One-millilitre microbioreactor with impeller for improved mixing

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Publication date:
2012

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

One-Millilitre Microbioreactor with Impeller for Improved Mixing

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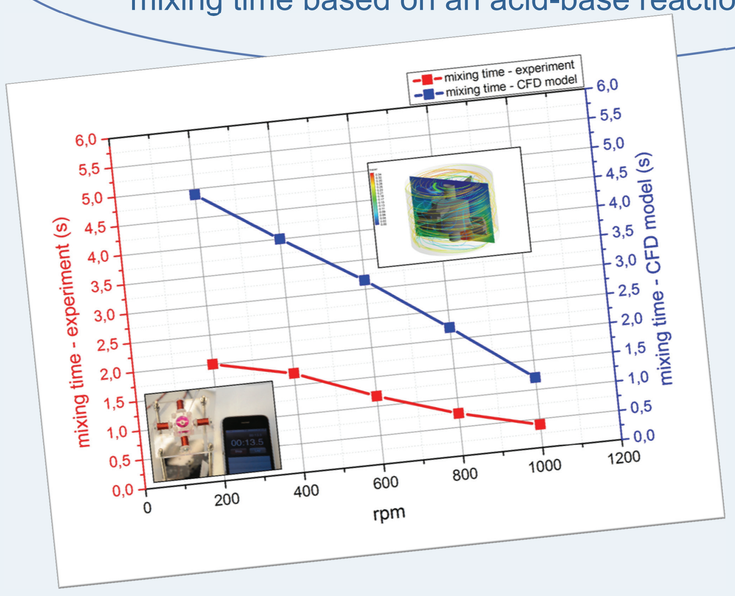
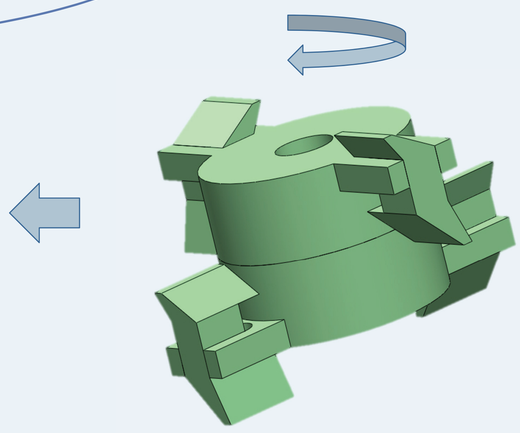
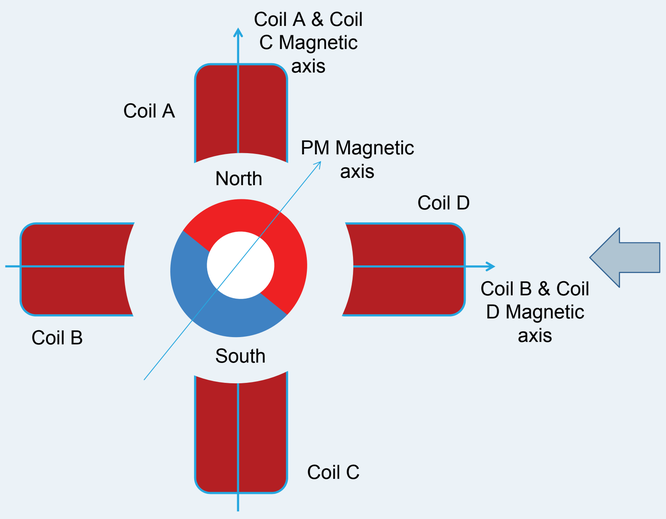
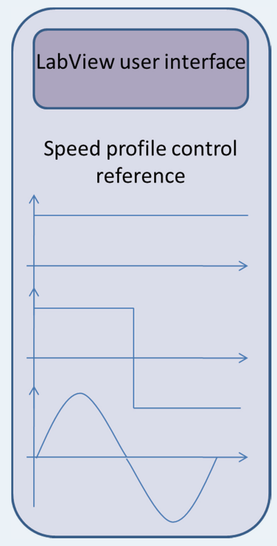
The mixing capability of a microbioreactor was quantified using a conventional colorimetric method for determining mixing time based on an acid-base reaction.[1]

