Exploiting the lignocellulose degrading potential of anaerobic fungi

Master thesis or practical training in Biology, Biotechnology or Bioengineering

Introduction
The cost-effective biotechnological production of biofuels, bulk and platform chemicals from lignocellulosic biomass is a prerequisite for the establishment of a bio-based economy. Anaerobic gut fungi belong to the most ancestral basal fungal lineages and have been identified in feces of a very wide range of herbivores (horses, elephants, sheep, cattle, etc.). They are an essential part of the gut microbiome in herbivores, responsible for effective digestion and the primary colonizers of ingested plant material. Recent “Omics-“ approaches showed that these fungi possess the greatest diversity of biomass degrading enzymes within in the fungal kingdom. This diversity will be exploited in this thesis.

Aims of the project
- Isolation of lignocellulose degrading enzymes from a culture of anaerobic fungi.
- Identification of the enzymes through peptide mass fingerprinting.
- Cloning of identified enzymes into Escherichia coli, Pichia pastoris or Saccharomyces cerevisiae and heterologous expression.
- Purification and characterization of the expressed enzymes.

Methods
- Anaerobic culture
- SDS-PAGE, native PAGE
- Peptide mass fingerprinting
- Cloning methods (heat shock, Li-acetate, electroporation)
- Protein purification with a Äkta system
- Liquid handling station (pipetting robot)
- DNS-Assay, 4-Nitrophenol-Substrate assays

Requirements
- 6 months of time during a master thesis or a practical training.
- Bachelor degree in biology, bioengineering or equivalent.
- Preferably experience in molecular biology and/or anaerobic culture.

Start of the project
As soon as possible.

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