GL Sciences

HPLC Columns

InertCore Core-Shell Columns

Plus C18 / C8 / Biphenyl / PFP



Precision Engineered
for Maximum Efficiency.

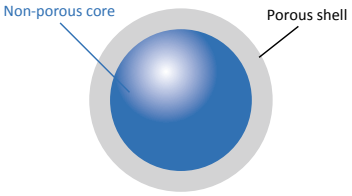
Core-Shell Technology and Reproducibility

High efficiency from controlled diffusion, supported by consistent shell-layer manufacturing.

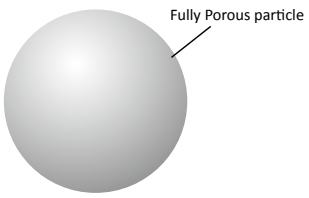
Core-shell particle design

A thin porous shell surrounds a solid non-porous core. The shorter diffusion path reduces band broadening within the particle compared with a fully porous design, helping produce sharp peaks and high theoretical plate counts.

Core-Shell particles

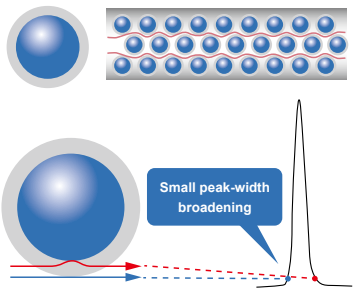


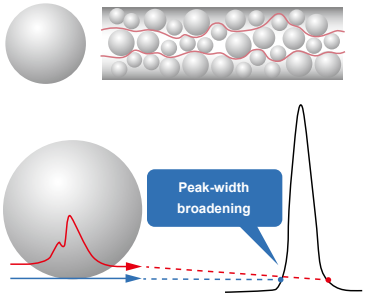
Conventional fully porous particles



Efficiency advantage

Narrow particle-size distribution
Shorter diffusion path
High plate count at practical pressure.



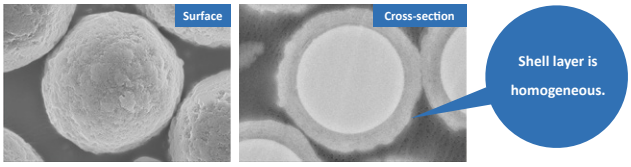


Manufacturing consistency

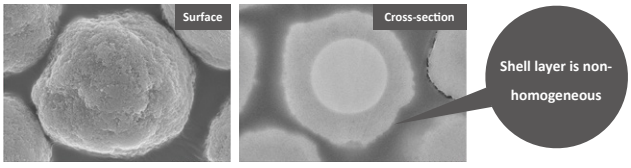
In-house quality control from core-shell silica synthesis to final inspection supports uniform shell layers and batch-to-batch reproducibility. The SEM images and particle-size distributions below compare InertCore with Brand A.

SEM Images

InertCore

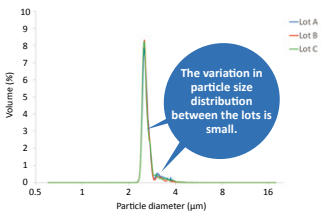


Brand A

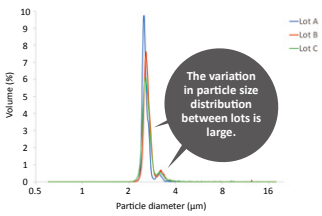


Particle size distribution

InertCore

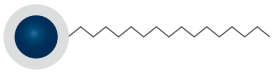
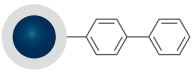
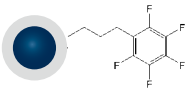


