

Paid Master Thesis

„ Statin synthesis via heterogeneous (bio)catalysis “

Statins are the active pharmaceutical ingredient (API) of many cholesterol lowering drugs. Their structure consists of the typical statin side-chain possessing two chiral alcohols linked to a heterocyclic core. This side-chain can be synthesized from simple and inexpensive starting materials via a two-step aldol condensation catalyzed by an enzyme called DERA (2-deoxyribose-5-phosphate aldolase). The side-chain can either be directly built at the core of the molecule or linked to the heterocyclic core subsequently via a C-C coupling reaction catalyzed by Palladium.

The goal of this work is to investigate the biocatalytic step in this synthetic route. A number of substrates, such as acetaldehyde, chloroacetaldehyd, benzaldehyde and cinnamaldehyde, will be testes as acceptors in the aldol condensation. The obtained product will be characterized and evaluated according to their potential for serving as intermediate in the synthetic route of statins. Further the enzyme (enclosed in E. coli cells) will be immobilized in order to apply it in a continuous process.

The results of this thesis will serve in the development of an integrated multistep process for the synthesis of statins consisting of a biocatalytic and a metal-catalyzed step.

The objectives of this work are:

- Substrate screening in batch
- Immobilization of the enzyme/cells for the application in a continuous process
- Purification and characterization of the products (NMR)

We offer:

- **payment** according to the FWF-rate (€440/month)
- a comprehensive **introduction** to the research topic
- access to novel experimental and analytical devices
- individual assistance for an **efficient realization** of the thesis

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