InertSustainSwift™

GL Sciences

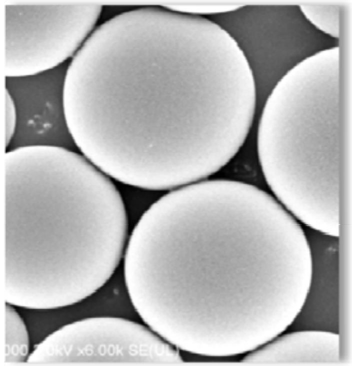
InertSustainSwift™ C18

Evolutional high performance for high throughput analysis . . .

InertSustainSwift C18 is an optimal column for high throughput analysis designed for elution time to be faster and shorten an equilibration time also in gradient analysis. Moreover, it has the inactive processing technology acquired by InertSustain C18, and has become a column which combines high durability and low bleeding.

InertSustainSwift™ C18

- Silica : Newly Developed ES Silica Gel
- Particle Size : 1.9 µm, 3 µm, 5 µm
- Surface Area : 200 m^2/g
- Pore Size : 200 Å (20 nm)
- Pore Volume : 1.00 mL/g
- Bonded Phase : Octadecyl Groups
- End-capping : Complete
- Carbon Loading : 9.0 %
- USP Code : L1
- pH Range : 1.0～10.0



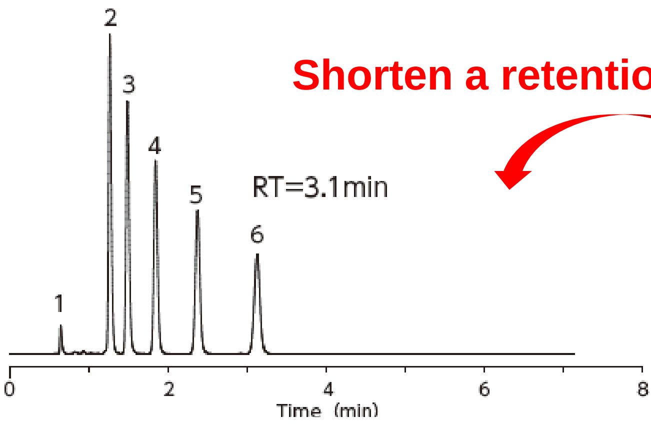
Evolved Surface Silica

Features

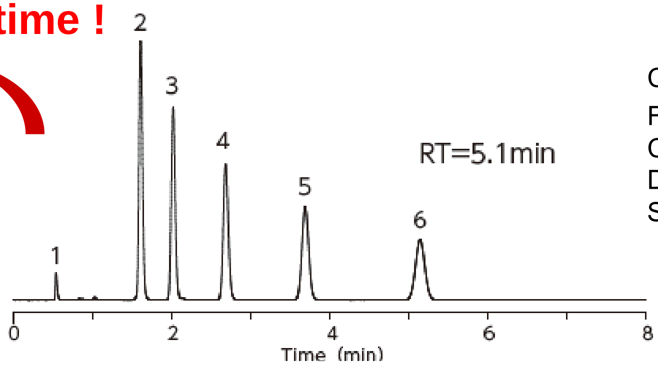
- **Wide pH range (pH1 to10)**
  Evolved Surface Silica
- **Shorten an equilibration time**
  Optimized Surface Area (200 m^2/g) and Pore size (200Å)
- **Suitable retentivity**
  Perfect Controlled Carbon Loading (9.0 %)
- **High inertness and Lower bleeding**
  Latest Production Process
- **Lower pressure**
  Traditional GL Sciences' Silica Production Technology
- **Appropriate performance for LC/MS/MS**
  High theoretical plate number and Lower bleeding

Superior Features

Shorten a retention time !



InertSustainSwift C18（3 μm）



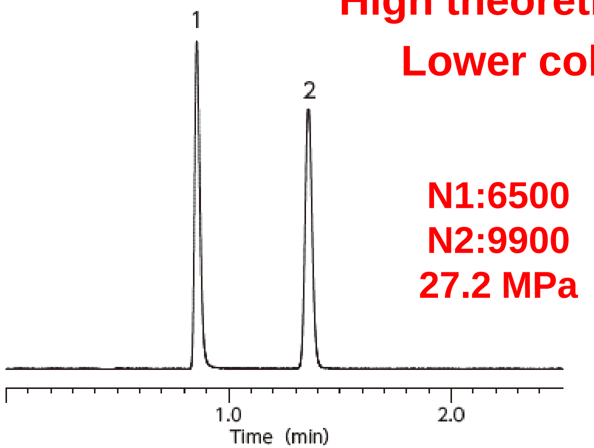
InertSustain C18（3 μm）

<u>Conditions</u>

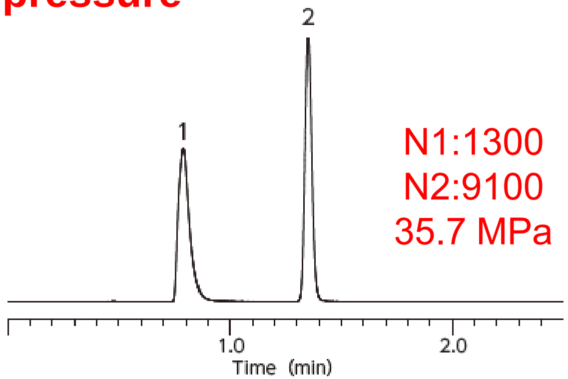
Eluent	: A) CH_3OH
	B) H_2O
	A/B = 80/20, v/v
Column Size	: 3 μm, 150 × 2.1mm I.D.
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1. Uracil
	2. Toluene
	3. Ethylbenzene
	4. Propylbenzene
	5. *n*-Butylbenzene
	6. *n*-Amylbenzene

High theoretical plate number

Lower column pressure



InertSustainSwift C18 (1.9 μm)



Acquity BEH (1.7 μm)

<u>Conditions</u>

Eluent	: A) CH_3OH
	B) H_2O
	A/B = 30/70, v/v
Column Size	: 50 × 2.1 mm I.D.
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1. Pyridine
	2. Phenol

Important contents for High Throughput Analysis

Rapid equilibration

Suitably retentivity

High inertness and Lower bleeding

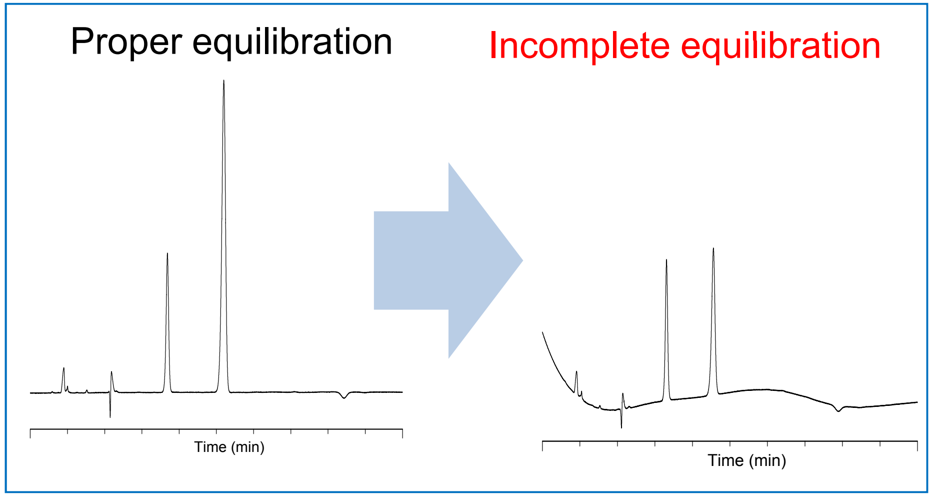
Incomplete Equilibration

If equilibration time is not enough in gradient analysis . . .

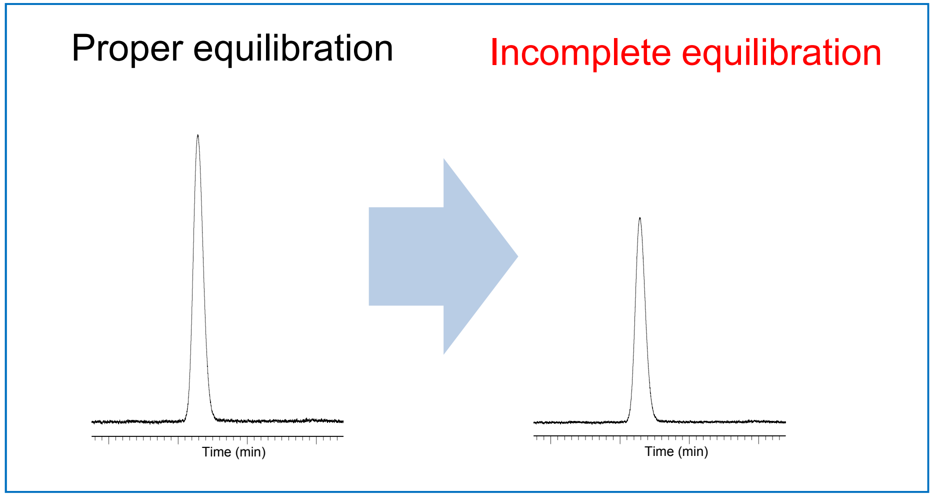
(Possible symptoms)

Bad reproducibility in high water solubilty components especially

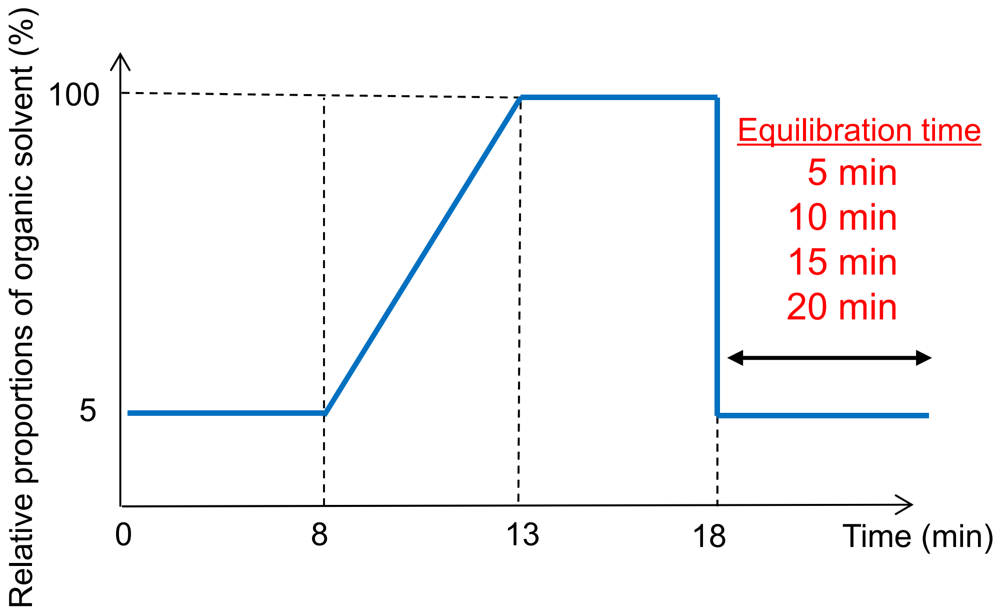
Wave of base line



Unstable sensitivity in LC/MS/MS



Comparison Test for Equilibration time (Conditions)



Conditions

Column Size : 3 μm, 150 × 2.1 mm I.D.

Eluent : A) H_2O B) CH_3CN

A/B = 95/5 (8 min hold) – 5 min - 0/100 –

5 min- 0/100 - 0.1min - 95/5 – Equilibration time , v / v

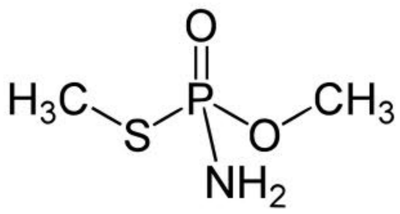
Flow Rate : 0.2 mL/min

Col. Temp. : 40 ℃

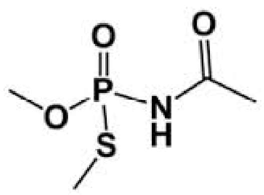
Detection : UV 215 nm

Sample : Water-soluble components (Pesticides)

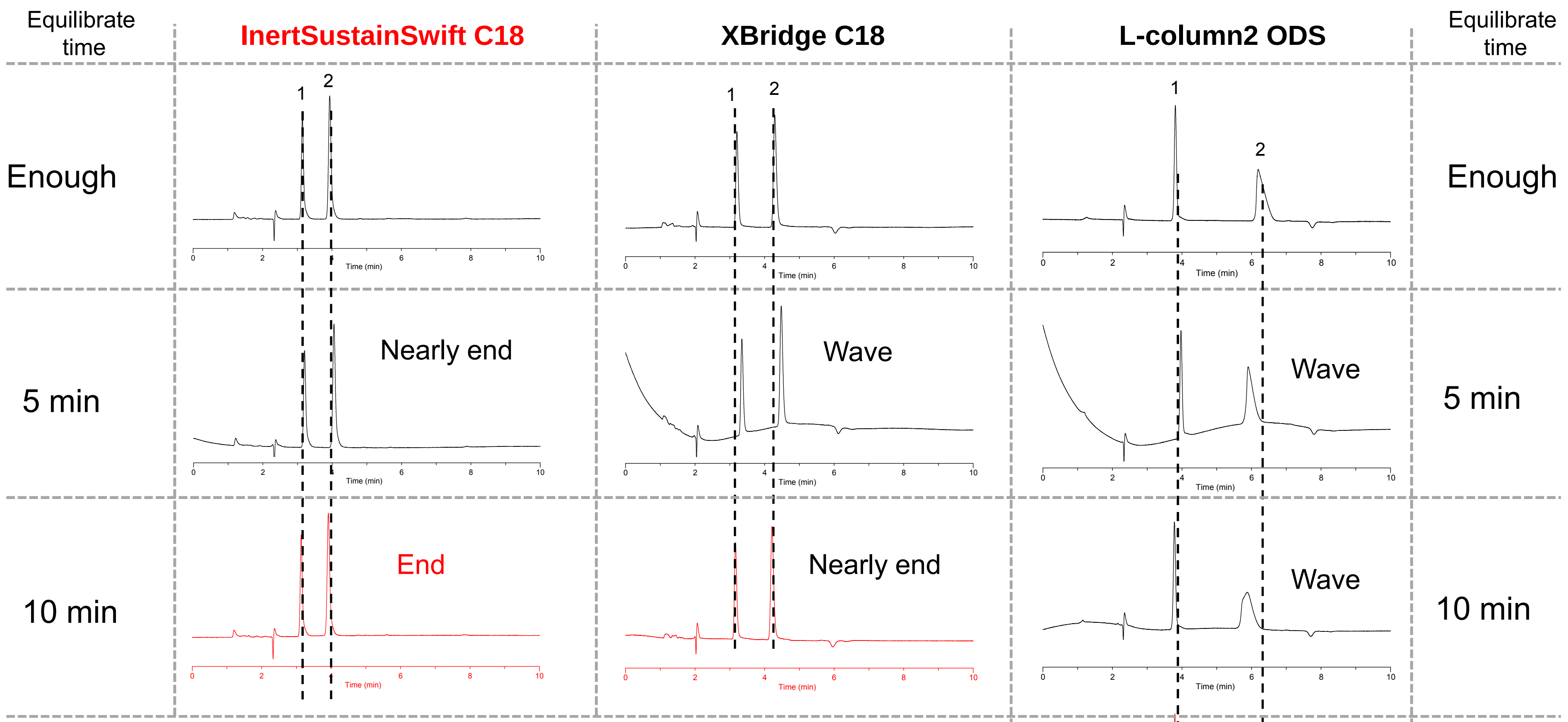
1. Methamidophos

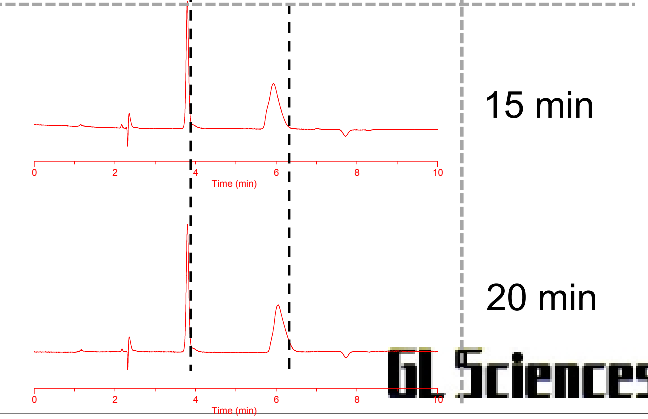


2. Acephate



Comparison Testing for Equilibration time (Results)

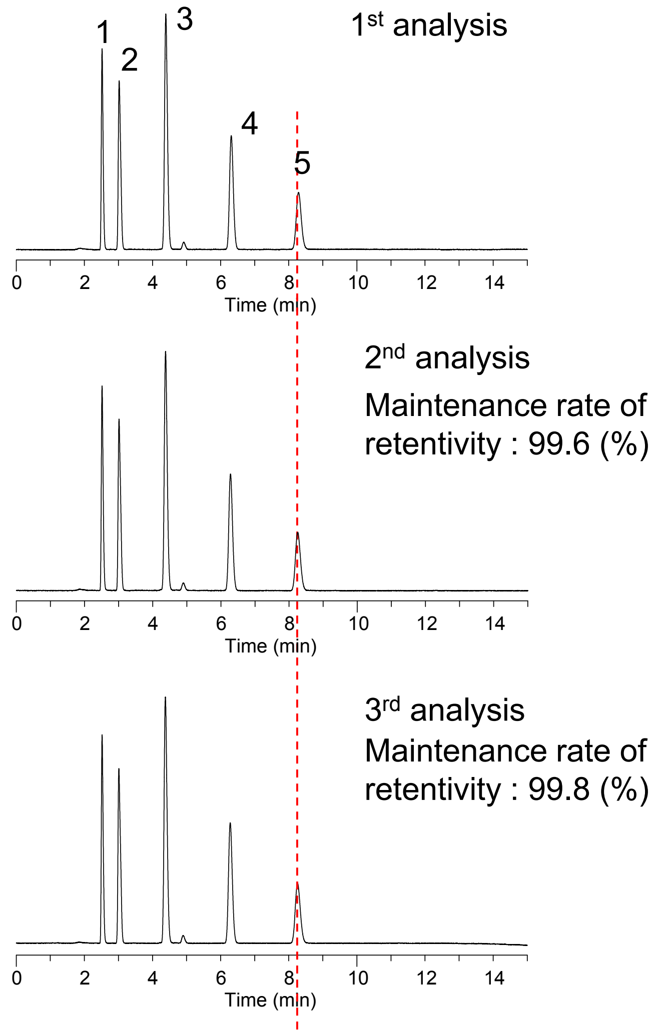




InertSustainSwift C18 has faster stabilization !

