS, PLA</td>
<td>Cellulose</td>
<td>&lt; 500</td>
</tr>
<tr>
<td>Trifillon</td>
<td>SE</td>
<td>PP</td>
<td>Hemp and flax fibres</td>
<td>&lt; 500</td>
</tr>
</tbody>
</table>

**Total EU** 3,500

*Created within the framework of the project „WeRümA – Material development on the basis of beet chips for market-relevant applications“*. This project is funded by the European Union and the state of North Rhine-Westphalia.

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\includegraphics[width=0.5\textwidth]{grass_hanger}
\end{center}

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