

SUSTAINABLE UTILIZATION OF MALAYSIAN AGROWASTE



**Ahmed Jalal Khan Chowdhury
Deny Susanti
Jamaluddin Daud
Kamarul Rahim Kamarudin
Rosliza Mohd Salim
Abul Bashar Mohammed Helaluddin**

IIUM Press
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



SUSTAINABLE UTILIZATION OF MALAYSIAN AGROWASTE

Ahmed Jalal Khan Chowdhury

Deny Susanti

Jamaluddin Mohd Daud

Kamarul Rahim Kamarudin

Rosliza Mohd Salim

Abul Bashar Mohammed Helaluddin



IIUM 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

Ahmed Jalal Khan Cowdhury, Deny Susanti, Jamaluddin Mohd Daud, Roslina Mohd Salim & Abul Bashar Mohammed Helaluddin : Sustainable Utilization of Malaysian Agrowaste

Includes Index
ISBN

ISBN: 978-967-418-008-9

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

TABLE OF CONTENT

Foreword	i
Preface	iii
Acknowledgments	ix
Chapter 1	1
Fruit Kernels, Peels and Seeds – From By-Products To Commercial Antioxidants	
<i>Kamarul Rahim Kamarudin, Ahmed Jalal Khan Chowdhury and 'Aisyah Mohamed Rehan</i>	
Chapter 2	21
Agrowaste Towards Sustainable By-Products: Malaysian Perspectives	
<i>Ahmed Jalal Khan Chowdhury and A.B.M. Helaluddin</i>	
Chapter 3	61
Malaysian Agrofood and Waste Products: The Value	
<i>Deny Susanti, Muhammad Taher, Anis Fadhlina Izyani Awang, Nur Izzati Mohd Hazmi, Siti Sarah Mat Nawi</i>	

Chapter 4	102
Bioadsorbent For Wastewater Treatment From Jackfruit (<i>Artocarpus heterophyllus</i>) Peel Powder	
<i>Rosliza Mohd Salim & Mohd Akhil Ayob</i>	
Chapter 5	124
Activated Carbon Production from Rubber Wood Residues towards Decolourisation of Crude Palm Oil	
<i>Jamaluddin Mohd Daud</i>	
Index	163

CHAPTER 5

**ACTIVATED CARBON PRODUCTION FROM RUBBER
WOOD RESIDUES TOWARDS DECOLOURISATION OF
CRUDE PALM OIL**

Jamaluddin Mohd Daud

Introduction

Elemental carbon can be in the crystalline or amorphous forms. The crystalline carbons are graphite and diamond, whereas the amorphous carbon is normally known as charcoal. All species of wood and cellulosic biomass can be converted to charcoal that is suitable for general use such as fuel for homes and industry. Charcoal is also an important commodity that can be used for the reduction of steel, production of carbide and activated carbon. The charcoal industry was first introduced into Malaysia by charcoal burners who migrated from Thailand to Matang, Perak as a result of the exhaustion of larger sizes of mangrove wood in their own swamps (Robertson, 1940).

Charcoal could be produced by heating of any carbonaceous material such as coconut shells, bamboo, wood chips, sawdust, coal, lignite, paddy husk, etc.