100% Water Condition

InertSustainSwift C18 can meet with 100% water condition easily.



Variation of retention time may be occurred by that ODS column is not equilibrated with high polar solvents easily such as water in gradient analysis.

However . . .

InertSustainSwift C18 can be used for 100% Water condition and equilibrated faster in gradient analysis by optimal carbon loading and pore size.

Testing Procedure:

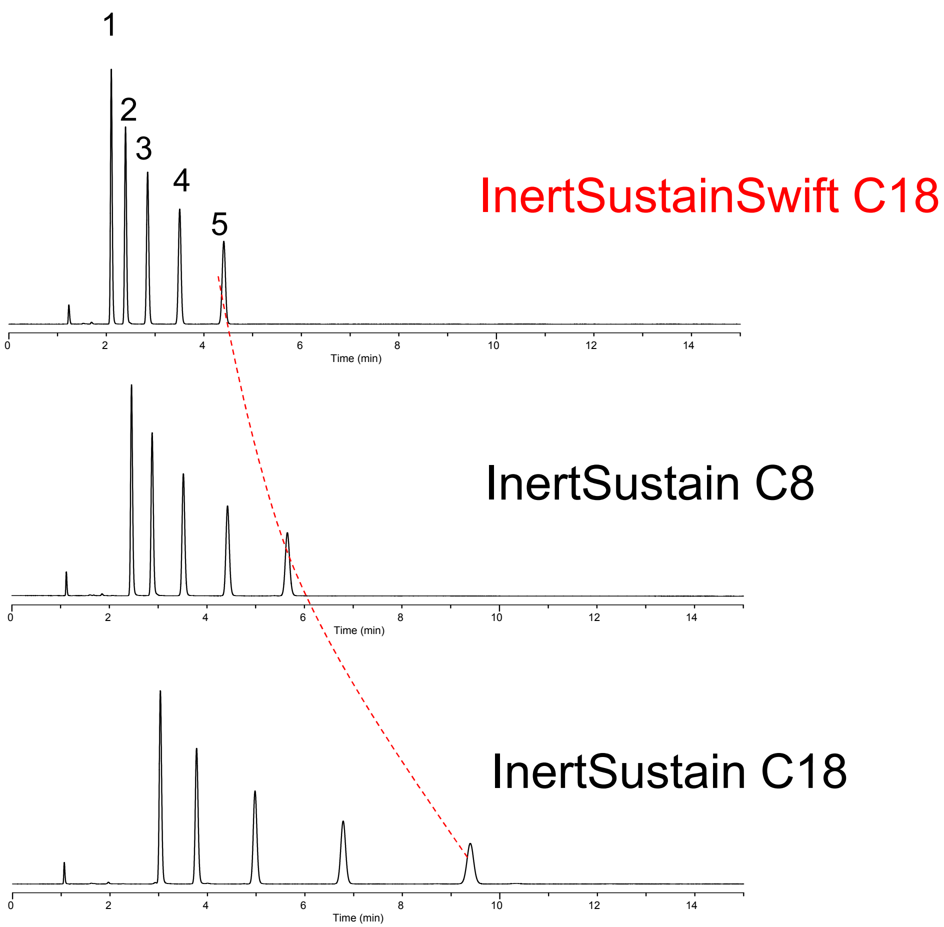
1) 100 % water is introduced into column over 20 minutes.
2) Conduct Analysis
3) Stop flow for 15 minutes.
4) 100 % water is introduced again into column over 30 minutes.
5) Stop flow for 15 minutes again.
6) Conduct Analysis

Conditions

Column	: InertSustainSwift C18 (5 μm, 4.6 × 250)
Eluent	: 100 % H_2O
Flow rate	: 1.0 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1.Cytosine 2.Uracil 3.Guanine 4.Thymine 5.Adenine

Suitable Retentivity

● Comparison data InertSustainSwift C18 with InertSustain C18 and C8



<u>Conditions</u>

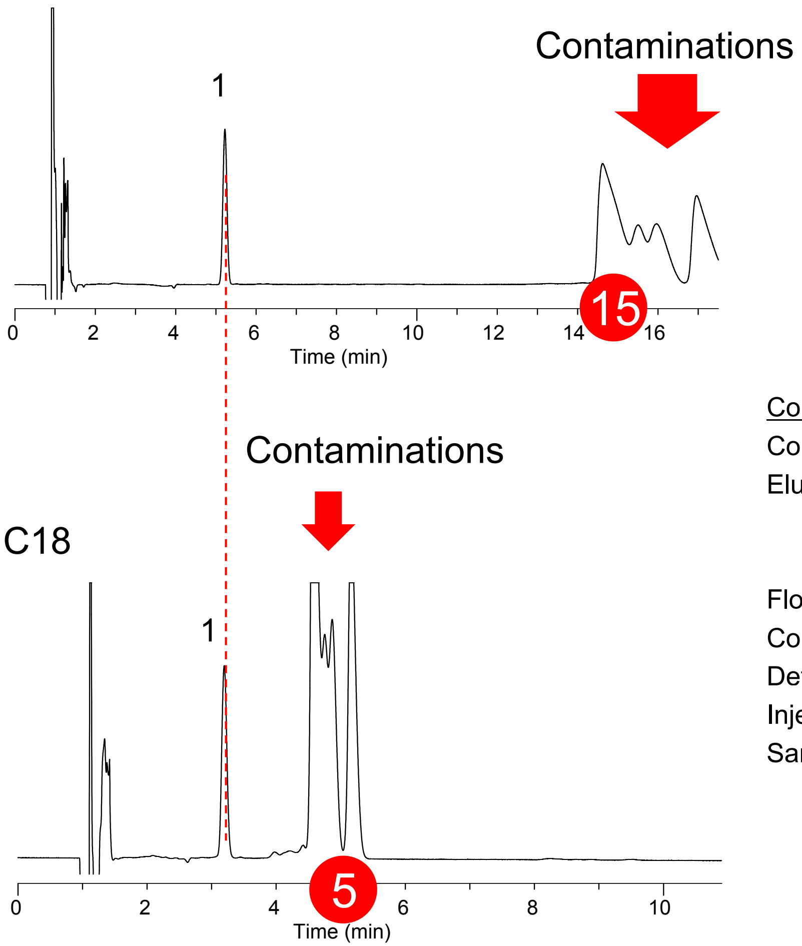
Column Size	: 3 μm, 150 × 2.1 mm I.D.
Eluent	: CH_3OH/H_2O = 80/20, v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1: Uracil 2: Toluene 3: Ethylbenzene 4: Propylbenzene 5: *n*-Butylbenzene 6: *n*-Amylbenzene

Suitable Retentivity

● Hydrophobic contaminations also are eluted faster !

High
hydrophobic
ODS column

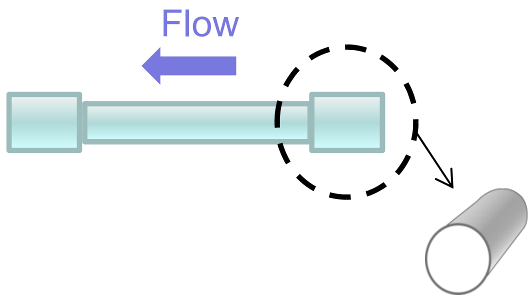
InertSustainSwift C18



Conditions

Column Size	: 3 μm, 150 × 2.1mm I.D.
Eluent	: A) CH_3CN
	B) 0.1 % HCOOH,50 mM $HCOONH_4$ in H_2O
	A/B = 65/35 , v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 225 nm
Injection Vol	: 5 μL
Sample	: 1. Etylbenzene

Adsorption of Analytes



After disconnect the column joints,
confirm to the packing of inlet !

Conditions

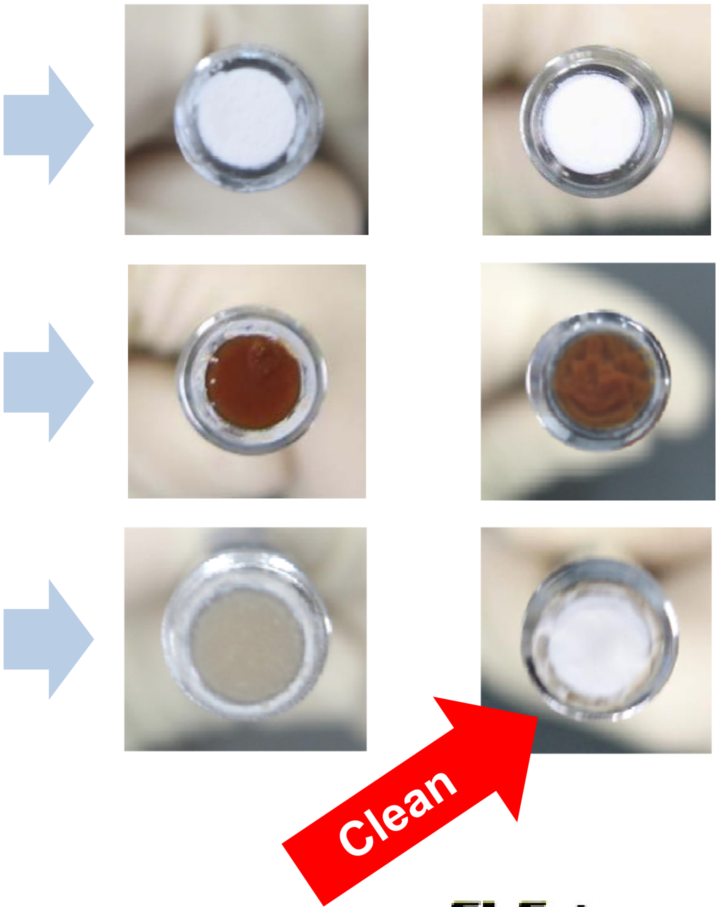
Eluent	: CH_3CN
Flow late	: 1 mL/min
Col. Temp	: Room temperature
Injection Vol.	: 100 uL
Sample	: Coffee sample

Existing C18 column **InertSustainSwift C18**

Before injecting

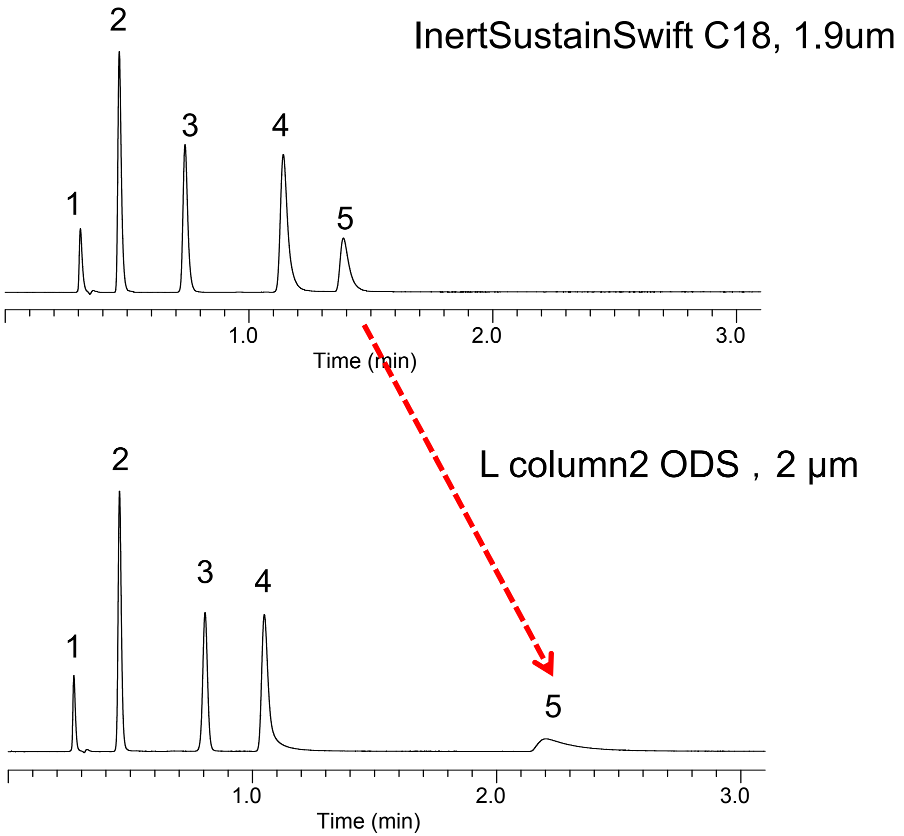
After injecting

After washing
by CH3CN for 10min



Highly Inertness

Column size: 50 mm × 2.1 mm I.D.



