



White Biotechnology with Plant cells

Development of a process for the production of plant active substances for the food, wood, pharmaceutical and cosmetics industry

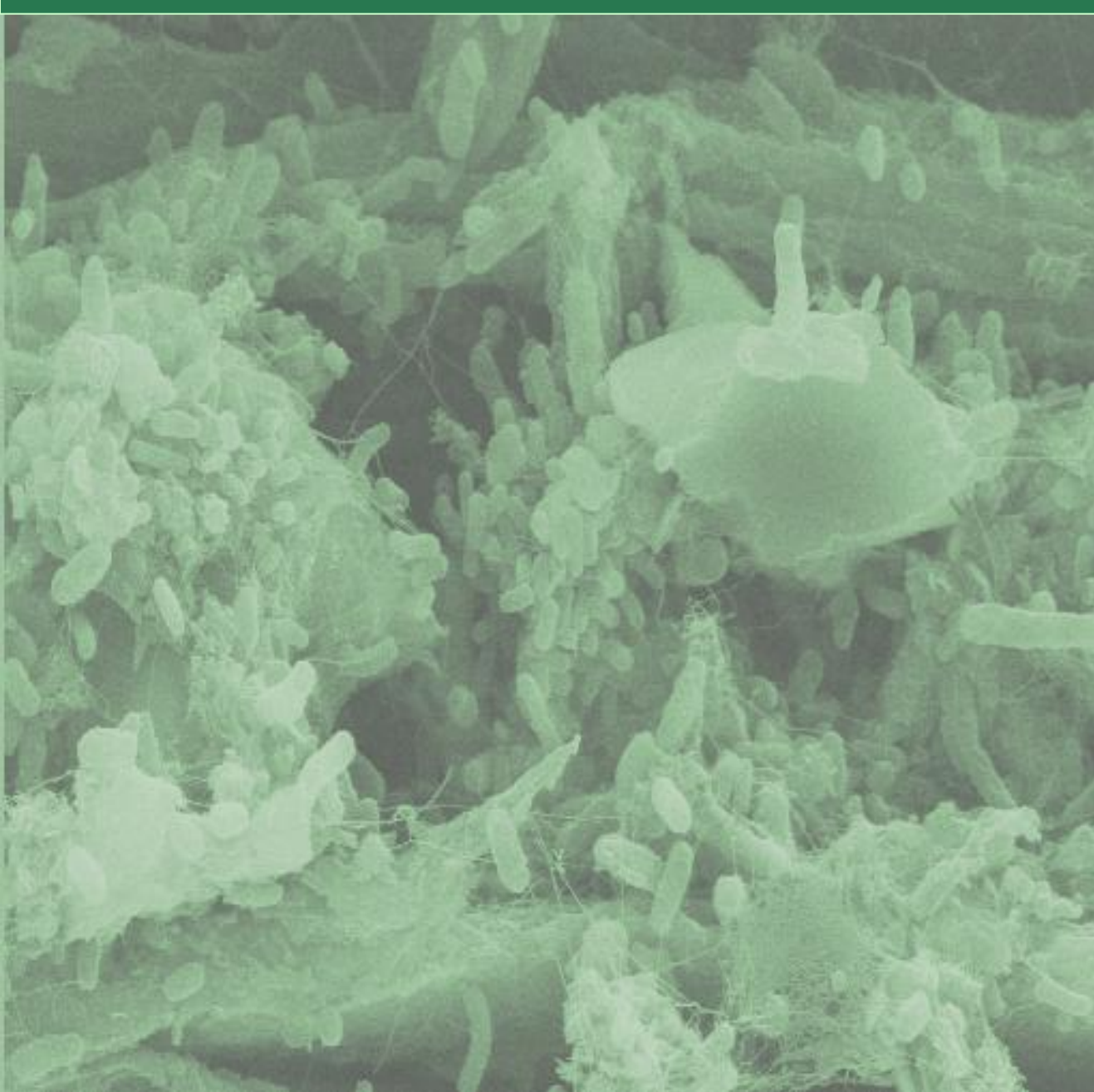
F. Lenk¹, Ch. Haas¹, K. Geipel¹, S. Schulz¹, A. Lippert², J. Püschel², J. Endrikat³, A.-K. Hüske³, H. Delenk⁴, T. Bley¹, A. Wagenführ⁴, E. Günther³, J. Ludwig-Müller⁴ & J. Steingroewer¹

¹ Institute of Food Technology and Bioprocess Engineering, Dresden University of Technology, 01062 Dresden, Germany

