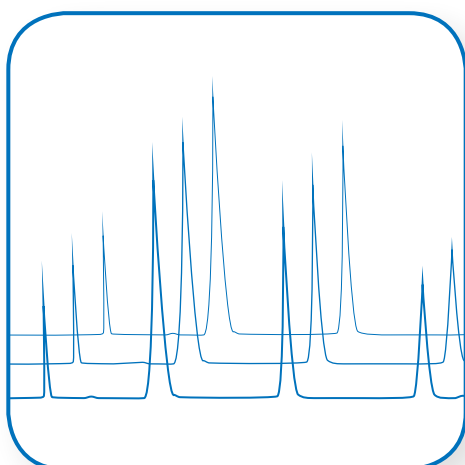
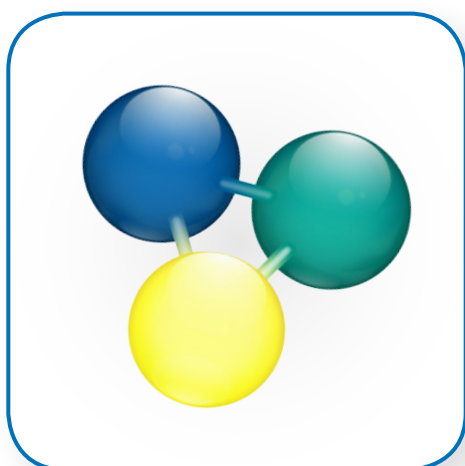


Reliable · Robust · Reproducible

(U)HPLC columns

YMC-Triart



LC/MS
(U)HPLC
SFC

YMC-Triart

Chromatographers always seek to push the limits of HPLC columns to greater extremes to allow them to perform day-to-day with ever-changing pH, buffers and temperature ranges. The column for the laboratory of today must be suitable for harsh pH conditions in combination with high temperature ranges without sacrificing selectivity.

In order to meet these goals, YMC has developed a novel particle technology. The revolutionary production technique provides a silica-organic hybrid stationary phase, which provides an outstandingly narrow pore size and particle size distribution. This in turn, results in low back pressures and high loadability.



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

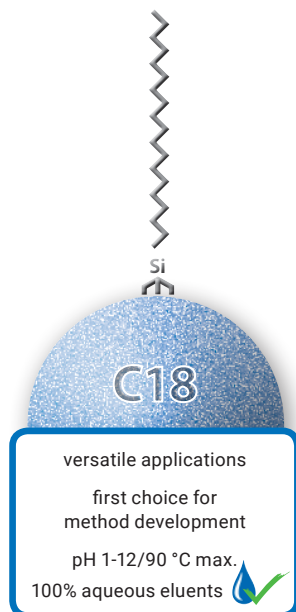
Contents

**NOW 7
DIFFERENT
MODIFICATIONS**

	page
Phases.....	4–5
Specifications	6–7
Transfer between HPLC↔UHPLC.....	8–9
pH and temperature flexibility	10–11
Applications	12–59
LC / MS.....	12–13
Pharmaceuticals	14–30
Pesticides	31
Food	32–38
Life Sciences.....	39–49
Polar Analytes / AQ Phase.....	50–53
HILIC	54–55
SFC.....	56–59
QC Data	60–65
Column hardware for bioseparations	66–67
Substance index	68–69
Ordering information	70–79

Phase overview

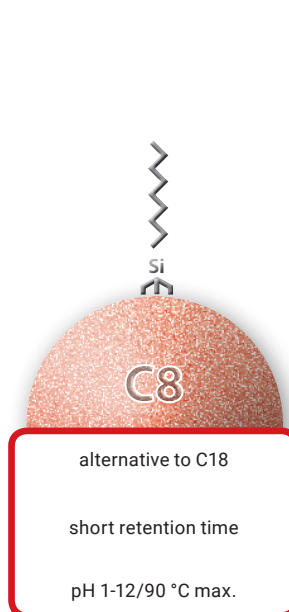
YMC-Triart C18



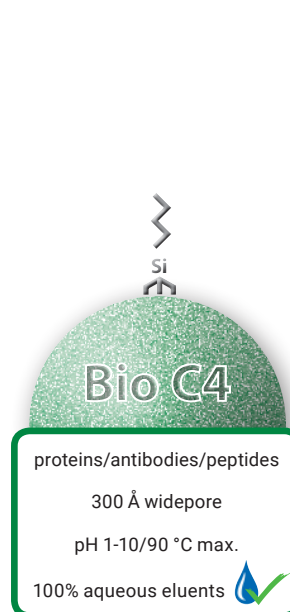
YMC-Triart C18 ExRS



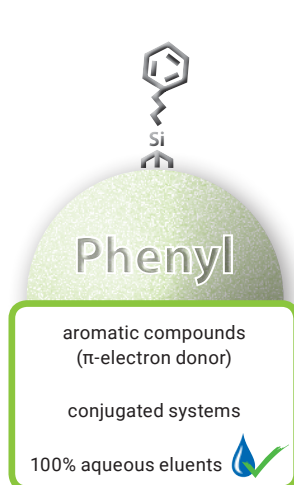
YMC-Triart C8



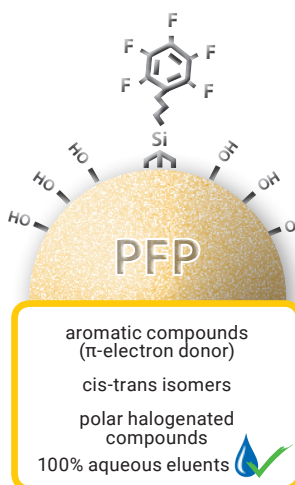
YMC-Triart Bio C4



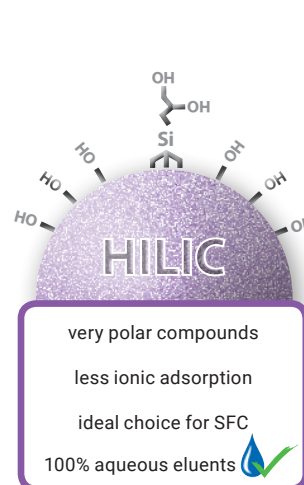
YMC-Triart Phenyl



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.

Specification

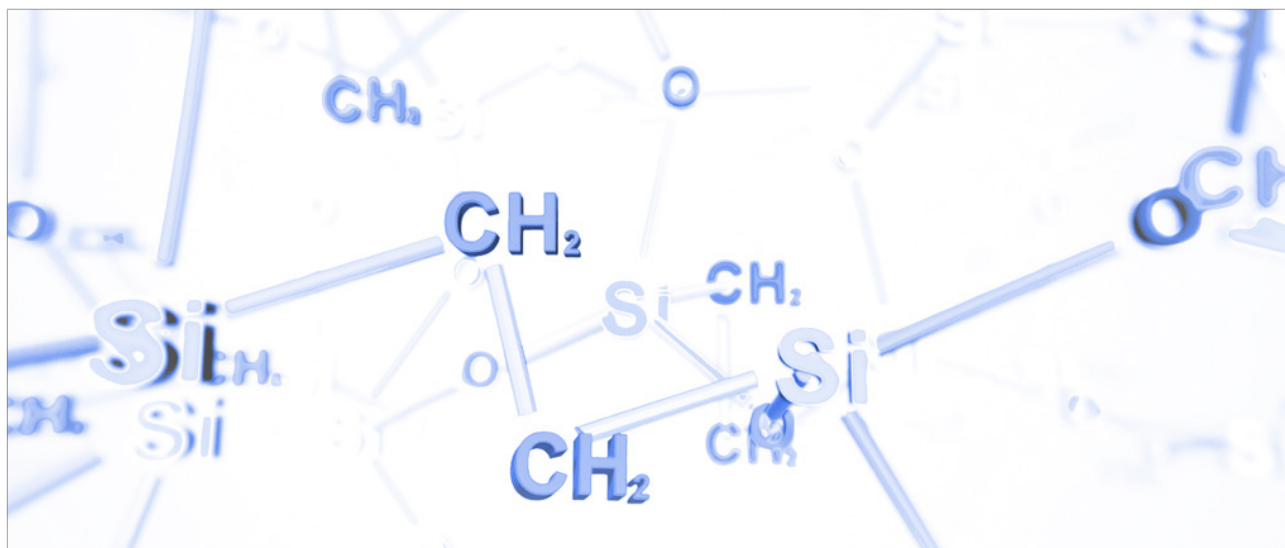
	YMC-Triart C18	YMC-Triart C18 ExRS	YMC-Triart C8	YMC-Triart Bio C4	YMC-Triart Phenyl	YMC-Triart PFP	YMC-Triart Diol-HILIC
Base	organic/inorganic silica						
Stationary phase	C18 (USP L1)	C18 (USP L1)	C8 (USP L7)	C4 (USP L26)	Phenyl (USP L11)	Penta-fluorophenyl (USP L43)	Diol (USP L20)
Particle size	1.9, 3 and 5 µm						
Pore size	12 nm	8 nm	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	none	none
pH range	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	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)]

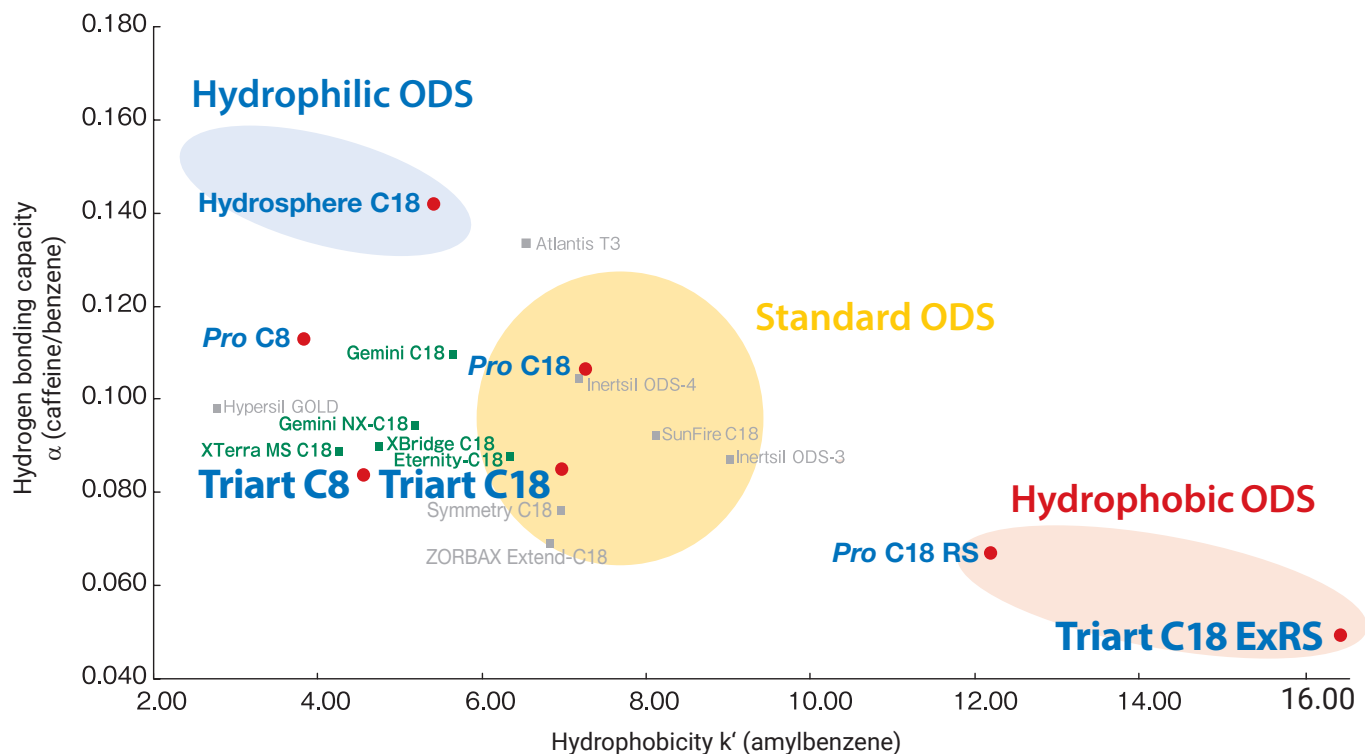
Particle technology

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.

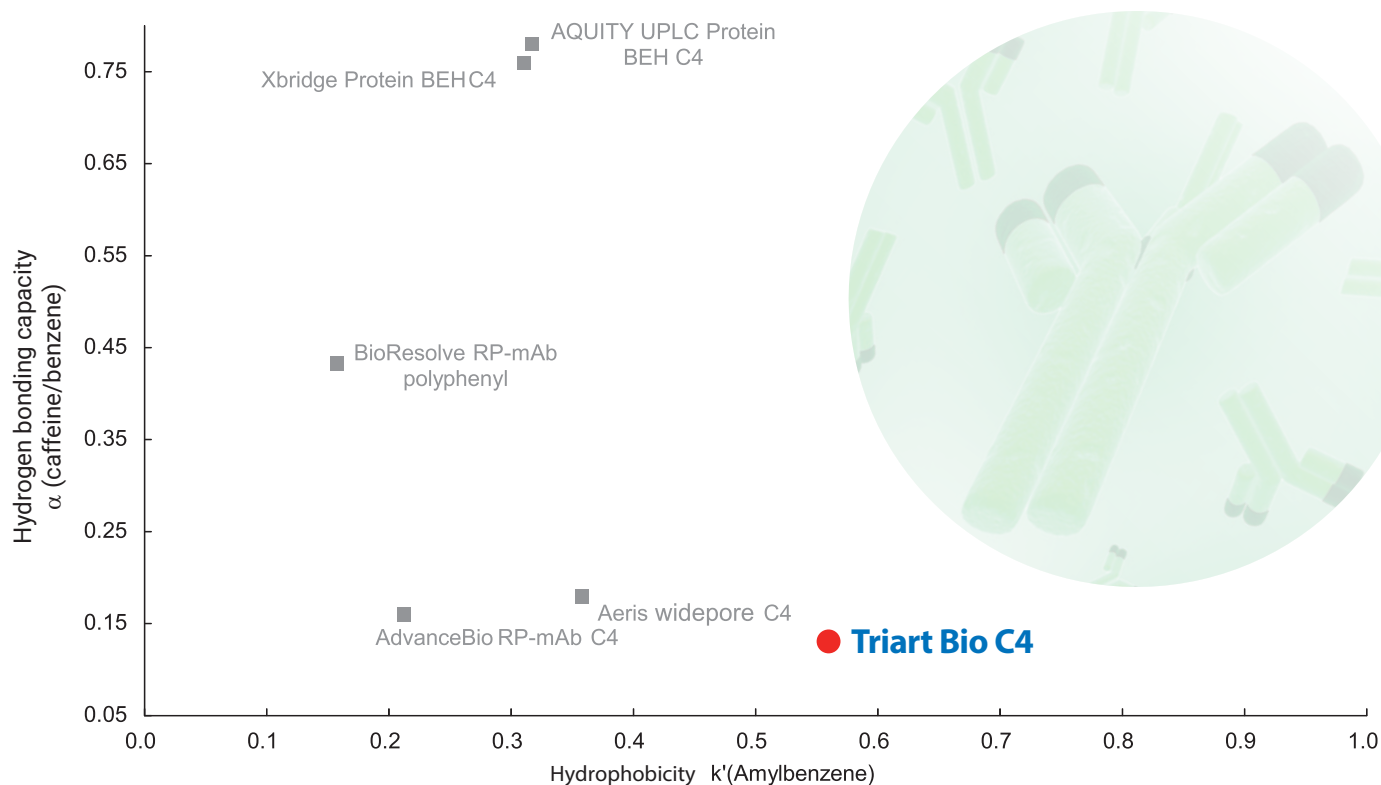


"First choice" column for method development



Conventional hybrid silica-based ODS columns tend to be less hydrophobic than silica-based columns. YMC-Triart C18 has a higher carbon load, giving it a hydrophobicity comparable to that of standard ODS

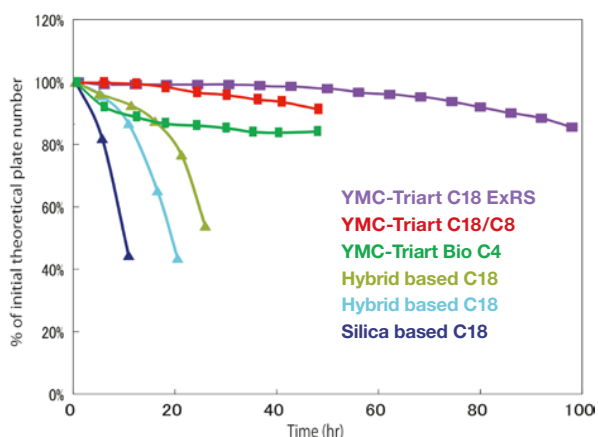
columns, thereby making it a "versatile first-choice" column for method development. On the other hand, YMC-Triart C18 ExRS has been designed to provide contrastingly different separation characteristics!



pH & temperature

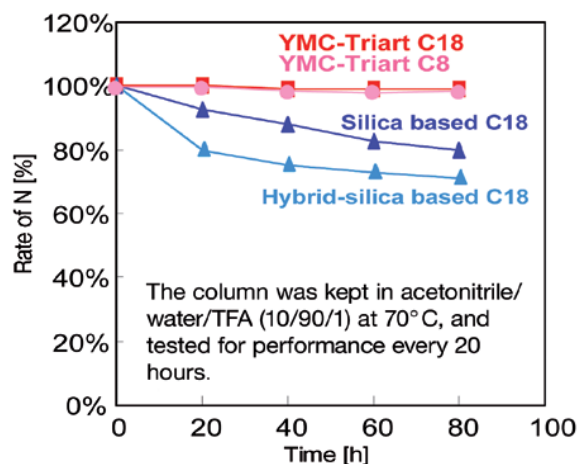
Versatile wide pH stability

Phosphate buffer (pH 11.5, 40 °C)



Column: YMC-Triart (5 µm) 150 x 4.6 mm ID
Part No.: TA12S05-1546PTH
Eluent: 50 mM K₂HPO₄-K₃PO₄ (pH 11.5) / methanol (90/10)
Flow rate: 1.0 mL/min
Temperature: 40 °C
Sample: benzyl alcohol

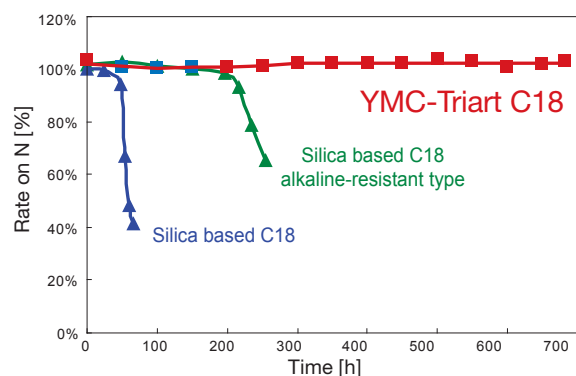
1% TFA (pH 1, 70 °C)



Column: YMC-Triart C18 (5 µm) 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

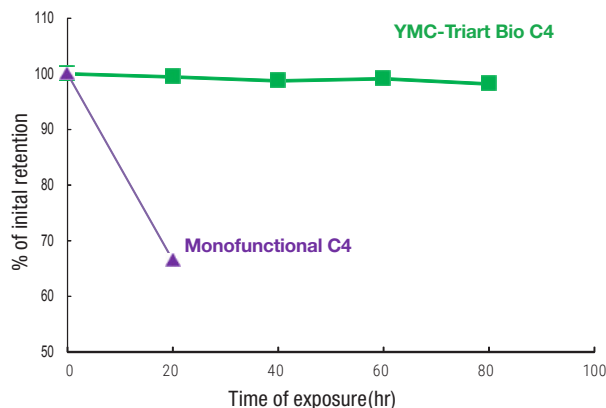
Stability at high temperature

pH 6.9, 70 °C



Column: YMC-Triart C18 (5 µm) 50 x 2.0 mm ID
Part No.: TA12S05-0502WT
Eluent: 20 mM KH₂PO₄-K₂HPO₄ (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 Column (5 µm) 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

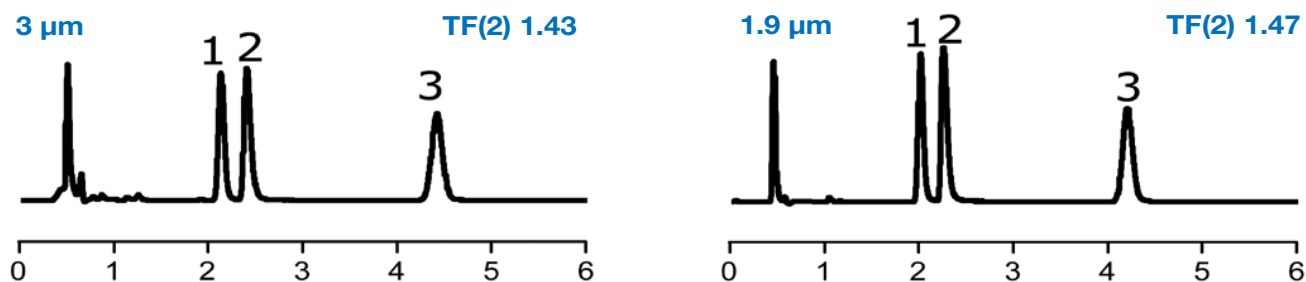
YMC-Triart phases show great chemical stability due to the highly developed hybrid-silica matrix. Even under high pH or high temperature conditions, the lifetime of YMC-Triart phases is more than 10 x greater than conventional reversed phase columns.

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.

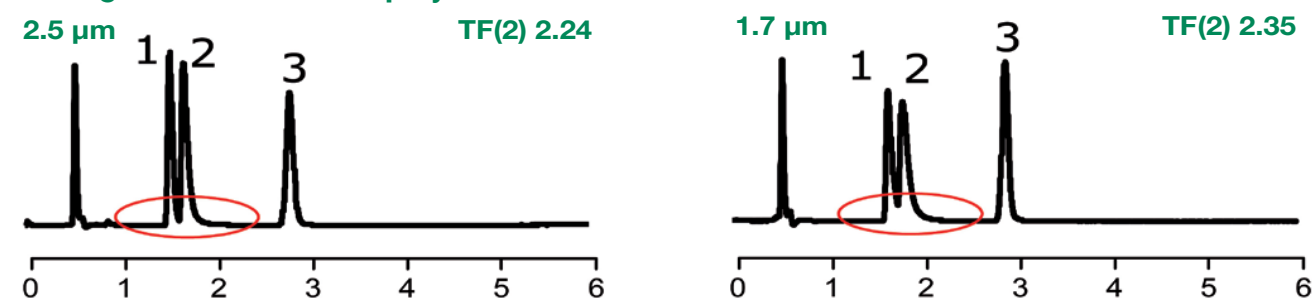
YMC-Triart C18



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.

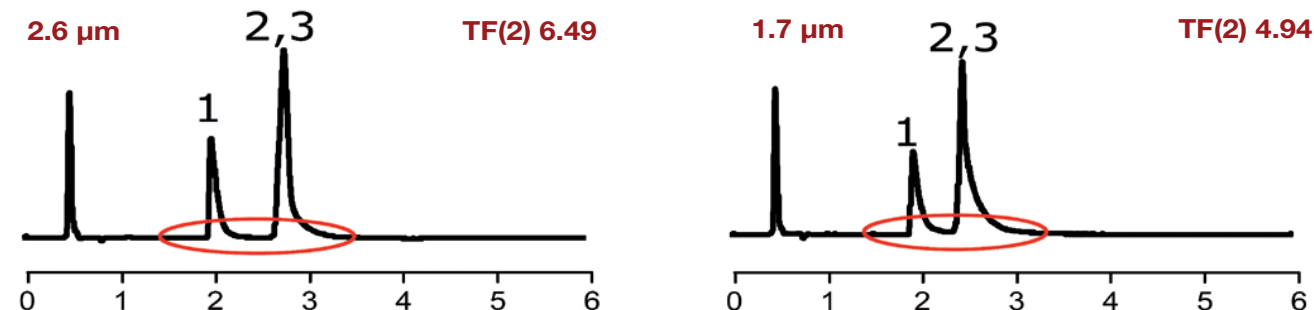
Case Studies

X-Bridge BEH C18 and Acquity UPLC BEH C18



** These observations might not be representative for all applications.

Kinetex™ C18



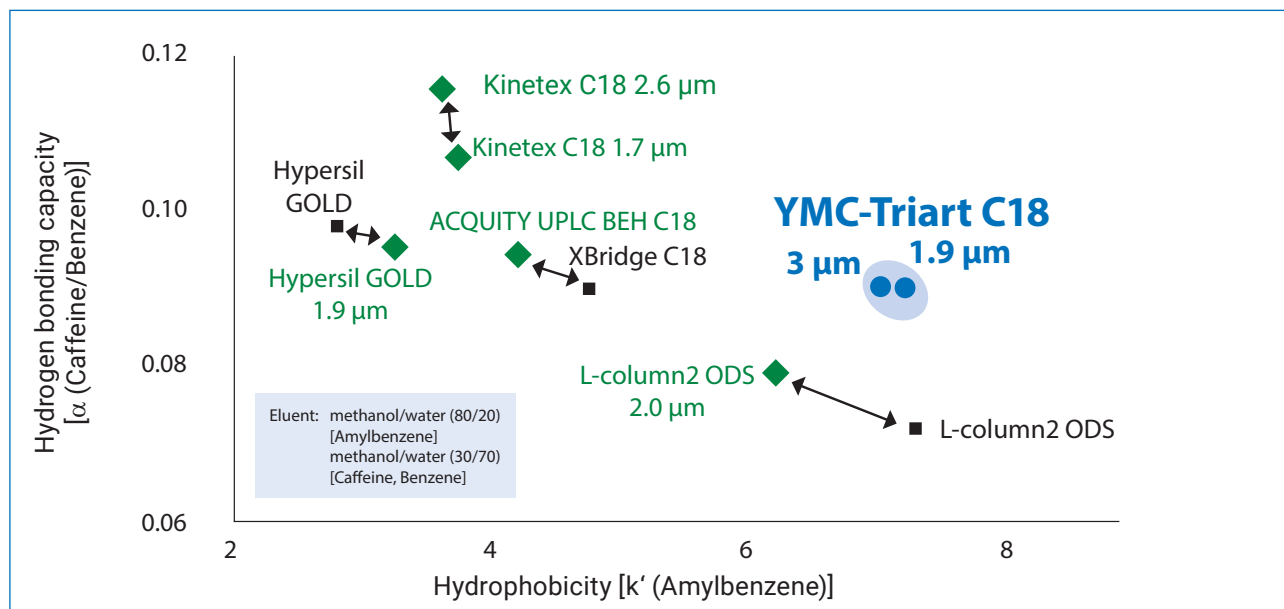
Kinetex™ C18 columns show significant peak tailing and have limited scalability due to lack of larger particle sizes.

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)

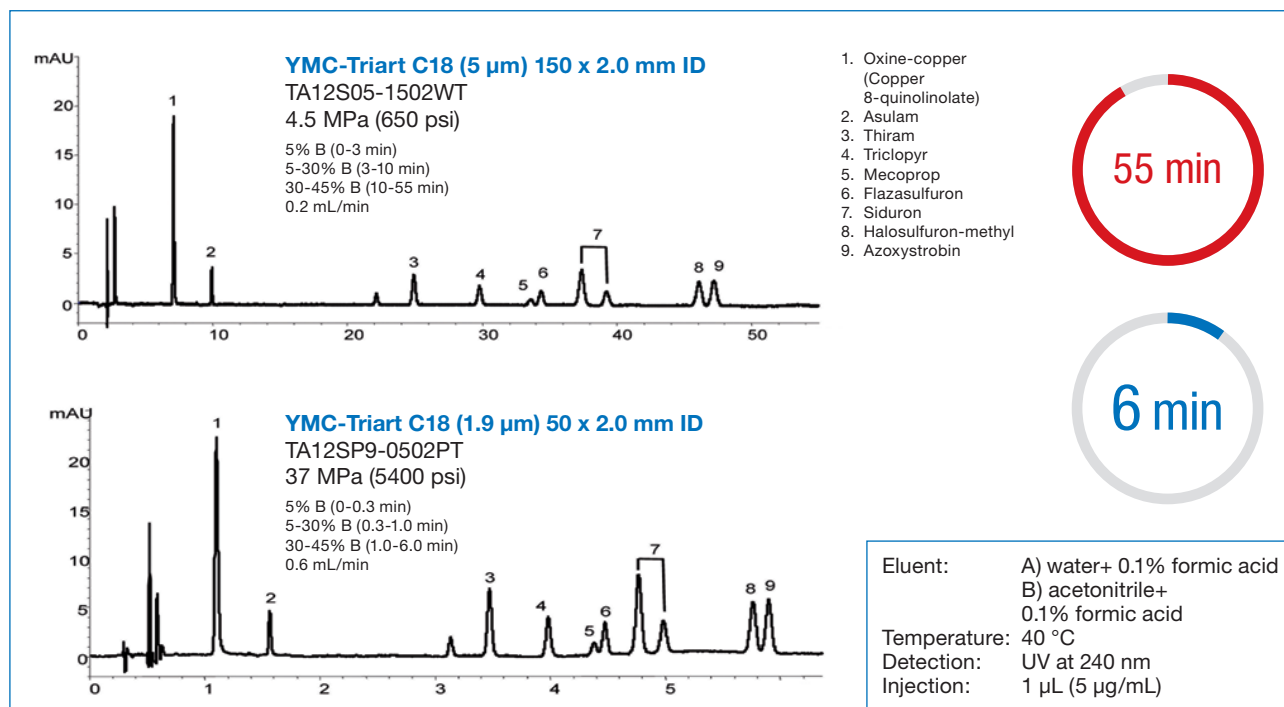
Transfer HPLC↔UHPLC

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!

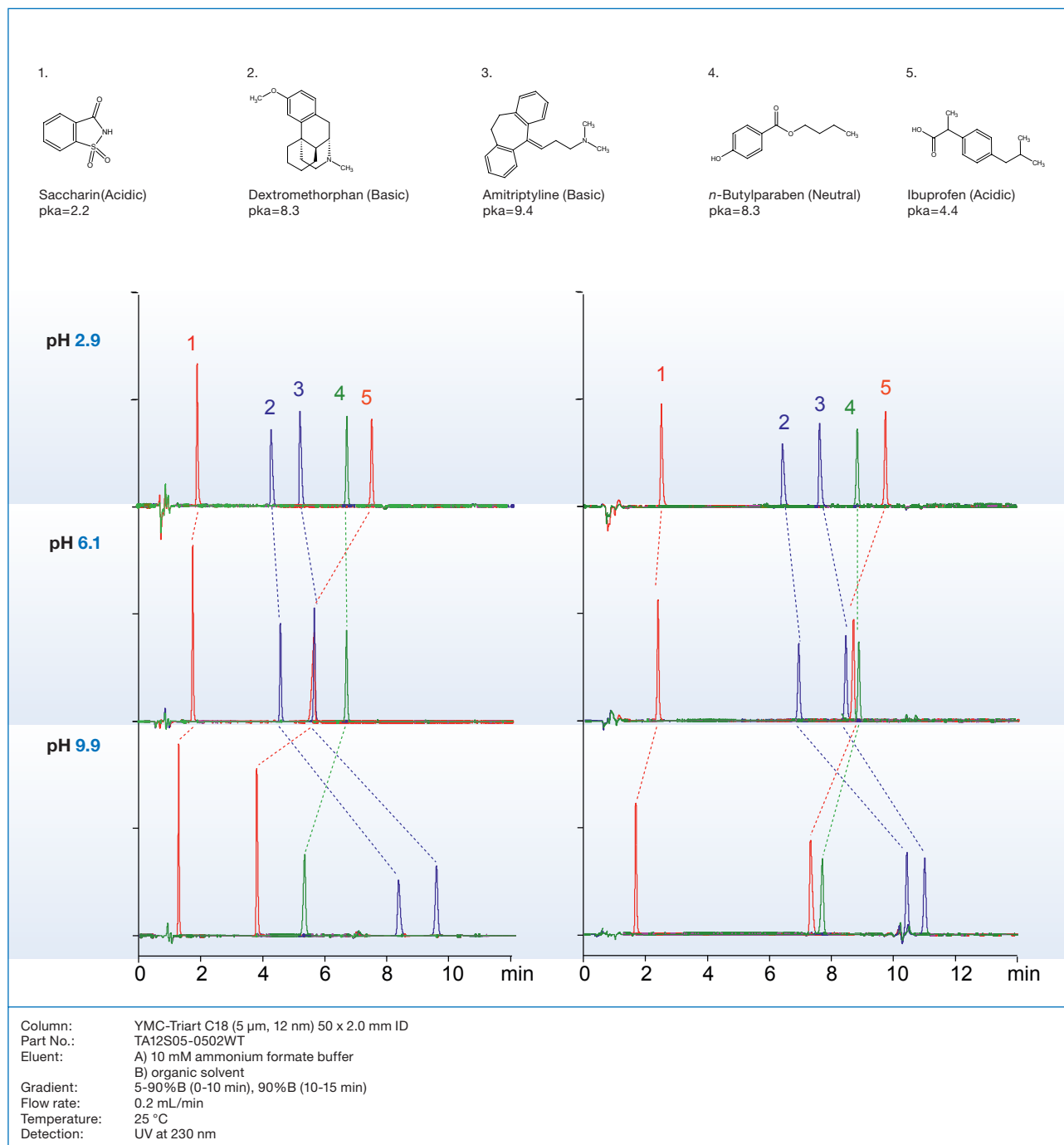
Method transfer HPLC↔UHPLC



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.

pH flexibility

Combination of pH and organic solvent

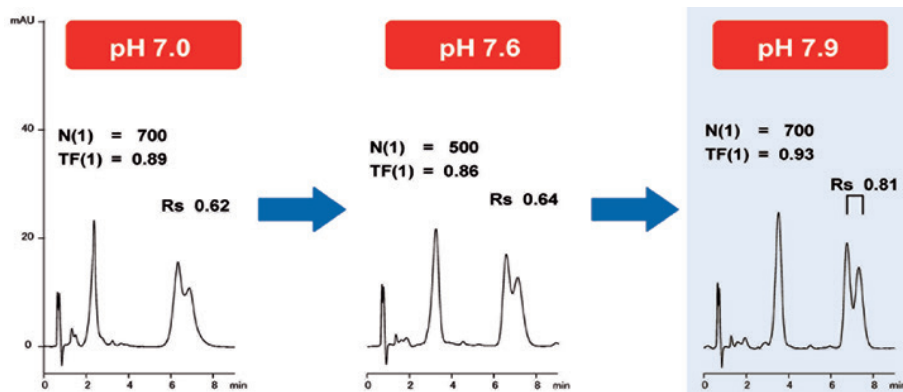


In reversed phase HPLC, pH and organic solvent are the most important factors to control retention and selectivity. YMC-Triart C18 with its wide range of usable pH offers significant advantage in selection of mobile phase conditions. YMC-Triart C18 delivers symmetrical peak shapes for all types of compounds 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.

