Food-borne toxicants: Elucidation of formation pathways as well as quantitation experiments using stable isotopically labelled compounds

In the past, a lot of studies have been undertaken to mitigate the formation of the so-called “food-borne toxicants” during food manufacturing. But, in some cases, a formation pathway is not known or well understood, leading to approaches on the basis of “trial and error”. Thus, beside the development of accurate, reliable, sensitive, and selective quantitation methods mostly on the basis of stable isotopically labelled standards, the elucidation of formation pathways and the knowledge of parameters influencing the generation of these toxicants is very important enabling systematic mitigation strategies. The lecture will demonstrate that the use of labelled compounds is not only recommended as internal standards for quantitation experiments, but they are also a useful tool to get deeper insights into the formation of food-borne toxicants. Thereby, the labeled compounds are used as precursors or intermediates to monitor their reactions in model systems or real food by mass spectrometry experiments, e.g., GC-MS or LC-MS/MS. In detail, the formation mechanisms of acrylamide, acrolein, and furan will be presented. Further, the development of quick and simple quantitation methods on the basis of headspace GC-MS analysis will be presented. Their robustness and reliability was proven in comparison to more time-consuming derivatization methods, exemplarily shown for the (E)-2-alkenals acrolein and crotonaldehyde by stable isotope dilution analysis (SIDA) using [13C3]-acrolein and synthesized [13C4]-crotonaldehyde.

Biography

Michael Granvogl has completed his PhD as well as Post-doctoral studies at the Chair for Food Chemistry (Technical University of Munich) under the supervision of Prof. Peter Schieberle. Actually, he is an Associate Professor at the same facility. He has published about 30 papers in peer-reviewed journals and has been serving as a reviewer for about 20 different journals. Furthermore, he is well-known as a presenter around the globe participating in the most important conferences about flavor chemistry, Maillard chemistry, and food safety related topics.

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