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Efficient approaches for perfusion medium development

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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.

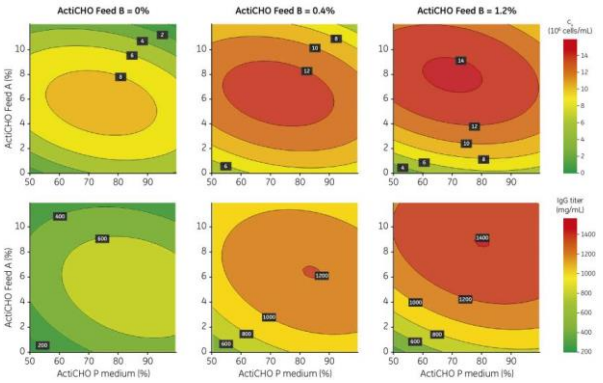

Figure 1. 4D contour plot for ActiCHO™ P medium, Feed A, and Feed B concentrations.

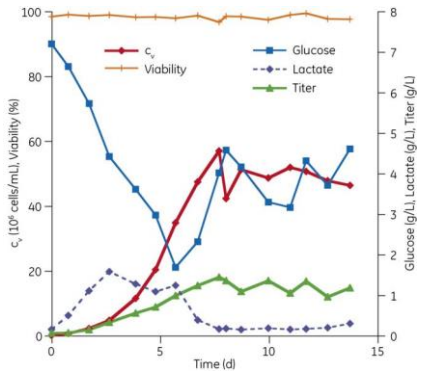

Figure 2. Confirmation under steady-state conditions at 50 MVC/mL and 1 RV/d (= CSPR 20).