

Determination of Formaldehyde in Ambient Air using Adsorbant Cartridge followed by High Performance Liquid Chromatography (HPLC)

Formaldehyde is an important industrial chemical used in the manufacturing of other chemicals, building materials, and household products. It is one of the large family of chemical compounds called volatile organic compounds or “VOCs”. At normal room temperatures these compounds vaporize. When present in air at levels above 0.1 ppm it can cause watery eyes, burning sensations in the eyes and nasal passages, as well as coughing, wheezing, and allergic reactions. Formaldehyde has been classified as a potential carcinogen and, as such, is regulated in many countries: Japan, 0.08 ppm; World Health Organization Europe, 0.08 ppm; Sweden, 0.1 ppm; US Department of Housing and Urban Development, 0.4 ppm.

HPLC CONDITIONS

Instrument: Waters Alliance® HPLC system with UV detection  
 Eluent: Water/tetrahydrofuran/acetonitrile  
 Column: Waters XBridge™ Phenyl, 3.5 µm, 4.6 x 150 mm @ 35 °C  
 Injection: 20 µL each of AccuStandard® mix (M- 8315-R1- DNPH and M- 8315-R2- DNPH) diluted 1:5 in 40:60 water/acetonitrile  
 Flow Rate: 1.5 mL/min  
 Detection: UV @ 360 nm  
 Data: Waters Empower™ software

SAMPLE PREPARATION

Use Sep-Pak® DNPH Silica cartridge, backflush cartridge with acetonitrile.

ELUENT PREPARATION

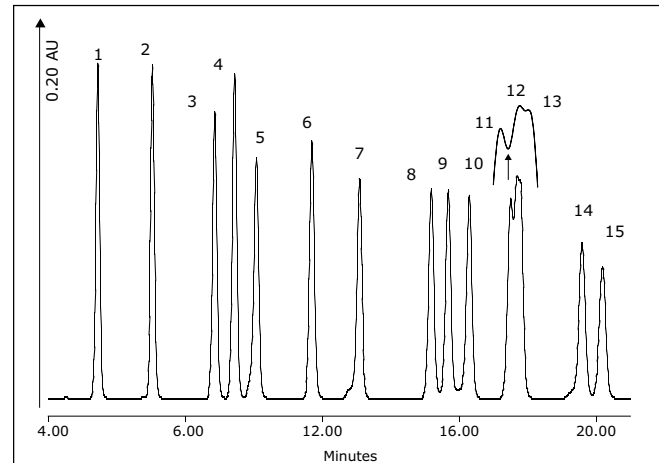
Filter and degas through a 0.45 µm filter.  
 A: 90% water, 10% tetrahydrofuran (THF).  
 Mix 900 mL water and 100 mL stabilized THF.  
 B: Acetonitrile

Time	Flow	%A	%B	Curve
Initial	1.5	70	30	-
20.0	1.5	36	64	6
22.0	1.5	36	64	6
22.1	1.5	70	30	6

Eluent gradient. For EPA methods 554 and 8315 Option 1.

Time	Flow	%A	%B	Curve
Initial	1.5	70	30	-
16.0	1.5	53	47	6
21.0	1.5	53	47	6
21.1	1.5	70	30	6

Eluent gradient for EPA Methods T011 and 8315 Option 2.



Peak	Analyte	Peak	Analyte
1	Formaldehyde	9	Isovaleraldehyde
2	Acetaldehyde	10	Pentanal
3	Acetone	11	o-Tolualdehyde
4	Acrolein	12	p-Tolualdehyde
5	Propanal	13	m-Tolualdehyde
6	Crotonaldehyde	14	Hexanal
7	Butanal	15	2-5 Dimethylbenzaldehyde
8	Benzaldehyde		

EPA method T011 and 8315-02 analytes, 20 ppm as DNPH analytes.

ORDERING INFORMATION

Description	Part Number
XTerra Phenyl, 3.5 µm, 2.1 x 150 mm	186001181
Sep-Pak DNPH-Silica Cartridge	WATO37500

Description	Literature Code
Determination of Formaldehyde in Ambient Air	720001988EN
Analysis of DNPH Derivatives using XBridge Phenyl	WAT60186

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