

Expanding the industrial use of Robust Oxidative Biocatalysts for the conversion and production of alcohols (ROBOX)

From 2015-04-01 to 2019-04-01, ongoing project

Project details

Total cost: EUR 11 371 611,56	Topic(s): <ul style="list-style-type: none">• BIOTEC-3-2014 - Widening industrial application of enzymatic processes
EU contribution: EUR 8 335 263	Call for proposal: H2020-LEIT-BIO-2014-1
Coordinated in: Netherlands	Funding scheme: IA

Objective

Oxygen functionalities are key functional groups in many of today's chemicals and materials. The efficient introduction of oxygen-functionalities into raw materials are key chemical transformations in bulk and fine chemicals. Innovative bio-catalytic oxidation routes using molecular oxygen (from air) under benign and mild (pH) conditions such as ambient temperature and pressure can greatly improve the sustainability and economics of processes, but were so far mainly been applied in the pharma segments. In this segment, the enzyme-catalyzed step often represents the highest added value and the high price of the end-product (> €1000/kg) justifies less than optimal enzyme production and limitations in its catalytic efficiency.

In order to achieve the widening of industrial application of enzymatic bio-oxidation processes to also larger volume but lower price chemical markets, ROBOX will demonstrate the techno-economic viability of bio-transformations of four types of robust oxidative enzymes: P450 monooxygenases (P450s), Baeyer-Villiger MonoOxygenase (BVMOs), Alcohol DeHydrogenase (ADH) and Alcohol OXidase (AOX) for which target reactions have already been validated on lab-scale in pharma, nutrition, fine & specialty chemicals and materials applications. ROBOX will demonstrate 11 target reactions on large scale for these markets in order to prepare them for scale up to commercial-scale plants.

ROBOX is industry-driven with 2 major industrial players and 6 SME's. It will assess the potential of technologies applied to become platform technologies technologies (multi-parameter screening systems, computational methodologies, "plug bug" expression systems) for broad replication throughout the chemical industry. The markets addressed within ROBOX represent a joint volume of over 6.000 ktons/year. The introduction of bio-oxidation processes is expected to bring substantial reductions in cost (up to -50%), energy use (-60%), chemicals (-16%) and GHG-emissions (-50%).

Coordinator

DSM CHEMICAL TECHNOLOGY R & D BV
Netherlands

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EU contribution: EUR 1 340 062

Participants

GIVAUDAN SUISSE SA
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EU contribution: Not available

CHEMSTREAM BVBA
Belgium

Belgium

EU contribution: EUR 298 812

DYADIC NEDERLAND BV
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EU contribution: EUR 355 337

C-LECTA GMBH
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EU contribution: EUR 245 175

EVOCATAL GMBH
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EU contribution: EUR 312 025

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EU contribution: EUR 148 142

ACIB GmbH
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EU contribution: EUR 188 125

TECHNISCHE UNIVERSITAET GRAZ
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EU contribution: EUR 637 115

RIJKSUNIVERSITEIT GRONINGEN
Netherlands

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EU contribution: EUR 916 514

UNIVERSITA DEGLI STUDI DI PAVIA
Italy

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EU contribution: EUR 391 000

RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
Germany

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EU contribution: EUR 803 887

THE UNIVERSITY OF MANCHESTER
United Kingdom

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EU contribution: EUR 512 001

DANMARKS TEKNISKE UNIVERSITET
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EU contribution: EUR 705 258

FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
Germany

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EU contribution: EUR 460 112

UNIVERSITAT AUTONOMA DE BARCELONA
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EU contribution: EUR 489 782

EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH
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