

A Suite of Sampling Aids for the In-Field SPME Collection of Analytes from Air, Particulates, and Surfaces

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Earlier this year, Torion Technologies introduced an improved version of its GUARDION®-7 field portable GC-TMS system. The system (marketed as the TRIDONTM-9 by Torion and as the GUARDION® by Smiths Detection) has improved analytical performance along with increased ruggedness. Like its predecessor, the new system continues to take advantage of SPME sampling and sample introduction. Concurrent with the development of this next-generation GC-TMS, has been the development of a suite of sampling technologies that can assist in acquiring samples from air, liquids, and surfaces while employing SPME sampling technology. For each type of sample, new strategies to improve the extraction and collection of targeted compounds. In one case, a portable field vacuum extractor (FVE), developed at Idaho National Laboratory and under prototype hardware development at Torion allows increased sampling efficiency for the SPME collection of semivolatile samples from surfaces by providing a low vacuum environment over the surface during sampling by the SPME fiber. Increased sample collection results in shorter sampling times using this approach as demonstrated for several Chemical Warfare Agent (CWA) simulants. To support in-field calibration and quantitation applications, a constant headspace concentration calibration vial has been developed. This approach encapsulates the desired calibrants in cross-linked, micro-ground PDMS particles, which for a given temperature, bleed into the headspace at a constant level allowing hundreds of quantitative samples to be acquired. For the detection of biological threats, a prototype, portable, and automated chemical processing unit designed to liberate unique, small molecule biomarkers from bacteria (at this stage, *Bacillus anthracis* spores have been targeted). These small molecule biomarkers are then sampled onto a SPME fiber, which is subsequently analyzed by GC/MS. Finally, a small-format, in-needle sample concentrator housed in the same form factor and dimensions as the SPME needle is under development for the concentration of trace analytes.