



Fraunhofer
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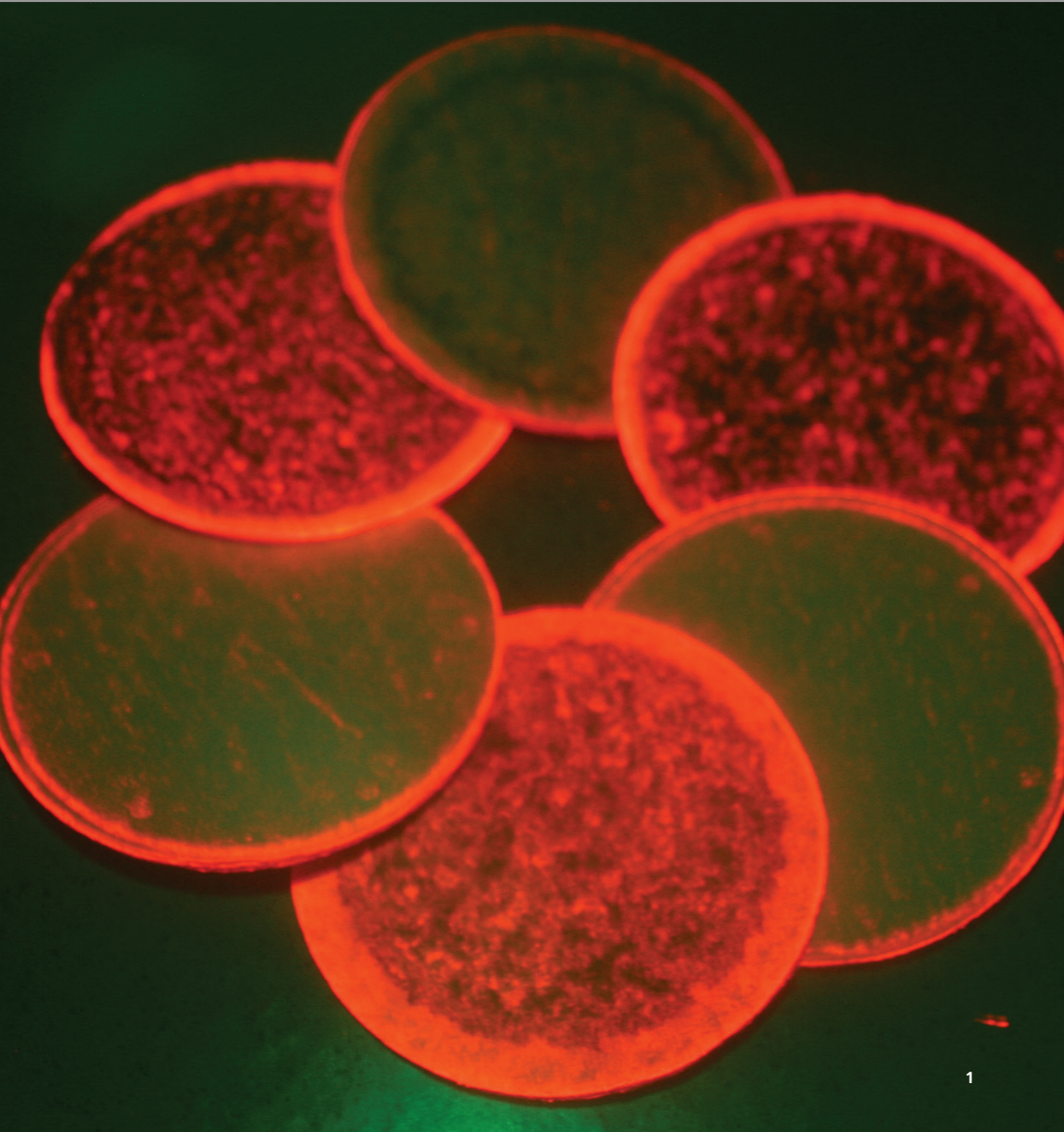
FRAUNHOFER INSTITUTE FOR MOLECULAR BIOLOGY AND APPLIED ECOLOGY IME

**MOLECULAR BIOTECHNOLOGY
RESEARCH, DEVELOPMENT AND SERVICES**





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BIOPROCESS ENGINEERING

1 *Depth filter layer used for fluorescence protein purification*
© Fraunhofer IME / Johannes Buyel.

2 *30 L fermenter for the cultivation of bacteria, yeast, animal and plant cells* © Fraunhofer IME / Birgit Orthen.

