# InertSustainSwift C8 Technical Data



InertSusta

### InertSustainSwift C8

#### **Physical Properties**

- ●Silica
- Particle Size
- •Surface Area
- •Pore Size
- •Pore Volume
- Bonded Phase
- •End-capping
- •Carbon Loading
- ●pH Range
- •USP Code

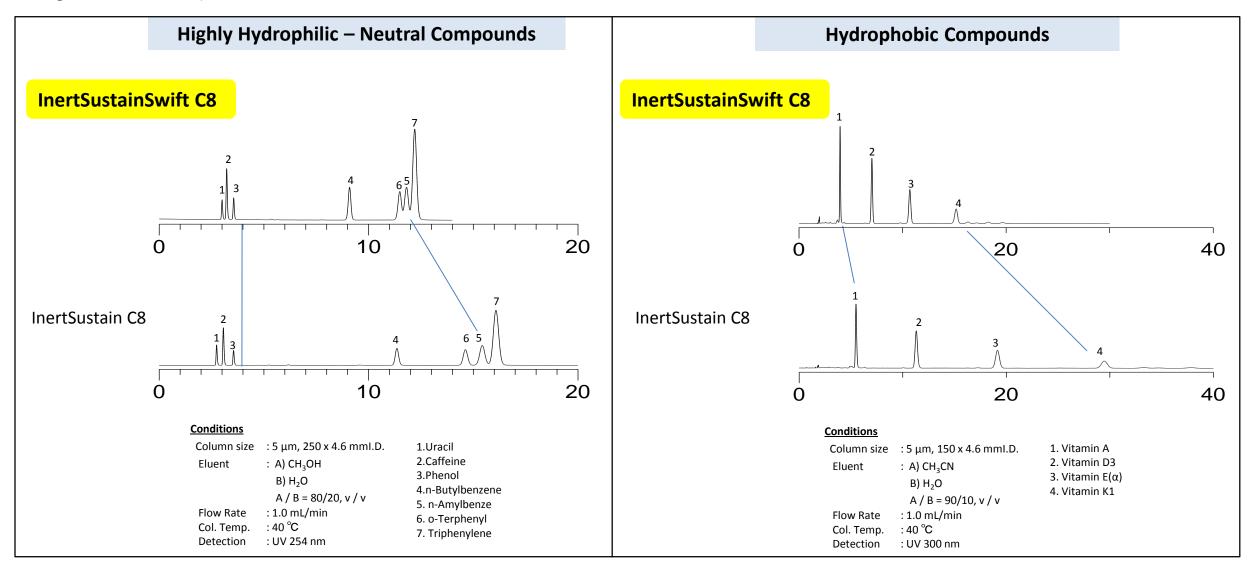
- : ES (Evolved Surface) Silica Gel
- :1.9 μm, 3 μm, 5 μm
- : 200 m<sup>2</sup>/g
- : 200 Å (20 nm)
- :1.00 mL/g
- : Octyl Groups
- : Complete
- :6%
- :1~10
- : L7

#### **Benefits of InertSustainSwift C8**

- Highly inert packing material results in less tailing of peaks for virtually any type of analytes
- Extreme resistance to low and high pH mobile phases
- Rapid elution of samples in isocratic methods
- Endlessly reproducible from column-to-column and batch-to-batch

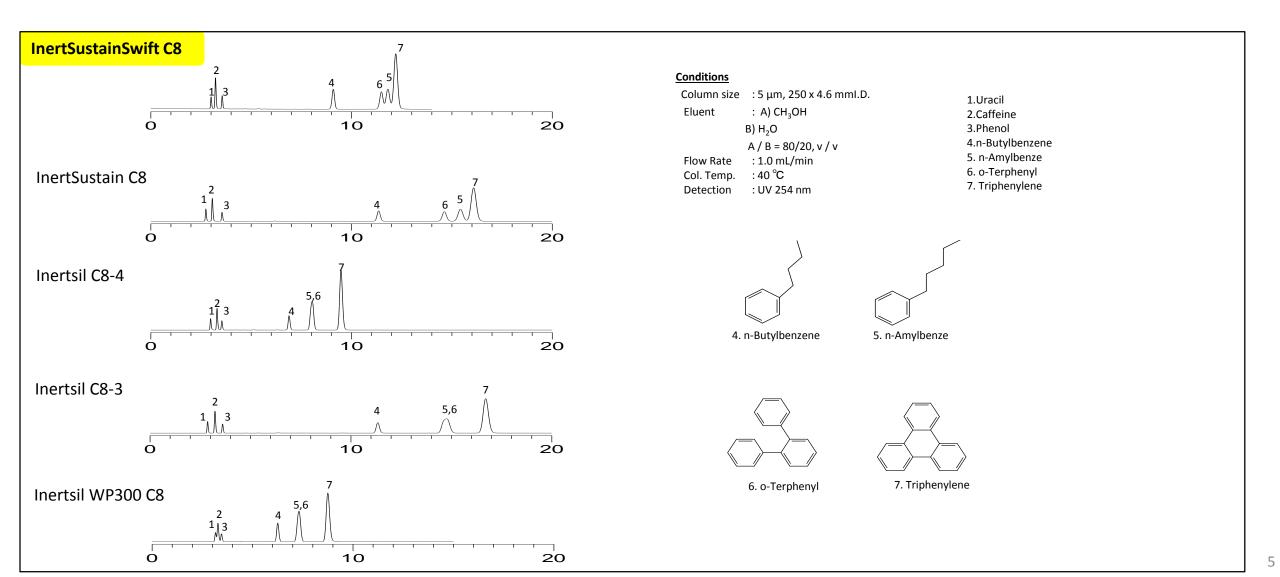
#### Comparison of Retentivity Between InertSustainSwift C8 & InertSustain C8

The retentivity of InertSustainSwift C8 is weaker than InertSustain C8 for neutral and especially for hydrophobic compounds. The weak retentivity is generated due to the difference in physical properties between InertSustainSwift C8 (surface area: 200 m2/g, carbon load: 6 %) and InertSustain C8 (surface area: 350 m2/g, carbon load: 8 %).



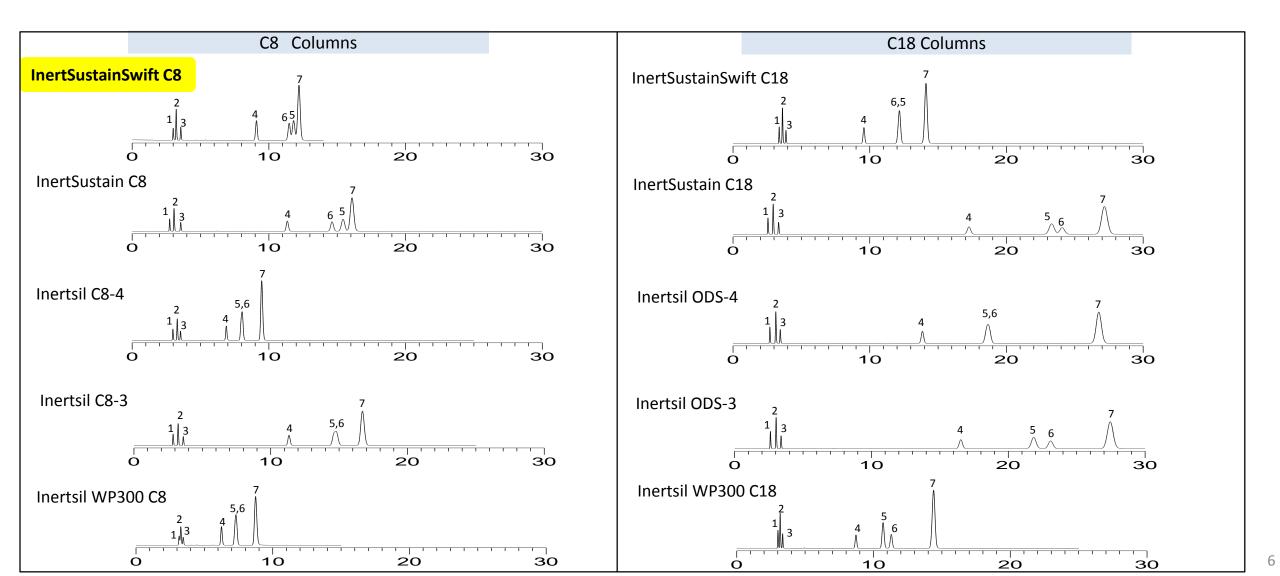
#### Comparison of Retentivity Between InertSustainSwift C8 & Other C8 columns

InertSustainSwift C8 offer moderate retentivity while comparing with GL Sciences' C8 columns.



