

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

Editors:

Ibrahim Ali Noorbatcha
Hamzah Mohd. Salleh
Mohamed Elwathig Saeed Mirghani
Raha Ahmad Raus



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

**CURRENT RESEARCH AND
DEVELOPMENT IN
BIOTECHNOLOGY ENGINEERING
AT IIUM**

(VOLUME II)

Editors:

Ibrahim Ali Noorbacha

Hamzah Mohd. Salleh

Mohamed Elwathig Saeed Mirghani

Raha Ahmad Raus

**Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia**



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 any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Ibrahim Ali Noorbacha, Hamzah Mohd. Salleh, Mohamed Elwathig Saeed Mirghani & Raha Ahmad Raus: Current Research and Development in Biotechnology engineering at IIUM
Volume II

ISBN: 978-967-418-151-2

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		v
CHAPTER 1	SCREENING FOR ANTI-CANCER COMPOUND FROM SELECTED MALAYSIAN PLANTS BY SULFORHODAMINE B ASSAY ON MCF-7 CANCER CELL LINE <i>Azura Amid, Abdul Aziz Ahmad and Raha Ahmad Raus</i>	1
CHAPTER 2	THE EVALUATION ON ANTICANCER PROPERTIES FROM KENAF SEEDS OIL FROM DIFFERENT VARIETIES <i>Azura Amid, Parveen Jamal, Nurul Elyani Mohamad and Engku Hasmah Engku Abdullah</i>	9
CHAPTER 3	SCREENING AND EVALUATION OF ANTICANCER PROPERTY IN MANGO FRUIT <i>Mangifera indica</i> <i>Azura Amid, Irwandi Jaswir and Muhd. Ezza Faiez Othman</i>	16
CHAPTER 4	SENSORY EVALUATION AND CONTAMINATION TEST ON MANGO FRUIT (<i>Mangifera indica</i>) PUREE <i>Azura Amid, Irwandi Jaswir and Muhd. Ezza Faiez Othman</i>	23
CHAPTER 5	THE OBSERVATION ON THE INHIBITION OF ANTI- INFLAMMATORY MEDIATOR OF THE TOMATO LEAVES EXTRACT <i>Azura Amid, Sulawati Semail and Parveen Jamal</i>	30
CHAPTER 6	A STUDY OF BACTERIAL CELL IMMOBILIZATION IN ALGINATE GEL BEADS FOR THE PRODUCTION OF <i>MYO</i> - INOSITOL PHOSPHATES <i>Noor Illi Mohamad Puad, Abd-ElAzizem Farouk and Hamzah Mohd. Salleh</i>	36
CHAPTER 7	EXTRACTION AND EVALUATION OF ANTIBACTERIAL ACTIVITY FROM SELECTED FLOWERING PLANTS <i>Raha Ahmad Raus, Erlina Abdullah and Parveen Jamal</i>	43

CHAPTER 8	EXTRACTION OF ANTIBACTERIAL COMPOUNDS FROM PLANTS USING SONICATOR <i>Raha Ahmad Raus, Nur Shazwana Mohd Puzi and Parveen Jamal</i>	50
CHAPTER 9	EXTRACTION AND EVALUATION OF ANTICANDIDAL ACTIVITY FROM SELECTED MALAYSIAN PLANTS <i>Raha Ahmad Raus, Nor Azlin Alia Nor Muhammad and Jacinta Santhanam</i>	57
CHAPTER 10	EXTRACTION AND EVALUATION OF ANTIFUNGAL ACTIVITY FROM SELECTED MALAYSIAN PLANTS <i>Raha Ahmad Raus, Hayatunissa Samsuddin, Nor Hafizah Addnan and Jacinta Santhanam</i>	62
CHAPTER 11	MOLECULAR MODELING OF BIODEGRADATION POLYESTERS USING LIPASE <i>Ibrahim Ali Noorbatcha, Nor Afina Eidura Hussin and Hamzah Mohd Salleh</i>	68
CHAPTER 12	POTENTIAL OF NAHAR SEED OIL EXTRACT AS ANTIMICROBIALS <i>Mohamed E. S. Mirghani, I. A. Ahmed, S. A. Muyibi., J. I. Daoud and M. A. Mikail</i>	74
CHAPTER 13	NAHAR (<i>Mesua ferrea</i>) TREE AS A MEDICINAL PLANT <i>Mohamed E. S. Mirghani, I. A. Ahmed, S. A. Muyibi., J. I. Daoud and M. A. Mikail</i>	82
CHAPTER 14	EXPLOIT OF MALAYSIAN MANGO KERNEL EXTRACT AS ANTIBACTERIAL AGENT <i>Mohamed Elwathig Saeed Mirghani, Nasereldin A. Kabbashi, Parveen Jamal and H. A. Abdullah</i>	90
CHAPTER 15	PREPARATION OF NUTRITIOUS DRINK FROM DATE PALM KERNEL (DPK) <i>Mohamed Elwathig Saeed Mirghani, Irwandi Jaswir and Nurul Hanan Mustapha</i>	101
CHAPTER 16	DATE SEED EXTRACT AS PRESERVATIVES <i>Mohamed E. S. Mirghani, M. A. Mikail, I. A. Ahmed, M. I. Abdul Karim and J. I. Daoud</i>	113

