

# Biocalorimetry: a novel method to analyze probiotic products and microbiomes

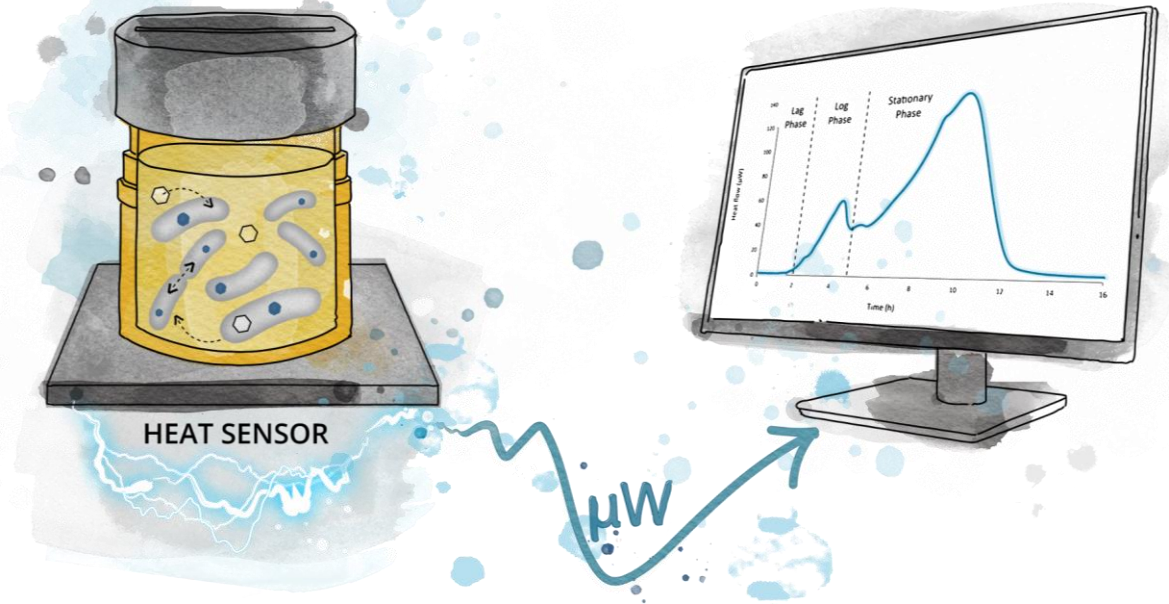
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# The calorimetric principle

● All metabolic processes produce heat

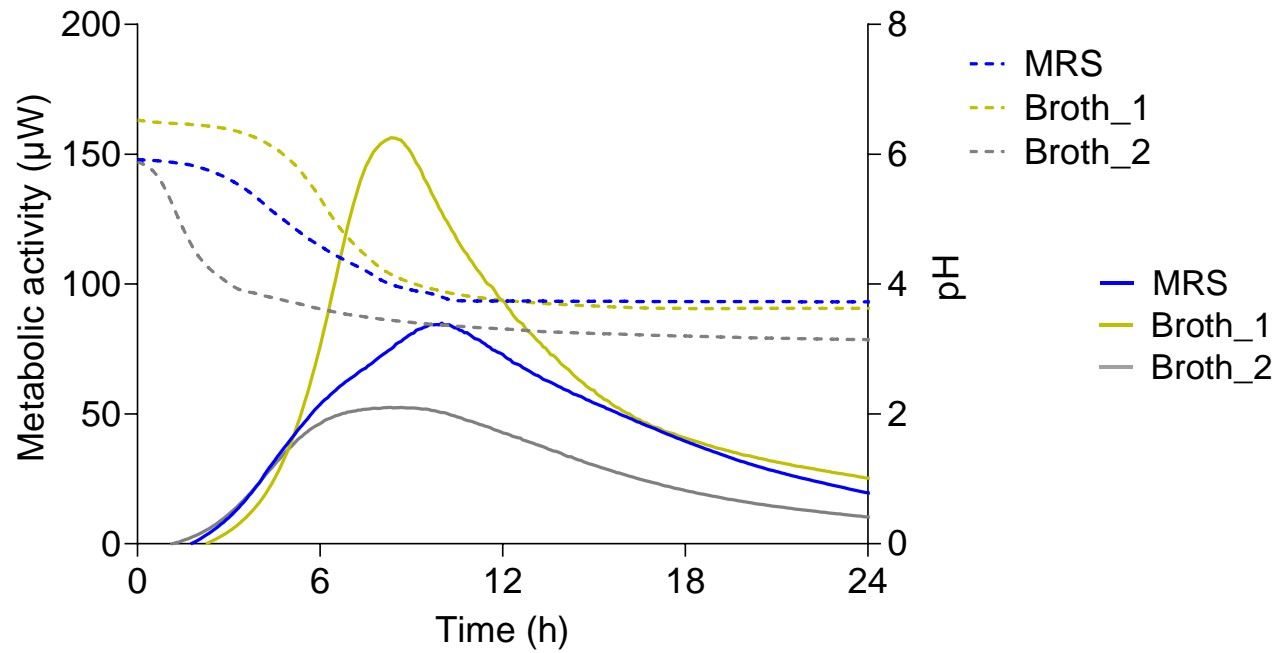
The heat production rate is measured as heat flow,  $\mu\text{W}$

