

Case Study

Rapid 200 Fold Scale-Up of a Fed-Batch Bioreactor Process for a CHO Cell Line expressing a Mab

Benefits of Case:

- A fed-batch bioreactor process for a CHO cell line was transferred from a client and scaled 200 fold with minimal process development evaluation and testing.
- Equivalent productivity profiles were obtained at 0.5, 3, and 100L bioreactor scale
- A commercially available off the shelf chemically defined media and feed solution were utilized
- Process Development costs and time were minimized

Background and Challenge:

- The client had performed preliminary bioreactor runs at the 0.5L scale with the CHO cell line
- The client required a rapid 200 fold scale-up to the 100L bioreactor level with minimal process development
- Time constraints dictated that only two-3L bioreactor evaluations could be performed prior to scale-up to the 100L bioreactor
- The clients' 0.5L bioreactor system differed in design from the 3 and 100L bioreactor utilized for process development and scale-up

Strategy

- Utilize a commercially available off the shelf chemically defined media and feed solution used by the client at the 0.5L scale
- Utilize process data from the 0.5 L scale to design operating parameters for the 3L scale bioreactor although the 0.5 and 3 L bioreactors differed in design
- 3L process development and 100L scale bioreactor are of similar design and use the same control software

Development Data

- The most favorable integrated viable cell density was obtained with the 0.5 L bioreactor most likely due to oxygen delivery rates
- A productivity of 900 mg of IgG /L at the 0.5,3,and 100L bioreactor scale was achieved
- The feed schedule data from the 0.5L scale transferred to the 3 and 100L scale with only minor adjustments
- Metabolic profiles were similar at all three bioreactor scales
- Only two process development 3L bioreactor runs were required prior to scale-up of the process to the 100L bioreactor

Value for the Client

- A rapid 200 fold bioreactor scale-up was achieved with minimal process development.
- Use of a commercially available off the shelf chemically defined media and feed solution facilitated technology transfer and scale-up
- Process development costs were minimized and product launch accelerated