

TITLE

A fast separation and quantification method for nitroguanidine and 2, 4-dinitroanisole and other explosives in soil, water, and plant tissues by liquid chromatography/tandem mass spectrometry

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Nitroguanidine and 2,4-Dinitroanisole (DNAN) are two insensitive energetic ingredients which are recently used as munitions explosives. To protect our environment and human health, the levels of these compounds in soils and waters need to be monitored. However, there have been no analytical methods developed for this purpose. In general, the concentrations of explosives in either soil or water samples are very low. Therefore, a fast and sensitive method is required to monitor those compounds. In this study, a fast, simple, and sensitive analytical method has been developed and validated to quantitatively determine nitroguanidine and DNAN in soil, tap water, and river water, by using high performance liquid chromatography - tandem mass spectrometry (HPLC-MS/MS). To make this method to be a comprehensive analytical technique for other explosives, it has included other commonly used explosives in the method development, such as Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), 1,3,5-Trinitroper- hydro-1,3,5-triazine (RDX), 2,4,6-trinitrotoluene (TNT), 2-amino-4,6-dinitrotoluene (ADNT), and Pentaerythritol tetranitrate (PETN). The method detection limits (MDLs) of these compounds in soil ranged from 0.2 to 5 ppb and a good linearity was obtained over a concentration range of 0.5-200 ppb. Recoveries of some compounds are the same or better than those obtained using EPA methods. This method was also successfully applied to different water matrices, and plant tissues. The detailed experimental conditions, interferences, and results will be presented at the conference. This study was supported by The Leonard Wood Institute (LWI) and environmental Research Center at Missouri University of Science and Technology.

Biography

Yinfa Ma received his Ph.D. in analytical chemistry and minor Ph.D. in biochemistry in December 1990 from Iowa State University. Ma has serviced as chemistry faculty at both Truman State University (1990-2000) and Missouri University of Science and Technology (2000-present). He is currently a Curators' Teaching Professor in chemistry. He is currently associate editor for Global Journal of Analytical Chemistry. He served as a guest editor for Electrophoresis journal in 1998 and 2002. Ma has published 96 peer-reviewed journal papers and 17 book chapters, given 202 presentations at national and international conferences, delivered 55 invited seminars, and filled 10 patents.