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Definition water activity. Typical sorption isotherms. Use of the moisture sorption isotherm. Determination of moisture sorption isotherms Drawing the isotherms.

This manual explains water activity in foods and shows why commonly held ideas about free and bound water are often inaccurate. It demonstrates how moisture sorption isotherms are created and how they are used to solve real-world problems such as the change in rate of moisture gain for individual packaged products over time, or the amount of sugar needed to lower the water activity of a product to make it shelf stable.The authors emphasize the physical chemistry of water in biological systems. For every equation provided they furnish examples from practical experience. These examples will help food scientists understand thermodynamics (equilibrium processes and water activity), dynamics (rate processes such as mass transfer of moisture between ingredients), and structure (weeping, swelling, droplets, and edible barriers). Using this manual will help solve product development problems and improve the quality of the foods brought to the market.

This book provides a fundamental understanding of physical properties of foods. It is the first textbook in this area and combines engineering concepts and physical chemistry. Basic definitions and principles of physical properties are discussed as well as the importance of physical properties in the food industry and measurement methods. In addition, recent studies in physical properties are summarized. The material presented is helpful for students to understand the relationship between physical and functional properties of raw, semi-finished, and processed food in order to obtain products with desired shelf-life and quality.

Dramatically restructured, more than double in size, the second edition of the Food Properties Handbook has been expanded from seven to 24 chapters. In the more than ten years since the publication of the internationally acclaimed and bestselling first edition, many changes have taken place in the approaches used to solve problems in food preservation, processing, storage, marketing, consumption, and even after consumption. Incorporating changes too numerous to list, this updated edition provides new measurement techniques, basic data compiled for diversified food groups, worked-out examples, and detailed graphs and illustrations. Explores Empirical and Theoretical Prediction Models The book clearly defines the terminology and elucidates the theory behind the measurement techniques, including applications and limitations of each method. It includes data on sources of error in measurement techniques and experimental data from the literature in graphical or tabular form. The volume also elucidates empirical and theoretical prediction models for different foods with processing conditions, descriptions of the applications of the properties, and coverage of where and how to use the data and models in food processing. User-Friendly Format Puts the Latest Information within Easy Reach Still under the aegis of Shafir Rahman, the new edition is now an edited volume, benefitting from the input and expertise of numerous contributors spanning both the globe and the many disciplines that influence the field. Presented in a user-friendly format, the second edition remains the definitive, and arguably the only, source for data on physical, thermal, thermodynamic, structural, and acoustic properties of foods.

This book presents a comprehensive review of the characteristics of bound water and its use in food processing. The significance of bound water in food is discussed in terms of quality, energy consumption and cost. Also included is a thorough discussion on the emerging and appropriate measuring techniques of bound water in food materials. The challenges involved with bound water measurement and strategies for bound water removal during processing are covered in order to establish the appropriate conditions for food preservation. This work presents researchers with a clear, up-to-date concept of bound water and its significance in food processing and preservation. Despite the importance of bound water in food processing, there are limited resources for researchers seeking an in-depth understanding of bound water in food materials. This is the first reference work dedicated to discussing the details of bound water in food materials and its significance in food processes and preservation, from its special characteristics to its energy consumption to its measurement and techniques. State of Bound Water: Measurement and significance in food processing is a singular work in the field of food preservation and processing arena.

The Handbook of Research on Food Processing and Preservation Technologies is a rich 5-volume collection that illustrates various design, development, and applications of novel and innovative strategies for food processing and preservation. The roles and applications of minimal processing techniques (such as ozone treatment, vacuum drying, osmotic dehydration, dense phase carbon dioxide treatment, pulsed electric field, and high-pressure assisted freezing) are discussed, along with a wide range of other applications. The handbook also explores some exciting computer-aided techniques emerging in the food processing sector, such as robotics, radio frequency identification (RFID), three-dimensional food printing, artificial intelligence, etc. Some emphasis has also been given on nondestructive quality evaluation techniques (such as image processing, terahertz spectroscopy imaging technique, near infrared, Fourier transform infrared spectroscopy technique, etc.) for food quality and safety evaluation. The significant roles of food properties in the design of specific foods and edible films have been elucidated as well. Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques of the multi-volume set reports on a number of applications of computer-aided techniques for quality evaluation and to secure food quality. The chapter authors present emerging nonthermal approaches for food processing and preservation including a detailed discussion on color measurement techniques, RFID, 3D-food printing, potential of robotics, artificial intelligence, terahertz spectroscopy imaging technique, instrumentation techniques and transducers, food labeling as marketing and quality assurance tool, detection of pesticides, mathematical simulation of moisture sorption in food products, numerical methods and modeling techniques, concept of phase change materials, and dielectric properties of animal source foods. Other volumes in the set include: Volume 1: Nonthermal and Innovative Food Processing Methods Volume 2: Nonthermal Food Preservation and Novel Processing Strategies Volume 3: Computer-Aided Food Processing and Quality Evaluation Techniques Volume 4: Design and Development of Specific Foods, Packaging Systems, and Food Safety Volume 5: Emerging Techniques for Food Processing, Quality, and Safety Assurance Along with the other volumes, Handbook of Research on Food Processing and Preservation Technologies provides an abundance of valuable information and will be an excellent reference for researchers, scientists, students, growers, traders, processors, industries, and others.

A guide to the major food drying techniques and equipment. It features technologies for meats, fruits, vegetables, and seafood. It covers microbial issues and safety. It includes designs for drying systems and manufacturing lines, and information on microbial safety, preservation, and packaging.

Water Activity in Foods: Fundamentals and Applications is a one-of-a-kind reference text that brings together an international group of food scientists, chemists, and engineers to present a broad but thorough coverage of an important factor known to influence the attributes of foods – water activity. A team of experienced editors designed this book for lasting value as a sound introduction to the concept of water activity for neophytes and seasoned professionals in both academe and industry. Topics have been carefully selected to provide a comprehensive understanding of the mechanisms by which water activity influences the quality, shelf life, and safety of food products. Water Activity in Foods belongs on the shelves of all food science professionals for use in product development, quality control, and food safety. Students and newcomers to these areas will appreciate the instructional approach adopted by the experienced teachers and industry specialists who have contributed chapters to this comprehensive overview.

Water Stress Management contains the invited lectures and selected oral and poster presentations of the 11th International Symposium on the Properties of Water (ISOPOW), which was held in Queretaro, Mexico 5-9 September 2010. The text provides a holistic description and discussion of state-of-the-art topics on the role of water in Biological, Chemical, Pharmaceutical and Food systems within a frame of an integrated approach and future trends on the subject. Different points-of-view about the state of water and phase transitions in a variety of substrates are presented. ISOPOW is a non-profit scientific organization whose activities aim at progressing the understanding of the properties of water in food and related biological systems and the exploitation of this understanding in improved raw materials, products and processes in the food, agro food or related industries. The first Symposium was organized in Glasgow, Scotland in 1974. Since then, ISOPOW meetings have promoted the exchange of knowledge between scientists involved in the study of food materials and scientists interested in water from a more basic point of view and the dialogue between academic and industrial scientists/technologists.

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