Conditions

Eluent : A) CH_3CN
B) 25mM K_2HPO_4 (pH 7.0, KH_2PO_4)
A/B = 30/70,v/v

Flow Rate : 0.4 mL/min

Col. Temp. : 40 ℃

Detection : UV 230 nm

Injection Vol : 0.5 µL

Sample : 1:Uracil
2:Pyridine
3:Phenol
4:Berberine chloride
5:Dextromethorphan

Highly Inertness

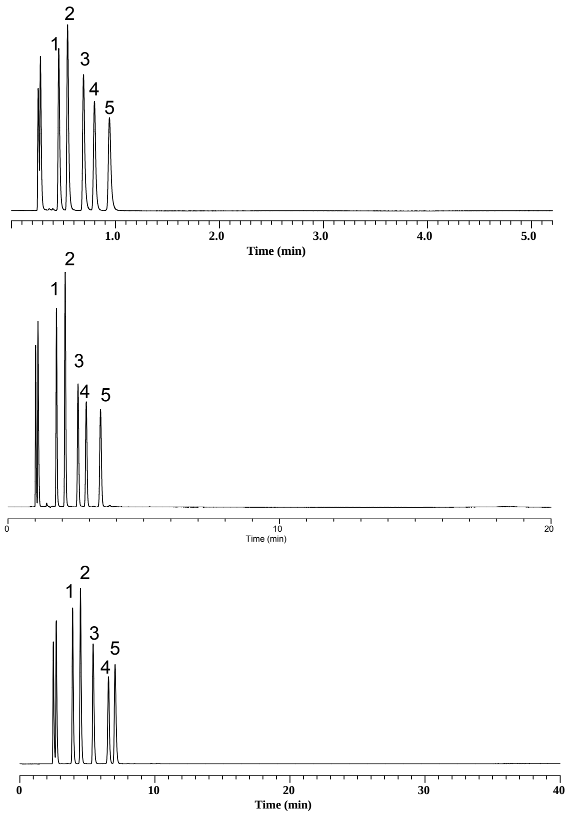
InertSustainSwift C18

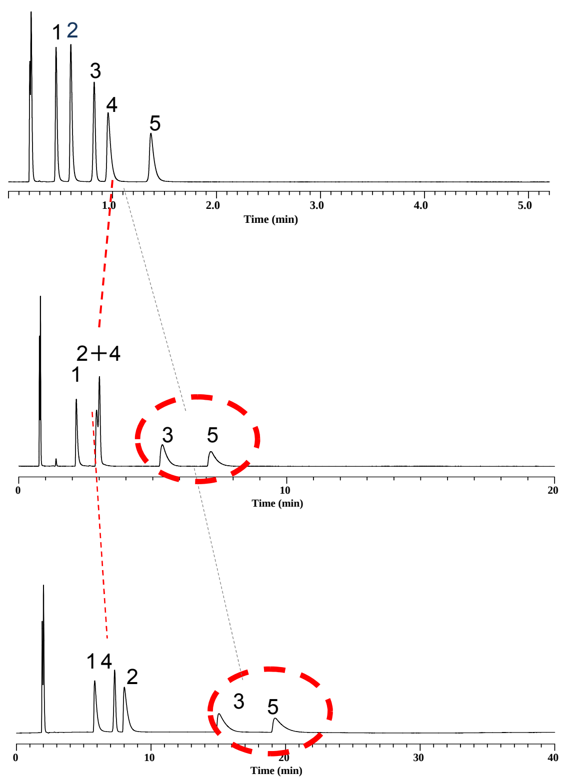
Zorbax Eclipse Plus C18

Sub 2 μm

3 μm

5 μm





Conditions

Eluent	: A) CH_3CN B) 25mM K_2HPO_4 (pH 7.0, KH_2PO_4) A/B = 60/40,v/v
Flow Rate	: ※1
Col. Temp.	: 40 ℃
Detection	: UV 220 nm
Injection Vol	: ※2

Sub 2 μm (2.1 × 50)
※1 : 0.4 mL/min ※2 : 0.5 μL
3 μm (2.1 × 150)
※1 : 0.3 mL/min ※2 : 1 μL
5 μm (4.6 × 250)
※1 : 1.0 mL/min ※2 : 2 μL

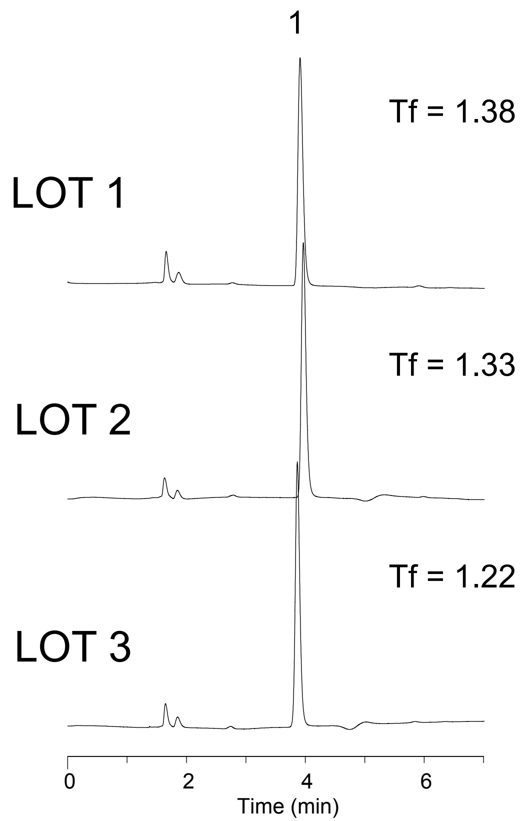
Sample:
1. Chlorpheniramine
2. Triprolidine
3. Homochlorcyclizine
4. Hydroxyzine
5. Clemastine

Reliable Reproducibility

Column Size : InertSustainSwift C18 3 μm, 150×4.6 mm I.D.

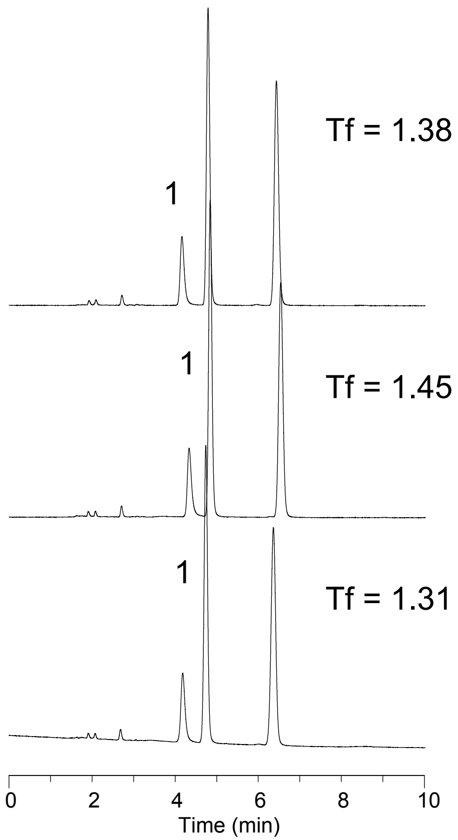
Strong Basic Compound Test

1. Dextromethorphan



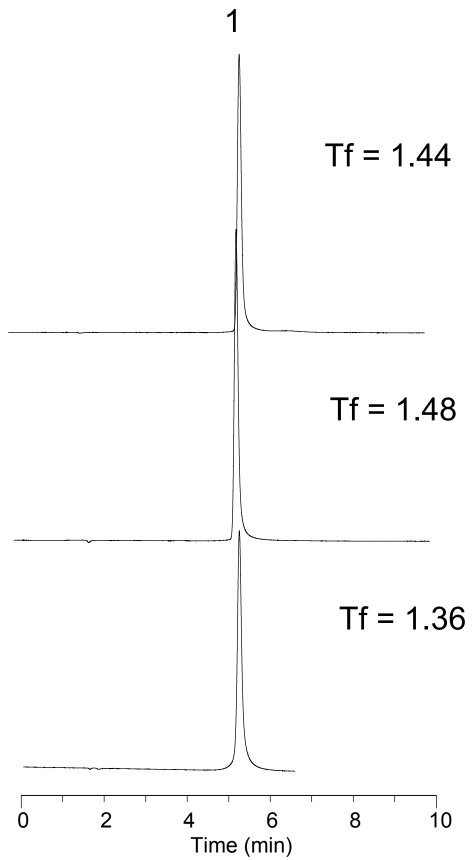
Strong Acidic Compound Test

1. Brilliant Blue FCF



Strong Chelating Compound Test

1. Hinokitiol



Ion Suppression in LC/MS(/MS) analysis

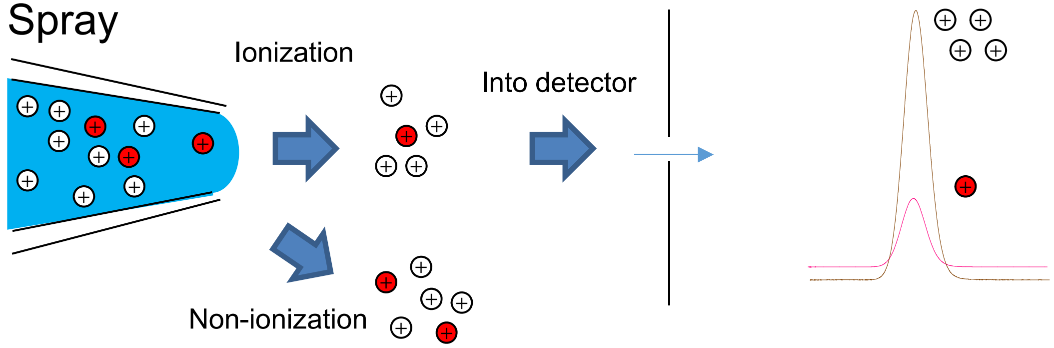
What is Ion Suppression ?

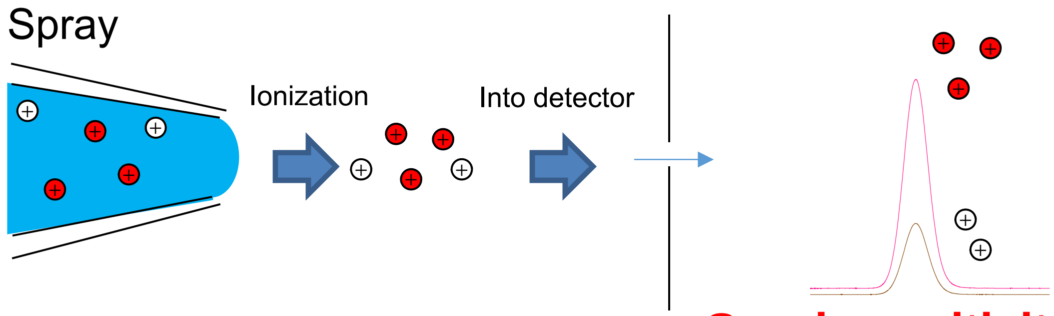
Ionized mass number at the same time has the limit in LC/MS(/MS) analysis.

If foreign substances were included in sample and the retention time was same with a target component, the sensitivity for target component will be decreased due to foreign substances.

⊕ : Foreign substances

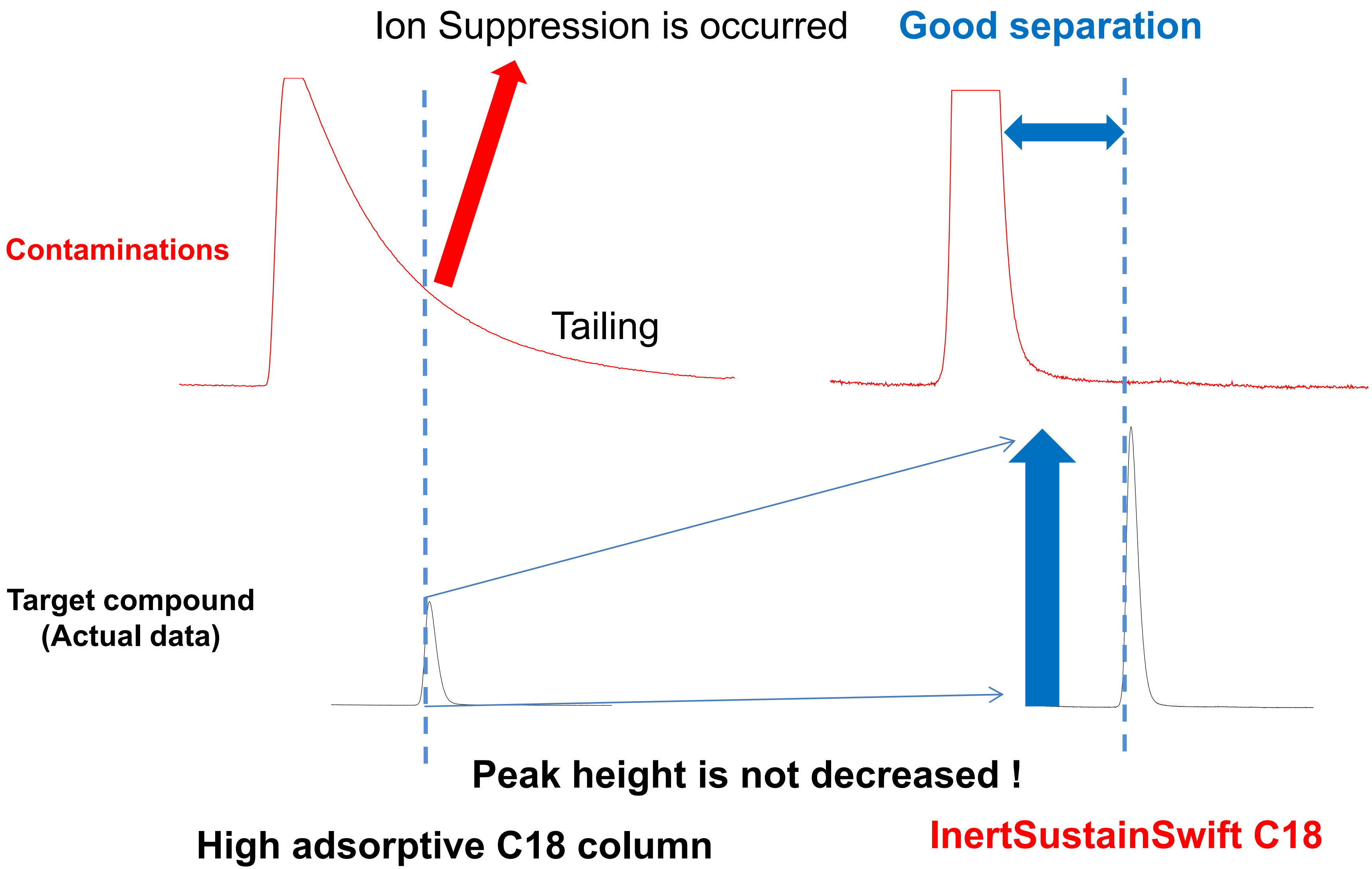
⊕ (red) : Target component





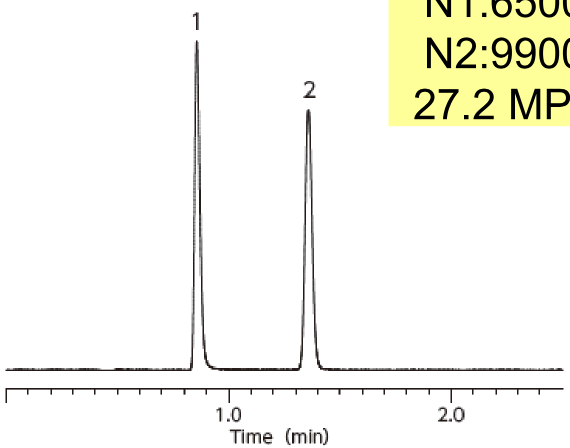
Good sensitivity for target component

Preventing Ion Suppression



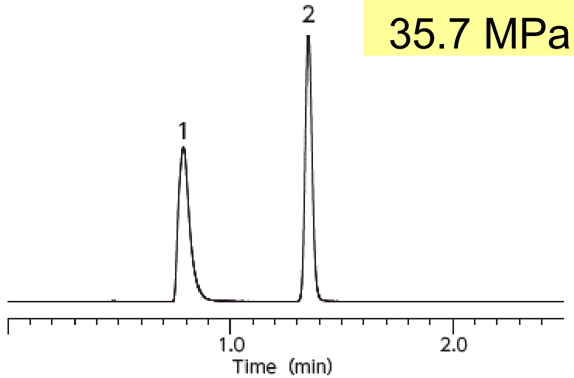
Offer Good Peak Shapes (1)

InertSustainSwift C18 can offer good peak shapes without adsorption due to high inertness. And also, high theoretical plate number will be achieved at low column back pressure due to 1.9 um particle size.



N1:6500
N2:9900
27.2 MPa

InertSustainSwift C18 (1.9 μm)



N1:1300
N2:9100
35.7 MPa

Acquity BEH (1.7 μm)

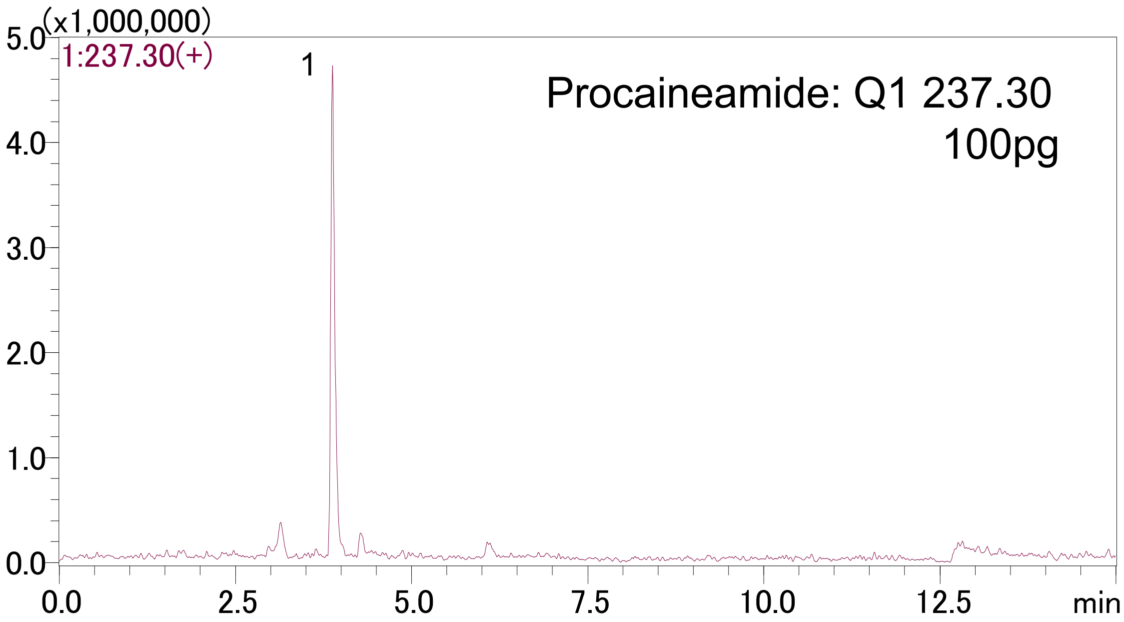
Conditions

Eluent	: A) CH_3OH B) H_2O A/B = 30/70, v/v
Column Size	: 50 × 2.1 mm I.D.
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1. Pyridine 2. Phenol

Offer Good Peak Shapes (2)

Basic compound adsorbed with remained silanol can be analyzed easily without any tailing due to highly inertness.

