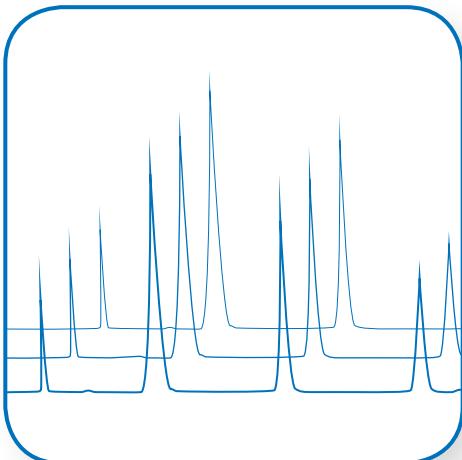
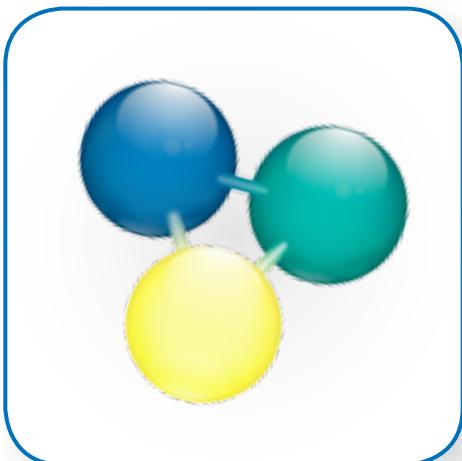


Reliable · Robust · Reproducible
(U)HPLC columns
YMC-Triart



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

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Phase overview

YMC-Triart C18



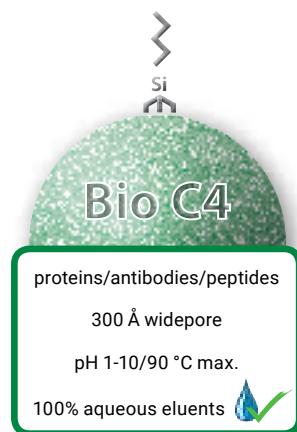
YMC-Triart C18 ExRS



YMC-Triart C8



YMC-Triart Bio C4



versatile applications
first choice for method development
pH 1-12/90 °C max.
100% aqueous eluents

extended pH and stability
hydrophobic substances
positional isomers
pH 1-12/90 °C max.

alternative to C18
short retention time
pH 1-12/90 °C max.

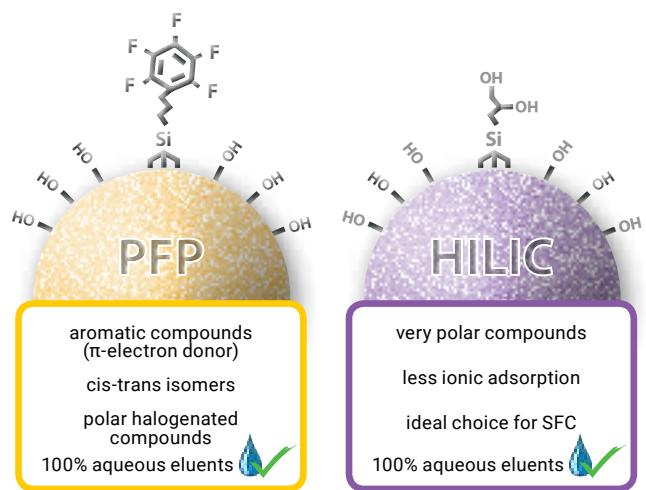
proteins/antibodies/peptides
300 Å widepore
pH 1-10/90 °C max.
100% aqueous eluents

YMC-Triart Phenyl



aromatic compounds (π -electron donor)
conjugated systems
100% aqueous eluents

YMC-Triart PFP



aromatic compounds (π -electron donor)
cis-trans isomers
polar halogenated compounds
100% aqueous eluents

YMC-Triart Diol-HILIC



very polar compounds
less ionic adsorption
ideal choice for SFC
100% aqueous eluents

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

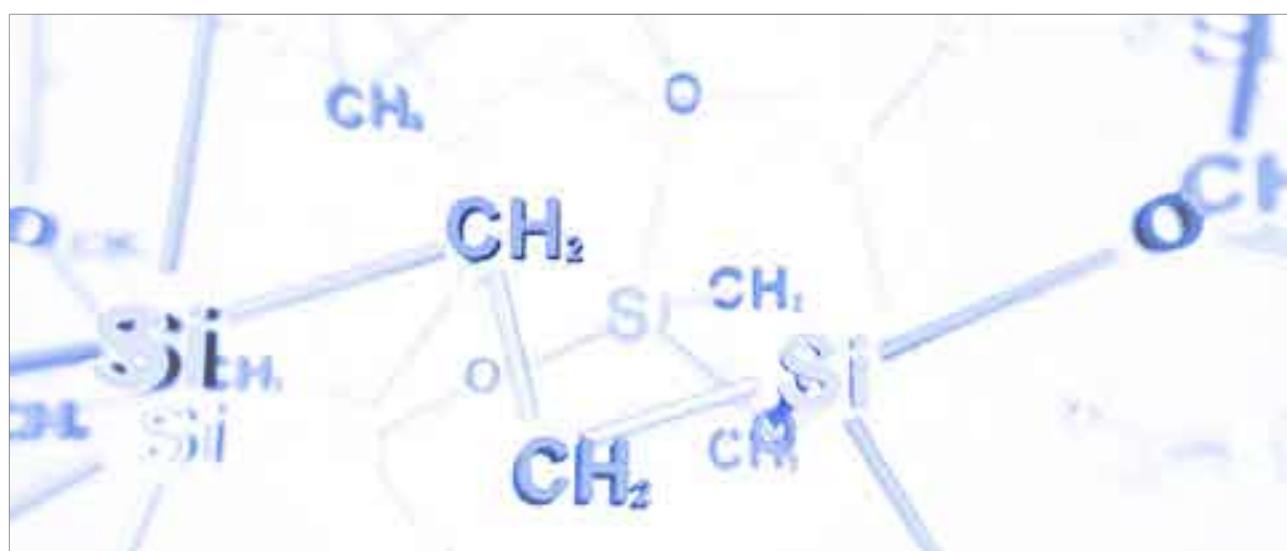
	YMC-Triart C18	YMC-Triart C18 ExRS	YMC-Triart C8	YMC-Triart Bio C4	YMC-Triart Phenyl	YMC-Triart PFP	YMC-Triart Diol-HILIC
Base	organic/inorganic silica						
Stationary phase	C18 (USP L1)	C18 (USP L1)	C8 (USP L7)	C4 (USP L26)	Phenyl (USP L11)	Penta-fluorophenyl (USP L43)	Diol (USP L20)
Particle size	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)]

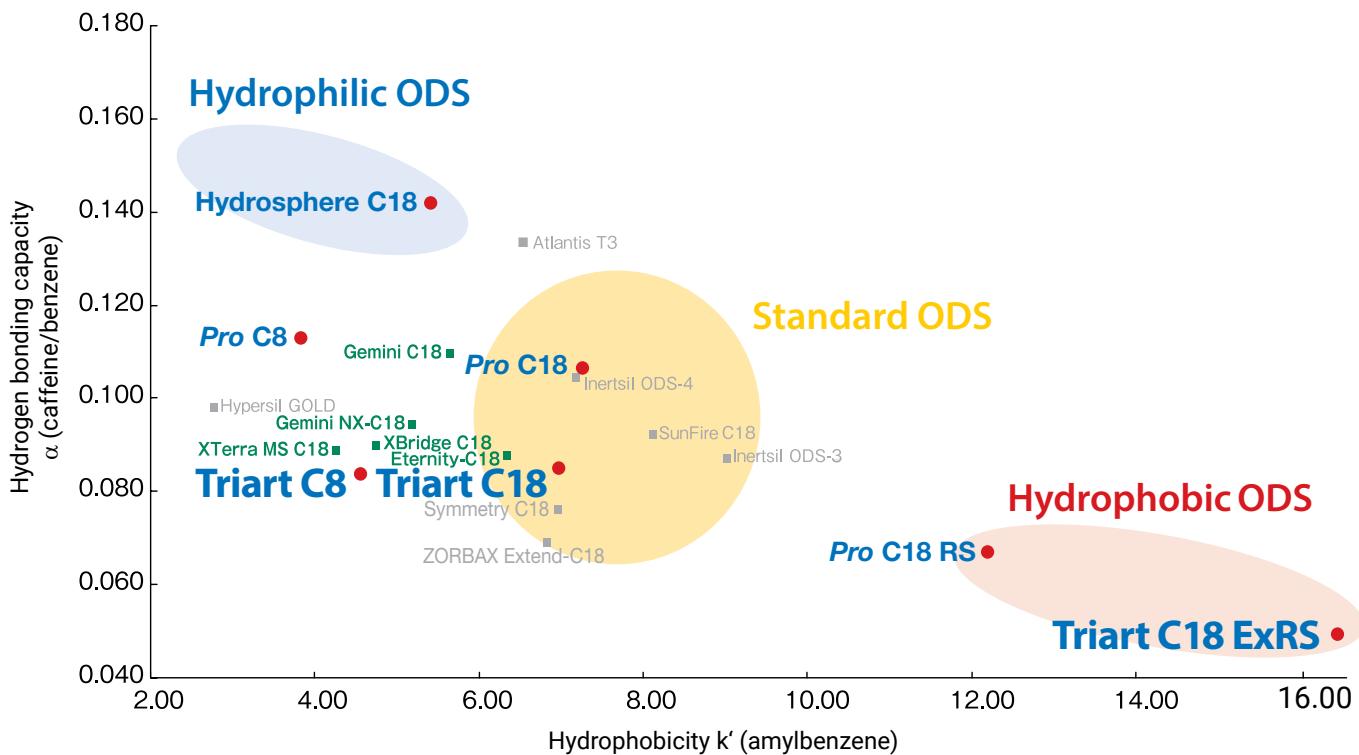
Particle technology

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.

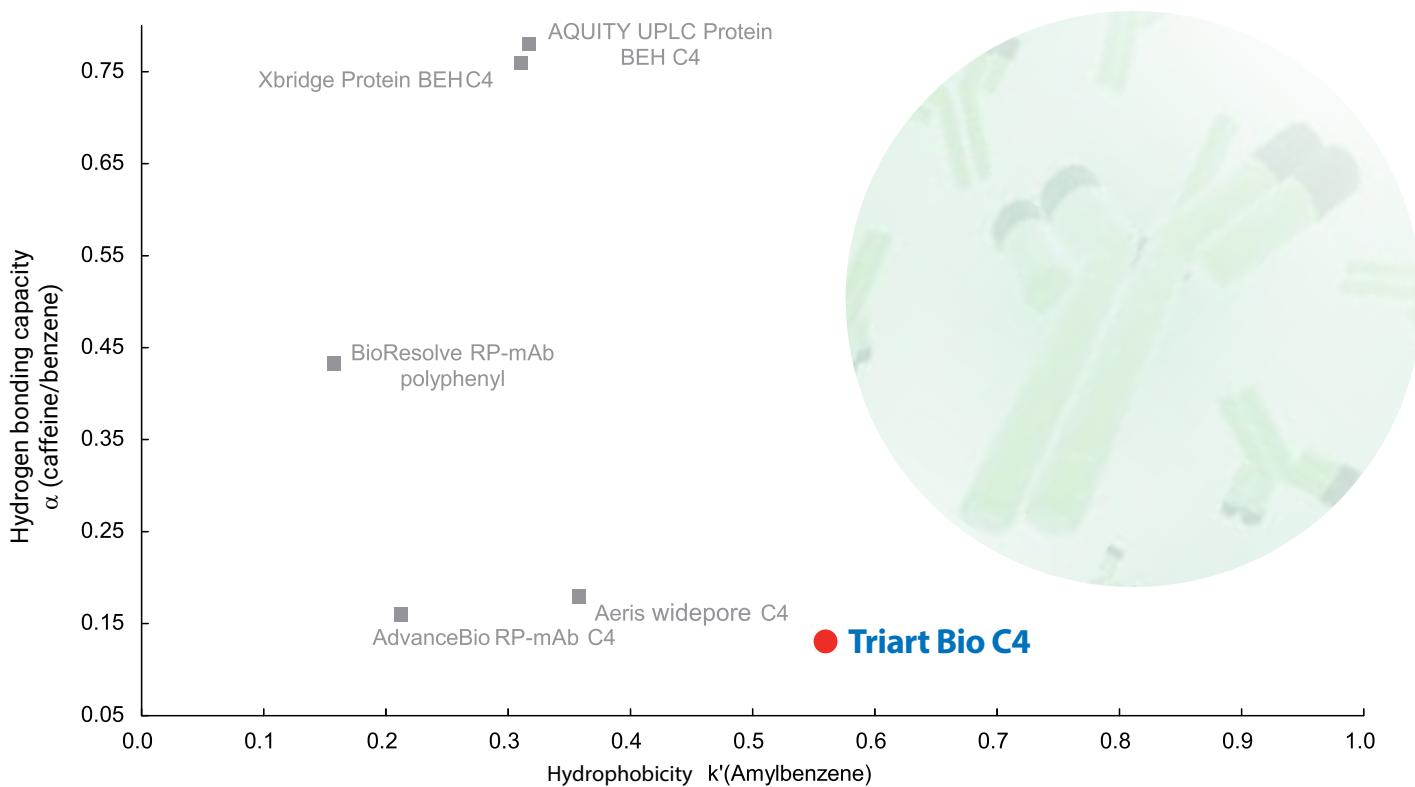


"First choice" column for method development



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

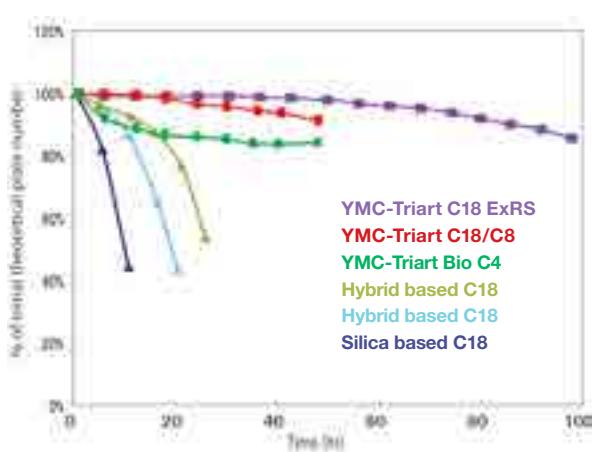
columns, thereby making it a "versatile first-choice" column for method development. On the other hand, YMC-Triart C18 ExRS has been designed to provide contrastingly different separation characteristics!



