

Press release

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New high-value products from sugar beet pulp: Betafib[®] microcellulose fibres, arabinose and galacturonic acid. Successful pilot testing and creating new value chains – PULP2VALUE project enters its second stage

During the extraction of sugar from sugar beet, large quantities of sugar beet pulp are produced. Currently, sugar beet pulp is valorised as low value feed and/or converted into biogas. In the PULP2VALUE project, multiple biorefinery concepts are being developed and installed to increase the value of sugar beet pulp.

The project aims to achieve two main objectives by the end of the project, June 2019: One objective is to scale up, optimize and integrate processes for production of Betafib[®] microcellulose fibres, arabinose and galacturonic acid. Secondly, to build long lasting value chains for Betafib[®] microcellulose fibres, arabinose and galacturonic acid.

Whilst achieving these two main objectives, the PULP2VALUE project contributes to the development of a bio-based economy within the EU and the creation of new economic activities in rural areas. While at the same time aiming for value chains with new bio-based products with environmental benefits.

A sustainability assessment, carried out by nova-Institute (Germany) will monitor these environmental benefits. The sustainability assessment aims to evaluate the environmental, economic and resource efficiency consideration that come with the utilisation of sugar beet pulp for the production of high value products. Overall, nova-Institute will provide market research, techno-economic evaluation, Life Cycle Assessment, and the establishment of a communication and dissemination strategy during the project.

In the first half of the project, much of the work on the production process focussed on the pilot testing of unit operations as well as the testing of process concepts to support process engineering for the demo-plants. For the Betafib[®] microcellulose fibres this was specifically successful as construction of the demo-plant commenced and the plant is close to being operational. Alongside the development of new processing technologies by Bio Base Europe Pilot Plant (Belgium) and the implementation of the demo plant by the project leader Cosun (The Netherlands), value chains are further being developed for the products under development in the PULP2VALUE project as well as new applications of sugar beet pulp products. This includes the use of sugar beet pulp products in flooring, adhesives and glues by Orineo and in beverages such as soda drinks and juices by Refresco (United Kingdom). Research into several chemical building blocks and the development of their synthesis routes has been conducted by Wageningen University & Research (division Food & Biobased Research) in the Netherlands. Last, human intervention studies at Wageningen University & Research (division of Human Nutrition) have led to empirical data and insights on the effects of arabinose in various food matrices on human glucose metabolism.

High value products from beet pulp

Betafib® microcellulose fibres can be utilised as structurant in liquid detergents, where it achieves homogenous formulations, pourable gels and stable liquids (e.g. oil-water emulsions), high temperature and pH stability, and good compatibility with surfactants. Combining all these properties into one molecule can provide the solution to formulation challenges. Simultaneously, as Betafib® is 100% bio-based, it can be used in environmentally friendly products.

In the oil and gas industry, more challenging conditions such as increased levels of temperature, alkalinity and pressure in complex matrices demand new chemistries and innovative technological solutions. At the same time the requirements for environmentally friendly production and drilling fluid additives is increasing. Betafib® offers a potential solution in this challenging environment, as Betafib® provides unique rheological properties stable at elevated temperatures and severe conditions. Betafib® also has outstanding cracking reduction properties in water-based formulations, high sag- and settling control and substantial VOC-reduction, which are interesting properties for the paints and coatings industry. This opens a wide range of possibilities for applications and new value chains.

For **arabinose**, the project developed a concrete process design for the demo plant, which is currently under construction and will be operational in the second half of the project. L-arabinose is a versatile and reactive sugar that is suitable for applications in flavours as reducing sugar in Maillard reactions and in food & beverages as a natural sweetener, potentially with health benefits.

Galacturonic acid derivatives show high promise to be used in personal care products. One of these derivatives is galactaric acid. In addition, rigid chemical building blocks based on galactaric acid are under development and their application profile in a wide range of performance materials, such as specialty polyesters and polyamides (nylons), is under investigation.

Outlook

PULP2VALUE will now focus on the demonstration of the different production processes, as well as the integration of the production process into an integrated biorefinery concept. Apart from this, activities and results are also expected with regards to the effects of arabinose on the human body and an environmental evaluation of the production process.

The PULP2VALUE consortium consists of seven project partners; Royal Cosun, Wageningen University (Health and Nutrition and Food and Biobased Research), Bio Base Europe Pilot Plant, Orineo, Refresco and nova-Institut and started its work in July 2015.

For more information on the PULP2VALUE project please visit www.pulp2value.eu or contact us, or express your interest in engaging in the PULP2VALUE project as a stakeholder in upcoming events by contacting niels.debeus@nova-institut.de

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