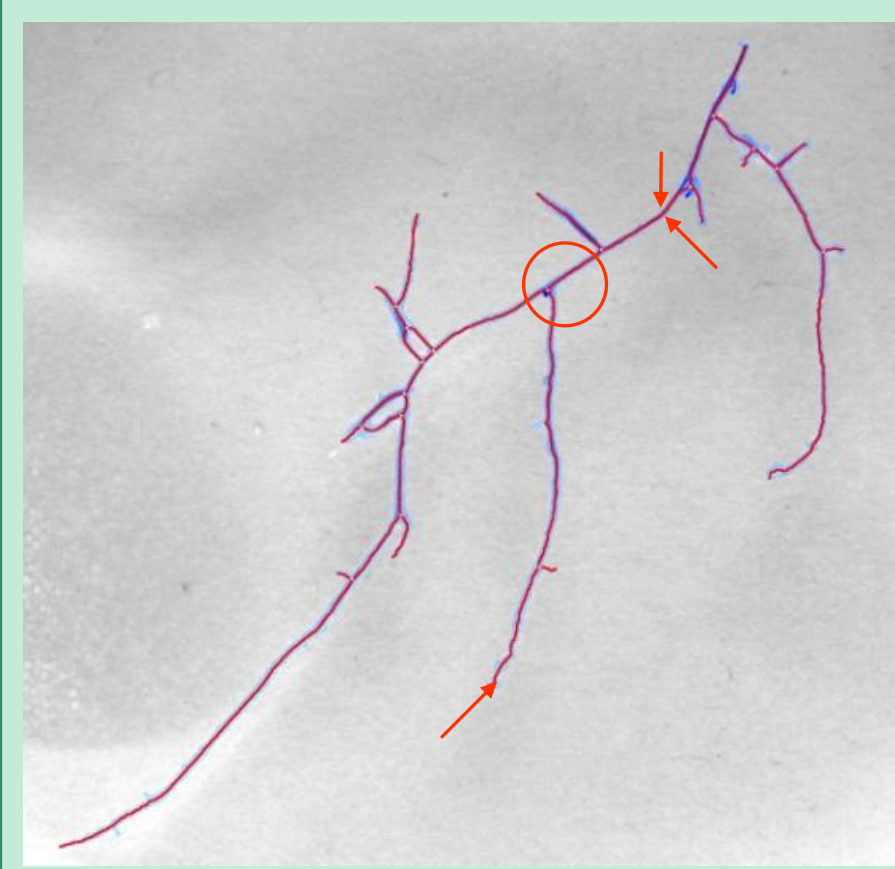
² Institute of Botany, Dresden University of Technology, 01062 Dresden, Germany

³ Chair of Business Administration, especially Environmental Mgmt. and Accounting, Dresden University of Technology, 01062 Dresden, Germany

⁴ Institute of Wood and Paper Technology, Dresden University of Technology, 01062 Dresden, Germany



Structured growth models for simulation and visualization of growth morphology and distribution of secondary metabolites in Hairy root organ complexes.

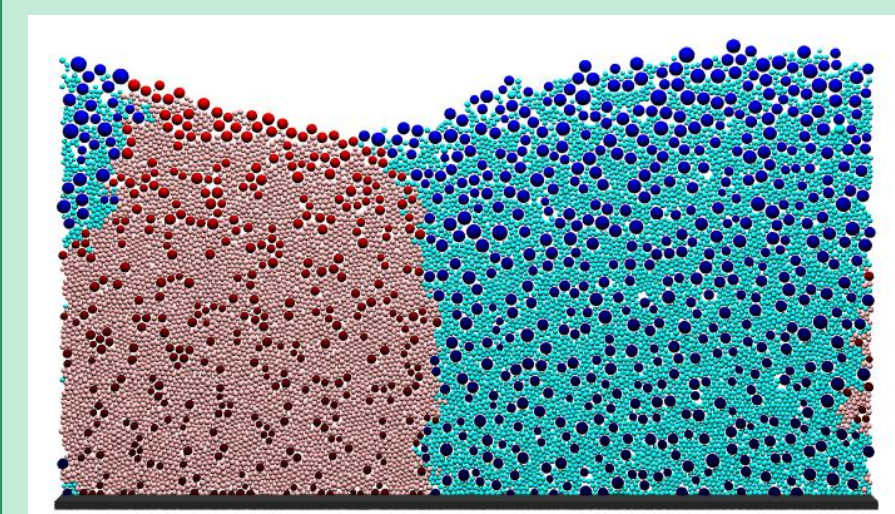


Modeling and Simulation



DRESDEN UNIVERSITY OF TECHNOLOGY

Institute of Food Science and Bioprocess Engineering



Individual-based Models for the growth of plant cell and tissue cultures.

