Horizon 2020
European Union Funding
for Research & Innovation

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Research Success Story

PLASTICS FROM SUGAR: THE END TO PETROCHEMICALS?

Europe is determined to positively transform its chemical production by replacing oil based for innovative bio based production methods. Now, with funding from the Bio-based Industries Joint Undertaking under Horizon 2020, the EnzOx2 (Enzymatic Oxidation/ Oxyfunctionalization) project aims to develop technologies to make high performance plastics from plant biomass waste. Twelve participants from five European countries have joined the consortium, including AVA Biochem in Basel.

Replacing oil-based plastics is a top EU priority. Thanks to Horizon 2020 funding, the EnzOx2 consortium is now working to determine the best products and methods for making this innovative change happen. One of the most promising approaches is to use fructose from biomass waste to make a platform chemical (HMF) that can be converted into FDCA, a plastic building-block. The end goal is to create a range of new materials.

Sugar into plastics

To get there, the consortium approached AVA Biochem, known for its water-based, scalable and cost-effective process for converting fructose into HMF. "We make HMF from any material that contains sugar, such as beechwood and sun-chokes," explains Dr. Stefan Krawielitzki, AVA's Organic Chemistry Expert. "We have managed to do it in a stable way on an industrial scale, which is quite unique. Only 2-3 companies in the world are even close."

"The proposal should fit your long-term strategy. Financial support enables us to execute ambitious research."

The platform chemical HMF has many downstream paths and EnzOx2 has selected FDCA as one of the most promising. "Converting HMF to FDCA can be done chemically, biologically and enzymatically, and each method has advantages and disadvantages," explains Development Engineer Mariangela Mortato. "We are now working to evaluate which methods will be best in terms of technology and economy. Chief Technology Officer Francois Badoux adds, "EnzOx2 is a great opportunity for us to collaborate with so many renowned research institutions and to exchange knowledge with them."

Not one programme but many

To other SMEs interested in joining a consortium, AVA CEO Urs Toedtli advises that "The proposal should fit your long-term strategy and you shouldn't be interested in fast results – plan for a project duration of, at least, three years. If the project is related to your current work, the funding (usually 40% upfront) can have a very positive impact on your developments. Financial support enables us to execute ambitious research. And being in a consortium can bring knowledge and ongoing collaboration with international experts."

Before launching any proposal, Urs Toedtli recommends talking with Euresearch. "Euresearch clarifies and eases the application process. Horizon 2020 is a promising programme for Swiss companies."

About EnzOx2

From left to right: Urs Toedtli (CEO), Francois Badoux (CTO), Dr. Mariangela Mortato (Development Engineer), Dr. Stefan Krawielitzki (Organic Chemistry Expert), Dr. Gilbert Anderer (H2020 Project Management)

"It's a great opportunity for us to collaborate with so many renowned research institutions and to exchange knowledge."

AVA Biochem, Basel

CONTENT SUMMARY

The EnzOx2 project aims to develop new bio-chemical technologies based on the use of oxidative enzymes, largely unexplored at the industrial level, to substitute biomass components for those of petrochemical origin.
The process will produce platform chemicals from sugar to create PEF polymers and for use in the cost-effective production of flavor and fragrance (F&F) ingredients, active pharmaceutical ingredients (APIs) and other end products.

FACTS AND FIGURES

Project Name
EnzOx2 (Enzymatic Oxidation/Oxyfunctionalization) Industrial Manufacture

Organisations
Twelve participants from five European countries, coordinated by Biological Research Centre, CSIC.

Start Date – End Date
01.11.2016 – 31.10.2019

Duration
36 Months

Project Cost
€5 million

Project Funding
€4,7 million

Programme
Joint Technology Initiative (JTI) Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 72029. Horizon 2020 Section: Public-Private Partnership between the EU and the Bio-based Industries Consortium

More Information
www.enzox2.eu

Euresearch is an information and advisory service on the European Research and Innovation Framework Programmes. It is organised as an association and is supported by the federal government. Euresearch has a Network Office in Bern and Offices all over Switzerland.

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