

RECENT DEVELOPMENT OF MICROCARRIER FOR CELL CULTURE ENGINEERING

Edited By
Maizirwan Mel
Yusilawati Ahmad Nor
Iis Sopyan
Ahmad Fadli



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
© IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of the publisher.

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Recent Development Of Microcarrier For Cell Culture Engineering
Maizirwan Mel
Include Index

ISBN 978-967-418-009-6

Member of Majlis Penerbitan Ilmiah Malaysia - MAPIM
(Malaysian Scholarly Publishing Council)

Printed by:
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3,
Taman Perindustrian Batu Caves,
Batu Caves Centre Point,
68100 Batu Caves,
Selangor Darul Ehsan

Contents

FOREWORD	vii
SYNOPSIS	ix
CHAPTER	
1 UV/Ozone Treatment System for Polystyrene Beads Modification	1
<i>Yusilawati Ahmad Nor, Maizirwan Mel, Iis Sopyan, Hamzah Mohd Salleh, Ng Kim Hooi, Wong C.S</i>	
2 Ultraviolet/Ozone Treatment for Polystyrene Beads Modification and Its Effect on Gelatin Coating	11
<i>Yusilawati Ahmad Nor, Maizirwan Mel, Iis Sopyan, Hamzah Mohd Salleh, Ng Kim Hooi, Wong C.S</i>	
3 The Study of Immobilized Bovine and Fish Gelatin on Carboxyl Containing Polystyrene Beads for Vero Cell Culture	23
<i>Yusilawati Ahmad Nor, Maizirwan Mel, Hamzah Mohd Salleh, Ng Kim Hooi, Wong C.S</i>	
4 The Effect of Hydroxyapatite Addition on Biocompatibility of Porous Alumina Microcarriers for Vero Cell Culture	33
<i>Ahmad Fadli, Iis Sopyan, Maizirwan Mel</i>	
5 Biocompatibility of Porous Hydroxyapatite Microcarrier for Vero Cell Culture Application	43
<i>Maizirwan Mel, Iis Sopyan, Ahmad Fadli</i>	
6 Evaluation on Biological Performance of Porous Pure and Magnesium-Doped Biphasic Calcium phosphate Ceramics using Vero Cell Culture	51
<i>Toibah Abd Rahim, Iis Sopyan, Maizirwan Mel, Ahmad Fadli</i>	
7 Locally Processed Serum Performance in Vero Cell Culture: Part I	61
<i>Yusilawati Ahmad Nor, Jaafar Nuhu Jaafar, Maizirwan Mel</i>	

8	Locally Processed Serum Performance in Vero Cell Culture: Part II	73
	<i>Yusilawati Ahmad Nor, Jaafar Nuhu Jaafar, Maizirwan Mel</i>	
9	The Vero Cells Growth in Different Type of Microcarriers	85
	<i>Yusilawati Ahmad Nor, Nurul Hafizah Sulong, Maizirwan Mel, Hamzah Mohd Salleh, Iis Sopyan</i>	
10	The Growth Culture of BRIN-BD11 Producing Insulin in Different Type of Microcarriers	97
	<i>Maizirwan Mel, Mohamed Ismail Abdul Karim, Siti Aisyah Mohd Yusuf, Yumi Zuhanis Has-yun Hashim, Yusilawati Ahmad Nor</i>	
11	The Growth Rate and Viability of DF1 Cell in Different Culture Media	111
	<i>Mohd Azmir Arifin, Maizirwan Mel, Raha A.R, Sharifah Syed Hassan, Aini Ideris</i>	
12	The Growth Study of DF1 Cell in Microcarrier Based Bioreactor	121
	<i>Mohd Azmir Arifin, Maizirwan Mel, Raha A.R, Sharifah Syed Hassan, Aini Ideris</i>	
13	Cell Attachment Study of Chicken Fibroblast Cell (DF-1) using Ceramic Microcarrier Granule in Bioreactors	131
	<i>Maizirwan Mel, Iis Sopyan, Yusilawati Ahmad Nor</i>	
14	Optimization of Process Conditions for High Cell Density Proliferation Of DF-1 Cells in Bioreactor	141
	<i>Maizirwan Mel, Mohd Azmir Arifin, Hajar Naemah Sohif, Sharifah Syed Hassan</i>	
15	The study of NDV Titer Using Different Cell Lines in T-Flask Culture	149
	<i>Jaafar Nuhu Ja'afar, Maizirwan Mel, Mohd Ismail Abdul Karim, Sharifah Syed Hassan, Aini Ideris</i>	
16	Newcastle Disease Virus Propagation in Stirred Tank Bioreactor: Part I	159
	<i>Mohd Azmir Arifin, Siti Hajar Salim, Maizirwan Mel</i>	
17	Newcastle Disease Virus Propagation in Stirred Tank Bioreactor: Part II	171
	<i>Mohd Azmir Arifin, Siti Hajar Salim, Maizirwan Mel</i>	

Chapter 11

The Growth Rate and Viability of DF1 Cell in Different Culture Media

Mohd Azmir Arifin, Maizirwan Mel, Raha A. R, Sharifah Syed

Hassan, Aini Ideris

1. Introduction

Animal cell culture is the most important tool in the study of animal cell structure, function and differentiation. It is also important for the production of many biologicals such as vaccines, enzymes, hormones, antibodies, interferons and nucleic acids. Most animal cells are anchorage-dependent and require attachment to a surface for their survival and replication (Adams, 1980). To improve the viability of any cell line for a targeted product formation, careful selection of an optimized media as well as other growth parameters are inevitable. Normally, the viability of a cell line increases upon the increase of duration time, but accumulation of toxic metabolic products such as lactate and ammonium, viable cell concentration drops after the stationary phase (Mel *et al*: 2008). Doubling time is an essential parameter in cell viability. Generally, the doubling time of mammalian cells varies between 10 and 50 hours, and cell concentration reaches its peak value within 3-5 days.

DF-1, named after the founder, Douglas Foster is a spontaneously immortalized continuous cell line of chicken embryo fibroblast