Analytical optimization of process control and design of bioreactors for plant cell and tissue cultures.

Raw material

Selected model organisms produce scientific and economical relevant active agents and additives as secondary metabolites.



Sunflower (α -Tocopherol)



Salvia (Triterpenes)



Rootbeet (red dye Betanin)

Induction & Cultivation

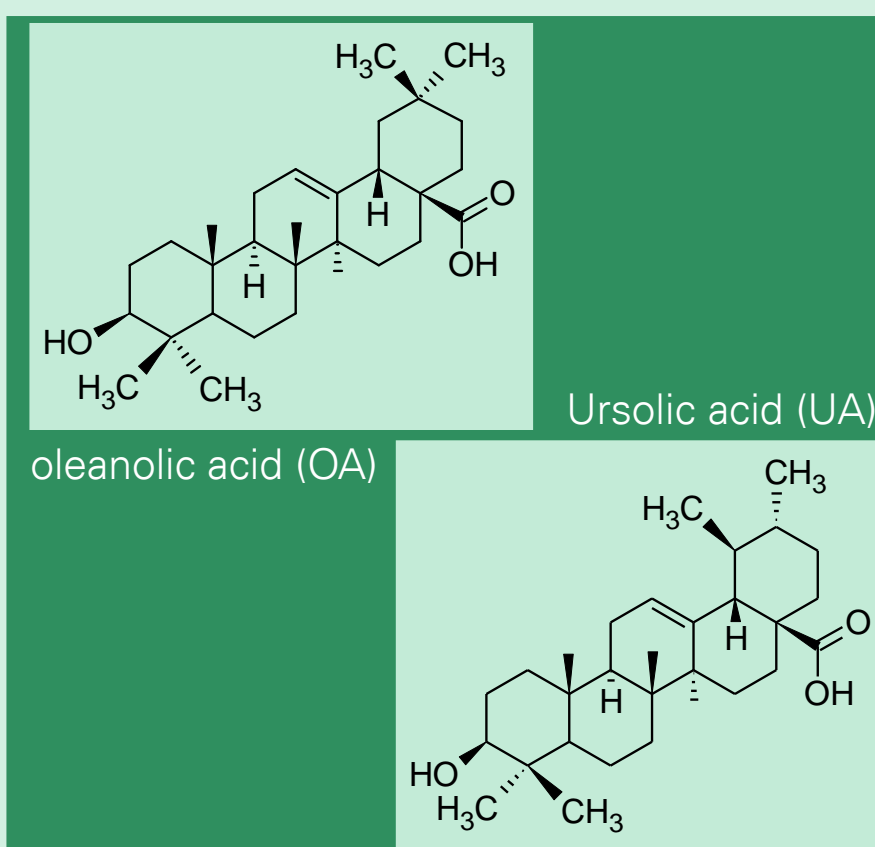
Generation of undifferentiated cell-tissues (callus) with hormone addition as well as Hairy root organ complexes with the help of *Agrobacterium rhizogenes*.



