CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

Editors:
Md. Zahangir Alam
Ahmed Tariq Jameel
Azura Amid

IIUM PRESS
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
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(VOLUME III)

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Department of Biotechnology Engineering
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IIUM Press
CONTENTS

PREFACE

CHAPTER 1  OPTIMIZATION OF EXTRACTION PROCESS PARAMETERS FOR ANTI-CANCER AGENT FROM Solanum lycopersicum
Azura Amid, Abdul Aziz Ahmad and Raha Ahmad Raus

CHAPTER 2  OPTIMIZATION OF THE EXTRACTION PROCESS PARAMETER FOR KENAF SEEDS OIL TO OBTAIN HIGH OIL YIELD
Azura Amid, Parveen Jamal, Nurul Elyani Mohamad and Engku Hasmah Engku Abdullah

CHAPTER 3  OPTIMIZATION OF THE EXTRACTION PROCESS PARAMETER TO OBTAIN HIGHEST ANTI-CANCER ACTIVITY FROM KENAF SEEDS
Azura Amid, Parveen Jamal, Nurul Elyani Mohamad and Engku Hasmah Engku Abdullah

CHAPTER 4  OPTIMIZATION OF HEAT STERILIZATION ON MANGO FRUIT (Mangifera indica) PUREE AND EFFECTS TOWARDS CANCER TREATMENT
Azura Amid, Irwandi Jaswir and Muhd. Ezza Faiez Othman

CHAPTER 5  DETERMINATION OF OPTIMAL RANGE OF POST-INDUCTION TEMPERATURE FOR PRODUCTION OF SOLUBLE RECOMBINANT BROMELAIN IN Escherichia coli USING ONE-FACTOR-AT-A-TIME (OFAT) APPROACH
Azura Amid and Jamil Jamaluddin

CHAPTER 6  AEROBIC BIODEGRADATION OF OIL AND GREASE IN PALM OIL MILL EFFLUENT USING CONSORTIUM OF MICROORGANISMS
Ahmad Tariq Jameel and Alade Abass Olanrewaju

CHAPTER 7  WASTEWATER TREATMENT BY IMMOBILISED CELL SYSTEMS
Ahmad Tariq Jameel and Alade Abass Olanrewaju

CHAPTER 8  BATCH FERMENTATION OF RECOMBINANT Escherichia coli PRODUCING β-GLUCURONIDASE USING DIFFERENT CONTROL CONDITION
Mohd Ismail Abdul Karim, Hamzah Mohd Salleh and Maizirwan Mel

CHAPTER 9  OPTIMIZATION OF PROCESS CONDITION FOR E. coli FERMENTATION PRODUCING NUCLEOCAPSID PROTEIN-AVIAN INFLUENZA VIRUS (NP-AIV)
Maizirwan Mel, Md Rashid Shamsuddin, Hamadah Mohd Nur Lubis, Syarifah Syed Hasan and Suriani Mohd Noor
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>TITLE</th>
<th>PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>CELL DISRUPTION IMPROVEMENT OF <em>E. coli</em> PRODUCING NP-AIV USING HIGH PRESSURE HOMOGENIZER</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Maizirwan Mel, Mohd Rashid Shamsuddin, Hamadah Mohd Nur Lubis, Sharifah Syed Hasan and Suriani Mohd Noor</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>SEEDS’ OIL AS BIOLUBRICANT</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Mohamed E. S. Mirghani, I. A. Ahmed, N. A. Kabbashi, S. A. Muyibi, J. I. Daoud and M. A. Mikail</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>SPECIAL OIL FROM DATE PALM KERNEL</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>Mohamed Elwathig Saeed Mirghani, Nasereldin A. Kabbashi and Nur Ellyana Mohd Noor</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>GUM ARABIC: A NARRATIVE EMULSIFYING AGENT</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>Mohamed Elwathig Saeed Mirghani, Maizirwan Mel and Fatimah Misran</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>INVESTIGATIONS ON SPIDER HOUSE FOR ANTI MICROBIAL ACTIVITY</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>Mohamed Elwathig Saeed Mirghani and Mohamad Zul Fahmi Zulkifli</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>EVALUATION ON QUALITY OF HEAT RESISTANCE CHOCOLATE</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Mohamed Elwathig Saeed Mirghani and Maan Fahmi Al-Khatib</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>ANTIMICROBIAL PROPERTY OF DATE SEED EXTRACT</td>
<td>139</td>
</tr>
<tr>
<td></td>
<td>Mohamed E. S. Mirghani, M. A. Mikail, I. A. Ahmed, M. I. Abdul Karim and J. I. Daoud</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>PROCESS IMPROVEMENT OF CONVENTIONAL PALM OIL MILLING: CONTINUOUS COOKER</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>Azlin Azmi, Mageswari Somasundaram and Dzun Jimat</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>FOWL CHOLERA VACCINE PRODUCTION: SCREENING AND OPTIMIZATION OF MEDIA IN SHAKE FLASK CULTURE</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>Maizirwan Mel, Mohd Ismail Abdul Karim, Nor Jannah Yob, Intan Zahrah Samsury, Sharifah Syed Hassan and Akma Ngah Hamid</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>FOWL CHOLERA VACCINE PRODUCTION: PROCESS OPTIMIZATION IN LABORATORY SCALE FERMENTER</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Maizirwan Mel, Mohd Ismail Abdul Karim, Nor Jannah Yob, Intan Zahrah Samsury, Sharifah Syed Hassan and Akma Ngah</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 20  PROCESS IMPROVEMENT OF CONVENTIONAL PALM OIL MILLING: DEPULPER
Azlin Azmi, Mageswari Somasundaram and Dzun Jimat

