

Bioenergetics of microbial growth

Professor

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General Information

In this course we describe a methodology based on bioenergetic analysis of chemotrophic microbial growth systems that allows for a generalized system description. The main parameters can be estimated based on the identification of (i) the Gibbs energy supplying redox reaction and (ii) the carbon and nitrogen source for microbial growth. The calculated parameter values can be considered as a first approximation and allow for comparison with measured parameter values. Stoichiometric and kinetic parameter values that deviate strongly from the estimated values suggest that a highly specific microbial system is encountered. Herewith, the generalized method may serve as a reference framework for interpretation of stoichiometric and kinetic parameter values describing microbial growth processes. Furthermore, the generalized method based on thermodynamics considerations may serve as interpretive tool for the experimental planning and results interpretation in competition-based studies. The course will comprise the presentation of case studies where such a thermodynamics-based method has been applied.

The course will be held in English, both in presence and online

Schedule

Dates	Description
21/04/2026 10-13	Thermodynamics of microbial growths, T. Lotti (3h)
28/04/2026 10-13	Thermodynamics of microbial growth and introduction of the Free Gibbs Energy Method, T. Lotti (2h) C. Polizzi (1h)
04/05/2026 10-13	Practical examples and exercises, C. Polizzi (3h)
Total 9 Hours – 1.5 Credits	

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