

Application News

Gas Chromatography Mass Spectrometry

No.M250

Analysis of Regulated Compounds and Related Compounds in Tap Water Using Purge & Trap-GC/MS

This Application News concerns the measurement of the volatile organic compounds in tap water. The analysis was conducted in accordance with the following Japanese regulation of April, 2009. Before conducting measurement using these conditions, please be sure to verify the applicability of these conditions with respect to the regulations that are in effect locally.

■ Analytical Method

This analytical method has been developed for the following applications:

Matrix : Tap water (processed drinking water, raw water)

Target substances : Volatile organic compounds

Analysis technique : Purge & Trap-GC/MS

Relevant regulation : Ministerial Ordinance concerning Water Quality Standard (May 30, 2003, Japanese Health, Labour and Welfare Ministry Ordinance No. 101 [Partial Revision of December 22, 2008, Japanese Health, Labour and Welfare Ministry Ordinance No. 174]), Items to be Tested for Water Quality Management, Suggested Test Items

■ Analytical Conditions

Following are the analytical conditions for purge & trap – GC/MS analysis.

Analytical Instrument	: GCMS-QP2010 Plus / AQUA PT 5000J Plus+AQUAauto70		
Column	: AQUATIC (60 m × 0.32 mm I.D. df = 1.4 μm) GL Sciences		
-Purge & Trap-			
Sample Quantity	: 5 mL	Trap Tubing	: GL Trap 1
Valve Oven Temperature	: 150 °C	Transfer Line Temperature	: 150 °C
Sample Mount Temperature	: 60 °C	Purge Ready Temperature	: 35 °C
MCS Temperature	: 40 °C	Standby Flow Rate	: 40 mL/min
Sample Heater	: Off	Purge Time	: 8 min
Purge Flow Rate	: 40 mL/min	Dry Purge Time	: 3 min
Dry Purge Flow Rate	: 40 mL/min	Desorb Time	: 6 min
Desorb Temperature	: 220 °C	Desorb Flow Rate	: 300 mL/min
Bake Time	: 15 min	Bake Temperature	: 230 °C
MCS Bake Temperature	: 230 °C	Bake Flow Rate	: 80 mL/min
-GC-			
Sample Injection Unit Temperature	: 150 °C	Carrier Gas (P&T)	: Helium (90 kPa)
Oven Temperature*1	: 35 °C (5 min)→(6 °C/min)→90 °C→(10 °C/min)→220 °C (3 min)		
-MS-			
Ion Source Temperature	: 200 °C	Ionization Mode	: EI
Interface Temperature	: 200 °C	Emission Current	: 60 μA
-Scan Mode-		Start <i>m/z</i> -End <i>m/z</i>	: <i>m/z</i> 35 - 280
Event Time	: 0.5 sec	Monitoring Ion	: See Fig. 1
-SIM Mode-			
Event Time	: 0.2 sec		

*1) If the column oven does not easily reach 35 °C due to the ambient temperature, the initial temperature can be changed to 40 °C.

Results

Fig. 1 shows the total ion chromatogram obtained from measurement of mineral water spiked with a standard solution.

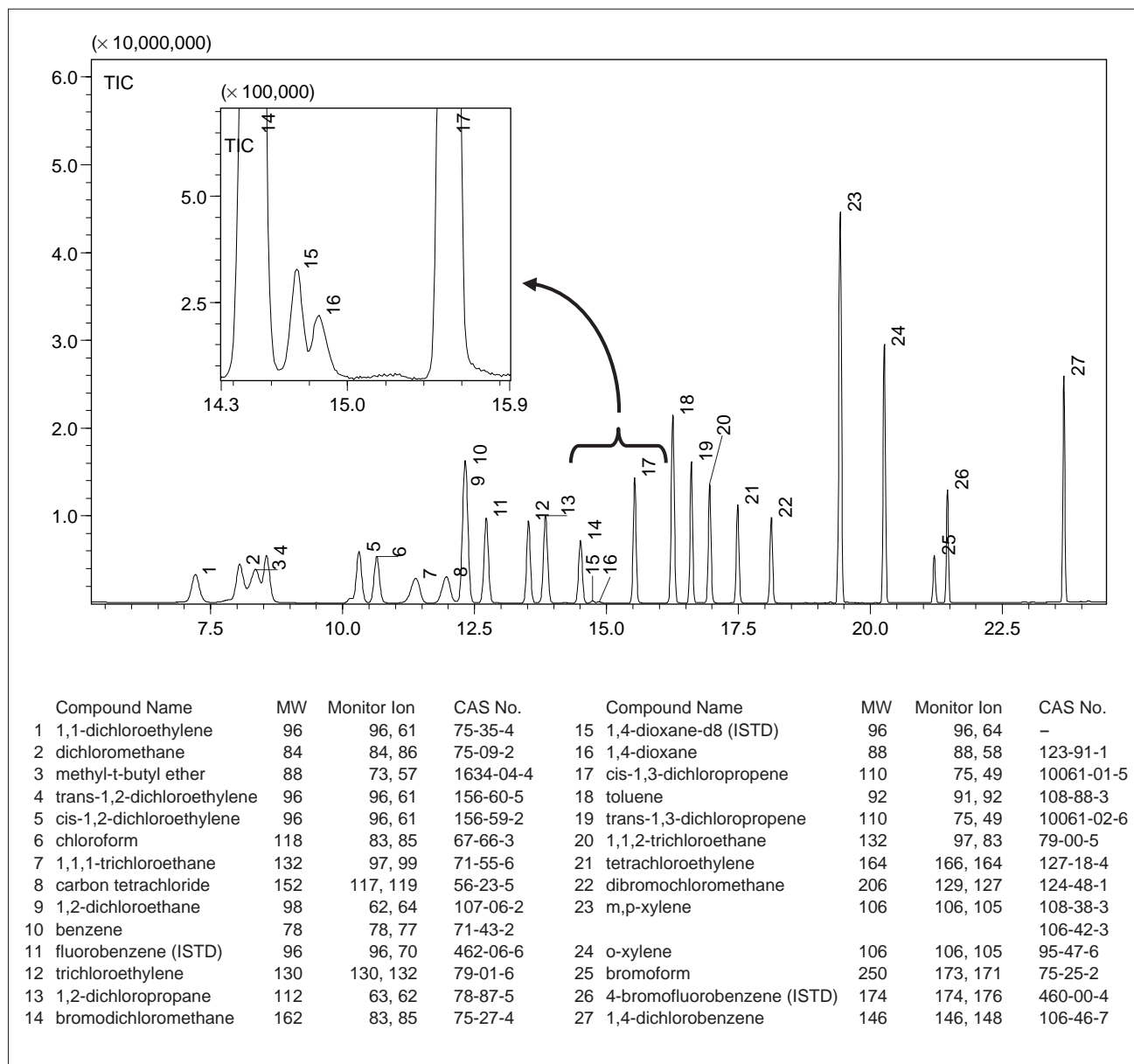


Fig. 1 Total Ion Chromatogram (TIC)

Note Regarding the Analysis

Due to the overlapping of the m-xylene and p-xylene chromatographic peaks, quantitation is conducted assuming the calibration curve as a combined value for m,p-xylene. If strict quantitation is required for each of the substances, these peaks must be separated.

NOTES:

*This Application News has been produced and edited using information that was available when the data was acquired for each article. This Application News is subject to revision without prior notice.



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