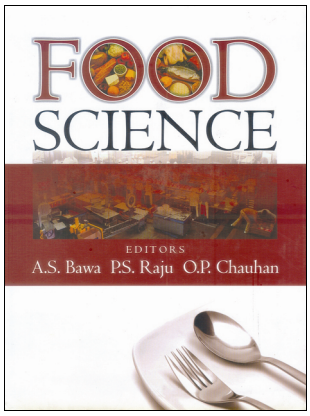

Food Science. A. S. Bawa, P. S. Raju and O. P. Chauhan (eds). New India Publishing Agency, Pitampura, New Delhi. 2013. 384 pp. Price: Rs 2450.

Food science is a multi-disciplinary subject involving various modules such as biology, physical sciences, chemical engineering, biochemistry, mathematics, etc. The main aim of this subject is to provide a better understanding of food processes and to ultimately improve food products for global population. The steady rise in world population, which is projected to reach nine billion by 2050, demands a proper dietary supply to all and the advents in food science appear promising in serving nutritional and hygienic food. The advancements in science and technology have generated adequate awareness among the public regarding food processing techniques, and the food science field has gained momentum in recent times. Improvements in any field of science and technology should be made available to the researchers and end-users through publications, where edited books play a pivotal role in compiling the information in a single booklet, which could be of immense use for research and in industry. Books also serve as source material and knowledge bank for students who would be future subject experts in the respective fields. Though there are many books available on the subject of food science, I appreciate the editors and authors for their collaborative effort to bring about a comprehensive book of international standard, covering all aspects of food science, including technologies for processing and preserving food, and the laws and regulations associated with it.

The first chapter of the book introduces the readers to food science, by providing a glimpse of the history, which is followed by a summary on advancements made in the subject. Chapter 2 on unit operations in food processing provides a detailed description of operations and related procedures in the food industry such as cleaning, separating, material handling, etc. Though the author gives an exhaustive note on all the aspects related to unit operations right from cleaning to packaging, it would have been much better if a flowchart depicting the unit operation pipeline was provided for an easy understanding. Chapter 3 deals with thermal processing of foods, where the author describes the techniques, concepts and kinetics involved in this aspect. Both the theory and practical application of various techniques in thermal processing are exciting to read. Hurdle technology in food preservation is summarized in chapter 4, in which the authors provide the concept and design of this technology along with the bottlenecks associated with it. Further, they also show the application of hurdle technology of all the important food products. Chapter 5 gives details on preserving foods at low temperatures. It categorically explains the historical developments made in low-temperature preservation, mechanical refrigerators, methods of cooling, and refrigeration of various food products. This chapter is written in a lucid manner, that even a layman can understand the details of low-temperature storage. In particular, the information provided in this chapter would also be more useful in storing food materials in regular day-to-day activities in every household. It would have been more stimulating if the author had shown a cold-chain pipeline from area of production (say, field or farm) to the end-user, which is more important for a developing nation like India, where large tonnages of food material are being wasted due to improper storage and handling.

Chapter 6 describes the separation and filtration processes. Here, the author has explained types and kinetics of the processes. Although the chapter provides all details related to the different types of techniques used for separation and filtration, I could not find any information on the choice of process for a given food material. Irrespective of this drawback, the chapter is well-written with informative tables and figures. Chapters 7 and 8, dehydration and freezing preservation of foods elucidate the different dehydration and freezing systems used in food industry. Both the chapters are full of mathematical equations explaining kinetics of dehydration and freezing processes, which may be interesting and useful for subject experts and students. However, in chapter 7, I could not find any description on how the dehydration process could be fine-tuned to retain the nutrition value of food materials. In chapter 8, the authors could have removed redundancies in the information already provided in chapter 5. Chapter 9 is all about food irradiation, which depicts the importance of using ionization radiation for sterilizing foods that would help in long-term storage and maintaining hygiene. The types, sources and effects of radiation along with their applications are detailed in this chapter. Immediately upon reading the title of this chapter, one could question the impact of radiation on food safety. But reading the complete chapter provides answers to all the questions on food safety. The authors have even described the impact of radiation on food components like lipids, proteins, etc. It should be appreciated that the chapter is written in an unbiased way explaining both the merits and demerits of irradiation technology. The authors have invested some efforts to bring awareness on RADURA logo, but in my opinion, it is not possible to track this while having food in eateries, as this is a growing trend nowadays.

Chapter 10 is on infrared and microwave processing of foods, which is deemed to be more convenient in preserving food due to reduced heating time, uniform heating, reduced quality losses, versatile, simple and compact equipment, and significant energy-saving. The chapter aims all the above, but it is still incomplete, as there is no information provided on integration of infrared and microwave processing technologies with other mature processing operations such as blanching, dehydration, freeze–dehydration, thawing, roasting, baking and cooking, which are emerging as innovative processing options. Chapter 11 deals with minimal processing (MP) of fruits and vegetables. It substantiates how MP renders reasonable shelf life for fruits and vegetables which are perishable and require chilled storage. Though conventional processing methods extend the shelf life of fruits and vegetables longer than MP products, the chapter provides a comprehensive note on types, advantages, effects, safety aspects and legal

issues associated with MP techniques. Recently, it has been realized that the use of combined preservation techniques is more reliable and versatile, such as combining MP with photochemical processes, other physical and chemical treatments, etc. for ensuring a longer shelf life of fruits and vegetables. The concerned chapter however has failed to provide a note on it.