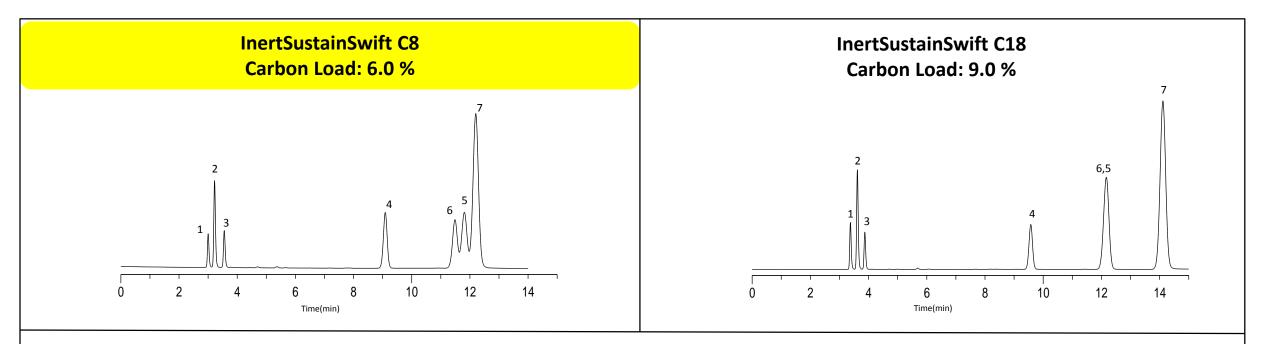
#### Comparison of Retentivity Between InertSustainSwift C8 & Other C18 columns

This example shows a difference in selectivity and retentivity between C18 and C8 columns which were tested under the same analytical conditions.



### **Comparison Between InertSustainSwift C18 & C8**

Under this analytical conditions, the retentivity is similar between both columns while the InerSustainSwift C8 provided better separation, which can be used to optimize selectivity or analysis time.



#### **Conditions**

Sample:

1.Uracil

2.Caffeine

4.n-Butylbenzene

5.n-Amylbenze

6.o-Terphenyl

7.Triphenylene

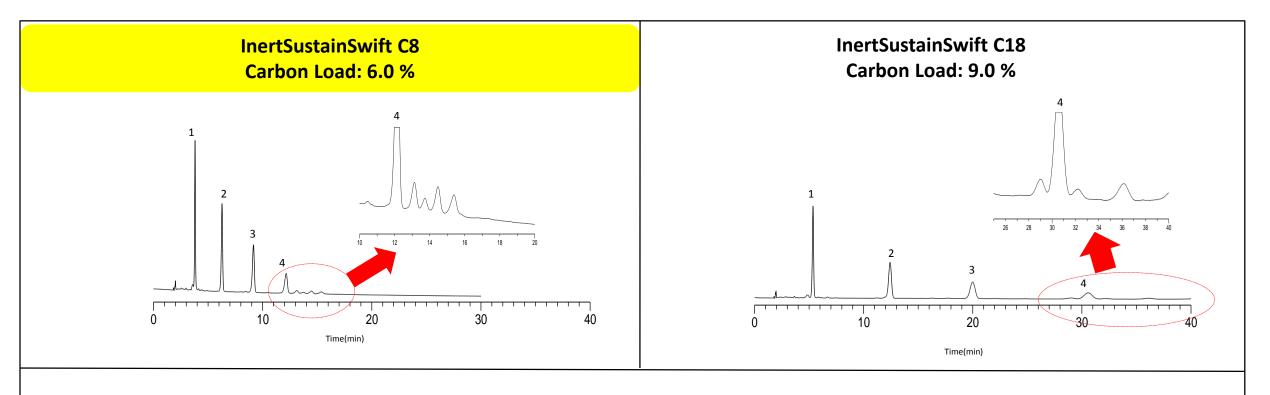
3.Phenol

•Sample No.4, n-Butylbenzene and Sample No.5, n-Amylbenzene were used to determine the hydrophobic property of the column. n-Amylbenzene elutes later against n-Butylbenzene when the hydrophobicity of the column is high.

•Stereoselectivity is indicated by Sample No.6, o-Terphenyl and Sample No.7, Triphenylene. O-Terphenyl has a twisted tertiary structure and Triphenylene has a planar structure. Triphenylene elutes later against o-Terphenyl when the stereoselectivity of the column is high.

### **Comparison Between InertSustainSwift C18 & C8**

Many chromatographers prefer a C8 column when an ODS phase shows excessive retention values. In this example, the InertSustainSwift C8 provides shorter analysis time with better selectivity on the impurities eluted after sample no. 4 due to the shorter alkyl chain length of the stationary phase.

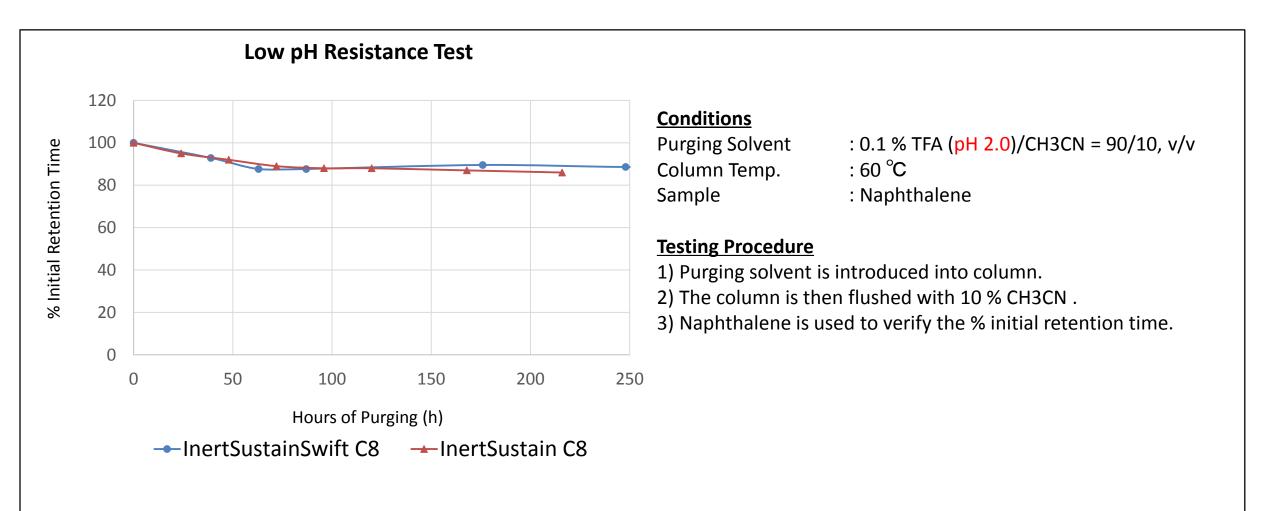


#### **Conditions**

Column size	: 5 μm, 150 x 4.6 mm I.D.	1. Vitamin A
Eluent	: A) CH <sub>3</sub> CN	2. Vitamin D3
	B) H <sub>2</sub> O	3. Vitamin E(α) 4. Vitamin K1
	A/B = 90/10, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: UV 300 nm	

