EnzOx2

New enzymatic oxidation/oxyfunctionalization technologies for added value bio-based products

http://www.enzox2.eu

Type of Action: Research & Innovation Action

Value Chain: Across VCs

Start date: 01 November 2016

End date: 31 October 2019

BBI JU contribution: € 3,000,000.00

Summary

Biomass bio-refineries can be greener and even more effective if they use efficient bio-chemical technologies. EnzOx2 explores the potential use of wild type (‘occurring in nature’) and engineered oxidative enzymes as innovative solutions to existing production bottlenecks.

The EnzOx2 project aims to provide innovative answers to the specific challenge of improving processes already in place in current bio refineries. It will do this by incorporating bio-chemical (enzymatic and chemo-enzymatic) technologies making them more efficient and cost-competitive and by developing a new generation of bio-chemical technologies for future bio refineries.

The ultimate goal is in enabling transformation of plant-based molecules with an exquisite regio-and stereo-selectivity that cannot be attained using classical chemical technologies.

Objectives

The overall aim of the EnzOx2 project is to develop new bio-chemical technologies based on the use of wild-type and engineered oxidative enzymes (such as microbial peroxygenases and oxidases), largely unexplored at the industrial level, to provide innovative solutions to some relevant bottlenecks (concerning selectivity, yield and cost efficiency) in the production of biomass (sugar, lipid and terpene) based chemical building blocks, flavour and fragrance (F&F) ingredients, and active pharmaceutical ingredients (APIs) by taking advantage from the unique characteristics of these biocatalysts (acting alone or in enzyme cascades) to be demonstrated in the future at the pilot level and incorporated into future flagships.

Expected impacts

EnzOx2 aims to increase the efficiency, yield and cost effectiveness of lignocellulose biorefineries by developing new bio-chemical or chemo-catalytic technologies to convert bio-based components into high added value products.

In particular the impacts of EnzOx2 will result in:

- High (>20%) increases in conversion efficiency due to absence of side-reactions in specific enzyme transformations compared with the corresponding chemical methods
- New products with significantly higher value from selective oxyfunctionalizations reactions that could not be previously obtained
- Improvement (>20%) in resource efficiency over comparable current technologies, due to the milder application conditions of enzymatic technologies
- Validation of new bio-chemical technologies to produce at least one bio-based chemical building block, one flavours and fragrances and one active

pharmaceutical ingredients of bio-based origin.

Consortium

- Consejo Superior de Investigaciones Cientificas - CSIC (Spain) (including CIB, Madrid, IRNAS, Seville, and ICP, Madrid)
- Technische Universitat Dresden (Germany)
- JenaBios GmbH (Germany)
- Firmenich SA (Switzerland)
- AVA-Biochem BSL AG (Switzerland)
- Novozymes A/S (Denmark)
- Technische Universiteit Delft (The Netherlands)
- Chiracon GmbH (Germany)
- University of Santiago de Compostela (Spain)
- AIMPLAS Plastic Technology Center (Spain)

Former members

- CLEA Technologies B.V. (The Netherlands)

Project coordination

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