- Feasibility studies for the production of recombinant proteins in various expression systems in the milligram scale
- Identification of manufacturable product variants from groups of several thousand candidates
- Design of cryopreservation protocols for long-term storage and cell banking of plant cell cultures
- Development of cost-effective expression and chromatographic purification processes for technical enzymes and biopharmaceuticals in less than six weeks
- Revision of existing bioprocesses to reduce running costs and to increase profits, taking into account device and product specifications
- Analysis of bioprocesses and associated models regarding the requirements of a quality-by-design approach

Contact

Dr. Dr.-Ing. Johannes Buyel
Phone +49 241 6085-13162
johannes.buyel@ime.fraunhofer.de



FUNCTIONAL AND APPLIED GENOMICS

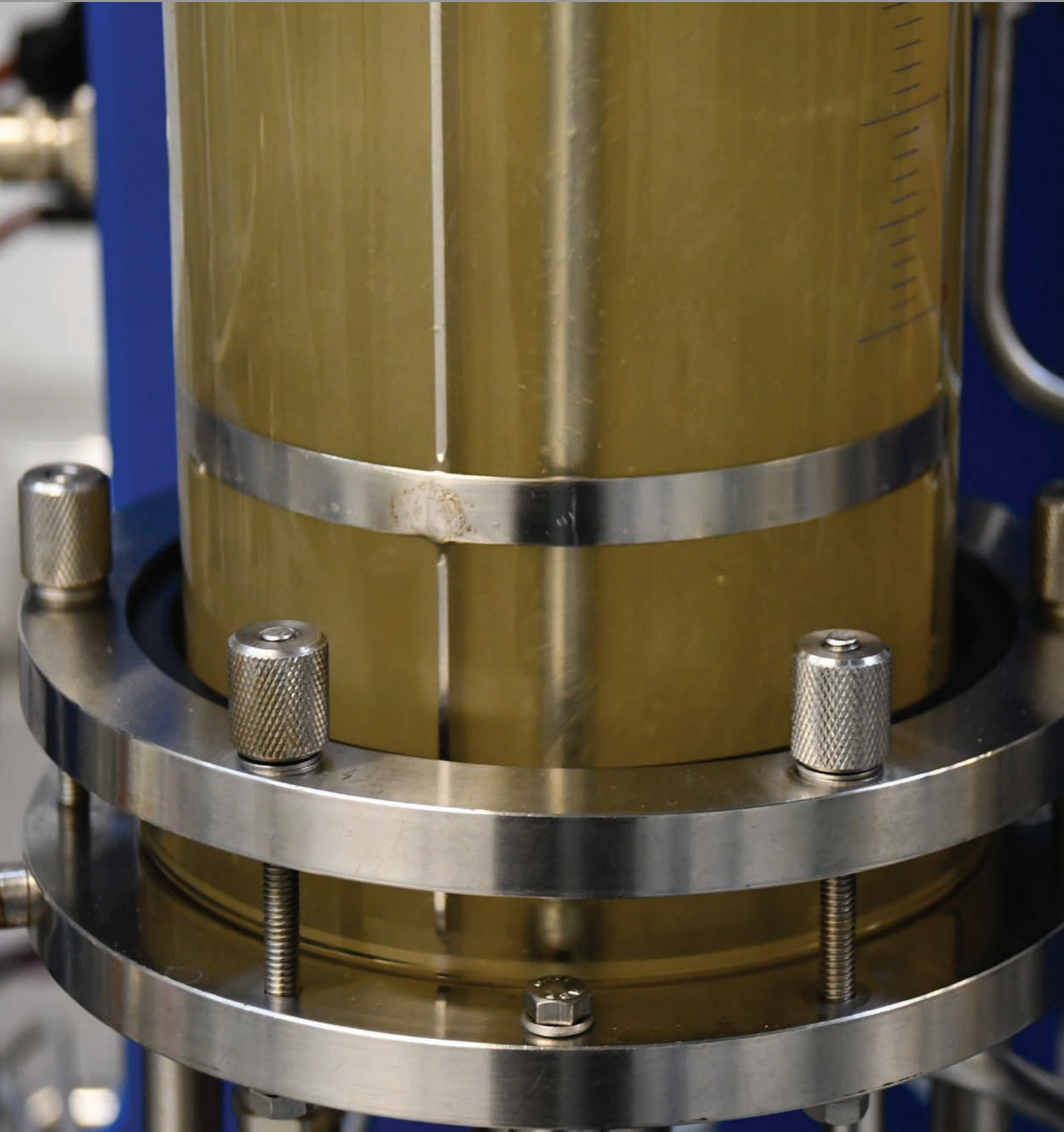
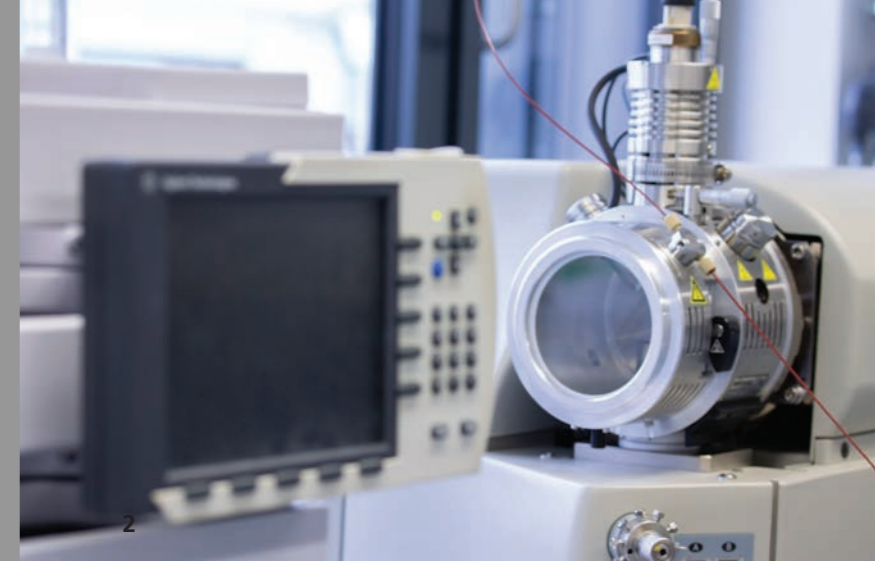
1 *Flowers of potato plants (Solanum tuberosum L.), one of the most important staple crops in Europe © Fraunhofer IME / Birgit Orthen.*

