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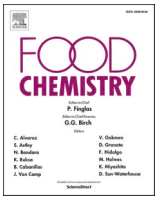

Preface

Valorization of food products using natural functional compounds for improving organoleptic and functional chemistry

Functional foods have emerged as an attractive option for many consumers, given their wide-ranging health benefits. The increasing demands from society for these kinds of products have prompted a continuous growth of the functional food market size in recent years. Nowadays, various natural products/compounds have been reported to exert significant functional activity on foodstuff, delaying food spoilage, enhancing organoleptic properties, but also providing new bioactive properties. These properties are related to potential health benefits, such as antioxidant, antimicrobial, neuroprotective, cardioprotective or even anti-cancer. Therefore, using natural compounds to prepare functional foods is a suitable strategy due to its higher safety, improved organoleptic properties, and health-enhancing attributes, which have been described to increase consumer acceptance. Many natural matrices have been evaluated as a source of bioactive extracts/compounds for the development of functional foods, including different plant species and agro-industrial by-products, which can be high-yield and cost-effective raw materials, following the use of suitable and optimum extraction methods. Stabilization and incorporation methods are also key to enable the maximum effectiveness of said natural extracts/compounds, and to which the chemical nature of these and the food matrix must be considered. In this sense, the use of advanced technologies in the formulation of functional foods provides a better means of utilizing natural compounds as relevant ingredients in food.

In this Special Issue, a broad spectrum of studies assessing different approaches to these topics is presented, with the aim of publishing new reports in this field, as well as updating current knowledge. Among the works here collected, there are several reports on extraction of active molecules from natural sources, such as curcuma (Lateh et al., 2022), raspberry (Teng et al., 2022), cardoon (Mandim et al., 2022), cucumber (Sun et al., 2022), basil (Mahmoud et al., 2022) or strawberry (Hanuka-Katz et al., 2022; Navarro-Hortal et al., 2022), among others. Additionally, some works present new insights on traditional medicinal plants (Ai et al., 2021; Rivas-García et al., 2022), as a potential novel source of bioactive compounds (Zhang et al., 2022). Some of these studies have employed innovative approaches for the obtaining of bioactive compounds, such as microwave (de la Fuente et al., 2022) or ultrasound-assisted extraction, or the use of ionic liquids (Ettoumi et al., 2022) or deep eutectic solvents (Fu et al., 2022) for green extraction. Besides extraction, another key point is to assess the potential biological and functional properties of the obtained natural extracts and molecules to confirm potential functional properties (Zhou et al., 2022). To this end, *in vitro* reports employing suitable spectrophotometric or cell-based methods are described for antioxidant, antimicrobial, anti-inflammatory or anticancer activities (Cianciosi et al., 2022; Yuan et al., 2022). Likewise, several *in vivo* experiments with diverse animal models, such as nematodes, mice, or rats (Gao et al., 2022; Q. Lyu et al., 2022), have been presented to evaluate neuroprotective, antiobesity or hepatoprotective properties. As key factors in the effectiveness of bioactive compounds, several studies have also evaluated the bioaccessibility and bioavailability of different compounds in diverse food matrices (Ayyash et al., 2021). Several works here included present new methods of stabilization (Hanuka-Katz et al., 2022; Sun et al., 2022) and incorporation (Ceccanti et al., 2022) of natural isolated compounds and extracts into foods, as well as studies assessing their effectiveness. The design of new food products with alternative and novel techniques is also considered in this Special Issue, including butter (Kaur et al., 2022), flour (Peng et al., 2022) and beverages (Tejera et al., 2022; Yang et al., 2021). Noteworthy, preservation of food quality (Shen et al., 2021; Zhang et al., 2022) by incorporation of natural compounds and/or components is discussed, also considering novel materials, as means of avoiding spoilage by oxidation and/or microbial agents (Villacrés-Granda et al., 2021; Wang et al., 2022). The scope of these methods is diverse, including encapsulation (X. Lyu et al., 2021), nanoparticle-based techniques (Wang et al., 2022; Yan et al., 2022) or the use of safe materials, such as cyclodextrins. Several studies also consider a sustainable and ecological approach on the topic, including the use of agricultural and industrial by-products derived from harvesting and processing of fruits, vegetables, or spices, such as kiwifruit (Chamorro et al., 2022), pomegranate (El-Shamy & Farag, 2021) pitahaya (Roriz et al., 2022), tomato (Yagci et al., 2022), onion (Günal-Köroğlu et al., 2022), carrot (Polat et al., 2022) soy (Wang et al., 2022) or hemp (Alonso-Esteban et al., 2022). Various review articles are also included in the collection, ranging from circular economy approaches for phytochemicals' extraction and potential health benefits (Farag et al., 2022), updates on health-related properties of natural products (Langyan et al., 2022), and a thorough discussion on relevant differences between conventional and organic plant-based foods (Giampieri et al., 2022; Jaramillo-Vivanco et al., 2022) considering recent scientific evidence.

Altogether, the Special Issue collects up to forty-four peer-reviewed articles covering all the relevant points involved in the extraction of active molecules from natural sources, new insights on traditional medicinal plants, innovative extraction approaches, potential biological and functional properties, improved bioaccessibility and bioavailability of active molecules, new methods of stabilization and incorporation, design of new food products, preservation of food quality and the use of agricultural and industrial by-products as well as other circular economy approaches. In conclusion, the research and review articles compiled in this Special Issue provide some of the most up-to-date knowledge on the

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valorization of food products using natural functional compounds and offer new insights for the further development of the food industry.

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