



Comparison Between InertSustain C18 and Commercially Available ODS Columns



Comparison Table

Brand Name	Column Size (mm)	Particle Size (μm)	Surface Area (m ² /g)	Pore Size (Å)	Pore Volume (mL/g)	Carbon Loading (%)
InertSustain C18	2.1 × 150	3	350	100	0.85	14
Brand-A CAPCELL PAK C18 MGIII, Shiseido	2.0 × 150	3	260	100	0.91	15
Brand-B YMC-Triart C18, YMC	2.0 × 150	3	—	120	—	Approx. 20
Brand-C L-column2 ODS, CERI	2.1 × 150	3	340	120	1.10	17
Brand-D Cadenza CD-C18, Imtakt	2.0 × 150	3	—	120	—	—
Brand-E Gemini-NX 3u C18, Phenomenex	2.0 × 150	3	375	110	1.10	14
Brand-F Luna 3u C18(2), Phenomenex	2.0 × 150	3	400	100	—	17.5
Brand-G X SELECT CSH C18, Waters	2.1 × 150	3.5	390	105	1.10	15
Brand-H XBridge C18, Waters	2.1 × 150	3.5	185	135	0.74	18
Brand-I ZORBAX Eclipse Plus C18, Agilent	2.1 × 150	3.5	160	95	—	8
Inertsil ODS-3	2.1 × 150	3	450	100	1.05	15
Inertsil ODS-4	2.1 × 150	3	450	100	1.05	11

Explanation of Analytical Tests and Conditions

Hydrophobicity Test

Alkyl benzene is introduced to measure the retentivity of each column.



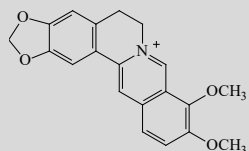
- R: 2. Toluene —CH₃
 3. Ethylbenzene —CH₂CH₃
 4. Propylbenzene —CH₂CH₂CH₃
 5. Butylbenzene —CH₂CH₂CH₂CH₃
 6. Amylbenzene —CH₂CH₂CH₂CH₂CH₃

Conditions

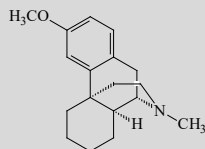
- Eluent** : CH₃OH/H₂O = 80/20
Flow Rate : 0.3 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Sample : 1: Uracil 2: Toluene 3: Ethylbenzene
 4: Propylbenzene 5: *n*-Butylbenzene
 6: *n*-Amylbenzene

Basic Compound Test (1)

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



4. Berberine hydrochloride



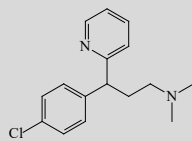
5. Dextromethorphan

Conditions

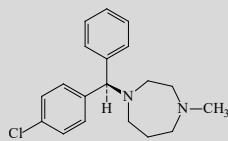
- Eluent** :A) CH₃CN
 B) 25 mM K₂HPO₄ (pH 7.0, KH₂PO₄)
 A/B = 30/70
Flow Rate : 0.2 mL/min
Col. Temp. : 40 °C
Detection : UV 230 nm
Sample : 1:Uracil 2:Pyridine 3:Phenol
 4:Berberine hydrochloride 5:Dextromethorphan

Basic Compound Test (2)

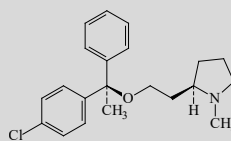
The following are antidepressants, which are also strong basic compounds. Poor endcapped columns will show tailing or some even may show different elution pattern. All compounds except for Hydroxyzine tends to elute later.



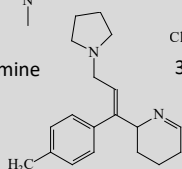
1. Chlorpheniramine



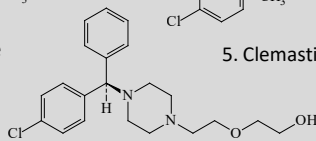
3. Homochlorcyclizine



5. Clemastine



2. Triprolidine



4. Hydroxyzine

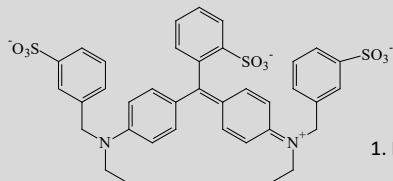
Conditions

- Eluent** :A) CH₃CN
 B) 25mM K₂HPO₄ (pH 7.0, KH₂PO₄)
 A/B = 60/40
Flow Rate : 0.3 mL/min
Col. Temp. : 40 °C
Detection : UV 220 nm
Sample : 1: Chlorpheniramine 2: Triprolidine
 3: Homochlorcyclizine 4: Hydroxyzine
 5: Clemastine

Explanation of Analytical Tests and Conditions

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.



