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CONTACT US:

EDITOR:
Luke Upton
Luke@BioBasedWorldNews.com
@Bio_BasedWorld

MANAGING DIRECTOR :
Alex Williamson
Alex@BioBasedWorldNews.com
@BioBasedMan

MARKETING MANAGER:
Stephen Scott
Stephen@BioBasedWorldNews.com

CONTENT MANAGER
Dave Songer
Dave@BioBasedWorldNews.com

SALES MANAGER:
Liam Clancy
Liam@BioBasedWorldNews.com

Web:
www.biobasedworldnews.com

LinkedIn:
https://www.linkedin.com/groups/8429881

Facebook:
www.facebook.com/biobasedworldnews

Bio-Based World News
3rd Floor, Petersham House,
57a Hatton Garden
London EC1N 8JG

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"... I DON'T THINK THE PERFECT EXISTS IN HUMAN SOCIETY. WE DON'T AIM FOR THE PERFECT, WE AIM FOR THE GOOD, WHICH IS POSSIBLE IN HUMAN SOCIETY."

We open this edition of the Quarterly, with a line from a recent fascinating but unfortunately off the the record discussion I had with a major financier within the sustainable space. But why this line? Isn't perfection something to be pursued? Yes but in the bio-based industry demanding it, or seeking it can often be a hindrance to progress.

The emerging bio-based industry is an exciting, innovative and diverse one but it is still, certain bio-fuels aside, largely in its infancy. Seeking a perfect product or chemical that delivers quality, a low price, no environmental impact and makes a profit for its manufacturer is too big a challenge. Each of these aspects can be executed individually, but ensuring all four are achieved 100% is beyond most of us at the moment. Compromises are made and will be continued to be made, hopefully not forever, but certainly in the immediate future.

One of the challenges for large companies when they engage with bio-based is they put their head above the parapet named sustainability and can as a result attract criticism for all and any aspects of their work. I remember being at one conference, where a multinational was presenting a bio-based development but in the question and answer session were asked about skin whitening products sold in Asia. An important issue yes, but not relevant to our sector, unless of course you are seeking perfection.

To use just one example, take DuPont's biopolymer Sorona that's used in residential carpeting and car mats. It includes 37 percent renewable bio-based ingredients, uses 30 percent less energy and releases 63 percent fewer greenhouse gas emissions compared to similar materials and is completely renewable and recyclable. Yet there are still non-renewable bio-based ingredients, it still uses energy and emits greenhouse gas emissions in manufacture. But it is a positive development, it is better than the traditional product and those numbers will surely only improve.

This is the case with the vast majority of products and chemicals produced within the bio-based sector. In displacing fossil resources, bio-based chemicals and products help make our world more sustainable. But bio-based does not equal total sustainability.

The critics need to realise that perfection for most of the sector is still some way down the path, and there's no harm in not yet reaching it.

Thank you for reading this edition and a special hello if you are currently in San Diego at Bio-Based Live Americas holding a special printed edition in your hands. October will see us celebrate our second birthday and a huge thank you to each and every one of you for your help and support in this time. We've got some very exciting plans for the next year, so look forward to you a big part of it!

One final note, this Summer has seen us say goodbye to Emily O'Dowd who has departed for postgraduate study but said welcomed Dave Songer (@BioBasedDave) to the team, both of whom contribute to this edition.

A big thanks also to Arctic Biomaterials, TOTAL, TIPA and Iowa Economic Development Authority for their support with this edition, your support is as always greatly appreciated.

Regards and thanks for the continued support,

Luke Upton

Luke Upton
Co-Founder and Editor, Bio-Based World Quarterly / Bio-Based World News
Luke@BioBasedWorldNews.com

HelioBioSys patents organism seven-times more effective than algae for biofuel.

A biochemical company that uses the earth's resources to create biofuel has gained sole rights to develop a particular stain of an algae-like organism after securing a patent for its use. Through the application of a process that combines air, seawater and sunlight, HelioBioSys Inc. produces a range of fermentable sugars that are particularly suitable for the production of biofuel, owing to its high sugar content.

HelioBioSys Inc. is working in conjunction with Sandia National (Sandia), a wholly owned science and technology subsidiary of Honeywell International, to explore the feasibility of successfully farming the three single-celled, algae-like cyanobacteria on a large scale. HelioBioSys uses a mixed population of carefully selected non-genetically modified marine cyanobacteria that obtain their energy from the sun, and carbon and nitrogen from the atmosphere and which can be up to seven-times more effective than algae for the production of biofuel.

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Norway sees the biggest investment for Blue Crude yet.

