

Comparative Evaluation of Commercially Available CHO Media






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INTRODUCTION

One of the key factors in a biopharmaceutical process is the selection of an appropriate cell culture medium. There are several commercially available CHO media, with most requiring further optimization to meet the demand of a particular cell line, its expression system and its protein product. In order to overcome these challenges, a unique CHO medium, BD Select™ CHO, has been developed, which supports and enhances the performance of multiple CHO lines. This high performance medium helps eliminate the need for further optimization of the cell culture medium, thus reducing the time required for process development. The current study was performed to compare the performance of BD Select™ CHO against commercially available chemically defined (CD) and Animal Free (AF) CHO media. A total of 5 commercial media were evaluated for their effect on growth and production of two CHO cell lines.

MATERIALS AND METHODS

MEDIA

- Medium 1.....  Commercial Chemically Defined (CD)
- Medium 2.....  Commercial Chemically Defined (CD)
- Medium 3.....  Commercial Chemically Defined (CD)
- Medium 4.....  Commercial Pre Supplemented (AF)
- BD Select™ CHO...  Commercial Pre Supplemented (AF)

CELL LINES

- CHO Line # 1Neomycin-Resistant (Neo) Expression System
- CHO Line # 2Glutamine-Synthetase (GS) Expression System

BATCH CULTURE STUDY

- 125 mL Shaker flasks (Corning)
- Cell counts and cell viability obtained using Vi-CELL™ (Beckman Coulter)
- Protein production obtained using Octet-Protein A (ForteBio)

***Cells were maintained in specific medium for 3 passages before experimentation.*

CHO LINE #1

Figure 1: Growth & Production in Various Media.

Figure shows the effect of three CD and two AF media on growth (line) and production (bars) of CHO line #1.

- Medium 1 and BD Select™ CHO both supported growth of CHO line #1, but BD Select CHO showed 200% higher productivity than Medium 1.
- Media 2, 3 and 4 showed lower growth and production as compared to BD Select™ CHO.

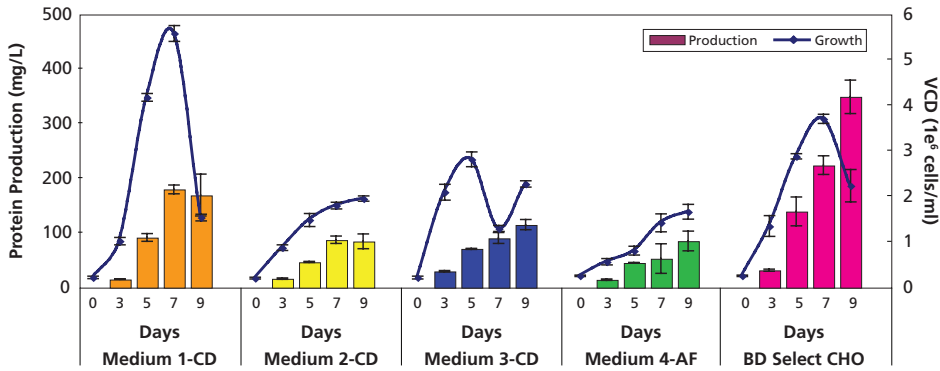


Figure 2: Animal Free Hydrolysate Supplementation of Media 1 and 3.

Figure shows the effect of hydrolysate supplemented CD media on growth (line) and production (bars) of CHO line #1. Hydrolysate 1 and 2 indicate two concentrations of hydrolysate.

- Hydrolysate supplementation did not improve the performance of Medium 3.
- Hydrolysate supplementation moderately improved the performance of Medium 1 as compared to non-supplemented Medium 1.