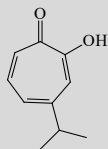
1. Brilliant Blue FCF

Conditions

Eluent	:A) CH_3CN B) 0.1% H_3PO_4 A/B = 25/75
Flow rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1: Brilliant Blue FCF 2: Phenol 3: Salicylic acid

Chelating Compound Test

Hinokitiol is a strong chelating compound, which coordinately binds with the surface of residual trace metal impurities, resulting in severe tailing. However, the peak shape improves as the injection increases since the surface of the packing material of the adsorption active sites eventually become masked.



1. Hinokitiol

Conditions

Eluent	:A) CH_3CN B) 0.1% H_3PO_4 A/B = 40/60
Flow rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inject Vol.	: 1 μL , 10 ppm
Sample	: 1: β -Thujaplicin (Hinokitiol)

Dewetting Test

When analyzing hydrophilic compounds under water rich mobile phase condition, once the pump is stopped, the hydrophobic bonded group 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 20 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)

Conditions

Eluent	: 100% H_2O
Flow rate	: 0.2 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Sample	: 1: Cytosine 2: Uracil 3: Guanine 4: Thymine 5: Adenine

Hydrophobicity Test

Basic Compound Test (1)

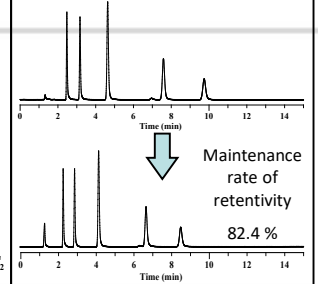
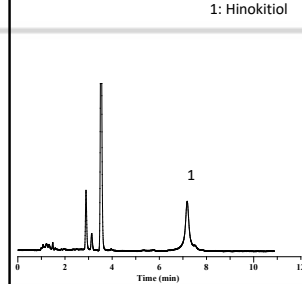
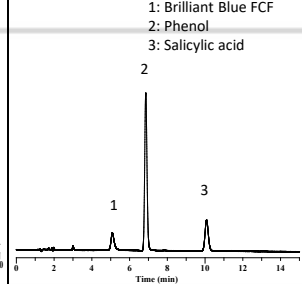
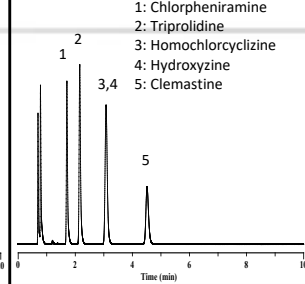
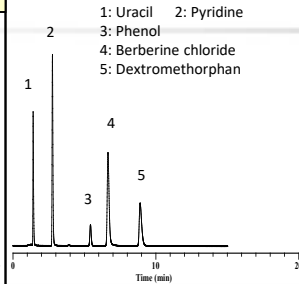
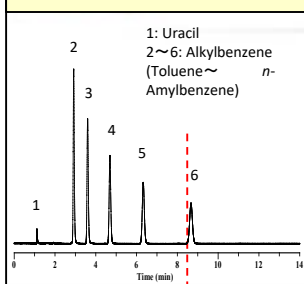
Basic Compound Test (2)

