BIOPROCESSING OF LACTIC ACID BY FERMENTATION TECHNIQUE

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

IIUM Press
BIOPROCESSING OF LACTIC ACID BY FERMENTATION TECHNIQUE
## Contents

**PREFACE**  
.ix

**SYNOPSIS**  
.xi

**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, Parveen Jamal, Mohammad Ramlan Mohammad Salleh, Noraini Alamin  
   17

3. **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

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

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

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 Biomass for Lactic Acid Production

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 Fermentation of Lactic Acid from Kenaf Biomass

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

Parveen Jamal, Maizirwan Mel, Mohamed Ismail Abdul Karim, Ilis Sopyan, Siti Fatihah Othman

12 Optimization of Process Parameters using Response Surface Design on Distribution Coefficient of Lactic Acid

Parveen Jamal, Maizirwan Mel, Mohamed Ismail Abdul Karim, Nur Syahida, Raha Ahmad Raus
Chapter 4

Effect of pO₂ Level on the Fermentation of Lactobacillus rhamnosus

Maizirwan Mel, Mohamed Ismail Abdul Karim, Parveen Jamal, Mohammad Ramlan Mohammad Salleh, and Rohane Abdullah

Abstract

This chapter discussed about the growth kinetic of Lactobacillus rhamnosus that directly influenced the production of lactic acid. This experiment was conducted via fermentation process using bioreactor’s batch mode operation at acidic pH condition and constant stirrer speed. Since L. rhamnosus is aerobic microorganism, thus it needs oxygen to live. In this study, oxygen level was varied and at the same time several sampling and analysis were done such as cell dry weight (CDW), optical density (OD) glucose analysis as well as lactic acid analysis. It was found that L. rhamnosus can produced higher lactic acid when it was grown in low oxygen level at acidic pH which at pH 6 in 100rpm.

Keyword(s): growth kinetic, L. rhamnosus, cell dry weight, optical density