pH & temperature

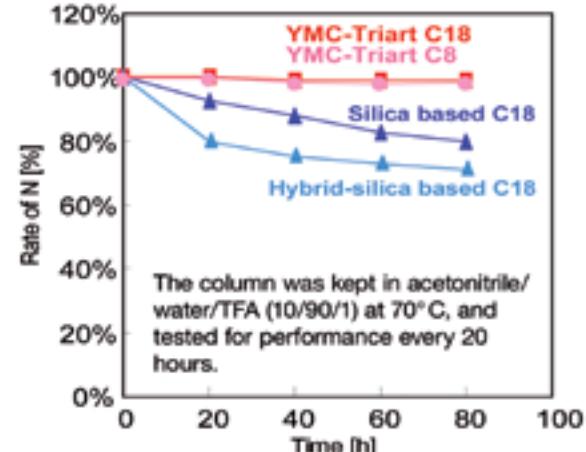
Versatile wide pH stability

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

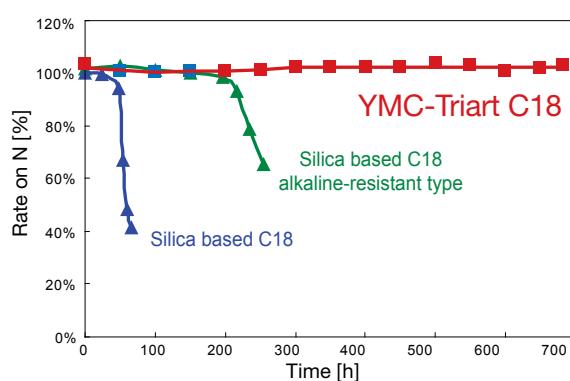
1% TFA (pH 1, 70 °C)



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

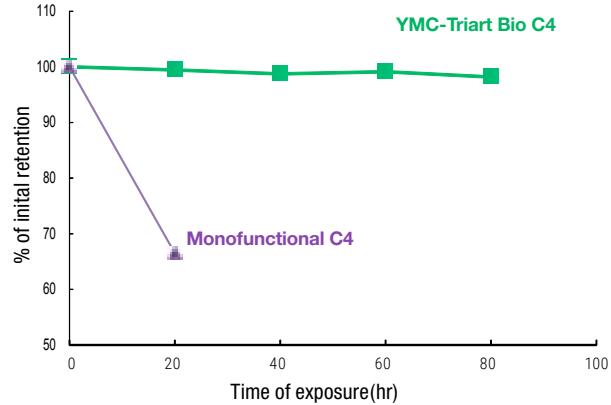
Stability at high temperature

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

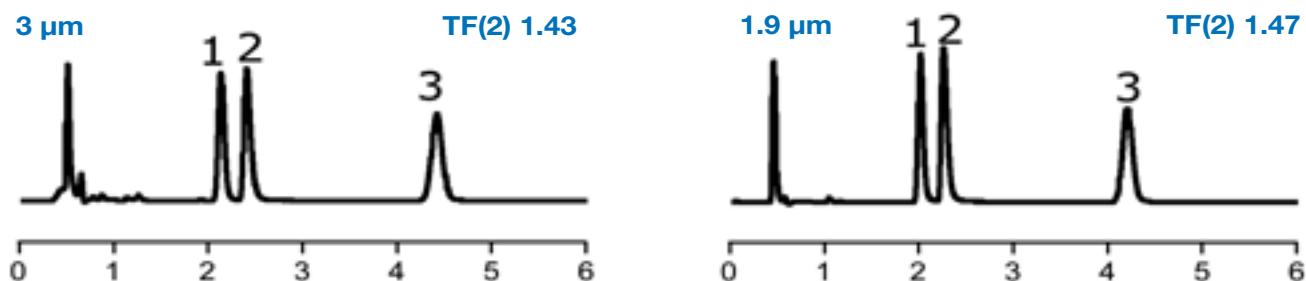
YMC-Triart phases show great chemical stability due to the highly developed hybrid-silica matrix. Even under high pH or high temperature conditions, the lifetime of YMC-Triart phases is more than 10 x greater than conventional reversed phase columns.

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.

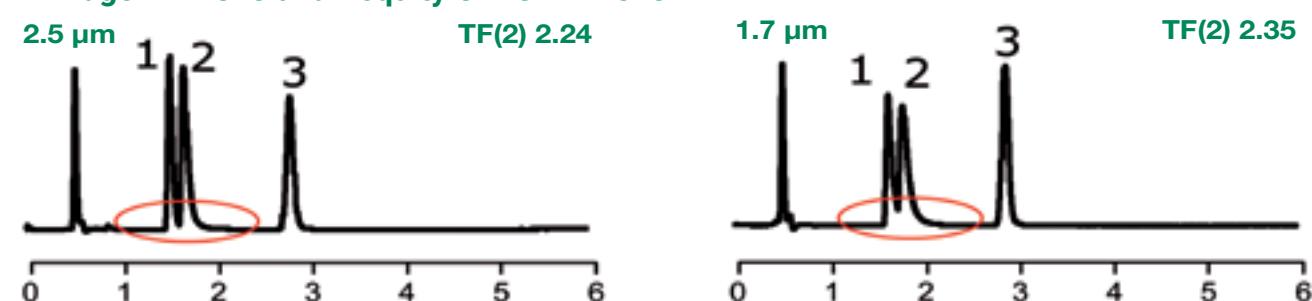
YMC-Triart C18



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.

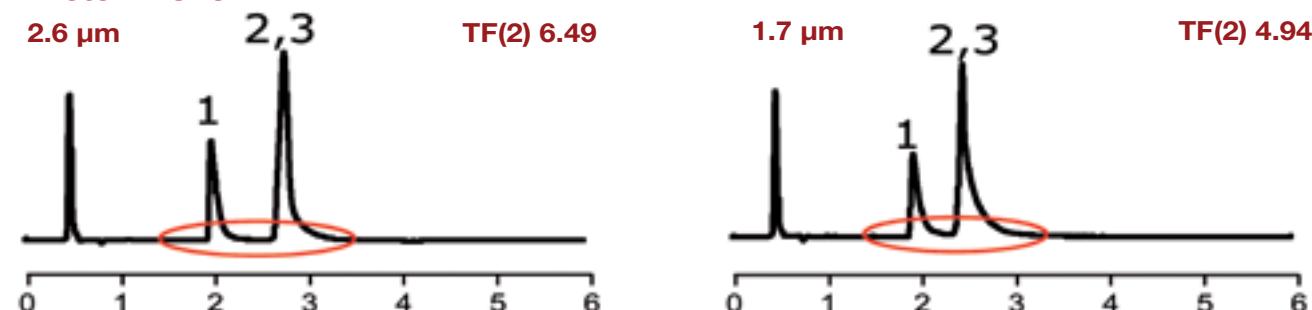
Case Studies

X-Bridge BEH C18 and Acquity UPLC BEH C18



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

Kinetex™ C18



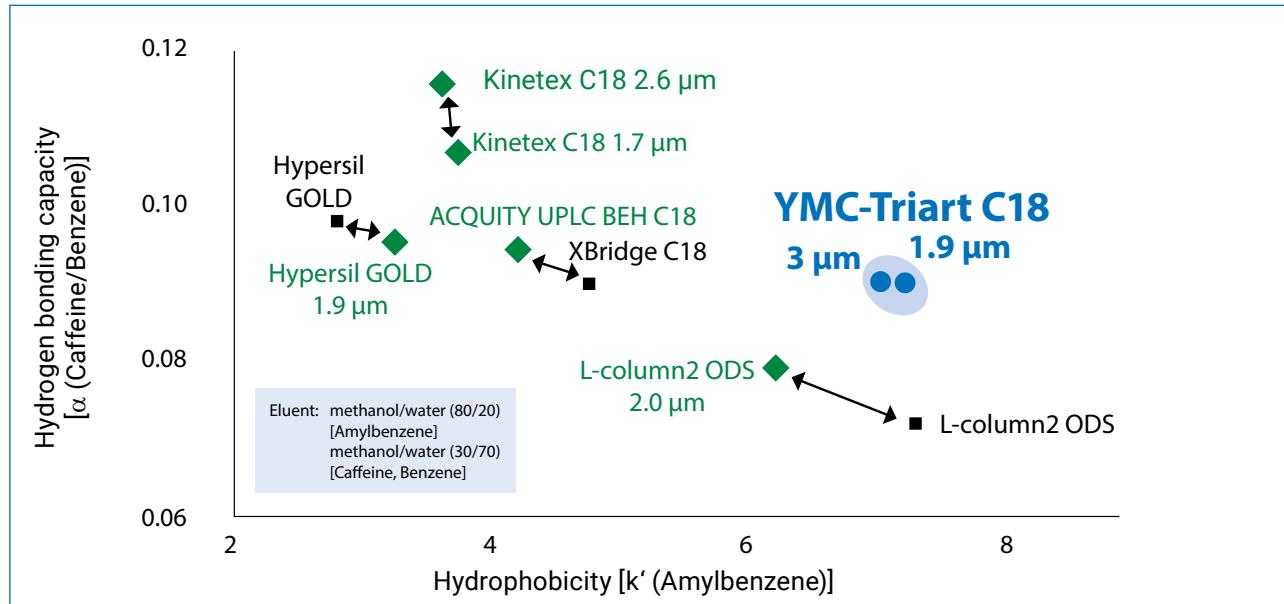
Kinetex™ C18 columns show significant peak tailing and have limited scalability due to lack of larger particle sizes.

Column:	50 x 2.0 mm ID or 2.1 mm ID
Eluent:	20 mM KH ₂ PO ₄ -K ₂ HPO ₄ (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)

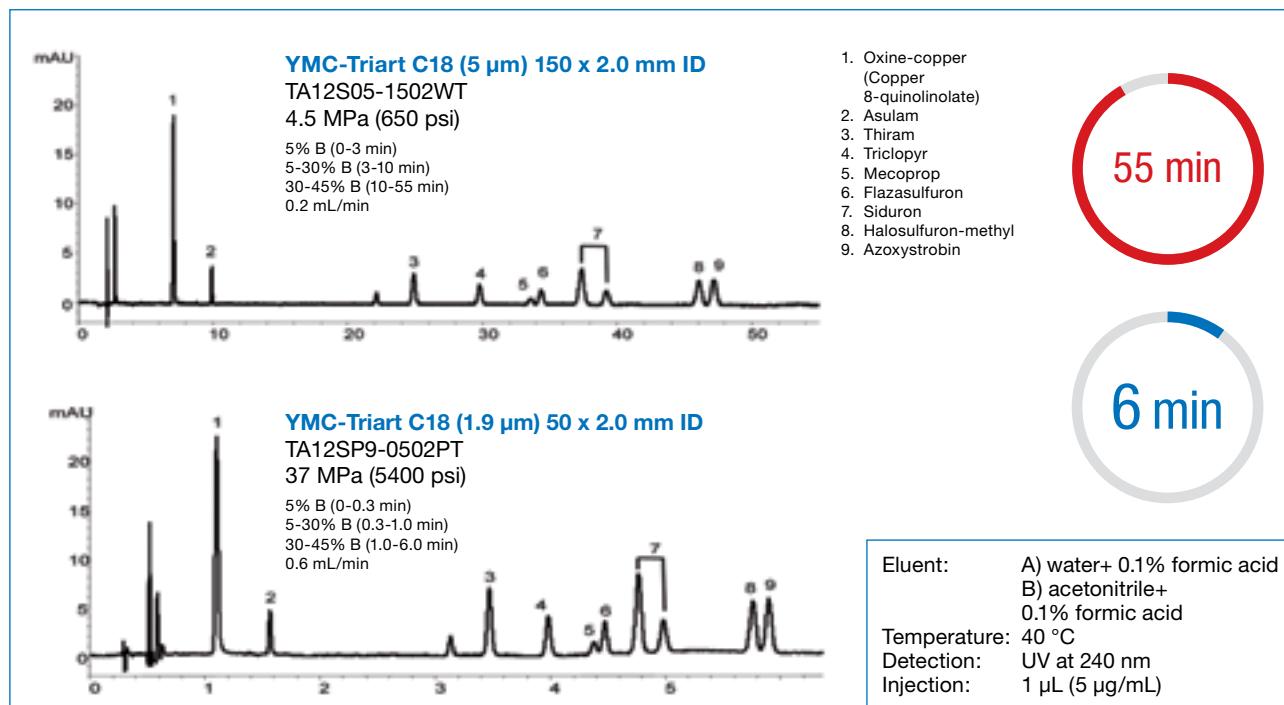
Transfer HPLC↔UHPLC

Evaluation of method transfer performance!