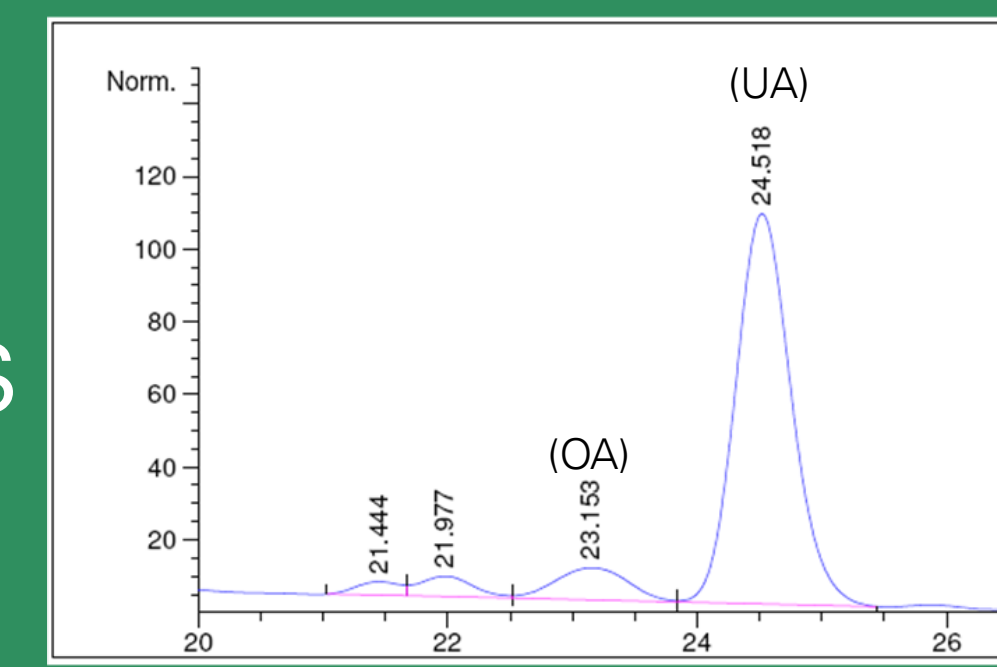
Callus cultures



Hairy roots



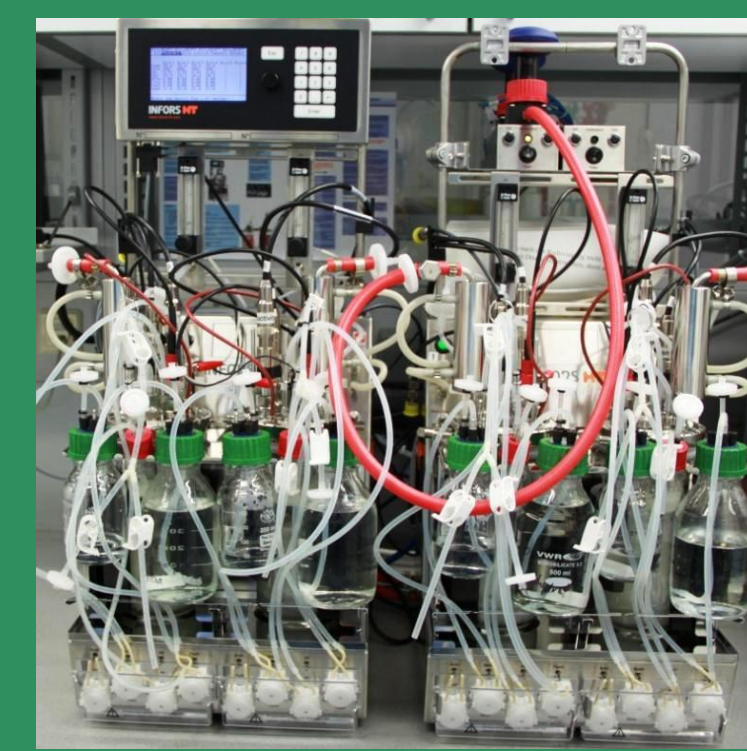
Analytics



HPLC-Chromatogramm of Salvia-callus extracts

During the screening of the cell lines the concentration of the active agents is determined with HPLC and GC-MS.

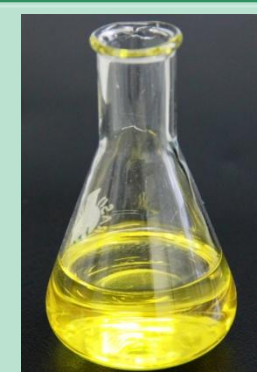
Up-scale Processing in bioreactor systems



Transfer of Callus- and Hairy root cultures in a parallel bioreactor system for experimental determination of optimal cultivation conditions in pilot plant station scale.

Final product after downstreaming

Subsequent to the fermentation the downstream processing and extraction of the desired target products from the bulk volume takes place.



α -Tocopherol

Triterpenes (e.g. oleanolic acid)



Application

Usage of these ultra-pure, sustainable and with constant quality produced extracts as preservatives, dye and active additive in food (e.g. vitamine E) etc..



Food additives (E162 & E307)



Fungicides (natural wood preservatives)

Analysis of the economical potential of White Biotechnology in Germany based on a periphery and market analysis.

Ecological validation and optimization with respect to flow patterns of materials and component substances.

Ecological & economical assessment, eco-balance, hurdle analysis

Analysis of environmental effects of the industrial application of biotechnological processes (Life Cycle Assessment).

Innovation-barrier research with expert interviews included in a Delphi-study.

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Contact details:

Dipl.-Ing. Felix Lenk
fon: +49 351 / 463 36943
fax: +49 351 / 463 37761
e-mail: felix.lenk@tu-dresden.de