● Application for basic drag under formic acid mobile phase condition

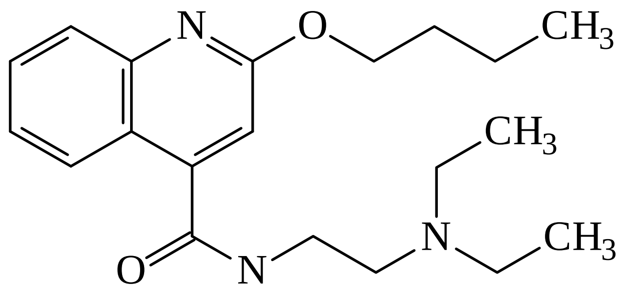


<u>Conditions</u>

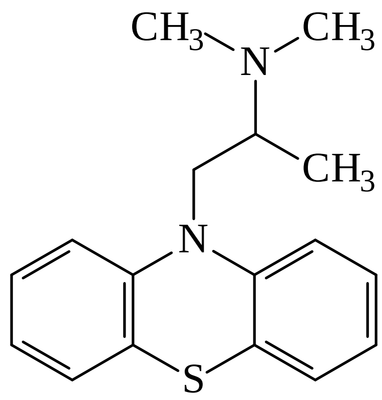
System : Nexera LCMS-8030 plus
Column : InertSustainSwift C18 (3 µm, 150 × 2.1 mm I.D.)
Eluent : A) 0.1% HCOOH in H_2O
B) 0.1% HCOOH in CH_3CN
A/B = 95/5 - 5 min - 0/100 - 5min - 0/100 – 0.1min - 95/5 - 5min - 95/5 -,v/v
Flow Rate : 0.2 mL/min
Col. Temp. : 40 ℃
Detection : LC/MS (ESI)

Confirmation Testing for Influence of Buffer (Conditions)

Concentration of ammonium acetate was changed in stages and then, peak shapes of each stage was confirmed if adsorption was occurred.



Dibucaine (pKa 8.5)



Promethazine (pKa 9.1)

<u>Conditions</u>

System	: Nexera LCMS-8030 plus
Column size	: (3 µm, 150 × 2.1 mm I.D.)
Eluent	: A) Ammonium Acetate in H_2O B) Ammonium Acetate in CH_3OH A/B = 30/70 ,v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 ℃
Detection	: LC/MS/MS (ESI, Positive, MRM)

Sample:each 0.1 (mg / mL)

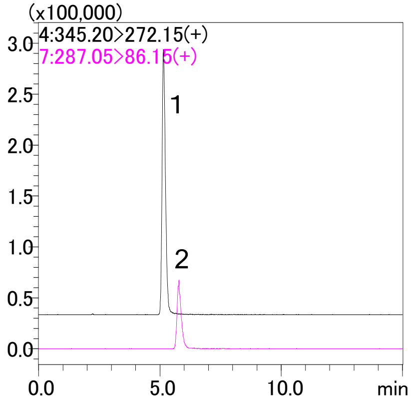
	Q1 > Q3
1. Dibcaine	: 345.20 > 272.15 (+)
2. Promethazine	: 287.05 > 86.15 (+)

Confirmation Test for Influence of Buffer (Results)

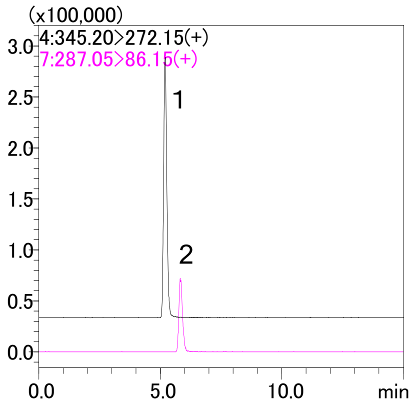
1. Dibucaine (pKa 8.5)
2. Promethazine (pKa 9.1)

InertSustainSwift C18

1mM Ammonium acetate



5mM Ammonium acetate

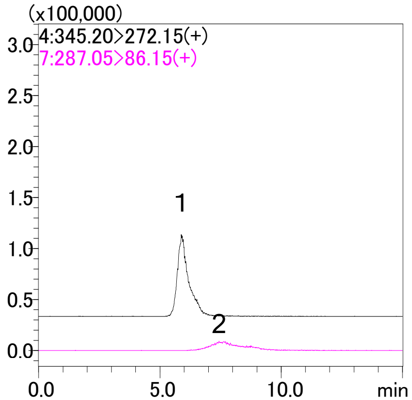


(Results)

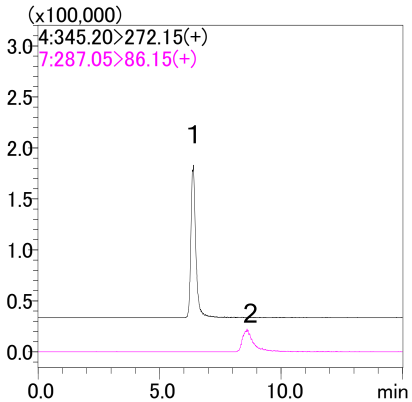
Good result !
Peak shapes were not changed

CAPCELLPAK MGⅢ C18

1mM Ammonium acetate



5mM Ammonium acetate



Peak shapes were improved from 1mM to 5mM, however the sensitivity were low due to adsorption.

(Possible symptoms)

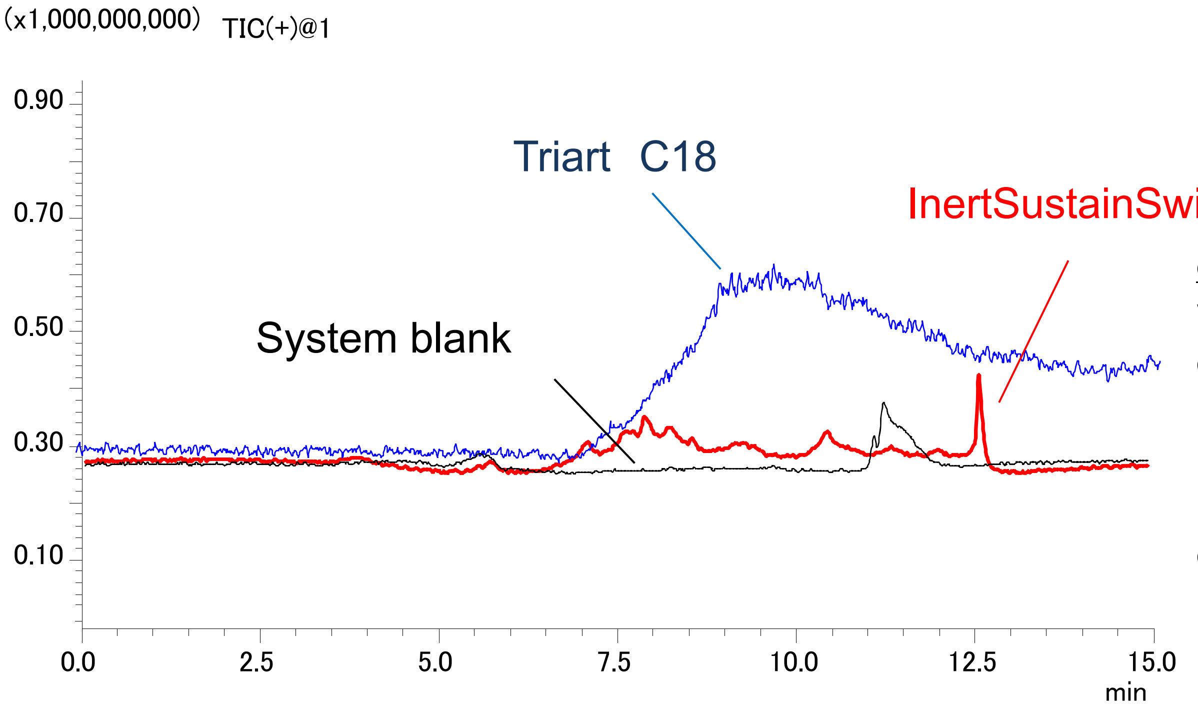
Incorrect calibration curve

Decreasing sensitivity

Extremely Low Bleeding (1)

It is known that an unreacted reagents and an product of the reagents from chemical modification in the production process of ODS provide a column bleeding.
These causes of the column bleeding are possible to be eluted in the gradient analysis and make a ion suppression.

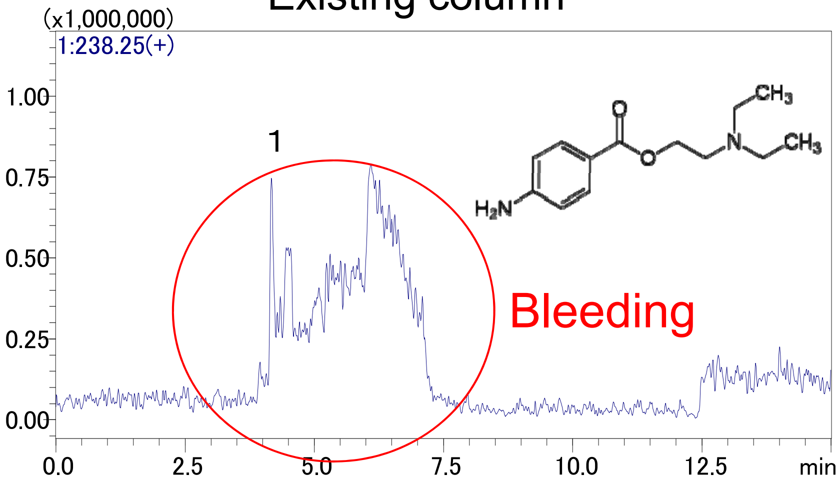
However, InertSustainSwift C18 offer **"High inertness"** and **"Low bleeding"**.



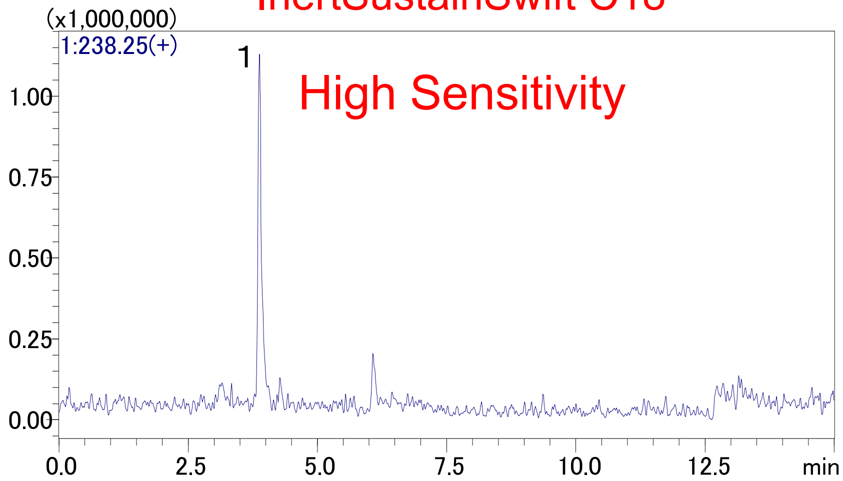
Conditions
System : Nexera
LCMS-8030 plus
Column Size : 3 µm, 150 × 2.1 mm I.D.)
Eluent : A) 0.1 % HCOOH in H_2O
B) 0.1 % HCOOH in CH_3CN
A/B = 95/5 - 5 min - 0/100 – 5 min - 0/100 – 0.1 min - 95/5 – 5 min - 95/5 ,v/v
Flow Rate : 0.2 mL/min
Col. Temp. : 40 ℃
Detection : LC/MS (ESI, Positive,
Mass Range: 50-1000)
Q1 SCAN : m/z 50 - 1000

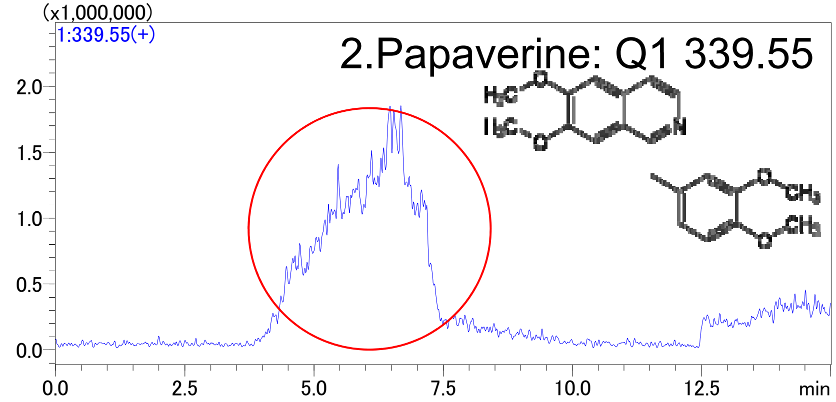
Extremely Low Bleeding (2)

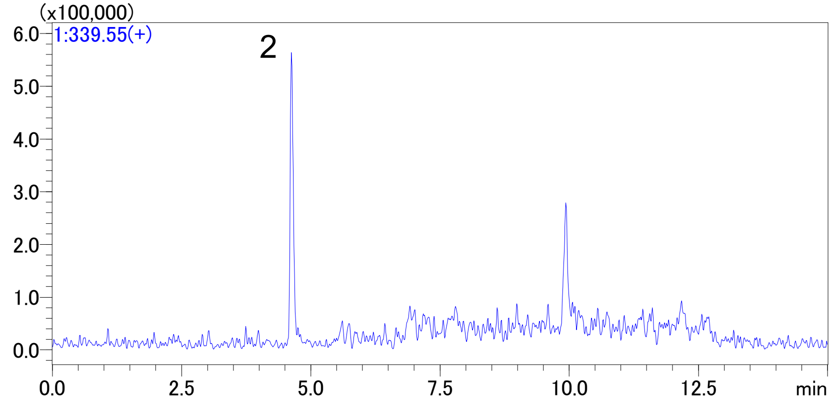
Existing column



InertSustainSwift C18







<u>Conditions</u>

System : Nexera
LCMS-8030 plus
Column Size : 3 μm, 150 × 2.1 mm I.D.)
Eluent : A) 0.1 % HCOOH in H_2O
B) 0.1 % HCOOH in CH_3CN
A/B = 95/5 - 5 min - 0/100 – 5 min - 0/100
– 0.1 min - 95/5 – 5 min - 95/5 ,v/v

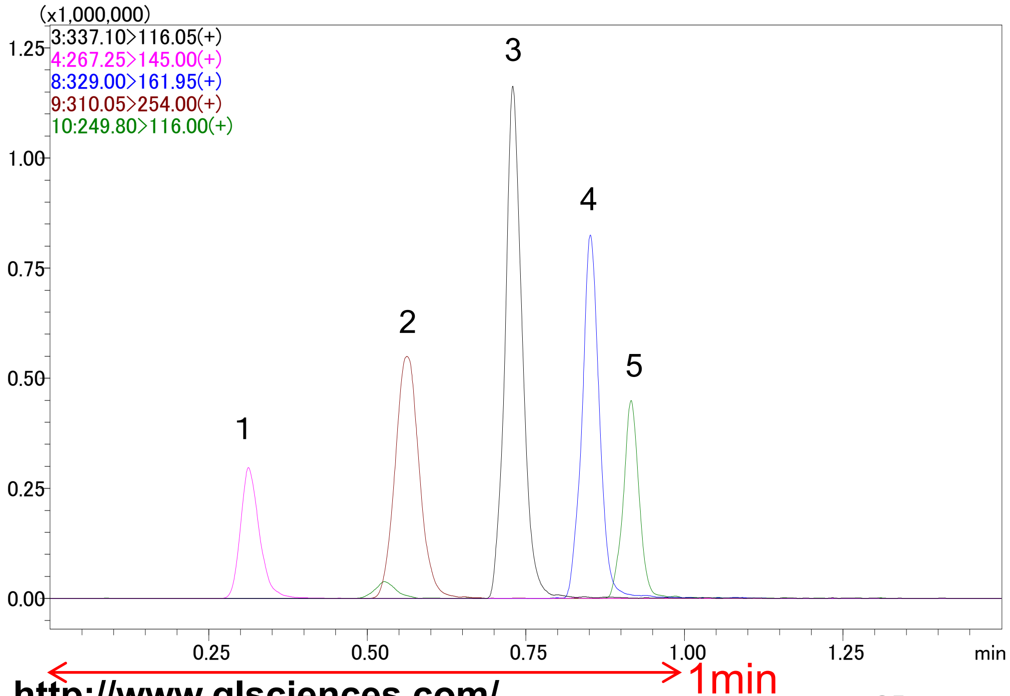
Flow Rate : 0.2 mL/min
Col. Temp. : 40 ℃
Detection : LC/MS (ESI, Positive,
Mass Range: 50-1000)
Q1 SCAN : m/z 50 - 1000

