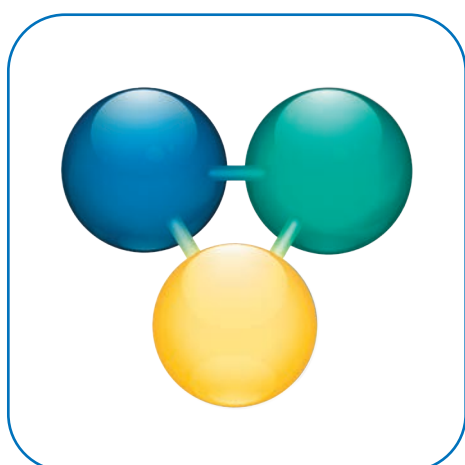
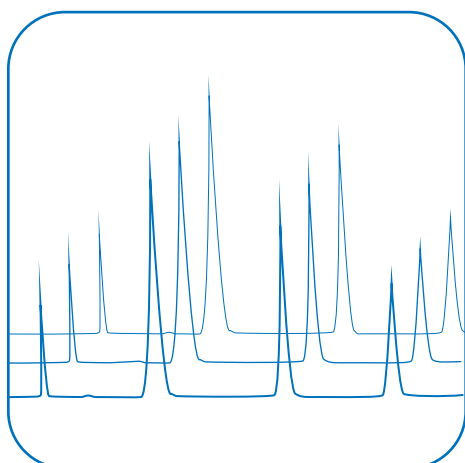


Reliable · Robust · Reproducible

(U)HPLC columns

YMC-Triart



LC/MS
(U)HPLC
SFC



Industry Solution

Pharmaceutical
QA / QC
Drug Discovery
Isolation to Purification
Manufacturing



Life Science

Amino Acids
Peptides to Proteins / Antibodies
Oligonucleotides



Food & Beverages

Food Safety
QA / QC
Environmental

Contents

“

“Good resolution, separation efficiency and broad pH range and capacity”

“This column has a broad pH tolerance. It has a very good resolution and separation efficiency for peptides fractionation for LC-MS/MS sample preparation.”

Chi Li Yu, The University of Iowa (US)

”

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Phase overview

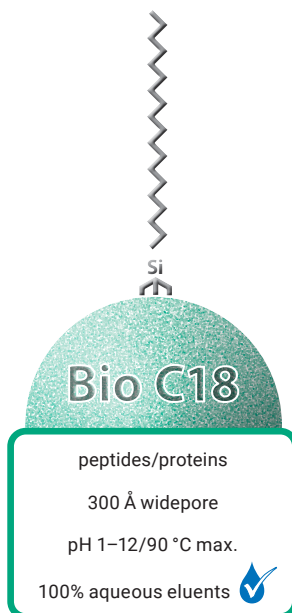
YMC-Triart C18



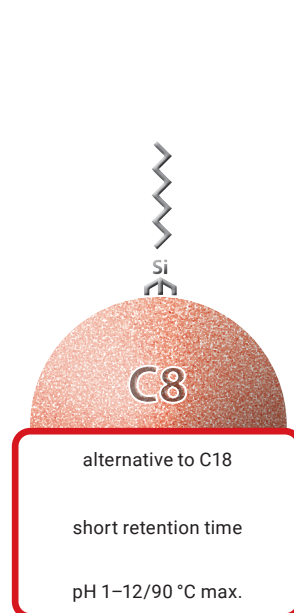
YMC-Triart C18 ExRS



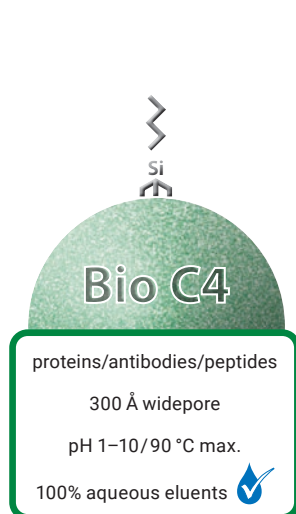
YMC-Triart Bio C18



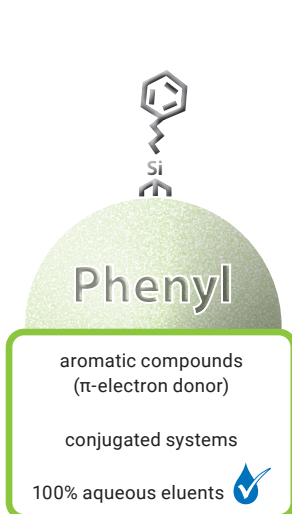
YMC-Triart C8



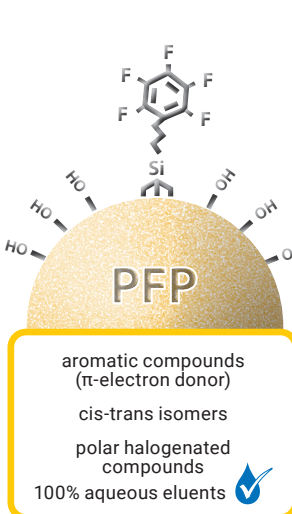
YMC-Triart Bio C4



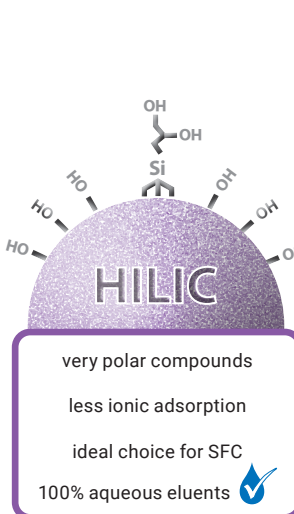
YMC-Triart Phenyl



YMC-Triart PFP



YMC-Triart Diol-HILIC



TIP

In order to offer a convenient solution for method developers YMC is offering price attractive Method Development Kits with a selection of 3 different YMC-Triart (U)HPLC columns.

Phase overview

Specification YMC-Triart

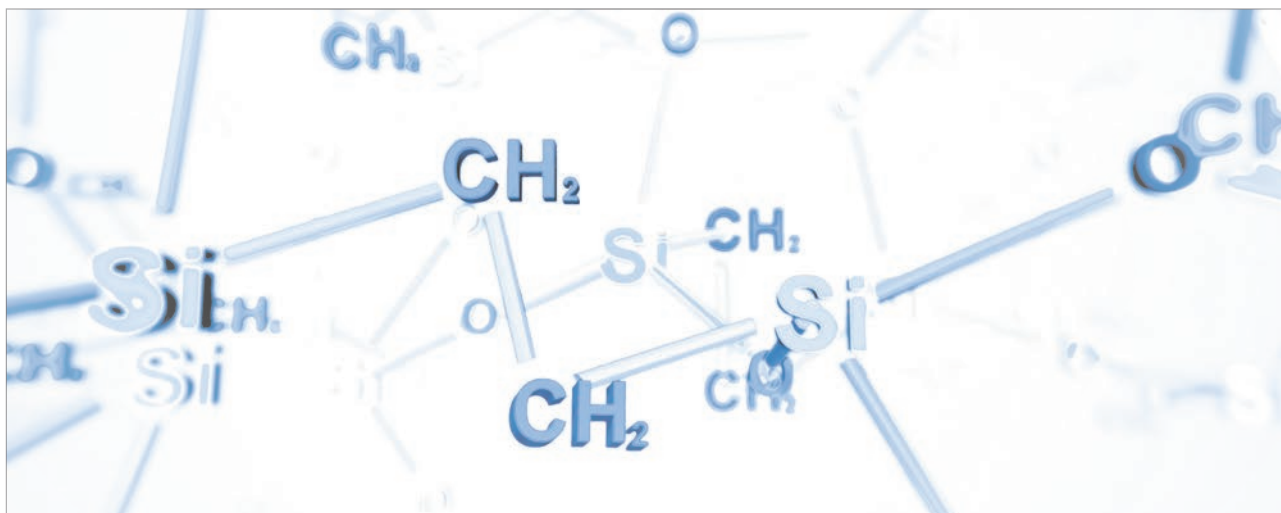
	C18	C18 ExRS	Bio C18	C8	Bio C4	Phenyl	PFP	Diol-HILIC
Base	organic/inorganic hybrid silica							
Stationary phase	C18 (USP L1)	C18 (USP L1)	C18 (USP L1)	C8 (USP L7)	C4 (USP L26)	Phenyl (USP L11)	Penta-fluorophenyl (USP L43)	Diol (USP L20)
Particle size	1.9, 3 and 5 µm							
Pore size	12 nm	8 nm	30 nm	12 nm	30 nm	12 nm	12 nm	12 nm
Specific surface	360 m ² /g	430 m ² /g	—	360 m ² /g	—	360 m ² /g	360 m ² /g	360 m ² /g
Carbon content	20%	25%	—	17%	—	17%	15%	—
Bonding	trifunctional							
Endcapping	multi-stage	multi-stage	multi-stage	multi-stage	multi-stage	multi-stage	none	none
pH range	1 ~ 12	1 ~ 12	1 ~ 12	1 ~ 12	1 ~ 10	1 ~ 10	1 ~ 8	2 ~ 10
Temperature range	pH < 7: 90 °C pH > 7: 50 °C	pH < 7: 90 °C pH > 7: 50 °C	pH < 7: 90 °C pH > 7: 50 °C	pH < 7: 90 °C pH > 7: 50 °C	pH < 7: 90 °C pH > 7: 50 °C	50 °C	50 °C	50 °C
Pressure limit	1.9 µm: 100 MPa (15,000 psi) 3/5 µm: 45 MPa (6,525 psi)*							
100% aqueous eluents	✓	✗	✓	✗	✓	✓	✓	✓

* previous hardware, still available [20/25 MPa (3,000/3,750 psi)]

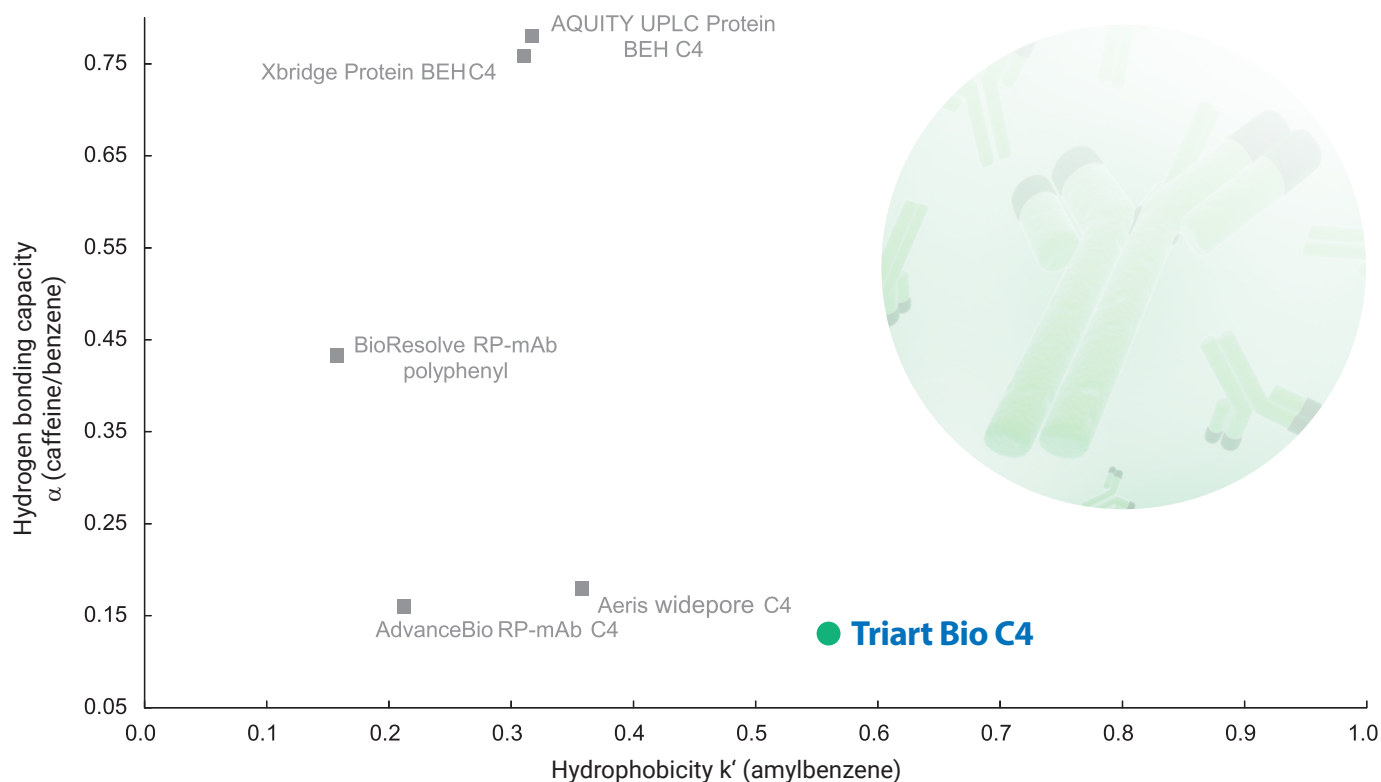
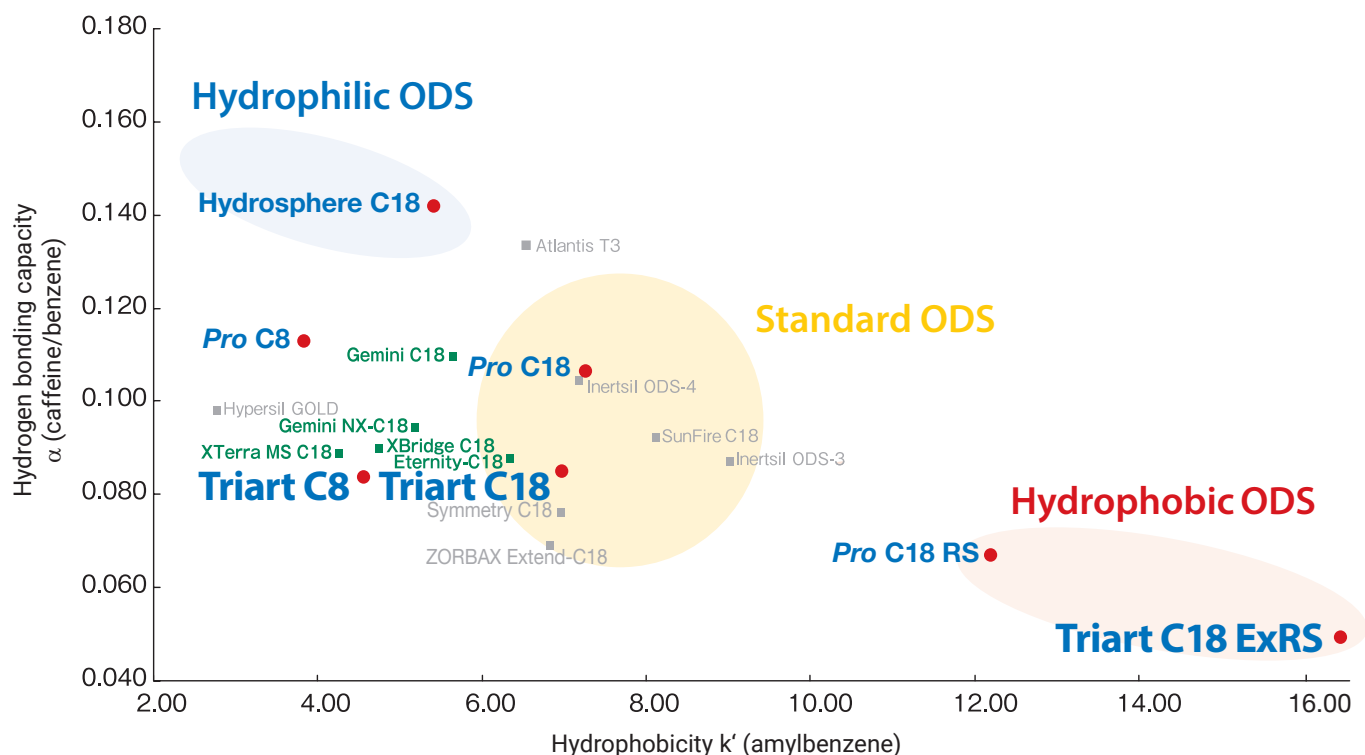
Particle technology

YMC-Triart is a versatile material prepared using tightly controlled particle formation technology which has been adapted from micro-reactor technology. This recently developed production process developed by YMC results in exceptionally narrow particle and pore size distributions.

With YMC-Triart, challenging pH and high temperature conditions are no longer a limitation to the day-to-day work in laboratories. Most importantly, due to its unique particle composition, a balanced hydrophobicity and silanol activity are achieved which makes YMC-Triart a "First Choice" column in method development.



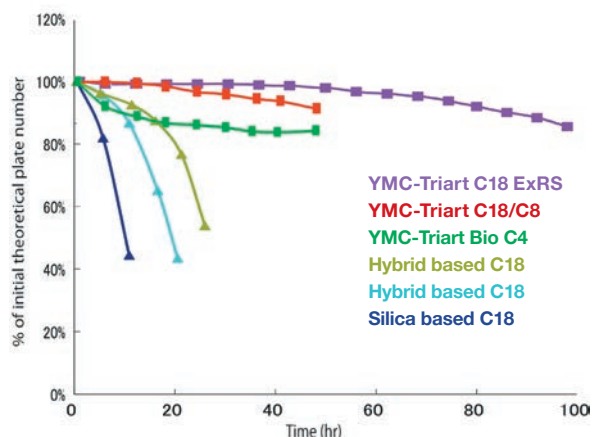
"First choice" column for method development



pH & temperature

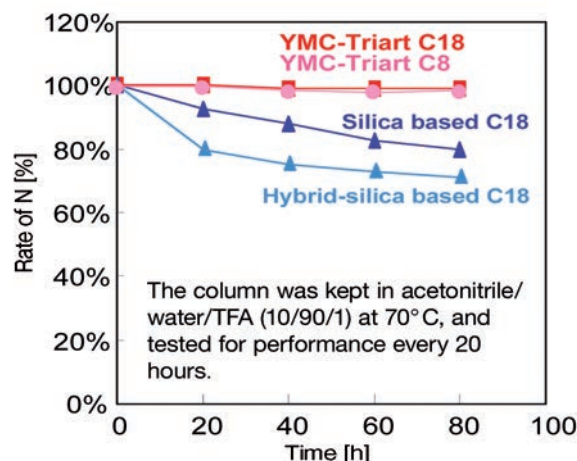
Versatile wide pH stability

Phosphate buffer (pH 11.5, 40 °C)



Column: YMC-Triart (5 μ m, 12 nm) 150 x 4.6 mm ID
Part No.: TA12S05-1546PTH
Eluent: 50 mM KH_2PO_4 - K_3PO_4 (pH 11.5)/methanol (90/10)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Sample: benzyl alcohol

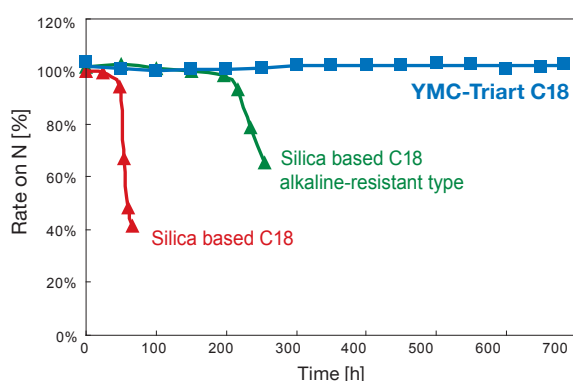
1% TFA (pH 1, 70 °C)



Column: YMC-Triart C18 (5 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12S05-0502WT
Eluent: acetonitrile/water (60/40)
Flow rate: 0.2 mL/min
Temperature: 37 °C
Sample: butyl benzoate

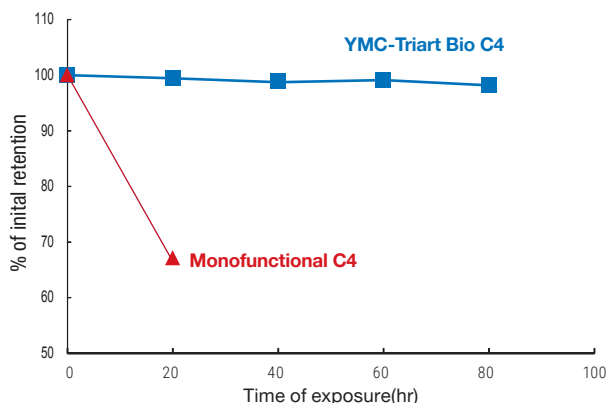
Stability at high temperature

pH 6.9, 70 °C



Column: YMC-Triart C18 (5 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12S05-0502WT
Eluent: 20 mM KH_2PO_4 - K_2HPO_4 (pH 6.9)/acetonitrile (90/10)
Flow rate: 0.2 mL/min
Temperature: 70 °C
Sample: phenol

pH 1, 90 °C

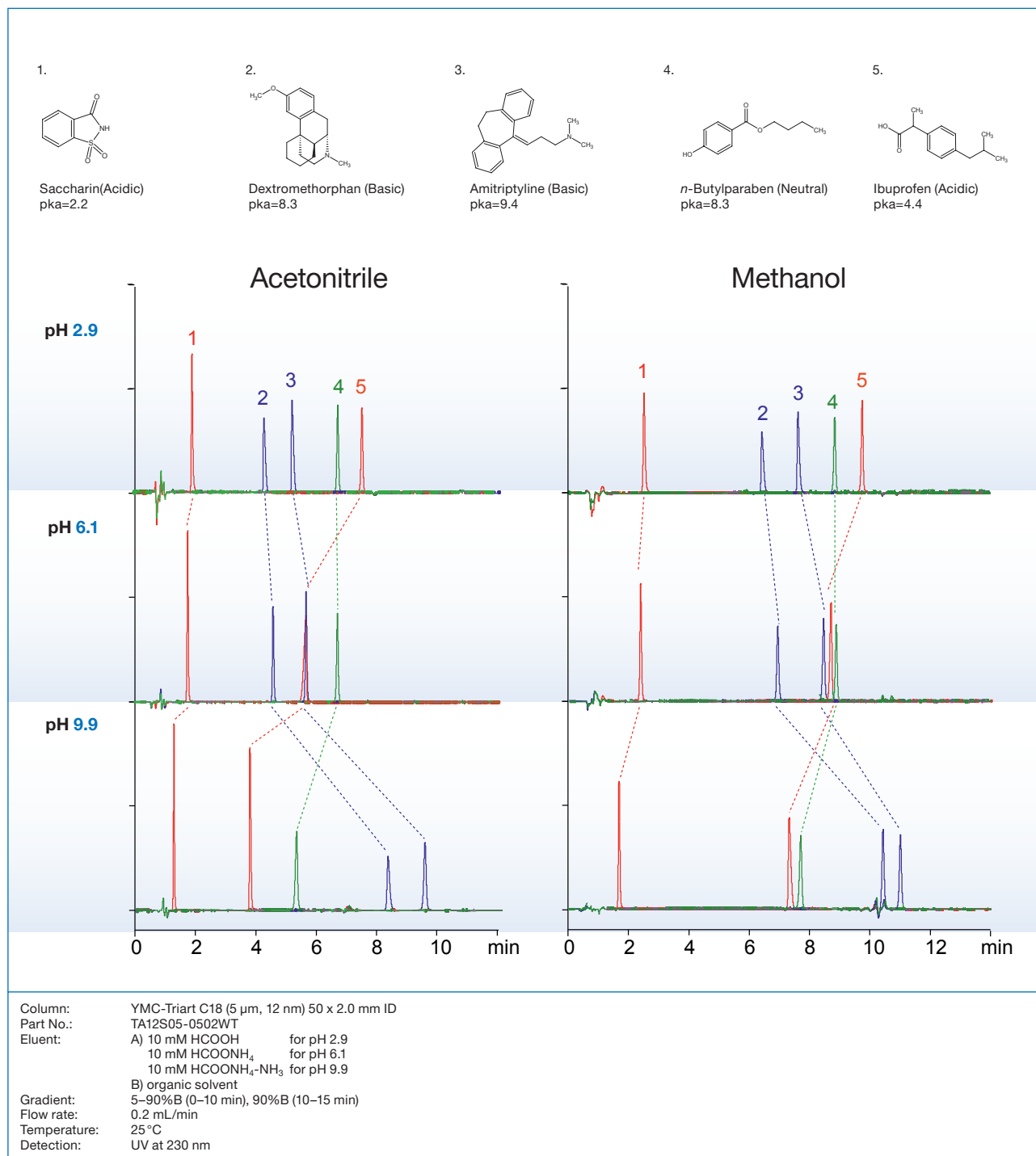


Column: YMC-Triart Bio C4 (5 μ m, 30 nm) 150 x 3.0 mm ID
Part No.: TB30S05-1503PTH
Eluent: acetonitrile/water (60/40)
Flow rate: 0.4 mL/min
Temperature: 37 °C
Sample: butyl benzoate

YMC-Triart phases show great chemical stability due to the highly developed hybrid-silica matrix. Even under high pH or high temperature conditions, the lifetime of YMC-Triart phases is more than 10 x greater than conventional reversed phase columns.

pH flexibility

Combination of pH and organic solvent

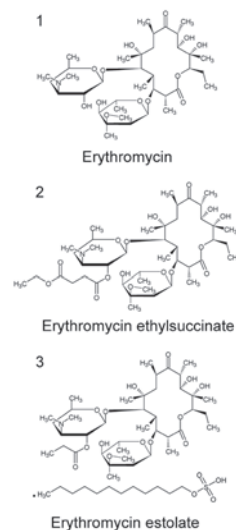
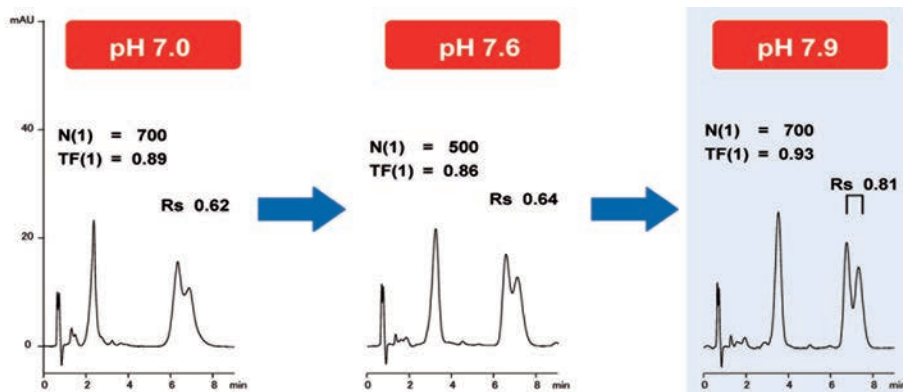


In reversed phase HPLC, pH and organic solvent are the most important factors to control retention and selectivity. YMC-Triart C18 with its wide range of usable pH offers significant advantage in selection of mobile phase conditions. YMC-Triart C18 delivers symmetrical peak shapes for all types of compounds irrespective of the pH and composition of the mobile phase. Chromatographers can select the optimal condition by combining various mobile phase parameters such as mobile phase pH, and type of organic solvent or buffer system.

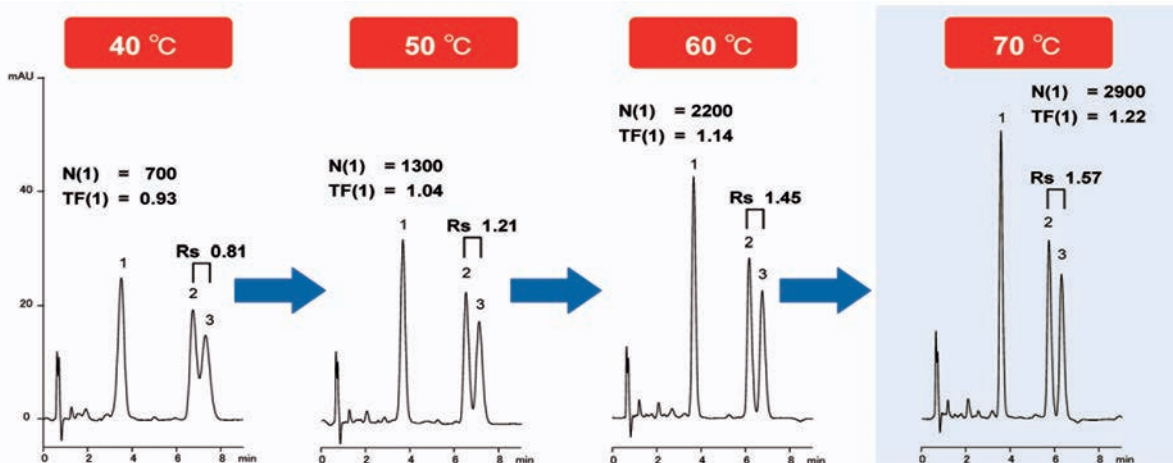
Temperature flexibility

Erythromycin at elevated pH and temperature

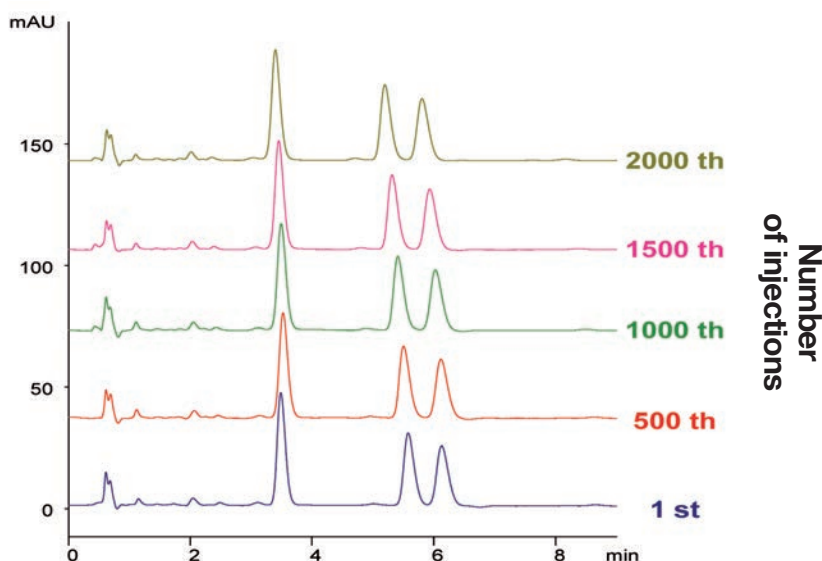
1. Optimisation of pH



2. Optimisation of temperature (pH 7.9)



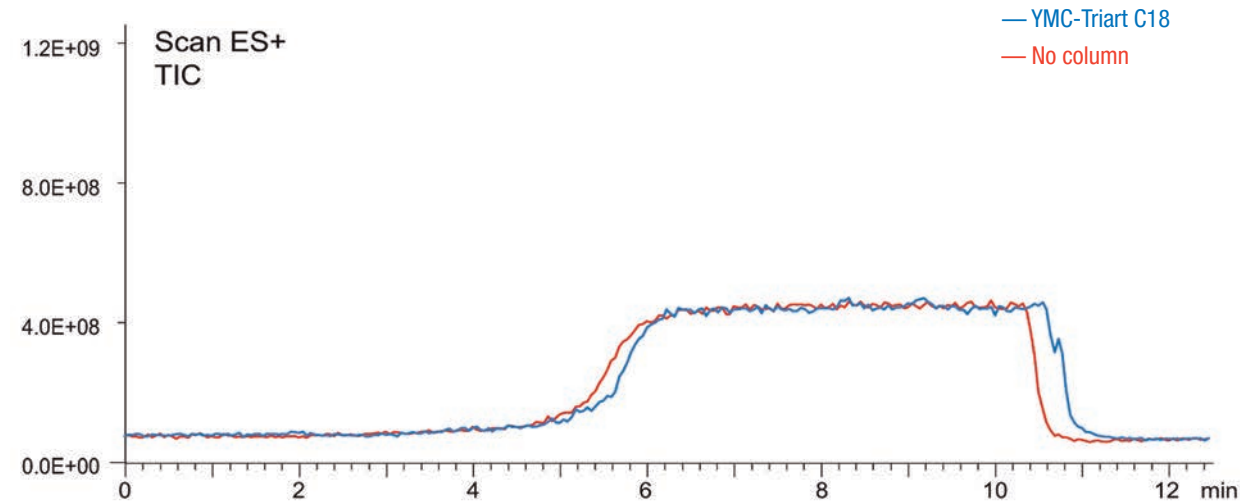
3. Stability test: pH 7.9, 70 °C



Column: YMC-Triart C18 (3 μ m, 12 nm)
50 x 2.0 mm ID
Part No.: TA12S03-0502WT
Eluent: 20 mM KH_2PO_4 - K_2HPO_4 /acetonitrile / methanol (40/45/15)
Flow rate: 0.2 mL/min
Detection: UV at 210 nm

LC/MS coupling

LC/MS compatibility

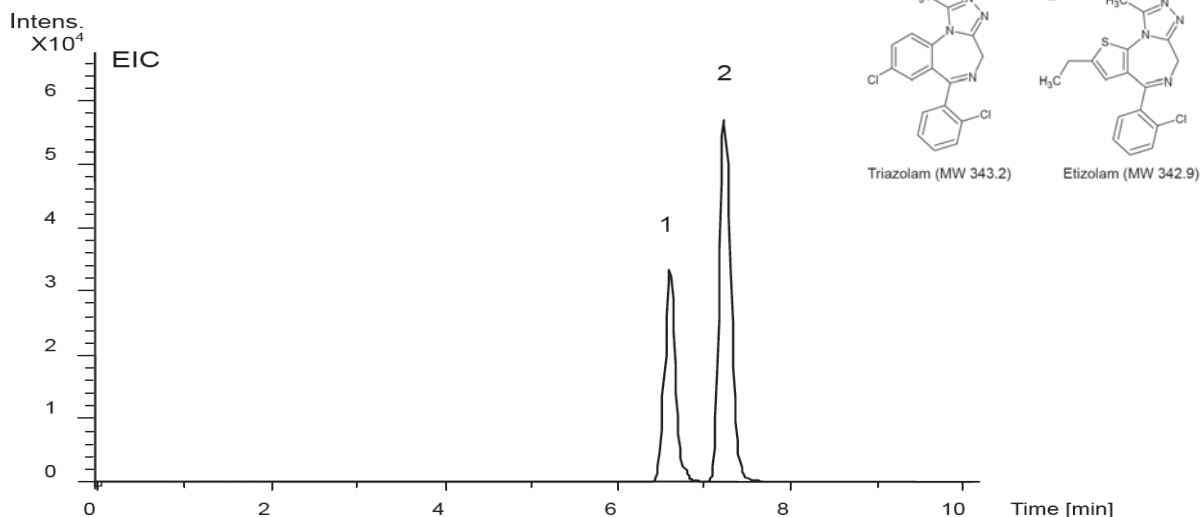


Column: 5 μ m, 50 x 2.0 mm ID
 Part-No.: TA12S05-0502WT
 Eluent: A) water + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5%B (0–1 min), 5–100%B (1–5 min),

100%B (5–10 min), 100–5%B (10–10.1 min),
 5%B (10.1–12.5 min)
 Flow rate: 0.4 mL/min
 Temperature: 40 °C
 Detection: ESI positive, TIC (Mass Range: 50–1,000)

Column bleeding, caused by the fragments of stationary phase, is the main reason for background noise and restrictions on detection limits. No bleed is observed in the test of total ion current (TIC) measured by LC/MS with blank or with YMC-Triart C18. So in terms of the signal/noise ratio (S/N ratio), YMC-Triart C18 can be expected to not only reduce the background noise but to also increase the sensitivity of the analysis.

LC/MS analysis of benzodiazepine derivatives



Peak 1: 100ng_mL_RB4_01_2291.d: EIC 343.051 $\pm$ 0.01+All MS
 Peak 2: 100ng_mL_RB4_01_2291.d: EIC 343.078 $\pm$ 0.01+All MS

Column: YMC-Triart C18 (5 μ m, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12S05-0502WT
 Eluent: A) 10 mM formic acid
 B) acetonitrile
 Gradient: 25–50%B (0–10 min)

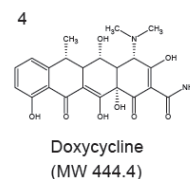
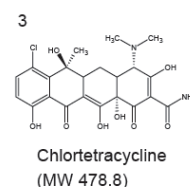
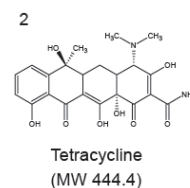
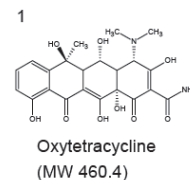
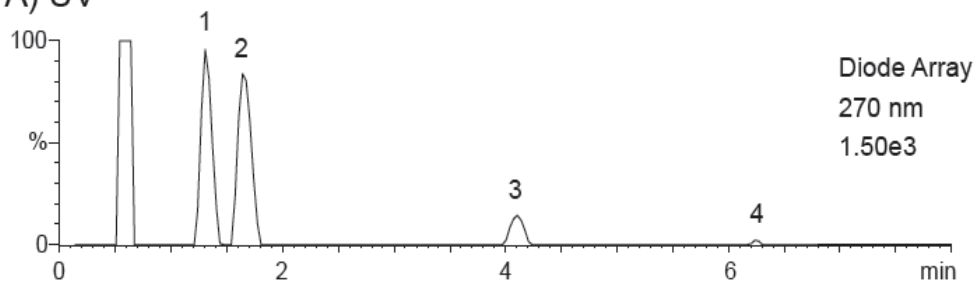
Flow rate: 0.2 mL/min
 Temperature: 40 °C
 Detection: Bruker Daltonics microTOF, ESI,
 positive mode
 Injection: 5 μ L (100 ng/mL)

Courtesy of J. Watanabe, Bruker Daltonics K. K.

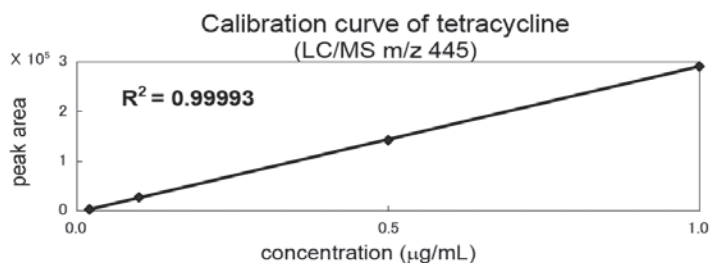
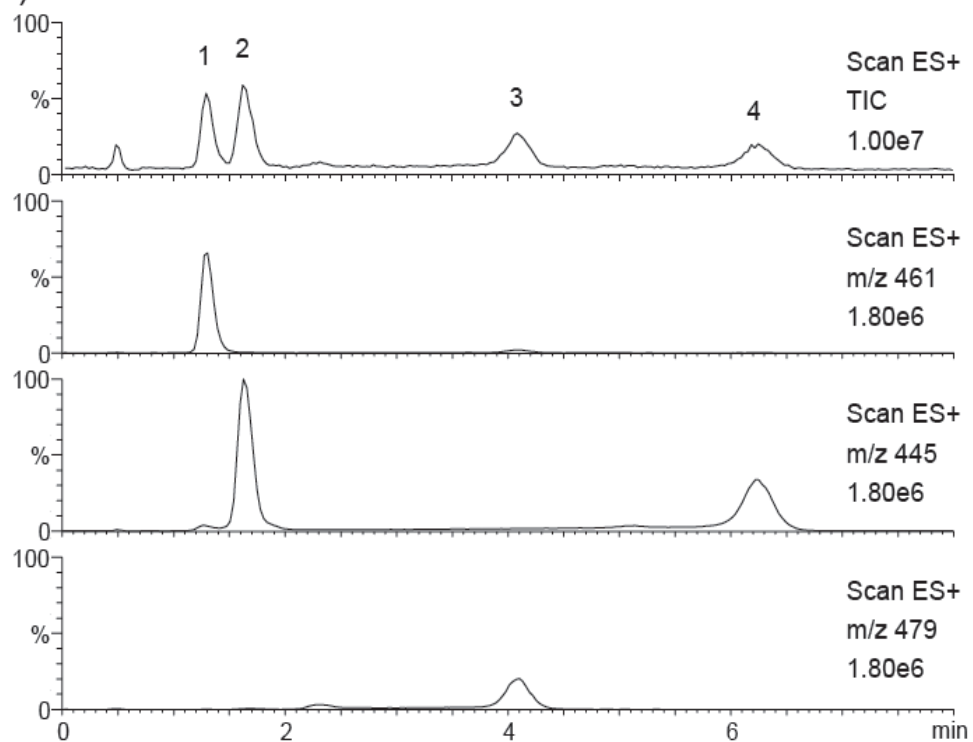
LC/MS coupling

LC/MS analysis of tetracycline antibiotics

A) UV



B) MS



Column: YMC-Triart C18 (5 μm , 12 nm) 50 x 2.0 mm ID
Part No.: TA12S05-0502WT
Eluent: acetonitrile/water/formic acid (15/85/0.1)
Flow rate: 0.4 mL/min
Temperature: 40 °C
Detection: A) UV at 270 nm
B) ESI positive-mode
Injection: 10 μL (1 $\mu\text{g/mL}$)

Transfer HPLC↔UHPLC

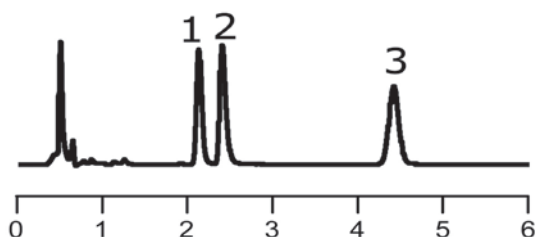
Secure your method transfer!

Differences in selectivity, retention time, and also peak shapes between different particle sizes of commercially available C18 phases in the same brand (or an alternative as recommended by its manufacturer) have been observed.

YMC-Triart C18

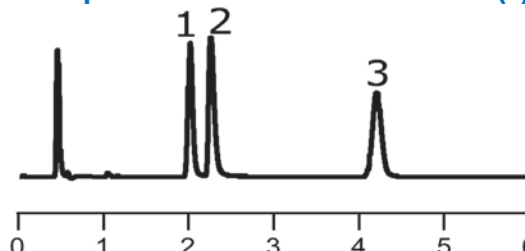
3 µm

TF(2) 1.43



1.9 µm

TF(2) 1.47



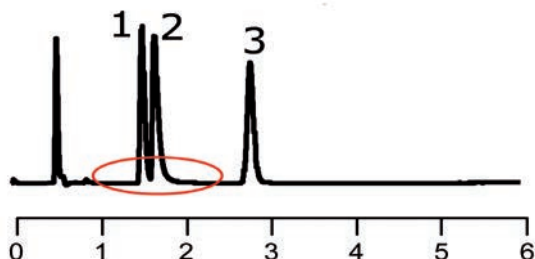
YMC has addressed this issue of method transfer. YMC-Triart columns show identical selectivity and excellent peak shapes for basic compounds for all 3.0 µm to 1.9 µm particle sizes. It allows predictable scale up from UHPLC to conventional HPLC and even to semi-preparative LC, and vice versa.

Case Studies

XBridge BEH C18 and Acquity UPLC BEH C18

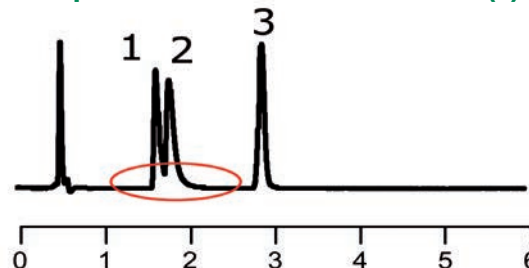
2.5 µm

TF(2) 2.24



1.7 µm

TF(2) 2.35

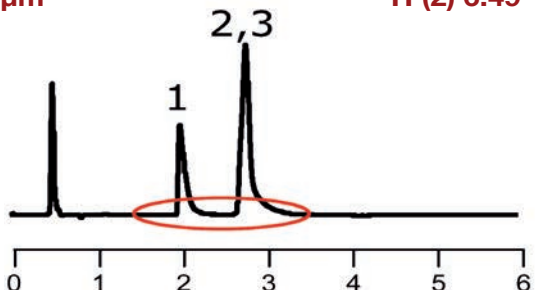


These observations might not be representative for all applications.

Kinetex C18

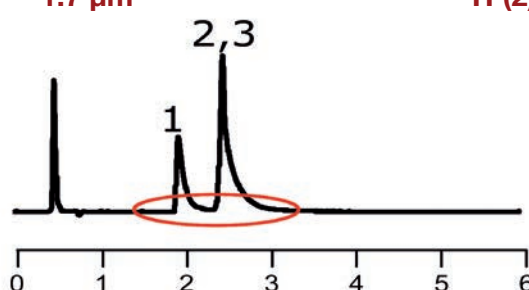
2.6 µm

TF(2) 6.49



1.7 µm

TF(2) 4.94



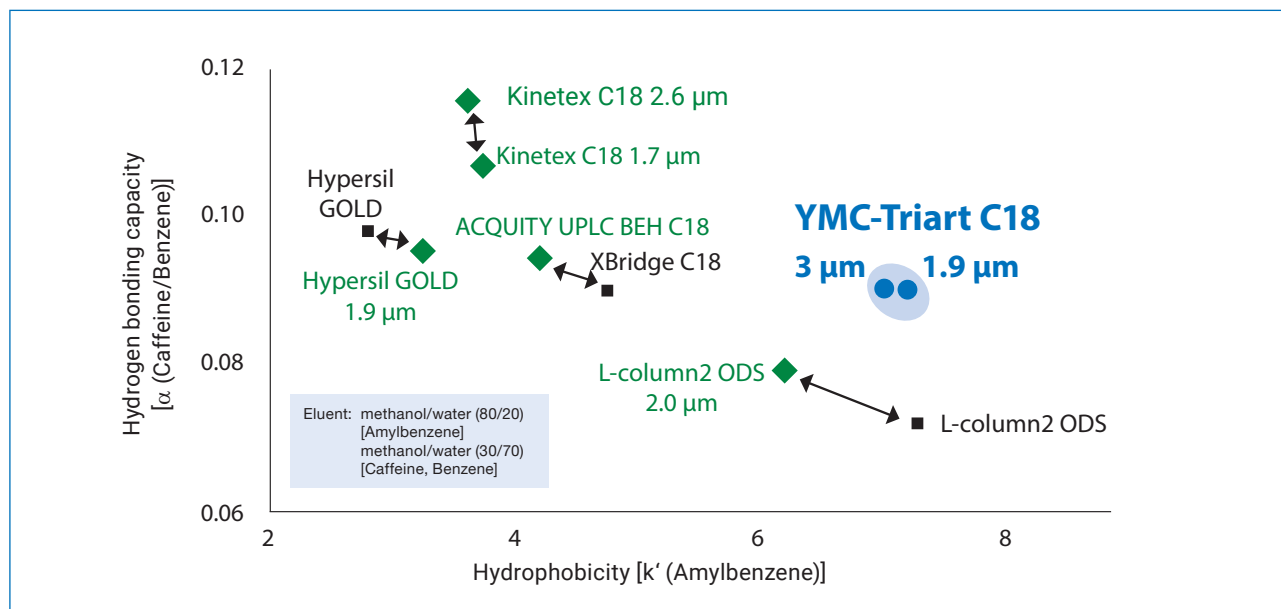
Kinetex C18 columns show significant peak tailing and have limited scalability due to lack of larger particle sizes.

