



U.S. EPA Method 524.3 for Analysis of Volatile Organic Compounds (VOCs) in Finished Drinking Water

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The U.S. EPA Office of Groundwater and Drinking Water released Method 524.3, “Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry, Version 1.0,” in the Federal Register on August 3rd, 2009 (1, 2). This new method contains an updated list of 76 VOCs that includes fuel oxygenates and two emerging contaminants of interest.

Method 524.3 allows the analyst to use purge-and-trap (P&T) operating conditions recommended by the instrument manufacturer, while restricting five parameters to prescribed ranges. This study was undertaken to optimize instrument parameters and validate that the resulting data meet or exceed new quality control and performance criteria in Method 524.3.

Experimental Conditions

Instrumentation used in this study was an Eclipse 4660 Purge-and-Trap Sample Concentrator equipped with an Infra-Sparge™ sample heater, a 4551A Autosampler, and an Agilent 7890/5975 GC-MS.

Modified P&T parameters of 60 mL/min purge gas flow rate for 6 min with samples heated to 40 °C were used in this study.

Results

The new method includes several modifications to the required quality control (QC), including changes to the way the initial calibration curve is evaluated, addition of acceptance criteria for the minimum reporting levels (MRLs), and elimination of the statistical method detection limit (MDL) requirement. These and all other QC requirements were included in the initial demonstration of capability (IDC).

Drinking water samples from three municipalities and one bottled-water facility were collected and analyzed. A chromatogram of a sample from College Station is shown in Figure 1. A summary of analytical results is presented in Table I.

Conclusions

U.S. EPA Method 524.3 permits greater latitude in setting instrument operating parameters. Parameters used in this study provided method validation and quality control data that consistently met or exceeded new performance criteria specified in U.S. EPA 524.3. The modified purge parameters also reduced the purge-and-trap cycle time for each sample by 5 min.

References

(1) Federal Register, Vol. 74, No. 147, August 3, 2009.

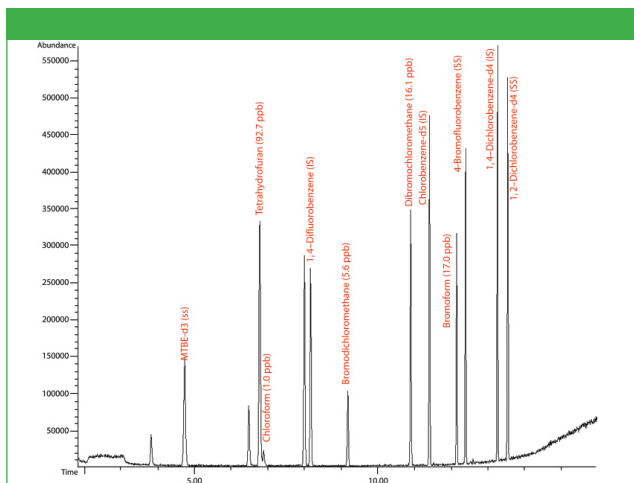


Figure 1: Chromatogram of finished drinking water from College Station, TX.

- (2) Method 524.3. *Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry*, Version 1.0; EPA-815/B-09-009.
- (3) OI Application Note #3500, “U.S. EPA Method 524.3 for Analysis of Volatile Organic Compounds (VOCs) in Finished Drinking Water: Optimized Instrument Parameters and Method Validation,” 2009.

Table I: Summary of analytical results from analysis of four finished drinking water samples, MS Scan mode. Only those compounds with concentrations above the minimum reporting level (MRL) of 0.5 ppb are listed.

Compound	Bryan, TX	College Station, TX	Well-born, TX	Bottled Water Facility
Surrogate Standard % Recovery				
MTBE-d3	102%	104%	104%	104%
4-Bromofluorobenzene	97%	98%	98%	99%
1,2-Dichlorobenzene-d4	101%	102%	102%	104%
Target Compound Concentration Detected Above the MRL (ppb)				
Tetrahydrofuran	<MRL	92.7	<MRL	<MRL
Chloroform	1.2	1.0	5.8	<MRL
Bromodichloromethane	4.4	5.6	22.1	<MRL
Dibromochloromethane	14.2	16.1	71.6	<MRL
Bromoform	20.7	17.0	111.0	<MRL

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