Acidic Compound Test

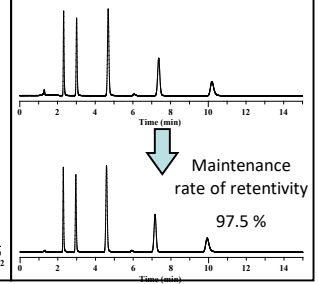
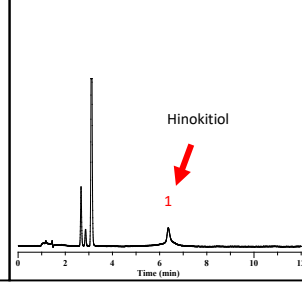
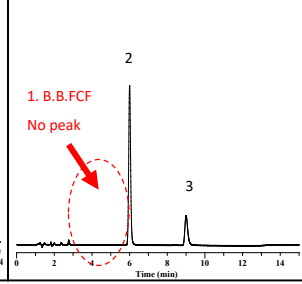
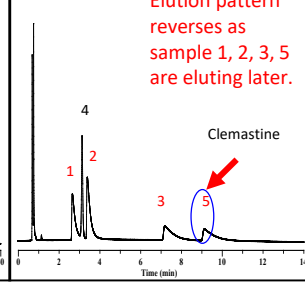
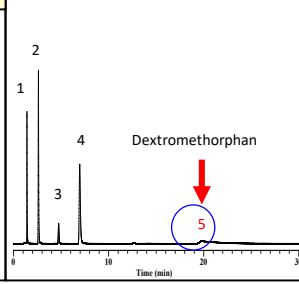
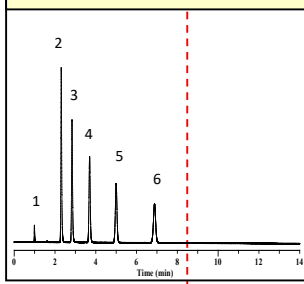
Chelating Compound Test

Dewetting Test

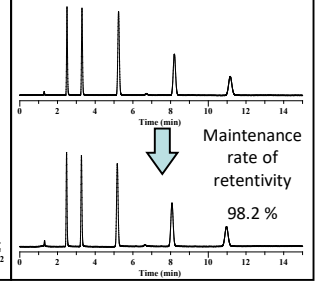
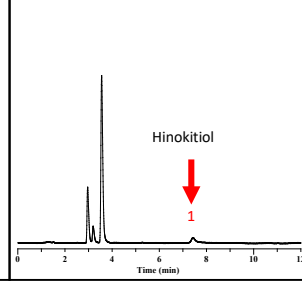
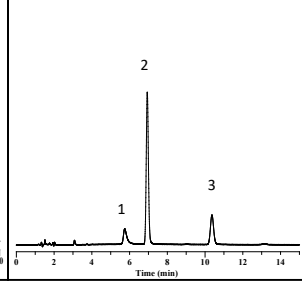
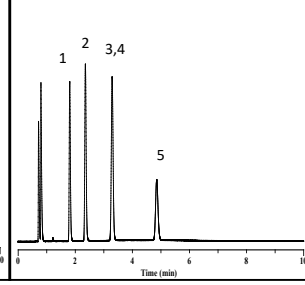
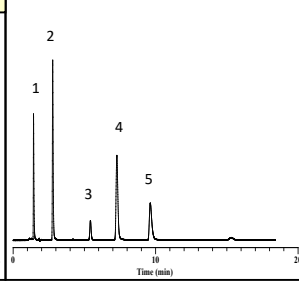
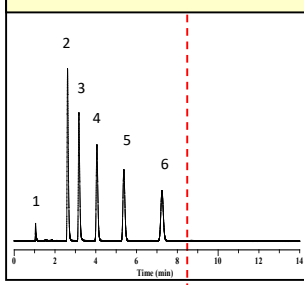
InertSustain C18



