Microbial fermentation of syngas/CO

My PhD project started in April 2009, under the supervision of professor Madalena Alves and professor Diana Sousa, from University of Minho, Portugal. During my third year of PhD program, I’m developing my research activities at the Department of Microbiology, University of Wageningen, Holland, under the supervision of Professor Alfons Stams and Doctor Caroline Plugge.

Syngas or synthesis gas is produced during the gasification of different materials, e.g. coal, oil and natural gas, tar sands, recalcitrant wastes, lignocellulosic biomass, and sewage sludge. The principal components of syngas are carbon monoxide (CO), hydrogen (H₂), and carbon dioxide (CO₂). Both catalytic and biological processes can be used for the production of biofuels and bulk chemicals from syngas. The development of novel bioprocesses for syngas conversion to added-value products is a promising field comprising some advantages over the chemical processes. However, biological conversion of syngas is still rather unexplored within the bioprocess engineering community.

The main objectives of my research are to explore the potential of biofuels or other valuable compounds production from syngas, and to get more insights about the microbiology of the syngas fermentation process. The screening of different anaerobic inocula, at different temperatures (mesophilic and thermophilic conditions), the achievement of enriched mixed cultures degrading syngas, and the isolation of new bacterial strains and further characterization is being carried out in order to get more insights into the physiological and biochemical aspects of syngas fermentation.

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