



## acib Project Offer

### Biotechnological production of Flavor & Fragrance compounds (**BioF&F**)

*Looking for innovations in natural flavor & fragrance production? The **BioF&F** research and development pipeline of acib provides customized, cost effective and efficient production routes for flavor & fragrances, meeting the demands of industry as well as consumers for natural, environmentally-friendly and affordable products.*

#### BACKGROUND

Currently, most commercial essential oils are derived from the original plant species, in which the products accumulate. However, these plant-based production lines have inherent disadvantages. Extraction from plants suffers from inadequate yields due to slow biomass growth or low product concentrations, risk of plant diseases or seasonal and climatic influences and batch-to-batch variations. Thus, both prices and quality strongly fluctuate, hampering commercial exploitation. Chemical synthesis, however, is neither environmentally-friendly, nor does it lead to “natural” products.

Biotechnological production routes are performed under mild conditions, offer **high product selectivity**, do not generate toxic waste, and the products obtained can be **labelled as “natural”**, thus, satisfying the (consumer) trend towards all 'natural' products in the food, feed, perfumery or personal care sectors. The market value of these natural flavour & fragrance compounds is usually far above their synthetic counterparts. Thus, flexible, customizable and **efficient production routes and processes** for a variety of natural flavour & fragrance compounds are in high demand.

#### TECHNOLOGY

We have extensive experience in the biosynthesis and conversion of hydrophobic and volatile flavor & fragrances e.g. terpenes, with metabolically engineered and optimized microbial cells (WO2015162305 A1; Wriessnegger et al., 2014 and 2016; Emmerstorfer et al., 2015; Hirz et al., 2013). Our approaches to metabolic and enzyme engineering lead to **innovative strategies for biotechnological production of natural flavor and fragrance compounds** using yeasts or bacteria as whole cell biocatalysts.

#### OFFER

We offer our **BioF&F development services** applicable not only in flavor and fragrances but also in pharmaceuticals, (agro)chemicals, food and feed or personal care. These services include (1) discovery and selection of appropriate biosynthetic enzymes (bioprospecting), (2) pathway design and engineering (3) development of reliable analytical and downstream processing tools for product recovery and refinement, (4) optimization and up-scaling, (5) support for industrial implementation.

#### KEYWORDS:

- flavor & fragrance
- natural aroma
- biosynthesis
- terpene

#### acib-Experts:

Assoc. Prof. Dr. Harald Pichler  
Dr. Tamara Wriessnegger

#### AVAILABLE FOR:

- Joint Research Project
- Contract Research

#### Development Status:

Proof of concept  
TRL 2-4

#### CONTACT:

Dr. Martin Trinker  
ACIB - Austrian Centre of  
Industrial Biotechnology  
Director Business Development

Krenngasse 37/2  
8010 Graz  
T: +43 316 873 9316  
F: + 43 316 873 9302  
martin.trinker@acib.at