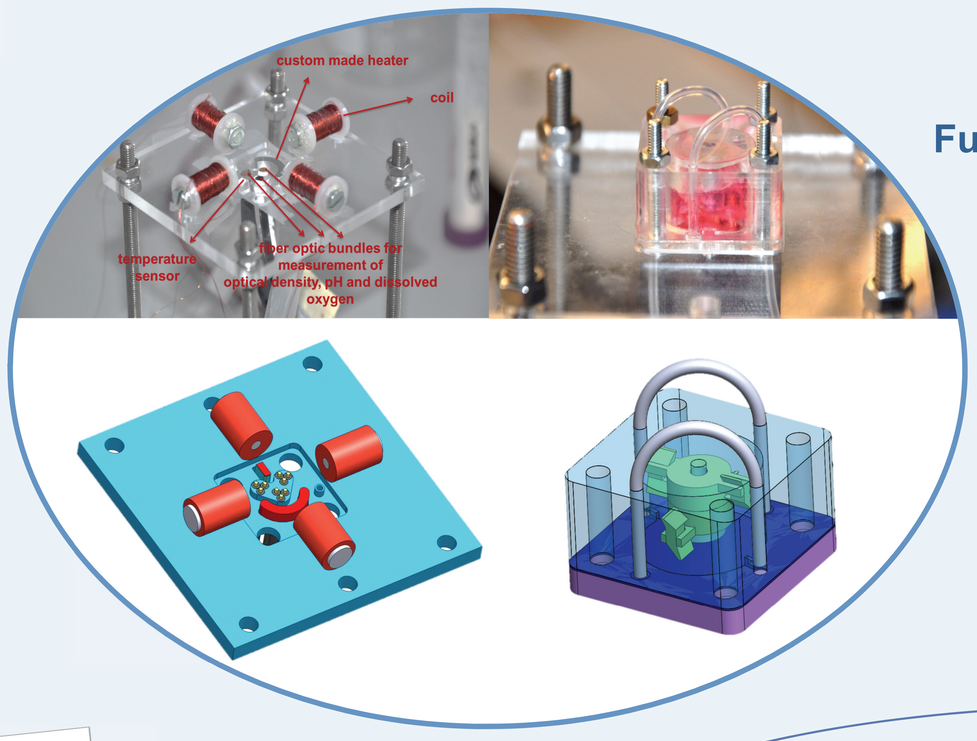






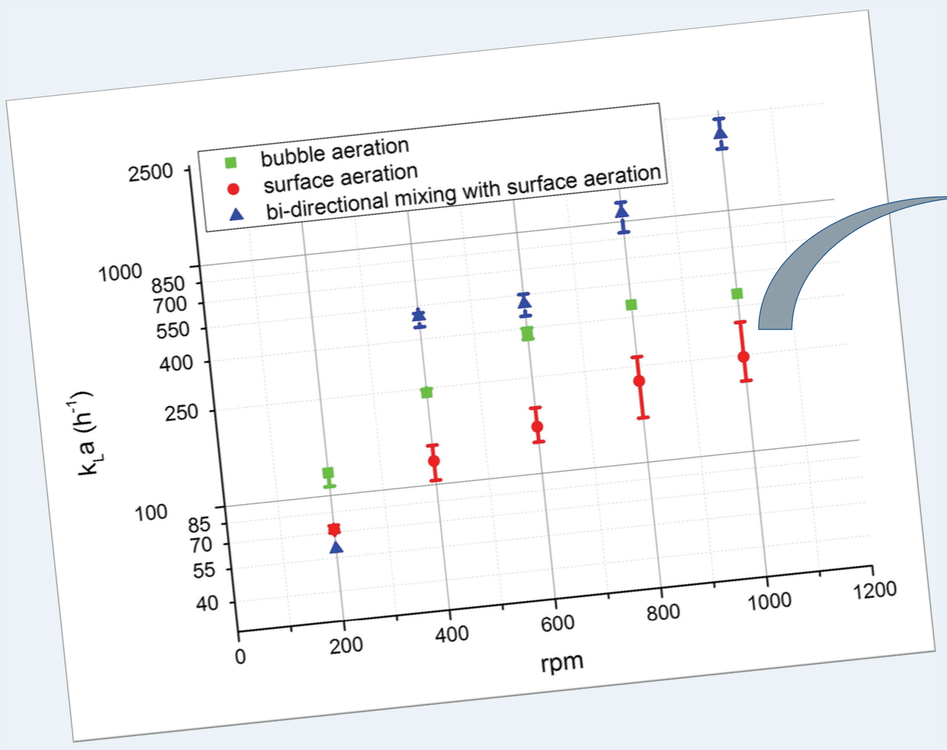


- Small footprint
- Disposable
- High level of flexibility:
  - ✓ Surface or bubble aeration
  - ✓ One- or bi- directional mixing
  - ✓ Volume (0.5 – 2 mL)
- Mixing can be considered almost instantaneous
- Bi-directional stirring eliminates need for baffles
- k_La >1000 h^{-1}
- k_La obtained by surface aeration is sufficient for standard cultivations

