

# **Book Review: Food Drying Technologies for High Efficiency and Fine Quality**

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High efficiency in terms of energy saving and product throughput, and high quality in the manufactured products are the most important aspects in contemporary research and development projects being undertaken in food drying. The motivations for innovating highly efficient and energy saving technologies have arisen from long drying time, high operating costs and limited worldwide energy resources. Drying processes are commonly and extensively used in daily life, and about 15% of the total energy used by industries in developed countries is applied in such processes. Therefore, improving efficiencies of drying processes including energy and product throughput, reducing the amount of heat input, and adopting new sources of energies for food drying require to be researched with priority. Dielectric heating (microwave, radio frequency and infrared) is an enormously promising technology for food drying. It has proven to shorten drying time and save energy; however, nonuniformity of heating and hence drying is a key question affecting its much broader commercial application. In addition, the quality of dried food materials is proven to be related to the entire

production process that includes unit operations such as pretreatment, drying, packaging, storage and rehydration. In this context, the book *Food Drying Technologies for High Efficiency and Fine Quality* provides a comprehensive overview of all the important processing aspects mentioned above.

New research findings introduced in this book were derived from various projects carried out under the auspices of national high technology research and development program (863). Various projects under this program were supported by the Chinese government during 11<sup>th</sup> and 12<sup>th</sup> five-year plans. These projects included research on various drying technologies and design and development of energy efficient drying equipment. These pieces of equipment combined novel thermal technologies with traditional convection and/or conduction based thermal technologies. Overall, these nationally funded projects supported research at Authors' laboratory aimed at developing technologies and equipment which are highly efficient in terms of energy input and product throughput and produce highly desirable fine quality products.

This book contains six chapters all of which are highly comprehensive. The first chapter provides an overview of food drying technologies and the food quality regulation, control and assurance. The second chapter introduces some new technologies and associated fundamental sciences applied to quality regulation and control. This

chapter is organized in the order of pretreatment, drying, packaging, storage and rehydration processes. The third chapter presents how best to build quality assurance and control systems for dried food products. The fourth chapter discusses the selection of highly efficient food drying systems in terms of energy saving and product recovery together with quality regulation and control. The typical and prominent novel food drying technologies and quality control mechanisms are nicely illustrated in chapters 5 and 6, respectively. The authors have admirably discussed how best to improve drying uniformity at the same time increasing drying efficiency and reducing energy consumption.

Compared with other books in this area, this book emphasizes integration of concepts of many other disciplines such as mechanical engineering, food processing, dielectric heating and provides good examples of cross disciplinary research. The authors have attempted to establish a new concept of quality regulation and control specific to food drying by holistically including raw material pretreatment, drying, backing, preservation, and rehydration. By doing so, this book breaks the traditional boundaries between disciplines, expands perspectives and scope. On the structural or organizational aspect, this book uses "two combinations", namely combination of theoretical aspects with specific research methods, and combination of processing technologies and mechanistic understanding to quality control and assurance systems.

This book is culmination of the authors' about 15 years of continuous research and innovation, from ideas to real-life application. This book bears fingerprint of more than 15 years of collaboration between Professor Arun Mujumdar and Professor Min Zhang and his group in Jiangnan University. During these 15 long years, the authors undertook many challenging research projects mentioned above aimed at developing highly efficient and energy saving technologies including hybridization of novel technologies with traditional ones. All of the examples or cases provided in this book come from collaborative research projects undertaken with industry partners. The outcomes of these research projects have also enabled Chinese food drying industry to become globally competitive. Therefore, this book has been listed as a key publication outcome of 12<sup>th</sup> five-year plan in China.

The authors have succeeded in systematically combining nutritional aspects of foods with processing and engineering aspects. There are many examples in books where the authors introduce innovations carried out for the first time. These innovative ideas can be adopted and implemented by engineers and developers who are actively involved in drying of food materials.

I am pleased to recommend this book to institutional and individual libraries collecting text and reference books in food science, food technology and food engineering. This book is suitable as a text book

and/or reference book for undergraduate as well as postgraduate levels.

This book will be highly valuable as a reference book for food scientists and engineers working in industry and R&D organizations.

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