Sunfire is a German developer of regenerative energy from a range of sources including wind, sea for whenever and wherever it is needed. The mass production of the environmentally friendly synthetic crude oil substitute Blue Crude becomes reality: from 2020 the first plant shall start its operation in the industrial park Heroya in Norway. The fuel is created from carbon dioxide, water and electricity with a process powered by renewable energy sources. Blue crude, also known as e-diesel is considered to be a carbon neutral fuel which does not extract new carbon. The synthetic Blue Crude consists of various hydrocarbons – making it comparable with crude oil. Refineries can use it as raw material for waxes, but also petrol, diesel, kerosene and even rocket fuel. Nordic Blue Crude AS, Sunfire, Climeworks, EDL Anlagenbau and additional partners have already started with the engineering.

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3.5 billion items of rubbish saved from landfill by TerraCycle and UPS.

Hundreds of thousands of tonnes of waste that would otherwise be disposed of in landfill has instead been recycled, thanks to the help of two international companies. TerraCycle, which specialises in recycling hard-to-recycle waste such as toothpaste tubes and crisp packets, and global giant UPS, have teamed up to give 3.5 billion items of waste a new life, turning them into products including rubbish bins and park benches. The initiative has been running since 2012, in which time it has diverted more than 18,000 tonnes of waste from landfill.

"UPS is helping TerraCycle transport what was once considered trash or unrecyclable materials," said Patrick Browne, Director of Global Sustainability at UPS.

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Plans to scale up enzymatic biorecycling could lead to “a true revolution in the world of PET.”

A new collaboration in the industry has been made which will produce virgin PET from plastic waste. The companies behind the innovation are Carbios, a green chemistry company specialising in enzymatic bioprocesses, and TechnipFMC, renowned for oil and gas projects. This contract will support Carbios with the scale up of its process to ensure industrial competitiveness during this development. The French based company have already developed two industrial bioprocesses able to biodegrade and recycle polymers. These have been recognised as breakthroughs in the industry in their ability to leverage the highly specific properties of enzymes to optimise the performances and the life cycle of plastic and textile materials.

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EU devise three year packaging initiative to improve “end life disposal.”

To many, the circular economy is still a translucent term which has no real meaning. But by definition it looks beyond our current disposal and extraction and concentrates on restoring and regenerating designs. This is a concept which the EU are keen to promote and transform our plastic waste into a more sustainable, re-usable form of packaging. By doing so, leading us one step closer to the circular economy. The start of this three year project was launched in May and will call upon a 22 partner consortium led by the Zaragoza-based Research Centre for Energy Resources and Consumption (CIRCE). Participants will carry out three large scale demonstrations that will involve parties across the value chain including consumers, plastic suppliers, converters and retailers. It is hoped this initiative will create, test and validate alternative bio-based and recyclable plastics to manufacture bottles, jars, trays, films and multilayer packaging.

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Spanish startup Bios buries competition with urnings potential.

“The idea of the tree continuing life is important, but it’s also about the process of planting and caring as way of honouring someone you love, and this technology facilitates that.”

For a little while now, the Internet of Things applied to everyday products has revolutionised everything from checking energy readings to making toast but, as a Spanish start-up has now proved, it can also be used for a form of after-life care. The Barcelona based company has developed a biodegradable urn that can be filled with a loved one’s ashes after they have been cremated, using an innovative design that allows the remains to mix with the plant after it has germinated – when the ashes are lower in acids that could harm the roots.

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BIO-BASED STEPS UP WITH THE FIRST-EVER MOULDED SHOE MADE FROM ALGAE.

By Emily O'Dowd
Bio-Based World News

"THEY'RE LIKE CROCS," SAYS CLARK, "BUT YOU CAN RUN A MARATHON IN THEM."

The bio-based world never fails to impress or surprise us. After several generations of experience in the footwear industry, Galahad Clark whose family owns the famous shoe brand, Clark's, decided it was time to take a risk. With a passion for footwear, Clark created his very own shoe designs made from algae. In 2014 Vivobarefoot was launched to provide an alternative 'for people who don't want to wear shoes.' The thin soles are designed for running and hitting trials so that every nerve in your foot is connected to the ground that you are running on.

The harvested algae biomass is dewatered and dried, polymerised into pellets, then combined with other compounds to ultimately form a flexible, pliable foam. Depending on the formulation and intended application, the algae makes up anywhere from 15 to 60 percent of the finished product, which is said to be similar in quality to traditional petroleum-derived foam. They're flexible enough to scrunch up into a ball, with a thin white sole that's topped by a perforated upper. Built for use on dry land, rivers and oceans, the holes are designed to flush water out.

The UK based manufacturer Vivobarefoot (@VIVOBAREFOOT) is collaborating with the San Diego based Bloom Foam to create the updated Ultra III version. Every pair will help re-circulate 57 gallons of filtered water back into natural habitats, and prevent the equivalent of 40 balloons full of CO2 being released into the Earth's atmosphere. The Bloom Foam is created by harvesting algal biomass from freshwater sources at high risk of algal bloom.