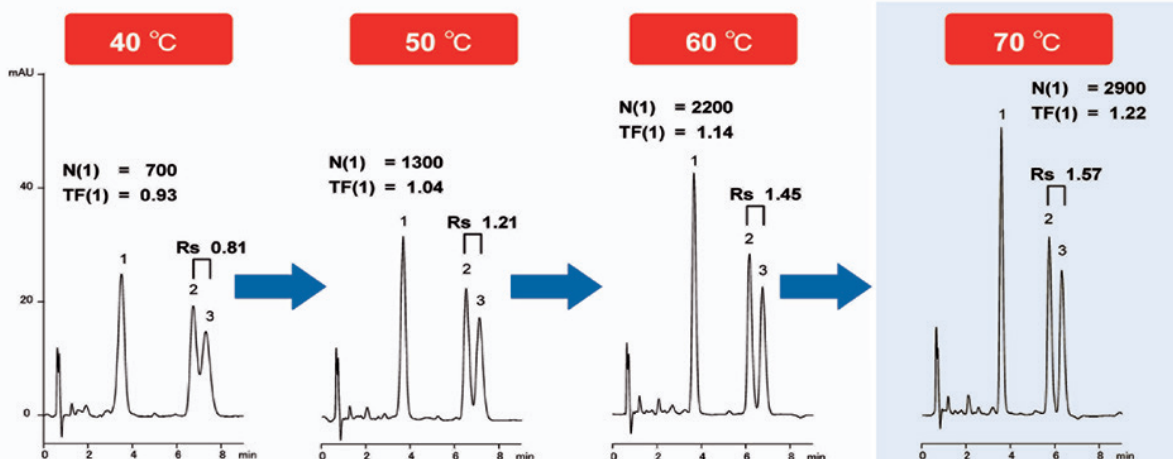
Temperature flexibility

Erythromycin at elevated pH and temperature

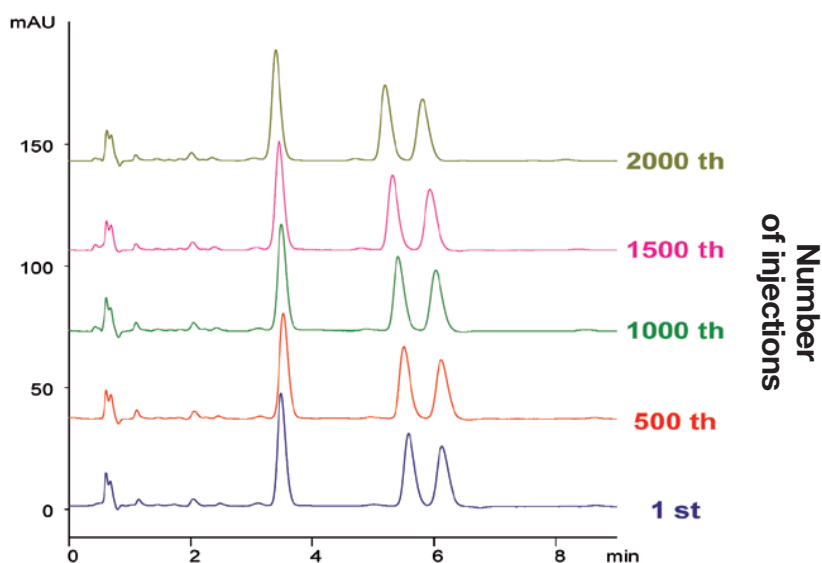
1. Optimisation of pH



2. Optimisation of temperature (pH 7.9)



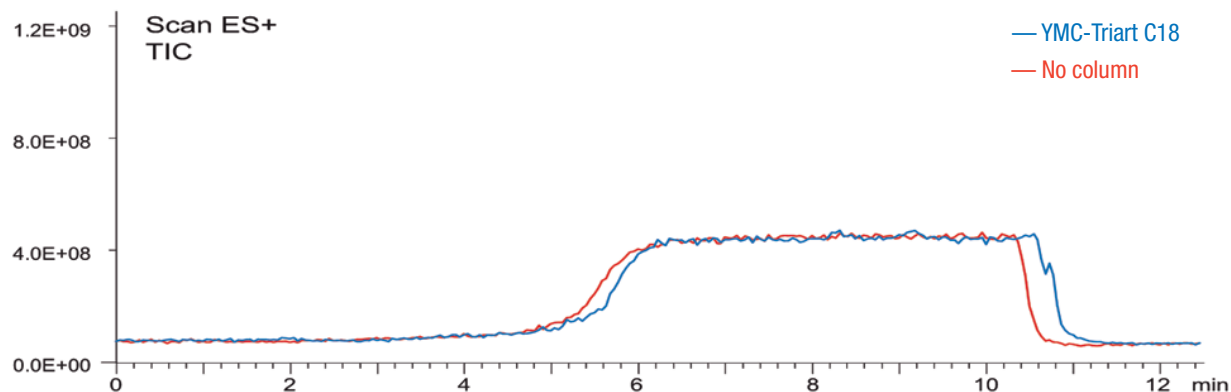
3. Stability test: pH 7.9, 70 °C



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

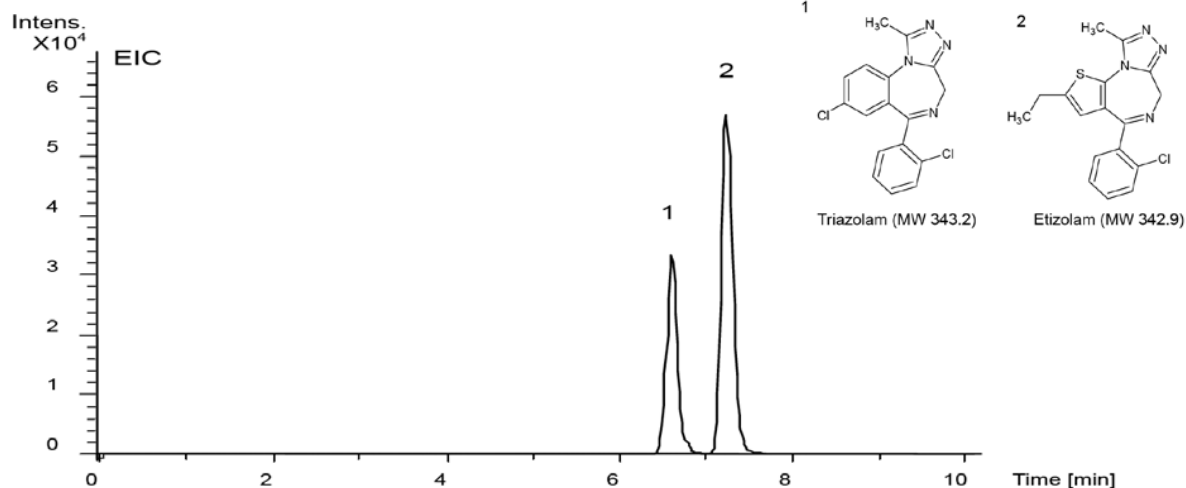
LC / MS compatibility



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: 50-1000)

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.

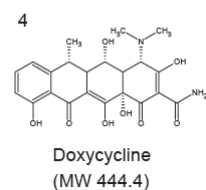
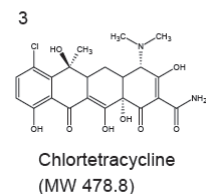
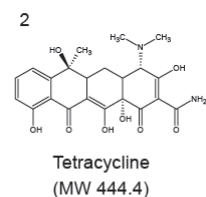
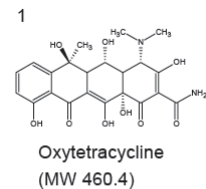
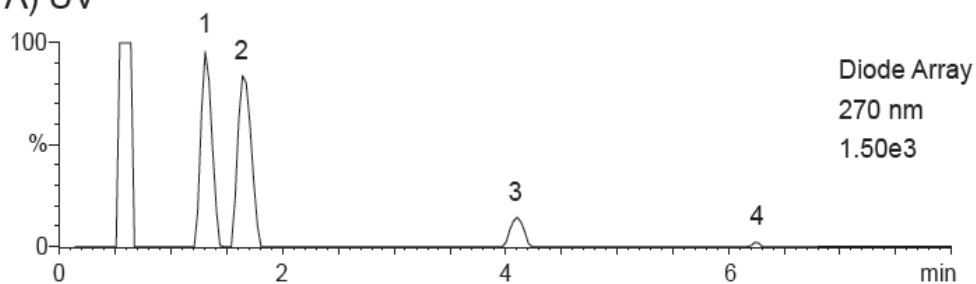
LC / MS analysis of benzodiazepine derivatives



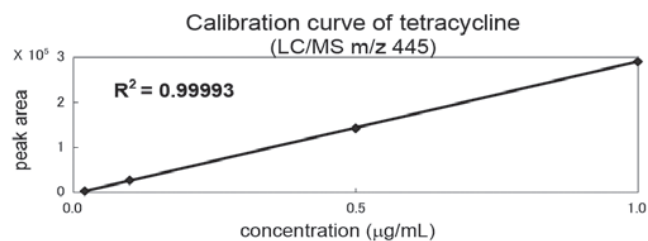
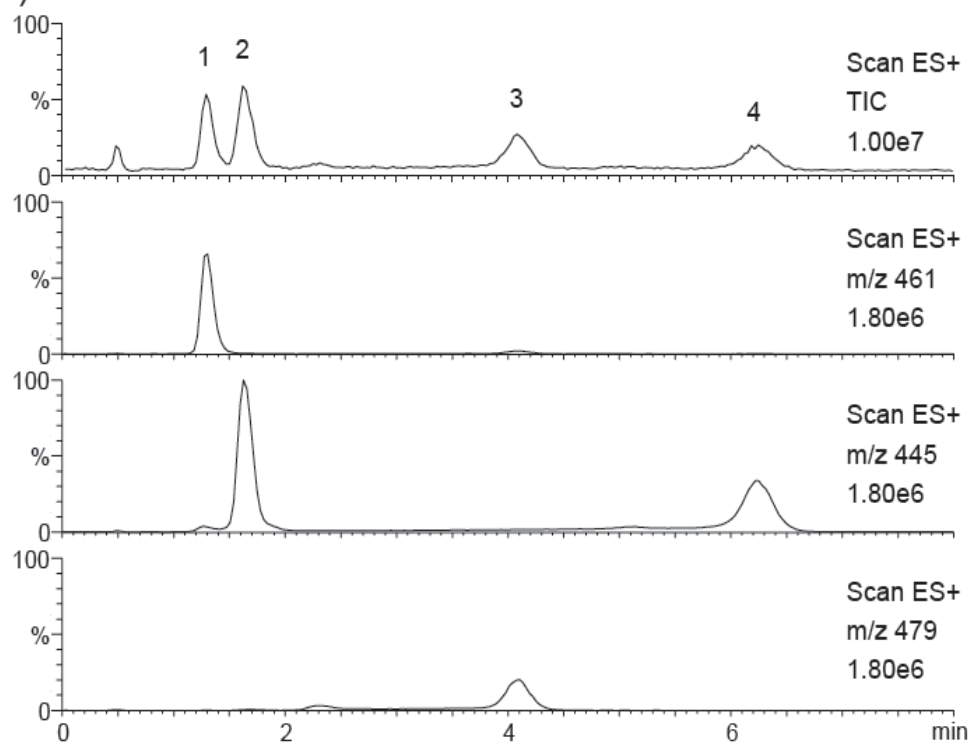
Column: YMC-Triart C18 (5 μ m, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12S05-0502WT
 Eluent: A) 10 mM formic acid
 B) acetonitrile
 Gradient: 25-50% B (0-10 min)
 Flow rate: 0.2 mL/min
 Temperature: 40 °C
 Detection: Bruker Daltonics microTOF, ESI,
 positive mode
 Injection: 5 μ L (100 ng/mL)

LC / MS analysis of tetracycline antibiotics

A) UV



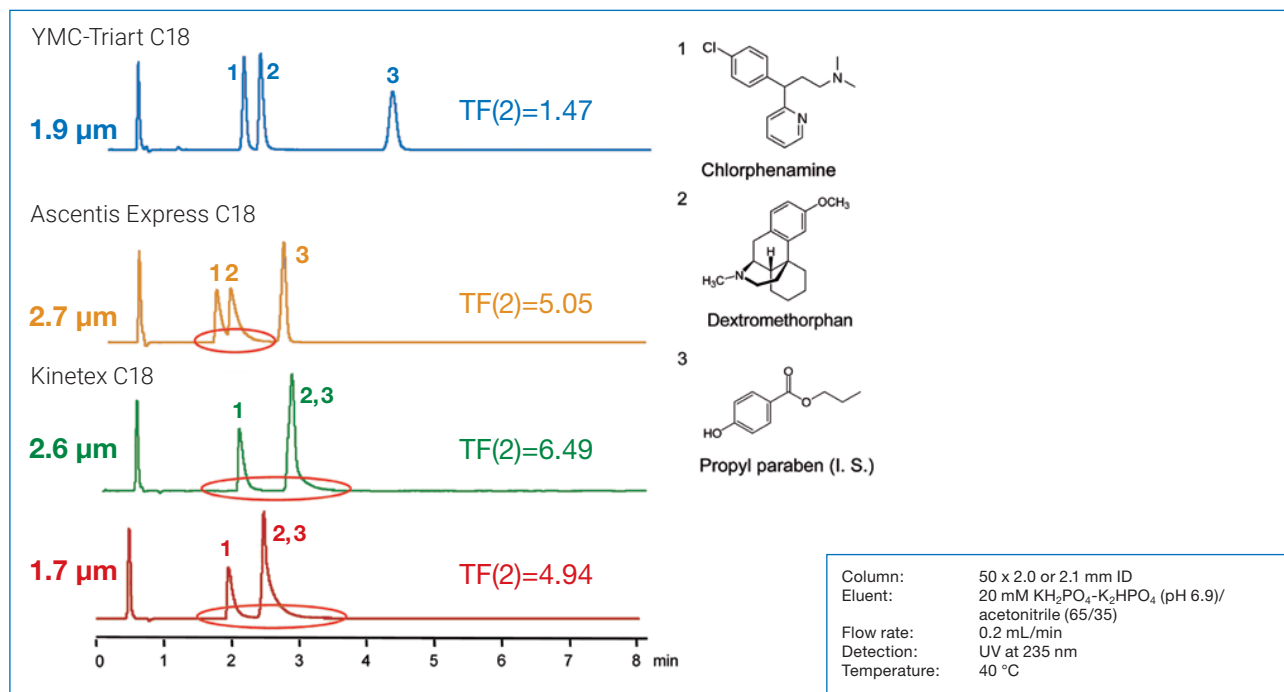
B) MS



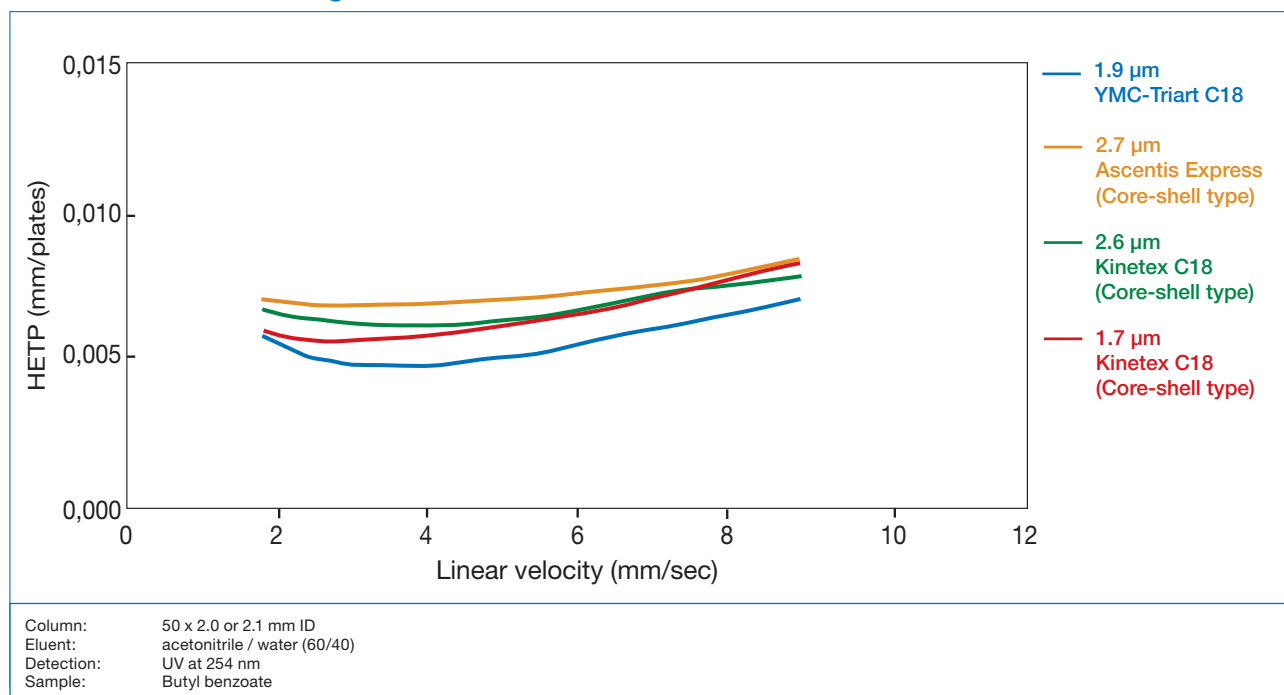
Column: YMC-Triart C18 (5 μm , 12 nm) 50 x 2.0 mm ID
 Part No.: TA12S05-0502WT
 Eluent: acetonitrile / water / formic acid (15/85/0.1)
 Flow rate: 0.4 mL/min
 Temperature: 40 °C
 Detection: A) UV at 270 nm
 B) ESI positive-mode
 Injection: 10 μL (1 $\mu\text{g/mL}$)

Highest resolution in UHPLC

Higher resolution and good loadability



Lower HETP means higher resolution!

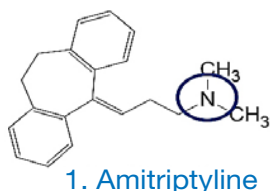


YMC-Triart C18 always shows the lowest HETP compared to the three Core-Shell products over the range of linear velocity applied.

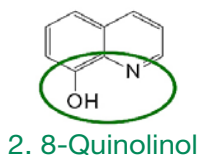
Pharmaceuticals – YMC-Triart C18 ExRS

High hydrophobicity & high steric recognition ability

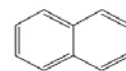
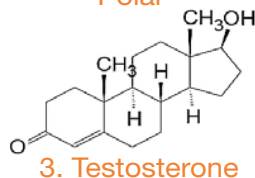
Basic Compound



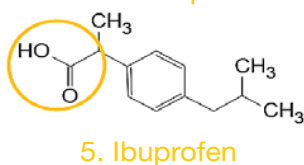
Coordination Compound



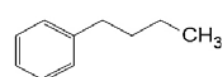
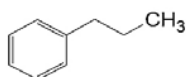
Neutral Compounds
Polar π - π interaction



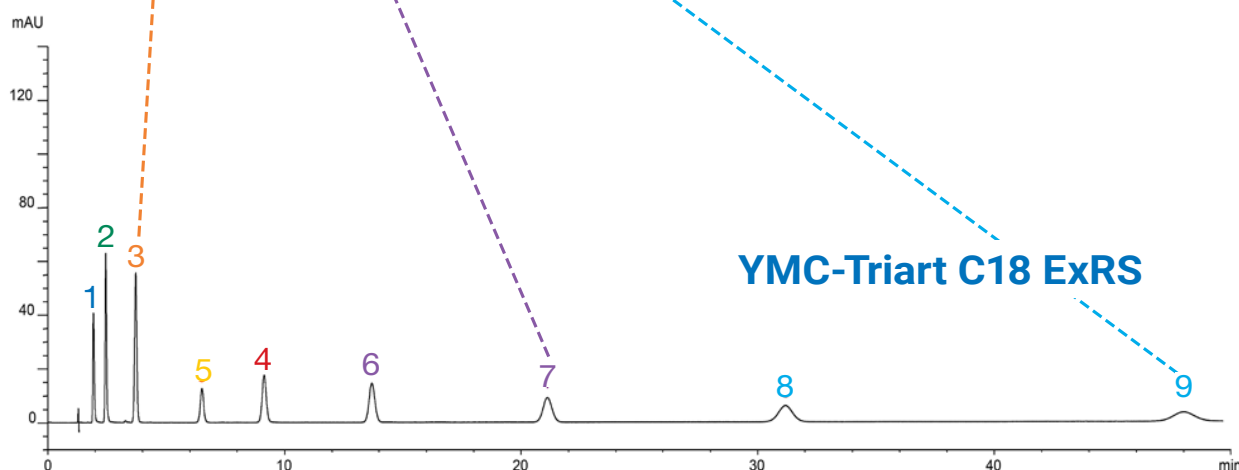
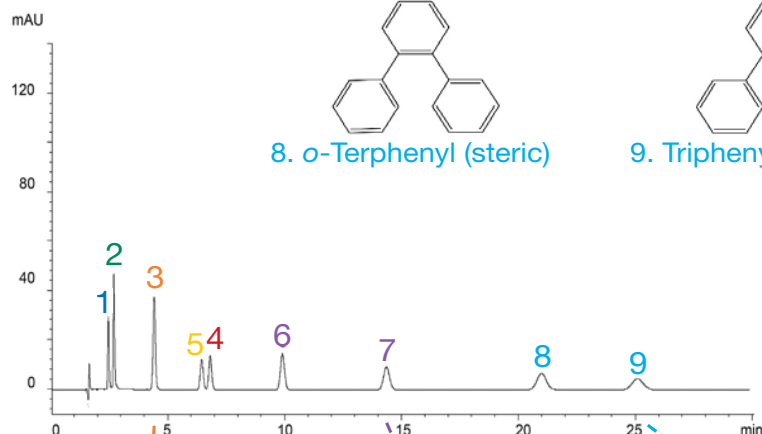
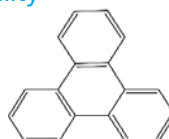
Acidic Compound



Hydrophobic



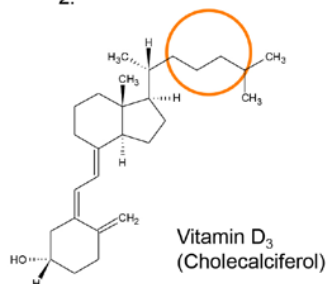
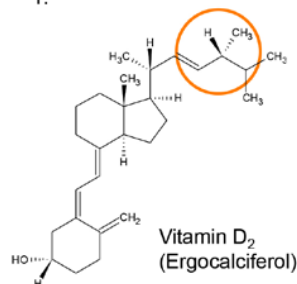
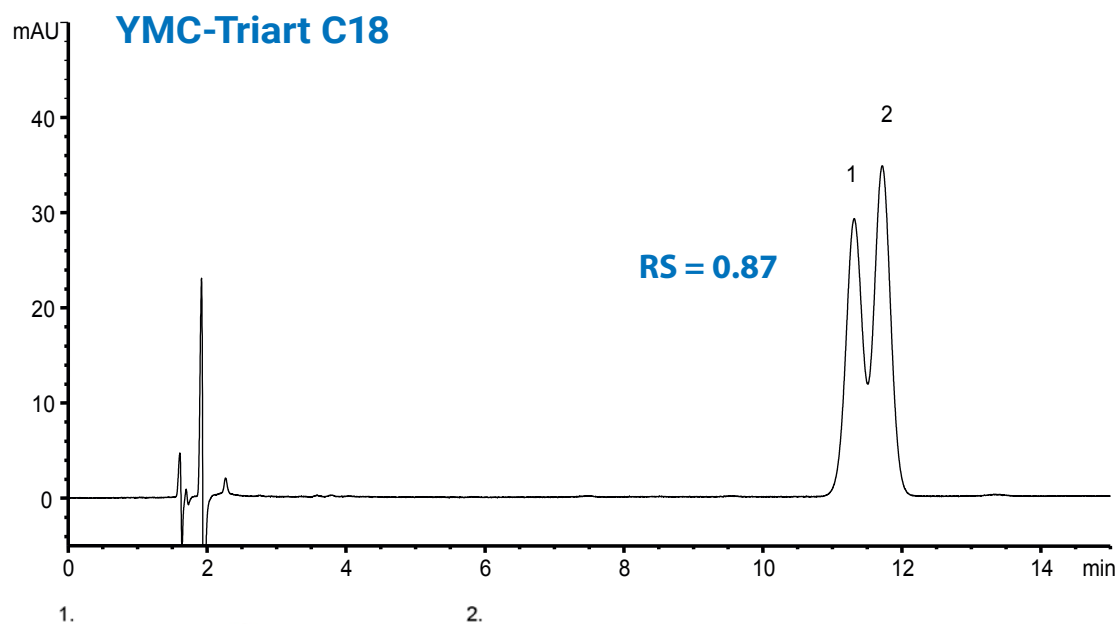
Steric Cognitive Ability



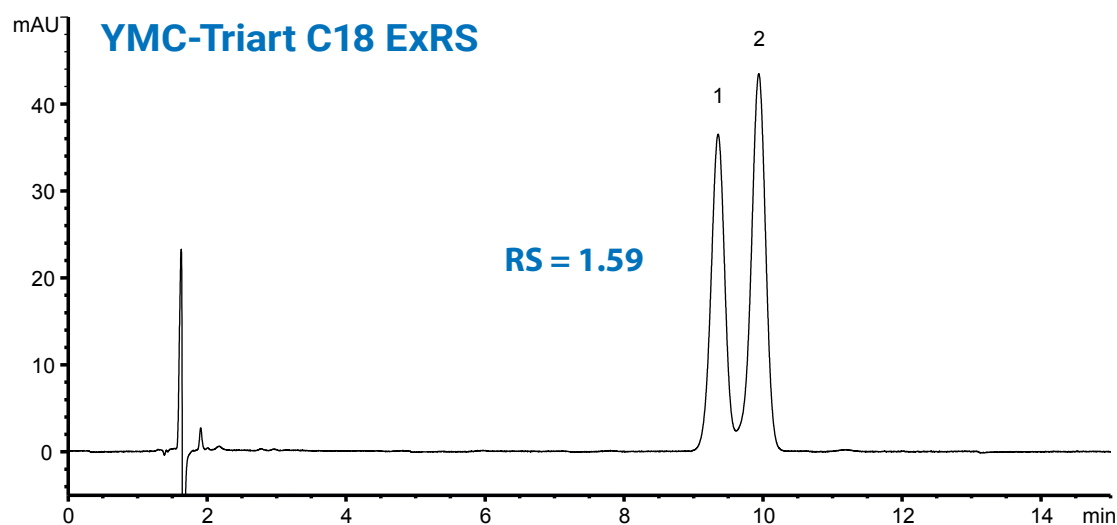
Column: 5 μ m, 150 x 3.0 ID
Part Nos.: TA12S05-1503PTH / TAR08S05-1503PTH
Eluent: 20 mM HCOOH-HCOONH₄ (pH 4.3) / acetonitrile (90/10)
Flow rate: 1.0 mL/min
Detection: UV at 254 nm
Injection: 2 μ L (10 μ g/mL)
Temperature: 25 °C

Pharmaceuticals – YMC-Triart C18 ExRS

Structural analogs



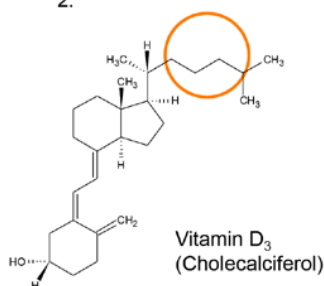
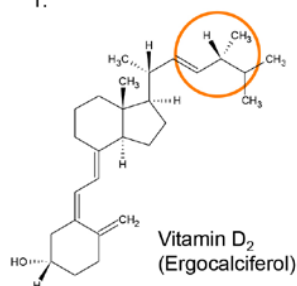
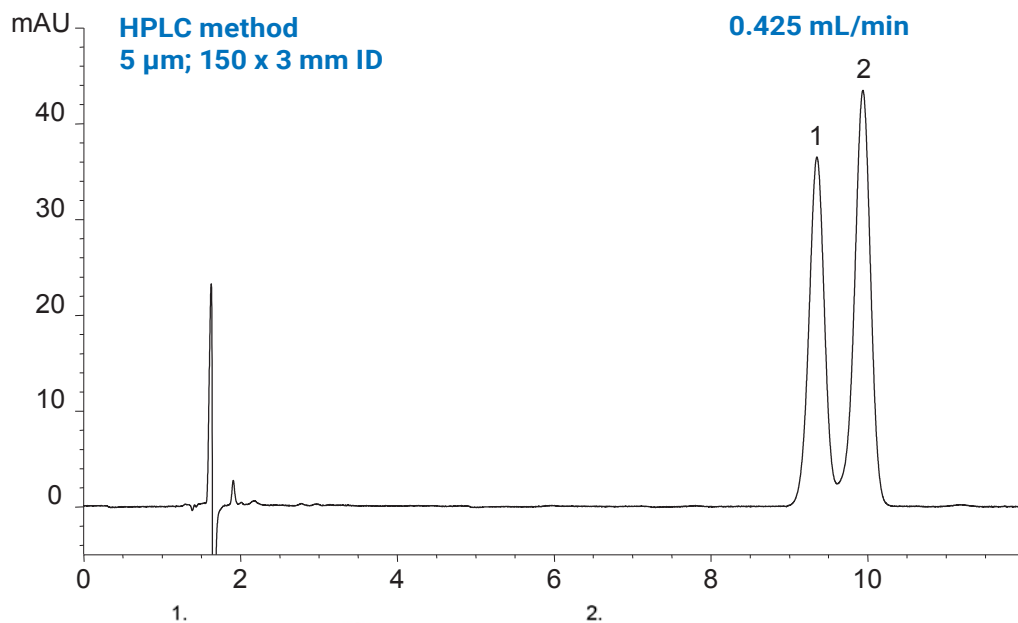
Higher Resolution



Column: 5 μ m, 150 x 3.0 mm ID
Part No.: TA12S05-1503PTH / TAR08S03-1503PTH
Eluent: THF / acetonitrile (10/90)
Flow rate: 0.425 mL/min
Detection: UV at 265 nm
Injection: 4.25 μ L (10 μ g/mL)
Temperature: 30 $^{\circ}$ C

Pharmaceuticals – YMC-Triart C18 ExRS

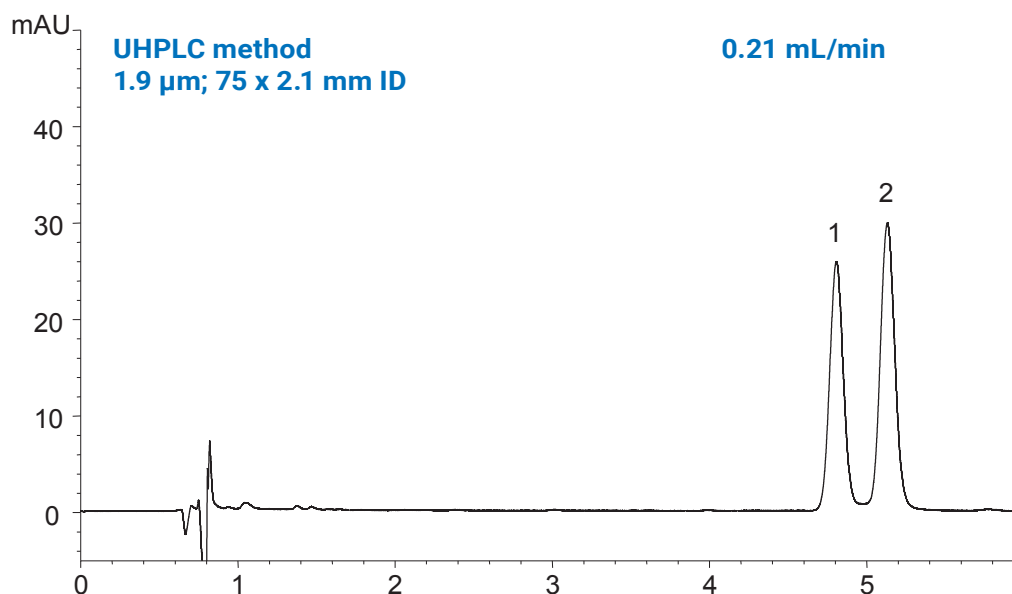
Easy transfer HPLC →UHPLC



12 min

-50%

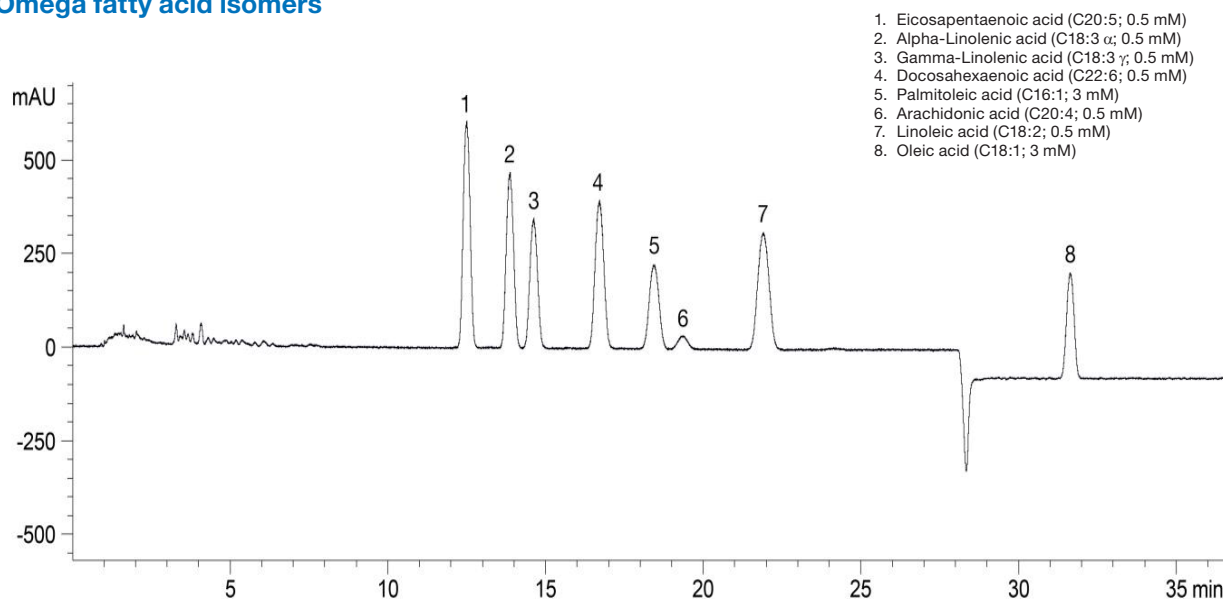
6 min



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

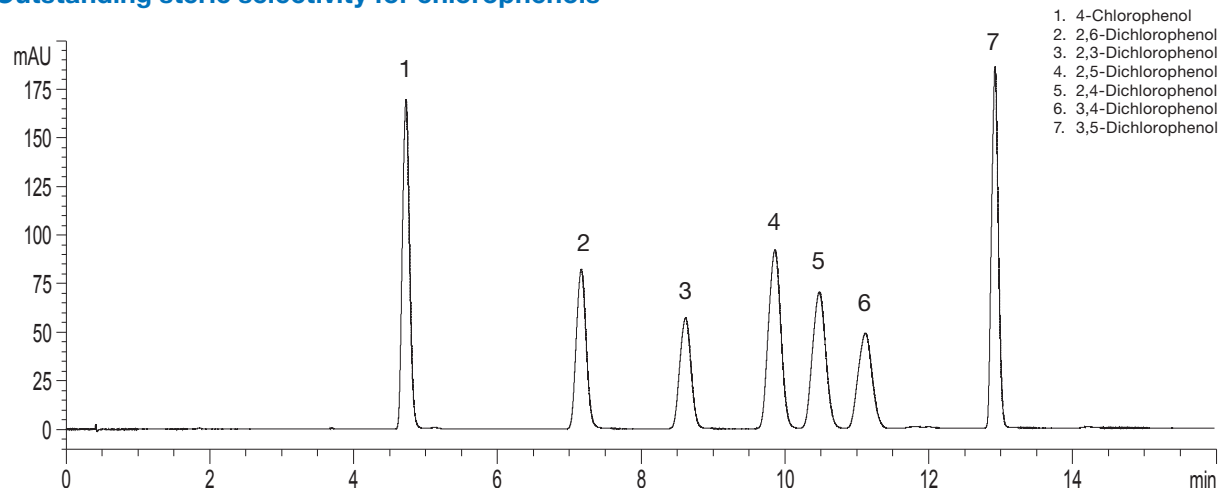
Pharmaceuticals – YMC-Triart C18 ExRS

Omega fatty acid isomers



Column: YMC-Triart C18 ExRS (3 μ m, 8 nm) 150 x 4.6 mm ID
 Part No.: TAR08S03-1546PTH
 Eluent: A) H_2O + 0.5 % H_3CCOOH
 B) ACN + 0.5 % H_3CCOOH
 Gradient: 76.5-78.5% B (0-2 min), 78.5% B (2-27 min), 78.5-90% B (27-27.1 min), 90% B (27.1-55 min)
 Flow rate: 1 mL/min
 Temperature: 35 $^{\circ}C$
 Detection: UV at 254 nm
 Injection: 20 μ L

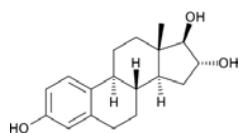
Outstanding steric selectivity for chlorophenols



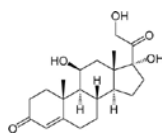
Column: YMC-Triart C18 ExRS (1.9 μ m, 8 nm) 75 x 3.0 mm ID
 Part No.: TAR08SP9-L503PT
 Eluent: A) water + 0.1% $HCOOH$ B) methanol + 0.1% $HCOOH$
 Gradient: 44-50% B (0-8.1 min), 50-51.5% B (8.1-11 min), 51.5-65% B (11-11.1 min), 65% B (11.1-20 min)
 Flow rate: 0.7 mL/min
 Detection: UV at 280 nm
 Injection: 1 μ L (0.7 mg/mL)
 Temperature: 40 $^{\circ}C$

Pharmaceuticals – YMC-Triart Phenyl

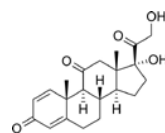
Excellent alternative to C18 phases for steroids