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

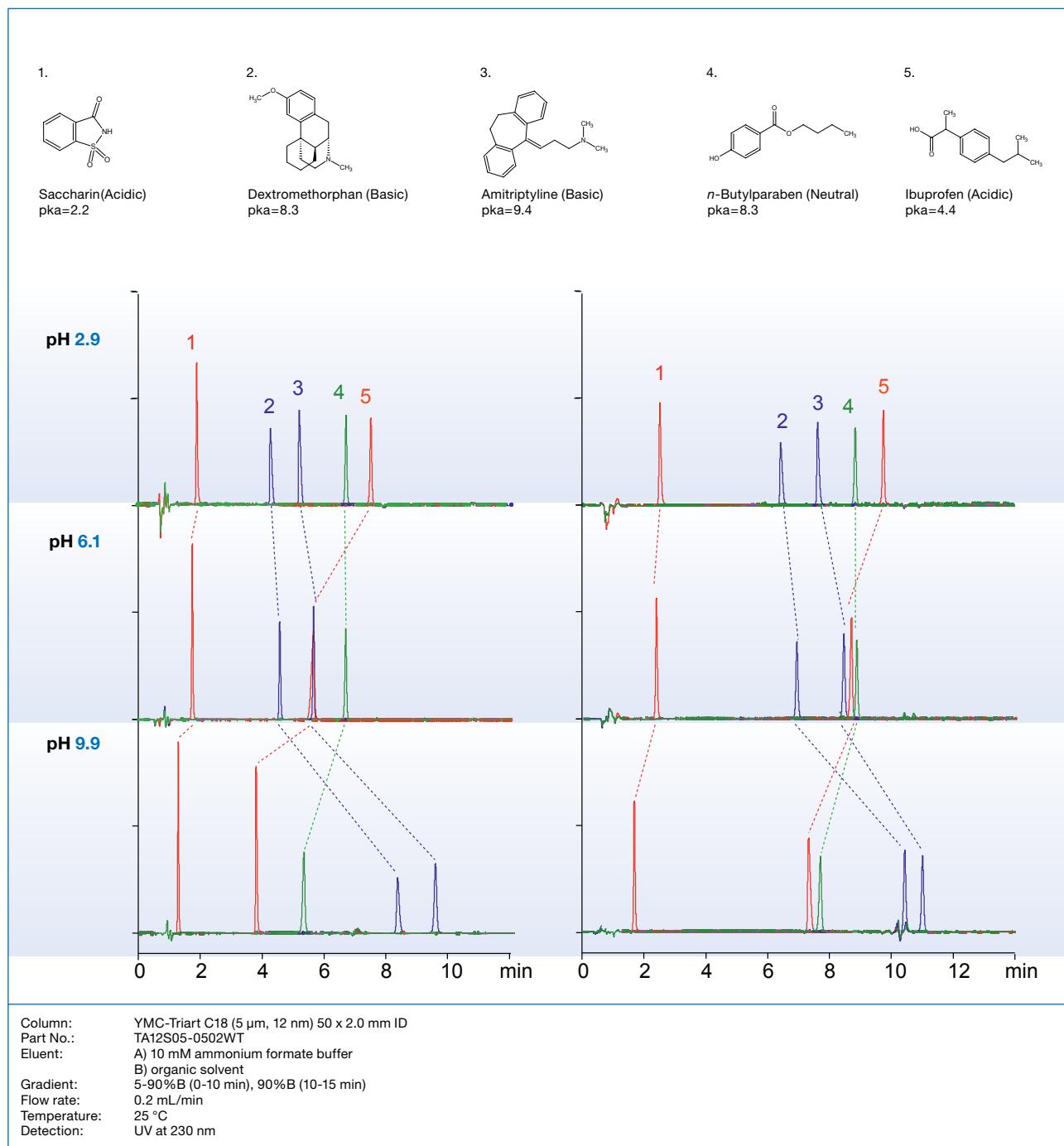
Method transfer HPLC↔UHPLC



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

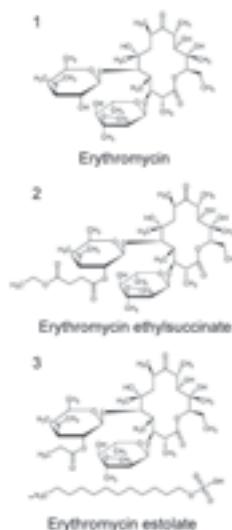
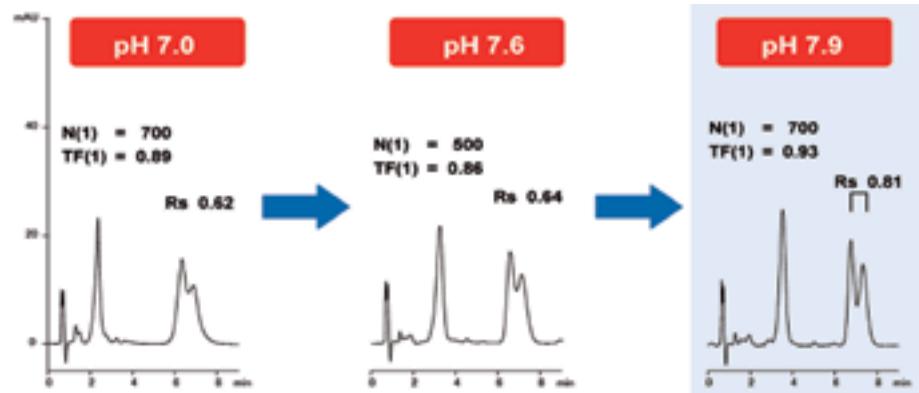


In reversed phase HPLC, pH and organic solvent are the most important factors to control retention and selectivity. YMC-Triart C18 with its wide range of usable pH offers significant advantage in selection of mobile phase conditions. YMC-Triart C18 delivers symmetrical peak shapes for all types of compounds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

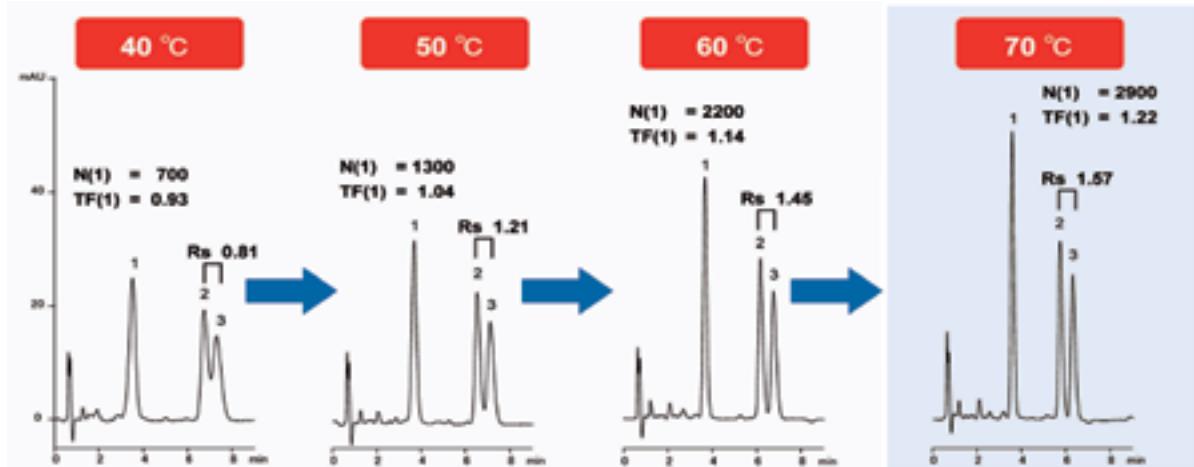
Temperature flexibility

Erythromycin at elevated pH and temperature

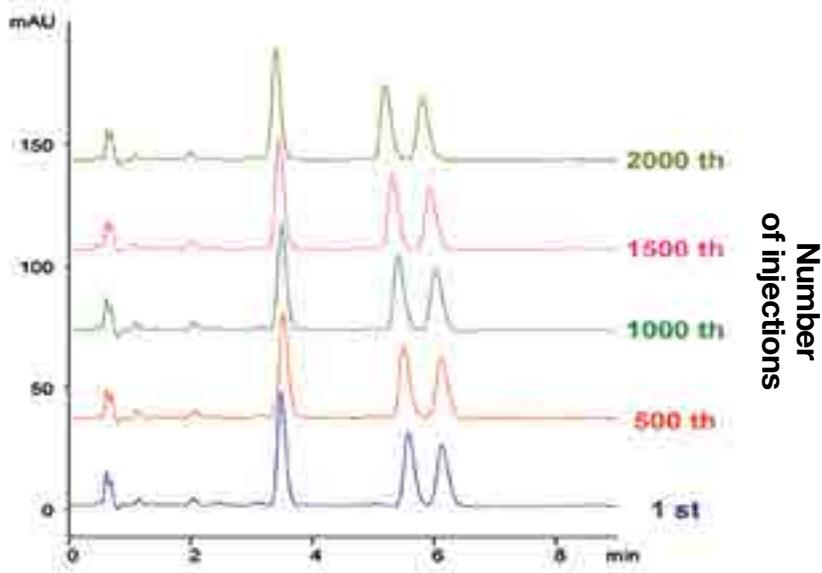
1. Optimisation of pH



2. Optimisation of temperature (pH 7.9)



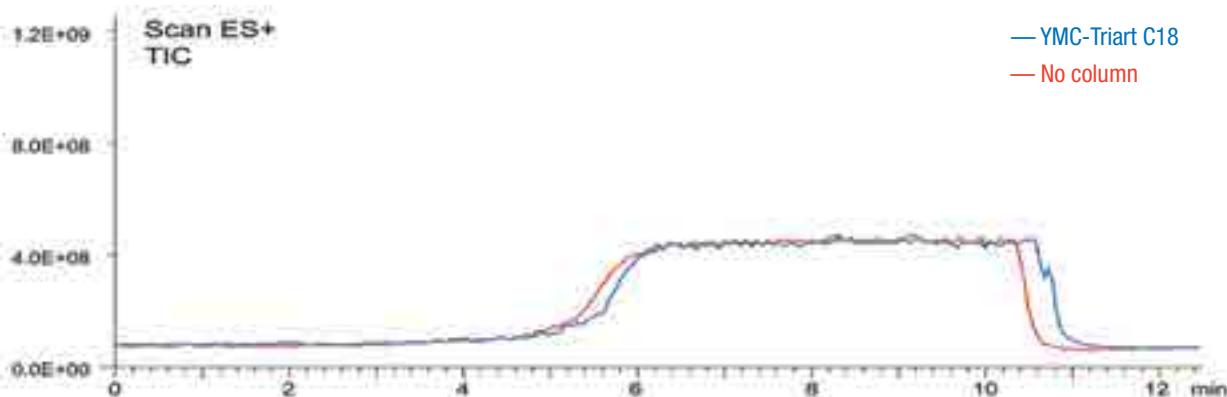
3. Stability test: pH 7.9, 70 °C



Column: YMC-Triart C18 (3 μ m, 12 nm)
50 x 2.0 mm ID
Part No.: TA12S03-0502WT
Eluent: 20 mM KH₂PO₄-K₂HPO₄ / acetonitrile / methanol (40/45/15)
Flow rate: 0.2 mL/min
Detection: UV at 210 nm

LC / MS

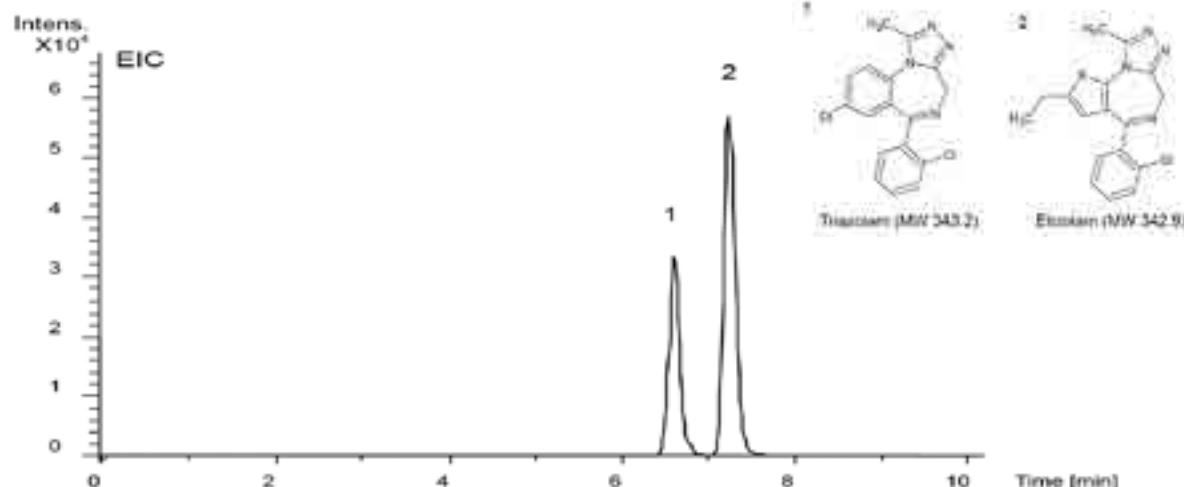
LC / MS compatibility



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 derivates



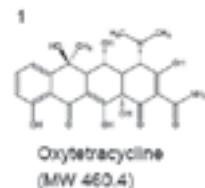
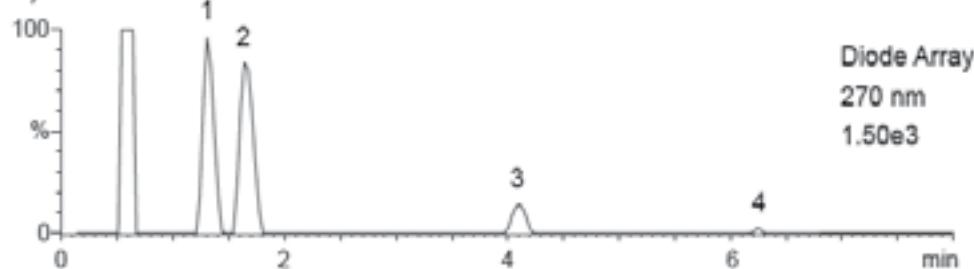
Column: YMC-Triart C18 (5 μ m, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12S05-0502WT
 Eluent:
 A) 10 mM formic acid
 B) acetonitrile
 Gradient: 25-50% B (0-10 min)
 Flow rate: 0.2 mL/min
 Temperature: 40 °C
 Detection: Bruker Daltonics microTOF, ESI,
 positive mode
 Injection: 5 μ L (100 ng/mL)

Courtesy of J. Watanabe, Bruker Daltonics K. K., Application Data by courtesy YMC Co., Ltd.