CHAPTER 17	IMMOBILIZATION OF LIPASE BY CROSS-LINKED ENZYME AGGREGATE (CLEA) TECHNOLOGY <i>Faridah Yusof and Nik Rashidah Nik Abdul Ghani</i>	120
CHAPTER 18	DETECTION OF ETHANOL IN BEVERAGES USING AN ELECTRONIC NOSE <i>Irwandi Jaswir, Nurul Asyikeen A.M and Rini Akmeliawati</i>	130
CHAPTER 19	EFFECTS OF CELL IMMOBILIZATION TO THE PHYTATE-DEGRADING ENZYME ACTIVITY <i>Noor Illi Mohamad Puad, Abd-ElAzim Farouk and Hamzah Mohd. Salleh</i>	137
CHAPTER 20	ENZYMATIC DEVULCANIZATION OF WASTE RUBBER <i>Faridah Yusof and Ainie Asyikin Ahmad</i>	144
CHAPTER 21	EXTRACTION AND CHARACTERIZATION OF ASTAXANTHIN FROM MARINE SOURCES <i>Irwandi Jaswir, Shazana Azfar and Azura Amid</i>	154
CHAPTER 22	EXTRACTION OF FISH COLLAGEN USING ENZYMATIC PROCESS <i>Irwandi Jaswir, Noor Yulsida Hazahari and Mohamed Elwathig Saeed Mirghani</i>	159
CHAPTER 23	FROM RECREATION MATHEMATICS TO PSEUDO-GENES <i>Ibrahim Ali Noorbatcha and Ahmad Faizul Shamsudin</i>	166
CHAPTER 24	MECHANICAL PROPERTIES OF A GELATIN REPLACER, PECTIN, FROM BANANA AND MANGO PEELS <i>Hamzah Mohd. Salleh, Irwandi Jaswir and Hamida Zakaria</i>	173
CHAPTER 25	DEVELOPMENT OF <i>IN-VIVO</i> BIOFUEL CELL FOR IMPLANTABLE MEDICAL DEVICES <i>Hamzah Mohd. Salleh, Nur Syaheera Mohd Yusoff, Raihan Othman and Mohd. Firdaus Abd. Wahab</i>	182
CHAPTER 26	IMPROVEMENT OF EXTRACTION PROCESSING CONDITIONS FOR ANTIBACTERIAL COMPOUNDS FROM <i>Curcuma longa</i>	192

*Raha Ahmad Raus, Nur Fariah Abdul Malek, Mohd Saufi Bastami
and Noriha Mat Amin*