● The measured heat flow is directly proportional to the metabolic rate

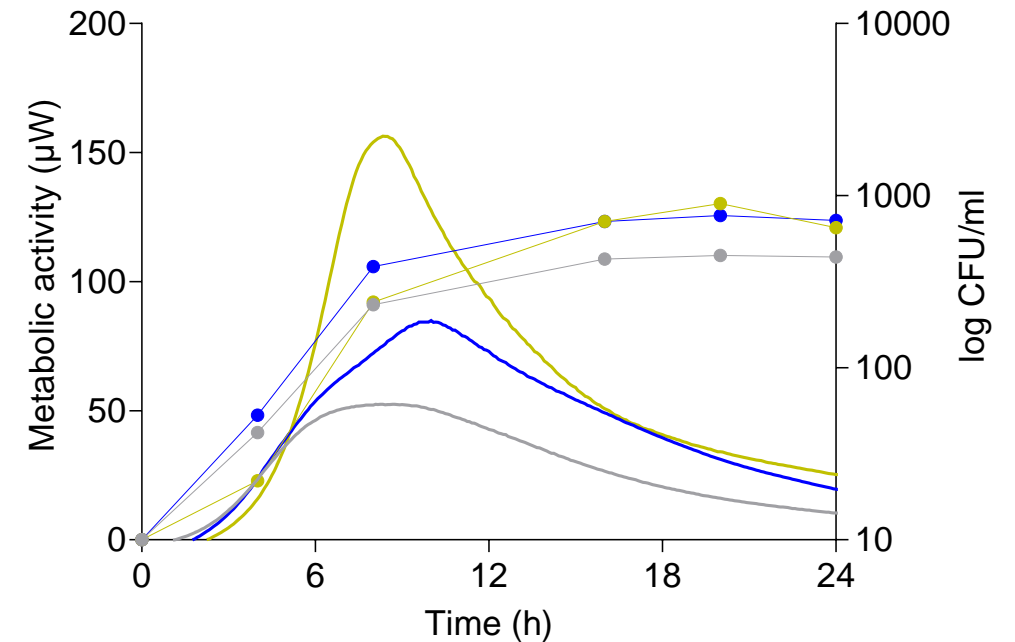


# Beyond growth: sensitive metabolic data

Metabolic activity/pH



Metabolic activity/biomass

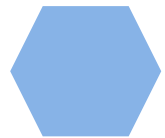
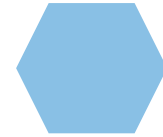


# Why calorimetry for probiotics and microbiome analysis?



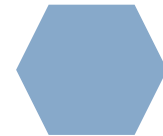
Easy method to quantify viable microbial cells directly in your medium of choice

