

1. Record Nr.	UNINA9910830641203321
Titolo	Innovative food processing technologies [[electronic resource]] : advances in multiphysics simulation / / Kai Knoerzer ... [et al.], editors
Pubbl/distr/stampa	Chichester, West Sussex, UK ; ; Ames, Iowa, : Wiley-Blackwell/IFT Press, 2011
ISBN	0-470-95942-8 1-62198-225-4 1-283-05236-9 9786613052360 0-470-95941-X 0-470-95943-6
Descrizione fisica	1 online resource (1078 p.)
Collana	IFT Press series
Classificazione	TEC012000
Altri autori (Persone)	KnoerzerKai
Disciplina	664.020113 664/.020113
Soggetti	Food industry and trade - Mathematical models Food industry and trade - Simulation methods
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Half title page; IFT Press; Title page; Copyright page; Titles in the IFT Press series; Preface; Contributors; 1.1. Introduction; 1.2. Multiphysics Modeling; 1.3. Innovative Food Processing Technologies; 1.4. Modeling Challenges; 1.5. Concluding Remarks; Chapter 1 Introduction to Innovative Food Processing Technologies: Background, Advantages, Issues, and Need for Multiphysics Modeling; 2.1. Introduction; 2.2. Definitions and Methods to Determine Thermophysical Properties; 2.3. Final Remarks and Future Recommendations; Notations Chapter 2 The Need for Thermophysical Properties in Simulating Emerging Food Processing Technologies3.1. Brief History of NNs; 3.2. Basis of NNs; 3.3. How NNs Are Helping the Chemical Industry; 3.4. The Role of NNs in the Food Industry; 3.5. NNs in High-Pressure Processes; 3.6. A Macroscopic Model for Thermal Exchange in an HPP System; 3.7. Conclusions; Acknowledgments; Notation; Chapter 3 Neural Networks:

Their Role in High-Pressure Processing; 4.1. Introduction; 4.2. Thermofluiddynamic Phenomena under High-Pressure Conditions
4.3. Mathematical Modeling and Numerical Simulation of High-Pressure Processes
4.4. Prediction of Process Impact and Control of High-Pressure Treatment; 4.5. Conclusions and Outlook; Acknowledgment; Notation; Chapter 4 Computational Fluid Dynamics Applied in High-Pressure Processing Scale-Up; 5.1. Introduction; 5.2. Description of an HPHT Processing System; 5.3. Developing a CFD Model for an HPHT System; 5.4. Prediction of Temperature Uniformity and Flow by Means of CFD Modeling; 5.5. Distribution of Process Sterility by Coupling with Kinetic *C. botulinum* Inactivation Models
5.6. Dimensionless Parameters to Express the Process Performance
5.7. Overview and Future Challenges; Notation; Chapter 5 Computational Fluid Dynamics Applied in High-Pressure High-Temperature Processes: Spore Inactivation Distribution and Process Optimization; 6.1. Introduction; 6.2. EM Wave Equations; 6.3. Solutions to Maxwell's Equations; 6.4. MW Heating Equations; 6.5. Computer Simulation of MW Heating; 6.6. Simulation Model for MW Sterilization; 6.7. Conclusion; Notation; Chapter 6 Computer Simulation for Microwave Heating; 7.1. Introduction; 7.2. Microwave Thermal Modeling
7.3. Temperature Measurement (Mapping) Methods in Microwave Fields
7.4. Examples of Validated Microwave Heating Models; 7.5. Summary, Conclusions, and Outlook; Notation; Chapter 7 Simulating and Measuring Transient Three-Dimensional Temperature Distributions in Microwave Processing; 8.1. Introduction; 8.2. Electrical Heating of Foods: Governing Processes; 8.3. Modeling and Validation; 8.4. Further Development of Ohmic Heating and Appropriate Modeling; 8.5. Conclusions; Notation; Chapter 8 Multiphysics Modeling of Ohmic Heating; 9.1. Introduction
9.2. Governing Equations for Multiphysics Simulation of PEF Processing

Sommario/riassunto

Part of the IFT (Institute of Food Technologists) series, this book discusses multiphysics modeling and its application in the development, optimization, and scale-up of emerging food processing technologies. The book covers recent research outcomes to demonstrate process efficiency and the impact on scalability, safety, and quality, and technologies including High Pressure Processing, High Pressure Thermal Sterilization, Radiofrequency, Ultrasound, Ultraviolet, and Pulsed Electric Fields Processing. Ideal for food and process engineers, food technologists, equipment designers, microbiologists