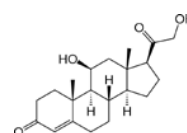
1. Estriol



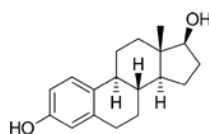
2. Cortisol / Hydrocortison



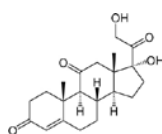
3. Prednisone



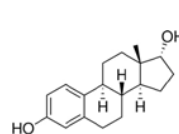
4. Corticosterone



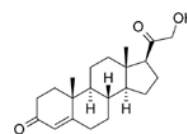
5. Beta-Estradiol



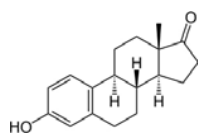
6. Cortisone / Cortison acetate



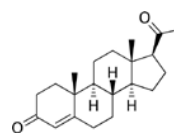
7. Alpha-Estradiol



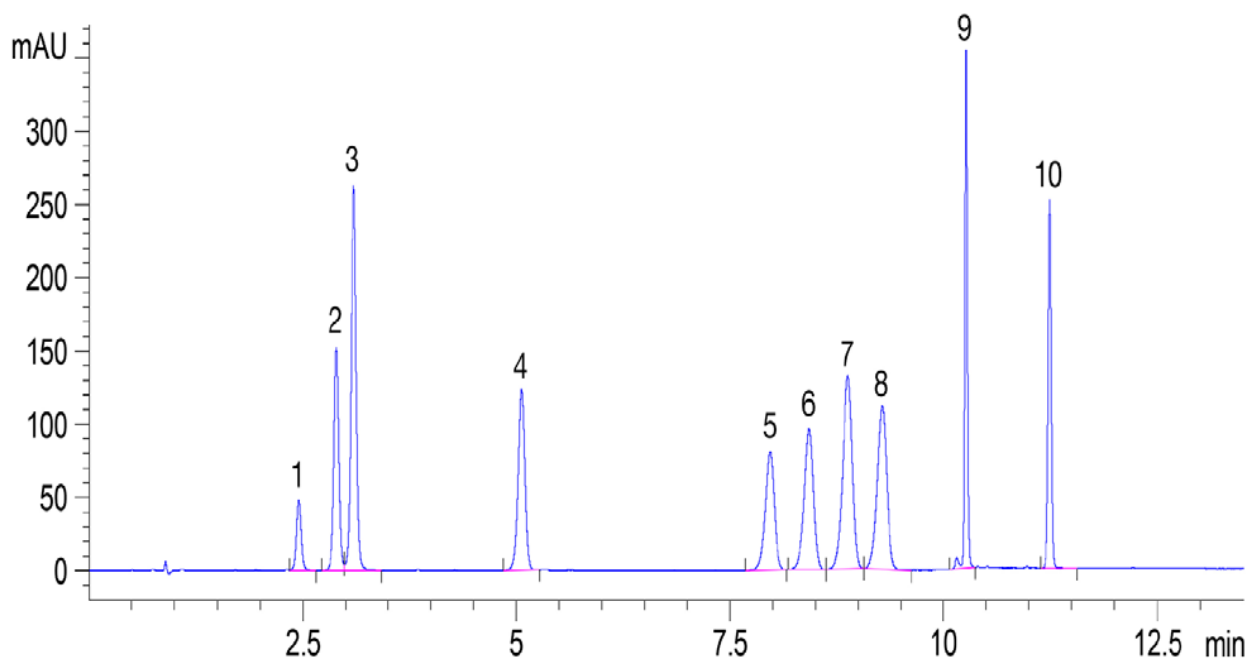
8. 21-Hydroxyprogesterone



9. Estrone



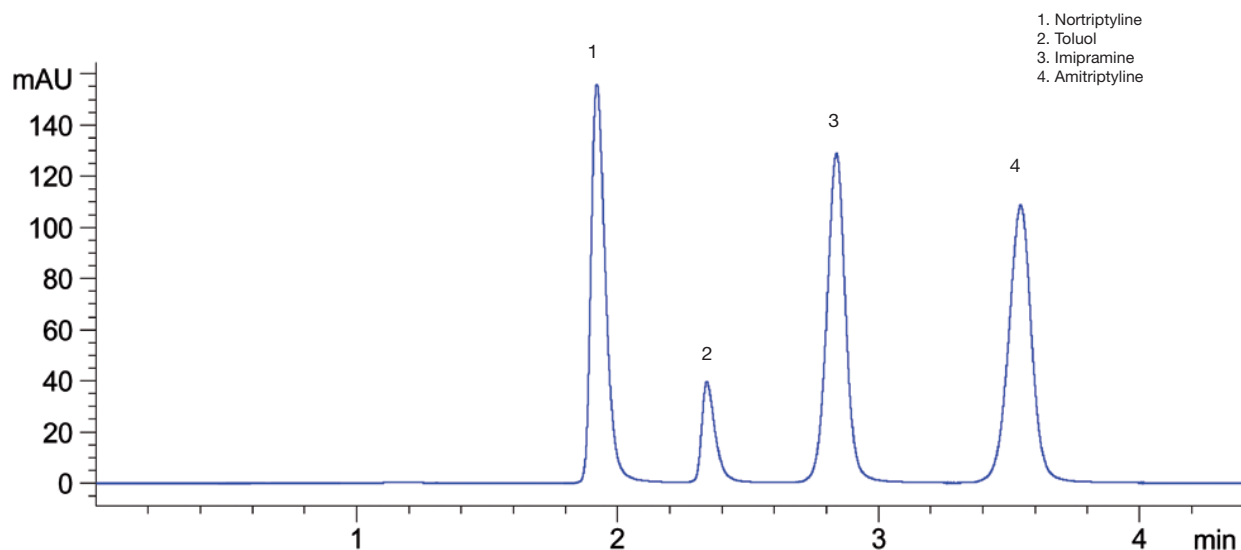
10. Progesterone



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
 Detection: UV at 220 nm
 Injection: 0.5 μ L
 Temperature: 48 $^{\circ}$ C

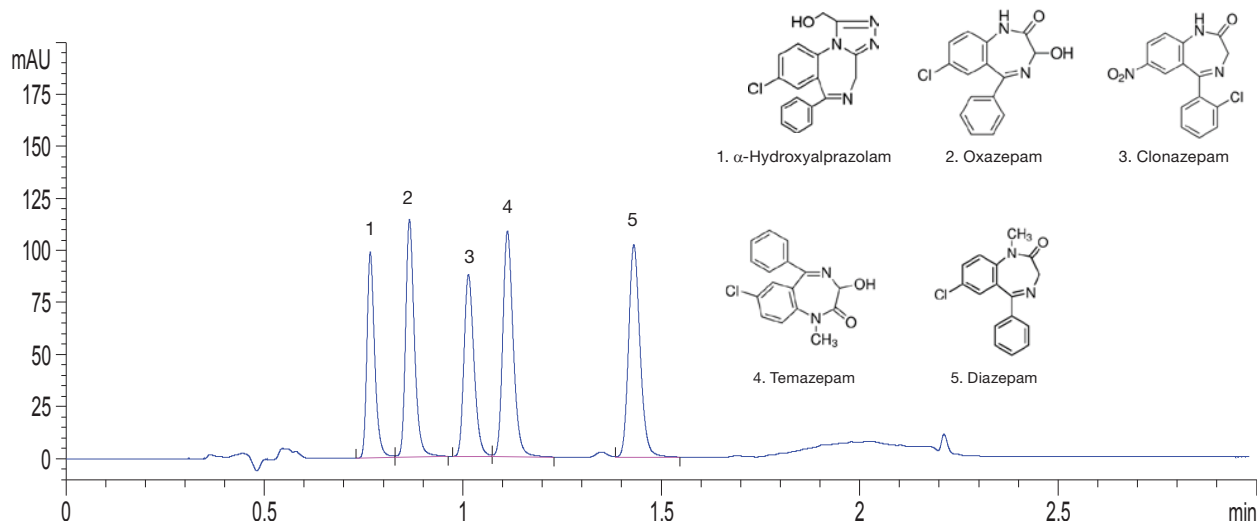
Pharmaceuticals – YMC-Triart Phenyl

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
Detection: UV at 254 nm
Injection: 2 μ L
Temperature: 25 $^\circ\text{C}$

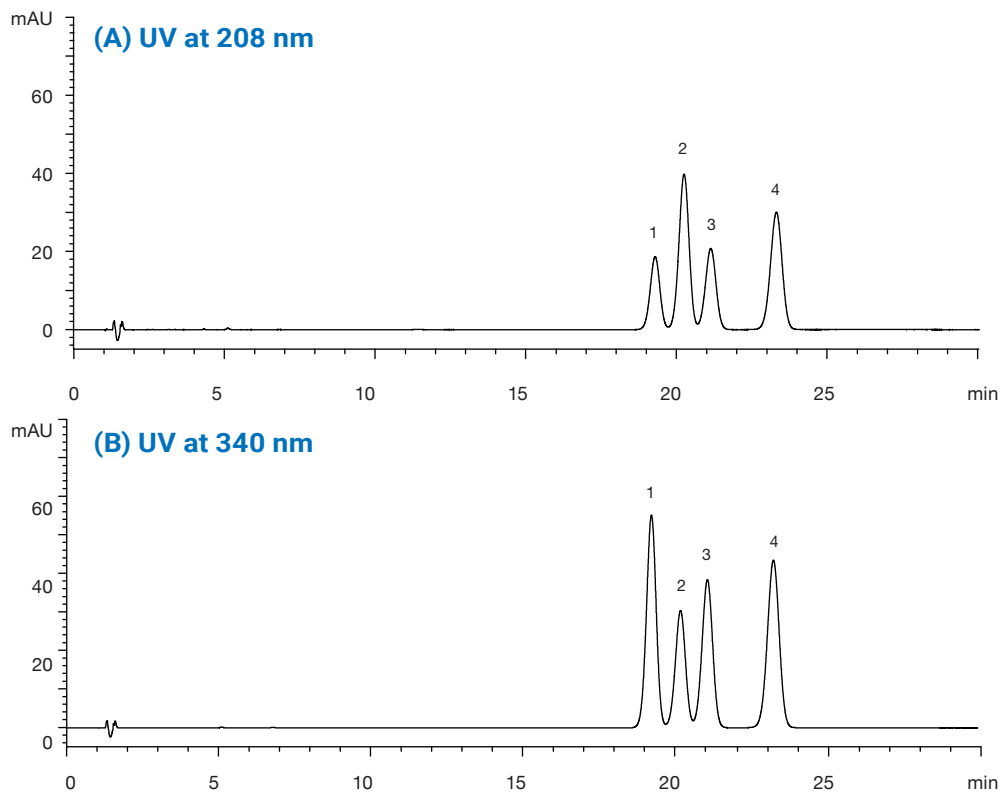
UHPLC separation of different benzodiazepines



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
Detection: UV at 254 nm
Injection: 2 μ L (0.02 mg/mL)
Temperature: 35 $^\circ\text{C}$

Pharmaceuticals – YMC-Triart PFP

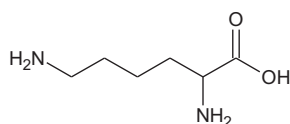
Piperine and its isomers*



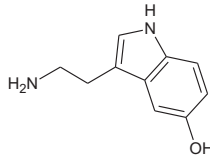
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 3.0 mm ID
 Part No.: TPF12S05-1503PTH
 Eluent: 0.1% HCOOH / acetonitrile (60/40)
 Flow rate: 0.425 mL/min
 Injection: 4.25 μ L
 Temperature: 25 $^{\circ}$ C

Pharmaceuticals – YMC-Triart PFP

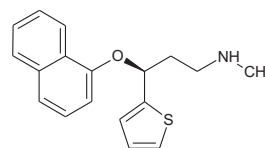
Retention of basic compounds with various hydrophobicity on PFP column



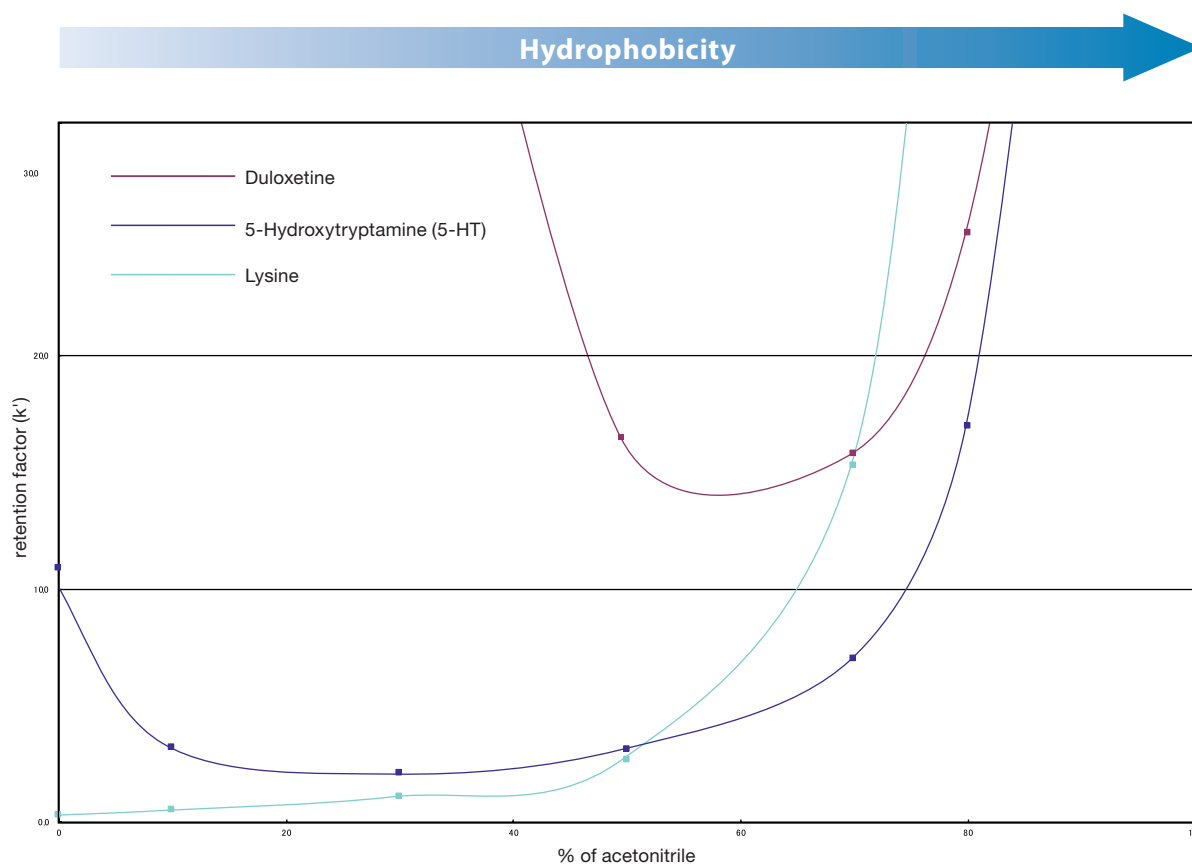
Lysine (Lys)



5-Hydroxytryptamine (5-HT)



Duloxetine



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 behavior of Duloxetine

Acetonitrile composition 0-30%:

Duloxetine does not elute due to the high hydrophobicity.

Acetonitrile composition 50-70%:

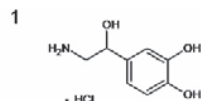
It can be eluted.

Acetonitrile composition 80-100%:

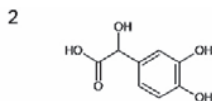
Retention becomes stronger, and elution does not take place at acetonitrile composition of 90% or higher.

Pharmaceuticals – YMC-Triart PFP

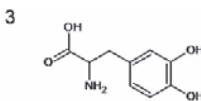
Catecholamines, serotonin, and their precursors and metabolites



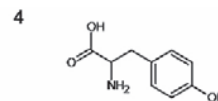
Noradrenaline hydrochloride (NA)
(Norepinephrine hydrochloride)



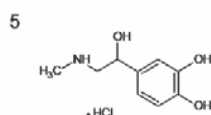
3,4-Dihydroxymandelic acid
(DOMA)



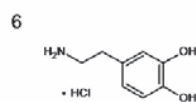
3,4-Dihydroxyphenylalanine
(DOPA)



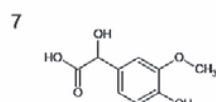
Tyrosine (Tyr)



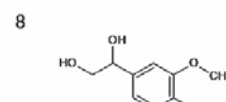
Adrenaline hydrochloride (A)
(Epinephrine hydrochloride)



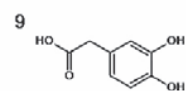
Dopamine hydrochloride (DA)



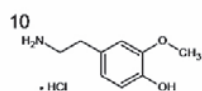
Vanillylmandelic acid (VMA)



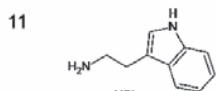
3-Methoxy-4-hydroxyphenylglycol
(MHPG)



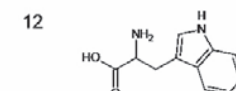
3,4-Dihydroxyphenylacetic acid
(DOPAC)



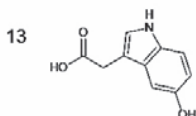
3-Methoxytyramine hydrochloride
(3MT)



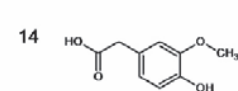
Serotonin hydrochloride
(5-Hydroxytryptamine hydrochloride, 5HT)



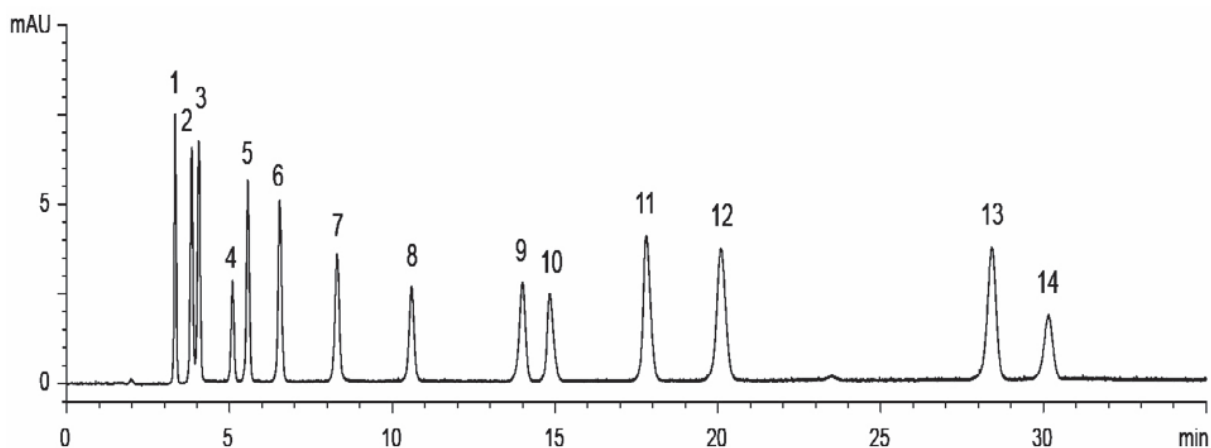
Tryptophan (Trp)



5-Hydroxyindoleacetic acid
(5HIAA)



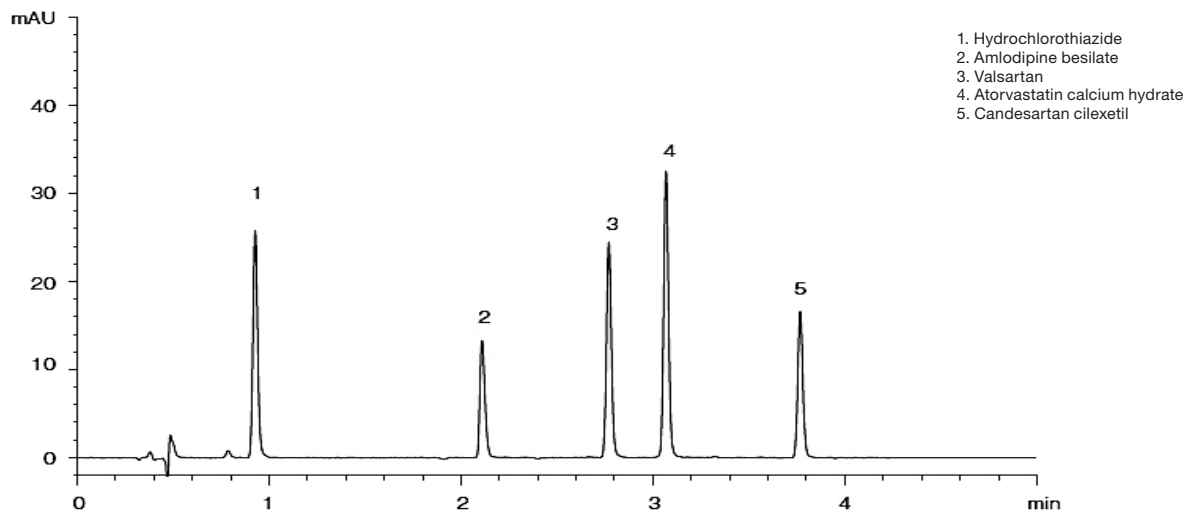
Homovanillic acid (HVA)



Column: YMC-Triart PFP (3 μ m, 12 nm) 150 x 3.0 mm ID
Part No.: TPF12S03-1503PTH
Eluent: A) 10 mM formic acid
B) methanol containing 10 mM formic acid
Gradient: 0-20% B (0-30 min), 20% B (30-35 min)
Flow rate: 0.425 mL/min
Detection: UV at 280 nm
Injection: 4 μ L (5 μ g/mL)
Temperature: 25 $^{\circ}$ C

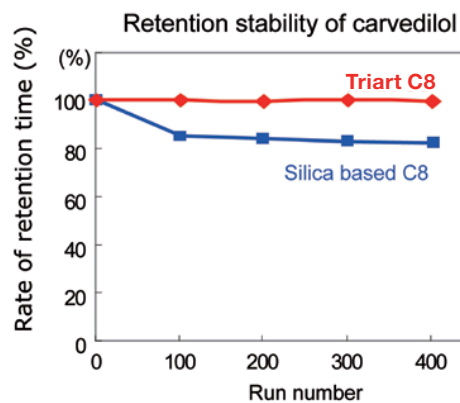
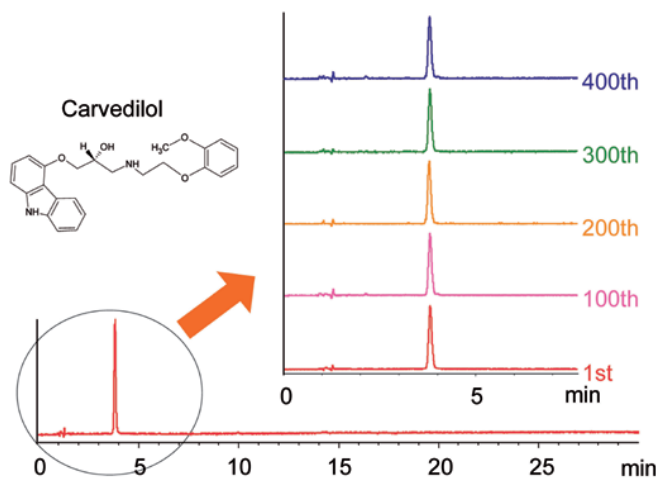
Pharmaceuticals – YMC-Triart C8

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

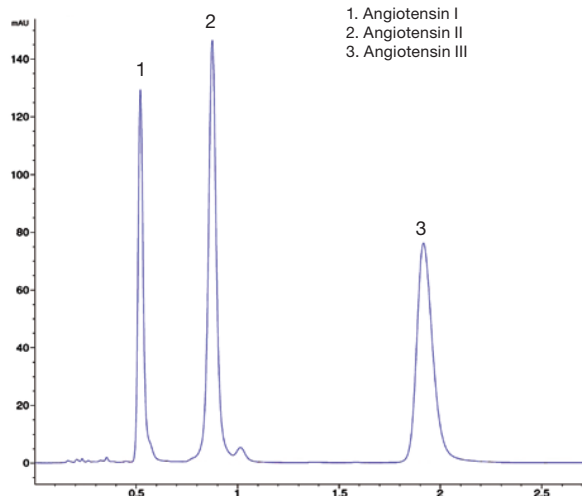


Column: YMC-Triart C8 (5 μ m, 12mm) 150 x 2.0 mm ID
Part No.: TO12S05-1502WT
Eluent: phosphate buffer (pH 2.0)* / acetonitrile (65/35)
*Dissolve 2.72 g of KH_2PO_4 in 900 mL water, adjust pH 2.0 with H_3PO_4 and add water to make 1000 mL
Flow rate: 0.28 mL/min (adjust the flow rate so that the retention 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.

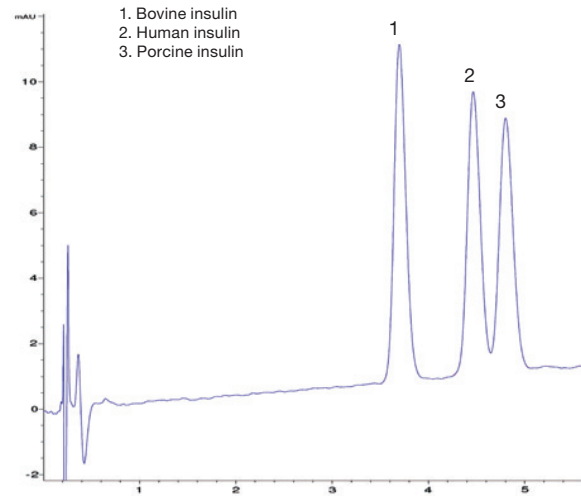
Pharmaceuticals – UHPLC

Angiotensin I, II and III



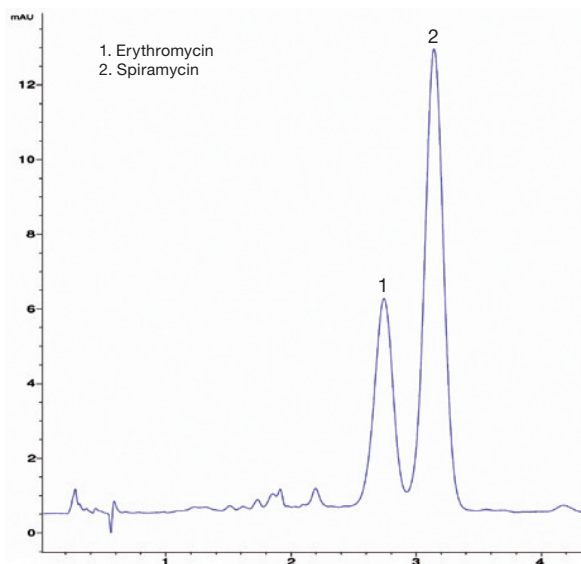
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: 20 mM KH_2PO_4 + K_2HPO_4 (pH 7.9) / acetonitrile (22/78)
Flow rate: 0.7 mL/min
Detection: UV at 220 nm
Pressure: 720 bar
Injection: 0.5 μ L
Temperature: 40 $^\circ\text{C}$

Insulin



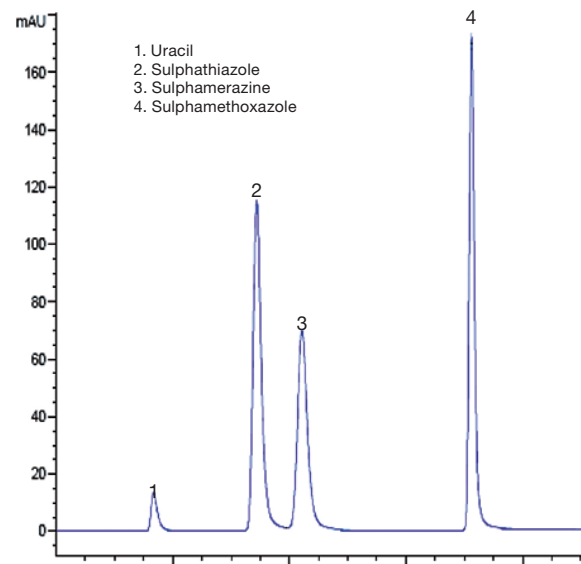
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: A) H_2O + 0.1% TFA
B) acetonitrile + 0.1% TFA
Gradient: 30% B (0 min); 30-32% B (0-5 min); 32% B (55 min)
Flow rate: 0.6 mL/min
Detection: UV at 220 nm
Pressure: 611 bar
Injection: 0.5 μ L
Temperature: 30 $^\circ\text{C}$

Macrolide antibiotics



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
Detection: UV at 210 nm
Pressure: 520 bar
Injection: 1 μ L
Temperature: 50 $^\circ\text{C}$

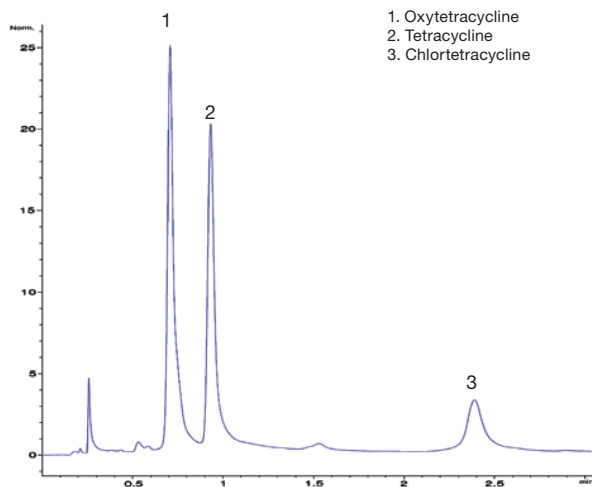
Sulpha drugs



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
Detection: UV at 280 nm
Pressure: 740 bar
Injection: 0.5 μ L
Temperature: 50 $^\circ\text{C}$

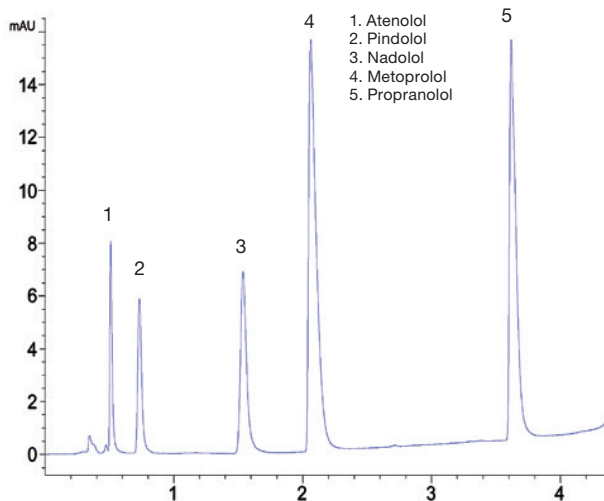
Pharmaceuticals – UHPLC

Tetracycline antibiotics



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
Detection: UV at 280 nm
Pressure: 662 bar
Injection: 1 μ L
Temperature: 40 $^\circ\text{C}$

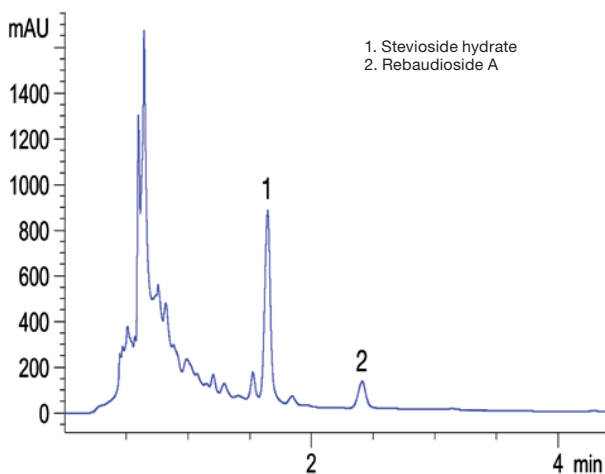
Betablockers



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
Detection: UV at 254 nm
Pressure: 450 bar
Injection: 1 μ L
Temperature: 40 $^\circ\text{C}$

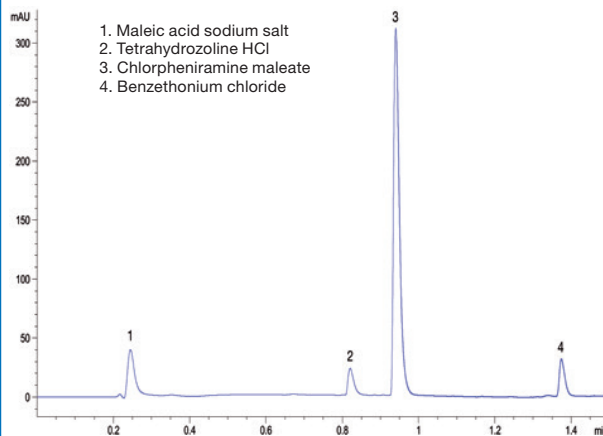
Pharmaceuticals – UHPLC

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 mL/min
 Detection: UV at 200 nm
 Injection: 2 μ L
 Temperature: 30 $^{\circ}$ C

Nasal spray

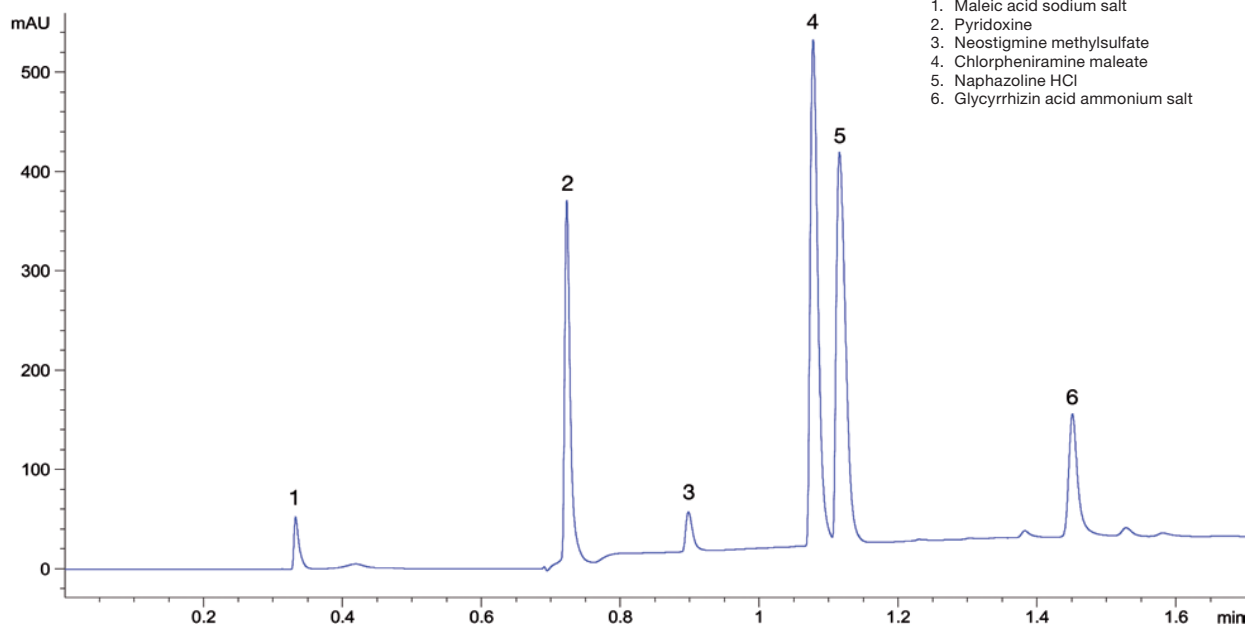


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) water + 0.05% TFA / B) methanol (50/50)
 Gradient:

min	A	B
0	80	20
0.5	10	90
1.2	0	100

 Flow rate: 0.6 mL/min
 Detection: UV at 260 nm
 Injection: 0.2 μ L
 Temperature: 40 $^{\circ}$ C

Eye drop formulation



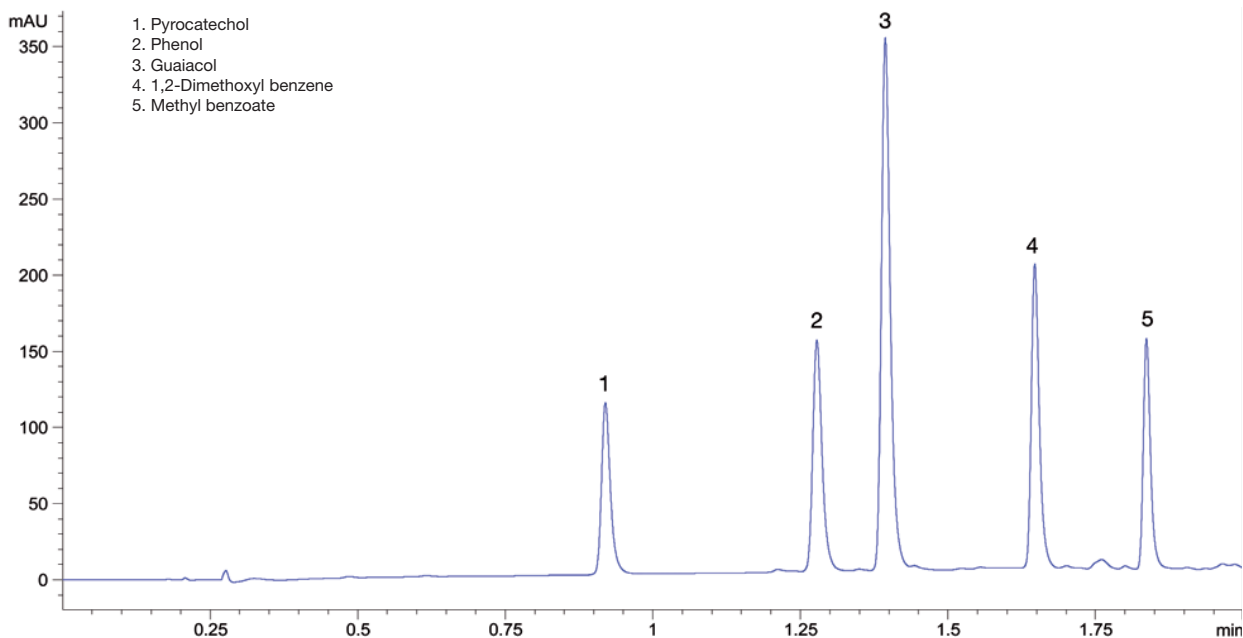
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
 Part No.: TA12SP9-0502PT
 Eluent: A) water + 0.05% TFA
 B) acetonitrile
 Flow rate: 0.6 mL/min
 Detection: UV at 265 nm
 Injection: 0.5 μ L
 Temperature: 40 $^{\circ}$ C

Gradient:

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

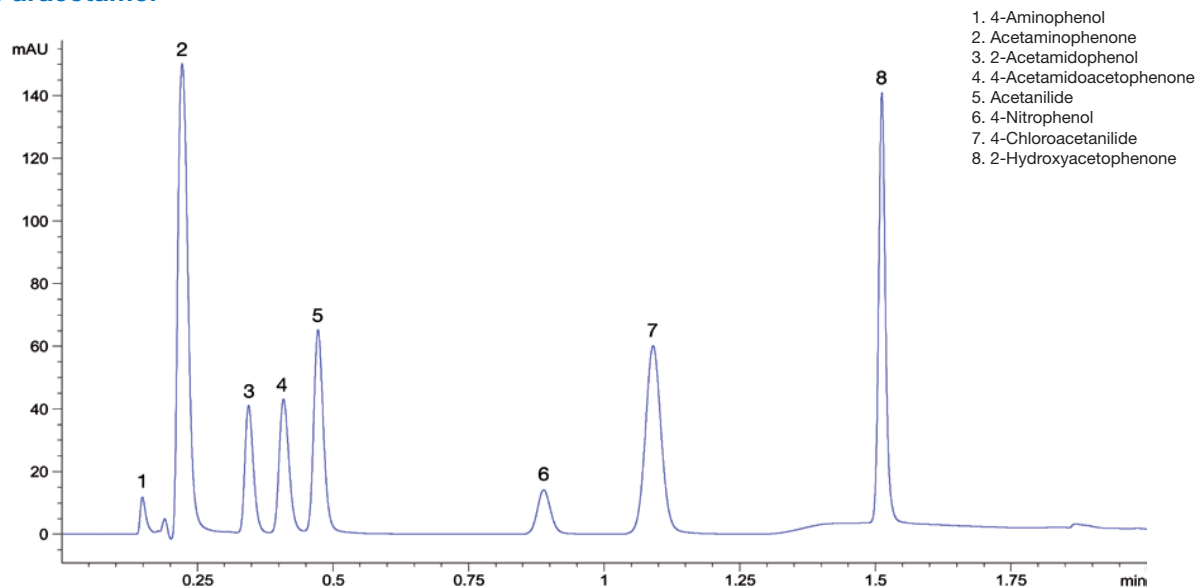
Pharmaceuticals – UHPLC

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
Detection: UV at 254 nm
Injection: 0.5 μ L
Temperature: 40 °C

