

PLANT SECONDARY METABOLITES

Volume 1

Biological and Therapeutic Significance



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Biological and Therapeutic Significance

Edited by

Mohammed Wasim Siddiqui, PhD

Kamlesh Prasad, PhD

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ACADEMIC
PRESS

Apple Academic Press Inc. | Apple Academic Press Inc.
3333 Mistwell Crescent | 9 Spinnaker Way
Oakville, ON L6L 0A2 | Waretown, NJ 08758
Canada | USA

©2017 by Apple Academic Press, Inc.

Exclusive worldwide distribution by CRC Press, a member of Taylor & Francis Group

No claim to original U.S. Government works

Printed in the United States of America on acid-free paper

International Standard Book Number-13: 978-1-77188-352-8 (Hardcover)

International Standard Book Number-13: 978-1-315-36632-6 (CRC Press/Taylor & Francis eBook)

International Standard Book Number-13: 978-1-77188-353-5 (AAP eBook)

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Library and Archives Canada Cataloguing in Publication

Plant secondary metabolites.

Includes bibliographical references and indexes.

Contents: Volume 1. Biological and therapeutic significance / edited by Mohammed Wasim Siddiqui, PhD, Kamlesh Prasad, PhD

Issued in print and electronic formats.

ISBN 978-1-77188-352-8 (v. 1 : hardcover)--ISBN 978-1-77188-353-5 (v. 1 : pdf)

1. Plant metabolites. 2. Plants, Edible--Metabolism. 3. Medicinal plants--Metabolism.

4. Metabolism, Secondary. I. Siddiqui, Mohammed Wasim, author, editor II. Prasad, Kamlesh, author, editor

QK881.P63 2016

572'.42

C2016-904969-8

C2016-904970-1

Library of Congress Cataloging-in-Publication Data

Names: Siddiqui, Mohammed Wasim, editor. | Prasad, Kamlesh, editor.

Title: Plant secondary metabolites / editors, Mohammed Wasim Siddiqui, Kamlesh Prasad.

Other titles: Plant secondary metabolites (Siddiqui)

Description: New Jersey : Apple Academic Press, Inc., [2017-] | Includes bibliographical references and index.

Identifiers: LCCN 2016030295 (print) | LCCN 2016031056 (ebook) | ISBN 9781771883528 (hardcover : alk. paper) | ISBN 9781771883535 (ebook) | ISBN 9781771883535 ()

Subjects: LCSH: Plant metabolites. | Plants, Edible--Metabolism. | Medicinal plants--Metabolism. | Metabolism, Secondary. | MESH: Plants, Edible--metabolism | Plant Extracts--chemistry | Phytochemicals | Plants, Medicinal Classification: LCC QK881 .P5526 2017 (print) | LCC QK881 (ebook) | NLM QK 98.5.A1 | DDC 572/.42--dc23

LC record available at <https://lcn.loc.gov/2016030295>

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Plant Secondary Metabolites:

Volume 1: Biological and Therapeutic Significance

Editors: Mohammed Wasim Siddiqui, PhD, and Kamlesh Prasad, PhD

Plant Secondary Metabolites:

Volume 2: Stimulation, Extraction, and Utilization

Editors: Mohammed Wasim Siddiqui, PhD, Vasudha Bansal, PhD,
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Plant Secondary Metabolites:

Volume 3: Their Roles in Stress Ecophysiology

Editors: Mohammed Wasim Siddiqui, PhD, and Vasudha Bansal, PhD



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DEDICATION

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CONTENTS

<i>List of Contributors</i>	<i>xiii</i>
<i>List of Abbreviations</i>	<i>xv</i>
<i>Preface</i>	<i>xvii</i>
<i>Acknowledgments</i>	<i>xix</i>
1. Microalgae as a Source of Nutritional and Therapeutic Metabolites	1
Srivatsan Vidyashankar, P. Simon Daris, K. G. Mallikarjuna, and Ravi Sarada	
2. Medicinal Plants in Preventive and Curative Roles for Various Ailments	63
R. Singh, K. K. Prasad, Mohammed Wasim Siddiqui, and Kamlesh Prasad	
3. Secondary Metabolites of Basil and Their Potential Roles	101
Kamlesh Prasad, Neeha V. S., Vasudha Bansal, Mohammed Wasim Siddiqui, and Isabella Montenegro Brasil	
4. Secondary Metabolites in Spices and Medicinal Plants: An Overview	143
Amit Baran Sharangi	
5. Bacterial Cellulose as Secondary Metabolite: Production, Processing, and Applications.....	169
Idayu Muhamad Ida, Pa'e Norhayati, and Azly Zahan Khairul	
6. Secondary Metabolites in Horticultural Crops	201
Ankita Anu, Sangita Sahni, Pankaj Kumar, and Bishun Deo Prasad	
7. Pulse Secondary Metabolites: A Perspective on Human and Animal Health	215
Rafat Sultana, Ravi S. Singh, P. Ratnakumar, Nidhi Verma, S. K. Chaturvedi, A. K. Chaudhary, C. V. Sameer, and Mohammed Wasim Siddiqui	
8. Spirulina: Functional Compounds and Health Benefits.....	243
Ashraf Mahdy Sharoba	
Index.....	287