2 *Latex production by dandelion (Taraxacum kok-saghyz L.E. Rodin) © Fraunhofer IME.*

- Engineering of plant metabolic pathways
- Optimization of plant-derived polymers
- Improvement of plant biomass and morphology
- Identification and characterization of active ingredients from medicinal plants
- Functional gene analysis in plants and cell culture
- Crop genetic improvement by classical and modern breeding technologies such as TILLING and CRISPR-CAS

Contact

Prof. Dr. Dirk Prüfer
Phone +49 251 8322-302
dirk.pruefer@ime.fraunhofer.de



INDUSTRIAL BIOTECHNOLOGY

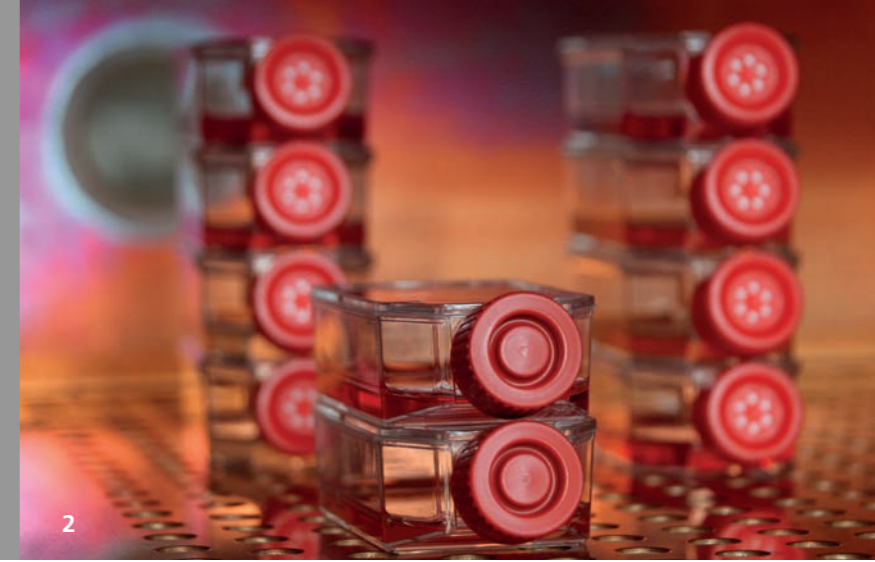
1 *Cultivation of bacteria*
© Fraunhofer IME / Birgit Orthen.

2 *QTRAP LC-MS/MS System for the analysis of peptides and metabolites* © Fraunhofer IME / Sebastian de Vries.