Brand A



Comparison of production lots A, B and C

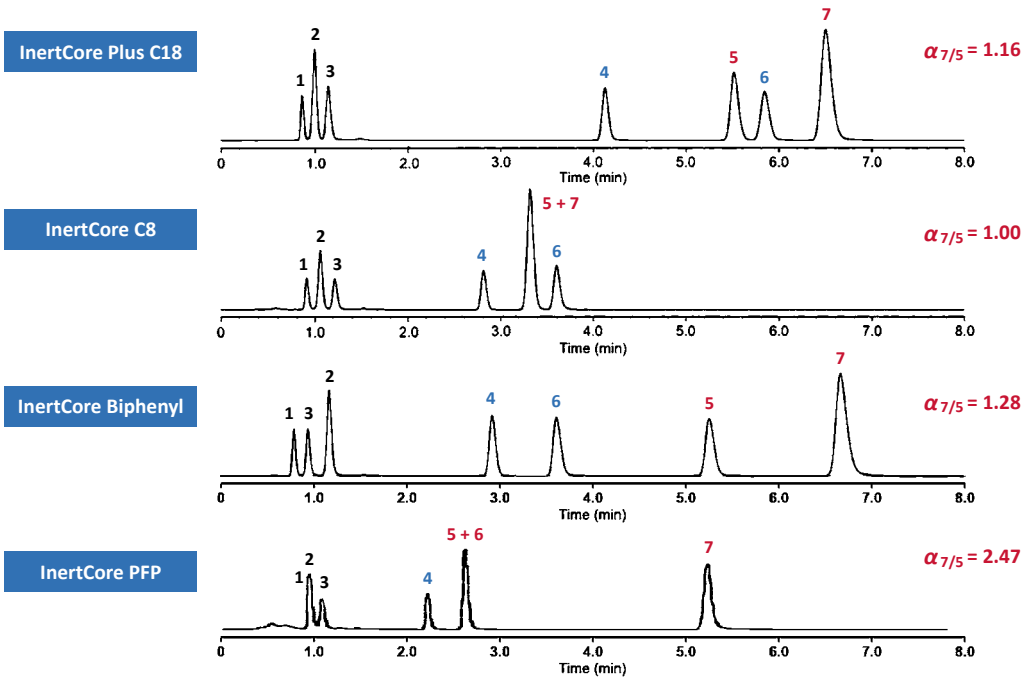
Specifications

Item	InertCore Plus C18	InertCore C8	InertCore Biphenyl	InertCore PFP
Stationary phase structure				
Base Material	Core-shell type silica gel	Core-shell type silica gel	Core-shell type silica gel	Core-shell type silica gel
Particle Size	2.6 µm	2.6 µm	2.6 µm	2.6 µm
Solid Core Size	2.0 µm	2.0 µm	2.0 µm	2.0 µm
Surface Area*	200 m²/g	200 m²/g	200 m²/g	200 m²/g
Pore Size	90 Å (9 nm)	90 Å (9 nm)	90 Å (9 nm)	90 Å (9 nm)
Functional Group	Octadecyl (C18)	Octyl (C8)	Biphenyl	Pentafluorophenyl (PFP)
End-capping	Yes	Yes	Yes	Yes
Carbon Loading*	15%	10%	10%	10%
Recommended pH Range	1–10	1.5–9	1.5–8.5	1.5–8.5
USP Code	L1	L7	L11	L43
Max Pressure	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)	100 MPa (2.1 mm I.D.) 60 MPa (3.0 / 4.6 mm I.D.)

*Surface area and carbon loading are calculated for the porous layer only, excluding the core.
100 MPa ≈ 14,500 psi. 60 MPa ≈ 8,700 psi.

Versatile Phase Selection for Optimized Separation

The InertCore series provides four complementary stationary phases for flexible method development. From the strong hydrophobic retention of **Plus C18** and the shorter retention of **C8** to the aromatic/planar selectivity of **Biphenyl** and the multipoint selectivity of **PFP**, users can optimize retention and separation selectivity while maintaining the high efficiency of 2.6 µm core-shell particles.



