VICAB – Blended Learning in Biocatalysis

Lukas Neutsch, Andrea Baier (ZHAW, Wädenswil)

Simon Crelier, Manfred Zinn (HES-SO Valais, Wallis)

Project Summary

Biocatalysis and bio-based production are key technologies for multiple branches of modern industry, including the pharmaceutical, fine chemical, cosmetic, food, and other sectors. However, many engineers, researchers and decision-makers are still unaware of the potential and possibilities offered by biocatalytic systems, which is also due to the fact that the **required, transdisciplinary skill set and background knowledge is underrepresented in the currently established education programs** on the tertiary level.

At Swiss Universities, the specialized expertise, equipment and training resources to cover the entire R&D value chain of biocatalytic production concepts (from gene to product) are readily available, but are **regionally distributed among different locations and/or research departments**. Having a truly multidisciplinary orientation, biocatalysis as a training subject needs to be open for **students from different scientific and professional backgrounds**, e.g. chemistry, biotechnology, molecular biology or process engineering.

The goal of this project is to develop an innovative course format for biocatalysis in life science BSc curricula, which is able to meet the above-named challenges by utilizing a **blended learning** concept. The core element of the new course will be an **online learning platform (*Virtual Campus Biocatalysis; VICAB*)** that serves as a framework to guide students through a step chain of eLearning activities and interlaced practical exercise sessions in the laboratory.

The *VICAB* will offer a **fully integrated training environment**, including knowledge resources and simulation tools as preparation for practical work, as well as a cloud database to combine and collectively analyse experimental data. Communication forums and virtual meeting rooms will be available for online discussions among groups and interaction with lecturers and external mentors from industry. Emphasis will be placed on self-directed learning, with student teams designing their own experimental strategies under supervision of lecturers and applying data handling and teamwork routines according to the *Industry 4.0* principle.

In the first implementation stage, *VICAB* will cover the two course modules on biocatalyst production (i.e. bioprocess development and enzyme purification/characterization). In further expansion stages, **additional course modules** (e.g. molecular biology, directed enzyme evolution, special biocatalytic applications) and **case studies provided by industrial partners** can seamlessly be integrated into the platform.