- Development of biofuels and bio-chemical concepts
- Metabolic engineering of microorganisms (including metabolomics and flux analysis)
- Synthesis gas fermentation
- Classical strain development of aerobic and anaerobic microorganisms (genome shuffling, chemical mutagenesis and high-throughput-screening)
- LC-MS/MS and GC-MS/MS analysis, including targeted proteomics and metabolomics
- Phytochemistry and natural product analysis, in particular of terpenes including cytochrome P450 monooxygenases
- Working with radioisotopes (^{14}C , ^3H , ^{32}P) for the elucidation of metabolic pathways and importer/exporter studies
- Screening for novel biocatalysts based on quorum sensing quenching
- Development of tailor-made biocatalysts using guided protein evolution

Contact

Dr. Stefan Jennewein
Phone +49 241 6085-12120
stefan.jennewein@ime.fraunhofer.de



PLANT BIOTECHNOLOGY

1 *Sampling of tobacco leaves*
© Fraunhofer IME / Dirk Mahler.

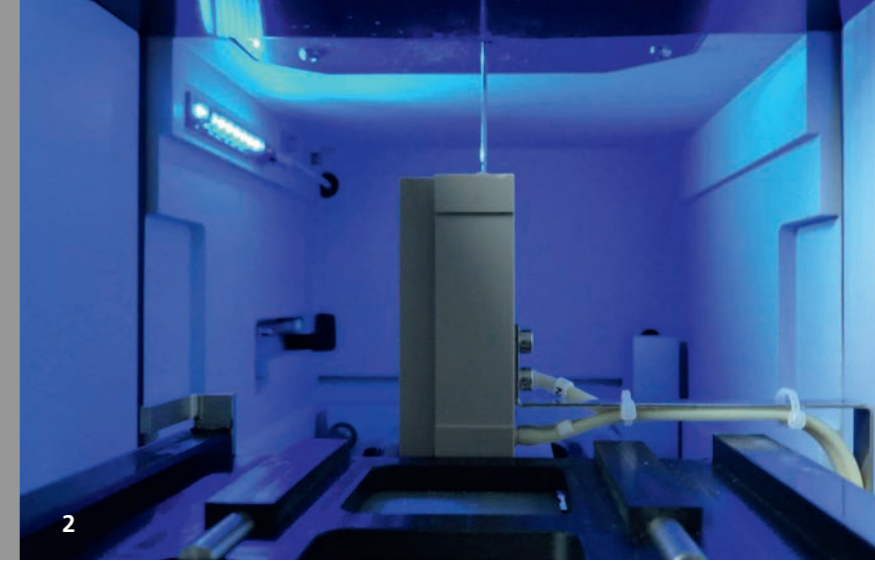
2 *Cultivation of cells*
© Fraunhofer IME / Anne
Peuscher.

- Identification, cloning and optimization of target genes
- Genome Editing
- Plant transformation and development of crops with improved stress tolerance and agronomic traits
- Metabolic engineering to improve metabolic pathways
- Production of technical proteins and recombinant pharmaceuticals in microbes, plants as well as plant and mammalian cell cultures
- Cell-free biosynthesis of proteins and metabolites
- Optimization of process and cultivation conditions through statistical experimental design
- Development of novel purification strategies
- Characterization of recombinant proteins
- Proteomics
- Flow-cytometric analysis and cell sorting
- High-content imaging/screening and assay development for plant and animal cells
- Development and production of plant stem cell lines

Contact

Dr. Stefan Rasche
Phone +49 241 6085-12321
stefan.rasche@ime.fraunhofer.de

Holger Spiegel
Phone +49 241 6085-12461
holger.spiegel@ime.fraunhofer.de



CONTACT CONTRACT SERVICES

1 *Pipetting robot*

© Fraunhofer IME / Birgit Orthen.

2 *Surface plasmon resonance*

© Fraunhofer IME / Holger Spiegel.

Assay development for high-content screening

Stefano Di Fiore
Phone +49 241 6085-10460
stefano.difiore@ime.fraunhofer.de

DNA sequencing / DNA fragment analysis

Dr. Jost Muth
Phone +49 241 6085-12050
jost.muth@ime.fraunhofer.de

Metabolic engineering and natural products

Dr. Stefan Jennewein
Phone +49 241 6085-12120
stefan.jennewein@ime.fraunhofer.de

Flow cytometry analysis and cell sorting

Simon Vogel
Phone +49 241 6085-13161
simon.vogel@ime.fraunhofer.de

Generation and production of monoclonal antibodies

Dr. Nicole Raven
Phone +49 241 6085-12412
nicole.raven@ime.fraunhofer.de

Biacore interaction analysis (SPR)

Dipl.-Biol. Holger Spiegel
Phone +49 241 6085-12461
holger.spiegel@ime.fraunhofer.de

Bioprocess development

Dr. Dr.-Ing. Johannes Buyel
Phone +49 241 6085-13162
johannes.buyel@ime.fraunhofer.de

Recombinant protein production

Dr. Stefan Rasche
Phone +49 241 6085-12321
stefan.rasche@ime.fraunhofer.de

