CONSUMABLES AND SUPPLIES

AIR SAMPLING

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Gas Sampling Bags

Gas sampling bags are widely used as whole air sampling devices for monitoring gases in cabin, emission, workplace environments, indoor, etc. The gas sampling method by bags is ideal for many applications because of easy introduction to GC or enrichment by concentration tubes. However the results of analyses may vary depending on the material of the gas sampling bags, which is caused due to permeation or adsorption of gases. In addition, background delivered from the bag materials may disturb the determination of the target compounds. Therefore selecting a right bag material is inevitable for leading your analysis to success.
GL Sciences is proud to introduce "Smart Bag" series of new sampling bags, which were developed based on many years of our experiences and along with some other bags fulfills customer's demanding requirements worldwide.
In accordance with the following directions, select an appropriate bag to achieve highly reliable analytical results.

Select the Appropriate Sampling Bags for your Application

Smart Bag PA
- Polyvinyl alcohol film
- Chemically inert, resistant to heat and permeation
- Low background contamination
- Max. Operating Temp. : 120 °C
- Film thinkness: 53 µm

Applications: In-cabin VOC's, Vehicle Emission, Emitted gases from materials, Permanent gases, etc.

Smart Bag 2F
- Polyvinylidene fluoride (PVDF) film
- Chemically inert and resistant to heat
- Max. Operating Temp. : 120 °C
- Film thinkness: 50 µm

Applications: In-cabin VOC's, Vehicle Emission, Emitted gases from materials, etc.

Tedlar Bag
- Polyvinyl fluoride (PVF)
- Max. Operating Temp. : 100 °C
- Film thickness : 50 µm

Applications: Permanent gases and organic solvent gases.

ANALYTIC-BARRIER Bag
- Resistant to permeation
- Low background contamination
- Max. Operating Temp. : 70 °C
- Film thinkness: 45 µm

Applications: In-cabin VOC's, Vehicle Emission, Permanent Gases, etc.

Fluororesin Bag
- Tetrafluoroethylene hexafluoropropylene copolymer film
- Chemically inert and resistant to heat
- Max. Operating Temp. : 110 °C
- Film thinkness: 50 µm

Applications: Organic solvent gases.

Aluminum Bag (5-Layer Foil)
- Aluminum Bag is made of laminated film (from outer: nylon, polyethylene, alum foil and polyethylene, polyethylene)
- Resistant to permeation of permanent gases and methane
- Max. Operating Temp. : 65 °C
- Film thinkness: 120 µm

Applications: Permanent gases.

Polyester Bag
- Polyester film
- Resistant to VOC permeation
- Film thinkness: 38 µm

Applications: VOC's and malodorous compounds.

SKYPIA Bag
- Ethylene-vinyl alcohol copolymer (EVOH)
- Resistant to permeation
- Low background Contamination
- Max. Operating Temp: 100 °C

Applications: Automobile Interior Material VOC Emissions Testing

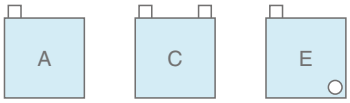
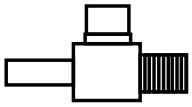
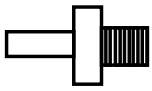
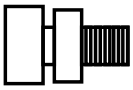
As shown above, GL Sciences has a wide variety of sampling bags to offer. It is extremely important to select the appropriate sampling bag depending on the target compound you are required to sample/collect to avoid any sampling error as much as possible. Please select the appropriate sampling bag to achieve highly reliable test results.

How to Choose a Gas Sampling Bag

(Example)

①	②	③	④
Smart Bag PA	A	A	10

※ This is the example for a Smart Bag PA with type A, standard sleeve at one end (6 mm), 10L.

①	**Name of Bag**	Smart Bag PA / Smart Bag 2F / ANALYTIC-BARRIER Bag Tedlar Bag / Fluororesin Bag / Aluminum Bag / Polyester Bag
②	**Type**	 □ : Sleeve or sleeve with mini valves ○ : M6 Connector
③	**Connector** Standard is: ・6 mm for less than 20 L ・8 mm for not less than 20 L	A : Standard sleeve at one end AS : 7 mm sleeve at one end AK : 6 mm sleeve with mini valve at one end B : M6 connector at one end C : Standard sleeves at both ends CS : 7 mm sleeve at both ends CK : 6 mm sleeve with mini valve at both ends D : M6 connectors at both ends E : Standard sleeve at one end + M6 connector at the other end EK : 6 mm sleeve with mini valve at one end + M6 connector at the other end F : PP sleeve at one end (Type A of Smart Bag only avilable) G : PP sleeve at both ends (Type C of Smart Bag only avilable) AA8 : 8 mm sleeve at one end AAJ8 : PTFE joint for 8 mm sleeve at one end (Aluminum bag A type only) CCJ8 : PTFE joint for 8 mm sleeve at both ends (Aluminum bag C type only) AAP8 : PTFE joint for 8 mm sleeve at one end ＋ 8 mm sleeve with valve at the other end (Aluminum bag only)  Sleeve with mini valve (6 mm)  Standard sleeve (6 mm)  M6 Connector
④	**Bag Capacity (L)**	Standard: 1 L, 2 L, 3 L, 5 L, 10 L Other sizes such as from 0.1 L ～ 500 L can be manufactured upon request.

Connectors for Gas Sampling Bags

Standard Sleeve
(O.D.: 6, 7, 8 mm; PTFE)

6 mm O.D. Sleeve with
Mini Valve (PTFE)

M6 Connector with
Septum (PTFE)

8 mm O.D. Sleeve with Valve (PP)

6 mm O.D. Sleeve (PP)
for Smart Bag

8 mm O.D. Sleeve with
Valve (PTFE)

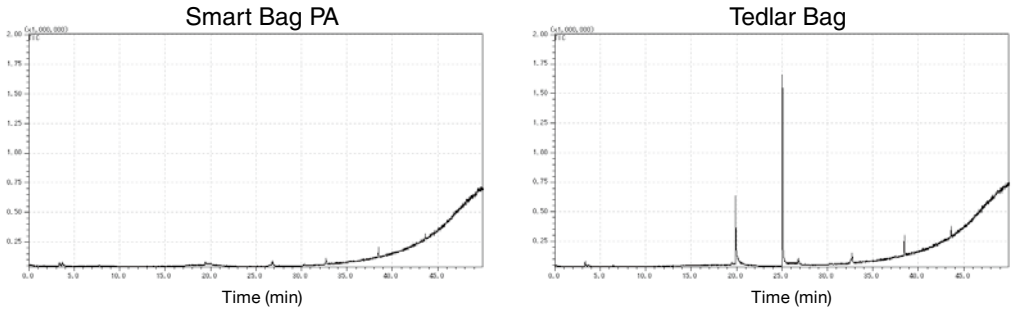
Smart Bag PA

Smart Bag PA is made of poly vinyl alcohol film and delivers superior resistance to solvent gases, heat and adsorption for low back ground contamination. Smart Bag PA also avoids the permeation of most gases. This feature enables a wide range of sampling from permanet gases to organic gases.
Max. Operating Temp. : 120 °C

Blank Test

【Testing Procedure】

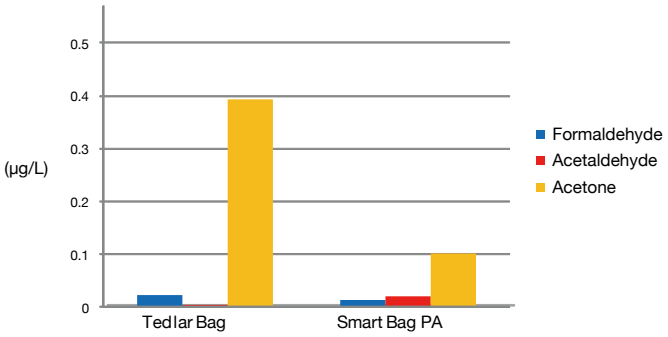
Each sampling bag (1L) was filled with nitrogen and put in an oven at 60 °C. 1 hour later, the each gas in the bags was withdrawn into a gas tight micro syringe and injected directly to a GC/MS. The both bags were not flushed/cleaned in advance.



Aldehydes/Acetone Blank Test

【Testing Procedure】

After being filled with nitrogen, both bags were closed and put in an oven at 60 °C. 1 hour later, each 1L gas in the bags was vacuumed with a pump through a DNPH cartridge and eluted sample was analyzed by HPLC. The both bags were not flushed/cleaned before test.



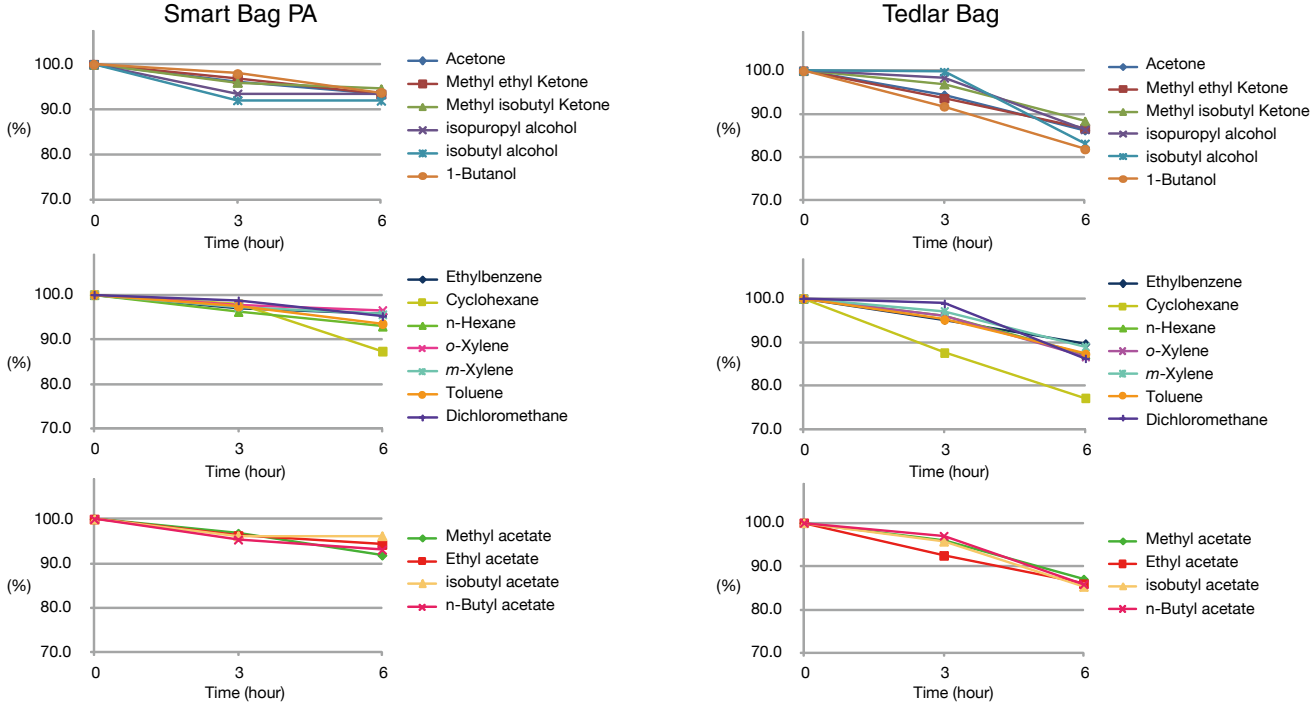
Storage Stability of Organic Solvent Gas in Smart Bag PA and Tedlar Bag

【Testing Procedure】

The same volume with the same constitution of vaporized standards were introduced to each bag. Then nitrogen was added to each bag and concentration changes over time were measured by a GC/FID.

