Development of a scale down toolbox for perfusion process development

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**SCALE-DOWN TOOLBOX FOR**

**PERFUSION PROCESS DEVELOPMENT**

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**The good, the bad and the ugly... clone in perfusion**

You mean you can use scale down semi-continuous system to assess the performance of a perfusion process? Yes, I compared my results with a push-to-low² approach using a lab-scale perfusion bioreactor!

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**Figure 1:** Viable cell density of the 4 clones in (A) fed-batch bioreactors (B) semi-continuous shake tubes (C) perfusion bioreactors and (D) on-line capacitance signal used to increment the biomass set-point (SP) progressively (SP 1 to 4)

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He is right, from the semi-continuous experiment it is possible to

1. Predict CSPRₘᵢₙ
2. Estimate volumetric productivities
3. Obtain stable operation was achieved using the capacitance signal
4. Impact on growth and productivity

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**Figure 2:** CSPRₘᵢₙ calculated at SP4 for perfusion and at the VCDₘᵢₙ for ST (n=2) and DWP (n=6)

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**Figure 3:** Bioreactor volumetric productivity in perfusion, semi-continuous and fed-batch (increased by respectively 4.1, 3.6, 5.6 and 5.1 fold in perfusion compared to fed-batch)

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**Figure 4:** Growth and productivity in perfusion (A) Biomass (B) Bleed fraction (C) mAb concentration and (D) Specific productivity

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