

MANIPULATIONS OF ANTIBODY GALACTOSYLATION IN A FED-BATCH ADAPTED PERFUSION PROCESS

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Perfusion processes have demonstrated significantly higher volumetric productivity while maintaining consistent product quality attributes (PQAs) throughout an extended harvest period. With this, a drastic decrease of the bioreactor footprint in future commercial plants can be achieved. Therefore, there are significant efforts in biopharmaceutical industry focused on developing high productivity perfusion process for both future biologics, as well as on developing new generation processes for legacy fed-batch processes.

In this presentation, we will report the adaptation of an established 14-day fed-batch process for a therapeutic monoclonal antibody to a 30-day perfusion process using alternating tangential flow (ATF) technology. In the proof-of-concept perfusion process, a 6-fold viable cell density (VCD) was reached and maintained compared to the peak VCD in the fed-batch process. The productivity increased 3.5-fold as compared to the original fed-batch process after normalization to cell culture duration. The major PQAs from this perfusion process were consistent throughout the harvest period. Most of the PQAs from the perfusion process showed no significant differences from the original fed-batch process. However, significantly higher galactosylation level was observed in the perfusion process as compared to its fed-batch version. In the presentation, we will also detail the perfusion medium and process parameter optimization, which enabled the matching of the galactosylation profile of the last version perfusion process to the established fed-batch process without compromising target VCD, productivities, and other PQA profiles.