

BOOK REVIEWS

Cold plasma in food and agriculture

Fundamentals and applications

N.N. MISRA, O.K. SCHLÜTER and P.J. KULLEN (Eds)

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N.N. MISRA is a food scientist at R&D, General Mills India. His research interests include cold plasma technologies for foods, food physics, and computational modelling.

This book is the first one about plasma in food industry and agriculture and an essential reference offering a broad perspective on a new, exciting, and growing field for the food industry. The atmospheric cold plasma is a promising disinfective of surfaces in the medical area and the food industry as well.

There are several advantages of cold plasma treatment for non-thermal food preservation. Among others, cold plasma offers high microbial inactivation efficiency at low temperatures (generally <50 °C), which allows to extend shelf life, thereby improving the efficiency of the supply chain in the food industry. It has negligible impact on the food product matrix, and this technology is free of water or solvent; thus, it is also considered environmentally friendly. Cold plasma leaves no residue, and requires only a low energy input.

Another important point is that the technology is applicable for both solid and liquid foods. However, due to some limitations, this technology is not widespread in the food industry yet.

The two key parts of the book are “Theory and Mechanisms” and “Food and Agriculture Applications.” The 14 individual chapters dealing with physics and chemistry, with plasma sources and diagnostics, as well as with antimicrobial mechanisms and interactions with food constituents, offer an in-depth source of information regarding the basics of plasma science and technology. Among them, chapters 7, 9–12, and 14 contain cold plasma application in food industry, specifically interaction with food constituents, application for food safety, quality of treated plant and animal foods, food packaging, and the future of cold plasma in food processing.

The closing chapter of the book deals with an outlook into the future of plasma in food and agriculture comprising regulatory aspects, plasma source design and process control, future innovations, and a discussion about consumer confidence.

In summary, this book is also useful for biologists, chemists, and physicists who wish to understand the fundamentals of plasma physics, chemistry, and technology and their biological interactions through applying novel plasma sources to food and other sensitive biomaterials.

L. SZALÓKI-DORKÓ

Innovative food processing technologies

Extraction, separation, component modification and process intensification

K. KNOERZER, P. JULIANO and G. SMITHERS (Eds)

Woodhead Publishing, The Officers' Mess Business Centre, Royston Road, Duxford, CB22 4QH, UK, 50
Hampshire Street, 5th Floor, Cambridge, MA 02139, USA
The Boulevard, Langford Lane, Kidlington, OX5 1GB, UK
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"Innovative Food Processing Technologies – Extraction, Separation, Component Modification and Process Intensification" focuses on new technologies that have the potential to improve or replace conventional processing technologies to deliver higher-quality and better consumer-targeted food products. The Editors are working at Commonwealth Scientific and Industrial Research Organisation (CSIRO) Food and Nutrition Sciences. K. KNOERZER is involved in research activities on engineering aspects (e.g., numerical modelling, simulation, process/equipment design and optimisation, as well as scale-up) across all innovative food processing technologies. P. JULIANO is working with different separation technologies and ultrasound. G. SMITHERS is an expert in protein chemistry, protein separations technologies, and protein analytical techniques; particularly as applied to food proteins. They worked on this book with 37 excellent contributors from all over the world, for example from the U.S.A, Germany, Spain, and Denmark.

The book is divided into 4 parts with 18 chapters. In the first part of the book, detailed information is given on innovative extraction of food components, for instance the advances and perspectives of ultrasound-assisted extraction, trends in microwave-assisted extraction, and the application of pulsed electric energy.

The second part contains 4 chapters that focus on separation technologies like megasonic waves, simulating moving bed chromatography, novel membrane technologies, and forward osmosis. This part presents concrete examples to implementation of these technologies and analyses their advantages and disadvantages as well.

The third part is concerned with food structure modification, since the structure of food materials is the main determinant of the sensorial quality of food products, including texture and consistency, which contribute to the palatability and pleasure of eating food. This part pays attention to effects of ultrasound processing on plant-based products and also on meat and dairy products. In addition, it deals with application of shockwaves and high hydrostatic pressure for meat tenderization.