Paracetamol

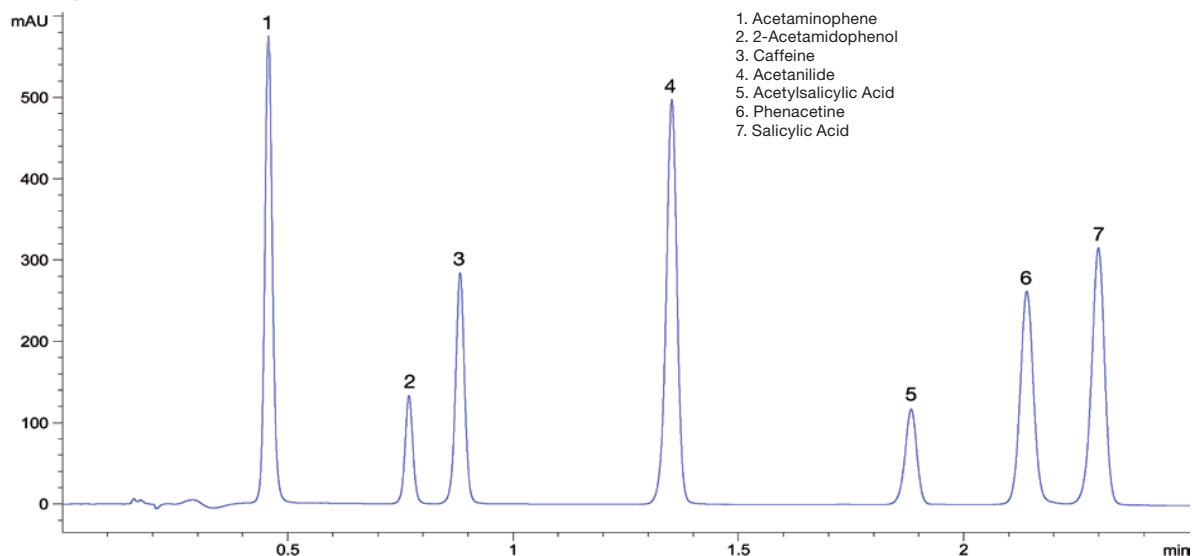


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: A) water + formic acid (pH 2.5) / B) acetonitrile
Flow rate: 0.7 mL/min
Detection: UV at 254 nm
Injection: 0.5 μ L
Temperature: 40 °C

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

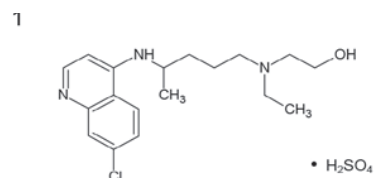
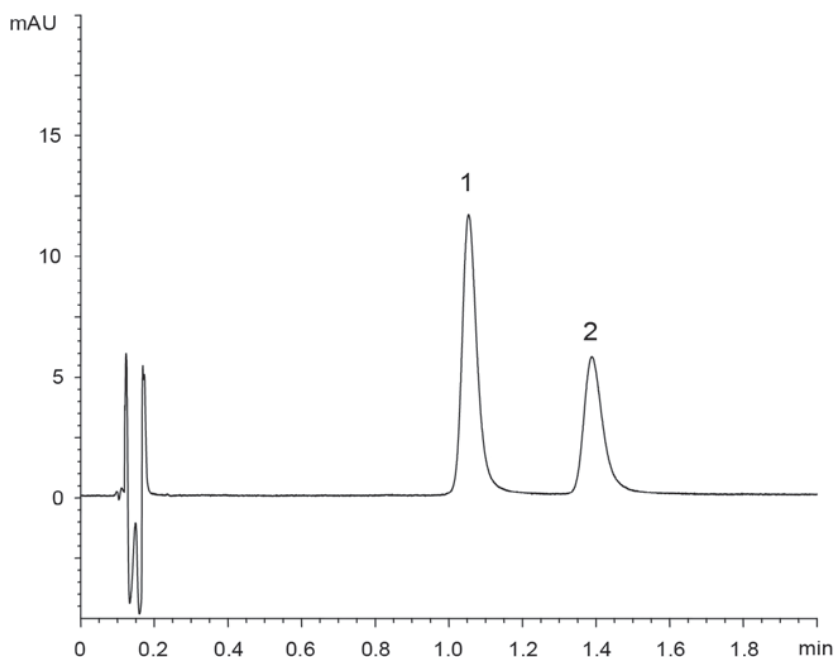
Pharmaceuticals – UHPLC

7 Analgesics

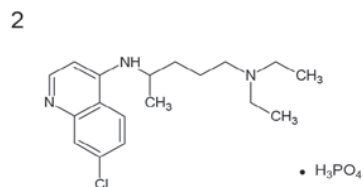


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: water + formic acid (pH 2.5) / acetonitrile (50/50)
Flow rate: 0.8 mL/min
Detection: UV at 240 nm
Injection: 1 μ L
Temperature: 40 $^{\circ}$ C

Hydroxychloroquine and chloroquine



Hydroxychloroquine sulfate



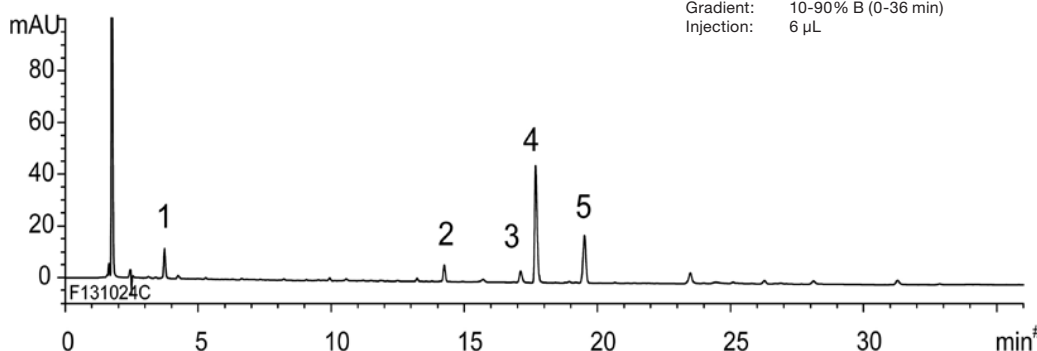
Chloroquine phosphate

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
Detection: UV at 254 nm
Injection: 2 μ L (10 μ g/mL)
Temperature: 25 $^{\circ}$ C

Pharmaceuticals – UHPLC

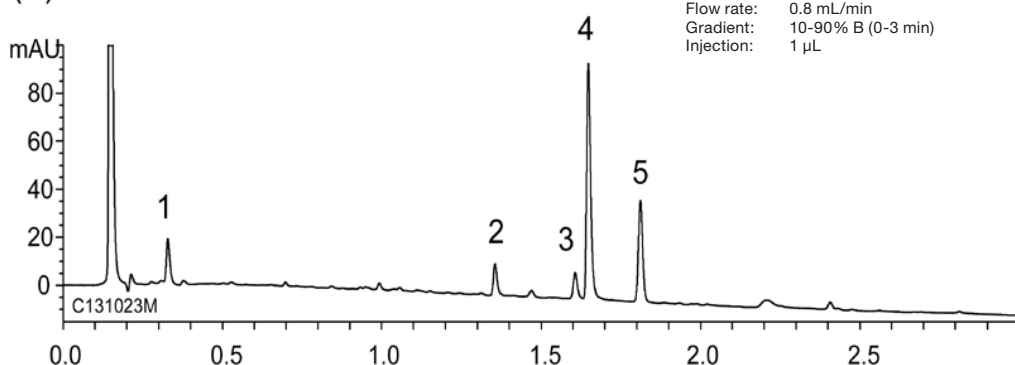
Duloxetine and its degradation products

(A) HPLC method



35 min

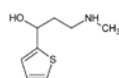
(B) UHPLC method



11x faster

3 min

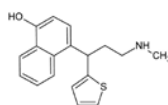
1.



Amino alcohol

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

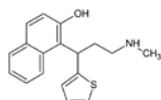
2.



Para isomer

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

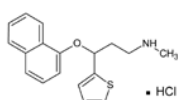
3.



Ortho isomer

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

4.



Duloxetine hydrochloride

5.



α -Naphthol

Eluent: A) 10 mM $\text{CH}_3\text{COONH}_4$ (pH 6.0)

B) acetonitrile

Detection: UV at 230 nm

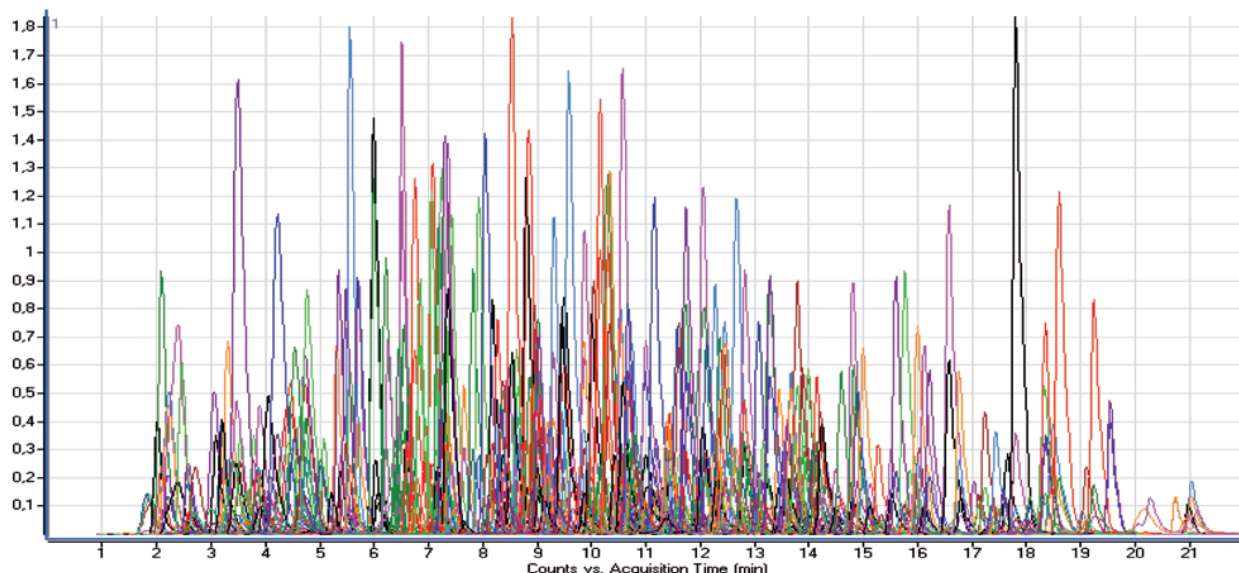
Temperature: 30 $^\circ\text{C}$

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



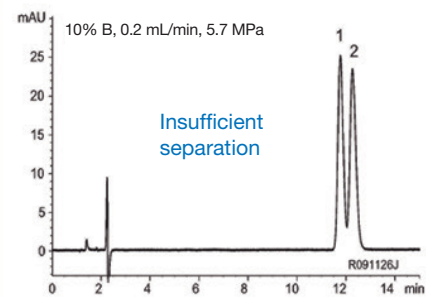
Column: YMC-Triart C18 (3 μ m, 12nm) 100 x 2.0 mm ID
 Part No.: TA12S03-1002WT
 Eluent: A) 5 mM ammonium formate / water
 B) 5 mM ammonium formate / methanol
 Gradient: 0 min: 30% B, 0.1 min: 50% B, 18 min: 100% B,
 21 min: 100% B, 21.01 min: 30% B, 29 min: 30% B

Total run time: 30 min
 Flow rate: 0.25 mL/min
 Temperature: 45 $^{\circ}$ C
 Injection: 5 μ L
 Sample: 100 ng/mL pesticide mix in acetonitrile

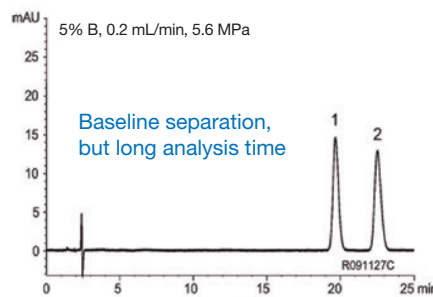
Application data by courtesy of: József László
 WIREC, WESSLING International Research and Educational Centre Nonprofit Co. (Hungary)

Fast LC for conventional HPLC

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

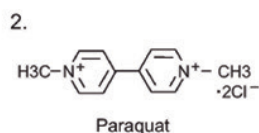
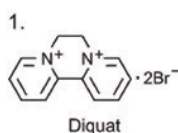
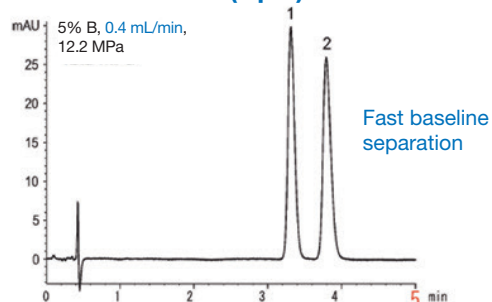


optimisation



Down scaling

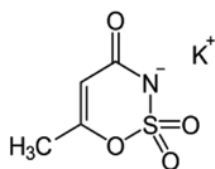
YMC-Triart C18 (3 μ m) 50 x 2.0 mm ID



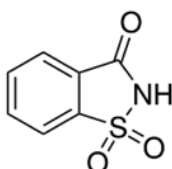
Eluent: A) water / HFBA* (100/0.1)
 B) acetonitrile / HFBA* (100/0.1)
 Part Nos.: TA12S05-1502WT, TA12S03-0502WT
 Temperature: 37 $^{\circ}$ C
 Detection: UV at 290 nm
 Injection: 1 μ L (0.1 mg/mL)
 *heptafluorobutyric acid

Food – LC / MS

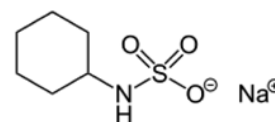
Determination of artificial sweeteners with LC-MS/MS



Acesulfame (K salt)

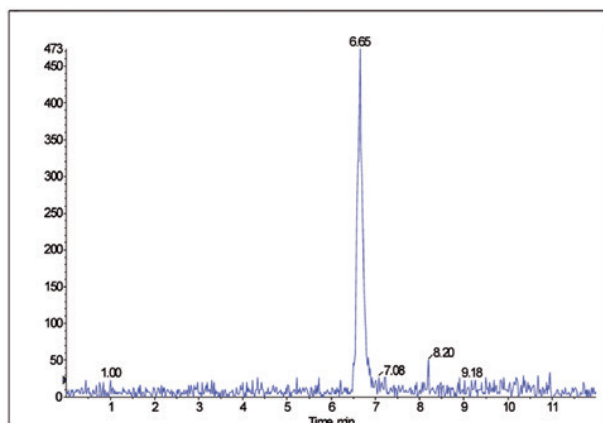


Saccharin

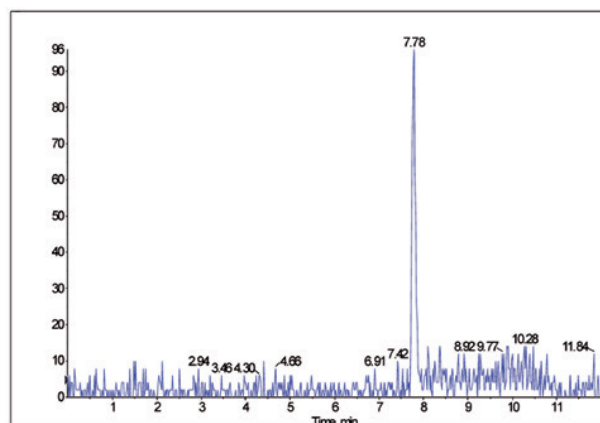


Cyclamate Na

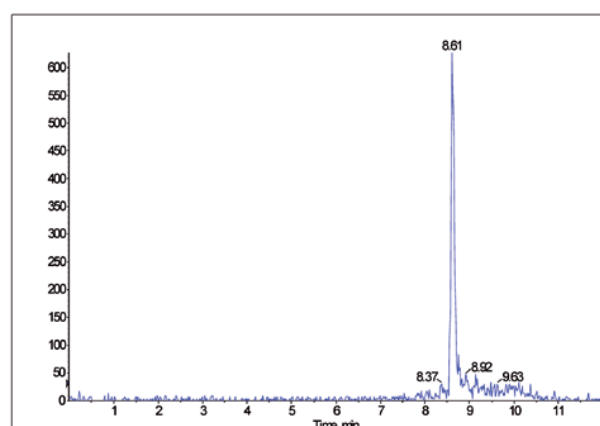
→ Non biological markers of wastewater entries in ground and surface water



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



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



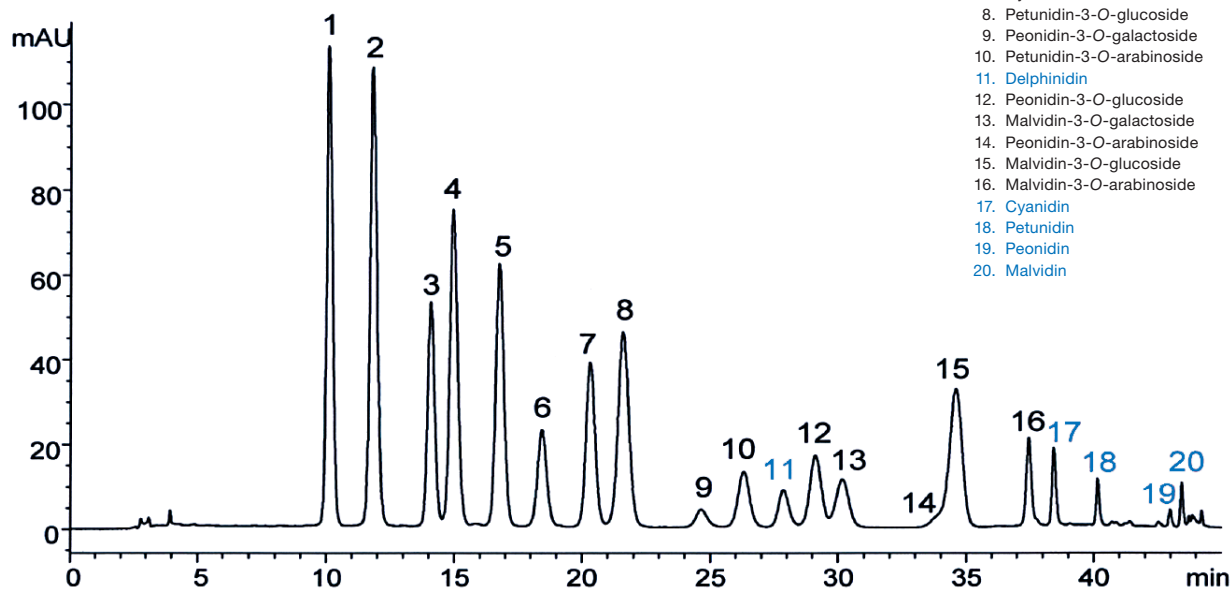
Extracted Ion Chromatogram (XIC) of Cyclamate Na, 0.1 µg/L

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

Analysis of anthocyanins and anthocyanidins

Anthocyanins: Indicated in black

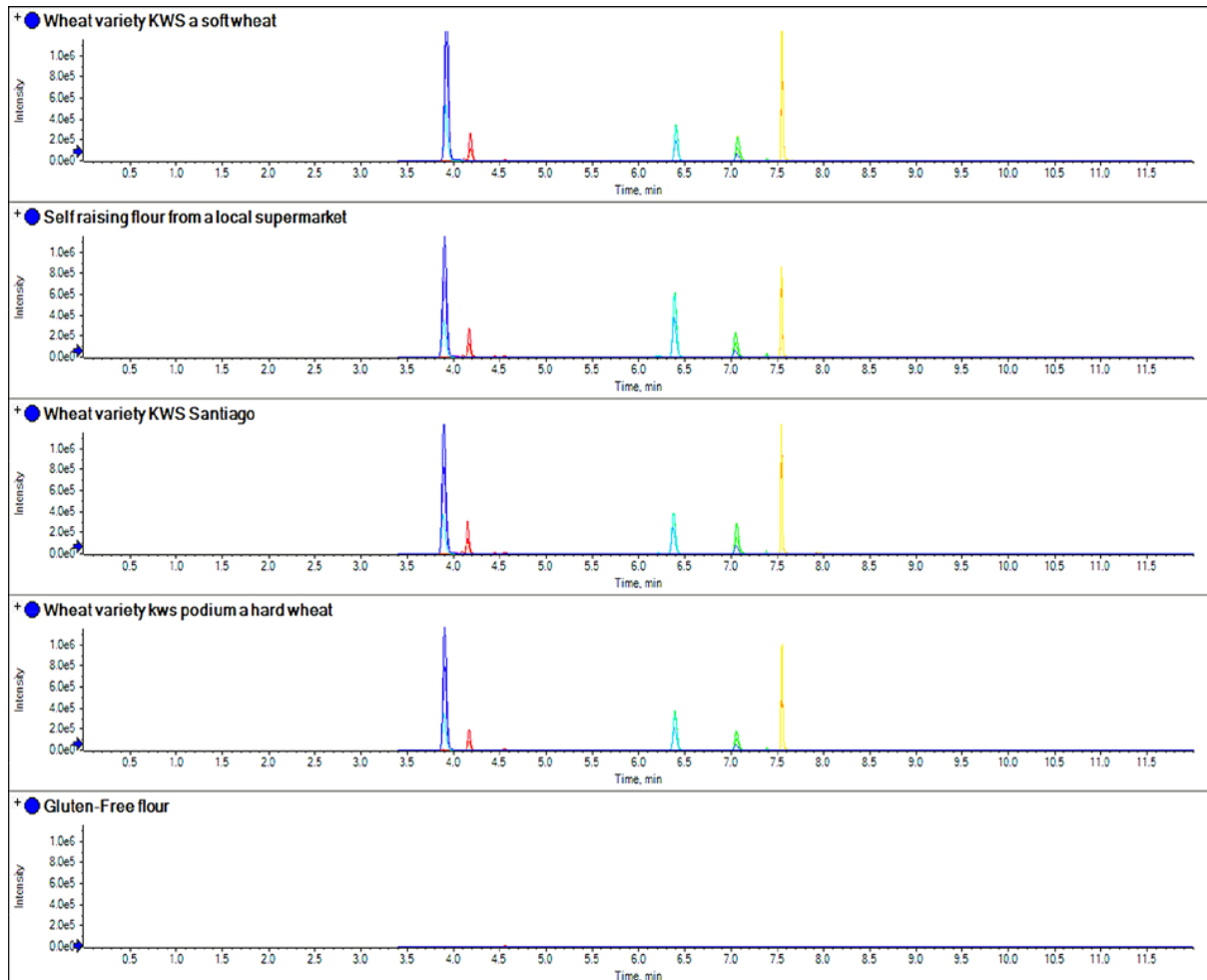
Anthocyanidins: Indicated in blue



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 $^{\circ}$ 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



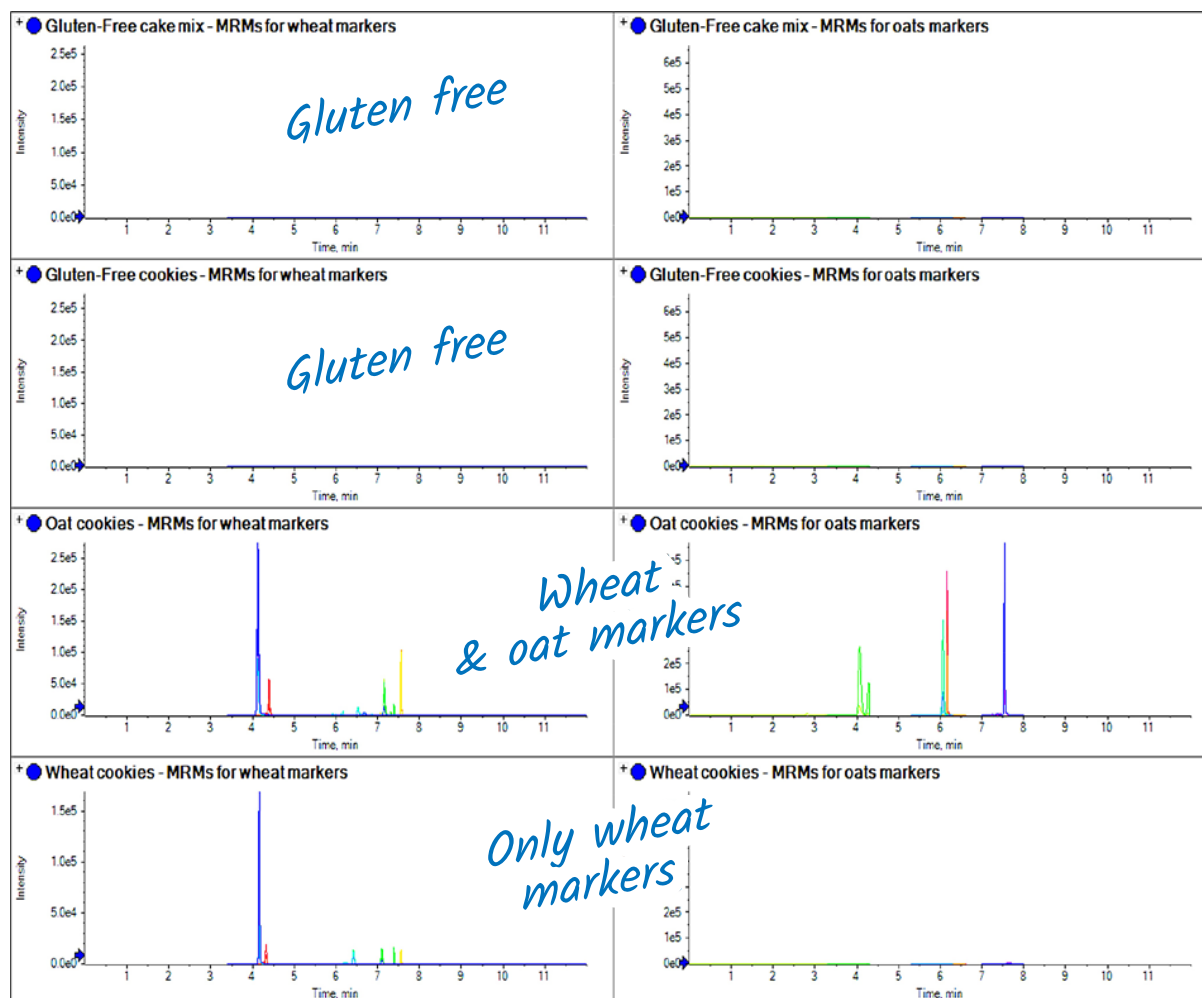
Column: YMC-Triart C18 (12 nm, 3 μ m) 100 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-10J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5% B (0-1 min), 25% B (6 min), 95% B (8-9 min), 5% B (9.2-12 min)
 Flow rate: 25 μ L/min
 Temperature: 40 $^{\circ}$ C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

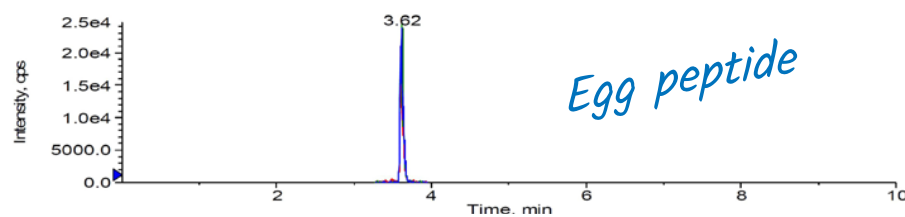
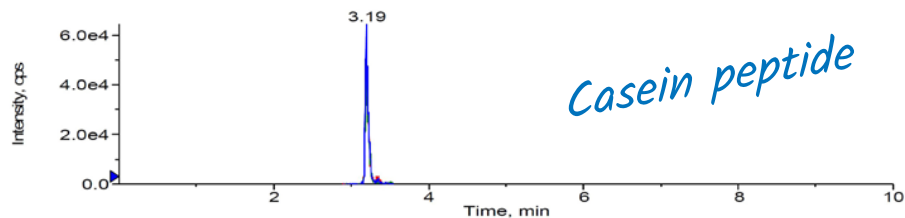


Column: YMC-Triart C18 (12 nm, 3 μ m) 100 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-10J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5% B (0-1 min), 25% B (6 min), 95% B (8-9 min), 5% B (9.2-12 min)
 Flow rate: 25 μ L/min
 Temperature: 40 $^{\circ}$ C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

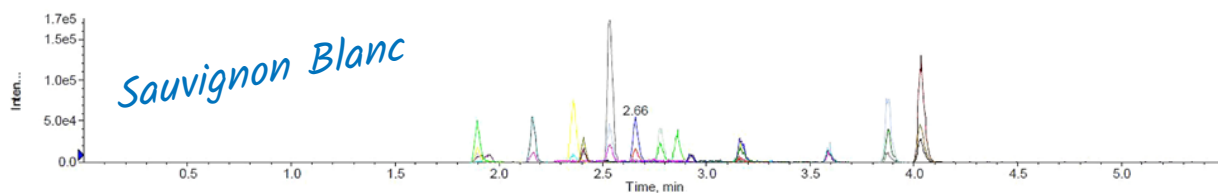
Application data by Courtesy of: Stephen Lock, SCIEX, Warrington (UK)

Food – MicroLC

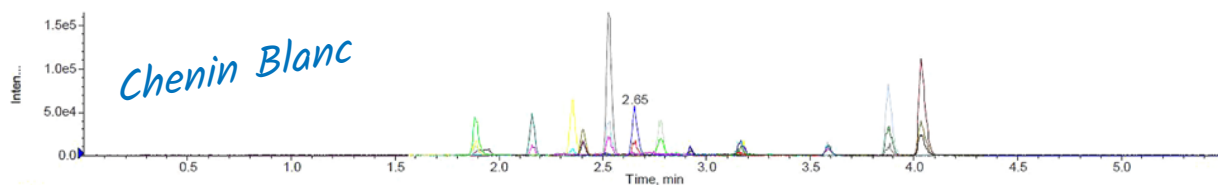
Screening of allergens in white wine by MicroLC-MS/MS



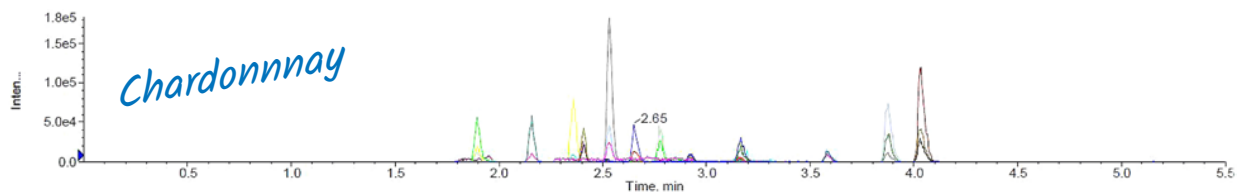
■ XIC of +MRM (47 pairs): 348.660/421.160 amu Expected RT: 2.7 ID: Alpha-lact Lactose B.ALC[MSH]SEK.2/b4 from Sample 3 (sauvignon blan... Max. 5.5e4 cps.



■ 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.

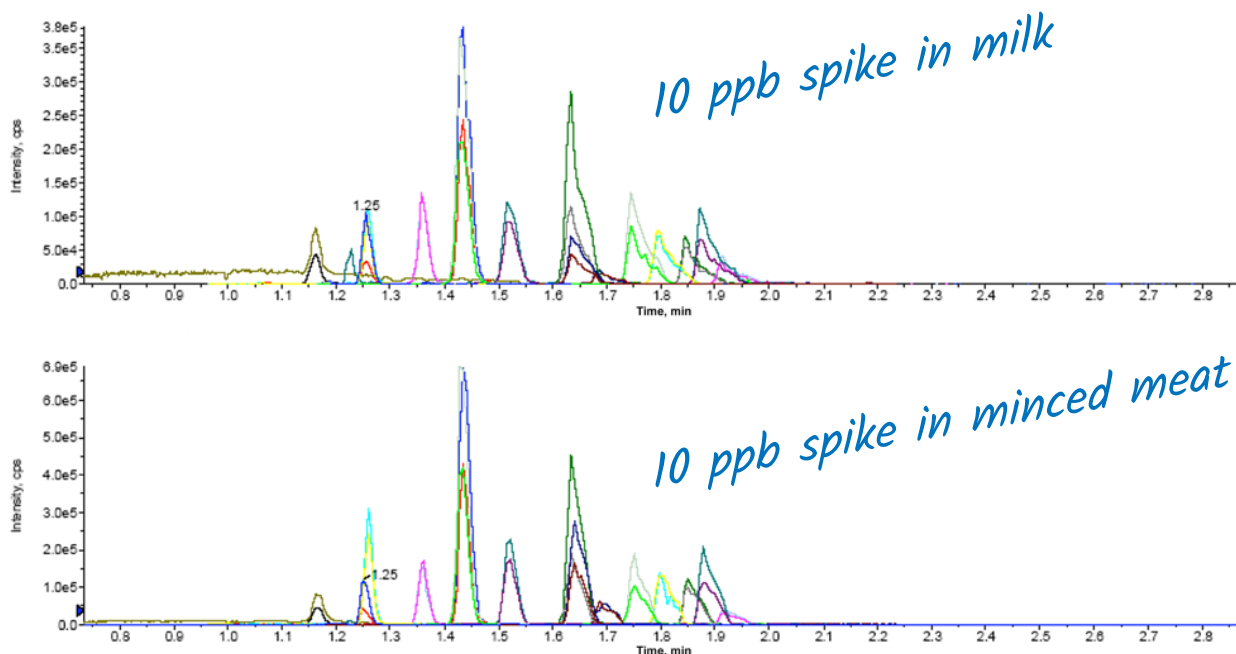


Column: YMC-Triart C18 (12 nm, 3 μ m) 50 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-05J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 2% B (0-0.3 min), 40% B (4 min), 95% B (4.1-4.3 min), 2% B (4.4-5.5 min)
 Flow rate: 25 μ L/min
 Temperature: 40 $^{\circ}$ C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 μ L
 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



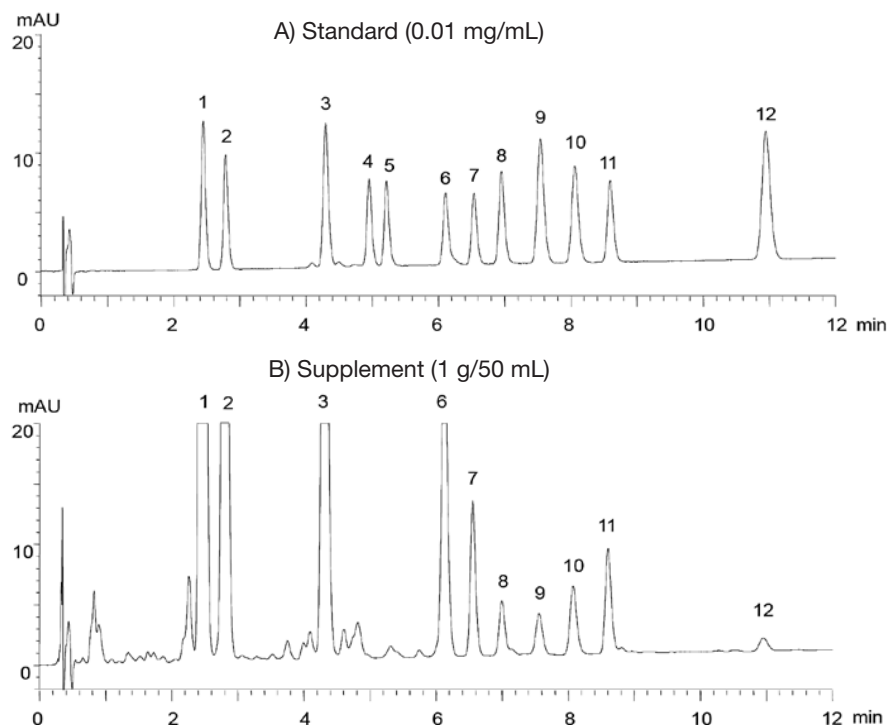
Column: YMC-Triart C18 (12 nm, 3 μ m) 50 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-05J0RU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 2% B (0-0.5 min), 65% B (1.7 min), 100% B (1.8-2.3 min), 2% B (2.4-3.5 min)
 Flow rate: 30 μ L/min
 Temperature: 60 $^{\circ}$ 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)