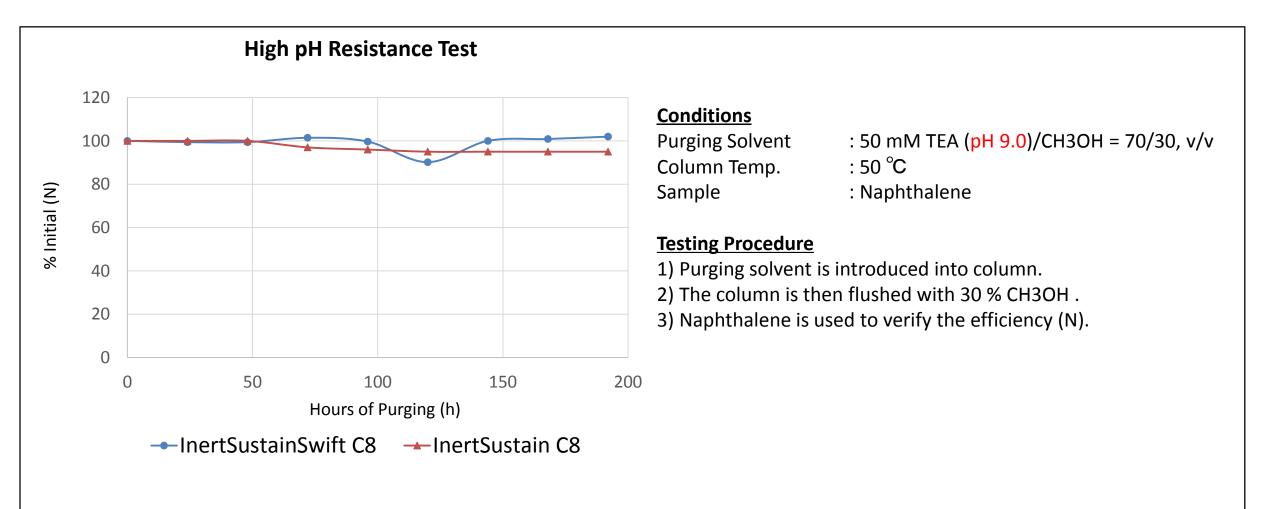
## **Durability Testing at Low pH**

InertSustainSwift C8 columns are stable over a wide pH range, just like InertSustain C8.



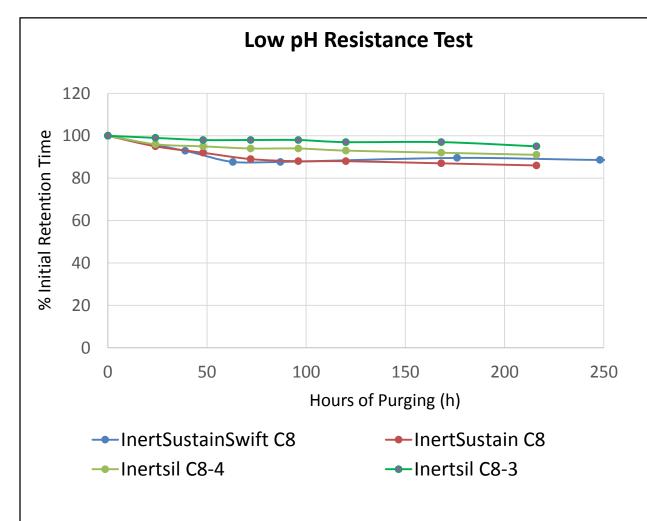
## **Durability Testing at High pH**

InertSustainSwift C8 columns are stable over a wide pH range, just like InertSustainSwift C18.



#### Comparison of Durability Between InertSustainSwift C8 & Other C8 columns

InertSustainSwift C8 columns are stable over a wide pH range, just like InertSustain C8.



#### **Conditions**

Purging Solvent Column Temp. Sample

- : 0.1 % TFA (pH 2.0)/CH3CN = 90/10, v/v : 60 °C
- : Naphthalene

#### **Testing Procedure**

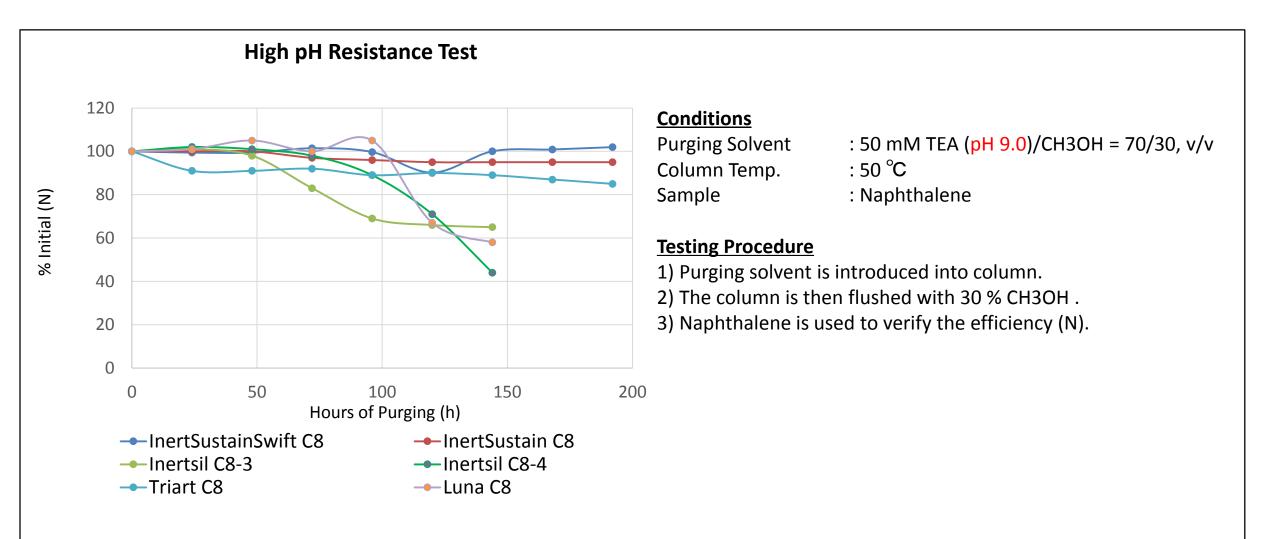
1) Purging solvent is introduced into column.

2) The column is then flushed with 10 % CH3CN .

3) Naphthalene is used to verify the % initial retention time.