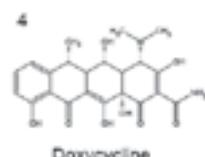
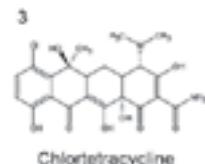
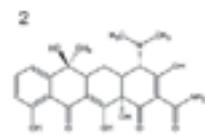
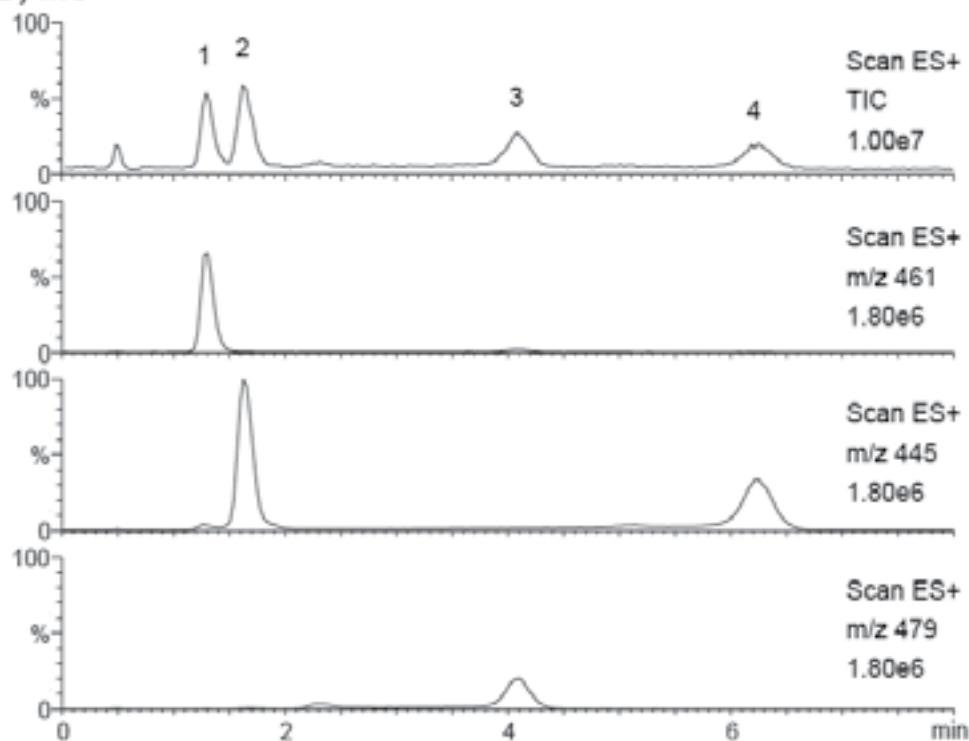
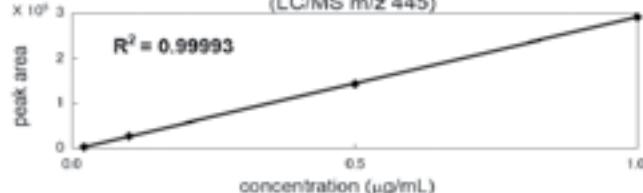
LC / MS

LC / MS analysis of tetracycline antibiotics

A) UV



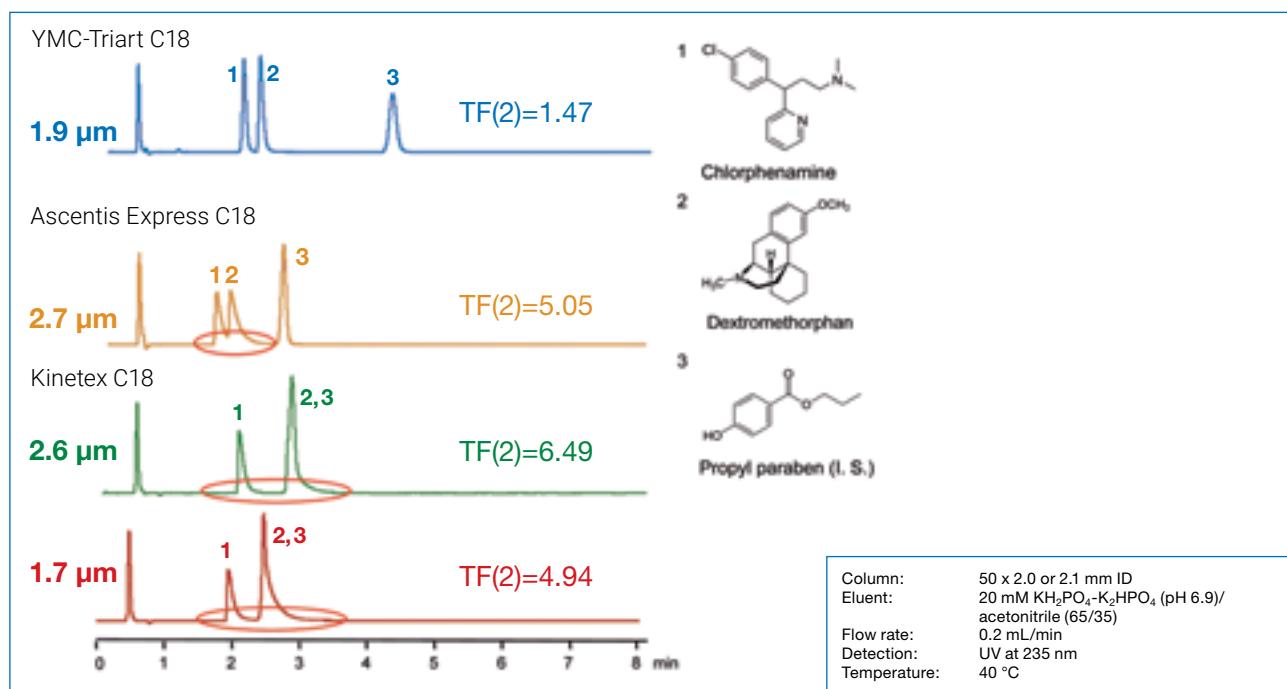
B) MS

Calibration curve of tetracycline
(LC/MS m/z 445)

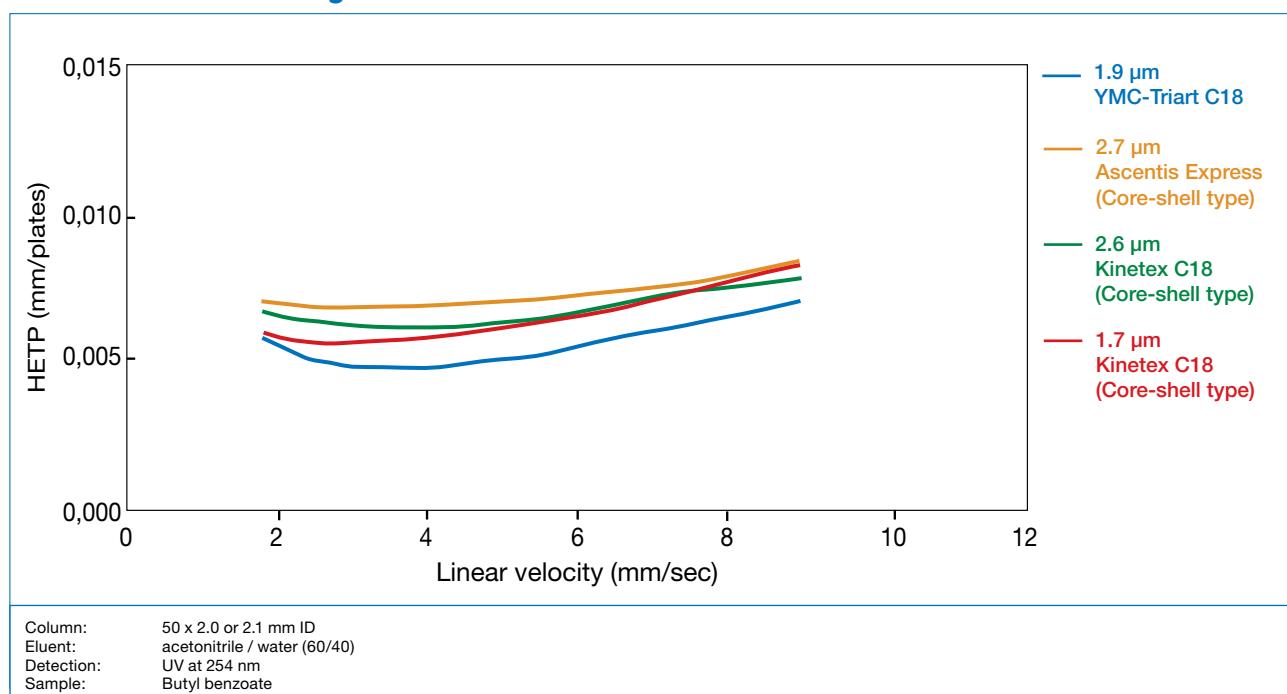
Column:	YMC-Triart C18 (5 μm , 12 nm) 50 x 2.0 mm ID
Part No.:	TA12S05-0502WT
Eluent:	acetonitrile / water / formic acid (15/85/0.1)
Flow rate:	0.4 mL/min
Temperature:	40 °C
Detection:	A) UV at 270 nm B) ESI positive-mode
Injection:	10 μL (1 $\mu\text{g}/\text{mL}$)

Highest resolution in UHPLC

Higher resolution and good loadability



Lower HETP means higher resolution!

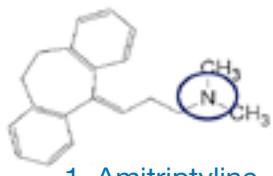


YMC-Triart C18 always shows the lowest HETP compared to the three Core-Shell products over the range of linear velocity applied.

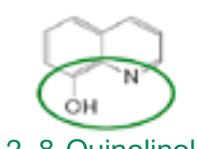
Pharmaceuticals – YMC-Triart C18 ExRS

High hydrophobicity & high steric recognition ability

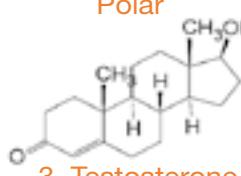
Basic Compound



Coordination Compound



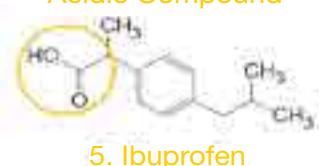
Neutral Compounds Polar



π - π interaction



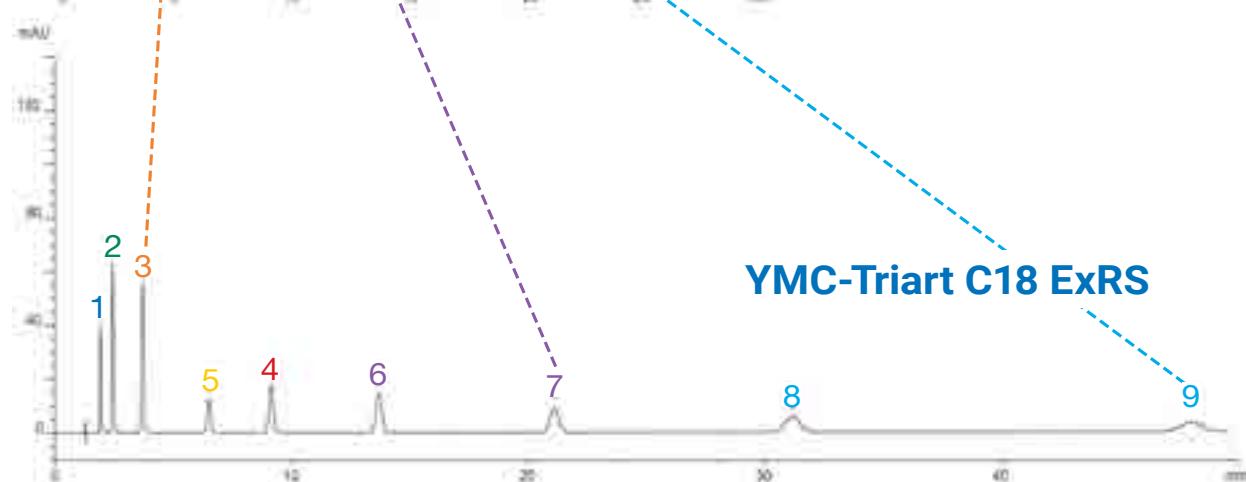
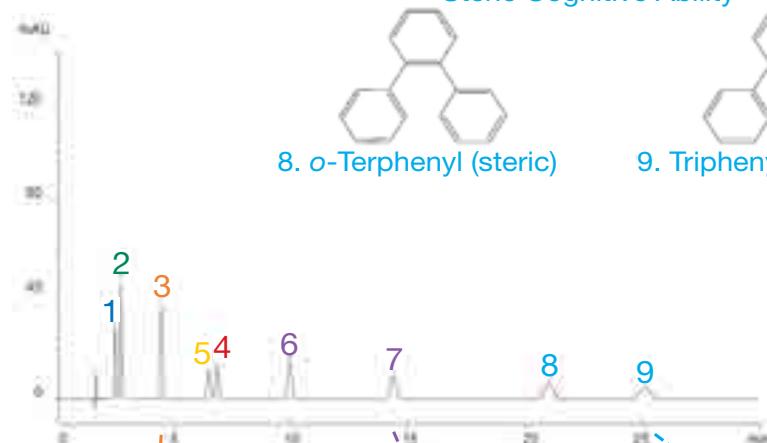
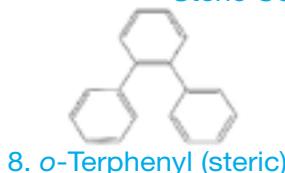
Acidic Compound



Hydrophobic



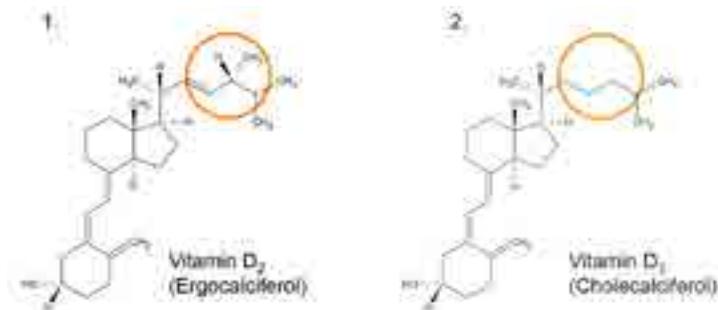
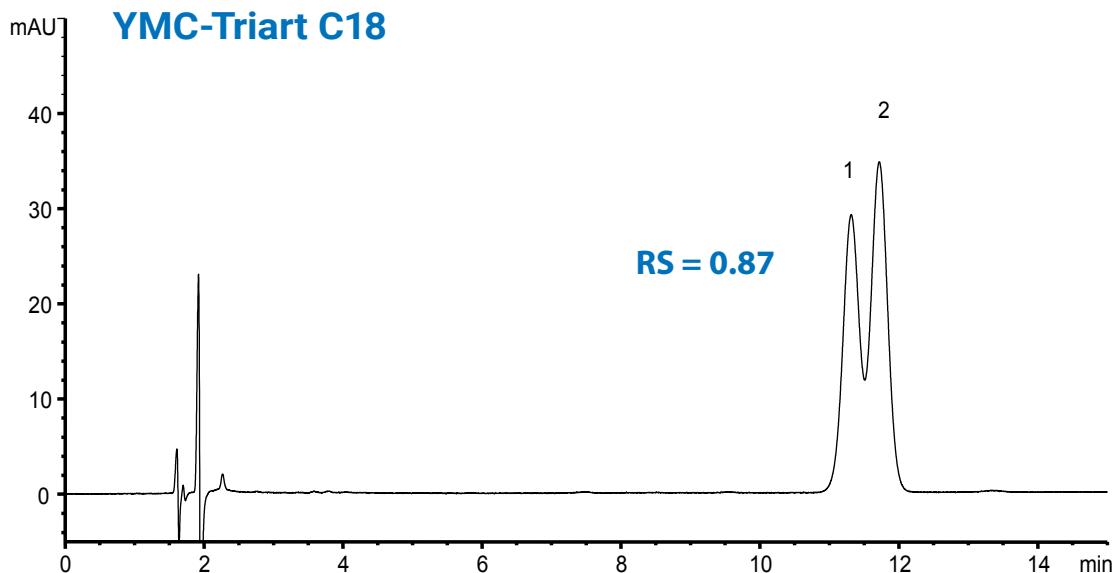
Steric Cognitive Ability



