

# **Fundamentals of Food Process Engineering**

Third Edition

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# **Fundamentals of Food Process Engineering**

Third Edition

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# Preface

Since the publication of the first edition in 1981 and the second edition in 2001, this textbook has been widely adopted for Food Engineering courses worldwide. The author expresses his gratitude to colleagues who have adopted this textbook and to those who have made constructive criticisms on the material. This new edition not only incorporates changes suggested by colleagues, but additional material has been added to include facilitated problem solving using a computer, and new food processing and food product technologies. New sections have been added in most of the chapters reflecting the current state of the technology. The expanded coverage may result in not enough time available in a school term to cover all areas; therefore, instructors are advised to carefully peruse the book and select the most appropriate sections to cover in a school term. The advantage of the expanded coverage is the elimination of the need for a supplementary textbook.

The success of this textbook has been attributed to the expansive coverage of subject areas specified in the Institute of Food Technologists model curriculum for food science majors in the United States of America and the use of examples utilizing conditions encountered in actual food processing operations. This theme continues in the third edition. In addition to the emphasis on problem solving, technological principles that form the basis for a process are presented so that the process can be better understood and selection of processing parameters to maximize product quality and safety can be made more effective. The third edition incorporates most of what was in the second edition with most of the material updated to include the use of computers in problem solving. Use of the spreadsheet and macros such as the determinant for solving simultaneous linear equations, the solver function, and programming in Visual BASIC are used throughout the book. The manual problem-solving approach has not been abandoned in favor of the computer approach. Thus, users can still apply the concepts to better understand a process rather than just mechanically entering inputs into a pre-programmed algorithm.

Entirely new sections include enthalpy change calculations in freezing based on the freezing point depression, evaporative cooling, interpretation of pump performance curves, determination of shape factors in heat exchange by radiation, unsteady-state heat transfer, kinetic data for thermal degradation of foods during thermal processing, pasteurization parameters for shelf-stable high-acid foods and long-life refrigerated low-acid foods, high-pressure processing of fluid and packaged foods, concentration of juices, environmentally friendly refrigerants, modified atmosphere packaging of produce, sorption equations for water activity of solid foods, the osmotic pressure and water activity relationships, vacuum dehydration, new membranes commercially available for food processing and waste treatment, and supercritical fluid extraction.

This edition contains much new hard-to-find data needed to conduct food process engineering calculations and will be very useful as a sourcebook of data and calculation techniques for practicing food engineers.

Athens, Georgia

Romeo T. Toledo

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