Ambr® 250 High Throughput and Ambr® 250 Modular

Selected Bibliography
Ambr® 250 High Throughput and Ambr® 250 Modular

This bibliography covers many key applications and topics for the Ambr® High Throughput and Ambr® 250 Modular systems. Cell and product types and application areas are shown as icons on the next page.

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For more information, please visit www.sartorius.com
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Parallel Scale-Down Tool to Accelerate Fermenterphile Selection
Jonas Bafna-Rührer, Suresh Sudarsan
Novo Nordisk Foundation Center for Biosustainability, Technical University of Denmark, Kemitorvet, Building 220, 2800 Kgs. Lyngby, Denmark
2022

"...the presented scale-down tool can be used to efficiently characterize the performance of microbial production strains in industrial fermentation processes and accelerate fermenterphile selection."

The Next Generation of Cell Factories for Viral Vector Production
MaryAnn Labant
Genetic Engineering & Biotechnology News
2021
https://doi.org/10.1089/gen.41.S2.04

"...the Ambr® platform, for cell culture, in combination with our design of experiments software... enables manufacturers to take a systematic approach toward optimizing cell culture and transfection parameters."
Use of Ambr® 250 to Assess Mucic Acid Production in Fed-Batch Cultures of a Marine Trichoderma SP. D-221 04

Anu Tamminen, Rosaliina Turunen, Dorothee Barth, Virve Vidgren, Marilyn G. Wiebe

VTT Technical Research Centre of Finland Ltd, Tietotie 2, P.O. Box 1000, 02044 Espoo, Finland

2022

https://doi.org/10.1186/s13568-022-01436-4

“The wide bore sampling tips provided for the Ambr® 250 were adequate for sampling these cultures of filamentous fungi.”

Modulation of High Mannose Levels in N-Linked Glycosylation Through Cell Culture Process Conditions to Increase Antibody-Dependent Cell-Mediated Cytotoxicity Activity for an Antibody Biosimilar

Shahid Rameez, Yogender K. Gowtham, Gautam Nayar, Sigma S. Mostafa

KBI Biopharma Inc., Durham, North Carolina, USA

2021

https://doi.org/10.1002/btpr.3176

“A Semi-Empirical Mathematical Model to Specify the PH of Bicarbonate-Buffered Cell Culture Medium Formulations

Tam T. Duong, James M. Piret, R. Robert Balcarcel

Bayer U.S. LLC, Pharmaceuticals, BD Cell Culture Development, Berkeley, California, USA

University of British Columbia, Vancouver, British Columbia, Canada

2021

https://doi.org/10.1002/cjce.24242

“The pH model was validated with bioreactors with controlled CO₂ flow; all four solutions made using the recipes derived from the pH model were within 0.01 pH unit of the model pH.”
Spent Media Analysis With an Integrated Ce-MS Analyzer of Chinese Hamster Ovary Cells Grown in an Ammonia-Stressed Parallel Microbioreactor Platform

Kathryn Elliott, Ji Young L. Anderson, Colin M. Gavin, Kenion H. Blakeman, Sarah W. Harcum, Glenn A. Harris

Clemson University, 105 Collings Street, Clemson, South Carolina 29634 USA
2. 908 Devices Inc., 645 Summer Street, Boston, Massachusetts 02210 USA

2020

https://doi.org/10.12665/J19OA.Elliott

Efficient High-Throughput Biological Process Characterization: Definitive Screening Design with the Ambr® 250 Bioreactor System

Mitchell Tai, Mandy Ly, Inne Leung, Gautam Nayar

Biologics Bioprocess Development, Bristol-Myers Squibb, Seattle, WA

2015

https://doi.org/10.1002/btpr.2142

“The Ambr® 250 system demonstrated good scale-down capabilities and was useful for systematic and rapid experimentation that would normally be labor-intensive and prone to human error.”
Scalability Evaluation of a 50 L Stirred Tank Bioreactor Platform to Produce Adeno-Associated Viral Vectors (AAV) Using HEK293F Cells
Ambra Albertario, Patricia Curto, Lara Nascimento-Brooks, Daphne Bocciarelli, Kiren Baines, David Vincent
eXmoor Pharma, Bristol, UK
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Request from your Sartorius representative. Celum ID 165621
“We realized greater improvements in final product titer as well as improvements in production kinetics in the fed batch mode using the Ambr® 250 system.”