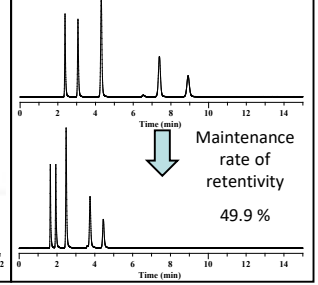
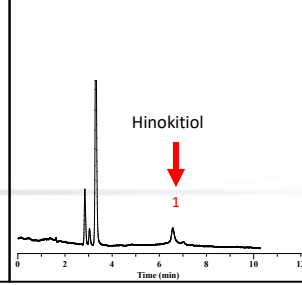
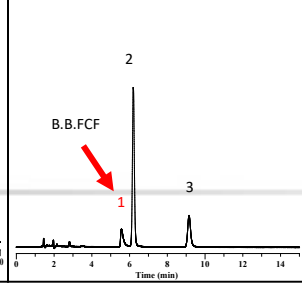
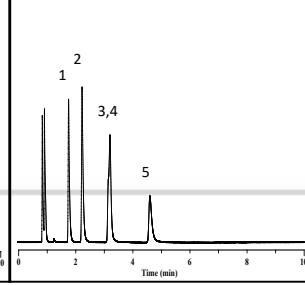
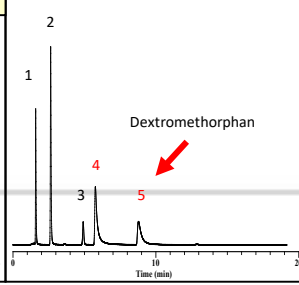
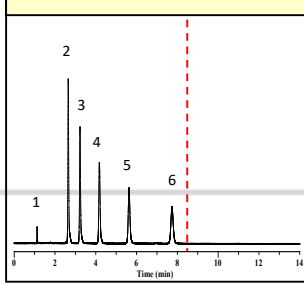
CAPCELL PAK C18 MG III