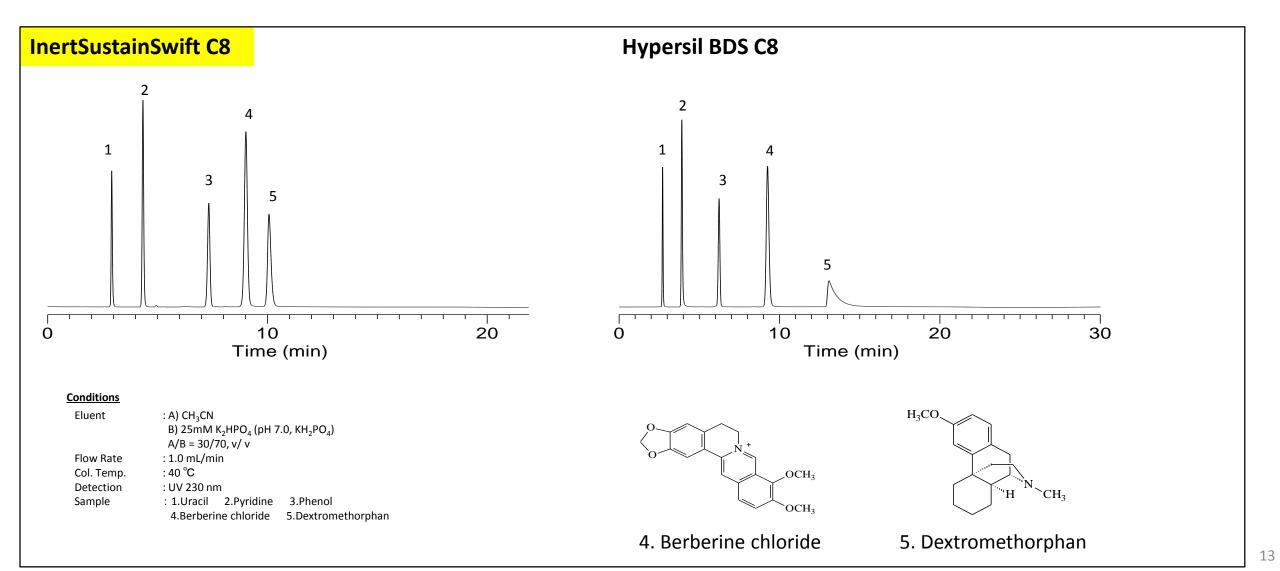
#### Comparison of Durability Between InertSustainSwift C8 & Other C8 columns

InertSustainSwift C8 columns are stable over a wide pH range, just like InertSustain C8.



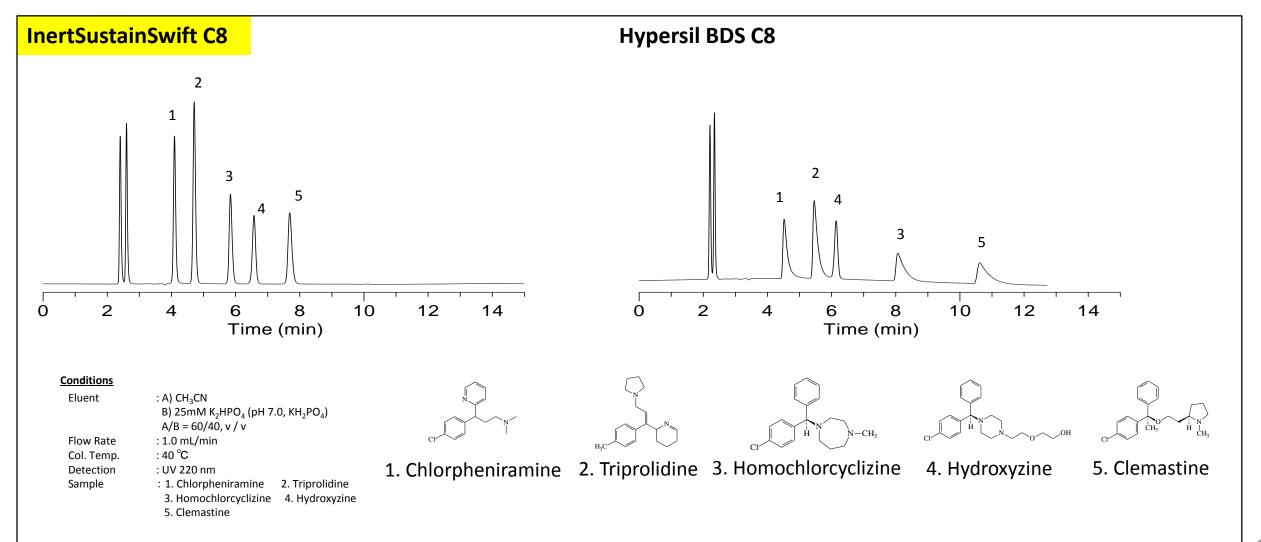
## **Comparison of Strong Basic Compound Test**

Dextromethorphan is a strong basic compound. Severe tailing can be confirmed when the packing material contains residual silanol groups.



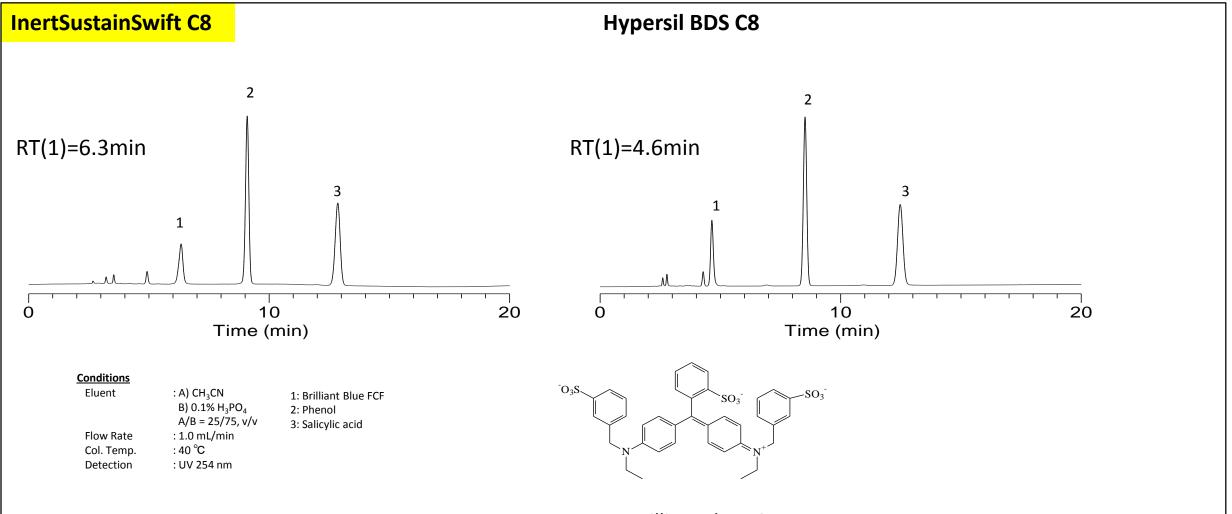
## **Comparison of Strong Basic Compound Test**

A basic compound test using antihistamine drugs are highly basic, which can show tailing of peaks and different elution pattern on columns with insufficient end-capping. Columns with insufficient end-capping will show later elution of sample 1, 2, 3 and 5.