Chapter 12 gives a brief summary on fermentation preservation of foods. Being an effective technique used in extending the shelf life of foods for millennia, the chapter should have commenced with a historical note. When historians report that cheese was produced in 6000 BC itself (in Iraq), it would have been more interesting to the readers if a timeline of similar events that have occurred in history related to fermentation was provided. Further, the chapter is incomplete as several prime topics are left uncovered. For example, the author has described only the lacto-fermentation, where details of bacteriocins such as nicins, lacticin, etc. are not discussed. In my opinion, in the post-genomic age of microbiology, this chapter could have been written better covering all the information pertaining to fermentation preservation for improving the safety, quality and composition of food products. Chapter 13 on packaging of food products elaborates the importance of packaging along with its associated aspects such as packaging materials, tactics, requirements, etc. All these modules have adequately been described, providing a good amount of exposure to the readers who are unaware of the role of packaging in maintaining hygiene of food materials. Chapter 14 summarizes the non-thermal methods of food preservation. Different non-thermal methods such as high pressure, pulsed electric field, oscillating magnetic field, ultrasound, pulsed light and ozonation-mediated processing are detailed in the chapter. For reasons unknown, much emphasis is given to high-pressure processing, whereas other techniques are only briefly summarized. The use of non-thermal processes in combination with other preservation technologies presents a number of potential benefits to food preservation, but this aspect has not been discussed anywhere in the chapter.

Chapter 15 on functional foods describes the nutraceutical aspects of food materials along with the different methods available for processing and preserving these foods. I enjoyed reading this chapter in particular, as it discusses a completely new aspect in an interesting way. In my opinion, this chapter would serve as an important resource material not only for those who are associated with food sciences, but also provides preliminary leads to researchers who are working in nutritional genomics. Food laws and regulations are defined in chapter 16, which discusses the national and international food laws and regulatory systems. More emphasis has been given to Indian food laws, but equal importance should have been provided to international laws too, as this would help the readers have a comparative understanding on national and international laws related to food safety.

Taken together, the book under review is a quality output from subject experts from various Indian and international institutes and organizations. It is well organized and the choice of paper for printing and binding is worth appreciating. The only drawback is with the printing, which appears like a photocopy. The editors could have encouraged the authors to provide actual photographs in support of their essays, e.g. photographs of actual food processing machinery, types of packed foods, etc. Lack of coloured illustrations is also another shortcoming. Regardless, this book is an excellent contribution to the area of food science and technology.

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Annual Review of Cell and Developmental Biology, 2013. Randy Schekman, Larry Goldstein and Ruth Lehmann (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, CA 943030-0139, USA. Vol. 29. 651 pp. Price: US$ 97.00.

This volume begins with an interesting and thought-provoking introduction. Rather than describing the contents in the *Annual Reviews*, the editors discuss the sociology of publications. More specifically, the tendency of scientists to publish in competitive or 'high impact factor' journals is debated. The unfortunate scenario where many review committees and academic institutions favour candidates who publish in 'prestigious journals', based on impact factors (IFs) and personal cash incentives for publishing in high IF journals is highlighted. In response to the flawed manner in which IF is used to judge scientific merit, recommendations of San Francisco Declaration of Research Assessment are prominently discussed. At the end, the modus operandi for submission and evaluation of reviews in the *Annual Review of Cell and Developmental Biology* is detailed.

Ten of the 22 reviews are related to developmental biology. This is my classification and not implied or attempted by the editors. The topics are varied and newer aspects and perspectives are outlined in areas that have been subject of extensive investigations for more than two decades. The reviews related to development include: (1) Molecular and cellular processes involved in body axis formation and patterning with focus on chicken embryo as a model system. The authors Bénazéraf and Pourquié review aspects of gastrulation and formation of the anterior part of the body axis, extension of axis and formation of posterior body and regulation of segment number and axis length. Although the topics covered in the review have been the subject of extensive investigation for several years, several questions remain to be answered, as indicated by the authors in the various sections and conclusions. How physics may be integrated into the field of morphogenesis is also refered to in the concluding section. Findings in other embryonic model systems have been discussed with respect to convergence and divergence of specific developmental mechanisms. (2) The central role that physical forces and extracellular matrix mechanisms play in various aspects of embryonic development. Mammoto *et al*. in the review entitled 'Mechanobiology and developmental control', discuss control of cell-fate switching pattern formation and tissue development in the embryo. The review also details how these mechanical signals contribute to tissue homeostasis and developmental control throughout adult life. In the concluding section, the