



## Optimisation Of Parageobacillus Thermoglucosidasius For Climate-Positive Acetone Production

**Millgaard, Marie; Pogrebnyakov, Ivan; Nahuel Bidart Costoya, Gonzalo; Welner, Ditte Heddam; Ingemann Jensen, Sheila; Nielsen, Alex Toftgaard**

*Published in:*  
The Danish Microbiological Society Annual Congress 2023

*Publication date:*  
2023

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Millgaard, M., Pogrebnyakov, I., Nahuel Bidart Costoya, G., Welner, D. H., Ingemann Jensen, S., & Nielsen, A. T. (2023). Optimisation Of Parageobacillus Thermoglucosidasius For Climate-Positive Acetone Production. In *The Danish Microbiological Society Annual Congress 2023: Abstract book* (pp. 66-66). Article 64 The Danish Microbiological Society.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## POSTER PRESENTATIONS

### [64] OPTIMISATION OF *PARAGEOBACILLUS THERMOGLUCOSIDASII* FOR CLIMATE-POSITIVE ACETONE PRODUCTION

Marie Millgaard\*,<sup>1</sup>, Ivan Pogrebnyakov,<sup>2</sup>, Gonzalo Bidart,<sup>3</sup>, Ditte Welner,<sup>3</sup>, Sheila I. Jensen,<sup>4</sup>, Alex Toftgaard Nielsen,<sup>5</sup>

<sup>1</sup> Technical University of Denmark, Dtu Biosustain, Kgs. Lyngby, Denmark, <sup>2</sup> The Novo Nordisk Foundation - Center for Biosustainability, <sup>3</sup> Technical University of Denmark, <sup>4</sup> Technical University of Denmark, Novo Nordisk Foundation Center for B, Kgs. Lyngby, Denmark, <sup>5</sup> Technical University of Denmark, Novo Nordisk, Kgs. Lyngby, Denmark

The world is currently facing a climate crisis facilitated by greenhouse gas emissions. The chemical industry is a major contributor to this issue, as conventional chemical productions are energy-intensive and mostly rely on petrochemical-based feedstocks. Microbial production provides a promising sustainable alternative, as it requires less energy and can utilise renewable feedstocks. However, the most prominent issue with microbial approaches lies with the economic viability of biochemicals. In the case of bulk chemicals, which have lower profit margins, most large-scale bio-based productions struggle to compete with the higher yields and lower production costs of their fossil fuel-based counterparts. If sustainable bio-based productions are to make an impact on the global market, it is vital to improve their feasibility and competitiveness in large-scale industrial settings.

Thermophilic fermentation can provide advantages to the development of the biochemical market, as high-temperature productions offer several benefits. This includes significantly reduced process costs, lower contamination risks, and easier extraction of volatile compounds. Amongst thermophilic species, *Parageobacillus thermoglucosidasius* is a promising candidate for bulk-chemical production. Here, we present the development of a strain of *P. thermoglucosidasius* that is optimised for the conversion of acetic acid into acetone. This is accomplished through metabolic engineering, omics-based analysis, and the application of adaptive evolution-based strategies. The aim is to optimise growth, acetate tolerance, and acetone production in *P. thermoglucosidasius* to facilitate the development of large-scale sustainable acetone production, and to empower the development of other chemical production strategies that intend to take advantage of the thermophilic aspects of this species.