

**VOLUME 1**

# ADVANCES IN FOOD SCIENCE AND TECHNOLOGY

**EDITED BY**

Visakh P. M., Sabu Thomas,  
Laura B. Iturriaga, and Pablo Daniel Ribotta

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# Advances in Food Science and Technology

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# Advances in Food Science and Technology

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## Preface

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*“Advances in Food Science and Technology”* summarizes many of the recent technical research accomplishments in the area of food science and technology, such as food security as a global problem, nanotechnology in food application, frozen food and technology food: production, properties & quality, trace element speciation in food, bionanocomposites for food packing application etc. It is written in a systematic and comprehensive manner and recent advances in the developments in food science area and food technologies are discussed here in detail. Therefore, the content of the current book is unique. It covers an up-to-date record on the major findings and observations in the field of food science and food technology and it is intended to serve as a “one stop” reference resource for important research accomplishments in this area. The various chapters in this book are contributed by prominent researchers from industry, academia and government/private research laboratories across the globe. This book will be a very valuable reference source for university and college faculties, professionals, post-doctoral research fellows, senior graduate students, food science technologists and researchers from R&D laboratories working in the area of food science.

The first chapter on food chemistry and technology gives an overview of the area of food science and technology such as food security a global problem, nanotechnology in food application, frozen food and technology food: production, properties & quality, trace element speciation in food, bionanocomposites for food packing application. This chapter is very essential for the beginners in these fields since it provides a basic yet thorough understanding of the food science field.

The following chapter provides an overview on food security as a global problem. The first part of this chapter reviews food security: definitions and basic concepts, main causes of food insecurity including social issues, economic issues, environmental issues and

later in the chapter, the authors explain the various aspects of the food insecurity dimension such as current situation at global level, financial and economic crisis and their implications on food security. Lastly, they look at food prices volatility, food sector numbers: trends in global food production and trade.

A survey on nanotechnology in food application is tackled in the third chapter. The authors concentrate on the importance of nanotechnology in food science, applications and also address some of the challenges. This chapter also brings out new innovative methods for food formulations and novel applications such as food packaging, enhanced barrier, active packaging, and intelligent packaging.

The fourth chapter on frozen food and technology comprises several subtopics. The first topic looks at pre-freezing treatments of different food products such as fruits, vegetables, fish, and meat products. In the another topic, the authors explain about the freezing methods and equipment such as freezing by contact with cold air, freezing by contact with cold liquid, freezing by contact with cold surfaces, cryogenic freezing and combination of freezing methods. The last section of this chapter, the authors explain the effect of freezing and frozen storage on food properties such as physical changes, chemical changes, microbiological aspects.

The following chapter on chemical and functional properties of food components provides the basic understanding of food components, nutritional value and sensory, post harvest storage and processing. This chapter gives an overview of functional and chemical properties of food components with some subtopics such as functional foods: historical perspective and definitions, legislation on functional food claims, classification of functional foods and functional properties of food components.

Another chapter examines the new aspects on food production, food properties and food quality. In this chapter the authors mainly focus on the food production factors such as, soil, climate, population, income and technology, plant source foods and animal source foods.

The following chapter is based on regulatory aspects of food ingredients in the United States with the focus on the safety of enzyme preparations used in food. The authors explain the various aspects such as regulatory history of food ingredients, scientific advancement as part of the regulatory history of enzyme preparations, safety evaluation of enzyme preparations, identity of the enzyme and manufacturing process and composition.

In the chapter on trace element speciation in food, the authors discuss the implications of toxic elements such as arsenic, mercury, tin, chromium, cadmium on speciation for food safety. Elements such as selenium iron, cobalt, zinc, impact on the nutritional value of food are also discussed. Moreover, the authors examine the analytical methods for food elemental speciation analysis, species separation and species detection.

The book concludes with a chapter on bionanocomposites for natural food packing which discusses the natural biopolymer-based films such as polysaccharide films and protein films. Sections are given over to the modification of film properties such as natural nanoreinforcements, cellulose-based nanoreinforcements, starch nanocrystals/starch nanoparticles, chitin/chitosan nanoparticles, plant-protein nanoparticle, plasticizers, clays and active agents. The chapter concludes with a section on the environmental impact of bionanocomposites materials, their safety and toxicology, biodegradability and compostability.

The editors of this unique volume would like to express their sincere gratitude to all the contributors of this book, who made excellent support to the successful completion of this venture. We are grateful to them for the commitment and the sincerity they have shown towards their contributions in the book. Without their enthusiasm and support, the compilation of this book could not have been realized. We would like to thank all the reviewers who have taken their valuable time to make critical comments on each chapter. We also thank the publisher Scrivener-Wiley for recognizing the demand for such a book, and for realizing the increasing importance of the area of food science and technology.

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January 1, 2013



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