【Standard Compound List】

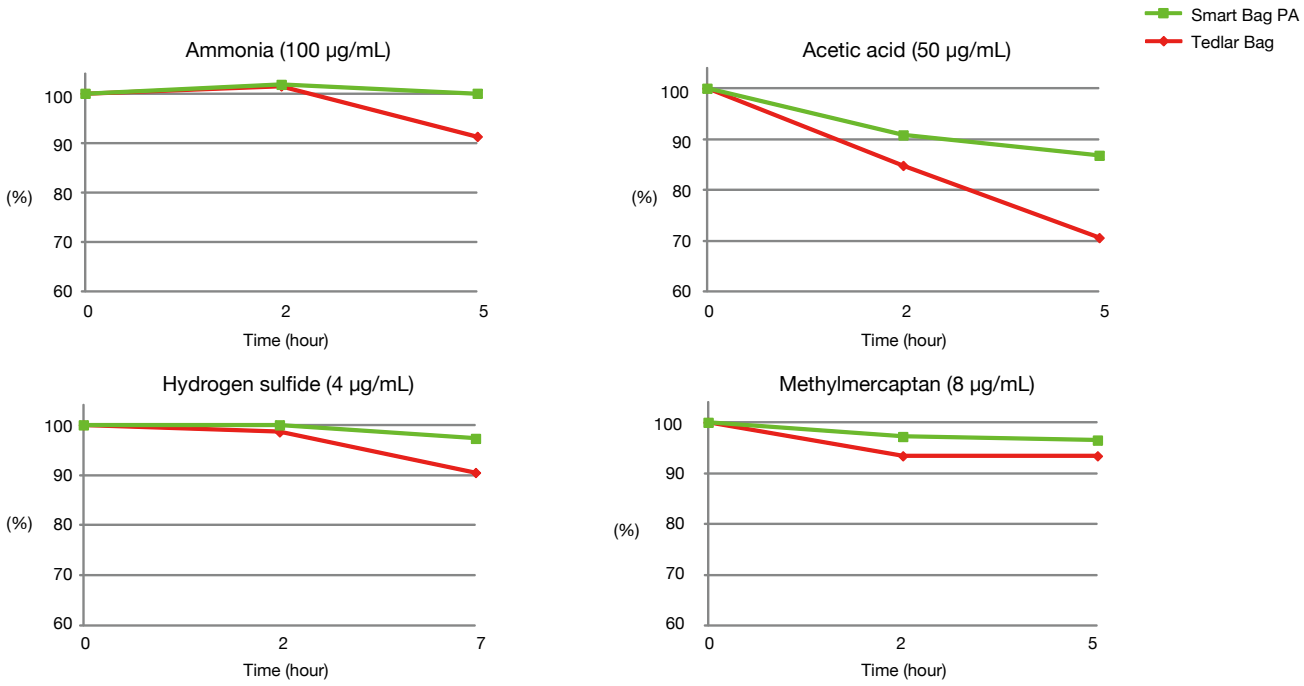
Acetone, Methylethylketone, Methyl isobutyl ketone, Isopropyl alcohol, Isobutyl alcohol, 1-Butanol, Ethylbenzene, Cyclohexane, n-Hexane, *o*-Xylene, *m*-Xylene, Toluene, Dichloromethane, Methyl acetate, Ethyl acetate, Isobutyl acetate, n-Butyl acetate (50 ng/mL each)



Storage Stability of Malodorous Compounds in Smart Bag PA and Tedlar Bag

【Testing Procedure】

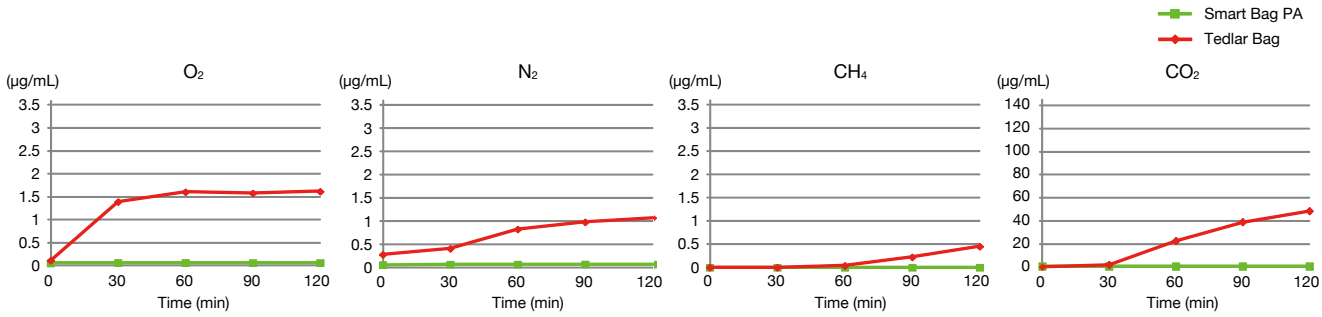
After preparation of each malodorous sample as described below, 5L Smart Bag PA and Tedlar Bag were filled with the sample together with nitrogen gas. Concentration changes over time were calculated with a detecting tube at certain times.



Gas Permeability Test

【Testing Procedure】

Permeation rates of O_2, N_2, CH_4 and CO_2 were measured using a permeation rate measurement system on each sampling bag.



Smart Bag PA

Type	1 L	2 L	3 L	5 L	10 L	20 L	30 L	50 L	100 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AF	3008-48101	3008-48102	3008-48103	3008-48105	3008-48110	3008-48120	3008-48130	3008-48150	3008-48160
AA	3008-97101	3008-97102	3008-97103	3008-97105	3008-97110	3008-97120	3008-97130	3008-97150	3008-97160
AAK	3008-97201	3008-97202	3008-97203	3008-97205	3008-97210	3008-97220	3008-97230	3008-97250	3008-97260
CG	3008-48401	3008-48402	3008-48403	3008-48405	3008-48410	3008-48420	3008-48430	3008-48450	3008-48460
CC	3008-97401	3008-97402	3008-97403	3008-97405	3008-97410	3008-97420	3008-97430	3008-97450	3008-97460
CCK	3008-97501	3008-97502	3008-97503	3008-97505	3008-97510	3008-97520	3008-97530	3008-97550	3008-97560
CEK	3008-97701	3008-97702	3008-97703	3008-97705	3008-97710	3008-97720	3008-97730	3008-97750	3008-97760

* Other bag sizes available upon request.

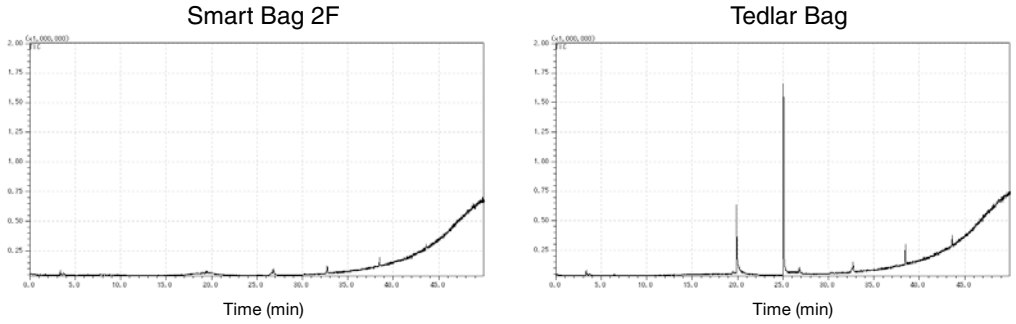
Smart Bag 2F

Smart Bag 2F is made of polyvinylidene fluoride (PVDF) film and delivers superior resistance to solvent gases and heat. In addition, this bag is suitable for sampling of VOC's from in-cabin, indoors, workplace environment, etc.
Max. Operating Temp. : 120 ˚C

Blank Test

【Testing Procedure】

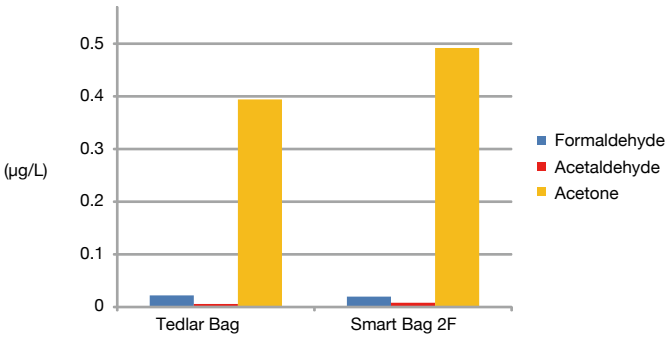
Each sampling bag (1L) was filled with nitrogen and put in an oven at 60 ˚C. 1 hour later, the each gas in the bags is withdrawn into a gas tight micro syringe and injected directly to a GC/MS. Both bags were not flushed/cleaned with nitrogen.



Aldehydes/Acetone Blank Test

【Testing Procedure】

After being filled with nitrogen, both bags were closed and put in an oven at 60 ˚C. 1 hour later, each 1L gas in the bags was vacuumed with a pump through a DNPH cartridge and eluted sample was analyzed by HPLC. The both bags were not flushed/cleaned before the test.



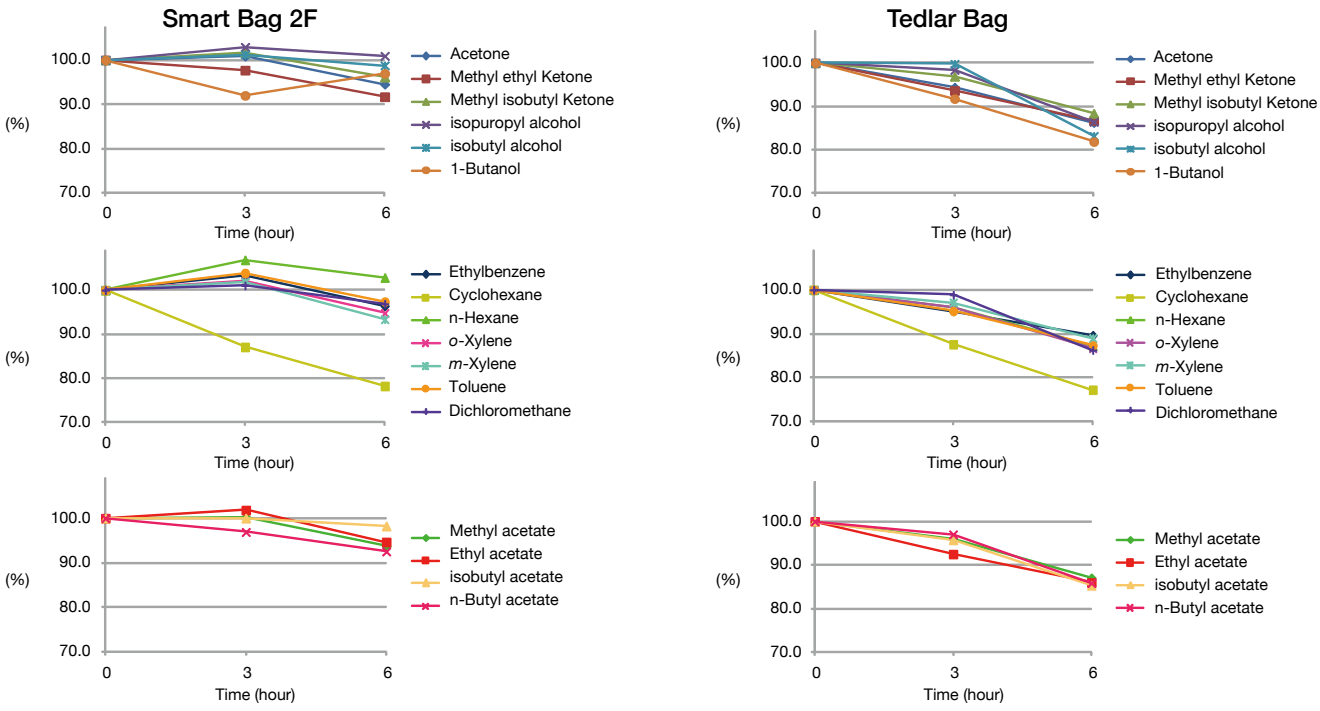
Storage Stability of Organic Solvent Gases in Smart Bag 2F and Tedlar Bag

【Testing Procedure】

The same volume with the same constitution of vaporized standards were introduced to each bag. Then nitrogen was added to each bag and were measured by a GC/FID.

