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Editorial

Chemistry of Food Contaminants and Their Remediation or Mitigation

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The food industry and research community are particularly focused on developing new mitigation strategies to avoid or alleviate the occurrence of chemical contaminants in the food chain. Food chemical contaminants could be present as naturally occurring, entering the food chain as an additive, by cross-contamination, or formed under different processing conditions. Food contaminants also come from the phases of food processing, packaging, transportation, and storage [1]. The implications of these contaminants on human health range from mild gastroenteritis to fatal cases of hepatic, renal, and neurological syndromes [2]. Therefore, regulations are always up to date with legal limits aiming to guarantee to the consumer the safety of food products. Thus, the aim of this special issue was to publish research papers addressing recent advances on the common food contaminants and to offer a deeper insight into food chemistry.

Numerous manuscripts have been evaluated, but only six have been successfully published. J. Zhao and coworkers investigated the remediation of antibiotic residues that their abuse poses a great threat to public health and food security. In particular, they focused on oxidative degradation of amoxicillin (AMO) in aqueous solution by thermally activated persulfate (TAP). They concluded that the TAP was efficient in AMO degradation in aqueous solution under a pseudo-first-order kinetic model and in drinking water under the experimental condition. Particularly, they suggested that TAP could be a valid technology for water remediation contaminated by AMO.

G. Volpi and coworkers evaluated the use of water kefir grains as an absorber of heavy metal ions. More specifically, they investigated the role of two different microbial colonies in the remediation of both heavy metals and mineral water metals such as Ca, K, Mg, and Na analysed by ICP. They have concluded that water kefir grains could be an efficient adsorber/biosorber of metals on polluted water contaminated by heavy metal ions.

F. Shakeri and coworkers have evaluated the occurrence of acrylamide, a potential carcinogenic compound formed during the heat processing of starch-rich foods, in Kolompeh traditional sugary Iranian cookie. The authors have evaluated industrial and household processing conditions, evaluating different recipes of traditional and industrial processing of Kolompeh. In a controlled environment, they have produced different Kolompehs: traditional and sugar enriched. They have used the industrial oven and the traditional oven (direct heating) at 273°C to bake the different recipes. They have concluded that in order to reduce the exposure to acrylamide to the population, control of the type of raw material and increasing the automatization level even on traditional food preparation need to be in place to reduce the acrylamide exposure.

L.-A. Bouzalakou-Butel and coworkers investigated the occurrence of hydroxymethylfurfural (HMF), a potential harmful compound formed in different food products under different food processing regimes, in selection of smoked food (cheese, fish, and meat). The authors have also analysed the volatile fraction of the smoked product to correlate with HMF. The authors concluded that, in all the samples analysed, HMF was present ranging between 30 and 330 ppb for processed meat. The highest amount of HMF was found in the smoked fish, while the cheese samples showed a wide range of HMF concentrations. The authors discovered a positive correlation between HMF and the measured phenols in cheese samples, while the correlation for fish and

processed meat samples was not significant but indicative. This finding could lead to other research works between smoking processes employed and the formation of HMF.

T. X. Le Thi and coworkers investigated the role of deep eutectic solvents (DESs), a new class of ionic liquid analogues, which show promising results in green solvent extraction due to their biodegradability, low toxicity, and easy way of use. They optimised the extraction of omega 3, 6, and 9 fatty acids from fish industry waste. They concluded that the proposed approach shows an increasing recovery of polyunsaturated fatty acid from 57% to 91% in the raw material (fish waste). This eco-friendly method shows a potential in the recovery of polyunsaturated fatty form food by-product.

Finally, the work of M. Hokkanen and coworkers investigated the four marker polycyclic aromatic hydrocarbons (PAH4) on different traditionally smoked Finnish fish and meat products. PAH4 are classified as human carcinogenic teratogenic, haematological, and immune-toxic compounds; therefore, the exposure to those contaminants is high risk to human health. Their wide sampling of the Finnish smoked product includes a detailed information on the production process, and the results were able to correlate to the best smoking practice to obtain a safer product; the authors highlighted indirect smoking, and having a distance of at least five meters between the food and smoke source and a smoking time no longer than 5 hours are recommended.

In conclusion, the current special issue offers updated information to the readers on the recent advancements regarding food contaminants giving further thoughts with handling of harmful compounds and their mitigation strategy. It is clearly evidenced that the food processing contaminants are a current topic and need further investigation towards their remediation or the mitigation of their formation.

Conflicts of Interest

The editors declare that they have no conflicts of interest regarding the publication of this special issue.

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References

[1] R. Krska, A. Becalski, E. Braekevelt et al., "Challenges and trends in the determination of selected chemical contaminants and allergens in food," *Analytical and Bioanalytical Chemistry*, vol. 402, no. 1, pp. 139–162, 2012.

[2] I. A. Rather, W. Y. Koh, W. K. Paek, and J. Lim, "The sources of chemical contaminants in food and their health implications," *Frontiers in Pharmacology*, vol. 8, p. 830, 2017.