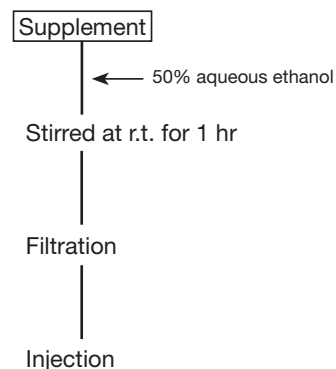
Food

Soy isoflavones in supplement



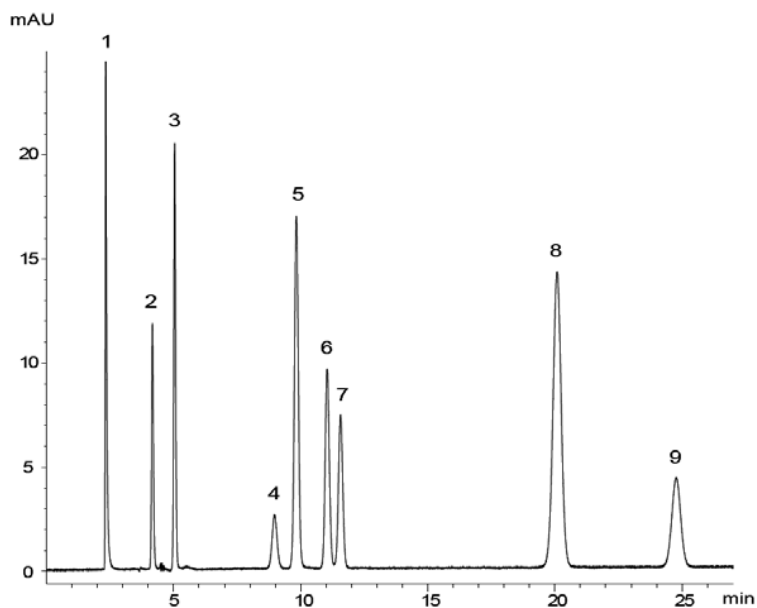
1. Daidzin
2. Glycitin
3. Genistin
4. 6"-O-Malonyldaidzin
5. 6"-O-Malonylglycitin
6. 6"-O-Acetyldaidzin
7. 6"-O-Acetylglycitin
8. 6"-O-Malonylgenistin
9. Daidzein
10. Glycitein
11. 6"-O-Acetylgenistin
12. Genistein

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



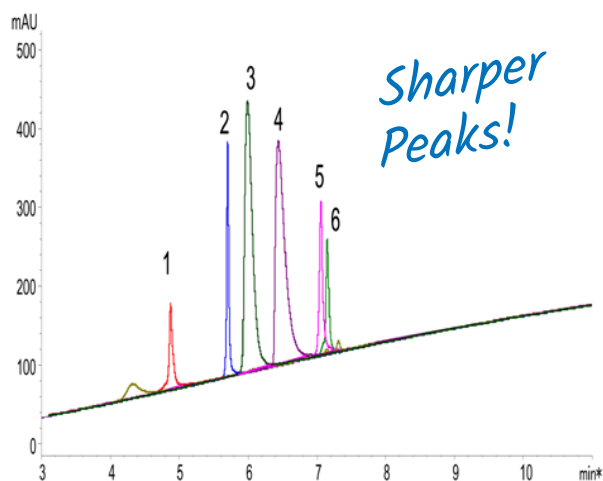
1. Thiamine HCl (Vitamin B₁)
2. Pyridoxine HCl (Vitamin B₆)
3. Nicotinamide
4. Cyanocobalamin (Vitamin B₁₂)
5. L-Ascorbic acid 2-glucoside
6. L-Ascorbic acid (Vitamin C)
7. Erythorbic acid
8. Riboflavin (Vitamin B₂)
9. Nicotinic acid (Vitamin B₃)

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 1000 mL
 Flow rate: 0.8 mL/min
 Temperature: 40 °C
 Detection: UV at 260 nm
 Injection: 10 μ L (5 μ g/mL)

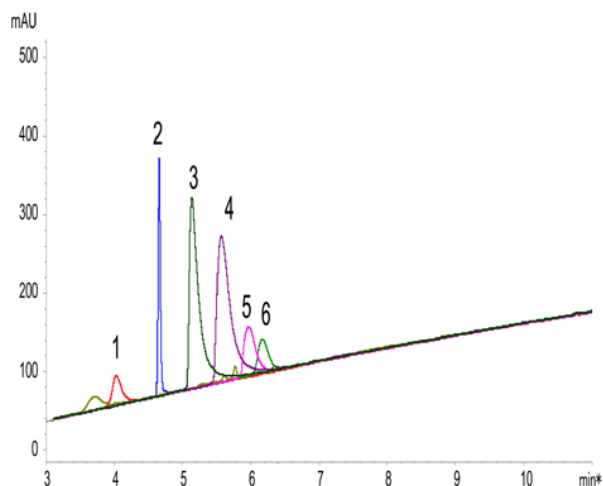
Life Science – Proteins

High sensitivity and sharp peaks under LC/MS compatible conditions

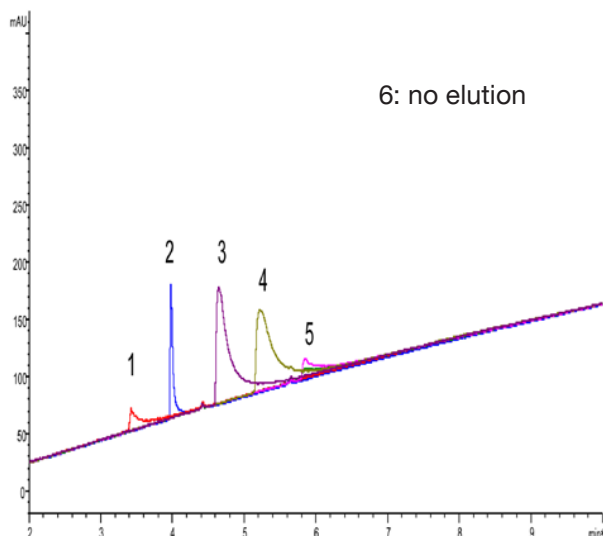
YMC-Triart Bio C4 (3 μ m, 30 nm)



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

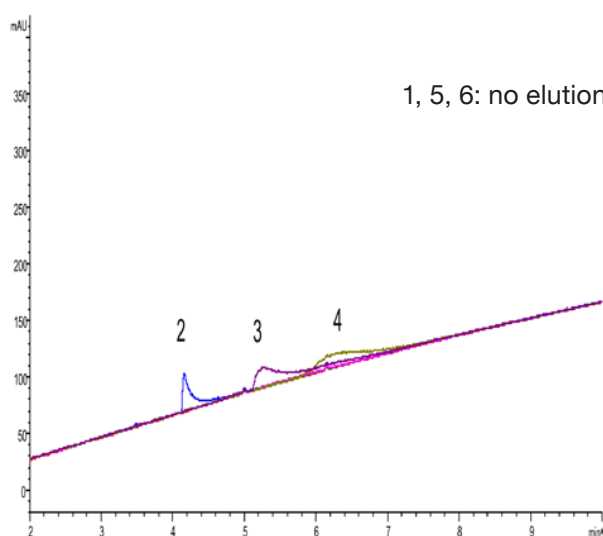


AdvanceBio RP-mAb C4 (3.5 μ m, 45 nm)



6: no elution

Aeris widepore C4 (3.6 μ m, 20 nm)



1, 5, 6: no elution

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)
Temperature: 40 °C
Detection: UV at 220 nm

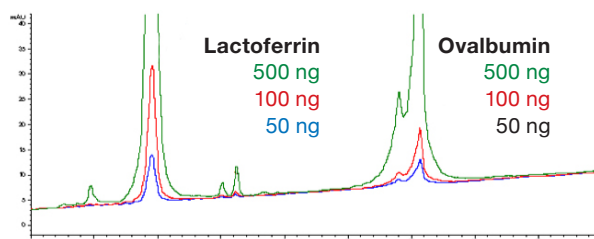
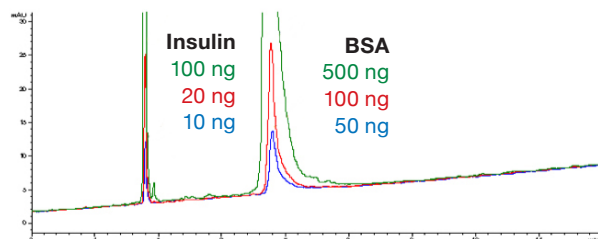
Sample:
1. Cytochrome-C (Horse heart)
2. Insulin (Bovine pancreas)
3. Transferrin (Human)
4. BSA
5. β -Lactoglobulin (Bovine)
6. α -Chymotrypsinogen A (Bovine pancreas)

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.

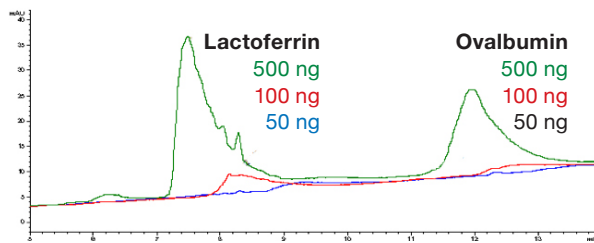
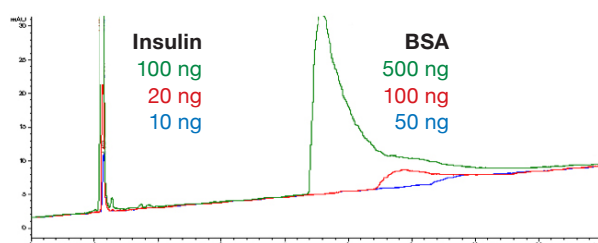
Life Science – Proteins

Ideal for Microanalysis

YMC-Triart Bio C4 (1.9 μ m, 30 nm)



Aeris widepore C4 (3.6 μ m, 20 nm)

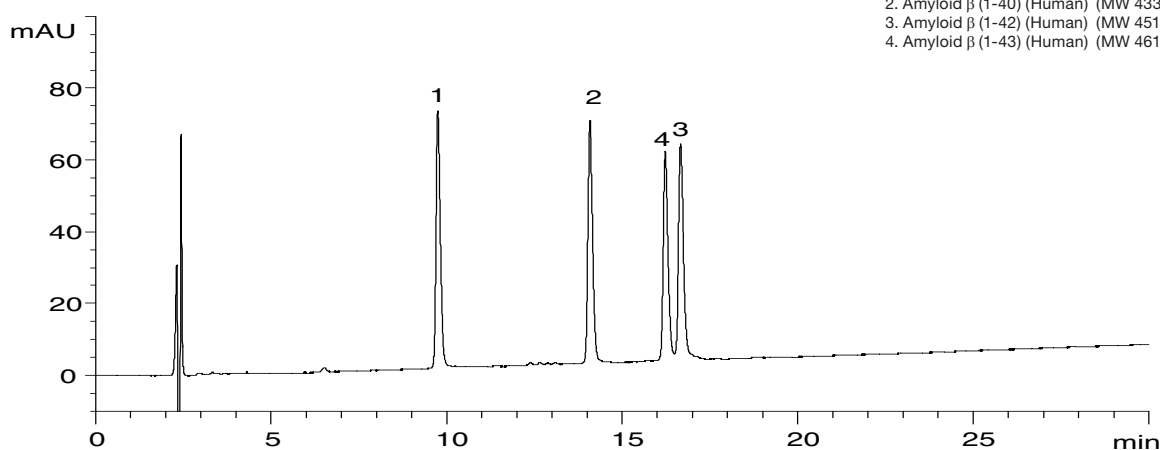


Column: 150 x 2.1 mm ID
 Eluent: A) water/TFA (100/0.05)
 B) acetonitrile/TFA (100/0.05)
 Gradient: 25-60%B (0-15 min), 90%(15-20 min), 25%(20-35 min)

Detection: UV at 220 nm
 Temperature: 40 °C

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

Amyloid β -proteins



1. Amyloid β (1-38) (Human) (MW 4132)
2. Amyloid β (1-40) (Human) (MW 4330)
3. Amyloid β (1-42) (Human) (MW 4514)
4. Amyloid β (1-43) (Human) (MW 4615)

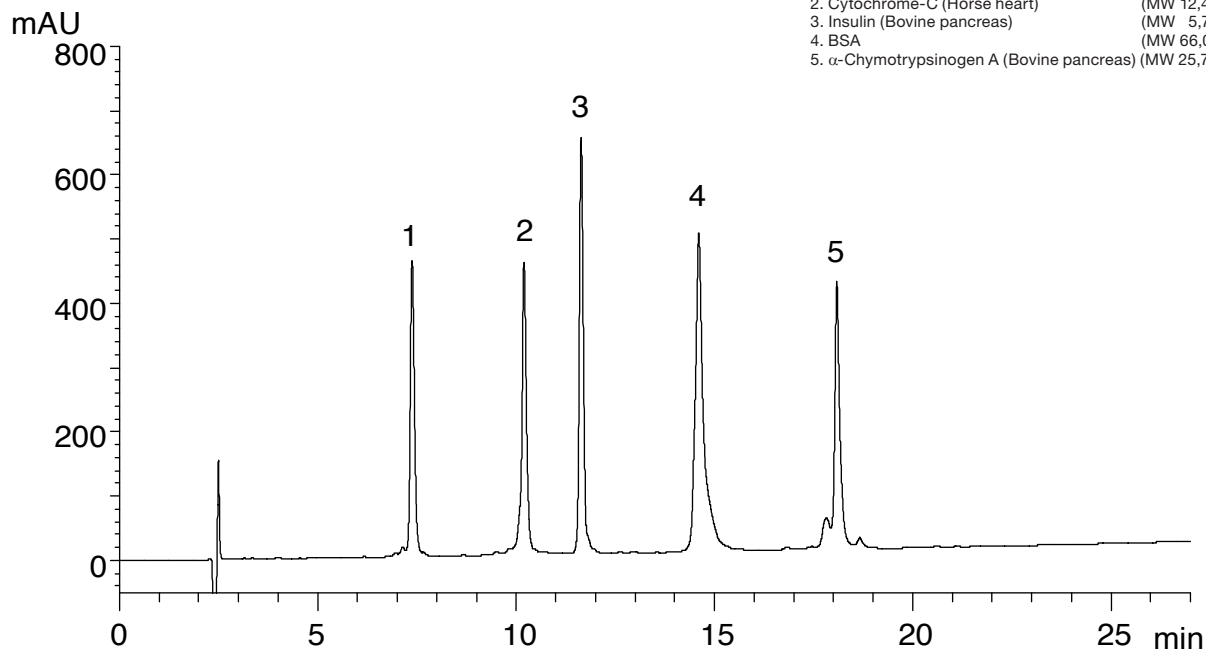
Amyloid β (1-43) : Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala-Thr

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

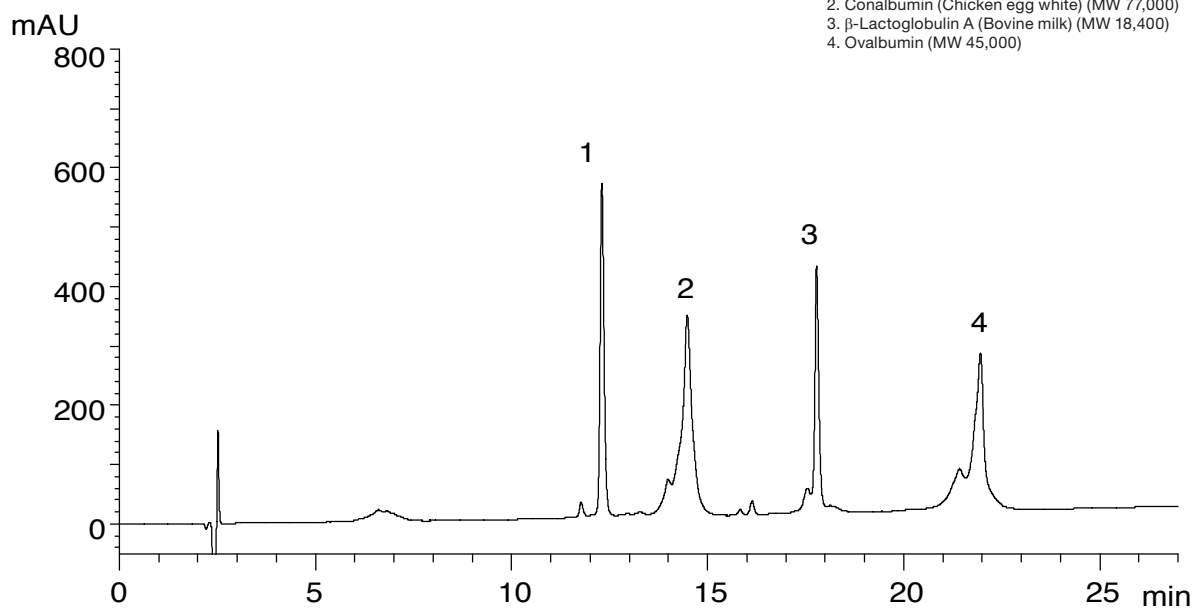
Proteins (MW 5,700 ~ 66,000)



Column: YMC-Triart Bio C4 (5 μm, 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 μL (0.25 ~ 0.50 mg/mL)

Proteins (MW 14,300 ~ 77,000)



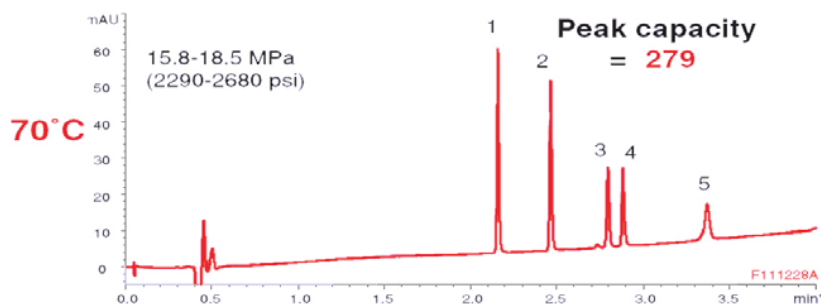
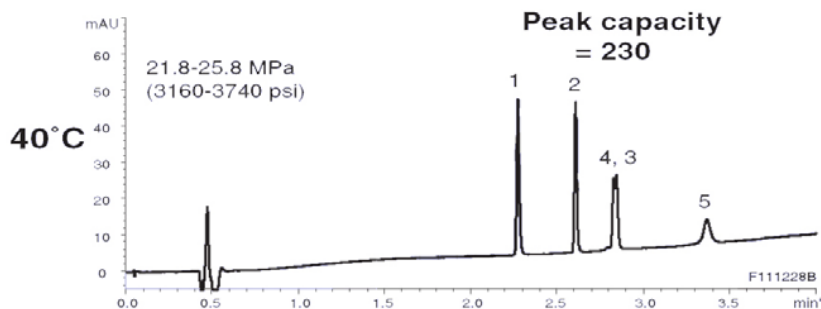
Column: YMC-Triart Bio C4 (5 μm, 30 nm) 150 x 3.0 mm ID
 Part No.: TB30S03-1503PTH
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: 20-60%B (0-27 min), 90%B (27-35 min)

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

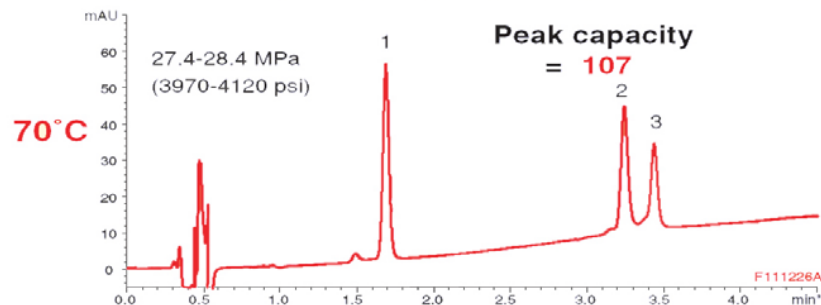
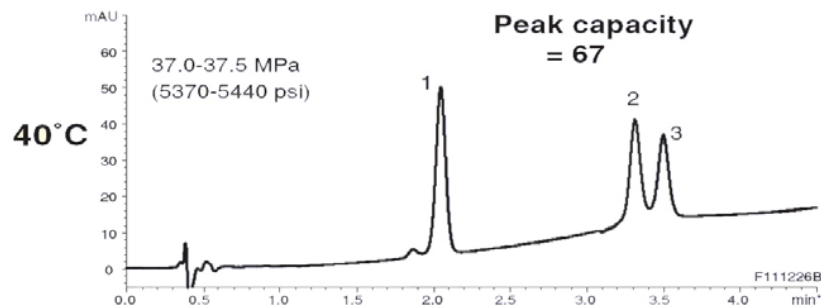
Life Science – Proteins

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

Mixture A (MW 500–18,400)



Mixture B (MW 14,300–25,700)



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

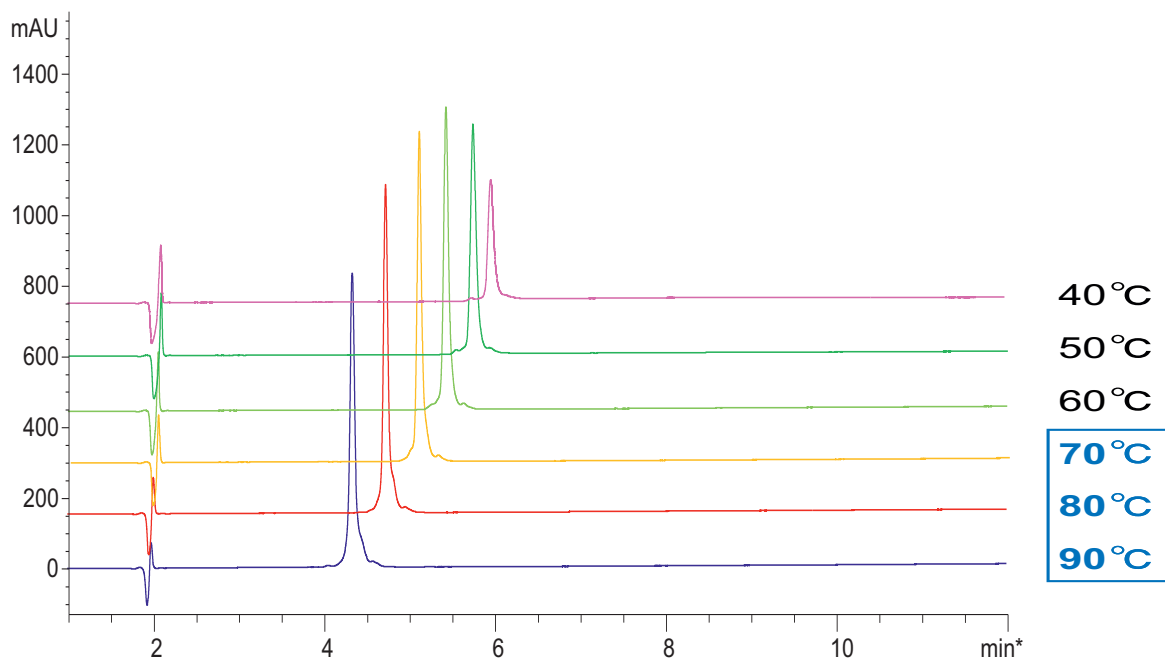
Column: YMC-Triart C18 (1.9 μm, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12SP9-0502PT
 Eluent: A) water / TFA (100/0.1)
 B) acetonitrile / TFA (100/0.1) - mixture A
 B) acetonitrile / 2-propanol / TFA (50/50/0.1) - mixture B
 Gradient: 10-80% B (0-5 min) - mixture A
 30-60% B (0-5 min) - mixture B

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

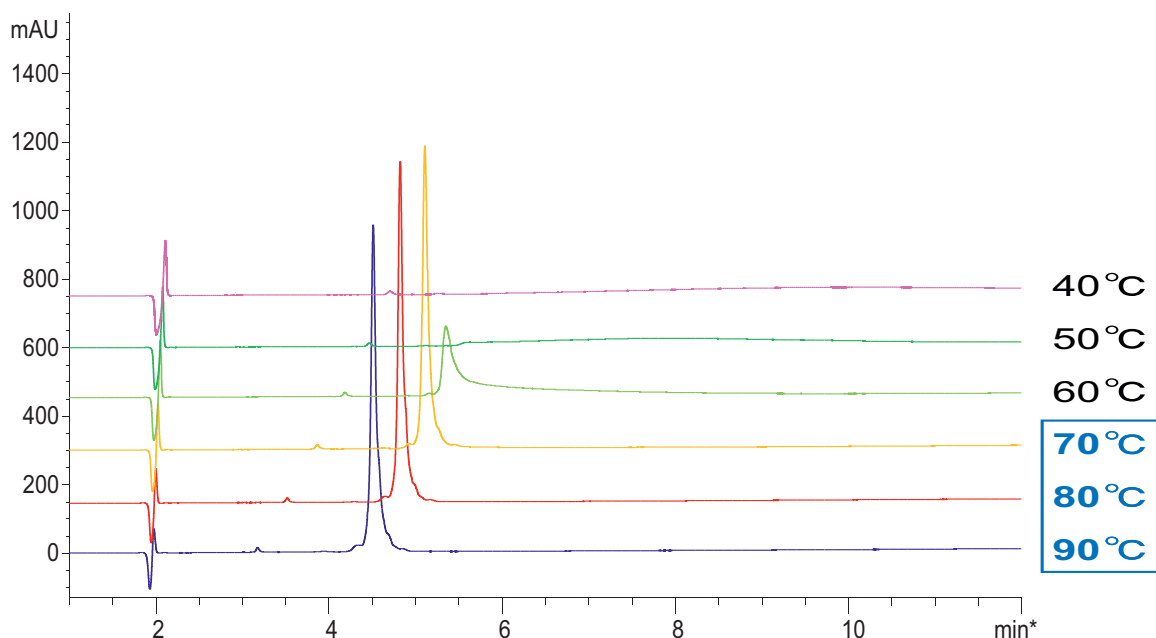
PC (peak capacity) = 1 + (gradient time / peak width*)
 *peak width = 2W_{0.5h} average

Life Science – Antibodies

Adalimumab (MW: ca. 148 kDa)



Bevacizumab (MW: ca. 148 kDa)

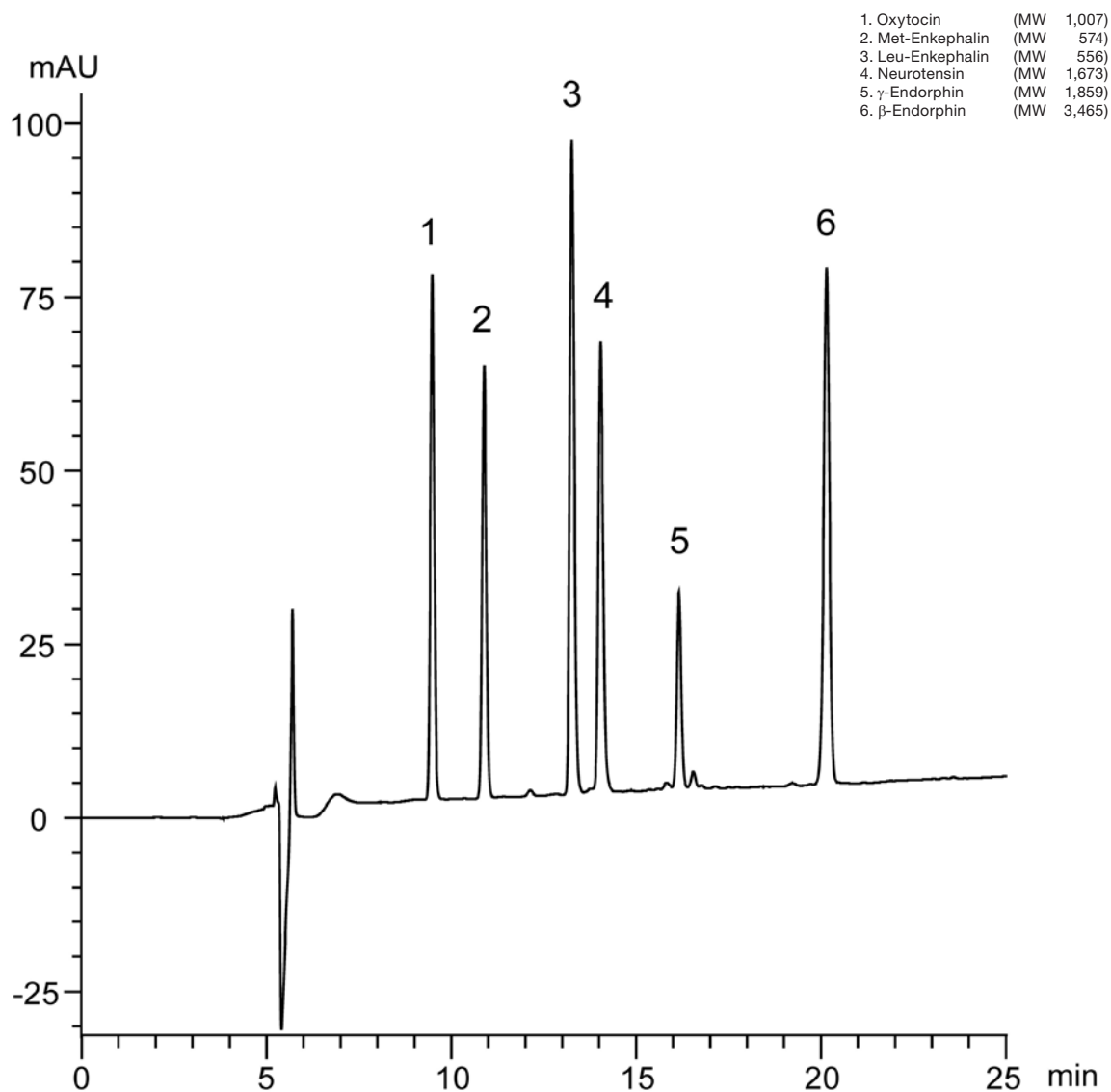


Column: YMC-Triart Bio C4 (3 μ m, 30 nm) 150 x 3.0 mm ID
 Part No.: TB30S03-1503PTH
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.1)
 Gradient: Time [min] Eluent B [%]
 0 30
 15 60
 30 90

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

Life Science – Peptides

Peptides (MW 556 - 3,465)

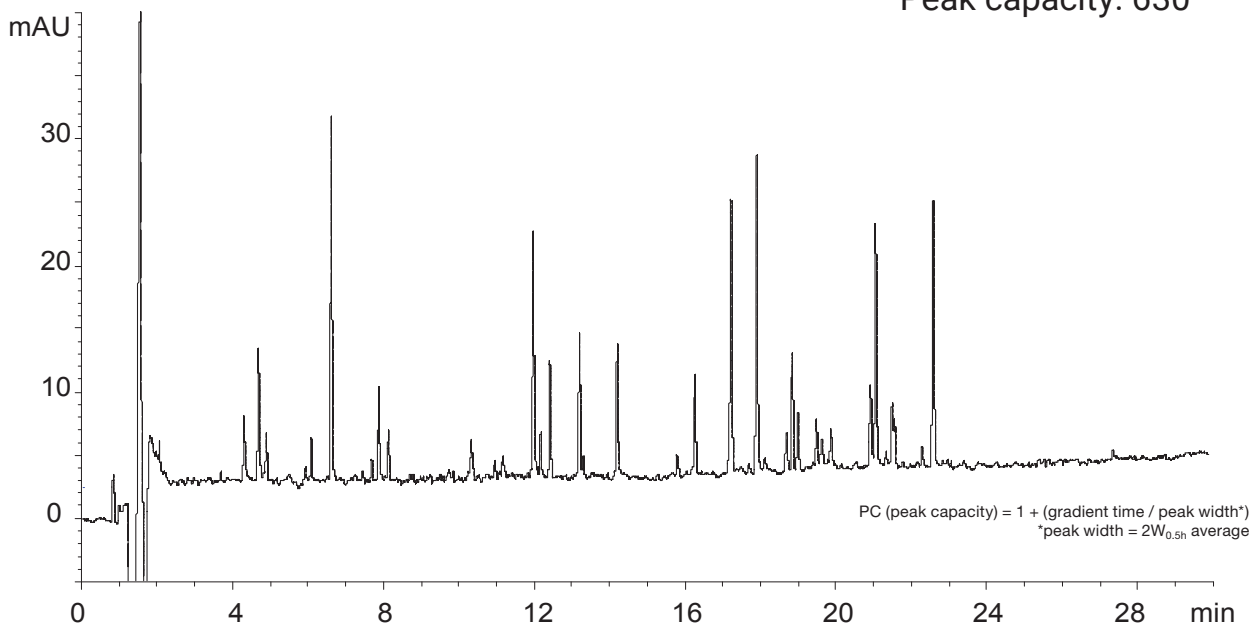


Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 2.0 mm ID
 Part No.: TA12S05-1502WT
 Eluent: A) water + 0.1% TFA
 B) acetonitrile + 0.1% TFA
 Gradient: 20-45% B (0-25 min)
 Flow rate: 0.2 mL/min
 Temperature: 37 °C
 Detection: UV at 220 nm
 Injection: 2 mL (0.075 ~ 0.25 mg/mL)

Life Science – Peptides

Peptide mapping

Peak capacity: 630

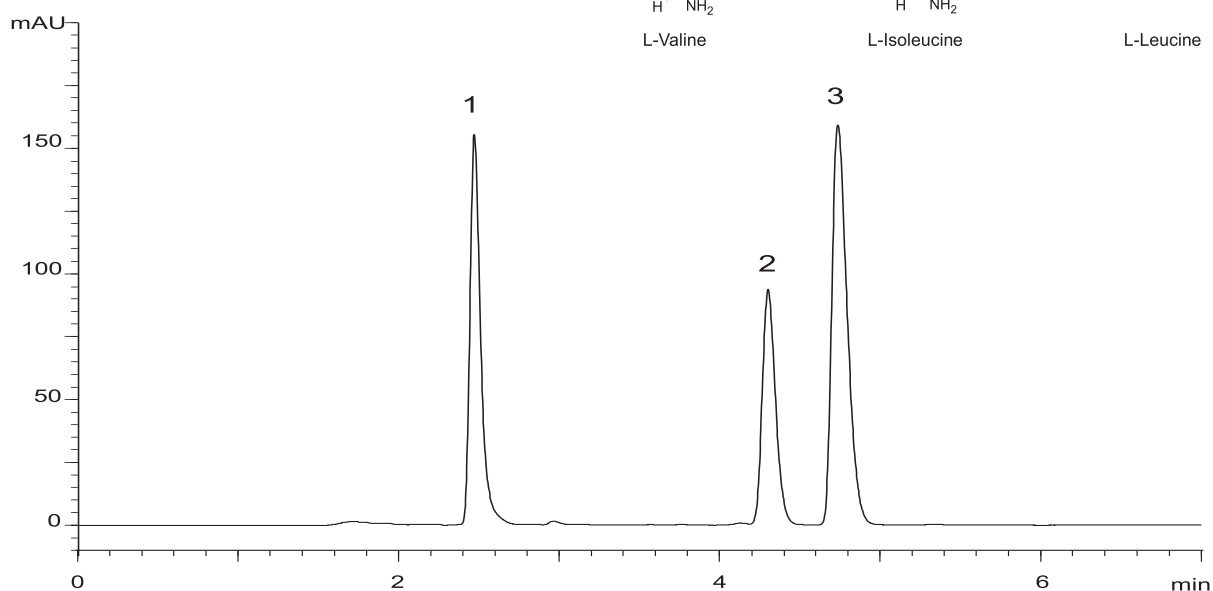


Column: YMC-Triart C18 (1.9 μm , 12 nm) 200 x 2.0 mm ID (Two coupled 100 x 2.0 mm ID)
 Part No.: TA12SP9-1002PT (2x)
 Eluent: A) water/TFA (100/0.1)
 B) acetonitrile/TFA (100/0.08)
 Gradient: 5-40%B (0-30 min)
 Flow rate: 0.4 mL/min
 Temperature: 70 $^{\circ}\text{C}$
 Detection: UV at 220 nm
 Injection: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

Life Science – Amino Acids

Hydrophobic amino acids

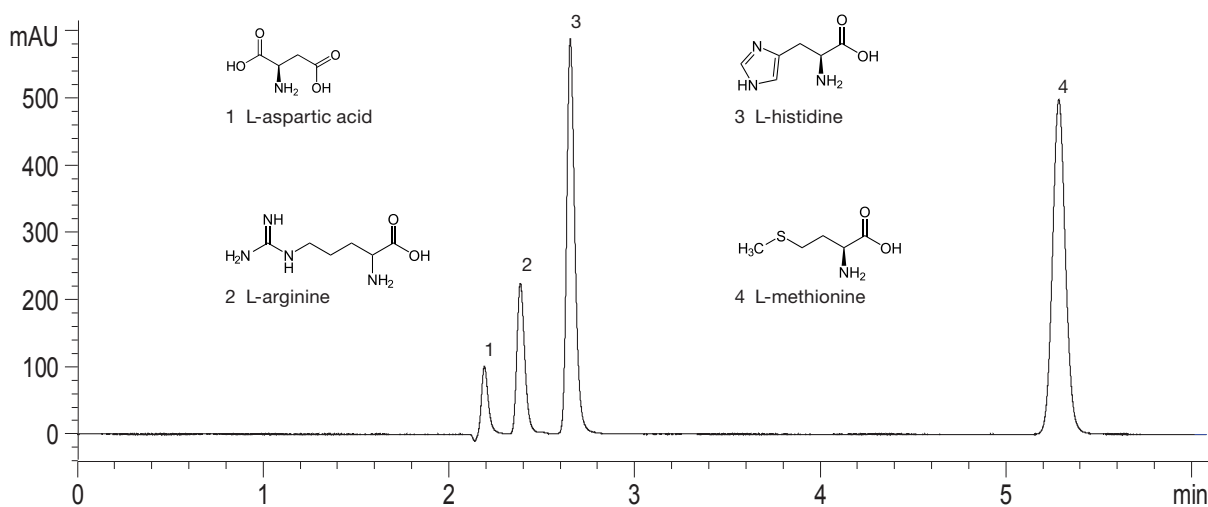
Standard solution*1
(1.10 mg/mL L-Valine, 0.92 mg/mL L-Isoleucine, 1.84 mg/mL L-Leucine)



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)²/acetonitrile (97/3)
 (² Dissolve 31.2 g of NaH₂PO₄·2H₂O in 1000 mL of water and adjust pH 2.8 with H₃PO₄)
 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