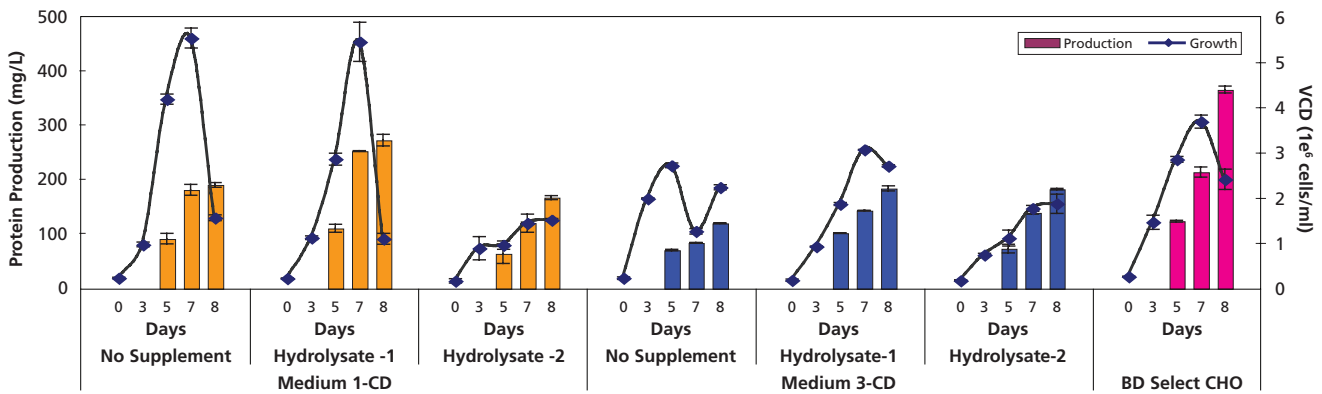
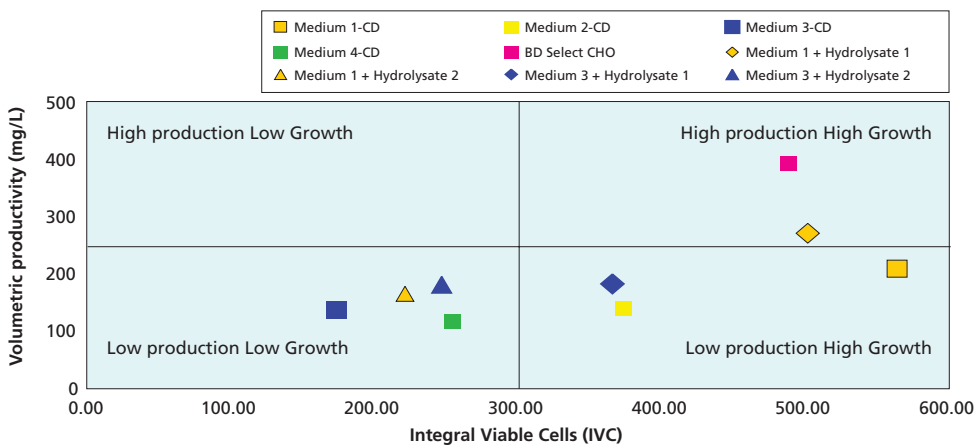


Figure 3: Performance Comparison of Chemically Defined (CD), Animal Free (AF) and Hydrolysate Supplemented – CD CHO Media.

Figure shows the plot of Integral Viable Cell density (IVC) against volumetric production for five CHO media for Cell line #1. IVC was calculated from data shown in Figure 1 and 2. Each quadrant shows the performance level based on growth and production of CHO cells in specific medium.



CHO LINE #2

Figure 4: Growth & Production in Various Media.

Figure shows the effect of three CD and two AF media on growth (line) and production (bars) of CHO line # 2.

- BD Select™ CHO promoted the highest levels of growth and production for CHO Line # 2.
- Media 1 – 4 all exhibited lower levels of growth and production for CHO Line # 2.

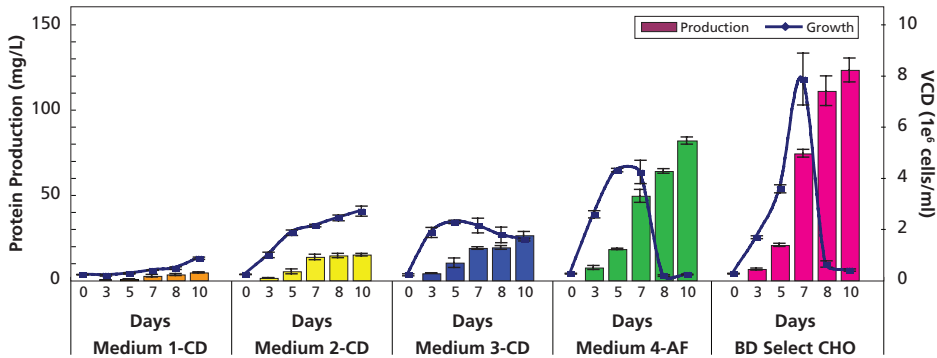


Figure 5: Animal Free Hydrolysate Supplementation of Media 2 and 3.