The final part provides information on innovative technologies, airborne ultrasound, hydrodynamic pressure processing, and high-power ultrasonication.

In summary, the book brings together food scientists and engineers from academia and industry around the world, to provide the reader with a unique insight into the development and utilization of innovative technologies for these purposes.

A. NAGY

Handbook on natural pigments in food and beverages
Industrial applications for improving food color

R. CARLE and R.M. SCHWEIGGERT (Eds)

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Under common conditions, consumers have the possibility to inspect food and drink visually through the colour – which is the most important sensory property – before deciding to buy or taste it. Considering this recognition about the food consuming, the colouring of the food has a thousand-year history. In our consumer society the appearance of the products has special importance, so the colorants are used more often. As in the last time the health issues, and food safety and quality have come into the forefront, the application of the colorants tends to the natural ones from the artificial. From this aspect, this novel Handbook on Natural Pigments: Industrial Applications for Improving Food Color is a unique summary for food scientists and also includes industrial applications.

Part I, “Consumer expectations and legal framework of food colorants” delineate the safety, quality, and regulatory aspects of colouring food, the psychological effects of food colours.

Part II, “General considerations about pigment stability” summarizes the most appropriate physical and chemical properties affecting the stability of the commonly used colouring pigments from various sources. The structure, biosynthesis, biological effects and analytical questions are also discussed for anthocyanins, betalains, carotenoids and chlorophylls.

Part III, “Specific industrial applications of natural colorants” provides application notes for a wide range of colouring agents used in the different parts of the food industry, including the aqueous food products, the low-moisture and gelatinized food products, ice creams, meat and cereal-based products. Reviews are detailing some special problems about colouring, as the stabilization of wine colour, feed additives for influencing the colour of fish and crustaceans, or chicken meat, and egg yolk colour.

Part IV, “Recent developments and future perspectives” summarize the novel trends and changes for the production of food colour pigments of natural sources. There are forward-looking technologies, which could offer new sources for food dyes, e.g. underutilized fruits and vegetables, pigments of microbial origin, sources for natural blue colours, potential alternatives for the “carmine problem”, improving colour sources by plant breeding, health benefits of carotenoids.

Summarizing, this book is recommended for food scientists, analytical chemists, food technologists and product developers for investigating and producing novel food products.

N. ADÁNYI

Advances in potato chemistry and technology

J. SINGH and L. KAUR (Eds)

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Potato is the third most important staple food crop after wheat and rice worldwide and plays a significant role in human diet. Nowadays, the trends in potato consumption and growing are changing: there is a dramatic increase in potato production in Asia and Africa, beside the traditional European and American growing. By the increase of the global population the role of potatoes in nutrition would be more and more important.

Potatoes are often thought of as unhealthy foods, however, when prepared the right way – without oil – these vegetables are somewhat nutritious. Potatoes are low calorie intake and they are rich in vitamins – C and B₆, manganese, phosphorus, niacin and pantothenic acid. Potatoes contain several phytonutrients, which are organic components of plants that are thought to promote health, like as carotenoids, flavonoids, caffeic acid. These minor components and secondary metabolites may prevent some diseases (heart diseases, high blood pressure and cancer). Potatoes contain some antinutritive components (acrylamide, steroidal glycoalkaloids), but the proper technology or breeding may reduce these risk minimal.

This book combines scientific access with practical usefulness, contains wide range of information about potatoes' components, effect of technology, analytical techniques and some novel applications of this vegetable.

This second edition is a comprehensive review, which summarizes the knowledge and latest results connected to potatoes in 23 chapters. After the introduction of historical background and the importance of potato, the next chapters give us a synthetic description about the main and minor components, the microstructure of potato. The next chapters focus on the effect of storage and different processing methods (organic fielding, thermal processing, frying, dehydration, cooking, fermentation, etc.) on the structure and composition of potato. The analytical techniques, the role of potatoes in pharmaceutical or biomedical applications, in human health and other novel non-food applications are the main topics of last chapters.

This book serves as a tool for food scientists, food chemists, nutritionists, breeders, engineers and students as well. I'm sure that will be useful in understanding of the potato "science" and help to develop new applications in this area.

R. TÖMÖSKÖZI-FARKAS