

Application News

Gas Chromatography Mass Spectrometry

No.M254

Analysis of Compounds Related to Musty Odor Regulated in Drinking Water Using Headspace - GC/MS

This Application News pertains to the measurement of substances (2-methylisoborneol and geosmin) responsible for the musty (mold-related) odor in tap

water. The analysis was conducted in accordance with the Japanese regulations described below, in effect as of August, 2009.

■ Analytical Method

This analytical method is applicable for the analysis specified below.

Matrix : Tap water (processed drinking water and raw water)
 Analytes : 2-methylisoborneol, geosmin
 Analytical Method : Headspace - GC/MS
 Related Regulations : Ministerial Ordinance Concerning Water Quality Standard for Drinking Water (Japanese Ministry of Health, Labour and Welfare Ordinance No. 101, May 30, 2003 [Partial Revision, Japanese Ministry of Health, Labour and Welfare Ordinance No. 174, December 22, 2008])

■ Analytical Conditions

The headspace – GC/MS analytical conditions are shown below.

Analytical Instrument	: GCMS-QP2010 Plus / TurboMatrix HS with PPC and Vial Shaker (option)		
-Column-	: Rtx-5MS (30 m × 0.25 mm I.D., df = 1.0 μm) Restek		
Headspace			
Sample Volume	: 10 mL + 3.5 g NaCl	Pressurization Time	: 1 min
Injection Time	: 1 min	Withdrawal Time	: 0 min
Oven Temp.	: 80 °C	Heating Hold Time	: 30 min
Needle Temp.	: 100 °C	HS Carrier Gas Pressure	: 120 kPa
Transfer Temp.	: 180 °C	Vial Septum	: Silicon / PTFE
Vial Venting	: OFF	Sample Vial Shaker	: ON
High-Pressure Sampling	: ON (250 kPa)		
-GC-			
Injection Port Temp.	: 200 °C		
Column Oven Temp.*1	: 35 °C (1 min) - (30 °C/min) → 170 °C → (5 °C/min) → 230 °C (5 min)		
-MS-			
Ion Source Temp.	: 200 °C	Ionization Mode	: EI
Interface Temp.	: 220 °C	Emission Current	: 150 μA
-Scan Mode-			
Event Time	: 0.5 sec	Start <i>m/z</i> – End <i>m/z</i>	: <i>m/z</i> 50 - 200
-SIM Mode-			
Event Time	: 0.2 sec	Monitor Ion	: See Fig. 1

*1) Depending on the ambient temperature, the column oven initial temperature can be changed to 40 °C if 35 °C is difficult to achieve.

Results

Fig. 1 shows the total ion chromatograms (TIC) and mass spectra of a sample consisting of mineral water

with spiked target analytes.

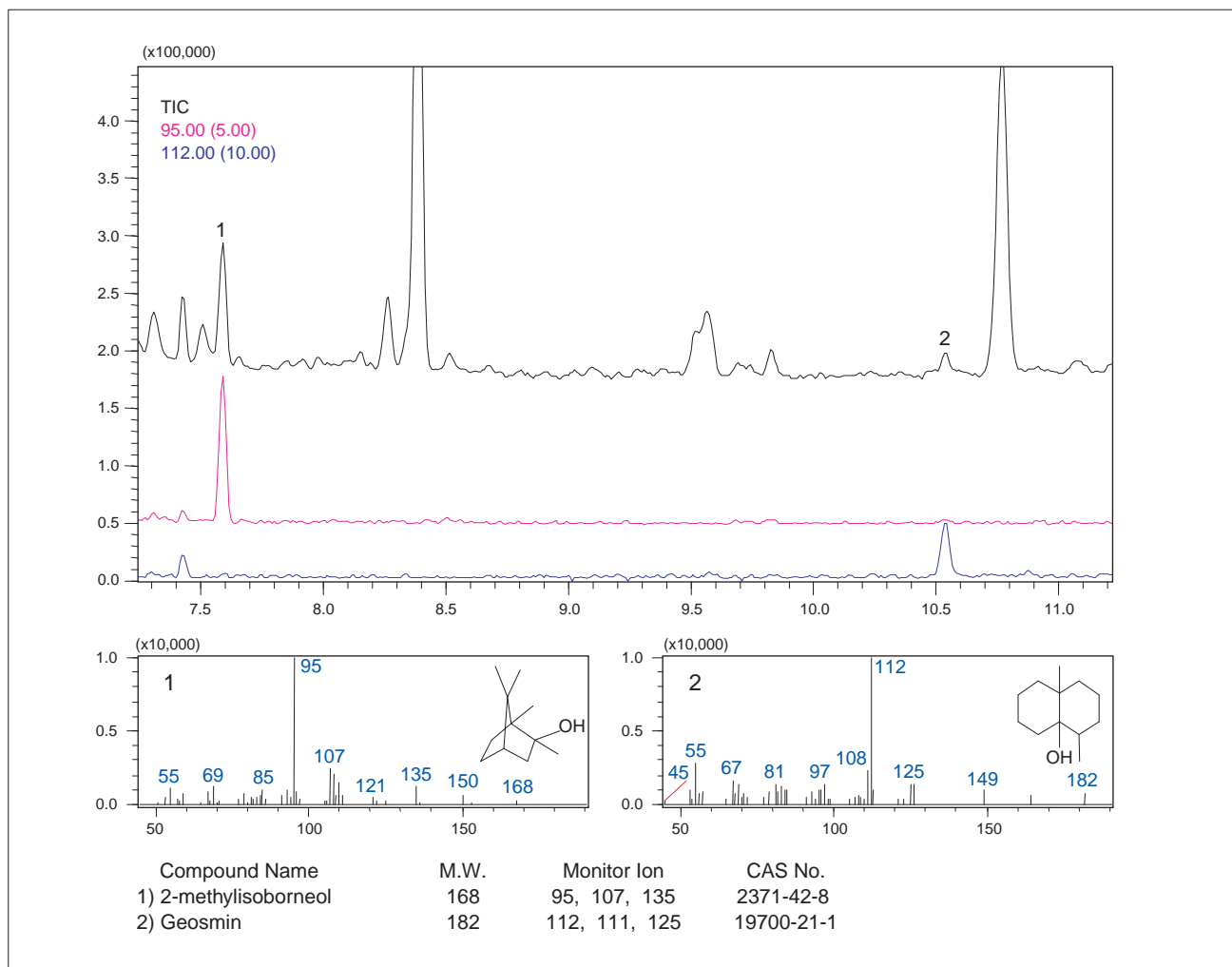


Fig. 1 Total Ion Chromatograms (TIC) and Mass Spectra

Note on the Analysis

Measurement of 2-methylisoborneol and geosmin must be conducted at very low trace levels. Therefore, depending on the condition of the column, the results

may include many overlapping impurities. In this situation, modification of the operating parameters may be required in order to achieve optimum results.



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