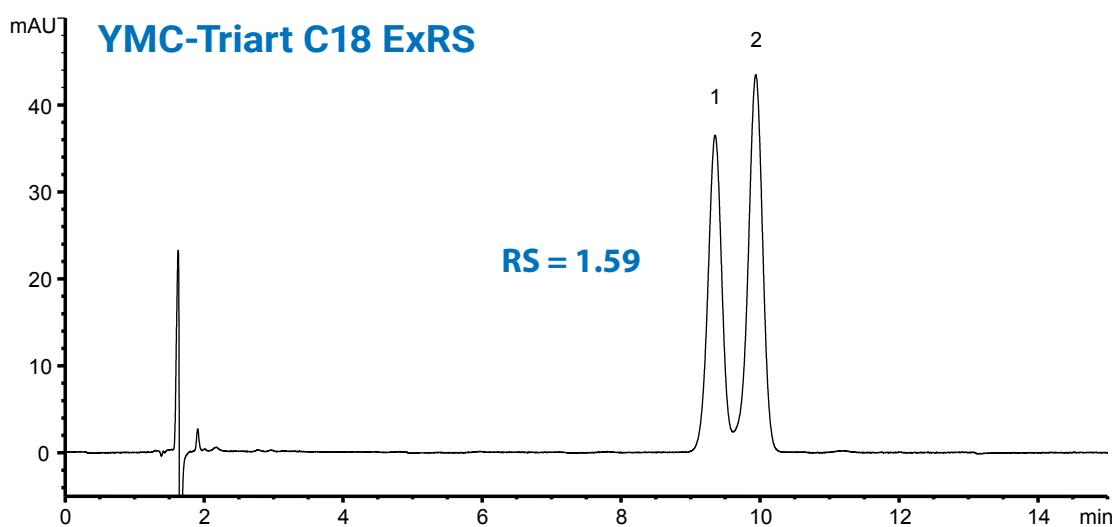
Column:	5 μ m, 150 x 3.0 ID
Part Nos.:	TA12S05-1503PTH / TAR08S05-1503PTH
Eluent:	20 mM HCOOH-HCOONH ₄ (pH 4.3) / acetonitrile (90/10)
Flow rate:	1.0 mL/min
Detection:	UV at 254 nm
Injection:	2 μ L (10 μ g/mL)
Temperature:	25 °C

Pharmaceuticals – YMC-Triart C18 ExRS

Structural analogs



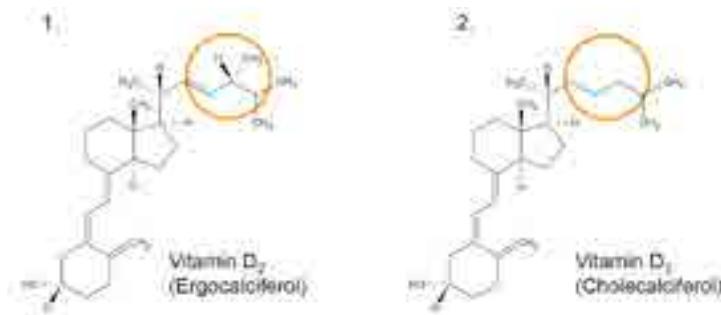
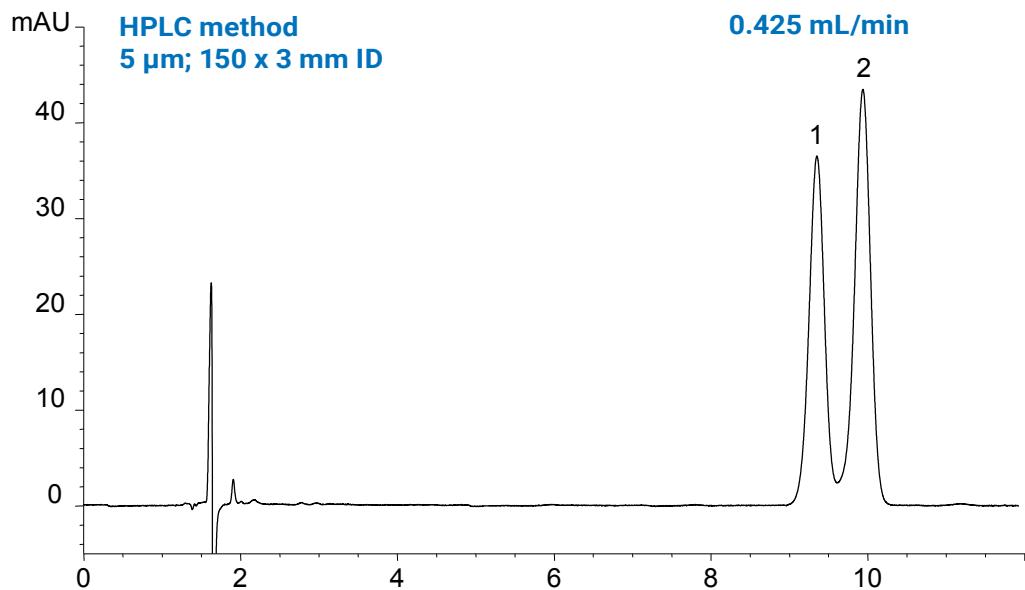
Higher Resolution



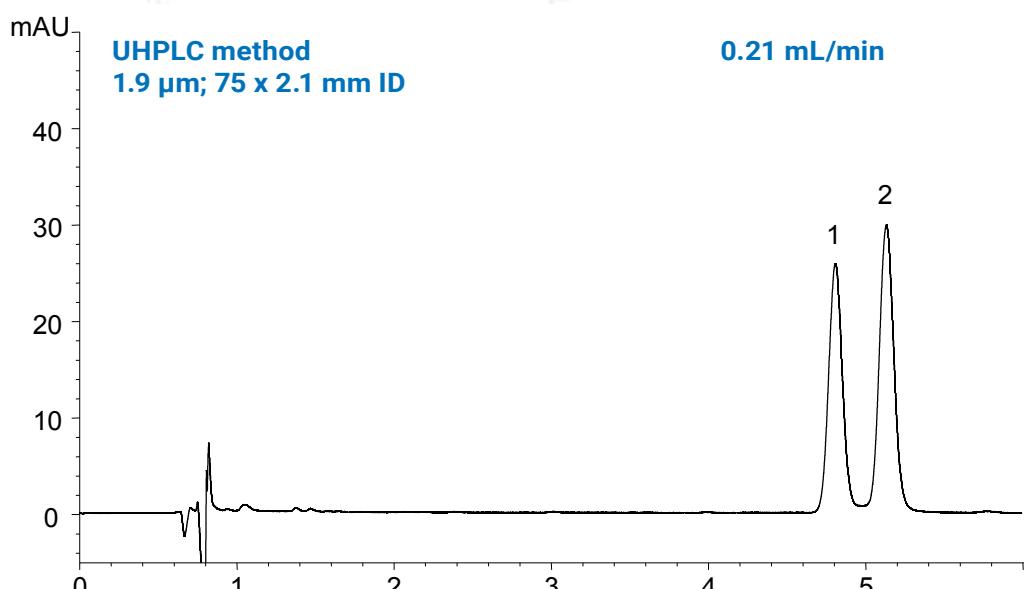
Column:	5 µm, 150 x 3.0 mm ID
Part No.:	TA12S05-1503PTH / TAR08S03-1503PTH
Eluent:	THF / acetonitrile (10/90)
Flow rate:	0.425 mL/min
Detection:	UV at 265 nm
Injection:	4.25 µL (10 µg/mL)
Temperature:	30 °C

Pharmaceuticals – YMC-Triart C18 ExRS

Easy transfer HPLC UHPLC



-50%

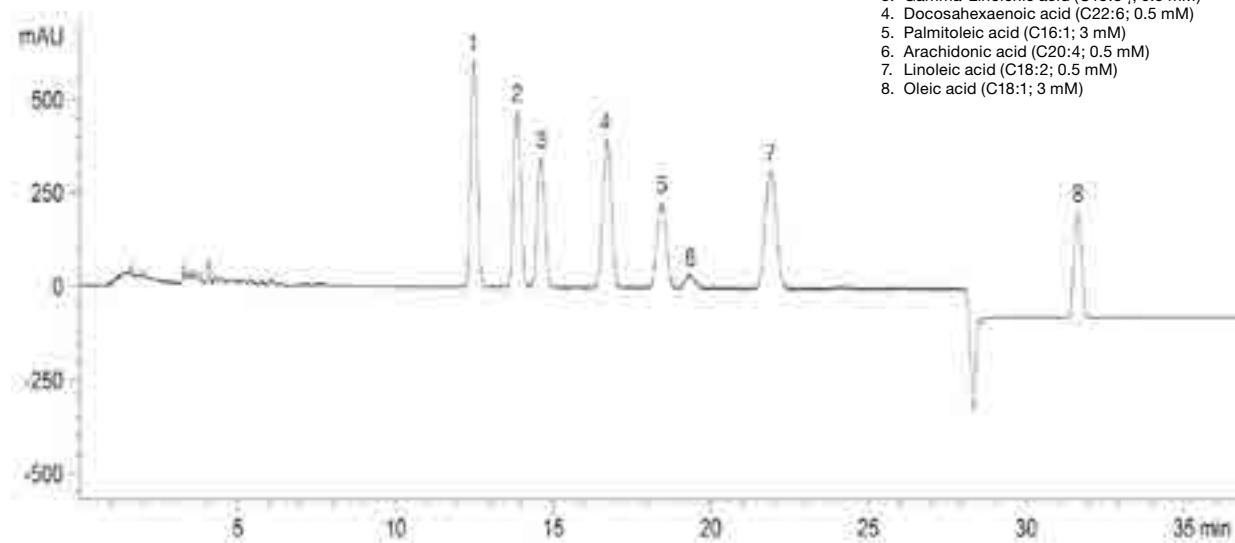


6 min

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

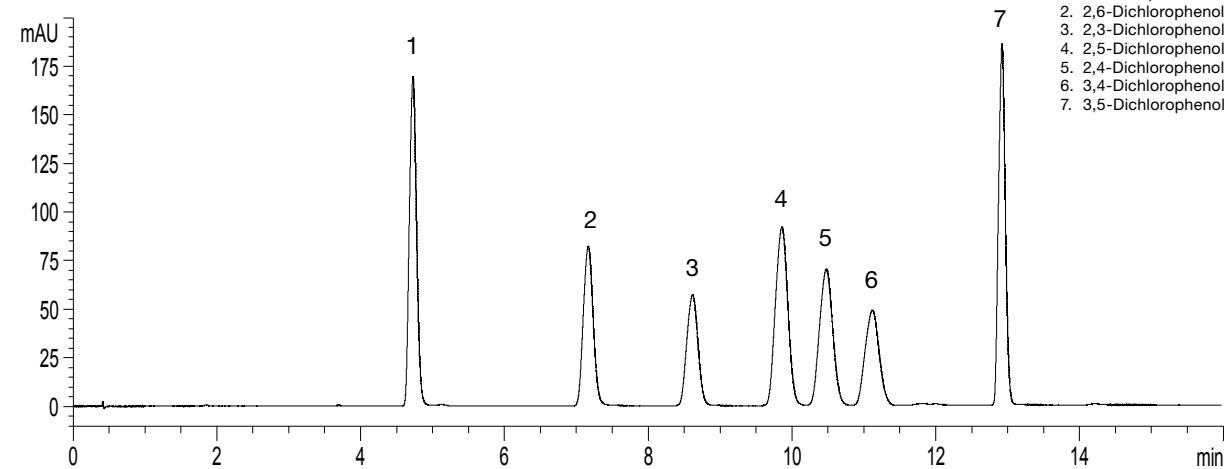
Pharmaceuticals – YMC-Triart C18 ExRS

Omega fatty acid isomers



Column: YMC-Triart C18 ExRS (3 μ m, 8 nm) 150 \times 4.6 mm ID
 Part No.: TAR08S03-1546PTH
 Eluent: A) H₂O + 0.5 % H₃CCOOH
 B) ACN + 0.5 % H₃CCOOH
 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 °C
 Detection: UV at 254 nm
 Injection: 20 μ L

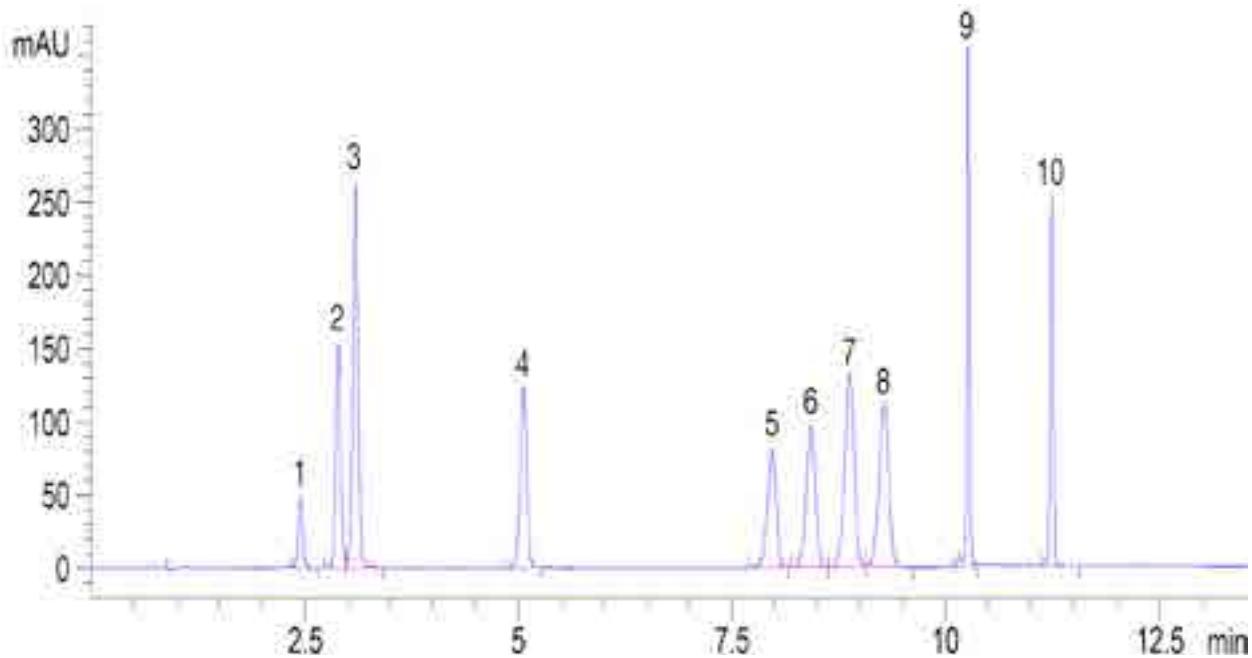
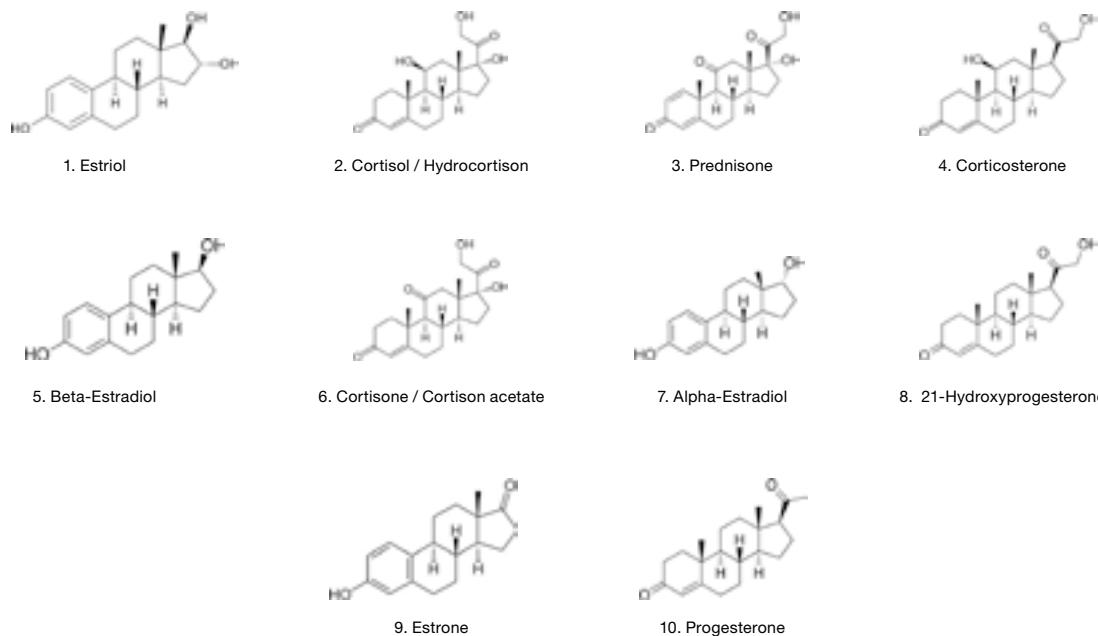
Outstanding steric selectivity for chlorophenols



