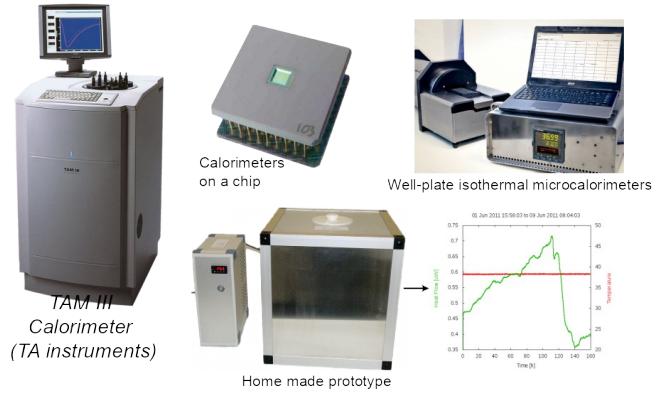
University of Basel

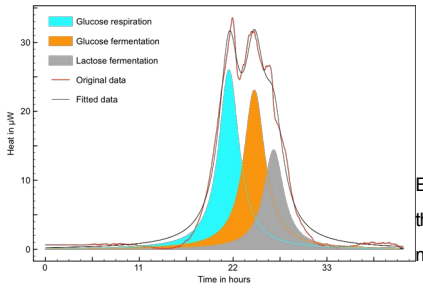
Department of Biomedical Engineering

Biological Calorimetry Basel group

Researchers of the Biological Calorimetry group and their South African colleagues in a biosafety level 3 lab, testing isothermal microcalorimetry for the diagnosis of tuberculosis (picture: O. Braissant)



Types of calorimeters available at the Biological Calorimetry group of the DBE.



Example of measurment showing the different phases of microbial metabolism during diauxic events

The Biological Calorimetry group research focuses on the use of isothermal microcalorimetry to study microbial metabolism with a special interest in biofilms metabolism, antimicrobial materials and urological infections. We aim at developing new approaches to use calorimetry in the field of microbiology and diagnostic <u>in close collaboration with industrial partners.</u>

Using the minute amount of heat release by microbial metabolism it is possible to assess growth and metabolic activities of microbes even in small quantities. In this context, the Biological Calorimetry group has focused on various applications in the fields of biofilm research, diagnostics and assessment of antimicrobial efficacy of new materials or new molecules.

<u>Diagnostic and drug resistance testing:</u>

Using the sensitivity of isothermal micro- and nano-calorimetry and its ability to detect down to 3000 growing bacteria our lab has demonstrated that urinary tract infections could be diagnosed and the antibiogram delivered in less than 7 hours.
Similarly, we have recently shown that microcalorimetry could be used diagnostic of tuberculosis using simulated and real patient sputum samples.

<u>Biofilms and antimicrobial materials:</u>

Biofilms develop most surfaces. In the case of implants, catheters or contact lenses the consequences can be dramatic for the patients. In this context, our lab focuses on the understanding of the biofilm metabolism on surfaces and when exposed to antimicrobials. Isothermal microcalorimetry provides an excellent tool to assess the metabolism of living biofilms at the surface of metal, plastic or ceramic implants. In addition, we use calorimetry to assess the antimicrobial properties of various implant coatings. Finally, we work closely with dentists from the UZB to better understand cariogenic biofilms.

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