Conditions
Column : 2.6 µm, 100 x 2.1 mm I.D.
Eluent : A) CH_3OH B) H_2O
A/B = 80/20, v/v
Flow Rate : 0.2 mL/min
Col. Temp. : 40 °C
Detection : UV 254 nm
Analytes : 1. Uracil
2. Caffeine
3. Phenol
4. *n*-Butylbenzene
5. *o*-Terphenyl
6. *n*-Amylbenzene
7. Triphenylene

Hydrophobicity
C18 >> Biphenyl ≈ C8 > PFP

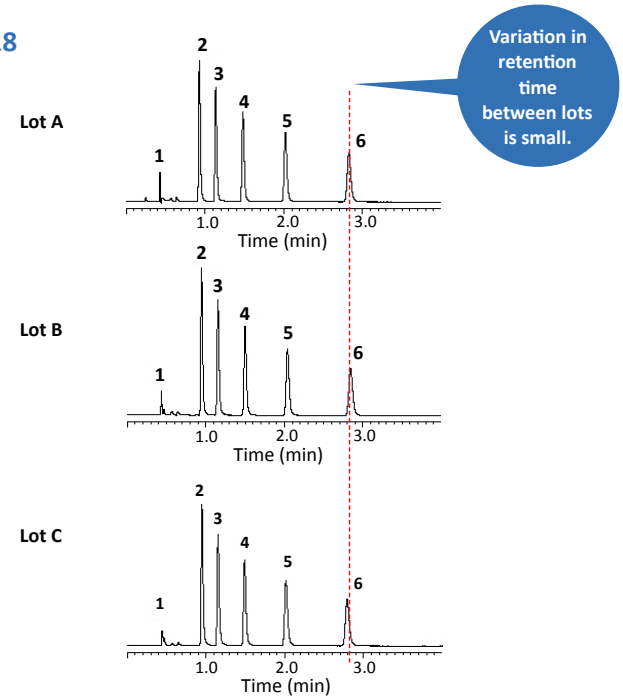
Steric Selectivity
PFP > Biphenyl > C18 > C8

Stability and Batch-to-Batch Consistency

Retention time stability

The hydrophobic retention test shows closely matched retention times across three InertCore Plus C18 production lots. Consistent retention behavior supports reproducible routine analyses and method transfer under the tested conditions.

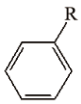
InertCore Plus C18



Hydrophobic retention test

Conditions

Column	: 2.6 µm, 100 × 2.1 mm I.D.
Eluent	: CH_3OH/H_2O = 80/20, v/v
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.2 µL
Analytes	: 1. Uracil
	2. Toluene
	3. Ethylbenzene
	4. Propylbenzene
	5. n-Butylbenzene
	6. n-Amylbenzene



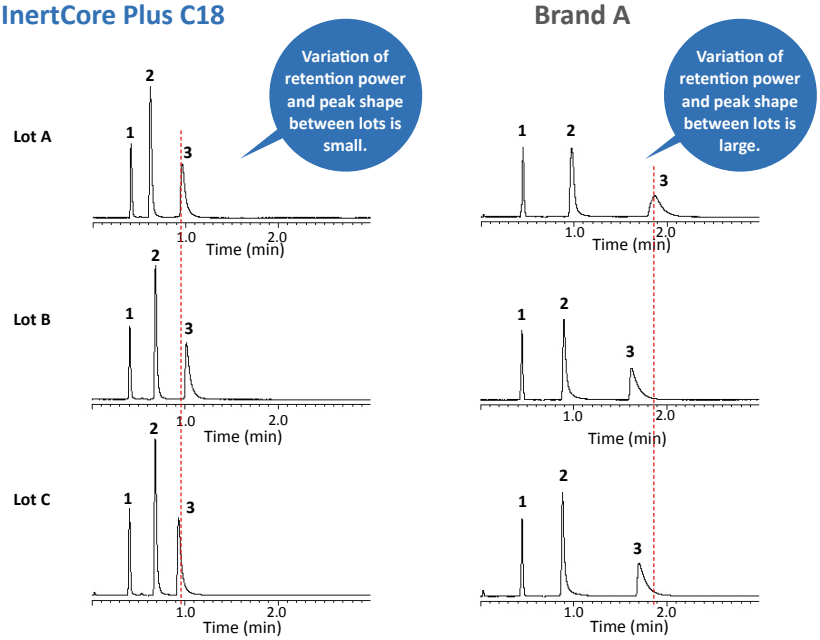
R: 2. Toluene — CH_3
3. Ethylbenzene — CH_2CH_3
4. Propylbenzene — $CH_2CH_2CH_3$
5. n-Butylbenzene — $CH_2CH_2CH_2CH_3$
6. n-Amylbenzene — $CH_2CH_2CH_2CH_2CH_3$

Peak shape for basic compounds

InertCore shows consistent peak shapes for basic compounds across multiple production lots. The comparison with Brand A illustrates the reproducibility of retention and peak symmetry under the stated test conditions.