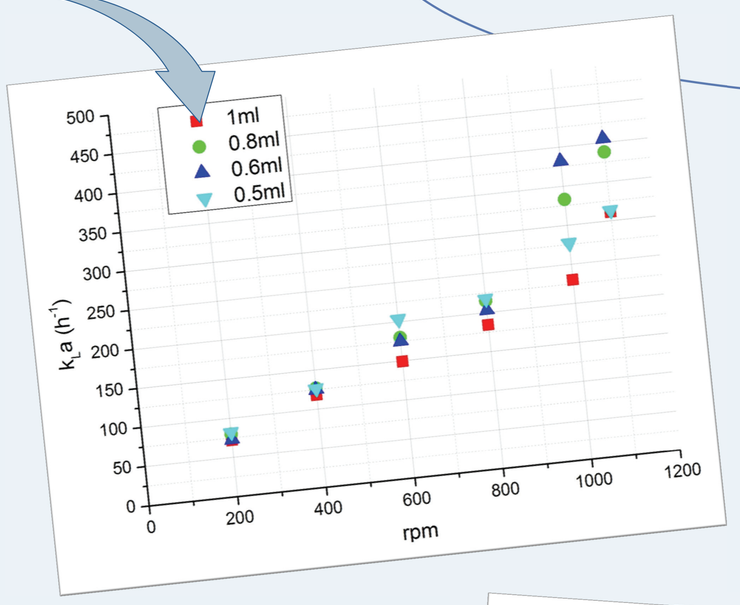


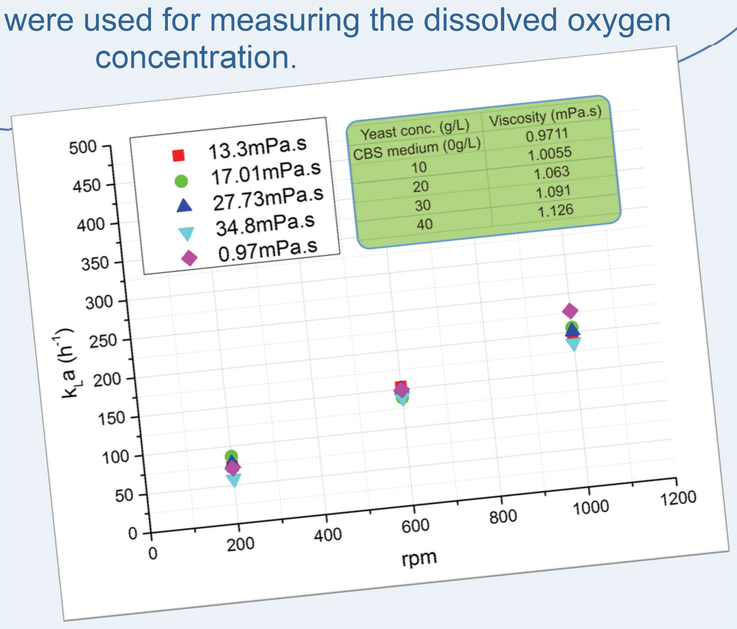
Fully controllable mixing integrated :

- ✓ Magnetic stirrer with adjustable geometry
- ✓ User defined stirrer speed profiles (change of rotation direction and speed)
- ✓ Low cost and maintenance free
- ✓ Stand alone – no external devices like plate shakers and motors

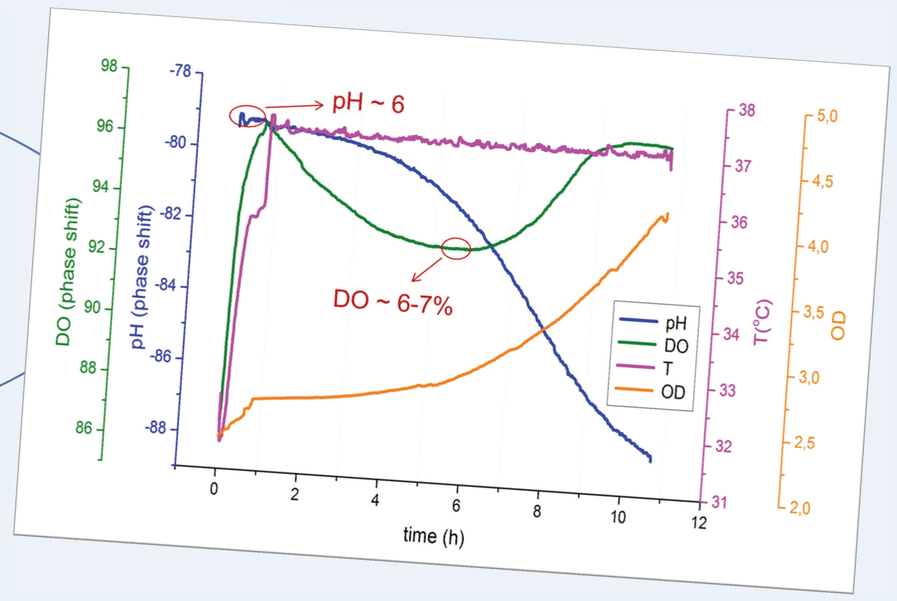


The gassing-out method was used to evaluate k_La values in the microbioreactor filled with CBS medium as a model liquid (without microbial cells).[2] Presens sensor spots with a response time between 10 and 14 seconds were used for measuring the dissolved oxygen concentration.





Anaerobic batch cultivations, with *Lactobacillus paracasei* as a model organism, were performed in the microbioreactor and in a 2L fermenter in order to characterize the performance of the small-scale reactor. End-point measurements of glucose and lactic acid concentrations as well as the optical density were used for the comparison between two scales. Growth of *Lactobacillus paracasei* in the microbioreactor was faster than in the 2L fermenter, which was confirmed by higher values of optical density and lactic acid and a lower value of glucose after 11 hours of cultivation.[3]



References

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Acknowledgment

This project is supported by the Danish Council for Strategic Research in the frame of the project “Towards robust fermentation processes by targeting population heterogeneity at microscale” (project 09-065160)