Special Topic: Food Chemistry

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The quality of food is of utmost importance to a society and harmful contaminants, e.g., the Minamata disease is a chronic poisoning by organic mercury compounds that first appeared in the mid-1950s around the city of Minamata. Consuming fish contaminated with organic mercury has resulted in the most severe poisoning of thousands of people.

But even in recent times—deliberately or unconsciously—caused contamination of food were determined. In 2008, for example, it was noted that melamine was blended into milk products in China, thus simulating a high protein content despite dilute milk. Or in the horsemeat scandal in Europe in 2013, foods declared as beef products were found in several European countries, containing up to 100% undeclared horse meat. For this reason, a constant and extensive control of food is one of the main tasks of analytical chemistry, with the requirements in this field have increased significantly in recent years. It is no longer sufficient to quantify

only a few substances in relatively simple samples. Nowadays, the trend is towards ever more complex samples that need to be analyzed comprehensively. The cost factor and the sample throughput play an ever more important role, which is why increasingly automated or significantly reduced sample preparation is carried out. The latter, however, makes a specific detection unavoidable. Thus, enzyme assays and quadrupole or triple quad MS have prevailed in the area of target analysis, while, in the suspected target area, almost exclusively applications with triple quad mass spectrometers are used. In non-target screening, ultra-high-resolution mass spectrometers or chromatographic pre-separations in combination with high-resolution mass spectrometers are normally used. Here, the combination of ion mobility with mass spectrometry will gain in importance in the next few years. In this special issue, some leading scientists in the field of food chemistry presenting their newest results and you will find articles about the determination of fusarium toxins in barley and other cereals and about the identification of allergenic in sesame seeds for a better quality control of food.

Another major task, which needs to be dealt with by food chemistry, is the investigation of health effects and the identification of the healthiest diet. Here, often, the sample preparation of very complex samples is a major challenge. To get a broader overview, you will find a review about green extraction methods of bioactive compounds from microalgae and also a research paper, which handle with a pressurized liquid extraction. In addition, a semi-quantitative ICP–MS method is presented, which allows the high-throughput analysis of rice entire elements.

Due to the importance of food analysis, I am very happy about the special volume and wish you an interesting reading.

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Yours sincerely,
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Oliver J. Schmitz in 2009 got a full professor in Analytical Chemistry at the University of Wuppertal (BUW). Between 2010 and 2012, he was the chair of the Analytical Chemistry department at BUW. Since 2013, he has been a full professor at the University of Duisburg-Essen and is the chair of the Institute of Applied Analytical Chemistry. In 2009, he cofounded the company iGenTraX UG which develops new ion sources and units to couple separation techniques with mass spectrometers. Since 2013 he is a consultant for various international companies and organizing – together with national partners – Sino-German workshops and analytica conferences in China and Vietnam. In 2018, he has founded the Teaching and Research Center for Separation (TRC) at the University of Duisburg-Essen, which belongs to

Agilent's global network of world-class Centers of Excellence. He is the author/co-author of one textbook and 9 book chapters, 78 papers published in peer reviewed journals, more than 130 lectures and 4 patents. His main research area is separation science, with a particular focus on the analysis of complex samples, the development of ion sources, the use and optimization of multidimensional LC and GC, ion mobility-mass spectrometry and coupling analytical techniques with mass spectrometers. He is member of several editorial boards and was awarded the scholar-in-training award of the American Association for Cancer Research in 2003, the Gerhard-Hesse Prize for chromatography in 2013 and in the same year the Fresenius Lecturer.