

Book reviews

Introduction to Food Engineering, 2nd Edition. By R. Paul Singh and Dennis R. Heldman. Academic Press Inc., London, 1993. xi + 499 pp. ISBN 0-12-646381-6. Price: £42.00.

This is the second edition of a work first published in 1984 and widely used throughout the world as a textbook for undergraduate and postgraduate students studying food science/technology/engineering. It is comprised of twelve chapters and seven appendices. In the introductory Chapter 1 dimensions, units, properties and laws of thermodynamics are covered. Fluid flow, including a new section on pumps, is covered in Chapter 2. Chapter 3 entitled energy for food processing, deals with generation of steam, fuel and electric power utilization. Chapter 4 covers steady-state and unsteady-state heat transfer, and includes a new section on microwave heating. Chapters 5 and 6 are new to this second edition. Chapter 5 is concerned with thermal processing and process calculation. Chapter 6 deals with aseptic processing, including mathematical treatment of heat transfer and residence time distribution. Refrigeration, food freezing, evaporation and psychrometrics are the subjects treated in the next four chapters. Chapter 11 is entitled mass transfer and is also new to this second edition. The diffusion process, membrane separation systems and permeability characteristics of packaging materials are included in this chapter. Chapter 12 covers food dehydration. The appendices are entitled, in sequence: SI system of units and conversion factors; physical properties of foods; physical properties of nonfood materials; physical properties of water and air; a psychrometric chart; pressure-enthalpy data and symbols for use in drawing food engineering process equipment. The information contained in the appendices is very useful and is an important feature of the book. All the chapters contain worked examples, including many that involve the use of spreadsheet programmes, problems for the reader to solve and a list of references. The figures are well drawn and helpful. There is also an extensive index.

The second edition of this book, with its extended coverage, is an excellent text to prepare students for the more applied aspects of food processing/engineering which they will study in the later stages of their courses. Of course, one can always think of additional topics that might be included in a book of this type such as: the principles of process control, irradiation, kinetics of reactions in foods. However, as it stands the coverage is quite comprehensive. It is very likely that it will continue to be used by academics and students in

departments of food science and technology in many countries worldwide.

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Food Packaging: Principles and Practice. By Gordon L. Robertson. Marcel Dekker Inc., New York, 1993. xx + 676 pp. ISBN 0-8247-8749-8. Price: \$165.00.

Following a brief introductory Chapter 1, Chapters 2–9 cover packaging materials and containers including plastic polymers, paper and paper-based materials, metals and glass. Of particular interest are Chapter 4 on permeability of polymers and Chapter 8 on corrosion of metal packaging materials. Chapter 10 covers deteriorative reactions in foods including enzymic, chemical, physical and biological changes; rates of reaction and factors affecting those rates. In Chapter 11 methods of food preservation are briefly outlined including fermentation, heat processing, irradiation, chilling, freezing, concentration, drying and the use of preservatives. Chapter 12 is entitled shelf life of foods and includes definitions of shelf life, factors controlling shelf life, shelf life testing and shelf life devices such as biochemical, chemical and electronic time-temperature indicators. Chapters 13 and 14 cover aseptic packaging and packaging of microwavable foods, respectively, both topics of current interest. The packaging requirements and current packaging practices for different groups of foods are discussed in Chapters 15–19. These groups are, in sequence flesh foods, horticultural products, dairy products, cereal and snack foods and beverages. The final chapter deals with safety and legislative aspects of packaging. Current and imminent regulations in the USA and Europe are discussed. This is a rapidly changing field but the treatment here gives a good base to update as new laws are introduced. Migration from plastic packaging and models for the same are covered. Problems associated with monomers, plasticizers, antioxidants, odours and taints are discussed. Safety concerns about metal, paper and glass packaging are outlined.

The book is written in a very readable style. A reference list is included at the end of each chapter. It is well indexed. There are relatively few diagrams for a book of this size, but those that are included are clear and helpful. There have been a number of good books on this topic published in the last few years. However, this is the most comprehensive treatment of which this reviewer is aware of. Of course, there are some aspects of the topic that could have received more attention.

There is little or no discussion of filling equipment or form-fill-seal systems. There are only passing references to the environmental implications of packaging, disposal recycling, etc. The author has achieved a good balance between the food-related aspects on the one hand and the packaging-related topics on the other.

The book should be of equal interest to food scientists and technologists working in academia and industry and to packaging technologists and engineers involved in teaching, research and development or in customer services.

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