YMC-Triart C18



L-column2 ODS



Hydrophobicity Test

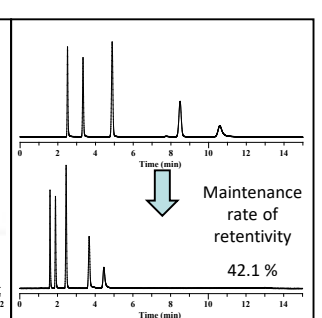
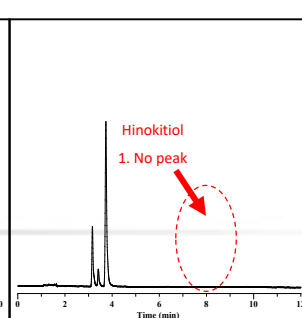
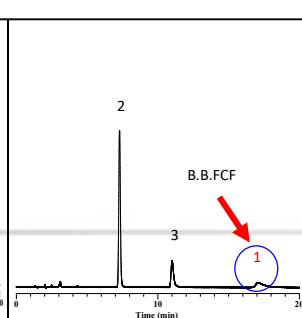
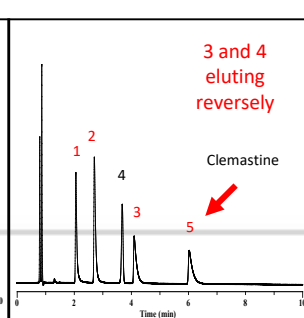
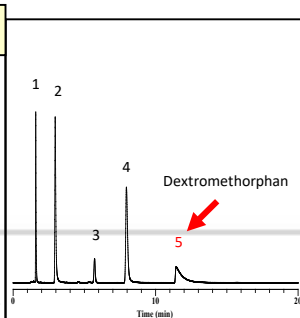
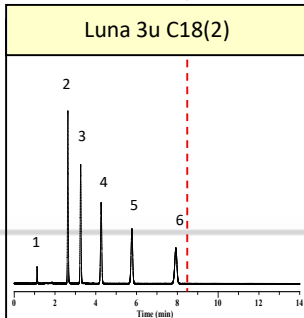
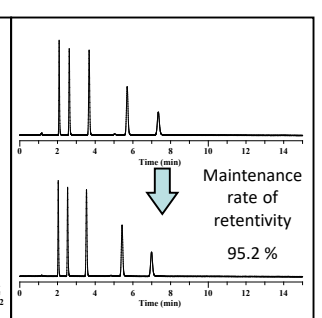
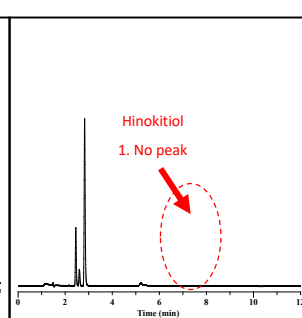
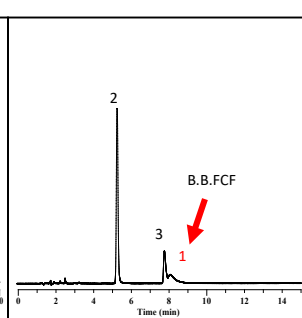
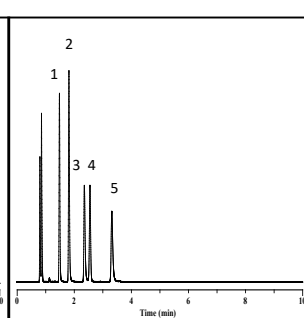
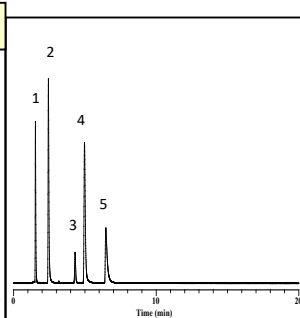
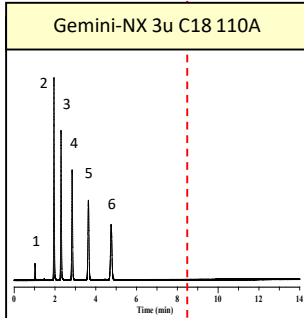
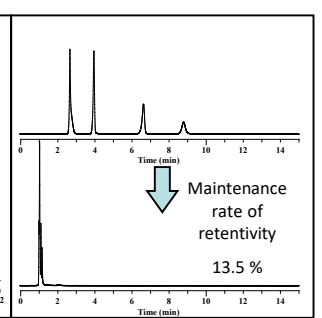
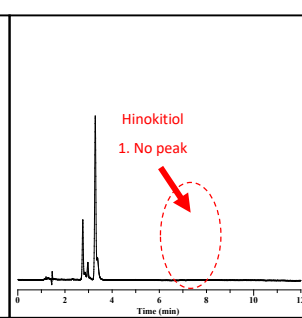
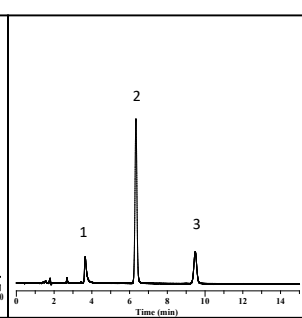
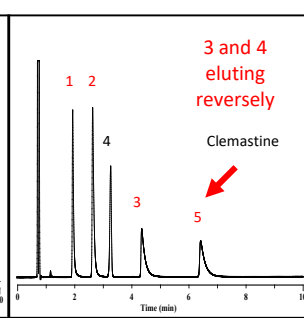
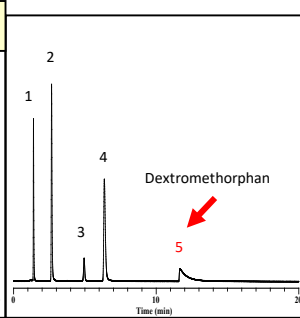
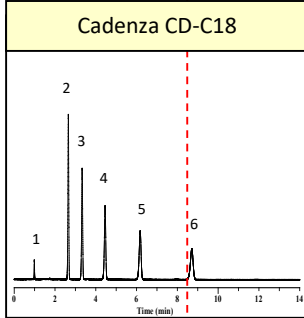
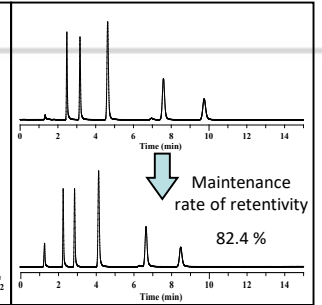
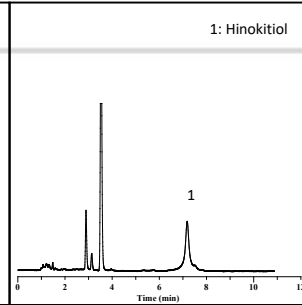
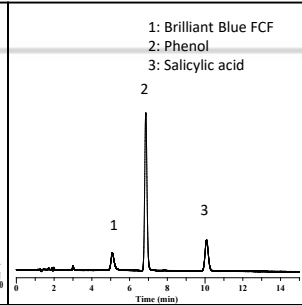
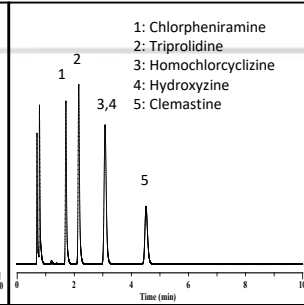
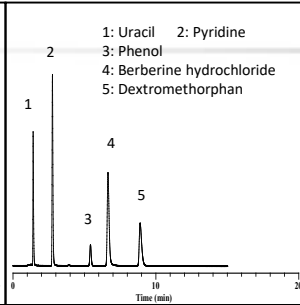
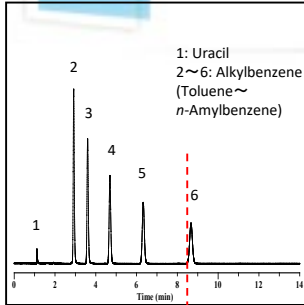
Basic Compound Test (1)