Application (1)

● Analysis of β- adrenergic blocking agent (β-blocker)

<u>Conditions</u>

System	: Nexera LCMS-8030 plus
Column	: 1.9 µm, 2.1 x 50 mm
Eluent	: A) 10 mM Ammonium Formate in H_2O B) 10 mM Ammonium Formate in CH_3OH A/B = 70/30 – 0.3 min - 40/60 – 0.5min - 0/100 – 0.1min – 0/100 – 0.01min -70/30 – 0.5min - 70/30 ,v/v
Flow Rate	: 0.6 mL/min
Col. Temp.	: 40 ℃
Detection	: LC/MS/MS (ESI, Positive, Negative MRM)



Sample: each 100 (µg/L)

	Q1 > Q3
1. Acebutolol	: 337.10 > 116.05 (+)
2. Atenolol	: 267.25 > 145.00 (+)
3. Labetalol	: 329.00 > 161.95 (+)
4. Nadolol	: 310.05 > 254.00 (+)
5. Pindolol	: 249.80 > 116.00 (+)

Comparison Test Contents

1) Comparison of Retentivity

2) Comparison of Separation/Selectivity

3) Comparison of InertSustainSwift C18 with the other brand

   a) Hydrophobicity Test

   b) Chelating Compounds Test

   c) Weak Acidic/Basic Compounds Test

   d) Acidic Compounds Test

   e) Basic Compounds Test

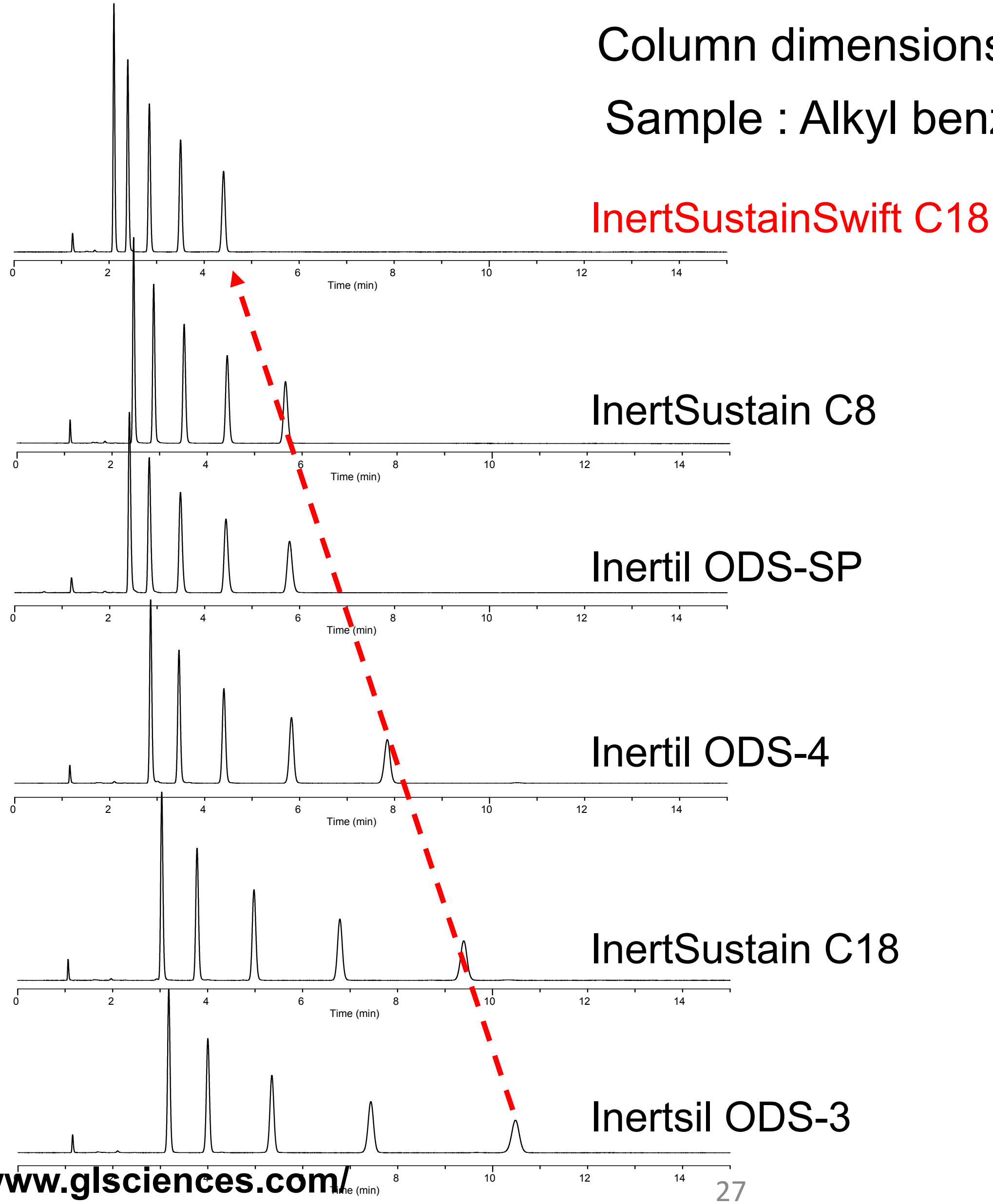
4) Test for Influence of Buffer

5) Durability Test

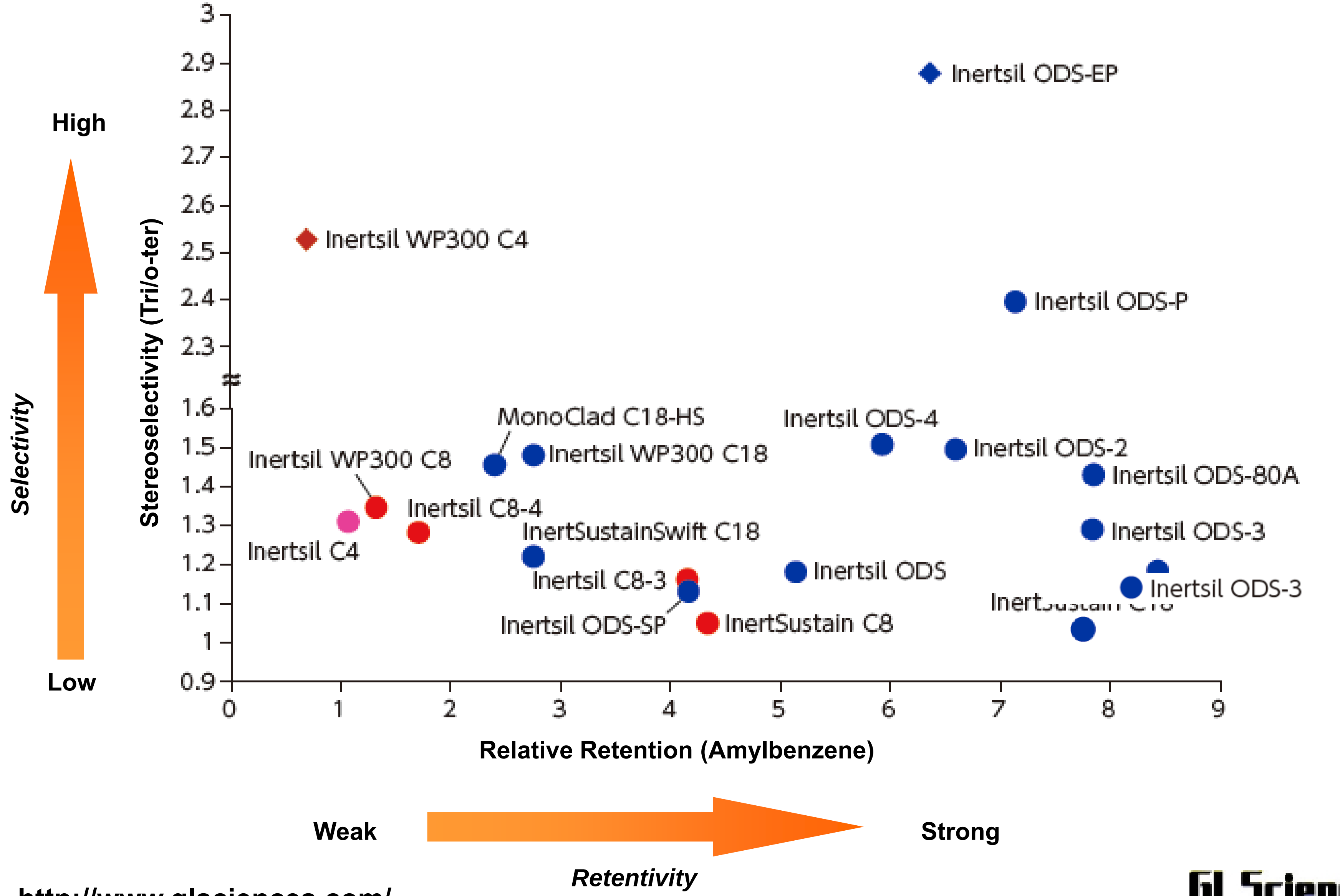
1) Comparison of Retentivity

Column dimensions : 3 µm 150 × 2.1 mm I.D.

Sample : Alkyl benzenes



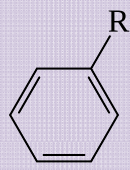
2) Comparison of Separation/Selectivity



3) Comparison of InertSustainSwift C18 with the other brand

(Test conditions)

a) Hydrophobicity Test

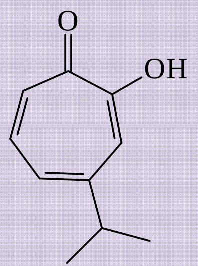


R: 2. Toluene —CH_3
3. Ethylbenzene —CH_2CH_3
4. Propylbenzene —$CH_2CH_2CH_3$
5. Butylbenzene —$CH_2CH_2CH_2CH_3$
6. Amylbenzene —$CH_2CH_2CH_2CH_2CH_3$

<u>Conditions</u>

Eluent : CH_3OH/H_2O = 80/20
Flow Rate : 5um (4.6 x 250mm) 1.0mL/min, Inj. Vol. 5uL
3um (2.1 x 150mm) 0.3mL/min, Inj. Vol. 1uL
1.9um (2.1 x 50mm) 0.4mL/min, Inj. Vol. 0.5uL
Col. Temp. : 40 ℃
Detection : UV 254 nm
Sample : 1: Uracil 2: Toluene 3: Ethylbenzene
4: Propylbenzene 5: *n*-Butylbenzene
6: *n*-Amylbenzene

b) Chelating Compounds Test



Hinokitiol

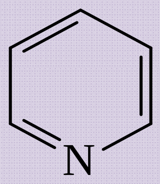
<u>Conditions</u>

Eluent : A) CH_3CN
B) 0.1%H_3PO_4
A/B = 40/60
Flow Rate : 5um (4.6 x 250mm) 1.0mL/min, Inj. vol. 3uL
3um (2.1 x 150mm) 0.3mL/min, Inj. vol. 1uL
1.9um (2.1 x 50mm) 0.4mL/min, Inj. vol. 0.5uL
Col. Temp. : 40 ℃
Detection : UV 254 nm
Sample : 1: β-Thujaplicin (Hinokitiol)

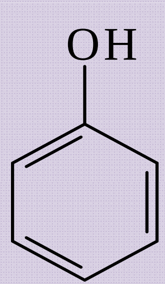
3) Comparison of InertSustainSwift C18 with the other brand

(Test conditions)

c) Weak Acidic/Basic Compounds Test



Pyridine

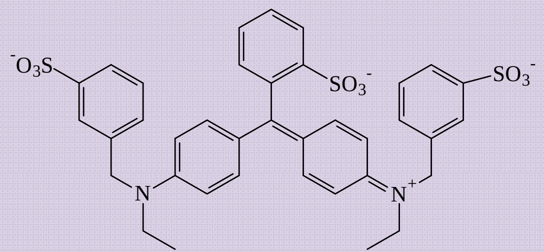


Phenol

Conditions

Eluent	: A) CH_3OH B) H_2O A/B = 30/70
Flow Rate	: 5um (4.6 x 250mm) 1.0mL/min, Inj. vol. 1uL 3um (2.1 x 150mm) 0.3mL/min, Inj. vol. 1uL 1.9um (2.1 x 50mm) 0.3mL/min, Inj. vol. 0.5uL
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1: Uracil 2:Pyridine 3:Phenol

d) Acidic Compounds Test



Brilliant Blue FCF

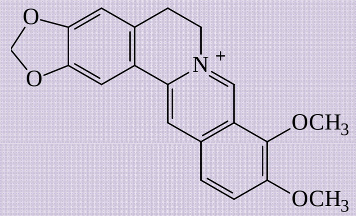
Conditions

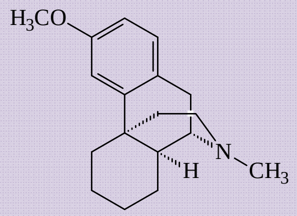
Eluent	: A) CH_3CN B) 0.1% H_3PO_4 A/B = 25/75,v/v
Flow Rate	: 5um (4.6 x 250mm) 1.0mL/min, Inj. vol. 3uL 3um (2.1 x 150mm) 0.3mL/min, Inj. vol. 1uL 1.9um (2.1 x 50mm) 0.4mL/min, Inj. vol. 0.5uL
Col. Temp.	: 40 ℃
Detection	: UV 254 nm
Sample	: 1:Brilliant Blue FCF 2:4-Ethylbenzoic acid 3:Salicylic acid

3) Comparison of InertSustainSwift C18 with the other brand

(Testing conditions)

e) Basic Compounds Test (1)


Berberine chloride


Dextromethorphan

Conditions

Eluent : A) CH_3CN
B) 25 mM K_2HPO_4 (pH 7.0, KH_2PO_4)
A/B = 30/70,v/v

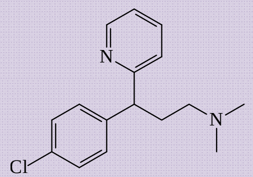
Flow Rate : 5um (4.6 x 250mm) 1.0mL/min, Inj. vol. 2uL
3um (2.1 x 150mm) 0.3mL/min, Inj. vol. 1uL
1.9um (2.1 x 50mm) 0.4mL/min, Inj. vol. 0.5uL

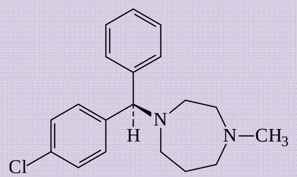
Col. Temp. : 40 ℃

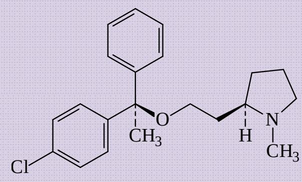
Detection : UV 230 nm

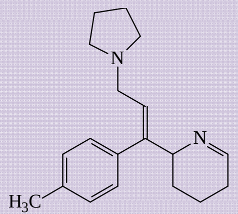
Sample : 1:Uracil 2:Pyridine 3:Phenol
4:Berberine chloride 5:Dextromethorphan

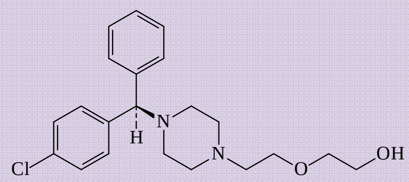
e) Basic Compounds Test (2)


Chlorpheniramine


Homochlorcyclizine


Clemastine


Triprolidine


Hydroxyzine

Conditions

Eluent : A) CH_3CN
B) 25mM K_2HPO_4 (pH 7.0, KH_2PO_4)
A/B = 60/40,v/v

Flow Rate : 5um (4.6 x 250mm) 1.0mL/min, Inj. vol. 5uL
3um (2.1 x 150mm) 0.3mL/min, Inj. vol. 1uL
1.9um (2.1 x 50mm) 0.4mL/min, Inj. vol. 0.5uL