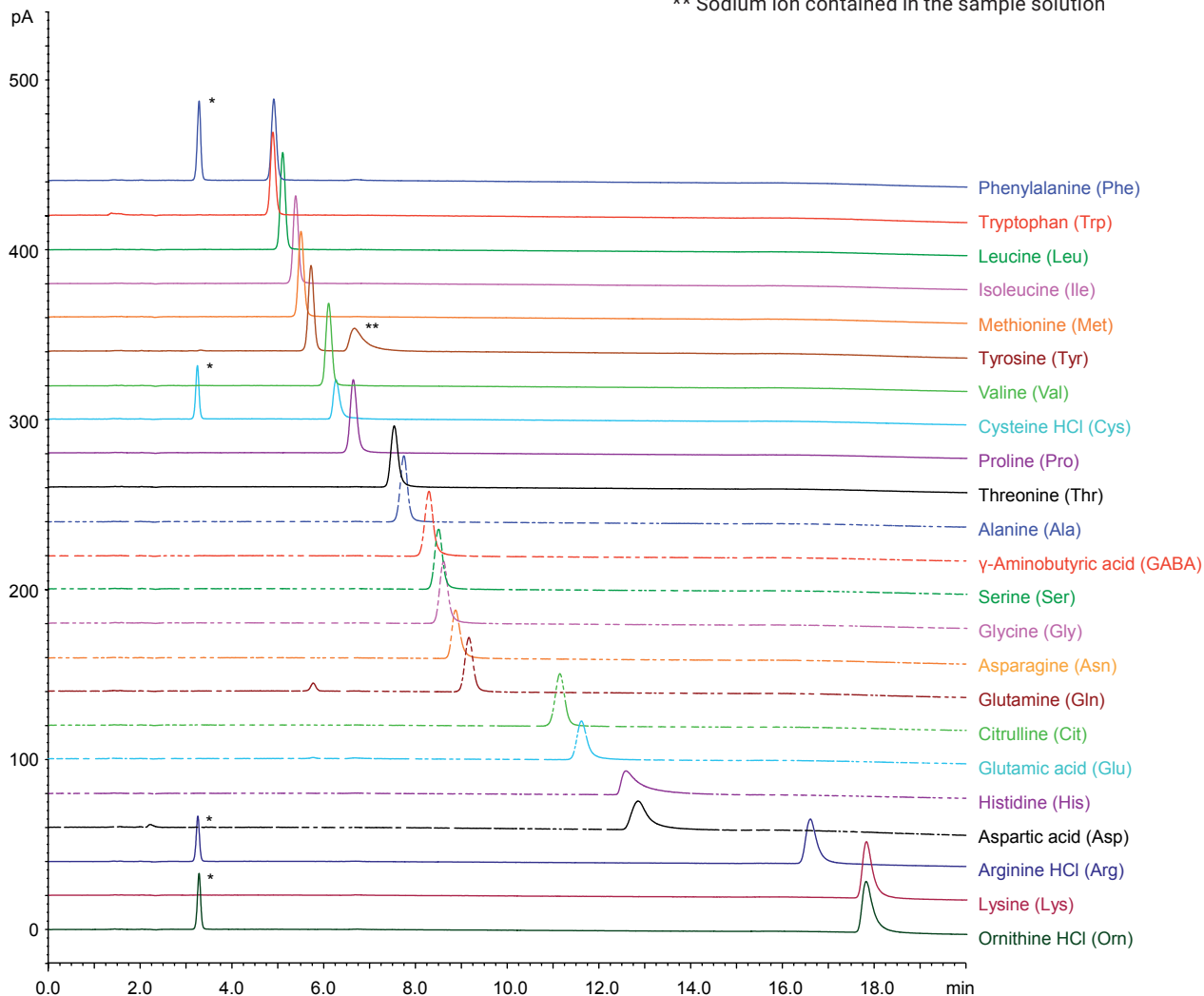
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 150 x 3.0 mm ID
 Part No.: TA12SP9-1503PT
 Eluent: 40 mM K₂HPO₄ (pH 7.0)
 Flow rate: 0.3 mL/min
 Temperature: 20 °C
 Detection: UV at 210 nm
 Injection: 2 μ L (1 mg/mL)

Life Science – Amino Acids

Free amino acids in HILIC mode

* Chloride ion contained in the sample solution

** Sodium ion contained in the sample solution



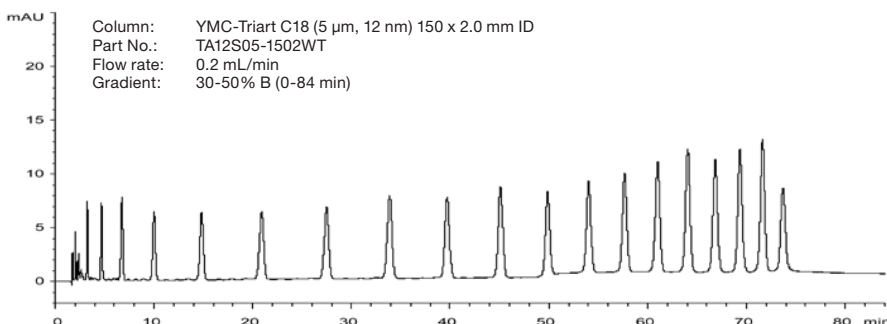
Column: YMC-Triart Diol-HILIC (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDH12S05-1546PTH
 Eluent: A) 100 mM HCOOH-HCOONH₄ (pH 3.6)
 B) acetonitrile
 Gradient: 83-80%B (0-12 min), 80-68%B (12-20 min)
 Flow rate: 1.0 mL/min
 Temperature: 40 °C
 Detection: Corona® CAD® (Charged Aerosol Detector)
 Injection: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

Corona and CAD are trademarks of Thermo Fisher Scientific.

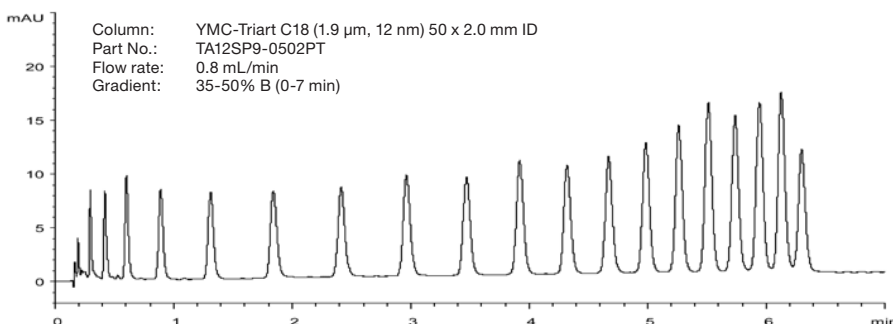
Life Science – Oligonucleotides

Oligonucleotides d(T)2-20 method transfer from HPLC to UHPLC

Conventional LC method



UHPLC method



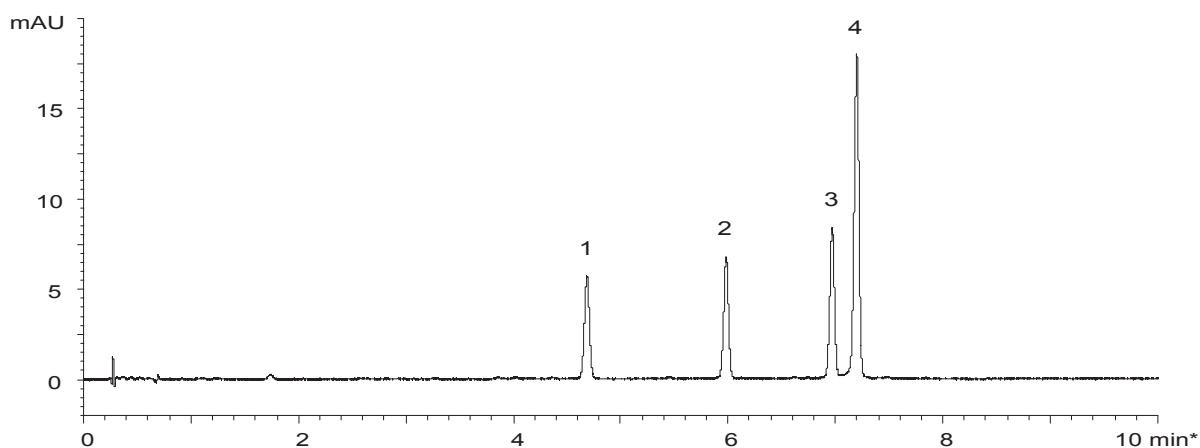
80 min

11x
faster

7 min

Eluent: A) 10 mM di-n-butylamine-acetic acid (pH 6.0)
B) methanol
Detection: UV at 269 nm
Injection: 1 µL (5 nmol/mL)
Temperature: 37 °C

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)

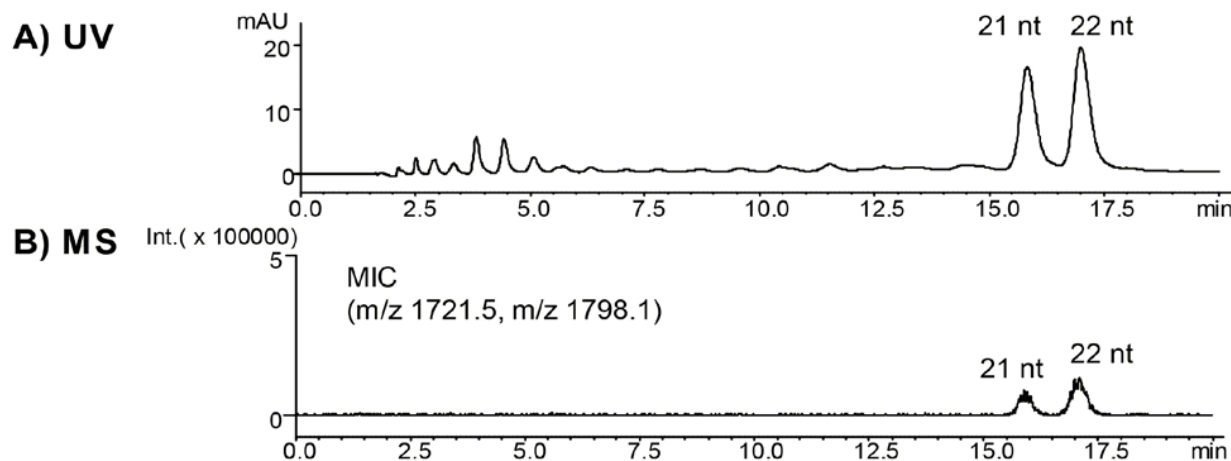
Column: YMC-Triart C18 (1.9 µm, 12 nm) 50 x 2.1 mm ID
Part No.: TA12SP9-05Q1PT
Eluent: A) 200 mM HFIP*-8 mM triethylamine
B) methanol
Gradient: 10-20%B (0-10 min)
*hexafluoroisopropanol

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

Courtesy of M. Yamada, SHIMADZU CORPORATION

Life Science – Oligonucleotides

LC/MS analysis of miRNA



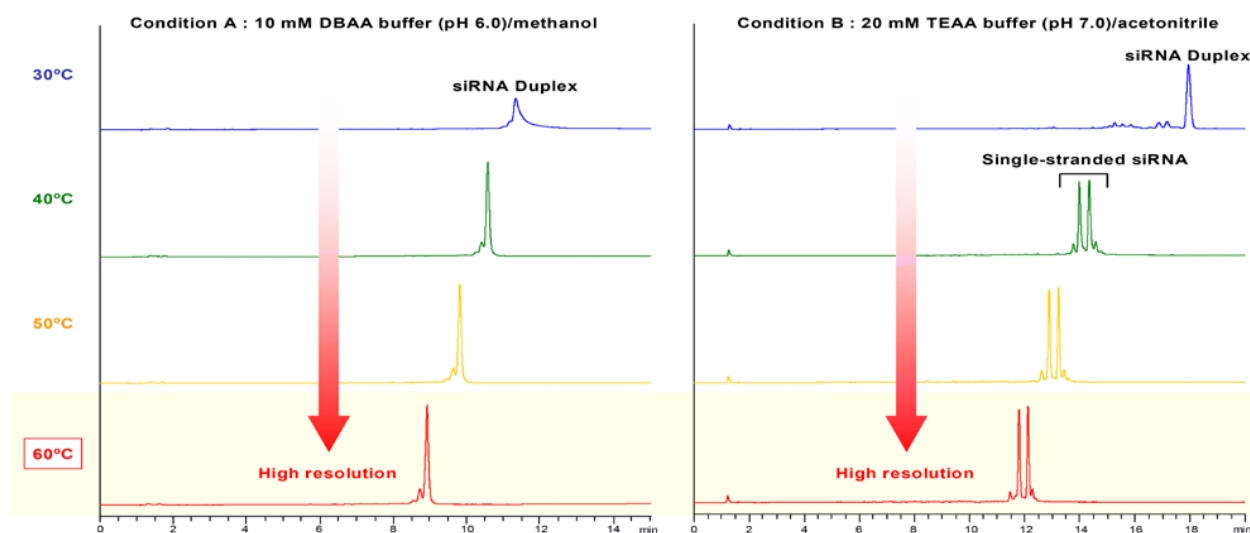
5'-pUGG AGU GUG ACA AUG GUG UUG-3' (21 nt, MW 6890.1)
 5'-pUGG AGU GUG ACA AUG GUG UUG U-3' (22 nt, MW 7196.3)

Column: YMC-Triart C18 (3 μ m, 12 nm), 150 x 2.0 mm ID
 Part No.: TA12S03-1502WT
 Eluent: A) 10 mM di-n-butylamine-acetic acid (pH 7.5)
 B) 10 mM di-n-butylamine-acetic acid (pH 7.5)/acetonitrile (50/50)
 Gradient: 62-72%B (0-20 min)
 Flow rate: 0.2 mL/min

Temperature: 30°C
 Detection: A) UV at 260 nm
 B) ESI-negative mode
 Injection: 4 μ L (5 nmol/mL)
 System: LC) Shimadzu Prominence
 MS) Shimadzu LCMS2020

Courtesy of M. Yamada, SHIMADZU CORPORATION

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'

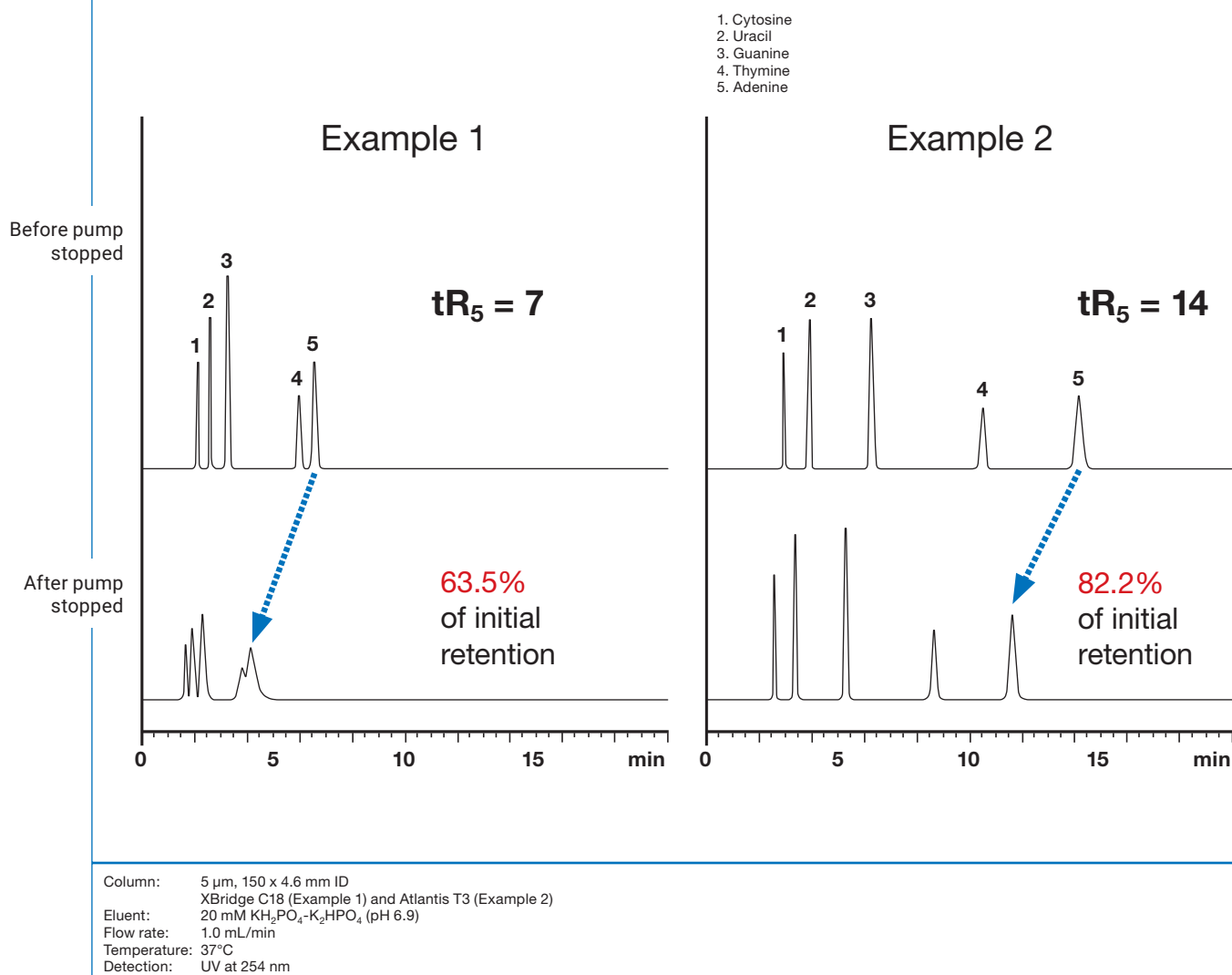
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 100 x 2.0 mm ID
 Part No.: TA12SP9-1002PT
 Flow rate: 0.2 mL/min
 Detection: UV at 269 nm
 Injection: 1 μ L (5 nmol/mL)
 System: Agilent 1290

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

Problem with conventional C18 columns

Aqueous conditions deteriorate column performance



Why?

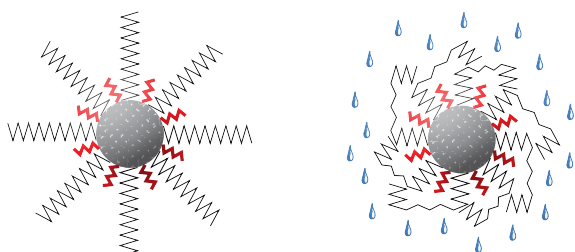


Image of C18 surface hydration

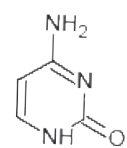
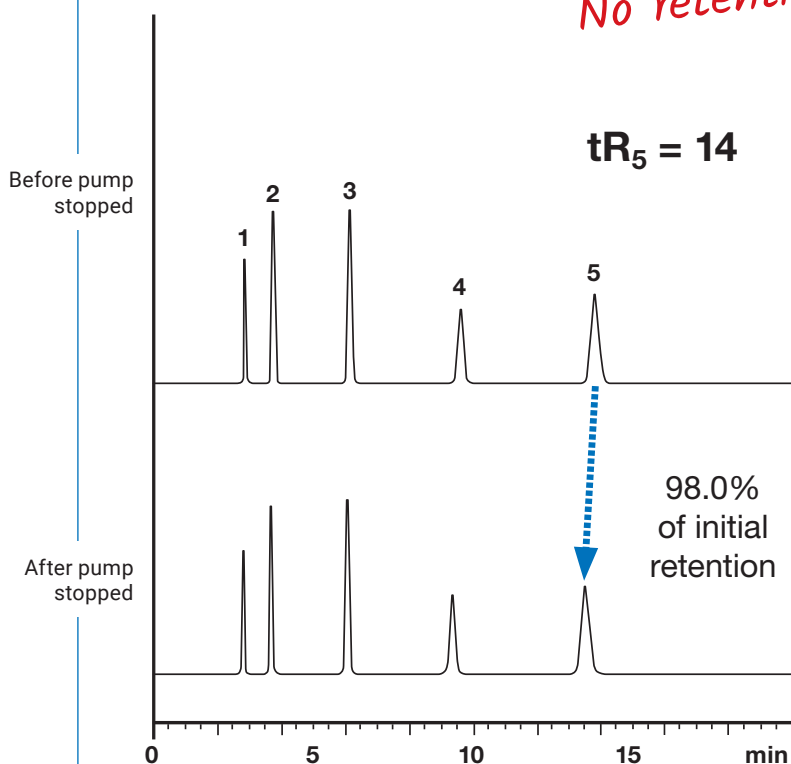
The columns used for applications involving 100% aqueous buffers provide shorter retention times after the flow was stopped between analyses. This behaviour is caused by poor hydration of the phase. Polar compounds cannot easily distribute between the mobile phase and the stationary phase.

YMC-Triart "AQ" | YMC-Triart C18

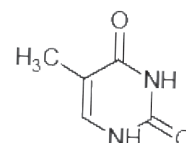
Solution with YMC-Triart C18

Reproducible stable performance!

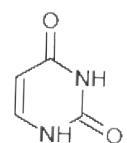
No retention time changes!



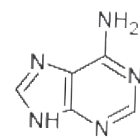
1. Cytosine



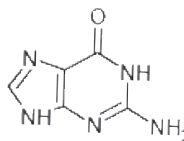
4. Thymine



2. Uracil



5. Adenine



3. Guanine

Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S05-1546PTH
 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

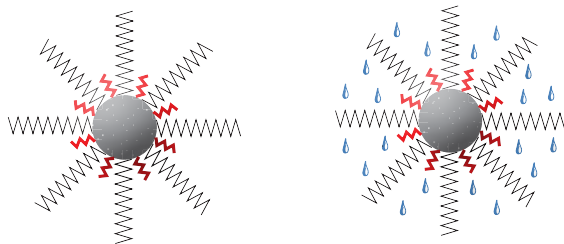


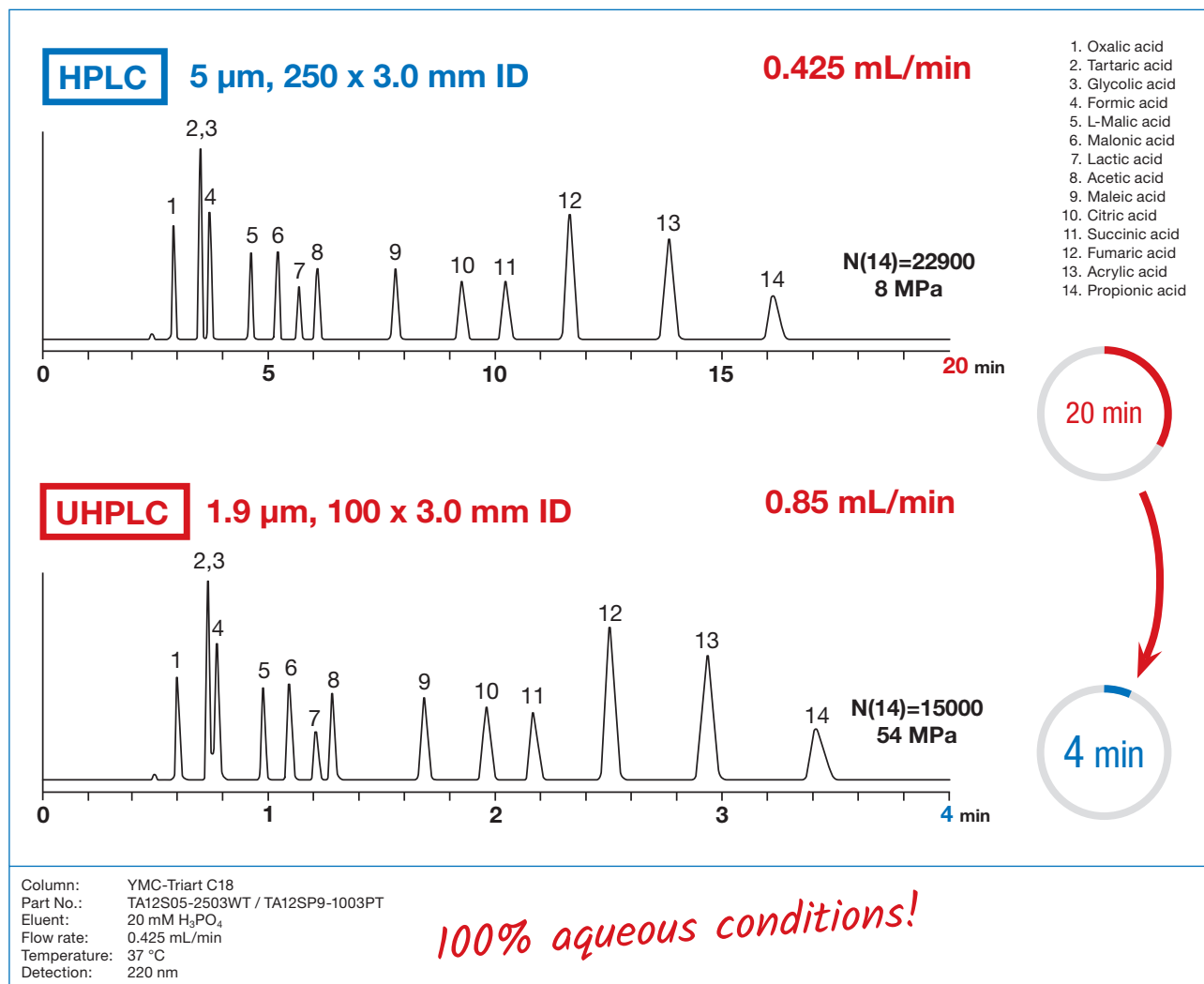
Image of C18 surface hydration

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

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



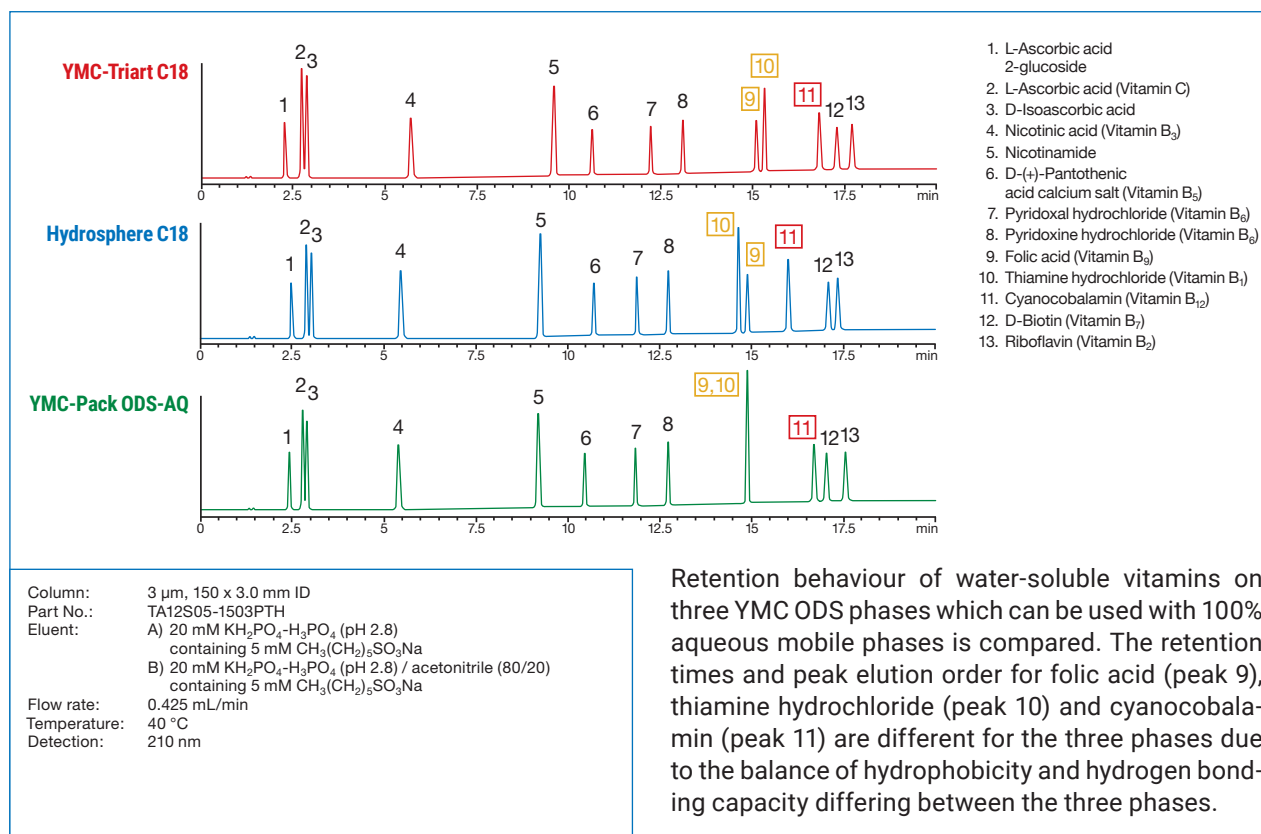
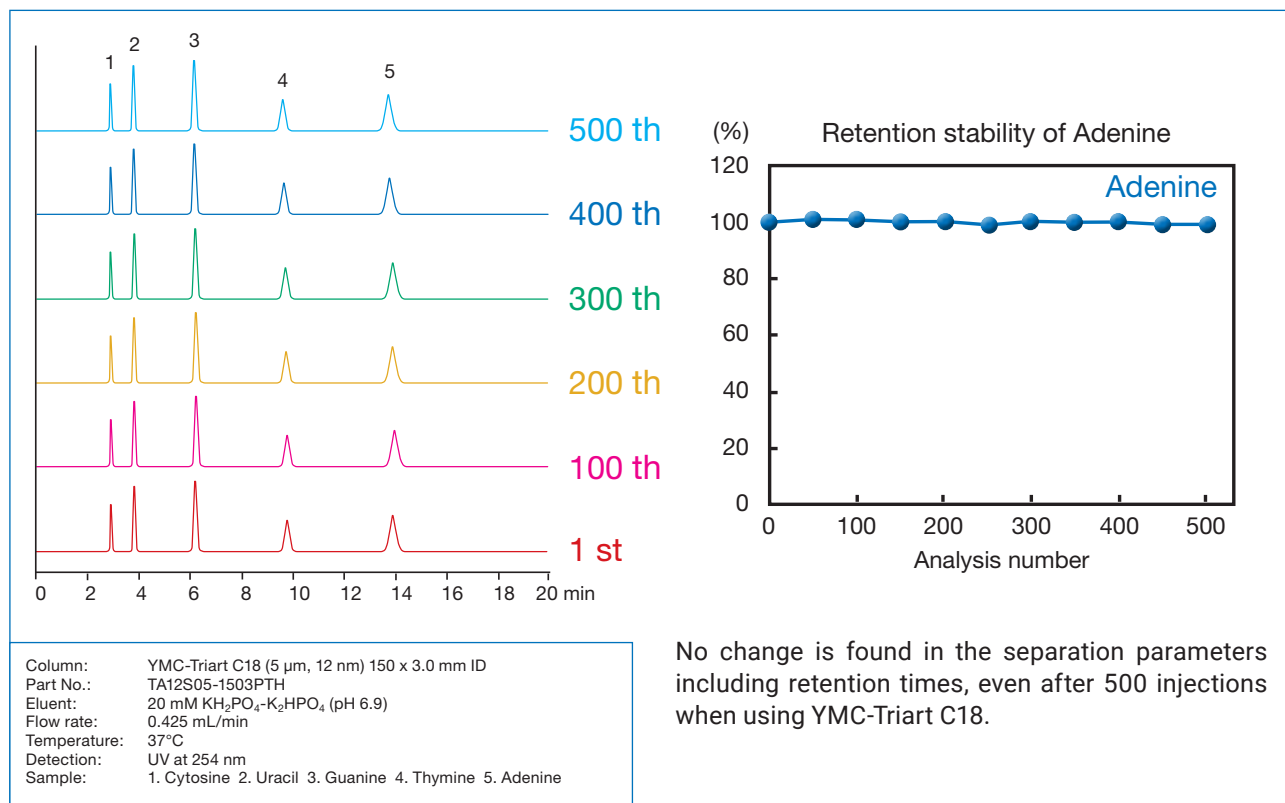
Stable under harsh conditions: pH 1-12 and temperature up to 90 °C.

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

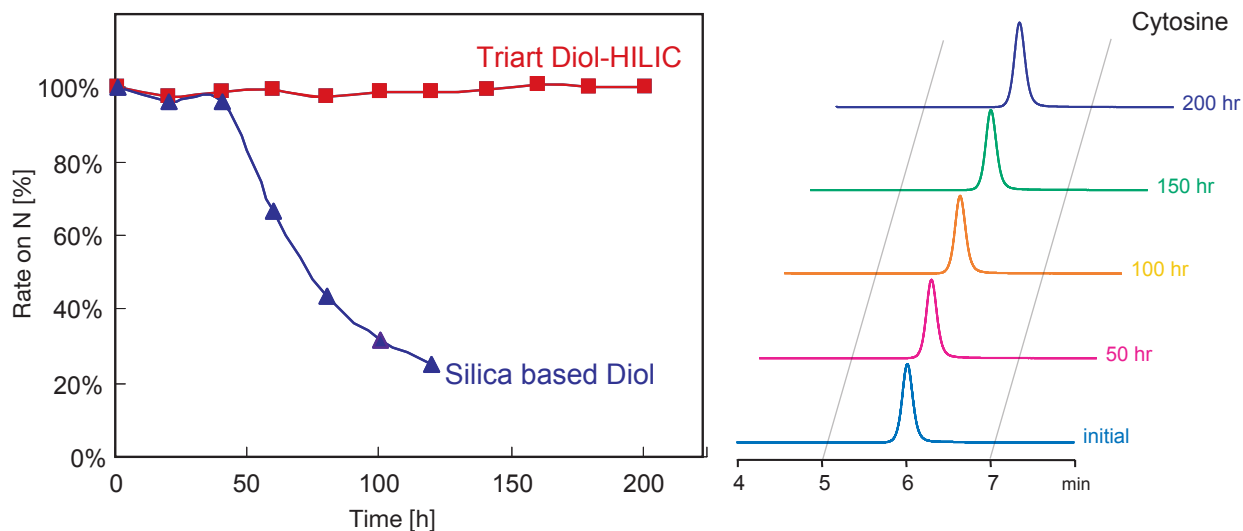
Proven reliability



HILIC

Great stability and reproducibility at high pH

Stability at high pH (pH 11, 50 °C)*

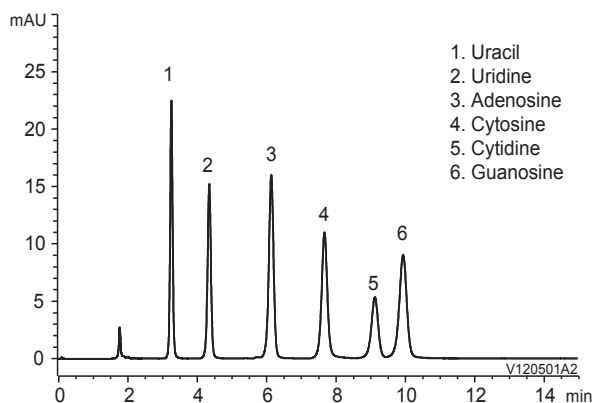


* pH ≤ 10 is recommended for regular use

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

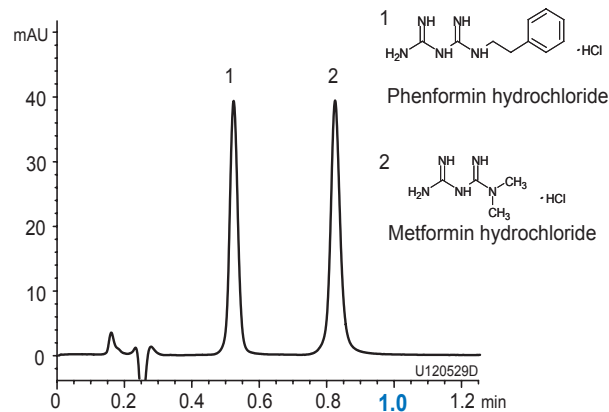
YMC-Triart Diol-HILIC offers highly reproducible separations even at high pH and high temperature. The lifetime of YMC-Triart Diol-HILIC is much longer than that of conventional silica-based Diol columns.