【Standard Compound List】

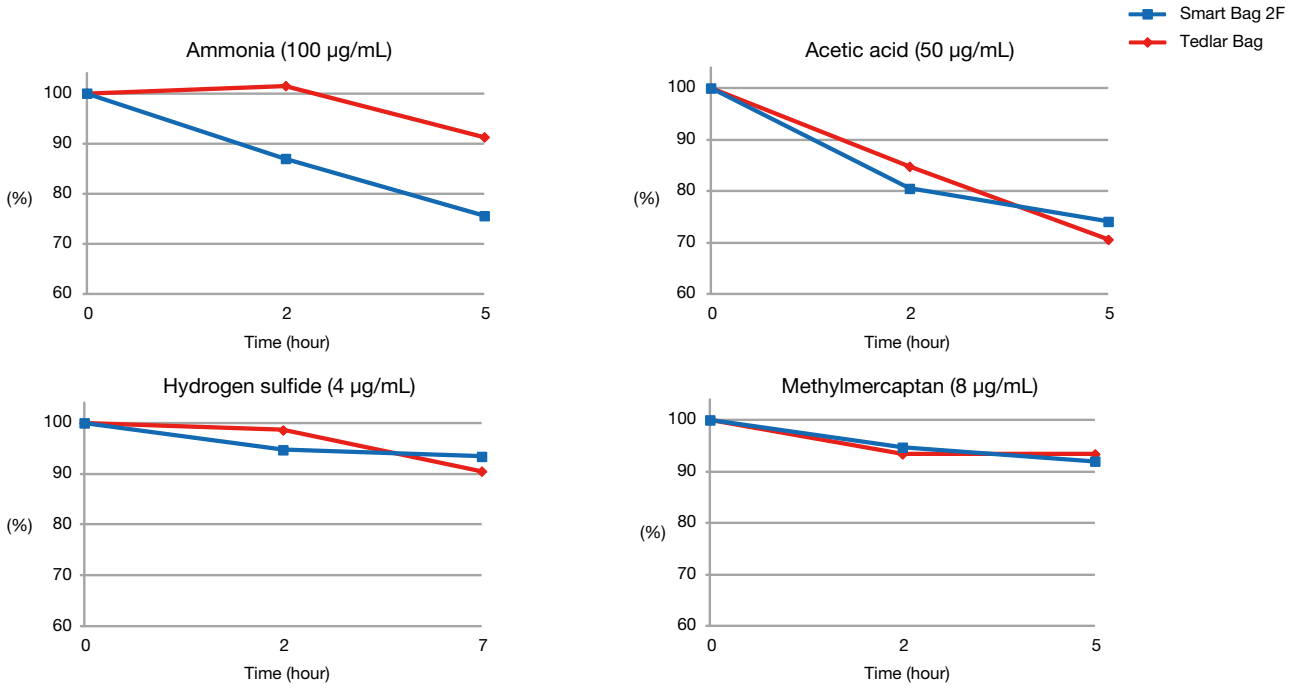
Acetone, Methylethylketone, Methyl isobutyl ketone, Isopropyl alcohol, Isobutyl alcohol, 1-Butanol, Ethylbenzene, Cyclohexane, n-Hexane,*o*-Xylene, *m*-Xylene Toluene, Dichloromethane, Methyl acetate, Ethyl acetate, Isobutyl acetate, n-Butyl acetate (50 ng/mL each)



Storage Stability of Malodorous Compounds in Smart Bag 2F and Tedlar Bag

【Testing Procedure】

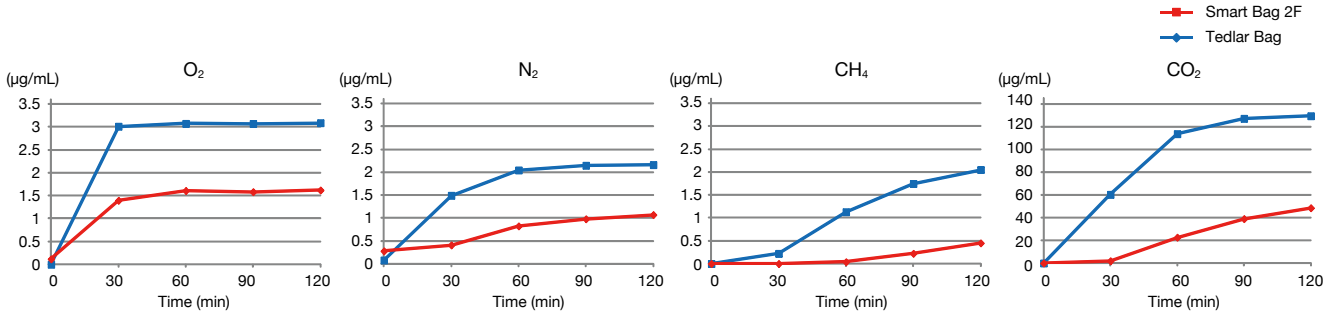
After preparation of each malodorous sample as described below, 5L Smart Bag 2F and 5 L Tedlar Bag were filled with the sample together with nitrogen gas. Concentration changes over time were calculated with a detecting tube at certain times.



Gas Permeability Test

【Testing Procedure】

Permeation rates of O_2, N_2, CH_4 and CO_2 were measured using a permeation rate measurement system on each sampling bag.



Smart Bag 2F

Type	1 L	2 L	3 L	5 L	10 L	20 L	30 L	50 L	100 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AF	3008-49101	3008-49102	3008-49103	3008-49105	3008-49110	3008-49120	3008-49130	3008-49150	3008-49160
AA	3008-98101	3008-98102	3008-98103	3008-98105	3008-98110	3008-98120	3008-98130	3008-98150	3008-98160
AAK	3008-98201	3008-98202	3008-98203	3008-98205	3008-98210	3008-98220	3008-98230	3008-98250	3008-98260
CG	3008-49401	3008-49402	3008-49403	3008-49405	3008-49410	3008-49420	3008-49430	3008-49450	3008-49460
CC	3008-98401	3008-98402	3008-98403	3008-98405	3008-98410	3008-98420	3008-98430	3008-98450	3008-98460
CCK	3008-98501	3008-98502	3008-98503	3008-98505	3008-98510	3008-98520	3008-98530	3008-98550	3008-98560
CEK	3008-98701	3008-98702	3008-98703	3008-98705	3008-98710	3008-98720	3008-98730	3008-98750	3008-98760

* Other bag sizes available upon request.

Tedlar Bag

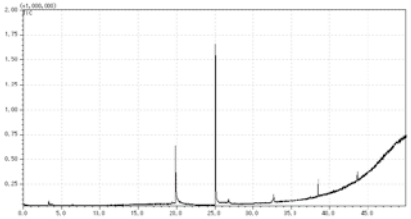
Tedlar Bag is made of Polyvinyl fluoride (PVF) film and delivers superior resistance to organic solvent gases, abrasion-resistant and a wide operating temperature range from -70 ℃ to 100° C.
Tedlar Bag is suitable for various compounds from permanent gases to organic solvent gases.

Blank Test

【Testing Procedure】

A Tedlar Bag (1L) was filled with nitrogen gas and put in an oven at 60 ℃. 1 hour later, the gas in the bag was withdrawn into a gastight micro syringe and injected directly to a GC/MS. The bag was not flushed / cleaned in advance.

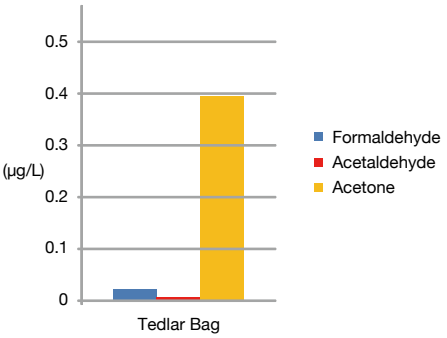
Tedlar Bag



Aldehydes/Acetone Blank Test

【Testing Procedure】

After being filled with nitrogen gas, a Tedlar bag was closed and put in an oven at 60 ℃. 1 hour later, 1L gas in the bag was vacuumed with a pump through a DNPH cartridge and eluted sample was analyzed by HPLC. These bag was not flushed / cleaned in advance.



Storage Stability of Organic Solvent Gases in Tedlar Bag

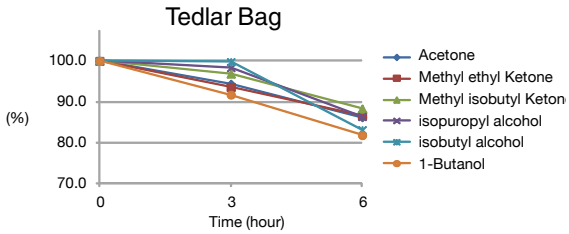
【Testing Procedure】

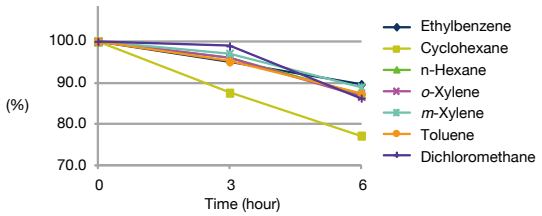
Vaporized standards as described below were introduced into Tedlar Bags. Then nitrogen gas was added into the Tedlar Bags and were measured by a GC/FID.

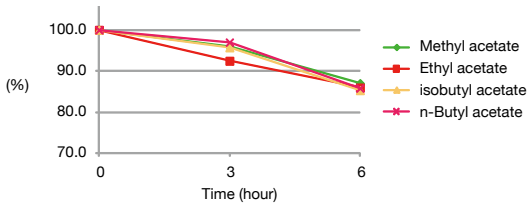
【Standard Compound List】

Aceton, Methylethylketone, Methyl isobutyl ketone, Isopropyl alcohol, Isobutyl alcohol, 1-Butanol, Ethylbenzene, Cyclohexane, n-Hexane,
o-Xylene, *m*-Xylene, Toluene, Dicholoromethane, Methyl acetate, Ethyl acetate, Isobutyl acetate, n-Butyl acetate (50ng/mL each)

Tedlar Bag



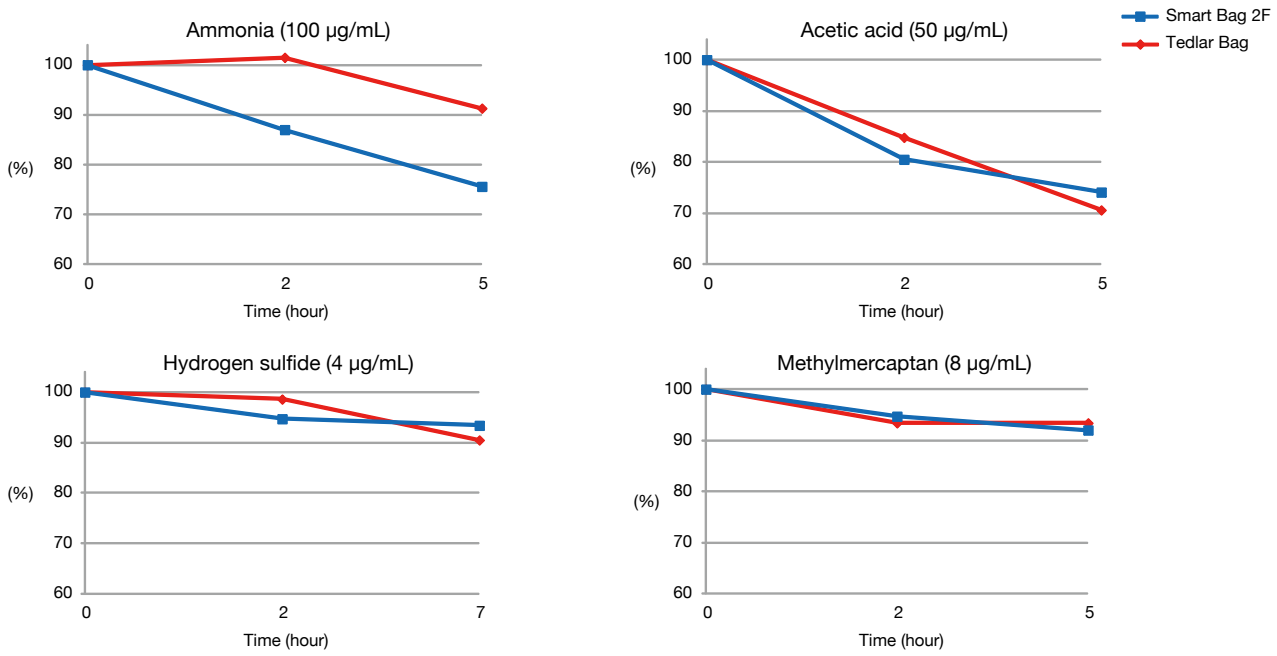




Storage Stability of Malodorous Compounds in Tedlar Bag

【Testing Procedure】

Each concentration of malodorous compound was prepared as described below and filled in a 5L Tedlar Bag together with nitrogen gas. Concentration changes over time were calculated with a detecting tube at certain times.



Gas Permeability Test

Permeation rate of O_2, N_2, CH_4 and CO_2 was measured using a permeation rate measurement system on Tedlar Bag.

($cm^3/(m^2 \cdot 24\ h \cdot 1\ atm)$)

Material	Hydrogen	Oxygen	Nitrogen	Carbon dioxide
Tedlar Bag	324.9	20.4	2.9	158.5

Tedlar Bag

Type	1 L	2 L	3 L	5 L	10 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-11101	3008-11102	3008-11103	3008-11105	3008-11110
AAK	3008-91101	3008-91102	3008-91103	3008-91105	3008-91110
AAS	3008-11701	3008-11702	3008-11703	3008-11705	3008-11710
AB	3008-11201	3008-11202	3008-11203	3008-11205	3008-11210
CC	3008-13301	3008-13302	3008-13303	3008-13305	3008-13310
CCK	3008-93301	3008-93302	3008-93303	3008-93305	3008-93310
CCS	3008-13801	3008-13802	3008-13803	3008-13805	3008-13810
CD	3008-13401	3008-13402	3008-13403	3008-13405	3008-13410
CE	3008-13501	3008-13502	3008-13503	3008-13505	3008-13510
CEK	3008-93501	3008-93502	3008-93503	3008-93505	3008-93510
EE	3008-15501	3008-15502	3008-15503	3008-15505	3008-15510
EEK	3008-95501	3008-95502	3008-95503	3008-95505	3008-95510

* Other bag sizes available upon request.

Special large type Tedlar bag, 500 mL, 1000 mL and 2000 mL are available upon request.