Col. Temp. : 40 ℃

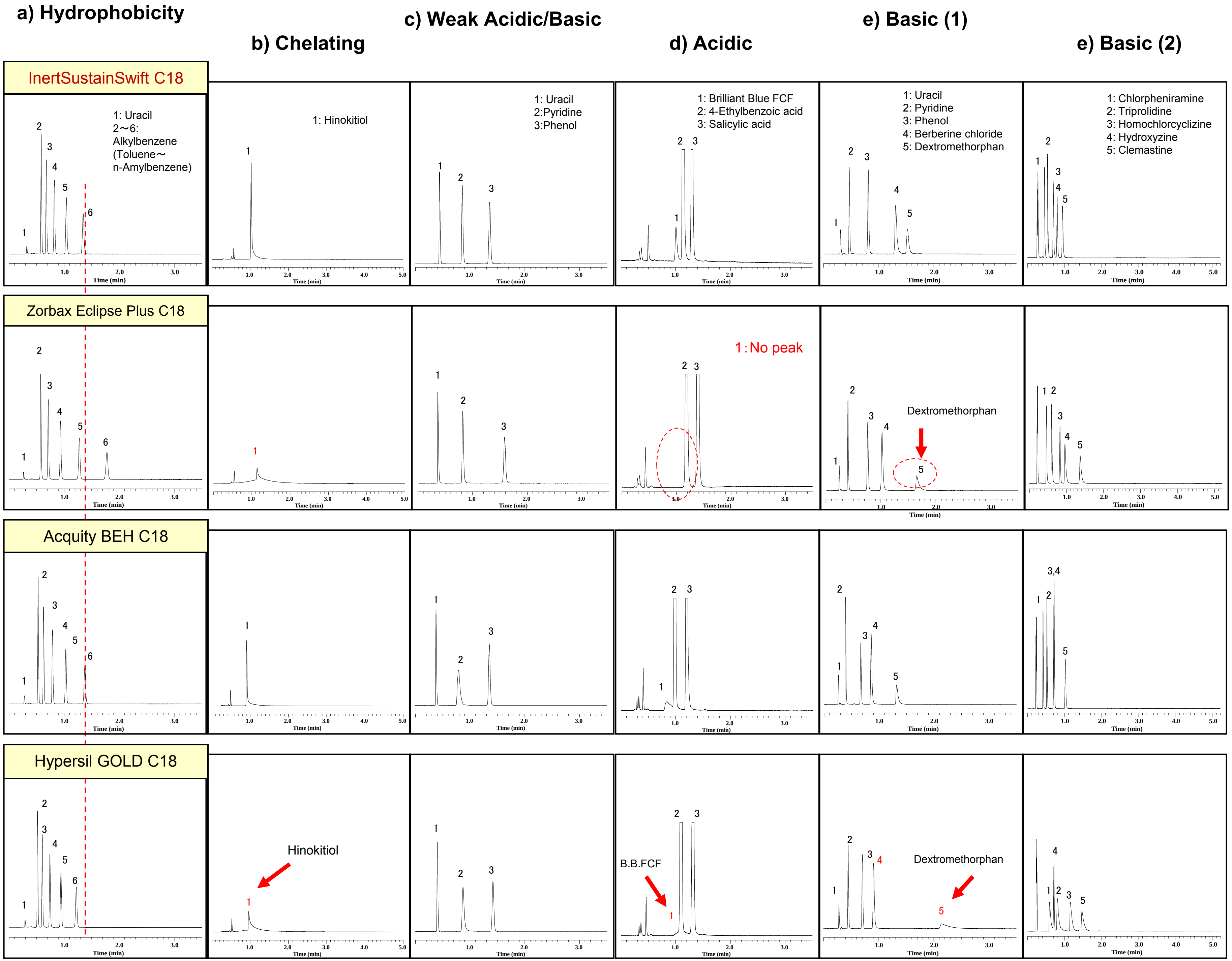
Detection : UV 220 nm

Sample : 1: Chlorpheniramine 2: Triprolidine
3: Homochlorcyclizine 4: Hydroxyzine
5: Clemastine

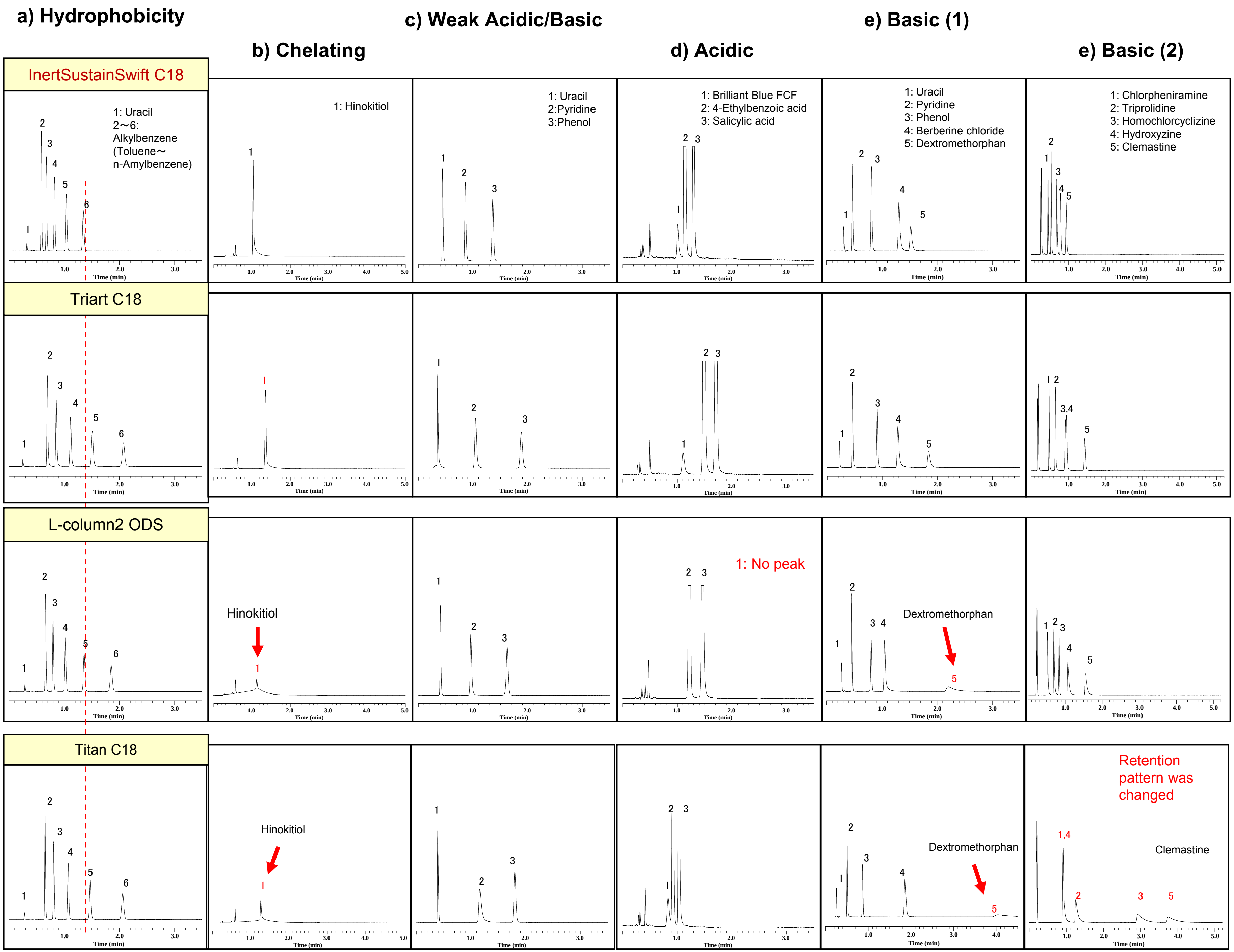
3) Comparison of InertSustainSwift C18 with the other brand

Comparison List (Sub 2um)

Description	Particle size (μm)	Surface area (㎡/g)	Pore size (Å)	Pore Volume (mL/g)	Carbon Loading (%)	pH
InertSustainSwift C18	1.9	200	200	1	9	1 to10
Zorbax Eclipse Plus C18 (Agilent)	1.8	160	95	—	8	2 to 9
Acquity BEH C18 (Waters)	1.7	185	135	0.7	18	1 to 12
Hypersil GOLD C18 (Thermo Fisher Scientific)	1.9	220	175	—	10	1 to 11
Triart C18 (YMC)	1.9	—	120	—	20	1 to 12
L-column2 ODS （CERI）	2	340	120	—	17	2 to 9
Titan C18 (Sigma-Aldrich)	1.9	410	80	0.76	13.5	2 to 8



a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
1: Uracil
2~6: Alkylbenzene (Toluene~n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil
2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Zorbax Eclipse Plus C18
1 : No peak
Dextromethorphan
Acquity BEH C18
Hypersil GOLD C18
Hinokitiol
B.B.FCF
Dextromethorphan
Time (min)


a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
Triart C18
L-column2 ODS
Titan C18
1: Uracil
2～6: Alkylbenzene (Toluene～ n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil
2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Hinokitiol
1: No peak
Dextromethorphan
Retention pattern was changed
Clemastine
Time (min)

3) Comparison of InertSustainSwift C18 with the other brand

Comparison List (Sub 2um)

Description	Inertness			Reteintion time	100% Water	Bleeding
	Chelating	Acidic	Basic			
InertSustainSwift C18	Great	Great	Great	1	Great	Great
Zorbax Eclipse Plus C18 (Agilent)	Poor	Poor	Normal	2	Poor	Great
Acquity BEH C18 (Waters)	Good	Normal	Normal	1	Normal	Great
Hypersil GOLD C18 (Thermo Fisher Scientific)	Poor	Normal	Poor	1	Good	Great
Triart C18 (YMC)	Good	Great	Good	2	Great	Good
L-column2 ODS (CERI)	Poor	Poor	Normal	2	Poor	Normal
Titan C18 (Sigma-Aldrich)	Poor	Great	Poor	2	Great	Great

1: Early

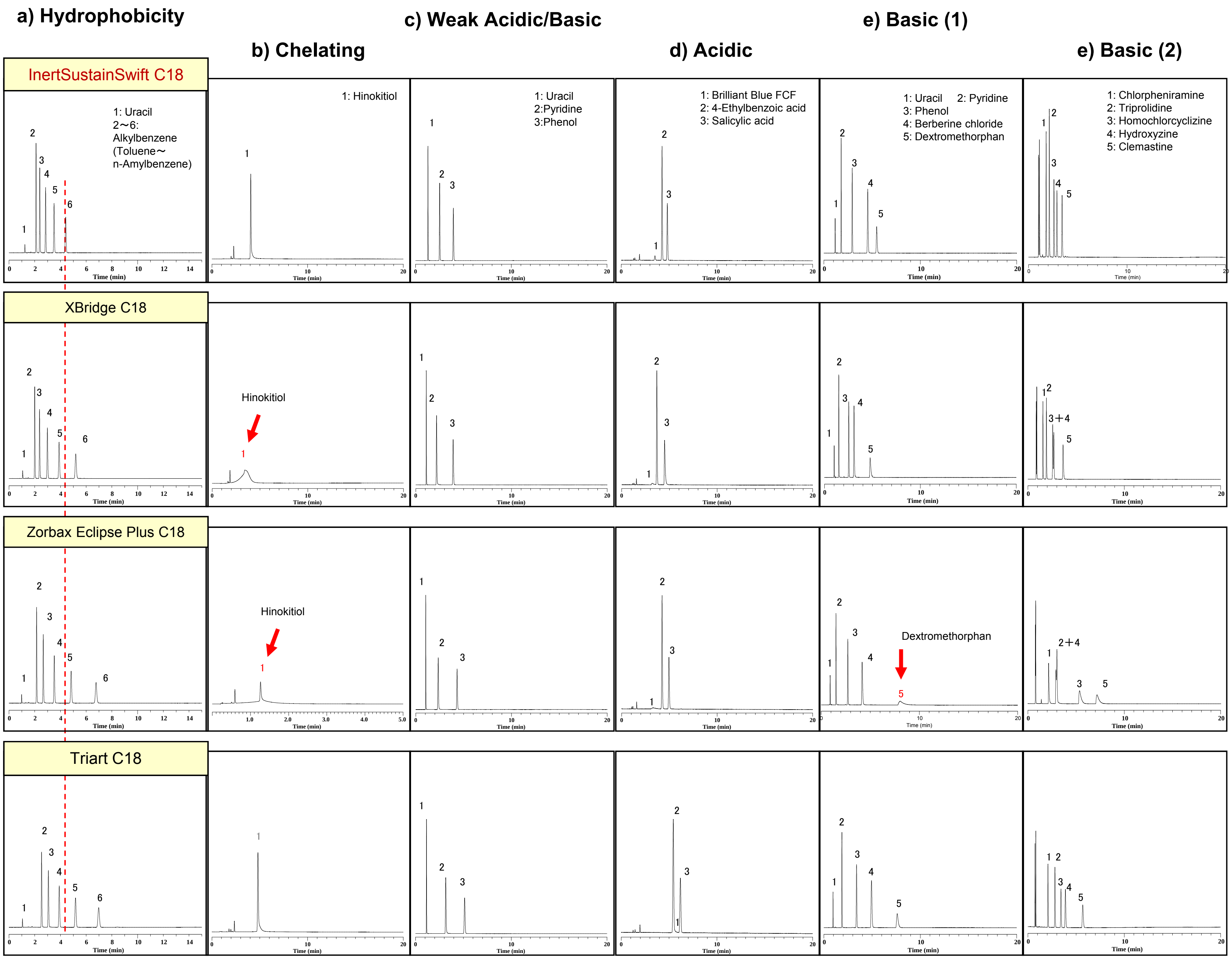
2: Middle

3: Late

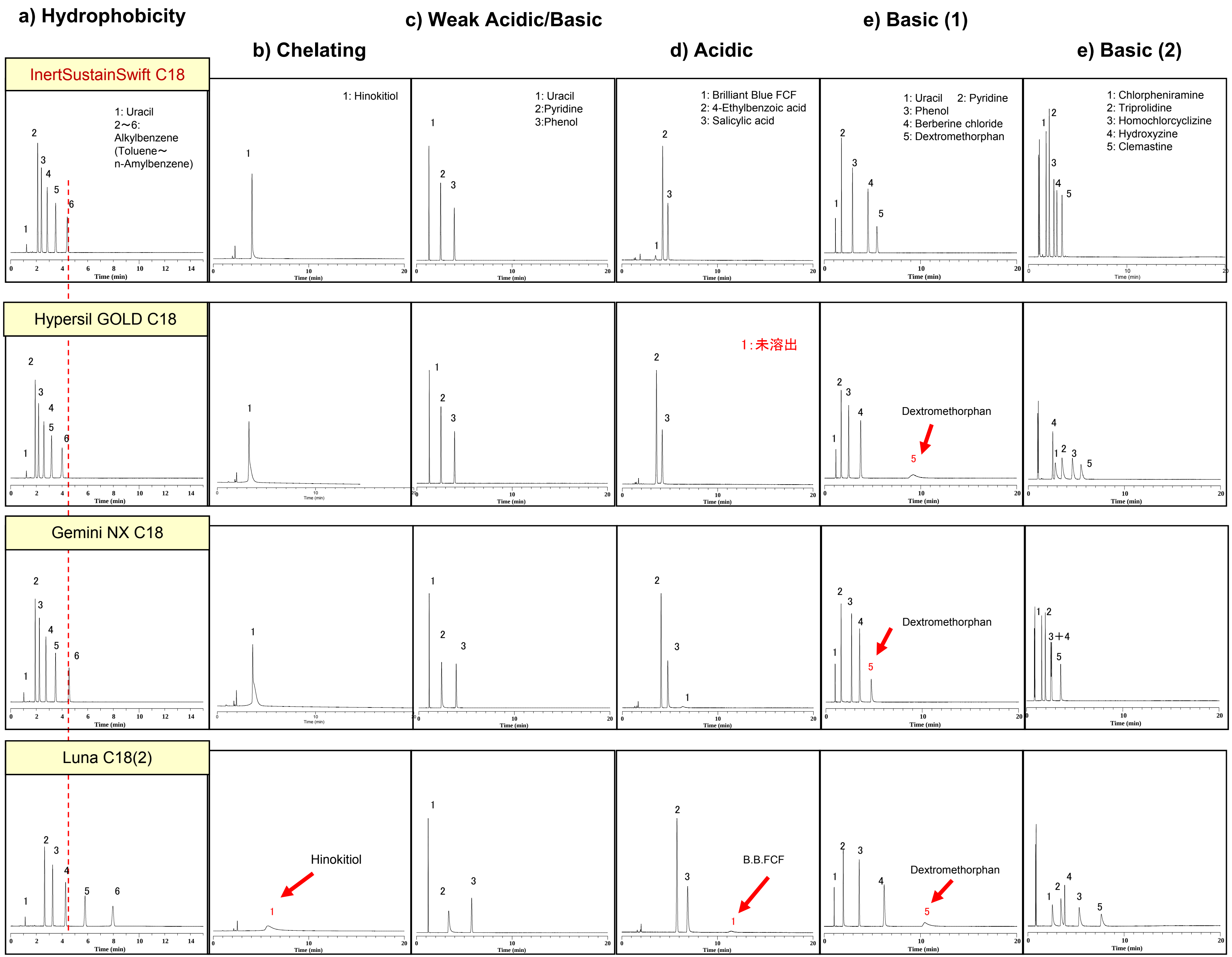
3) Comparison of InertSustainSwift C18 with the other brand

