Press Release

40 MILLION EURO FOR THE DEVELOPMENT OF BIOTECHNOLOGICAL PROCESSES MANUFACTURING NEW PRODCUTS FROM WASTE STREAMS

Leipzig, November 08, 2023

Today the Federal Agency for Disruptive Innovation SPRIND announced the participants for the first phase of the SPRIND Challenge 'Circular Biomanufacturing'. In the first stage of this three-year innovation competition, eight teams will be funded to develop novel bioprocessing techniques that valorize raw materials from waste streams and integrate the output of the biomanufacturing processes into conventional manufacturing practices.

Today our production is based almost entirely on using newly mined raw materials or resources. The extraction and processing of new raw materials and resources continues to be an enormous burden on the environment and society. A transition to a circular economy that manufactures new products with existing raw materials and resources facilitates more sustainable and resilient manufacturing. A key role in making this state possible is biomanufacturing because these manufacturing processes use comparably less energy and is less labor intensive, while converting waste streams into valued feedstock

Recent scientific advances have led to new insights and methods which have significantly improved biomanufacturing processes and identified novel possibilities to employ biomanufacturing techniques more effectively. Although some biomanufacturing technologies have demonstrated their value in niche markets, the challenge still remains to scale biomanufacturing capabilities to industrial scale and integrate these into existing manufacturing processes, in order to replace or augment costly and labor intensive petro-chemical manufacturing.

"Using the SPRIND Challenge vehicle, this specific Challenge, entitled Circular Biomanufacturing, we will seek to develop an end-to-end prototype, which consumes valorized waste streams under continuous fermentation conditions to produce intermediary or final materials," explains Dr. Jano Costard, Challenge Officer at SPRIND. "The goal is to establish novel biomanufacturing processes that utilize locally available (secondary) raw materials and are closed, sustainable, environmentally friendly system and resilient to market fluctuations."

A jury from science and industry has now selected eight teams from 50+ applications to participate in the first stage of this innovation competition:

C3 Biotechnologies (Acrylics)

The *C3 Biotechnologies (Acrylics)* team produces PMMA - better known as Plexiglas - from potato starch, residues from the production of biodiesel and sugar beet pulp. The team led by Prof. Nigel Scrutton from the University of Manchester has thus found a way to produce PMMA biologically, without the use of crude oil. In addition, *C3 Biotechnologies (Acrylics)* uses halophilic microorganisms in its microbial production process, which, unlike other microorganisms, can also thrive in brackish water with a high salt concentration. This approach reduces the risk of contamination as well as the consumption of fresh water and energy.

Insempra

Insempra's '*BioTreasure'* team, produces materials such as polyester and polyamides from plant residues, used cooking oil or PET waste using a special yeast. These materials were previously produced using petrochemicals. The team thus covers two classes of plastics that are extremely versatile in terms of their chemical composition and potential areas of application and are present in almost all products in daily use. In addition, the scientists led by CEO & founder Jens Klein are able to produce protein fibers that have outstanding properties for use in the textile industry and other applications.

CircuMat-3D

The *CircuMat-3D* team, led by Dr. Mahmoud Masri, primarily uses fats and long-chain hydrocarbons produced in yeasts in order to gain many different technically interesting polymers, some of which are even edible. In the long term, other waste streams such as agricultural, bioenergy, and food waste streams will also serve as a basis. In order to remain flexible regarding their waste streams, the team based in the company 'Global Sustainable Transformation', a spin-off from the Technical University of Munich, has developed a particularly versatile and sustainable fermentation platform. It is noteworthy that the fermentation process itself produces almost no unused by-products or further waste streams.

EveryCarbon

The *EveryCarbon* team uses organic waste to produce an important chemical for the manufacture of high-quality plastics. In contrast to conventional biogas plants, which emit significant amounts of CO2 through the metabolism of microorganisms, the team led by Prof. Johannes Gescher from the Hamburg University of Technology has set itself the goal of binding all carbon atoms from the organic waste in the desired products. To achieve this, the team is relying on a highly complex combination of reactors in which the emitted CO2 can be used directly as a carbon source for the microbial synthesis of further products.

MATERI-8

As waste streams such as plastic waste or old textiles are often contaminated, the *Materi-8* team does not rely on a single microorganism, but on a co-culture of different microorganisms in order to be able to utilize as much of the waste stream as possible. The co-culture produces different basic chemicals from the waste mixture. These can then be used for the production of highly relevant monomers and polymers, such as acrylic monomers or polylactides, for application as inks in additive manufacturing. The team from the University of Nottingham is led by Dr. Patricia Parlevliet.

Quantum Leap

The *Quantum Leap* team works with waste materials from the paper recycling industry, residues from bioethanol production and breweries, as well as molasses. In their process, the team relies on a comparatively little-noticed yeast-like fungus that can feed on various waste streams and secret three chemicals. These can then be used to produce biopolymers, surfactants, and lubricants. The biopolymers will be converted by the interdisciplinary team, led by Dr. Lars Regestein from the Leibniz-HKI In Jena and Dr. Till Tiso from the RWTH Aachen University, into materials for 3D printing, thus creating a value-increasing circular economy.

AmphiStar (SURFACycle)

The *AmphiStar* (*SURFACycle)* team from Belgium focuses on the production of various biosurfactants from food waste, such as supermarket- and industrial waste, waste cooking oil, etc. Today, surfactants are not only used as dirt removers in cleaning agents, but are also used in the cosmetics, textile, agro and food industries, amongst others. Surfactants, which are still mainly produced from fossil- and/or palm oil, are as versatile as their areas of applications. *AmphiStar (SURFACycle)* shows a more sustainable way to produce them.

SymbioLoop

The *SymbioLoop* team is developing plastics that are in no way inferior to conventional plastics in terms of their functionality. However, unlike the latter, *SymbioLoop's* plastics are almost infinitely recyclable. To produce the plastics, the team needs chemicals that - even on the basis of crude oil - are hardly economically feasible using conventional manufacturing processes. The team, led by Dr. Manuel Häußler from the Max Planck Institute of Colloids and Interfaces, is therefore planning to produce these chemicals on the basis of a symbiotic co-culture of algae and yeast that feeds on old food oil or recycled plastic.

For this SPRIND Challenge, which started on November 1, 2023, 40 Mio. Euros will be made available to support the three-year competition. All eight teams that were selected to participate in this SPRIND Challenge will receive up to 1.5 million euros over the next 12 months. The teams will be supported by SPRIND, receive expert consultation and will be connected with a broad network of subject matter experts. Teams will be evaluated each year to determine which teams will be eligible to receive the following year of funding.

More information can be found at https://www.sprind.org/en/challenges/biomanufacturing

About SPRIND

The Federal Agency for Disruptive Innovation, SPRIND, was created 2019 and is headquartered in Leipzig, Germany. The sole proprietor of SPRIND is the German Federal government, represented by the Ministry of Education and Research (BMBF) and the Ministry of Economic Affairs and Climate Action (BMWK). SPRIND fills a gap in the German innovation ecosystem: it discovers novel, disruptive technologies to address the greatest challenges of our time. SPRIND also ensures that the value provided by developing radically new technologies remains within Germany and Europe. SPRIND is financially supported with funding made available through the Federal budget. SPRIND is led by Rafael Laguna de la Vera and Berit Dannenberg.

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