## **Comparison of Strong Acidic Compound Test**

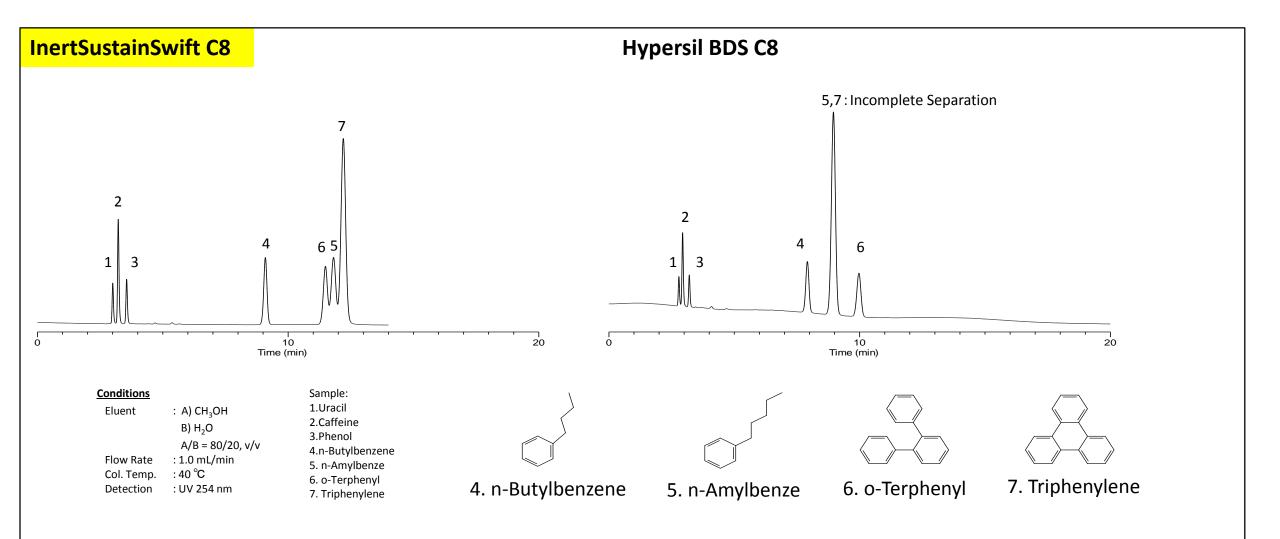
Sharp peaks can be obtained when analyzing Phenol or Salicylic Acid. However, as Brilliant Blue FCF has three sulfonic groups in its chemical structure, tailing will occur when the surface of the packing material is slightly basic.



1. Brilliant Blue FCF

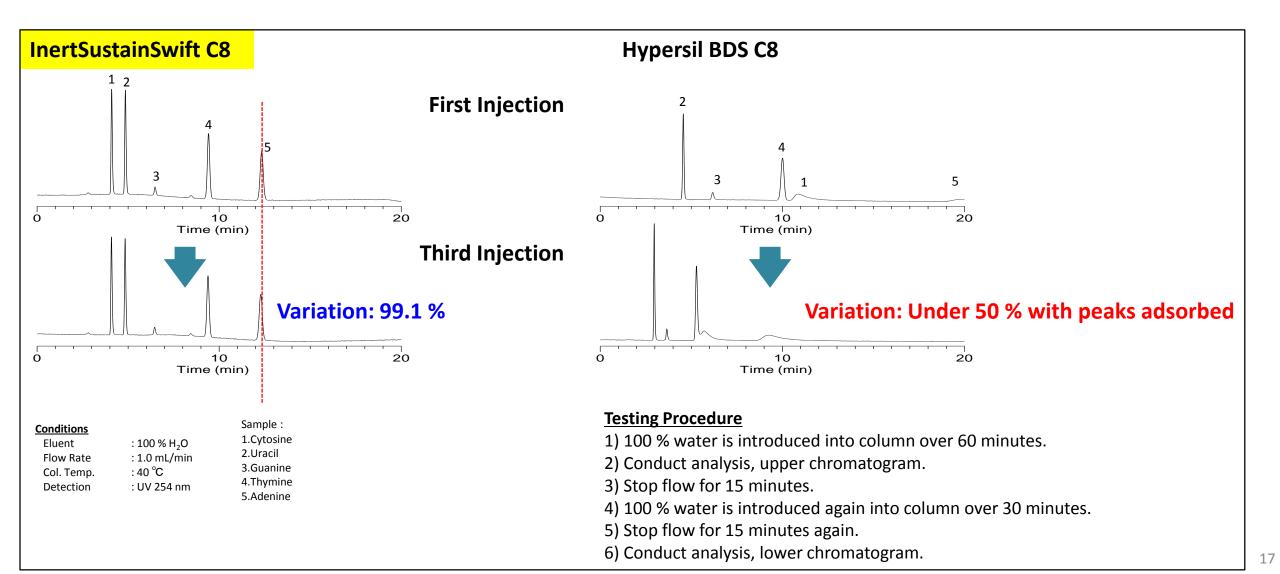
#### **Comparison of Selectivity**

Sample No. 5, n-Amylbenzene was used to determine the hydrophobic property of columns. The overall retentivity of InertSustainSwift C8 offers similar retentivity to Hypersil BDS C8.



#### **Comparison of Compatibility with 100 % Water Mobile Phase**

Sample No. 5, n-Amylbenzene was used to determine the hydrophobic property of columns. The overall retentivity of InertSustainSwift C8 offers similar retentivity to Hypersil BDS C8.



# **Comparison of Performance**

## **List of Columns**

Brand	Dimension (mm)	Particle Size (µm)	Surface Area (m²/g)	Pore Size (Å)	Pore Volume (mL/g)	Carbon Loading (%)	pH Range
InertSustainSwfit C8	4.6 × 250	5	200	200	1.00	6	1-10
InertSustain C8	4.6 × 250	5	350	100	0.85	8	1-10
Thermo Fisher Scientific: Hypersil BDS C8	4.6 × 250	5	170	130	0.65	7	2-9
YMC; Triart C8	4.6 × 250	5	_	120	_	17	1-12
Phenomenex; Luna C8(2)	4.6 × 250	5	400	100	_	13.5	1.5-10
YMC; YMC-Pack Pro C8	4.6 × 250	5	325	120	0.97	10	2-7.5
CERI; L-column C8	4.6 × 250	5	340	120	1.1	10	2-7.5
Waters; SunFire C8	4.6 × 250	5	340	100	0.86	11.5	2-8
Waters; XBridge C8	4.6 × 250	5	185	130	0.77	13	1-12
Agilent; Zorbax Eclipse plus C8	4.6 × 250	5	95	160	_	8	2-9

## **Explanation of Analytical Tests and Conditions**

Selectivity Test					Conditions	
Sample No.4, n-Butylbenzene and Samplagainst n-Butylbenzene when the hydrog Triphenylene. O-Terphenyl has a twisted stereoselectivity of the column is high. 4. <i>n</i> -E	phobicity of the column is high tertiary structure and Triphe	h. Stereoselectivity is india nylene has a planar struct	cated by Sample No.6, o	o-Terphenyl and Sample No.7,	Eluopt	: A) $CH_3OH$ B) $H_2O$ A/B = 80/20, v / v : 1.0 mL/min : 40 °C : UV 254 nm : 1. Uracil 2. Caffeine 3. Phenol 4. <i>n</i> -Butylbenzene 5. <i>n</i> -Amylbenzene 6. <i>o</i> -Terphenyl 7. Triphenylene
Basic Compound Test (1)		· · ·	· ·	· ·		
Dextromethorphan and Berberine chlori groups.	ide are strong basic compound $N^+$ $OCH_3$ erine chloride	ds. Severe tailing can be considered to the constraint of the cons	СН3	king material contains residual silanol	<u>Conditions</u> Eluent Flow Rate Col. Temp. Detection Sample	: A) $CH_3CN$ B) $25mMK_2HPO_4$ (pH 7.0, $KH_2PO_4$ ) A/B = $30/70$ , v/ v : $1.0 mL/min$ : $40 ^{\circ}C$ : UV 230 nm : $1.Uracil$ 2.Pyridine 3.Phenol 4.Berberine chloride 5.Dextromethorphan
Basic Compound Test (2)						
A basic compound test using antihistami insufficient end-capping. Column with in				ution pattern on columns with	<u>Conditions</u> Eluent	: A) CH <sub>3</sub> CN B) 25mM K <sub>2</sub> HPO <sub>4</sub> (pH 7.0, KH <sub>2</sub> PO <sub>4</sub> ) A/B = 60/40, v / v
		N-CH <sub>3</sub>	N OH Cr	$ \begin{array}{c} & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ $	Flow Rate Col. Temp. Detection Sample	: 1.0 mL/min : 40 °C : UV 220 nm : 1. Chlorpheniramine 2. Triprolidine 3. Homochlorcyclizine 4. Hydroxyzine 5. Clemastine
1. Chlorpheniramine 2. Tripro	olidine 3. Homochlord	yclizine 4. Hydro>	kyzine 5.	Clemastine		