Species identification based on metabolic profile

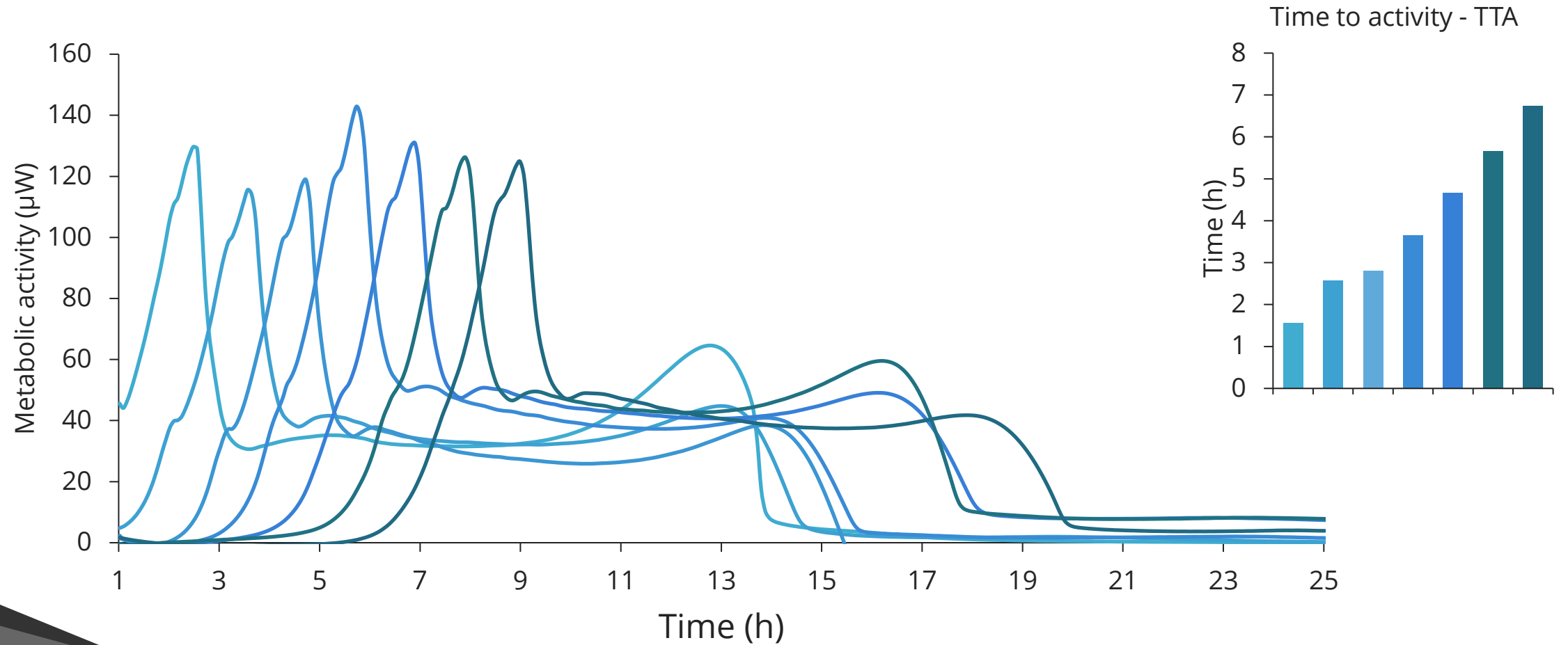


Fast detection of contaminations

Metabolic profile of a strain as quality control

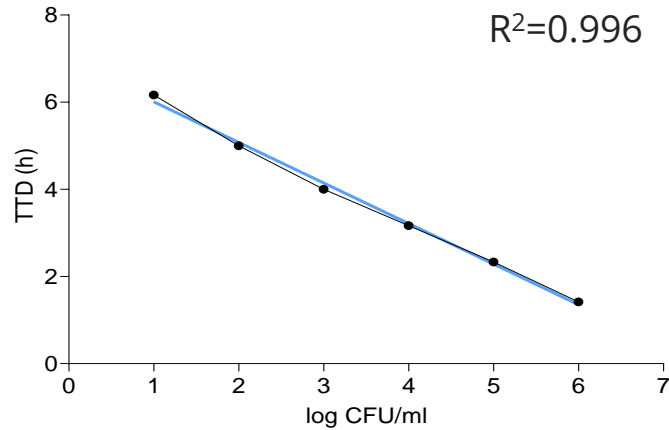


# Enumeration of viable microbial cells

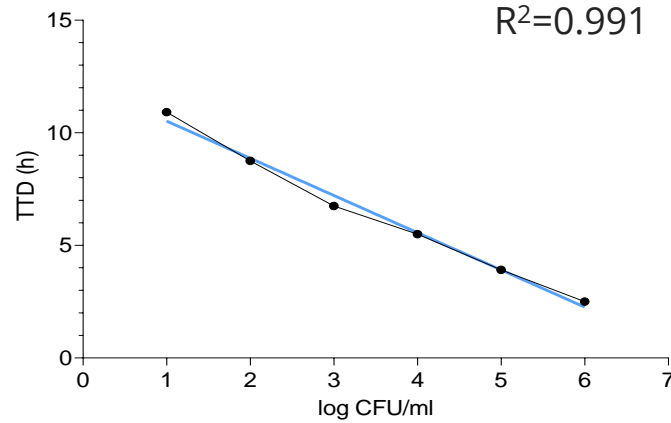