InertCore Plus C18

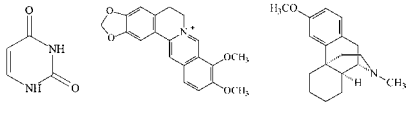
Brand A



Strongly basic compounds adsorption test

Conditions

Column	: 2.6 µm, 100 × 2.1 mm I.D.
Eluent	: A) CH_3CN
	B) 25 mM K_2HPO_4 (pH 7.0, KH_2PO_4)
	A/B = 40/60, v/v
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 220 nm
Inj. Vol.	: 0.2 µL
Analytes	: 1. Uracil
	2. Berberine chloride
	3. Dextromethorphan

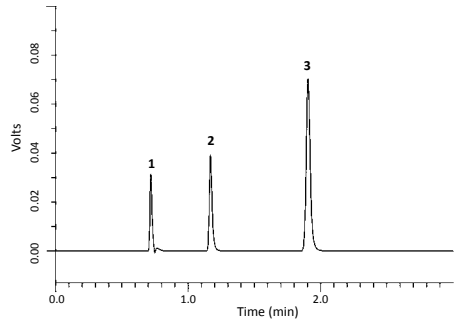


1:Uracil (Neutral) 2:Berberine chloride (Basic) 3:Dextromethorphan (Basic)

High Durability

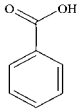
Performance over 2,000 injections

InertCore demonstrates excellent durability, maintaining retention time, number of theoretical plates and peak symmetry even after 2,000 consecutive injections.

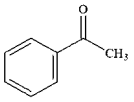


Conditions

Column	: InertCore Plus C18 2.6 µm, 100 × 4.6 mm I.D.	
Eluent	: CH_3CN/0.1 % H_3PO_4 in H_2O = 40/60, v/v	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: UV 254 nm	
Inj. Vol.	: 10 µL	
Analytes	: 1. Uracil	1 mg/L
	2. Benzoic acid	20 mg/L
	3. Acetophenone	5 mg/L

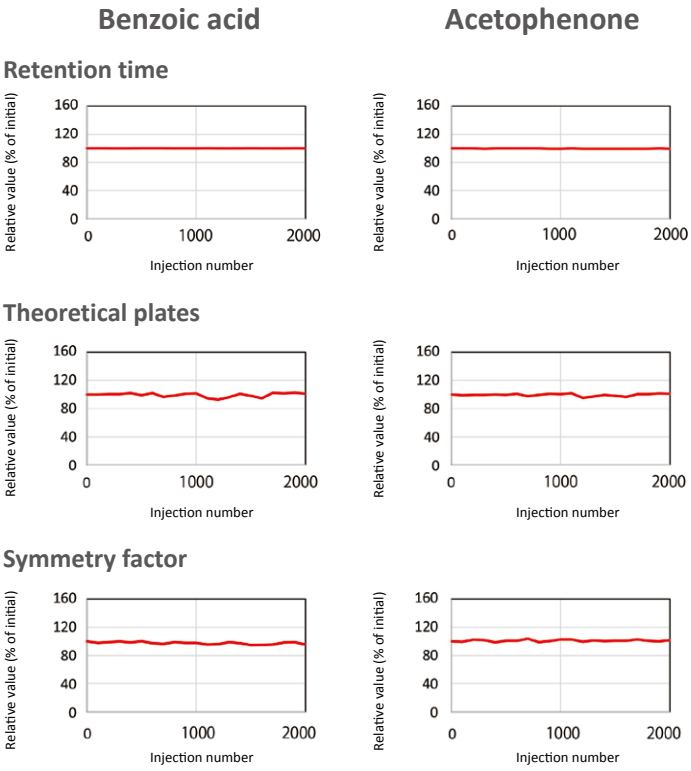


2. Benzoic acid



3. Acetophenone

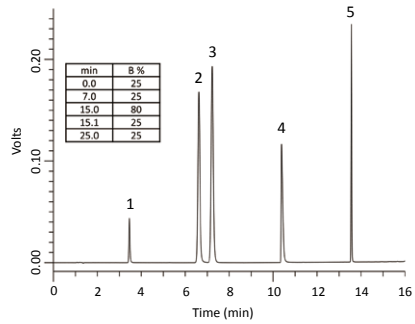
Performance is maintained even after 2000 injections.