Column: 50 x 2.0 mm ID or 2.1 mm ID
Eluent: 20 mM KH₂PO₄-K₂HPO₄ (pH 6.9)/acetonitrile (65/35)
Temperature: 40 °C
Flow rate: 0.2 mL/min
Detection: UV at 235 nm

1. Chlorpheniramine (basic)
2. Dextromethorphan (basic)
3. Propyl paraben (internal standard)

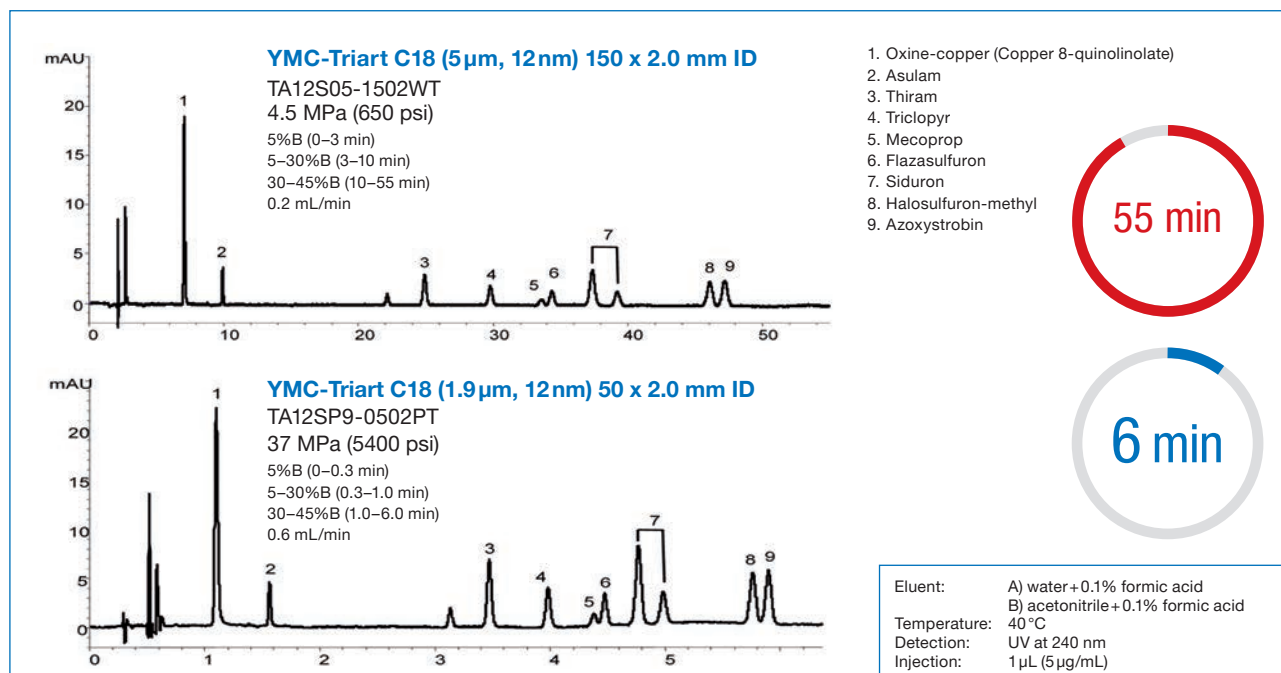
Transfer HPLC↔UHPLC

Evaluation of method transfer performance!



With the introduction of UHPLC, sub-2-μm particles became necessary. Therefore smaller particles have been added to existing column lines. Consequently, sub-2-μm particles may exhibit differences in chromatographic performance. By introducing YMC-Triart, YMC provides matching chromatographic behaviour for all particles sizes!

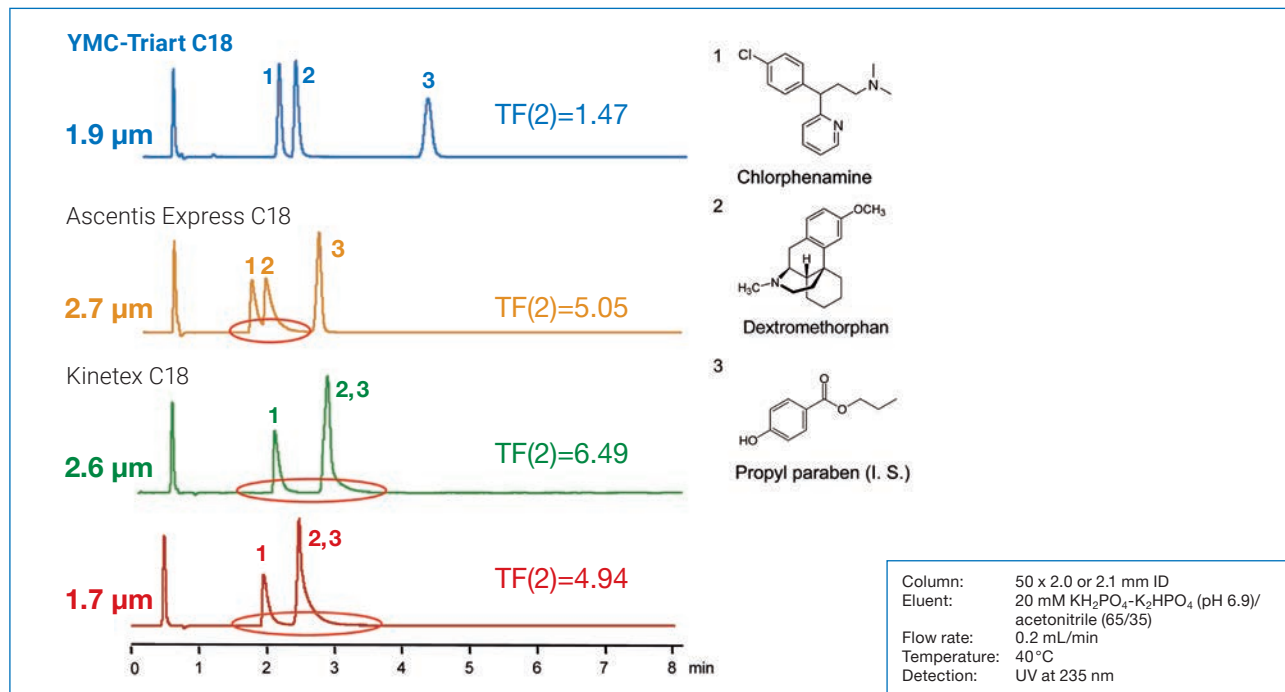
Method transfer HPLC↔UHPLC



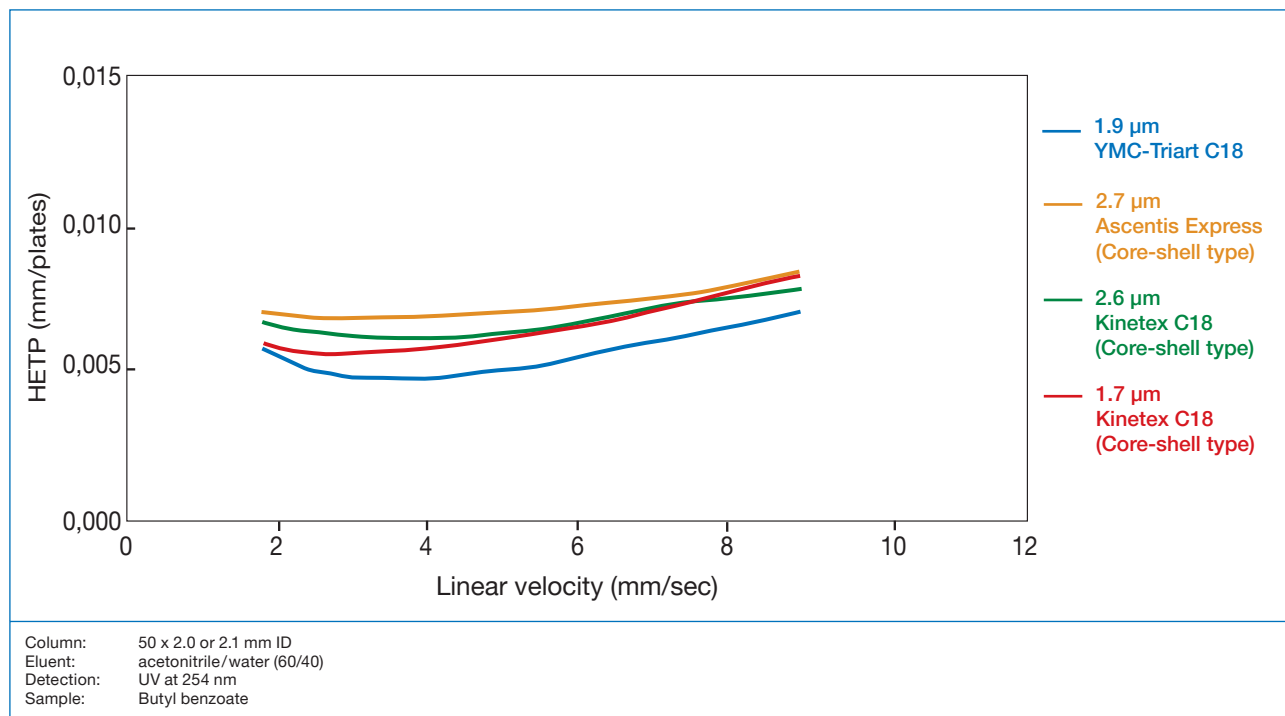
When transferring the 55 min HPLC method to UHPLC scale, the resolution remains the same although the separation time is reduced to only 6 min.

Highest resolution in UHPLC

Higher resolution and better peak shapes



Lower HETP means higher resolution!

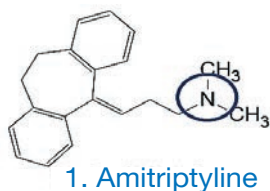


YMC-Triart C18 always shows the lowest HETP compared to the three Core-Shell products over the range of linear velocity applied.

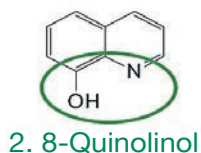
Pharmaceuticals – YMC-Triart C18 ExRS

High hydrophobicity & high steric recognition ability

Basic Compound

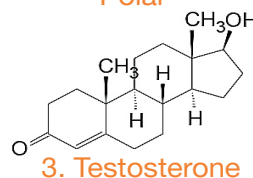


Coordination Compound

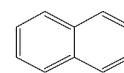


Neutral Compounds

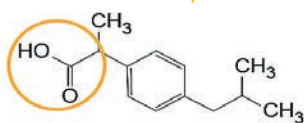
Polar



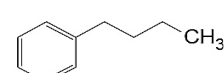
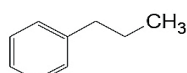
π - π interaction



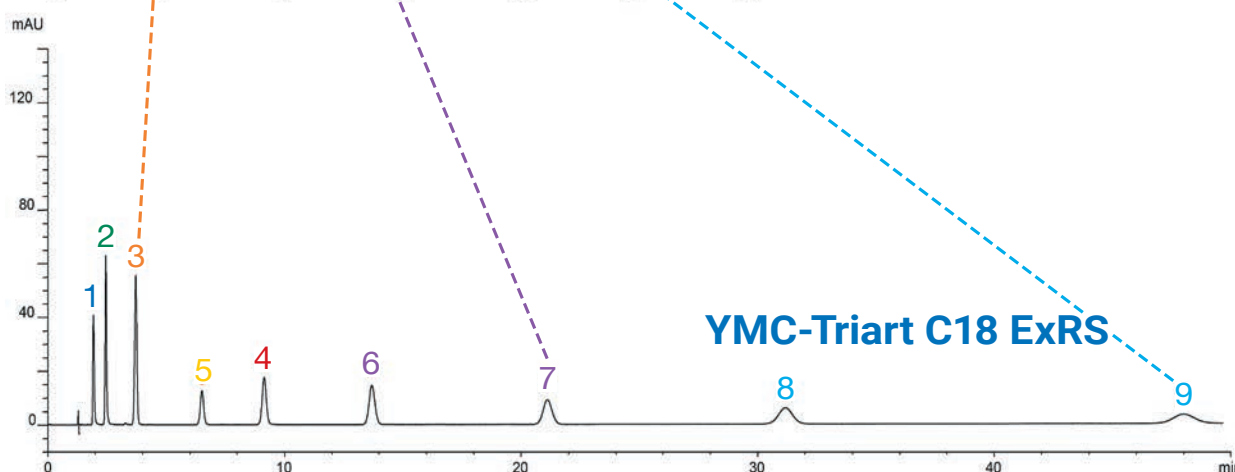
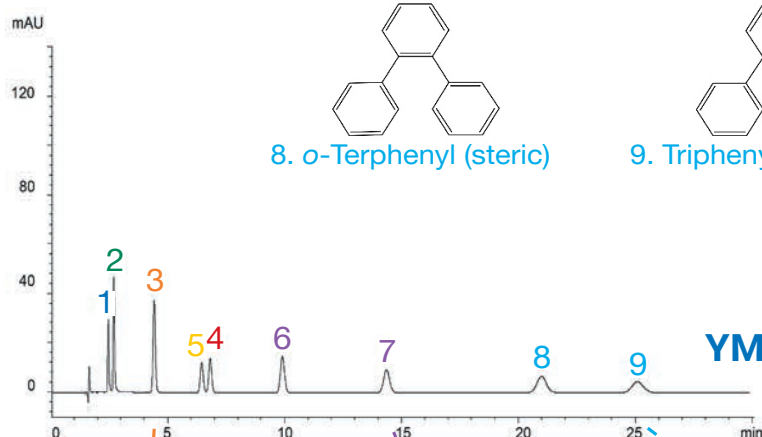
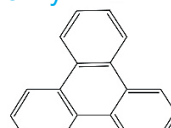
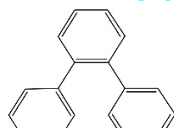
Acidic Compound



Hydrophobic



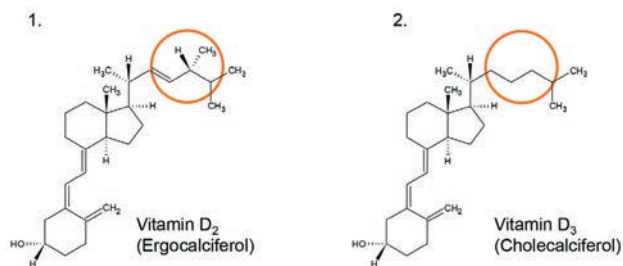
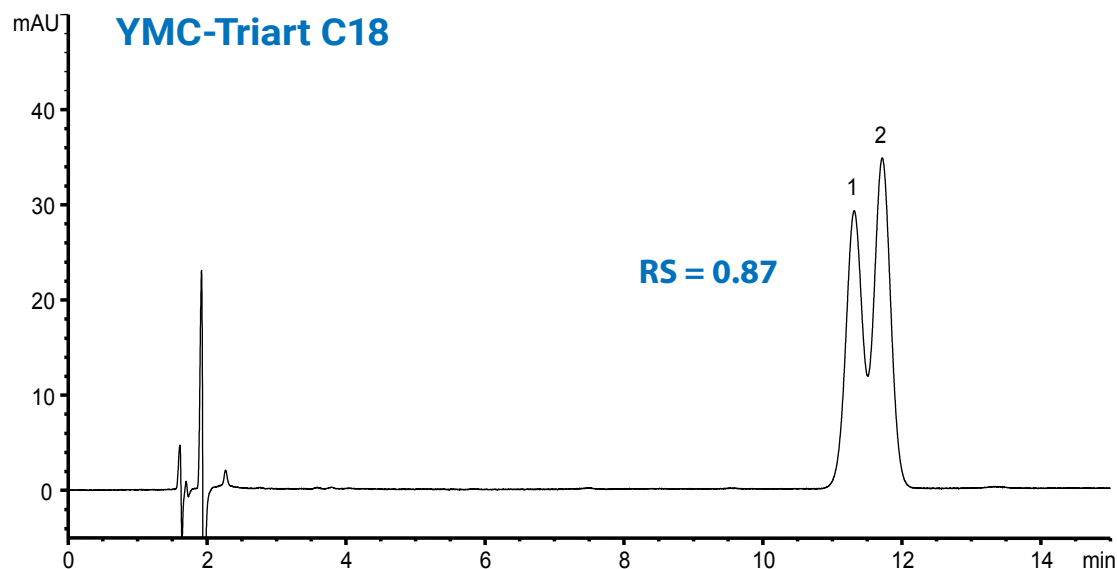
Steric Cognitive Ability



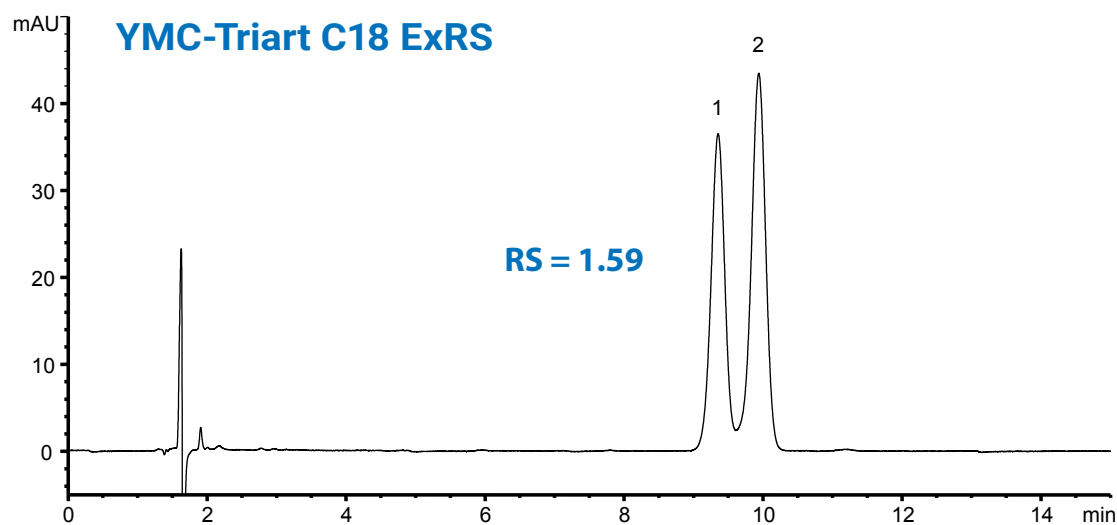
Column: 5 μ m, 150 x 3.0 mm ID
 Part Nos.: TA12S05-1503PTH / TAR08S05-1503PTH
 Eluent: 20 mM HCOOH-HCOONH₄ (pH 4.3)/acetonitrile (90/10)
 Flow rate: 1.0 mL/min
 Temperature: 25 °C
 Detection: UV at 254 nm
 Injection: 2 μ L (10 μ g/mL)

Pharmaceuticals – YMC-Triart C18 ExRS

Structural analogues



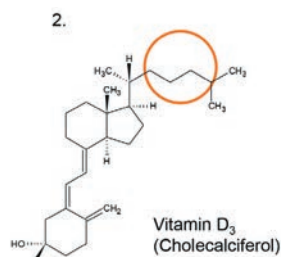
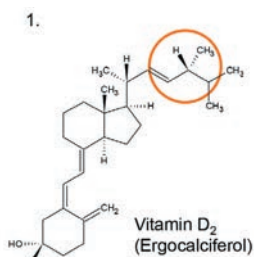
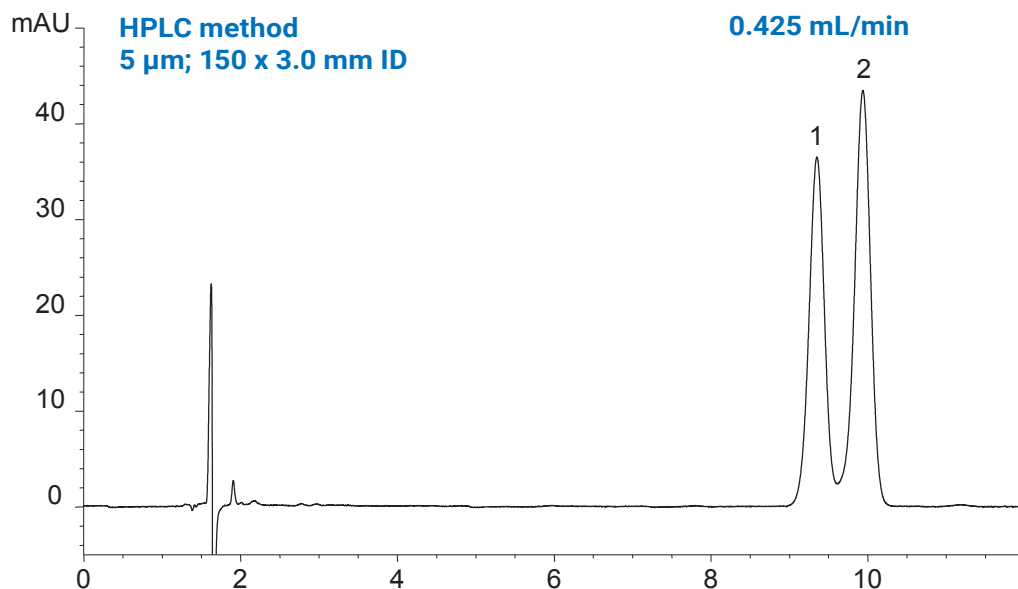
Higher Resolution



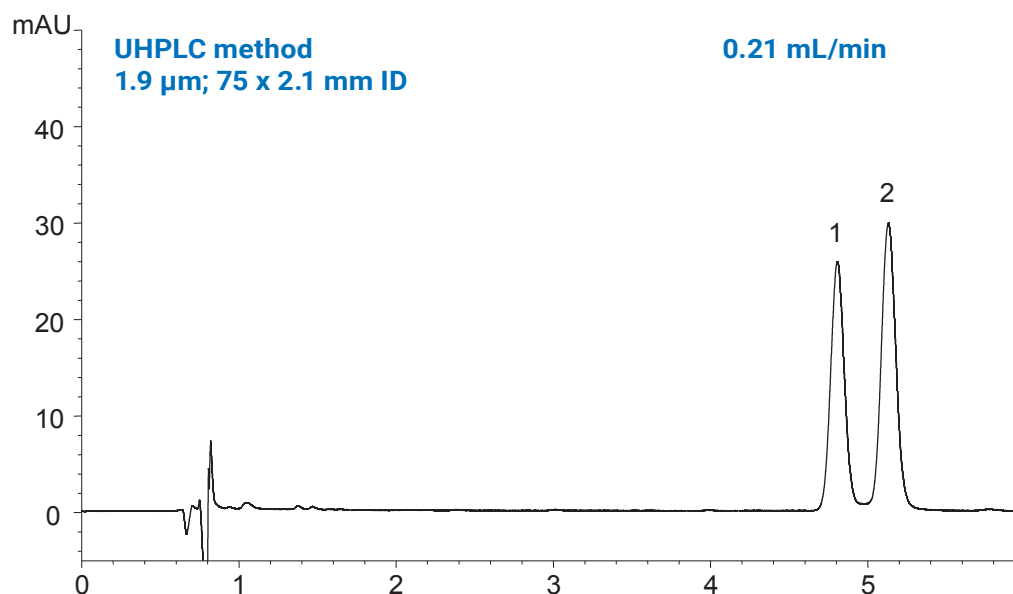
Column: 5 μ m, 150 x 3.0 mm ID
 Part Nos.: TA12S05-1503PTH/TAR08S03-1503PTH
 Eluent: THF/acetonitrile (10/90)
 Flow rate: 0.425 mL/min
 Temperature: 30 °C
 Detection: UV at 265 nm
 Injection: 4.25 μ L (10 μ g/mL)

Pharmaceuticals – YMC-Triart C18 ExRS

Easy transfer HPLC ↔ UHPLC



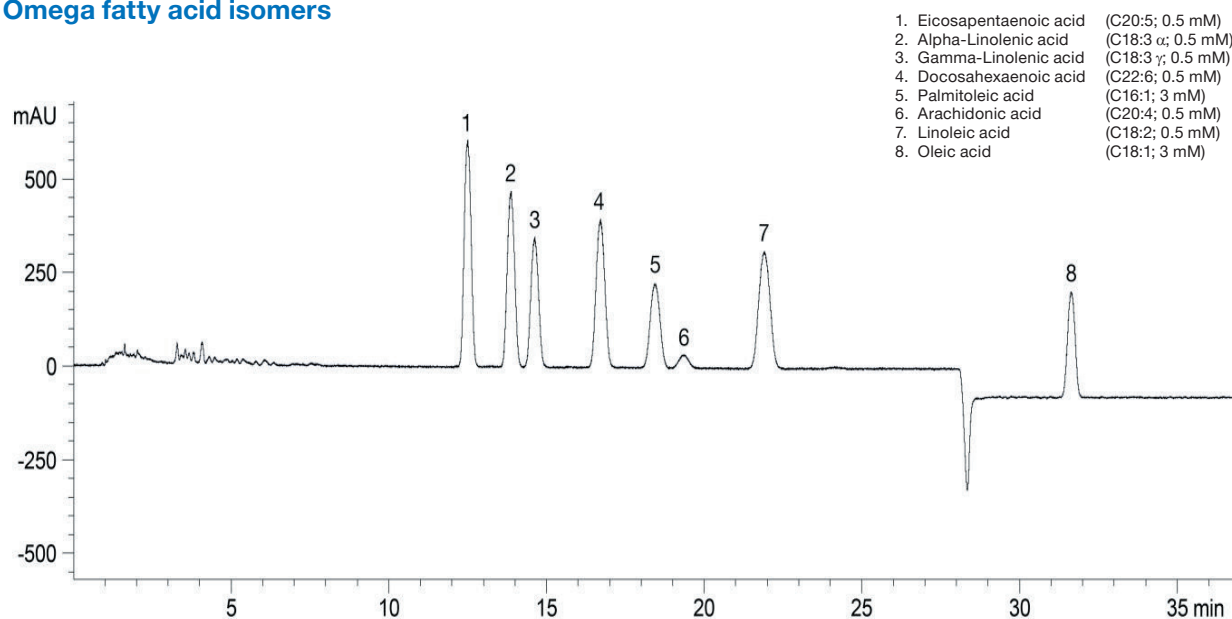
-50%



Part Nos.: TAR08S03-1503PTH/TAR08SP9-L5Q1PT
Eluent: THF/acetonitrile (10/90)
Temperature: 30 °C
Detection: UV at 265 nm

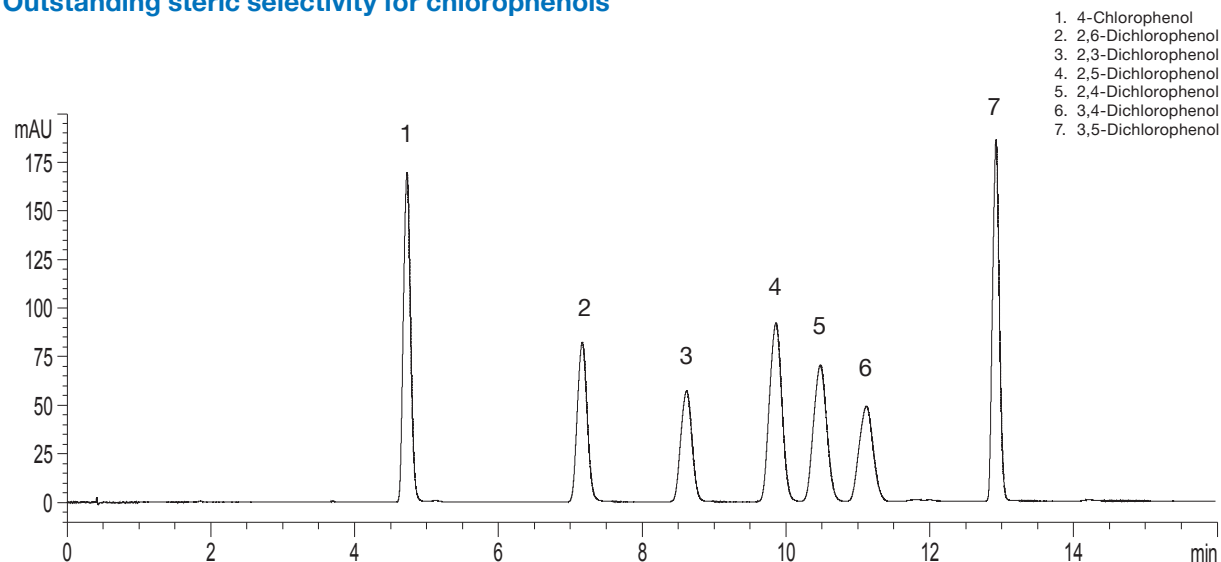
Pharmaceuticals – YMC-Triart C18 ExRS

Omega fatty acid isomers



Column: YMC-Triart C18 ExRS (3 μm, 8 nm) 150 × 4.6 mm ID
 Part No.: TAR08S03-1546PTH
 Eluent: A) H₂O + 0.5 % H₂CCOOH
 B) ACN + 0.5 % H₂CCOOH
 Gradient: 76.5–78.5%B (0–2 min), 78.5–90%B (2–27 min), 78.5–90%B (27–27.1 min), 90%B (27.1–55 min)
 Flow rate: 1.0 mL/min
 Temperature: 35 °C
 Detection: UV at 254 nm
 Injection: 20 μL

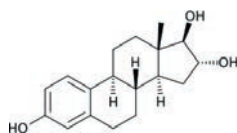
Outstanding steric selectivity for chlorophenols



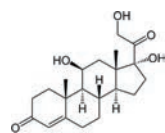
Column: YMC-Triart C18 ExRS (1.9 μm, 8 nm) 75 × 3.0 mm ID
 Part No.: TAR08SP9-L503PT
 Eluent: A) water + 0.1% HCOOH B) methanol + 0.1% HCOOH
 Gradient: 44–50%B (0–8.1 min), 50–51.5%B (8.1–11 min), 51.5–65%B (11–11.1 min), 65%B (11.1–20 min)
 Flow rate: 0.7 mL/min
 Temperature: 40 °C
 Detection: UV at 280 nm
 Injection: 1 μL (0.7 mg/mL)

Pharmaceuticals – YMC-Triart Phenyl

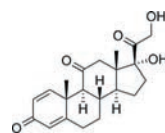
Excellent alternative to C18 phases for steroids



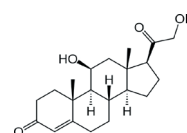
1. Estriol



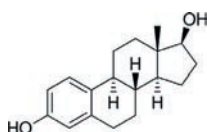
2. Cortisol/Hydrocortison



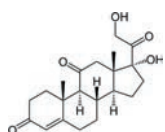
3. Prednisone



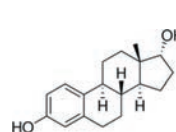
4. Corticosterone



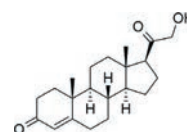
5. Beta-Estradiol



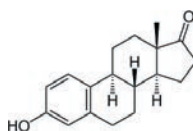
6. Cortisone/Cortison acetate



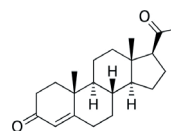
7. Alpha-Estradiol



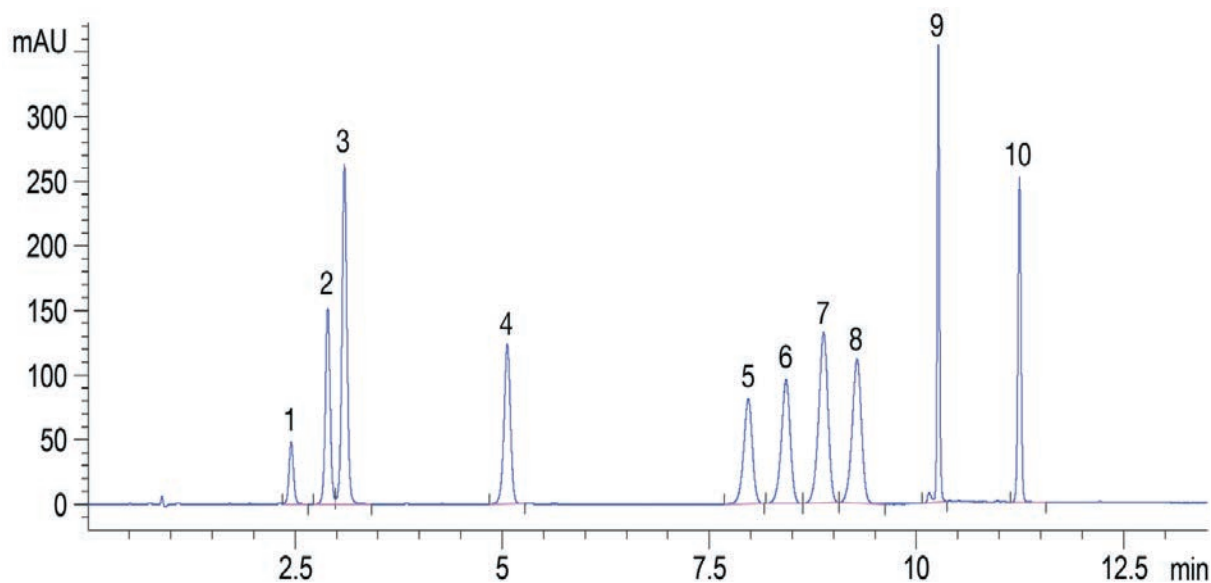
8. 21-Hydroxyprogesterone



9. Estrone



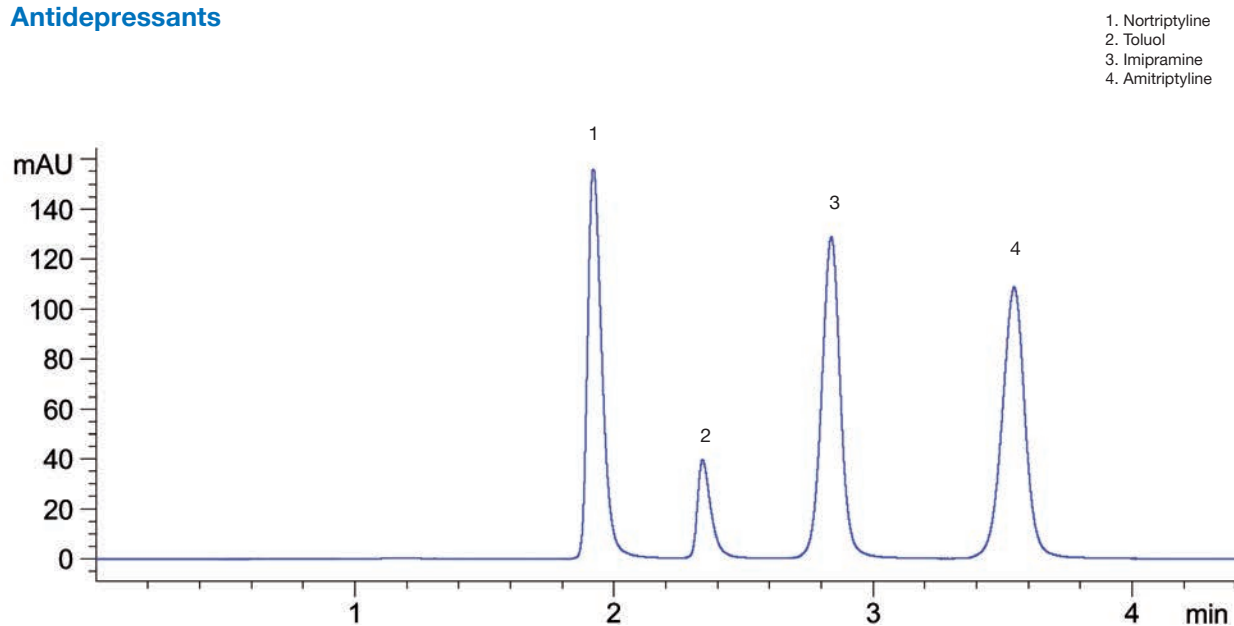
10. Progesterone



Column: YMC-Triart Phenyl (1.9 μ m, 12 nm) 100 x 2.0 mm ID
 Part No.: TPH12SP9-1002PT
 Eluent: A) water B) acetonitrile
 Gradient: 29–35%B (0–9 min), 35–60%B (9–9.1 min), 60%B (9.1–13.5 min)
 Flow rate: 0.3 mL/min
 Temperature: 48 °C
 Detection: UV at 220 nm
 Injection: 0.5 μ L

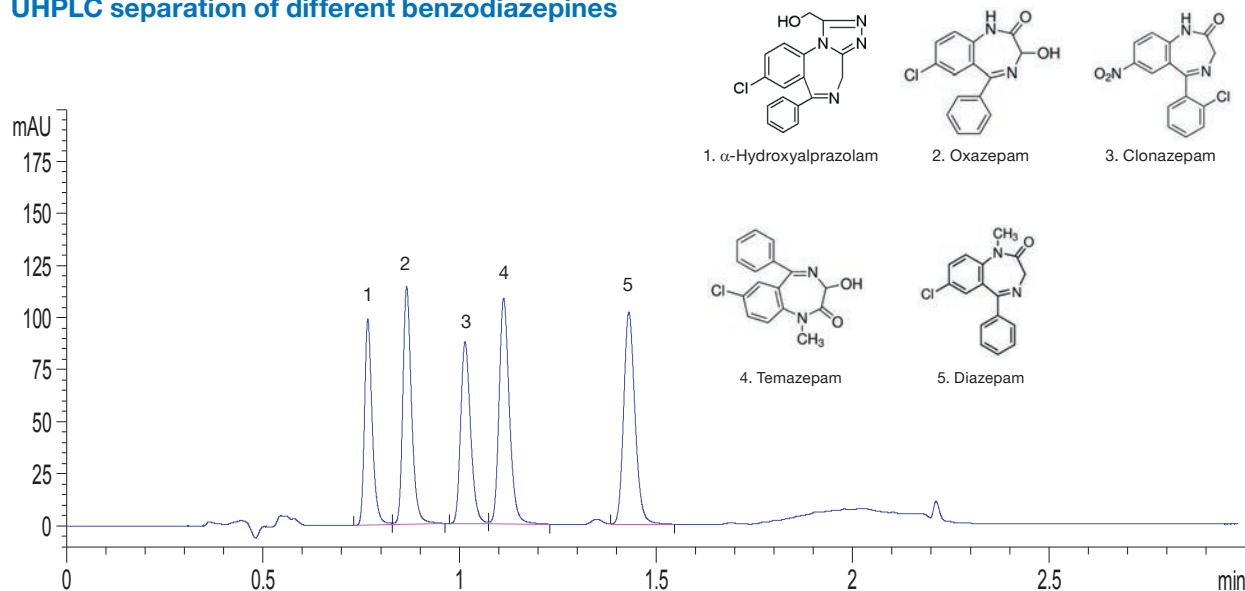
Pharmaceuticals – YMC-Triart Phenyl

Antidepressants



Column: YMC-Triart Phenyl (1.9 μ m, 12 mm) 100 x 2.0 mm ID
Part No.: TPH12SP9-1002PT
Eluent: methanol/25 mM KH_2PO_4 (pH 6.0) (65/35)
Flow rate: 0.4 mL/min
Temperature: 25 $^\circ\text{C}$
Detection: UV at 254 nm
Injection: 2 μ L

UHPLC separation of different benzodiazepines



Column: YMC-Triart Phenyl (1.9 μ m, 12 mm) 100 x 2.0 mm ID
Part No.: TPH12SP9-1002PT
Eluent: A) water B) acetonitrile
Gradient: 52–54%B (0–1.1 min), 54–95%B (1.1–1.2 min), 95%B (1.2–3 min)
Flow rate: 0.5 mL/min
Temperature: 35 $^\circ\text{C}$
Detection: UV at 254 nm
Injection: 2 μ L (0.02 mg/mL)

Pharmaceuticals – YMC-Triart PFP

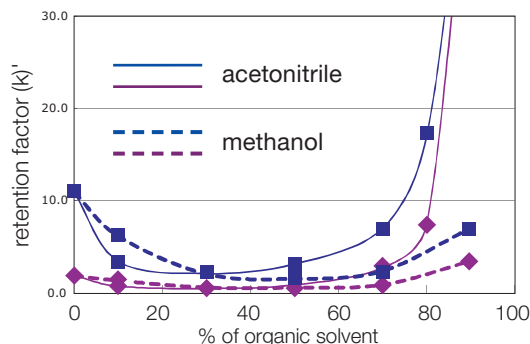
Effect of organic solvent concentration on the retention of basic and zwitterionic compounds (under acidic conditions)

Basic compound (■)

5-Hydroxytryptamine HCl (5-HT)
(Serotonin HCl)

Zwitterionic compound (◆)

Tyrosine (Tyr)



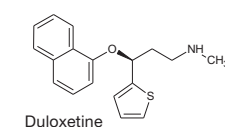
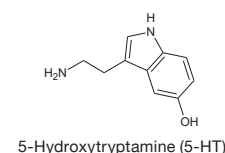
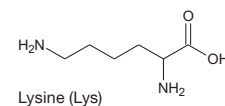
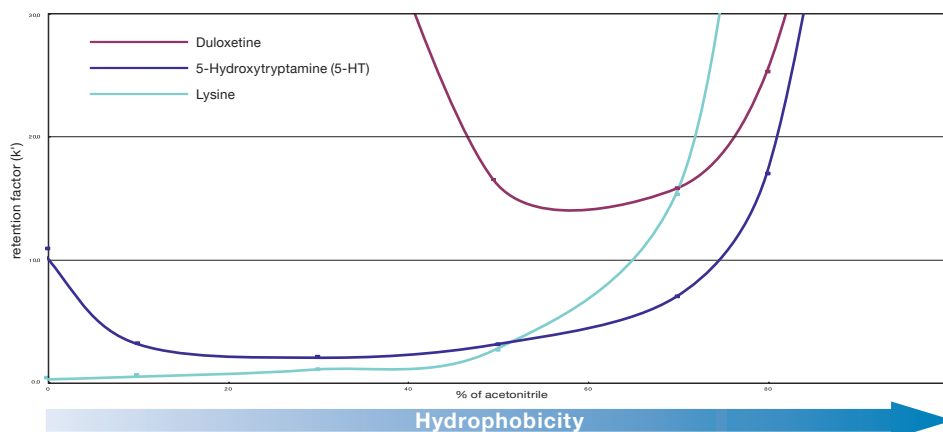
Column: YMC-Triart PFP (5 μ m, 12 nm) 50 x 4.6 mm ID
Part No.: TPF12S05-0546PTH
Eluent: A) water containing 10 mM formic acid
B) acetonitrile or methanol containing 10 mM formic acid

Flow rate: 1.0 mL/min
Temperature: 40 °C
Detection: UV at 280 nm

The retention increases when using both mobile phase conditions containing organic solvent with less than 20% and more than 60% solvent. These RP and HILIC-like retention behaviours on the YMC-Triart PFP column are useful for optimising the separation of samples containing basic or zwitterionic compounds by the simple approach of changing organic solvent content.

Using high organic mobile phase conditions, acetonitrile provides stronger retention than methanol. Methanol may disturb the formation of the water-enriched layer on the surface of stationary phases by replacing water molecules.

Retention of basic compounds with different hydrophobicity on PFP column



Column: YMC-Triart PFP (5 μ m, 12 nm) 50 x 4.6 mm ID
Part No.: TPF12S05-0546PTH
Eluent: A) water containing 10 mM formic acid
B) acetonitrile containing 10 mM formic acid

Flow rate: 1.0 mL/min
Temperature: 40 °C

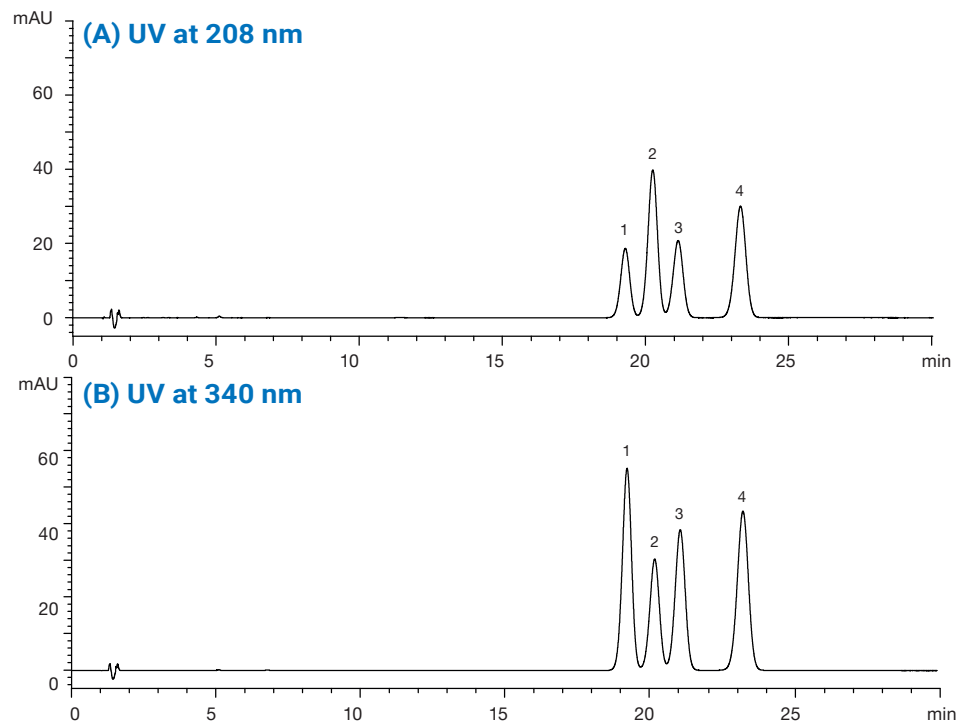
Retention behaviour is strongly dependent on the analyte hydrophobicity. Lysine shows increasing retention when using >50% acetonitrile, while 5-HT shows a similar behaviour, but with higher retention at <10% acetonitrile. Duloxetine can be eluted only between 50–70%, as no elution takes place due to its high hydrophobicity when using 0–30% or >90%.

TIP

Using high organic mobile phase conditions, acetonitrile provides stronger retention than methanol. Methanol may disturb the formation of the water-enriched layer on the surface of stationary phases by replacing water molecules.