# Enumeration of viable microbial cells

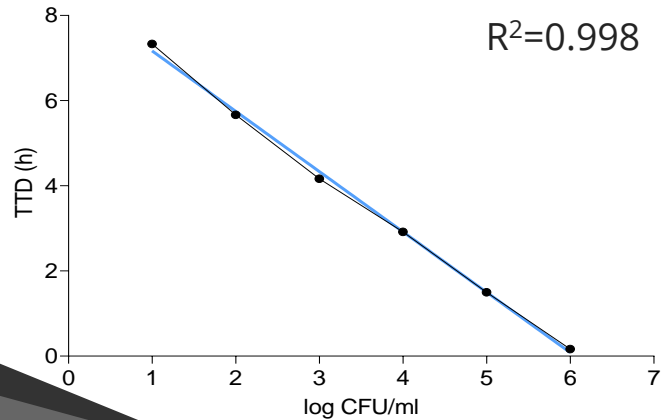
*E.coli* in Mueller-Hinton broth



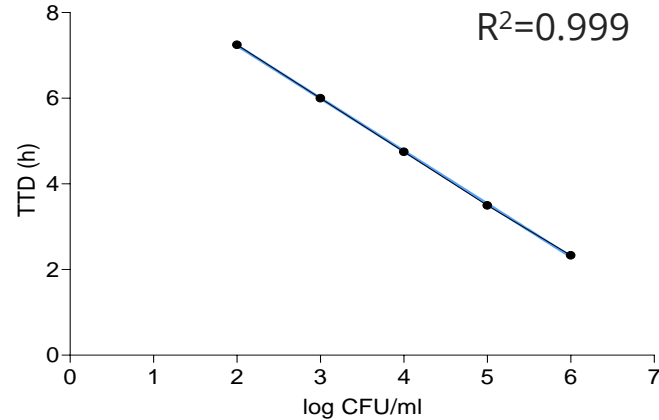
*Enterococcus* CLED broth



*Salmonella* in Milk

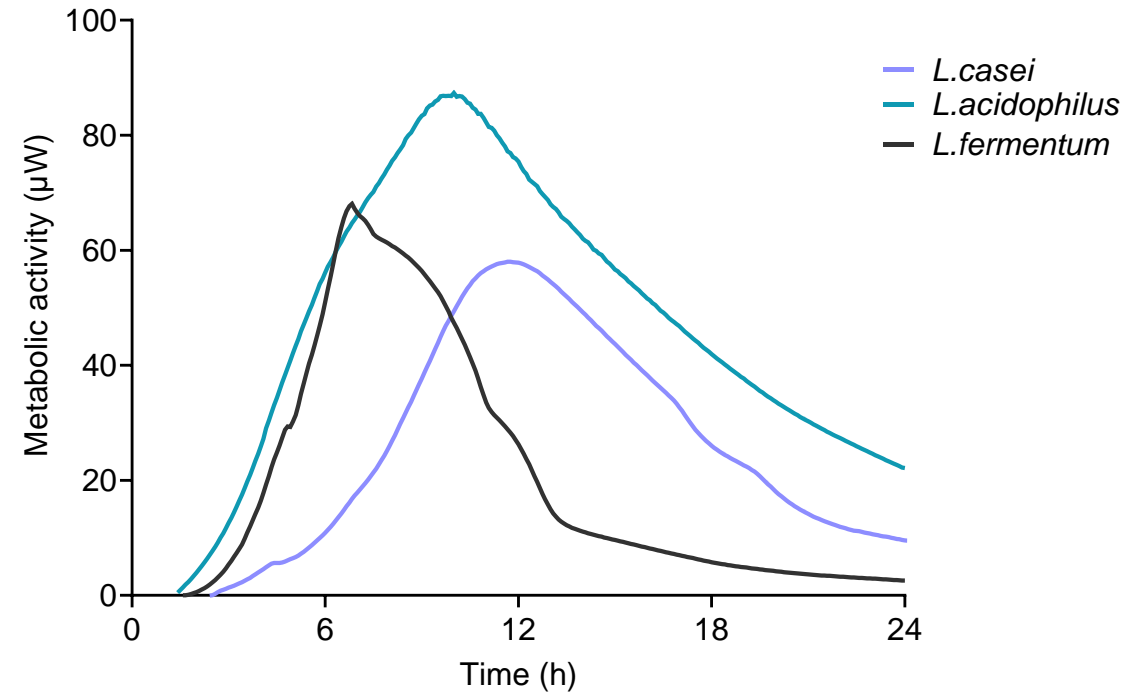
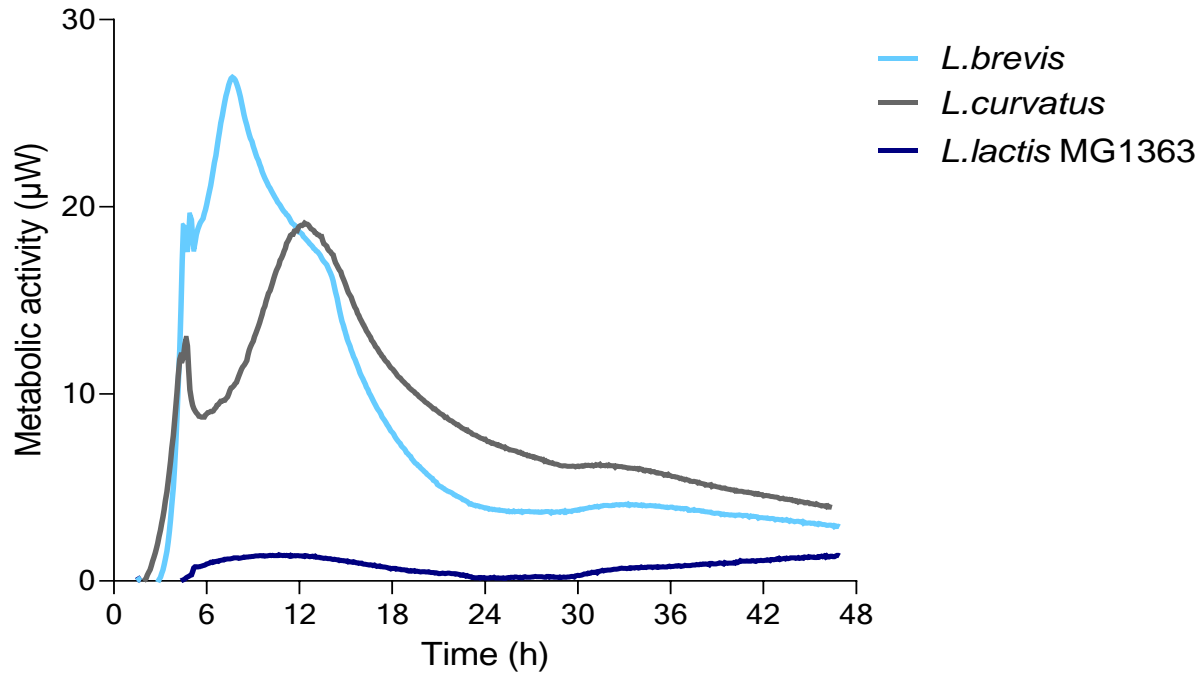