Nucleosides and bases



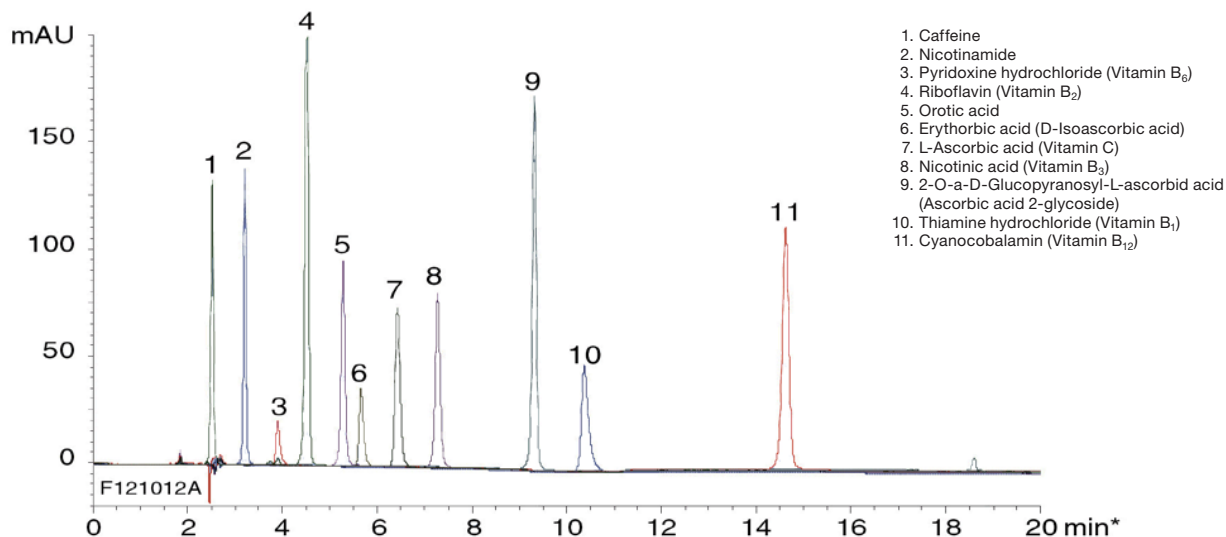
Column: YMC-Triart Diol-HILIC (5 µm, 12 nm) 150 x 3.0 mm ID
 Part No.: TDH12S05-1503PTH
 Eluent: 100 mM CH₃COONH₄ / acetonitrile (10/90)
 Flow rate: 0.425 mL/min
 Temperature: 30 °C
 Detection: UV at 254 nm
 Injection: 2 µL (5 ~ 10 µg/mL)

Diabetes drugs



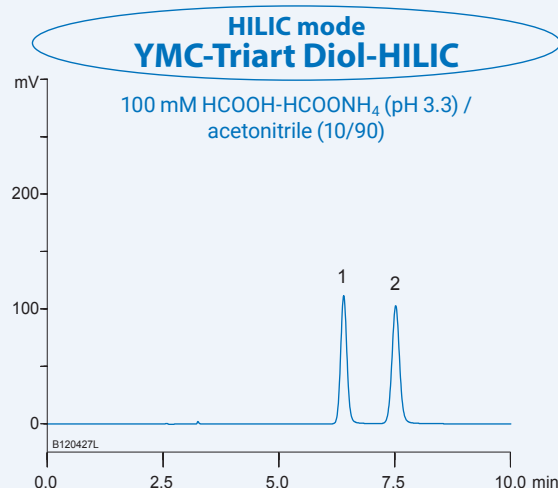
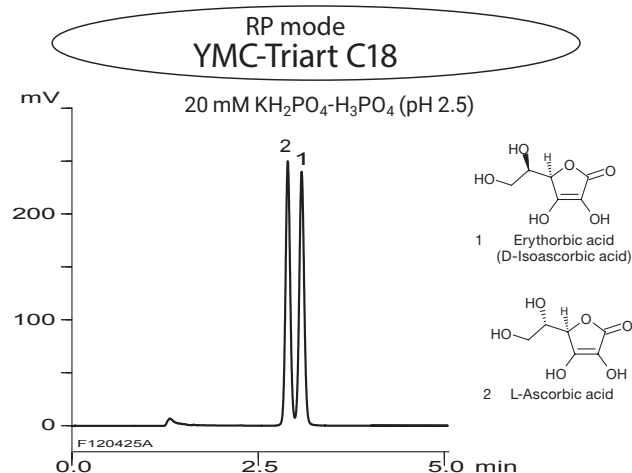
Column: YMC-Triart Diol-HILIC (1.9 µm, 12 nm) 50 x 2.0 mm ID
 Part No.: TDH12SP9-0502PT
 Eluent: 100 mM HCOOH-HCOONH₄ (pH 3.7) / acetonitrile (10/90)
 Flow rate: 0.8 mL/min
 Temperature: 25 °C
 Detection: UV at 235 nm
 Injection: 2 µL (10 µg/mL)

Water soluble vitamins



Column: YMC-Triart Diol-HILIC (5 μ m, 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 μ L (50 μ g/mL)

Polar and hydrophilic compounds

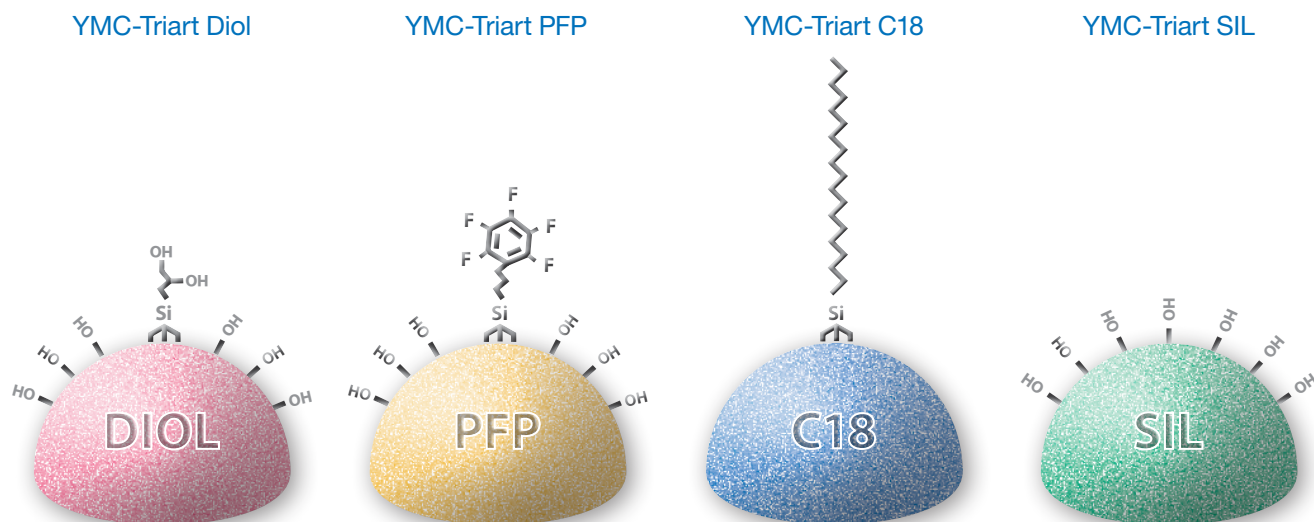


Column: 5 μ m, 150 x 3.0 mm ID
Part No.: TDH12S05-1503PTH
Flow rate: 0.425 mL/min
Temperature: 40 °C
Detection: UV at 254 nm
Injection: 4 μ L (0.05 mg/mL)

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

Phases for SFC



Specification

	YMC-Triart Diol	YMC-Triart PFP	YMC-Triart C18	YMC-Triart SIL
Base	organic/inorganic 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*			

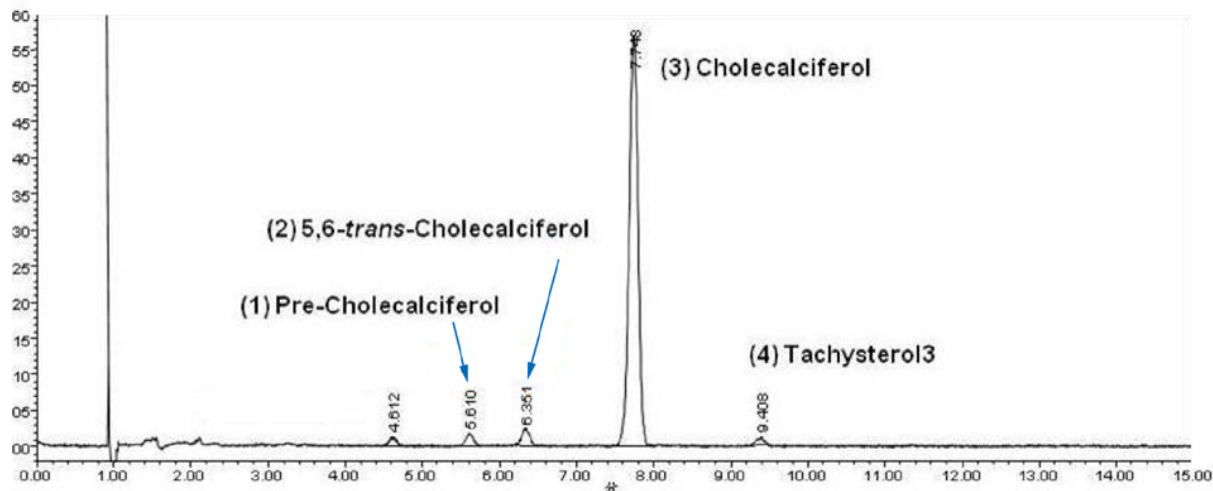
*a statement is available to confirm the usability in SFC mode

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.

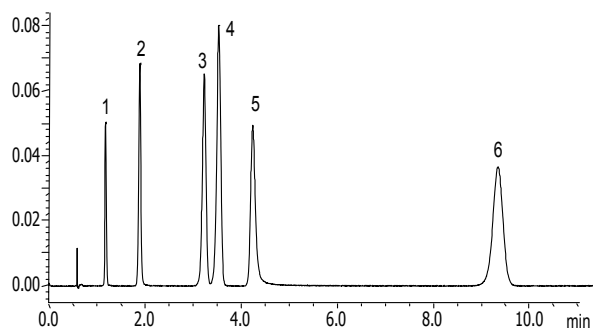
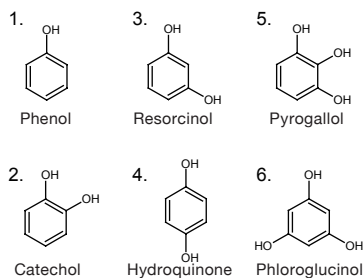
Rapid analysis of vitamin D3 and related substances in nutritional products



Column: YMC-Triart Diol (3 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: TDN12S03-2546PTH
 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 (2000 psi)
 System: UPC²

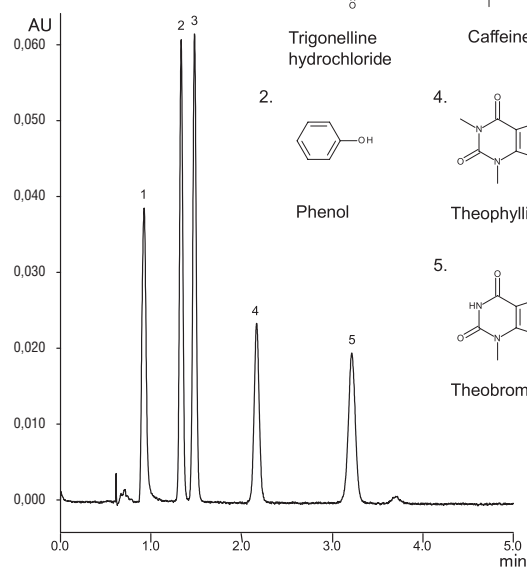
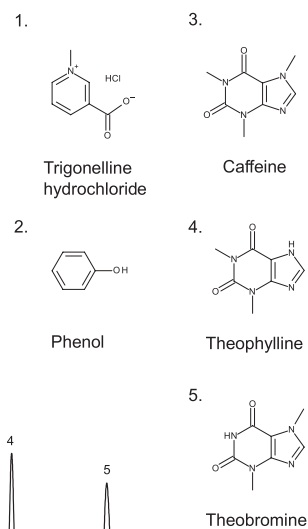
Trade quality and stressed samples used were supplied by DSM Nutritional Products, Site Sisseln (CH)

Quick separation of phenols



Column: YMC-Triart Diol (5 μ m, 12 nm) 250 x 4.6 mm ID
 Part No.: TDN12S05-2546PTH
 Eluent: CO₂ / methanol (88/12)
 Flow: 3.0 mL/min
 Temperature: 30 °C
 Detection: UV at 230 nm
 Back pressure: 10.3 MPa (2000 psi)

Purin alkaloids

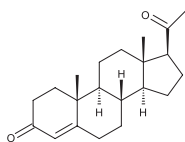


Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDN12S05-1546PTH
 Eluent: CO₂/methanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 230 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.085 ~ 5.7 mg/mL)

SFC

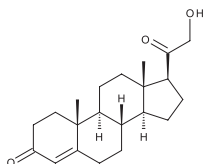
Steroids using different modifiers

1.



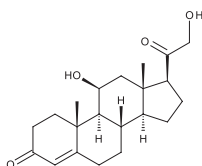
Progesterone

2.



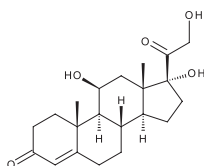
Deoxycorticosterone

3.



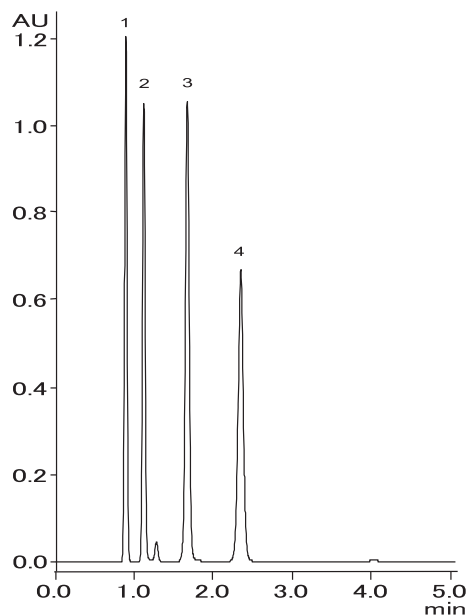
Corticosterone

4.

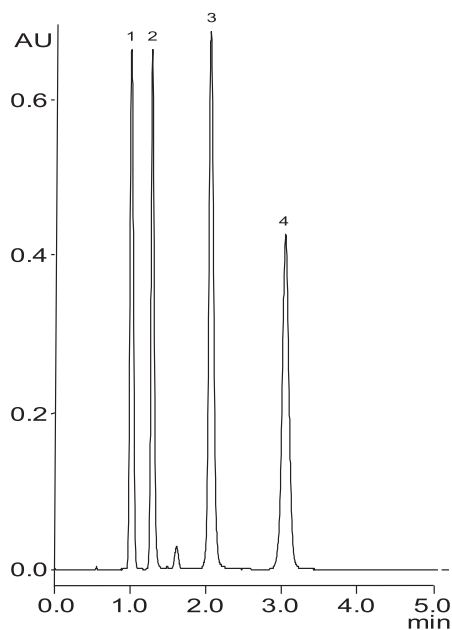


Hydrocortisone

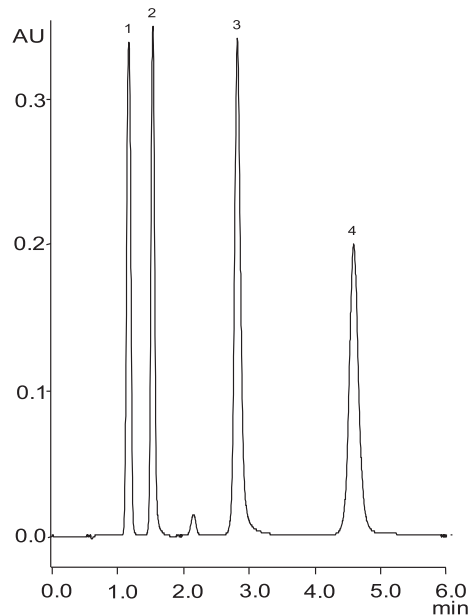
Methanol



Ethanol

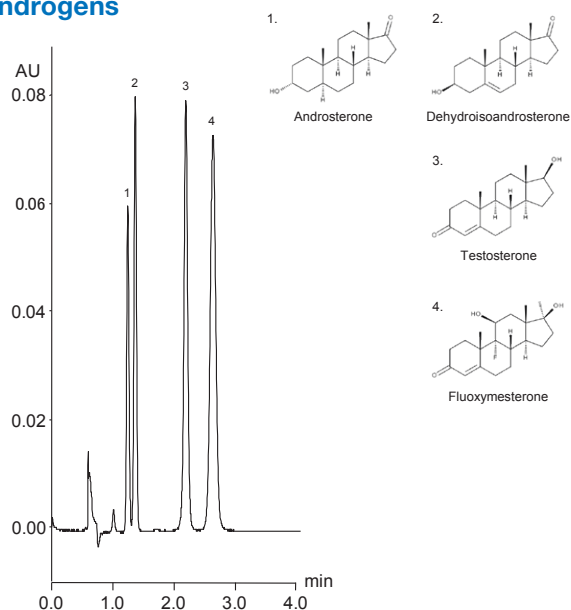


Isopropanol



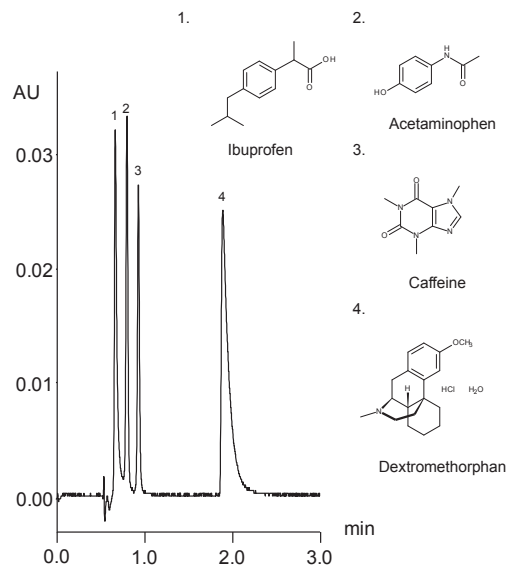
Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDN12S05-1546PTH
 Eluent: CO₂/alcohol (80/20)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.8 mg/mL)

Androgens



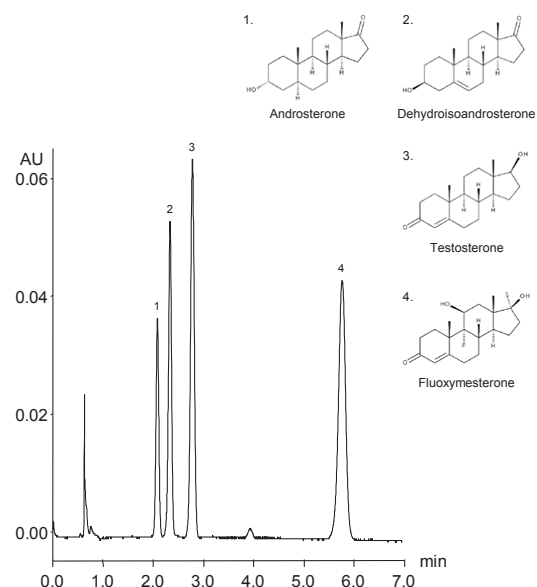
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TPF12S05-1546PTH
 Eluent: CO₂/ethanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.56 mg/mL ~ 6.7 mg/mL)

Ingredients in a cough/cold medication



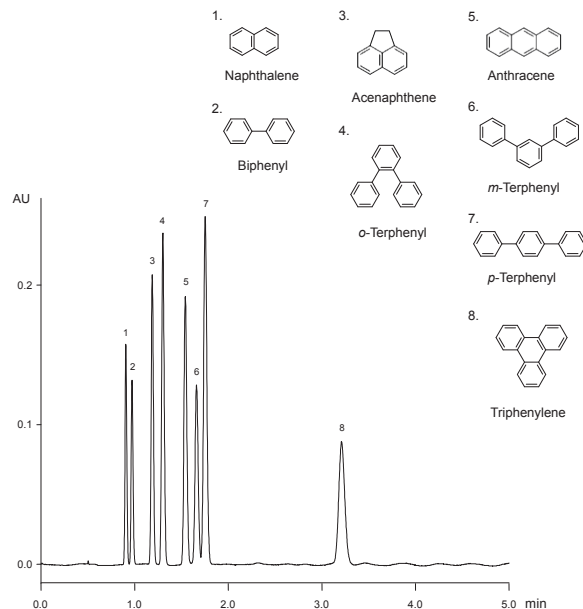
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TPF12S05-1546PTH
 Eluent: CO₂/methanol containing 0.1% diethylamine (80/20)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 1 μ L (0.044mg/mL ~ 5.32 mg/mL)

Androgens



Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDN12S05-1546PTH
 Eluent: CO₂/methanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.56 ~ 6.7 mg/mL)

Polyaromatic hydrocarbons



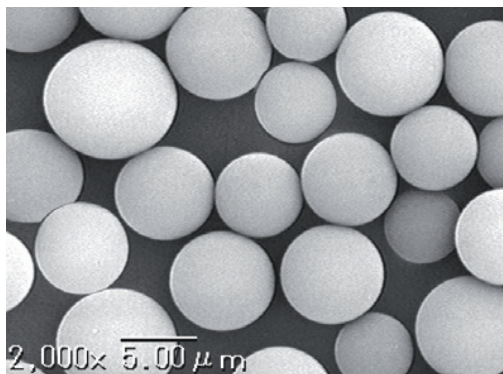
Column: YMC-Triart C18 (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TA12S05-1546PTH
 Eluent: CO₂/methanol (95/5)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 2 μ L (0.03 ~ 1.0 mg/mL)

QC Data – Low back pressure

YMC-Triart: Improved quality of particles

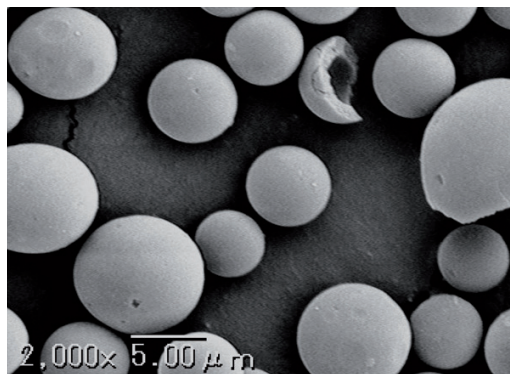
Uniform spherical particles

YMC-Triart



by courtesy of YMC Co., Ltd.

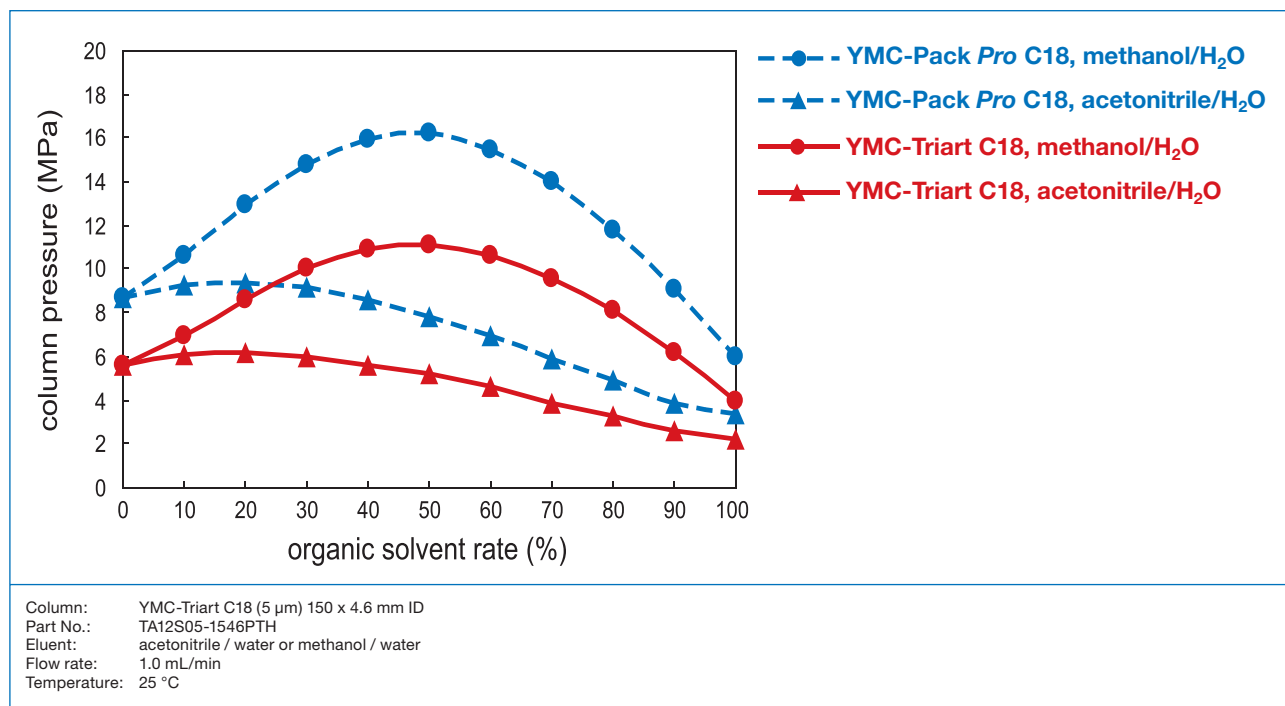
X-Bridge HILIC



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 back-pressure and leads to more reproducibility in surface modification.

Low column back-pressure



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).

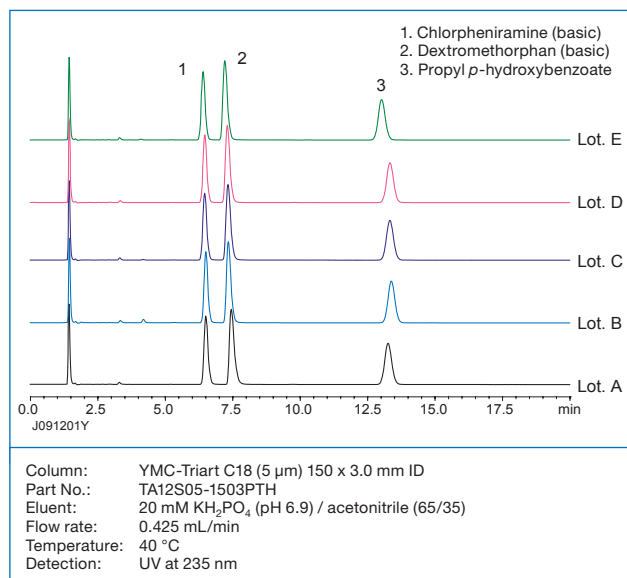
QC Data – Excellent reproducibility

Batch-to-batch reproducibility

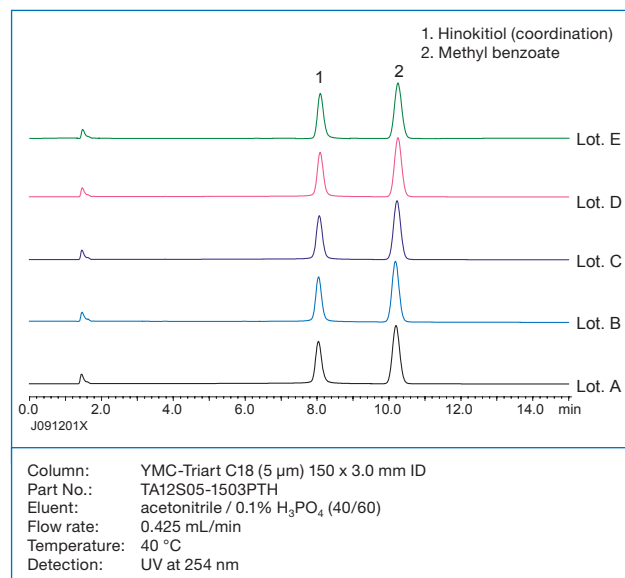
Excellent reproducibility of YMC-Triart phases is available even for the analysis of basic and coordination

compounds which normally exhibit tailing and adsorption effects.

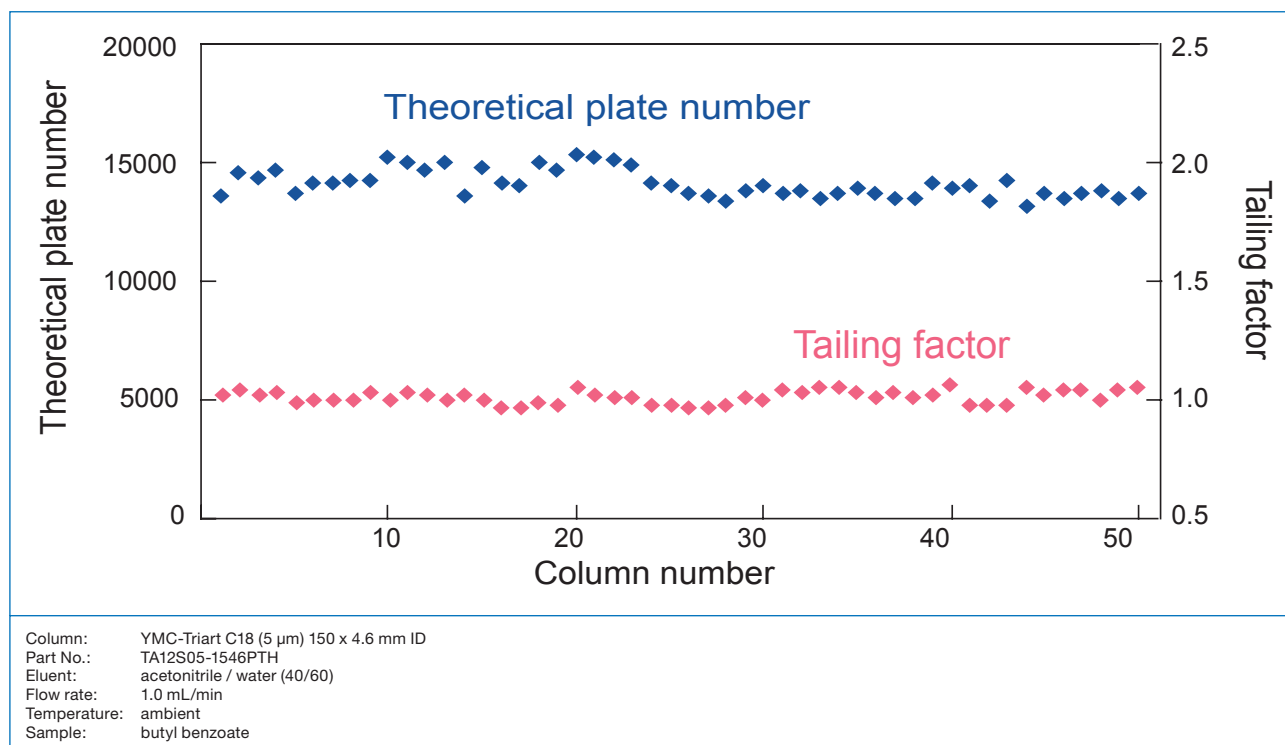
Basic compounds



Coordination compounds

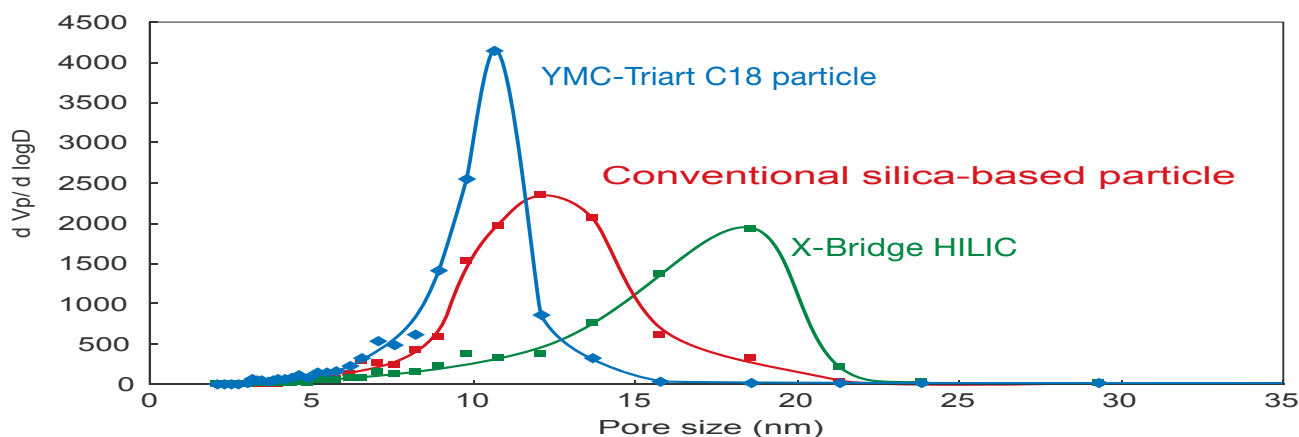


The reproducibility of packed columns is shown below in terms of theoretical plate number (N) and tailing factor (Tf). YMC-Triart packed columns exhibit a very narrow range of variation.



QC Data – High loadability

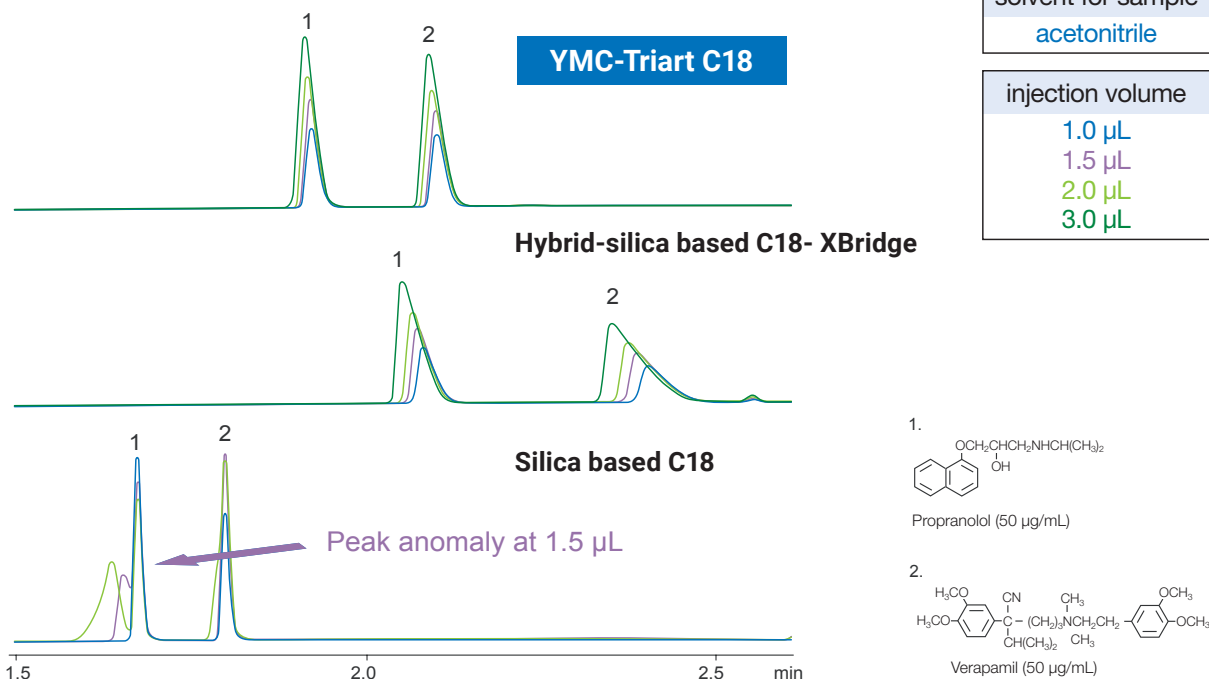
Narrow pore distribution



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



Column: 5 μ m, 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 $^{\circ}$ 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.

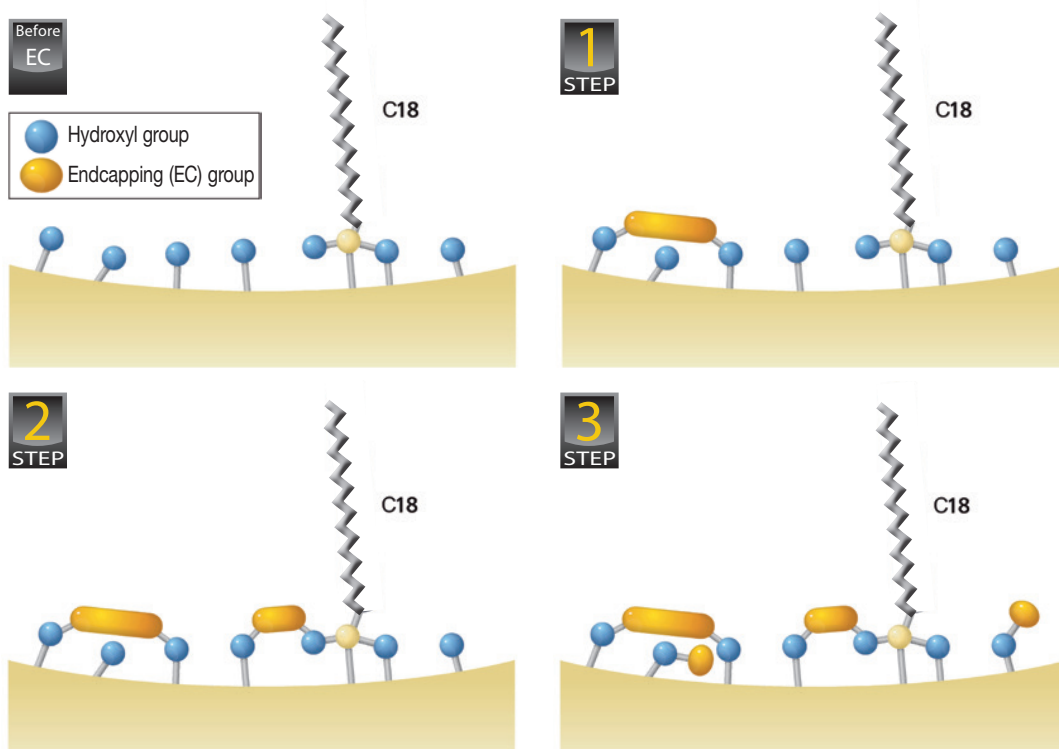
QC Data – Efficient endcapping

Multi-stage endcapping

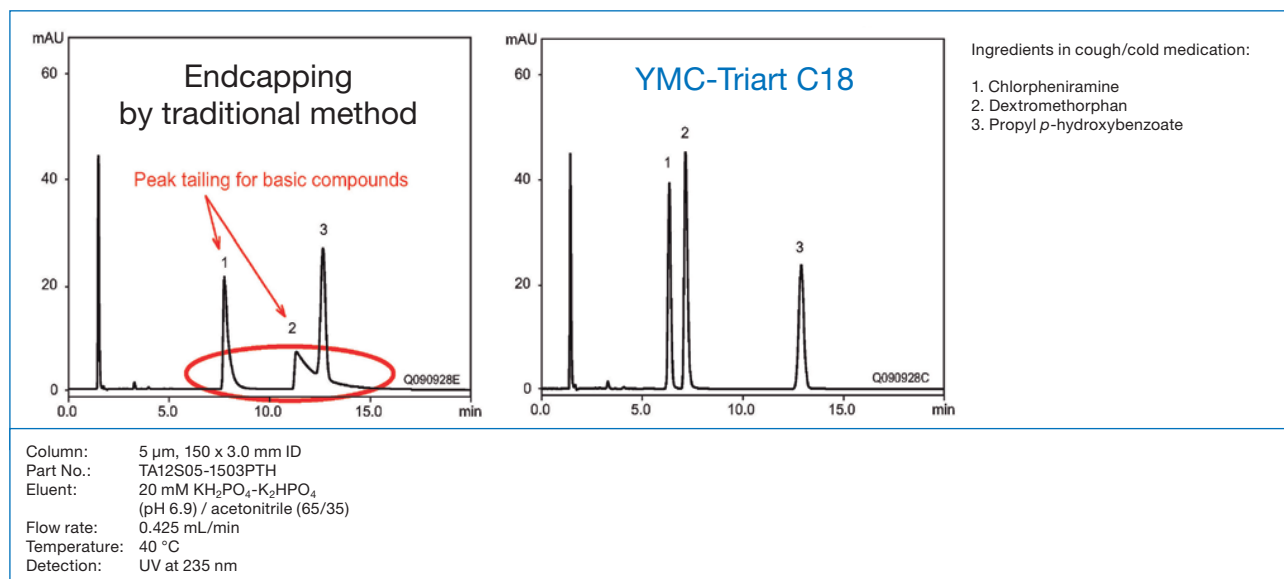
After bonding the alkyl chain, there are highly reactive and less reactive silanols on the surface. In traditional bonding processes, these are reacted with a single endcapping-compound in one step. However, the highly reactive silanols can be hydrolysed easily which contributes to the poor stability. 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.