Pharmaceuticals – YMC-Triart PFP

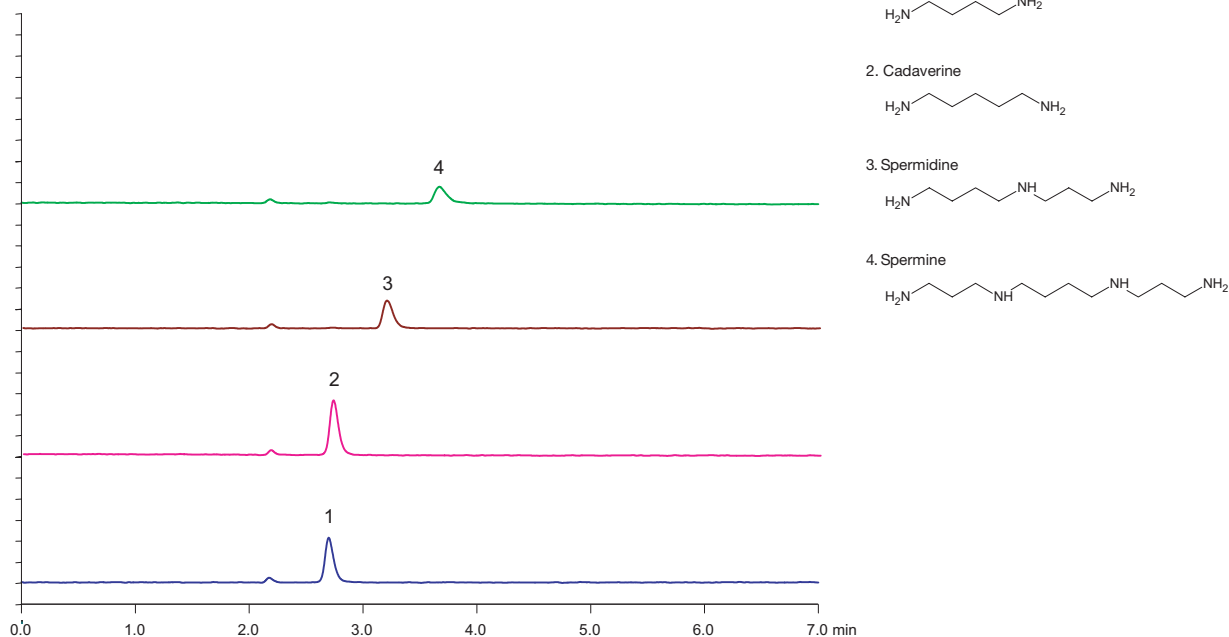
Piperine and its isomers*



Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 3.0 mm ID
Part No.: TPF12S05-1503PTH
Eluent: 0.1% HCOOH/acetonitrile (60/40)

Flow rate: 0.425 mL/min
Temperature: 25 $^{\circ}$ C
Injection: 4.25 μ L

Biogenic polyamines

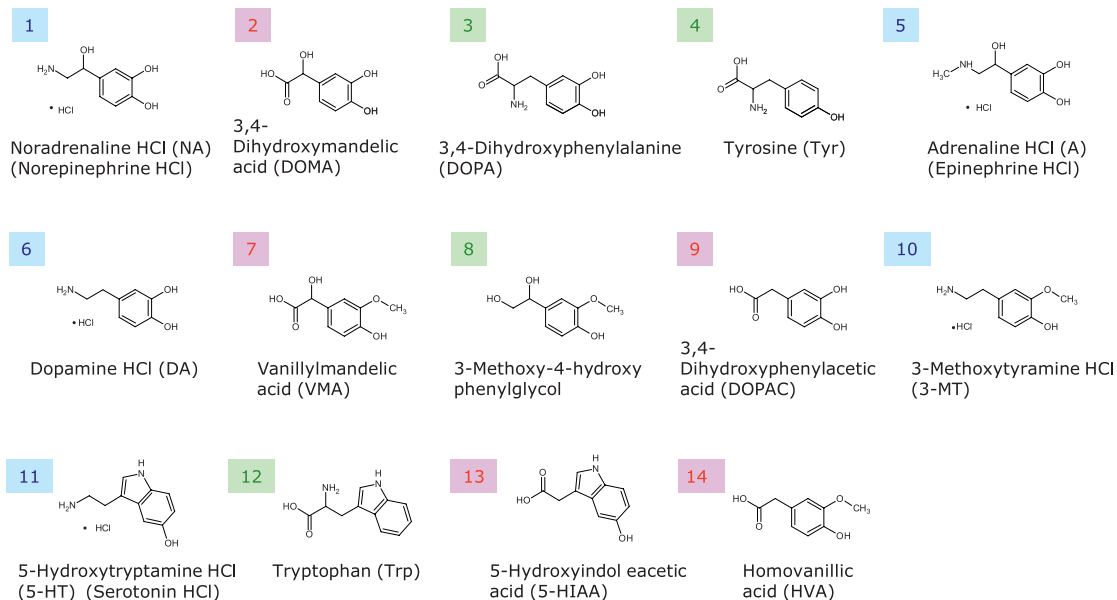


Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
Part No.: TPF12S05-1546PTH
Eluent: methanol/water (30/70) containing 10 mM formic acid
Flow rate: 1.0 mL/min

Temperature: 25 $^{\circ}$ C
Detection: Corona[®] CAD[®] (Charged Aerosol Detector)
Injection: 1 μ L (25 μ g/mL)

Pharmaceuticals – YMC-Triart PFP

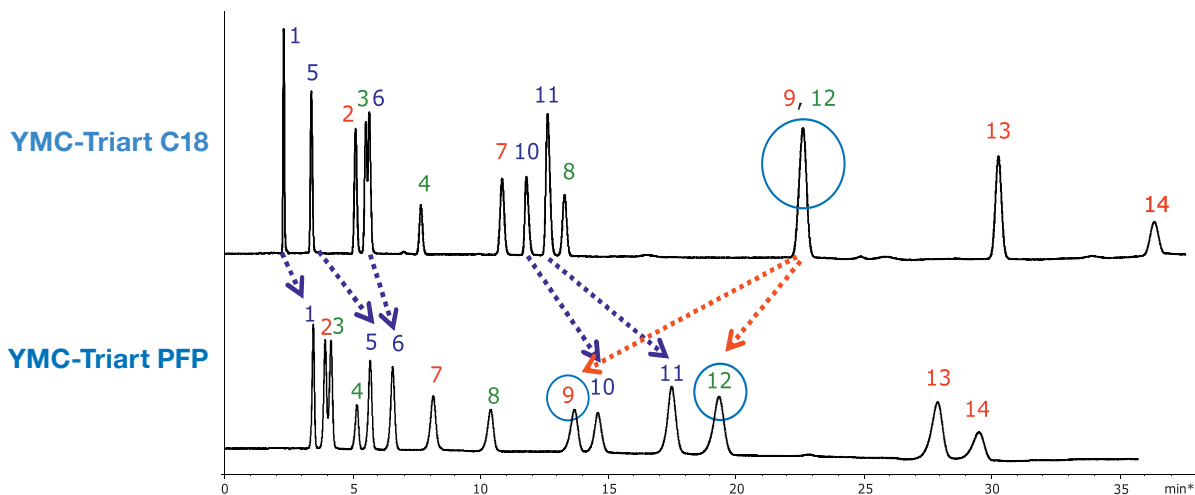
Separation of catecholamines using YMC-Triart C18 compared to YMC-Triart PFP



acidic compound

neutral and zwitterionic compound

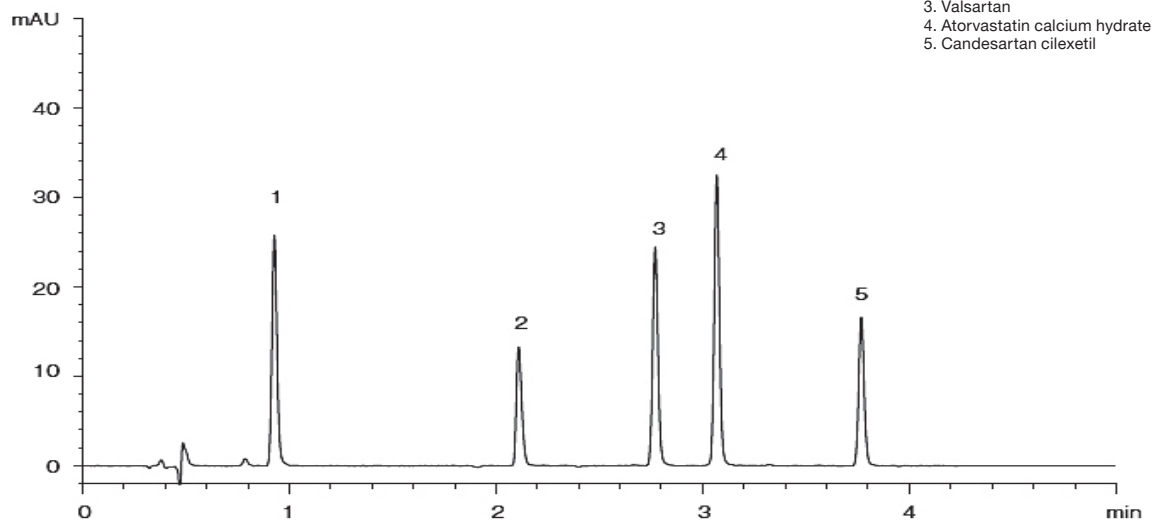
basic compound



Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 3 mm ID
YMC-Triart PFP (5 μ m, 12 nm) 150 x 3 mm ID
Part Nos.: TA12S05-1503PTH
TPF12S05-1503PTH
Eluent: A) 10 mM formic acid in water
B) 10 mM formic acid in methanol
Gradient: 0–20%B (0–30 min), 20%B (30–35 min)
Flow rate: 0.425 mL/min
Temperature: 25°C
Detection: UV at 280 nm

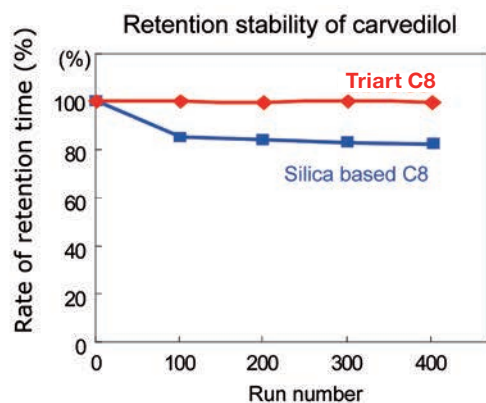
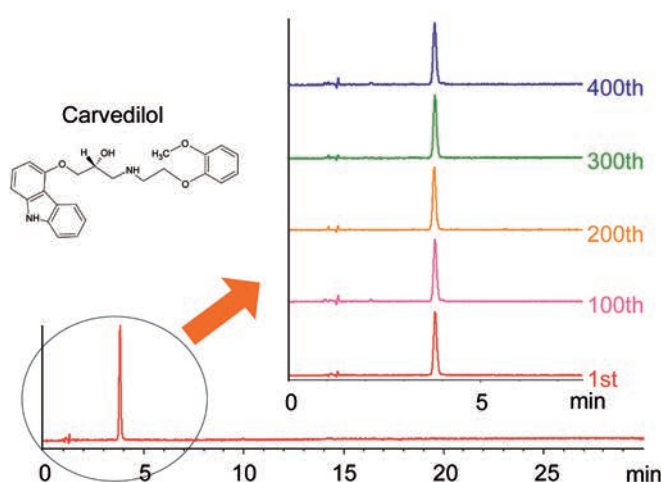
Pharmaceuticals – YMC-Triart C8

Basic drugs



Column: YMC-Triart C8 (3 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TO12S03-0502WT
Eluent: A) water/formic acid (100/0.1)
B) acetonitrile/formic acid (100/0.1)
Gradient: 10–90%B (0–5 min), 90%B (5–7 min)
Flow rate: 0.4 mL/min
Temperature: 30 °C
Detection: UV at 254 nm
Injection: 2 μ L (10–20 μ g/mL)

Sequential analysis of Carvedilol

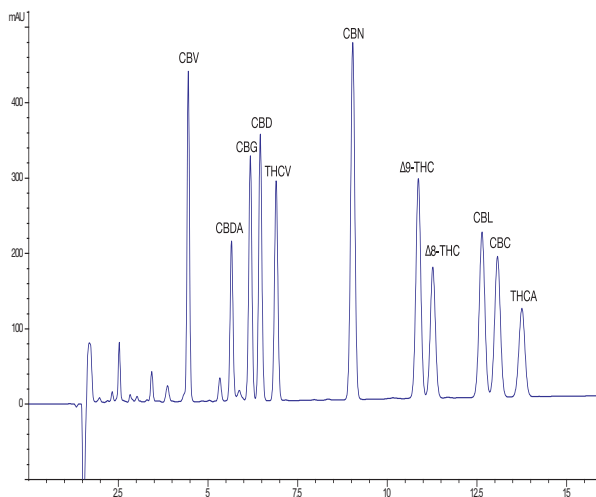


Column: YMC-Triart C8 (5 μ m, 12 nm) 150 x 2.0 mm ID
Part No.: TO12S05-1502WT
Eluent: phosphate buffer (pH 2.0)* / acetonitrile (65/35)
*Dissolve 2.72 g of KH_2PO_4 in 900 mL water, adjust pH 2.0 with H_3PO_4 and add water to make 1,000 mL
Flow rate: 0.28 mL/min (adjust the flow rate so that the retention time of carvedilol is about 4 min)
Temperature: 55 °C
Detection: UV at 240 nm

No change in retention time is observed even under a high pH and at an elevated temperature.

Pharmaceuticals – (U)HPLC

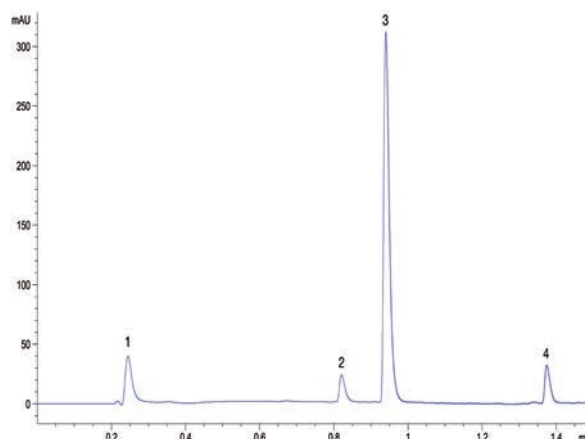
Separation of 11 cannabinoids



Column: YMC-Triart C18 (3 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S03-1546PTH
 Eluent: A) 0.1 % formic acid in water
 B) 0.1 % formic acid in acetonitrile
 Gradients: 75–80 %B (0–20 min)
 Flow rate: 1.0 mL/min
 Temperature: 35 °C
 Detection: UV at 220 nm
 Injection: 10 μ L
 Sample: 11 cannabinoids each 0.05 mg/mL
 diluted with acetonitrile/water (75/25)

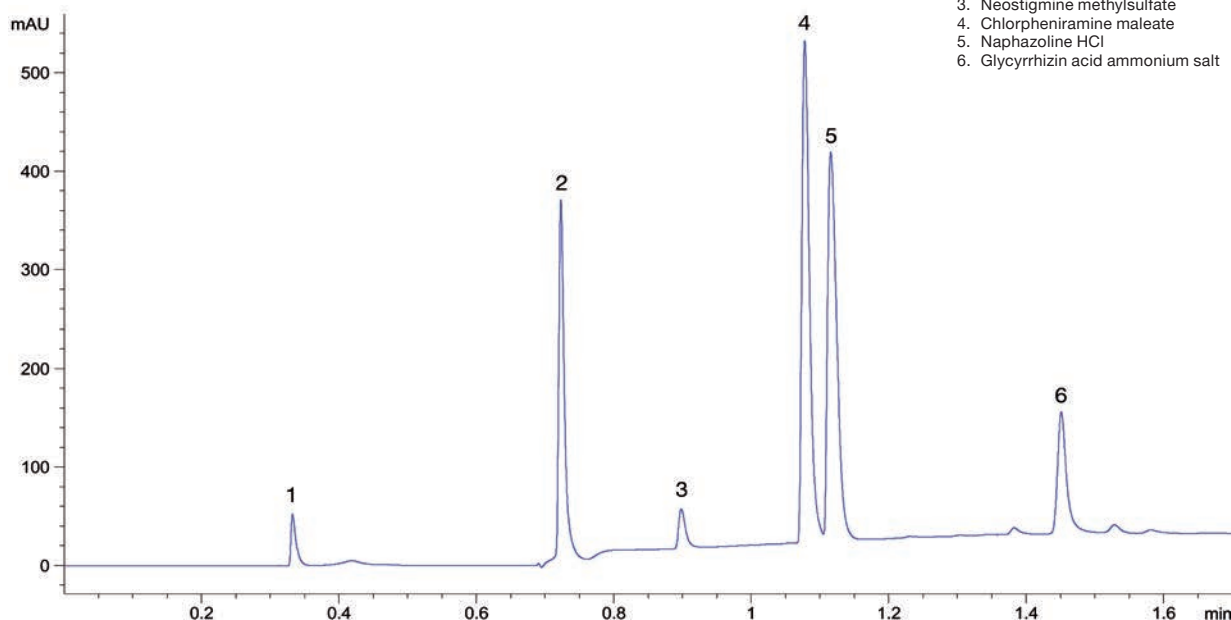
Nasal spray

1. Maleic acid sodium salt
2. Tetrahydrozoline HCl
3. Chlorpheniramine maleate
4. Benzethonium chloride



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) water + 0.05% TFA/B) methanol (50/50)
 Gradient: min A B
 0 80 20
 0.5 10 90
 1.2 0 100
 Flow rate: 0.6 mL/min
 Temperature: 40 °C
 Detection: UV at 260 nm
 Injection: 0.2 μ L

Eye drop formulation



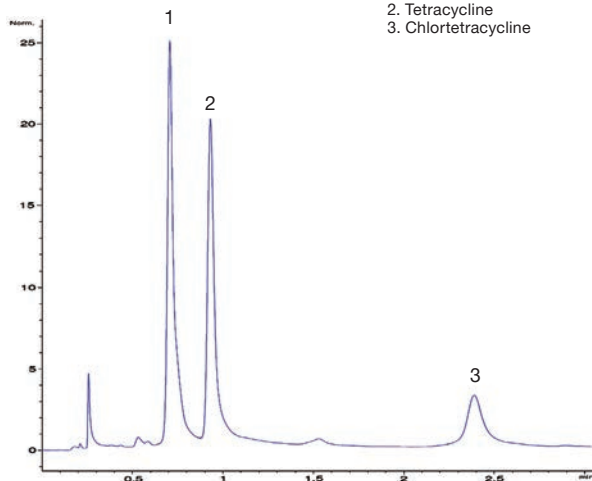
1. Maleic acid sodium salt
2. Pyridoxine
3. Neostigmine methylsulfate
4. Chlorpheniramine maleate
5. Naphazoline HCl
6. Glycyrrhizin acid ammonium salt

Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) water + 0.05% TFA
 B) acetonitrile
 Flow rate: 0.6 mL/min
 Temperature: 40 °C
 Detection: UV at 265 nm
 Injection: 0.5 μ L

Gradient: min A B
 0 100 0
 1 50 50
 1.5 50 50
 1.7 10 90

Pharmaceuticals – UHPLC

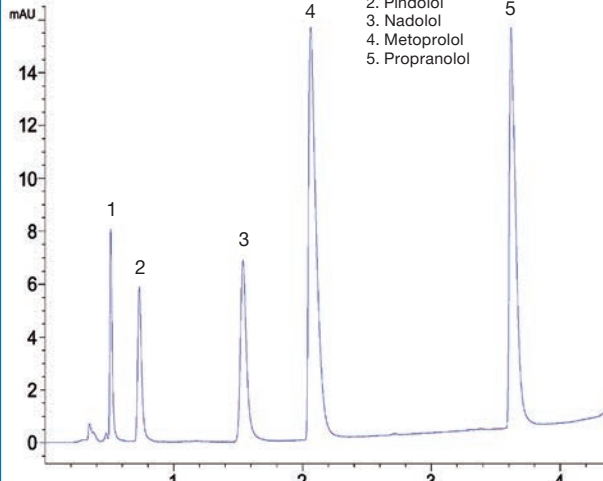
Tetracycline antibiotics



1. Oxytetracycline
2. Tetracycline
3. Chlortetracycline

Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: 5 mM $\text{CH}_3\text{COONH}_4$ / acetonitrile (87/13)
 Flow rate: 0.65 mL/min
 Temperature: 40 °C
 Detection: UV at 280 nm
 Injection: 1 μ L
 Pressure: 662 bar

Betablockers

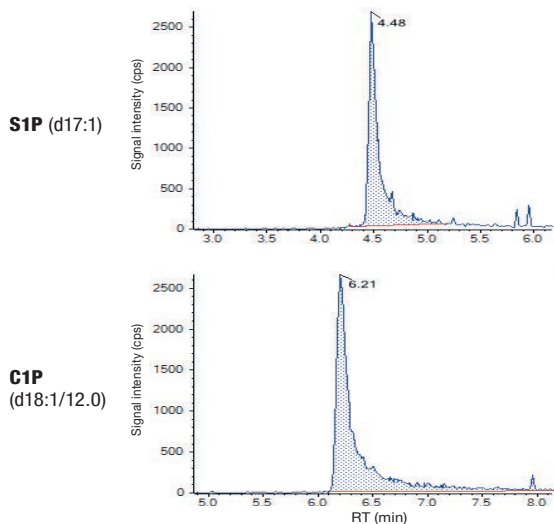


1. Atenolol
2. Pindolol
3. Nadolol
4. Metoprolol
5. Propranolol

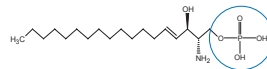
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) 20 mM $\text{CH}_3\text{COONH}_4$ + ammonia (pH 9.0)
 B) acetonitrile
 Gradient: 25%B (1.0 min); 75%B (1–6 min)
 Flow rate: 0.35 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Injection: 1 μ L
 Pressure: 450 bar

High sensitivity for sphingophospholipids

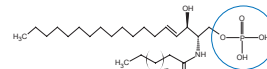
Standard C18 column with conventional stainless steel hardware (1.8 μ m, 50 x 2.1 mm ID)



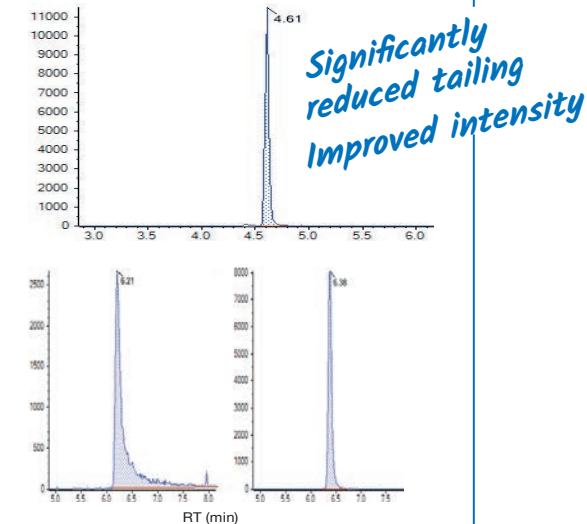
Sphingosine-1-phosphate (S1P)



Ceramide-1-phosphate (C1P)



YMC-Triart C18 metal-free column (1.9 μ m, 50 x 2.1 mm ID)



Part No.: TA12SP9-05Q1PTP
 Eluent: A) methanol/acetonitrile/water (1/1/3) containing X
 B) 2-propanol containing X
 X: 5 mM ammonium acetate, 500 nM EDTA and 0.025% NH_3 water
 Gradient: 0%B (0–1 min), 0–50%B (1–5 min), 50–64%B (5–11 min), 64–95%B (11–13 min), 95%B (13–15 min), 0%B (15–20 min)

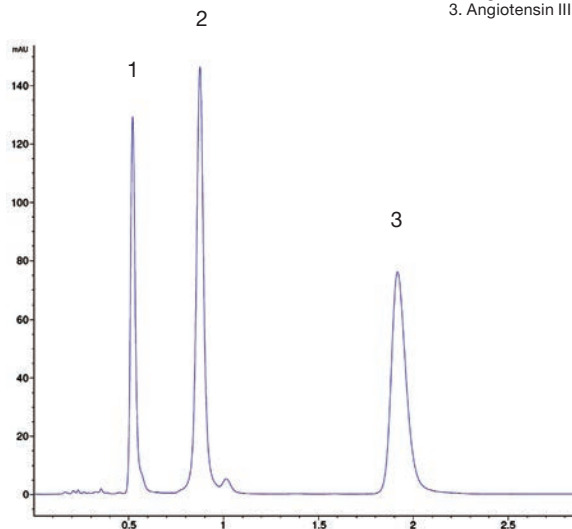
Flow rate: 0.25 mL/min
 Temp.: 40 °C
 Detection: ESI, positive
 Injection: 1 μ L
 Instrument: LC) Waters ACQUITY UPLC H-class system
 MS) AB Sciex QTRAP 6500

Reference: Siddabasave Gowda B. Gowda, Kazutaka Ikeda, Makoto Arita, Facile determination of sphingolipids under alkali condition using metal-free column by LC-MS/MS, Analytical and Bioanalytical Chemistry, 410 (20): 4793-4803 AUG 2018

Pharmaceuticals – UHPLC

Angiotensin I, II and III

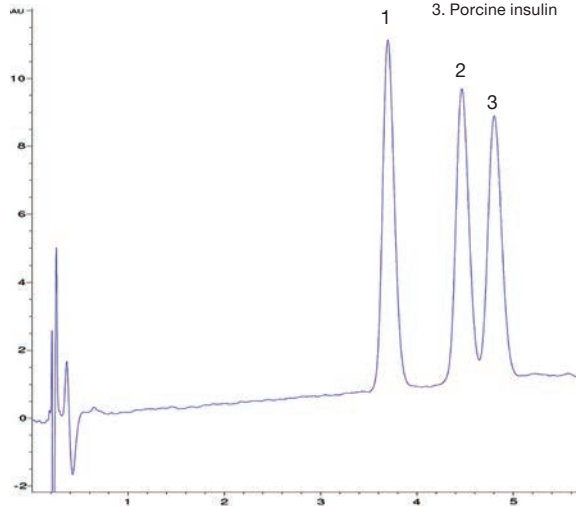
1. Angiotensin I
2. Angiotensin II
3. Angiotensin III



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: 20 mM KH_2PO_4 + K_2HPO_4 (pH 7.9)/acetonitrile (22/78)
 Flow rate: 0.7 mL/min
 Temperature: 40 °C
 Detection: UV at 220 nm
 Injection: 0.5 μ L
 Pressure: 720 bar

Insulin

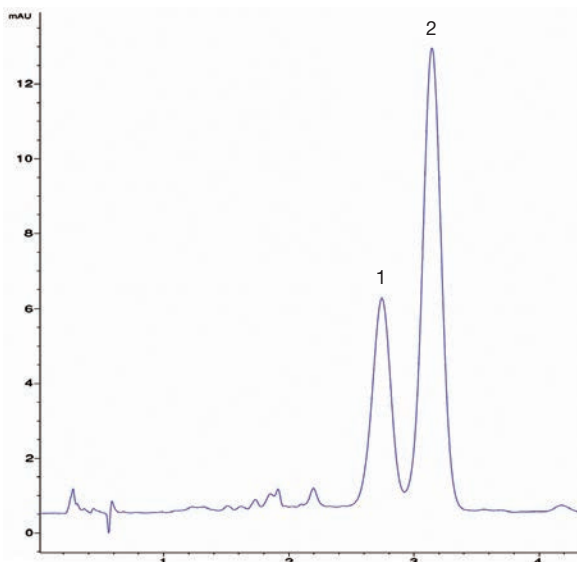
1. Bovine insulin
2. Human insulin
3. Porcine insulin



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) H_2O + 0.1% TFA
 B) acetonitrile + 0.1% TFA
 Gradient: 30%B (0 min); 30-32%B (0-5 min); 32%B (55 min)
 Flow rate: 0.6 mL/min
 Temperature: 30 °C
 Detection: UV at 220 nm
 Injection: 0.5 μ L
 Pressure: 611 bar

Macrolide antibiotics

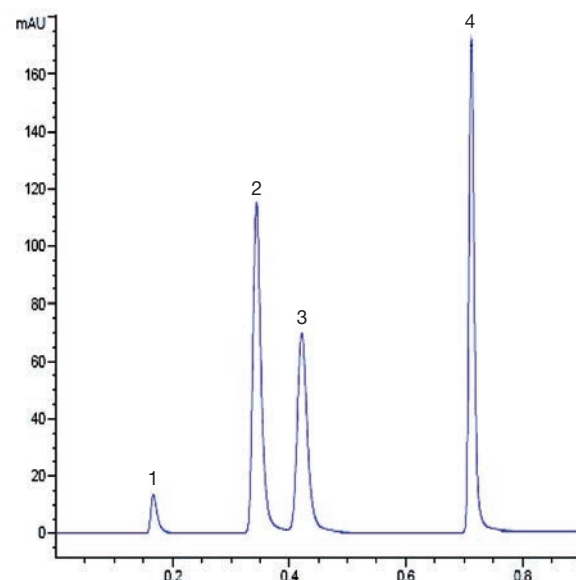
1. Erythromycin
2. Spiramycin



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) 20 mM K_2HPO_4 + 20 mM KH_2PO_4 (pH 7.9)
 B) acetonitrile
 Gradient: 60%B (0.5 min); 60-70%B (0.5-1.5 min); 70%B (3.5 min)
 Flow rate: 0.45 mL/min
 Temperature: 50 °C
 Detection: UV at 210 nm
 Injection: 1 μ L
 Pressure: 520 bar

Sulpha drugs

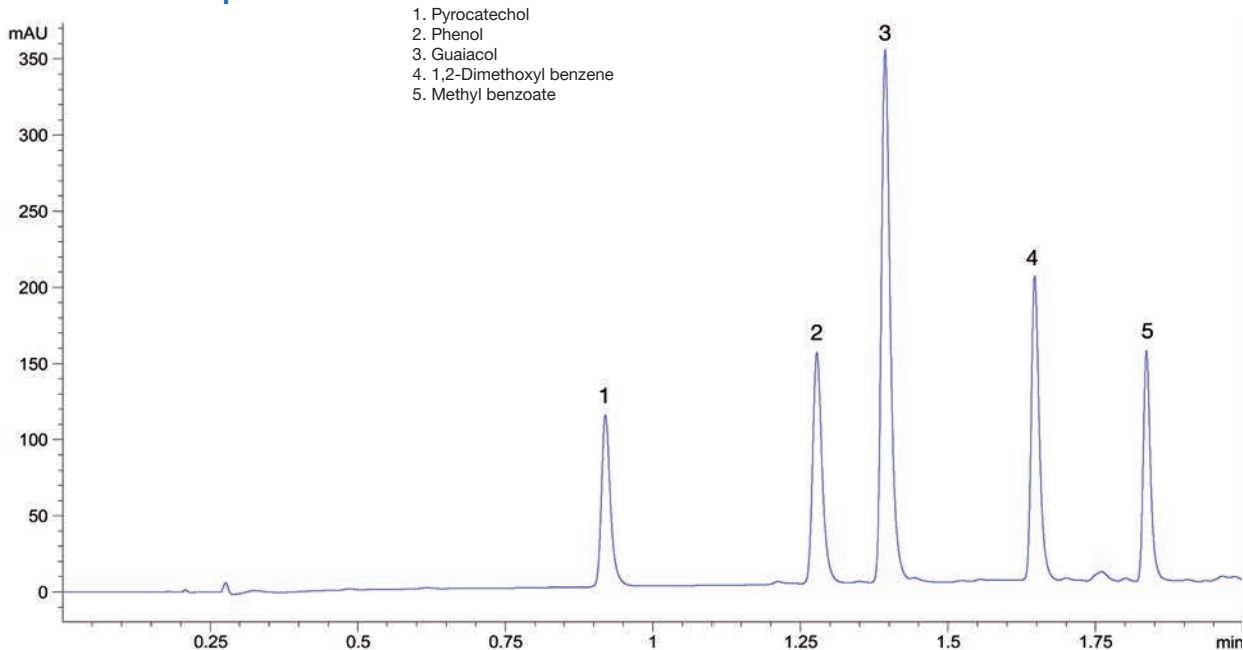
1. Uracil
2. Sulphathiazole
3. Sulphamerazine
4. Sulphamethoxazole



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: H_2O + formic acid (pH 2.5)/acetonitrile (75/25)
 Flow rate: 0.75 mL/min
 Temperature: 50 °C
 Detection: UV at 280 nm
 Injection: 0.5 μ L
 Pressure: 740 bar

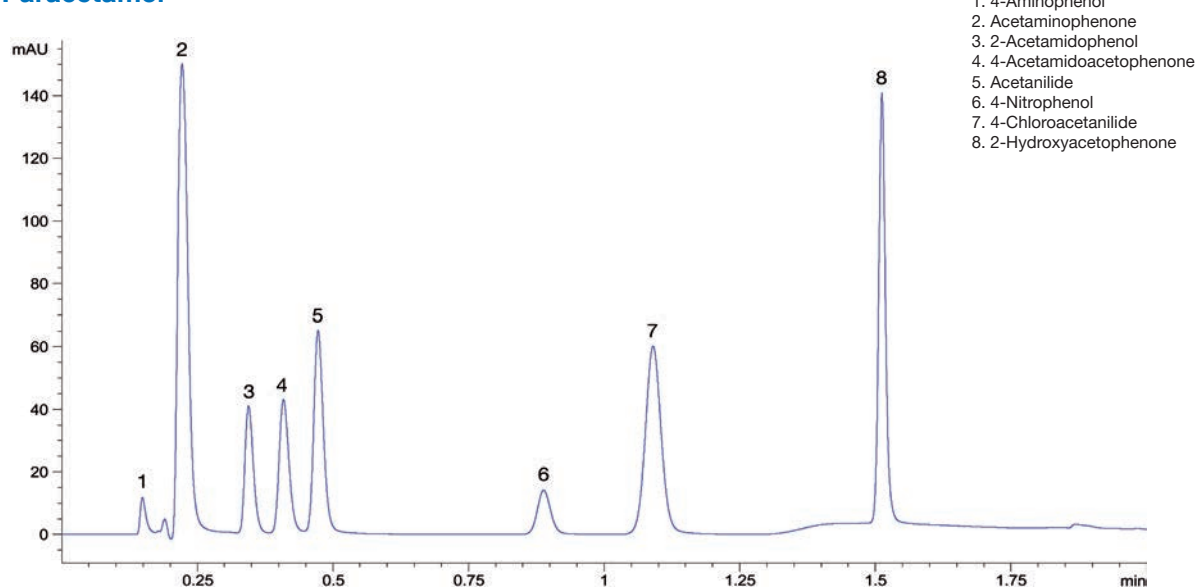
Pharmaceuticals – UHPLC

Guaiacol and impurities



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: water/acetonitrile (50/50)
Flow rate: 0.7 mL/min
Temperature: 40 °C
Detection: UV at 254 nm
Injection: 0.5 μ L

Paracetamol

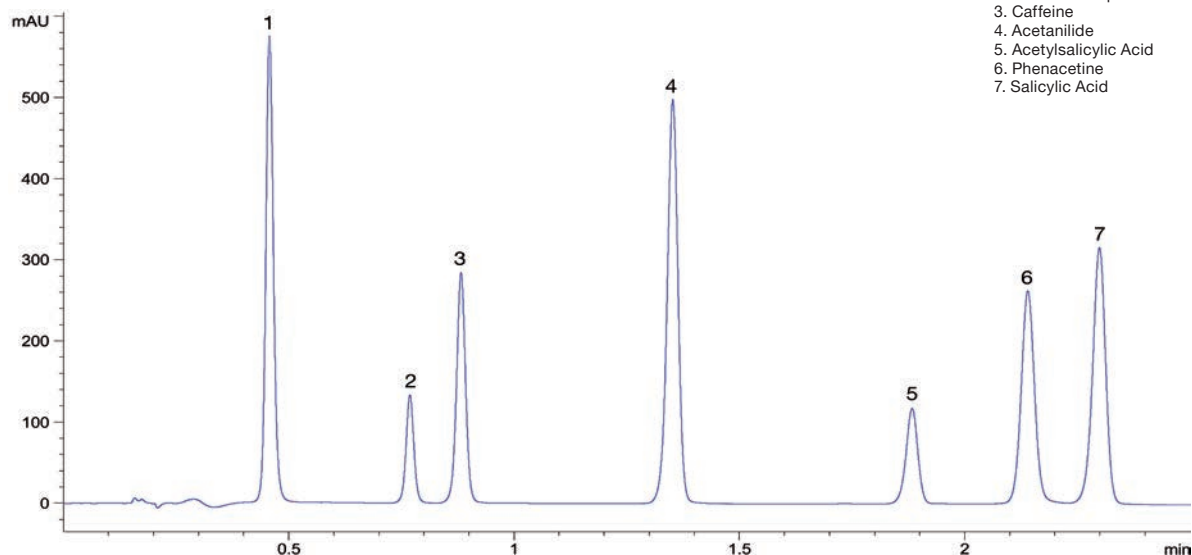


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: A) water + formic acid (pH 2.5)/B) acetonitrile
Flow rate: 0.7 mL/min
Temperature: 40 °C
Detection: UV at 254 nm
Injection: 0.5 μ L

Gradient:	min	A	B
0	70	30	
1	70	30	
1.5	20	80	
2	20	80	

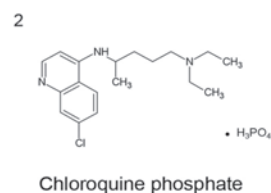
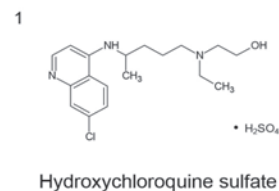
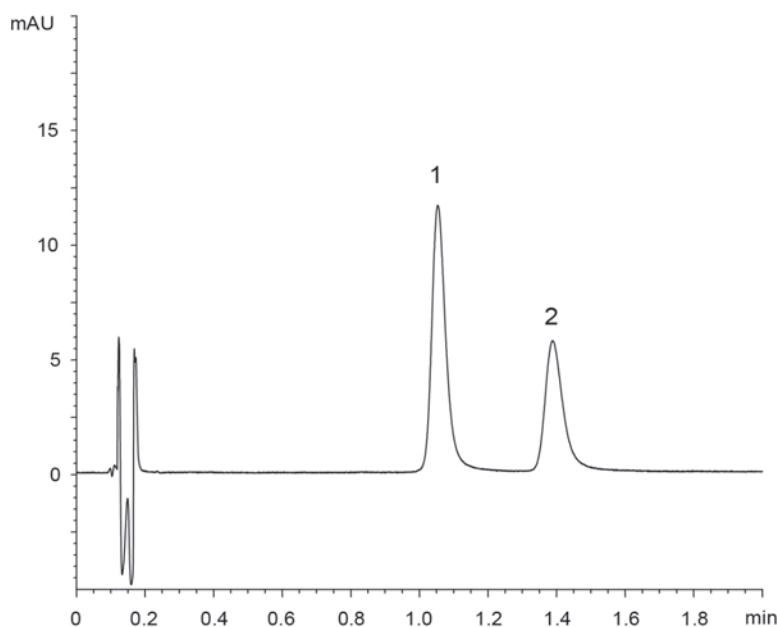
Pharmaceuticals – UHPLC

7 Analgesics



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: water + formic acid (pH 2.5)/acetonitrile (50/50)
Flow rate: 0.8 mL/min
Temperature: 40 °C
Detection: UV at 240 nm
Injection: 1 μ L

Hydroxychloroquine and chloroquine

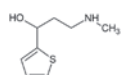


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: 20 mM HCOOH-HCOONH₄ (pH 4.3)/acetonitrile (90/10)
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV at 254 nm
Injection: 2 μ L (10 μ g/mL)

Pharmaceuticals – UHPLC

Duloxetine and its degradation products

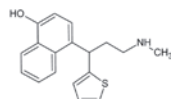
1.



Amino alcohol

(3-Methylamino-1-thiophen-2-yl-propan-1-ol)

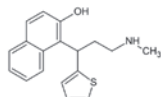
2.



Para isomer

(4-(3-Methylamino-1-thiophen-2-yl-propyl)-naphthalen-1-ol))

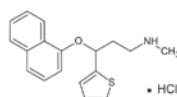
3.



Ortho isomer

(2-(3-Methylamino-1-thiophen-2-yl-propyl)-naphthalen-1-ol)

4.



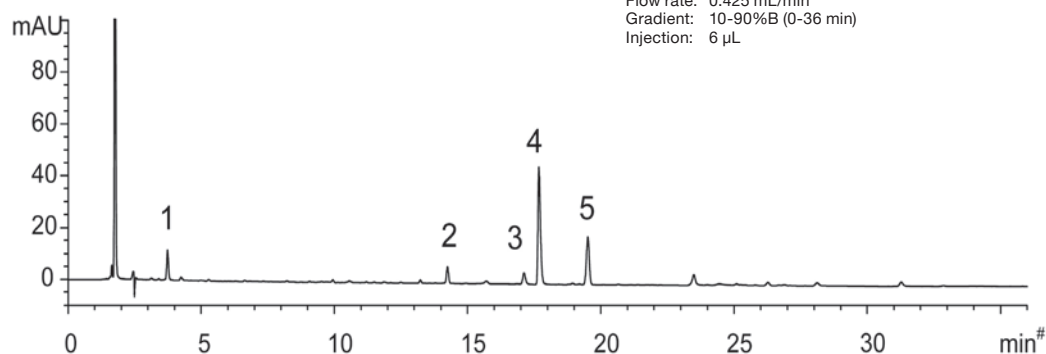
Duloxetine hydrochloride

5.



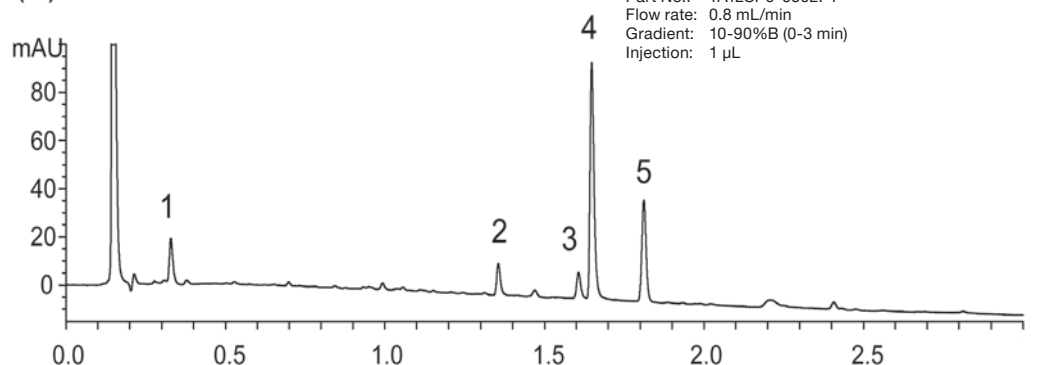
α-Naphthol

(A) HPLC method



35 min

(B) UHPLC method



11x
faster

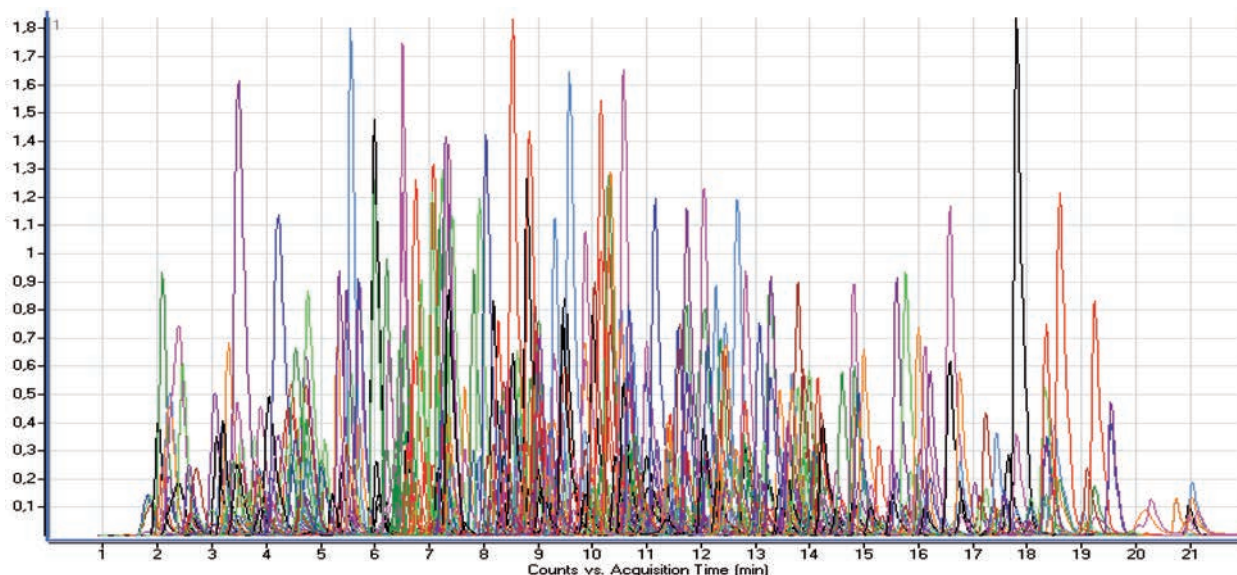
3 min

Eluent: A) 10 mM $\text{CH}_3\text{COONH}_4$ (pH 6.0)
 B) acetonitrile
 Temperature: 30°C
 Detection: UV at 230 nm
 Sample: Oxidative degradation products of duloxetine hydrochloride*

* Sample preparation was performed as described by Veera Reddy. Arava et al. Der Pharma Chemica, 2012 4 (4): 1735-1741

Pesticides

Analysis of 360 pesticides in a single run



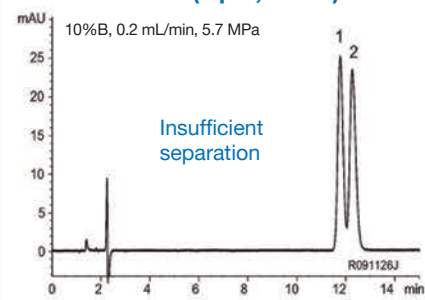
Column: YMC-Triart C18 (3 μ m, 12nm) 100 x 2.0 mm ID
 Part No.: TA12S03-1002WT
 Eluent: A) 5 mM ammonium formate/water
 B) 5 mM ammonium formate/methanol
 Gradient: 0 min: 30%B, 0.1 min: 50%B, 18 min: 100%B,
 21 min: 100%B, 21.01 min: 30%B, 29 min: 30%B

Total run time: 30 min
 Flow rate: 0.25 mL/min
 Temperature: 45°C
 Detection: ESI-MS
 Injection: 5 μ L
 Sample: 100 ng/mL pesticide mix in acetonitrile

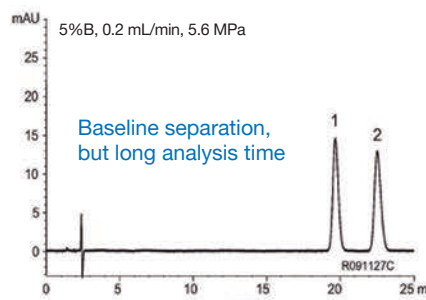
Application data by courtesy of: József László
 WIREC, WESSLING International Research and Educational Centre Nonprofit Co. (Hungary)

Fast LC for conventional HPLC

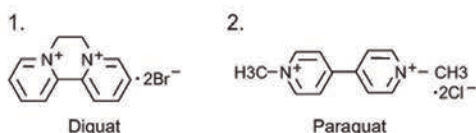
YMC-Triart C18 (5 μ m, 12nm) 150 x 2.0 mm ID



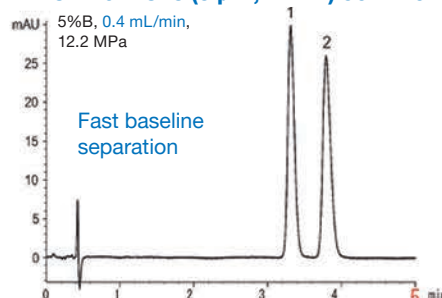
optimisation



Down scaling



YMC-Triart C18 (3 μ m, 12nm) 50 x 2.0 mm ID

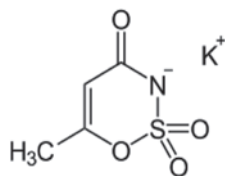


Eluent: A) water/HFBA* (100/0.1)
 B) acetonitrile/HFBA* (100/0.1)
 Part Nos.: TA12S05-1502WT, TA12S03-0502WT
 Temperature: 37°C
 Detection: UV at 290 nm
 Injection: 1 μ L (0.1 mg/mL)

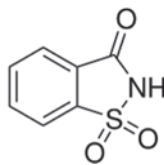
*heptafluorobutyric acid

Food – LC/MS

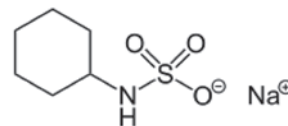
Determination of artificial sweeteners with LC-MS/MS



Acesulfame (K salt)

