Master's Thesis

Bacterial gas fermentation

Looking for a master thesis in the field of bacterial fermentation and CO_2 valorization? Want to gain experience in an international working group? Then dive into the exciting world of CO_2-metabolising bacteria producing isopropanol and help us to further improve the fermentation process. Us is the working group of Prof. Dr. Stéphane Guillouet at the Toulouse Biotechnology Institute (TBI), INSA Toulouse.

Project overview One of the challenges in the transition process of our linear economy to a circular one is the utilization of industrial gaseous off-streams. A promising solution involves employing the bacterium *Cupriavidus necator*, capable of metabolizing CO_2 and producing industrial products such as PHB or alcohols. Our focus is on genetically engineered strains, producing isopropanol – a disinfectant needed in high amounts, and also a sought-after chemical for cosmetics and household products. However, limited knowledge exists about the bacterial gas requirements during growth and product formation.

You would conduct your master's thesis in cooperation with a doctoral candidate whose PhD thesis focuses on the characterization of the process, including the comparison of several genetic-engineered strains, the calculation of gas uptake rates, and the uptake of trace elements. The master thesis topic can be tailored to the candidate's interests, leaning towards the characterization of fermentation kinetics in the bioreactor, medium optimization, or strain comparison.

Why choose us? The laboratory where you will conduct your master's thesis has extensive experience in the field of fermentation and bioprocessing and is equipped with modern facilities adhering to the latest technological standards. You will collaborate with a dynamic team primarily composed of international PhD students and engineers.

Methods Aerobic, autotrophic cultivation of *Cupriavidus necator* in gas bioreactor and/or shake flasks, Analytical methods (HPLC, GC-MS, ICP-MS, HIPC, off-gas analytics)

Your qualifications:

- Master's student (f/m/d) in Biotechnology, Bioengineering, Biology, or a related field
- Experience in microbial cultivation required
- Fluent in both written and spoken English
- Highly motivated and independent person with the drive to learn and develop

The position is available **from April 2024**. For the master thesis, a period of 6 months is planned. Feel free to contact me via e-mail with further questions or send me directly your CV and current transcript of records.

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