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LIST OF ABBREVIATIONS

AA	arachidonic acid
ALA	alpha-linolenic acid
AM	<i>Aegle marmelos</i>
AMD	age-related macular degeneration
ANF	antinutritional factor
APC	allophycocyanin
BHT	butylated hydroxyl toluene
BLG	β -lacto globulin
BSG	basil seed gum
CAM	complementary and alternative medicine
CMC	carboxymethyl cellulose
COX2	cyclooxygenase 2
CSTR	continuous stirrer tank reactor
CVDs	cardiovascular disease
DHA	docosahexaenoic acid
DM	diabetes mellitus
DM	dry matter
DPPH	2,2-diphenyl-1-picryl-hydrazyl
EFSA	European Food Safety Authority
EOS	essential oils
EPA	eicosapentaenoic acid
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
G6PD	glucose-6-P-dehydrogenase
GC	gas chromatography
GLA	gamma-linolenic acid
GSH	glutathione
HDL	high-density lipoprotein
IBD	inflammatory bowel disease
IBS	inflammatory bowel syndrome
LA	linoleic acid
LDL	low-density lipoprotein
LPSS	low-pressure superheated steam

ME	methyl eugenol
MI	myocardial infarction
MS	mass spectroscopy
NAFLD	nonalcoholic fatty liver disease
NCD	non-communicable diseases
NFHS	National Family Health Survey
NO	nitric oxide
NPAA	nonprotein amino acid
NPs	natural products
NSCLC	non-small-cell lung cancer
PBPs	phycobiliproteins
PBRs	photobioreactors
PC	phycocyanin
PE	phycoerythrin
PUFAs	polyunsaturated fatty acids
RBC	red blood cell
RDA	Recommended Dietary Allowances
RDR	rotary discs reactor
ROS	reactive oxygen species
SFE	supercritical fluid extraction
SMs	secondary metabolites
STZ	streptozotocin
TAG	triacylglycerol
TIU	trypsin inhibitor unit
TNF	tumor necrosis factor
UC	ulcerative colitis
WBCs	white blood cells
WHO	World Health Organization

PREFACE

Plant-based formulations have been used since the medieval time of the human history against the ailments of living beings. Taking the evidence of natural functional components as secondary metabolites present in the plants, various medicines have been developed all over the world. Also, with the changing scenario of consumer perspective, there is more inclination toward natural healing compounds today. Owing to that, health supplements such as food additives, nutraceuticals, taste enhancers, and flavor retainers have engulfed the commercial food market by focusing and highlighting the natural ingredients of bioactive components present in them.

This book, *Plant Secondary Metabolites: Volume 1: Biological and Therapeutic Significance*, includes chapters based on the curative and/or therapeutic role of secondary metabolites present in different natural food groups. Efforts have been made not to just showcase the applications of herbal-based group but also to include the effective utility of other plant-based food categories as well. In addition to the clinical role of secondary metabolites, other natural sources like microalgae and bacterial cellulose are also presented as the efficacious source of functional components.

The chapters included in this book demonstrate the innovative and exploratory potential applications of secondary metabolites toward nutritional enrichment of food as well as their beneficial aspects. Chapter 1 illustrates microalgae as the source of nutritional and clinical metabolites; Chapter 2 covers the role of medicinal plants in the prevention of several ailments; Chapter 3 showcases the role of basil and the strength of its functional compounds; Chapter 4 explores the significance of spices as the medium of bioactive compounds; Chapter 5 discusses the production, processing, and medicinal prospective of bacterial cellulose; Chapter 6 describes the different therapeutic significance of horticultural crops; Chapter 7 is comprised of the details of pulses and their composition of metabolites for the sustenance of human and animal health; and Chapter 8 embraces the health benefits and functional components of Spirulina.

The editors and authors have contributed the chapters in order to delineate the natural components in a summarized manner. It is hoped that food scientists and chemists will find this book extremely useful. This book will also render an overview to the technical food industry for converting the functional compounds present in vivid nutritional sources to novel products.

ACKNOWLEDGMENTS

It was almost impossible to express the deepest sense of veneration to all without whose precious exhortation this book project could not be completed. At the onset of the acknowledgment, we ascribe all glory to the gracious “Almighty God” from whom all blessings come. We would like to thank for His blessing to write this book.

With a profound and unfading sense of gratitude, we sincerely thank the Bihar Agricultural University (BAU), India, CSIR—Central Scientific Instruments Organisation (CSIO), India, and Sant Longowal Institute of Engineering & Technology (SLIET), India, for providing us the opportunity and facilities to execute such an exciting project, and for supporting us toward our research and other intellectual activities around the globe. We convey special thanks to our colleagues and other research team members for their support and encouragement for helping us in every footstep to accomplish this venture. We would like to thank Mr. Ashish Kumar, Ms. Sandy Jones Sickels, and Mr. Rakesh Kumar of Apple Academic Press for their continuous support to complete the project.

Our vocabulary will remain insufficient in expressing our indebtedness to our beloved parents and family members for their infinitive love, cordial affection, incessant inspiration, and silent prayer to “God” for our well-being and confidence.



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