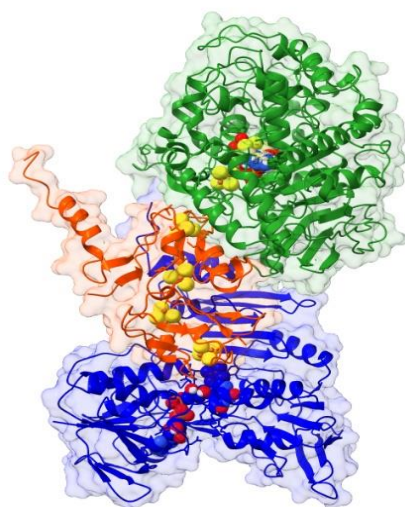


Biocatalytic production of NADH and aromatic/aliphatic aldehydes

Biotechnology, enzymatic reduction of carboxylic acids, reduction of NAD⁺, „NADH recycling“, PtX-technologies

DESCRIPTION OF TECHNOLOGY

Biotechnological processes are essential methods for the sustainable production of numerous types of chemical compounds, base chemicals as well as functionalized specialty chemicals. For the efficient run of fermentation processes it is generally also very supportive to provide sufficient supply of NADH, the universal „energy compound“ for nearly all biological processes in cells.



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Surface Chemistry

The invention presented herein provides a biocatalytic (enzymatic) process for the reduction of either carboxylic acids (primarily providing aldehydes and subsequently alcohols) or NAD⁺ (providing NADH). The process is using the enzyme aldehyde oxidoreductase (AOR, left) as biocatalyst and requires only hydrogen as readily available and cheap reductant.

APPLICATION FIELDS

The first variant of the biocatalytic reduction process is well suited for the manufacturing of flavouring compounds (aldehydes) and biofuels (alcohols), the second variant is applicable for improving all types of fermentation processes, for it provides a facile way of „NADH-recycling“ during fermentation processes generally. The products from the first variant can also be used as intermediate compounds for chemical synthesis (production). Thus the application fields of the invention are quite manifold.

AT A GLANCE ...

Application Fields

- Fermentation processes of all types

Business

- Chemical manufacturing generally
- Production of biofuels, flavouring compounds, chemical intermediate compounds
- Recycling of NADH (from NAD⁺)

USP

- Simple application of hydrogen as reducing agent
- Easily adjustable to the product of desire.

Development Status

- Both variants are shown to be running on laboratory scale.

Patent Status

Priority applications filed on 29.03.2021 at the Polish Patent Office.

ADVANTAGES OVER THE PRIOR ART

The biocatalytic reduction process is already elaborated in two variants, the first one providing chemical compounds which can be directly used for different purposes, the second one being a NADH-recycling process which can be easily „attached“ to already existing fermentation processes in order to enhance their performance.

The biocatalytic reduction process is working with hydrogen as sole reducing agent, thus being perfectly predestined for the application of „green“ hydrogen for chemical synthesis (PtX-technologies).

STATE OF THE PRODUCT DEVELOPMENT

The applicability of both variants are proven to be working on laboratory scale. Further development is already under way.

MARKET POTENTIAL

Due to the broad applicability of the biocatalytic reduction process, especially in connection with PtX-processes, it is considered to have high market potential in the area of sustainable chemical production, thus effectively supporting the „metamorphosis“ of the chemical industry towards being based on renewable feedstock.

COOPERATION OPPORTUNITIES

On behalf of its shareholder Philipps-Universität Marburg TransMIT GmbH is looking for licensees or cooperation partners for further development in Europe and worldwide.

A TECHNOLOGY OF



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