# Getting a Hold of Trace Vapors: Quantifying Analyses of Toxins

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A rapid and simple diagnostic tool for the early detection of meat spoilage would be invaluable to ensure meat quality during production, distribution, and retail. Recently, we developed an improved purge and trap method for sampling low volatility, as well as volatile, compounds by applying low temperature collection on short alumina-coated porous layer open tubular (PLOT) columns. This method was applied to the analysis of both fresh and spoiled poultry to identify marker compounds that could be used as indicators for poultry spoilage. Samples of chicken breast were crimp-sealed in individual autosampler vials and maintained at 25 °C for either a day or two weeks. Two weeks was sufficient to ensure severe spoilage. The headspace was sampled by cryoadsorption for 10, 20, or 30 minutes; and the analytes were then separated, identified, and quantified with gas chromatography and mass spectrometry. Six potential markers for poultry spoilage were identified in the headspace of spoiled chicken: dimethyl disulfide; dimethyl trisulfide; phenyl sulfide; methyl thiolacetate; allyl methyl sulfide; and 2,4,6-trimethylpyridine. Additionally, isophorone was detected in the headspace of both the fresh and the spoiled chicken; its origin is unknown but is suspected to come from the packaging. The applicability of this method to detect chicken spoilage in a commercial setting was tested by sampling the air above spoiled chicken breast that was maintained in its original retail packaging, as obtained direct from a commercial vendor, for two weeks at 25 °C. Sampling was done via a modified, room-temperature approach with an activated PLOT column and a motorized pipette filler/dispenser. Five of the above compounds were also identified with this approach: dimethyl disulfide; dimethyl trisulfide; phenyl sulfide; 2,4,6-trimethylpyridine; and isophorone. We also applied this method to the detection of flame retardant compounds in the headspace of car parts, including sections from the dashboard, seat upholstery and ceiling materials. We have identified tris(1,3-dichloroisopropyl) phoshate (TDCPP) a flame retardant used as an alternative to the phased-out polybrominated diphenyl ether flame retardants.