CELLiST™ Basal CHO MX - A Novel High-Productivity Cell Culture Medium for CHO Bioproduction

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Over the last two decades, the industry has seen dramatic increases in the productivity of CHO cells due to rapid improvements in cell culture media and upstream process development. At KBI Biopharma, the upstream process development team has tested various commercial media and feed combinations and successfully developed robust processes for various biologics. However, the use of commercial media has limitations when additional media optimization is required as access to these formulations is often proprietary. We are now introducing a new high-productivity cell culture medium, CELLiST Basal CHO MX (CHO MX). This new medium was developed through a collaboration between KBI Biopharma and JSR Life Sciences, leveraging KBI's knowledge of upstream cell culture processes to customize media formulations for optimal performance.

Early medium development began with available commercial media formulations and screening for key components. After this initial screening, we implemented an iterative process using a combination of OFAT and DoE studies to identify the impact of key components such as amino acids, vitamins, and trace elements on cell growth, viability, lactate, ammonia and productivity. Once higher productivity (>30%) was achieved compared to commercial medium, we used response surface modeling to understand and optimize modulations in product quality attributes. The medium was then successfully tested from small-scale ambr15 to pilot-scale 200L bioreactors. In summary, the CELLiST Basal CHO MX is a novel cell culture medium that supports high productivity and is scalable for large-scale CHO bioproduction.

CELLiST™ Basal CHO MX

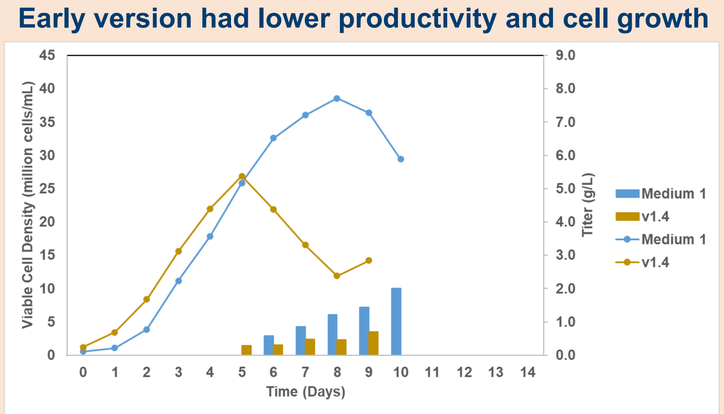
CELLiST™ is a registered trademark of Ajinomoto Co., Inc.

- **Higher Productivity across CHO cell lines**
- **Scalable from 15 mL to 200L**
- **Ability to Tune Product quality attributes**

Development Strategy

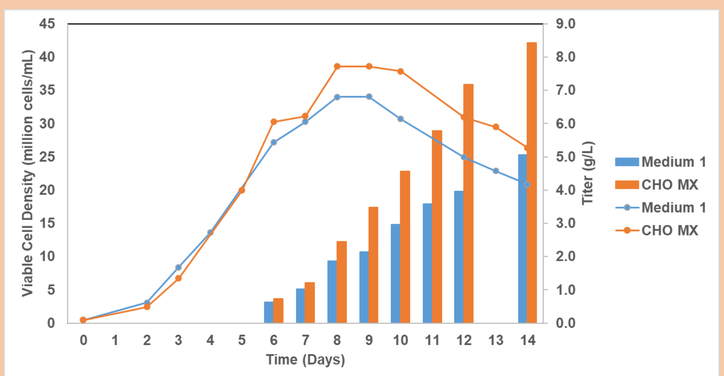
- **v1.3** — Original formulation based on commercial media information
- **v1.4** — Optimized amino acids composition using OFAT studies
- **v2.0** — Optimized Trace elements and Vitamins using DoE and OFAT studies
- **CHO MX** — Optimized amino acids, lipids and organic compounds using DoE

Early version had lower productivity and cell growth



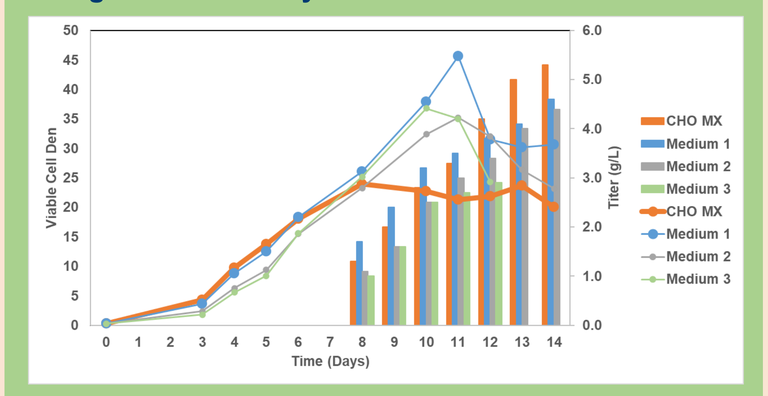
Iterative process with DoE and OFAT studies