Accelerating Manufacturing to Enable Large-Scale Supply of a New Adenovirus-Vectored Vaccine Within 100 Days
Carina C.D. Joe, Rameswara R. Segireddy, Cathy Oliveira, Adam Berg, Yuanyuan Li, Dimitrios Doultsinos, Nitin Chopra, Steffi Scholze, Asma Ahmad, Piergiuseppe Nestola, Julia Niemann, Alexander D. Douglas
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https://www.biorxiv.org/content/10.1101/2021.12.22.473478v1.full
“Our ‘design of experiments’ approach on the Sartorius Ambr® 250 High Throughput Perfusion system identified early perfusion start and intensified perfusion after infection as factors that improved volumetric productivity.”

High Density HEK293T Culture for High Yield, High Quality, Stable Adenoviral Vector Production in Ambr® 250 Stirred Tank Reactors
Amélie Boulais, Lara Nascimento-Brooks, Shuangqing Yu, Zhicheng Cao, Li Hu, Shuren Feng, Jinlu Du, Cuiling Song, Junjie Luo,
Fiveplus Gene Technology Co., Ltd., China
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A Machine-Vision Approach for Bioreactor Foam Sensing

Jonas Austerjost, Robert Söldner, Christoffer Edlund, Johan Trygg, David Pollard, Rickard Sjögren

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How to Intensify Upstream Process Development With Ambr® 15 & 250

James Edwards, Don Traul

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2021


Genome-Scale Metabolic Rewiring Improves Titers Rates and Yields of the Non-Native Product Indigoidine at Scale

Deepanwita Banerjee, Thomas Eng, Andrew K. Lau, Yusuke Sasaki, Brenda Wang, Yan Chen, Jan-Philip Prahl, Vasanth R. Singan, Robin A. Herbert, Yuzhong Li, Deepti Tanjore, Christopher J. Petzold, Jay D. Keasling, Aindrila Mukhopadhyay

Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA Lawrence Berkeley National Laboratory, Emeryville, CA, 94608, USA

2020

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“We realized greater improvements in final product titer as well as improvements in production kinetics in the fed-batch mode using the Ambr® 250 system.”
Upstream Microbial Process Characterization with Single-Use Bioreactors from 250 mL to 50 L
Lara Nascimento, Marco Leupold, Jens Rupprecht, Alison Rees-Manley, Barney Zoro, Melisa Carpio, Kevin McHugh
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Advanced Process Development Using Automated Micro Bioreactors Shortens Timelines and Provides Process Solutions for a Rapid Scale Up
Jincai Li, Sunil Chhatre
WuXi Biologics Sartorius
2018

Developing New Perfusion Capabilities for Ambr® Bioreactors
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Lara Nascimento, Marco Leupold, Jens Rupprecht, Alison Rees-Manley, Barney Zoro
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Process Development of Microbial Plasmid DNA: Fast-Tracking with Modular Single-Use Minibioreactors
Barney Zoro, Andrew Frazer
Cobra Biologics, Keele, UK Sartorius
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**Single Use Micro Scale Bioreactor Enables Higher Productivity**

Barney Zoro

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**Webinar: Implementation of Ambr® 250 Modular Benchtop Bioreactor System for Fast-Track Process Development of Microbial Products**

Andrew Frazer, Barney Zoro

Cobra Biologics, Keele, UK

Sartorius

2016

Request from your Sartorius representative. Celum ID 178232

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**Accelerate Your Process Development With High-Throughput, Single Use, Fully Automated Bioreactors**

Mwai Ngibuini

Sartorius

2015


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**Evaluation of a Stirred Small Scale Single-Use Bioreactor for Microbial Application**

Marco Leupold, Thomas Dreher, Ute Husemann, Mwai Ngibuini, Gerhard Greller

Sartorius

2015

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**Automated Mini Bioreactor Technology for Microbial and Mammalian Cell Culture: Flexible Startegy to Optimize Early Process Development of Biologics and Vaccines**