*Enterococcus* TSB broth

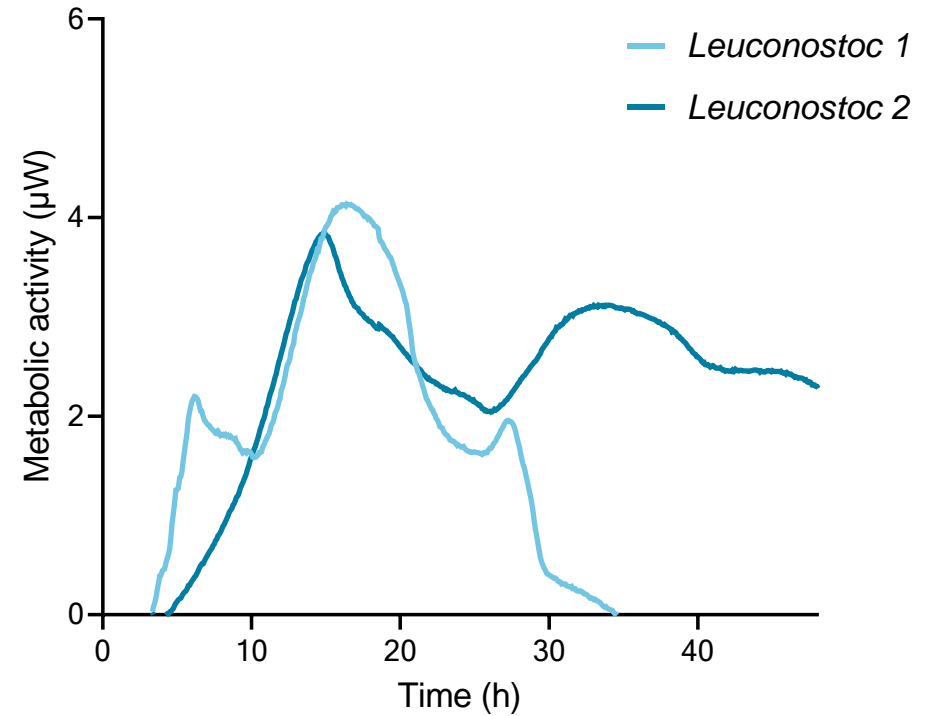
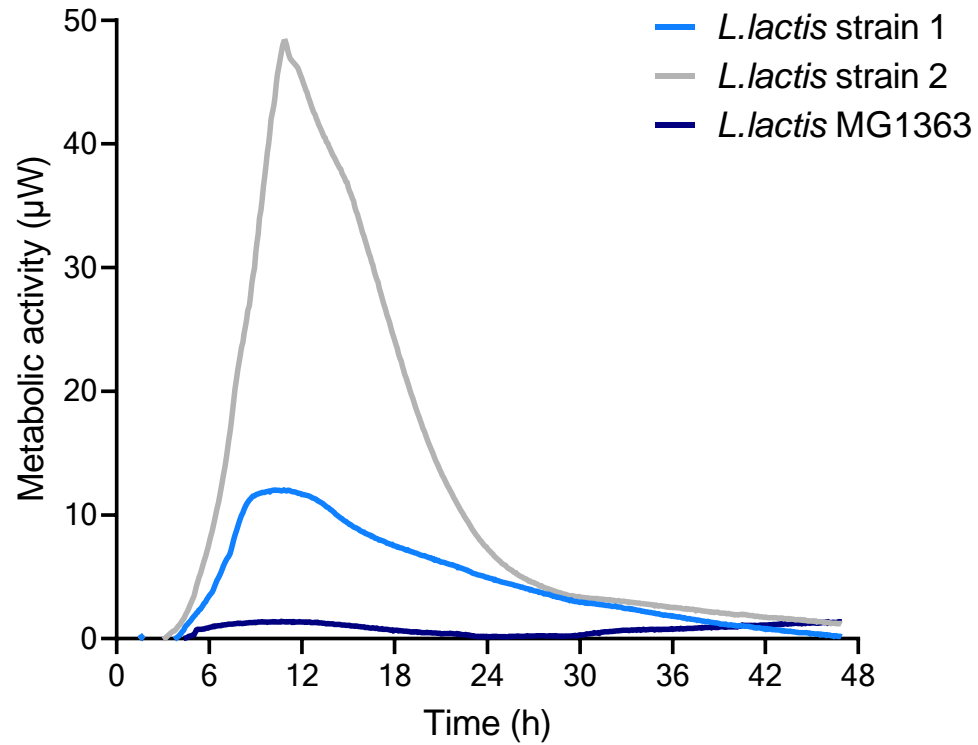


- Minimal labor – samples added directly to incubation vials
- Direct correlation of CFU numbers
- Viability in preferred growth conditions
- Results in hours
- Standard curves needed