Higher Productivity in CHO M_Clone



Higher Productivity

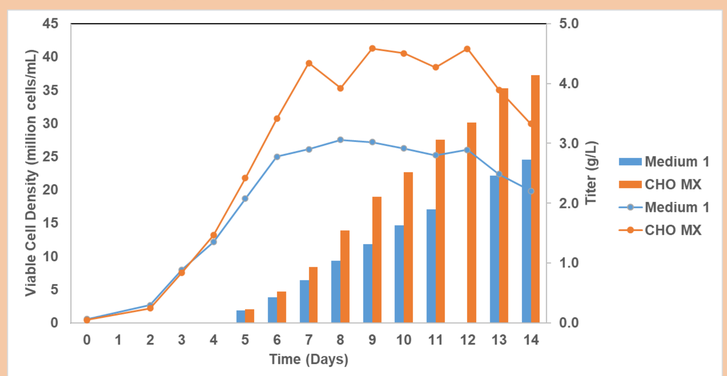
Higher Productivity than Other Commercial Media



Comparable Product Quality in CHO MX medium

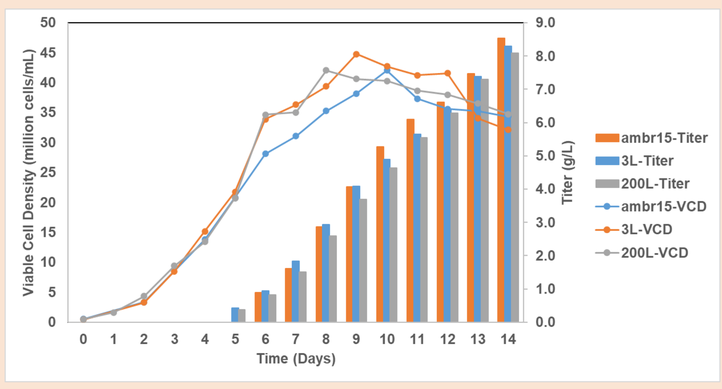
	SEC			CEX			
Condition	HMW (%)	LMW (%)	Main (%)	Acidic (%)	Main (%)	Basic (%)	Man5 (%)
CHO MX	1.6	0.0	98.5	43.2	36.9	20.0	7.4
Medium 1	2.4	0.0	97.7	55.8	33.6	10.7	3.7
Medium 2	1.4	0.0	98.6	47.8	33.0	19.3	3.8
Medium 3	1.3	0.0	98.7	46.6	35.5	18.0	2.5

Higher Productivity in CHO ZN_Clone



Scalable from 15 mL to 200L

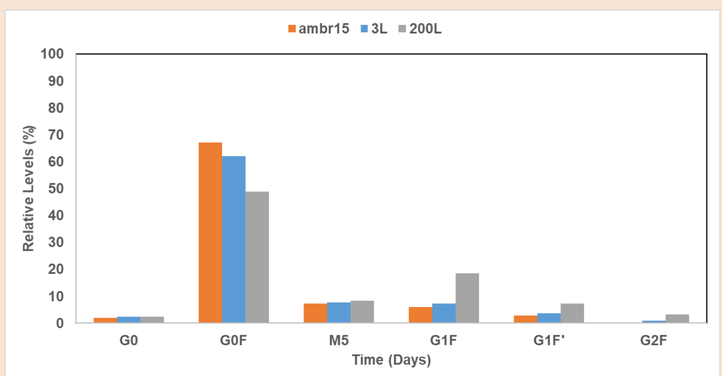
Comparable Performance in various scales



Comparable Product Quality

	SEC			CEX		
Condition	HMW (%)	LMW (%)	Main (%)	Acidic (%)	Main (%)	Basic (%)
ambr15	1.5	0.0	98.5	43.2	36.9	20.0
3L	1.5	0.8	97.7	50.6	33.5	15.9
200L	0.8	0.8	98.4	41.0	40.8	18.3

Comparable N-Glycan profile



The CELLiST™ Basal CHO MX medium enables higher productivity for the development of various biologics and future biomanufacturing

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