

Fall 11-2-2015

Efficient approaches for perfusion medium development

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Recommended Citation

Thomas Falkman, Andreas Castan, Eric Faldt, Teres Persson, Jill Simon, and Helena Nordvarg, "Efficient approaches for perfusion medium development" in "Integrated Continuous Biomanufacturing II", Chetan Goudar, Amgen Inc. Suzanne Farid, University College London Christopher Hwang, Genzyme-Sanofi Karol Lacki, Novo Nordisk Eds, ECI Symposium Series, (2015).
http://dc.engconfintl.org/biomanufact_ii/124

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HIGH-PERFORMING PERFUSION MEDIA DEVELOPMENT STRATEGIES

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Here, we present a fast and convenient strategy for developing a high-cell density perfusion process for antibody-producing Chinese hamster ovary (CHO) cells based on the commercially available ActiCHO™ Media System. ActiCHO P base medium was used as a starting point and ActiCHO Feed-A and Feed-B were added in various concentrations as supplements. The resulting perfusion medium prototypes were first evaluated in batch cultures, applying a design of experiment (DoE) strategy (Figure 1), and then tested in small-scale perfusion cultures in rocking single-use WAVE bioreactor™ systems (Figure 2). The medium optimization resulted in a final process with a cell-specific perfusion rate (CSPR) of less than 50 pL/cell/d, which is a more than 45% decrease compared with the starting process conditions. The performance of the perfusion process was further validated in lab-scale single-use stirred-tank bioreactor systems. Productivity and product quality of the perfusion process were compared with a standard fed-batch culture process.

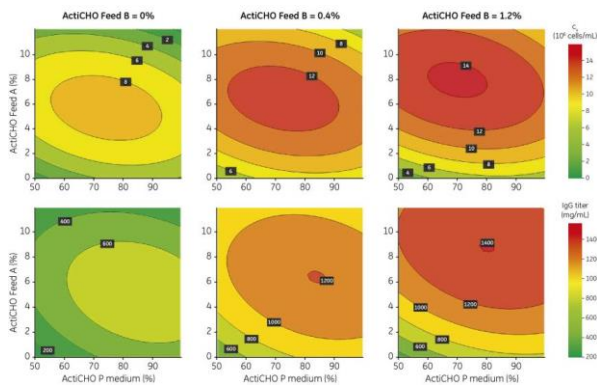


Figure 1. 4D contour plot for ActiCHO™ P medium, Feed A, and Feed B concentrations.

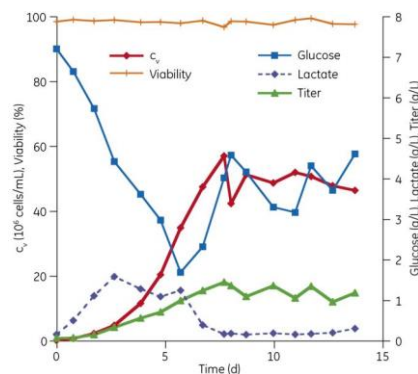


Figure 2. Confirmation under steady-state conditions at 50 MVC/mL and 1 RV/d (= CSPR 20).