# Metabolic fingerprinting for microbial identification - species

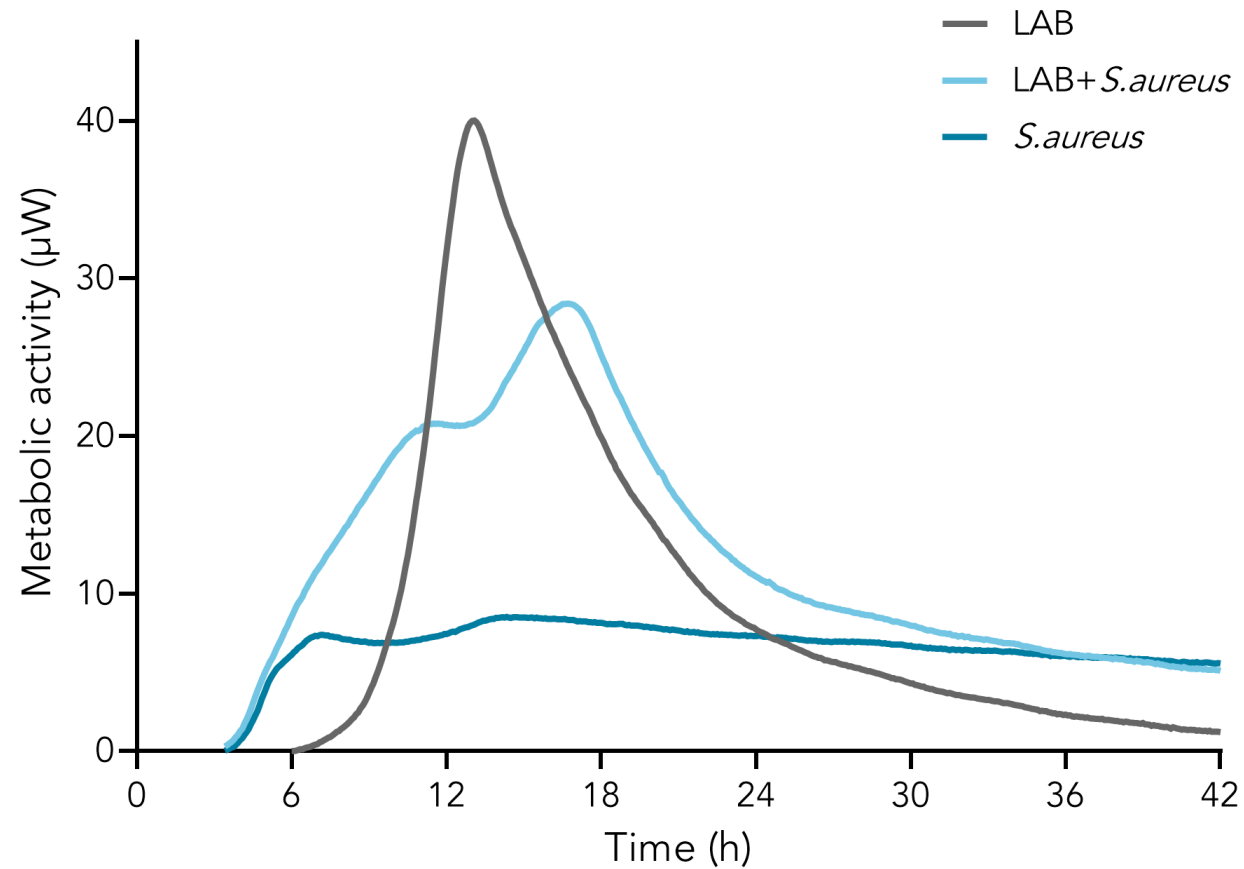


# Metabolic fingerprinting for microbial identification - strains

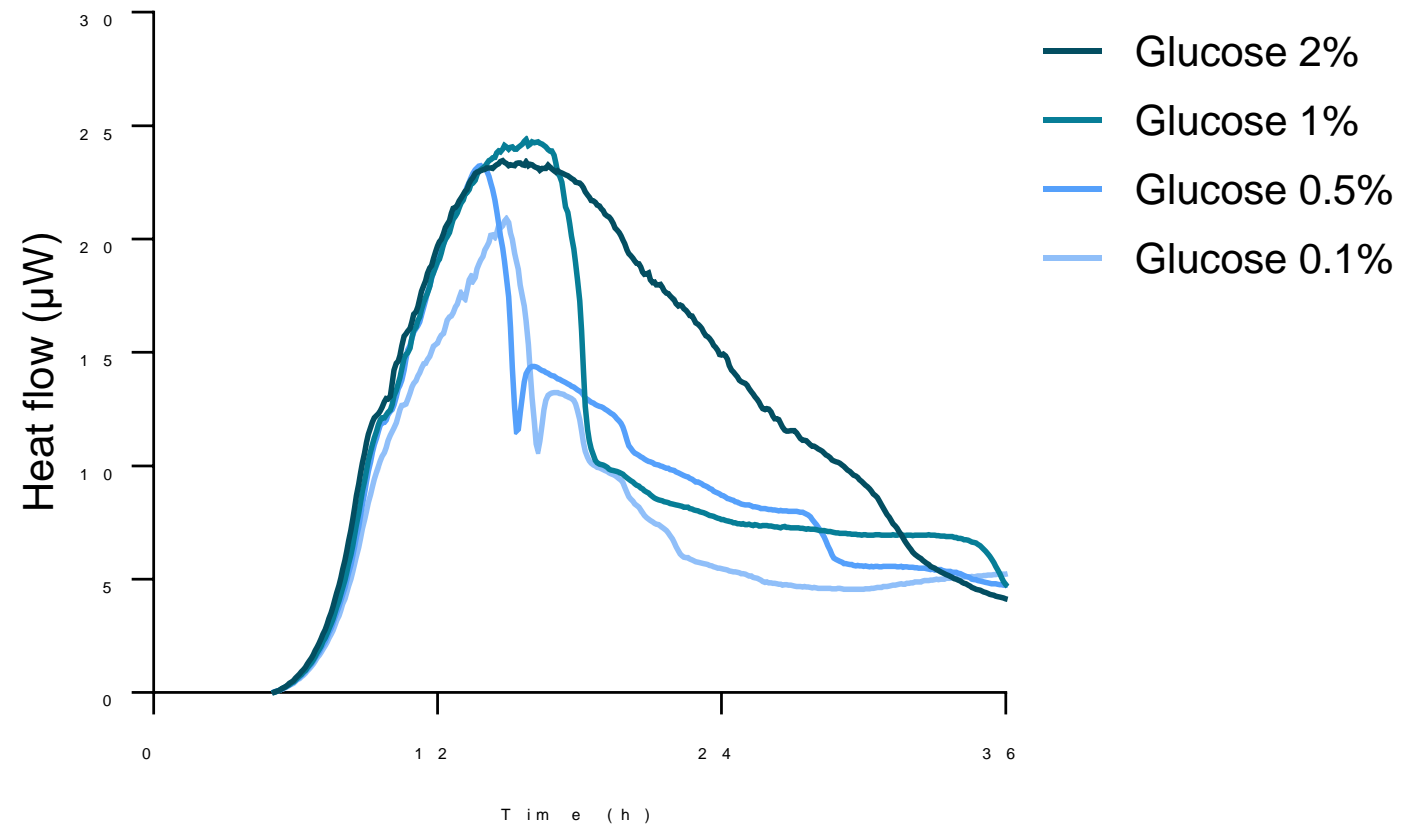




# Nothing is hidden from biocalorimetry: microbial contaminations



# Effect of substrate quality on the metabolic output

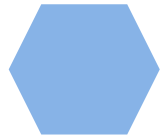
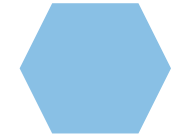