Excess algae in lakes and ponds can choke marine life or threaten the supply of drinkable water. It's not a small problem: Last year, Florida declared a state of emergency over the plant that is suffocating its coastline. Bloom visits waterways with high algal bloom, collects the algae and uses its moisture to create the foamlike material used in Vivobarefoot's shoes.

By removing the Algae from marine-systems and replacing the ecologically harmful petrol-based materials used for so many modern products, Bloom Foam is able to directly tackle the problem.

Bloom co-founder Rob Falken explained how the harvesting process works. "We work with any type of blue-green algae," he said. "Blue-green algae is a polymer, so we basically vacuum it off a lake and dry it using our continuous solar drying process. Solar drying produces a charcoal-like flake, which we pulverize into powder. Once we have a pure powder—ours has no toxins—we make it into what is essentially a pellet, which we injection-mold into a panel and make a fiber out of it."

"They're like Crocs, but you can run a marathon in them... Ultimately, billions of pairs of shoes could be made with this material," concludes Clark. "There's that much algae in the world." ■

CORBION COMES TO THE RESCUE OF TERRAVIA WITH $20M BID.

By Dave Songer, Bio-Based World News

"THE ACQUISITION OF TERRAVIA'S MICROALGAE PLATFORM WOULD EXTEND CORBION'S PRODUCTS PORTFOLIO INTO ALGAE-BASED FATTY ACIDS AND PROTEINS, WHILE LEVERAGING CORBION'S EXTENSIVE FERMENTATION AND DOWNSTREAM PROCESSING CAPABILITIES."

In a bid to extend its product portfolio, Corbion has made moves to purchase TerraVia a week after the algae products specialist filed for bankruptcy. Corbion, the 100-year old company that develops lactic acid and lactic acid derivatives, initiated the asset and purchase agreement for close to $20m for the struggling TerraVia, though the figure is expected to rise due to Corbion having made the order in anticipation of a stronger candidate coming forward – known as a stalking horse agreement.

As part of the bankruptcy, the Corbion purchase agreement will form a primary bid for all of TerraVia's assets in an auction that is expected to be completed within 90 days. A company spokesperson said: "The acquisition of TerraVia's microalgae platform would extend Corbion's products portfolio into algae-based fatty acids and proteins, while leveraging Corbion's extensive fermentation and downstream processing capabilities."

Three months prior to its bankruptcy, TerraVia (formerly Solazyme before changing its name in March 2016) received a clean bill of health from the US Food and Drug Agency for its algae butter, a quick melting oil alternative that the company said "maintains quality, taste and functionality", but which also meets its stringent requirements for sustainable sourcing.

The news of Corbion's purchase agreement comes in a month that the company announced a €2m slip in sales for its frozen dough business to €336m, compared to the same period in the previous year. Despite this, a rise in total sales were felt across the company, increasing net profits to €461m.

In further positive news for Corbion, which in July joined RE100, The Climate Group campaign that commits influential companies to 100% renewable power, the company developed an antimicrobial that improves the food safety and shelf life of packaged meat without compromising quality.

Speaking to FoodIngredientsFirst, David Charest, vice president meat industry at Corbion said the company was confident of the effectiveness of Verdad Opti Powder N70 after being developed with input from existing customers. "Verdad Opti Powder N70, is the most effective, clean-label powder antimicrobial. Customers need to consider taste, texture and performance in addition to shelf life and food safety and we have optimized this clean label solution to achieve that." ■

PROCTER & GAMBLE SHARE FRAGRANCE INGREDIENTS AS CONSUMERS PUSH FOR GREATER TRANSPARENCY.

By Luke Upton
Bio-Based World News

"WE WANT PEOPLE TO FEEL GREAT ABOUT PUTTING OUR PRODUCTS IN THEIR SHOPPING BASKETS. WE'RE PROVID-ING MORE INFORMATION ABOUT FRAGRANCE INGREDIENTS BECAUSE WE BELIEVE THIS WILL BUILD EVEN GREATER TRUST IN THE QUALITY AND SAFETY OF ALL OF OUR PRODUCTS."

For decades, federal regulations in the United States allowed companies use the word "fragrance" on soap, shampoo, skincare and other personal care product labels to hide the identity of multiple chemicals, many of them linked to allergies or other health effects. For the most part, personal care product companies and fragrance manufacturers have resisted calls for disclosure, and "fragrance" has remained a black box for hundreds of chemicals in thousands of everyday products.

But this is now changing, with consumer goods giant Procter & Gamble announcing on August 31st that it will share online all fragrance ingredients down to 0.01 percent for its entire product portfolio in the U.S. and Canada by the end of 2019, which includes more than 2000 fragranced products. They follow Unilever who announced a similar openness earlier in the year.

P&G's latest announcement builds on previous steps the company has taken over the past five years in recognition of consumers' growing interest in knowing what ingredients are in the products they use. P&G already shares its full fragrance palette as well as a list of ingredients not used in fragrances. The additional level of detail on product fragrance ingredients announced today will offer consumers more reliable information to help choose what's best for them and their families.

