Advanced food analysis

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The rapidly increasing number of participants at major conferences suggests scientific interest in advanced food analysis has grown steadily over the last decade. Highly sophisticated instrumental analytical methods based on chromatography and mass spectrometry (MS) have become the techniques of choice for multi-analyte and multi-class detection. Because of the still increasing performance of tandem MS and high-resolution MS, sample preparation and chromatography are both becoming less critical, which is enabling a revival of “dilute-and-shoot” flow-injection and direct probe analysis, the latter under ambient conditions. For ultra-trace level analysis and for appropriate coverage of composition in foodomics, however, ultra-high performance gas and liquid chromatography will continue to be combined with advanced mass spectrometry. Recent developments in magnetic resonance imaging (MRI) and ambient mass spectrometric imaging

(MSI) have enabled spatially resolved surface and 3D analysis of the constituents of entire foods, food ingredients, crops, seeds, etc. Although these food-imaging techniques are definitely not the most sensitive nor the most quantitative options, spatially resolved food analysis will, nevertheless, become of increasing interest to scientists searching for added-value natural food ingredients, investigating (the degree of) surface contamination or surface defects, and seeking markers of early ripening in agriforensics and in food security. For the last of these, information is needed about options for (re)use of off-spec food and feed ingredients (highly relevant in the future to feed a growing world population).

At the opposite end of the range of the advanced food-analysis technology one finds highly creative, simplified solutions with potential for rapid on-site testing, for example ultrafast strip test immunoassays and rapid PCR tests for specific target analytes in well-defined sample matrices. Here, sensing is micro-/nanotechnology-driven and moving toward portable and personalized food-analysis systems, eventually even on such an ordinary device as a mobile phone.

In this topical collection, research papers emphasise and illustrate the developments discussed above. We hope they will inspire (young) scientists to push advances in food analysis even further. We would like to express our great gratitude to the contributors—thanks to them this special issue provides updated and high-quality original contributions on new developments in Advanced Food Analysis, and its emerging applications and future trends. Last, but not least we are also very grateful to the editorial team and reviewers of *Analytical and Bioanalytical Chemistry* for their support and excellent cooperation.

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