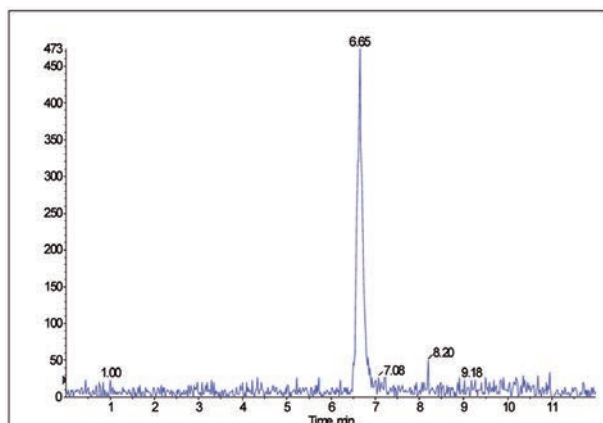


Saccharin

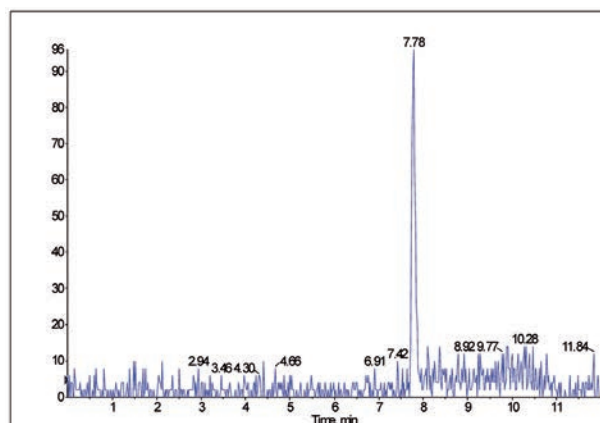


Cyclamate Na

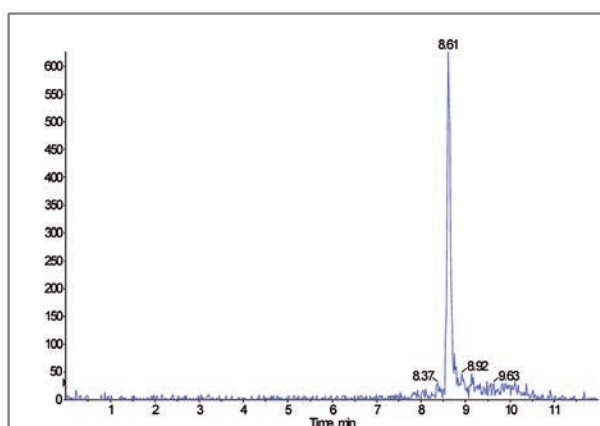
→ Non biological markers of wastewater entries in ground and surface water



Extracted Ion Chromatogram (XIC) of Acesulfame K, 0.1 µg/L



Extracted Ion Chromatogram (XIC) of Saccharin, 0.1 µg/L



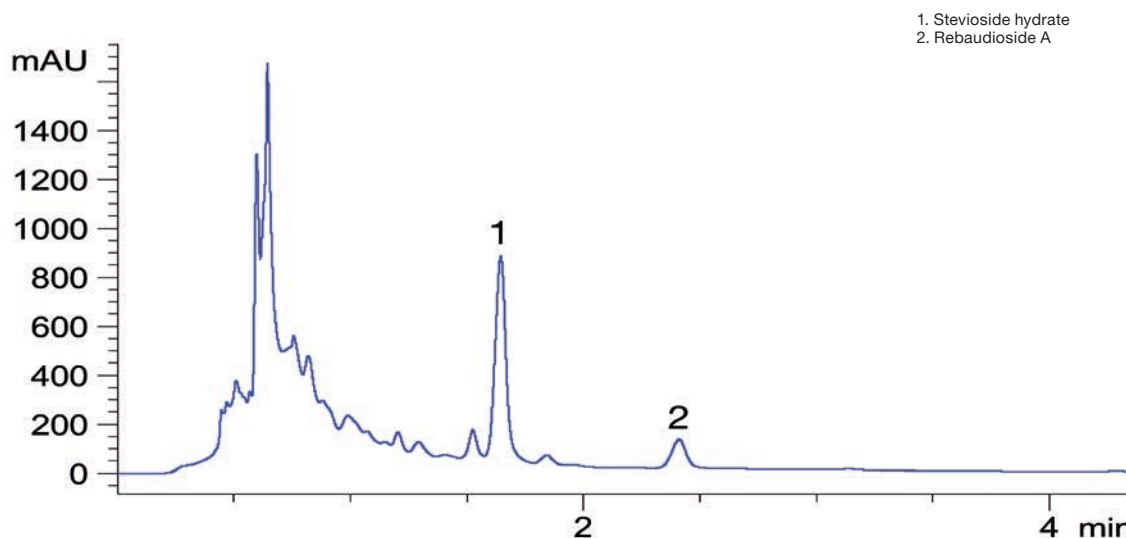
Extracted Ion Chromatogram (XIC) of Cyclamate Na, 0.1 µg/L

Column: YMC-Triart C18 (1.9 µm, 12 nm) 100 x 3.0 mm ID
 Part-No.: TA12SP9-1003PT
 LC-System: Agilent 1100 HPLC system and CTC Analytics
 HTC-Pal Autosampler
 MS/MS System: Applied Biosystems MDS Sciex API 4000,
 ESI negative
 Temperature: 35°C

Flow: 0.3 mL/min
 Injection: 40 µL, direct injection
 Eluent: A: water (containing 10 mmol NH₄ formate)
 B: methanol (containing 10 mmol NH₄ formate)
 Gradient: Time 0 6.0 6.1 12.0
 %B 2 75 2 2

Application data by courtesy of: Thomas Class, Sandro Jooß, PTRL Europe, Helmholtzstraße 22, Science Park I, D-89081 Ulm

Stevia leaves

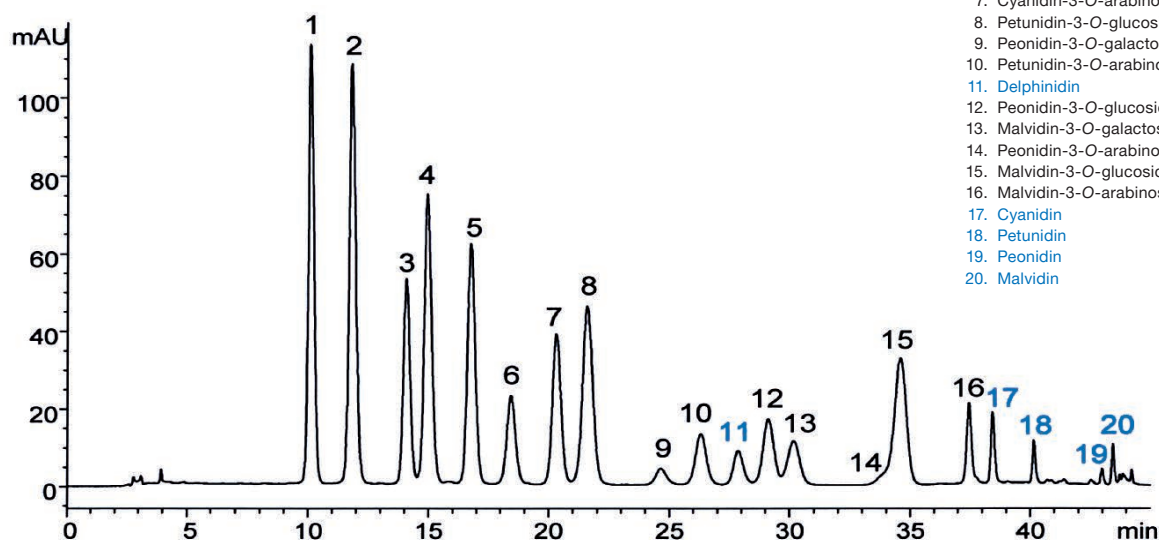


Column: YMC-Triart Diol-HILIC (1.9 μ m, 12 nm) 100 x 3.0 mm ID
Part No.: TDH12SP9-1003PT
Eluent: acetonitrile/water (85/15)
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detection: UV at 200 nm
Injection: 2 μ L

Analysis of anthocyanins and anthocyanidins

Anthocyanins: Indicated in black

Anthocyanidins: Indicated in blue

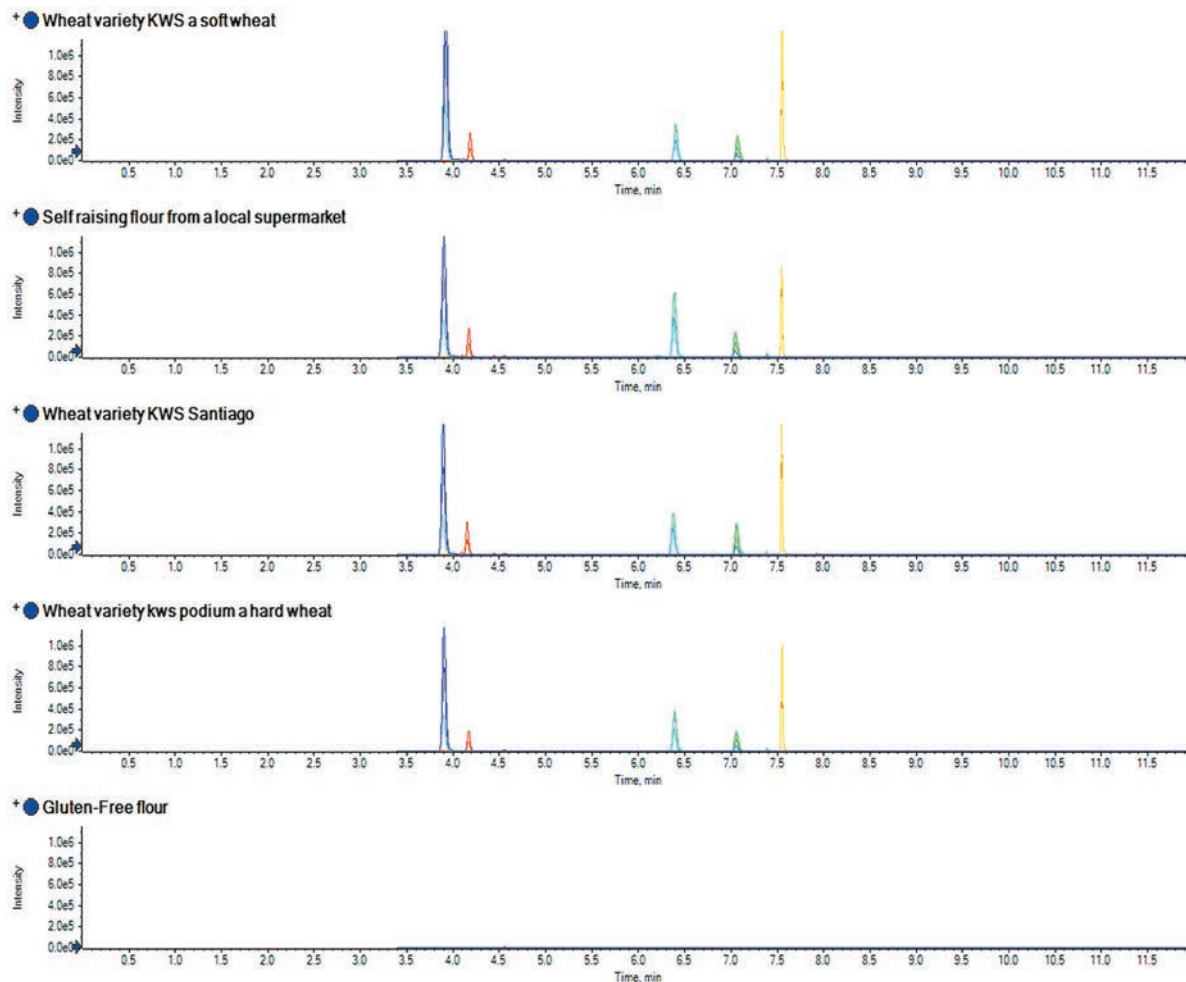


Column: YMC-Triart C18 (5 μ m, 12 nm) 250 x 4.6 mm ID
Part No.: TA12S05-2546PTH
Eluent: A) water/formic acid (90/10)
B) acetonitrile/methanol/water/formic acid (22.5/22.5/40/10)
Gradient: 20–28%B (0–30 min),
28–70%B (30–40 min),
100%B (40–45 min)

Flow rate: 1.0 mL/min
Temperature: 25 °C
Detection: UV/VIS at 535 nm
Sample: commercial bilberry powder
(1.25 mg/mL)

Food – MicroLC

MicroLC-MS/MS analysis of gluten markers in flour



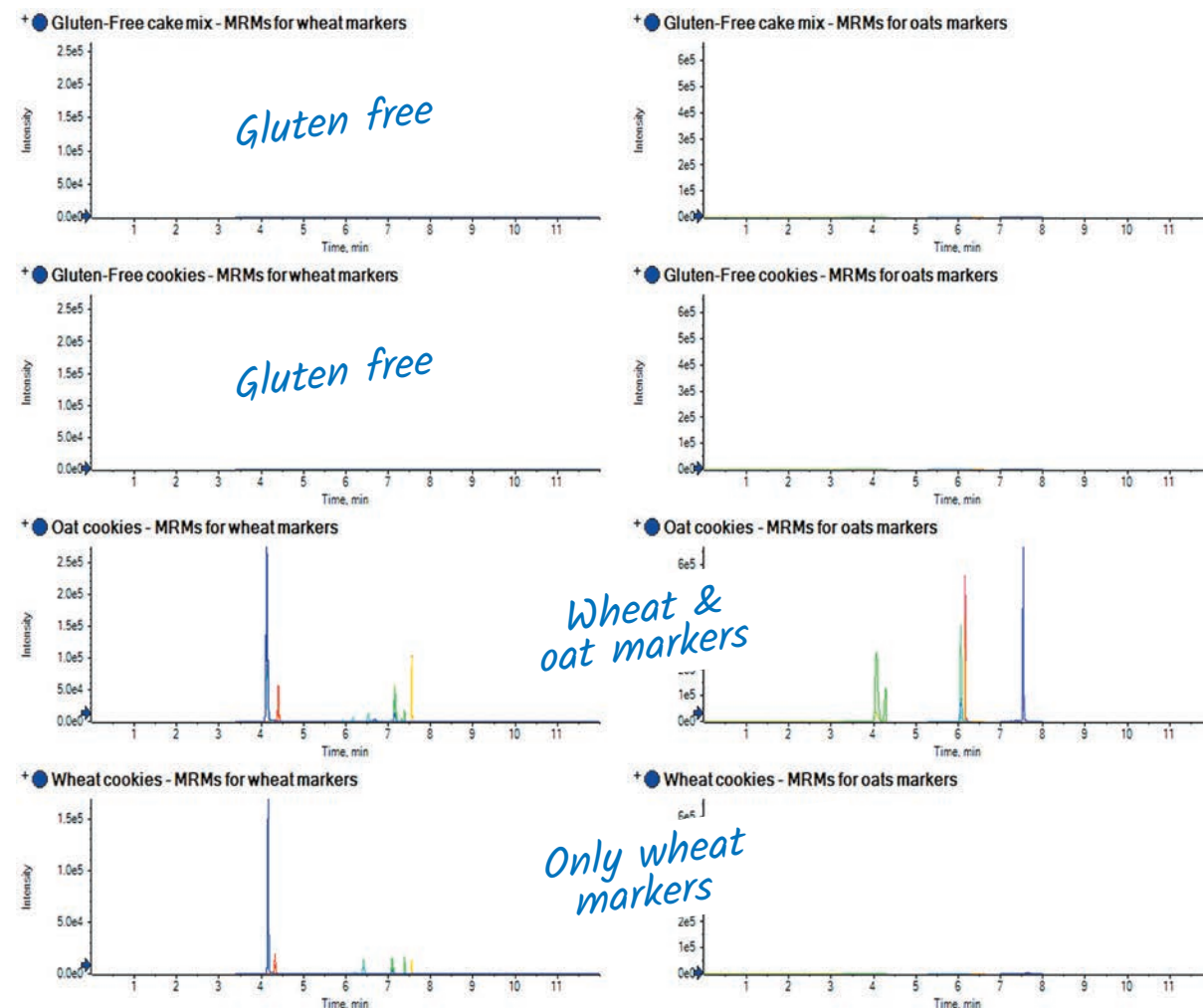
Column: YMC-Triart C18 (12 nm, 3 μ m) 100 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-10J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5%B (0–1 min), 25%B (6 min), 95%B (8–9 min), 5%B (9.2–12 min)
 Flow rate: 25 μ L/min
 Temperature: 40 $^{\circ}$ C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 μ L
 LC system: Eksigent ekspert MicroLC 200

Application data by Courtesy of: Stephen Lock, SCIEX, Warrington (UK)



Food – MicroLC

MicroLC-MS/MS analysis of wheat or oat markers for gluten in cookies



Column: YMC-Triart C18 (12 nm, 3 μ m) 100 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-10J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5%B (0-1 min), 25%B (6 min), 95%B (8-9 min), 5%B (9.2-12 min)

Flow rate: 25 μ L/min
 Temperature: 40°C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 μ L
 LC system: Eksigent ekspert MicroLC 200

Application data by Courtesy of: Stephen Lock, SCIEX, Warrington (UK)

“

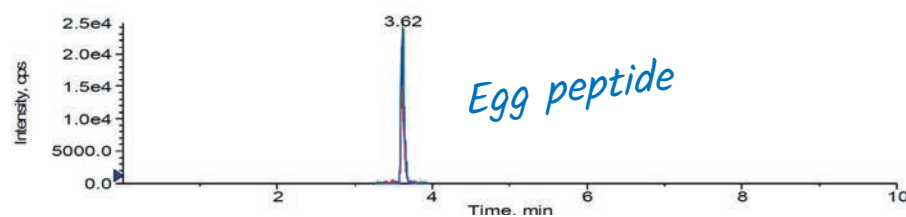
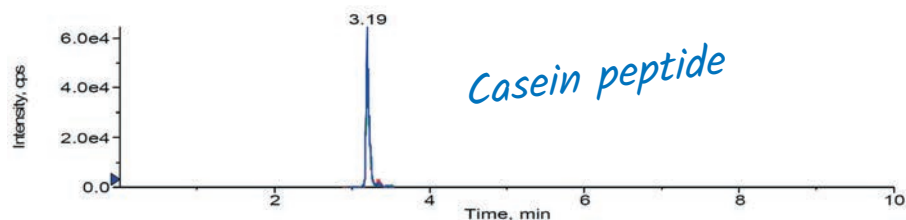
“Column of choice for fast and reproducible micro and nano scale separations.
 Excellent pH and temperature stability, compatibility with 100% water allows
 enrichment by large injection volumes.”

Tobias Werres, Institute for Energy- and Environmental Technology e. V. (IUTA, DE)

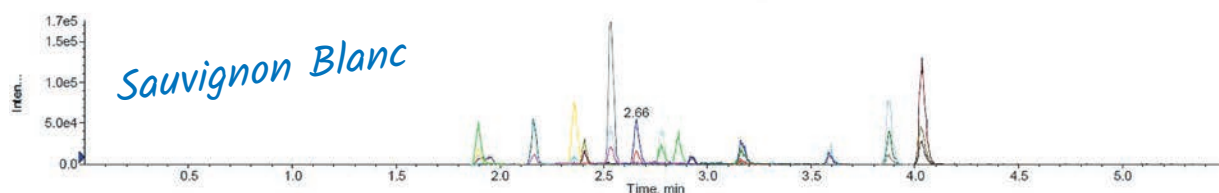
”

Food – MicroLC

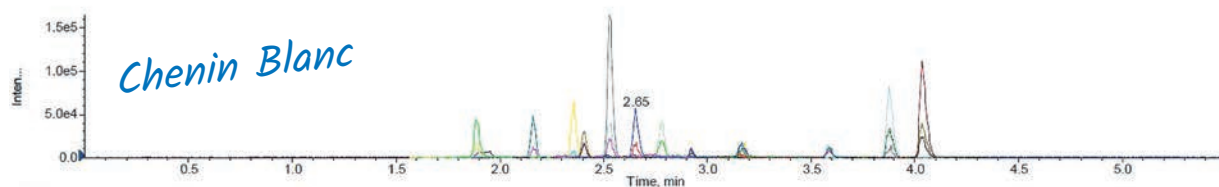
Screening of allergens in white wine by MicroLC-MS/MS



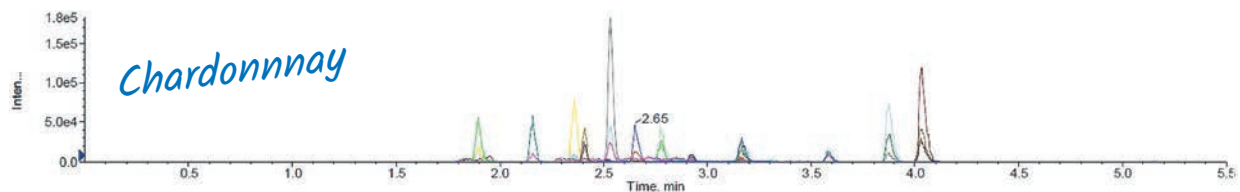
XIC of +MRM (47 pairs): 348.660/421.160 amu Expected RT: 2.7 ID: Alpha-lact Lactose B.ALC[MSH]SEK.2/b4 from Sample 3 (sauvignon blanc...) Max. 5.5e4 cps.



XIC of +MRM (47 pairs): 348.660/421.160 amu Expected RT: 2.7 ID: Alpha-lact Lactose B.ALC[MSH]SEK.2/b4 from Sample 2 (chenin blanc 0....) Max. 5.7e4 cps.



XIC of +MRM (47 pairs): 348.660/421.160 amu Expected RT: 2.7 ID: Alpha-lact Lactose B.ALC[MSH]SEK.2/b4 from Sample 4 (chardonnay 0.5...) Max. 4.7e4 cps.

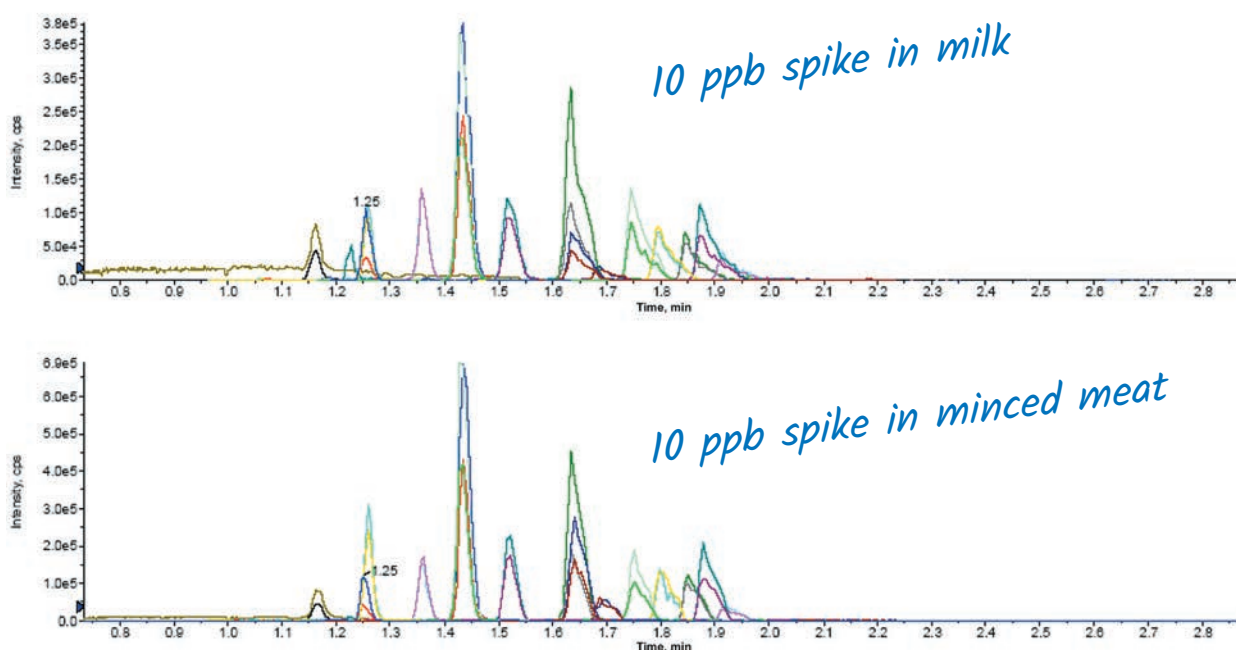


Column: YMC-Triart C18 (12 nm, 3 µm) 50 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-05J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 2%B (0-0.3 min), 40%B (4 min), 95%B (4.1-4.3 min), 2%B (4.4-5.5 min)
 Flow rate: 25 µL/min
 Temperature: 40 °C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 µL
 Sample: spiked white with 0.5 ppm milk/egg proteins
 LC system: Eksigent ekspert MicroLC 200

Application data by Courtesy of: Stephen Lock, SCIEX, Warrington (UK)

Food – MicroLC

MicroLC-MS/MS analysis of 15 different veterinary drugs in milk and meat



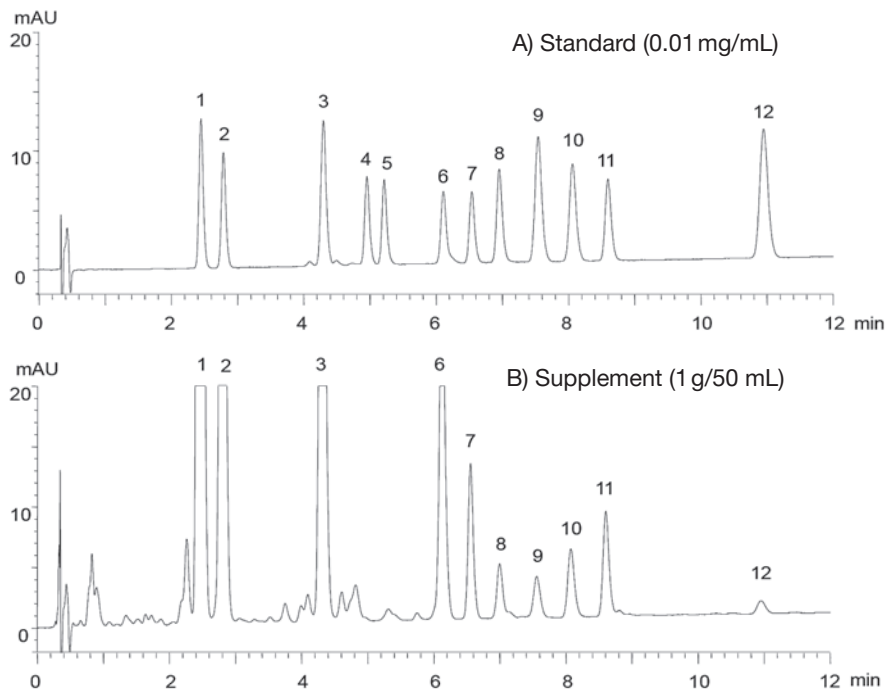
Column: YMC-Triart C18 (12 nm, 3 μ m) 50 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-05J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 2%B (0-0.5 min), 65%B (1.7 min), 100%B (1.8-2.3 min), 2%B (2.4-3.5 min)
 Flow rate: 30 μ L/min
 Temperature: 60°C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 μ L
 LC system: Eksigent ekspert MicroLC 200

Application data by Courtesy of: Stephen Lock, SCIEX, Warrington (UK)



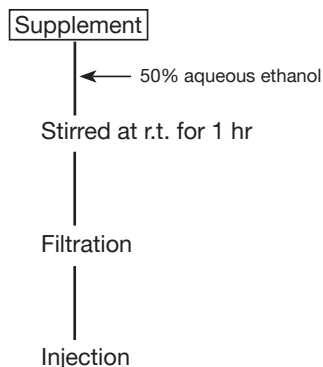
Food

Soy isoflavones in supplement



1. Daidzin
2. Glycitin
3. Genistin
4. 6"-O-Malonyldaidzin
5. 6"-O-Malonylglycitin
6. 6"-O-Acetyldaidzin
7. 6"-O-Acetylglycitin
8. 6"-O-Malonylgenistin
9. Daidzein
10. Glycitein
11. 6"-O-Acetylgenistin
12. Genistein

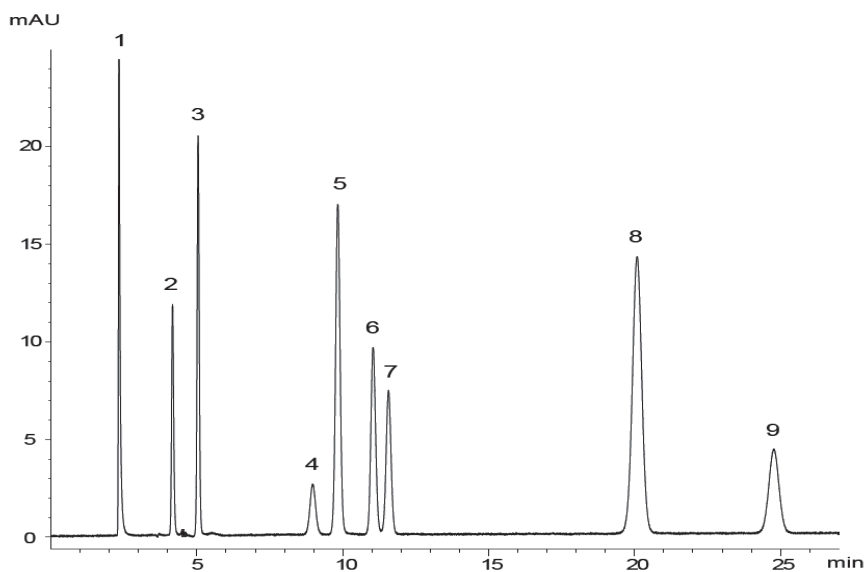
Sample preparation method



Column: YMC-Triart C18 (3 μ m, 12 nm)
 50 x 2.0 mm ID
 Part No.: TA12S03-0502WT
 Eluent: A) acetonitrile/water/HCOOH (10/90/0.1)
 B) acetonitrile/water/HCOOH (60/40/0.1)

Gradient: 5–40%B (0–12 min)
 Flow rate: 0.4 mL/min
 Temperature: 25 °C
 Detection: UV at 254 nm
 Injection: 2 μ L

Separation of water-soluble vitamins



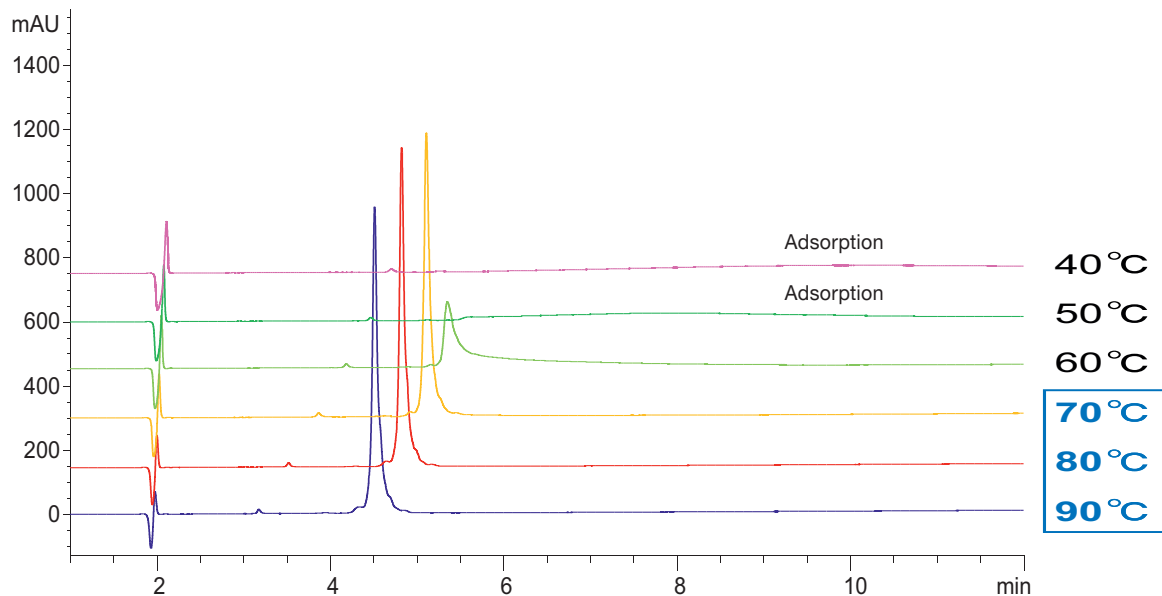
1. Thiamine HCl (Vitamin B₁)
2. Pyridoxine HCl (Vitamin B₆)
3. Nicotinamide
4. Cyanocobalamin (Vitamin B₁₂)
5. L-Ascorbic acid 2-glucoside
6. L-Ascorbic acid (Vitamin C)
7. Erythorbic acid
8. Riboflavin (Vitamin B₂)
9. Nicotinic acid (Vitamin B₃)

Column: YMC-Triart C18 (5 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: TA12S05-2546PTH
 Eluent: phosphate buffer*/acetonitrile (90/10)
 * Dissolve 1.4 g KH₂PO₄ in 800 mL water
 → add 26 mL 10% TBA-OH
 → adjust pH 5.2 by 20% H₃PO₄
 → add water to make 1,000 mL

Flow rate: 0.8 mL/min
 Temperature: 40 °C
 Detection: UV at 260 nm
 Injection: 10 μ L (5 μ g/mL)

Life Science – Antibodies

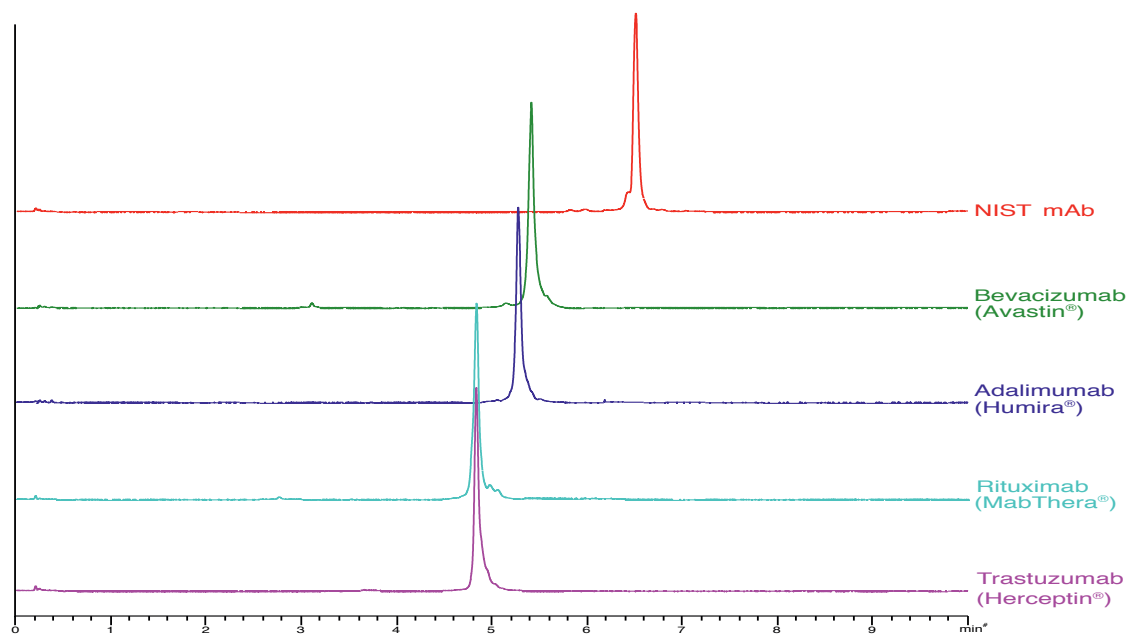
Bevacizumab (Avastin®, MW: ca. 148 kDa)



Column: YMC-Triart Bio C4 (3 μ m, 30 nm) 150 x 3.0 mm ID
 Part No.: TB30S03-1503PTH
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: Time [min] Eluent B [%]
 0 30
 15 60
 30 90

Flow rate: 0.4 mL/min
 Detection: UV at 220 nm
 Injection: 4 μ L (0.5 mg/mL)

RP analysis of different monoclonal antibodies using YMC-Triart Bio C4



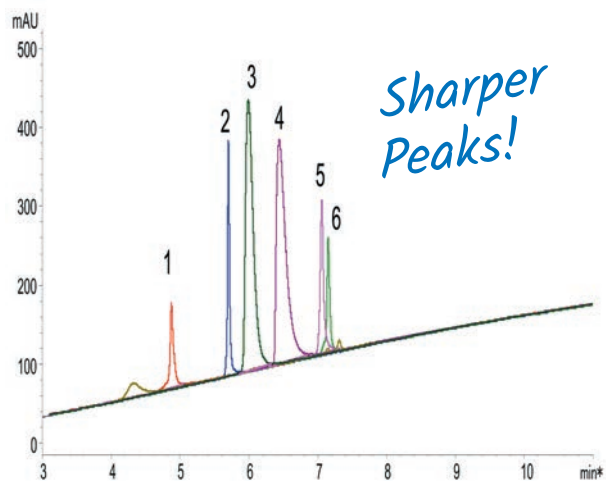
Column: YMC-Triart Bio C4 (1.9 μ m, 30 nm) 50 x 2.1 mm ID
 Part No.: TB30SP9-05Q1PT
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: 25–45%B (0–10 min)

Flow rate: 0.4 mL/min
 Temperature: 80 °C
 Detection: UV at 280 nm (0.13s, 40Hz)
 Injection: 2 μ L (0.5 mg/mL)

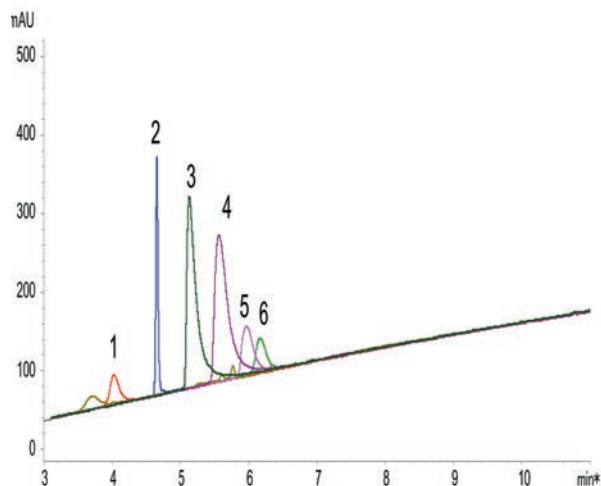
Life Science – Proteins/Peptides

High sensitivity and sharp peaks under LC/MS compatible conditions

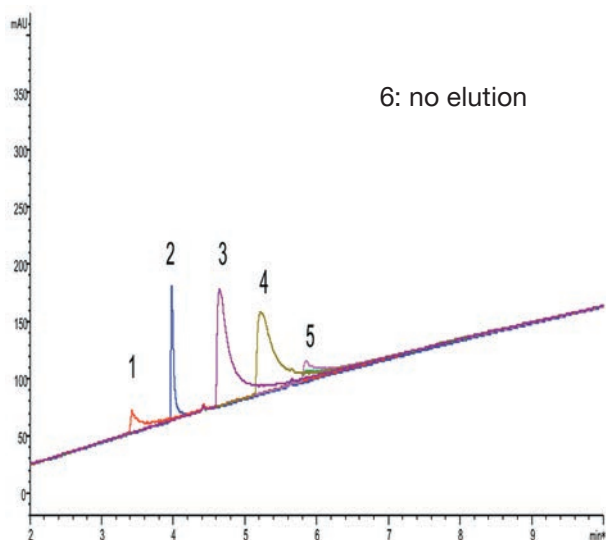
YMC-Triart Bio C4 (3 μ m, 30 nm)



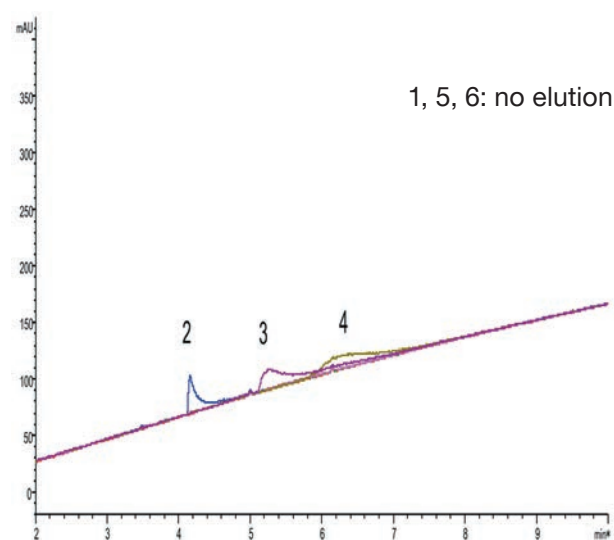
XBridge Protein BEH C4 (3.5 μ m, 30 nm)



AdvanceBio RP-mAb C4 (3.5 μ m, 45 nm)



Aeris widepore C4 (3.6 μ m, 20 nm)



Column: 150 x 3.0 mm ID
 Eluent: A) water/formic acid (100/0.1)
 B) acetonitrile/formic acid (100/0.1)
 Gradient: 10–95%B (0–15 min)
 Flow rate: 0.4 mL/min (for 3.0 mm ID)
 1.0 mL/min (for 4.6 mm ID)
 Temperature: 40°C
 Detection: UV at 220 nm

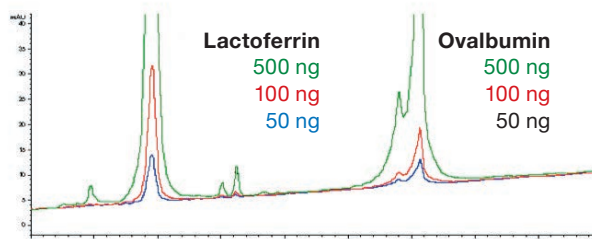
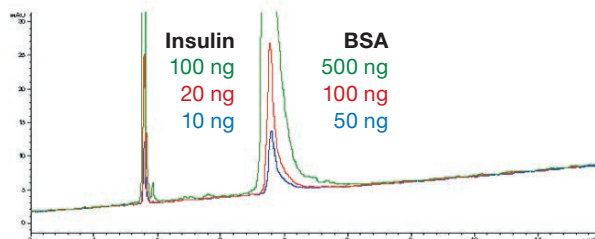
Sample:
 1. Cytochrome-C (Horse heart)
 2. Insulin (Bovine pancreas)
 3. Transferrin (Human)
 4. BSA
 5. β -Lactoglobulin (Bovine)
 6. α -Chymotrypsinogen A (Bovine pancreas)

YMC-Triart Bio C4 shows better peak shape and recovery with a mobile phase containing formic acid, which is commonly used for LC/MS analysis. Therefore, YMC-Triart Bio C4 is ideal for highly sensitive analysis of proteins.

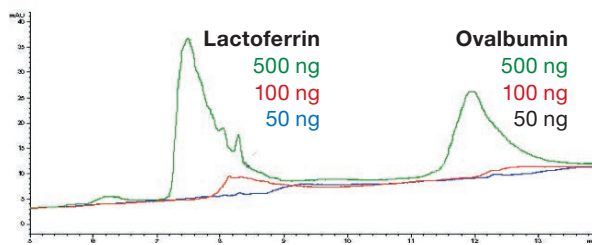
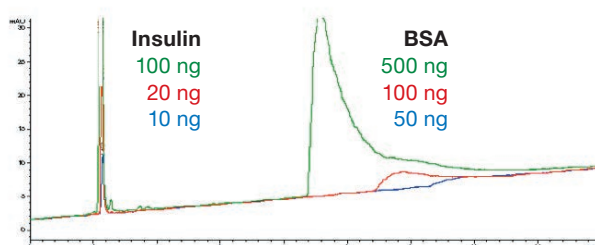
Life Science – Proteins/Peptides

Ideal for Microanalysis

YMC-Triart Bio C4 (1.9 μ m, 30 nm)



Aeris widepore C4 (3.6 μ m, 20 nm)

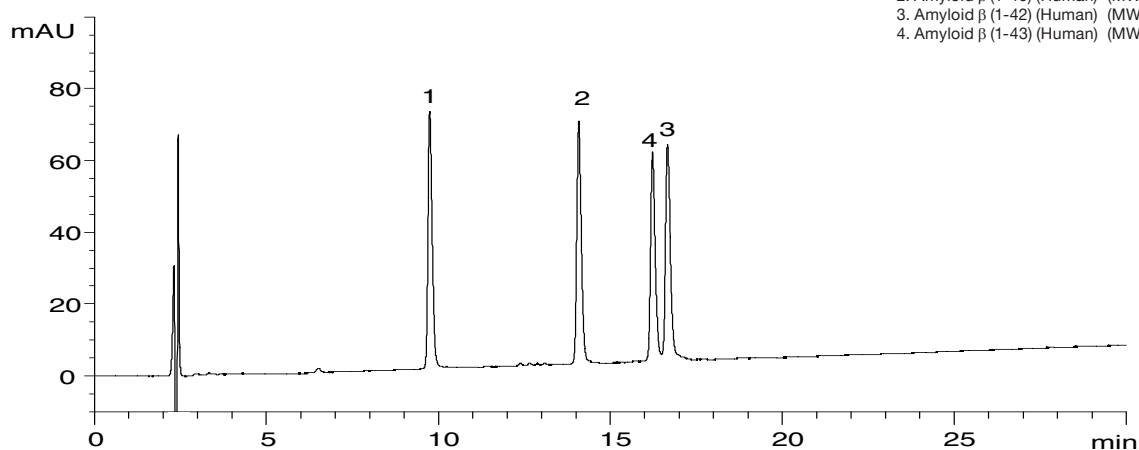


Column: 150 x 2.1 mm ID
Eluent: A) water/TFA (100/0.05)
B) acetonitrile/TFA (100/0.05)
Gradient: 25–60%B (0–15 min), 90%B (15–20 min), 25%B (20–35 min)

Flow rate: 0.2 mL/min
Temperature: 40 °C
Detection: UV at 220 nm

No adsorption was observed on YMC-Triart Bio C4 even at a low loading amount. This feature is beneficial for micro-analysis of proteins.

