

# Current Issues in PHARMACY

Qamar Uddin Ahmad



IIUM PRESS  
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA



# Current Issues in Pharmacy

Editor

Qamar Uddin Ahmed, PhD

Kulliyah of Pharmacy, International Islamic University Malaysia



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

Qamar Uddin Ahmed: Current Issues in Pharmacy

ISBN: 978-967-418-019-5

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

<b>TABLE OF CONTENTS</b>	<b>Page</b>
<b>PREFACE</b>	<b>3</b>
<b>Chapter 1: Issues in Pharmacy Education</b>	
<i>Tariq Abdul Razak</i>	<b>5</b>
<b>Chapter 2: Direct-to-Consumer Advertising in Malaysia: Skirting the Regulations?</b>	
<i>Syahiera Farhana Zakaria; Noordin Othman</i>	<b>15</b>
<b>Chapter 3: Tobacco Control Education in Pharmacy: From Theory to Practice</b>	
<i>Mohamad Haniki Nik Mohamed; Saraswathi Simansalam</i>	<b>25</b>
<b>Chapter 4: Pharmaceutical Promotion: The Theoretical Framework of Regulation</b>	
<i>Noordin Othman; Agnes Vitry; Elizabeth E. Roughead</i>	<b>57</b>
<b>Chapter 5: The Challenge of Pharmaceutical Promotion Regulation in Malaysia</b>	
<i>Noordin Othman; Agnes Vitry; Elizabeth E. Roughead</i>	<b>70</b>
<b>Chapter 6: Innovations in the Delivery of Pharmaceutical Care</b>	
<i>Nurdiana Jamil; Syahiera Farhana Zakaria</i>	<b>88</b>
<b>Chapter 7: Microencapsulation of Gentamicin into PLGA-Chitosan Matrices</b>	
<i>Anas Abdullah Hazim; Ahmad Fahmi Harun Ismail; Mohamed Awang; Farahidah Mohamed</i>	<b>112</b>
<b>Chapter 8: Process Analytical Technology Based Monitoring and Control of Crystal Properties in Pharmaceutical Crystallisation Processes</b>	
<i>Mohd Rushdi Abu Bakar; Zoltan Karman Nagy</i>	<b>129</b>
<b>Chapter 9: Pharmaceutical Application of Solid Dispersion Technology in Improving Solubility of Poorly Soluble Drugs: A Review</b>	
<i>Uttam Kumar Mandal</i>	<b>156</b>

## Current Issues in Pharmacy

<b>Chapter 10:</b> Natural Surfactants for Pharmaceutical Emulsions	
<i>Hadi, J. N; Norazian M. Hassan; Kausar Ahmad</i>	178
<b>Chapter 11:</b> The Vascular Protective Effects of Polyphenols	
<i>Juliana Md Jaffri</i>	196
<b>Chapter 12:</b> The Stress and Free Radical towards Disease and Aging	
<i>May Khin Soe</i>	215
<b>Chapter 13:</b> Research and Development on Antidiabetic Herbs: Malaysia Perspective	
<i>Abdul Razak Kasmuri</i>	227
<b>Chapter 14:</b> <i>In Vitro</i> Activities of Malaysian Antidiabetic Plant Extracts on Adipocyte Cells	
<i>Muhammad Taher; Mohamed Zaffar Ali Mohamed Amiroudine; Deny Susanti</i>	238
<b>Chapter 15:</b> Herbs as Antimicrobial Remedies and the Scientific Evidences	
<i>Norazian M. Hassan; Qamar Uddin Ahmed</i>	249
<b>Chapter 16:</b> Phytochemical Screening Expedition 2009: Drug Discovery From Nature	
<i>Siti Zaiton, M. S; Norazian M. Hassan; Shamsul Khamis</i>	274
<b>Chapter 17:</b> Pharmacology, Phytochemistry, and Toxicity of <i>Rhazya Stricta</i> DECNE	
<i>Saifullah Khan; Farmanullah</i>	285
<b>Chapter 18:</b> Effect of Different Growth Regulators on Shoot Proliferation of Garlic ( <i>Allium sativum</i> L.)	
<i>Santi Rosana; Retno A. Budi Muljono; Ishak</i>	305
<b>Chapter 19:</b> Metals in Herbal Formulations	
<i>A. B. M. Helal Uddin</i>	320
<b>Chapter 20:</b> Flavonoids: Future Pharmaceutical Agents	
<i>Qamar Uddin Ahmed</i>	333

## CHAPTER 18

### **EFFECT OF DIFFERENT GROWTH REGULATORS ON SHOOT PROLIFERATION OF GARLIC (*ALLIUM SATIVUM* L.)**

*Santi Rosana<sup>1</sup>; Retno A. Budi Muljono<sup>1</sup>; Ishak<sup>2</sup>*

*<sup>1</sup>Department of Pharmaceutical Chemistry, Kulliyah of Pharmacy, International Islamic University Malaysia, Kuantan, Pahang DM, Malaysia; <sup>2</sup>Centre for The Applications of Isotopes and Radiation Technology, Indonesian National Nuclear Energy Agency, Indonesia*

Shoot formation of garlic (*Allium sativum* L.) tissue culture was studied in Murashige and Skoog (MS) and Gamborg's basal medium (B5) which are supplemented with a different combination of growth hormones namely 6-benzyl aminopurine (BAP) and  $\alpha$ -Naphthaleneacetic acid (NAA) with and without cold pretreatments. A stem-disc of shoot tips was used as explants for the induction of garlic shoot formation in the six weeks period.. A number of shoots, bulbs and fresh weight of bulb were observed. The shoot and bulbs formation were rapidly induced via organogenesis for the cold-pretreated bulbs at 4°C grown in a half MS media which contained 0.1 ppm of BAP in combination with 0.1 ppm NAA. Apparently, the induction of shoot and bulbs of garlic were influenced by temperature, hormones composition and nitrogen sources.

#### **Introduction**

Garlic (*Allium sativum* L.) is vegetatively propagated plant and sexually sterile and seedless. It has long been used as cooking spice and medicinal plant. Garlic has been used traditionally for the treatment of gastro intestinal problems as well as anti bacteria. Recently, it