Figure shows the effect of hydrolysate supplemented CD media on growth (line) and production (bars) of CHO line #1. Hydrolysate 1 and 2 indicate two concentrations of hydrolysate.

- Hydrolysate supplementation did not improve the performance of CD Media 2 and 3 for CHO Line # 2.

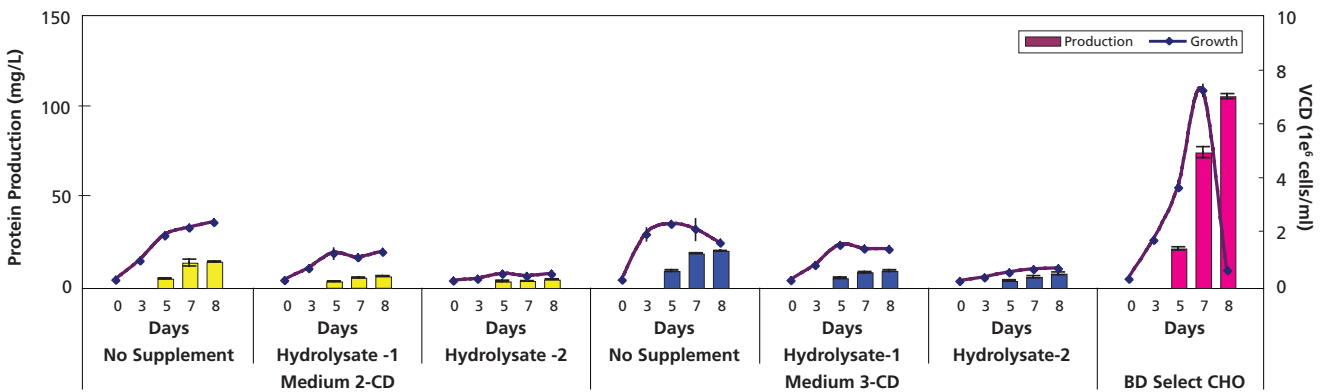
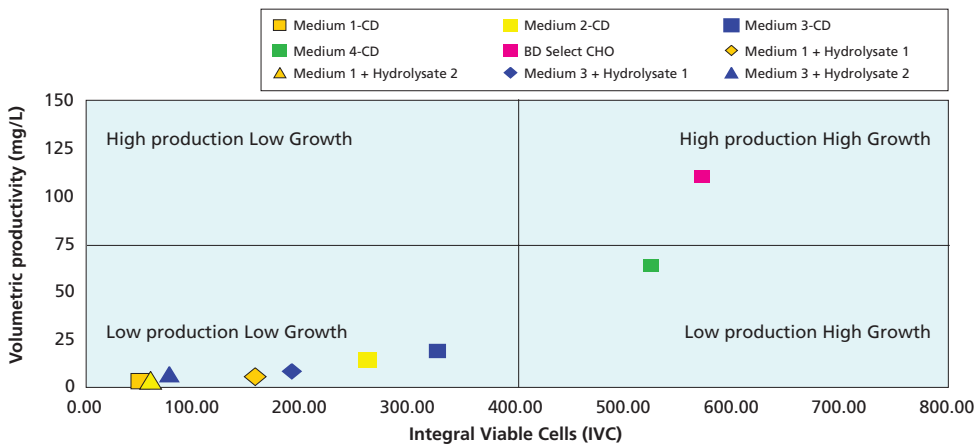


Figure 6: Performance Comparison of Chemically Defined (CD), Animal Free (AF) and Hydrolysate Supplemented – CD CHO Media.

Integral Viable Cell density (IVC) plotted against volumetric production for five CHO media for Cell line #1. IVC was calculated from data shown in Figure 4 and 5. Each quadrant shows the performance level based on growth and production.



CONCLUSIONS

- Among all the media tested, only BD Select™ CHO promoted the growth and productivity of both the CHO lines.
- Medium 1 and Medium 4 supported performance of CHO line #1 and #2 respectively, but response was less than BD Select™ CHO.
- Overall, this comparative evaluation demonstrated that BD Select™ CHO is a high performance production medium for use in CHO based applications.