

CLIB²⁰²¹ Project:

Optimization of the accessibility of microbial secondary metabolites

The accessibility of microbial low-molecular natural products will be increased through the development of new methods of downstream processing and innovative chromatography procedures. The evaluation and optimization according to established procedures and methodologies are accompanied by comprehensive HPLC DAD/MS analytics. After optimization of the fermentation conditions first the isolation and structural clearing-up of the most important metabolites will be accomplished by 2D NMR and HR-MS. The resulting pure compounds will be used to establish quantitative analytical procedures, which are indispensable for process optimization.

A major research target of the project is the development of a heuristic based process synthesis procedure which will allow synthesizing process concept options based on physical property data and few scouting experiments. Mass and energy balances will allow an economic evaluation of the process concepts. Because of high dilution rates and the large solvent employment thereby above all chromatographic separation steps are deemed important, which are inevitable if pure compounds are to be obtained from complex mixtures. Therefore the technical goal of the project lies in the advancement and scale-up of CPC (Centrifugal partition Chromatography) technology, which already represents a valuable alternative to the conventional liquid chromatography, but is at present still limited to small mass flows.

The approach outlined above will accelerate and improve development of bioactive secondary metabolites, thereby increasing their market chances and intrinsic value significantly. The new methods and technologies can as well be applied to numerous similar scenarios associated with downstream processing of commercially interesting low-molecular secondary metabolites in the Biotech, Agro and Pharma industry, including natural products from plants.

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Contact:

Dr. Marc Stadler
InterMed Discovery GmbH
Otto-Hahn Str. 15, D-44227 Dortmund
Tel: +49 (0)231-9742-6065
e-mail: marc.stadler@intermed-discovery.com