ANALYTIC-BARRIER Bag & Fluororesin Bag

ANALYTIC-BARRIER Bag

- Good resistance to permeation
- Low background contamination
- Max. Operating Temp. : 70 ˚C

Applications: In-cabin VOC, Permanent gases, etc.

Type	1 L	2 L	3 L	5 L	10 L	20 L	30 L	50 L	100 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-99101	3008-99102	3008-99103	3008-99105	3008-99110	3008-99120	3008-99130	3008-99150	3008-99160
AAK	3008-99201	3008-99202	3008-99203	3008-99205	3008-99210	3008-99220	3008-99230	3008-99250	3008-99260
AB	3008-99301	3008-99302	3008-99303	3008-99305	3008-99310	3008-99320	3008-99330	3008-99350	3008-99360
CC	3008-99401	3008-99402	3008-99403	3008-99405	3008-99410	3008-99420	3008-99430	3008-99450	3008-99460
CCK	3008-99501	3008-99502	3008-99503	3008-99505	3008-99510	3008-99520	3008-99530	3008-99550	3008-99560
CE	3008-99601	3008-99602	3008-99603	3008-99605	3008-99610	3008-99620	3008-99630	3008-99650	3008-99660
CEK	3008-99701	3008-99702	3008-99703	3008-99705	3008-99710	3008-99720	3008-99730	3008-99750	3008-99760

* Other bag sizes available upon request.

Fluororesin Bag

- Ethylene-tetrafluoroethylene copolymer film
- Good resistance to chemical compounds and heat
- Max. Operating Temp. : -70 ˚C ~ 110 ˚C

Applications: Organic solvent gases

Type	1 L	2 L	3 L	5 L	10 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-21101	3008-21102	3008-21103	3008-21105	3008-21110
AAK	3008-38101	3008-38102	3008-38103	3008-38105	3008-38110
CC	3008-23301	3008-23302	3008-23303	3008-23305	3008-23310
CCK	3008-38301	3008-38302	3008-38303	3008-38305	3008-38310

* Other bag sizes available upon request.

Aluminum Bag(5-Layer Foil)

- Aluminum Bag is made of laminated film (from outer: nylon, polyethylene, alum foil and polyethylene, polyethylene)
- Good permeation resistance to permanent gases, methane
- Shows relatively higher adsorption of high-boiling organic solvents, which background of organic compounds
- Max. Operating Temp. : 65 ˚C

Applications: Permanent gases

Type	1 L	2 L	3 L	5 L	10 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-26101	3008-26102	3008-26103	3008-26105	3008-26110
AAK	3008-26201	3008-26202	3008-26203	3008-26205	3008-26210
CCK	3008-26301	3008-26302	3008-26303	3008-26305	3008-26310
CEK	3008-26401	3008-26402	3008-26403	3008-26405	3008-26410

Type	20 L	30 L	50 L	100 L	200 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AAK	3008-26220	3008-26230	3008-26250	–	–
CCK	3008-26320	3008-26330	3008-26350	–	–
CEK	3008-26420	3008-26430	–	–	–
AA8*	3008-28520	3008-28530	3008-28550	3008-28591	3008-28592

* Other bag sizes available upon request.

ANALYTIC-BARRIER Bag & Fluororesin Bag

Polyester Bag

- Polyester film
- Good permeation resistance to VOC's
- Compatible with sampling of malodorous compounds at boundary lines for environmental analysis
  Applications: Volatile Organic Compounds, odor analysis

Type	1 L	2 L	5 L	10 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-60101	3008-60102	3008-60105	3008-60110
AAK	3008-60201	3008-60202	3008-60205	3008-60210
CCK	3008-60401	3008-60402	3008-60405	3008-60410

Description	Cat.No.
Polyester Bag 20 L 8 mm Sleeve, 10 pcs	3008-62000

* Other bag sizes available upon request.

SKYPIA Bag

Skypia bag is made of Ethylene-vinyl alcohol copolymer (EVOH). It is excellent in gas barrier properties, adsorption resistant.

Type	1 L	2 L	3 L	5 L	10 L
	Cat.No.	Cat.No.	Cat.No.	Cat.No.	Cat.No.
AA	3008-21101	3008-21102	3008-21103	3008-21105	3008-21110
AAK	3008-38101	3008-38102	3008-38103	3008-38105	3008-38110
CC	3008-23301	3008-23302	3008-23303	3008-23305	3008-23310
CCK	3008-38301	3008-38302	3008-38303	3008-38305	3008-38310

* Other bag sizes available upon request.

Odor Bag

- Polyester Bag
- Thickness: 25 µm
  Glass Tube: 10 (I.D) x 12 (O.D)mm
  Size: 3L (250 × 280mm)
  10L (390 × 400mm)

Description	Detail	Qty.	Cat.No
Odor Bag 3L	No.1, No.2, No.3	100 pcs	3008-31130
Odor Bag 3L	None No.	100 pcs	3008-31030
Odor Bag 10L	None No.	1 pc	3008-31500
Nose Mask	for odor bag	100 pcs	3008-35300
Silicon Cap	for odor bag	50 pcs	3008-35200

Custom Size Gas Sampling Bags

Custom size 300 L sampling bag

Our great deal of experience in this industry enable us to provide custom size gas sampling bags from 0.1 L to 500 L on request.

Accessories for Sampling Bags

Accessories for Sampling Bags

Details of Connectors for Sampling Bags and Availability of Replacement

Description	Standard Sleeve (O.D.: 6, 7, 8 mm)	6 mm O.D. Sleeve	6 mm O.D. Sleeve with Mini Valve	M6 Connector with a Septa	8 mm O.D. Sleeve with Valve	8 mm O.D. Sleeve with Valve
Photo						
Purpose	Easy to connect to the tube.	Sleeve for Smart Bags. Easy to connect to the tube. The special shape avoids the gases to remain inside the bag.	Easy to connect to the tube. The open/close valve avoids gas leak.	The silicon makes this valve suitable for using by syringe.	For Aluminium Bag. The silicon makes this valve suitable for using by syringe.	For Aluminium Bag. The silicon makes this valve suitable for using by syringe.
Material	PTFE	Polypropylene (PP)	PTFE	PTFE	Polypropylene (PP)	PTFE
Replacement	Not available	Not available	3008-39998	3008-39997	3008-29999	3008-29998

Description	Qty.	Cat.No.
6 mm O.D. Sleeve with Mini Valve	1 pc	3008-39998
M6 Connector with Septum	1 pc	3008-39997
8 mm O.D. PP Valve with sleeve	1 pc	3008-29999
8 mm O.D. PTFE Valve with sleeve	1 pc	3008-29998

Accessories for Connector

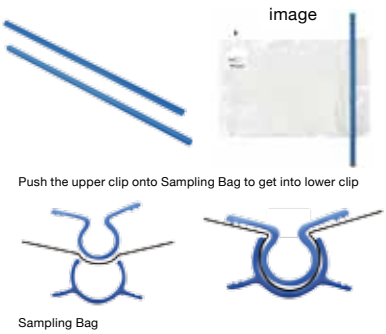
Plug for 7 and 8 mm O.D.

Cap for 6 mm O.D. sleeve

Septum for M6 connector

Description	Qty.	Cat.No.
Plug for 7 and 8 mm O.D. Sleeve	50 pcs	3008-35006
Cap for 6 mm O.D. Sleeve	30 pcs	3008-35105
Septum for M6 Connector	50 pcs	3008-35016

Clip for 10L Sampling Bags



To use with one side open sampling bags.

Specifications

length : 50 cm

Max. Operating Temp. : 65 ˚C

Description	Qty.	Cat.No.
Clip for 10L Sampling Bag	1 pc	3008-18000

Sampling Pump

SP209-100Dual·SP209-1000Dual Features

For Accuracy Control of Flow Measurement

SP209 can perform two (2) lines sampling at once by two (2) pumps. It also can perform integration of suction and its volume. Flow rate is set to display the value in 20℃ conversion.

The Large Flow Rate Range is Covered

1000 type corresponds to the sampling cartridge which suction resistance can be large different by formaldehyde and VOC by one set.
100 type is very high accuracy in low flow rate range and suitable for thermal desorption.

Correspondence to Suction Resistance Change

The suction capability of pumps is adjusted to be able to perform sampling at stable flow rate since it has a function that setting flow rate is maintained even if suction resistance of trapping materials or cartridge is changed. Especially when sampling is performed in a low flow rate range, the pump's revolution speed is getting slower, and noise or consumption power can be down.

Multiple Function

Setup of sampling conditions

A sampling start can be selected from the conditions of Real Time (year, month, day, hour and min) after setting time (minute) progress.

Setup of sampling end conditions

A sampling end can be selected from the lapsed time from a sampling start, the total sampling volume and the conditions of sequencing (it stops manually).

Sampling conditions are saved as file

Checking functions can be performed by a personal computer. Software is an option.

Data logging function

It is possible to visualize the sampling results on the PC.

Pulse Adjustment to Obtain Optimal Conditions

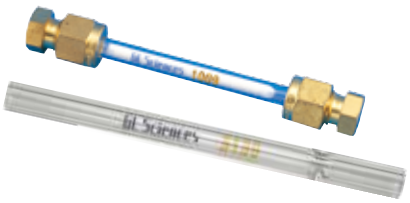
In order to obtain optimal conditions between the sampling tube and cartridge friction and the suction capability, the pump pulse is detected and the result is indicated by a three color LED (High, Good, Low). When pulse (High, Low) is displayed, adjust the pulse valve manually till you obtain "Good".

Model	SP209-100Dual	SP209-1000Dual
Suction Flow Rate Range	2 ～ 100 mL/min	20 ～ 1000 mL/min
Flow Rate Measurement Accuracy	10 ～ 20 mL/min (within ± 10 %) 21 ～ 100 mL/min (within ± 5 %)	100 ～ 200 mL/min (± 10 %) 201 ～ 1000 mL/min (± 5 %)
Flow Rate Measurement Tolerance	± 1 digit	
Setting Items	Start Condition: Promptly, After setting time, Real time End Condition: After setting time, after reaching to integrating capacity, sequence (manual stop)	
Integrating Range	0.1 ～ 999.9 L	0.1 ～ 9999.9 L
Storage Files	5	
Flow Channels	2	
Operation Temp. Humidity Range	10 ～ 35 °C (10 ～ 30 °C), 20 ～ 80 % RH (No condensation)	
Power Supply	DC12 V (AC adaptor: AC100-240 V 50/60 Hz)	
Power Consumption	DC12 V: 0.5 A AC100 V: 0.15 A AC220 V: 0.08 A	DC12 V: 0.9 A AC100 V: 0.2 A AC220 V: 0.1 A
Weight	3 kg approx.	
Dimension	260 (W) × 230 (D) × 99 (H) mm	

Description	Qty.	Cat.No.
Air Sampling Pump SP209-100Dual	1	2702-17590
Air Sampling Pump SP209-1000Dual	1	2702-17595
SP209 Dual Filter Element	10	2702-37632

Accessories for Sampling Bags

Thermal Desorption Tubes AERO TD Tube Series



AERO TD Tube is an efficient thermal desorption tube for collection of trace amount of VOC's in air. Quite wide range of adsorbents are available in AERO TD Tubes.

Description	Adsorbent Material	Qty.	Cat.No.
AERO TD Tube (for T-Dex, ATD, Markes)	Tenax TA 35/60 150 mg	10 pcs	1003-74101
	Tenax TA 60/80 150 mg	10 pcs	1003-74102
	Tenax GR 35/60 150 mg	10 pcs	1003-74201
	Carbopack B 190 mg + Carboxen 1000 140 mg	10 pcs	1003-74301
	Carbotrap 50 mg + Carboxen 1000 75 mg	10 pcs	1003-74302

Sample Tube Conditioner STC-4200

- 12 sample tubes can be installed
- 5 temperature programs can be installed
- Compatible with sample tube dimensions 6-6.35 mm O.D. and 35-178 mm in length

Specifications

Temperature Range: ambient + 10 °C to 450 °C
Dimension: 562 (W) × 520 (D) × 450 (H) mm
Weight：Approx. 44 kg

Description	Cat.No.
Sample Tube Conditioner STC-4200	2701-13075

MonoTrap (Monolithic Material Sorptive Extraction)

MonoTrap is a newly-developed, state-of-the-art sorptive media, based on the high surface area of silica monolith technology. It has been designed for the simple and fast enrichment of flavors, aromas, and fragrances; and can easily be used for the analysis of volatile and semi-volatile compounds for quality control, environmental, and forensic applications.

Features

Easy-to-use

MonoTrap performs a very low blank, it can be used directly without any conditioning.

Highly Efficient Adsorption

MonoTrap's large surface area offers larger sample loading capacity, ensuring a higher concentration of adsorbed compounds.