Mwai Ngibuini

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Working With Scale Down Models

Shedding Light On the Dark Art Of Bioprocess Scaling
Kevin McHugh, Sinyee Yau-Rose, Katy McLaughlin
Sartorius
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Webinar - The Concept of Upstream Scaling: From Theory to Practice
Vincent Lam, Sherwin Ting, Sinyee Yau-Rose
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Svea Cheeseman, Dan Kiopec
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(8F) Ambr® 250 Scale-Down Model Limitations and Mass Transfer Characterization
Brian Kwan, John Bowers, Gaurav Chauhan, Arpan Bandyopadhyay, Wai Lam Ling
Merck & Co., Inc., University of Iowa University of Minnesota
2020
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“Cell culture process development and process characterization studies leverage bench-scale bioreactor systems as scale-down models for large scale manufacturing. The Ambr® 250 micro-scale bioreactor platform is a bench-scale system that offers customizable automation and individualized bioreactor control to support high-throughput workflows.”

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A Rapid, Low-Risk Approach for Process Transfer of Biologics from Development to Manufacturing Scale

Sebastian Ruhl, Naomi de Almeida, Melisa Carpio, Jens Rupprecht, Gerhard Greller, and Jens-Christoph Matuszczyk

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A Novel, Risk-Based Approach for Predicting the Optimum Set of Process and Cell Culture Parameters for Scaling Upstream Bioprocessing

Adrian Stacey, Jochen Scholz, Sinyee Yau-Rose

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Aline Hughson, Douglas Marsh, Quentin Vicard

Gyroscope

Sartorius

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From Early Stage to Late Stage Development: How to Characterize a Perfusion-Base

Perrine Rouel, Tom Jeffery

The Janssen Pharmaceutical Companies of Johnson & Johnson

Sartorius

2019


Systematic Evaluation of High-Throughput Scale-Down Models for Single-Use Bioreactors (SUB) Volumetric Gas Flow Rate as the Criterion

Xiaolin Zhang, Joseph Moroney, Linda Hoshan, Rubin Jiang, Sen Xu

Merck & Co., Inc., 2000 Galloping Hill Road, Kenilworth, NJ 07033, USA

2019

https://doi.org/10.1016/j.bej.2019.107307

“The highly comparable culture performance between Ambr® 250 and SUBs suggest that high throughput systems could be directly scaled up to production scales without the need of intermediate scales such as bench scale bioreactors, and the suitability of the Ambr® 250 systems for accelerated process development and characterization.”
Scale-Down Model Qualification of Ambr® 250 High Throughput Mini-Bioreactor System for Two Commercial-Scale mAb Processes
Matthew Manahan, G Michael Nelson, Jonathan J. Cacciatore, G Jessica Weng, Sen Xu, G Jennifer Pollard
Merck & Co., Inc., Kenilworth, New Jersey
2019
https://doi.org/10.1002/btpr.2870

An Industrial Perspective on Scale-Down Challenges Using Miniaturized Bioreactors
Tannaz Tajseleiman, Lisa Mears, Ulrich Krühne, Krist V. Gernaey, Sjef Cornelissen
Technical University of Denmark, Building 229, 2800 Kgs. Lyngby, Denmark, Novozymes A/S, Krogshojevej 36, 2880 Bagsvaerd, Denmark
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https://doi.org/10.1016/j.tibtech.2019.01.002

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Alison Arnold, Ian Ransome
Ingenza Ltd, Sartorius
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Scale-Down Model Development in Ambr® Systems: An Industrial Perspective
Viktor Sandner, Leon P. Pybus, Graham McCreath, Jarka Glassey
FUJIFILM Diosynth Biotechnologies Belasis Avenue, Billingham, TS23 1LH, UK
University of Newcastle
Newcastle Upon Tyne, NE1 7RU, UK
2018
https://doi.org/10.1002/biot.201700766

