

Biotechnologies towards Sustainable Development in Malaysia

Zarina Zainuddin

**IIUM PRESS
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**



Biotechnologies towards Sustainable Development in Malaysia

Zarina Zainuddin



HUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Zarina Zainuddin

Biotechnologies towards Sustainable Development in Malaysia

Zarina Zainuddin

Include index

Bibliography: p. 149

ISBN: 978-967-418-200-7

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

Table of Contents

Chapter 1 Bioethics and biotechnology: A holistic approach in Islamic perspectives	1
Ahmed Jalal Khan Chowdhury, Zaima Azira Zainal Abidin, Zarina Zainuddin and Suzannah Abdul Rahman	
Chapter 2 Malaysia's Sea Cucumber (Echinodermata: Holothuroidea) Database	16
Kamarul Rahim Kamarudin	
Chapter 3 Diversity and Exploitation of Sea Cucumbers in Malaysia and Its Neighbouring Countries	25
Kamarul Rahim Kamarudin	
Chapter 4 <i>Holothuria (Mertensiothuria) leucospilota</i> (Brandt, 1835) in the Marine Environment of Malaysia	36
Kamarul Rahim Kamarudin	
Chapter 5 Genetic manipulation for better bioremediation processes	50
Noor Faizul Hadry Nordin	
Chapter 6 Microbial bioremediation and sustainable development	64
Noor Faizul Hadry Nordin	
Chapter 7 Heavy metal uptakes by plants	74
Phang Ing Chia	
Chapter 8 Mechanisms of heavy metal tolerance in plants (I) – Avoidance mechanisms	84
Phang Ing Chia	
Chapter 9 Mechanisms of heavy metal tolerance in plants (I) – Tolerance mechanisms	89
Phang Ing Chia	
Chapter 10 Identifying catalytic residues for peptidases: <i>in silico</i> perspective	97
Noraslinda Muhamad Bunnori	
Chapter 11 Important considerations in qRT-PCR	103
Phang Ing Chia	

Chapter 12 Molecular approach of macroinvertebrates in tropical wetland, Lake Bera, Malaysia: Towards the assessment of ecosystem health	113
Nurhidayati Abdul Aziz, Ahmed Jalal Khan Chowdhury, Kamarul Rahim Kamarudin, Mohd Azmi Ambak and Najiah Musa	
Chapter 13 Probiotic for sustainability protein source in Malaysia	126
Tengku Haziya Amin Tengku Abdul Hamid	
Chapter 14 Bacteriocin as safe antimicrobial agent	133
Tengku Haziya Amin Tengku Abdul Hamid	
Chapter 15 Review on marine actinomycetes	141
Zaima Azira Zainal Abidin	
Chapter 16 Biotechnology potential tropical mangrove plant with special emphasis on <i>Avicennia alba</i> in Tanjung Lumpur, Pahang Malaysia	154
Ahmed Jalal Khan Chowdhury., Deny Susanti, and Nur Sazwi Binti Nordin	
Chapter 17 Studies on agronomy, breeding and genetics of <i>Stevia rebaudiana</i> (Bertoni) in Malaysia	168
Raji Akintunde Abdullateef and Mohamad bin Osman	
Chapter 18 Identification and characterization of <i>Burkholderia pseudomallei</i> serine and metallopeptidases	191
Noraslinda Muhamad Bunnori	
Chapter 19 Analysis of xylene degradation by bacteria isolated from petroleum contaminated sites	203
Noor Faizul Hadry Nordin and Marni Farhani Mansor	
Chapter 20 Bioadsorption of heavy metals from synthetic waste water by tropical rambutan seed	208
Ahmed Jalal Khan Chowdhury, Abul Bashir Mohammed Helal Uddin, Mohd Sufian Mohamad Shukri, Kamaruzzaman Yunus	
Chapter 21 Chitin and chitosan from fresh water fish tilapia (<i>Oreochromis niloticus</i>) scale	223
Ahmed Jalal Khan Chowdhury, Nor Hafizah Zakaria, Tengku Haziya Amin Tengku Abdul Hamid and Deny Susanti	
Chapter 22 Chitin and chitosan from potential shrimps and crabs of Malaysia	236
Ahmed Jalal Khan Chowdhury, Suffi Nurul Husna, Deny Susanti, Akbar John and Kamaruzzaman Yunus	

Chapter 23 Extraction of chitin and chitosan from Malaysian cephalopods “Sotong mengaban” (<i>Sepioteuthis lessoniana</i>) and “Sotong jarum” (<i>Loligo vulgaris</i>)	244
Ahmed Jalal Khan Chowdhury, Mohd Hazman Mohd Salleh, Deny Susanti, Akbar John and Jamaluddin Daud	
Chapter 24 <i>In Planta Agrobacterium tumefaciens</i> transformation of MR 219 rice	258
Zaima Azira Zainal Abidin and Rabiah Abdul Wahab	
Chapter 25 Optimisation of transformation system for chilli embryo (<i>Capsicum annuum</i> variety Kulai) using particle bombardment	268
Zarina Zainuddin and Rozilawati Mohamad Achil	
Chapter 26 Screening of mangrove plants for gram negative antibacterial activity	275
Zarina Zainuddin and ‘Izzati Akmal Hasan	
Chapter 27 Antibacterial activities of green and ripens banana peel (Musa, AA cv. Sucrier) in Malaysia	284
Ahmed Jalal Khan Chowdhury, Dina Fuad, Md. Tariqur Rahman and Akbar John	
Chapter 28 Agglutinin and antibacterial activities in oyster, <i>Chama pacifica</i> plasma	298
Najiah Musa, Arief Izzairy Zamani, Ahmed Jalal Khan Chowdhury and Muhamad Hazwan Mat Tar, Nadirah Musa	
Chapter 29 The effect of cooking methods on meat samples using PCR-RFLP analysis	305
Zaima Azira Zainal Abidin and Haryati Ithnin	

Chapter 2

Malaysia's Sea Cucumber (Echinodermata: Holothuroidea) Database

Kamarul Rahim Kamarudin

kamarulr@iium.edu.my

Introduction

The Sea Cucumber (Echinodermata: Holothuroidea) Database, Kulliyah of Science (KOS), International Islamic University Malaysia (IIUM) is part of the outcomes of a national project entitled “Systematics of Sea Cucumbers of the Genus *Holothuria* (Aspidochirotida: Holothuriidae) and Phylogeography in *H. leucospilota*” (the duration of project: January 2007 – December 2008) supported by the Fundamental Research Grant Scheme (FRGS) Category A for cycle 01/2006 (FRGS0106-25) through the sponsorship of the Department of Higher Education, Ministry of Higher Education (MOHE), Malaysia. This database has been launched and maintained by the Sea Cucumber (Echinodermata: Holothuroidea) Research Group which was formed under the Institute of Oceanography and Maritime Studies (INOCEM), KOS, IIUM. This easy-to-access and on-line reference has enabled a lot of people around the world including business owners, academics and researchers to refer to and be up-to-date with available research and information on Malaysia’s sea cucumbers.

Development history

The Sea Cucumber (Echinodermata: Holothuroidea) Database was launched on-line on two separate dates. The first launching was on 1st of January 2009 at