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Preface

A food property is a particular measure of the food's behavior as a matter or its behavior with respect to energy, or its interaction with the human senses, or its efficacy in promoting human health and well-being. An understanding of food properties is essential for scientists and engineers who have to solve the problems in food preservation, processing, storage, marketing, consumption, and even after consumption. Current methods of food processing and preservation require accurate data on food properties; simple, accurate, and low-cost measurement techniques; prediction models based on fundamentals; and links between different properties. The first edition was well received, secured bestseller from the publisher, and received an award. Appreciation from scientists, academics, and industry professionals around the globe encouraged me to produce an updated version. This edition has been expanded with the addition of some new chapters and by updating the contents of the first edition. The seven chapters in the first edition have now been expanded to 24 chapters.

In this edition, the definition of the terminology and measurement techniques are clearly presented. The theory behind the measurement techniques is described with the applications and limitations of the methods. Also, the sources of errors in measurement techniques are compiled. A compilation of the experimental data from the literature is presented in graphical or tabular form, which would be very useful for food engineers and scientists. Models can reduce the number of experiments, thereby reducing time and expenses of measurements. The empirical and theoretical prediction models are compiled for different foods with processing conditions. The applications of the properties are also described, mentioning where and how to use the data and models in food processing.

Chapter 1 provides an overview of food properties including its definition, classification, and predictions. Chapters 2 through 4 present water activity and sorption isotherm including its terminology, measurement techniques, data for different foods, and its prediction models. Chapters 5 through 12 present thermodynamic and structural characteristics including freezing point, glass transition, gelatinization, crystallization, collapse, stickiness, ice content, and state diagram. Chapters 13 through 15 discuss the density, porosity, shrinkage, size, and shape of foods. Chapters 15 through 23 present the thermophysical properties including specific heat, enthalpy, thermal conductivity, thermal diffusivity, and heat transfer coefficient. Chapter 24 provides the acoustic properties of foods.

This second edition will be an invaluable resource for practicing and research food technologists, engineers, and scientists, and a valuable text for upper-level undergraduate and graduate students in food, agriculture/biological science, and engineering. Writing such a book is a challenge, and any comments to assist in future compilations will be appreciated. Any errors that remain are entirely mine. I am confident that this edition will prove to be interesting, informative, and enlightening.

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Acknowledgments

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Editor

Mohammad Shafiur Rahman is an associate professor at the Sultan Qaboos University, Sultanate of Oman. He has authored or coauthored more than 200 technical articles including 81 refereed journal papers, 71 conference papers, 40 book chapters, 33 reports, 8 popular articles, and 4 books. He is the editor of the internationally acclaimed *Handbook of Food Preservation* published by CRC Press, Boca Raton, Florida. The first edition was one of the bestsellers from CRC Press in 2003, and the second edition is now released. He was invited to serve as one of the associate editors for the *Handbook of Food Science, Engineering and Technology*, and one of the editors for the *Handbook of Food and Bioprocess Modeling Techniques* published by CRC Press, Boca Raton, Florida. Dr. Rahman has initiated the *International Journal of Food Properties* (Marcel Dekker, Inc.) and has served as the founding editor for more than 10 years. He is a member in the Food Engineering Series editorial board of Springer Science, New York. Presently, he is serving as a section editor for the Sultan Qaboos University journal *Agricultural Sciences*. In 1998, he was invited to serve as a food science adviser for the International Foundation for Science (IFS) in Sweden.

Dr. Rahman is a professional member of the New Zealand Institute of Food Science and Technology and the Institute of Food Technologists; a member of the American Society of Agricultural Engineers and the American Institute of Chemical Engineers; and a member of the executive committee for International Society of Food Engineering (ISFE). He received his BSc Eng (chemical) (1983) and MSc Eng (chemical) (1984) from Bangladesh University of Engineering and Technology, Dhaka; his MSc (1985) in food engineering from Leeds University, England; and his PhD (1992) in food engineering from the University of New South Wales, Sydney, Australia. Dr. Rahman has received numerous awards and fellowships in recognition of research/teaching achievements, including the HortResearch Chairman's Award, the Bilateral Research Activities Program (BRAP) Award, CAMS Outstanding Researcher Award 2003, SQU Distinction in Research Award 2008, and the British Council Fellowship. He has ranked four as a leading scientists and engineers of 57 OIC member states in Agrosciences discipline.

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