### **Explanation of Analytical Tests and Conditions**

Acidic Compound Test			
		<b>Conditions</b>	
Sharp peaks can be obtained when analyzing Phenol or Salicylic Acid. However, as Brilliant Blue FCF has three sulfonic groups in its chemical structure, tailing will occur when the surface of the packing material is slightly basic.		Eluent	: A) CH <sub>3</sub> CN B) 0.1% H <sub>3</sub> PO <sub>4</sub>
	<sup>10</sup> 3S SO3 <sup>-</sup> SO3 <sup>-</sup>	Flow Rate	A/B = 25/75, v/v : 1.0 mL/min
		Col. Temp.	: 40 °C
		Detection	: UV 254 nm
		Sample	: 1.Brilliant Blue FCF 2.Phenol
	1.Brilliant Blue FCF		3.Salicylic acid
Chelating Compound Tes			
0		<b>Conditions</b>	
linokitiol is a strong chelating compou	d, which coordinately binds with the surface of residual trace metal impurities, resulting in severe tailing.	Eluent	: A) CH <sub>3</sub> CN
lowever, the peak shape improves as t	ne injection increases since the surface of the packing material of the adsorption active sites eventually become masked.		B) 0.1%H <sub>3</sub> PO <sub>4</sub>
			A/B = 40/60, v/v
	ОЦОН	Flow Rate	: 1.0 mL/min
	, On	Col. Temp.	: 40 °C
		Detection	: UV 254 nm
		Inject Vol. Sample	: 1 μL, 10ppm : 1. Phenol 2. β-Thujaplicin (Hinokitiol)
		Sample	. 1. Phenor 2. p-mujapheni (Hinokito)
	2. β-Thujaplicin (Hinokitiol)		
Dewetting Test			

pushes the aqueous mobile phase out off the pore in an irreversible fashion, in what has become known as the dewetting phenomenon.

#### **Testing Procedure:**

1) 100 % water is introduced into column over 60 minutes.

2) Conduct Analysis (Upper chromatogram in the following pages)

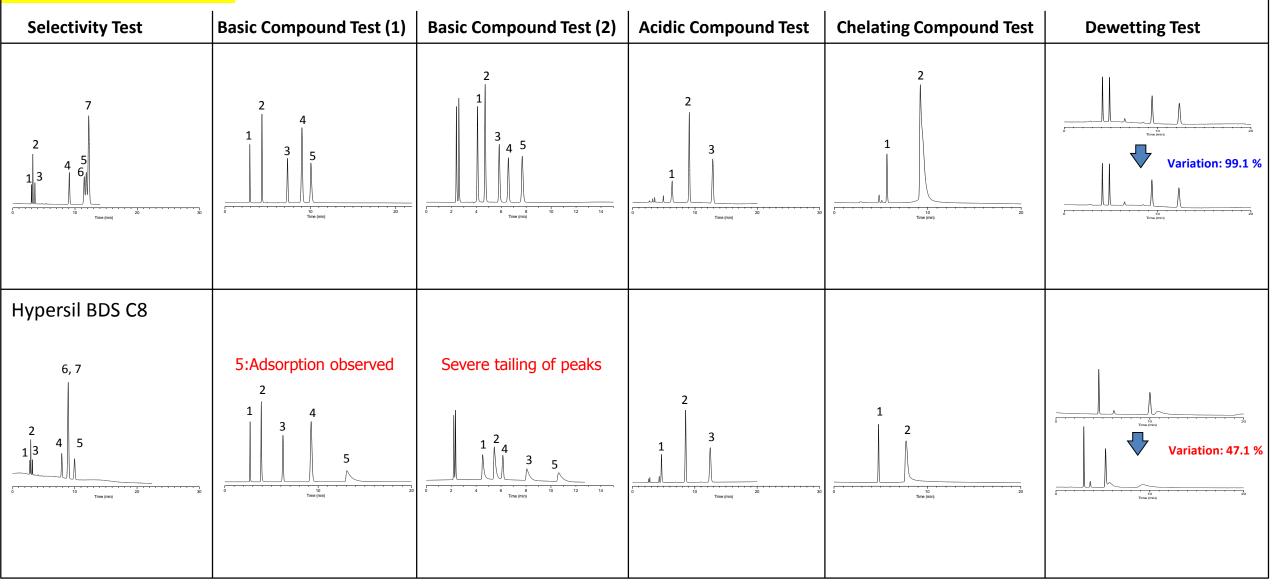
3) Stop flow for 15 minutes.

4) 100 % water is introduced again into column over 30 minutes.

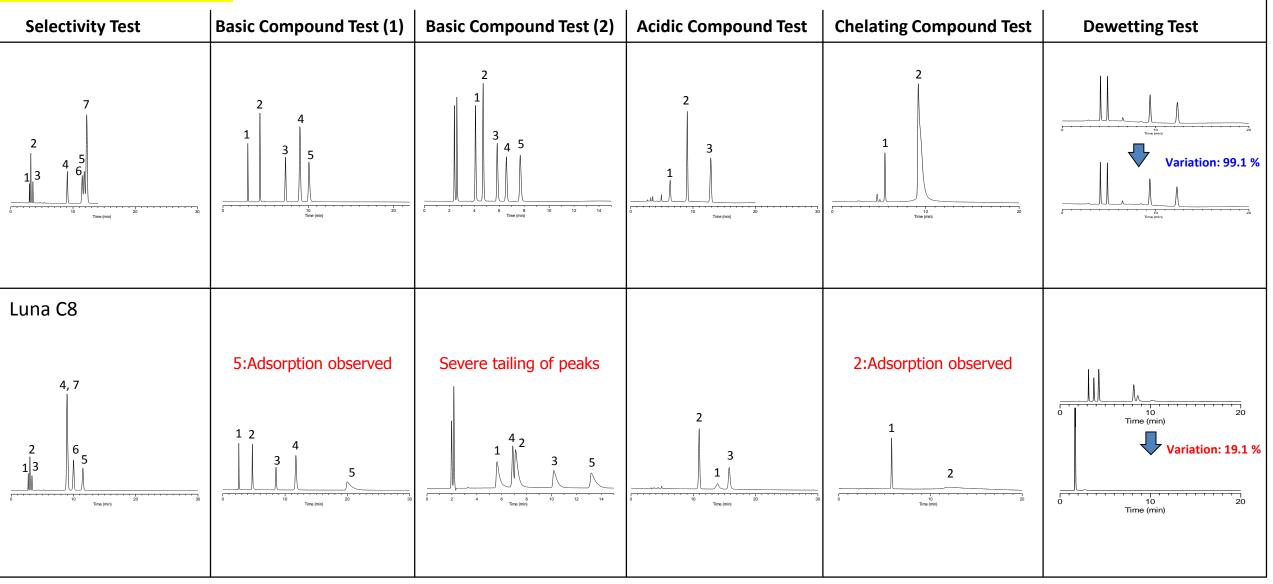
5) Stop flow for 15 minutes again.