"Our goal is to give people information that is clear, reliable and accessible. This is another step in our sustainability journey toward enabling consumers to make informed choices," said Kathy Fish, Chief Technology Officer at Procter & Gamble. "We want people to feel great about putting our products in their shopping baskets. We're providing more information about fragrance ingredients because we believe this will build even greater trust in the quality and safety of all of our products."

P&G will go a step beyond listing fragrance ingredients to include where else these ingredients can be found, such as everyday fruits, foods, and other products. P&G is providing some

Just some of the Procter & Gamble product range

initial examples of what the expanded fragrance disclosures include on selected Tide, Febreze, Herbal Essences and Olay products. P&G will first focus this effort on its fabric, home and beauty care products where there is the greatest consumer interest and will expand across additional product categories and geographies over time.

"EWG applauds Procter & Gamble's ground-breaking decision to dramatically improve transparency about its fragrance ingredients across all of its brands. The policy announced today not only demonstrates P&G's deep commitment to providing consumers everywhere with the information they increasingly demand, it also marks a turning point for the entire consumer product industry," said Environmental Working Group President Ken Cook. "EWG has long considered transparency a major driving force in consumer product markets. The example set by Febreze, Tide, Olay and Herbal Essences today will without question encourage greater ingredient transparency efforts throughout the industry, providing consumers with the information they want and need to make better, healthier choices for themselves and their families."

By making this more detailed information available to anyone who wants it, P&G is building on its history of developing products consumers can trust and feel confident using.

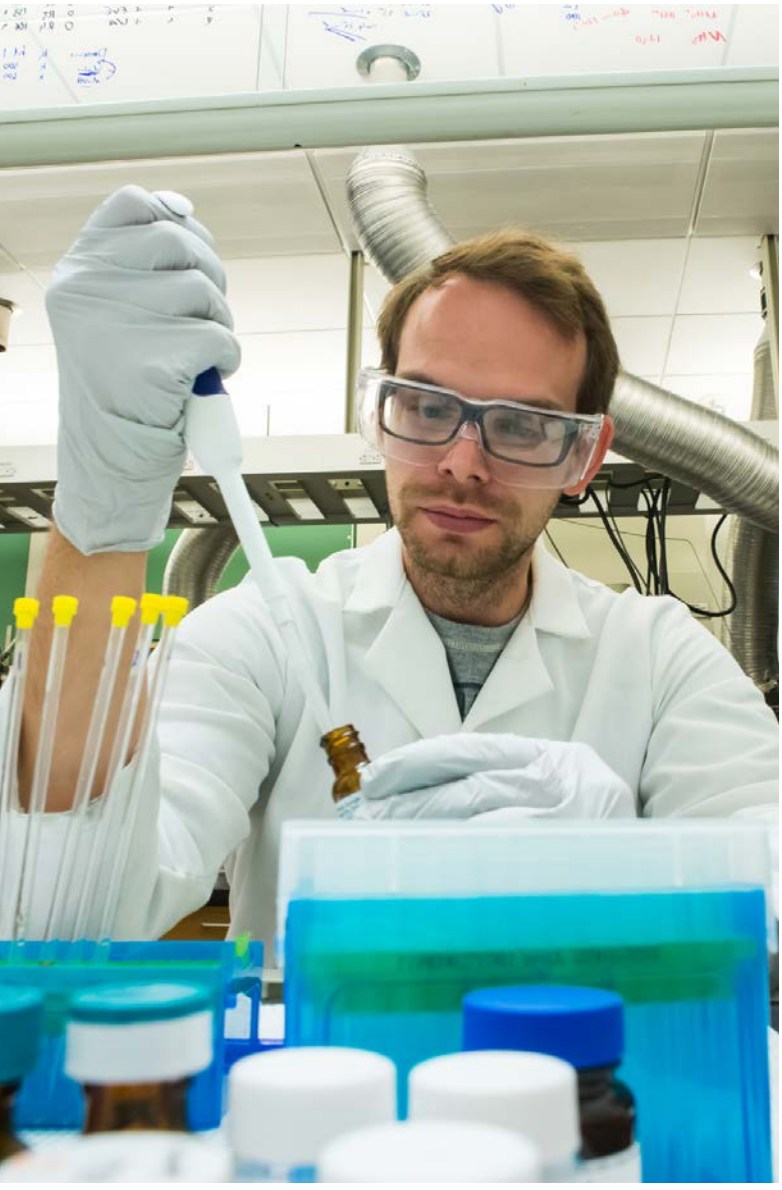
In February, fellow industry giant Unilever announced a new initiative to provide detailed information on fragrance ingredients for all products in its multibillion-dollar portfolio of personal care brands, including Dove, Noxzema, Axe/Lynx and many more. The initiative has been launched in the US, UK, Netherlands and Germany with more European countries due to come online soon.

