

## FROM SYSTEM BIOLOGY TO BIOSYSTEMS ENGINEERING FOR THE CONVERSION OF GLYCEROL

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The rapid development in genome sequencing makes it now possible to sequence almost any organisms of industrial interest in a very short time. Furthermore, technological and instrumental advances in functional genomics allow faster and more accurate quantitative measurements at different molecular levels (gene, mRNA, protein and metabolite) and thus the reconstruction and analysis of genome-scale metabolic and regulatory networks. These developments open up new horizons and impose at the same time also challenges for systems biology and its application to industrial biotechnology. In this talk, a brief overview about the modelling and analysis of large scale metabolic and regulatory networks of organisms will be first given. With the example of bioconversion of glycerol to industrial chemicals such as 1,3-propanediol the usefulness of a systemsbiological approach will then be illustrated. It will be further shown that for such a process of the industrial biotechnology a biosystems engineering approach integrating bioconversion and downstream processing and coupling energy generation and consumption in the same process is desirable. In this context, a biorefinery process for the use of glycerol from biodiesel production in a pilot plant scale will be introduced.