

RAMOS: New applications of an established online technology for shaken vessels



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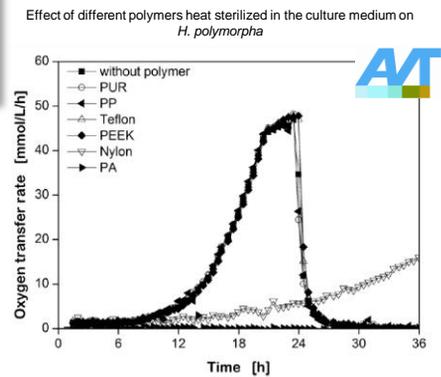
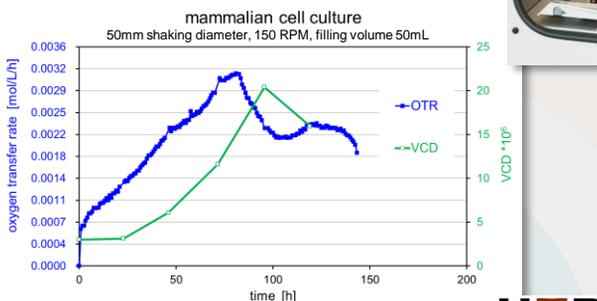
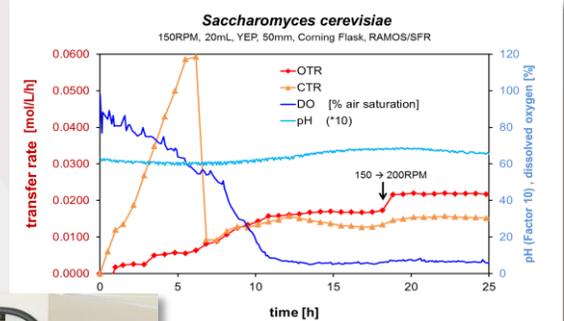
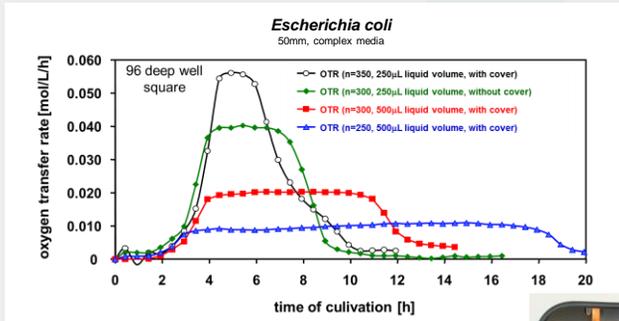
Introduction

RAMOS [1] determines the oxygen transfer rate (OTR), the carbon dioxide transfer rate (CTR) and the respiratory quotient (RQ) of microbial, plant and cell cultures online. The respiration rates (OTR, CTR) are the most suitable measurable variables to quantify the physiological state of biological cultures. RAMOS is the right tool to meet the PAT initiative of the FDA for shaken bioreactors. RAMOS was designed for measuring in 250mL glass shake flasks which limited the number of applications. To overcome this bottle neck Kühner developed three new add-ons. A new application for the "detection of leachables in single use components" is also presented.

MicrOTR: This add-on allows the user to measure OTR and CTR in microtiter plates. Its main application is finding the right fermentation conditions in microtiter plates.



Combination: RAMOS technology is combined with the SFR (Presens) to measure dissolved oxygen (DO), pH, OTR and CTR in up to six flasks.



polymers were removed after sterilization, amount of polymer 0.5 g per flask (40 g/L medium), Syn-6-MES medium, pH 6.0, 37°C, 350 rpm, 50 mm, 250 mL RAMOS shake flask and filling volume 12.5 mL [2]

Adapter for disposable flasks: With this new development disposable flasks can be directly attached to the RAMOS-System. Therefore the RAMOS-System can now easily be used for the application field cell cultivation.



New application: RAMOS technology was used to test plastic components to determine their impact on the cultivation [2].



Literature

- [1] Device for sterile online measurement of the oxygen transfer rate in shaking flasks
 Anderlei T, Buechs J, Biochem Eng J. 2001 Mar;7(2):157-162
 [2] Quantifying the release of polymer additives from single-use materials by respiration activity monitoring
 Kristina Meier, Elena Herweg, Burkhard Schmidt, Tobias Klement, Lars Regestein, Jochen Buechs, Polymer Testing (2013), Volume 32, Issue 6, Pages 1064–1071

Conclusion

- RAMOS: valuable online measurement tool
 + MicrOTR: cultivation conditions in MTP
 + Adapter: measurement in disposable flasks
 + SFR: OTR / CTR / RQ and pH / DO