Comparison List (3um)

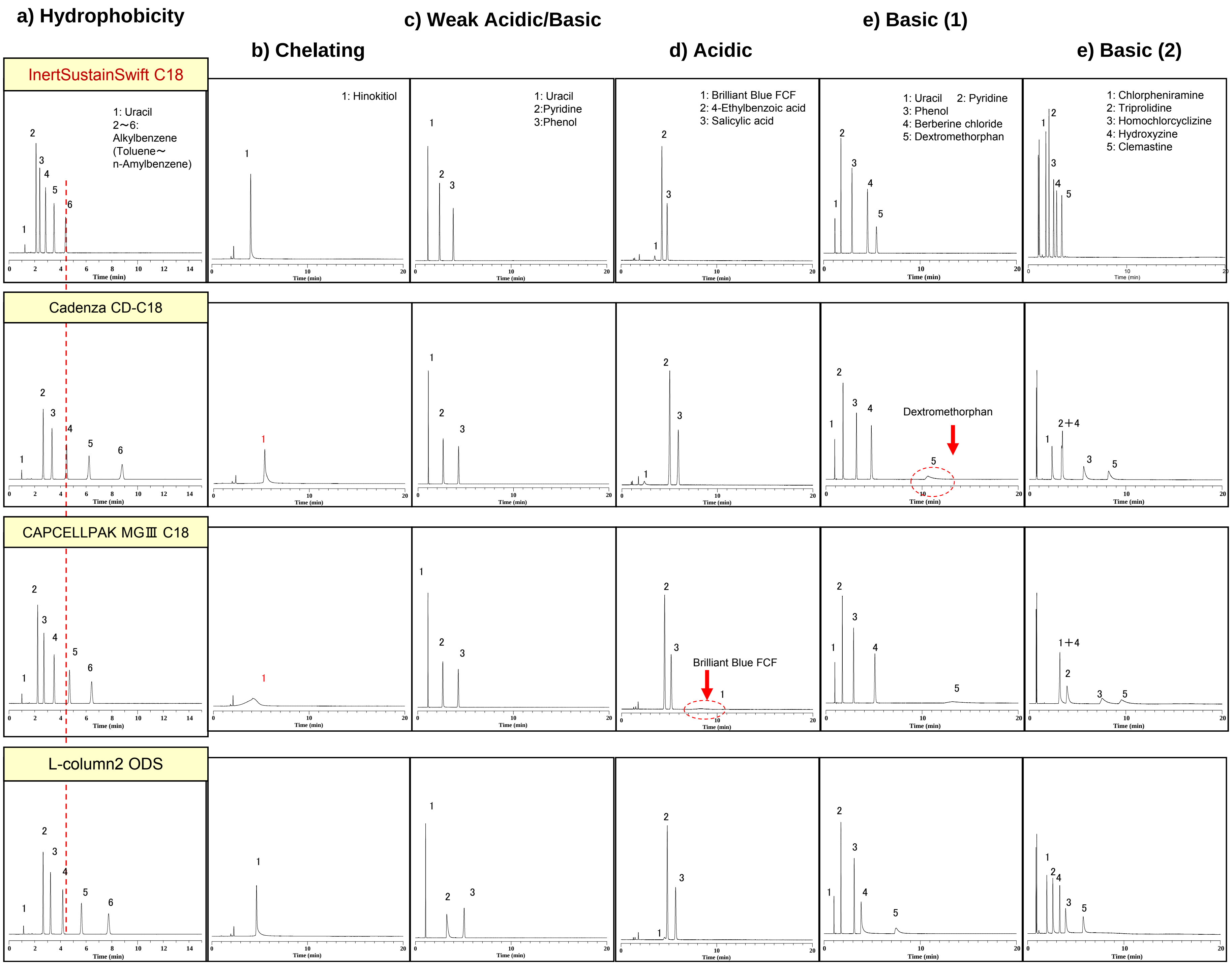
Description	Particle size (μm)	Surface area (㎡/g)	Pore size (Å)	Pore Volume (mL/g)	Carbon Loading (%)	pH
InertSustainSwift C18	3	200	200	1	9	1 to 10
XBridge C18 (Waters)	3.5	185	135	0.7	18	1 to 12
Zorbax Eclipse Plus C18 (Agilent)	3.5	160	95	—	8	2 to 9
Triart C18 (YMC)	3	—	120	—	20	1 to 12
Hypersil GOLD C18 (Thermo Fisher Scientific)	3	220	175	—	10	1 to 11
Gemini NX C18 (Phenomenex)	3	375	110	1.1	14	1 to 12
Luna C18(2) (Phenomenex)	3	400	100	—	17.5	1.5 to 10
Cadenza CD-C18 (Imtakt)	3	—	120	—	—	—
CAPCELLPAK MGⅢ C18 (SHISEIDO)	3	300	100	—	15	2 to 10
L-column2 ODS (CERI)	3	340	120	1.1	17	2 to 9



a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
XBridge C18
Zorbax Eclipse Plus C18
Triart C18
1: Uracil
2~6:
Alkylbenzene
(Toluene~
n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil 2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Hinokitiol
Hinokitiol
Dextromethorphan
3+4
2+4
Time (min)



a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
1: Uracil
2～6:
Alkylbenzene
(Toluene～
n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil 2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Hypersil GOLD C18
1:未溶出
Dextromethorphan
Gemini NX C18
Dextromethorphan
3+4
Luna C18(2)
Hinokitiol
B.B.FCF
Dextromethorphan
Time (min)



a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
Cadenza CD-C18
CAPCELLPAK MGⅢ C18
L-column2 ODS
1: Uracil
2～6: Alkylbenzene (Toluene～n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil 2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Dextromethorphan
Brilliant Blue FCF
2+4
1+4
Time (min)

3) Comparison of InertSustainSwift C18 with the other brand

Comparison List (3um)

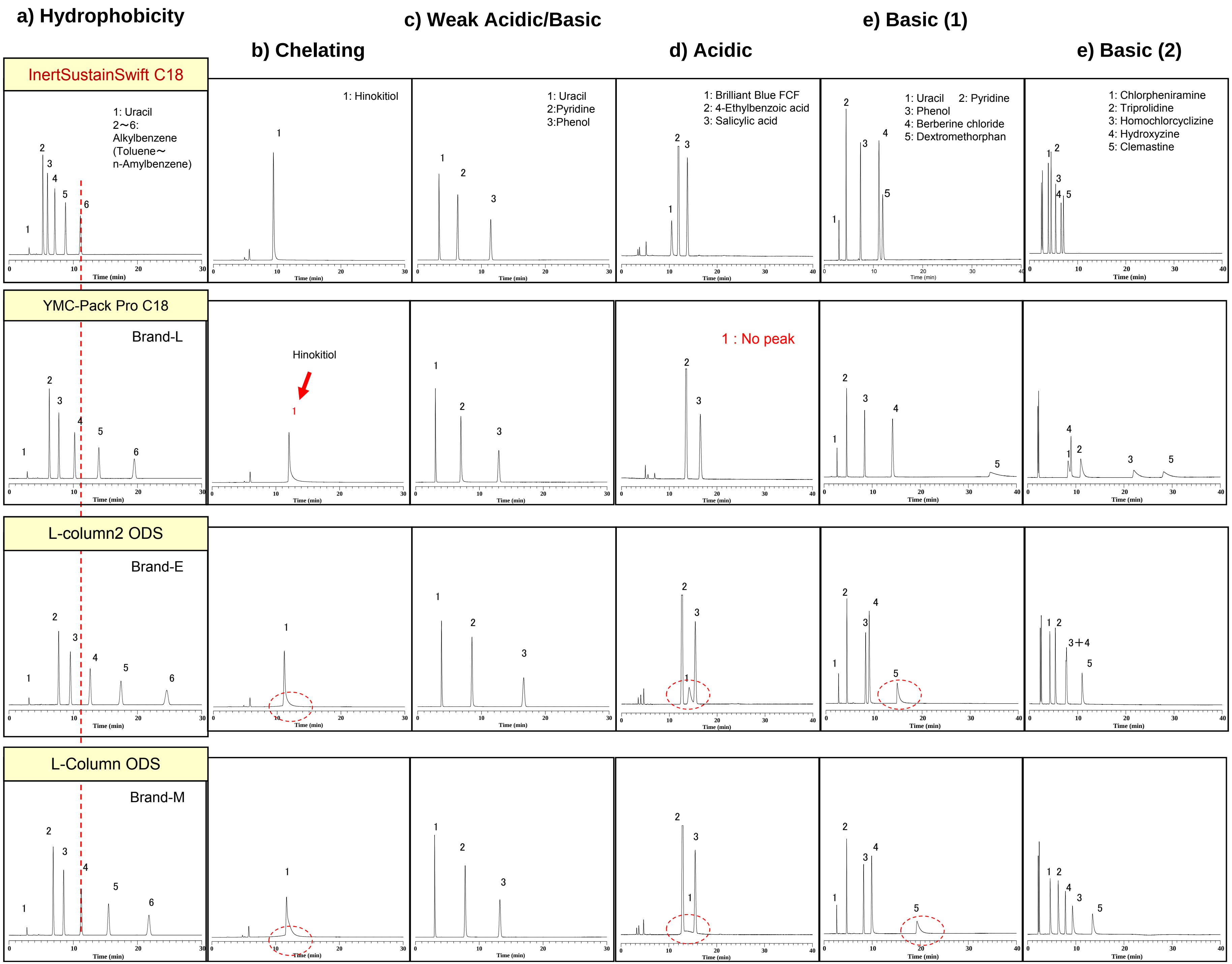
Description	Inertness			Analytical time	100% Water	Bleeding
	Chelating	Acidic	Basic			
InertSustainSwift C18	Great	Great	Great	1	Great	Great
XBridge C18 (Waters)	Poor	Normal	Great	2	Normal	Great
Zorbax Eclipse Plus C18 (Agilent)	Poor	Normal	Poor	3	Poor	Great
Triart C18 (YMC)	Great	Normal	Great	3	Great	Good
Hypersil GOLD C18 (Thermo Fisher Scientific)	Normal	Poor	Poor	1	Good	Great
Gemini NX C18 (Phenomenex)	Normal	Poor	Good	1	Great	Great
Luna C18(2) (Phenomenex)	Poor	Poor	Poor	3	Poor	Good
Cadenza CD-C18 (Imtakt)	Normal	Good	Poor	3	Poor	Good
CAPCELLPAK MGⅢ C18 (SHISEIDO)	Poor	Poor	Poor	2	Great	Great
L-column2 ODS (CERI)	Normal	Normal	Normal	3	Poor	Normal

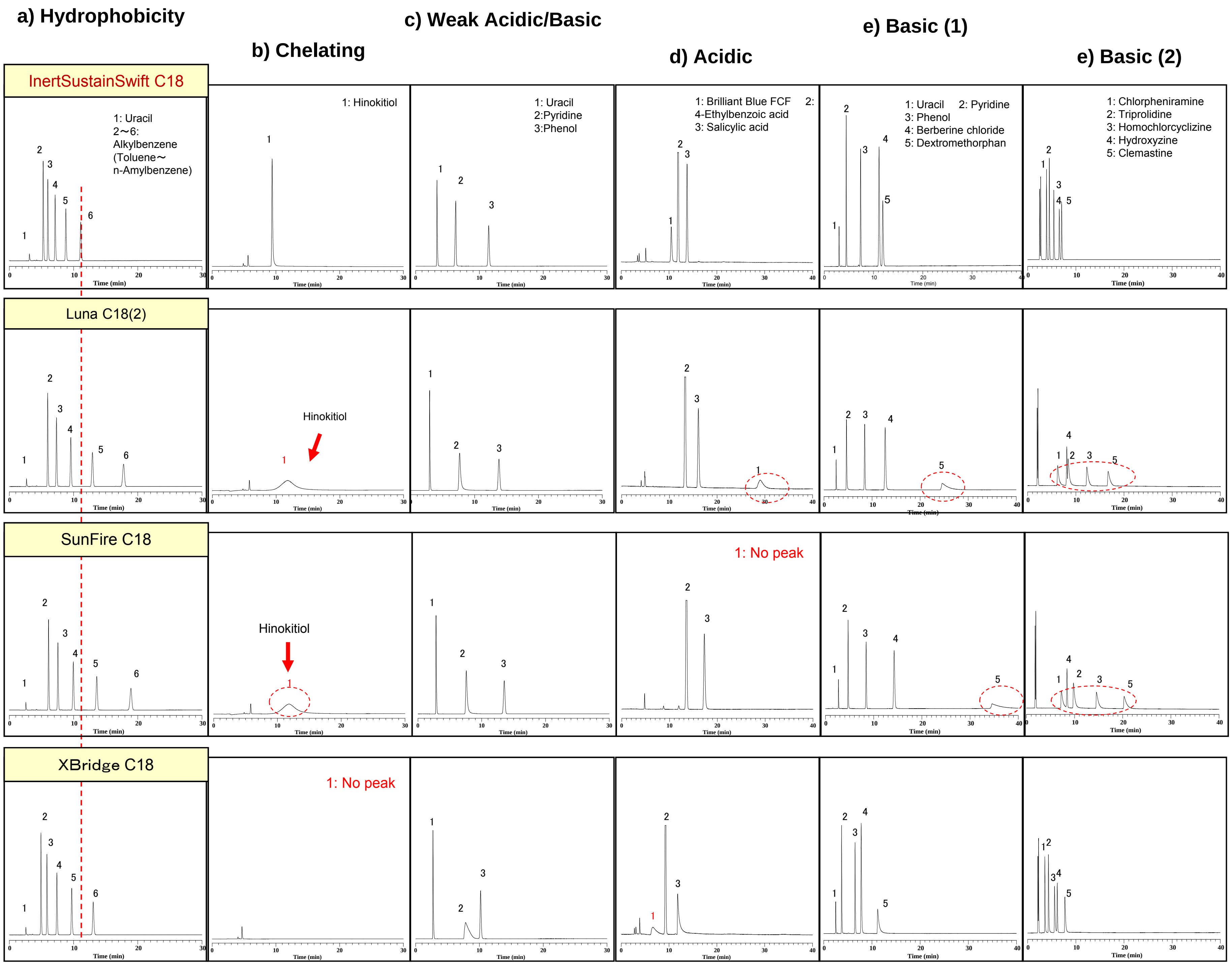
1: Early
2: Middle
3: Late

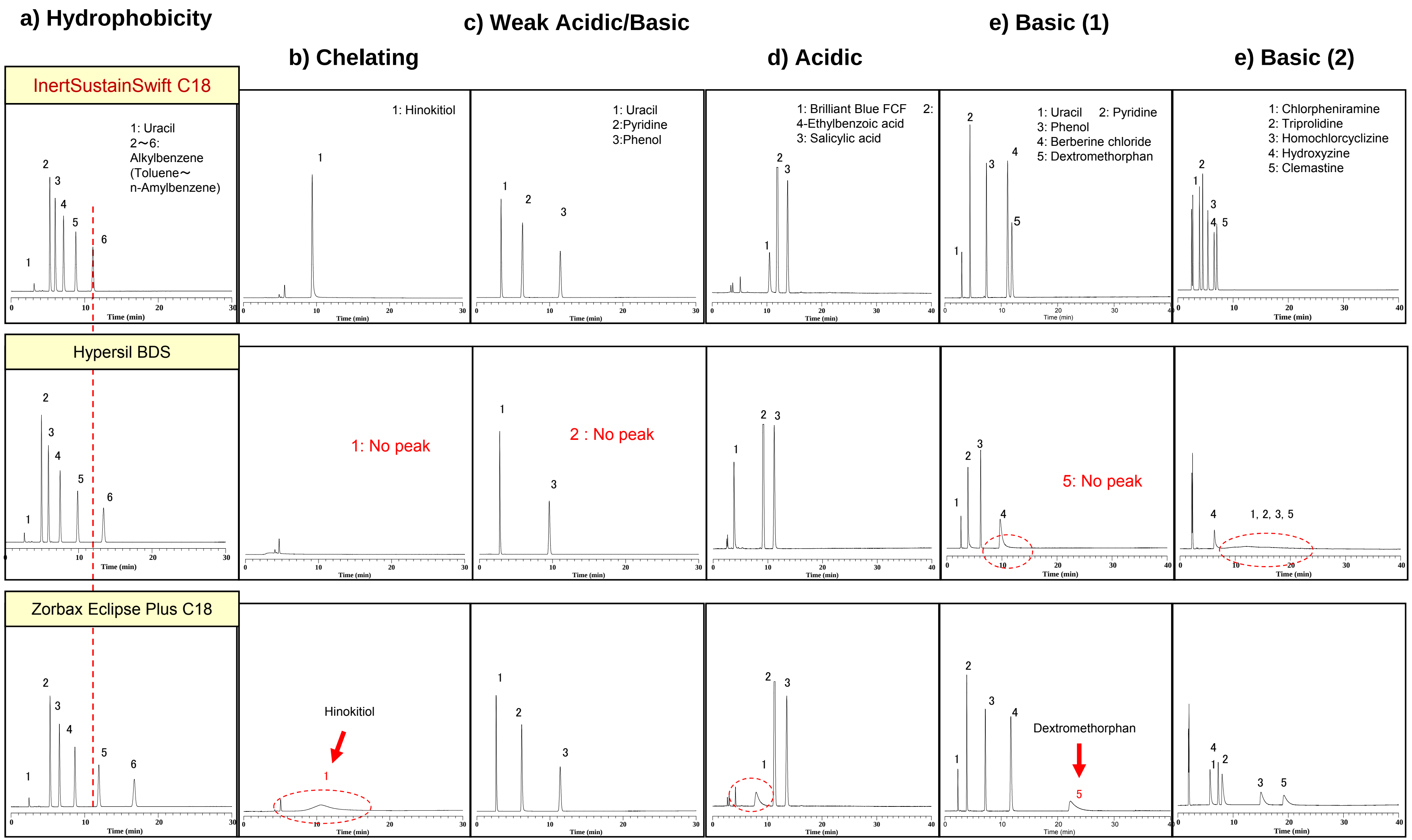
3) Comparison of InertSustainSwift C18 with the other brand

