

DEVELOPMENT OF SCALE-DOWN SYSTEM FOR PERFUSION PROCESSES

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As a consequence of recent initiatives towards continuous bioprocessing, and since it often involves perfusion processes, there is an increasing need to scale these down and enable experiments with a decreased resource usage for each culture. In this poster, strategies are presented to enable screening of multiple process parameters, while focus is on simple, yet predictive, scale-down systems for perfusion processes. Due to the difficulty of implementing cell retention in small scale, it was decided to develop a chemostat scale-down system. The conception of a chemostat with exponential increasing in-flow and discontinuous out-flow (EIDO) yields a constant dilution rate (Figure 1). Its implementation in 10-15 mL scale ambr™ cultures is presented. The scale-down system is benchmarked towards bench top ATF perfusion cultures, illustrating the predictability of the scale-down system. The power of using chemostats to scale down perfusion is shown: the cells experience the same metabolite concentrations, and the same product concentration is observed, in the two systems, when the dilution rate in the chemostat is equal to the bleed rate in the perfusion. Therefore, this scale-down system can also predict product quality attributes.

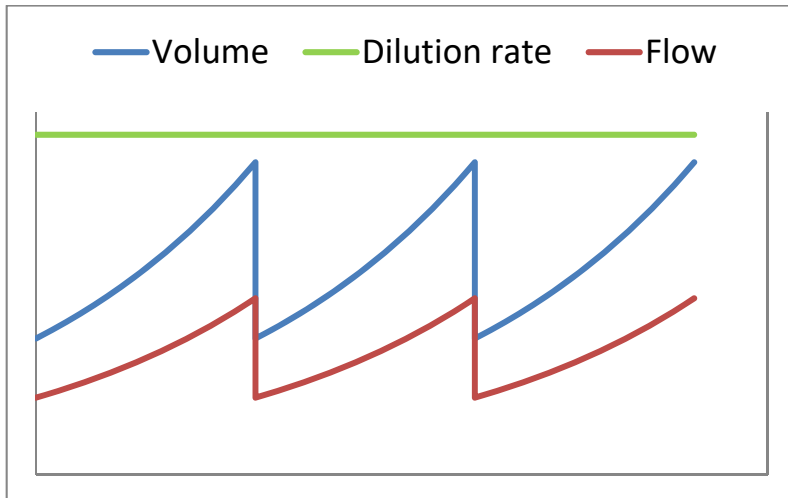


Figure 1. Scaled-down chemostat culture with Exponential increasing In-flow and Discontinuous Out-flow (EIDO)