Tariq Aftab
Khalid Rehman Hakeem *Editors*

Medicinal and Aromatic Plants

Healthcare and Industrial Applications

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(1908–1999)

A great philanthropist, thinker, visionary, and founder-chancellor of ***Jamia Hamdard****, New Delhi, India.*

Preface

In prehistoric times, humans undoubtedly acquired nature's benefits by discovering medicinal and aromatic plants (MAPs) that were food and medicine. Today, a variety of available herbs and spices are used and enjoyed throughout the world and continue to promote good health. As the benefits from medicinal and aromatic plants are recognized, these plants will have a special role for humans in the future. The enormous demand in botanicals results in a huge trade from local to international level. Until the last century, production of botanicals relied to a large degree on wild collection. However, utilization and commerce of wild plant resources are not detrimental in themselves, For example, the increasing commercial collection, largely unmonitored trade, and habitat loss lead to an incomparably growing pressure on plant populations in the wild. Throughout time, medical care has continually progressed, moving from illnesses to vaccinations and new medicines along with improved healthcare facilities that can more accurately diagnose and treat health problems. Advancements in modern medicine and medical care have enabled people to live longer and healthier lives. New medicines from plant materials and antibiotics from microflora have defeated most diseases. Medicinal and aromatic plants are of high priority for conservation action as wildcrafting will certainly continue to play a significant role in their future trade: the sustainable commercial use of their biological resources may provide a financial instrument for nature conservation. The international market is also quite welcoming for MAPs and essential oils. The increasing environment- and nature-conscious buyers encourage producers to produce high-quality essential oils. There has been growing preference for organic and herbal-based products in the world market. Similarly, the world is shifting from crude export to processing of herbal products and essential oils.

The present book covers a wide range of topics, discussing the role of MAPs in healthcare and their industrial uses. Moreover, this will be a unique reference book on the topic highlighting various healthcare, industrial, and pharmaceutical applications that are being currently used on immensely important MAPs and its future prospects. In this volume, we highlighted the working solutions as well as open problems and future challenges in MAPs research. We believe that this book will

initiate and introduce readers to state-of-the-art developments and trends in this field of study.

The book comprises 27 chapters, most of them being review articles written by experts, highlighting wide range of topics, discussing the role of MAPs in healthcare, industry, and their pharmaceutical applications. We are hopeful this volume would furnish the need of all researchers who are working or have interest in this particular field. Undoubtedly, this book will be helpful for general use of research students, teachers, and those who have interest in MAPs.

We are highly grateful to all our contributors for accepting our invitation and for not only sharing their knowledge and research but for venerably integrating their expertise in dispersed information from diverse fields in composing the chapters and enduring editorial suggestions to finally produce this venture. We also thank the Springer Nature team for their generous cooperation at every stage of the book's production.

Lastly, thanks are also due to well-wishers, research students, and authors' family members for their moral support, blessings, and inspiration in the compilation of this book.

Aligarh, India — Tariq Aftab
Jeddah, Saudi Arabia — Khalid Rehman Hakeem

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About the Editors

Tariq Aftab received his Ph.D. from the Department of Botany at Aligarh Muslim University, India, and is currently an Assistant Professor there. He is recipient of the prestigious Leibniz-DAAD Fellowship from Germany, Raman Fellowship from the Government of India, and Young Scientist Awards from the State Government of Uttar Pradesh (India) and Government of India. After completing his doctorate, he worked as Research Fellow at the National Bureau of Plant Genetic Resources, New Delhi, and as Postdoctoral Fellow at Jamia Hamdard, New Delhi, India. Dr. Aftab also worked as Visiting Scientist at Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany, and in the Department of Plant Biology, Michigan State University, USA. He is a member of various scientific associations from India and abroad.

He has edited 7 books with international publishers, including Elsevier Inc., Springer Nature, and CRC Press (Taylor & Francis Group), co-authored several book chapters, and published over 50 research papers in peer-reviewed international journals. His research interests include physiological, proteomic, and molecular studies on medicinal and aromatic plants.

Khalid Rehman Hakeem, PhD is Professor at King Abdulaziz University, Jeddah, Saudi Arabia. After completing his doctorate (botany; specialization in plant eco-physiology and molecular biology) from Jamia Hamdard, New Delhi, India, in 2011, he worked as a Lecturer at the University of Kashmir, Srinagar, for a short period. Later, he joined Universiti Putra Malaysia, Selangor, Malaysia, and worked there as Postdoctoral Fellow in 2012 and Fellow Researcher (Associate Professor) from 2013 to 2016. Dr. Hakeem has more than 10 years of teaching and research experience in plant eco-physiology, biotechnology and molecular biology, medicinal plant research, plant-microbe-soil interactions, as well as in environmental studies. He is the recipient of several fellowships at both national and international levels; he has also served as a Visiting Scientist at Jinan University, Guangzhou, China. Currently, he is involved with a number of international research projects with different government organizations.

So far, Dr. Hakeem has authored and edited more than 50 books with international publishers, including Springer Nature, Academic Press (Elsevier), and CRC Press. He also has to his credit more than 110 research publications in peer-reviewed international journals and 60 book chapters in edited volumes with international publishers.

At present, Dr. Hakeem serves as an editorial board member and reviewer of several high-impact international scientific journals from Elsevier, Springer Nature, Taylor and Francis, Cambridge, and John Wiley Publishers. He is included in the advisory board of Cambridge Scholars Publishing, UK. He is also a fellow of Plantae group of the American Society of Plant Biologists; member of the World Academy of Sciences; member of the International Society for Development and Sustainability, Japan; and member of Asian Federation of Biotechnology, Korea. Dr. Hakeem has been listed in Marquis Who's Who in the World between 2014 and 2019. Currently, Dr. Hakeem is engaged in studying the plant processes at eco-physiological as well as molecular levels.