Johanna Schmeer creates Synthetic Foods with Bioplastics that could feed world's growing population

Source: Industry Leaders Magazine

Posted: Jul 03, 2014

Nozzles emitting sugar

A conceptual project by Royal College of Art graduate Johanna Schmeer builds on developments in the field of nanotechnology to create synthetic foods to meeting the world's burgeoning population food demands.

For the 'Bioplastic Fantastic' task, Johanna Schmeer has envisioned how different products produced using enzyme-enhanced bioplastics could create vital supplements as a substitute for conventional food resources that could soon deplete.

"Bioplastic Fantastic investigates new types of products and interactions that might emerge from material innovations in the fields of bio- and nanotechnology," said Schmeer. "The UN estimates that the world must produce 70 per cent more food (measured in calories) by 2050," she continued. "So instead of discussing how to grow more food, maybe we need to rethink food entirely."

Johanna proposal comes after a recent breakthrough by researcher Russell Johnson, who figured out how to orchestrate functioning biological cells produced using plastics. She outlined seven items that make the vital food groups much required for humans to get by through engineered techniques controlled by artificial photosynthesis.

Those items produce water, vitamins, fiber, sugar, fat, protein and minerals in the form of fluids and powders. The items include an arrangement of green tubes that emit sugar syrup and a machine that gathers moister from the air in white pockets, which can be drank from when squeezed.

Protien producing product. Model organism: Caulobacter crescentus

Decaying vitamin-producing product. Model organism: Lactobacillus

"All of the product designs are based on model organisms which have similar functions in nature," explained Schmeer. "They use the functional part of the biological circuit (enzymes), and combine this with non-living matter (bioplastic)."

"The project focusses less on communicating the exact functionality of these products, and more on the interactions, aesthetics, atmosphere, and the feeling involved in interacting with them," said the designer.

Johanna Schmeer's project was presented at the Royal College of Arts Show RCA 2014 exhibition of graduate's projects.

Glycix: The First "Green" Thermosetting Plastic

Source: Green Plastics News

Posted: July 07, 2014

Albert Alberts and Gadi Rothenberg

Prof. Gadi Rothenberg and Dr Albert Alberts, Researchers of the University of Amsterdam (UvA) developed a biobased and biodegradable resin, called Glycix, the only thermoset plastic that is both biobased and biodegradable. All inflexible plastic items used in homes and buildings can be made from this polymer: computer and telephone casings, insulation foam, trays, tables, lamps. This is a major step forward in the battle against the mounting pile of plastic waste and the plastic soup in the oceans. But take care not to use this material outside: after some time, the polymer dissolves in water.

According to their story, they were looking for a biofuel and discovered the plastic by chance. The basic ingredients are citric acid and glycerol, two completely natural compounds. Glycix is 100% biodegradable,' says prof. Rothenberg. 'With water it breaks down into its monomers, i.e. glycerol and citric acid, two compounds which are completely natural and will be absorbed in the natural cycle. That, of course, is a disadvantage on one hand, as it makes the material unsuitable for outdoor use without a waterproof coating. On the other hand, it is a huge advantage, because the material can break down and be absorbed without leaving back any unnatural or toxic substances. As the world is getting more and more concerned about the huge amounts of plastic waste floating around in our oceans intoxicating fish and wildlife, these kinds of materials will have growing importance in the near future.

Glycix table presented to the board of the University of Amsterdam

Processing glycix is low-tech. Injection moulding is easy. The substance easily adheres to other materials and can therefore be used in combination with stainless steel, glass etc. Furniture made from glycix will need extra protection; therefore, the table produced for UvA for instance, has been covered with a glass plate, in order to prevent that the cup of coffee spilt will decompose the table.

Glycix seems to be the first alternative to conventional thermoset resins, none of which is biodegradable or even recyclable. Imagine the wide spectrum of possibilities this bioplastic provides in combination with natural fibers as a biobased, compostable composite material. Some of the applications Rothenberg and Alberts have proposed for Glycix include indoor applications like furniture padding and foam packaging.

Spain Doing Extensive Research To Produce Biodegradable Milk Bottlele

Source: Plastics News Articles

Posted: July 09, 2014

When the who world is struggling to make our mother earth eco-friendly, this initiative of Spain could cherish them as according to the latest news from chemical sector Spain's institute of plastic technology, Aimplas is conducting and coordinating a two-year 'Biobottle' project in partnership with eight European partners. While asked about the technology the spokerperson says the main aim of the research and development was to develop a new biodegradable material that is resistant to thermal treatment for the manufacture of dairy packaging.

According to various reports despite being the world's largest consumer of dairy and dairy-alliedproducts it only 10-15 percent of the 2 million tons of high density polyethylene milk bottles were recycled, so it is especially useful having biodegradable products. The research was being carried at Spain's Aimplas research institute. With this new research unit the country will be able to create both multilayer and monolayer plastic bottles as well as bags to package dairy products, which do not require to be separated from the rest of the organic wastes at the end of their brief lifespan.

