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[64] OPTIMISATION OF PARAGEOBACILLUS THERMOGLUCOSIDASIUS FOR CLIMATE-POSITIVE ACETONE PRODUCTION

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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.