TECHNOLOGY OFFER

Biocatalytic Synthesis of Enantiopure Monoterpenes

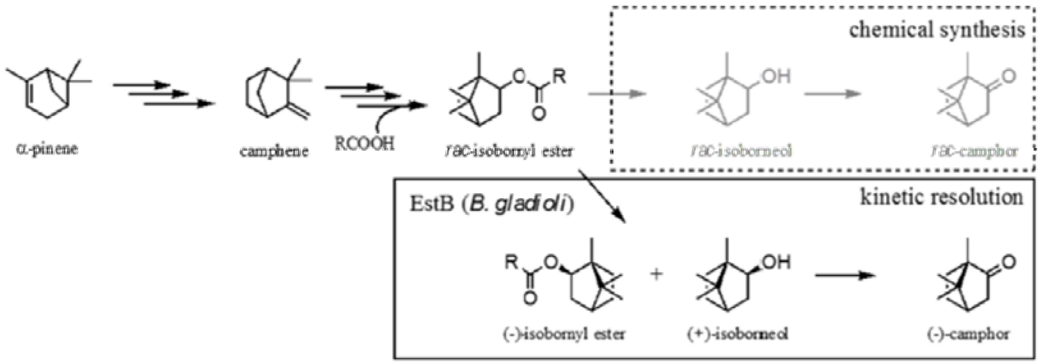
The technology provides a biocatalytic method for the hydrolysis of bicyclic monoterpene esters using a set of hydrolase enzymes that can convert these challenging substrates with high stereoselectivity. This process enables the production of enantiopure monoterpenes from racemic mixtures and consequently opens up new routes for the efficient synthesis of high value chemicals, e.g. (-)-camphor, for which there is a growing market in the pharmaceutical, cosmetic, and chemical industry.

BACKGROUND

The demand for enantiopure, bicyclic monoterpenes is constantly growing in the chemical industry. These compounds are generally extracted from renewable sources, sometimes as byproducts, e.g. in the pulp & paper industry. This makes them a promising feedstock for the petrol-independent, sustainable synthesis of chemicals. Their accessibility is, however, often limited due to difficulties in separating their steric isomers. For example, α-pinene is easily transformed to racemic camphor (Figure 1, upper panel), while there is so far no efficient path to enantiopure (-)-camphor.

TECHNOLOGY

This invention represents an elegant tool to access a range of bicyclic monoterpene target products in their enantiopure form. A subset of hydrolases has been discovered (and engineered) that accepts bicyclic monoterpene esters and converts these challenging substrates with high stereoselectivity, resulting in the efficient resolution of the racemic substrate mixture into an enantiopure alcohol and an ester fraction, which are easy to separate into two distinct product streams for further processing. This method allows for the efficient production of compounds that are otherwise hard to access, such as (-)-camphor (Figure 1, lower panel).



ADVANTAGES

The technology offers the following benefits:

- cofactor independent (cheap)
- mild reaction conditions (energy efficient)
- environmentally friendly (no harmful waste)
- renewable feedstock (sustainable)

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KEYWORDS:
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INVENTORS:

- Robert Kourist
- Elia Calderini
- Ivana Drienovska
- Helmut Schwab

COOPERATION OPTIONS:
License Agreement
Transfer of Rights
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CONTACT:

Alexander Muhr
Graz University of Techology
Research & Technology House
Mandellstraße 9/II
8010 Graz
T: +43-(0)316-873 6924
alexander.muhr@tugraz.at
www.tugraz.at/go/ft-haus