Amyloid β -peptides



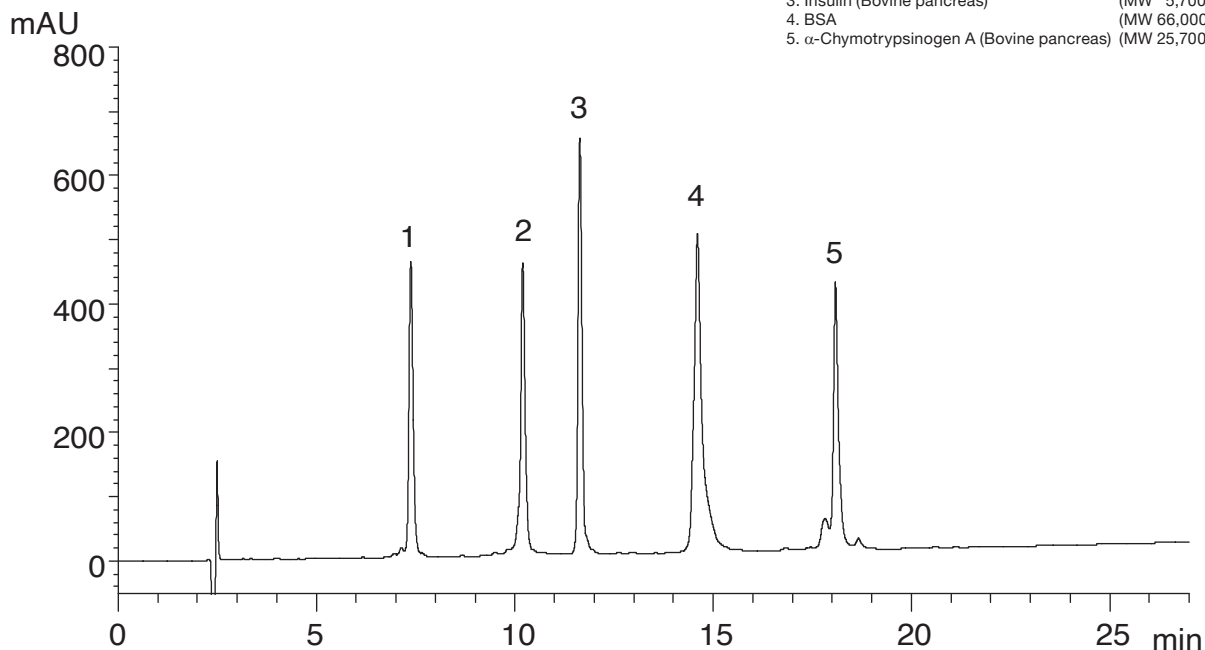
Amyloid β (1-43) : Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala-Thr

Column: YMC-Triart Bio C4 (3 μ m, 30 nm) 150 x 3.0 mm ID
Part No.: TB30S03-1503PTH
Eluent: A) water/TFA (100/0.1)
B) acetonitrile/TFA (100/0.1)
Gradient: 25–40%B (0–30 min), 90%B (30–40 min)

Flow rate: 0.4 mL/min
Temperature: 70 °C
Detection: UV at 220 nm
Injection: 4 μ L (each 0.1 mg/mL)

Life Science – Proteins/Peptides

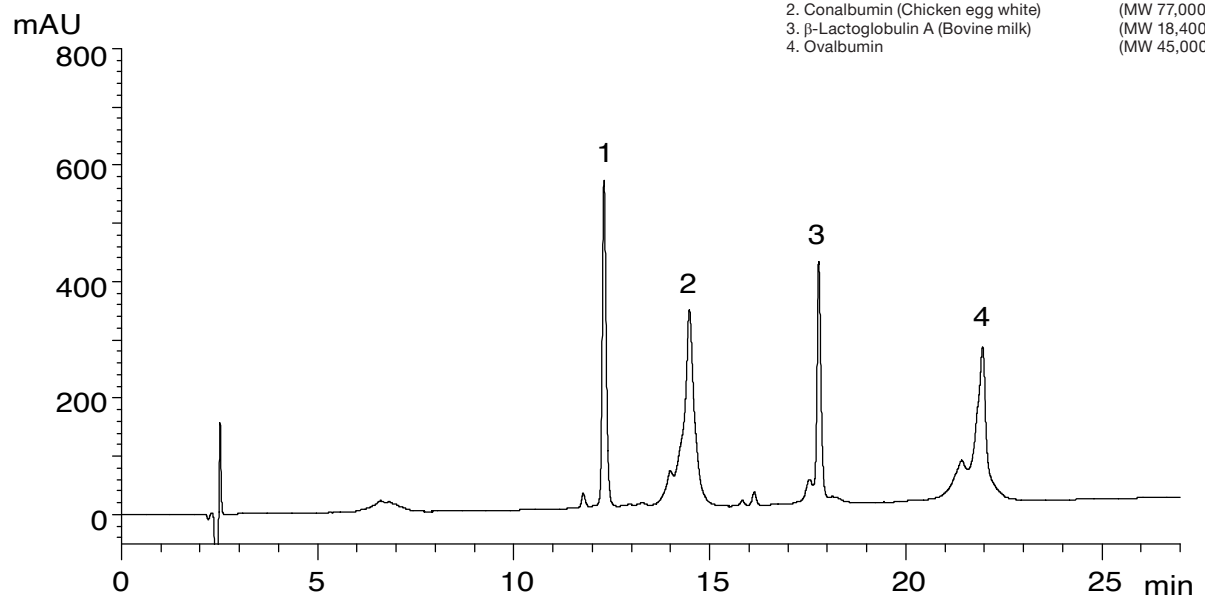
Proteins (MW 5,700 ~ 66,000)



Column: YMC-Triart Bio C4 (5 μ m, 30 nm) 150 x 3.0 mm ID
 Part No.: TB30S03-1503PTH
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: 20–60%B (0–27 min), 90%B (27–35 min)

Flow rate: 0.4 mL/min
 Temperature: 70°C
 Detection: UV at 220 nm
 Injection: 10 μ L (0.25 ~ 0.50 mg/mL)

Proteins (MW 14,300 ~ 77,000)



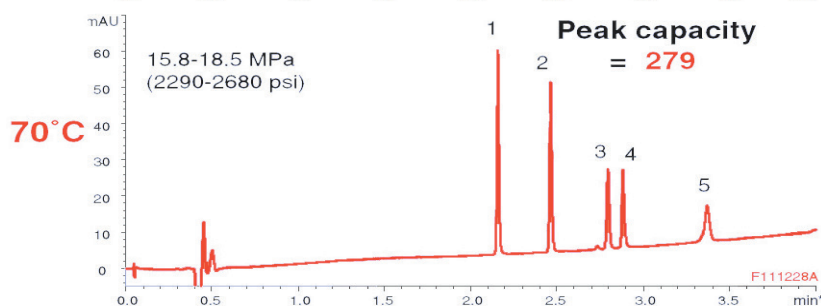
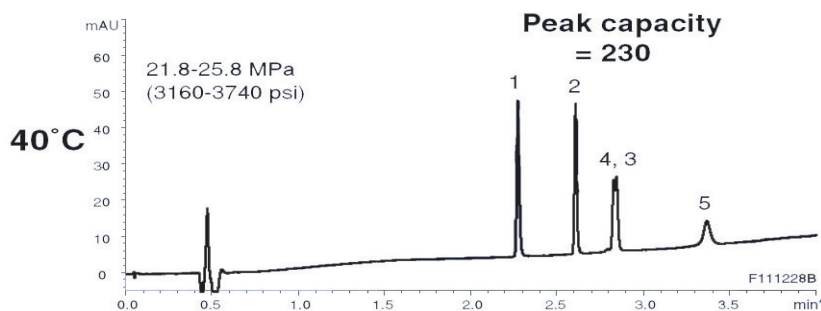
Column: YMC-Triart Bio C4 (5 μ m, 30 nm) 150 x 3.0 mm ID
 Part No.: TB30S03-1503PTH
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: 20–60%B (0–27 min), 90%B (27–35 min)

Flow rate: 0.4 mL/min
 Temperature: 70°C
 Detection: UV at 220 nm
 Injection: 10 μ L (0.25 ~ 0.50 mg/mL)

Life Science – Proteins/Peptides

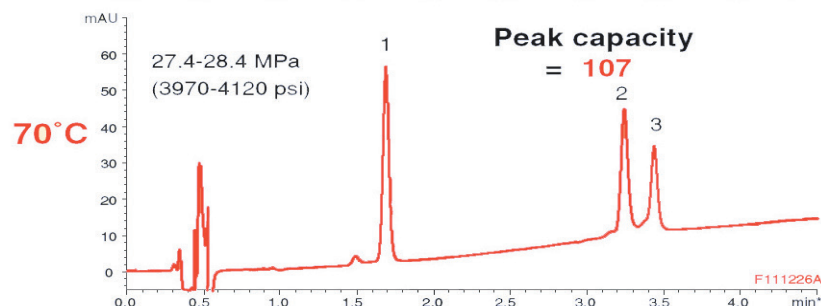
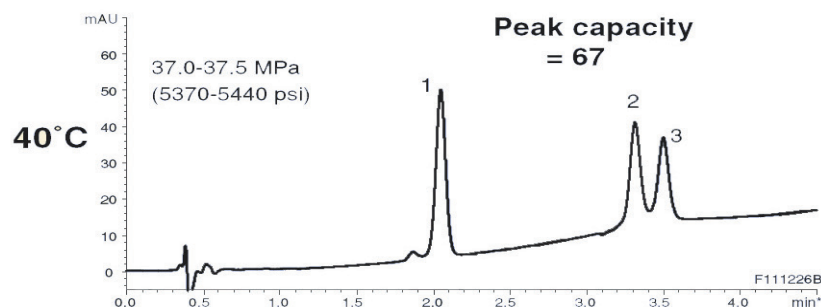
Highly efficient RP-HPLC separation of proteins and peptides using high temperature

Mixture A (MW 500–18,400)



Analytes	MW	Peak width 1/2 (min)	
		40°C	70°C
Mixture A			
1. Oxytocin	1,007	0.017	0.014
2. Leu-Enkephalin	556	0.015	0.015
3. β-Endorphin	3,465	—	0.016
4. Insulin	5,733	—	0.015
5. β-Lactoglobulin A	18,400	0.043	0.030
Mixture B			
1. Lysozyme	14,300	0.069	0.044
2. α-Chymotrypsinogen	25,700	0.080	0.049
3. β-Lactoglobulin A	18,400	0.080	0.048

Mixture B (MW 14,300–25,700)



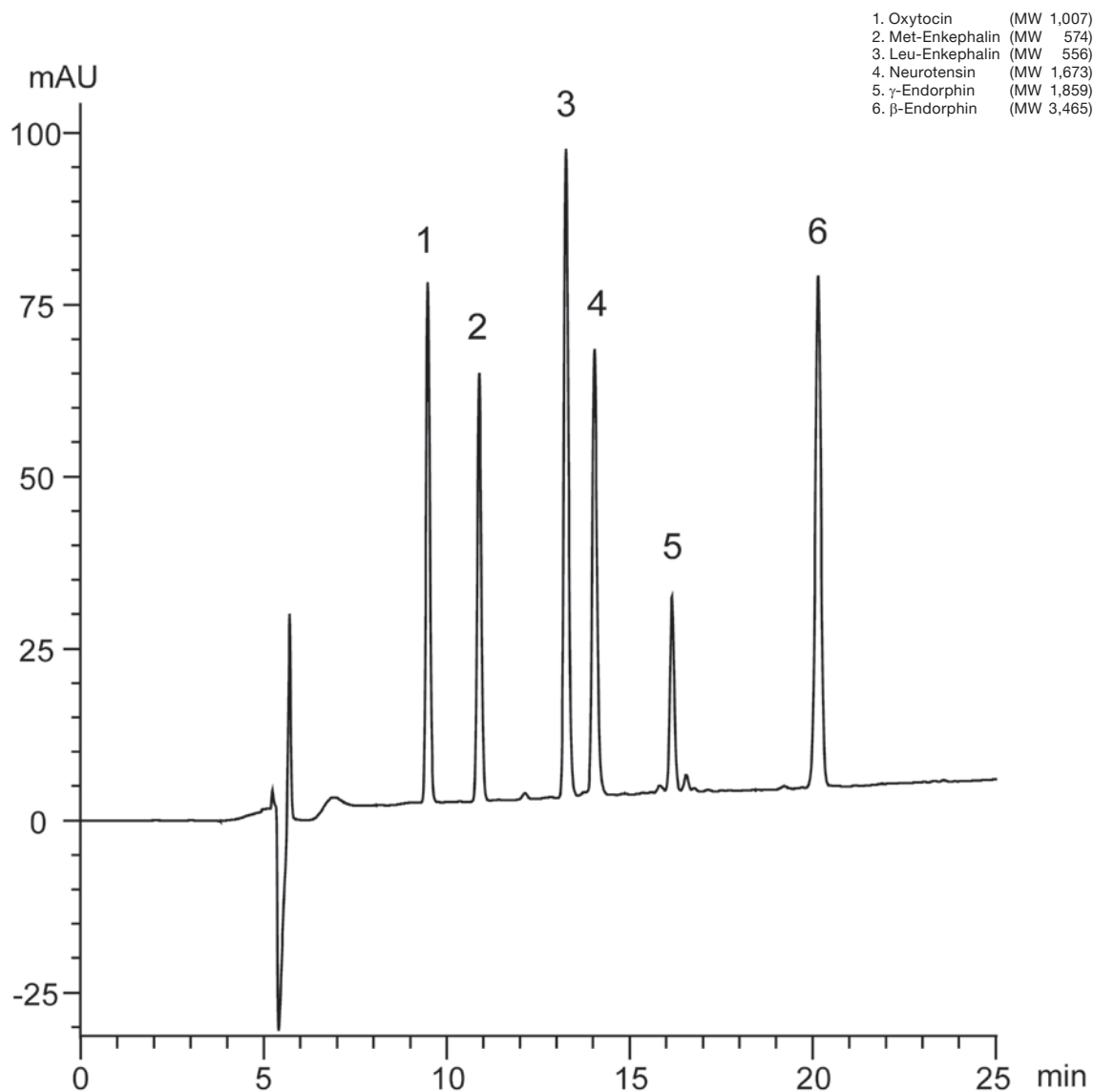
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12SP9-0502PT
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1) - mixture A
 B) acetonitrile/2-propanol/TFA (50/50/0.1) - mixture B
 Gradient: 10–80%B (0–5 min) - mixture A
 30–60%B (0–5 min) - mixture B

Flow rate: 0.4 mL/min
 Detection: UV at 220 nm
 Injection: 1 μ L (50 μ g/mL) - condition A
 1 μ L (250 μ g/mL) - condition B
 System: Agilent 1200SL

PC (peak capacity) = 1 + (gradient time/peak width*)
 *peak width = $2W_{0.5h}$ average

Life Science – Proteins/Peptides

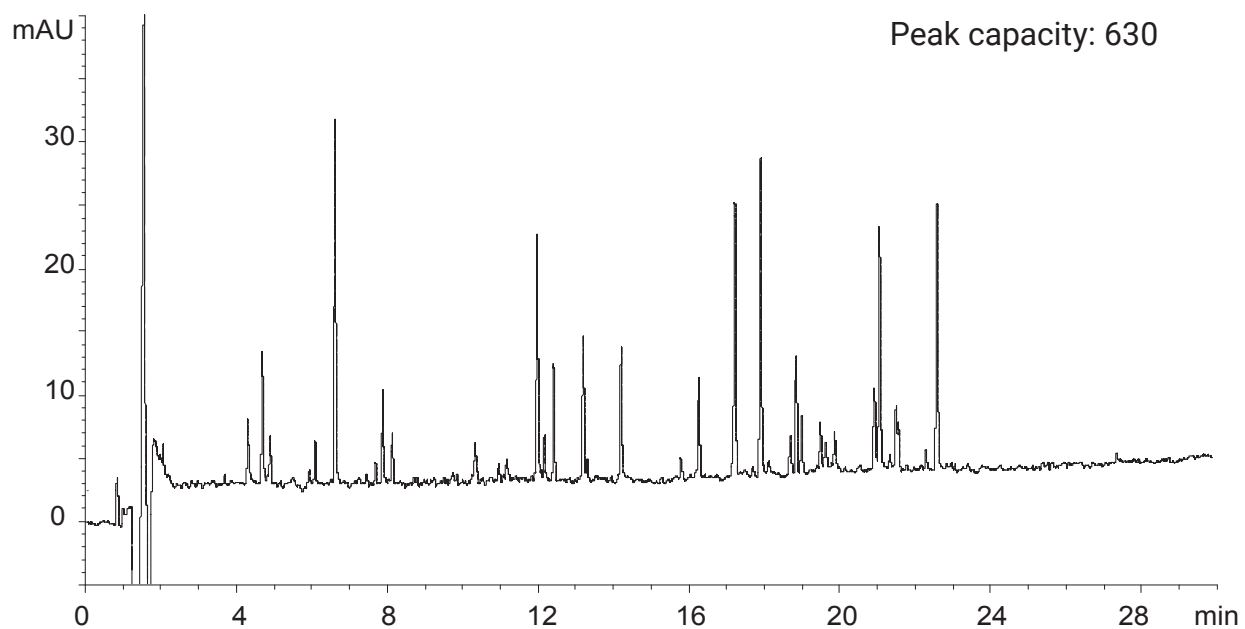
Peptides (MW 556 - 3,465)



Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 2.0 mm ID
Part No.: TA12S05-1502WT
Eluent: A) water + 0.1% TFA
B) acetonitrile + 0.1% TFA
Gradient: 20–45%B (0–25 min)
Flow rate: 0.2 mL/min
Temperature: 37 °C
Detection: UV at 220 nm
Injection: 2 μ L (0.075 ~ 0.25 mg/mL)

Life Science – Proteins/Peptides

Peptide mapping



$$PC \text{ (peak capacity)} = 1 + (\text{gradient time} / \text{peak width}^*)$$

*peak width = $2W_{0.5h}$ average

Column: YMC-Triart C18 (1.9 μm , 12 nm) 200 x 2.0 mm ID (Two coupled 100 x 2.0 mm ID)
 Part No.: TA12SP9-1002PT (2x)
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.08)
 Gradient: 5–40%B (0–30 min)
 Flow rate: 0.4 mL/min
 Temperature: 70 °C
 Detection: UV at 220 nm
 Injection: 20 μL
 Sample: Tryptic digest of Bovine Hemoglobin (2.5 nmol/mL)
 Pressure: 58.1–61.6 MPa (8,430–8,930 psi)

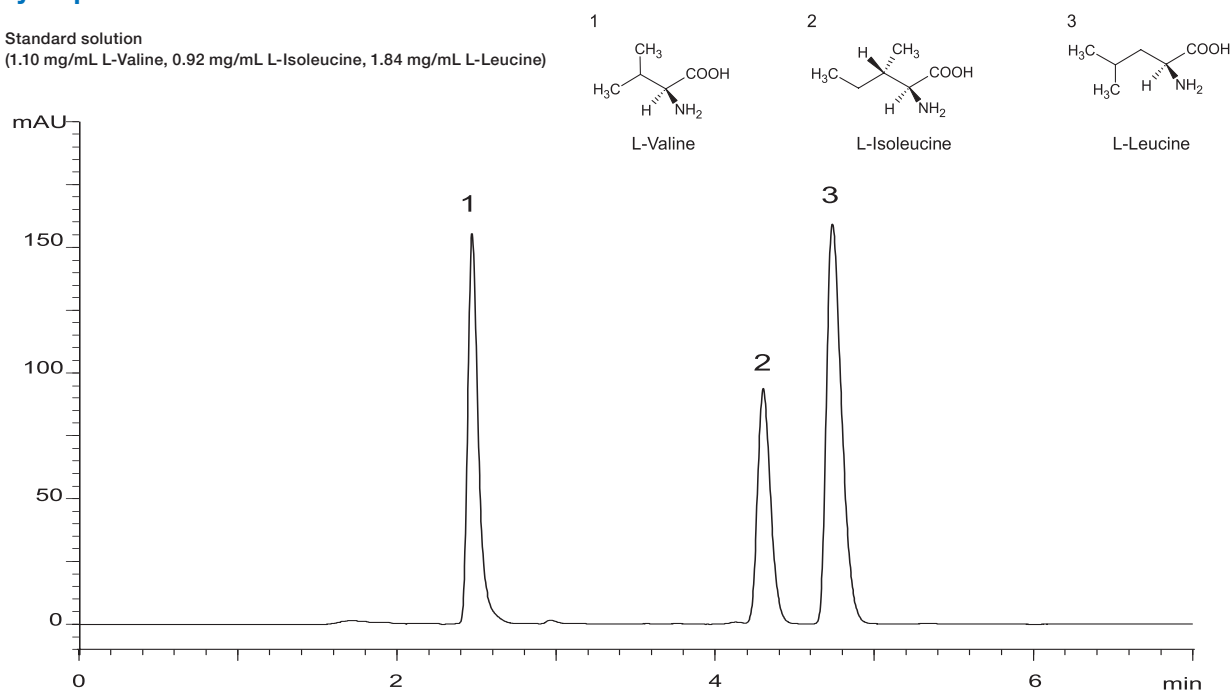


Coupling of two YMC-Triart UHPLC columns using the dead volume free MarvelX™ connector.

Life Science – Amino Acids

Hydrophobic amino acids

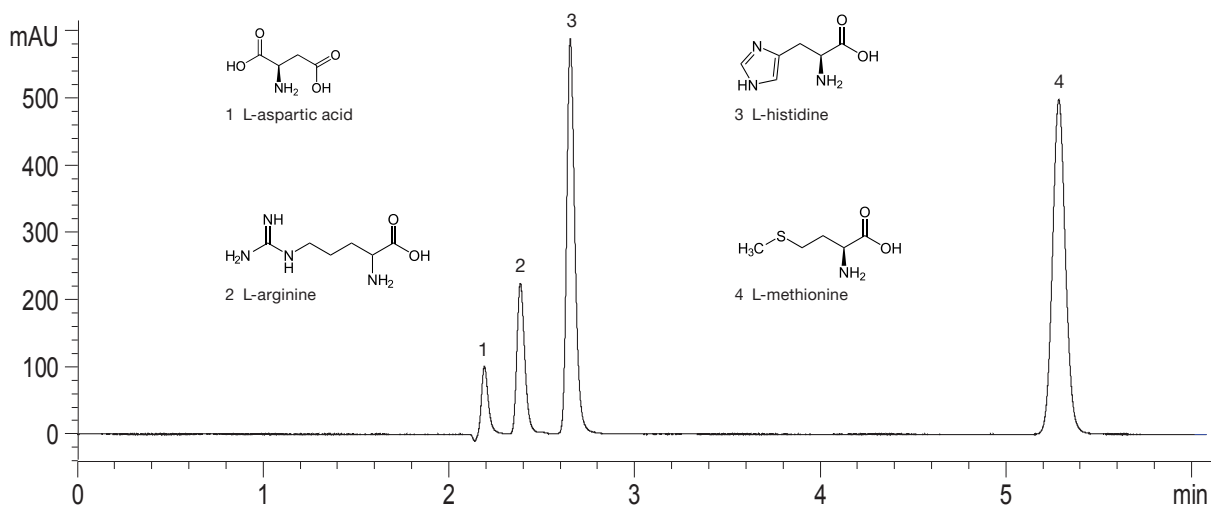
Standard solution
(1.10 mg/mL L-Valine, 0.92 mg/mL L-Isoleucine, 1.84 mg/mL L-Leucine)



Column: YMC-Triart C18 (3 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S03-1546PTH
 Eluent: phosphate buffer (pH 2.8)/acetonitrile (97/3)
 ("Dissolve 31.2 g of $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$ in 1,000 mL of water and adjust pH 2.8 with H_3PO_4)
 Flow rate: 0.9 mL/min (adjust the flow rate so that the retention time of L-Valine is about 2.5 min)
 Temperature: 40 °C
 Detection: UV at 210 nm
 Injection: 20 μ L

The Japanese Pharmacopoeia 16th; Identification

Amino acids with 100% aqueous phase



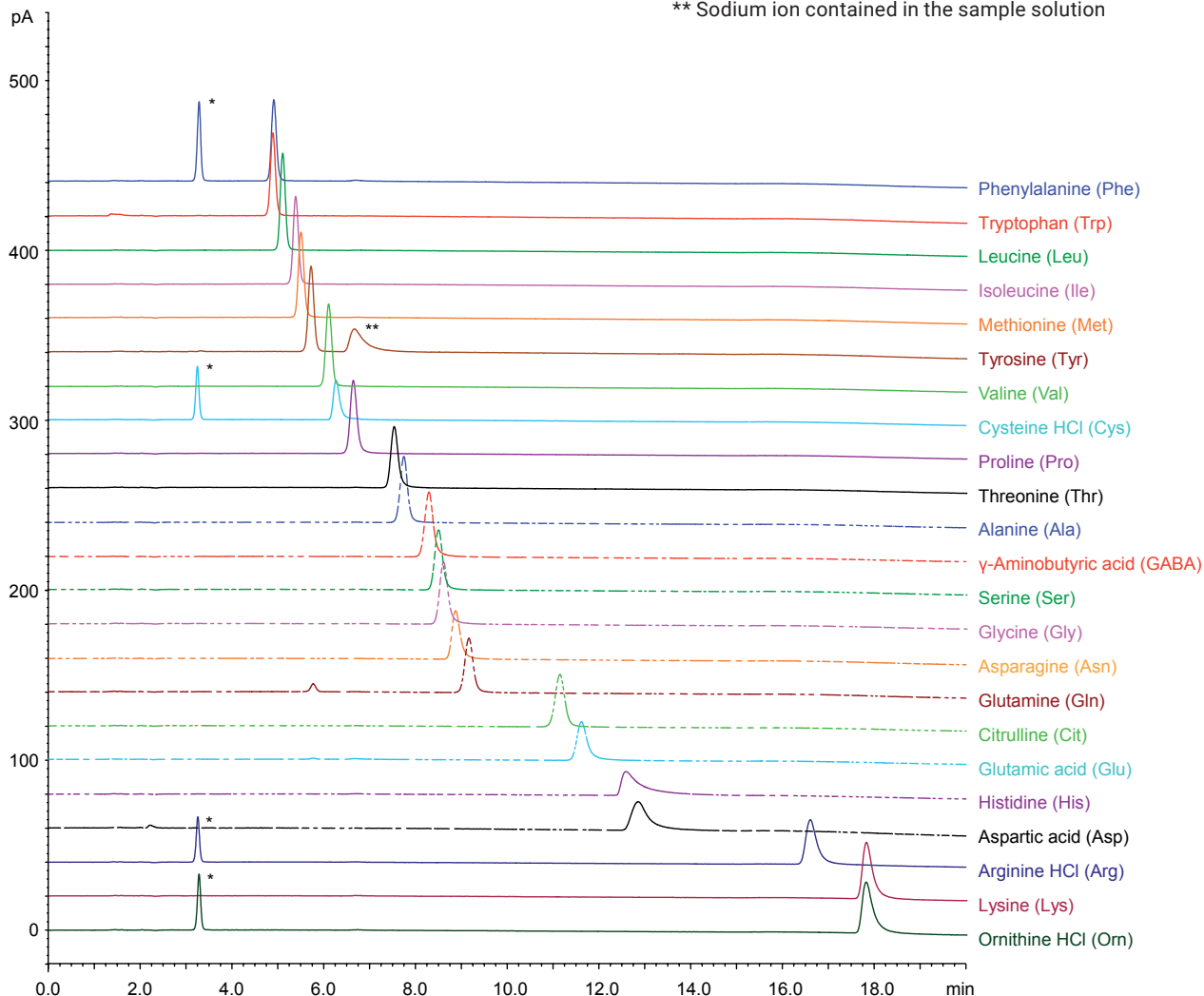
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 150 x 3.0 mm ID
 Part No.: TA12SP9-1503PT
 Eluent: 40 mM K_2HPO_4 (pH 7.0)
 Flow rate: 0.3 mL/min
 Temperature: 20 °C
 Detection: UV at 210 nm
 Injection: 2 μ L (1 mg/mL)

Life Science – Amino Acids

Free amino acids in HILIC mode

* Chloride ion contained in the sample solution

** Sodium ion contained in the sample solution



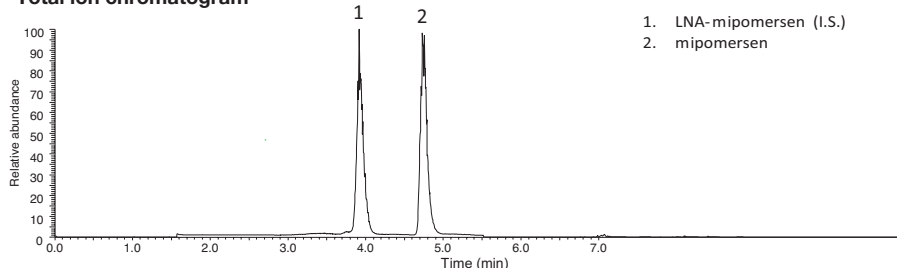
Column: YMC-Triart Diol-HILIC (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTH
 Eluent: A) 100 mM HCOOH-HCOONH₄ (pH 3.6)
 B) acetonitrile
 Gradient: 83–80%B (0–12 min), 80–68%B (12–20 min)
 Flow rate: 1.0 mL/min
 Temperature: 40°C
 Detection: Corona® CAD® (Charged Aerosol Detector)
 Injection: 10 μ L (0.1 mg/mL)

Corona and CAD are trademarks of Thermo Fisher Scientific.

Life Science – Oligonucleotides

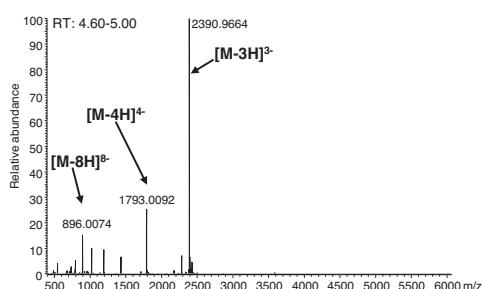
LC-HRMS analysis of the antisense oligonucleotide Mipomersen (Kynamro®)

Total ion chromatogram

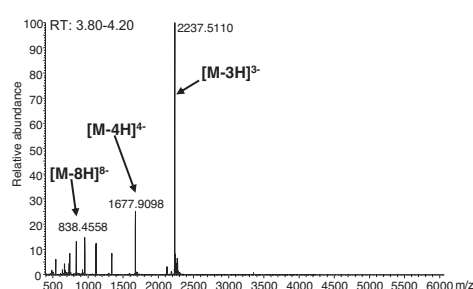


1. LNA-mipomersen (I.S.)
2. mipomersen

Mass spectrum of mipomersen



Mass spectrum of LNA-mipomersen



Column: YMC-Triart C8 **metal-free** (1.9 μ m, 12 nm)¹ 100 x 2.1 mm ID
 Part No.: TO12SP9-10Q1PTP
 Eluent: A) water/triethylamine/HFIP²
 (100/0.4/2; triethylamine 28.0 mM, HFIP 135.8 mM)
 B) methanol/triethylamine/HFIP (100/0.4/2)
 Gradient: [Sample separation step]
 10–40%B (0–5.0 min)

[Column wash steps]

40–70%B (5.0–5.1 min), 70%B (5.1–7.0 min), 70–10%B (7.0–7.1 min),
 10%B (7.1–8.0 min), 10–90%B (8.0–8.1 min), 90%B (8.1–9.0 min),
 90–10%B (9.0–9.1 min), 10%B (9.1–10.0 min),
 10–90%B (10.0–10.1 min), 90%B (10.1–11.0 min),
 90–10%B (11.0–11.1 min)
 Flow rate: 0.3 mL/min
 Temperature: 50 °C
 Injection: 10 μ L (1,000 ng/mL)
 System: LC) Vanquish Binary Pump H system
 HRMS) Orbitrap HRMS Q Exactive Plus

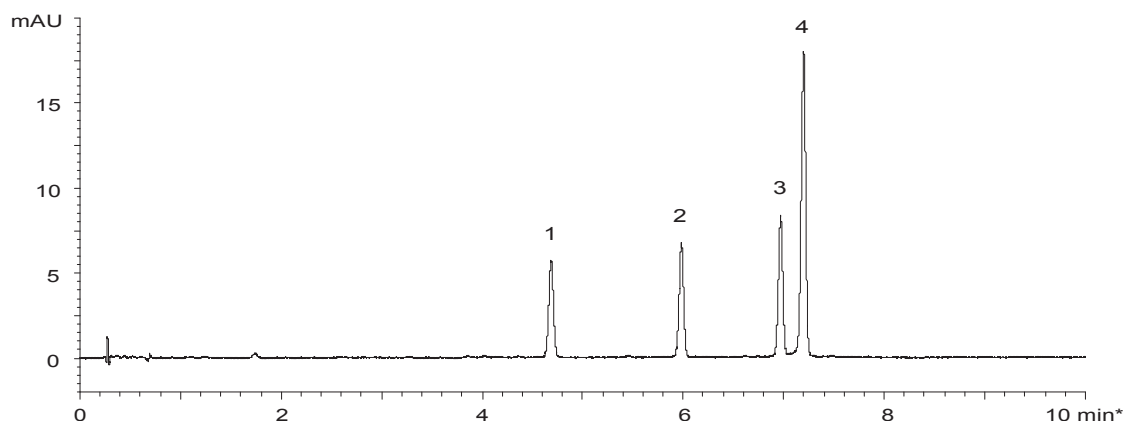
Courtesy of Y. Sun, National Institute of Health Sciences

*1 Prewash the column prior to the first use with water/methanol/phosphoric acid (70/30/0.1) for 1 hour

*2 1,1,1,3,3,3-hexafluoro-2-propanol

Reference: Y. Sun et al, Development of a bioanalytical method for an antisense therapeutic using high-resolution mass spectrometry, Bioanalysis, 2020 NOV 26, doi: 10.4155/bio-2020-0225.

Synthetic oligonucleotides



1. 5'-CAC UGA AUA CCA AU-3' (14mer)

2. 5'-UCA CAC UGA AUA CCA AU-3' (17mer)

3. 5'-UCA UCA CAC UGA AUA CCA AU-3' (20mer)

4. 5'-GUC AUC ACA CUG AAU ACC AAU-3' (21mer)

Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.1 mm ID
 Part No.: TA12SP9-05Q1PT
 Eluent: A) 200 mM HFIP^{*}-8 mM triethylamine
 B) methanol
 Gradient: 10–20%B (0–10 min)

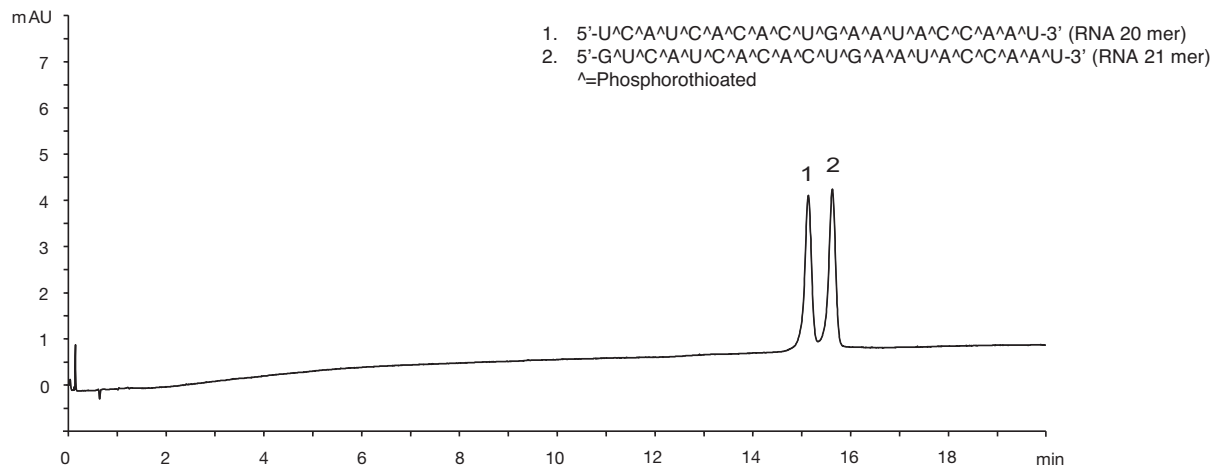
Flow rate: 0.42 mL/min
 Temperature: 65 °C
 Detection: UV at 260 nm
 Injection: 1 μ L (2–4 nmol/mL)

Courtesy of M. Yamada, SHIMADZU CORPORATION (JP)

*hexafluoroisopropanol

Life Science – Oligonucleotides

Challenging phosphorothioate oligonucleotides

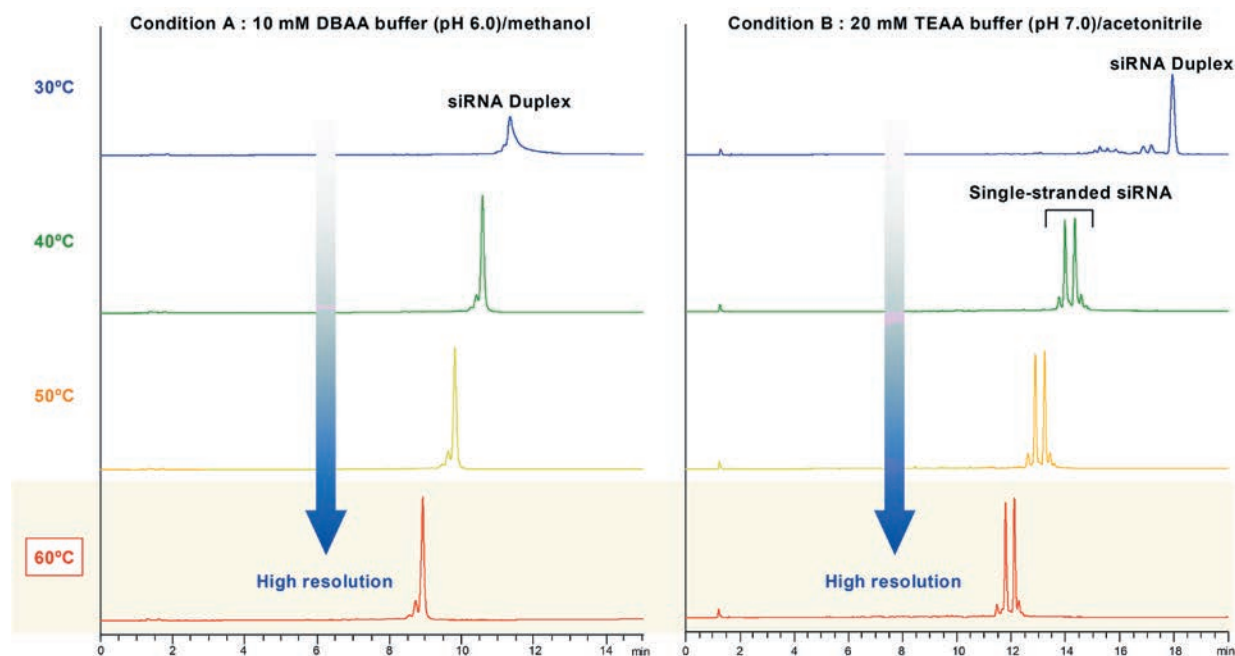


Column: YMC-Triart C8 **metal-free** (1.9 μ m, 12 nm) 100 x 2.1 mm ID
 Part no.: TO12SP9-10Q1PTP
 Eluent: A) 15 mM triethylamine-400 mM HFIP*
 B) methanol
 Gradient: 10–20%B (0–20 min)

Flow rate: 0.42 mL/min
 Temperature: 70 °C
 Detection: UV at 260 nm
 Injection: 1 μ L (each 1.25 nmol/mL)

*1,1,1,3,3,3-hexafluoro-2-propanol

Effect of mobile phase and column temperature on separation of siRNA duplex



Crude synthetic siRNA duplex (19 bp):

5'-CGU ACG CGG AAU ACU UCG AdTdT-3'
 3'-dTdTGCA UGC GCC UUA UGA AGC U-5'

Column: YMC-Triart C18 (1.9 μ m, 12 nm) 100 x 2.0 mm ID
 Part No.: TA12SP9-10Q2PT
 Flow rate: 0.2 mL/min
 Detection: UV at 269 nm
 Injection: 1 μ L (5 nmol/mL)
 System: Agilent 1290

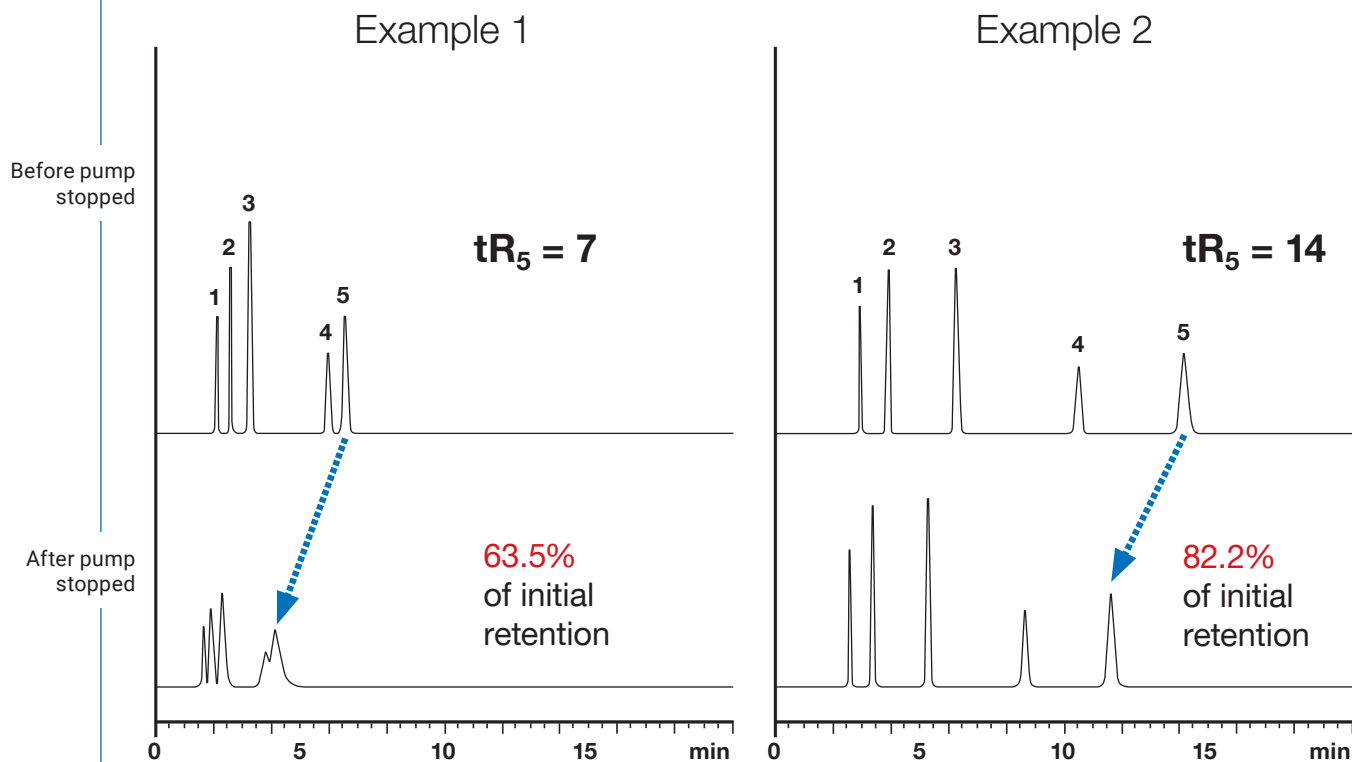
Condition A Eluent: A) 10 mM di-n-butylamine-acetic acid (pH 6.0)
 B) methanol
 Gradient: 35–60%B (0–15 min)
 Condition B Eluent: A) 20 mM triethylamine-acetic acid (pH 7.0)
 B) acetonitrile
 Gradient: 5–12%B (0–20 min)

YMC-Triart "AQ" | YMC-Triart C18 for polar compounds

Problem with conventional C18 columns

Aqueous conditions deteriorate column performance

1. Cytosine
2. Uracil
3. Guanine
4. Thymine
5. Adenine



Column: 5 μ m, 150 x 4.6 mm ID
 XBridge C18 (Example 1) and Atlantis T3 (Example 2)
 Eluent: 20 mM KH_2PO_4 - K_2HPO_4 (pH 6.9)
 Flow rate: 1.0 mL/min
 Temperature: 37°C
 Detection: UV at 254 nm

Why?

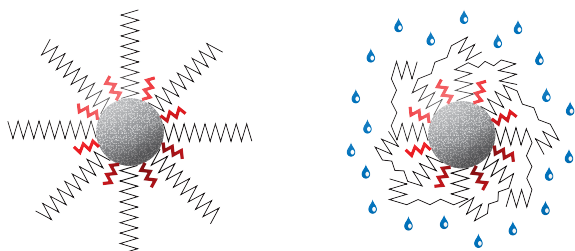


Image of C18 surface hydration

The columns used for applications involving 100% aqueous buffers provide shorter retention times after the flow was stopped between analyses. This behaviour is caused by poor hydration of the phase. Polar compounds cannot easily distribute between the mobile phase and the stationary phase.

YMC-Triart "AQ" | YMC-Triart C18 for polar compounds

Solution with YMC-Triart C18: Reproducible and stable performance!

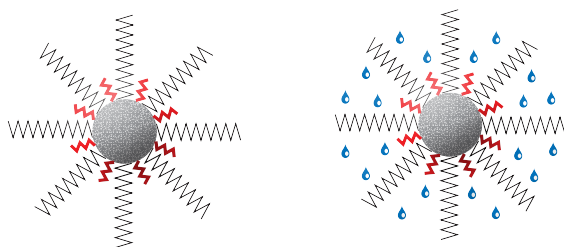
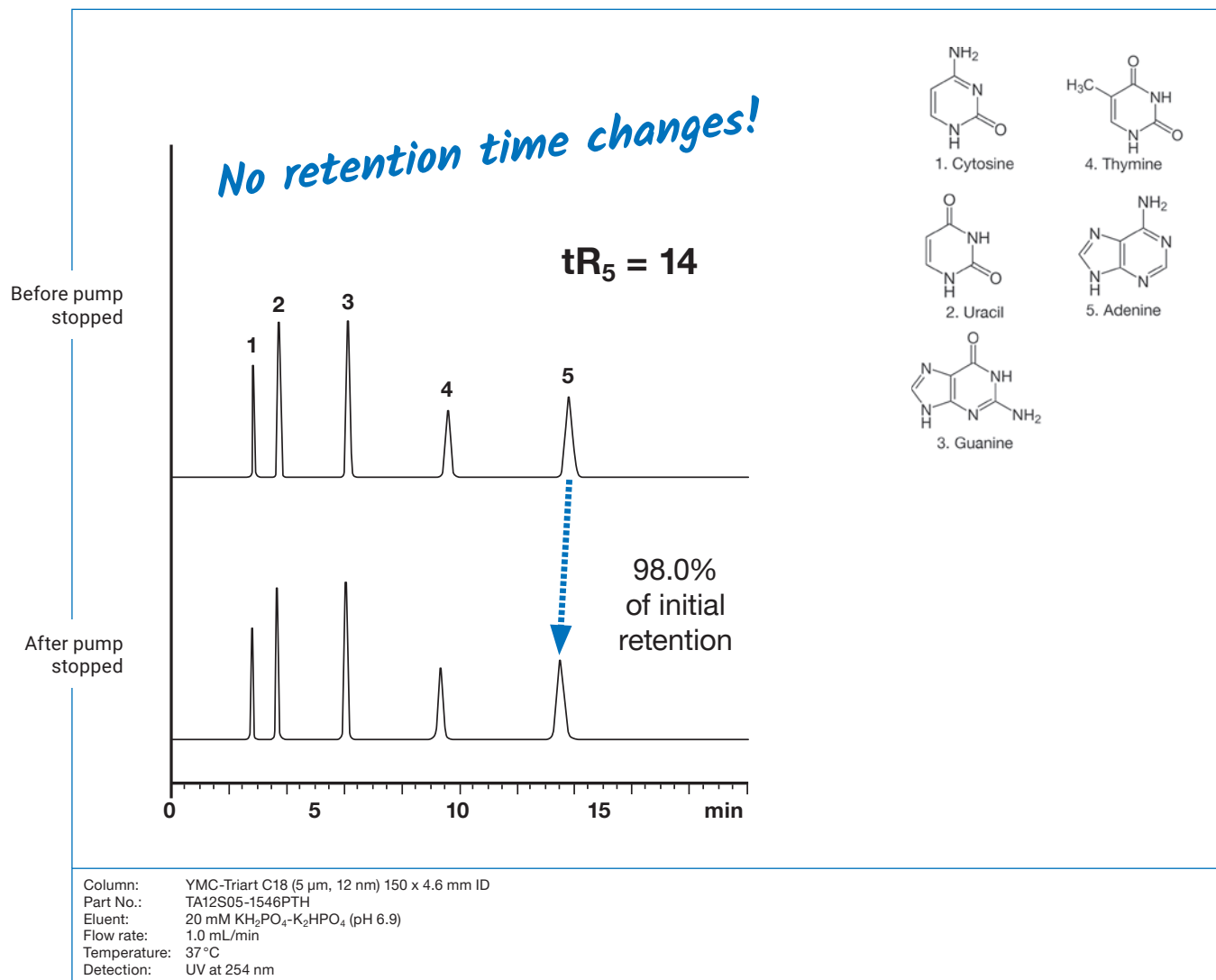


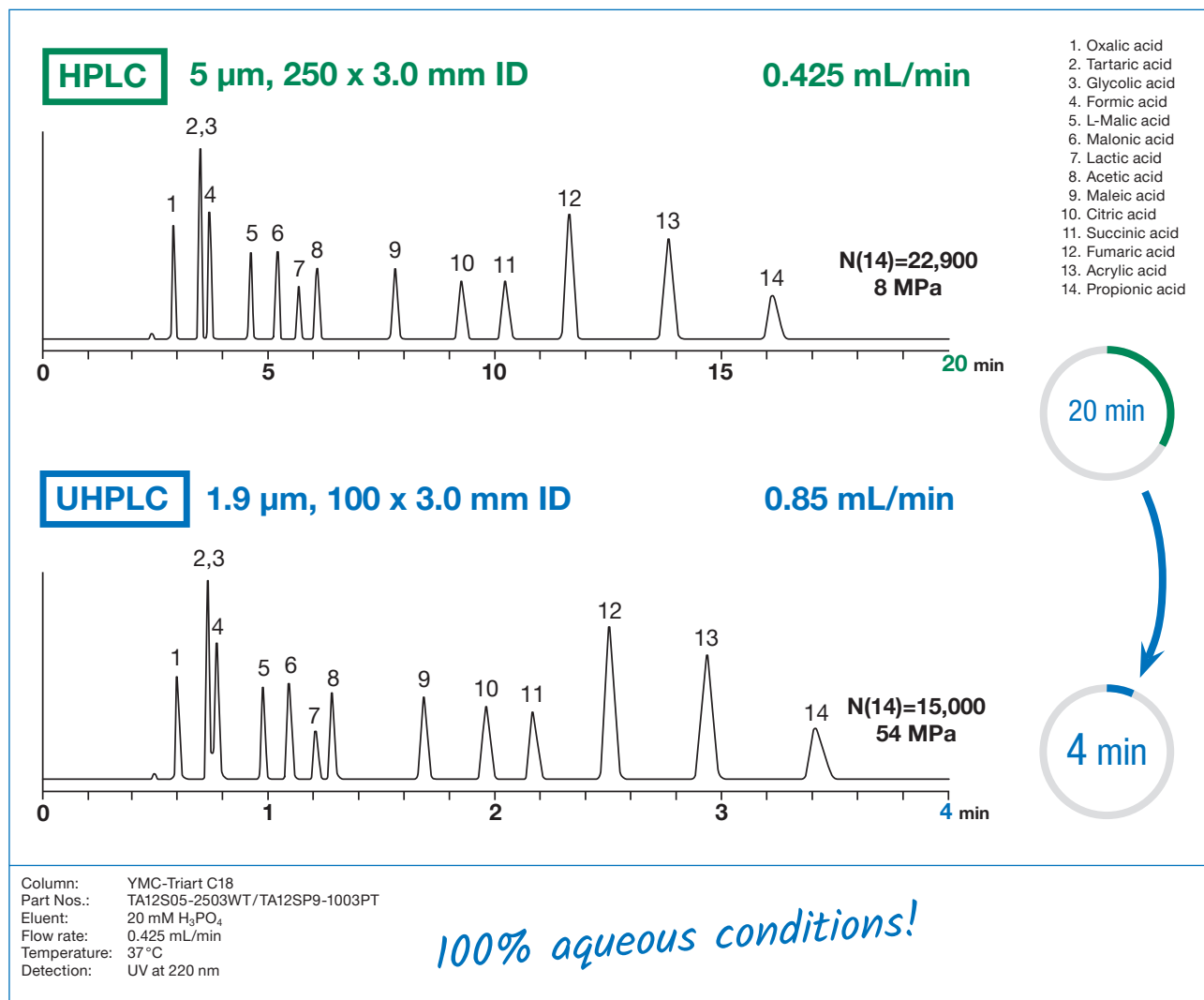
Image of C18 surface hydration

When YMC-Triart C18 columns are used for applications involving 100% aqueous buffers, the retention times are unchanged after the flow was stopped between analyses.

