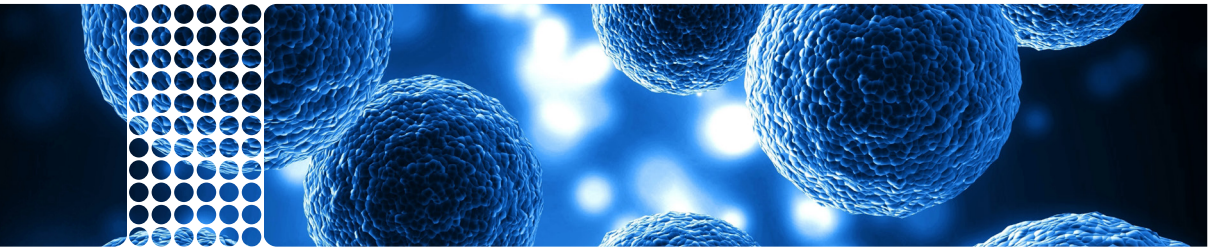

Case study

Optimizing CHO-K1 fed-batch cell culture medium for mAb production

Authors: Novo Nordisk Pharmatech in collaboration with Quacell Biotechnology

Background

The Chinese Hamster Ovary (CHO) cell line is widely used to produce recombinant proteins due to its high growing capacity and productivity. Adapting cell culture media for each specific cell line is key to exploit these features for cost effective and fast product generation. In this study, we compared the effects of animal-free recombinant insulin (r-insulin) supplementation on CHO-K1 cell proliferation and productivity of IgG protein, in fed-batch culture.

Study description

In the first part of the study, different concentrations (2, 5, 10 mg/L) of r-insulin were added into basal in-house chemically defined medium at the beginning of fed-batch culture of CHO-K1Q cells producing antibody (IgG). In the second part of the study, different concentrations of r-insulin (8, 20, 40 mg/L) were supplemented into the feeding medium (added to the cell culture every 48 hours).

Results

In the first part of the experiment, cell density reached the highest level on day 9th in the control group without r-insulin. Among the three concentrations of r-insulin tested, 2mg/L had the highest effect on increasing cell proliferation by 17% (Fig. 1A). The highest concentration of IgG expressed in the control group was observed on day 13th. Among the three concentrations, 2mg/L r-insulin showed the highest improvement (by 51%) on IgG expression (Fig. 1B). Also in the second part of the experiment, the control group reached the highest cell density on day 9th, but there was no obvious influence of r-insulin on the cell growth (Fig. 1C). However, the production of IgG was increased by different concentrations of r-insulin, with 8 mg/L improving productivity by 49% (Fig. 1D).

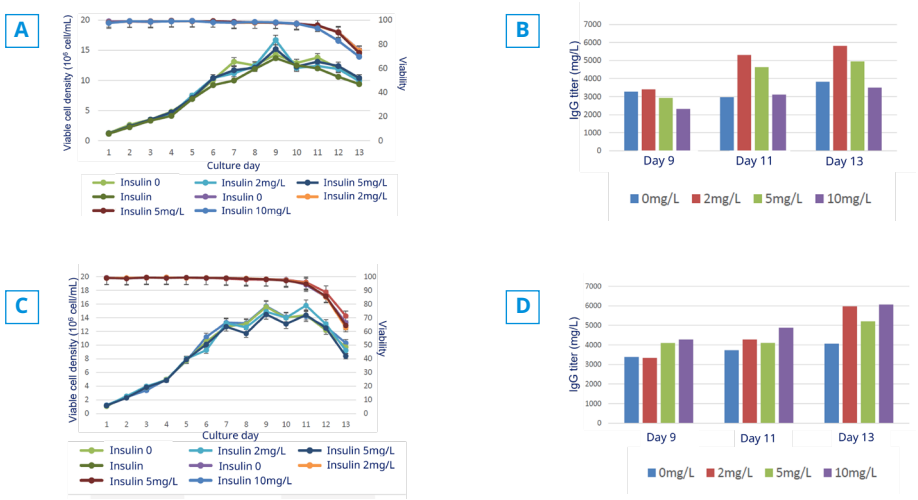

Figure 1: Effects of r-insulin supplementation to chemically defined media. A) CHO-K1 cell proliferation following r-insulin supplementation in basal medium B) IgG titer following r-insulin supplementation in basal medium C) CHO-K1 cell proliferation following r-insulin supplementation in feeding medium D) IgG titer following r-insulin supplementation in feeding medium.

Conclusion

- Low concentrations of r-insulin supplemented into basal media significantly improves cell proliferation and IgG productivity of CHO-K1 cells in fed-batch culture
- r-insulin supplemented into feeding media significantly improves IgG productivity, without affecting cell proliferation
- Optimization of r-insulin concentration in cell culture media is crucial to identify optimal conditions to maximize cell culture media performance

Further information

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