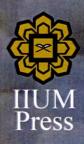
# BIOPROCESSING OF LACTIC ACID BY FERMENTATION TECHNIQUE

Editors:
Maizirwan Mel
Mohamed Ismail Abdul Karim
Parveen Jamal
Nur Aimi Mohd Nasir
Nurhafizah Seeni Mohamed



# BIOPROCESSING OF LACTIC ACID BY FERMENTATION TECHNIQUE

#### 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 retrival 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

Maizirwan Mel
Bioprocessing of Lactic Acid by Fermentation Technique / Maizirwan Mel ... [et al.].
978-967-418-093-5

ISBN 978-967-418-093-5

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**

PREFACE		VII
SY	NOPSIS	ix
CHAPTER		
1	Lactic Acid, its Processing and Utilization in Industry: A review Nur Aimi Mohd Nasir, Nurhafizah Seeni Mohamed, Maizirwan Mel	1
2	Media Screening of Lactobacillus rhamnosus Fermentation for Lactic Acid Production Mohamed Ismail Abdul Karim, Maizirwan Mel,	17
3	Parveen Jamal. Mohammad Ramlan Mohammad Salleh, Noraini Alamin  Optimization of Media for Lactobacillus rhamnosus Fermentation for Lactic Acid Production  Maizirwan Mel, Mohamed Ismail Abd Karim, Mohammad Ramlan Mohammad Salleh, Noraini Alamin Mohammad Amin	25
4	Effect of pO2 level on the Fermentation of Lactobacillus rhamnosus  Maizirwan Mel, Mohamed Ismail Abdul Karim, Parveen Jamal, Mohammad Ramlan Mohammad Salleh, Rohane Abdullah	37
5	Process Optimization of Lactic Acid Fermentation in Bioreactor  Maizirwan Mel, Mohamed Ismail Abdul Karim, Parveen Jamal, Mohammad Ramlan Mohammad Salleh, Ruzi Aini Zakaria	51

6	Determination of Critical pO2 level and Process Online Monitoring of Lactic Acid Fermentation by Lactobacillus rhamnosus	63
	Maizirwan Mel, Mohamed. Ismail Abdul Karim, Mohammad Ramlan Mohammad Salleh, Rohane Abdullah	
7	Effect of Different Process Conditions on Lactic Acid Production by Lactobacillus rhamnosus	73
	Maizirwan Mel, Mohamed Ismail Abdul Karim, Parveen Jamal, Mohammad Ramlan Mohammad Salleh, Ruzi Aini Zakaria	
8	Synthesis Lactic Acid from Kenaf Bast by Using Lactobacillus rhamnosus	83
	Nurhafizah Seeni Mohamed, Nur Hanis Mohd Sibi, Nur Aimi Mohd Nasir, Mohd Adlan Mustafa Kamalbhrin, Maizirwan Mel, Hazleen Anuar, Rashidi Othman	
9	Factors Affecting the Hydrolysis Process of Kenaf Blomass for Lactic Acid Production	93
	Nurhafizah Seeni Mohamed, Maizirwan Mel, Hazleen Anuar, Rashidi Othman, Nur Aimi Mohd Nasir, Mohd Adlan Mustafa Kamalbhrin	
10	Growth Kinetic Study of Rhizopus oryzae via Fermention of I Acid from Kenaf Biomass	Lacti 101
	Nur Aimi Mohd Nasir, Mohd Adlan Mustafa Kamalbhrin, Nurhafizah Seeni Mohamed, Hazleen Anuar, Maizirwan Mel, Rashidi Othman	
11	Effect of Process Parameters on Distribution Coefficient of Lactic Acid by using Alamine 336	113
	Parveen Jamal, Maizirwan Mel, Mohamed Ismail Abdul Karim, lis Sopyan, Siti Fatiha Othman	
12	Optimization of Process Parameters using Response Surface Design on Distribution Coefficient of Lactic Acid	125
	Parveen Jamal, Maizirwan Mel, Mohamed Ismail Abdul Karim, Nur Syahida , Raha Ahmad Raus	

## Lactic Acid, its Processing and Utilization in Industry: A review

Nur Aimi Mohd Nasir, Nurhafizah Seeni Mohamed, Maizirwan Mel

#### Abstract

This chapter reviewed about lactic acid and its application in industry. It is widely occurring organic acid produce either chemically or biologically depends on the suitability, cost effectiveness and availability of the technology. However, biological production of lactic acid tends to give more advantages then the chemical one. Thus, in this paper, the bioprocess of lactic acid using biological fermentation is reviewed. As for that, the correct selection of microorganism should be considered in order to produce more lactic acid. In terms of economic, lactic acid prices become increase with the increase of consumption according to what industry it is used for. It has become great attention of scientists and technologists worldwide to produce it using inexpensive raw materials. A review of lactic acid producer, fermentation approaches for lactic acid production as well as its application either present or future is discussed.

Keyword(s): Lactic acid, fermentation, chemical synthesis, lactic acid producer