

**LC-ESI-MS ANALYSIS OF CHEMICAL WARFARE AGENTS**

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More than 140 State Parties have ratified the Chemical Weapons Convention (CWC) and agreed not to develop, produce, stockpile, transfer or use chemical weapons and agree to destroy their own chemical weapons and production facilities. The CWC has reduced the likelihood of chemical weapons use by State Parties, but there remains a serious concern that other parties may make use of these weapons against civilian or military targets. Analytical methods need to be developed to ensure that suspect samples collected under these scenarios can be analysed for the presence of chemical warfare agents in a timely manner.

Packed capillary column LC-ESI-MS methods were developed for the separation and identification of CW agents, their hydrolysis products and unknown related compounds in aqueous, snow, soil and munitions samples. Recent applications include the analysis of soil samples from a former mustard storage/destruction site and the development of a method to allow the removal and analysis of samples from a Biocontainment Level 3 facility for CW agent presence. High resolution, full mass spectra were acquired for picogram amounts of analyte using a time-of-flight mass spectrometer. Data were obtained at several sampling cone voltage settings, including higher voltages that promoted product ion formation in the ESI interface, and resulted in the acquisition of mass spectra containing both molecular and product ion information. The electrospray data for more than 60 compounds characterized during these investigations have been stored in a database that may be used for identification purposes.

LC-ESI-MS appears to be an attractive alternative to GC-MS for the analysis of aqueous samples or extracts containing CW agents and their hydrolysis products, since they may be analysed directly without the need for additional sample handling. Application of this method is anticipated during chemical weapons destruction monitoring, for the verification of these compounds in samples collected during compliance monitoring inspections or in support of allegations of CW agent use claims.

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