# Four quality parameters in one assay



Robust method to estimate microbial content

Microbial identification based on species-specific metabolic profiles

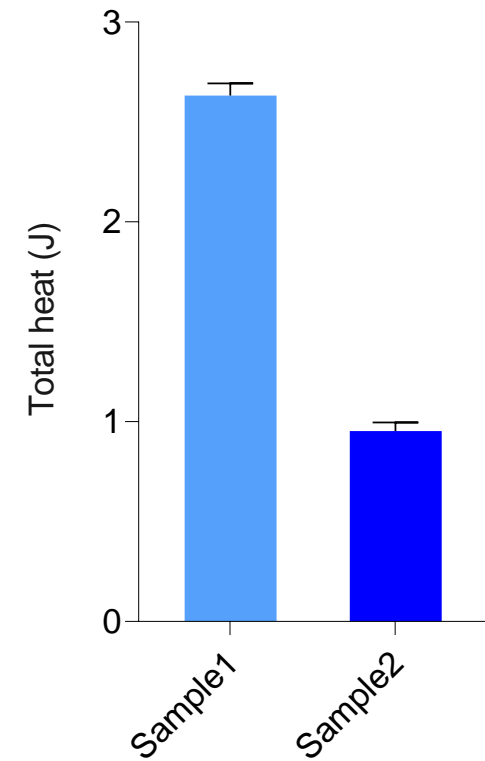
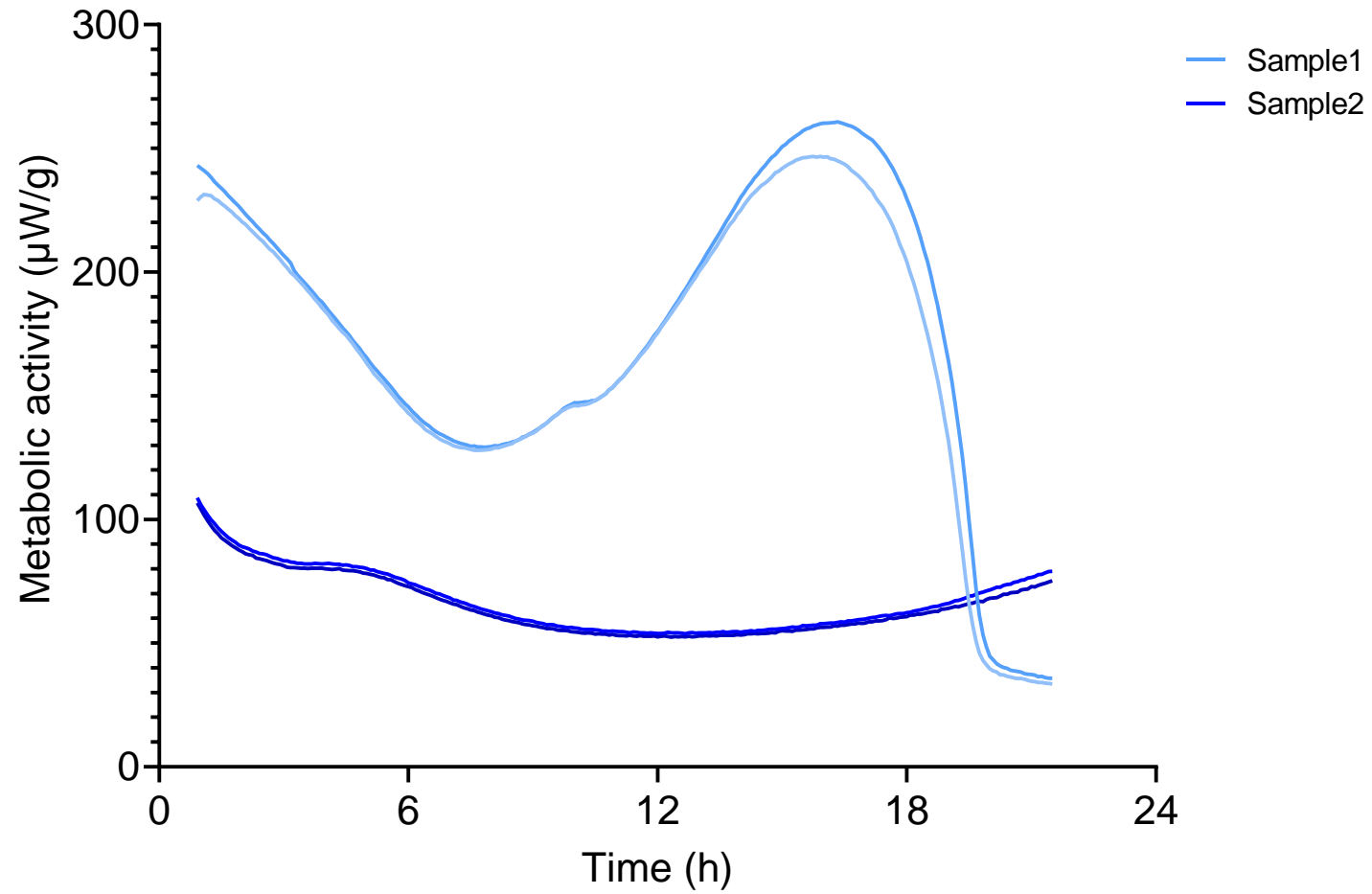