Column: YMC-Triart C18 ExRS (1.9 μ m, 8 nm) 75 \times 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 °C

Pharmaceuticals – YMC-Triart Phenyl

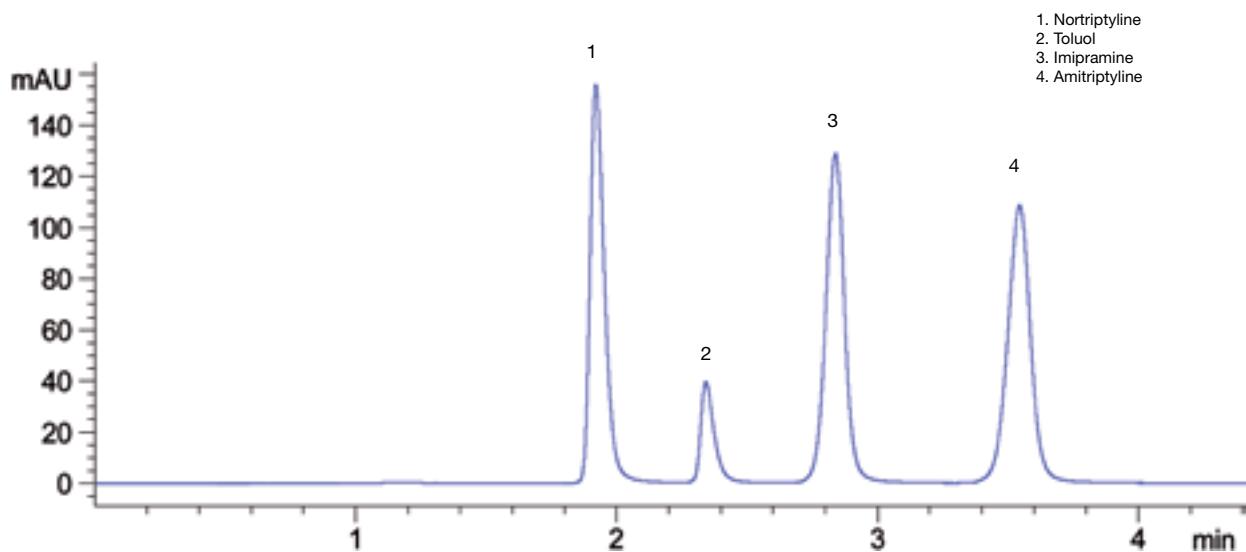
Excellent alternative to C18 phases for steroids



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 °C

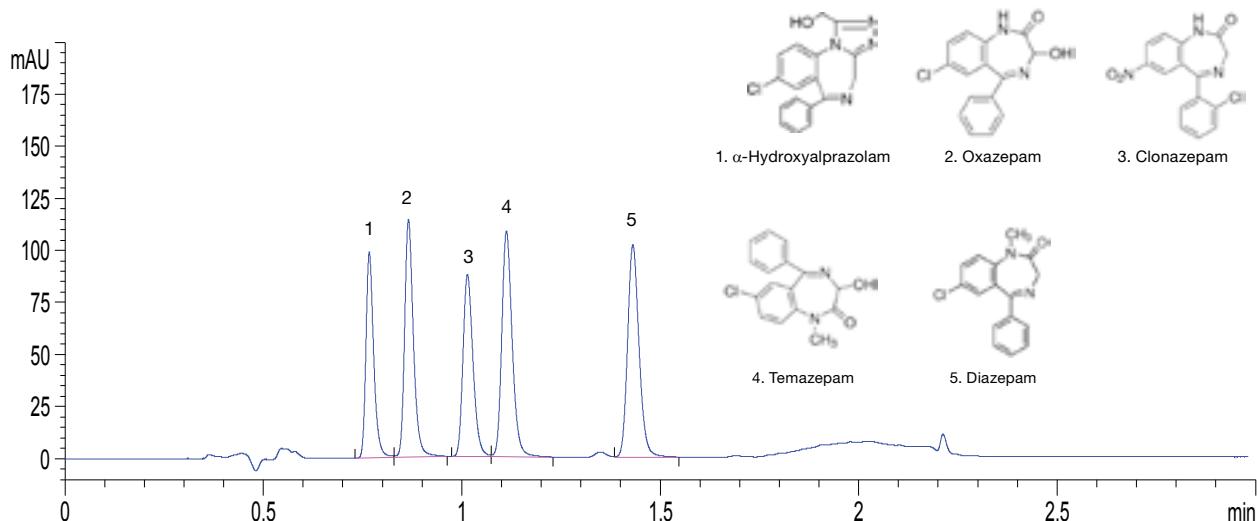
Pharmaceuticals – YMC-Triart Phenyl

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 KH₂PO₄ (pH 6.0) (65/35)
 Flow rate: 0.4 mL/min
 Detection: UV at 254 nm
 Injection: 2 μ L
 Temperature: 25 °C

UHPLC separation of different benzodiazepines



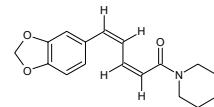
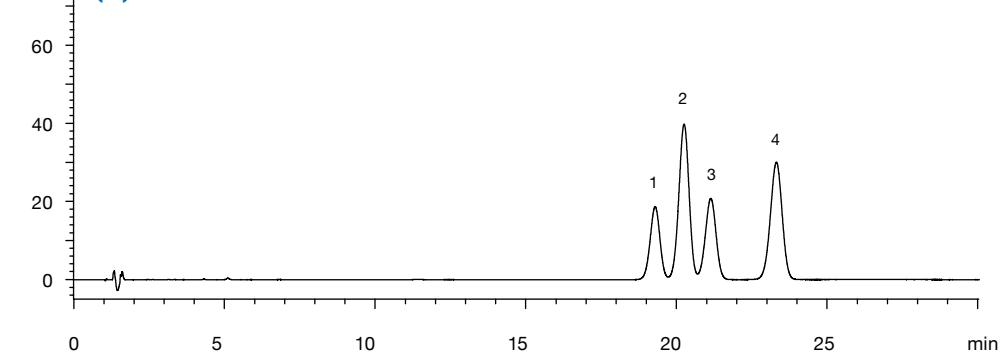
Column: YMC-Triart Phenyl (1.9 μ m, 12 nm) 100 x 2.0 mm ID
 Part No.: TPH12SP9-1002PT
 Eluent: A) water B) acetonitrile
 Gradient: 52-54% B (0-1.1 min), 54-95% B (1.1-1.2 min), 95% B (1.2-3 min)
 Flow rate: 0.5 mL/min
 Detection: UV at 254 nm
 Injection: 2 μ L (0.02 mg/mL)
 Temperature: 35 °C

Pharmaceuticals – YMC-Triart PFP

Piperine and its isomers*

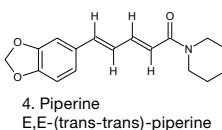
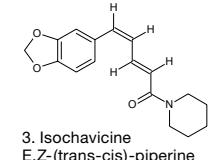
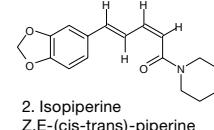
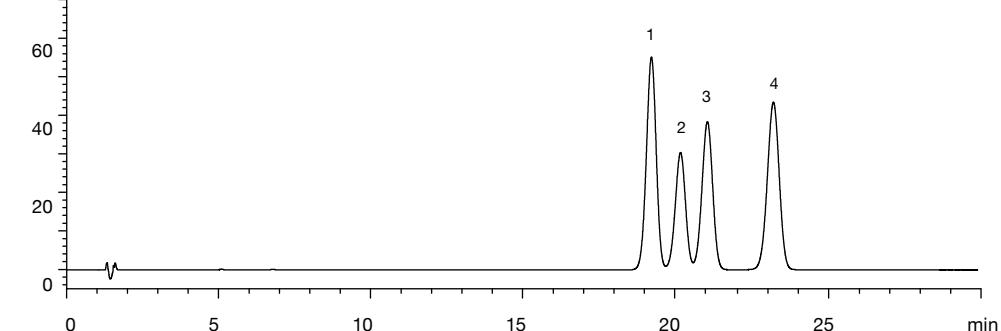
mAU

(A) UV at 208 nm



mAU

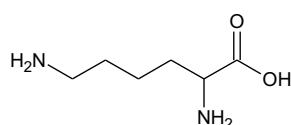
(B) UV at 340 nm



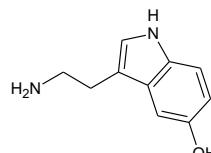
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 3.0 mm ID
 Part No.: TPF12S05-1503PTH
 Eluent: 0.1% HCOOH / acetonitrile (60/40)
 Flow rate: 0.425 mL/min
 Injection: 4.25 μ L
 Temperature: 25 °C

Pharmaceuticals – YMC-Triart PFP

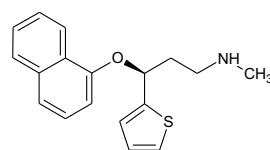
Retention of basic compounds with various hydrophobicity on PFP column



Lysine (Lys)

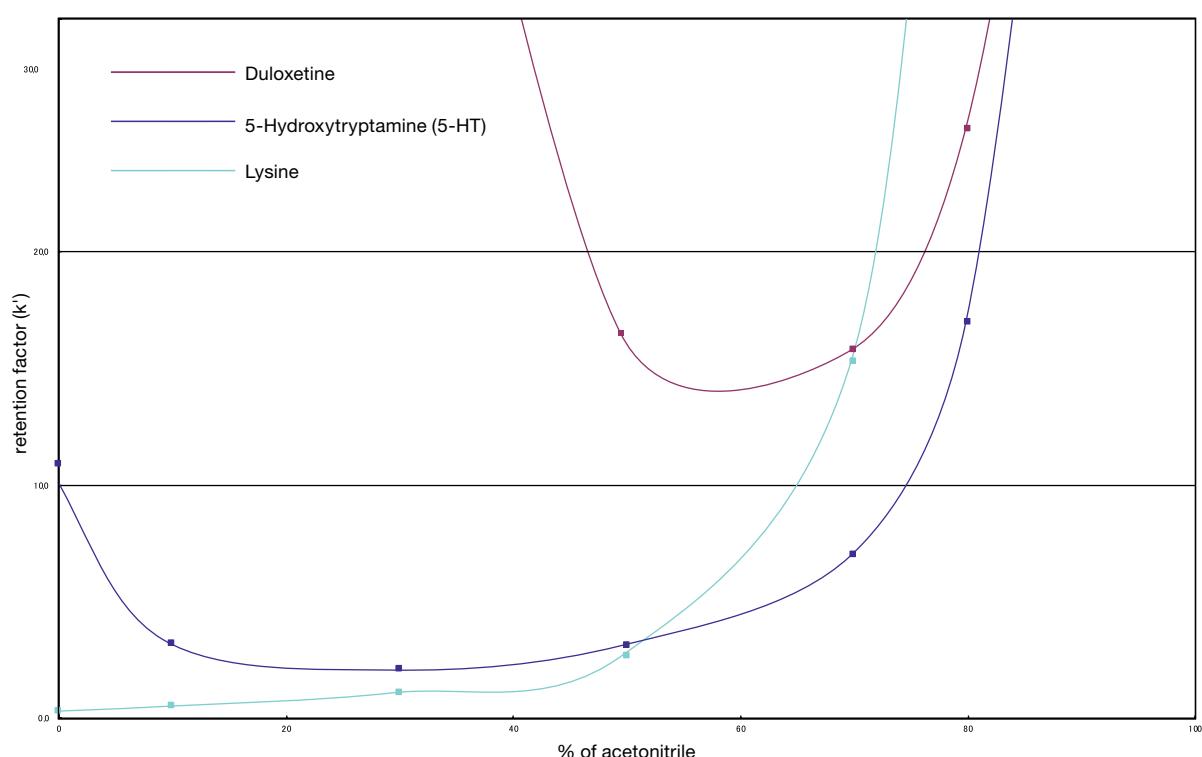


5-Hydroxytryptamine (5-HT)



Duloxetine

Hydrophobicity →



Column: YMC-Triart PFP (5 µm, 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%:

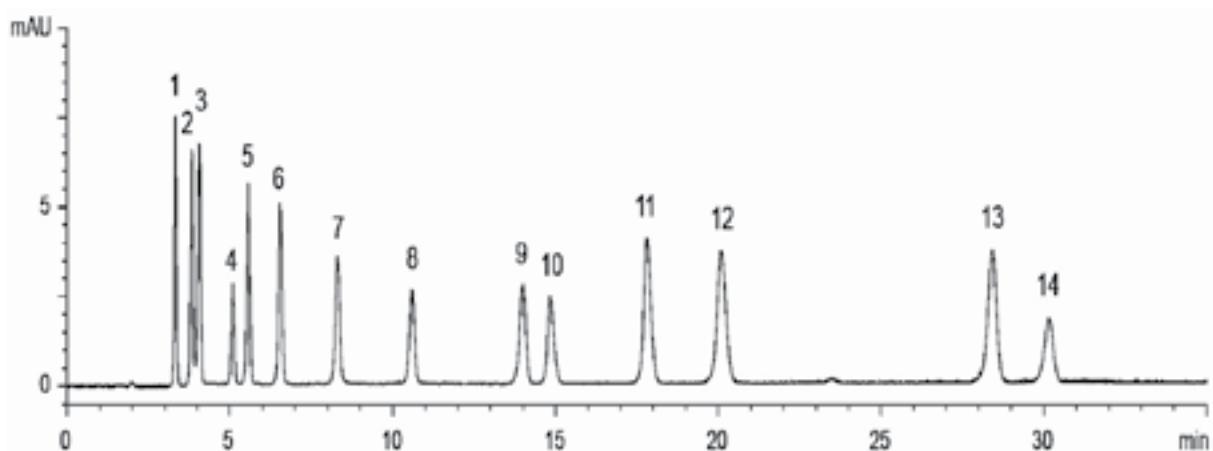
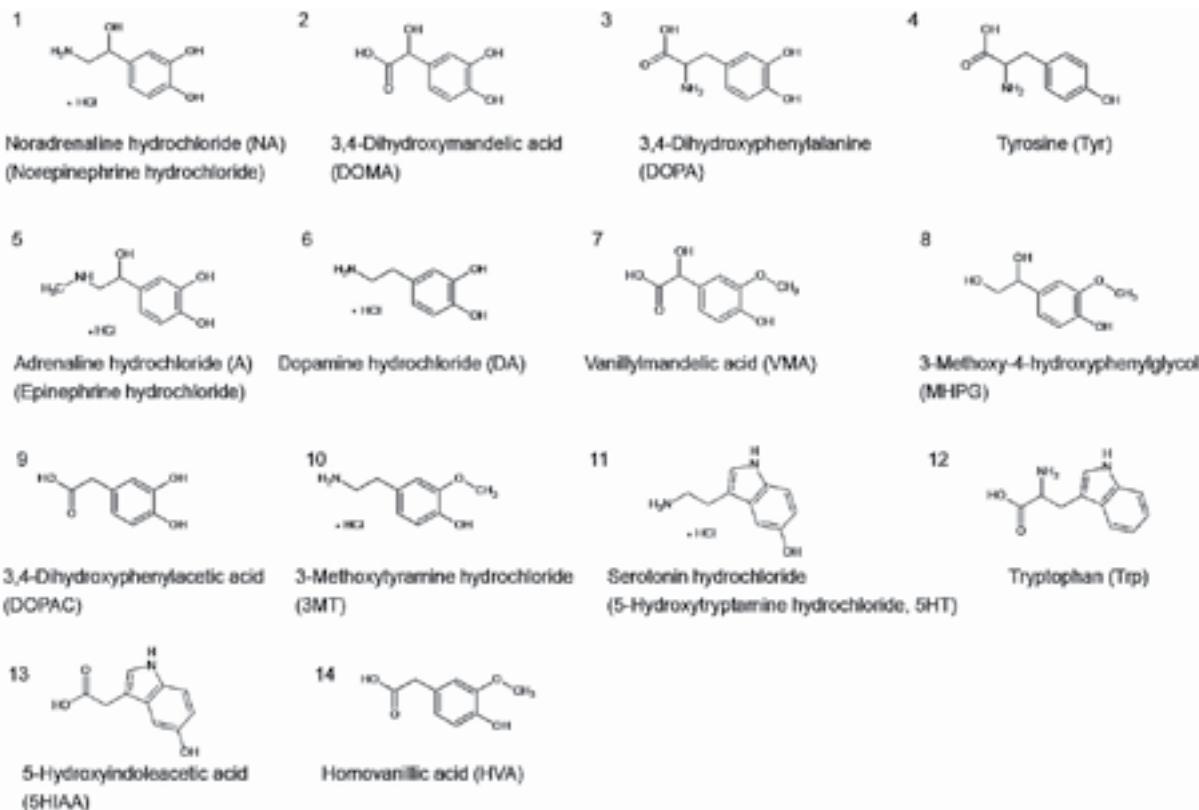
It can be eluted.

Acetonitrile composition 80-100%:

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

Pharmaceuticals – YMC-Triart PFP

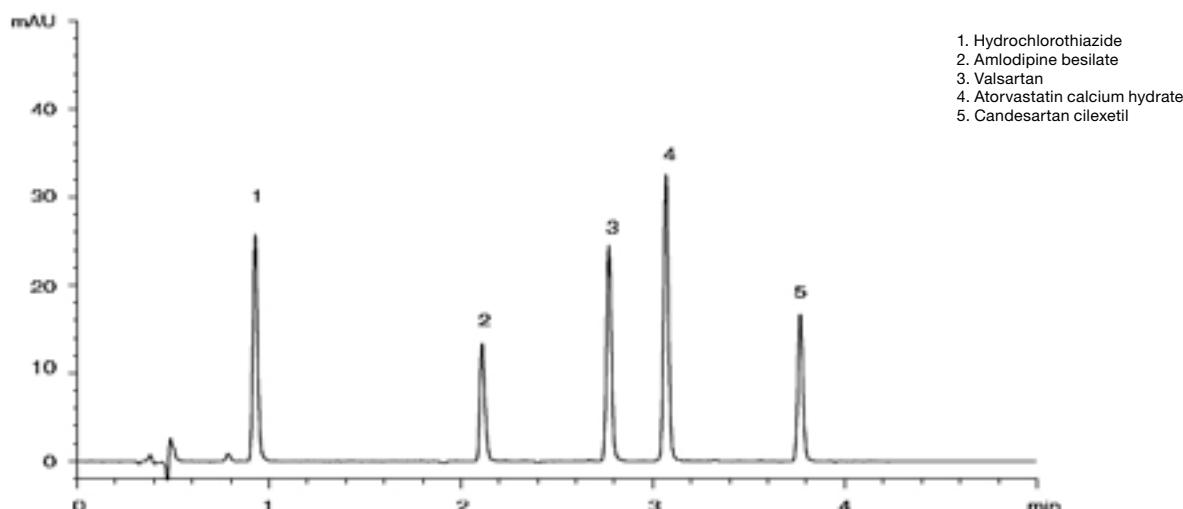
Catecholamines, serotonin, and their precursors and metabolites



Column:	YMC-Triart PFP (3 µm, 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 µL (5 µg/mL)
Temperature:	25 °C

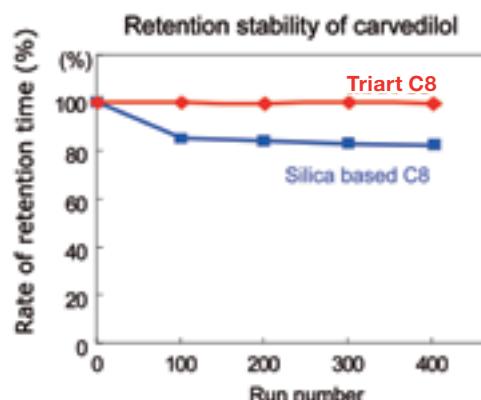
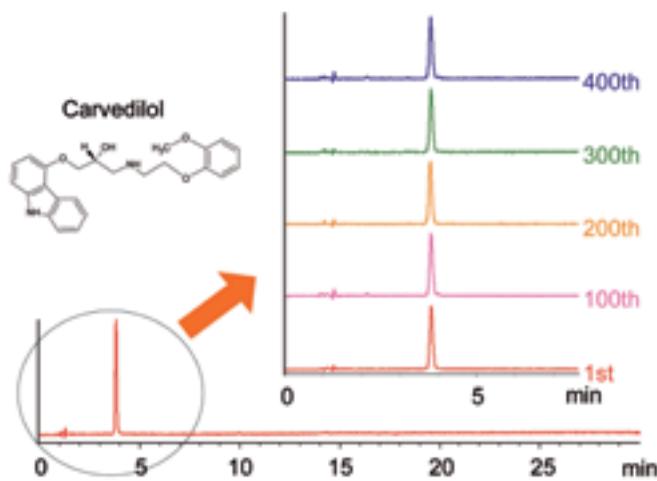
Pharmaceuticals – YMC-Triart C8

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

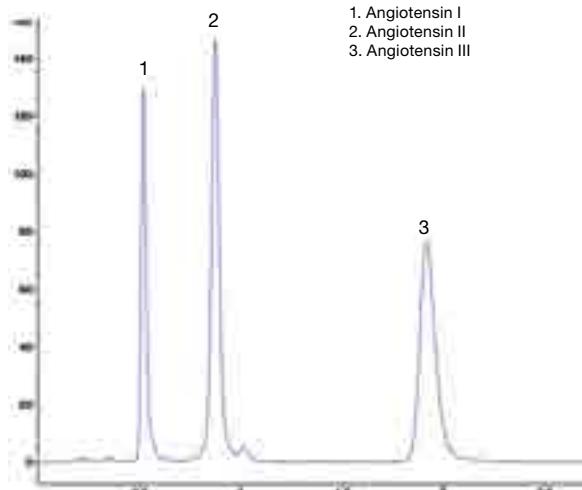


Column: YMC-Triart C8 (5 μ m, 12mm) 150 x 2.0 mm ID
Part No.: TO12S05-1502WT
Eluent: phosphate buffer (pH 2.0)* / acetonitrile (65/35)
*Dissolve 2.72 g of KH₂PO₄ in 900 mL water, adjust pH 2.0 with H₃PO₄ and add water to make 1000 mL
Flow rate: 0.28 mL/min (adjust the flow rate so that the retention 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.

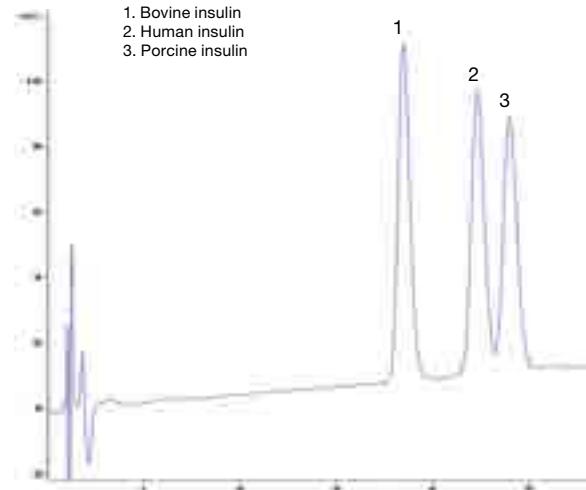
Pharmaceuticals – UHPLC

Angiotensin I, II and III



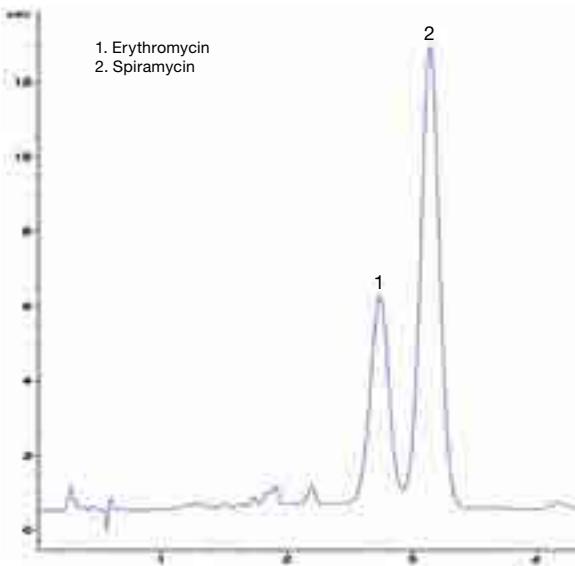
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: 20 mM KH_2PO_4 + K₂HPO₄ (pH 7.9) / acetonitrile (22/78)
Flow rate: 0.7 mL/min
Detection: UV at 220 nm
Pressure: 720 bar
Injection: 0.5 μ L
Temperature: 40 °C

Insulin



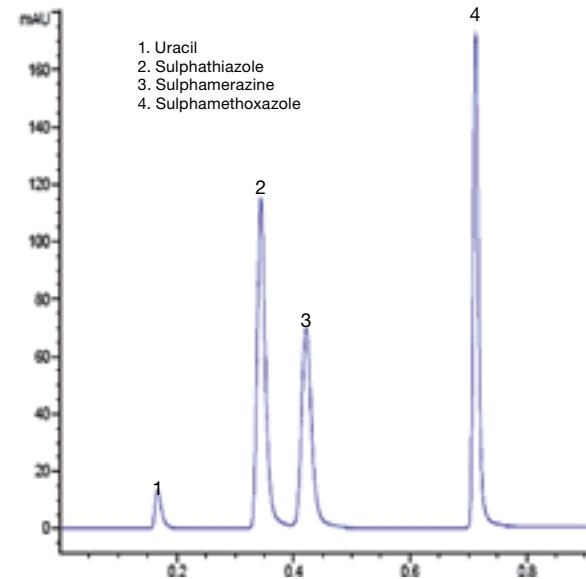
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: A) H_2O + 0.1% TFA
B) acetonitrile + 0.1% TFA
Gradient: 30% B (0 min); 30-32% B (0-5 min); 32% B (55 min)
Flow rate: 0.6 mL/min
Detection: UV at 220 nm
Pressure: 611 bar
Injection: 0.5 μ L
Temperature: 30 °C