Basic Compound Test (2)

Acidic Compound Test

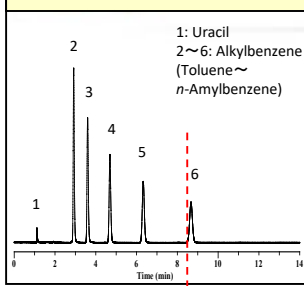
Chelating Compound Test

Dewetting Test



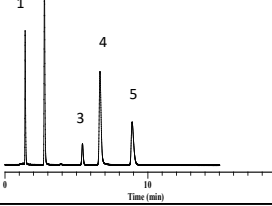
Hydrophobicity Test

InertSustain C18



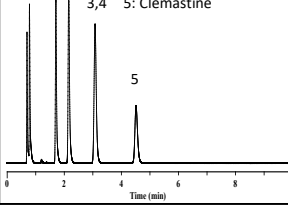
Basic Compound Test (1)

- 1: Uracil
- 2: Pyridine
- 3: Phenol
- 4: Berberine hydrochloride
- 5: Dextromethorphan



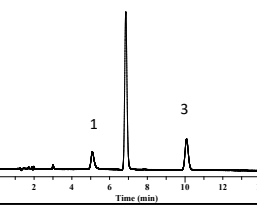
Basic Compound Test (2)

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



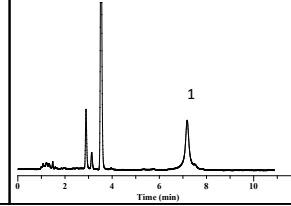
Acidic Compound Test

- 1: Brilliant Blue FCF
- 2: Phenol
- 3: Salicylic acid

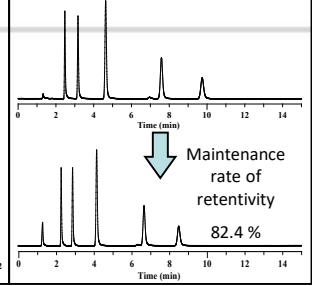


Chelating Compound Test

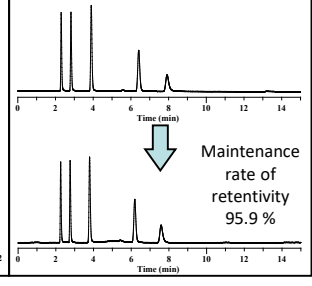
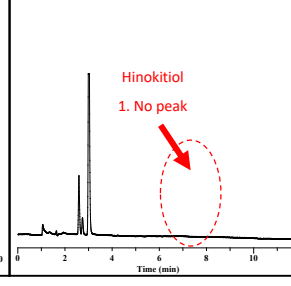
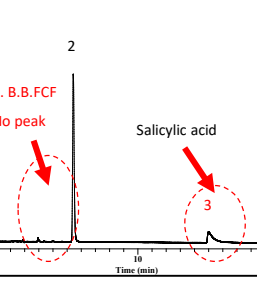
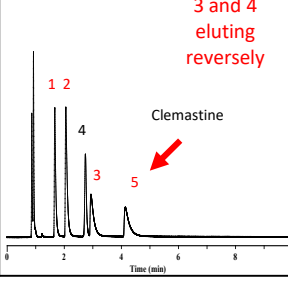
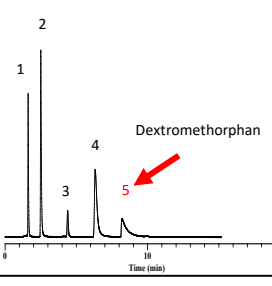
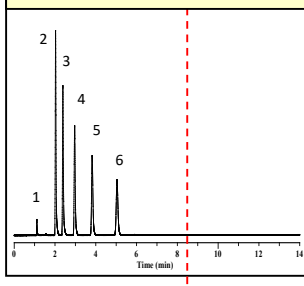
- 1: Hinokitiol