CHAPTER 27	IMPROVEMENT OF SONICATION PROCESSING CONDITIONS FOR EXTRACTION OF ANTIBACTERIAL COMPOUNDS FROM <i>Spathiphyllum cannifolium</i> <i>Raha Ahmad Raus, Nur Shazwana Mohd Puzi and Parveen Jamal</i>	199
CHAPTER 28	IMPROVING ENZYME CATALYSIS THROUGH THE IMPROVEMENT OF BINDING STRENGTH: SIMULATED MUTATION TO PREDICT THE MUTATIONAL EFFECT ON XYLANASE CEX <i>Ibrahim Ali Noorbatcha, Muaz Abdul Hadi, Ahmad Faris Ismail and Hamzah Mohd Salleh</i>	207
CHAPTER 29	MOLECULAR INTERACTION ANALYSIS TO DESIGN NEW DRUG CANDIDATES FOR LYSOSOMAL STORAGE DISEASE <i>Ibrahim Ali Noorbatcha, Muaz Abdul Hadi, Zarul Azwan Adam and Hamzah Mohd. Salleh</i>	215
CHAPTER 30	MECHANICAL IMPROVEMENT OF HALAL GELATIN FROM MARINE SOURCES <i>Irwandi Jaswir, Aniza Binti Asari and Hamzah Mohd. Salleh</i>	222
CHAPTER 31	PERFORMANCE OF ARTIFICIAL ANTIOXIDANTS IN RBD PALM OLEIN DURING DEEP-FAT FRYING <i>Irwandi Jaswir and Ahmad Badli Yusoff</i>	229
CHAPTER 32	PHYSICO-CHEMICAL PROPERTIES OF COLLAGEN EXTRACTS FROM TWO LOCAL FISH SPECIES <i>Irwandi Jaswir, Nur'ain Che Kamaludin and Hamzah Mohd. Salleh</i>	237
CHAPTER 33	PHYTOCHEMICAL SCREENING AND PURIFICATION OF XO1 FROM SELECTED MEDICINAL PLANT <i>Parveen Jamal, Azura Amid and Suhana Abdullah</i>	242
CHAPTER 34	POTENTIAL ENERGY SURFACES FOR REACTIONS AMONG HYDROGEN FLUORIDE MOLECULES <i>Ibrahim Ali Noorbatcha, Borhannuddin Arifin and Sharifudin M Zain</i>	251

CHAPTER 35	POTENTIAL REMEDIES FOR GOUT FROM MEDICINAL PLANTS <i>Parveen Jamal, Saiful Mohammad Nizam Azmi and Azura Amid</i>	262
CHAPTER 36	PRODUCTION OF CARRAGEENAN FROM MALAYSIAN SEAWEED <i>Irwandi Jaswir, Ainur Farhana and Parveen Jamal</i>	272
CHAPTER 37	PRODUCTION OF GELATIN REPLACERS FROM MALAYSIAN TUBEROUS PLANTS <i>Irwandi Jaswir, Nurul Ain Zafirah Binti Kamalurudin and Hamzah Mohd. Salleh</i>	279
CHAPTER 38	PURIFICATION OF PATATIN-LIKE PROTEIN (HEV B7) FROM SKIM LATEX OF <i>Hevea brasiliensis</i> <i>Faridah Yusof and Nurul Ain Harmiza Abdullah</i>	285
CHAPTER 39	PURIFICATION OF SUPEROXIDE DISMUTASE FROM <i>Hevea brasiliensis</i> LEAF EXTRACT <i>Faridah Yusof and Nazhirah Mohamed</i>	296
CHAPTER 40	QUALITATIVE AND QUANTITATIVE ANALYSIS OF ANTI-GOUT FROM <i>Carica papaya</i> LEAVES <i>Parveen Jamal, Saiful Mohammad Nizam Azmi and Azura Amid</i>	306
CHAPTER 41	RECYCLING OF WASTE RUBBER VIA MICROBIAL DEVULCANIZATION <i>Faridah Yusof and Ainie Asyikin Ahmad</i>	316
CHAPTER 42	SCREENING ANTI-CANCER COMPOUNDS FROM PALM OIL INDUSTRIAL WASTES <i>Raha Ahmad Raus, Syamsa Shazwan Shamsudin and Parveen Jamal</i>	326
CHAPTER 43	SCREENING ANTI-CANCER COMPOUNDS FROM MEDICINAL MALAYSIAN PLANTS <i>Raha Ahmad Raus, Yusuf Johari and Azura Amid</i>	332
CHAPTER 44	SCREENING ANTI-CANCER COMPOUNDS FROM RICE INDUSTRIAL WASTES <i>Raha Ahmad Raus, Mohd Hafizul Muhammad and Parveen Jamal</i>	338