Comparison List (5um)

Description	Particle size (μm)	Surface area (㎡/g)	Pore size (Å)	Pore Volume (mL/g)	Carbon Loading (%)	pH
InertSustainSwift C18	5	200	200	1	9	1 to 10
YMC-Pack Pro C18 (YMC)	5	330	120	1.05	16	2 to 8
L-column2 ODS (CERI)	5	340	120	1.1	17	2 to 9
L-column ODS (CERI)	5	340	120	1.1	17	2 to 9
Luna C18(2) (Phenomenex)	5	400	100	—	17.5	1.5 to 10
SunFire C18 (Waters)	5	340	100	1	16	2 to 8
XBridge C18 (Waters)	5	185	130	—	18	1 to 12
Hypersil BDS (ThermoFisherScientific)	5	—	130	—	11	2 to 9
Zorbax Eclipse Plus C18 (Agilent)	5	160	95	—	8	2 to 9


a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
1: Uracil
2~6:
Alkylbenzene
(Toluene~
n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF
2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil
2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
YMC-Pack Pro C18
Brand-L
Hinokitiol
1 : No peak
L-column2 ODS
Brand-E
3+4
L-Column ODS
Brand-M
Time (min)


a) Hydrophobicity
b) Chelating
c) Weak Acidic/Basic
d) Acidic
e) Basic (1)
e) Basic (2)
InertSustainSwift C18
Luna C18(2)
SunFire C18
XBridge C18
1: Uracil
2~6: Alkylbenzene (Toluene~ n-Amylbenzene)
1: Hinokitiol
1: Uracil
2:Pyridine
3:Phenol
1: Brilliant Blue FCF 2: 4-Ethylbenzoic acid
3: Salicylic acid
1: Uracil 2: Pyridine
3: Phenol
4: Berberine chloride
5: Dextromethorphan
1: Chlorpheniramine
2: Triprolidine
3: Homochlorcyclizine
4: Hydroxyzine
5: Clemastine
Hinokitiol
Hinokitiol
1: No peak
1: No peak
Time (min)



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3) Comparison of InertSustainSwift C18 with the other brand

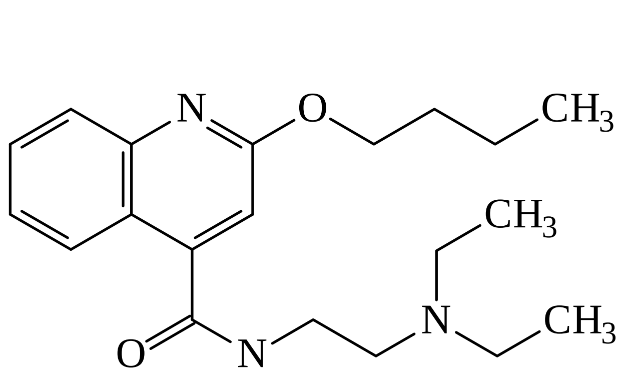
Comparison List (5um)

Description	Inertness			Analytical time	100% Water	Bleeding
	Chelating	Acidic	Basic			
InertSustainSwift C18	Great	Great	Great	1	Great	Great
YMC-Pack Pro C18 (YMC)	Normal	Poor	Poor	3	Good	-
L-column2 ODS (CERI)	Normal	Normal	Good	3	Poor	-
L-column ODS (CERI)	Normal	Poor	Normal	3	Normal	-
Luna C18(2) (Phenomenex)	Poor	Normal	Normal	2	Poor	-
SunFire C18 (Waters)	Poor	Poor	Normal	2	Poor	-
XBridge C18 (Waters)	Poor	Normal	Good	1	Poor	-
Hypersil BDS（ThermoFisherScientific）	Poor	Great	Poor	1	Poor	-
Zorbax Eclipse Plus C18 (Agilent)	Poor	Normal	Poor	2	Poor	-

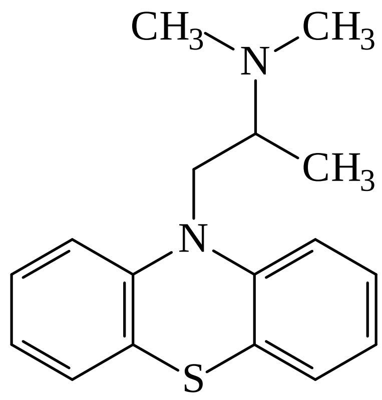
1: Early
2: Middle
3: Late

4) Confirmation Test for Influence of Buffer (Conditions)

Concentration of ammonium acetate was changed in stages and then, peak shapes of each stage was confirmed if adsorption was occurred.



Dibucaine (pKa 8.5)



Promethazine (pKa 9.1)

Conditions

System	: Nexera LCMS-8030 plus
Column size	: (3 µm, 150 × 2.1 mm I.D.)
Eluent	: A) Ammonium Acetate in H_2O B) Ammonium Acetate in CH_3OH A/B = 30/70 ,v/v
Flow Rate	: 0.2 mL/min
Col. Temp.	: 40 ℃
Detection	: LC/MS/MS (ESI, Positive, MRM)

Sample:each 0.1 (mg / mL)

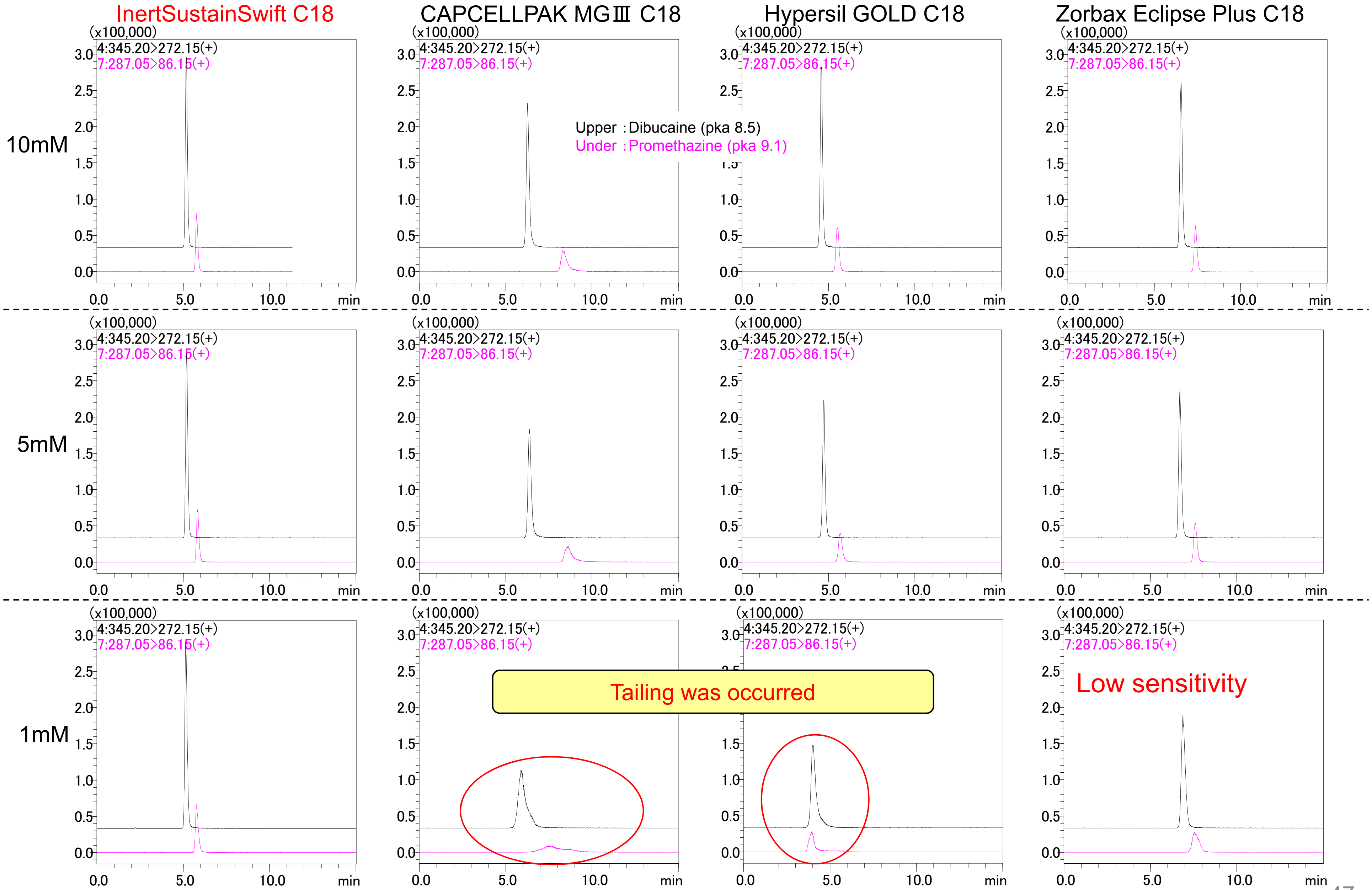
	Q1 > Q3
1. Dibcaine	: 345.20 > 272.15 (+)
2. Promethazine	: 287.05 > 86.15 (+)

Column size: 3µm, 2.1 × 150

Upper : Dibucaine (pka 8.5)

Under : Promethazine (pka 9.1)

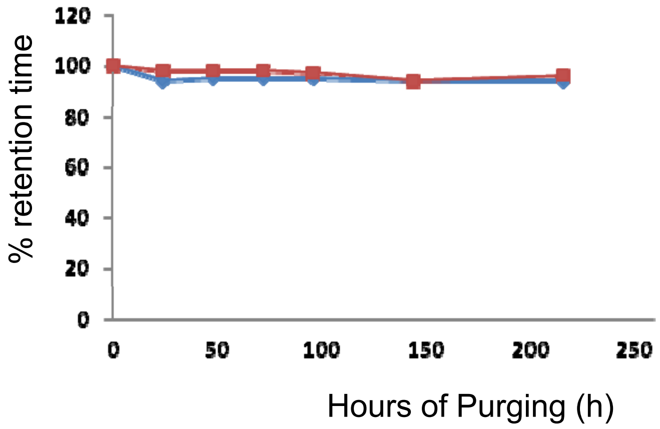
4) Confirmation Test for Influence of Buffer (Results)

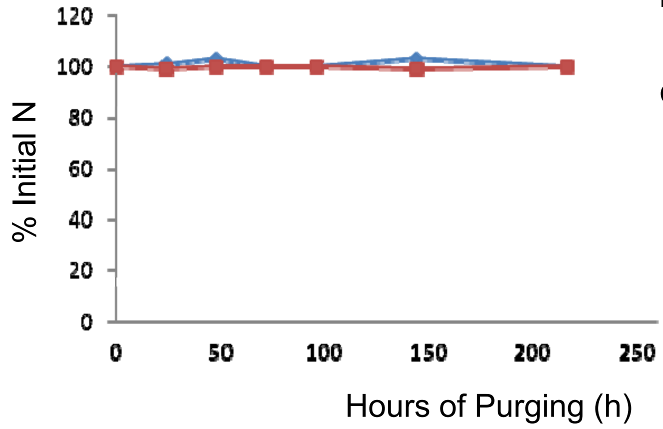


5) Durability Test for Acidic/Basic conditions

● Durability test for Acidic conditions

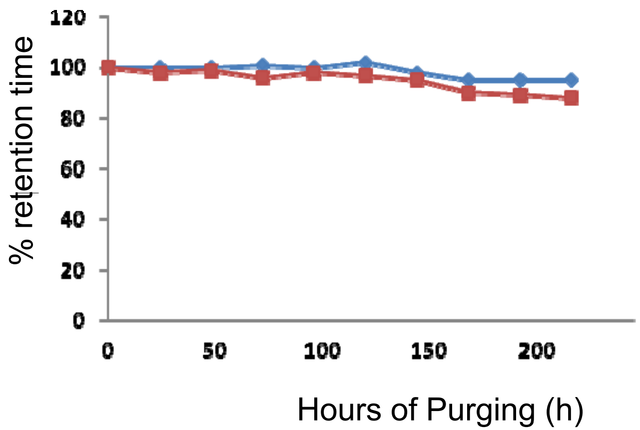
<u>Purging Conditions</u>
Column Size : 3um, 2.1 x 150mm
Eluent : 1% TFE (ph1.0) or 0.1% TFA(2.0) / CH3CN : 90/10, v / v
Col. Temp : 60℃

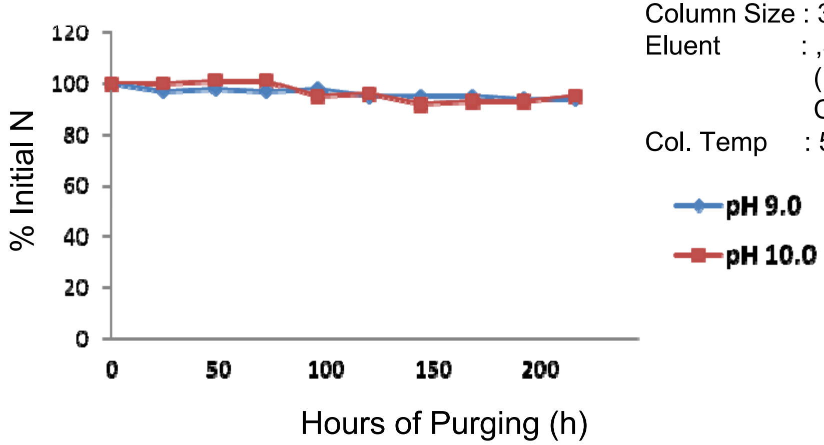




● Durability test for conditions

<u>Purging Conditions</u>
Column Size : 3um, 2.1 x 150mm
Eluent : ,50mM TEA (pH 9.0 or pH 10) / CH3OH : 70 / 30, v / v
Col. Temp : 50℃



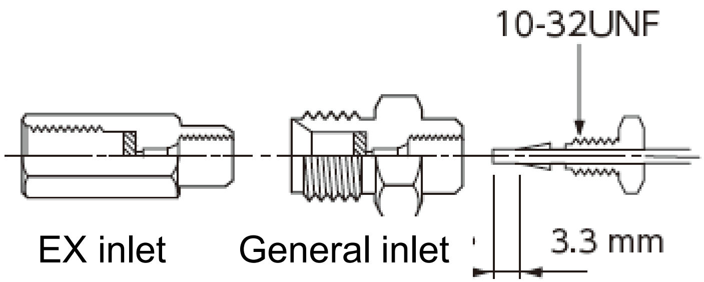


Joint for Inlet

● Waters Type
General type
Lineup of 5um and 3um are used for Waters type

● UP Type (For UHPLC)
Lineup of 1.9um and 3um HP are used for UP type

Waters type



UP type