



Tübingen, 09.10.2020

**MASTER-THESIS / INTERNSHIP:**

**Comprehensive life cycle sustainability assessment (LCSA) of a process combining microbial and electrochemical conversions**

Within the framework of the BMBF-funded MolkeKraft project, a process for microbial-electrochemical conversion of acid whey for the production of drop-in fuels for aviation is investigated. The MolkeKraft process is a multi-stage process. The first stage is a two-phased temperature-controlled microbial conversion that converts acid whey to medium-chain carboxylic acids (MCCAs). After the extraction of the MCCAs from the fermentation broth, the MCCAs can be further converted to a mixture of alkanes by electrochemical conversion, a process called Kolbe electrolysis. The mixture of alkanes then can serve as a drop-in fuel for aviation as it shows kerosene-like combustion properties. The feasibility of the two process stages has already been proven, but only separately. In the MolkeKraft project, these processes are now to be coupled with each other.

The potential for the application of the overall process will be evaluated based on data gained from lab-scale experiments. The evaluation will be carried out with the help of a comprehensive life cycle sustainability assessment (LCSA). The approach is software-based and provides under a single umbrella the modeling of manufacturing and end-of-pipe treatment processes, scaling, project economic evaluation, de-bottlenecking of the process line, and environmental impact assessment. The advertised position focuses on assessing specifically the microbial conversion stage of the MolkeKraft process.

Qualified candidates have a Bachelor's degree or intermediate diploma in biotechnology, business economics, process engineering, or related fields and are interested in computer-aided modeling approaches. Very good English language skills are necessary. German language skills are helpful but not a requirement. Other requirements include the ability to do work independently and in a team, communication skills, and a high motivation.

The candidate will learn about bioprocess fundamentals using bioreactors as well as economic aspects within an application-oriented focus. These fundamentals will help the candidate to use the software SuperPro Designer as the tool to conduct the LCSA. For an improved learning curve, the candidate receives co-supervision by an experienced SuperPro Designer user.

The project is designed for a Master's thesis or a 6-month internship. The work on the project is carried out in presence work. Remote work is not possible. Applications (in English), including a short cover letter, CV, transcripts, and diplomas should be sent by email to richard.hegner@uni-tuebingen.de. Applications will be accepted until the position is filled.

**Dr. Richard Hegner**