PROJECT OFFER

Biocatalytic valorisation of fatty acids

A new fatty acid valorization platform has been developed by acib. Through the use and expansion of the vast biocatalytic potential of hydratases, value-added compounds can be produced for diverse industries e.g. materials, cosmetics and flavour & fragrance.

BACKGROUND

Hydratases provide easy access to secondary and tertiary alcohols by regio- and/or stereo-specifically adding water to carbon-carbon double bonds. Many of the resulting products are highly sought-after molecules for various industries, including the materials, cosmetics and flavour & fragrance sectors. Considering that asymmetric hydration of (non-activated) carbon-carbon double bonds is virtually impossible with current organic chemistry, enzymatic hydration reactions are highly attractive for industrial applications [1]. Fatty acid hydratases (FAH) are predestined for flexible applications in a wide range of synthetic problems. Despite their remarkable potential, hydratases have not yet been implemented in industrial bioprocesses, due to rigid regioselectivity in the past.

TECHNOLOGY

acib tackles the next step in developing FAHs as viable industrial catalysts by providing a versatile platform for the functionalization of unsaturated FAs to target products of choice.
acib will provide remedy against the limitation of rigid regioselectivity by optimising the versatility of FAHs via enzyme engineering as demonstrated in recent publications by possessing the tools and expertise to modify the substrate spectrum of FAHs [2][3] and other hydratases [4][5]. acib is able to engineer biocatalysts providing routes towards hydration of double bonds at different positions of target FAs. The efficiency of this versatile enzyme platform will be further enhanced by improving FAH activity and process stability with the aim to make them even more applicable for large-scale processes. In addition, acib's FAH technology is a safe, cost-effective and resource-efficient approach to an extent that is inconceivable with current (bio)organic methods.

[1] Engleder and Pichler. (2018) Appl. Microbiol. Biotechnol. 102(14): 5841–5858
[2] Engleder et al., (2015) Chembiochem, 16(12): 1730-1734
[3] Engleder et al., Angew Chem Int Ed Engl, (2019), 58(22): 7480-7484
[4] Engleder et al., Molecules, 2019, 24(11): 2092-2105
[5] Engleder et al., PLoS One, 2018, 13(2): e019265

EXPERTS

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AVAILABLE FOR

- Joint Research Project
- Contract Research

DEVELOPMENT STATUS

Technology Readiness Level: 3-4
(Experimental proof of concept - Technology validated in lab)

KEYWORDS

- Hydratases
- Value-added compounds
- Fatty acids
- Enzyme engineering
- Materials
- Cosmetics
- Flavour & Fragrance

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