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Editorial: Improving protein functionality using conventional and non-conventional methods

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Editorial on the Research Topic
Improving protein functionality using conventional and non-conventional methods

Proteins, as complex macromolecules, play pivotal roles in food by influencing the sensory, structural, and nutritional attributes of food products. Food proteins serve as stabilizers in emulsions, contributors to viscoelasticity in gels, and carriers for targeted delivery systems. These versatile proteins interact with other components to create stable structures, enhance texture, and facilitate the controlled release of bioactive compounds. Their ability to form networks and interact with lipid or water phases makes them indispensable in a wide range of food applications. From improving shelf life to enhancing nutritional delivery, proteins play a fundamental role in the functionality and performance of food products. With increasing consumer awareness regarding healthy foods and the role of processing in influencing the health and environment, the demand for improving protein functionality with positive impacts on health and the environment has become a research hotspot.

Food proteins undergo various changes during processing, impacting the final properties of food products. Understanding the influence of processing on food proteins is crucial for optimizing product development and ensuring desired attributes in the final food items. Today, a revolution is underway, utilizing both conventional and non-conventional processing methods to unlock the full potential of proteins, promising a future where food not only nourishes but is also sustainable. Our Research Topic, titled "Improving Protein Functionality using Conventional and Non-conventional Methods," covers the collective efforts of researchers worldwide to explore novel approaches and insights in this critical area. The articles featured in this Research Topic include a diverse array of methodologies, from traditional to cutting-edge techniques, all aimed at elucidating and increasing protein functionality across different domains of food science. Traditional techniques have long been employed to modify protein functionality, offering tried-and-tested approaches to enhance texture, stability, and nutritional value. Processes such as heat treatment, pH adjustment, and enzymatic hydrolysis have been instrumental in tailoring proteins to meet specific functional requirements. Nowadays high pressure and pulsed electric fields as well as ultra sound and microwave processing are tailoring new protein

functionalities. These methods leverage the inherent properties of proteins, allowing for precise control over their structure and functionality.

The work of Bello-Pérez et al. exemplifies the intersection of conventional food processing techniques with innovative ingredient utilization, aligning with our Research Topic's focus on holistic approaches to protein functionality enhancement. The authors have highlighted tackling the challenge of formulating semolina pasta with enhanced nutritional properties, a task that necessitates a delicate balance between protein enrichment and sensory attributes. Through meticulous analysis of amaranth flour supplementation, they demonstrate the feasibility of fortifying traditional food products with alternative protein sources while addressing textural and sensory considerations. This wonderful approach can be utilized by industries where economic considerations are of pinnacle importance for the production of affordable healthier foods.

The convergence of conventional and non-conventional methods presents a wealth of opportunities for food scientists and manufacturers. By combining established techniques with cutting-edge technologies, researchers can unlock synergies that maximize the functional potential of proteins. Purohit et al. embark on an exploration of dielectric properties in ground beef, a fundamental aspect of protein behavior under varying conditions. By scrutinizing the impact of fat content and temperature on dielectric constants and loss factors, their work not only sheds light on the physicochemical properties of meat but also underscores the potential for radiofrequency processes in food processing, aligning with our theme of leveraging non-conventional methods to enhance protein functionality in food products.

Likewise, Salamun et al. have highlighted protein-bioactive interactions, offering an enlightening perspective on encapsulation technology. Their meticulous examination of hydrophilic bioactives and plant proteins reveals insights into the mechanisms underpinning encapsulation efficiency and bioactive delivery. By exploring the interplay between molecular structures and encapsulation matrices, their findings shed light on optimizing protein functionality for targeted applications in nutraceuticals and functional foods. This is one of the crucial aspects associated with our Research Topic.

Minestrini et al. explore the importance of adopting a circular economy approach to valorize agro-industrial by-products, through the valorization of brewer's spent grain (BSG). The authors have reported BSG, a ubiquitous by-product of the brewing industry, as a potential source of bioactive compounds with diverse functional properties. By employing state-of-the- art analytical techniques, they uncover a treasure trove of phenolic compounds and Maillard reaction products within BSG extracts, highlighting the untapped potential of this abundant resource in various food and nutraceutical applications. Their findings thus mitigate waste generation while simultaneously creating value-added products with tangible societal and environmental benefits.

Finally, Singh and Krishnaswamy explore the sensory enhancement of soy-based products through flavor modulation to create palatable and appealing formulations. The sensory acceptance of soy-based food products faces hurdles due to their distinctive flavor, texture, and aroma. By systematically investigating the physicochemical properties of flavored soymilk powders, the authors offer novel insights into the impact of flavoring components on product stability, reconstitution properties, and sensory attributes. The study highlights flavor engineering as a suitable tool for expanding plant-based food options in an increasingly health-conscious and sustainability-driven marketplace. Thus, the authors address the various hurdles in soy product consumer preferences that can boost market trends for soy consumption.

In conclusion, the manuscripts included in this Research Topic collectively represent a tapestry of innovative research endeavors aimed at advancing protein functionality across diverse applications. From fundamental investigations into protein behavior to applied research in food formulation and processing, each contribution offers valuable insights, contributing to our collective understanding of protein science sustainably. As Editors, we extend our gratitude to the authors for their diligent efforts and to the reviewers for their invaluable feedback. It is our sincere hope that this Research Topic will catalyze further exploration and innovation in the field of protein functionality enhancement.

Author contributions

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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