CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

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Ahmed Tariq Jameel
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IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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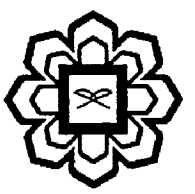

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Md. Zahangir Alam, Ahmed Tariq Jameel & Azura Amid: Current Reasearch and Development in Biotechnology Engineering at IIUM Volume III

ISBN: 978-967-418-144-4

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 7

WASTEWATER TREATMENT BY IMMOBILISED CELL SYSTEMS

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ABSTRACT

The immobilization of whole cells is an important technique which provides alternative solution in the field of wastewater treatment for the purification of wastewater contaminated with various materials, such as organic compounds, inorganic compounds, metals, and so on. The immobilized cells are biocatalysts which can easily be separated from treated water without a settling step and such can be repeatedly used without washing out from the systems. The processes using immobilized cells have been studied and applied to practical treatment systems. An effective way of removing ammonia nitrogen from aqueous solutions is the utilization of immobilized cells because of high cell concentration, long retention time of biomass in the system, rapid separation of cells from liquid and ability to scale up the process. These immobilized catalyst systems are therefore proposed as potential methods for the treatment of various types of wastewater from low to high strength.

Keywords: immobilization, wastewater treatment, carrierless, entrapment, adsorption

INTRODUCTION

The application of immobilized cells as biocatalysts for the treatment of wastewater has been drawing interest in recent times. The process of immobilization of whole cells is an important technique in the field of wastewater treatment particularly for the purification of water contaminated with various materials such as organic, inorganic and metals. The advantages of the immobilized cells, particularly for water treatment includes their continually use without washing out from the systems, concentration of useful cells in as small a volume as possible, and cell protection, which are all effective in the field of wastewater treatment. The challenges of the immobilized cells includes constant exposure and competition with various microorganisms and the inhibition with chemical materials derived from external inflow, though, high density of microorganisms and biopolymers that surround the cells often protect them against the competition and inhibition. Furthermore the use of immobilized cells for the treatment of wastewater has been proved to be advantageous above the use of suspended free cells.