

Preface

High-pressure processing (HPP) of food, one of the most successful nonthermal technologies, has been adopted by the food industry because of the number of advantages it offers to some conventional methods of preservation. The high demand for minimally processed foods, but at the same time very safe, makes this technology appropriate for a number of applications. HPP could replace or partially replace well-accepted technologies because it offers the opportunity for the development of new products and it might bring an alternative to address processing issues not yet resolved.

The possibility to use HPP to treat foods is not new, but applications at industrial scale are fairly recent. Some of the pioneering research on high pressure in food processing has been reported by Hite (1899) and Bridgman (1912). However, it took nearly 80 years for the food industry to embrace high-pressure processing as a viable food manufacturing technology for preserving a variety of value-added products of excellent quality and very safe from a microbiological point of view. HPP offers the possibility to have mildly processed, wholesome, convenient, fresh-tasting foods with minimal to no preservatives to satisfy health conscious lifestyles.

Pressure-treated jams and jellies were introduced in the Japanese market in early 1990, followed by introduction of HPP guacamole in the USA in 1997. Now high-pressure processing is a commercially viable technology for the pasteurization of products of diverse origin such as meat, seafood, beverages, dairy, fruits, and vegetables that are enjoyed by consumers all over the world.

This comprehensive book includes the basic principles to understand the technology behind high-pressure processing as well as its current and future applications within the food industry. The book has 31 chapters distributed in seven parts addressing topics such as process engineering characterization, industrial equipment, packaging, microbial safety, preservation of bioactive compounds, quality changes, and applications in the food industry.

The editors are very thankful to more than 80 authors for sharing their expertise, experience, and vision to come up with very valuable chapters to make the book an excellent reference for high-pressure processing of food for the years to come. The editors are aware of some overlaps between a few chapters, but this is inevitable in

a book of this magnitude. This, however, will also help to visualize basic concepts from different angles for the benefit of the readers in this rapidly evolving field. The gratitude is extended to all the reviewers who contributed their time and expertise to improve the chapters.

It is worth mentioning that from the pioneering efforts made by the Japanese to bring this technology to fruition, to what is taking place now, a significant number of developments took place. Nonthermal strategies to process foods caught the attention of a number of institutions, scientists, regulatory agencies, the food industry, and, of course, the consumers. Several technologies were scrutinized roughly at the same time, and it is quite apparent HPP is the one that, so far, has been receiving the most attention based on its potential to process a wide variety of food products and because it is amenable to be combined with other technologies, such as in the case of pressure-assisted thermal processing (PATs), which allows sterilization of low-acid foods.

The development of HPP technology and its adoption by the food industry were expedited by a number of factors such as the vision of some of the earlier researchers, investors who believed in long-term commercial viability of the technology, as well as worldwide coordinated research and technology transfer efforts among scientists and engineers from academia, equipment manufacturer, food processors, policy makers, and regulatory agencies. In 1997, the Institute of Food Technologists (IFT) Nonthermal Division and European Federation of Food Science and Technology (EFFoST) started to organize annual workshops on nonthermal processing in various European countries and a number of places in the USA. Later on, these workshops have been offered in other parts of the world such as Australia, China, and Brazil. These professional clusters facilitated the rapid growth of several nonthermal technologies, and, as mentioned before, HPP is one that has been receiving great attention. The team approach to develop these technologies has been an example of cooperation, fast development, and an unselfish manner to disseminate acquired knowledge by leading groups. The synergism between regulatory agencies, equipment manufacturers, consumer groups, scientists from research institutions, and food processors has been remarkable, maybe like never seen before. Such collaborative environment enabled fruitful technology partnership between equipment manufacturers and the food industry taking advantage of basic and applied research developed in a number of research institutions, mainly universities. Participation of regulatory authorities facilitated development of science-based regulations that are also harmonized across many countries. Academic researchers not only contributed to technology development and evaluation but also in the training of numerous postdoctoral fellows and graduate and undergraduate students as future leaders in the high-pressure industry. A number of academic institutions developed centers of excellence around nonthermal technologies facilitating interaction among all constituencies interested in exploring new alternatives to process the foods of the future. Universities also play a critical role in providing a pipeline of trained, scientifically sound, next-generation workforce with industrially relevant skills for sustained long-term success of this advanced food manufacturing industry.

We sincerely hope the book will be inspirational to entrepreneurs to continue bringing to the market new and exciting high-pressure-treated food products to enhance the health and well-being of a good number of consumers.

V.M. Balasubramaniam
Gustavo V. Barbosa-Cánovas
Huub L.M. Lelieveld

High Pressure Processing of Food

Principles, Technology and Applications

Balasubramaniam, V.; Barbosa-Cánovas, G.V.; Lelieveld, H. (Eds.)

2016, XX, 762 p. 139 illus., 64 illus. in color., Hardcover

ISBN: 978-1-4939-3233-7