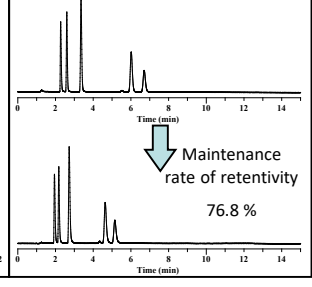
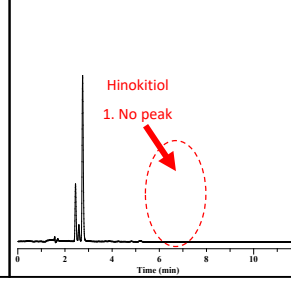
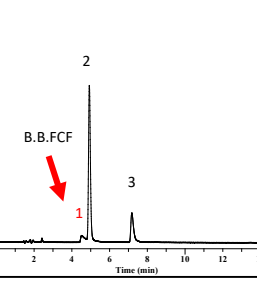
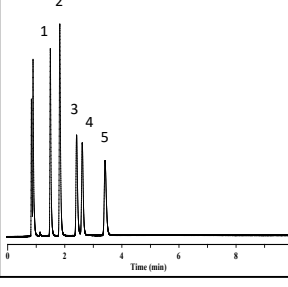
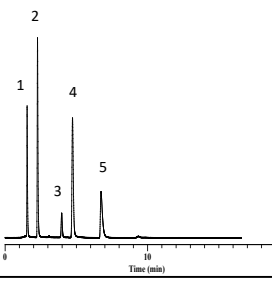
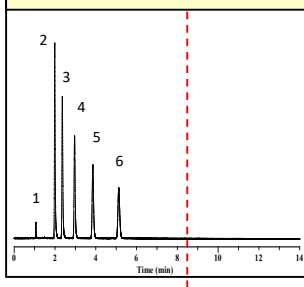
Dewetting Test



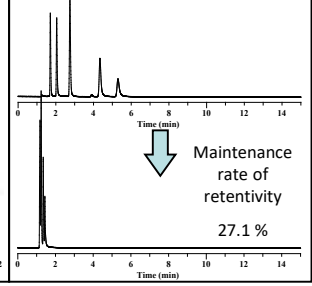
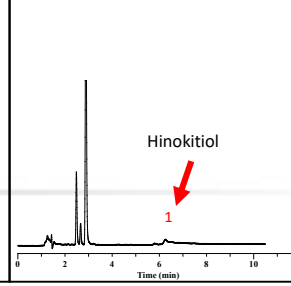
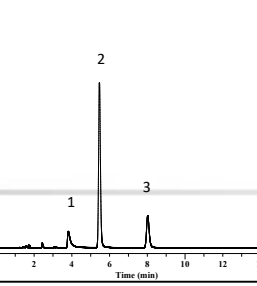
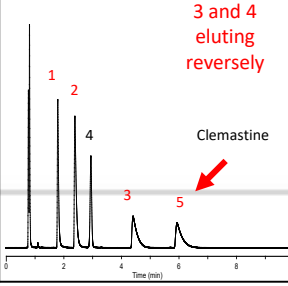
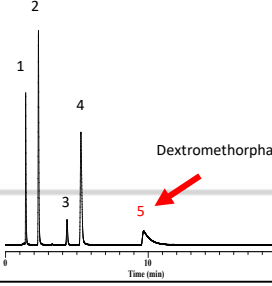
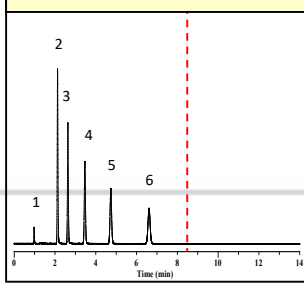
X SELECT CSH C18