This is due to the improved hydration of the phase. Polar compounds can easily distribute between the mobile phase and the stationary phase.

YMC-Triart "AQ" | YMC-Triart C18 for polar compounds

From the inventors of AQ-columns: YMC-Triart C18 "validated" for AQ-conditions!



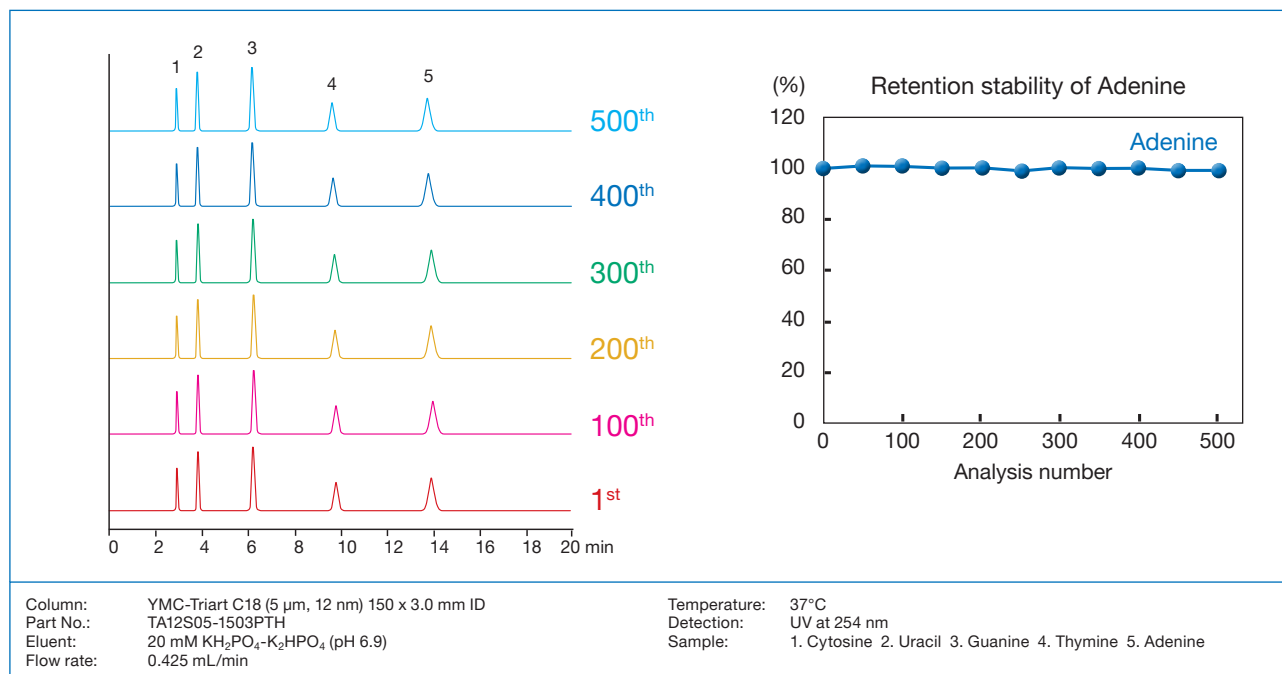
Stable under harsh conditions: pH 1–12 and temperature up to 90°C.

Stable retention times with 100% aqueous eluents!

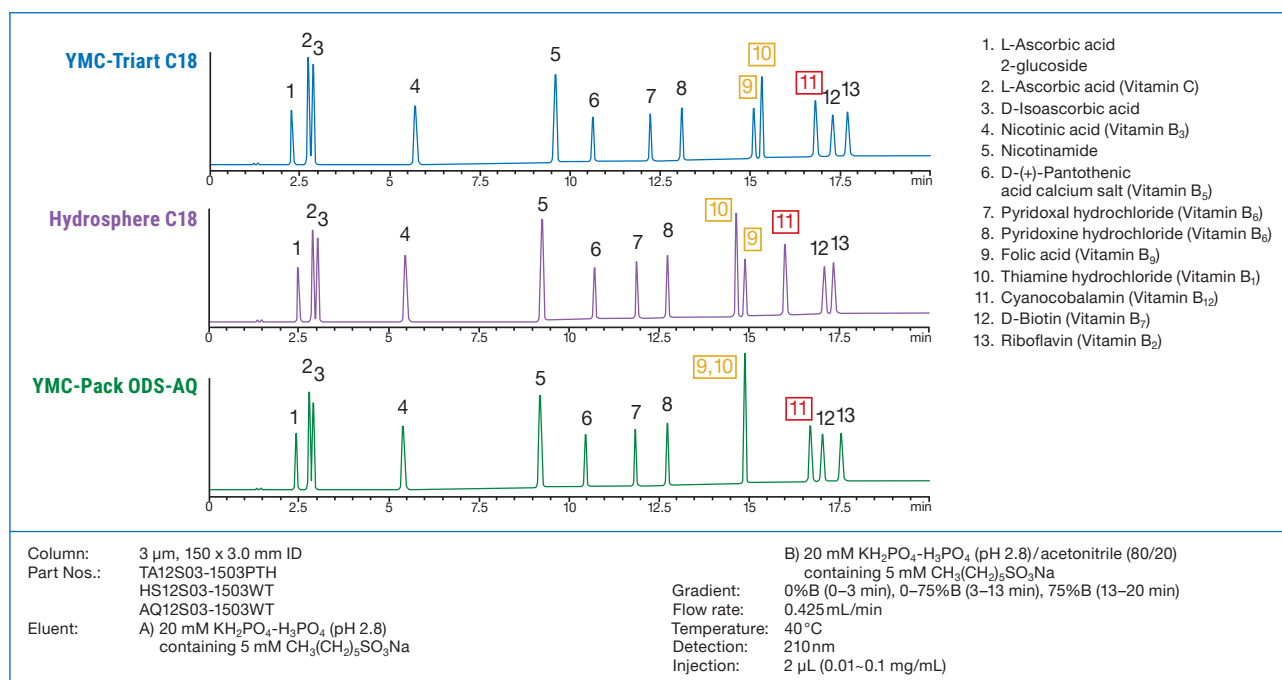
Reproducible results day-after-day, column-to-column and lab-to-lab!

YMC-Triart "AQ" | YMC-Triart C18 for polar compounds

Proven reliability



No change is found in the separation parameters including retention times, even after 500 injections when using YMC-Triart C18.

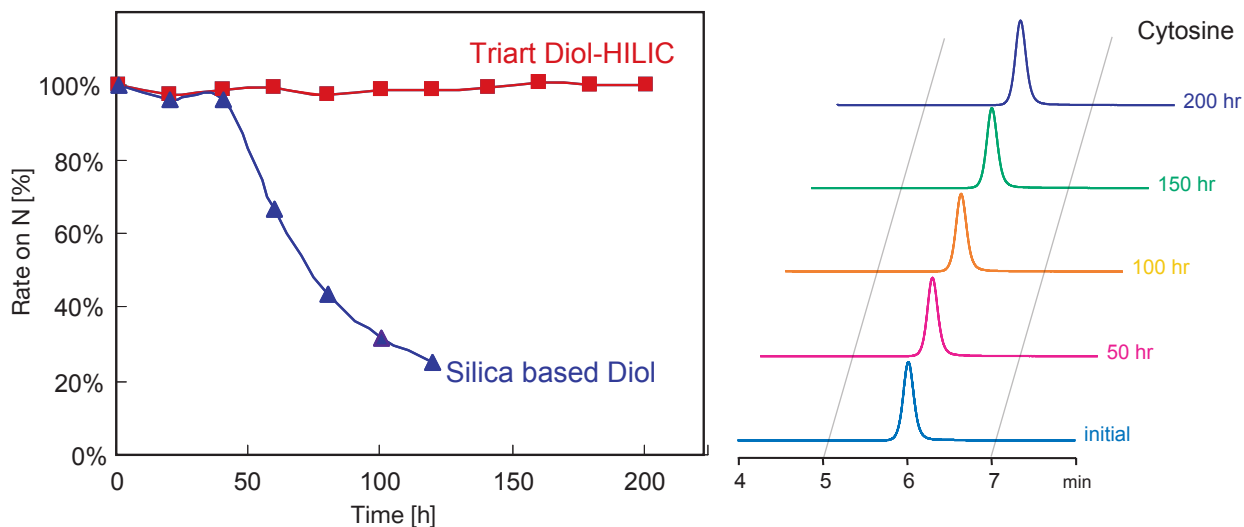


Retention behaviour of water-soluble vitamins on three YMC ODS phases which can be used with 100% aqueous mobile phases is compared. The retention times and peak elution order for folic acid (peak 9), thiamine hydrochloride (peak 10) and cyanocobalamin (peak 11) are different for the three phases due to the balance of hydrophobicity and hydrogen bonding capacity differing between the three phases.

HILIC

Great stability and reproducibility at high pH

Stability at high pH (pH 11, 50 °C)*

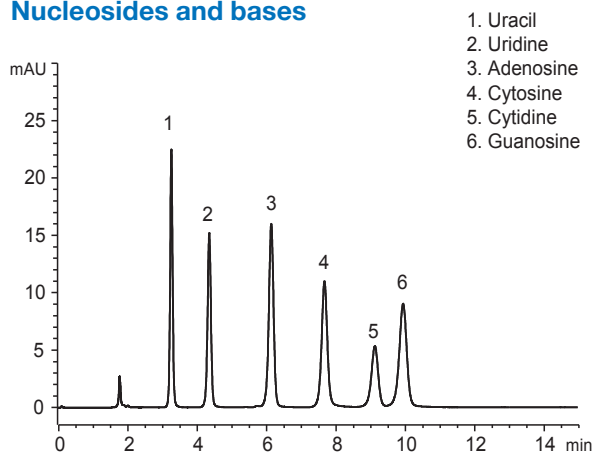


* pH ≤ 10 is recommended for regular use

Column: 5 µm, 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTH
 Eluent: acetonitrile/water/NH₃ (90/10/0.1) pH 11.3
 Flow rate: 1.0 mL/min
 Temperature: 50 °C
 Sample: Cytosine

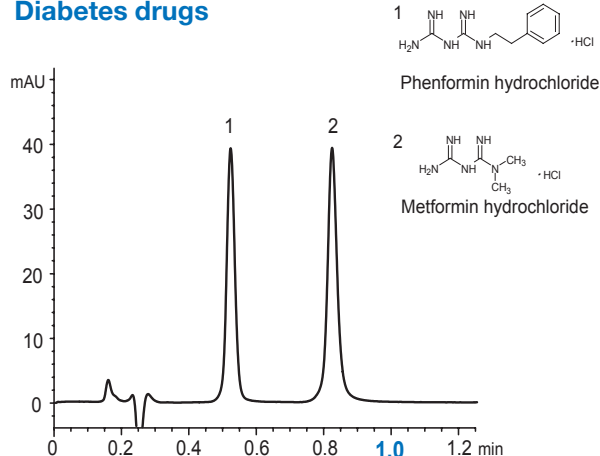
YMC-Triart Diol-HILIC offers highly reproducible separations even at high pH and high temperature. The lifetime of YMC-Triart Diol-HILIC is much longer than that of conventional silica-based Diol columns.

Nucleosides and bases



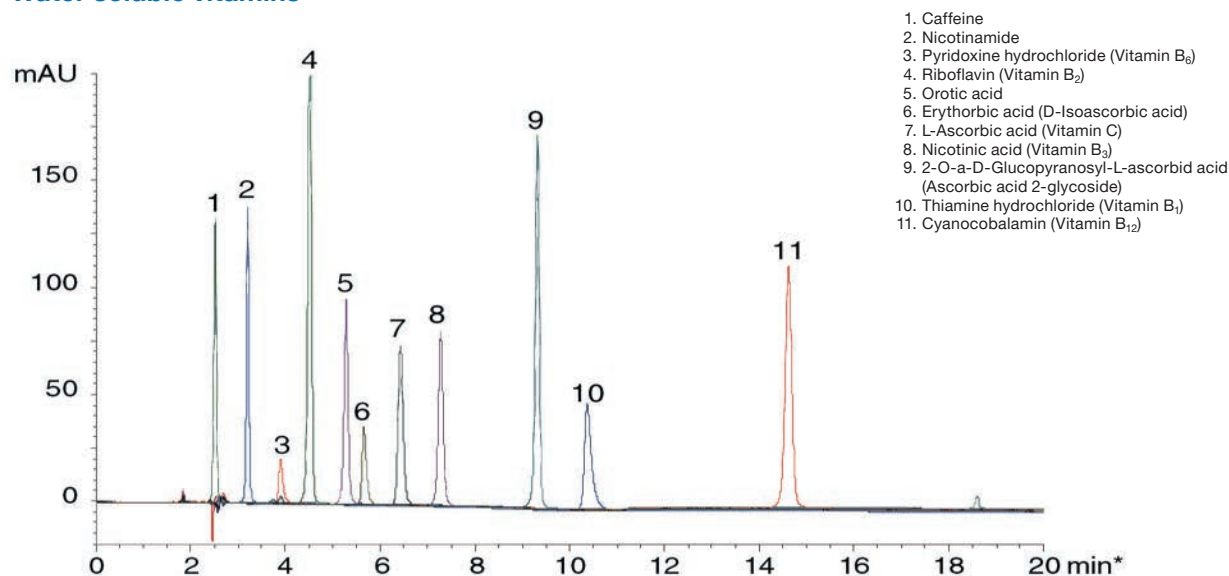
Column: YMC-Triart Diol-HILIC (5 µm, 12 nm) 150 x 3.0 mm ID
 Part No.: TDH12S05-1503PTH
 Eluent: 100 mM CH₃COONH₄/acetonitrile (10/90)
 Flow rate: 0.425 mL/min
 Temperature: 30 °C
 Detection: UV at 254 nm
 Injection: 2 µL (5 ~ 10 µg/mL)

Diabetes drugs



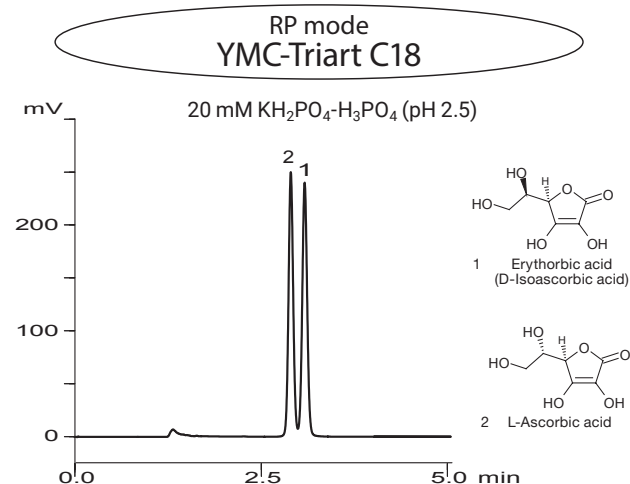
Column: YMC-Triart Diol-HILIC (1.9 µm, 12 nm) 50 x 2.0 mm ID
 Part No.: TDH12SP9-0502PT
 Eluent: 100 mM HCOOH-HCOONH₄ (pH 3.7)/acetonitrile (10/90)
 Flow rate: 0.8 mL/min
 Temperature: 25 °C
 Detection: UV at 235 nm
 Injection: 2 µL (10 µg/mL)

Water soluble vitamins

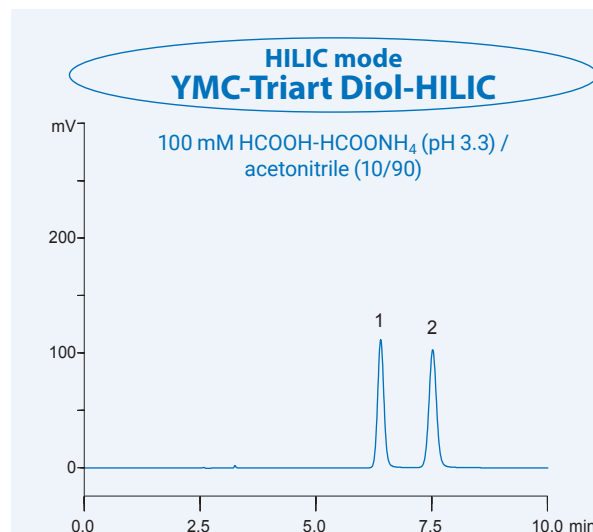


Column: YMC-Triart Diol-HILIC (5 μm, 12 nm) 150 x 3.0 mm ID
Part No.: TDH12S05-1503PTH
Eluent: A) acetonitrile/200 mM HCOOH-HCOONH₄ (pH 3.6)/water (90/5/5)
B) acetonitrile/200 mM HCOOH-HCOONH₄ (pH 3.6)/water (50/5/45)
Gradient: 0–75%B (0–20 min)
Flow rate: 0.425 mL/min
Temperature: 40°C
Detection: UV at 254 nm
Injection: 4 μL (50 μg/mL)

Polar and hydrophilic compounds



Column: 5 μm, 150 x 3.0 mm ID
Part No.: TDH12S05-1503PTH
Flow rate: 0.425 mL/min
Temperature: 40°C
Detection: UV at 254 nm
Injection: 4 μL (0.05 mg/mL)



YMC-Triart C18 (RP) shows very weak retention and poor resolution of L-ascorbic acid and its stereoisomer (erythorbic acid) even if 100% aqueous mobile phase is used. However, YMC-Triart Diol-HILIC shows strong retention and good resolution of these compounds with mobile phase containing 90% organic solvent.

SFC

*SFC compatibility
certified by an
independent institute!*



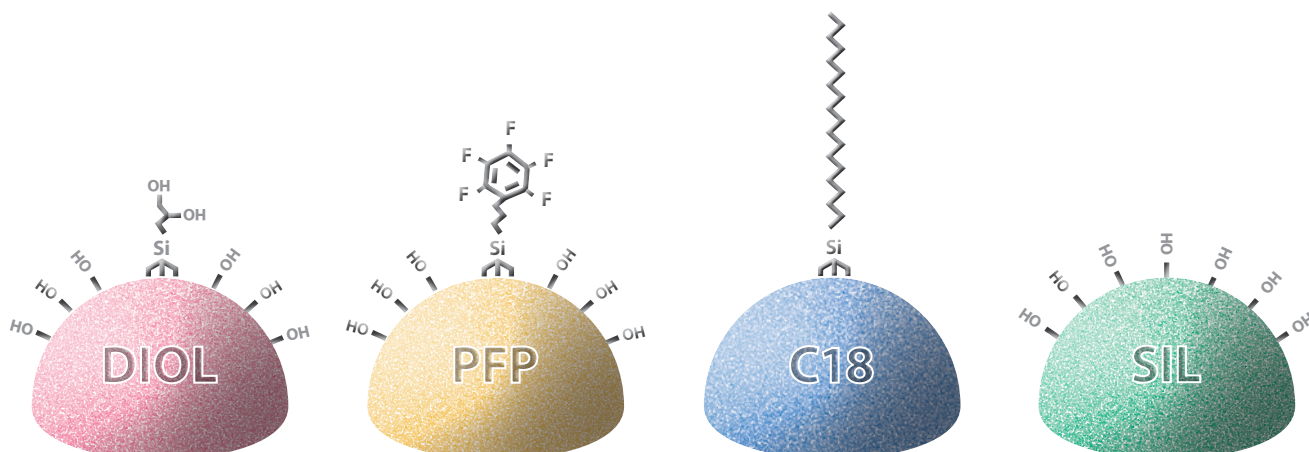
Phases for Supercritical Fluid Chromatography

YMC-Triart Diol

YMC-Triart PFP

YMC-Triart C18

YMC-Triart SIL



Specification YMC-Triart

	Diol	PFP	C18	SIL
Base	organic/inorganic hybrid silica			
Stationary phase	Diol (USP L20)	Pentafluorophenyl (USP L43)	C18 (USP L1)	Unmodified
Particle size	1.9, 3 and 5 µm			3 and 5 µm
Pore size	12 nm			
Specific surface	360 m ² /g			
Carbon content	—	15%	20%	—
Bonding	trifunctional	trifunctional	trifunctional	—
Endcapping	none	none	multi-stage	—
pH range	2 ~ 10	1 ~ 8	1 ~ 12	—
Temperature range	50 °C	50 °C	pH < 7: 90 °C pH > 7: 50 °C	50 °C
Pressure limit	1.9 µm: 100 MPa (15,000 psi) 3/5 µm: 45 MPa (6,525 psi)			
SFC compatibility	100% SFC compatible hardware*			

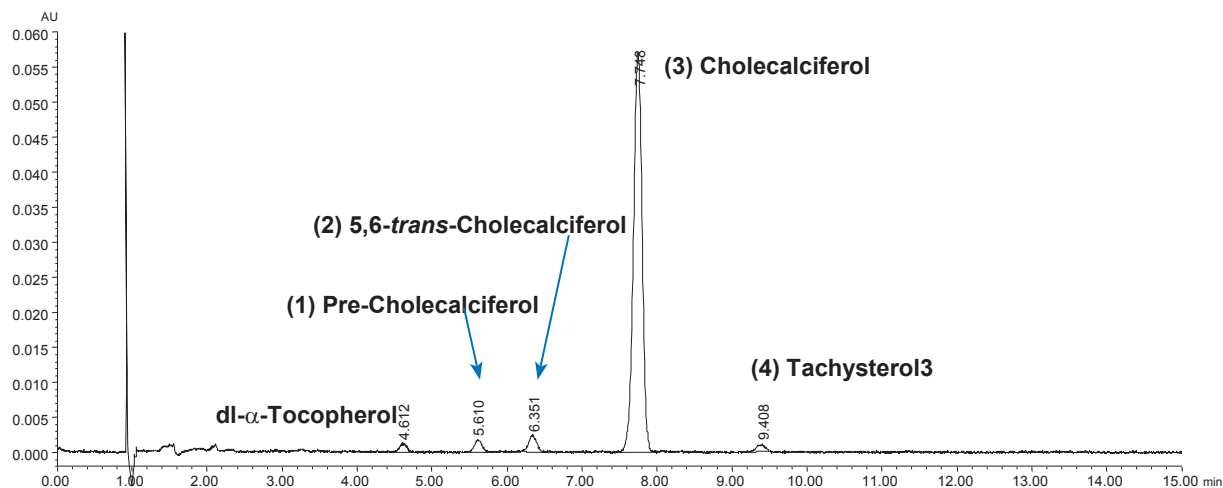
*Statement is available to confirm the usability in SFC mode!

SFC columns by YMC

Further, optionally SFC dedicated columns with 5 µm are available: Alcyon SFC Triart. Alcyon SFC columns are specifically packed in a SFC dedicated hardware. The stationary phase used in Alcyon SFC

columns is identical to that used in the corresponding YMC-Triart LC columns. The selection of phases, particle sizes and dimensions are limited compared to the LC column hardware.

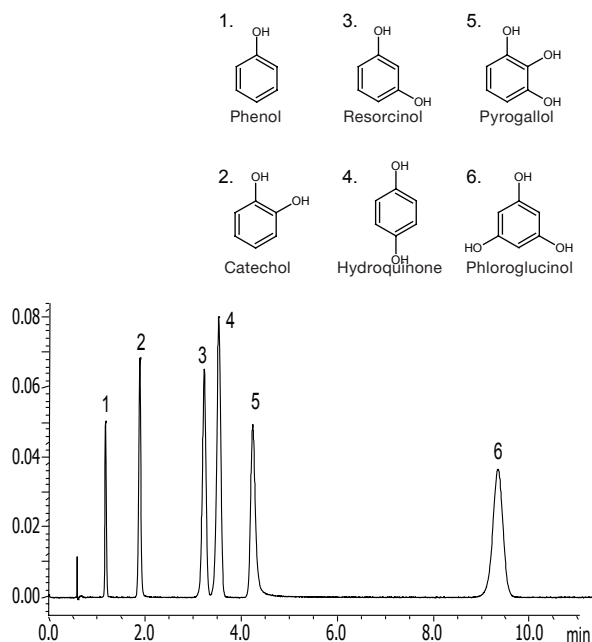
Rapid analysis of vitamin D3 and related substances in nutritional products



Column: YMC-Triart Diol (3 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: TDH12S03-2546PTHB
 Mobile phase: CO₂/ethanol (96/4)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 10.3 MPa (2,000 psi)
 System: UPC²

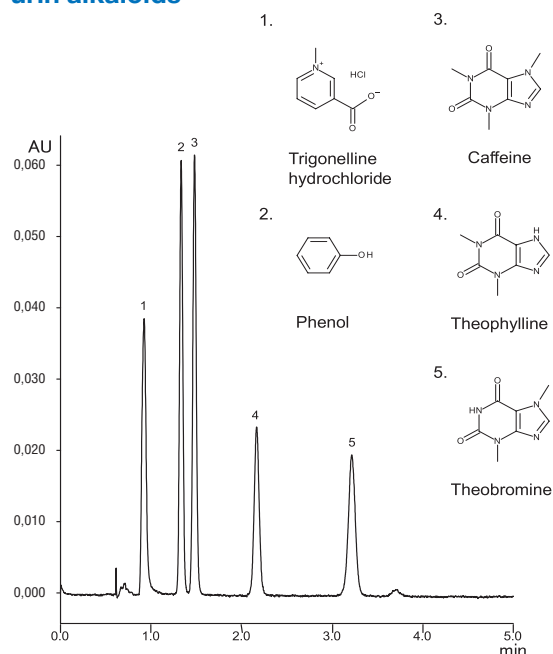
Trade quality and stressed samples used were supplied by DSM Nutritional Products, Site Sisseln (CH)

Quick separation of phenols



Column: YMC-Triart Diol (5 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: TDH12S05-2546PTHB
 Eluent: CO₂/methanol (88/12)
 Flow rate: 3.0 mL/min
 Temperature: 30 °C
 Detection: UV at 230 nm
 Back pressure: 10.3 MPa (2,000 psi)

Purin alkaloids

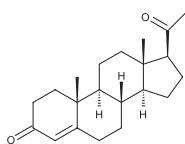


Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTHB
 Eluent: CO₂/methanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 230 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 5 μ L (0.085 – 5.7 mg/mL)

SFC

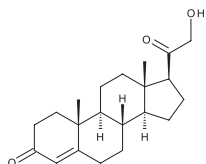
Steroids using different modifiers

1.



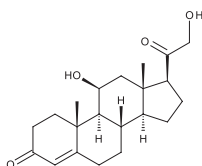
Progesterone

2.



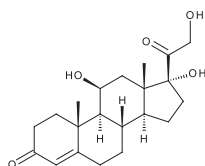
Deoxycorticosterone

3.



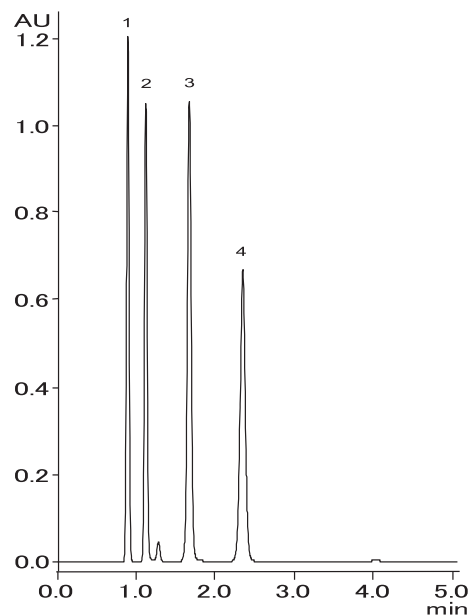
Corticosterone

4.

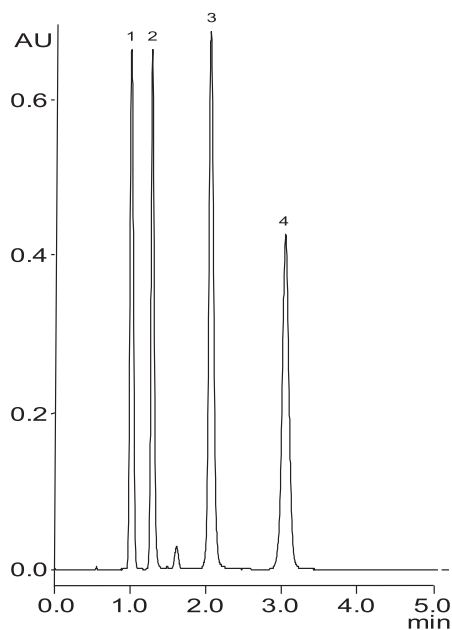


Hydrocortisone

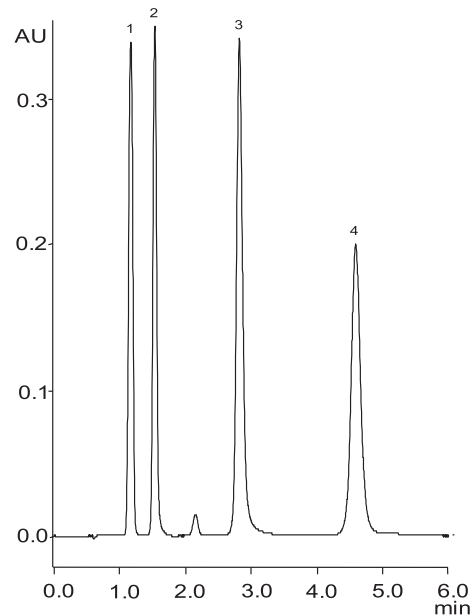
Methanol



Ethanol

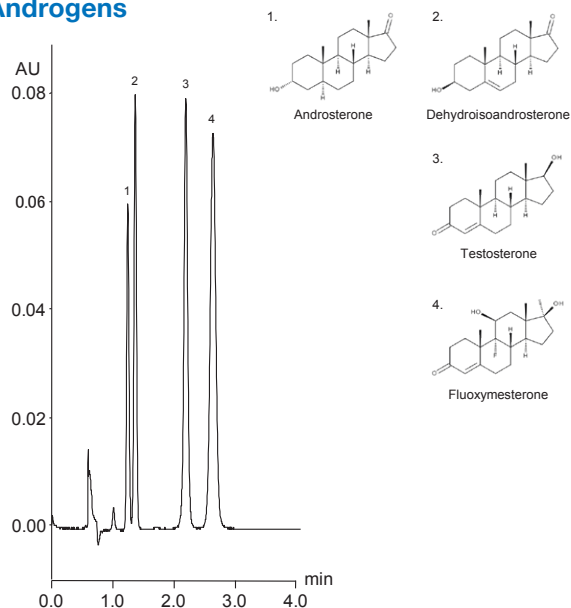


Isopropanol



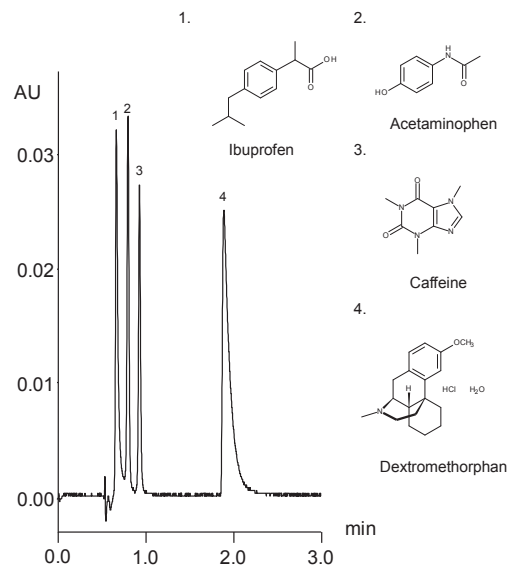
Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTHB
 Eluent: CO₂/alcohol (80/20)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 5 μ L (0.8 mg/mL)

Androgens



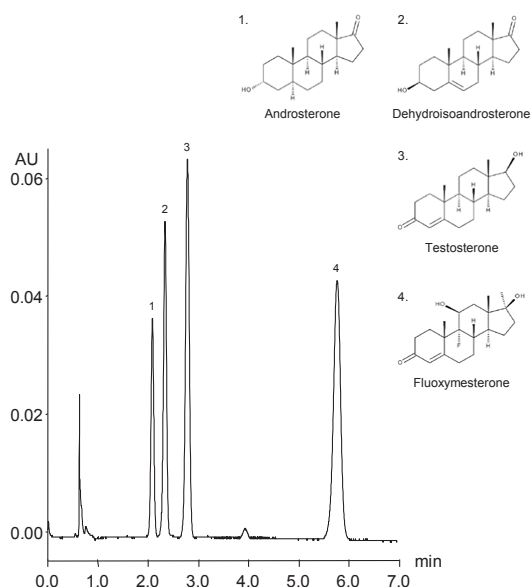
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TPF12S05-1546PTH
 Eluent: CO₂/ethanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 5 μ L (0.56 mg/mL ~ 6.7 mg/mL)

Ingredients in a cough/cold medication



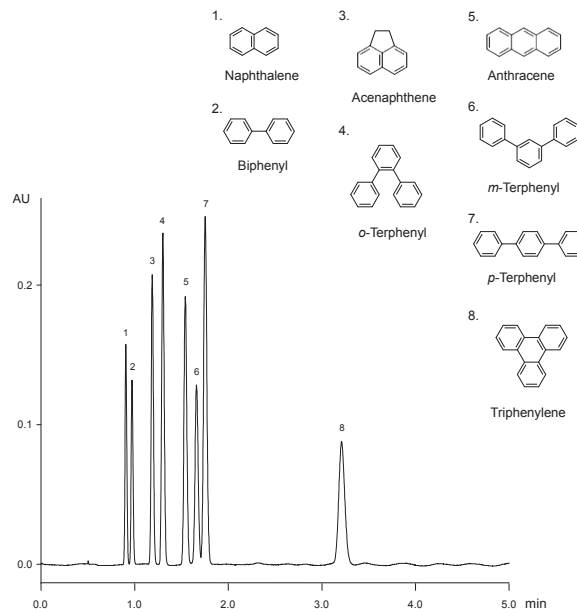
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TPF12S05-1546PTH
 Eluent: CO₂/methanol containing 0.1% diethylamine (80/20)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 1 μ L (0.044mg/mL ~ 5.32 mg/mL)

Androgens



Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTH
 Eluent: CO₂/methanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 5 μ L (0.56 ~ 6.7 mg/mL)

Polyaromatic hydrocarbons



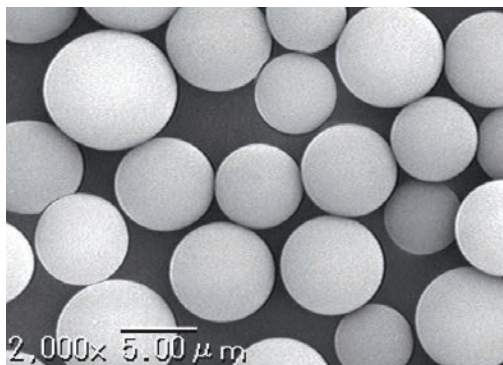
Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S05-1546PTH
 Eluent: CO₂/methanol (95/5)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2,000 psi)
 Injection: 2 μ L (0.03 ~ 1.0 mg/mL)

QC Data – Low back pressure

YMC-Triart: Improved quality of particles

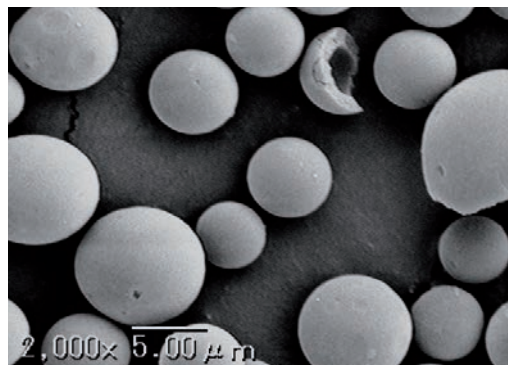
Uniform spherical particles

YMC-Triart



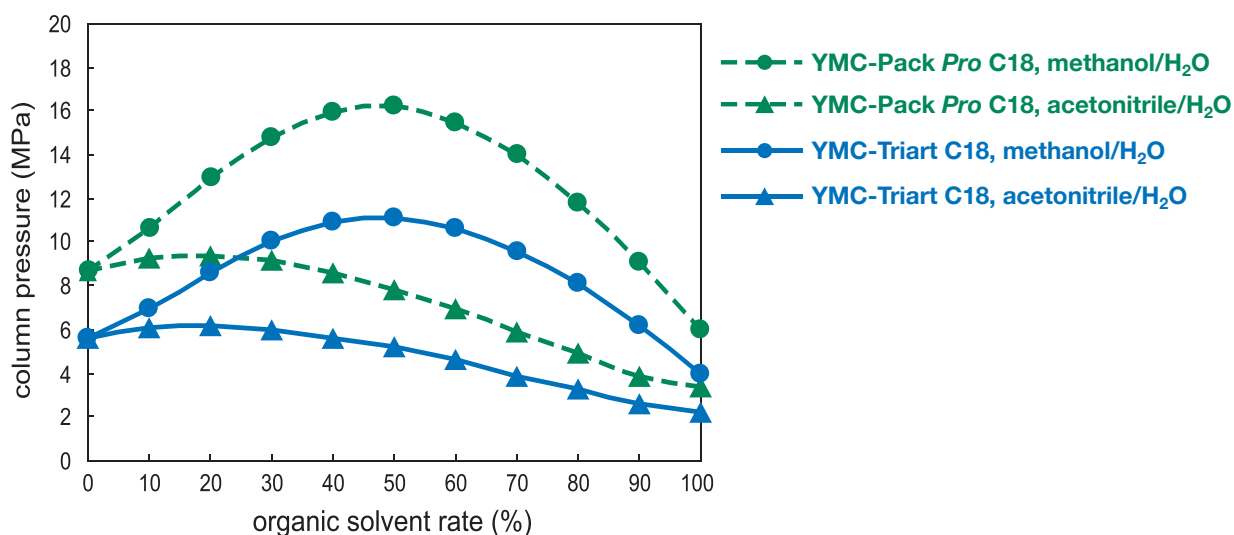
by courtesy of YMC Co., Ltd.

XBridge HILIC



The uniform spherical particle support is used for all YMC-Triart phases. The particles are produced using micro-reactor technology for the granulation process. This results in reduction of the backpressure and leads to more reproducibility in surface modification.

Low column backpressure



Column: YMC-Triart C18 (5 μm, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S05-1546PTH
 Eluent: acetonitrile/water or methanol/water
 Flow rate: 1.0 mL/min
 Temperature: 25°C

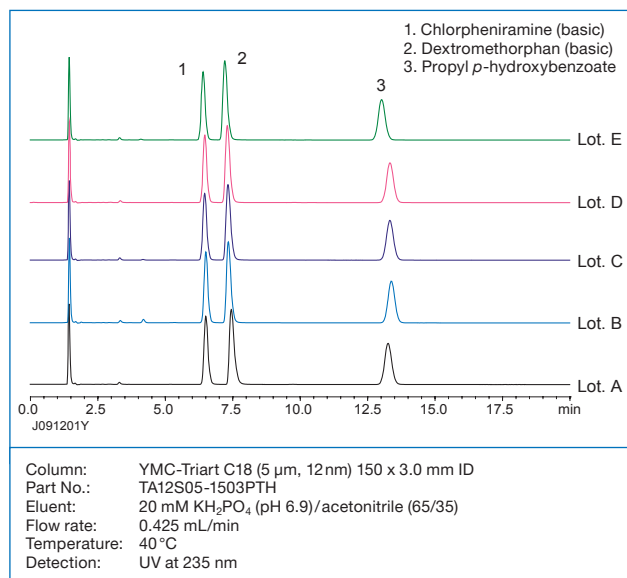
The revolutionary production technique, adapted from micro-reactor flow technology, produces a silica/organic hybrid stationary phase, with outstanding narrow pore size and particle size distributions which result in low back pressures. YMC-Triart is designed for use under a wide range of conditions. Elution with higher viscosity methanol (compared with acetonitrile), YMC-Triart generates lower pressure (approx. 30% lower than with conventional phases).

QC Data – Excellent reproducibility

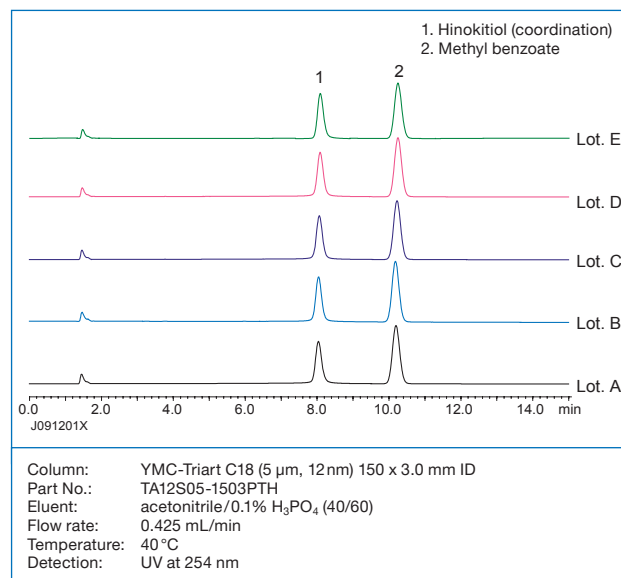
Batch-to-batch reproducibility

Excellent reproducibility of YMC-Triart phases is available even for the analysis of basic and coordination compounds which normally exhibit tailing and adsorption effects.

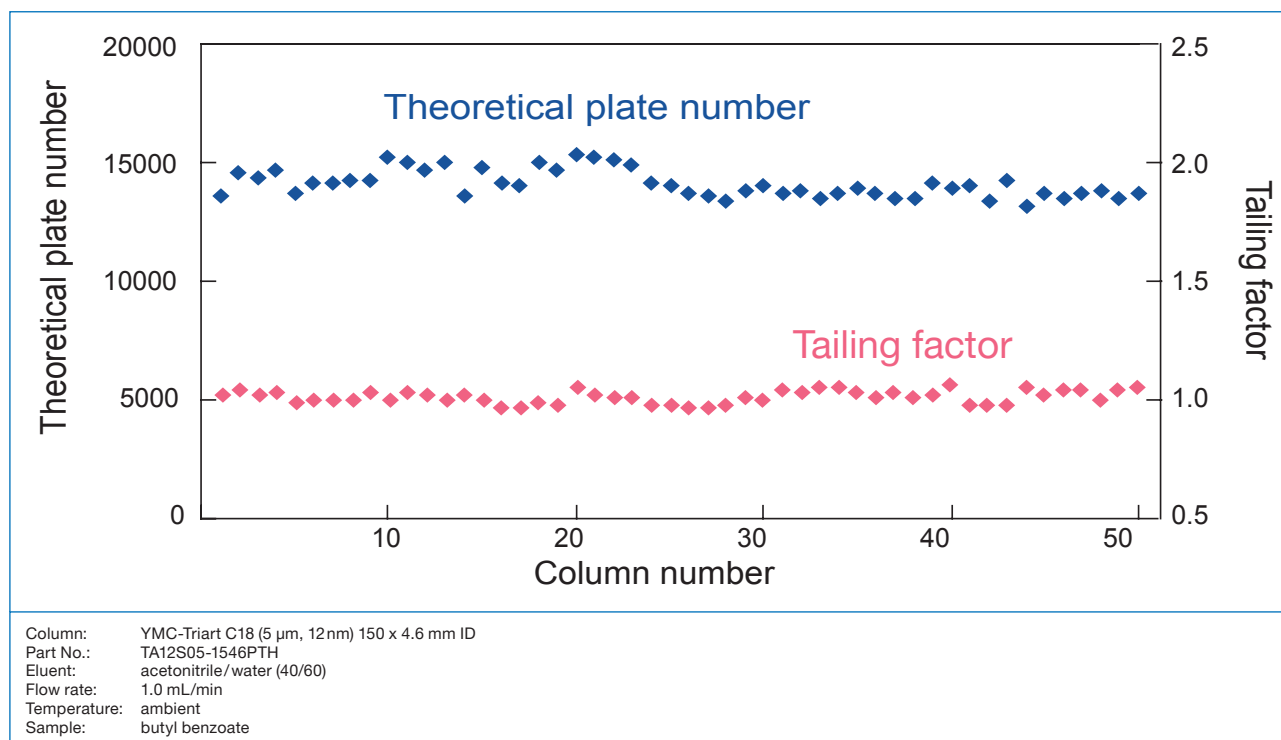
Basic compounds



Coordination compounds

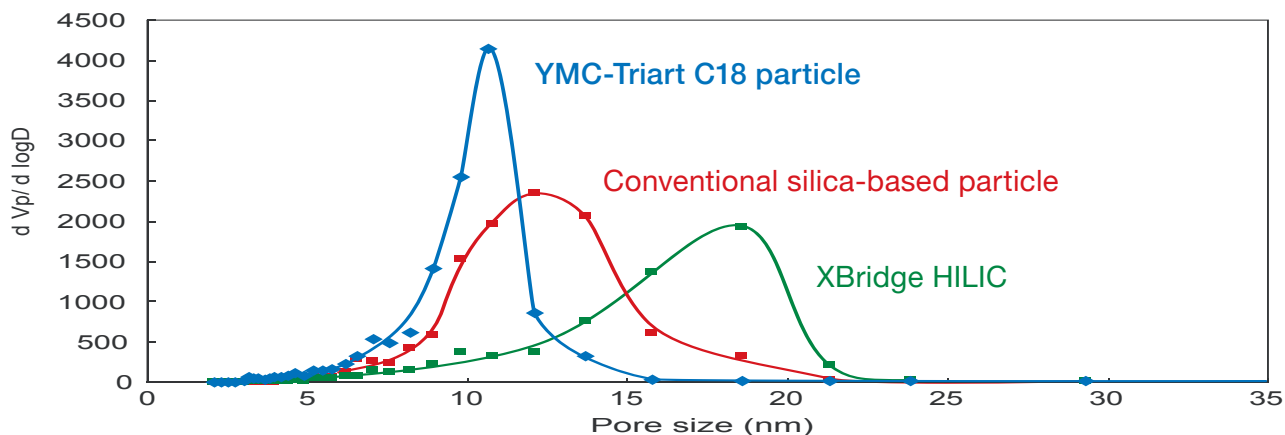


The reproducibility of packed columns is shown below in terms of theoretical plate number (N) and tailing factor (Tf). YMC-Triart packed columns exhibit a very narrow range of variation.