CHAPTER 21  DIFFUSION-REACTION OF NUTRIENT IN IMMOBILIZED SLAB BIOMASS FOR FIRST AND ZERO ORDER REACTIONS
Ahmad Tariq Jameel and RM Syibli Milasi

CHAPTER 22  DIFFUSION-REACTION OF SUBSTRATE IN CYLINDRICAL IMMOBILIZED BIO-CATALYST
Ahmad Tariq Jameel and RM Syibli Milasi

CHAPTER 23  DIFFUSION-REACTION OF SUBSTRATE IN IMMOBILIZED SLAB BIOMASS FOR MICHAELIS-MENTEN KINETICS
Ahmad Tariq Jameel and RM Syibli Milasi

CHAPTER 24  FERMENTATION OF BIOETHANOL FROM SAGO STARCH
Mohamed Ismail Abdul Karim and Husna Muhammad Nadzri

CHAPTER 25  KINETIC STUDY ON VINEGAR PRODUCTION USING STAR FRUIT JUICE
Mohamed Ismail Abdul Karim and Noor Izzaida Kamaruddin

CHAPTER 26  FERMENTATION OF VINEGAR FROM STAR FRUIT (Averrhoa carambola)
Mohamed Ismail Abdul Karim, Farah Izora Jasni and Parveen Jamal

CHAPTER 27  DESIGN AND DEVELOPMENT OF A LAB SCALE BIOREACTOR FOR HEAT INDUCIBLE ENZYME EXPRESSION SYSTEM
Daud Adam, Ahmad Faris Ismail and Hamzah Mohd. Salleh

CHAPTER 28  OPTIMIZATION OF PHYTOCHEMICAL ANTIOXIDANTS IN RBD PALM OLEIN DURING FRYING PROCESS
Irwandi Jaswir and Mohd Syakirin Sudin

CHAPTER 29  OPTIMIZATION OF PROCESS PARAMETERS FOR EXTRACTION OF XANTHINE OXIDASE INHIBITOR (XOI) FROM Lycopersicon esculentum
Parveen Jamal, Azura Amid, Rasidi Bahardin and Saiful Mohammad Nizam Azmi

CHAPTER 30  PROCESS OPTIMIZATION OF HYDROCOLLOID PRODUCTION FROM SEAWEEDS
Irwandi Jaswir, Mohd Razi Kodin and Parveen Jamal

CHAPTER 31  IMPROVEMENT OF CONVENTIONAL MILLING PROCESS IN PALM OIL PROCESSING: ROTARY FILTER PRESS
CHAPTER 34

TREATMENT OF PALM OIL MILL EFFLUENT USING MICROORGANISMS

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ABSTRACT

Palm oil mill effluent (POME) is produced in large volumes by many of the palm oil mills in Malaysia and poses a major source of pollution. POME contains large quantities of organic matter in the form of total solids that contribute to high biological oxygen demand (BOD) and chemical oxygen demand (COD) in wastewater if left untreated. A study was conducted to evaluate the potential use of Trichoderma harzianum and the mix culture of Trichoderma harzianum and Penicillium for the treatment of POME in reducing the pollutant. Using central composite design (CCD) experiment, each flask containing 100 ml POME is treated with an inoculums consisting of 3% inoculums containing 3 x 10^8 spores/ml and fermented in shake flask with pH 3,6,9 and the agitation speed; 50, 150, 250 rpm and incubated at 30°C for 5 days. Sample of the POME were analyzed at 24 intervals for BOD, COD and total suspended solids (TS). The result showed that the mix culture of Trichoderma harzianum and Penicillium gave better reduction of COD, and TSS with a value of 87.5% and 28.9%, respectively as compared to Trichoderma harzianum in which the value for reduction of COD and TSS is 85.2% and 27.2%, respectively at day 5 of the treatment.

Keywords: POME Treatment, Trichoderma harzianum, Penicillium, COD, TSS.

INTRODUCTION

Palm oil industry, apart from being a major producer and exporter of palm oil, is also identified as the single largest source of wastewater pollution (Omar et al., 2004). Large quantities of POME and palm waste are generated and discharged in the processing of palm oil fruit (Wahid, 2007; Omar et al., 2004). The effluent must be treated to acceptable quality before it can be discharged into the watercourse for land application (Ahmad et al., 2003; Wahid, 2007). The treatment of POME usually involves cellulose degrading microorganisms (Shi, 2007). However, the biological processes for wastewater treatment consist of mixed communities with a wide spectrum of microorganisms, including bacteria, protozoa, fungi, rotifers, and possibly algae (Sethupathi, 2004). A typical characteristic of POME is shown in Table 1 where large quantities of BOD, COD and TSS are evident.