PREFACE 1

"25 grams of soy protein a day,
As part of a diet low in saturated fat and cholesterol,
May reduce the risk of heart disease." [USFDA 21CFR101.82]
—Ramabhau Patil, PhD

To be healthy, it is our moral responsibility,
Towards Almighty God, ourselves, and our family;
Eating fruits and vegetables makes us healthy,
Believe and have a faith;
Reduction of food waste can reduce the world hunger and
can make our planet eco-friendly.
—Megh R. Goyal

If wealth is lost, nothing is lost,
If health is lost, something is lost, and
If character is lost, everything is lost.
—P. P. Joy, Kerala
<https://www.researchgate.net/profile/Pp_Joy>

We introduce this book volume published under book series *Innovations in Plant Science for Better Health: From Soil to Fork.* This book mainly covers the current scenario of the research and case studies and looks at the importance of phytochemicals from marine and plant sources therapeutics. The volume is broken into four parts: Part I: Functional Foods for Human Health; Part II: Pharmacological Aspects of Fruits and Vegetables; Part III: Pharmacological Aspects of Natural Products; and Part IV: Pharmacological Aspects of Cereals, Grains, and Tea.

This book volume sheds light on the potential of plants for human health for different technological aspects, and it contributes to the ocean of knowledge on food science and technology. We hope that this compendium will be useful for students and researchers as well as for those working in the food, nutraceuticals, and herbal industries.

The contributions by the cooperating authors to this book volume have been most valuable in the compilation. Their names are mentioned in each chapter and in the list of contributors. We appreciate you all for having

patience with our editorial skills. This book would not have been written without the valuable cooperation of these investigators, many of whom are renowned scientists who have worked in the field of food engineering and food science throughout their professional careers.

I am glad to introduce Dr. Hafiz Ansar Rasul Suleria, who is a Postdoc Research Fellow/Honorary Research Fellow (Food and Nutrition) at The University of Queensland, School of Medicine, Translational Research Institute, in Australia. With several awards and recognitions, Dr. Suleria brings his expertise and innovative ideas on pharmaceutical sciences in this book.

We will like to thank editorial staff, Sandy Jones Sickels, Vice President, and Ashish Kumar, Publisher and President at Apple Academic Press, Inc., for making every effort to publish the book when the diminishing water resources are a major issue worldwide. Special thanks are due to the AAP Production Staff as well.

We request that readers offer their constructive suggestions that may help to improve the next edition.

We express our admiration to our families and colleagues for understanding and collaboration during the preparation of this book volume. As an educator, there is a piece of advice to one and all in the world: *"Permit that our almighty God, our Creator, provider of all and excellent Teacher, feed our life with Healthy Food Products and His Grace—and Get married to your profession."*

—Megh R. Goyal, PhD, PE
Senior Editor-in-Chief

PREFACE 2

In the recent era, along with technological advancement and food-based strategies, changes in dietary patterns and nutritional awareness are becoming a foremost topic of concern. Globally, the consumption of therapeutic foods, including functional foods, is rising as they are a vital component of dietary interventions for health promotion and disease management. It has been observed that there is tremendous surge in the rate of survival by exploring the secrets of functional food components over the past 200 years. The concept of "proper diet providing health benefits and disease prevention" is emerging as more than basic nutrition.

Presently, due to increased burden of diseases, people are more inclined toward consumption of foods that provide additional health benefits along with fulfillment of nutritional requirements. Functional foods encompass physiologically active components that may or may not have been modified to enhance their bioactivity and provide health benefits in addition to basic nutrition. These foods may help to decrease the risk of diseases, prevent disease development, and enhance an individual's health. Owing to increased demand, the functional food market is growing and expanding at a strange level.

Plant-based functional foods are known to contain compounds (also referred to as phytochemicals) in the leaves, stems, flowers, and fruits that can help to promote human health. Therefore, plant products are drawing the attention of researchers and policymakers because of their demonstrated beneficial effects against diseases with high global burdens such as diabetes, hypertension, cancer, and neurodegenerative diseases. The side effects associated with conventional medicine have awakened the interest of researchers to explore these plants as alternative or complementary medicine. Various plants like onion, garlic, ginger, citrus, flaxseed, broccoli, and other cruciferous vegetables and green and black tea are utilized to develop functional foods that are effectively used to improve human nutrition.

Cereal products, especially oat, soya, and flaxseed, are widely used as a source of cholesterol-lowering dietary fiber β-glucan, whose consumption decreases cholesterol level, reducing the risk of coronary heart disease. Flaxseed being a rich source of linolenic acid and as its consumption is associated with fiber-associated compounds and lignin, it can reduce

cholesterol along with platelet aggregation. These plants were discovered by traditional healers to have activities against certain diseases mostly by chance or by testimonies from other users. Hence, there is the need for substantial scientific evidence in terms of efficacy, dosage, and safety in order for traditional herbs to have a place in modern medicine.

This book presents scientific reports on therapeutic values of different plants against diseases. It aims to further encourage the need for the development of plant-based drugs through innovative and ground breaking research studies and, thus, will help to promote the health and economic well-being of people around the world. The understanding of the therapeutic values of these plants will also help to improve their sustainability, as people and governments will be encouraged to preserve and conserve the plants for future generations. The book covers the phytochemistry and health-promoting potentials of the plants against different ailments such as diabetes, hypertension, and microbial infections. Some of the mechanisms by which these plants exert their beneficial effects are also reported.

I thank Dr. Megh R. Goyal for his leadership qualities for inviting me to join his team. He is a world-renowned scientist and engineer with expertise in agricultural and biological engineering. Truly, he is a giver and a model for budding scientists. I am on the board to learn.

—Hafiz Ansar Rasul Suleria
Coeditor