6) Conduct Analysis (Lower chromatogram in the following pages)

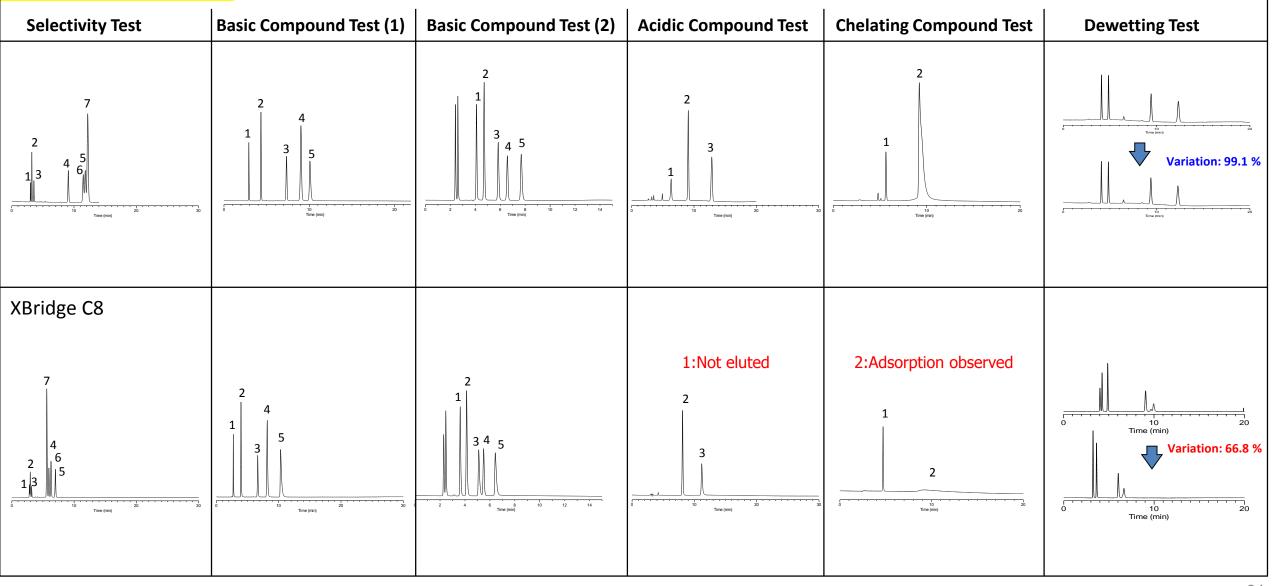
## **Comparison of Performance (1/9)**



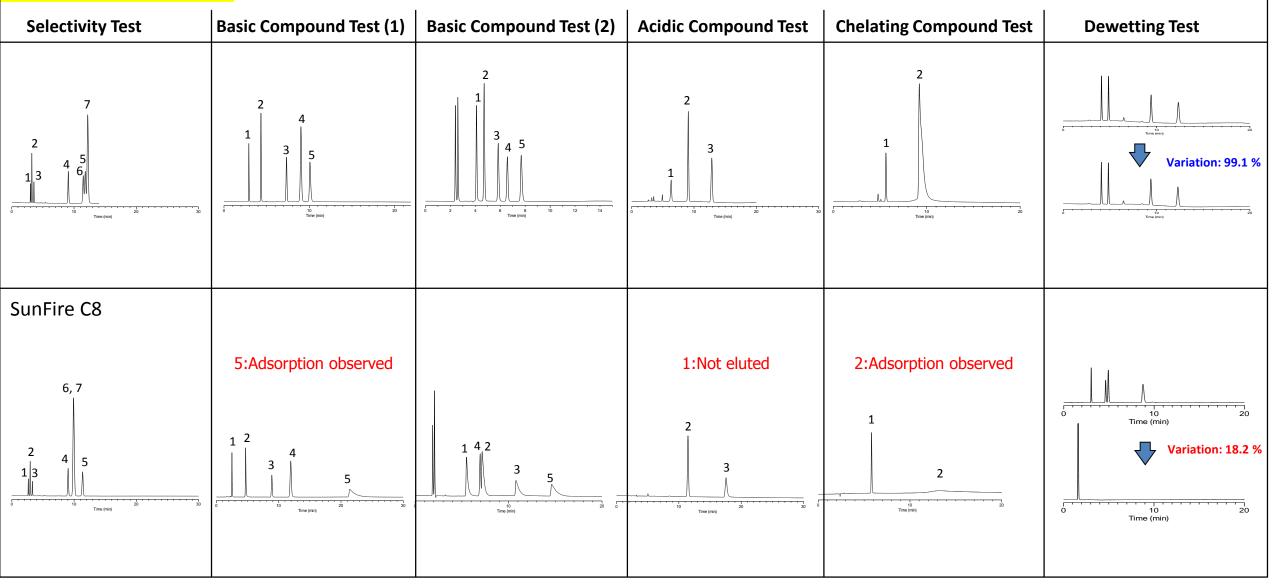
## **Comparison of Performance (2/9)**



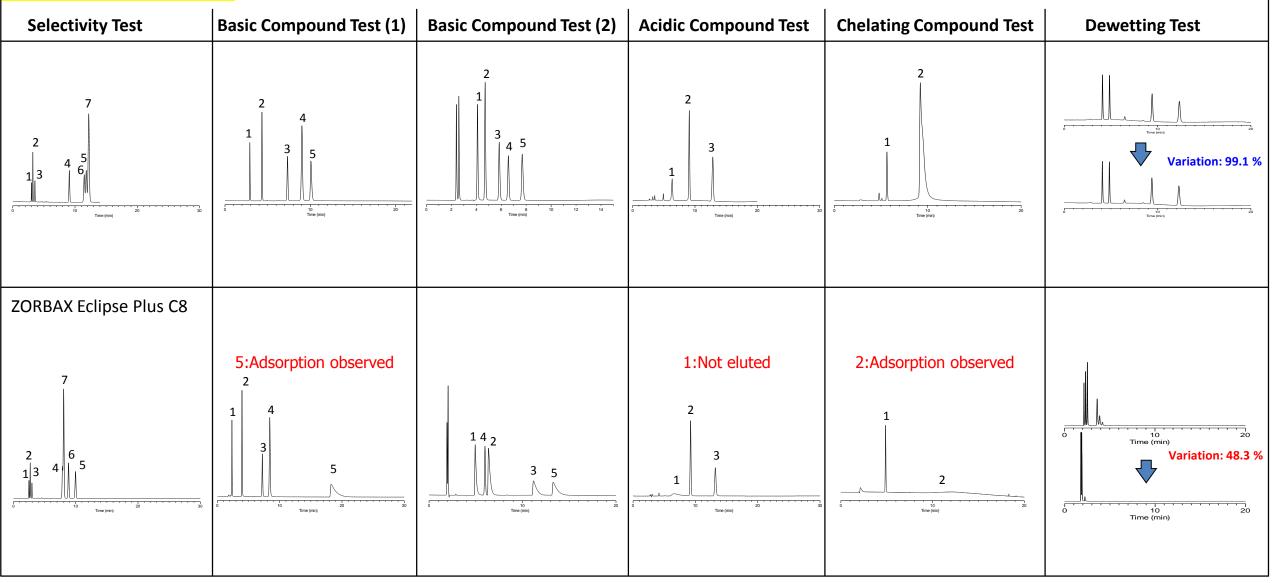
## **Comparison of Performance (3/9)**



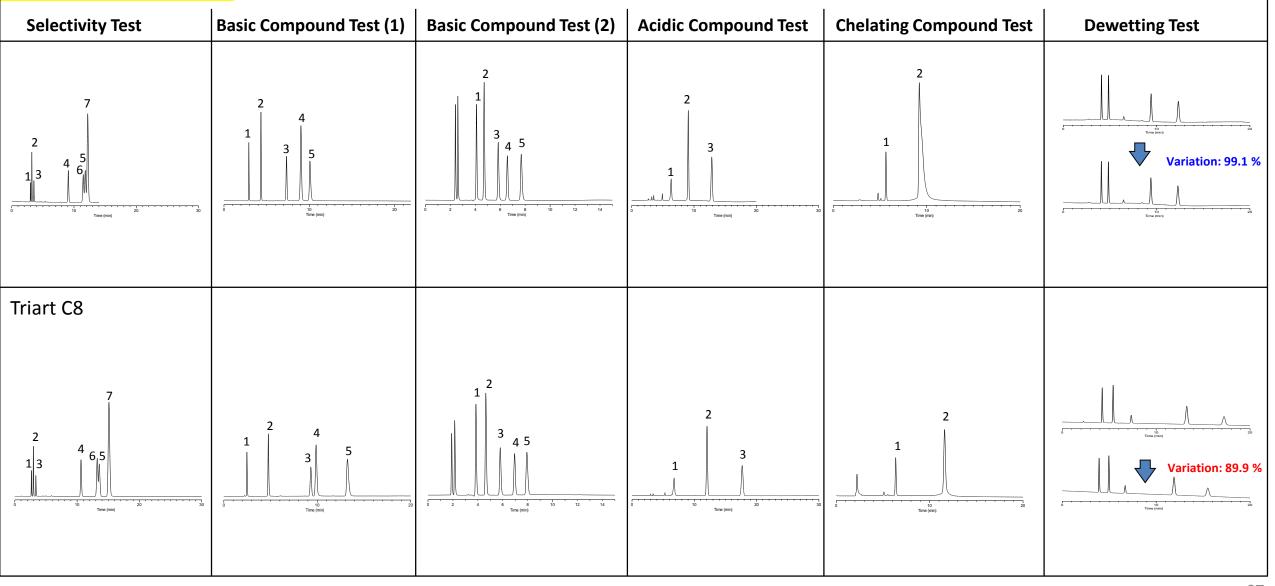