Complete Desorption with Low Solvent Volume

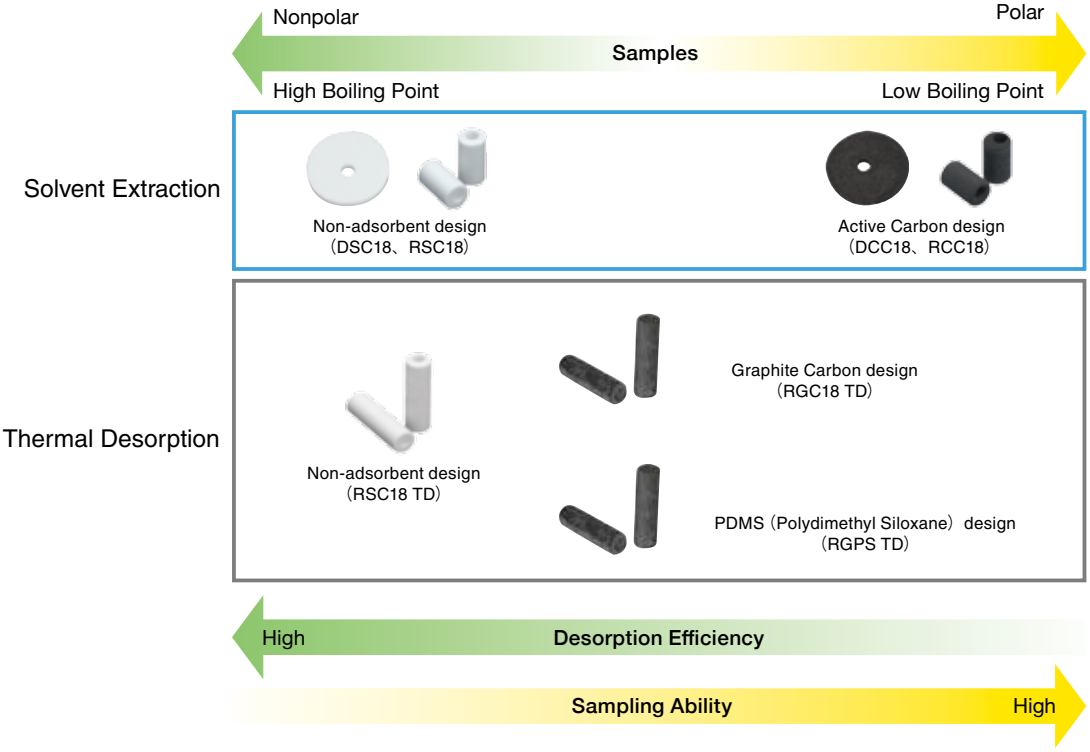
It only takes a small amount of solvent, 200 µL, to completely saturate the monolithic network and achieve desorption, though more solvent can be used to control the final concentration of your samples.

Hydrophobic Surface

MonoTrap's monolithic network is functionalized using hydrophobic ODS groups, therefore, MonoTrap will not adsorb water from aqueous samples. No need to worry about injecting water onto your GC or GC/MS when using MonoTrap as with liquid-liquid extraction or other sorptive media. This also allows for the addition of ionic salts to improve sample adsorption with MonoTrap.

Multiple Injections & Analyses

Because compounds adsorbed to MonoTrap can be extracted using 200 µL (or more) of organic solvent, it is no problem to perform multiple injections of your sample. With MonoTrap, it is even possible to make injections on different GC systems utilizing different column phases! Solvent extraction can even be accomplished within a GC autosampler vial using the rod shaped MonoTrap.

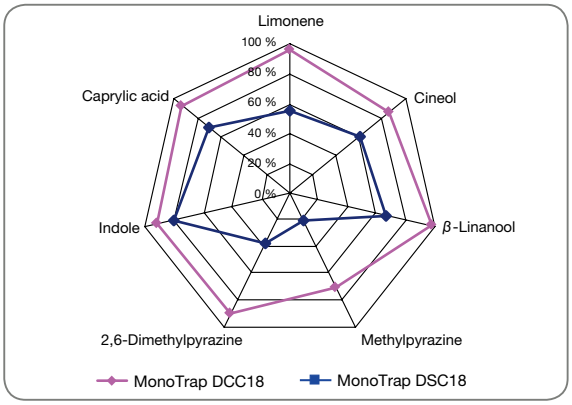


Superior Enrichment Capabilities Using Activated Carbon/Graphite Carbon in Addition to ODS

The graph on the right shows a comparison between the recovery rate of DCC18 (containing activated carbon) and DSC18 (containing only ODS groups). For a relatively non-polar compound such as Indole, both the MonoTrap DCC18 and DSC18 have approximately the same enrichment capabilities.

With more polar compounds, such as Methylpyrazine, the activated carbon groups on the MonoTrap DCC18 do a much better job of enrichment than the MonoTrap DSC18, which contains only hydrophobic ODS groups.

Recoveries were calculated using dichloromethane as the extraction solvent.



MonoTrap (Monolithic Material Sorptive Extraction)

How to Use MonoTrap

Solvent Extraction

Thermal Desorption

Sample Adsorption

Head Space Gas Sampling

MT Holder & MT Stand
Grasp the MonoTrap with tweezers and insert the holder into the hole on MonoTrap.

Hold MT Holder with pliers which ends have been cleaned and pass it through septum. Put a cap on top of holder.

Clean Pin Hole Septum with Vial (40 mL)
Tighten the septum on vial.

Stirring Sampling

Use an agitation bath for heating and stirring.
For screening without heating, use handless shaker
(Cat.No. 8500 - 50000)
and special holder
(Cat.No. 8500 - 50001)
※ We recommend EYELA NTS- 4000 B series for agitation bath.
Please contact our local dealer for more details of the agitation bath and vial rack.

Put the sample into the vial and float MonoTrap

Handsfree shaker and holder

Passive Sampling

※ Please contact our local dealer for the Tedlar bags

Solvent Extraction

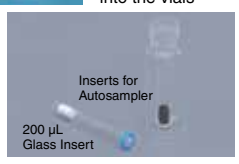
Extraction from the Disk Type

Fill the MT Extract Cup with the extraction solvent

Put the MonoTrap and tighten the septum

Pour pure water into the vials

Extraction from the Rod Type



Thermal Desorption

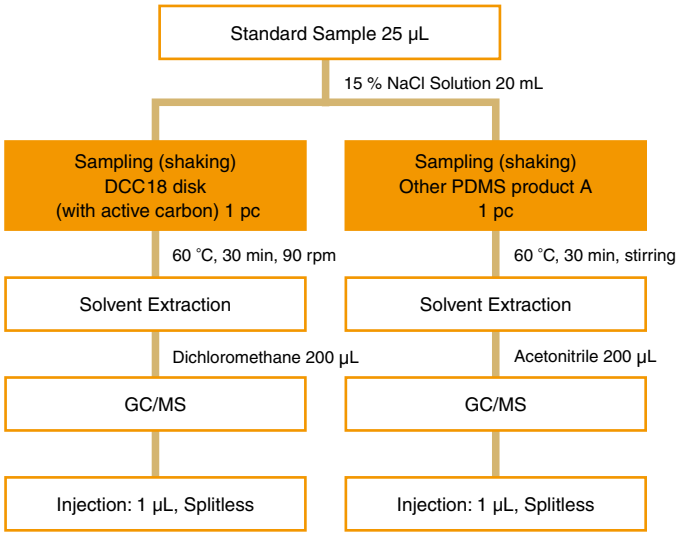
Gerstel, T-Dex and Linex glass tubes are available

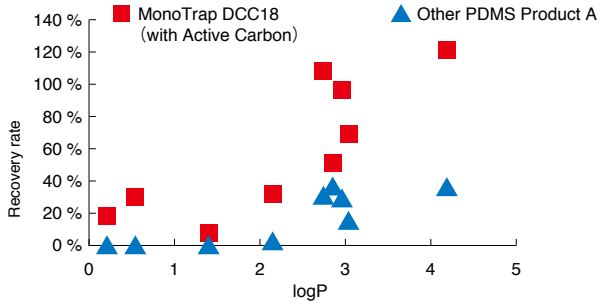
MonoTrap Performs High Recovery

MonoTrap for Solvent Extraction

MonoTrap DCC18 shows high recovery rates for low to high logP compounds and hydrophilic to hydrophobic compounds. Unlike other products for which usable extraction solvents are limited to methanol and acetonitrile, dichloromethane with higher solvent extraction power can be used for MonoTrap.
To obtain a high recovery MonoTrap is an easy-to use media to select the types of extraction solvents.

Standard samples : Limonene, Cineol, β -Linalool, Methylpyrazine, 2,6-dimethylpyrazine, Indole, Camphor, Octanoic acid, Coumarin, 2' -acetonaphthone.
200 µg/mL of each in Methanol.

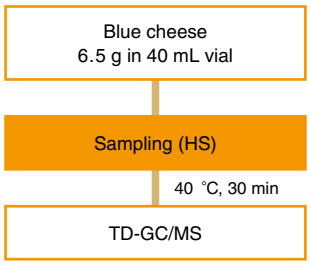




Recovery rate comparison between
MonoTrap DCC18 and other PDMS product A

Component	logP	MonoTrap DCC18 (with Active Carbon)	Other PDMS Product A
Methylpyrazine	0.21	18.8 %	0.6 %
2,6-Dimethylpyrazine	0.54	30.7 %	1.8 %
Indole	2.14	32.0 %	3.5 %
Cineol	2.74	107.0 %	30.5 %
Linalool	2.97	97.0 %	29.8 %

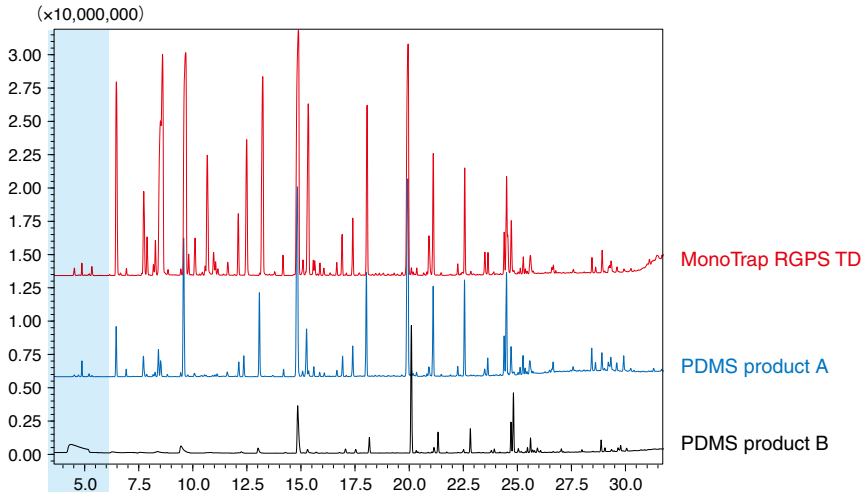
MonoTrap for Thermal Desorption



Here is an example of blue cheese, after sampling fragrance of blue cheese with MonoTrap RGPS TD, analysis was performed with Thermal Desorption system.

System	: GC/MS-Thermal Desorption (T-Dex Ⅱ)
Column	: InertCap Pure-WAX
	0.32 mm I.D. x 60 m df = 0.50 µm
Col.Temp.	: 40 °C (3 min hold) - 6 °C/min - 250 °C (30 min hold)
Carrier Gas	: He 1 mL/min (constant flow)
Desorb Temp.	: 250 °C
Time	: 5 min
Flow	: 7 mL/min
Split	: Splitless
Cryo Trapping	: -150 °C
Injection Temp.	: 250 °C
Detection	: MS Scan (28.5 - 600 m/z)

Comparison of different sampling tools on the flavor of blue cheese analysis.