Compatible with Both Conventional HPLC and UHPLC Systems

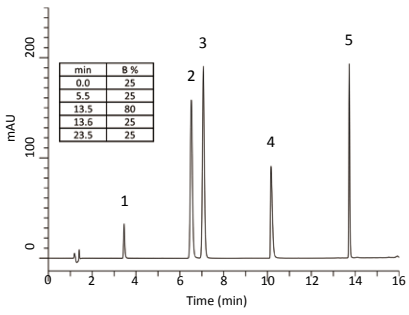
InertCore delivers comparable performance on conventional HPLC and UHPLC systems after system-specific optimization.

UHPLC



Pressure: 22.0 MPa (including all plumbing, etc.)
Resolution (Rs, peaks 2 and 3) between peak 2 and peak 3: 3.65

Conventional HPLC



Pressure: 19.0 MPa (including all plumbing, etc.)
Resolution (Rs, peaks 2 and 3) between peak 2 and peak 3: 3.29

Conditions

Column	: InertCore Plus C18 2.6 µm, 150 × 4.6 mm I.D.	
Eluent	: A) 10 mM KH_2PO_4 in H_2O (pH 2.0, H_3PO_4) B) CH_3CN	
Flow Rate	: 1.0 mL/min	
Col. Temp.	: 40 °C	
Detection	: PDA 250 nm	
Inj. Vol.	: 2 µL	
Analytes	: 1. Benzoic acid	3. Acetophenone
	2. Ethyl p-Hydroxybenzoate (100 mg/L each in 50 % MeOH)	4. Amitriptyline 5. Indomethacin

*To eliminate the effect of system volume, plumbing size, etc. A general purpose HPLC system is optimized.

InertCore Series Selectivity Comparison

A practical guide to choosing the stationary phase for the separation problem.

Phase	Key Selectivity	Recommended For	When to Choose
InertCore Plus C18	Strong hydrophobic retention, broad reversed-phase selectivity	General reversed-phase analysis and routine LC/LC-MS methods	First choice for standard reversed-phase separations
InertCore C8	Moderate hydrophobic retention, shorter retention than C18	Strongly hydrophobic compounds requiring shorter analysis time	Choose when C18 retention is too strong or a slight selectivity change is needed
InertCore Biphenyl	π–π interaction and strong aromatic / planar recognition	Aromatic compounds, nucleobases and nucleosides, and compounds with structural or shape differences	First choice when aromatic or steric selectivity is important
InertCore PFP	π–π, dipole, hydrogen-bonding, and polar / electronic interactions	Isomers, positional isomers, electron-withdrawing compounds, polar analytes	First choice when a substantial selectivity change from C18 is required

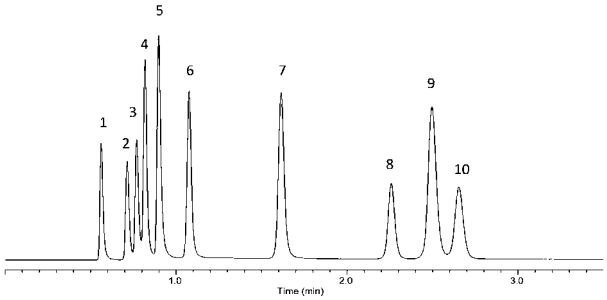
Qualitative Selectivity Guide

Selectivity	Plus C18	C8	Biphenyl	PFP
Hydrophobic retention	●●●●	●●●	●●●	●●
Aromatic / π–π selectivity	●●	●	●●●●	●●●●
Steric / shape selectivity	●●	●	●●●	●●●●
Polar / electronic selectivity	●	●	●●	●●●●
100% aqueous mobile phase	Method-dependent	Method-dependent	**Compatible**	**Compatible**

The dot ratings provide qualitative guidance. Actual retention and selectivity depend on the analyte and mobile-phase conditions. Suitability for a fully aqueous mobile phase also depends on the method.
Start with Plus C18 for general reversed-phase methods. Consider C8 for shorter retention, Biphenyl for aromatic and shape selectivity, and PFP for an alternative to C18 selectivity.