Unilever will label fragrance allergens to European Union standards across its full range of personal care products on the U.S. market, where such disclosures are not currently required by the government. The driving reason for the disclosures, company officials said, is their commitment to being as transparent as possible. ■

"OUR GOAL IS TO GIVE PEOPLE INFORMATION THAT IS CLEAR, RELIABLE AND ACCESSIBLE. THIS IS ANOTHER STEP IN OUR SUSTAINABILITY JOURNEY TOWARD ENABLING CONSUMERS TO MAKE INFORMED CHOICES."

IOWA SEEKS TO LEAD $250B BIO-CHEMICAL INDUSTRY WITH UNITED STATES' FIRST TAX CREDIT.

By Debi Durham, Director, Iowa Economic Development Authority



Iowa's tradition of excellence in agriculture — coupled with its open-armed welcome of new businesses and new ideas — has made this U.S. state a fertile hub for cutting-edge industries like bio-renewables.

The state is betting the beautifully complex chemistry found in nature will replace petroleum-based products. It's the next frontier of biosciences – an estimated $250 billion global industry. Research by Iowa State University (ISU) suggests the industry could add as many as 50,000 jobs in Iowa alone.

Three research centers at ISU have joined forces to change the renewable chemical industry; the National Science Foundation Engineering Research Center for Biorenewable Chemicals (CBiRC), the Center for Crops Utilization Research and the BioCentury Research Farm.

Brent Shanks, director of CBiRC, said today's petrochemical industry is locked into seven platform chemical compounds, "[Petrochemical companies] have really gone as far as they can. They don't introduce new products much and it's all become a low-cost industry of feedstocks."

"Biobased chemicals is the chance for the second wave of innovation in the chemical space. Not only because we can now use biomass carbon to make existing products, but we can also start accessing new chemical compounds that aren't easy to get from crude oil," Shanks added.

Like the global petrochemical industry developed in clusters around available feedstock – oil refineries – so to, will the bio-based chemical industry develop around feedstock sources: bio-refineries. Iowa is the land of bio-refineries, including three cellulosic refineries, and produces more biodiesel than any other state. The state is also rich in biomass, with the second most harvestable acres of any state in the country, according to the U.S. Department of Energy.

In addition to bio-processing infrastructure and university leadership, Iowa has the workforce in place for large-scale bio-based chemical production. According to U.S. Bureau

"RESEARCH BY IOWA STATE UNIVERSITY SUGGESTS THE INDUSTRY COULD ADD AS MANY AS 50,000 JOBS IN IOWA ALONE."

of Labor Statistics figures, Iowa is home to more plant and soil scientists than any other state, and it has the highest concentration of agricultural and feedstock employment of any state. Complementing things further, the state leads the U.S. in percentage of electricity derived from wind energy. The ability for manufacturers in Iowa to utilize renewable power resources to manufacture bio-renewables promotes sustainable and environmentally friendly practices.

The only piece missing for total success was the right supporting policies. In 2016, the Iowa Legislature passed the country's first tax credit specifically designed for renewable chemical production. The U.S. Department of Agriculture has called Iowa's Renewable Chemicals Production Tax Credit the "strongest" incentive for the bio-based chemical industry.

The program allocates $100 million in tax credits over 10 years to be applied to the manufacturing of 40 key building block chemicals, with the possibility of added new molecules to the incentive as innovations emerge. Here are five quick things to know about Iowa's Renewable Chemicals Production Tax Credit program.

1. **No other U.S. state has an incentive like this**
   The program offers tax credits equal to five cents per pound of qualified chemicals produced, and the state will have the authority to grant up to $10 million in tax relief annually. A 2016 USDA report, "A Economic Impact Analysis of the U.S. Biobased Products Industry," says Iowa's Renewable Chemicals Production Tax Credit program, "represents the strongest existing incentive package for the global bio-based chemical industry."

2. **It's not for food, feed or fuel**
   Products eligible under this program must not be primarily used for food, feed or fuel. However, food additives may be eligible.

3. **Iowa has the infrastructure and raw materials in place for advanced bioprocessing**
   Iowa has a network of more than 50 bioprocessing sites and one of the nation's highest amounts of harvestable biomass. In addition, the state's robust transportation infrastructure provides easy access to national and international markets.

4. **Bioprocessing research is concentrated in Iowa**
   ISU is home to the National Science Foundation Engineering Research Center for Biorenewable Chemicals, the BioCentury Research Farm and the Bioeconomy Institute. With these essential pieces already in place, the passing of this bill further cements Iowa's position as an innovative leader in a growing industry that accounts for more $250 billion in revenue and thousands of jobs each year.

5. **This is a tax credit built on a stable foundation**
   The legislation creating the Renewable Chemicals Production Tax Credit Program passed the Iowa Senate 46-3 and the House 95-1, indicating its broad support, and demonstrating how businesses in Iowa benefit from fair and supportive government.

