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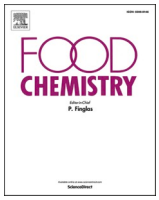

Preface

Molecular characterization, technology, and strategies for designing novel functional foods in the food industry

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Recently, consumer demand for healthy foods has rapidly increased, and the market for functional foods is expanding. Functional food is a food product enriched with special bioactive components that have beneficial physiological effects. Increased understanding of the influence of food consumption on human health, combined with food technologies, has resulted in substantial nutritional innovations, mass fabrication, and product improvements on an exceptional scale. The food industry has recognized the role of bioactive compounds in improving health, leading to the development of functional and healthy food products. The food industry is currently attracting consumer demand for designed functional food products that have the potential to aid in the prevention of chronic diseases. Fortified foods with bioactive compounds are widely available in the market and can be considered appropriate materials for promoting a variety of applications in the food industry. To improve health benefits, the food industry may fortify foods with natural or modified bioactive compounds derived from plants and animal material. These foods contain substantial and diverse sources of natural or derived bioactive compounds such as probiotics, omega fatty acids, phenolics, proteins, sterols, peptides, dietary fiber, and pigments.

The food industry is important to modern economies because most consumers are aware of the health benefits that food can contain, putting pressure on the industry to produce more novel, sustainable, healthy, and affordable foods. On the other hand, as molecular food continues to improve and expand its reach through social media, new foods, new food sources, and innovative food design are all competing for relevance. Thus, innovating in the food sector requires high-end and applied research, especially when the focus is to develop or improve foods with functional properties, as they require proof of their benefits.

The goal of the special issue "Molecular characterization, technology, and strategies for designing novel functional foods in the food industry" is to gather manuscripts that concentrate on the creation of new functional foods or ingredients with beneficial properties and sustainable production methods. The special issue, with published research papers, touched upon several aspects of novel functional foods. Some of the published papers were particularly intriguing due to their novelty. For example, Yin et al. (2023) showed that treating broccoli sprouts with ZnSO4 and Na2SeO3 could reduce stress and increase selenium and isothiocynates. Another manuscript studied natural pigments from *Papaver braceatum* as a natural food pigment (Sarabandi et al., 2023). Chua et al. (2024) tested white and purple varieties of *Orthosiphon aristatus* leaves as bioactive hydrolysates, whereas Bhuiyan et al. (2024) tested the physicochemical, thermal, mechanical, structural, and sensory properties of plant-based composites for coated fried food. Two more important papers in this collection are Alrosan et al.'s (2024) study of the protein quality and composition of water kefir-fermented casein and Moin et al.'s (2024) study of how to make low-fat sauces by improving rice starches.

The guest editors would like to thank all researchers who submitted their works to the special issue, making it a collection of intriguing research focused on novel bioactive foods and ingredients. Furthermore, they also acknowledge the reviewers who read and helped improve the quality of the manuscripts with their constructive and pertinent comments and suggestions. The guest editors hope the issue can be of interest not only to academic readers but also to students and other members of the members of the public, as they intended to have a broad and interesting collection of research papers.

This special issue covered state-of-the-art research that investigates and designs novel functional food products from various food industries, as well as papers related to developing a novel food approach to achieving improved health by improving well-being and potentially lowering the risk of chronic diseases.

Lastly, we will include the technological and industrial uses of lab experiments in this special issue. For example, we will look at how to develop technological techniques to keep bioactive compounds safe and make the best functional co-products from them while also considering costs, safety, and product integrity. Thermal approaches yielded

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conflicting results in terms of the bioaccessibility of bioactive compounds. However, a non-thermal technique reduced the extractability and stability of bioactive components in food co-products. Moreover, the invention and development of these technologies should prioritize the creation of food co-products that are rich in bioactive chemicals. These novel industrial techniques should prioritize the preservation of food quality, including sensory, health, and nutritional characteristics.

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