Applications

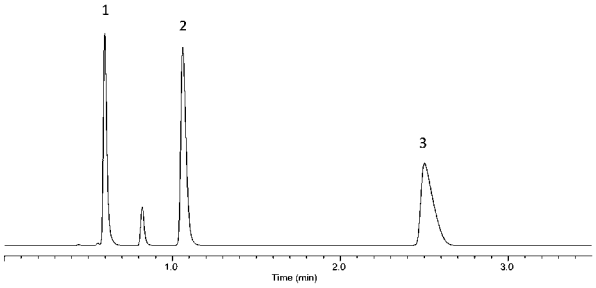
Nucleobases and Nucleosides



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ + 0.1 % HCOOH in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.5 µL
Analytes	: 1. Cytosine 5. Uracil 8. Thymine 2. Cytidine 6. Uridine 9. Adenosine 3. Guanine 7. Guanosine 10. 5-Methyluridine 4. Adenine (Nucleobase 25 mg/L each, Nucleoside 50 mg/L each)

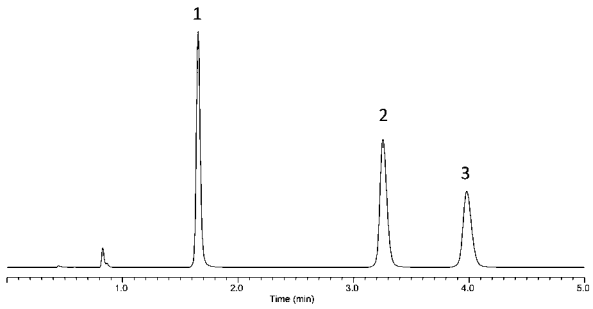
Cyclic Nucleotides



Conditions

Column	: InertCore Biphenyl 2.6µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 1 µL
Analytes	: 1. cGMP 2. cAMP 3. 2'3'-cGAMP 100 mg/L each

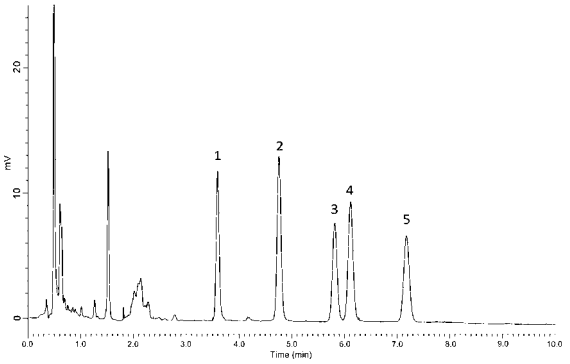
Guanine-based Antiviral Drugs



Conditions

Column	: InertCore Biphenyl 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 0.5 µL
Analytes	: 1. Ganciclovir 3. Penciclovir 2. Aciclovir (100 mg/L each)

Analysis of Sterols

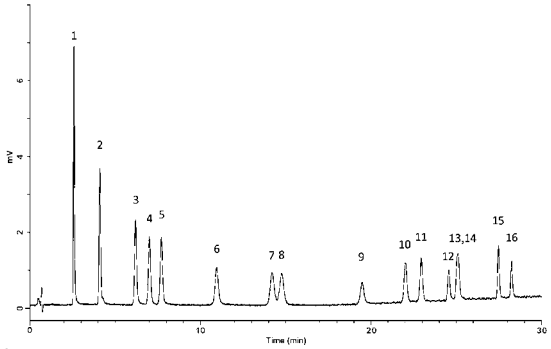


Conditions

Column	: InertCore Plus C18 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: A) CH_3CN B) H_2O A/B = 95/5, v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 °C
Detection	: UV 210 nm
Inj. Vol.	: 1 µL

