CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME I

Editors:
Suleyman Aremu Muyibi
Mohammed Saedi Jami
Zaki Zainudin

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CONTENTS

PREFACE v

CHAPTER 1 SELECTION OF POTENTIAL FUNGAL STRAINS FOR THE PRODUCTION OF GLUCOAMYLASE USING NON-FOOD CASSAVA (4157/20570)
Md. Zahangir Alam, Hamzah Mohd Salleh, Juwairiyah Abd Karim, and Aliyu Salihu

CHAPTER 2 WATER QUALITY MODELING TO ASSESS THE IMPACTS OF PALM OIL MILL EFFLUENT (POME) IN SG. KALUMPANG BASIN (6601/20573)
Zaki Zainudin

CHAPTER 3 WATER QUALITY CHARACTERIZATION STUDIES ON SPRING WATER FOR USE IN PONDS FOR KELAH FISH BREEDING IN KELAH SANCTUARY (4164/20576)
Suleyman Aremu Mayibi, Sin Harayah Binn Mortan, and Mohamed Ismail Abd Karim

CHAPTER 4 THE SOLID WASTE MANAGEMENT SYSTEM ISSUES ON POLLUTION AND WASTE DISPOSAL PROBLEMS (4286/20578)
Nassereldeen Kabbash, Najla Shuhud, and Mohammed Saedi Jami

CHAPTER 5 SETTLING COLUMN ANALYSIS FOR WATER TURBIDITY REMOVAL USING CHITOSAN (4286/20584)
Nassereldeen Ahmed Kabbashi and Muhammad Fazil B Anisar

CHAPTER 6 PROCESS DEVELOPMENT OF REMOVING LOW TURBIDITY WATER USING CHITOSAN AS A BIOCOAGULANT (4286/20586)
Nassereldeen Ahmed Kabbashi and Muhammad Fazil B Anisar

CHAPTER 7 OPTIMIZATION OF PROCESS CONDITIONS FOR GLUCOAMYLASE PRODUCTION USING NON-FOOD CASSAVA (4157/20590)
Md. Zahangir Alam, Hamzah Mohd Salleh, Radhiah Ariffin, and Noor Mohammad

CHAPTER 8 DEVELOPMENT OF RAPID ENZYMATIC PROCESS FOR ACID OIL PRODUCTION FROM SLUDGE PALM OIL (4157/20596)
Md. Zahangir Alam, Hamzah Mohd Salleh, and Noraini Mohd Yusof

CHAPTER 9 OPTIMISATION OF CHROMATOGRAPHY CONDITION FOR BIOPHENOLS SEPARATION FROM OIL PALM FRUIT FIBER (2937/20598)
Parveen Jamal, Shahrul Yahaya, Md Zahangir Alam, and Azlin Azmi

CHAPTER 10 MORINGA SEED OIL EXTRACTION AND CAKE PROCESSING FROM BENCH TO COMMERCIAL PRODUCTION OF ALTERNATIVE WATER TREATMENT CHEMICALS FOR DEVELOPING COUNTRIES (4146/20603)
Suleyman A. Mayibi and Idris M Bugaje

CHAPTER 11 INVESTIGATION OF ANTIBACTERIAL ACTIVITY OF MORINGA OLEIFERA SEEDS FOR APPLICATION IN WATER TREATMENT (4164/20605)
Suleyman A. Mayibi and Farhana Aina Bt Ahmad Nazir

CHAPTER 12 SCREENING OF LIGNOCELLSULOSIC MATERIALS FOR THE PRODUCTION OF FERMENTABLE SUGAR (4151/20606)
Md. Zahangir Alam, Abdullah-Al-Mamun, Hikmah Mohd Noor, and Noor Mohammad

CHAPTER 13 LOCAL SOURCING FOR RENEWABLE AND SUSTAINABLE REPLACEMENT FOR WATER AND WASTEWATER TREATMENT CHEMICALS: ACTIVATED CARBON FROM AGRO-WASTES (4164/20610)
Suleyman Aremu Mayibi, Mohd Ismail Abdulkarim, Md. Zahangir Alam, Enad S M Ameen, and Nassereldeen A Kabbashi

CHAPTER 14 EVALUATION OF THE PERFORMANCE OF WATER TREATMENT SYSTEM FOR KELAH BREEDING IN FISH PONDS (4164/20612)
Suleyman Aremu Mayibi, Siti Sara Binti Ghazali, and Mohamed Ismail Abd Karim
CHAPTER 15  DESIGN OF TERTIARY TREATMENT SYSTEM FOR EFFLUENT FROM STP AT IIUM FOR HORTICULTURAL USES
Suleyman A. Mayibi and Tamrin Tagari (4164/2063)

CHAPTER 16  COMPARATIVE STUDIES OF MORAING OLEIFERA AND ALUMINIUM SULPHATE AS COAGULANTS IN TURBIDITY REMOVAL FROM SURFACE WATER
Suleyman A. Mayibi, Eman N. Ai, Md Zahangir Alam, and Hamzah M. Salleh (4164/20618)

CHAPTER 17  AN EXPERT SYSTEM FOR DESIGN OF WATER TREATMENT PLANT
Nassereddeen Kabbashi, Anwar Bin Mohamad, and Suleyman A. Mayibi (4286/20017)

CHAPTER 18  ISOLATION AND SCREENING OF POTENTIAL MICROORGANISM FOR BIOREMEDIATION OF HYDROCARBON CONTAMINATED SITES
Parveen Jamal, Md Zahangir Alam, and Nur Aineem Fadza (2497/2625)