CHAPTER 45	SOLUBILIZATION OF VITAMIN E IN CULTURE MEDIUM AND ITS ANTIOXIDANT ACTIVITY <i>Irwandi Jaswir and Siti Fairus Sahul Hamid</i>	342
CHAPTER 46	STRUCTURE ACTIVITY RELATIONS IN PENTACYCLIC TRITERPENOIDS TOWARDS HYALURONIDASE INHIBITORY ACTIVITY <i>Ibrahim Ali Noorbatcha, Nor Hayati Abdullah and Khalijah Awang</i>	348
CHAPTER 47	<i>IN SILICO</i> PREDICTION OF ANTICANCER ACTIVITY OF NITROSOUREAS <i>Ibrahim Ali Noorbatcha, Farahana Hamzah, Hamzah Mohd. Salleh and Syed Zahir Idid</i>	356
CHAPTER 48	BIOMOLECULAR COMPUTING IN DEGENERATIVE BRAIN RESEARCH <i>Ibrahim Ali Noorbatcha and Ahmad Faizul Shamsudin</i>	363
CHAPTER 49	ISOLATION AND IDENTIFICATION OF FERULIC ACID FROM RICE BRAN <i>Faridah Yusof and Aimi Izyana Ismail</i>	370
CHAPTER 50	IMPROVEMENT OF EXTRACTION PROCESSING CONDITIONS FOR ANTIFUNGAL COMPOUNDS FROM <i>Alpinia galanga</i> <i>Raha Ahmad Raus, Nor Hafizah Addnan, Noriha Mat Amin and Syamsiah Aini Shohaimi</i>	379

CHAPTER 5

THE OBSERVATION ON THE INHIBITION OF ANTI-INFLAMMATORY MEDIATOR OF THE TOMATO LEAVES EXTRACT

Azura Amid, Sulawati Semail and Parveen Jamal

Department of Biotechnology Engineering, Faculty of Engineering,
International Islamic University Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

ABSTRACT

The leaves of tomato plant that contained several active compound including alkaloid, steroid and flavanoid has been used for treatment of variety of diseases included anti-cancer, anti-oxidant and anti-gout. However, there are no studies on the anti-inflammation from the action of tomato leaves. In this study, the inhibitory of inflammation of *Solanum lycopersicum* was investigated by observing the Prostaglandin E₂ (PGE₂) production with LPS-stimulated murine macrophage cells RAW264.7. The leaves extract of *Solanum lycopersicum* were tested for anti-inflammatory effect against lipopolysaccharide (LPS)- induced PGE₂ according to a instructions of the manufacturer provided in commercially available PGE₂ enzyme immunometric assay kit (Cayman CO., Ann Arbor, MI, USA). Then, the concentrations of PGE₂ were determined using commercial ELISA kit and the inhibition of PGE₂ was calculated. Results showed that the tomato leaves extract inhibited the productions of inflammatory mediators (PGE₂) which plays a central role in the anti-inflammatory activity. At the highest concentration (100 µg/mL) of tomato leaves extract tested, the PGE₂ production was reduced 37.41% compared to the untreated. Hence, these present study may support that the leaves of *Solanum lycopersicum* extract potentially in treatment of inflammatory-related disease through the inhibition of PGE₂ releases.

Keywords: Anti-inflammatory mediator (PGE₂); *Solanum lycopersicum*; lipopolysaccharide (LPS); macrophages cells RAW264.7; immunometric assay kit

INTRODUCTION

Inflammation is a group of beneficial host response to a foreign challenge or tissue injury that leads ultimately to the restoration of normal tissue structure and function. This mechanism is an immunological response following bacterial and is primarily mediated by phagocytes macrophages. The inflammatory events triggering macrophage activation induce various other cellular processes such as the production of inflammatory mediators included Prostaglandin E₂