Analyte:
1. Ergosterol
2. Brassicasterol
3. Campesterol
4. Stigmasterol
5. β-Sitosterol
(100 mg/L each)

16 Carbonyl Compounds after DNPH Derivatization

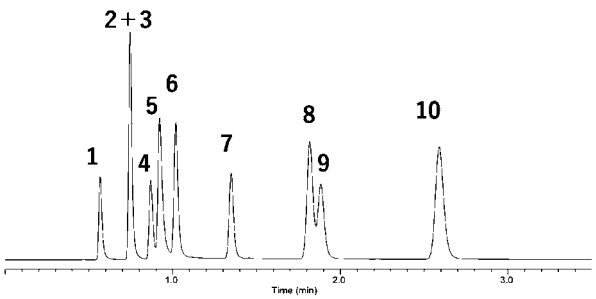


Conditions

Column	: InertCore C8 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: A) CH_3OH B) H_2O A/B = 50/50 - 15 min - 50/50 - 15 min - 75/25 - 0.1 min - 50/50, v/v
Flow Rate	: 0.3 mL/min
Col. Temp.	: 40 °C
Detection	: UV 360 nm
Inj. Vol.	: 1 µL

Analyte:
1. DNPH-Formaldehyde
2. DNPH-Acetaldehyde
3. DNPH-Acetone
4. DNPH-Acrolein
5. DNPH-Propionaldehyde
6. DNPH-Crotonaldehyde
7. DNPH-Isobutyraldehyde
8. DNPH-*n*-Butyraldehyde
9. DNPH-Benzaldehyde
10. DNPH-Isovaleraldehyde
11. DNPH-*n*-Valeraldehyde
12. DNPH-*o*-Tolualdehyde
13. DNPH-*m*-Tolualdehyde
14. DNPH-*p*-Tolualdehyde
15. DNPH-*n*-Hexanal
16. DNPH-2, 5-Dimethylbenzaldehyde
(0.5 µg/mL each)

Nucleobases and nucleosides



Conditions

Column	: InertCore PFP 2.6 µm, 100 x 2.1 mm I.D.
Eluent	: 10 mM $HCOONH_4$ + 0.1 % HCOOH in H_2O
Flow Rate	: 0.4 mL/min
Col. Temp.	: 40 °C
Detection	: UV 254 nm
Inj. Vol.	: 1 µL
Sample	: Nucleobase 25 mg/L Nucleoside 50 mg/L

1. Cytosine
2. Cytidine
3. Uracil
4. Guanine
5. Adenine
6. Uridine
7. Thymine
8. Guanosine
9. 5-Methyluridine
10. Adenosine

Ordering Information

Analytical Columns

All columns: 2.6 µm

Phase	Length (mm)	2.1 mm I.D.	3.0 mm I.D.	4.6 mm I.D.
InertCore Plus C18	50	5020-17510	5020-17515	5020-17520
	75	5020-17513	5020-17518	5020-17523
	100	5020-17511	5020-17516	5020-17521
	150	5020-17512	5020-17517	5020-17522
InertCore C8	50	5020-17527	5020-17531	5020-17535
	75	5020-17528	5020-17532	5020-17536
	100	5020-17529	5020-17533	5020-17537
	150	5020-17530	5020-17534	5020-17538
InertCore Biphenyl	50	5020-17542	5020-17546	5020-17550
	75	5020-17543	5020-17547	5020-17551
	100	5020-17544	5020-17548	5020-17552
	150	5020-17545	5020-17549	5020-17553
InertCore PFP	50	5020-17557	5020-17561	5020-17565
	75	5020-17558	5020-17562	5020-17566
	100	5020-17559	5020-17563	5020-17567
	150	5020-17560	5020-17564	5020-17568

Guard Columns

All guard columns: 20 mm / 2.6 µm

Phase	2.1 mm I.D.	3.0 mm I.D.	4.6 mm I.D.
InertCore Plus C18	5020-17506	5020-17507	5020-17508
InertCore C8	5020-17524	5020-17525	5020-17526
InertCore Biphenyl	5020-17539	5020-17540	5020-17541
InertCore PFP	5020-17554	5020-17555	5020-17556

Note) The type of fitting connections used is Parker type (UP type).

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