Sampling blue cheese with MonoTrap RGPS TD

MonoTrap (Monolithic Material Sorptive Extraction)

MonoTrap Series Line-up

	Description	Recommended Operating Temperature	Appearance	Type	Size	Active Carbon	Graphite Carbon	ODS Function	PDMS	Qty.	Cat.No.
Solvent Extraction	MonoTrap DCC18	—		Disk	Diameter：10 mm Thickness：1 mm	●		●		50 pcs	1050-72101
	MonoTrap RCC18	—		Rod	Diameter：2.9 mm Length：5 mm	●		●		50 pcs	1050-72201
	MonoTrap DSC18	—		Disk	Diameter：10 mm Thickness：1 mm			●		50 pcs	1050-71101
	MonoTrap RSC18	—		Rod	Diameter：2.9 mm Length：5 mm			●		50 pcs	1050-71201
Thermal Desorption	MonoTrap RGPS TD*	250 °C		Rod	Diameter：2.9 mm Length：10 mm		●		●	30 pcs	1050-74202
	MonoTrap RSC18 TD*	200 °C		Rod	Diameter：2.9 mm Length：10 mm			●		30 pcs	1050-73201
	MonoTrap RGC18 TD*	200 °C		Rod	Diameter：2.9 mm Length：10 mm		●	●		30 pcs	1050-74201

* : MonoTrap for Thermal Desorption is packed individually in an ampoule

MonoTrap's Nomenclature & Character

Ex) MonoTrap ① R ② G ③ C18 ④ TD

① Shape --- D：disk type, R：rod type
② Adsorbent --- C：Chemical bonded with active carbon, G：Chemical bonded with graphite carbon, S：without adsorbent
③ Function group/stationary phase --- C18：octadecyl C18, end-capped
PS ：coded withPDMS (Polydimethyl Siloxane), end-capped
④ Desorption --- TD：for thermal desorption

MonoTrap (Monolithic Material Sorptive Extraction)

Start-up Kit

Type	Description	Contens	Cat.No.
Solvent Extraction	MMSE Start Up KIT for SE	①～④ x 20 pcs, ⑧～⑩, ⑪ x 5 pcs, ⑫ x 40 pcs	1050-79001
Thermal Desorption	MMSE Start Up KIT for TD(OPTIC/LINEX)	⑤～⑦ x 10 pcs, ⑧～⑨, ⑪ x 5 pcs, ⑬ x 3 pcs	1050-78001
	MMSE Start Up KIT for TD(T-Dex/ATD/TD-20)	⑤～⑦ x 10 pcs, ⑧～⑨, ⑪ x 5 pcs, ⑭ x 3 pcs	1050-78002
	MMSE Start Up KIT for TD(Gerstel-TDS)	⑤～⑦ x 10 pcs, ⑧～⑨, ⑪ x 5 pcs, ⑮ x 3 pcs	1050-78003
	MMSE Start Up KIT for TD(Gerstel-TDU)	⑤～⑦ x 10 pcs, ⑧～⑨, ⑪ x 5 pcs, ⑯ x 3 pcs	1050-78005

Solvent Extraction

① DCC18

② RCC18

③ DSC18

④ RSC18

Thermal Desorption

⑤ RSC18 TD

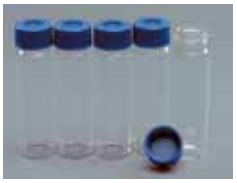
⑥ RGC18 TD

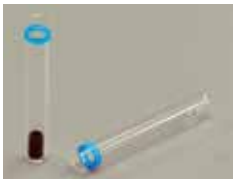
⑦ RGPS TD

⑧ MT Holder 5 pcs

⑨ MT Stand 1 pcs

⑩ MT Extract Cup with Vial (20 mL) 5 pcs


⑪ Clean Pin Hole Septum with Vial (40 mL)


⑫ 200 µL Glass Insert

⑬ MonoTrap TD Liner for OPTIC/LINEX

⑭ MonoTrap TD Liner for T-Dex/ATD/TD- 20

Accessories

Description	Qty.	Cat. No.
⑧ MT Holder	5 pcs	1050-79003
⑨ MT Stand	1 pc	1050-79004
⑩ MT Extract Cup with Vial (20 mL)	5 pcs	1050-79005
⑪ Clean Pin Hole Septum with Vial (40 mL)	72 pcs	1050-79006
⑫ 200 µL Glass Insert (Flat-bottom)	500 pcs	1030-17211

Glass Tube for Thermal Desorption

Description	Qty.	Cat. No.
⑬ MonoTrap TD Liner for OPTIC/LINEX	1 pc	1003-75001
⑭ MonoTrap TD Liner for T-Dex/ATD/TD-20	1 pc	1003-75002
⑮ MonoTrap TD Liner for Gerstel-TDS	1 pc	1003-75003
⑯ MonoTrap TD Liner for Gerstel-TDU	1 pc	1003-75004

Passive Sampling Bag

Convenient Tedlar bags for passive sampling with MonoTrap

Description	Qty.	Cat.No.
TK-5 MT Passive Bag	1pc	1050-79007
TK-10 MT Passive Bag	1pc	1050-79008

Sampler for Skin Gases MonoTrap SG DCC18

MonoTrap SG DCC18 is a sampler for skin gases which uses monolithic silica adsorption with high adsorption efficiency, and enables to adsorb diffused gases from the skin out of touch with human body but adsorb in space from surface of the skin.

Description	Qty.	Cat.No.
MonoTrap SG DCC18	10 sets	1050-70001
	20 sets	1050-70002

Applications

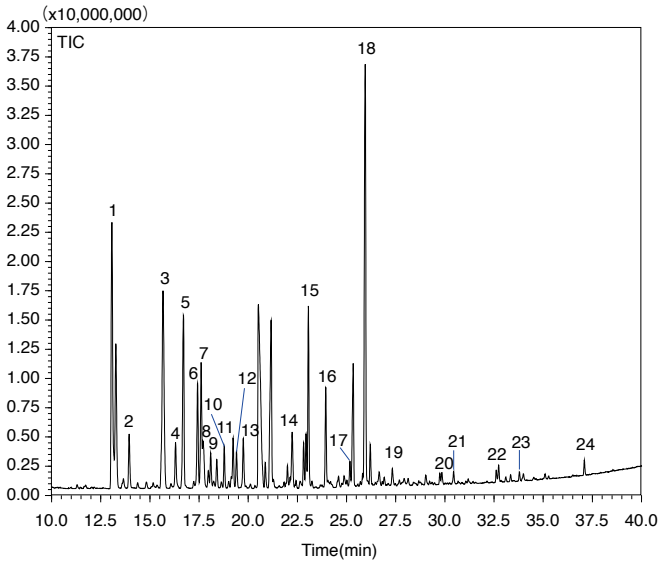
Easy Enrichment of Coffee Fragrance

Sample (coffee) 3.0 g

Sampling (HS)
MonoTrap RGPS TD 1 pc

60 ℃, 10 min

TD-GC/MS



System : GC/MS-Thermal Desorption (OPTIC-4)
Column : InertCap Pure-WAX
0.25 mm I.D. x 60 m df = 0.25 µm
Col.Temp. : 40 ˚C (3 min hold)- 5 ˚C /min - 250 ˚C
Carrier Gas : He 1 mL/min (constant flow)

Desorb Temp. : 250 ˚C
Time : 10 min
Flow : 1 mL/min
Split : Split 1:20 (split flow 20 mL/min)
Cryo Trapping : -150 ˚C
Injection Temp. : 250 ˚C
Detection : MS Scan (28.8 - 600 m/z)

1. Pyridine
2. Pyrazine
3. Methylpyrazine
4. 3-Hydroxy-2-butanone
5. 1-Hydroxy-2-propanone
6. Dimethylpyrazine
7. Dimethylpyrazine
8. Ethylpyrazine
9. Dimethylpyrazine
10. 1-Hydroxy-2-butanone
11. Ethylmethylpyrazine
12. Ethylmethylpyrazine
13. Trimethylpyrazine
14. Acetylfuran
15. Furfuryl acetate
16. 2-Formyl-5-methylfuran
17. 2-Formyl-1-methylpyrrole
18. 2-Furanmethanol
19. 1-Acetyl-1,4-dihydropyridine
20. 1-Furfurylpyrrole
21. Guaiacol
22. Maltol
23. 1H-Pyrrole-2-carboxaldehyde
24. 2-Methoxy-4-vinylphenol

* According to NIST Mass Spectral Library, Sample 6, 7, 9 and Sample 11, 12 are isomers.

Fragrance of Peach Juice

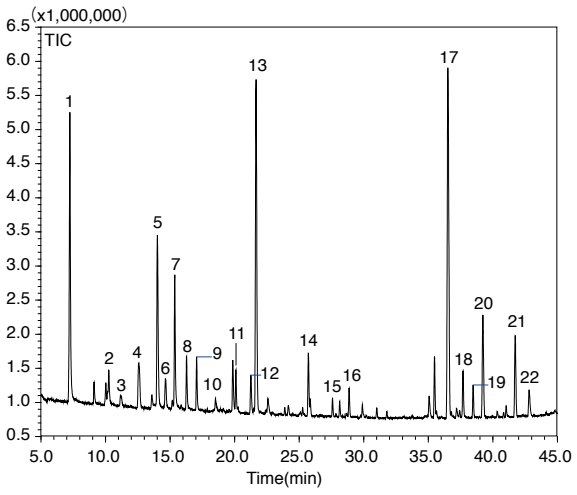
Peach juice 30 mL

Sampling (agitate)
MonoTrap RGPS TD 1 pc

36 ℃, 10 min, 160 rpm

Rinse

TD-GC/MS



System : GC/MS-Thermal Desorption (OPTIC-4)
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col.Temp. : 40 ˚C (5 min hold) - 4 ˚C /min - 250 ℃
Carrier Gas : He 1 mL/min (constant flow)

Desorb Temp. : 250 ˚C
Time : 10 min
Flow : 1 mL/min
Split : Split 1:20 (split flow 20 mL/min)
Detection : MS Scan (28.8 - 600 m/z)

1. Isoamyl acetate
2. Isopentanol
3. Ethyl hexanoate
4. Hexyl acetate
5. Hexenyl acetate
6. Hexenyl acetate
7. Hexanol
8. 3-Hexenol
9. 2-Hexenol
10. Furfural
11. Benzaldehyde
12. *p*-Menthan-2-one
13. Linalool
14. Terpineol
15. Geranyl acetate
16. Damascenone
17. γ -Decalactone
18. δ -Decalactone
19. 6-Pentyl-5,6-dihydro-2H-pyran-2-one
20. δ -Undecalactone
21. γ -Dodecalactone
22. δ -Dodecalactone

* According to NIST Mass Spectral Library, Sample 5 and 6 are isomers.

Flower Hyacinth Aroma

Sample

Sampling (passive)
MonoTrap DCC18 1 pc

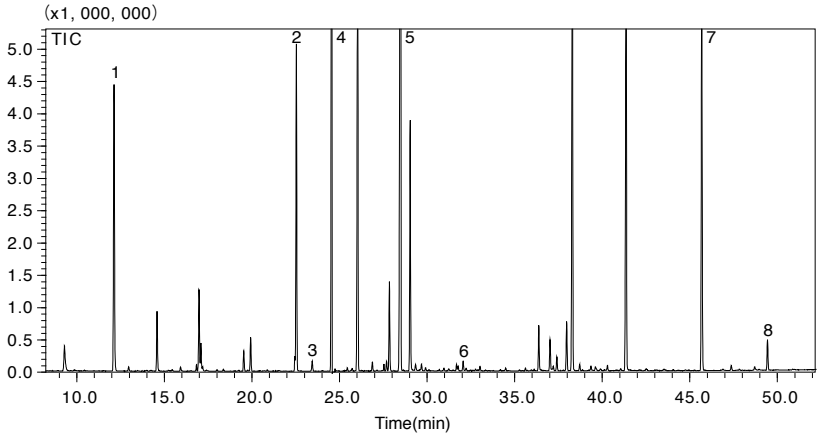
Leave at room temperature
for 3 hours

Solvent Extraction
/ Concentration

Dichloromethane 1000 µL
Ultrasonication for 5 min
Enrich by N_2 purge to 100 µL

GC/MS

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 °C (5 min hold - 4 °C /min - 250 °C (5 min hold)
Carrier Gas : He 120 kPa
Injection : Splitless 0.5 min
250 °C
Detection : MS Scan (40-350 m/z)
Sample Size : 1.0 µL



1. β -cis-Ocimene
2. β -Linalool
3. Caryophyllene
4. Benzoic acid, methyl ester
5. α -Farnesene
6. Benzyl Alcohol
7. Indole
8. Benzyl Benzoate

* Identificated the results from standard samples.

