CELL-tainer® single use bioreactor supports high cell densities using serum-free suspension CHO cells

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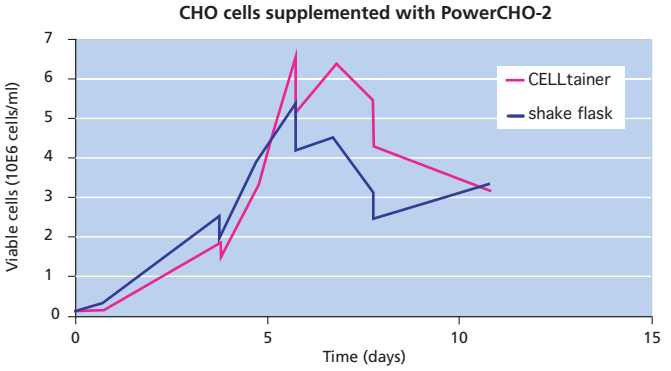
Goal of the study is to show that the CELL-tainer® single-use bioreactor characterized by a 2-D rocking motion is able to support high cell densities using serum-free suspension CHO cells without the necessity of pH or DO regulation.

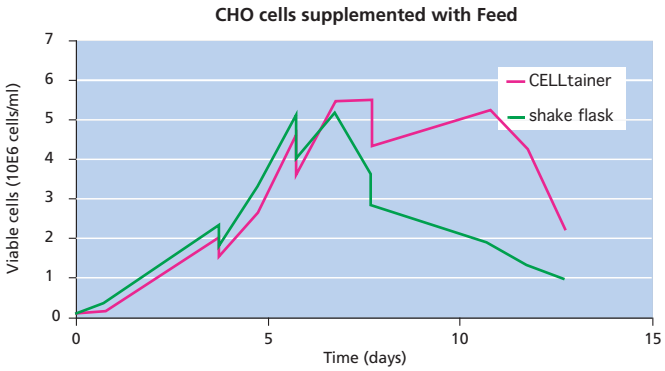
Materials and Methods:

CHO-S cells are inoculated at cell density of 0.1 x 106 cells/ml in 5 L PowerCHO-2 medium supplemented with 8 mM L-glutamine. At day 4 either 1.4 L of PowerCHO-2 medium or 1.4 L of Feed for PowerCHO-2. At day 6 again 1.7 L of same feeds have been supplied. For direct comparison the cells were also grown under identical conditions in shake flasks. When PowerCHO-2 was used, another feed 2.2 L was provided at day 8 of the culture. Experiments were terminated when viability in the CELLtainers were < 70%.

Results

Cell growth was comparable during the first 4 days of the culture in both shakers and the CELL-tainer® The population-doubling time was 20-24 hours. When the CHO cells were supplemented with PowerCHO-2 (left graph) viability and cell density were higher in the CELL-tainer® compared to the identical shaker and remained at > 80 % viable until day 8 of the culture. When cells were supplemented with Feed for PowerCHO-2 (right graph), population-doubling time increased to 30-35 hour, however cells remained much longer viable at high cell densities. Viability in the CELL-tainer® was still >85% at day 13, this in contrast to the corresponding shaker flask in which viability dropped to values < 80% from day 11 onward.





Conclusion

The CELL-tainer® single-use bioreactor with a 2-D rocking motion is able to support a high CHO cell viability at higher cell densities over a long period of time when cells are fed with Power CHO-2 FEED during the fed-batch period. This in contrast to the parallel shaker cultures.

The 2-D movement assures high mass transfer not only for O_2 but especially also for CO_2. pH control is such way not needed. Further feed optimization will lead to improved cell densities.

CELL-tainer® is a registered trademark of CELLution Biotech BV.

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