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Food-producing animals are exposed to various dioxin-related compounds like polychlorodibenzo-p-dioxins (PCDDs), polychlorodibenzofurans (PCDFs) and Polychlorobiphenyls (PCBs). Due to their lipophilic nature, these micro-pollutants are rapidly transferred from the environment to animal edible tissues where they are bio-accumulated, thus representing a public health risk. Only a fraction of these micro-pollutants is bioaccessible to the consumer due to technological and physiological processes applied to the food matrix before and after ingestion. Therefore, worldwide food safety agencies encourage residue chemists to investigate their fate during processes like cooking or digestion in order to upgrade their risk assessment procedures. The aim of the present paper was to develop a multiresidue method based on GCxGC-TOF/MS in order to investigate changes induced by cooking in the composition of a complex food matrix spiked with 226 dioxin-related micro-pollutants. In a first step, a GCxGC-TOF/MS method was developed to achieve a satisfactory separation of the 209 PCBs and the 17 toxic PCDD/Fs in hexane. The best GCxGC-TOF/MS conditions were determined according to peak shape (width and symmetry), peak count and resolution and enabled to separate 206 dioxin-related micro-pollutants including the 17 PCDD/Fs. Starting with meat as a model matrix, the second step enabled to set up procedures for both micro-pollutant spiking and sample preparation. The later included Accelerated Solvent Extraction (ASE), Centrifugal Evaporation and Gel Permeation Chromatography (GPC). The performance of the ASE-GPC-GCxGC-TOF/MS method was assessed in terms of recoveries, reproducibility, linearity and LODs. In the third and final step, the multiresidue method was implemented to assess the modulating influence of cooking on meat content in the 206 dioxin-related micro-pollutants. The results are discussed in light of the current knowledge about mass and heat transfer occurring in meat during cooking and about physico-chemical properties of these compounds.

This study was supported by the French National Research Agency, project SOMEAT, Contract No. ANR-12-ALID-0004. Safety of Organic Meat. Available at http://www.so-meat.fr