## **Comparison of Performance (4/9)**



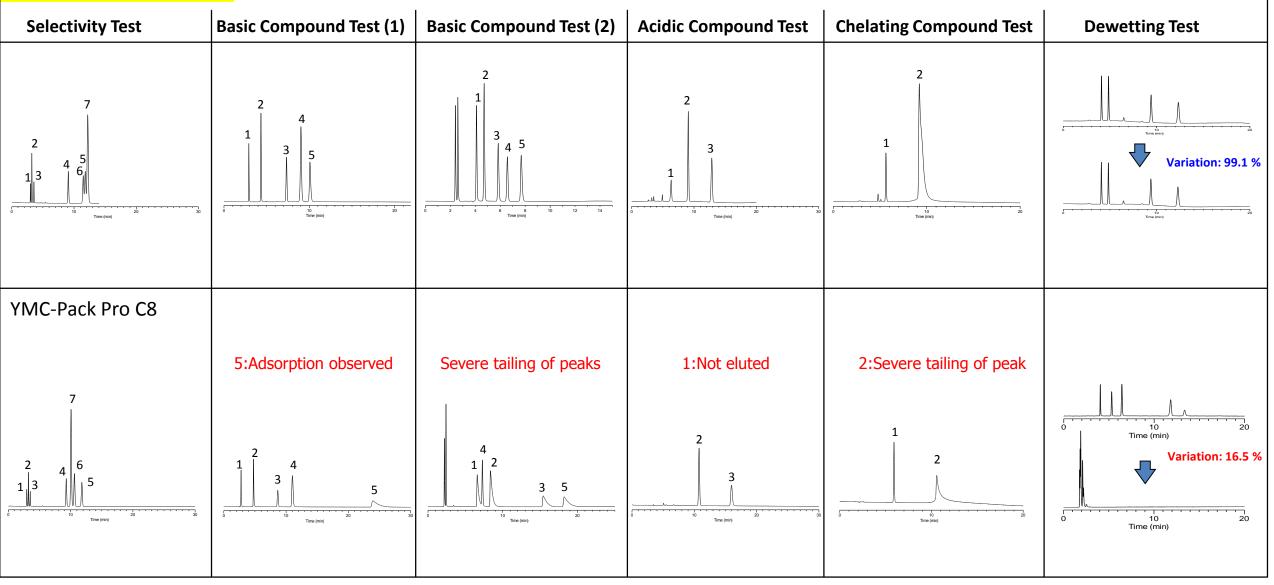
## **Comparison of Performance (5/9)**



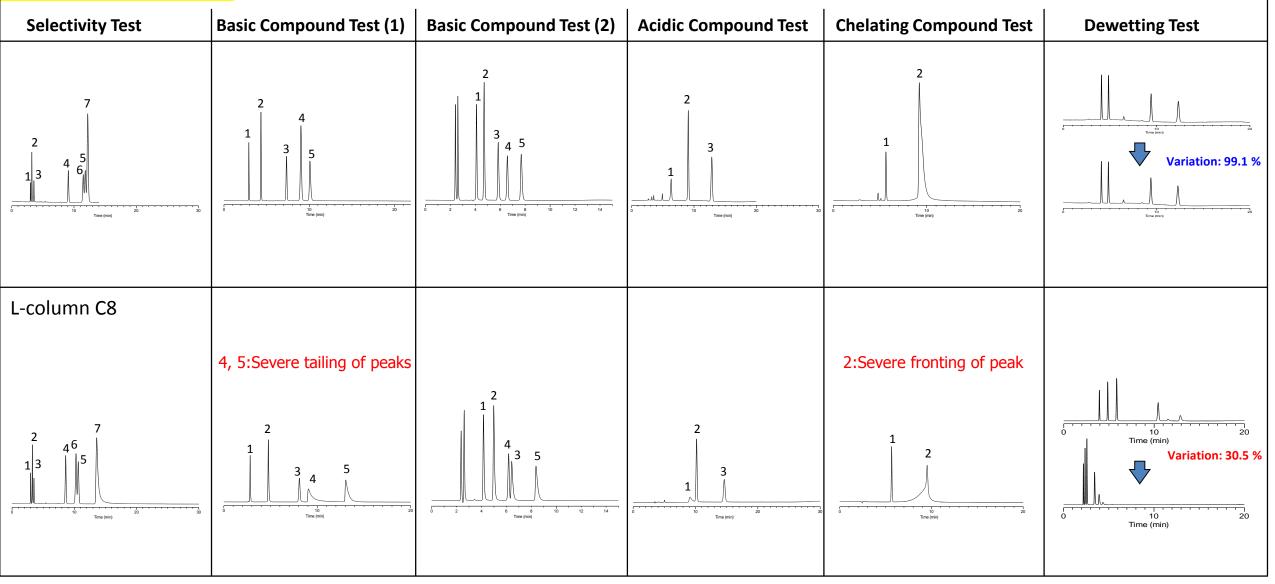
## **Comparison of Performance (6/9)**



## **Comparison of Performance (7/9)**



## **Comparison of Performance (8/9)**



## **Comparison of Performance (9/9)**