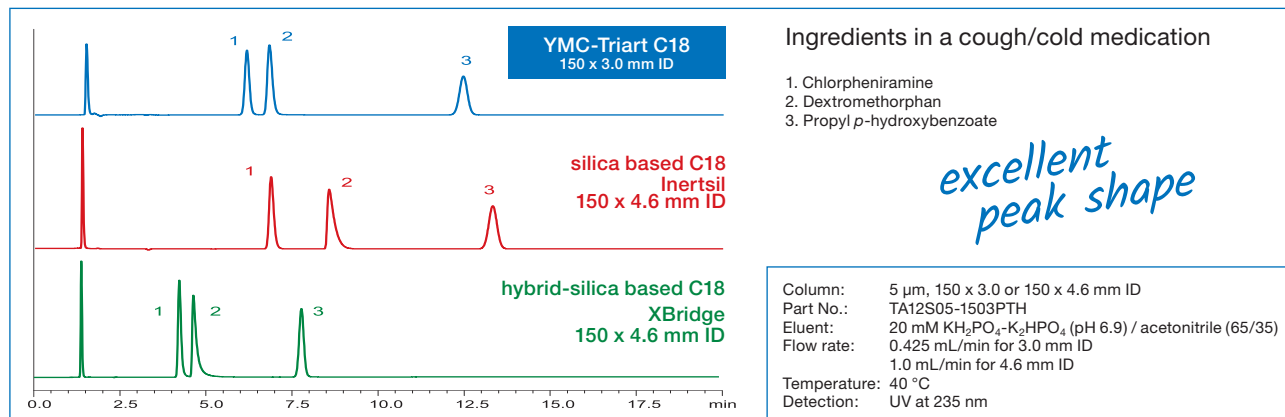


The chromatographic result of a “good” endcapping is demonstrated:



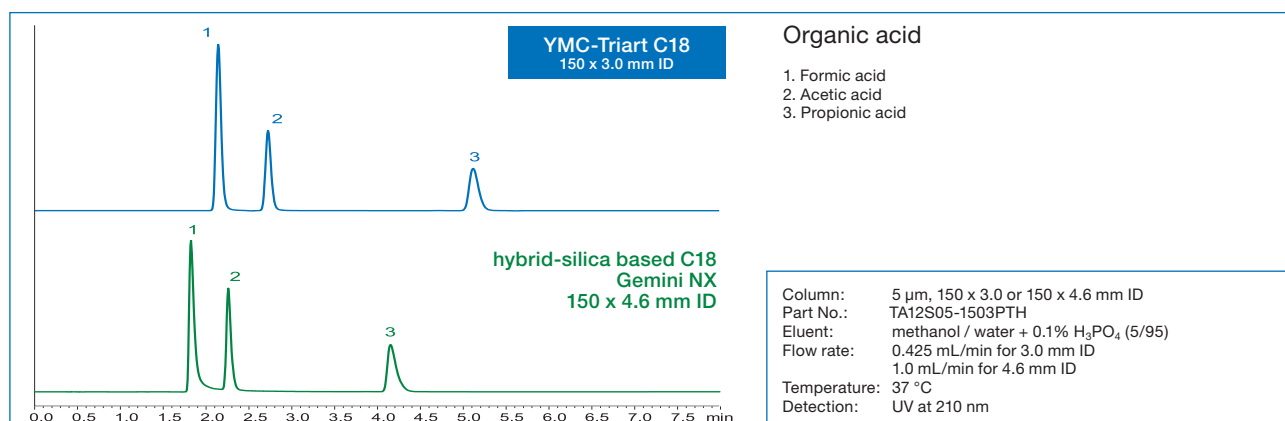
QC Data – Symmetric peaks

Basic compounds



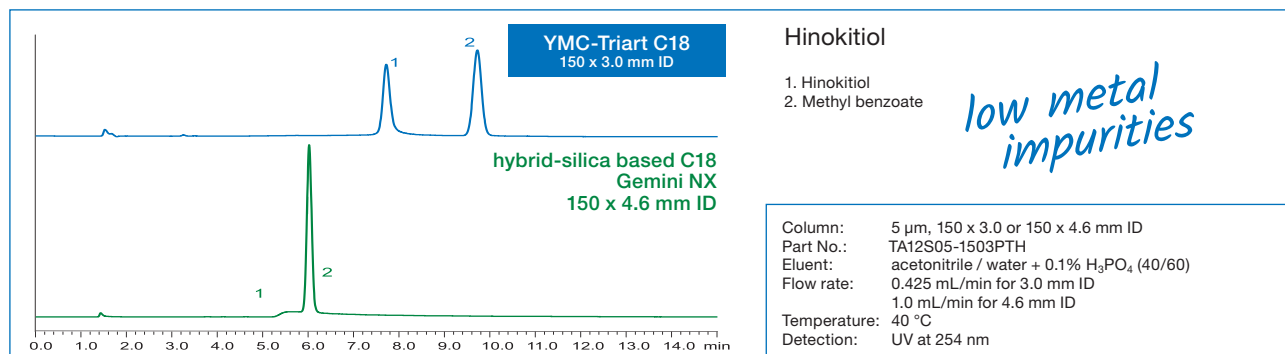
The innovative surface modification technology results in excellent peak shapes even for basic compounds that often exhibit peak tailing with conventional silica- and hybrid silica-based reversed phase columns.

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 acidic compounds.

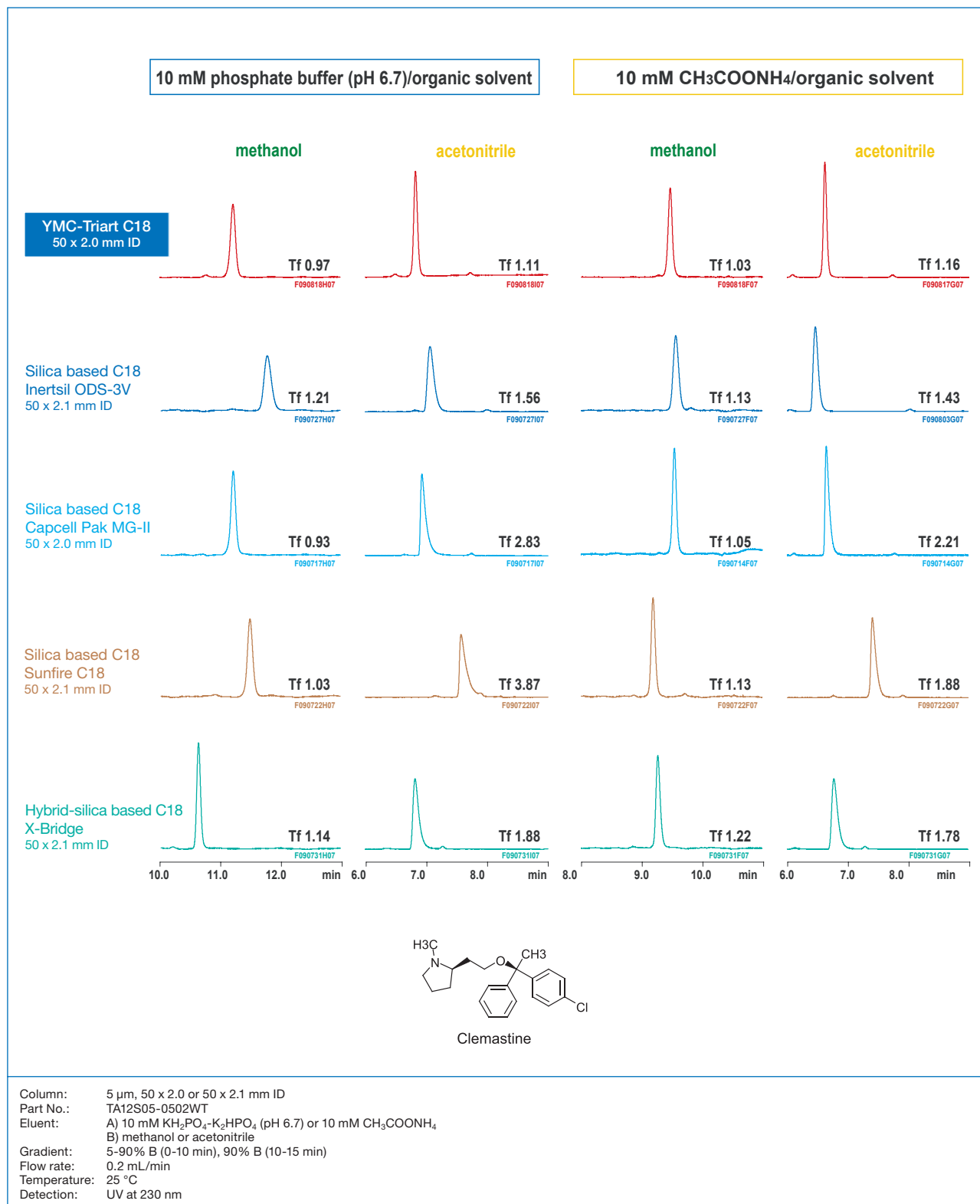
Coordinating compounds



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

Comparison of clemastine analysis



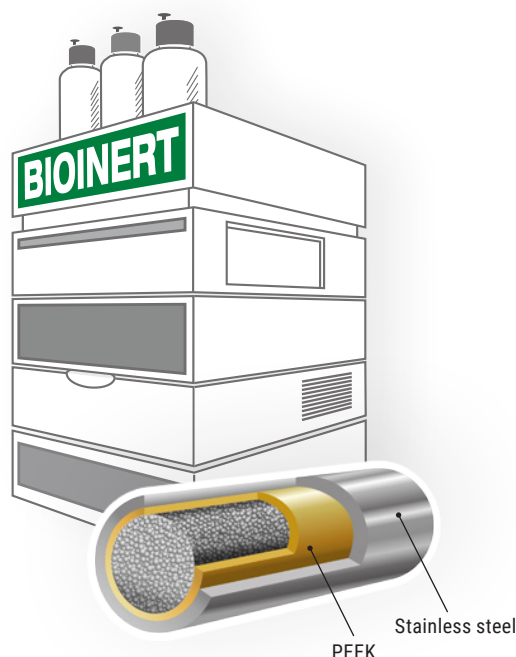
Clemastine is a well-known basic compound which readily exhibits peak tailing with conventional ODS columns. YMC-Triart C18 provides sharp separations with many different buffer/solvent compositions.

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, C8, Bio C4, Phenyl, PFP, Diol-HILIC
Particle Size	1.9, 3, 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.

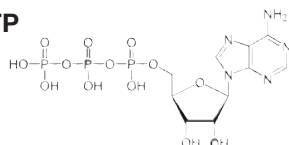


Metal coordinating compounds, which have a phosphate group in their structure, tend to show poor peak shape due to interactions with metals, such as the stainless steel in column bodies and frits. By using the metal-free column hardware, better peak shapes can

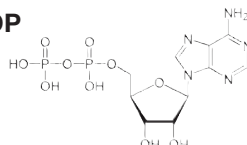
be expected. Nucleotides with phosphate groups also show better peak shapes when compared to the regular column hardware. The YMC-Triart metal-free column hardware is very suitable for highly sensitive analyses using LC/MS.

Improved sensitivity for coordination compounds

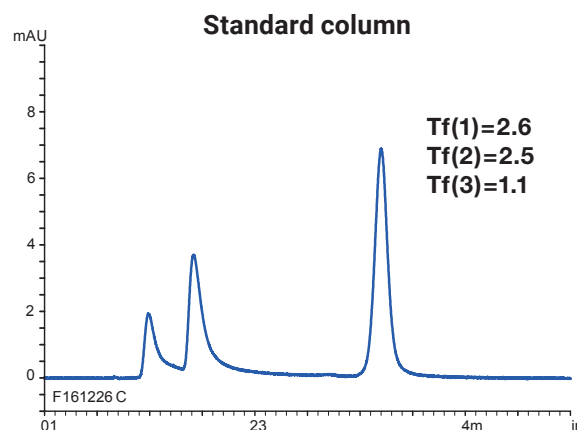
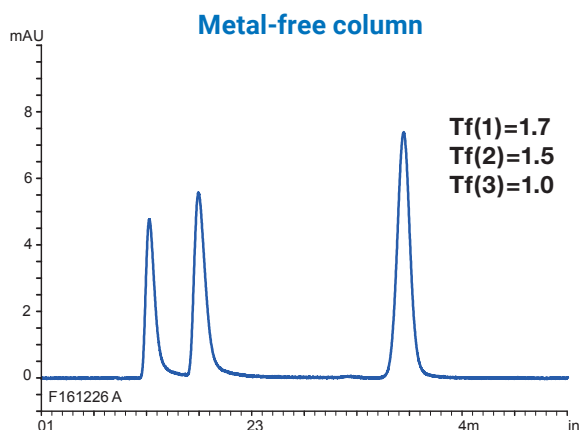
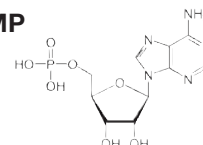
1. ATP



2. ADP



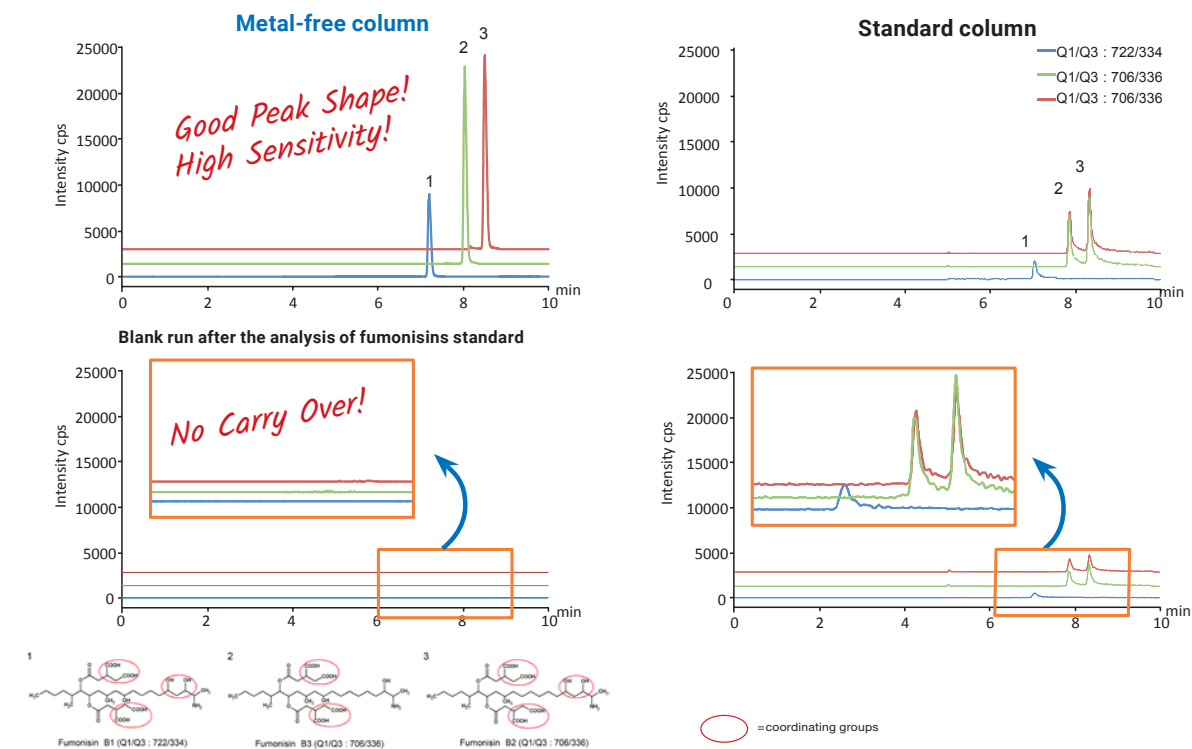
3. AMP



Column: YMC-Triart C18 (3 μm) 50 x 2.1 mm ID
 Part Nos.: TA12S03-05Q1PTP (metal-free) or
 TA12S03-05Q1PTH (regular hardware)
 Eluent: 5 mM HCOONH_4
 Flow rate: 0.21 mL/min
 Temperature: 25 $^{\circ}\text{C}$
 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 (3 μ m, 12 nm) 150 x 2.1 mm ID
 Part No.: TA12S03-15Q1PTP
 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
 Scheduled 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 analysis.

Column connectors

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. UFPF-6050250	e.g. UFPF-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		Bevacizumab	43	Dextromethorphan		Glycitein	38
Acesulfame K	32	D-Biotin	53	8, 10, 14, 55, 59, 61, 64		Glycitin	38
Acenaphthene	59	Biphenyl	59	Diazepam	20	Glycyrrhizin acid ammonium salt	27
4-Acetamidoacetophenone	29	Bovine insulin	25	Dichlorophenols	18	Guaiaacol	28
2-Acetamidophenol	29, 30	BSA	40, 41	3,4-Dihydroxymandelic acid (DOMA)	23	Guanine	51, 53
Acetaminophene	29, 59	<i>n</i> -Butylparabene	10, 15	3,4-Dihydroxyphenylacetic acid (DOPAC)	23	Guanosine	54
Acetaminophenone	29	Butyl benzoate	53			H	
Acetanilide	29, 30	C		3,4-Dihydroxyphenylalanine (DOPA)	23	Halosulfuronmethyl	9
Acetic acid	52, 64	Caffeine	29, 55, 57, 59	1,2-Dimethoxyl benzene	28	Hinokitiol	61, 64
α -Chymotrypsinogen	39, 41, 42	Candesartan cilexetil	24	Diquat	31	L-Histidine (His)	46, 47
6''-O-Acetylaidzin	38	Carvedilol	24	Docosahexaenoic acid	18	Homovanillic acid (HVA)	23
6''-O-Acetylgelatin	38	Casein peptide	36	Dopamine hydrochloride (DA)	23	Humira	43
6''-O-Acetylglycitol	38	Catechol	57	Doxycycline	13	Hydrochlorothiazide	24
Acetylsalicylic acid	29	Catecholamines	23	Duloxetine	22, 30	2-Hydroxyacetophenone	29
Acidic compounds	52	Chavidine	21	Duloxetine isomers	30	α -Hydroxyalprazolam	20
Acrylic acid	52	4-Chloroacetanilide	29			Hydrocortison	19, 58
Adalimumab	43	Chlorophenol	18	E		5-Hydroxyindoleacetic acid (5HIAA)	23
Adenine	51, 53	Chloroquine phosphate	29	Egg peptide	36	Hydroxychloroquine sulfate	29
Adenosine	54	Chlorpheniramine	8, 14, 27, 55, 61, 64	Eicosapentaenoic acid	18	21-Hydroxyprogesterone	19
Adenosine diphosphate (ADP)	66	Chlortetracycline	13, 26	β -Endorphin	42, 44	Hydroquinone	57
Adenosine monophosphate (AMP)	66	Cholecalciferol	16, 17, 57	γ -Endorphin	44	5-Hydroxytryptamine hydrochloride (5HT)	22
Adenosine triphosphate (ATP)	66	Pre-Cholecalciferol	57	Epinephrine hydrochloride	23		
Adrenaline hydrochloride (A)	23	5,6-trans-Cholecalciferol	57	Ergocalciferol	16, 17	I	
L-Alanine (Ala)	47	Citric acid	52	Erythorbic acid	38, 55	Ibuprofen	10, 15, 59
4-Aminophenone	29	Citrulline (Cit)	47	Erythromycin	11, 25	Imipramine	20
γ -Aminobutyric acid (GABA)	47	Clemastine	65	Erythromycin estolate	11	Insulin	25, 39, 40, 41, 42
Amitriptyline	10, 15, 20	Clonazepam	20	Erythromycin ethylsuccinate	11	D-Isoascorbic acid	53
Amlodipine besilate	24	Conalbumin	41	α -Estradiol	19	Isochavicine	21
Amyloid β	40	Copper 8-quinolinolate	9	β -Estradiol	19	L-Isoleucine (Ile)	46, 47
Androsterone	59	Corticosterone	19, 58	Estradiol	19	Isopiperine	21
Angiotensin I	25	Cortisol	19	Estrone	19	L	
Angiotensin II	25	Cortisone	19	Etizolam	12	Lactic acid	52
Angiotensin III	25	Cyanidin	33			Lactoferrin	40
Anthocyanidins	33	Cyanidin-3-O-arabinoside	33	F		β -Lactoglobulin A	39, 41, 42
Anthocyanins	33	Cyanidin-3-O-galactoside	33	Flazasulfuron	9	L-Leucine (Leu)	46, 47
Antracene	59	Cyanidin-3-O-glucoside	33	Fluoxymestron	59	Leu-Enkephalin	42, 44
Arachidonic acid	18	Cyanocobalamin	38, 53, 55	Folic acid	53	Linoleic acid	18
L-Arginine (Arg)	46, 47	Cyclamate Na	32	Formic acid	52, 64	α -Linolenic acid	18
L-Ascorbic acid	38, 53, 55	L-Cysteine (Cys)	47	Fumaric acid	52	γ -Linolenic acid	18
L-Ascorbic acid		Cytidine	54	Fumonisin B1-3	67	L-Lysine (Lys)	22, 47
2-glucoside	38, 53, 55	Cytosine	51, 53, 54			Lysozyme	39, 41, 42
L-Asparagine (Asn)	47	D		G		M	
L-Aspartic acid (Asp)	46, 47	Daidzein	38	Genistein	38	Macrolide antibiotics	25
Asulam	9	Daidzin	38	Genistin	38	Maleic acid sodium salt	27
Atenolol	26	Dehydroisoandrosterone	58	L-Glutamic acid (Glu)	47	L-Malic acid	52
Atorvastatin calcium hydrate	24	Delphinidin	33	L-Glutamine (Gln)	47	Malonic acid	52
Avastin	43	Delphinidin-3-O-arabinoside	33	Gluten markers	34, 35	6''-O-Malonyldaidzin	38
Azoxystrobin	9	Delphinidin-3-O-galactoside	33	Glycidic acid	52		
B		Delphinidin-3-O-glucoside	33	L-Glycine (Gly)	47		
Benzethonium chloride	27	Deoxycorticosterone	58				
Betablockers	26						

Substance index

6''-O-Malonylgenistin	38	P	Q	Thymine	51, 53
6''-O-Malonylglycitin	38	Palmitoleic acid	18	Toluol	20
Malvidin	33	D-(+)-Pantothenic acid		Triazolam	12
Malvidin-3-O-arabinoside	33	calcium salt	53	Triclopyr	9
Malvidin-3-O-galactoside	33	Paracetamol	28	Trigonelline HCl	57
Malvidin-3-O-glucoside	33	Paraquat	31	Triphenylene	15, 59
Mecoprop	9	Peonidin	33	L-Tryptophan (Trp)	23, 47
Met-Enkephalin	40, 44	Peonidin-3-O-arabinoside	33	L-Tyrosine (Tyr)	23, 47
L-Methionine (Met)	46, 47	Peonidin-3-O-galactoside	33		
3-Methoxy-4-hydroxyphenylglycol		Peonidin-3-O-glucoside	33	U	
(MHPG)	23	Peptides	33, 45	Uracil	25, 51, 53, 54
3-Methoxytyramine		Pesticides	31	Uridine	54
hydrochloride (3MT)	23	Petunidin	33	V	
Methyl benzoate	28, 61	Petunidin-3-O-arabinoside	33	L-Valine (Val)	46, 47
Metoprolol	26	Petunidin-3-O-galactoside	33	Valsartan	24
		Petunidin-3-O-glucoside	33	Vanillylmandelic acid (VMA)	23
N		Phenacetine	29	Verapamil	62
Nadolol	26	Phenol	28, 57	Veterinary drugs	37
Naphazolin HCl	27	L-Phenylalanine (Phe)	47	Vitamin B1	38, 53, 55
Naphthalene	15, 59	Phloroglucinol	57	Vitamin B2	38, 53, 55
Neostigmine methylsulfate	27	Pindolol	26	Vitamin B3	38, 53, 55
Neurotensin	44	Piperine	21	Vitamin B5	53
Nicotinamide	38, 53, 55	Porcine insulin	25	Vitamin B6	38, 53, 55
Nicotinic acid	38, 53, 55	Prednisone	19	Vitamin B7	53
4-Nitrophenol	28	Progesterone	19, 58	Vitamin B12	38, 53, 55
Noradrenaline hydrochloride (NA)	23	L-Proline (Pro)	47	Vitamin C	38, 53, 55
Norepinephrine hydrochloride	23	Propranolol	26	Vitamin D2	16, 17
Nortriptyline	20	Propionic acid	52, 64	Vitamin D3	16, 17
O		n-Propyl paraben	8, 14, 15	W	
Oleic acid	18	Propyl p-hydroxybenzoate	61, 64	Water-soluble vitamins	38, 53, 55
Oligonucleotides	48, 49	Pyridoxal HCl	53		
Ornithine HCl (Orn)	47	Pyridoxine HCl	27, 38, 55		
Orotic acid	55	Pyrocatechol	28		
Ovalbumin	40, 41	Pyrogallol	57		
Oxalic acid	52				
Oxazepam	20				
Oxine-copper	9				
Oxytetracycline	13				
Oxytocin	39, 42, 44				
		R			
		Rebaudioside A	27		
		Resorcinol	57		
		Riboflavin	38, 53, 55		
		Ribonuclease A	41		
		miRNA	49		
		siRNA	49		
		S			
		Saccharin	10, 32		
		Salicylic acid	29		
		L-Serine (Ser)	47		
		Serotonin hydrochloride	23		
		Siduron	9		
		Soy isoflavones	38		
		Spiramycin	25		
		Stevioside hydrate	27		
		Succinic acid	52		
		Sulpha drugs	25		
		Sulphamerazine	25		
		Sulphamethoxazole	25		
		Sulphathiazole	25		
		T			
		Tachysterol3	57		
		Tartaric acid	52		
		Temazepam	20		
		m-Terpheny	59		
		o-Terphenyl	15, 59		
		p-Terpheny	59		
		Testosterone	15, 59		
		Tetracycline	13		
		Tetrahydrozoline HCl	27		
		Theobromine	57		
		Theophylline	57		
		Thiamine HCl	38, 53, 55		
		L-Threonine (Thr)	47		

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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
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
PPF	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	TDN12SP9-0202PT	TDN12SP9-0302PT	TDN12SP9-0502PT	TDN12SP9-L502PT	TDN12SP9-1002PT	TDN12SP9-1502PT	—
	2.1	TDN12SP9-02Q1PT	TDN12SP9-03Q1PT	TDN12SP9-05Q1PT	TDN12SP9-L5Q1PT	TDN12SP9-10Q1PT	TDN12SP9-15Q1PT	—
	3.0	—	—	TDN12SP9-0503PT	TDN12SP9-L503PT	TDN12SP9-1003PT	—	—

*Guard cartridge holder required, part no. XPCHUHP, **Guard cartridge: 2.1 mm ID

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
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
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

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
C8	2.1	TO12S03-02Q1PTH	TO12S03-H3Q1PTH	TO12S03-05Q1PTH	TO12S03-L5Q1PTH	TO12S03-10Q1PTH	TO12S03-15Q1PTH	—	TO12S03-01Q1GC
	3.0	—	—	TO12S03-0503PTH	TO12S03-L503PTH	TO12S03-1003PTH	TO12S03-1503PTH	—	TO12S03-0103GC
	4.6	—	TO12S03-H346PTH	TO12S03-0546PTH	TO12S03-L546PTH	TO12S03-1046PTH	TO12S03-1546PTH	TO12S03-2546PTH	TO12S03-0104GC
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	TDN12S03-02Q1PTH	TDN12S03-H3Q1PTH	TDN12S03-05Q1PTH	TDN12S03-L5Q1PTH	TDN12S03-10Q1PTH	TDN12S03-15Q1PTH	—	—
	3.0	—	—	TDN12S03-0503PTH	TDN12S03-L503PTH	TDN12S03-1003PTH	TDN12S03-1503PTH	—	—
	4.6	—	TDN12S03-H346PTH	TDN12S03-0546PTH	TDN12S03-L546PTH	TDN12S03-1046PTH	TDN12S03-1546PTH	TDN12S03-2546PTH	—
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

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
C8	2.1	TO12S03-05Q1PTP	TO12S03-10Q1PTP	TO12S03-15Q1PTP
	4.6	TO12S03-0546PTP	TO12S03-1046PTP	TO12S03-1546PTP
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	TO12S03-0202WT	TO12S03-0302WT	TO12S03-0502WT	TO12S03-L502WT	TO12S03-1002WT	TO12S03-1502WT	—	TO12S03-01Q1GC
	3.0	—	—	TO12S03-0503WT	TO12S03-L503WT	TO12S03-1003WT	TO12S03-1503WT	—	TO12S03-0103GC
	4.6	—	—	TO12S03-0546WT	TO12S03-L546WT	TO12S03-1046WT	TO12S03-1546WT	TO12S03-2546WT	TO12S03-0104GC
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	
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
C18ExRS	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
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

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	TATPFTDHP9-05Q1PT
		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
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	TDN12S05-02Q1PTH	TDN12S05-H3Q1PTH	TDN12S05-05Q1PTH	TDN12S05-L5Q1PTH	TDN12S05-10Q1PTH	TDN12S05-15Q1PTH	—	—
	3.0	—	—	TDN12S05-0503PTH	TDN12S05-L503PTH	TDN12S05-1003PTH	TDN12S05-1503PTH	—	—
	4.6	—	TDN12S05-H346PTH	TDN12S05-0546PTH	TDN12S05-L546PTH	TDN12S05-1046PTH	TDN12S05-1546PTH	TDN12S05-2546PTH	—
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	—

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
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	
									(pack of 5)
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
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
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
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
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

*Guard cartridge holder required, part no. XPGCH-Q1 (2.1, 3, 4 mm ID)
XPCCHSPW1 (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	
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
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
PFP	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

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	
C18	20	TA12S05-0520WX	TA12S05-L520WX	TA12S05-1020WX	TA12S05-1520WX	TA12S05-2520WX	TA12S05-0120CC
	30	TA12S05-0530WX	TA12S05-L530WX	TA12S05-1030WX	TA12S05-1530WX	TA12S05-2530WX	TA12S05-0130CC
	50	TA12S05-0553DX	—	TA12S05-1053DX	TA12S05-1553DX	TA12S05-2553DX	TA12S05-0553DXG**
C18 ExRS	20	TAR08S05-0520WX	TAR08S05-L520WX	TAR08S05-1020WX	TAR08S05-1520WX	TAR08S05-2520WX	TAR08S05-0120CC
	30	TAR08S05-0530WX	TAR08S05-L530WX	TAR08S05-1030WX	TAR08S05-1530WX	TAR08S05-2530WX	TAR08S05-0130CC
	50	TAR08S05-0553DX	—	TAR08S05-1053DX	TAR08S05-1553DX	TAR08S05-2553DX	TAR08S05-0553DXG**
C8	20	TO12S05-0520WX	TO12S05-L520WX	TO12S05-1020WX	TO12S05-1520WX	TO12S05-2520WX	TO12S05-0120CC
	30	TO12S05-0530WX	TO12S05-L530WX	TO12S05-1030WX	TO12S05-1530WX	TO12S05-2530WX	TO12S05-0130CC
	50	TO12S05-0553DX	—	TO12S05-1053DX	TO12S05-1553DX	TO12S05-2553DX	TO12S05-0553DXG**
Bio C4	20	TB30S05-0520WX	TB30S05-L520WX	TB30S05-1020WX	TB30S05-1520WX	TB30S05-2520WX	TB30S05-0120CC
	30	TB30S05-0530WX	TB30S05-L530WX	TB30S05-1030WX	TB30S05-1530WX	TB30S05-2530WX	TB30S05-0130CC
	50	TB30S05-0553DX	—	TB30S05-1053DX	TB30S05-1553DX	TB30S05-2553DX	TB30S05-0553DXG**
Phenyl	20	TPH12S05-0520WX	TPH12S05-L520WX	TPH12S05-1020WX	TPH12S05-1520WX	TPH12S05-2520WX	TPH12S05-0120CC
	30	TPH12S05-0530WX	TPH12S05-L530WX	TPH12S05-1030WX	TPH12S05-1530WX	TPH12S05-2530WX	TPH12S05-0130CC
	50	TPH12S05-0553DX	—	TPH12S05-1053DX	TPH12S05-1553DX	TPH12S05-2553DX	TPH12S05-0553DXG**
PPF	20	TPF12S05-0520WX	TPF12S05-L520WX	TPF12S05-1020WX	TPF12S05-1520WX	TPF12S05-2520WX	TPF12S05-0120CC
	30	TPF12S05-0530WX	TPF12S05-L530WX	TPF12S05-1030WX	TPF12S05-1530WX	TPF12S05-2530WX	TPF12S05-0130CC
	50	TPF12S05-0553DX	—	TPF12S05-1053DX	TPF12S05-1553DX	TPF12S05-2553DX	TPF12S05-0553DXG**

*Guard cartridge holder required, part no. XPCHSPW2 (20 mm ID)/XPCHSPW3 (30 mm ID)

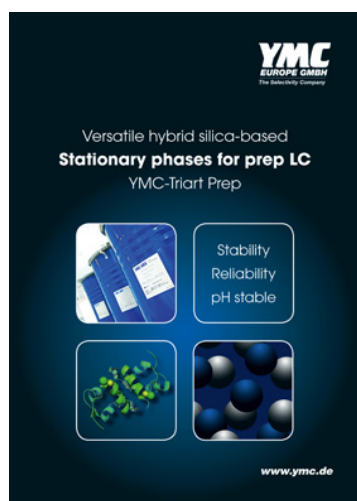
** no holder required for 50 x 50 mm ID guard columns (no cartridge)

YMC-Triart, preparative bulk media

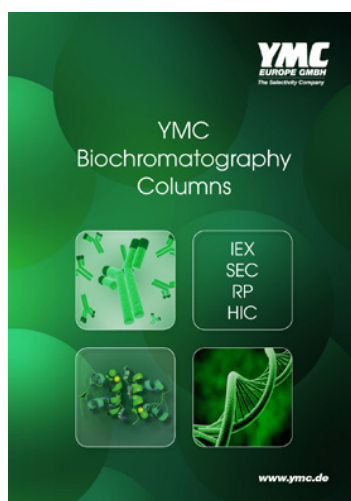
YMC-Triart C18-S			YMC-Triart C8-S		
Pore size (nm)	Particle size (µm)	Product Code	Pore size (nm)	Particle size (µm)	Product Code
12	10	TAS12S11	20	10	TOS20S11
	15	TAS12S16		15	TOS20S16
	20	TAS12S21		20	TOS20S21

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

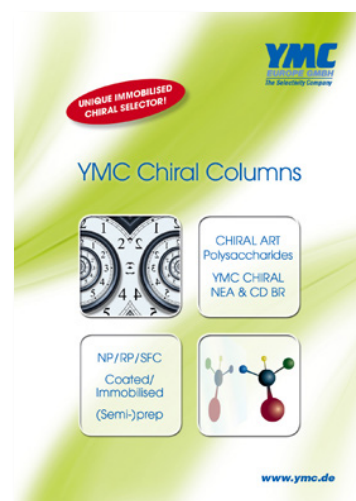
Please inquire for the corresponding catalogues



YMC-Triart Prep

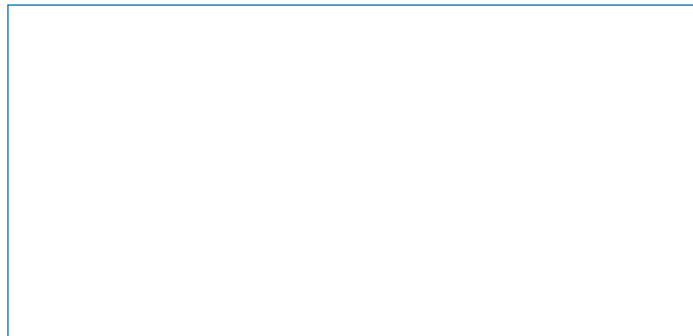


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YMC Chiral Columns

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