

ADVANCES IN BIOCHEMICAL  
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# Disposable Bioreactors

 Springer

# Disposable Bioreactors Advances In Biochemical Engineeringbiotechnology

**Huangqi Zhang**



## **Disposable Bioreactors Advances In Biochemical Engineering/biotechnology:**

*Disposable Bioreactors* Regine Eibl, Dieter Eibl, 2009-11-27 Over the past five years the immense financial pressure on the development and manufacturing of biopharmaceuticals has resulted in the increasing use and acceptance of disposables which are discarded after harvest and therefore intended only for single use. In fact, such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted reaching double figures. Alongside disposable filter capsules, membrane chromatography units, tubing connectors, flexible containers, processing or containing fluids, freezer systems, mixers and pumps, and fully controlled disposable bioreactors of up to 2 000 L culture volume are already available on the market. Numerous studies highlight the advantages of disposable bioreactors and reveal their potential for simple, safe and fast seed inoculum production process development and small as well as middle volume production, e.g. bioactive substances, viruses for vaccines and gene therapies etc. They suggest that such disposable bioreactors, typically characterized by the cultivation chamber or bag from plastic materials, may be advantageous for plant, animal and microbial cells. Running industrial activities such as CFD modelling, development of single use process monitoring and control technology and standardized film formulations are attempting to resolve the limitations of the current disposable bioreactors. These achievements along with substantial improvements in product yield will reduce the use of stainless steel in the biomanufacturing facilities of the future.

**Disposable Bioreactors (Advances in Biochemical Engineering/Biotechnology)** Fredrick Moreno, 2016-12-29 Over the past five years the immense financial pressure on the development and manufacturing of biopharmaceuticals has resulted in the increasing use and acceptance of disposables which are discarded after harvest and therefore intended only for single use. In fact, such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted reaching double figures. Alongside disposable filter capsules, membrane chromatography units, tubing connectors, flexible containers, processing or containing fluids, freezer systems, mixers and pumps, and fully controlled disposable bioreactors of up to 2 000 L culture volume are already available on the market.

**Disposable Bioreactors (Advances in Biochemical Engineering/Biotechnology)** Zane Johnson, 2017-04-20 In fact, such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted reaching double figures. Alongside disposable filter capsules, membrane chromatography units, tubing connectors, flexible containers, processing or containing fluids, freezer systems, mixers and pumps, and fully controlled disposable bioreactors of up to 2 000 L culture volume are already available on the market. Numerous studies highlight the advantages of disposable bioreactors and reveal their potential for simple, safe and fast seed inoculum production process development and small as well as middle volume production.

*Disposable Bioreactors (Advances in Biochemical Engineering/Biotechnology)* Willene Rose, 2017-03-14 Over the past five years the immense financial pressure on the development and manufacturing of

biopharmaceuticals has resulted in the increasing use and acceptance of disposables which are discarded after harvest and therefore intended only for single use. In fact, such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted, reaching double figures.

**Disposable Bioreactors** Dieter Eibl, Regine Eibl, 2014      Disposable Bioreactors II Dieter Eibl, Regine Eibl, 2013-12-17  
Dynamic Single Use Bioreactors Used in Modern Liter and m3 Scale Biotechnological Processes Engineering Characteristics and Scaling Up by Christian Löffelholz, Stephan C. Kaiser, Matthias Kraume, Regine Eibl, Dieter Eibl, Orbitally Shaken Single Use Bioreactors by Wolf Klückner, Sylvia Diederichs, Jochen B. Chs, Therapeutic Human Cells Manufacture for Cell Therapy Regenerative Medicine by Christian van den Bos, Robert Keefe, Carmen Schirmaier, Michael McCaman, Fast Single Use VLP Vaccine Productions Based on Insect Cells and the Baculovirus Expression Vector System Influenza as Case Study by Regine Eibl, Nina Steiger, Sabine Wellnitz, Tiago Vicente, Corinne John, Dieter Eibl, Microbial High Cell Density Fermentations in a Stirred Single Use Bioreactor by Thomas Dreher, Bart Walcarius, Ute Husemann, Franziska Klingenberg, Christian Zahnow, Thorsten Adams, Davy de Wilde, Peter Casteels, Gerhard Greller, Quorus Bioreactor A New Perfusion Based Technology for Microbial Cultivation by Sheena J. Fraser, Christian Endres, Cultivation of Marine Microorganisms in Single Use Systems by Friederike Hillig, Maciej Pilarek, Stefan Junne, Peter Neubauer, Flexible Biomanufacturing Processes that Address the Needs of the Future by Bernhard Diel, Christian Manzke, Thorsten Peuker, An Approach to Quality and Security of Supply for Single Use Bioreactors by Magali Barbaroux, Susanne Gerighausen, Heiko Hackel, A Risk Analysis for Production Processes with Disposable Bioreactors by Tobias Merseburger, Ina Pahl, Daniel Müller, Markus Tanner      *Single-Use Technology in Biopharmaceutical Manufacture* Regine Eibl, Dieter Eibl, 2011-08-08  
This book gives an overview of commonly used disposables in the manufacture of biopharmaceuticals, their working principles, characteristics, engineering aspects, economics and applications. With this information, readers will be able to come to an easier decision for or against disposable alternatives and to choose the appropriate system. The book is divided into two parts: the first is related to basic knowledge about disposable equipment and the second discusses applications through case studies that illustrate manufacturing quality assurance and environmental influence.