Red Wine Aroma

Sample 20 mL

Sampling (HS)
MonoTrap DCC18 1 pc

60 ℃, 30 min

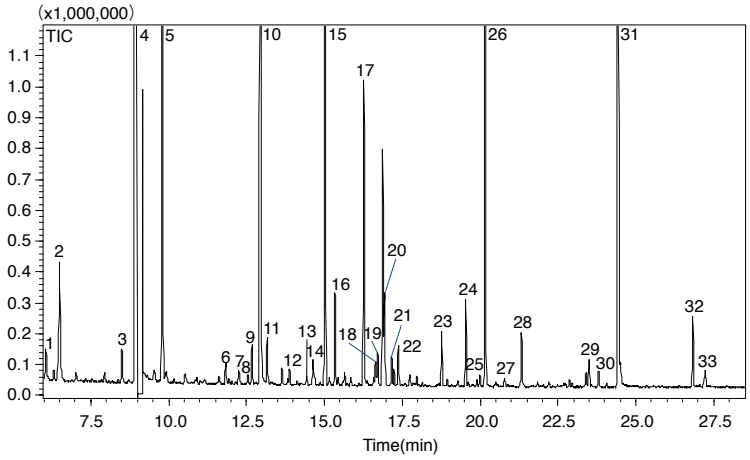
Solvent Extraction

Dichloromethane 300 µL
Ultrasonication for 5 min

GC/MS

image

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 °C (5 min hold) - 6 °C /min -250 °C (5 min hold)
Carrier Gas : He 95 kPa
Injection : Splitless
250 °C
Detection : MS Scan (55-400 m/z)
Sample Size : 1.0 µL



1. 2,2,6-Trimethyl-6-vinyltetrahydropyran
2. Isoamyl acetate
3. Limonene
4. 1-Pentanol
5. Ethyl hexanoate
6. Maleic anhydride
7. 3-Methylpentanol
8. 1,1-Dimethoxy-2-propanol
9. Ethyl 2-hexenoate
10. 1-Hexanol
11. *cis*-3-Hexen-1-ol
12. Nonanal
13. *cis*-2-Hexen-1-ol
14. Ethyl 2-hydroxy-3-methylbutanoate
15. Ethyl octanoate
16. Furfural
17. 2-Ethyl-1-hexanol
18. Benzaldehyde
19. 3-Ethyl-4-methylpentanol
20. 2-Bornene
21. *n*-Propyl propionate
22. Ethyl dl-2-hydroxycaproate
23. β -Cyclocitral
24. Ethyl decanoate
25. α -D-Galactopyranose methyl glycoside
26. Diethyl succinate
27. 3- (Methylthio) -1-propanol
28. 1,5,8-Trimethyl-1,2-dihydronaphthalene
29. Hexanoic acid
30. Benzyl Alcohol
31. Phenylethyl Alcohol
32. Diethyl dl-malate
33. Octanoic Acid

* According to NIST Mass Spectral Library: Red.... [Food] Fragrance Encyclopedia by Japan Perfumery & Flavoring Association.

Applications

Mushroom Fragrance

Sample

2 kinds of Mushrooms produced in different areas 38 g/each

Sampling (Still Standing)
MonoTrap DCC18 5 pcs

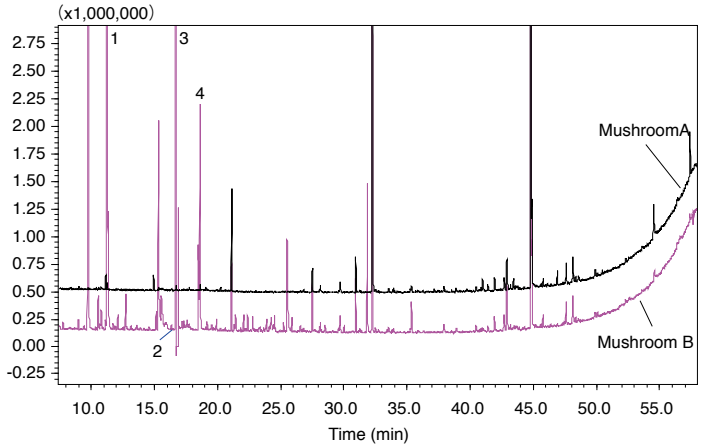
Room temperature, 12 hours

Solvent Extraction / Concentration

Diethylether 1000 µL
Ultrasonication for 5 min
Enrich by N_2 purge to a few µL

GC/MS

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 °C (5 min hold) - 4 °C /min - 250 °C (5 min hold)
Carrier Gas : He 95 kPa
Injection : Split 1:10
: 250 °C
Detection : MS Scan (25-450 m/z)
Sample size : 1.0 µL



< Comparison of Fragrances by Area % >

	Mushroom A	Mushroom B
1. 3-Octanone	1.8 %	35.8 %
2. Dimethyl trisulfide	1.7 %	4.5 %
3. 3-Octanol	1.7 %	33.1 %
4. 1-Octen-3-ol	2.3 %	4.5 %

* References: [Food] Fragrance Encyclopedia by Japan Perfumery & Flavoring Association.

Pu-erh Tea

Sample

Brew 5 g tea leaves with 15 mL hot water

Sampling
MonoTrap DCC18 1 pc

60 °C, 30 min

Solvent Extraction

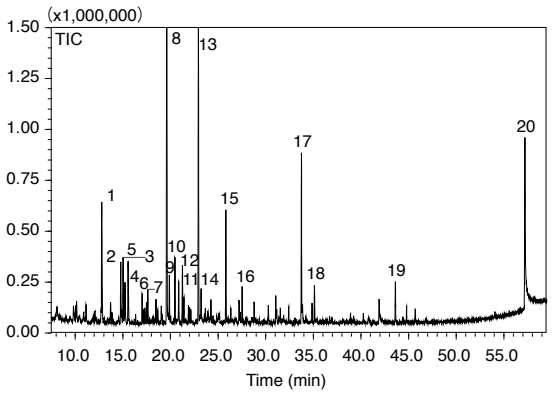
Dichloromethane 1000 µL
Ultrasonication for 5 min

Enrichment

Enrich by N_2 purge to 100 µL

GC/MS

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 °C (5 min hold) - 4 °C /min - 250 °C
Carrier Gas : He 1 mL/min
Injection : Splitless
250 °C
Detection : MS Scan (40-600 m/z)
Sample Size : 1.0 µL



1. Methylpyrazine
2. Dimethylpyrazine
3. Dimethylpyrazine
4. Ethylpyrazine
5. 6-Methyl-5-hepten-2-one
6. 2-Ethyl-6-methylpyrazine
7. Trimethylpyrazine
8. Furfural
9. Acetol acetate
10. 2,4-Heptadien-1-al
11. 2-Acetylfuran
12. Benzaldehyde
13. 2-Formyl-5-methylfuran
14. Methyl 2-furoate
15. 2-Furanmethanol
16. Dimethoxybenzene
17. Trimethoxybenzene
18. Pyrrole-2-aldehyde
19. Coumaran
20. Caffeine

* According to NIST Mass Spectral Library, Sample 2 and 3 are isomers.

Cinnamon

Sample

Sampling (HS)
MonoTrap RCC18 2 pcs

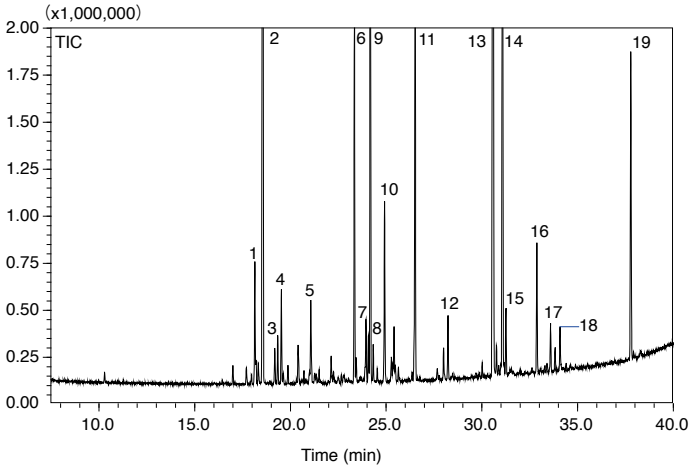
Solvent Extraction

Ethanol 200 µL
Ultrasonication 5 min

GC/MS

Image

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 °C (5 min hold) - 5 °C /min - 250 °C
Carrier Gas : He 1 mL/min
Injection : Split 1 : 20
250 °C
Detection : MS Scan (35-600 m/z)
Sample Size : 1.0 µL



1. Cycloisosativene
2. α -Cubebene
3. Sativen
4. Sativen
5. β -Elemene
6. γ -Muurolene
7. Eudesma-4 (14) ,11-diene
8. β -Chamigrene
9. α -Muurolene
10. δ -Cadinene
11. Calamenene
12. α -Calacorene
13. Cinnamaldehyde
14. 3-Methyl-7,8-dihydroquinolin-5 (6H) -one
15. Cedr-8-ene
16. Murolan-3,9 (11) -diene-10-peroxy
17. α -Cadinol
18. Cadalene
19. Coumarin

* According to NIST Mass Spectral Library, Sample 3 and 4 are isomers.

VOC from Burnt Materials

Sample

Put the wood (12.75 g) on soil, pour gasoline over the wood and burn.

Sampling (Passive)
MonoTrap RCC18 2 pcs

Leave for 1 hour at room temperature.

Rinse

Take the MonoTrap out after sampling. Rinse lightly with pure water to remove soil and dirt from the surface.

Solvent Extraction

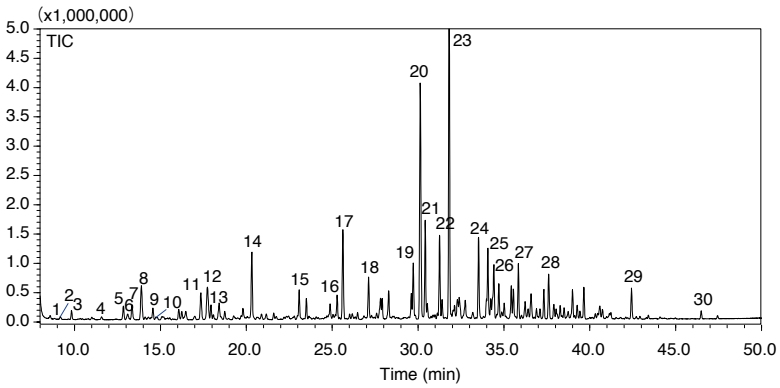
Acetone 200 µL
Ultrasonication 5 min

GC/MS

Burning

Recovered clod part

System : GC/MS
Column : InertCap AQUATIC
0.25 mm I.D. x 60 m df = 1.00 µm
Col.Temp. : 40 °C (5 min hold) - 4 °C /min - 220 °C
Carrier Gas : He 1 mL/min
Injection : Split 1:50
220 °C
Detection : MS Scan (30 - 600 m/z)
Sample Size : 1.0 µL



1. 2-Methylpentane
2. 3-Methylpentane
3. Hexane
4. Methylcyclopentane
5. 2-Methylhexane
6. 2,3-Dimethylpentane
7. 3-Methylhexane
8. Trimethylpentane
9. Heptane
10. Benzene
11. Trimethylpentane
12. Trimethylpentane
13. 2-Methylheptane
14. Toluene
15. 2-Methyloctane
16. Ethylbenzene
17. *m,p* -Xylene
18. o -Xylene
19. Propyl benzene
20. Ethyl methyl benzene
21. Trimethyl benzene
22. Ethyl methyl benzene
23. Trimethyl benzene
24. Propyl toluene
25. Cymene
26. Indane
27. Cymene
28. 1-Ethyl-3,5-dimethylbenzene
29. Naphthalene
30. 1-Methylnaphthalene

* According to NIST Mass Spectral Library, Sample 8, 11 and 12; 20 and 22; 21 and 23; 25 and 27 are isomers.

VOC from Papers Before & After Printing

Sample

1.Chopped paper before color print 10 g
2.Chopped paper after color print 10 g

Sampling
MonoTrap RCC18 5 pcs

Put MonoTrap into the vial
and leave for 3 days at 60 ℃

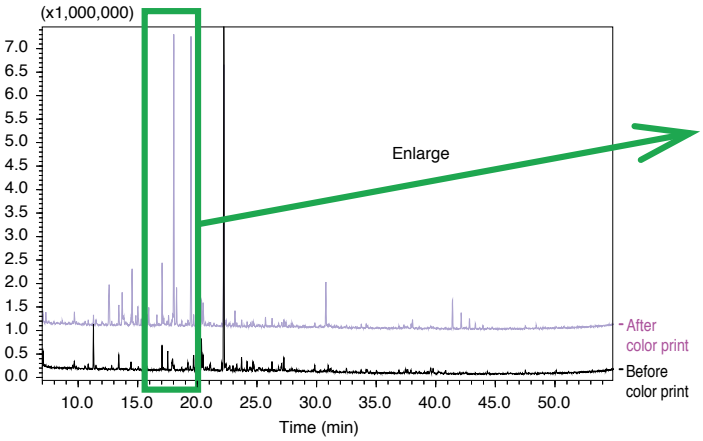
Solvent Extraction

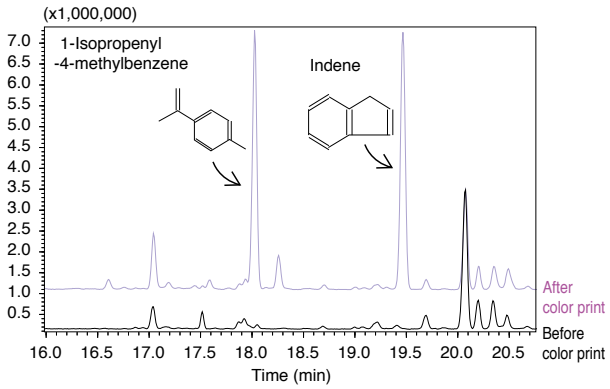
Dichloromethane 500 µL
Ultrasonication for 5 min

GC/MS

Left : Before color print
Right : After Before color print

System : GC/MS
Column : InertCap Pure-WAX
0.25 mm I.D. x 30 m df = 0.25 µm
Col. Temp. : 40 ˚C (5 min hold) - 4 ˚C /min - 250 ˚C
Carrier Gas : He 1 mL/min
Injection : Splitless
250 ˚C
Detection : MS Scan (35-500 m/z)
Sample Size : 1.0 µL





* According to NIST Mass Spectral Library.