The innovations coming from the Hawkeye State have a global impact. For more information on this tax credit program and doing business in Iowa, visit iowaeconomicdevelopment.com/bioproducts ■

HOW ARCTIC BIOMATERIALS HAVE DEVELOPED COMPOSITES INSPIRED BY NATURE.

With only around 5.5 million inhabitants, Finland may be one of the smallest countries in Europe when it comes to population, but one of the biggest when it comes to bio-based innovation. With its bio-economy worth over €60billion, it's a true industry powerhouse and today we focus on one of its leading lights – Arctic Biomaterials. The Tampere based company has since being founded in 2014 evolved from helping solve major challenges for medical implants to offering high-performance biodegradable and bio-based alternatives for demanding technical applications and consumer products. Today we speak to Tomi Kangas, Sales and Marketing director, Arctic Biomaterials to gain an exclusive insight into their journey so far, their rapid growth and their potential for further development.

At the heart of Arctic Biomaterials is a very special composite material, a biodegradable glass fiber. It has a polymer matrix chosen from commercially available bioplastics. One of the main matrix polymers is PLA which is made from a dextrose (sugar) derived from field corn. This feedstock already popular for industrial bio-based production, but corn is not the only source that can be used but currently is the most cost effective. Future feedstocks could include agricultural wastes and non-food plants.

Arctic Biomaterials' material comes in the form of pellets, measuring between 5mm and 20mm, and in each there are 3000 – 5000 glass fibers surrounded with PLA, PBS, PHA or other bio-based resin in a molded fiber felt (fabric) like structure. Having the continuous fibre process Arctic Biomaterials is able to control the length of the pellets even in some cases looking at continuous fibre applications.

"WE AT ABM CHALLENGE THE MARKET TO LOOK AT THEIR OWN PROCESSES AND ASSESS HOW THEY CAN BE CHANGED TO IMPROVE TOMORROW."

I ask Tomi Kargas for some detail on how their materials were first used: "Quite simply, we helped solve a problem. For decades chemists and scientists all over the world have tried to solve the challenge of developing a strong bioresorbable material that can be used for medical implants. Many surgeries only require implants to provide temporary support, allowing the surrounding tissue to heal for example, and as a result often means an intervention or secondary surgery is required to remove the material at the end of its use. However, we created bioresorbable implants which as well as offering excellent stiffness, strength and impact resistance, dissolve into the body at the end of use. And not only that but they also help increase bone growth."

This breakthrough had made a dream a reality now and the ABMcomposite technology is enabling their customers to finalize their visions for strong solid bioresorbable implants for patients around the world.

But medical sector is not the only sector benefitting from the ABMcomposite technology as it now offers high-performance biodegradable and bio-based alternatives for demanding technical applications as well. Their PLA based bioresorbable glass reinforced plastics increase temperature resistance (Heat deflection temperature (HDTA) of up to 160 °C can be reached) and mechanical properties to new levels and opens a variety of possible application areas in the field where technical plastics are being used. The plastic has high energy absorption in impact, low shrinkage, good dimensional stability and is easy to colour.

Tomi tells us more: "Having proven what we can do in medicine, now have a renewed focussed on wider applications. We already have a number of large multinational companies that we work with on a confidential basis and are committed to serving our customers with high quality products and services."

We at ABM believe that instead of just being a material supplier we work to understand the customers needs and then find ways to fulfil these needs, hence we also help our customers with product design, modelling and tool design.

One business that Tomi can tell us they work with is Belightful Design an ecological design company focused on wildlife feeder products for outdoors. Their products include an award winning butterfly feeder (pictured left), designed to attract butterflies to your garden. With an emphasis on a hard wearing but attractive plastic and a firm commitment that any of its products be "environmentally ethical", Arctic Biomaterials proved to be the perfect partners to work with in developing their product range.

The environmental credentials which attracted Belightful Design among other clients are embedded deep in the companies DNA. We have already learnt that its PLA sources are bio-based but by choosing ABM's compounds over traditional technical plastics, the amount of greenhouse gases (GHGs) and use of non-renewable energy (per kg of polymer produced) can be reduced as much as 6050-80% by using ABM compounds. To determine the final environmental footprint needs a detailed LCA (Life Cycle Analysis) study. At the end of life, an environmental commitment remains too, with the products being able to be incinerated (with energy recovery), recycled or composting.

Speaking to Tomi, it's clear that the Arctic Biomaterials is as enthusiastic as it is confident for its future and he concludes our time together with a rallying call "We at ABM challenge the market to look at their own processes and assess how they can be changed to improve tomorrow. The team are already working with major companies and we love to talk to more about joining us on our journey to not just improve product performance but also to make sure we give future generations the possibility to enjoy an innovative, green and healthy planet." ■

To contact Tomi and learn more:
e-mail tomi.kangas@abmcomposite.com
call +358 46 922 9900

IN A TURBULENT ECONOMY, PURPOSE NOT PROFIT IS BUSINESS LEADER'S KEY TO SUCCESS STATES EY REPORT.