QC Data – High loadability

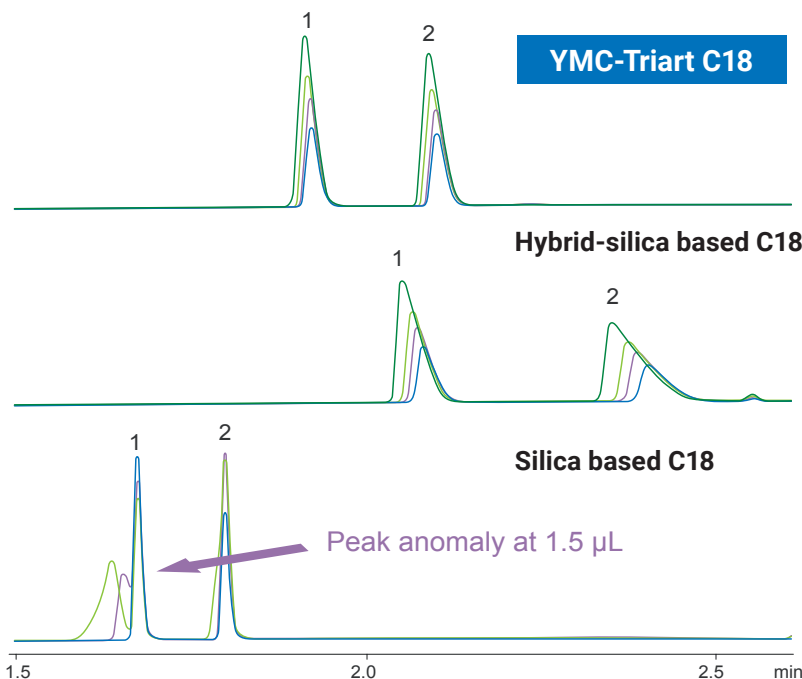
Narrow pore distribution



This figure shows the pore size distributions of some competitive material. Comparing the pore size distributions shows that YMC-Triart has a narrower distribution which results in sharper peak shapes.

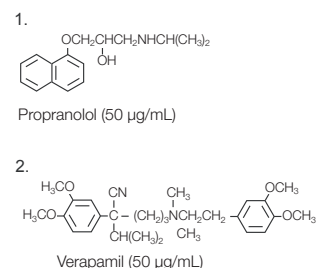
Improved loadability

Influence of injection volume on peak shapes



solvent for sample
acetonitrile

injection volume
1.0 µL
1.5 µL
2.0 µL
3.0 µL



Column: 5 µm, 50 x 2.0 or 2.1 mm ID
Part No.: TA12S05-0502WT
Eluent: A) water + 0.1% formic acid
B) acetonitrile + 0.1% formic acid
Gradient: 5%B (0–0.5 min), 5–100%B (0.5–2.5 min)
Flow rate: 0.4 mL/min
Temperature: 40°C
Detection: UV at 275 nm

In order to prevent peak errors, there is a limit to the injection volume when a sample is injected in high elution solvents (such as 100% acetonitrile). Compared with traditional columns, more than double the injection volume can be injected into YMC-Triart columns as a result of the extremely narrow particle size distribution.

QC Data – Efficient endcapping

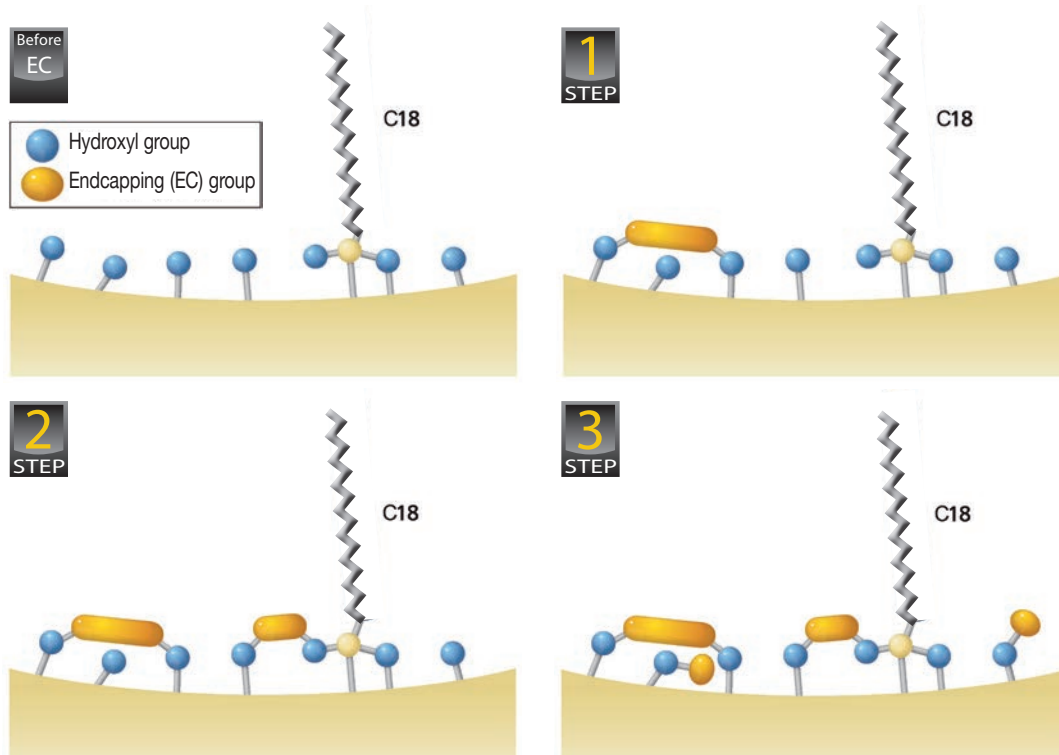
Multi-stage endcapping

After bonding the alkyl chain, there are highly reactive and less reactive silanols on the surface. In traditional bonding processes, these are reacted with a single endcapping-compound in one step.

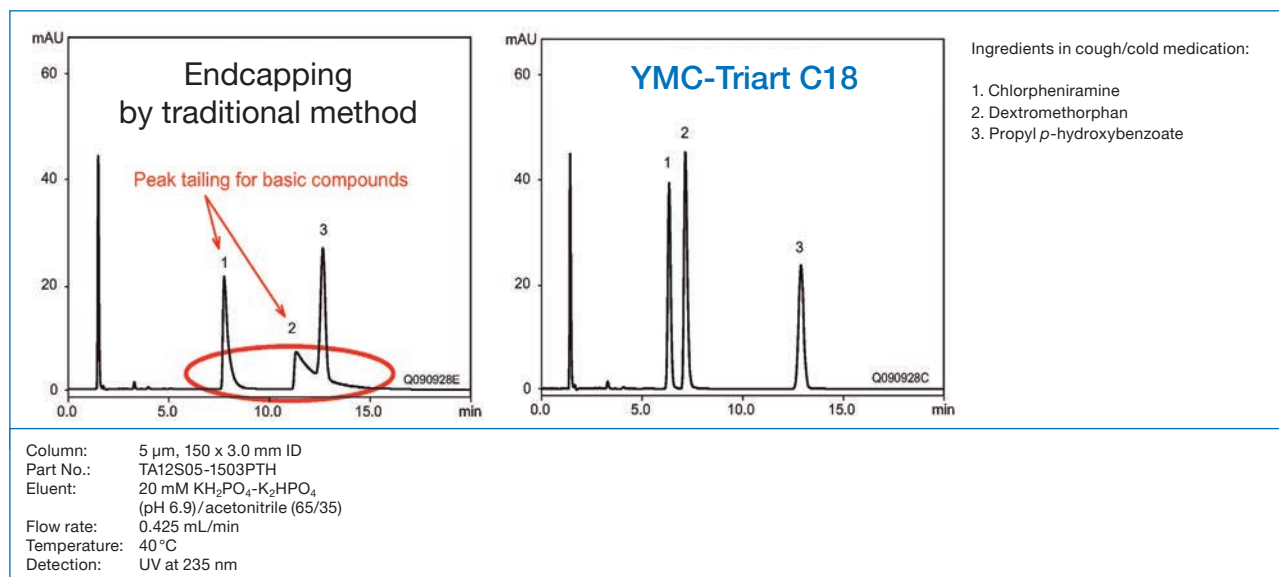
However, the highly reactive silanols can be hydrolysed easily which contributes to the poor stability. The less reactive silanols are hard to endcap which

results in poor resolution due to peak tailing. YMC-Triart phases use an innovation in endcapping called “multi-stage endcapping” for its surface modification process.

By using a number of compounds with different reactivities in successive steps, all silanols can be capped to the maximum extent.

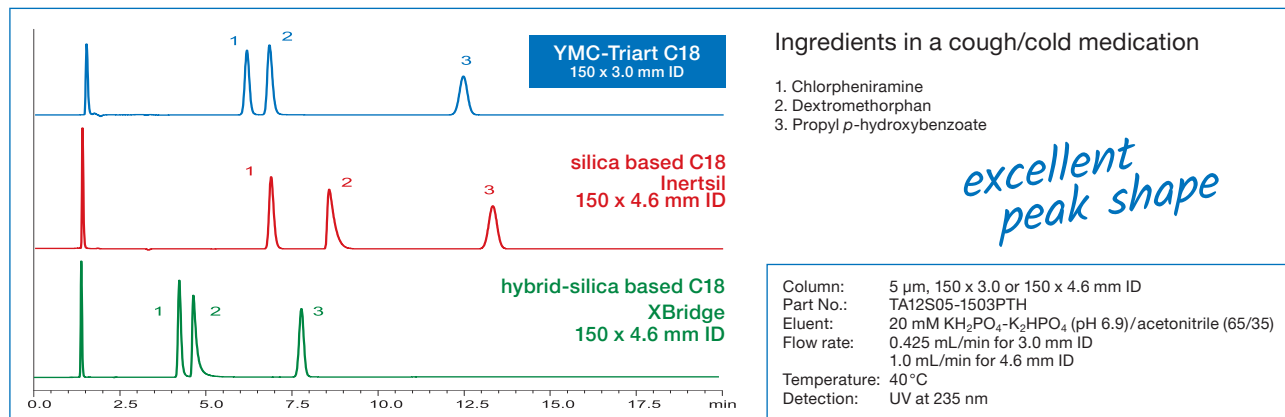


The chromatographic result of a “good” endcapping is demonstrated:



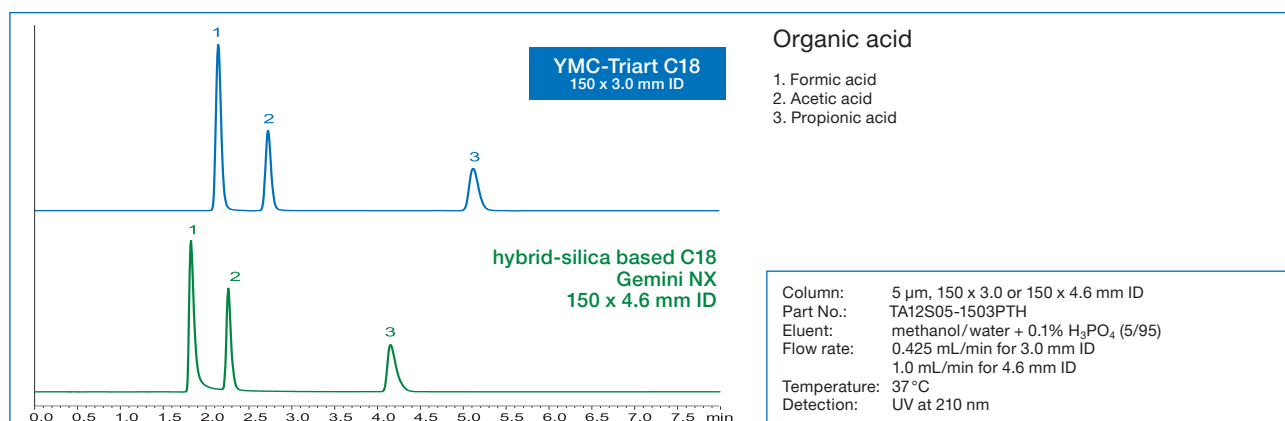
QC Data – Symmetric peaks

Basic compounds



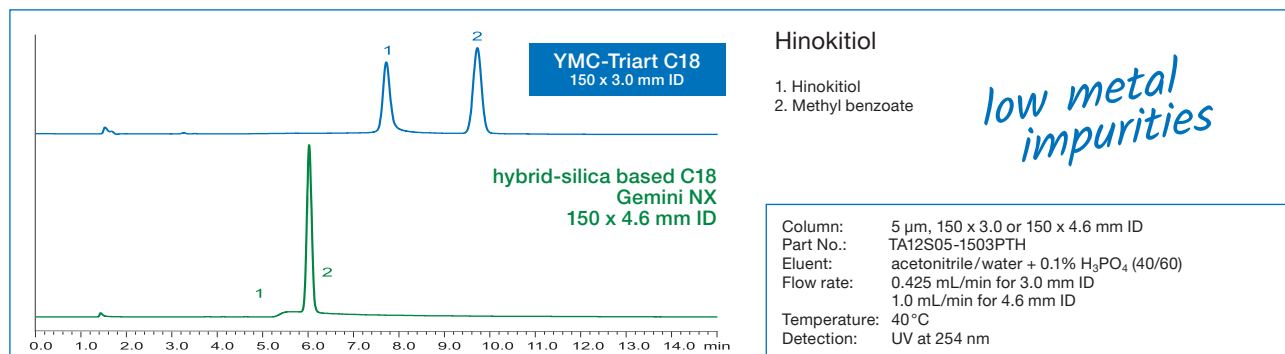
The innovative surface modification technology results in excellent peak shapes even for basic compounds that often exhibit peak tailing with conventional silica- and hybrid silica-based reversed phase columns.

Acidic compounds



YMC-Triart phases are synthesised using methodology adapted from micro-reactor technology. This technique ensures a reduction of impurities that contribute to peak tailing during the analysis of some types of acidic compounds.

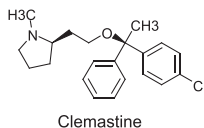
Coordinating compounds



YMC-Triart phases have an extremely low level of metal impurities, much lower than conventional products, ensuring excellent peak shape for coordination compounds.

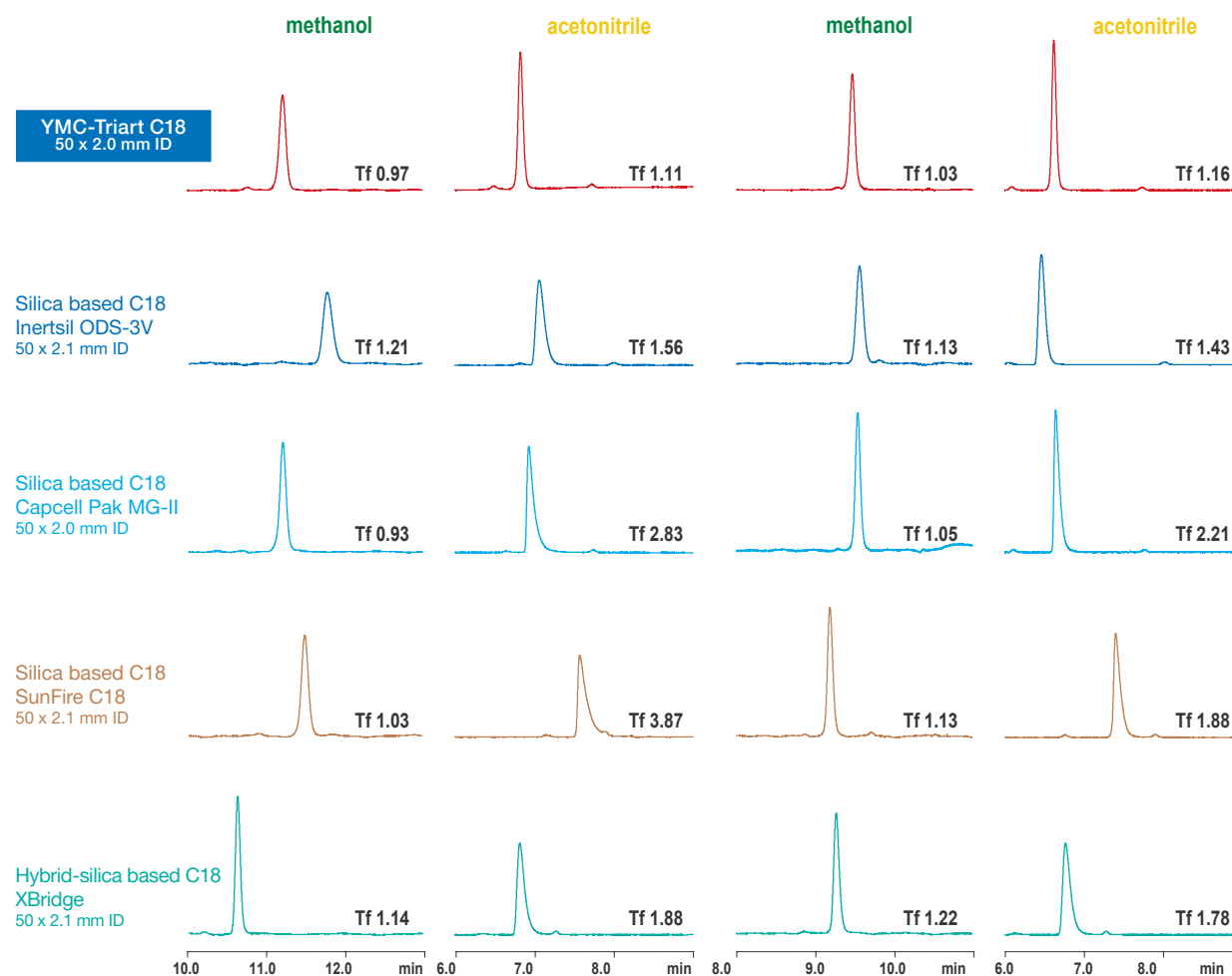
QC Data – Base deactivation

Peak shape comparison of basic compound clemastine



10 mM phosphate buffer (pH 6.7)/organic solvent

10 mM CH₃COONH₄/organic solvent



Column: 5 μ m, 50 x 2.0 or 50 x 2.1 mm ID
 Part No.: TA12S05-0502WT
 Eluent: A) 10 mM KH₂PO₄-K₂HPO₄ (pH 6.7) or 10 mM CH₃COONH₄
 B) methanol or acetonitrile
 Gradient: 5–90%B (0–10 min), 90%B (10–15 min)
 Flow rate: 0.2 mL/min
 Temperature: 25°C
 Detection: UV at 230 nm

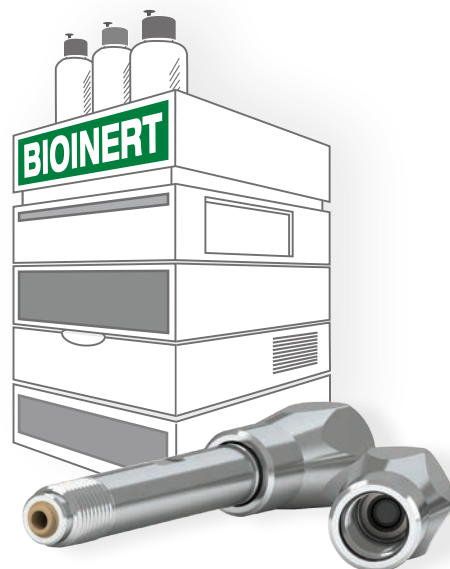
Clemastine is a well-known basic compound which readily exhibits peak tailing with conventional ODS columns. YMC-Triart C18 provides sharp separations with many different buffer/solvent compositions.

Column hardware for bioseparations and coordinating compounds

- Obtain excellent resolution and great sensitivity
- No carry-over effects
- Reproducible results day-after-day!

Specifications	
YMC-Triart Modifications	C18, C18 ExRS, Bio C18, C8, Bio C4, Phenyl, PFP, Diol-HILIC
Particle Size	1.9, 3 and 5 μm
Inner layer	PEEK
Outer layer	Stainless steel
Frit	PEEK
Pressure limit	1.9 μm : 100 MPa (15,000 psi) 3/5 μm : 45 MPa (6,525 psi)

Special column connectors required. See below for recommendations.

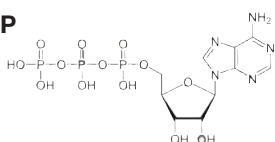


Metal coordinating compounds, which have a phosphate group in their structure, tend to show poor peak shape due to interactions with metals, such as the stainless steel in column bodies and frits. By using the metal-free column hardware, better peak shapes can

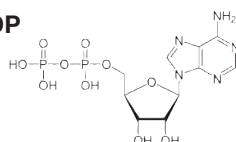
be expected. Nucleotides with phosphate groups also show better peak shapes when compared to the regular column hardware. The YMC-Triart metal-free column hardware is very suitable for highly sensitive analyses using LC/MS.

Improved sensitivity for coordination compounds

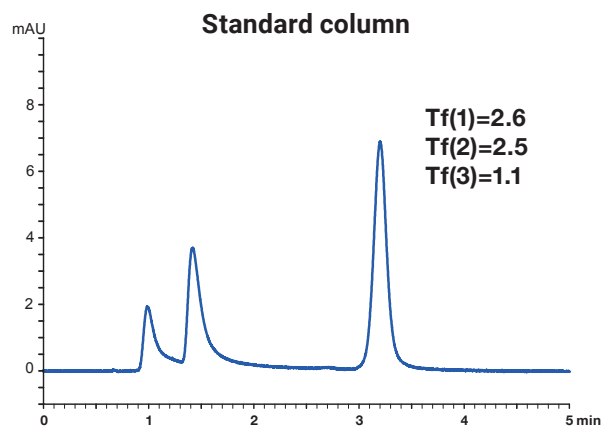
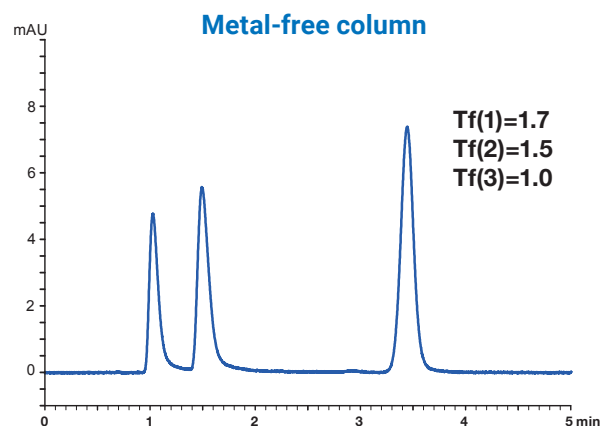
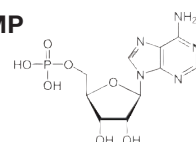
1. ATP



2. ADP



3. AMP

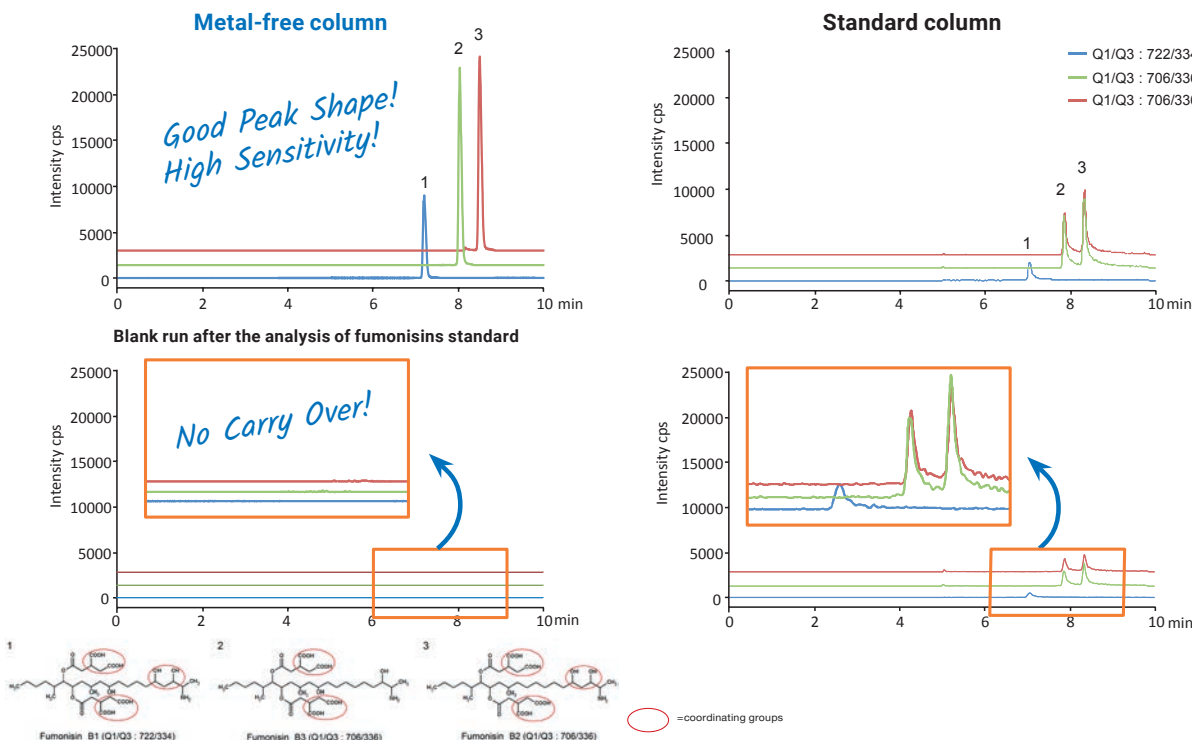


Column: YMC-Triart C18 (3 μm , 12 nm) 50 x 2.1 mm ID
Part Nos.: TA12S03-05Q1PTP (metal-free) or TA12S03-05Q1PTH (regular hardware)
Eluent: 5 mM HCOONH₄
Flow rate: 0.21 mL/min

Temperature: 25 °C
Detection: UV at 265 nm
Injection: 1 μL (10 mg/mL)
System: bioinert/"metal-free" HPLC system

Column hardware for bioseparations and coordinating compounds

Improved LC/MS results



Column: YMC-Triart C18 (metal-free/standard) (3 μ m, 12 nm) 150 x 2.1 mm ID
Part Nos.: TA12S03-15Q1PTP/TA12S03-15Q1PTH
Eluent: A) water/HCOOH (100/0.1)
B) acetonitrile
25–50%B (0–5 min), 50%B (5–8 min), 50–90%B (8–10 min)
Flow rate: 0.2 mL/min

Temperature: 40 °C
Detection: ESI, positive
Schedul MRM (Metal-free column)
MRM (Standard column)
Injection: 5 μ L (0.1 mg/mL)
Instrument: LC) Shimadzu Prominence UFLC, MS) AB Sciex 3200 QTRAP

The YMC-Triart metal-free column showed excellent peak shapes when used to analyse fumonisins, while the regular column showed severe peak tailing due to interactions between the sample and the hardware. No carry over was observed when using the metal-free col-

umn, while the regular column showed sample carry over caused by adsorption of the sample on the hardware. The YMC-Triart metal-free column gives excellent peak shape for these coordination compounds and contributes to reliable analyses.

Column connectors for metal-free (U)HPLC columns

Recommendation	✓ ✓		✓	
Ferrule	no		replaceable	
Product	MarvelX™	MarvelXACT™	Handy connector 2	Hand-tight EXP® fitting
Manufacturer	IDEX Health & Science LLC	IDEX Health & Science LLC	YMC Co., Ltd.	Optimize Technologies, Inc.
				
Pressure rating	131 MPa / 1,310 bar	131 MPa / 1,310 bar	42 MPa / 420 bar	137 MPa / 1,370 bar
Product code	e.g. UPFP-6050250	e.g. UPFP-YM7050250	XRP0204	XRHTF-01

MarvelX (ACT) is a registered trademark of IDEX Health & Science LLC · EXP® is a registered trademark of Optimize Technologies, Inc.

Substance index

A		BSA	40, 41, 42	Delphinidin	33	Glycidic acid	52
Acesulfame K	32	<i>n</i> -Butylparabene	8, 15	Delphinidin-3-O-arabinoside	33	L-Glycine (Gly)	47
Acenaphthene	59	Butyl benzoate	53	Delphinidin-3-O-galactoside	33	Glycitein	38
4-Acetamidoacetophenone	29			Delphinidin-3-O-glucoside	33	Glycitin	38
2-Acetamidophenol	29, 30	C		Deoxycorticosterone	58	Glycyrrhizin acid ammonium salt	25
Acetaminophene	29, 59	Cadaverine	22	Dextromethorphan		Guaiacol	28
Acetaminophenone	29	Caffeine	29, 55, 57, 59		8, 12, 14, 55, 59, 61, 64	Guanine	51, 53
Acetanilide	29, 30	Candesartan cilexetil	24	Diazepam	20	Guanosine	54
Acetic acid	52, 64	Cannabivarin (CBV)	25	Dichlorophenols	18		
6''-O-Acetylaidzin	38	Cannabidiolic acid (CBDA)	25	3,4-Dihydroxymandelic		H	
6''-O-Acetylgenistin	38	Cannabigerol (CBG)	25	acid (DOMA)	23	Halosulfuronmethyl	11
6''-O-Acetylglycitin	38	Cannabidiol (CBD)	25	3,4-Dihydroxyphenylacetic		Hemoglobin (digest)	45
Acetylsalicylic acid	29	Cannabinol (CBN)	25	acid (DOPAC)	23	Herceptin	39
Acidic compounds	52	Cannabicyclol (CBL)	25	3,4-Dihydroxyphenylalanine		Hinokitiol	61, 64
Acrylic acid	52	Cannabichromene (CBC)	25	(DOPA)	23	L-Histidine (His)	46, 47
Adalimumab	39	Carvedilol	24	1,2-Dimethoxyl benzene	28	Homovanillic acid (HVA)	23
Adenine	51, 53	Casein peptide	36	Diquat	31	Humira	39
Adenosine	54	Catechol	57	Docosahexaenoic acid	18	Hydrochlorothiazide	24
Adenosine diphosphate (ADP)	66	Catecholamines	23	Dopamine hydrochloride (DA)	23	2-Hydroxyacetophenone	29
Adenosine monophosphate (AMP)	66	Ceramide-1-phosphate (C1P)	26	Doxycycline	11	α -Hydroxyalprazolam	20
Adenosine triphosphate (ATP)	66	Chavicine	22	Duloxetine	21, 30	Hydrocortison	19, 58
Adrenaline hydrochloride (A)	23	4-Chloroacetanilide	29	Duloxetine isomers	30	5-Hydroxyindoleacetic	
L-Alanine (Ala)	47	Chlorophenol	18			acid (5HIAA)	23
4-Aminophenone	29	Chloroquine phosphate	29	E		Hydroxychloroquine sulfate	29
γ -Aminobutyric acid (GABA)	47	Chlorpheniramine		Egg peptide	36	21-Hydroxyprogesterone	19
Amitriptyline	10, 15, 20		12, 14, 25, 55, 61, 64	Eicosapentaenoic acid	18	Hydroquinone	57
Amlodipine besilate	24	Chlortetracycline	11, 26	β -Endorphin	43, 44	5-Hydroxytryptamine	
Amyloid β	40	Cholecalciferol	16, 17, 57	γ -Endorphin	44	hydrochloride (5HT)	21
Androsterone	59	α -Chymotrypsinogen	40, 42, 43	Epinephrine hydrochloride	23		
Angiotensin I	27	Pre-Cholecalciferol	57	Ergocalciferol	16, 17	I	
Angiotensin II	27	5,6-trans-Cholecalciferol	57	Erythorbic acid	38, 55	Ibuprofen	8, 15, 59
Angiotensin III	27	Citric acid	52	Erythromycin	11, 25	Imipramine	20
Anthocyanidins	33	Citrulline (Cit)	47	Erythromycin estolate	11	Insulin	27, 40, 41, 42, 43
Anthocyanins	33	Clemastine	65	Erythromycin ethylsuccinate	11	D-Isoascorbic acid	53
Antracene	59	Clonazepam	20	α -Estradiol	19	Isochavicine	22
Arachidonic acid	18	Conalbumin	41	β -Estradiol	19	L-Isoleucine (Ile)	46, 47
L-Arginine (Arg)	46, 47	Copper 8-quinolinolate	9	Estradiol	19	Isopiperine	22
L-Ascorbic acid	38, 53, 55	Corticosterone	19, 58	Estriol	19		
L-Ascorbic acid		Cortisol	19	Estrone	19	K	
2-glucoside	38, 53, 55	Cortisone	19	Etizolam	10	Kynamro	48
L-Asparagine (Asn)	47	Cyanidin	33				
L-Aspartic acid (Asp)	46, 47	Cyanidin-3-O-arabinoside	33	F		L	
Asulam	13	Cyanidin-3-O-galactoside	33	Flazasulfuron	11	Lactic acid	52
Atenolol	26	Cyanidin-3-O-glucoside	33	Fluoxymestron	59	Lactoferrin	41
Atorvastatin calcium hydrate	24	Cyanocobalamin	38, 53, 55	Folic acid	53	β -Lactoglobulin A	40, 42, 43
Avastin	43	Cyclamate Na	32	Formic acid	52, 64	L-Leucine (Leu)	46, 47
Azoxystrobin	9	L-Cysteine (Cys)	47	Fumaric acid	52	Leu-Enkephalin	43, 44
		Cytidine	54	Fumonisin B1-3	67	Linoleic acid	18
B		Cytochrom-C	40, 42			α -Linolenic acid	18
Benzethonium chloride	25	Cytosine	51, 53, 54	G		γ -Linolenic acid	18
Betablockers	26			Genistein	38	L-Lysine (Lys)	21, 47
Bevacizumab	39	D		Genistin	38	Lysozyme	42, 43
D-Biotin	53	Daidzein	38	L-Glutamic acid (Glu)	47		
Biphenyl	59	Daidzin	38	L-Glutamine (Gln)	47		
Bovine insulin	25	Dehydroisoandrosterone	58	Gluten markers	34, 35		

Substance index

M		Oxalic acid		52	R		Thiamine HCl		38, 53, 55
MabThera	39	Oxazepam	20	Rebaudioside A	33	Thiram		11	
Macrolide antibiotics	5	Oxine-copper	13	Resorcinol	57	L-Threonine (Thr)		47	
Maleic acid sodium salt	27	Oxytetracycline	11	Riboflavin	38, 53, 55	Thymine		51, 53	
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6''-O-Malonyldaidzin	38	P		siRNA	49	Trastuzumab		39	
6''-O-Malonylgenistin	38	Palmitoleic acid	18			Triazolam		10	
6''-O-Malonylglycitin	38	D-(+)-Pantothenic acid		S		Triclopyr		11	
Malvidin	33	calcium salt	53	Saccharin	11, 32	Trigonelline HCl		57	
Malvidin-3-O-arabinoside	33	Paracetamol	28	Salicylic acid	29	Triphenylene		15, 59	
Malvidin-3-O-galactoside	33	Paraquat	31	L-Serine (Ser)	47	L-Tryptophan (Trp)		23, 47	
Malvidin-3-O-glucoside	33	Peonidin	33	Serotonin hydrochloride	23	L-Tyrosine (Tyr)		21, 47	
Mecoprop	11	Peonidin-3-O-arabinoside	33	Siduron	9				
Met-Enkephalin	40, 44	Peonidin-3-O-galactoside	33	Spermidine	22	U			
L- Methionine (Met)	46, 47	Peonidin-3-O-glucoside	33	Spermine	22	Uracil	27, 50, 51, 53, 54		
3-Methoxy-4-hydroxyphenylglycol		Peptides	33, 45	Sphingosine-1-phosphate (S1P)	26	Uridine		54	
(MHPG)	23	Pesticides	31	Soy isoflavones	38				
3-Methoxytyramine		Petunidin	33	Spiramycin	27	V			
hydrochloride (3MT)	23	Petunidin-3-O-arabinoside	33	Stevioside hydrate	33	L-Valine (Val)	46, 47		
Methyl benzoate	28, 61	Petunidin-3-O-galactoside	33	Succinic acid	52	Valsartan		24	
Metoprolol	26	Petunidin-3-O-glucoside	33	Sulphamerazine	27	Vanillylmandelic acid (VMA)		23	
Mipomersen	48	Phenacetine	29	Sulphamethoxazole	27	Verapamil		62	
		Phenol	28, 57	Sulphathiazole	27	Veterinary drugs		37	
N		L-Phenylalanine (Phe)	47			Vitamin B1	38, 53, 55		
Nadolol	26	Phloroglucinol	57	T		Vitamin B2	38, 53, 55		
Naphazolin HCl	25	Pindolol	26	Tachysterol3	57	Vitamin B3	38, 53, 55		
Naphthalene	15, 59	Piperine	22	Tartaric acid	52	Vitamin B5	53		
Neostigmine methylsulfate	25	Porcine insulin	25	Temazepam	20	Vitamin B6	38, 53, 55		
Neurotensin	44	Prednisone	19	m-Terpheny	59	Vitamin B7	53		
Nicotinamide	38, 53, 55	Progesterone	19, 58	o-Terphenyl	15, 59	Vitamin B12	38, 53, 55		
Nicotinic acid	38, 53, 55	L-Proline (Pro)	47	p-Terpheny	59	Vitamin C	38, 53, 55		
NISTmAb	39	Propranolol	26	Testosterone	15, 59	Vitamin D2	16, 17		
4-Nitrophenol	28	Propionic acid	52, 64	Tetracycline	13	Vitamin D3	16, 17		
Noradrenaline hydrochloride (NA)	23	n-Propyl paraben	11, 14, 15	Tetrahydrocannabivarin (THCV)	25				
Norepinephrine hydrochloride	23	Propyl p-hydroxybenzoate	61, 64	Delta-9-tetrahydrocannabinol		W			
Nortriptyline	20	Putrescine	22	(Δ9-THC)	25	Water-soluble vitamins	38, 53, 55		
		Pyridoxal HCl	53	Delta-8-tetrahydrocannabinol					
O		Pyridoxine HCl	25, 38, 55	(Δ8-THC)	25				
Oleic acid	18	Pyrocatechol	28	Tetrahydrocannabinolic acid					
Oligonucleotides	48, 49	Pyrogallol	57	(THCA)	25				
Ornithine HCl (Orn)	47			Tetrahydrozoline HCl	25				
Orotic acid	55	Q		Theobromine	57				
Ovalbumin	41, 42	8-Quinolinol	15	Theophylline	57				

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Ordering information

YMC-Triart 1.9 µm, UHPLC columns (max. pressure 1,000 bar)

Phase	Column ID (mm)	Column length (mm)						Guard cartridges* with 5 mm length
		20	30	50	75	100	150	(pack of 3)
C18	2.0	TA12SP9-0202PT	TA12SP9-0302PT	TA12SP9-0502PT	TA12SP9-L502PT	TA12SP9-1002PT	TA12SP9-1502PT	TA12SP9-E5Q1CC**
	2.1	TA12SP9-02Q1PT	TA12SP9-03Q1PT	TA12SP9-05Q1PT	TA12SP9-L5Q1PT	TA12SP9-10Q1PT	TA12SP9-15Q1PT	TA12SP9-E5Q1CC**
	3.0	—	—	TA12SP9-0503PT	TA12SP9-L503PT	TA12SP9-1003PT	TA12SP9-1503PT	TA12SP9-E503CC
C18 ExRS	2.0	TAR08SP9-0202PT	TAR08SP9-0302PT	TAR08SP9-0502PT	TAR08SP9-L502PT	TAR08SP9-1002PT	TAR08SP9-1502PT	TAR08SP9-E5Q1CC**
	2.1	TAR08SP9-02Q1PT	TAR08SP9-03Q1PT	TAR08SP9-05Q1PT	TAR08SP9-L5Q1PT	TAR08SP9-10Q1PT	TAR08SP9-15Q1PT	TAR08SP9-E5Q1CC**
	3.0	—	—	TAR08SP9-0503PT	TAR08SP9-L503PT	TAR08SP9-1003PT	TAR08SP9-1503PT	TAR08SP9-E503CC
Bio C18	2.0	TA30SP9-0202PT	TA30SP9-0302PT	TA30SP9-0502PT	TA30SP9-L502PT	TA30SP9-1002PT	TA30SP9-1502PT	TA30SP9-E5Q1CC**
	2.1	TA30SP9-02Q1PT	TA30SP9-03Q1PT	TA30SP9-05Q1PT	TA30SP9-L5Q1PT	TA30SP9-10Q1PT	TA30SP9-15Q1PT	TA30SP9-E5Q1CC**
	3.0	—	—	TA30SP9-0503PT	TA30SP9-L503PT	TA30SP9-1003PT	TA30SP9-1503PT	TA30SP9-E503CC
C8	2.0	TO12SP9-0202PT	TO12SP9-0302PT	TO12SP9-0502PT	TO12SP9-L502PT	TO12SP9-1002PT	TO12SP9-1502PT	TO12SP9-E5Q1CC**
	2.1	TO12SP9-02Q1PT	TO12SP9-03Q1PT	TO12SP9-05Q1PT	TO12SP9-L5Q1PT	TO12SP9-10Q1PT	TO12SP9-15Q1PT	TO12SP9-E5Q1CC**
	3.0	—	—	TO12SP9-0503PT	TO12SP9-L503PT	TO12SP9-1003PT	TO12SP9-1503PT	TO12SP9-E503CC
Bio C4	2.0	TB30SP9-0202PT	TB30SP9-0302PT	TB30SP9-0502PT	TB30SP9-L502PT	TB30SP9-1002PT	TB30SP9-1502PT	TB30SP9-E5Q1CC**
	2.1	TB30SP9-02Q1PT	TB30SP9-03Q1PT	TB30SP9-05Q1PT	TB30SP9-L5Q1PT	TB30SP9-10Q1PT	TB30SP9-15Q1PT	TB30SP9-E5Q1CC**
	3.0	—	—	TB30SP9-0503PT	TB30SP9-L503PT	TB30SP9-1003PT	TB30SP9-1503PT	TB30SP9-E503CC
Phenyl	2.0	TPH12SP9-0202PT	TPH12SP9-0302PT	TPH12SP9-0502PT	TPH12SP9-L502PT	TPH12SP9-1002PT	TPH12SP9-1502PT	TPH12SP9-E5Q1CC**
	2.1	TPH12SP9-02Q1PT	TPH12SP9-03Q1PT	TPH12SP9-05Q1PT	TPH12SP9-L5Q1PT	TPH12SP9-10Q1PT	TPH12SP9-15Q1PT	TPH12SP9-E5Q1CC**
	3.0	—	—	TPH12SP9-0503PT	TPH12SP9-L503PT	TPH12SP9-1003PT	TPH12SP9-1503PT	TPH12SP9-E503CC
PFP	2.0	TPF12SP9-0202PT	TPF12SP9-0302PT	TPF12SP9-0502PT	TPF12SP9-L502PT	TPF12SP9-1002PT	TPF12SP9-1502PT	TPF12SP9-E5Q1CC**
	2.1	TPF12SP9-02Q1PT	TPF12SP9-03Q1PT	TPF12SP9-05Q1PT	TPF12SP9-L5Q1PT	TPF12SP9-10Q1PT	TPF12SP9-15Q1PT	TPF12SP9-E5Q1CC**
	3.0	—	—	TPF12SP9-0503PT	TPF12SP9-L503PT	TPF12SP9-1003PT	TPF12SP9-1503PT	TPF12SP9-E503CC
Diol-HILIC	2.0	TDH12SP9-0202PT	TDH12SP9-0302PT	TDH12SP9-0502PT	TDH12SP9-L502PT	TDH12SP9-1002PT	TDH12SP9-1502PT	TDH12SP9-E5Q1CC**
	2.1	TDH12SP9-02Q1PT	TDH12SP9-03Q1PT	TDH12SP9-05Q1PT	TDH12SP9-L5Q1PT	TDH12SP9-10Q1PT	TDH12SP9-15Q1PT	TDH12SP9-E5Q1CC**
	3.0	—	—	TDH12SP9-0503PT	TDH12SP9-L503PT	TDH12SP9-1003PT	—	—
Diol*** (SFC)	2.0	TDH12SP9-0202PTB	TDH12SP9-0302PTB	TDH12SP9-0502PTB	TDH12SP9-L502PTB	TDH12SP9-1002PTB	TDH12SP9-1502PTB	—
	2.1	TDH12SP9-02Q1PTB	TDH12SP9-03Q1PTB	TDH12SP9-05Q1PTB	TDH12SP9-L5Q1PTB	TDH12SP9-10Q1PTB	TDH12SP9-15Q1PTB	—
	3.0	—	—	TDH12SP9-0503PTB	TDH12SP9-L503PTB	TDH12SP9-1003PTB	—	—

*Guard cartridge holder required, part no. XPCUHP

**Guard cartridge: 2.1 mm ID

***Supplied as YMC-Triart Diol-HILIC shipped on 2-propanol

TIP

In order to achieve longer column lengths, columns of 2 x 100 mm or 100 + 150 mm can be coupled by using a MarvelX column coupler (70 mm x 125 µm ID, Part No. UPFS-YM6125070).