CHAPTER 19  SLUDGE PALM OIL AS A POTENTIAL SOURCE FOR EMULSIFIER PRODUCING STRAIN
Parveen Jamal, Md Zahangir Alama, and Nur Fathiah Abd Sana (2937/20631)

CHAPTER 20  MICROBIAL FERMENTATION FOR PRODUCING SURFACE ACTIVE AGENT BY USING PALM OIL MILL EFFLUENT ISOLATE
Parveen Jamal, Md Zahangir Alam, Nur Aineem Fadza, and Wan Mohd Fazli Wan Nawawi (2937/20622)

CHAPTER 21  A BATCH PROCESS PRODUCTION OF COMPOST AND KINETICS ORDER OF REACTION STUDY BY ISOLATED FUNGAL STRAINS
Nasceredeen A. Kabbashi, Optakun Suray, and Md Zahangir Alam (4286/20635)

CHAPTER 22  ANALYSIS OF ELECTROFOREDICTION SEDIMENTATION OF ZINC OXIDE
Mohammed S. Jam, Masashi Iwata, Ma an Alkhatib, and Myeji Mustapha (5545/20639)

CHAPTER 23  PRODUCTION OF BIODIESEL BY ACID-BASE CATALYZED TRANSESTERIFICATION OF WASTE COOKING OIL IN A BATCH REACTOR
Md Zahangir Alam, Parveen Jamal and Nor Rashid Bin Mohamad (4157/20641)

CHAPTER 24  FRACTIONATION, IDENTIFICATION AND QUANTIFICATION OF BIOPHENOLS FROM OIL PALM FRUIT FIBER
Parveen Jamal, Shahrul Yahaya, Md Zahangir Alam, and Azlin Azmi (2937/20644)

CHAPTER 25  CELLULASE PRODUCTION FROM RICE STRAW AND CORN COB BY SOLID STATE BIOCONVERSION
Md Zahangir Alam, Mazlinor Mohd Awall, and Aiyu Saliha (415/20646)

CHAPTER 26  NATURAL DISINFECTANTS FOR WATER TREATMENT
Mohamed E. S. Mirghani, I A Ahmed, S A Mayibi, J I Daoud and M A Mekail (4971/20649)

CHAPTER 27  REMOVAL OF WATER TURBIDITY USING FABA BEANS
Mohamed E. S. Mirghani, Nasserelain A. Kabbashi, and Faseolah Abdul Kadir (120653)

CHAPTER 28  WASTE TO WEALTH: DATE SEED PITS
Mohamed E. S. Mirghani, M A Mekail, I A. Ahmed, M I Abdul Karim and J I Daoud (4971/20656)

CHAPTER 29  EFFECT OF HYDROGEN PEROXIDE ON SETTLEABILITY AND FILTERABILITY OF SLUDGE FROM DRINKING WATER TREATMENT PLANT
Mohammed Saedi Jamil, Suleyman Aremu Mayibi, and Mohd Shahri Bnm Kamaruddin (5545/20659)

CHAPTER 30  ENHANCING THE DEWATERABILITY OF SLUDGE FROM WASTEWATER TREATMENT PLANT
Mohammed Saedi Jamil, Suleyman Aremu Mayibi, and Nur Sahihah Embong (5545/20661)

CHAPTER 31  EVALUATION OF AMMONIA NITROGEN REMOVAL IN AN EXISTING SEQUENTIAL BATCH REACTOR
Mohammed Saedi Jamil, Suleyman Aremu Mayibi, and Nur Faziah Bt Ismail (5545/20664)

CHAPTER 32  PRODUCTION OF GLUCOAMYLASE FROM RICE BRAN USING (4157/20666)
CHAPTER 19

SLUDGE PALM OIL AS A POTENTIAL SOURCE FOR EMULSIFIER PRODUCING STRAIN


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ABSTRACT

There is a recent increase of interest in the production of biosurfactants using microorganisms due to their biodegradability, reduced toxicity compared to synthetic surfactants, and their stability under wide range of temperature and pH. In this study, organic waste, sludge palm oil was used as a novel source for isolation of potential biosurfactant producer. Complex mixture of hydrocarbons of sludge palm oil can trigger certain strains to produce large amount of biosurfactant in order to survive under such harsh environment. Parafilm test and emulsification index were used as a basis for determination of the best strain. After screening, strain S104 was found to have the potential in producing highest yield of biosurfactant.

Keywords: biosurfactant, sludge palm oil, isolation, parafilm test, emulsification index

INTRODUCTION

Surfactants are amphiphilic compounds that reduce the free energy of the system by replacing the bulk molecules of higher energy at an interface (Mulligan, 2005). They contain a hydrophobic moiety with little affinity for the bulk medium and a hydrophilic portion that is attracted to the bulk medium. Surfactants have been used industrially as adhesives, demulsifiers, flocculating, wetting and forming agents, lubricants and penetrants (Mulligan & Gibbs, 1993). Because of their amphiphilic nature, surfactants tend to accumulate at interfaces (air-water and oil-water) and surfaces. As a result, surfactants reduce the forces of repulsion between unlike phases at interfaces or surfaces and allow the two phases to mix more easily (Bodour & Miller-Maier, 2002). Due to the presence of surfactant, less work is required to bring a molecule to the surface and the surface tension is reduced.

Biosurfactant is a structurally diverse group of surface-active molecule synthesized by microorganisms. Their capability of reducing surface and interfacial tension with low toxicity and high specificity and biodegradability, lead to an increasing interest on these microbial products as alternatives to chemical surfactants (Banat et al., 2000). However, up to now, biosurfactants is still unable to compete with the chemically synthesized surfactants in the surfactant market. This could be due to their high production costs in relation to inefficient