

2023

## Preface : Fruit and Vegetable Waste Utilization and Sustainability

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### Recommended Citation

Mandavgane, Sachin A.; Chakravarty, Ipsita; and Jaiswal, Amit, "Preface : Fruit and Vegetable Waste Utilization and Sustainability" (2023). *Books/Book Chapters*. 24.

<https://arrow.tudublin.ie/tschafbkc/24>

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Funder: This research received no external funding

# Preface

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Fruits and vegetables are an important source of nutrition and a key element of a healthy balanced diet. Several organizations such as the World Health Organization (WHO), Food and Agriculture Organization of United Nations (FAO), and Food Health England suggest consuming more than 400 g of fruits and vegetables per day (roughly five portions per day) to improve overall health and reduce the risk of certain cardiovascular diseases and cancer; subsequently, consumption and production of fruits and vegetables are on the rise. The increased consumption/production of fruits and vegetables has resulted in huge quantities of waste (approximately 42% of the total food waste) such as pomace, seeds, stones, rind, skins, pods, and peels. This results in a huge environmental burden in relation to increased carbon footprint, greenhouse gas emissions, and global warming. Therefore, in the current situation valorization of agri-food industries wastes is important to address many economic, environmental, and social challenges associated with waste disposal. It would also help in promoting the circular economy aligned with the Sustainable Development Goals (SDGs), particularly with SDG 2 “End hunger” and SDG 12 “Sustainable Production and Consumption”.

The food sector needs to undergo important changes in the improved supply chains and food waste valorization to achieve global sustainability ambitions. Waste streams from the fruit and vegetable industry are rich in several biologically active compounds such as carotenoids, flavonoids, phenolic acids, and glucosinolates and cell wall components such as cellulose, hemicellulose, lignin, and pectin; therefore they have a huge potential for being turned into value-added products and have immense potential for the economic upliftment of the country. Meanwhile, the use of fossil fuel resources is considerably increasing global warming and eradicating seasonal climates. In an environmentally declining world, it is of paramount importance that preventative measures are put in place to reduce food waste and combat the reliance on non-renewable energy sources by developing new and

renewable sources. As a result, in recent years, several studies were carried out, while a significant number of researches are still in progress worldwide to explore the sustainable valorization of fruit and vegetable waste such as nutraceuticals, biofuels, and other biochemicals.

The book aims at compiling the recent developments and new achievements in the field of chemical and biochemical engineering to harness the potential of different kinds of fruit and vegetable biomass in one place. The advantages and limitations of different technologies are also discussed by considering the local energy demands, government policies, environmental impacts, and education in bioenergy where possible.

It is an ideal reference book for researchers and industry professionals working in the areas of food processing, food producers, policymakers and NGOs, environmental technologists, environmental engineers, and students studying environmental engineering, food science, and more. The book also includes information on the integration of processes and technologies for the conceptualization of biorefineries through proven studies.

The book has 16 chapters in total and is divided into three sections. Section 1 is dedicated to the valorization of fruit and vegetable wastes of numerous high-value products. Section 2 is focused on the techno-economic assessment of the fruit and vegetable biorefinery/valorization and covers aspects of environmental impact assessment through real-life examples of the life cycle assessment (of different processes available for fruit and waste valorization). Section 3 includes integrated biorefineries, policies, and case studies related to fruit and vegetable waste valorization. In this section, several chapters on integrated biorefineries, policy and regulatory framework, and case studies are included, which will enhance readers’ understanding of the topics.

We would like to greatly express our gratitude to all the experts and leaders from academia and research institutions who have provided state-of-the-art, valuable contributions to this book. This book would not have been possible without the remarkable effort of

you and your team. We are also thankful to Elsevier Academic Press for the successful production of this book. We would also like to acknowledge the Elsevier editorial team for their prompt assistance and advice throughout the project, particularly Ms Megan Ball, the executive editor, and Ms Emerald Li, Editorial Project Manager.

We hope this book will meet the expectation of its readers. Any comments and suggestions for the further improvement of the book will be highly appreciated.

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