73% of respondents say that embracing and integrating corporate purpose in their organization is key to succeeding in the uncertain global economy.

66% say they are profoundly rethinking their organizations' purpose as a result of disruption.

15% say that their company's main purpose is to maximize shareholder value.

Good news for those working in bio-based and sustainable industries with a new survey finding that a majority of business leader respondents believe in the value of a strong corporate purpose, and only a minority stating their company's main purpose is to maximize shareholder value, according to the EY report, How can purpose reveal a path through disruption? Mapping the journey from rhetoric to reality. Based on a survey of 1,470 global leaders representing companies across various industries in developed and emerging markets around the world, the respondents include 500 businesses with annual revenues of US$2.5bn or more.

The report reveals that purpose means different things to different companies. When asked to characterize their organization's purpose, 33% of those surveyed cite bringing value to customers, 15% of global organizations say boosting their share price and 11% cite bringing value to their employees, all focusing on a single stakeholder group. Others have a different conception: 40% of respondents say their organization's purpose is aimed at creating value for multiple stakeholders or offering an aspirational reason for being.

In addition, two-thirds of executives (66%) are profoundly rethinking their organizations' purpose as a result of the disrupted environment, and 52% of those are moving in the direction of this wider concept of purpose. Sixty-eight percent of companies that broadly define purpose and integrated it into their organizations say purpose gives them the agility to innovate in times of disruption.

TANGIBLE BENEFITS

The survey finds that 97% of companies that deeply integrate a broader sense of purpose into their DNA report a good or great deal of incremental value from doing so.

Companies that have deeply embedded an aspirational and human-centric definition of purpose cite specific ways in which embedding their purpose across activities creates value. Fifty-two percent said say that it helps build customer loyalty; 51% report that it preserves brand value and reputation; 42% cite that it helps them attract and retain staff; and 40% attribute the ability to develop new and innovative products to the presence of purpose within their business.

Valerie Keller, EY Global Leader, Beacon Institute and Executive Director, Markets, Ernst & Young LLP, says: "Our research shows the real advantages companies gain when going on an authentic purpose journey. The data also busts the myth of purpose versus profit. Seventy-five percent of purposeful companies involved in our survey tell us that the integration of purpose creates value in the short-term, as well as over the long run. They also report that being purposeful gives them greater agility to innovate in the face of disruption and uncertainty. But you have to walk the talk in your strategy, products and services, and customer and employee experiences. A purpose patina of words without action runs the risk of unmet stakeholder expectations, decreased trust and missed opportunities."

LEADERS NEED TO TURN THEIR PURPOSE RHETORIC INTO BUSINESS REALITY

In order to help businesses understand the pathway to turning the purpose rhetoric into reality, the report identified four steps that can help every organization reach their purpose goals:

1. Clearly articulate a purpose that responds to the needs of their stakeholders and is grounded in what an organization does
2. Embed purpose into their strategy and operations, and align their decision-making with that purpose
3. Constantly evaluate where they are in their journey and what needs to change
4. Accelerate the journey by placing purpose at the center of their culture and ensuring it is owned by their people

Keller says: "All the disruption geopolitically, economically and technologically is a catalyst for a new evolution in business. Those most able to thrive in this new world are focused on their impact on the humans they touch – the customers, the employees and the wider society." ■

Read the report here: How can purpose reveal a path through disruption? Mapping the journey from rhetoric to reality.

FROM SEWER TO BREWER, LET'S RAISE A TOAST TO THE FIRST BEER MADE USING RECYCLED URINE!

By Luke Upton, Bio-Based World News

Most people when they think of beer and Copenhagen it would be Carlsberg that comes to mind. And they are certainly doing some fantastic work in the bio-economy with the development of their Green Fiber Bottle. But there's a remarkable new beer making sustainable headlines in Denmark... Pisner. Not Pilsner, Pisner. Why? Well the story begins at the Roskilde music festival in 2015, where 54,000 litres of urine was collected from its attendees. The liquid waste product was used as a fertiliser for 11 tons of malting barley used to produce this cheekily named beer, which although containing no actual traces of urine, owes its growth to this most bountiful of liquids. Urine is more organic than the traditional animal manure or factory-made plant nutrients. In a move Denmark's Agriculture and Food Council (DAFC) has lovingly dubbed "beercycling," the brand name Pisner is now ready to go on sale.

"60,000 bottles of PIS have been brewed in collaboration with Nørrebro Bryghus."

"When the news that we had started brewing the Pisner came out, a lot of people thought we were filtering the urine to put it directly in the beer and we had a good laugh about that," said Henrik Vang, chief executive of brewery Nørrebro Bryghus.