Emphasizing on the need of research and development the personal at the lead role of the research said R&D is at the heart of the success in this field and there is an urgent need for technologies that create high quality ethylene derivatives and hence we are trying to develop technologies that can give a boost to the industry as it will help us create products that are at the par of the industry and alongside it will help us create job opportunities for people.

With the growing demand of ethylene and ethylene derivatives it has become very important for us to keep on developing new products and hence the move.

Biodegradable Milk Bottlele

Researchers develop new Carbon Fiber from Plants

Source: Bioplastics Magazine

Posted: July 21, 2014

Researchers at the University of North Texas have created a new carbon fiber from plants that can replace common fossil products in wide range of goods including parts for cars, aircraft, electronics and sports equipment. The patent-pending carbon fiber also is stronger and lighter than similar products on the market.

The new carbon fiber is made from C-lignin, a linear polymer that was discovered by UNT Distinguished Research Professor Richard Dixon and Research Professor Fang Chen in 2012 and reported in the Proceedings of the National Academy of Sciences.

Individual fibers for c-lignin-based carbon fiber are extracted in a lab at the University of North

Lignin is the substance that makes plants woody and firm, and helps plants stand upright. C-lignin is found in high concentrations in the seed coats of plants including vanilla orchids and species of cactus.

"Finding new uses for plant materials like C-lignin is a great step toward replacing common petroleum- and coal-based products with products made from natural materials," Dixon said. Those products include carbon fiber; engineering plastics and thermoplastic elastomers, which can be stretched and formed to produce other products; synthetic foams and membranes; and other fuels, products and chemicals currently sourced from petroleum.

"Before our recent discoveries involving lignin, we thought lignin was just lignin, and there was nothing else we could do with it," Dixon said. "Now we know that businesses can use this material to create and replace petroleum-sourced products on the market, which is good for the environment."

Carbon Fiber products

The new carbon fiber was created in the laboratory of Nandika D'Souza, a joint professor in the departments of mechanical and energy engineering and materials science and engineering in UNT's College of Engineering. D'Souza and engineering doctoral student Mangesh Nar engineer low carbon footprint products using bioresources thro ugh the National Science Foundation's Partnerships for Innovation Program.

"Unlike carbon fiber made from other ligno-cellulose or lignin sources, C-lignin is ideal for creating naturally-sourced carbon fiber because C-lignin fibers are linear, and can be easily processed into carbon fiber with the same equipment often used to produce fossil-fuel based carbon fibers," D'Souza said.

Dixon and Chen joined the UNT faculty in 2013. The C-lignin discovery was made while working on a research project for the U.S. Department of Energy's BioEnergy Science Center (BESC). UNT became a partner of the BioEnergy Science Center in 2013. (KL)

Packaging Film shows promise as a low-cost Alternative for Medical Tests

Source: European Plastics News

Posted: July 28, 2014

Bio-plastics are usually more expensive than their conventional counterparts, and companies face supply chain challenges when they switch from one raw material solution to another. Nevertheless, the bio-based plastics market continues to grow. GreenPremium plays an important part in this. In its paper "GreenPremium along the value chain of bio-based products" Nova-Institute is, for the first time, putting forward a clear definition of GreenPremium:

A new cheap way to run tests on medical and environmental samples has been developed using the plastic packaging staple — the air filled flexible packaging film commonly called bubble wrap.

Bubble Wrap

George Whitesides at the Wyss Institute for Biologically Inspired Engineering at Harvard University and his team conceived the idea when visiting labs in developing countries where they could not afford even basic equipment.

"Scientists often have bubble wrap around the lab because other equipment is shipped in it. Bubble wrap has several characteristics that make it attractive as a candidate for adaptive use as a container for liquid samples: it is available in a wide range of sizes and it is compartmentalized in a regular pattern, which is useful for parallel multi-bubble assays. It is also a transparent and sealed container." Dionysios Christodouleas, part of Whitesides team, told *European Plastics News*, a sister publ ication of *Plastics News*.

The team used the plastic bubbles of bubble wrap as containers to perform assays for the detection of anemia and diabetes, and for the storage of microorganisms.

In a paper published in July, the team noted that it used a needle to insert a sample inside the air pocket, then sealed it with nail polish. Sealed Air Corp. of Elmwood Park, N.J., developed and owns the trade name Bubble Wrap.

Bubble Wrap used for Medical Test

"While conducting this work, we also found that the interior of the bubbles are sterile, which further increases the scope of their application for the transport of biological samples and in performing bacterial cultures and bio-analysis," said Christodouleas.

Although there are limitations to using bubble wrap, including the fact that the process of filling the bubbles requires the use of syringes or pipet tips and sealant, the team have high hopes for the future.

"Using bubbles of bubble wrap as containers for analytical assays can significantly reduce the cost of necessary storage containers. In resource-limited settings, any reduction of the cost of analysis, which also includes the cost of the necessary reagents, the instrumentation and the trained personnel, is an important step towards making important health test procedures available to local communities," said Christodouleas.