Turn flasks into Bioreactors

Real time monitoring of CHO cultivations

Introduction

The patented atSpiro ShakeReactor can turn flasks into bioreactors in 15 minutes. It adds online monitoring of dissolved oxygen, pH, temperature and humidity. As well as 3 programmable pumps, that can be used to implement fed-batch, pH control and automated induction in shaken cultivations.

The ShakeReactor fits with 500 mL and 1 L shake flasks. Setting up a ShakeReactor only adds 15 minutes of extra setup time when starting a cultivation.

The aim of this study was to show comparability of ShakeReactor cultivations to standard shake flask cultivations.

Materials and method

A CHO cell line was thawed and cells were passaged until viability >98% before commencing cultivations. All cultivations and passages were performed in an INFORS HT Multitron Cell incubator at 37 Celsius, 70% Relative humidity and 7.5% CO2. Shaking was set to 120 RPM with 25 mm throw diameter.

5-day batch cultivations were performed in duplicates in 500 mL Erlenmeyer flasks with PTFE filter caps and in atSpiro ShakeReactors. The flasks were filled with 150 mL Gibco FortiCHO media supplemented with glutamine and inoculated to 5 x 10^5 cells/mL.

Viable cell density and cell viability were measured on a NucleoCounter NC-200.

DO, pH, temperature and ambient relative humidity was recorded continuously by the ShakeReactors during the cultivation.

Results

Viable cell density (VCD) and viability during the 5-day batch cultivation can be seen in figure 1. Growth was similar between shake flasks and ShakeReactors and between replicates.

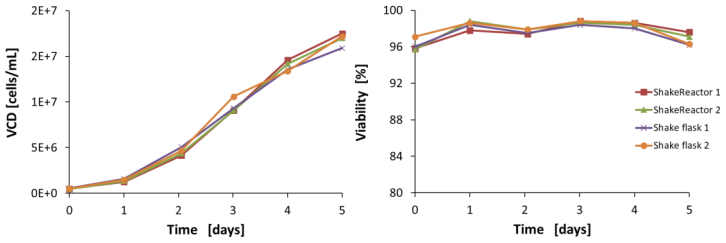

Figure 1 - Viable cell density (VCD) and viability during cultivation for both shake flask and ShakeReactor cultivations

Culture and ambient conditions in the incubator was monitored by the ShakeReactors, and can be seen in figure 2.

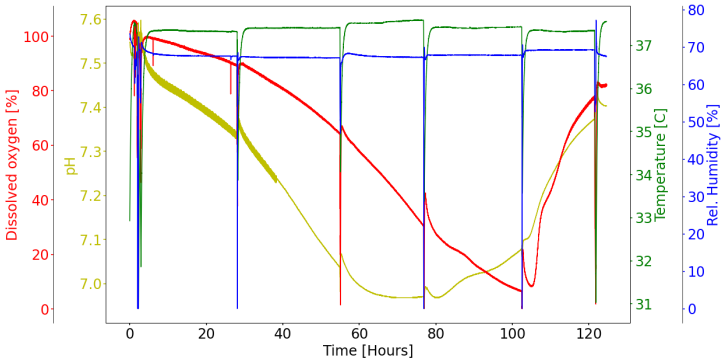

Figure 2 - pH, dissolved oxygen, in liquid temperature and ambient humidity as recorded by one of the ShakeReactors. The drops in readings stems from sampling outside the incubator

Conclusion

The ShakeReactor can be used for real time monitoring of culture conditions, without changing cell line behaviour.

Furthermore 3 programmable pumps makes it easy to implement fed-batch and pH control in your shaken cultivations.

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