

Master thesis project at Chalmers University of Technology, Division of Industrial Biotechnology, Department of Biology and Biological Engineering

Development of a lactic acid biosensor in yeast

Duration: 6-12 months (30 or 60 hp).

Preferred starting time: Flexible

Contact persons:

Maurizio Mormino (mormino@chalmers.se)

Yvonne Nygård (yvonne.nygard@chalmers.se)

One of the challenges of modern science is to lead the world towards a fossil-free society. A key role in this transition is played by the so-called “cell-factories”, model organisms employed in the bio-based industry to obtain more efficient ways to exploit renewable carbon sources (such as sugars) and produce commodity chemicals. With an estimated market of over 500'000 tons and an application field ranging from food industry to production of biodegradable polymers, **lactic acid** represents a valuable compound in modern society, and it can be produced naturally by various lactic acid bacteria and several yeast species. Moreover, the most widely used production host, the yeast *Saccharomyces cerevisiae*, has been genetically engineered to produce **lactic acid**.

The aim of this project is the development of a **genetic biosensor, sensing lactic acid**. A genetic biosensor is a molecular device that can be used for the detection of a specific compound. The biosensor transforms the signal resulting from the interaction of the target compound with a biological element into a quantifiable signal (e.g. fluorescence). The developed biosensor will be used for finding more robust and efficient cell factories with increased production of lactic acid. Efficient biochemical conversion of renewable carbon sources is crucial for the transition into a fossil-free society.

In this project the student will have the chance to work with molecular cloning and strain engineering, for developing and integrating the genetic biosensor into yeast. The work includes biosensor **characterization in high-throughput, fluorescence microscopy**, high performance liquid chromatography (**HPLC**) and gene editing using **CRISPR/Cas9 technologies**.

Applicants should have a background in **biotechnology/ microbiology / molecular biology / synthetic biology** or related fields.

If you are interested or have any questions, contact us!