

HITEC ZANG



Bioprocess optimisation in Shaking Flasks

RAMOS® - Respiration Activity MOonitoring System

NEW



Now also available with
fed-batch option!

The universal measurement system with Feeding-Modul

RAMOS® (Respiration Activity MOonitoring System) has established as a world wide standard tool for the online detection of the respiration activity in shaking flasks with prokaryotic and eukaryotic cultures.

The brand new Feeding Modul allows you now for performing controlled fedbatch experiments in shaking flasks.

In numerous previously examined processes RAMOS® has contributed to reveal key insights and the decisive impulses for research that has been worked on for years.

RAMOS® provides the most significant metabolic parameters O_2 - (OTR) and CO_2 transfer rate (CTR), as well as the derived indicators respiratory quotient (RQ) and the maximum specific growth rate (μ_{max}).

The extremely easy and fast setup of RAMOS® experiments are unique.

Applications

- » Bioprocess development
- » Process and media optimisation
- » Strain screening
- » Validation of fermentation
- » Reproducible inoculum production
- » Scale-Up
- » Stability tests

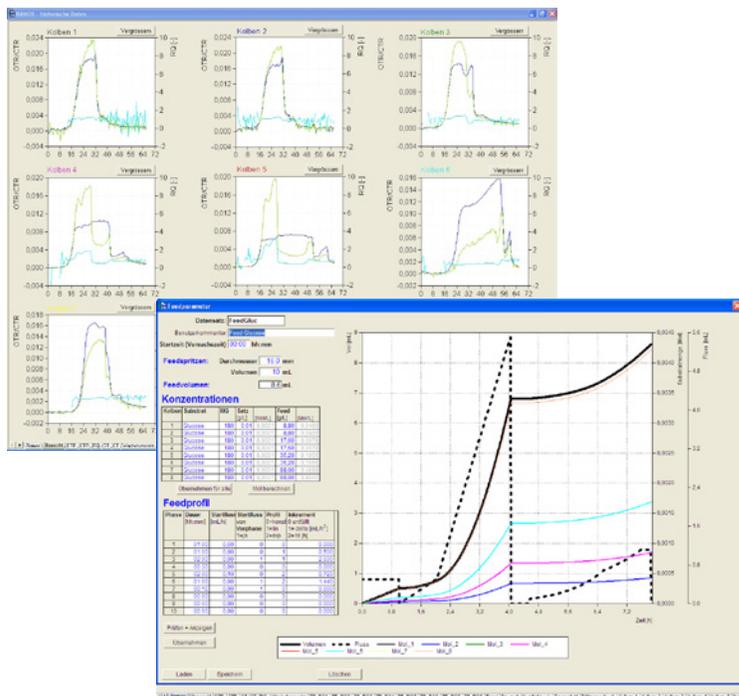
New with the Feeding-Modul

- » Seed Train Technology
- » Determination of K_s -value
- » Time controlled induction of metabolite production
- » Studying of inhibition kinetics

What can RAMOS® do for you?

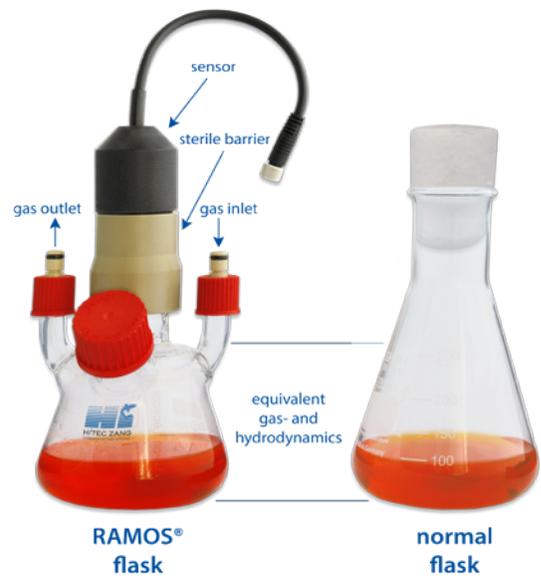
- » 8-time parallel fed-batch processing within shaking flasks including online measurement of respiration activity under sterile conditions
- » Configuration constant, linear, exponential and combined feed profiles
- » Continuous monitoring of cell growth of pro- and eukaryotic cells including mammalian cells within batch and fed-batch experiments
- » Development of Seed-Train processes within continuously monitored shaking flasks
- » Easy determination of characteristic parameters (OTR, CTR, RQ) and growth parameters (μ_{max} , K_s)
- » Bioprocess optimisation through early identification of oxygen/ substrate limitation and product inhibition
- » Bioassays (toxicity test, proliferation assays)
- » Determination of appropriate process parameters for primary and secondary screening (media, cultivation time and conditions)
- » Process balancing and quantification
- » Quality control QC (stability of mammalian cell lines)

Usually respiratory experiments are done in stirred tank bioreactors with a separate exhaust gas analyser. However statistically safe results require parallel experiments with an identical setup which is highly expensive in time and material. Using the RAMOS® 8 experiments can be carried out parallelly at the same time, now also available for parallel fed-batch processing including online measurement. Hence validated data cost only a fraction of single vessel experiments.



The characteristics of the measurement curves allow for the identification of biological phenomena, e.g.

- » Substrate/Oxygen limitation
- » Product inhibition
- » Diauxia
- » Fermentation
- » Overflow metabolism



The RAMOS® flask was constructed to be identical to Erlenmeyer flask's, according DIN 12380/ISO 1773, fluid-filled part regarding gas- and hydrodynamics.

The patented method allows for the determination of the O_2 - (OTR) and CO_2 transfer rate (CTR), RQ and the growth rate (for obligate aerobic) just by monitoring the changing partial oxygen pressure within the gas phase (non invasive measurement).

To ensure equal process conditions the gas-flow rate will be adjusted to that one of a standard shaking flask with cotton stopper.

Advantages

- » More information about microbial processes
- » Differentiation between process based and biological based effects
- » An alternative to more expensive stirred tank bioreactor experiments
- » Equivalent cultivation conditions compared to a standard shaking flask
- » Easy handling
- » Parallel cultivation system (savings in time and material, statically safe results)
- » Enhanced reproducibility
- » Quasi-Non-Stop processing through extremely short setup times
- » Abbreviated „Time to Market“

System extensions

- » Gmix™-precision gas mixing station
- » Optionally available for single use or disposable Erlenmeyer flasks

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