**Bioprospecting of Microorganism-Based Industrial Molecules** Sudhir Pratap Singh, Santosh Kumar Upadhyay, 2021-12-13  
Discover a comprehensive and current overview of microbial bioprospecting written by leading voices in the field. In *Bioprospecting of Microorganism Based Industrial Molecules*, distinguished researchers and authors Sudhir P. Singh and Santosh Kumar Upadhyay deliver global perspectives of bioprospecting of biodiversity. The book covers diverse aspects of bioprospecting of microorganisms, demonstrating biomass value of nutraceutical, pharmaceutical, biomedical and bioenergetic importance. The authors present an amalgamation of translational research on bioresource utilization and ecological sustainability that will further the reader's knowledge of the applications of different microbial diversity and reveal new avenues of research investigation. Readers will also benefit from A

thorough introduction to microbial biodiversity and bioprospecting An exploration of anti ageing and skin lightening microbial products and microbial production of anti cancerous biomolecules A treatment of UV protective compounds from algal biodiversity and polysaccharides from marine microalgal sources Discussions of microbial sources of insect toxic proteins and the role of microbes in bio surfactants production Perfect for academics scientists researchers graduate and post graduate students working and studying in the areas of microbiology food biotechnology industrial microbiology plant biotechnology and microbial biotechnology Bioprospecting of Microorganism Based Industrial Molecules is an indispensable guide for anyone looking for a comprehensive overview of the subject      Production of Biomass and Bioactive Compounds Using Bioreactor Technology Kee-Yoeup Paek,Hosakatte Niranjana Murthy,Jian-Jiang Zhong,2014-09-30 The bioactive compounds of plants have world wide applications in pharmaceutical nutraceutical and food industry with a huge market In this book a group of active researchers have addressed on the most recent advances in plant cell and organ cultures for the production of biomass and bioactive compounds using bioreactors Tremendous efforts have been made to commercialize the production of plant metabolites by employing plant cell and organ cultures in bioreactors This book emphasizes on the fundamental topics like designing of bioreactors for plant cell and organ cultures various types of bioreactors including stirred tank airlift photo bioreactor disposable bioreactor used for plant cell and organ cultures and the advantages and disadvantages of bioreactor cultures Various strategies for biomass production and metabolite accumulation have been discussed in different plant systems including Korean Chinese ginseng Siberian ginseng Indian ginseng Echinacea St John s wort Noni Chinese licorice Caterpillar fungus and microalgae Researches on the industrial application of plant cells and organs with future prospects as well as the biosafety of biomass produced in bioreactors are also described The topics covered in this book such as plant cell and organ cultures hairy roots bioreactors bioprocess techniques will be a valuable reference for plant biotechnologists plant biologists pharmacologists pharmacists food technologists nutritionists research investigators of healthcare industry academia faculty and students of biology and biomedical sciences The multiple examples of large scale applications of cell and organ cultures will be useful and significant to industrial transformation and real commercialization      *Fundamentals of Modern Bioprocessing* Sarfaraz K. Niazi,Justin L. Brown,2017-07-27 Biological drug and vaccine manufacturing has quickly become one of the highest value fields of bioprocess engineering and many bioprocess engineers are now finding job opportunities that have traditionally gone to chemical engineers Fundamentals of Modern Bioprocessing addresses this growing demand Written by experts well established in the field this book connects the principles and applications of bioprocessing engineering to healthcare product manufacturing and expands on areas of opportunity for qualified bioprocess engineers and students The book is divided into two sections the first half centers on the engineering fundamentals of bioprocessing while the second half serves as a handbook offering advice and practical applications Focused on the fundamental principles at the core of this discipline this work outlines every facet of design

component selection and regulatory concerns It discusses the purpose of bioprocessing to produce products suitable for human use describes the manufacturing technologies related to bioprocessing and explores the rapid expansion of bioprocess engineering applications relevant to health care product manufacturing It also considers the future of bioprocessing the use of disposable components which is the fastest growing area in the field of bioprocessing to replace traditional stainless steel In addition this text Discusses the many types of genetically modified organisms Outlines laboratory techniques Includes the most recent developments Serves as a reference and contains an extensive bibliography Emphasizes biological manufacturing using recombinant processing which begins with creating a genetically modified organism using recombinant techniques Fundamentals of Modern Bioprocessing outlines both the principles and applications of bioprocessing engineering related to healthcare product manufacturing It lays out the basic concepts definitions methods and applications of bioprocessing A single volume comprehensive reference developed to meet the needs of students with a bioprocessing background it can also be used as a source for professionals in the field