Ordering information

YMC-Triart 1.9 µm, metal-free UHPLC columns (max. pressure 1,000 bar)

Phase	Column ID (mm)	Column length (mm)		
		50	100	150
C18	2.1	TA12SP9-05Q1PTP	TA12SP9-10Q1PTP	TA12SP9-15Q1PTP
C18 ExRS	2.1	TAR08SP9-05Q1PTP	TAR08SP9-10Q1PTP	TAR08SP9-15Q1PTP
Bio C18	2.1	TA30SP9-05Q1PTP	TA30SP9-10Q1PTP	TA30SP9-15Q1PTP
C8	2.1	T012SP9-05Q1PTP	T012SP9-10Q1PTP	T012SP9-15Q1PTP
Bio C4	2.1	TB30SP9-05Q1PTP	TB30SP9-10Q1PTP	TB30SP9-15Q1PTP
Phenyl	2.1	TPH12SP9-05Q1PTP	TPH12SP9-10Q1PTP	TPH12SP9-15Q1PTP
PFP	2.1	TPF12SP9-05Q1PTP	TPF12SP9-10Q1PTP	TPF12SP9-15Q1PTP
Diol-HILIC	2.1	TDH12SP9-05Q1PTP	TDH12SP9-10Q1PTP	TDH12SP9-15Q1PTP

YMC-Triart 1.9 µm, 1/16" | 1/32" fitting*, microLC capillary columns (max. pressure 600 bar)

Phase	Column ID (µm)	Column length (mm)				Guard cartridges** with 5 mm length
		50	75	100	150	
C18	300	TA12SP9-05H0AU	TA12SP9-L5H0AU	TA12SP9-10H0AU	TA12SP9-15H0AU	TA12SP9-E5H0AU
	500	TA12SP9-05J0AU	TA12SP9-L5J0AU	TA12SP9-10J0AU	TA12SP9-15J0AU	TA12SP9-E5J0AU
C18 ExRS	300	TAR08SP9-05H0AU	TAR08SP9-L5H0AU	TAR08SP9-10H0AU	TAR08SP9-15H0AU	TAR08SP9-E5H0AU
	500	TAR08SP9-05J0AU	TAR08SP9-L5J0AU	TAR08SP9-10J0AU	TAR08SP9-15J0AU	TAR08SP9-E5J0AU
Bio C18	300	TA30SP9-05H0AU	TA30SP9-L5H0AU	TA30SP9-10H0AU	TA30SP9-15H0AU	TA30SP9-E5H0AU
	500	TA30SP9-05J0AU	TA30SP9-L5J0AU	TA30SP9-10J0AU	TA30SP9-15J0AU	TA30SP9-E5J0AU
C8	300	T012SP9-05H0AU	T012SP9-L5H0AU	T012SP9-10H0AU	T012SP9-15H0AU	T012SP9-E5H0AU
	500	T012SP9-05J0AU	T012SP9-L5J0AU	T012SP9-10J0AU	T012SP9-15J0AU	T012SP9-E5J0AU
Bio C4	300	TB30SP9-05H0AU	TB30SP9-L5H0AU	TB30SP9-10H0AU	TB30SP9-15H0AU	TB30SP9-E5H0AU
	500	TB30SP9-05J0AU	TB30SP9-L5J0AU	TB30SP9-10J0AU	TB30SP9-15J0AU	TB30SP9-E5J0AU
Phenyl	300	TPH12SP9-05H0AU	TPH12SP9-L5H0AU	TPH12SP9-10H0AU	TPH12SP9-15H0AU	TPH12SP9-E5H0AU
	500	TPH12SP9-05J0AU	TPH12SP9-L5J0AU	TPH12SP9-10J0AU	TPH12SP9-15J0AU	TPH12SP9-E5J0AU
PFP	300	TPF12SP9-05H0AU	TPF12SP9-L5H0AU	TPF12SP9-10H0AU	TPF12SP9-15H0AU	TPF12SP9-E5H0AU
	500	TPF12SP9-05J0AU	TPF12SP9-L5J0AU	TPF12SP9-10J0AU	TPF12SP9-15J0AU	TPF12SP9-E5J0AU
Diol-HILIC	300	TDH12SP9-05H0AU	TDH12SP9-L5H0AU	TDH12SP9-10H0AU	TDH12SP9-15H0AU	TDH12SP9-E5H0AU
	500	TDH12SP9-05J0AU	TDH12SP9-L5J0AU	TDH12SP9-10J0AU	TDH12SP9-15J0AU	TDH12SP9-E5J0AU

* YMC capillary columns are available with 1/16" (10-32 thread) or with 1/32" (6-40 thread) connections.

The connection size is indicated by the terminal letters of the order code:

1/16" fittings end with AU; 1/32" fittings end with RU. For ordering 1/32" connections, simply exchange AU by RU.

** no holder required, comes with a column coupler

Columns with 1/32" fitting are only available with 300 or 500 µm ID.

Ordering information

YMC-Triart 3 µm, high pressure rated analytical columns (max. pressure 450 bar)

Phase	Column ID (mm)	Column length (mm)							Guard cartridges* with 10 mm length
		20	33	50	75	100	150	250	
C18	2.1	TA12S03-02Q1PTH	TA12S03-H3Q1PTH	TA12S03-05Q1PTH	TA12S03-L5Q1PTH	TA12S03-10Q1PTH	TA12S03-15Q1PTH	—	TA12S03-01Q1GC
	3.0	—	—	TA12S03-0503PTH	TA12S03-L503PTH	TA12S03-1003PTH	TA12S03-1503PTH	—	TA12S03-0103GC
	4.6	—	TA12S03-H346PTH	TA12S03-0546PTH	TA12S03-L546PTH	TA12S03-1046PTH	TA12S03-1546PTH	TA12S03-2546PTH	TA12S03-0104GC
C18 ExRS	2.1	TAR08S03-02Q1PTH	TAR08S03-H3Q1PTH	TAR08S03-05Q1PTH	TAR08S03-L5Q1PTH	TAR08S03-10Q1PTH	TAR08S03-15Q1PTH	—	TAR08S03-01Q1GC
	3.0	—	—	TAR08S03-0503PTH	TAR08S03-L503PTH	TAR08S03-1003PTH	TAR08S03-1503PTH	—	TAR08S03-0103GC
	4.6	—	TAR08S03-H346PTH	TAR08S03-0546PTH	TAR08S03-L546PTH	TAR08S03-1046PTH	TAR08S03-1546PTH	TAR08S03-2546PTH	TAR08S03-0104GC
Bio C18	2.1	TA30S03-02Q1PTH	TA30S03-H3Q1PTH	TA30S03-05Q1PTH	TA30S03-L5Q1PTH	TA30S03-10Q1PTH	TA30S03-15Q1PTH	—	TA30S03-01Q1GC
	3.0	—	—	TA30S03-0503PTH	TA30S03-L503PTH	TA30S03-1003PTH	TA30S03-1503PTH	—	TA30S03-0103GC
	4.6	—	TA30S03-H346PTH	TA30S03-0546PTH	TA30S03-L546PTH	TA30S03-1046PTH	TA30S03-1546PTH	TA30S03-2546PTH	TA30S03-0104GC
C8	2.1	T012S03-02Q1PTH	T012S03-H3Q1PTH	T012S03-05Q1PTH	T012S03-L5Q1PTH	T012S03-10Q1PTH	T012S03-15Q1PTH	—	T012S03-01Q1GC
	3.0	—	—	T012S03-0503PTH	T012S03-L503PTH	T012S03-1003PTH	T012S03-1503PTH	—	T012S03-0103GC
	4.6	—	T012S03-H346PTH	T012S03-0546PTH	T012S03-L546PTH	T012S03-1046PTH	T012S03-1546PTH	T012S03-2546PTH	T012S03-0104GC
Bio C4	2.1	TB30S03-02Q1PTH	TB30S03-H3Q1PTH	TB30S03-05Q1PTH	TB30S03-L5Q1PTH	TB30S03-10Q1PTH	TB30S03-15Q1PTH	—	TB30S03-01Q1GC
	3.0	—	—	TB30S03-0503PTH	TB30S03-L503PTH	TB30S03-1003PTH	TB30S03-1503PTH	—	TB30S03-0103GC
	4.6	—	TB30S03-H346PTH	TB30S03-0546PTH	TB30S03-L546PTH	TB30S03-1046PTH	TB30S03-1546PTH	TB30S03-2546PTH	TB30S03-0104GC
Phenyl	2.1	TPH12S03-02Q1PTH	TPH12S03-H3Q1PTH	TPH12S03-05Q1PTH	TPH12S03-L5Q1PTH	TPH12S03-10Q1PTH	TPH12S03-15Q1PTH	—	TPH12S03-01Q1GC
	3.0	—	—	TPH12S03-0503PTH	TPH12S03-L503PTH	TPH12S03-1003PTH	TPH12S03-1503PTH	—	TPH12S03-0103GC
	4.6	—	TPH12S03-H346PTH	TPH12S03-0546PTH	TPH12S03-L546PTH	TPH12S03-1046PTH	TPH12S03-1546PTH	TPH12S03-2546PTH	TPH12S03-0104GC
PPF	2.1	TPF12S03-02Q1PTH	TPF12S03-H3Q1PTH	TPF12S03-05Q1PTH	TPF12S03-L5Q1PTH	TPF12S03-10Q1PTH	TPF12S03-15Q1PTH	—	TPF12S03-01Q1GC
	3.0	—	—	TPF12S03-0503PTH	TPF12S03-L503PTH	TPF12S03-1003PTH	TPF12S03-1503PTH	—	TPF12S03-0103GC
	4.6	—	TPF12S03-H346PTH	TPF12S03-0546PTH	TPF12S03-L546PTH	TPF12S03-1046PTH	TPF12S03-1546PTH	TPF12S03-2546PTH	TPF12S03-0104GC
Diol-HILIC	2.1	TDH12S03-02Q1PTH	TDH12S03-H3Q1PTH	TDH12S03-05Q1PTH	TDH12S03-L5Q1PTH	TDH12S03-10Q1PTH	TDH12S03-15Q1PTH	—	TDH12S03-01Q1GC
	3.0	—	—	TDH12S03-0503PTH	TDH12S03-L503PTH	TDH12S03-1003PTH	TDH12S03-1503PTH	—	TDH12S03-0103GC
	4.6	—	TDH12S03-H346PTH	TDH12S03-0546PTH	TDH12S03-L546PTH	TDH12S03-1046PTH	TDH12S03-1546PTH	TDH12S03-2546PTH	TDH12S03-0104GC
Diol** (SFC)	2.1	TDH12S03-02Q1PTHB	TDH12S03-H3Q1PTHB	TDH12S03-05Q1PTHB	TDH12S03-L5Q1PTHB	TDH12S03-10Q1PTHB	TDH12S03-15Q1PTHB	—	—
	3.0	—	—	TDH12S03-0503PTHB	TDH12S03-L503PTHB	TDH12S03-1003PTHB	TDH12S03-1503PTHB	—	—
	4.6	—	TDH12S03-H346PTHB	TDH12S03-0546PTHB	TDH12S03-L546PTHB	TDH12S03-1046PTHB	TDH12S03-1546PTHB	TDH12S03-2546PTHB	—
SIL (SFC)	2.1	TS12S03-02Q1PTH	TS12S03-H3Q1PTH	TS12S03-05Q1PTH	TS12S03-L5Q1PTH	TS12S03-10Q1PTH	TS12S03-15Q1PTH	—	—
	3.0	—	—	TS12S03-0503PTH	TS12S03-L503PTH	TS12S03-1003PTH	TS12S03-1503PTH	—	—
	4.6	—	TS12S03-H346PTH	TS12S03-0546PTH	TS12S03-L546PTH	TS12S03-1046PTH	TS12S03-1546PTH	TS12S03-2546PTH	—

*Guard cartridge holder required, part no. XPGCH-Q1

**Supplied as YMC-Triart Diol-HILIC shipped on 2-propanol

Ordering information

YMC-Triart 3 µm, metal-free analytical columns (max. pressure 450 bar)

Phase	Column ID (mm)	Column length (mm)		
		50	100	150
C18	2.1	TA12S03-05Q1PTP	TA12S03-10Q1PTP	TA12S03-15Q1PTP
	4.6	TA12S03-0546PTP	TA12S03-1046PTP	TA12S03-1546PTP
C18 ExRS	2.1	TAR08S03-05Q1PTP	TAR08S03-10Q1PTP	TAR08S03-15Q1PTP
	4.6	TAR08S03-0546PTP	TAR08S03-1046PTP	TAR08S03-1546PTP
Bio C18	2.1	TA30S03-05Q1PTP	TA30S03-10Q1PTP	TA30S03-15Q1PTP
	4.6	TA30S03-0546PTP	TA30S03-1046PTP	TA30S03-1546PTP
C8	2.1	T012S03-05Q1PTP	T012S03-10Q1PTP	T012S03-15Q1PTP
	4.6	T012S03-0546PTP	T012S03-1046PTP	T012S03-1546PTP
Bio C4	2.1	TB30S03-05Q1PTP	TB30S03-10Q1PTP	TB30S03-15Q1PTP
	4.6	TB30S03-0546PTP	TB30S03-1046PTP	TB30S03-1546PTP
Phenyl	2.1	TPH12S03-05Q1PTP	TPH12S03-10Q1PTP	TPH12S03-15Q1PTP
	4.6	TPH12S03-0546PTP	TPH12S03-1046PTP	TPH12S03-1546PTP
PFP	2.1	TPF12S03-05Q1PTP	TPF12S03-10Q1PTP	TPF12S03-15Q1PTP
	4.6	TPF12S03-0546PTP	TPF12S03-1046PTP	TPF12S03-1546PTP
Diol-HILIC	2.1	TDH12S03-05Q1PTP	TDH12S03-10Q1PTP	TDH12S03-15Q1PTP
	4.6	TDH12S03-0546PTP	TDH12S03-1046PTP	TDH12S03-1546PTP

YMC-Triart 3 µm, analytical columns (max. pressure 200/250 bar)

Phase	Column ID (mm)	Column length (mm)							Guard cartridges* with 10 mm length
		20	30	50	75	100	150	250	
C18	2.0	TA12S03-0202WT	TA12S03-0302WT	TA12S03-0502WT	TA12S03-L502WT	TA12S03-1002WT	TA12S03-1502WT	—	TA12S03-01Q1GC
	3.0	—	—	TA12S03-0503WT	TA12S03-L503WT	TA12S03-1003WT	TA12S03-1503WT	—	TA12S03-0103GC
	4.6	—	—	TA12S03-0546WT	TA12S03-L546WT	TA12S03-1046WT	TA12S03-1546WT	TA12S03-2546WT	TA12S03-0104GC
C8	2.0	T012S03-0202WT	T012S03-0302WT	T012S03-0502WT	T012S03-L502WT	T012S03-1002WT	T012S03-1502WT	—	T012S03-01Q1GC
	3.0	—	—	T012S03-0503WT	T012S03-L503WT	T012S03-1003WT	T012S03-1503WT	—	T012S03-0103GC
	4.6	—	—	T012S03-0546WT	T012S03-L546WT	T012S03-1046WT	T012S03-1546WT	T012S03-2546WT	T012S03-0104GC
Phenyl	2.0	TPH12S03-0202WT	TPH12S03-0302WT	TPH12S03-0502WT	TPH12S03-L502WT	TPH12S03-1002WT	TPH12S03-1502WT	—	TPH12S03-01Q1GC
	3.0	—	—	TPH12S03-0503WT	TPH12S03-L503WT	TPH12S03-1003WT	TPH12S03-1503WT	—	TPH12S03-0103GC
	4.6	—	—	TPH12S03-0546WT	TPH12S03-L546WT	TPH12S03-1046WT	TPH12S03-1546WT	TPH12S03-2546WT	TPH12S03-0104GC
PFP	2.0	TPF12S03-0202WT	TPF12S03-0302WT	TPF12S03-0502WT	TPF12S03-L502WT	TPF12S03-1002WT	TPF12S03-1502WT	—	TPF12S03-01Q1GC
	3.0	—	—	TPF12S03-0503WT	TPF12S03-L503WT	TPF12S03-1003WT	TPF12S03-1503WT	—	TPF12S03-0103GC
	4.6	—	—	TPF12S03-0546WT	TPF12S03-L546WT	TPF12S03-1046WT	TPF12S03-1546WT	TPF12S03-2546WT	TPF12S03-0104GC
Diol-HILIC	2.0	TDH12S03-0202WT	TDH12S03-0302WT	TDH12S03-0502WT	TDH12S03-L502WT	TDH12S03-1002WT	TDH12S03-1502WT	—	TDH12S03-01Q1GC
	3.0	—	—	TDH12S03-0503WT	TDH12S03-L503WT	TDH12S03-1003WT	TDH12S03-1503WT	—	TDH12S03-0103GC
	4.6	—	—	TDH12S03-0546WT	TDH12S03-L546WT	TDH12S03-1046WT	TDH12S03-1546WT	TDH12S03-2546WT	TDH12S03-0104GC

Ordering information

YMC-Triart 3 µm, 1/16" | 1/32" fitting*, microLC capillary columns (max. pressure 550 bar)

Phase	Column ID (µm)	Column length (mm)				Guard columns** with 5 mm length
		50	75	100	150	(pack of 3)
C18	75	TA12S03-05E8AU	TA12S03-L5E8AU	TA12S03-10E8AU	TA12S03-15E8AU	—
	100	TA12S03-05F0AU	TA12S03-L5F0AU	TA12S03-10F0AU	TA12S03-15F0AU	—
	300	TA12S03-05H0AU	TA12S03-L5H0AU	TA12S03-10H0AU	TA12S03-15H0AU	TA12S03-E5H0AU
	500	TA12S03-05J0AU	TA12S03-L5J0AU	TA12S03-10J0AU	TA12S03-15J0AU	TA12S03-E5J0AU
C18 ExRS	75	TAR08S03-05E8AU	TAR08S03-L5E8AU	TAR08S03-10E8AU	TAR08S03-15E8AU	—
	100	TAR08S03-05F0AU	TAR08S03-L5F0AU	TAR08S03-10F0AU	TAR08S03-15F0AU	—
	300	TAR08S03-05H0AU	TAR08S03-L5H0AU	TAR08S03-10H0AU	TAR08S03-15H0AU	TAR08S03-E5H0AU
	500	TAR08S03-05J0AU	TAR08S03-L5J0AU	TAR08S03-10J0AU	TAR08S03-15J0AU	TAR08S03-E5J0AU
Bio C18	75	TA30S03-05E8AU	TA30S03-L5E8AU	TA30S03-10E8AU	TA30S03-15E8AU	—
	100	TA30S03-05F0AU	TA30S03-L5F0AU	TA30S03-10F0AU	TA30S03-15F0AU	—
	300	TA30S03-05H0AU	TA30S03-L5H0AU	TA30S03-10H0AU	TA30S03-15H0AU	TA30S03-E5H0AU
	500	TA30S03-05J0AU	TA30S03-L5J0AU	TA30S03-10J0AU	TA30S03-15J0AU	TA30S03-E5J0AU
C8	75	T012S03-05E8AU	T012S03-L5E8AU	T012S03-10E8AU	T012S03-15E8AU	—
	100	T012S03-05F0AU	T012S03-L5F0AU	T012S03-10F0AU	T012S03-15F0AU	—
	300	T012S03-05H0AU	T012S03-L5H0AU	T012S03-10H0AU	T012S03-15H0AU	T012S03-E5H0AU
	500	T012S03-05J0AU	T012S03-L5J0AU	T012S03-10J0AU	T012S03-15J0AU	T012S03-E5J0AU
Bio C4	75	TB30S03-05E8AU	TB30S03-L5E8AU	TB30S03-10E8AU	TB30S03-15E8AU	—
	100	TB30S03-05F0AU	TB30S03-L5F0AU	TB30S03-10F0AU	TB30S03-15F0AU	—
	300	TB30S03-05H0AU	TB30S03-L5H0AU	TB30S03-10H0AU	TB30S03-15H0AU	TB30S03-E5H0AU
	500	TB30S03-05J0AU	TB30S03-L5J0AU	TB30S03-10J0AU	TB30S03-15J0AU	TB30S03-E5J0AU
Phenyl	75	TPH12S03-05E8AU	TPH12S03-L5E8AU	TPH12S03-10E8AU	TPH12S03-15E8AU	—
	100	TPH12S03-05F0AU	TPH12S03-L5F0AU	TPH12S03-10F0AU	TPH12S03-15F0AU	—
	300	TPH12S03-05H0AU	TPH12S03-L5H0AU	TPH12S03-10H0AU	TPH12S03-15H0AU	TPH12S03-E5H0AU
	500	TPH12S03-05J0AU	TPH12S03-L5J0AU	TPH12S03-10J0AU	TPH12S03-15J0AU	TPH12S03-E5J0AU
PFP	75	TPF12S03-05E8AU	TPF12S03-L5E8AU	TPF12S03-10E8AU	TPF12S03-15E8AU	—
	100	TPF12S03-05F0AU	TPF12S03-L5F0AU	TPF12S03-10F0AU	TPF12S03-15F0AU	—
	300	TPF12S03-05H0AU	TPF12S03-L5H0AU	TPF12S03-10H0AU	TPF12S03-15H0AU	TPF12S03-E5H0AU
	500	TPF12S03-05J0AU	TPF12S03-L5J0AU	TPF12S03-10J0AU	TPF12S03-15J0AU	TPF12S03-E5J0AU
Diol-HILIC	75	TDH12S03-05E8AU	TDH12S03-L5E8AU	TDH12S03-10E8AU	TDH12S03-15E8AU	—
	100	TDH12S03-05F0AU	TDH12S03-L5F0AU	TDH12S03-10F0AU	TDH12S03-15F0AU	—
	300	TDH12S03-05H0AU	TDH12S03-L5H0AU	TDH12S03-10H0AU	TDH12S03-15H0AU	TDH12S03-E5H0AU
	500	TDH12S03-05J0AU	TDH12S03-L5J0AU	TDH12S03-10J0AU	TDH12S03-15J0AU	TDH12S03-E5J0AU

* YMC capillary columns are available with 1/16" (10-32 thread) or with 1/32" (6-40 thread) connections.

The connection size is indicated by the terminal letters of the order code:

1/16" fittings end with AU; 1/32" fittings end with RU. For ordering 1/32" connections, simply exchange AU by RU.

** no holder required, comes with a column coupler

Columns with 1/32" fitting are only available with 300 or 500 µm ID.

YMC-Triart 1.9 and 3 µm Method Development Kits

Phases	Dimensions	Particle size	Part No.
C18 / C18 ExRS / Phenyl	50 x 2.1 mm	1.9 µm	TATARTPHSP9-05Q1PT
		3 µm	TATARTPHS03-05Q1PTH
C18 / C8 / Phenyl		1.9 µm	TATOTPHSP9-05Q1PT
		3 µm	TATOTPHS03-05Q1PTH
C18 / PFP / Diol-HILIC		1.9 µm	TATPFTDHSP9-05Q1PT
		3 µm	TATPFTDHS03-05Q1PTH

Ordering information

YMC-Triart 5 µm, high pressure rated analytical columns (max. pressure 450 bar)

Phase	Column ID (mm)	Column length (mm)							Guard cartridges* with 10 mm length
		20	33	50	75	100	150	250	
C18	2.1	TA12S05-02Q1PTH	TA12S05-H3Q1PTH	TA12S05-05Q1PTH	TA12S05-L5Q1PTH	TA12S05-10Q1PTH	TA12S05-15Q1PTH	—	TA12S05-01Q1GC
	3.0	—	—	TA12S05-0503PTH	TA12S05-L503PTH	TA12S05-1003PTH	TA12S05-1503PTH	—	TA12S05-0103GC
	4.6	—	TA12S05-H346PTH	TA12S05-0546PTH	TA12S05-L546PTH	TA12S05-1046PTH	TA12S05-1546PTH	TA12S05-2546PTH	TA12S05-0104GC
C18 ExRS	2.1	TAR08S05-02Q1PTH	TAR08S05-H3Q1PTH	TAR08S05-05Q1PTH	TAR08S05-L5Q1PTH	TAR08S05-10Q1PTH	TAR08S05-15Q1PTH	—	TAR08S05-01Q1GC
	3.0	—	—	TAR08S05-0503PTH	TAR08S05-L503PTH	TAR08S05-1003PTH	TAR08S05-1503PTH	—	TAR08S05-0103GC
	4.6	—	TAR08S05-H346PTH	TAR08S05-0546PTH	TAR08S05-L546PTH	TAR08S05-1046PTH	TAR08S05-1546PTH	TAR08S05-2546PTH	TAR08S05-0104GC
Bio C18	2.1	TA30S05-02Q1PTH	TA30S05-H3Q1PTH	TA30S05-05Q1PTH	TA30S05-L5Q1PTH	TA30S05-10Q1PTH	TA30S05-15Q1PTH	—	TA30S05-01Q1GC
	3.0	—	—	TA30S05-0503PTH	TA30S05-L503PTH	TA30S05-1003PTH	TA30S05-1503PTH	—	TA30S05-0103GC
	4.6	—	TA30S05-H346PTH	TA30S05-0546PTH	TA30S05-L546PTH	TA30S05-1046PTH	TA30S05-1546PTH	TA30S05-2546PTH	TA30S05-0104GC
C8	2.1	TO12S05-02Q1PTH	TO12S05-H3Q1PTH	TO12S05-05Q1PTH	TO12S05-L5Q1PTH	TO12S05-10Q1PTH	TO12S05-15Q1PTH	—	TO12S05-01Q1GC
	3.0	—	—	TO12S05-0503PTH	TO12S05-L503PTH	TO12S05-1003PTH	TO12S05-1503PTH	—	TO12S05-0103GC
	4.6	—	TO12S05-H346PTH	TO12S05-0546PTH	TO12S05-L546PTH	TO12S05-1046PTH	TO12S05-1546PTH	TO12S05-2546PTH	TO12S05-0104GC
Bio C4	2.1	TB30S05-02Q1PTH	TB30S05-H3Q1PTH	TB30S05-05Q1PTH	TB30S05-L5Q1PTH	TB30S05-10Q1PTH	TB30S05-15Q1PTH	—	TB30S05-01Q1GC
	3.0	—	—	TB30S05-0503PTH	TB30S05-L503PTH	TB30S05-1003PTH	TB30S05-1503PTH	—	TB30S05-0103GC
	4.6	—	TB30S05-H346PTH	TB30S05-0546PTH	TB30S05-L546PTH	TB30S05-1046PTH	TB30S05-1546PTH	TB30S05-2546PTH	TB30S05-0104GC
Phenyl	2.1	TPH12S05-02Q1PTH	TPH12S05-H3Q1PTH	TPH12S05-05Q1PTH	TPH12S05-L5Q1PTH	TPH12S05-10Q1PTH	TPH12S05-15Q1PTH	—	TPH12S05-01Q1GC
	3.0	—	—	TPH12S05-0503PTH	TPH12S05-L503PTH	TPH12S05-1003PTH	TPH12S05-1503PTH	—	TPH12S05-0103GC
	4.6	—	TPH12S05-H346PTH	TPH12S05-0546PTH	TPH12S05-L546PTH	TPH12S05-1046PTH	TPH12S05-1546PTH	TPH12S05-2546PTH	TPH12S05-0104GC
PFP	2.1	TPF12S05-02Q1PTH	TPF12S05-H3Q1PTH	TPF12S05-05Q1PTH	TPF12S05-L5Q1PTH	TPF12S05-10Q1PTH	TPF12S05-15Q1PTH	—	TPF12S05-01Q1GC
	3.0	—	—	TPF12S05-0503PTH	TPF12S05-L503PTH	TPF12S05-1003PTH	TPF12S05-1503PTH	—	TPF12S05-0103GC
	4.6	—	TPF12S05-H346PTH	TPF12S05-0546PTH	TPF12S05-L546PTH	TPF12S05-1046PTH	TPF12S05-1546PTH	TPF12S05-2546PTH	TPF12S05-0104GC
Diol-HILIC	2.1	TDH12S05-02Q1PTH	TDH12S05-H3Q1PTH	TDH12S05-05Q1PTH	TDH12S05-L5Q1PTH	TDH12S05-10Q1PTH	TDH12S05-15Q1PTH	—	TDH12S05-01Q1GC
	3.0	—	—	TDH12S05-0503PTH	TDH12S05-L503PTH	TDH12S05-1003PTH	TDH12S05-1503PTH	—	TDH12S05-0103GC
	4.6	—	TDH12S05-H346PTH	TDH12S05-0546PTH	TDH12S05-L546PTH	TDH12S05-1046PTH	TDH12S05-1546PTH	TDH12S05-2546PTH	TDH12S05-0104GC
Diol (SFC)	2.1	TDH12S05-02Q1PTH	TDH12S05-H3Q1PTH	TDH12S05-05Q1PTH	TDH12S05-L5Q1PTH	TDH12S05-10Q1PTH	TDH12S05-15Q1PTH	—	—
	3.0	—	—	TDH12S05-0503PTH	TDH12S05-L503PTH	TDH12S05-1003PTH	TDH12S05-1503PTH	—	—
	4.6	—	TDH12S05-H346PTH	TDH12S05-0546PTH	TDH12S05-L546PTH	TDH12S05-1046PTH	TDH12S05-1546PTH	TDH12S05-2546PTH	—
SIL (SFC)	2.1	TS12S05-02Q1PTH	TS12S05-H3Q1PTH	TS12S05-05Q1PTH	TS12S05-L5Q1PTH	TS12S05-10Q1PTH	TS12S05-15Q1PTH	—	—
	3.0	—	—	TS12S05-0503PTH	TS12S05-L503PTH	TS12S05-1003PTH	TS12S05-1503PTH	—	—
	4.6	—	TS12S05-H346PTH	TS12S05-0546PTH	TS12S05-L546PTH	TS12S05-1046PTH	TS12S05-1546PTH	TS12S05-2546PTH	—

*Guard cartridge holder required, part no. XPGCH-Q1

**Supplied as YMC-Triart Diol-HILIC shipped on 2-propanol

Ordering information

YMC-Triart 5 µm, metal-free analytical columns (max. pressure 450 bar)

Phase	Column ID (mm)	Column length (mm)		
		50	100	150
C18	2.1	TA12S05-05Q1PTP	TA12S05-10Q1PTP	TA12S05-15Q1PTP
	4.6	TA12S05-0546PTP	TA12S05-1046PTP	TA12S05-1546PTP
C18 ExRS	2.1	TAR08S05-05Q1PTP	TAR08S05-10Q1PTP	TAR08S05-15Q1PTP
	4.6	TAR08S05-0546PTP	TAR08S05-1046PTP	TAR08S05-1546PTP
Bio C18	2.1	TA30S05-05Q1PTP	TA30S05-10Q1PTP	TA30S05-15Q1PTP
	4.6	TA30S05-0546PTP	TA30S05-1046PTP	TA30S05-1546PTP
C8	2.1	T012S05-05Q1PTP	T012S05-10Q1PTP	T012S05-15Q1PTP
	4.6	T012S05-0546PTP	T012S05-1046PTP	T012S05-1546PTP
Bio C4	2.1	TB30S05-05Q1PTP	TB30S05-10Q1PTP	TB30S05-15Q1PTP
	4.6	TB30S05-0546PTP	TB30S05-1046PTP	TB30S05-1546PTP
Phenyl	2.1	TPH12S05-05Q1PTP	TPH12S05-10Q1PTP	TPH12S05-15Q1PTP
	4.6	TPH12S05-0546PTP	TPH12S05-1046PTP	TPH12S05-1546PTP
PFP	2.1	TPF12S05-05Q1PTP	TPF12S05-10Q1PTP	TPF12S05-15Q1PTP
	4.6	TPF12S05-0546PTP	TPF12S05-1046PTP	TPF12S05-1546PTP
Diol-HILIC	2.1	TDH12S05-05Q1PTP	TDH12S05-10Q1PTP	TDH12S05-15Q1PTP
	4.6	TDH12S05-0546PTP	TDH12S05-1046PTP	TDH12S05-1546PTP

YMC-Triart 5 µm analytical columns (max. pressure 200/250 bar)

Phase	Column ID (mm)	Column length (mm)							Guard cartridges* with 10 mm length
		20	30	50	75	100	150	250	
C18	2.0	TA12S05-0202WT	TA12S05-0302WT	TA12S05-0502WT	TA12S05-L502WT	TA12S05-1002WT	TA12S05-1502WT	—	TA12S05-01Q1GC
	3.0	—	—	TA12S05-0503WT	TA12S05-L503WT	TA12S05-1003WT	TA12S05-1503WT	—	TA12S05-0103GC
	4.6	—	—	TA12S05-0546WT	TA12S05-L546WT	TA12S05-1046WT	TA12S05-1546WT	TA12S05-2546WT	TA12S05-0104GC
	10**	—	—	—	—	—	TA12S05-1510WT	TA12S05-2510WT	TA12S05-0110CC
	10**	—	—	—	—	—	—	—	—
C8	2.0	T012S05-0202WT	T012S05-0302WT	T012S05-0502WT	T012S05-L502WT	T012S05-1002WT	T012S05-1502WT	—	T012S05-01Q1GC
	3.0	—	—	T012S05-0503WT	T012S05-L503WT	T012S05-1003WT	T012S05-1503WT	—	T012S05-0103GC
	4.6	—	—	T012S05-0546WT	T012S05-L546WT	T012S05-1046WT	T012S05-1546WT	T012S05-2546WT	T012S05-0104GC
	10**	—	—	—	—	—	T012S05-1510WT	T012S05-2510WT	T012S05-0110CC
	10**	—	—	—	—	—	—	—	—
Phenyl	2.0	TPH12S05-0202WT	TPH12S05-0302WT	TPH12S05-0502WT	TPH12S05-L502WT	TPH12S05-1002WT	TPH12S05-1502WT	—	TPH12S05-01Q1GC
	3.0	—	—	TPH12S05-0503WT	TPH12S05-L503WT	TPH12S05-1003WT	TPH12S05-1503WT	—	TPH12S05-0103GC
	4.6	—	—	TPH12S05-0546WT	TPH12S05-L546WT	TPH12S05-1046WT	TPH12S05-1546WT	TPH12S05-2546WT	TPH12S05-0104GC
	10**	—	—	—	—	—	TPH12S05-1510WT	TPH12S05-2510WT	TPH12S05-0110CC
	10**	—	—	—	—	—	—	—	—
PFP	2.0	TPF12S05-0202WT	TPF12S05-0302WT	TPF12S05-0502WT	TPF12S05-L502WT	TPF12S05-1002WT	TPF12S05-1502WT	—	TPF12S05-01Q1GC
	3.0	—	—	TPF12S05-0503WT	TPF12S05-L503WT	TPF12S05-1003WT	TPF12S05-1503WT	—	TPF12S05-0103GC
	4.6	—	—	TPF12S05-0546WT	TPF12S05-L546WT	TPF12S05-1046WT	TPF12S05-1546WT	TPF12S05-2546WT	TPF12S05-0104GC
	10**	—	—	—	—	—	TPF12S05-1510WT	TPF12S05-2510WT	TPF12S05-0110CC
	10**	—	—	—	—	—	—	—	—
Diol-HILIC	2.0	TDH12S05-0202WT	TDH12S05-0302WT	TDH12S05-0502WT	TDH12S05-L502WT	TDH12S05-1002WT	TDH12S05-1502WT	—	TDH12S05-01Q1GC
	3.0	—	—	TDH12S05-0503WT	TDH12S05-L503WT	TDH12S05-1003WT	TDH12S05-1503WT	—	TDH12S05-0103GC
	4.6	—	—	TDH12S05-0546WT	TDH12S05-L546WT	TDH12S05-1046WT	TDH12S05-1546WT	TDH12S05-2546WT	TDH12S05-0104GC
	10**	—	—	—	—	—	—	—	—
	10**	—	—	—	—	—	—	—	—

*Guard cartridge holder required, part no. XPGCH-Q1
XPCHSPW1 (10 mm ID)

**Max. pressure 100 bar

Ordering information

YMC-Triart 5 µm, 1/16" | 1/32" fitting*, microLC capillary columns (max. pressure 550 bar)

Phase	Column ID (µm)	Column length (mm)				Guard columns** with 5 mm length
		50	75	100	150	
						(pack of 3)
C18	75	TA12S05-05E8AU	TA12S05-L5E8AU	TA12S05-10E8AU	TA12S05-15E8AU	—
	100	TA12S05-05F0AU	TA12S05-L5F0AU	TA12S05-10F0AU	TA12S05-15F0AU	—
	300	TA12S05-05H0AU	TA12S05-L5H0AU	TA12S05-10H0AU	TA12S05-15H0AU	TA12S05-E5H0AU
	500	TA12S05-05J0AU	TA12S05-L5J0AU	TA12S05-10J0AU	TA12S05-15J0AU	TA12S05-E5J0AU
C18 ExRS	75	TAR08S05-05E8AU	TAR08S05-L5E8AU	TAR08S05-10E8AU	TAR08S05-15E8AU	—
	100	TAR08S05-05F0AU	TAR08S05-L5F0AU	TAR08S05-10F0AU	TAR08S05-15F0AU	—
	300	TAR08S05-05H0AU	TAR08S05-L5H0AU	TAR08S05-10H0AU	TAR08S05-15H0AU	TAR08S05-E5H0AU
	500	TAR08S05-05J0AU	TAR08S05-L5J0AU	TAR08S05-10J0AU	TAR08S05-15J0AU	TAR08S05-E5J0AU
Bio C18	75	TA30S05-05E8AU	TA30S05-L5E8AU	TA30S05-10E8AU	TA30S05-15E8AU	—
	100	TA30S05-05F0AU	TA30S05-L5F0AU	TA30S05-10F0AU	TA30S05-15F0AU	—
	300	TA30S05-05H0AU	TA30S05-L5H0AU	TA30S05-10H0AU	TA30S05-15H0AU	TA30S05-E5H0AU
	500	TA30S05-05J0AU	TA30S05-L5J0AU	TA30S05-10J0AU	TA30S05-15J0AU	TA30S05-E5J0AU
C8	75	T012S05-05E8AU	T012S05-L5E8AU	T012S05-10E8AU	T012S05-15E8AU	—
	100	T012S05-05F0AU	T012S05-L5F0AU	T012S05-10F0AU	T012S05-15F0AU	—
	300	T012S05-05H0AU	T012S05-L5H0AU	T012S05-10H0AU	T012S05-15H0AU	T012S05-E5H0AU
	500	T012S05-05J0AU	T012S05-L5J0AU	T012S05-10J0AU	T012S05-15J0AU	T012S05-E5J0AU
Bio C4	75	TB30S05-05E8AU	TB30S05-L5E8AU	TB30S05-10E8AU	TB30S05-15E8AU	—
	100	TB30S05-05F0AU	TB30S05-L5F0AU	TB30S05-10F0AU	TB30S05-15F0AU	—
	300	TB30S05-05H0AU	TB30S05-L5H0AU	TB30S05-10H0AU	TB30S05-15H0AU	TB30S05-E5H0AU
	500	TB30S05-05J0AU	TB30S05-L5J0AU	TB30S05-10J0AU	TB30S05-15J0AU	TB30S05-E5J0AU
Phenyl	75	TPH12S05-05E8AU	TPH12S05-L5E8AU	TPH12S05-10E8AU	TPH12S05-15E8AU	—
	100	TPH12S05-05F0AU	TPH12S05-L5F0AU	TPH12S05-10F0AU	TPH12S05-15F0AU	—
	300	TPH12S05-05H0AU	TPH12S05-L5H0AU	TPH12S05-10H0AU	TPH12S05-15H0AU	TPH12S05-E5H0AU
	500	TPH12S05-05J0AU	TPH12S05-L5J0AU	TPH12S05-10J0AU	TPH12S05-15J0AU	TPH12S05-E5J0AU
PPF	75	TPF12S05-05E8AU	TPF12S05-L5E8AU	TPF12S05-10E8AU	TPF12S05-15E8AU	—
	100	TPF12S05-05F0AU	TPF12S05-L5F0AU	TPF12S05-10F0AU	TPF12S05-15F0AU	—
	300	TPF12S05-05H0AU	TPF12S05-L5H0AU	TPF12S05-10H0AU	TPF12S05-15H0AU	TPF12S05-E5H0AU
	500	TPF12S05-05J0AU	TPF12S05-L5J0AU	TPF12S05-10J0AU	TPF12S05-15J0AU	TPF12S05-E5J0AU
Diol-HILIC	75	TDH12S05-05E8AU	TDH12S05-L5E8AU	TDH12S05-10E8AU	TDH12S05-15E8AU	—
	100	TDH12S05-05F0AU	TDH12S05-L5F0AU	TDH12S05-10F0AU	TDH12S05-15F0AU	—
	300	TDH12S05-05H0AU	TDH12S05-L5H0AU	TDH12S05-10H0AU	TDH12S05-15H0AU	TDH12S05-E5H0AU
	500	TDH12S05-05J0AU	TDH12S05-L5J0AU	TDH12S05-10J0AU	TDH12S05-15J0AU	TDH12S05-E5J0AU

*YMC capillary columns are available with 1/16" (10-32 thread) or with 1/32" (6-40 thread) connections. The connection size is indicated by the terminal letters of the order code:

1/16" fittings end with AU; 1/32" fittings end with RU. For ordering 1/32" connections, simply exchange AU by RU.

** no holder required, comes with a column coupler

Columns with 1/32" fitting are only available with 300 or 500 µm ID.

Ordering information

YMC-Triart 5 µm in YMC-Actus high-throughput semipreparative hardware (max. pressure 300 bar)

Phase	Column ID (mm)	Column length (mm)					Guard cartridges* with 10 mm length
		50	75	100	150	250	(pack of 2)
C18	20	TA12S05-0520WX	TA12S05-L520WX	TA12S05-1020WX	TA12S05-1520WX	TA12S05-2520WX	TA12S05-0120CCN
	30	TA12S05-0530WX	TA12S05-L530WX	TA12S05-1030WX	TA12S05-1530WX	TA12S05-2530WX	TA12S05-0130CCN
	50	TA12S05-0553DX	—	TA12S05-1053DX	TA12S05-1553DX	TA12S05-2553DX	TA12S05-0553DXG**
C18 ExRS	20	TAR08S05-0520WX	TAR08S05-L520WX	TAR08S05-1020WX	TAR08S05-1520WX	TAR08S05-2520WX	TAR08S05-0120CCN
	30	TAR08S05-0530WX	TAR08S05-L530WX	TAR08S05-1030WX	TAR08S05-1530WX	TAR08S05-2530WX	TAR08S05-0130CCN
	50	TAR08S05-0553DX	—	TAR08S05-1053DX	TAR08S05-1553DX	TAR08S05-2553DX	TAR08S05-0553DXG**
Bio C18	20	TA30S05-0520WX	TA30S05-L520WX	TA30S05-1020WX	TA30S05-1520WX	TA30S05-2520WX	TA30S05-0120CCN
	30	TA30S05-0530WX	TA30S05-L530WX	TA30S05-1030WX	TA30S05-1530WX	TA30S05-2530WX	TA30S05-0130CCN
	50	TA30S05-0553DX	—	TA30S05-1053DX	TA30S05-1553DX	TA30S05-2553DX	TA30S05-0553DXG**
C8	20	T012S05-0520WX	T012S05-L520WX	T012S05-1020WX	T012S05-1520WX	T012S05-2520WX	T012S05-0120CCN
	30	T012S05-0530WX	T012S05-L530WX	T012S05-1030WX	T012S05-1530WX	T012S05-2530WX	T012S05-0130CCN
	50	T012S05-0553DX	—	T012S05-1053DX	T012S05-1553DX	T012S05-2553DX	T012S05-0553DXG**
Bio C4	20	TB30S05-0520WX	TB30S05-L520WX	TB30S05-1020WX	TB30S05-1520WX	TB30S05-2520WX	TB30S05-0120CCN
	30	TB30S05-0530WX	TB30S05-L530WX	TB30S05-1030WX	TB30S05-1530WX	TB30S05-2530WX	TB30S05-0130CCN
	50	TB30S05-0553DX	—	TB30S05-1053DX	TB30S05-1553DX	TB30S05-2553DX	TB30S05-0553DXG**
Phenyl	20	TPH12S05-0520WX	TPH12S05-L520WX	TPH12S05-1020WX	TPH12S05-1520WX	TPH12S05-2520WX	TPH12S05-0120CCN
	30	TPH12S05-0530WX	TPH12S05-L530WX	TPH12S05-1030WX	TPH12S05-1530WX	TPH12S05-2530WX	TPH12S05-0130CCN
	50	TPH12S05-0553DX	—	TPH12S05-1053DX	TPH12S05-1553DX	TPH12S05-2553DX	TPH12S05-0553DXG**
PPF	20	TPF12S05-0520WX	TPF12S05-L520WX	TPF12S05-1020WX	TPF12S05-1520WX	TPF12S05-2520WX	TPF12S05-0120CCN
	30	TPF12S05-0530WX	TPF12S05-L530WX	TPF12S05-1030WX	TPF12S05-1530WX	TPF12S05-2530WX	TPF12S05-0130CCN
	50	TPF12S05-0553DX	—	TPF12S05-1053DX	TPF12S05-1553DX	TPF12S05-2553DX	TPF12S05-0553DXG**

*Guard cartridge holder required, part no. XPGHFSP20ID (20 mm ID)/XPGHFSP30ID (30 mm ID)

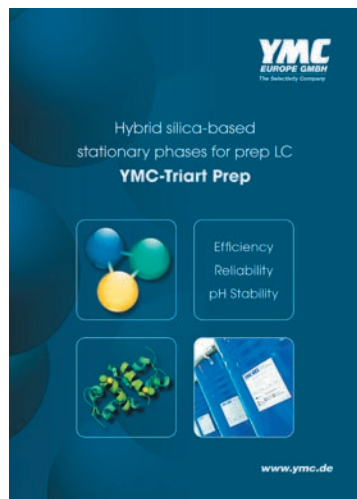
** no holder required for 50 x 50 mm ID guard columns (no cartridge)

YMC-Triart, preparative bulk media

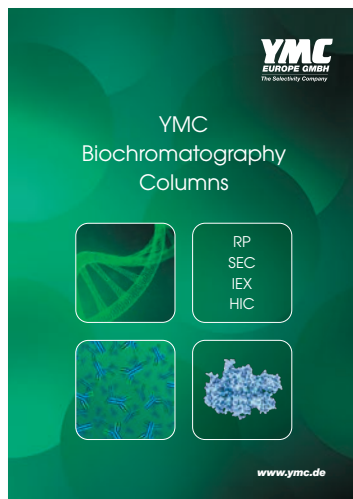
YMC-Triart Prep C18-S			YMC-Triart Prep C8-S			YMC-Triart Prep Bio200 C8			YMC-Triart Prep Phenyl-S		
Pore size [nm]	Particle size [µm]	Product Code	Pore size [nm]	Particle size [µm]	Product Code	Pore size [nm]	Particle size [µm]	Product Code	Pore size [nm]	Particle size [µm]	Product Code
12	7	TAS12S07	20	10	TOS20S11	20	10	TOB20S11	12	10	TPS12S11
	10	TAS12S11		15	TOS20S16						
	15	TAS12S16		20	TOS20S21						
	20	TAS12S21									

NOTE: customised particle sizes and pore sizes are available on request.
Contact YMC Europe GmbH for further details.

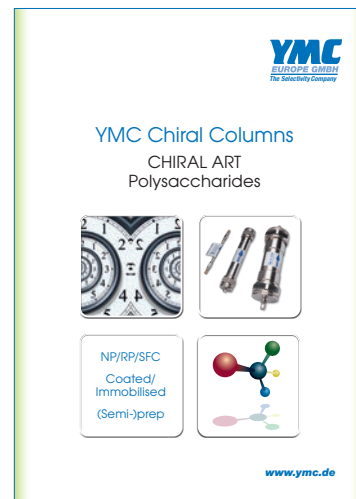
Please inquire for the corresponding catalogues



YMC-Triart Prep



YMC Biochromatography Columns



YMC Chiral Columns

“

“The possibility to use temperatures up to 90 °C with YMC-Triart Bio C4 simplifies the development of analytical methods. Furthermore, a good peak shape can be obtained without the addition of TFA, which means that I have fewer problems when using it for MS.”

Lars M. H. Reinders, Institute for Energy and Environmental Technology e. V. (IUTA, DE)

”

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