Direct detection of contaminant microorganisms

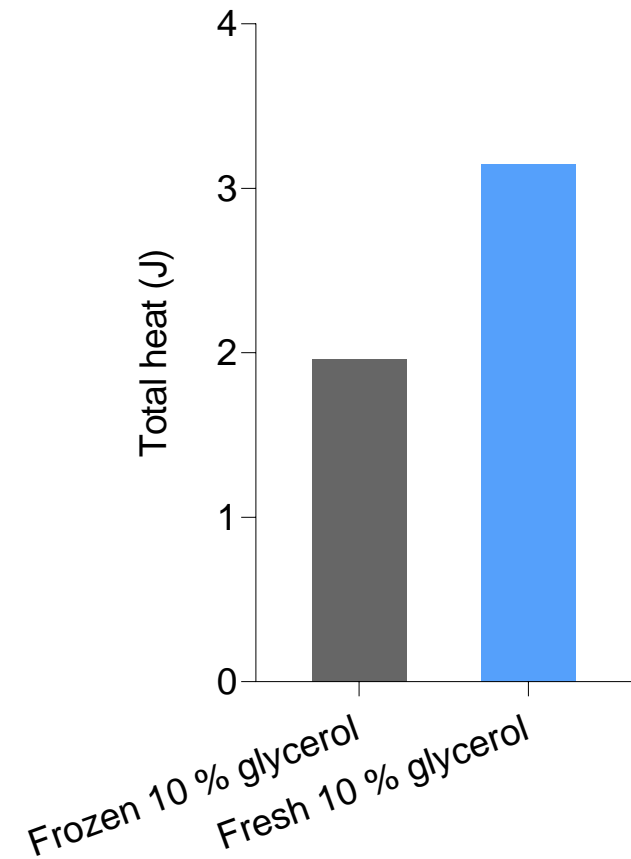
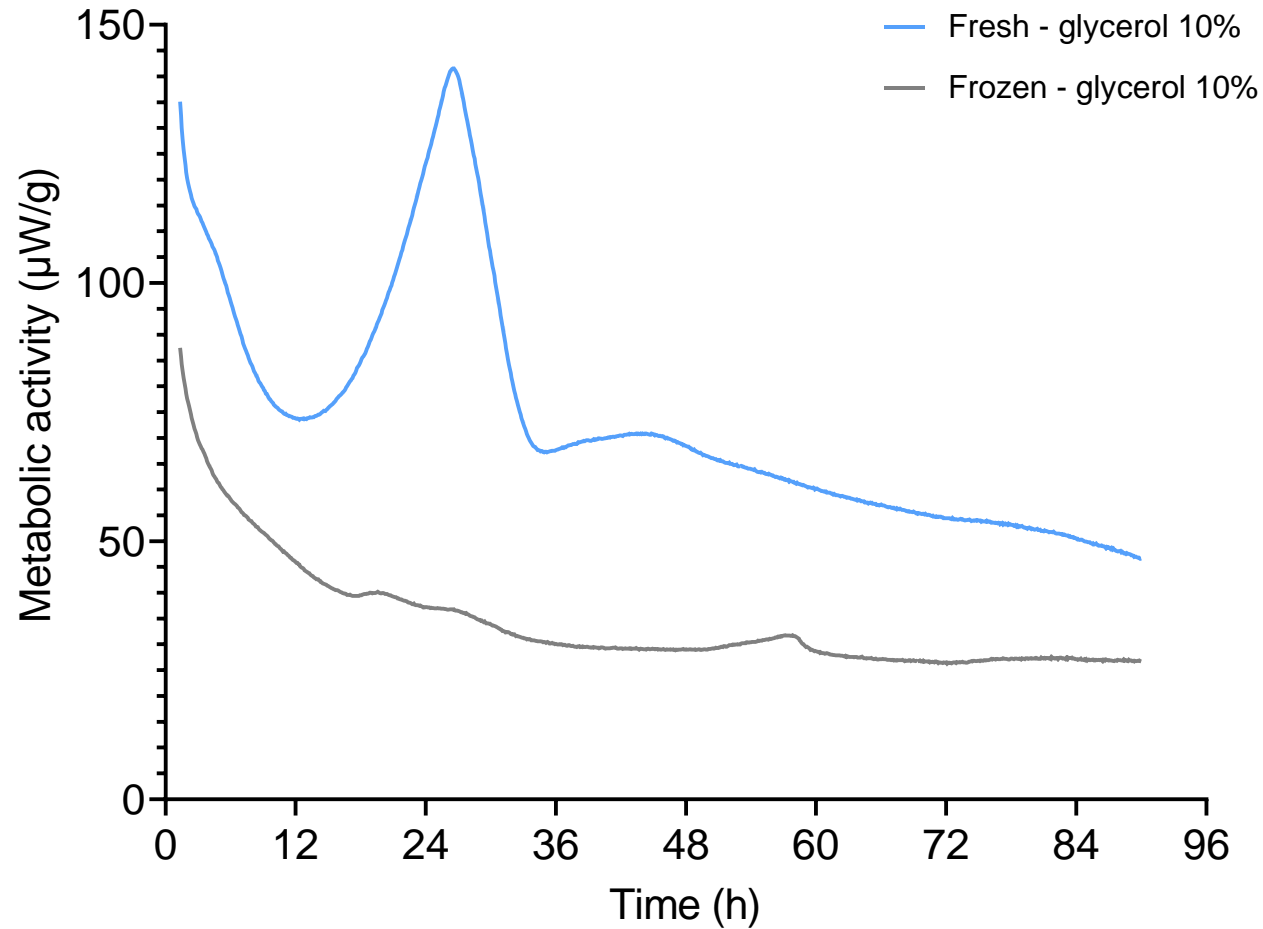
Phenotypic assessment of the metabolic health of your strain and/or  
quality of your media



# Metabolic diversity of microbial communities



# Viability of a microbiome after storage

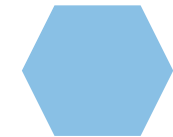


# Phenotypic assay for microbiome analysis



Metabolic characterization of microbial communities

Viability measurement after preservation



Metabolic effect of compounds on a microbiome

# Thank you for listening!

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