



Biotechnological synthesis of pure ingredients of natural essential oils

Essential oils from plants contain a wide variety of fragrance molecules. These compounds are often used as mixtures, either from plant extract or from chemical synthesis. We have developed an enzyme platform that allows the selective synthesis of the pure isomers of several monoterpenoids from bio-based precursors.

BACKGROUND

Essential oils from plants contain mixtures of bioactive natural products. Monoterpene alcohols and ketones find wide application as ingredients of fragrances. These compounds are often used as complex mixtures either from plant extracts or from their chemical derivatization. For instance, 'synthetic borneol' and 'semi-synthetic borneol' are mixtures of different borneol isomers stemming from the chemical reduction of racemic camphor or (+)-camphor, respectively. The use of pure compounds offers a better control of the olfactory effects of a fragrance.

TECHNOLOGY

Biocatalysis allows the synthesis of these products in high purity from inexpensive bio-based starting material under sustainable conditions. By genome mining and enzyme engineering, researchers from acib in collaboration with the Fraunhofer IGB have developed an enzyme platform for the stereoselective conversion of bicyclic monoterpenoids (Figure 1). The enzyme platform allows the synthesis of biocatalytic synthesis of the pure enantiomers in optically pure form with outstanding selectivity (>99% ee/>99% de) from the inexpensive bio-based starting material α -pinene.

OFFER

acib offers expertise for the further up-scale and optimization of the process and the expansion of the platform for the synthesis of pure monoterpenoids by genome mining and directed enzyme evolution.

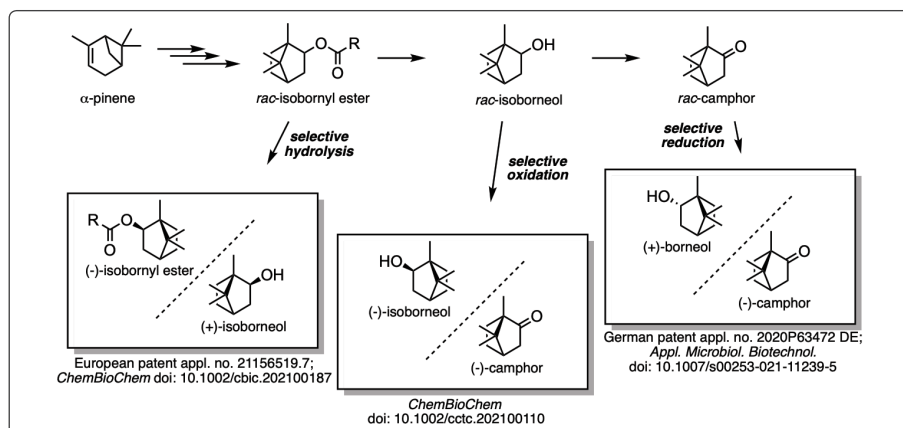


Figure 1: A selective enzyme platform for the synthesis of bio-based, optically pure monoterpenoids.

EXPERTS

Prof. Dr. Robert Kourist
Prof. Dr. Harald Pichler

AVAILABLE FOR

- Joint Research Project
- Contract Research

DEVELOPMENT STATUS

Technology Readiness Level 2-3

KEYWORDS

- Biocatalysis
- Genome Mining
- Enzyme Evolution
- Fragrance & Flavor
- Monoterpenoids
- Selective synthesis

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