“...combinatorial improvements in process understanding (matching of mass transfer and cellular stress between scales through computational fluid dynamics and in vitro analysis), experimental design (advanced risk assessment and statistical design of experiments), and data analysis (combining uni- and multi-variate techniques) will ultimately yield Ambr® SDMs [scale-down models] applicable for future regulatory submissions”
Case Study: Causing a Stir: How Single-Use, Mini Bioreactors Can Revolutionize Bioprocess Scale-Up

Mwai Ngibuini

Sartorius

2015

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Automated Disposable Small-Scale Bioreactor for High-Throughput Process Development Implementation of the 24 Bioreactor Array

Rachel Bareither, Marina Goldfeld, Chris Kistler, Andrew Tait, Neil Bargh, Robert Oakeshott, Kristin O’Neill, Linda Hoshan, David Pollard

Merck & Co, Inc., 2000 Galloping Hill Road, Kenilworth, NJ 07033, USA

Sartorius

2015


“The benefit of using a 24 array Ambr® 250 system instead of 5 L bioreactors is that it can significantly reduce cost and time as per our cost analysis, as well as expand the capacity for complicated DOE studies, which would typically overwhelm a multi 5 L system.”

Characterization of TAP Ambr® 250 Disposable Bioreactors, as a Reliable Scale-Down Model for Biologics Process Development

Ping Xu, Colleen Clark, Todd Ryder, Colleen Sparks, Jiping Zhou, Michelle Wang, Reb Russell, Charo Scott

Bristol-Myers Squibb, 519 Route 173 West, Bloomsbury, NJ 08804

2016

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“This work demonstrated the ability of the automated system to accelerate process development by executing a single statistical design of experiments, with a wider range of parameters, up to 3-5 times faster than conventional approaches”
Process Development for Improved Car-T Production Utilizing an Automated Perfusion Stirred-Tank Bioreactor

Tiffany Hood, Fern Slingby, Winfred Geis, Viktor Sander, Nicola Bevan, Quentin Vicard, Qasim A. Rafiq

University College London, United Kingdom

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Webinar: Single-use Technologies for Viral Vector Production

Lara Nascimento-Brooks, Franziska Bollmann

Sartorius

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https://www.icheme.org/membership/communities/special-interest-groups/biochemical-engineering/events/03-02-21-single-use-technologies-for-viral-vector-production/

Design and Development of a New Ambr® 250 Bioreactor Vessel for Improved Cell and Gene Therapy Applications

Marco Rotondi, Ned Grace, John Betts, Neil Bargh, Elena Costariol

University College London, Gower Street, London WC1E 6BT, UK
Aston Medical Research Institute, School of Life and Health Sciences, Aston University, Birmingham B4 7ET, UK
University of Birmingham, Edgbaston, Birmingham B15 2TT, UK
Sartorius

2020

https://doi.org/10.1007/s10529-021-03076-3

“The new vessel resulted in significantly higher cell densities for T-cell Dynabead cultures compared to the original Ambr® 250 and static T-flask culture. The new vessel also demonstrated the ability to support hMSC microcarrier cultures and resulted in higher cell densities compared with spinner flask cultures.

This study has shown that new Ambr® 250 platform gives significant improvement over the original vessel for cell and gene therapy applications involving beads and microcarriers and will support process development activity for cellular therapies.”
Establishing the Scalable Manufacture of Primary Human T-Cells in an Automated Stirred-Tank Bioreactor

Elena Costariol, Marco Rotondi, Arman Amini, Christopher J. Hewitt, Alvin W. Nienow, Thomas R.J. Heathman, Martina Micheletti and Qasim A. Rafiq

University College London, London, WC1E 6BT, United Kingdom
Aston Medical Research Institute, School of Life and Health Sciences, Aston University, Birmingham, B4 7ET, UK
University of Birmingham, Edgbaston, Birmingham, B15 2TT UK
Hitachi Chemical Advanced Therapeutic Solutions (HCATS), 4 Pearl Court, Allendale, NJ, 07401

2019

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“Not only can T-cells be cultured in stirred-tank bioreactors, but that higher impeller agitation speeds facilitate higher cell densities with no adverse impact on cell quality.”