

Cell culture

Maximizing scale-up efficiency of a mAb upstream process with the Gibco High-Intensity Perfusion CHO Medium

A collaboration between Thermo Fisher Scientific and the Zurich University of Applied Sciences

Continuous perfusion bioprocessing can be a powerful tool for mAb developers looking to improve the efficiency of their manufacturing processes. By keeping cells in a bioreactor while continuously exchanging the cell culture medium, it is possible to increase cell density, thus maximizing mAb productivity and ultimately helping increase cost-effectiveness and speed to market.

To achieve perfusion success, it is important to utilize a high-performing medium capable of supporting high cell densities at low perfusion rates (~1 vessel volume per day) for extended production runs at any scale. The Gibco™ High-Intensity Perfusion (HIP) CHO Medium has been developed to provide exceptional performance in perfusion processes while delivering substantial ease-of-use and scalability benefits.

To demonstrate the scalability of the HIP CHO medium, we collaborated with the Centre for Biochemical Engineering and Cell Cultivation Techniques at the Zurich University of Applied Sciences.

In our study, using a continuous perfusion process with CHO-K1 cells, we evaluated the performance of the HIP CHO medium at two scales:



**Thermo Scientific™
HyPerforma™ bioreactor**

- 3 L scale
- One production run



**Thermo Scientific™
DynaDrive™ S.U.B.**

- 50 L scale
- Two replicate production runs



zhaw

Pictured is the Life Sciences and Facility Management
Institute of Chemistry and Biotechnology
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A collaboration for success

The Zurich University of Applied Sciences (ZHAW) is a leading Swiss research institution with longstanding life science and pharmaceutical innovation expertise. ZHAW's Centre for Biochemical Engineering and Cell Cultivation Techniques has a strong reputation for research excellence in cell culture process development, with more than 20 years of bioprocessing experience. This deep subject knowledge has made ZHAW an ideal collaborator for this project.

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The HIP CHO Medium supports high performance for perfusion-based mAb production across scales

The results of this collaborative study demonstrate that the HIP CHO Medium supports sustained high performance for perfusion-based mAb production during scale-up, helping maximize efficiency.

Key findings

- Strong and sustained cell growth and viability (Figure 1) were maintained at all production volumes
- Average IgG titers ranging from 1.7 to 1.9 g/L/day were achieved during steady-state production with scale-up (Figure 2)
- Total process harvest yields ranged from 2,700 to 3,000 g of mAbs, demonstrating the high efficiency of a continuous perfusion process with modest scale-up to 50 liters

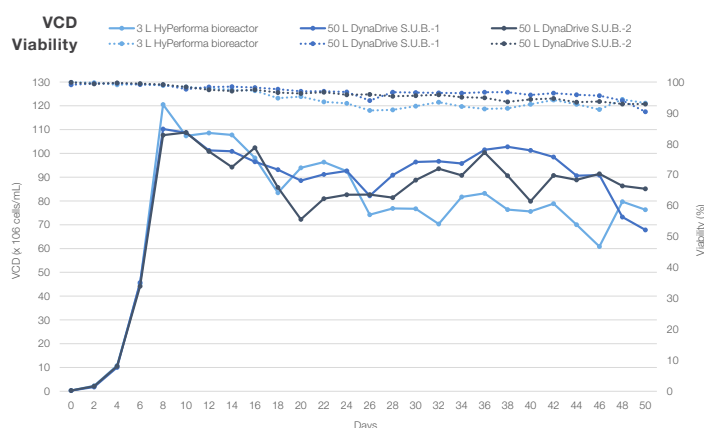


Figure 1. Cell growth and viability. VCD = viable cell density.

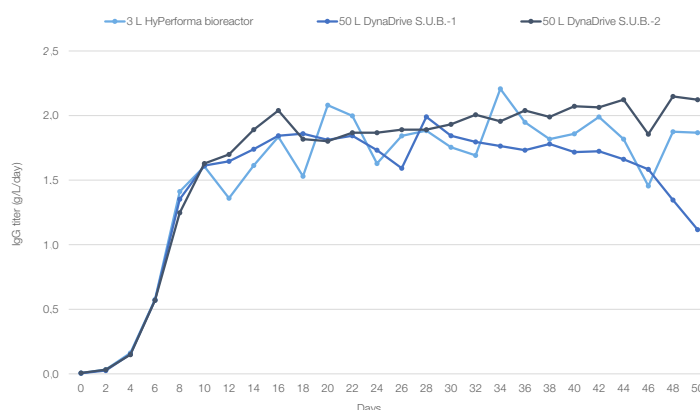


Figure 2. IgG titers.

Could the HIP CHO Medium help optimize your scale-up journey?

The HIP CHO Medium can help you deliver consistent and sustained high productivity in your perfusion process while supporting viable cell densities $>80 \times 10^6$ cells/mL using a perfusion rate as low as 1 vessel volume per day for extended production runs. Together, these factors make the medium an ideal choice for your process, helping accelerate your journey to market.

Unsure how to implement a perfusion process? You can rely on our global field application scientist (FAS) team to help you determine the ideal type of perfusion process, as well as provide insight and guidance on developing your process. Utilizing their extensive bioprocessing experience, the FAS team can also provide other personalized recommendations and troubleshooting support throughout evaluation and scale-up.

Ready to accelerate your mAb perfusion process development?

Get in touch with a bioprocessing representative to discover how the HIP CHO Medium can help you increase the efficiency of perfusion process development for mAb manufacturing workflows.

Visit our web page to learn more about how the HIP CHO Medium can benefit your process. With our range of support resources, from technical white papers to evaluation guides, we can help you take the guesswork out of scale-up.