The DAFC hope that more people start talking about sustainability and recycled beer is a good place to start. The idea shows that we can re-use body waste that we usually flush down the toilet and transform this into a valuable nutritient. 60,000 bottles of PIS have been brewed in collaboration with Nørrebro Bryghus. The huge amount of urine produced at festivals was having a negative impact on the environment and the sewage system.

"We're a 100 percent organic company, and even though Pisner actually isn't 100 percent organic, the idea of recycling beer is such a good vision that we couldn't really say no to being part of it," Henrik Vang, executive director at Nørrebro Bryghus, told The Local.

After the naming of their product, executives appreciated that 'Pisner' was a bold marketing choice which divided customers. Henrik Vang, executive director at Nørrebro Bryghus added, "that it's good to be honest. Then we can explain what it's all about."

"We wanted to keep it simple and call it what it is. That's a lot simpler for marketing than an explanation of circular economy, but still shows we want to recycle our resources," said Lisbeth Odgaard, DAFC's branding manager.

Scientists from Belgium created the unique beer formula. The urine is collected in a tank and heated in a solar-powered boiler. As the water evaporates, it passes through a membrane that filters out the remaining nutrients from the liquid. Scientists at the University of Ghent think their machine could provide fertilising minerals and clean water for people in developing areas where electricity isn't readily available. ■

THE LAST WORD WITH... VIRGINIA KLAUSMEIER, FOUNDER OF SYLVATEX.

In 2011, Virginia Klausmeier saw there was a dire need to develop bio-based materials for the future, a belief that drove her to start her own business. After completing an education in chemistry and bio-engineering she decided to blend these two disciplines with business and Sylvatex was launched. The role of founder is one that always offers opportunities for development and learning. And as Virginia tells us, from deals with corporates executives to innovation in the laboratory, every day is different. Now with a team of ten, Virginia provides an insight into the Sylvatex story as well as her own personal journey and one bio-based aspect of a very special day!

Emily O'Dowd (EOD): Thanks for the time today, what do you enjoy most about working in the bio-based industry?

Virginia Klausmeier (VK): I genuinely believe we are working at the front end of a booming economy. Although the recent low oil prices have impacted a lot of new businesses, there is more demand coming from commercial markets as well as a change in attitude from the consumer. It's a very exciting time! When I think about the bio-based industry I often compare it to the first invention of computers – as soon as more people understood its transformative benefits it created a huge snowball effect – and now we can't imagine a world without them! We can map this development onto the bio-based space as the invention of the computer is like the innovation of the bio-based world just in a different cohort. This helps us visualise the stage we are at in the bioeconomy. I think Sylvatex in particular is at a really good position because we can be the ones navigating change and bringing success very early on in the industry. Soon it will be so obvious to everyone how intrinsic the bio-based world is for our continued development in large industries.

EOD: To what extent has competition impacted your position in the market?

VK: Sadly I don't feel worried by competition at all – or for the moment anyway. Fortunately, we adopted an early business model approach which gives us a real advantage. This means that both our technology and business model are innovative and commercial which reduces the risk for us.

EOD: What are some of the biggest challenges that you've faced?

VK: I think some of the difficulties we have encountered have been looking for one specific opportunity to commercialise. We have a lot of different applications for our nanotechnology platform with many providing a healthy return, but the first market and best early commercial partners is where we are spending our time navigating.

EOD: How do you predict the industry will change over the next three years?

VK: In my opinion we will begin to see some big economic trends for new high-tech solutions. But bio-technology will provide the answer for our world energy needs which are constantly growing. There will soon be a greater demand for applications in safer chemistry and I can't wait for the boom to come!

EOD: What single change do you think would help the bio-based industry?

VK: Money markets follow positive results and we need more of these positive acquisitions. There are strong positive signals across the industry but now international global companies like BP need to step up their contribution to the industry. However, we are beginning to see them branch out. When the money is placed and there is greater funding then it will prompt more movement in this space. It's only a matter of time before the price of oil starts to increase and alternative energy starts to take meaningful market share, which means that now is the best time to invest.

EOD: What advice would you give for someone wanting to begin a business in this field?

VK: Firstly, it is important to work with technical companies early, talk to the industry and decide exactly how your business model will work alongside these companies. Secondly, don't expect to become an expert in three years, so ensure that you have a five year plan in place.

EOD: What is your favourite bio-based product on the market?

VK: I use a lot in my house! In fact, almost everything I own is non-plastic. All my make-up and cleaning products are as natural as possible. Therefore it's difficult to select my favourite! But next week I'm getting married and I have selected a sustainable dress - it's not 100 percent bio-based but it contains a lot of upcycled marine plastic!

EOD: That must be an industry first! Thank you for your time today Virginia, myself and the team at Bio-Based World News wish you warm congratulations on your wedding! ■