Lipids represent a major component of food and important structural and functional constituents of cells in biological systems. The aim of this special issue is to provide a representation of the new analytical and qualitative aspects about food lipids. The main focus is on the state of the art in the various areas covered, with an indication of the current developments taking place and the problems and challenges that remain to be addressed. With this editorial, we launch a series of papers presenting new analytical methodology, health properties, and food safety related to lipids. The papers were selected through routine rigorous double-blind external peer review by qualified experts.

Lipids contribute to many desirable qualities to foods, including attributes of texture, structure, mouthfeel, flavour, and colour. Generally, the quality of food is closely related to the quality of their lipids. Very often, the degradability and alteration of lipids are the main causes of the loss of quality of food. This is why several researchers have investigated the lipid fraction of food not only to provide new knowledge about their composition but also to assess whether it was possible inhibiting or slowing down alteration processes or modifying the native composition by fortifying foods with some lipid classes with health properties. A very important topic is presented by the study of the composition of lipid fraction present in foods, in particular the ratio ω-3/ω-6, the % of saturated fatty acids (SFA), and the occurrence of trans fatty acids. In fact, wrong ω-3/ω-6 ratios, high quantity of SFA, and trans fats are associated with cardiovascular diseases and other undesirable health effects. Therefore, many health authorities, such as EFSA or FDA, have recommended the use of healthy foods without trans fatty acids and a lower consumption of saturated fatty acids. Currently, many researchers consider healthy a diet with a lipid fraction rich in ω-3 fatty acids and conjugated linoleic acid (CLA) due to their beneficial effects such as cardiovascular and anti-inflammatory ones. In this special issue, J. Arias-Rico et al. reviewed the possible health effects of ω-3 supplementation in poultry products. This phase 1 study was performed on 29 volunteers of whom fourteen participants (9 women and 5 men) consumed chicken and eggs supplemented with ω-3 fatty acids and fifteen participants (8 women and 7 men) consumed chicken and eggs non-supplemented with ω-3 fatty acids. Both groups participated for a period of 14 weeks. After 14 weeks, the supplemented group had an increase in HDL, reducing the atherogenic index. Generally, high intake of trans fat is closely related with chronic diseases such as cardiovascular disease and cancer. In consideration of this, Buitimea-Cantúa et al. investigated fat blends, produced by direct blending process of palm stearin (PS) with high oleic sunflower oil (HOSO) in different concentrations, concluding that the direct blending process of equal amounts of PS and HOSO was an adequate strategy to formulate a new zero-trans crystallized vegetable fats with characteristics similar to commercial counterparts with well-balanced fats rich in both ω-3 and ω-6 fatty acids. To date, many foods rich in ω-3 and ω-6 are known, but fish
are certainly the first source of these fatty acids. Generally, marine organisms bring lipids with a high nutritional value, rich in polyunsaturated fatty acids and with low levels of saturated ones and cholesterol. Pyz-Aukasik et al. determined fatty acid profile regarding the fat of farmed grass carp, bighead carp, Siberian sturgeon, and wels catfish. The total content of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in 100 g of muscle tissue of the examined fish was very high particularly for bighead carp (488.67 mg) and Siberian sturgeon (619.06 mg). The ratios of $\omega -6/\omega -3$ in all the fish analyzed were always high or very high, between 0.44 and 1.72, and, similarly, the ratio PUFA/SFA was always very interesting (0.45–1.61). For these reasons, the authors concluded that the lipid fraction of the analyzed fish can be considered beneficial for human health. Another important topic concerning the study of food lipids is represented by extraction methods. The recovery and the quality of the lipid fraction from foods depend on the method used for its extraction; therefore, nowadays, the setting of the optimal extraction parameters is the focus of scientific research in the field of foods. Rosales-García et al. performed the extraction of squalene from puffed Amaranthus hypochondriacus seeds by supercritical fluid extraction (SCFE). The authors determined squalene content and carried out the acidic profile of the extracts by GC-MS. The extract obtained by SCFE reached 460 g/kg of squalene in oily extract with the optimized parameters, confirming that this matrix is a rich source of squalene, a potent natural antioxidant. Heat treatment such as roasting and frying are two of the most common methods used industrially, and not only, to improve the sensory properties of many foods. However, these treatments are not always harmless; in fact, some nutritional alteration might be unfavorable and lead to negative health impacts upon consumption. Ghazzawi and Al-Ismail evaluate the effects of frying and roasting on different nuts (raw almonds, pine, cashew, and pistachio). The authors took into consideration the modifications, after the heat treatment, of the total phenol content, total flavonoids, oxidative stability, and of the acidic profile of the nuts’ fat. In conclusion, the effects of roasting and frying have significantly influenced the fatty acid profile and the antioxidant activity of the matrices considered, and therefore, this work highlights the need to improve the knowledge on foods subjected to heat treatment. Sommella et al. determined the qualitative and quantitative variation of single fatty acids in cow milk samples before expiration date and within 28 days after expiration date in order to monitor how the profile of the lipid fraction is influenced by different physicochemical parameters. These authors concluded that, even after the expiration date, this matrix represents a rich source of fatty acids with potential substrates for the formulation of economically viable products and eco-friendly diesel-like fuels.

In light of these findings, all the papers published in this special issue represent exciting, innovative, and applicable approaches in the study of food safety and lipids quality, as well as emerging future research topics, in this multidisciplinary field. We hope that this special issue would attract major attention of the peers.

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