



innovations from nature



acib Project Proposal

Biotechnological synthesis of natural insect repellents

Essential oils from plants contain natural insect repellents. While the separation of the complex essential oils is difficult, newly discovered terpene synthases give unique access to pure ingredients of the oils. We offer a biotechnological approach for sesquiterpene alcohols activity against ticks and mosquitoes.

Background

Essential oils from plants contain mixtures of bioactive natural products. Terpenoids from *Geranium* act as insect repellents. Tests showed activity against medically relevant tick nymphs and the yellow fever mosquito *Aedes aegypti*. While essential oils are costly and difficult to separate, the isolation of the biosynthetic enzymes gives access to the pure ingredients. In a genome sequencing project, we have succeeded in the discovery of enzymes for the production of different eudesmols (Figure 1). The biotechnological production of these sesquiterpene alcohols gives access to “natural” repellents.

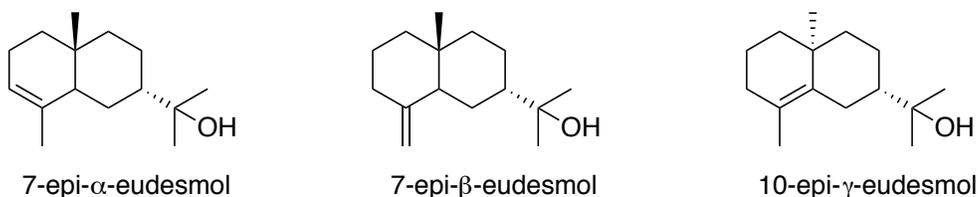


Figure 1: Terpene synthases allow the synthesis of pure constituents of essential oils from plant. The shown eudesmans showed activity as repellants against ticks and mosquitoes.

acib-Technology

Integration of the novel terpene synthases into microorganisms allows the synthesis of the individual bioactive terpenoids. Metabolic engineering and process engineering are efficient methods to raise production levels and reduce cost. By protein engineering, tailor-made enzyme variants are generated that form different or even entirely new products. Moreover, additional enzymes for further functionalization can be coupled to the terpenoid synthesis. This provides you with access to new bioactive structures. By metabolic engineering and process engineering, high concentrations of the pure compounds can be obtained.

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We offer you unique access to the bioactive sesquiterpene alcohols, as well as functionalization of these compounds, the further up-scale and optimization of the process.

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