

**BIOFILMS**

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# BOOK OF ABSTRACTS

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## Poster session: Biofilm applications

### The microbiome of anaerobic granules during volatile fatty acid production is shaped by fluctuations in pH

Eliana C. Guarda<sup>1,2</sup>, Eunice Costa<sup>3</sup>, Cátia Gil<sup>1,2</sup>, Cláudia F. Galinha<sup>4</sup>, Catarina L. Amorim<sup>3</sup>, Anouk F. Duque<sup>1,2</sup>, Paula M. L. Castro<sup>3</sup> and Maria A.M. Reis<sup>1,2</sup>

<sup>1</sup>Associate Laboratory i4HB - Institute for Health and Bioeconomy, NOVA of Science and Technology, Universidade NOVA de Lisboa, Portugal

<sup>2</sup>UCIBIO – Applied Molecular Biosciences Unit, Department of Chemistry, NOVA School of Science and Technology, Universidade NOVA de Lisboa, Portugal

<sup>3</sup>Universidade Católica Portuguesa, CBQF – Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Porto, Portugal

<sup>4</sup>LAQV-REQUIMTE, Chemistry Department, NOVA School of Science and Technology, Universidade NOVA de Lisboa, Portugal

Volatile fatty acids (VFA) are used on several applications, ranging from the pharmaceutical and textile to food and chemical industries. The bio-based production of VFA from waste-streams is attracting attention as it represents a more sustainable and environmentally friendly approach. Microbial communities are key for the VFA fermentation performance and yield and are affected by parameters such as pH, temperature, organic loading rate, retention time. Knowledge on the microbiota is needed to further advance the technology. The microbiome structure of anaerobic granules from an up flow anaerobic sludge blanket (UASB) reactor fed with hydrolyzed Brewer's spent grain (BSG) was evaluated over 311 days during which fluctuations on the pH occurred. At pH 4.5, the predominant genera within the biomass were *Olsenella* (11%), *Prevotella* (15%), *Clostridium* (13%) and *Caproiciproducens* (30%). These taxa belong to families that are known to be involved in the production of acetate and butyrate, which coincided with the main products obtained during this phase. When the pH was reduced to 3.9, the fermentation products profile changed, resulting in lactate predominance in the VFA mixture. The microbiome structure at genus level also changed and *Lactobacillus* became the dominant bacterial genera (ca. 88%). The restoration of the pH to 4.5 led to the restoration of VFA profile favoring the production of acetate and butyrate. Also, the genera *Olsenella* (14%), *Prevotella* (17%) and *Caproiciproducens* (21%) became again dominant within the microbiome. Knowledge on the dominant microbiota under specific process conditions can help devising robust approaches for efficient and stable VFAs production.

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