VOC from Putrid Cabbage

Sample

Cut into strips, put 25 g into 100 mL vial

Putrefacient cabbage

60 ˚C, a certain period

Sampling (Passive)
MonoTrap RCC18 3 pcs

Room temperature, 3 hours

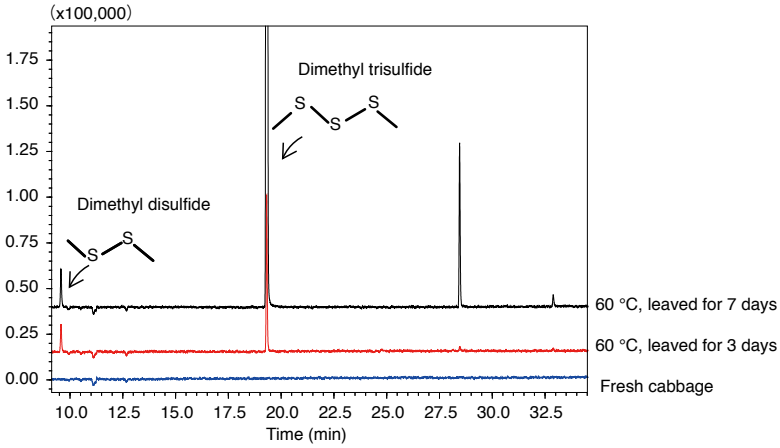
Solvent Extraction

Diethyl ether/ n-pentane = 1:1
Mixed sample 500 µL
Ultrasonication for 5 min

GC/FPD

Left : frewwsh Cabbage
Right : 60 ˚C, putrefacient cabbage
leaved for 3 days

System : GC/FPD
Column : InertCap AQUATIC
0.25 mm I.D. x 60 m df = 1.00 µm
Col. Temp. : 40 ˚C (5 min hold) - 6 ˚C /min - 220 ˚C (10 min hold)
Carrier Gas : He 1 mL/min
Injection : Split 1:50
220 ˚C
Detection : FPD (S)
Sample Size : 1.0 µL



* According to NIST Mass Spectral Library.

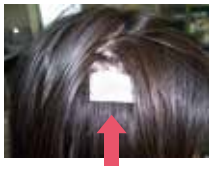
VOC from Scalp

Sample

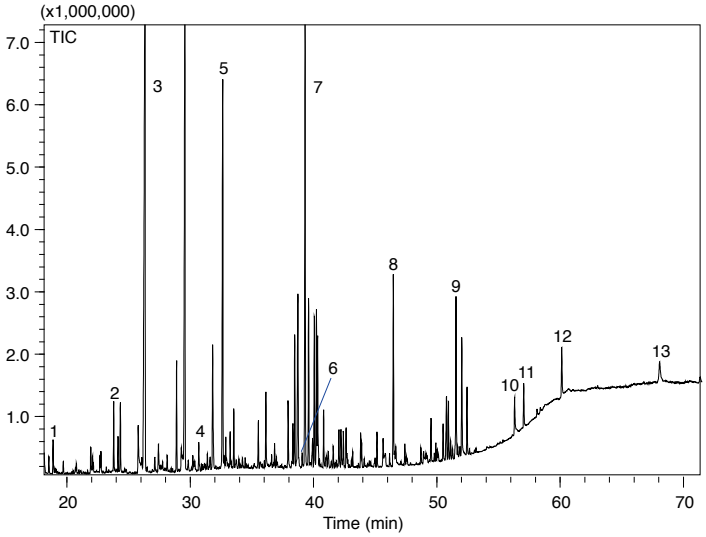
Sampling (Passive)
MonoTrap RGPS TD 1 pc

Room temperature 3 hours

TD-GC/MS



System	: GC/MS-Thermal Desorption (T-Dex Ⅱ)
Column	: InertCap Pure-WAX
	0.25 mm I.D. x 60 m df = 0.25 µm
Col.Temp.	: 35 °C (5 min hold) - 4 °C /min - 250 °C
Carrier Gas	: He 1 mL/min (constant flow)
Desorb Temp.	: 250 °C
Time	: 5 min
Flow	: 5 mL/min
Split	: Splitless
Cryo Trapping	: -150 °C
Injection Temp.	: 250 °C
Detection	: MS Scan (28.8 - 600 m/z)



1. D-Limonene
2. 6-Methyl-5-hepten-2-one
3. Nonanal
4. Linalool
5. Octadecane
6. Hexanoic acid
7. Dinonyl sebacate
8. Phenoxyethyl alcohol
9. Octanal, 2- (phenylmethylene) -
10. 1-Octadecanol
11. Benzyl Benzoate
12. Tetradecanoic acid
13. Squalane

* According to NIST Mass Spectral Library.

Tabacco

Sample

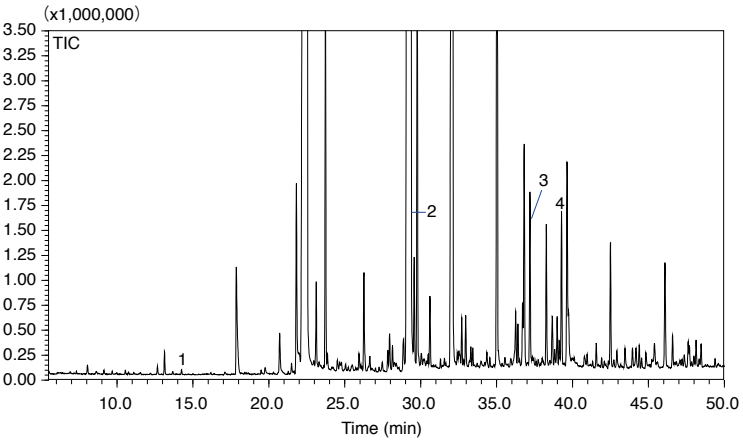
Samapling (Still Standing)
MonoTrap RGC 18 TD 1 pc

60 °C, 90 min

TD-GC/MS

Image

System	: GC/MS-Thermal Desorption (T-Dex Ⅱ)
Column	: InertCap Pure-WAX
	0.25 mm I.D. x 30 m df = 0.25 µm
Col.Temp.	: 40 °C (5 min hold) - 4 °C /min- 250 °C
Carrier Gas	: He 1 mL/min (constant flow)
Desorb Temp.	: 200 °C
Time	: 5 min
Flow	: 2 mL/min
Split	: Splitless
Cryo Trapping	: -160 °C
Injection Temp.	: 250 °C
Detection	: MS Scan (40 - 600 m/z)



1. 6-Methyl-5-hepten-2-one
2. *trans*-Geranylacetone
3. Megastigmatrienone
4. Megastigmatrienone

* According to NIST Mass Spectral Library, Sample 3 and 4 are isomers.

Applications

Parmesan Cheese

Sample 10 g

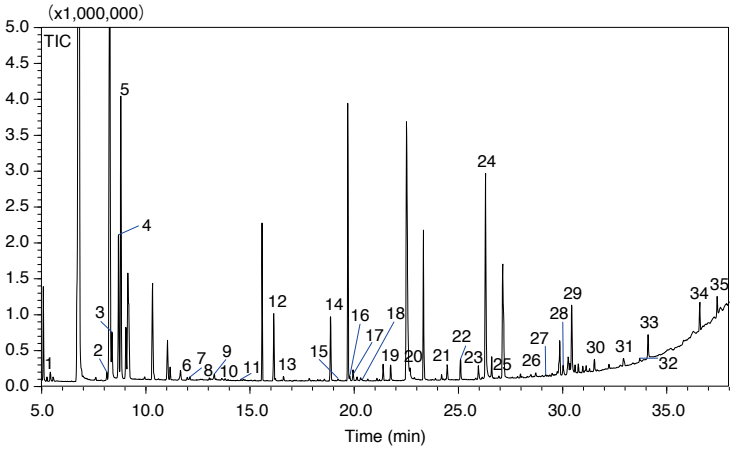
Sampling (HS)
MonoTrap RGC 18 TD 1 pc

60 ℃, 30 min

TD-GC/MS

System : GC/MS-Thermal Desorption (T-Dex Ⅱ)
Column : InertCap Pure-WAX
0.25 mm I.D. x 60 m df = 0.25μm
Col.Temp. : 40 ℃ (5 min hold) - 6 ℃ /min - 250 ℃
Carrier Gas : He 1 mL/min (constant flow)

Desorb Temp. : 200 ℃
Time : 5 min
Flow : 1 mL/min
Split : Splitless
Cryo Trapping : -150 ℃
Injection Temp. : 250 ℃
Detection : MS Scan (28.5 - 600 m/z)



1. Methanethiol
2. Ethyl Acetate
3. 2-Butanone
4. 2-methylbutanal
5. 3-methylbutanal
6. 1-Propanol
7. Toluene
8. Dimethyl disulfide
9. Hexanal
10. 2-Pentenal
11. 3-Penten-2-one
12. 2-Heptanone
13. D-Limonene
14. Acetoin
15. Acetol
16. Dimethylpyrazine
17. Dimethylpyrazine
18. Dimethylpyrazine
19. 2-Nonanone
20. 2,5-Dimethyl-3-ethylpyrazine
21. Benzaldehyde
22. Isobutyric acid
23. 2-Undecanone
24. Butanoic acid
25. 2-Furanmethanol
26. Acetamide
27. 2-Tetradecanol
28. 2-Tridecanone
29. Hexanoic acid
30. Dimethyl sulfone
31. δ -Octalactone
32. 2-Pentadecanone
33. Octanoic acid
34. δ -Decalactone
35. Decanoic acid

* According to NIST Mass Spectral Library, Sample 16 - 18 are isomers.

Maple Sugar

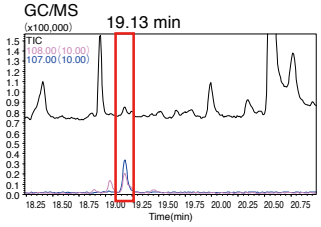
Sample

Sampling (HS)
MonoTrap RGC 18 TD 1 pc

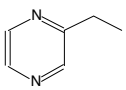
60 ℃, 1 hours

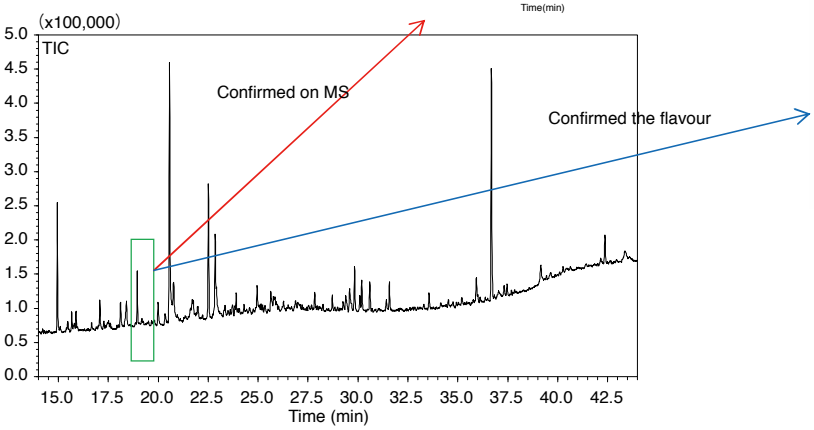
TD-GC/MS-O

GC/MS



Ethylpyrazine

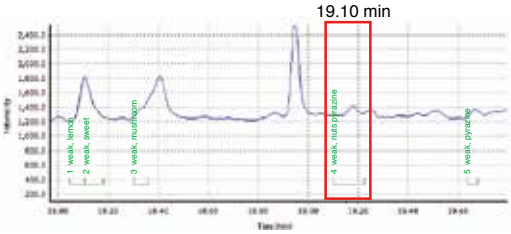




System : GC/MS-Thermal Desorption (T-Dex Ⅱ)
Column : InertCap Pure-WAX
0.25 mm I.D. x 60 m df = 0.25 μm
Col.Temp. : 40 ℃ (5 min hold) - 6 ℃ /min - 250 ℃
Carrier Gas : He 1 mL/min (constant flow)

Desorb Temp. : 200 ℃
Time : 5 min
Flow : 1 mL/min
Split : Split 1:2 (Desorb 10 mL/min, Split 20 mL/min)
Cryo Trapping : -150 ℃
Injection Temp. : 250 ℃
Detection : MS Scan (28.8 - 600 m/z)

Screen of Olfactory Voicegram Software



No.	Start (min)	End (min)	Intensity	Smell
1	18.05	18.11	weak	lemon
2	18.11	18.18	weak	sweet
3	18.30	18.36	weak	mushroom
4	19.10	19.23	weak	nuts pyrazine
5	19.64	19.68	weak	pyrazine