

# CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME IV

Editors:

Ma'an Alkhatib  
Abdullah Al Mamun  
Faridah Yusof



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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*(VOLUME IV)*

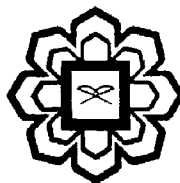
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**IIUM Press**

Published by:  
IIUM Press  
International Islamic University Malaysia

First Edition, 2011  
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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Ma'an Alkhatib, Abdullah Al Mamun & Faridah Yusof: Current Research and Development in Biotechnology Engineering at IIUM Volume IV

ISBN: 978-967-418-136-9

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

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## CHAPTER 4

### KINETICS OF ACTIVATED CARBON FROM EFB IN MERCURY REMOVAL

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#### ABSTRACT

This study is to research on adsorption of mercury from aqueous solution on powdered activated carbons (PAC) that is prepared from Empty Fruit Bunch (EFB). Materials used for adsorption usually determine the operational cost. If the materials used are cheaper and yet still effective, this can reduce the overall operational cost. Hence, this research is an attempt to use an activated carbon which is more economic and effective sorbent to adsorb mercury from water body. Malaysia is one of the major producers and exporters for palm oil. There are many plantation estates in order to fulfill the increasing demands from the world on palm oil. Therefore, there will be huge amount of waste generated from palm oil production. One of the wastes generated from palm oil production is the EFB. EFB will be used as the sources of activated carbon as the sorbent which will be to adsorb and control Hg(II) ion from industrial liquid streams. The advantage of using EFB is that it is a local material source and it is at abundance. Therefore, by studying this project, it may help to expose the usage of EFB and hence create a better waste management in the palm oil industry since it can be reused and recycled to another purpose

**Keywords:** aqueous solution, EFB, kinetic, mercury

#### INTRODUCTION

Mercury exists in two forms which are organic where it occurs naturally in ground water and inorganic such as from industrial discharge. Municipal landfills, sewage, metal refining and chemical manufacturing are significant potential emitters of mercury to land and water. Mercury can naturally occur in the ground water and also can occur due to industrial discharge into the river stream. Although both forms are toxic, it is the organic form that exhibits extreme biological toxicity towards living creatures (Ellis and Robert, 1996). Mercury occurs in different forms in the environment. Methyl mercury is the main compound which accumulates in seafood and freshwater fish. The methyl mercury will travel to the brain as that is the most sensitive organ to methyl mercury and the damage during the early development is likely to be widespread and permanent. Mercury is currently a global problem as it is estimated that approximately 3400 tons per year of mercury is emitted globally due to human activities (Ahalya, 2007). Cleanup technologies which are capable of treating large volumes of soil, water or sediment contaminated with relatively low mercury in a cost-effective way are urgently needed.