XBridge C18



ZORBAX Eclipse Plus C18



Hydrophobicity Test

Basic Compound Test (1)

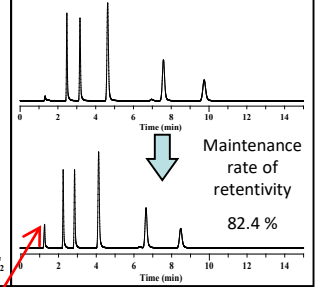
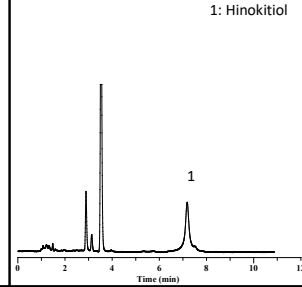
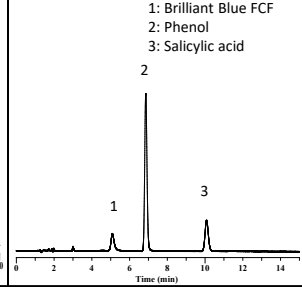
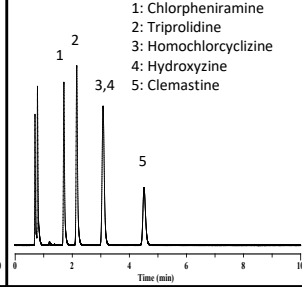
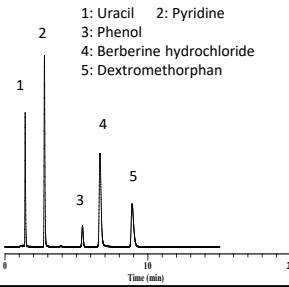
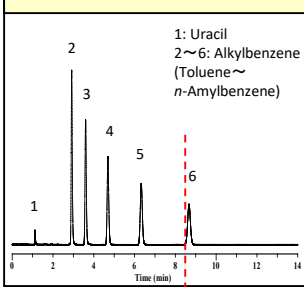
Basic Compound Test (2)

Acidic Compound Test

Chelating Compound Test

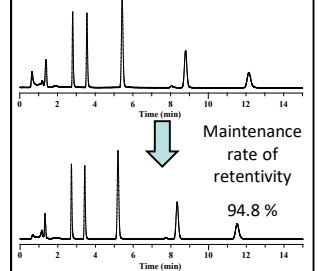
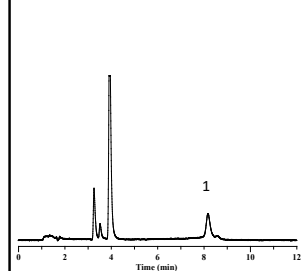
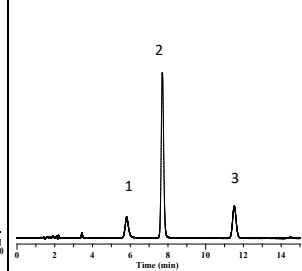
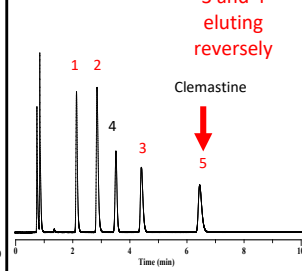
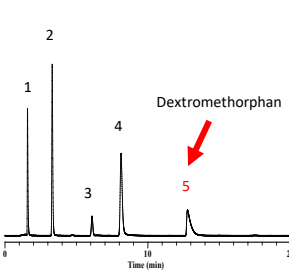
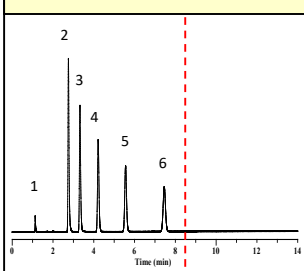
Dewetting Test

InertSustain C18



100% aqueous mobile phase can be used by periodically flushing the column with an organic solvent.

Inertsil ODS-4



Inertsil ODS-3

