

RECENT ADVANCES IN BIOENVIRONMENTAL ENGINEERING

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IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



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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

Suleyman A. Muyibi, Maan Alkhatib, Mohd Ismail Abdulkarim, Md Zahangir Alam, Hamzah Mohd Salleh and Mohammed Saedi Jami: Recent Advances in Bioenvironmental Engineering

ISBN: 978-967-0225-85-2

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

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CHAPTER 3

Pervaporation Process: Separation of Bioethanol from Direct Fermentation of Cassava Starch

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Introduction

Bioethanol is produced synthetically by fermentation from plants and agricultural wastes, is a renewable energy source with favorable features (Rudy et al. 2005). Substrate/raw materials used to produce bioethanol can be grouped according to the type of carbohydrate such as sugar, starch, cellulose (Roehr, 2001). Bioethanol can be produced by several yeasts, bacteria, and fungi through fermentation metabolism of carbohydrates though the overwhelming majority of fermentation alcohol produced world-wide uses of *S. cerevisiae* (Alam, et al. 2009). The fructose and glucose sugars react with an enzyme called zymase, which is contained in the yeast to produce ethanol and carbon dioxide.

During ethanol fermentation, if the ethanol concentration exceeds 8%, process is inhibited and ceases (Roehr, 2001). The problem is that alcohols are from azeotropes with water, making its separation difficult (Shanon, 2004). An azeotrope is a mixture of two or more pure compounds (chemicals) in such a ratio that its composition cannot be changed. Distillation is one way to separate water-ethanol mixture but limited by obstacles like