**Current Developments in Biotechnology and Bioengineering** Christian Larroche,M. Angeles Sanroman,Guocheng Du,Ashok Pandey,2016-09-17 Current Developments in Biotechnology and Bioengineering Bioprocesses Bioreactors and Controls provides extensive coverage of new developments state of the art technologies and potential future trends reviewing industrial biotechnology and bioengineering practices that facilitate and enhance the transition of processes from lab to plant scale which is becoming increasingly important as such transitions continue to grow in frequency Focusing on industrial bioprocesses bioreactors for bioprocesses and controls for bioprocesses this title reviews industrial practice to identify bottlenecks and propose solutions highlighting that the optimal control of a bioprocess involves not only maximization of product yield but also taking into account parameters such as quality assurance and environmental aspects Describes industrial bioprocesses based on the reaction media Lists the type of bioreactors used for a specific bioprocess application Outlines the principles of control systems in various bioprocesses

Biosimilars and Interchangeable Biologics Sarfaraz K. Niazi,2016-01-05 What s the Deal with Biosimilars Biosimilars are gaining momentum as new protein therapeutic candidates that can help fill a vital need in the healthcare industry The biological drugs are produced by recombinant DNA technology that allows for large scale production and an overall reduction time in costs and development Part of a two volume set that covers varying aspects of biosimilars Biosimilars and Interchangeable Biologics Tactical Elements explores the development and manufacturing of biosimilars and targets challenges surrounding the creation of these products This includes manufacturing production costs and intellectual property barriers particularly in regulated markets regulatory agencies are still in the process of developing guidelines It addresses the complexity of biological drugs and it discusses specific structural elements vital to the functionality immunogenicity and safety of biosimilar products Of specific interest to practitioners researchers and scientists in the biopharmaceutical industry this volume provides an overall understanding of the hurdles difficulties and practicalities of developing a strong plan It

introduces a step by step approach for creating a strategy that helps develop and manufacture a biosimilar product while reducing overall production costs and meeting the requirements of biosimilarity based on analytical and functional pharmacokinetic pharmacodynamic where applicable and nonclinical toxicology or toxicokinetic similarity where appropriate while remaining competitive in the market *Disposable Bioreactors* Regine Eibl, Dieter Eibl, 2009-11-27 Over the past five years the immense financial pressure on the development and manufacturing of biopharmaceuticals has resulted in the increasing use and acceptance of disposables which are discarded after harvest and therefore intended only for single use In fact such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted reaching double figures Alongside disposable filter capsules membrane chromatography units tubing connectors flexible containers processing or containing fluids freezer systems mixers and pumps and fully controlled disposable bioreactors of up to 2 000 L culture volume are already available on the market Numerous studies highlight the advantages of disposable bioreactors and reveal their potential for simple safe and fast seed inoculum production process development and small as well as middle volume production e g bioactive substances viruses for vaccines and gene therapies etc They suggest that such disposable bioreactors typically characterized by the cultivation chamber or bag from plastic materials may be advantageous for plant animal and microbial cells Running industrial activities such as CFD modelling development of single use process monitoring and control technology and standardized film formulations are attempting to resolve the limitations of the current disposable bioreactors These achievements along with substantial improvements in product yield will reduce the use of stainless steel in the biomanufacturing facilities of the future

**Advances in Biochemical Engineering/Biotechnology** Richard Wade, 2017-07-04 In fact such disposables are implemented in all the main bioprocess production stages today and an even higher growth than those in the biopharmaceutical market is predicted reaching double figures Alongside disposable filter capsules membrane chromatography units tubing connectors flexible containers processing or containing fluids freezer systems mixers and pumps and fully controlled disposable bioreactors of up to 2 000 L culture volume are already available on the market Numerous studies highlight the advantages of disposable bioreactors and reveal their potential for simple safe and fast seed inoculum production process development and small as well as middle volume production *Ullmann's Biotechnology and Biochemical Engineering, 2 Volume Set* Wiley-VCH, 2007-07-23 The one stop resource for all those involved in the biochemical and biotechnological industries Based on the latest online edition of Ullmann's Encyclopedia of Industrial Chemistry containing articles never seen before in print this ready reference meets the need for a detailed survey of the biochemical fundamentals and techniques as well as their applications in biochemical engineering and biobased production **Bioreactor Engineering Research and Industrial Applications II** Jie Bao, Qin Ye, Jian-Jiang Zhong, 2015-11-26 This book review series presents current trends in modern biotechnology The aim is to cover all aspects of this interdisciplinary technology where knowledge methods and

expertise are required from chemistry biochemistry microbiology genetics chemical engineering and computer science  
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**Bioreactor Systems for Tissue Engineering** Cornelia Kasper,Martijn van Griensven,Ralf Pörtner,2009      *Bioreactor Systems and Effects* ,1991  
*Bioreactor Systems and Effects* ,2013-11-20



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