CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME I

Editors:

Suleyman Aremu Muyibi
Mohammed Saedi Jami
Zaki Zainudin

IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

(VOLUME I)

Editors:
Suleyman Aremu Muyibi
Mohammed Saedi Jami
Zaki Zainudin

Department of Biotechnology Engineering
Faculty of Engineering
International Islamic University Malaysia

IIUM PRESS

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Suleyman Aremu Muyibi, Mohammed Saedi Jami & Zaki Zainudin: Current Reasearch and Development in Biotechnology Engineering at IIUM Volume I

ISBN: 978-967-418-150-5

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

CHAPTER 13

LOCAL SOURCING FOR RENEWABLE AND SUSTAINABLE REPLACEMENT FOR WATER AND WASTEWATER TREATMENT CHEMICALS: ACTIVATED CARBON FROM AGRO-WASTES

Suleyman Aremu Muyibi, Mohd Ismail Abdulkarim, Md Zahangir Alam, Emad S. M. Ameen, Nassereledeen A. Kabbashi

Department of Biotechnology Engineering, Faculty of Engineering, International Islamic University Malaysia, Gombak, 50728 Kuala Lumpur, Malaysia

ABSTRACT

The activated carbon produced in Malaysia is mostly from greenwood. Continued use of wood as raw material will result in the reduction in green cover of land and forests areas, the natural Malaysian national asset. Therefore it is necessary and urgent to seek for an alternative material like empty fruit bunch (EFP) with Malaysia currently producing more than 12 million tonnes annually to be used as a sustainable raw material for activated carbon production which will lead to forest conservation as well as reduction in solid waste environmental pollution and cost of waste treatment since the EFB as the basic raw material is obtainable at very minimum cost. Production of activated carbon from EFB will encourage its wide utilization by water and wastewater companies for its efficiency as well as its economic cost. This will lead to a good pollution control of surface water & ground water as the wastewater effluent will be of good quality.

Keywords: activated carbon, oil palm empty fruit bunch, water and wastewater treatment

INTRODUCTION

An area which needs serious attention will be the use of agro-waste such as empty fruit bunch for the production of activated carbon. Activated carbon has several important uses including: solution purification (as in the clean-up of cane, beet, and corn-sugar solutions), effective removal of tastes & odours from domestic and industrial water supplies, vegetable and animal fats and oils, chemicals and pharmaceuticals and in the waste water treatment. It also finds use in purification of gases, liquid phase recovery, separation processes and as catalyst and catalyst supports. Many organic compounds such as chlorinated & non-chlorinated solvents, gasoline, pesticides, and trihalomethanes can be adsorbed by activated carbon. It is also effective for removal of chlorine and moderately effective for removal of some heavy metals. Activated carbon has widely been used for the removal of inorganic and inorganic pollutants from aqueous solution. Various lignocellulosic materials or