



Cell culture

## Maximizing scale-up efficiency of a mAb upstream process with the Efficient-Pro Medium and Feeds System

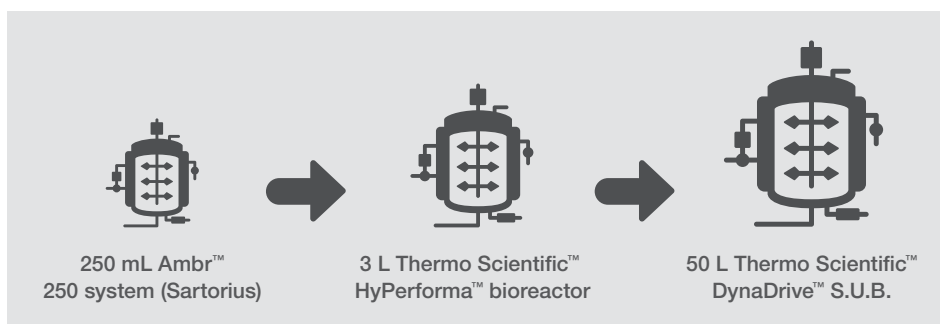
### A collaboration between Thermo Fisher Scientific and the Zurich University of Applied Sciences

Successfully scaling up monoclonal antibody (mAb) production can involve overcoming many challenges. Developers need to maintain process productivity and protein quality throughout, while simultaneously maximizing efficiency and cost-effectiveness.

Central to achieving these goals is a robust, commercially available, scalable medium and feed platform. The Gibco™ Efficient-Pro™ Medium and Feeds System, which consists of a basal medium and two separate feeds (Feed 1 and Feed 2) for use with different CHO cell lines, has been specifically developed to optimize CHO protein bioproduction and support scale-up for a seamless transition to clinical and commercial manufacturing.

To demonstrate the scalability of the Efficient-Pro system, we collaborated with the Centre for Biochemical Engineering and Cell Cultivation Techniques at the Zurich University of Applied Sciences.

In our study, using a fed-batch process with CHO-K1 cells, we evaluated the performance of the Gibco™ Efficient-Pro™ Medium and Feed 1 at three scales:



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

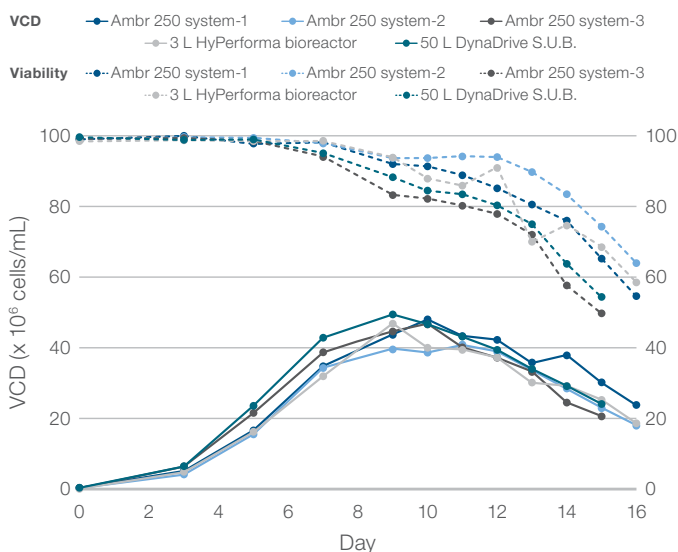
The Zurich University of Applied Sciences (ZHAW) is a leading Swiss research institution with longstanding life science and pharmaceutical innovation expertise. ZHAW's Centre for Biochemical Engineering and Cell Cultivation Techniques has a strong reputation for research excellence in cell culture process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

## The Efficient-Pro system supports strong and consistent mAb production across scales

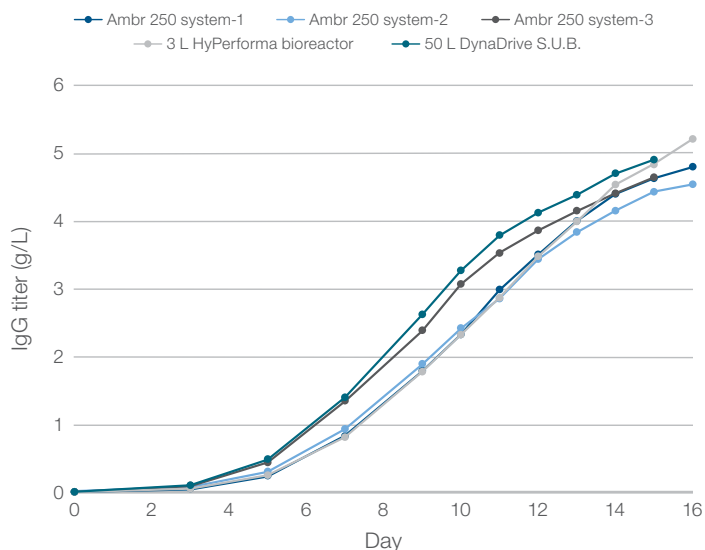
The results of this collaborative study demonstrate that the Efficient-Pro system can support consistent, high-quality fed-batch mAb production at a range of scales, helping maximize scale-up efficiency.

### Key findings

- Strong and similar trends in cell growth and viability (Figure 1) were maintained at all production volumes
- IgG titers ranging between 4.5 g/L and 5.2 g/L were achieved at all scales (Figure 2)
- Key protein quality attributes, including charge variants, protein aggregation, and N-glycosylation, remained consistent across scales



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



**Figure 2. IgG titers.**

## Could the Efficient-Pro system accelerate your scale-up journey?

The Efficient-Pro system can help streamline development and maximize titers while maintaining the quality of your final product. Together, these factors make the Efficient-Pro system an ideal choice for your process, and for ultimately accelerating your journey to market.

You can also rely on our global field application scientist (FAS) team to help you get the most from the Efficient-Pro system. Utilizing extensive bioprocessing experience, the FAS team can provide personalized recommendations and troubleshooting support throughout evaluation, implementation, and scale-up.

### Ready to revolutionize your mAb process development?

[Get in touch with a bioprocessing representative](#) to discover how the Efficient-Pro system can help you optimize process development for mAb manufacturing workflows.

[Visit our webpage](#) to learn more about how the Efficient-Pro system can benefit your process and to access a range of support resources. From technical application notes to evaluation guides, we can help you take the guesswork out of scale-up.