

Book of Abstracts

Symposium “Novel Anaerobes 2017”

10th November 2017

University of Minho, Braga, Portugal



This symposium is an international forum for discussion and knowledge transfer in environmental biotechnology and microbiology, with a special focus on anaerobic processes, in pursue of a sustainable bio-based economy.

Key topics, including the use of biological systems for the remediation of contaminated environments, isolation and characterisation of novel microorganisms with biotechnological potential, and microbial interactions in complex communities, will be addressed for advancing fundamental and applied knowledge.

This event will serve as a basis for collaborative platforms between the different players. Presentations by young researchers will be privileged through a call for abstract.

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PROGRAMME

9:30 - 10:00	Registration
10:00 - 10:10	Fons Stams, Wageningen University, The Netherlands and Madalena Alves, University of Minho, Portugal Opening session

Session I

Chairperson: Diana Sousa

10:10 - 10:50	PLENARY 1: Harold Drake, University of Bayreuth, Germany Functional interaction of anaerobic communities that mediate the emission of greenhouse gases
10:50 - 11:10	Caroline Plugge, Wageningen University & Research, The Netherlands Novel insights in syntrophic metabolism
11:10 - 11:40	Coffee break / Poster session
11:40 - 12:00	Inês Cardoso Pereira, Universidade Nova de Lisboa, Portugal Exploring sulfate reducers for formate/hydrogen interconversion and bioremediation
12:00 - 12:20	Andreia Salvador, University of Minho, Portugal Carbon materials improve the activity of methanogenic cultures
12:20 - 12:40	Ana Júlia Cavaleiro, University of Minho, Portugal Anaerobic microbial communities for recovering value from waste lipids
12:40 - 14:30	Lunch

Session II

Chairperson: Madalena Alves

14:30 - 15:10	PLENARY 2: Fons Stams, Wageningen University & Research, The Netherlands Hunting for novel anaerobes for biotechnology
15:10 - 15:30	Diana Sousa, Wageningen University & Research, The Netherlands Synthetic communities in syngas conversion
15:30 - 15:50	Marta Carballa, University of Santiago de Compostela, Spain Management of anaerobic microbiomes for optimal process performance
15:50 - 16:10	Alette Langenhoff, Wageningen University & Research, The Netherlands Anaerobic degradation of pharmaceuticals
16:10 - 16:40	Coffee break / Poster session

16:40 - 16:55	Mónica Martins, ITQB Nova, Portugal Anaerobic removal of pharmaceuticals using biogenic platinum nanoparticles
16:55 - 17:10	Anna Duber, Poznan University of Technology, Poland Mixed culture fermentation for caproic acid production from cheese whey
17:10 - 17:25	Hugo Ribeiro, CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, Portugal Potential involvement of dissimilatory nitrate reduction pathways in polycyclic aromatic hydrocarbon degradation
17:25 - 17:40	Daan M. van Vliet, Wageningen University & Research, The Netherlands Enrichment and isolation of novel polysaccharide-degrading anaerobes from abyssal Black Sea sediments

Closing session

17:40 - 17:50	Ana Júlia Cavaleiro, University of Minho, Portugal Final conclusions
17:50	End of sessions and drinks

Organizing committee:

Ana Júlia Cavaleiro (Chair, University of Minho, Portugal)

Madalena Alves (University of Minho, Portugal)

Alcina Pereira (University of Minho, Portugal)

Fons Stams (Wageningen University & Research, The Netherlands)

Diana Sousa (Wageningen University & Research, The Netherlands)

10. Designing mixed-culture bioprocesses by means of bioenergetics models

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Abstract

Mixed culture fermentations (MCFs) are recognised as an inexpensive means to produce high-added-value products from low-grade biomass. However, developing a new bioprocess based on this technology is a challenging task. Although mixed cultures are advantageous when treating complex substrates in a continuous operation, they also pose a fundamental challenge: we are not able to fully understand the mechanisms that control these populations. In consequence, it is difficult to control the operation and to foresee the outcome of the process. In this context, BIOCHEM project (Figure 1) aims at designing a methodology for the development of a novel process based on MCFs focusing on two aspects: reaching a high productivity and achieving a high selectivity of the desired product(s).

The new methodology is demonstrated on the production of volatile fatty acids (VFA) by anaerobic fermentation. The optimisation of product selectivity is carried out by a bioenergetics-based model [1], which can predict the most favoured metabolic routes according to the operational conditions. The model assumes that, in energy-scarce environments, like an anaerobic fermentation, thermodynamic constraints select the products. Hence, changing the operational conditions (e.g. pH, temperature or substrate) can shift the product spectrum. The increase of productivity is investigated by merging the bioenergetics model with a kinetic-based model (e.g. ADM1, [2]), thereby adapting the operation conditions and substrate composition to maximise the productivity of the desired product(s). As a final demonstration of the BIOCHEM methodology, the design of a bioprocess for the production of short carboxylates by fermentation of food waste is proposed and experimentally validated.

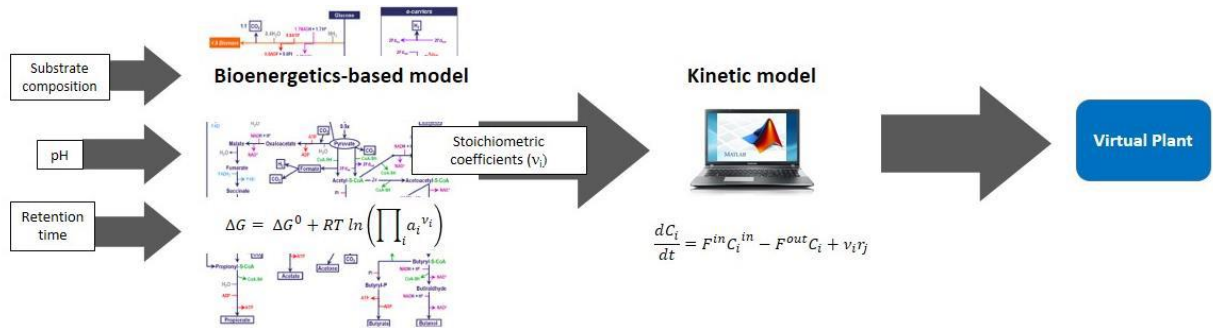


Figure 1: Information flow between modelling tools

References:

1. González-Cabaleiro, R., J.M. Lema, and J. Rodríguez, Metabolic Energy-Based Modelling Explains Product Yielding in Anaerobic Mixed Culture Fermentations. PLoS ONE, 2015. 10(5): p. e0126739.
2. Batstone, D.J., et al., The IWA Anaerobic Digestion Model No 1 (ADM1). Water Sci Technol, 2002. 45(10): p. 65-73.

SPONSORS



Traz a Serra do Gerês até si.