Macrolide antibiotics



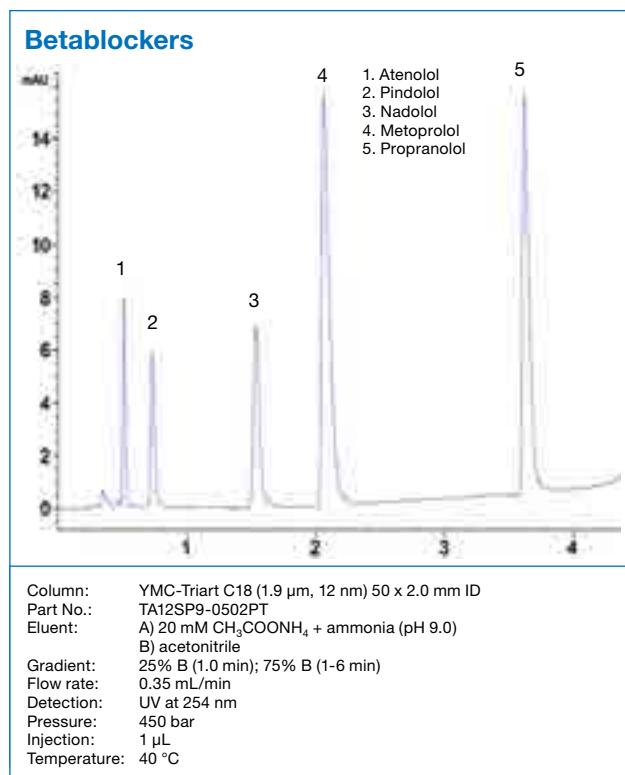
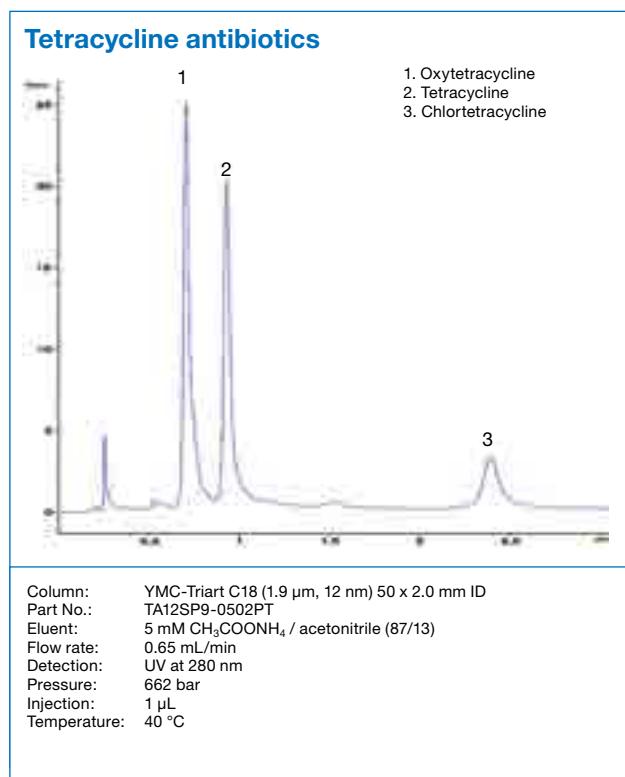
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: A) 20 mM K₂HPO₄ + 20 mM KH₂PO₄ (pH 7.9)
B) acetonitrile
Gradient: 60% B (0.5 min); 60-70% B (0.5-1.5 min); 70% B (3.5 min)
Flow rate: 0.45 mL/min
Detection: UV at 210 nm
Pressure: 520 bar
Injection: 1 μ L
Temperature: 50 °C

Sulpha drugs



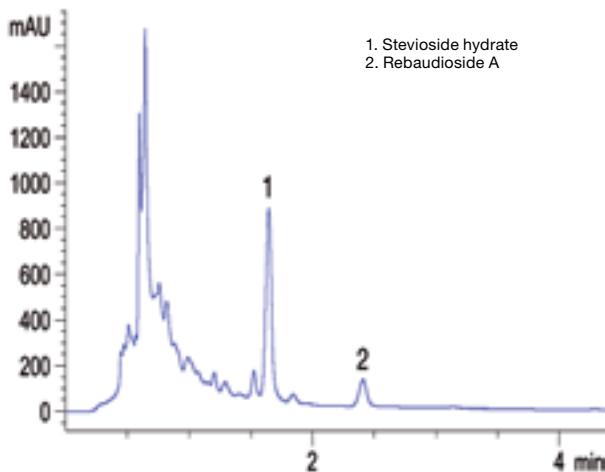
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: H_2O + formic acid (pH 2.5) / acetonitrile (75/25)
Flow rate: 0.75 mL/min
Detection: UV at 280 nm
Pressure: 740 bar
Injection: 0.5 μ L
Temperature: 50 °C

Pharmaceuticals – UHPLC



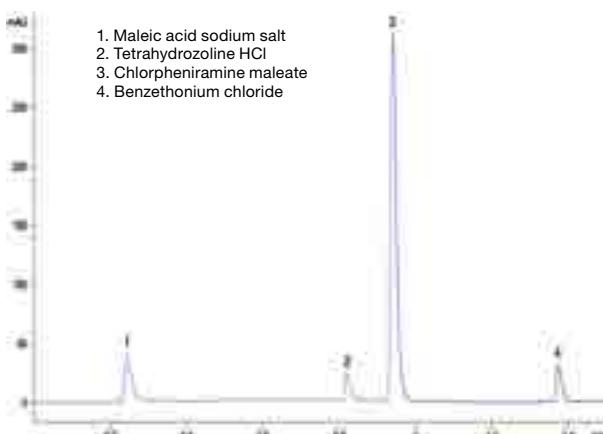
Pharmaceuticals – UHPLC

Stevia leaves



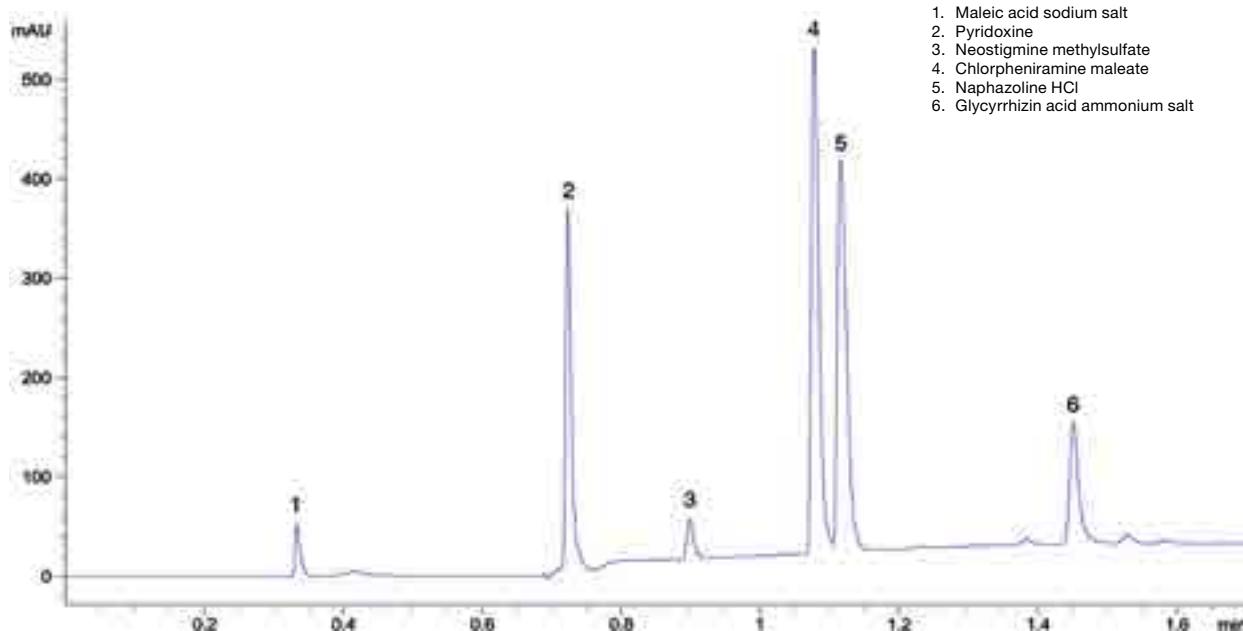
Column: YMC-Triart Diol-HILIC (1.9 μ m, 12 nm) 100 x 3.0 mm ID
Part No.: TDH12SP9-1003PT
Eluent: acetonitrile / water (85/15)
Flow rate: 1 mL/min
Detection: UV at 200 nm
Injection: 2 μ L
Temperature: 30 °C

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 °C

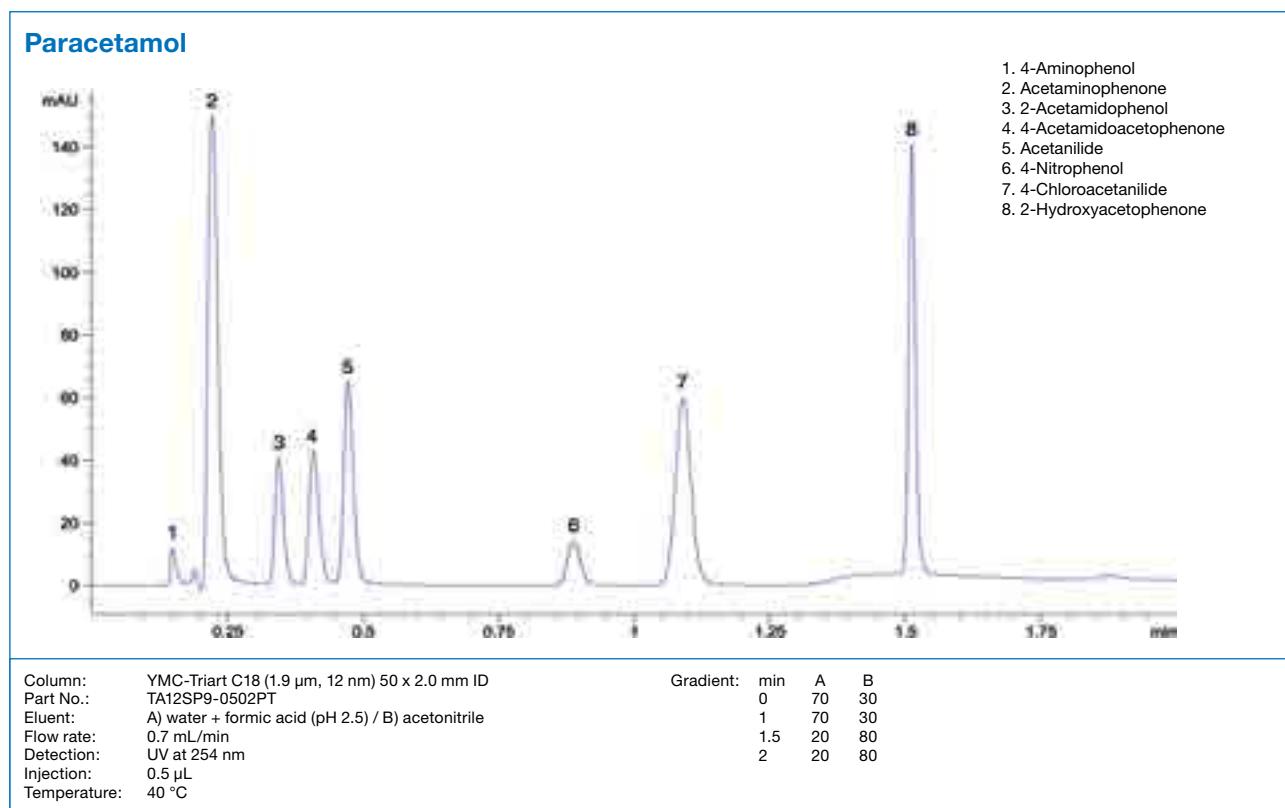
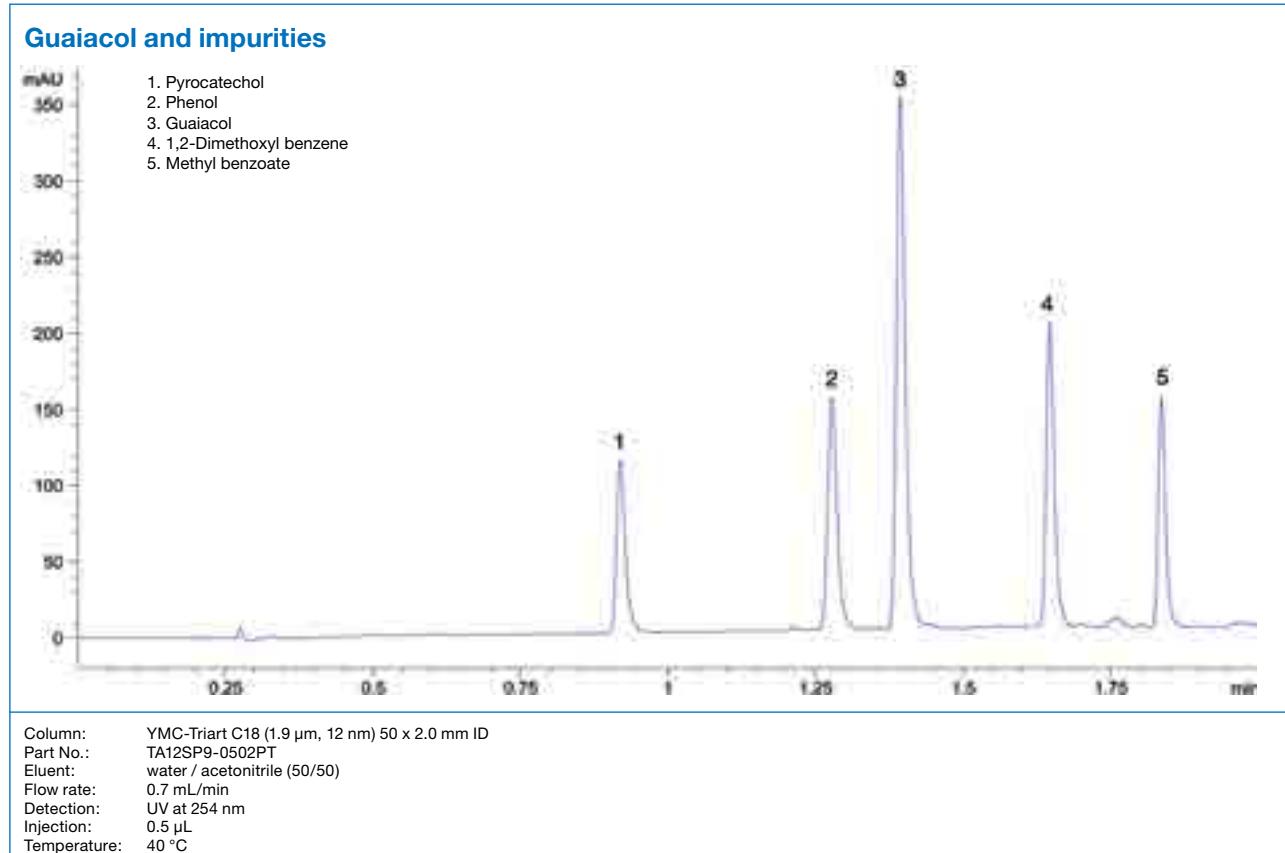
Eye drop formulation



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 °C

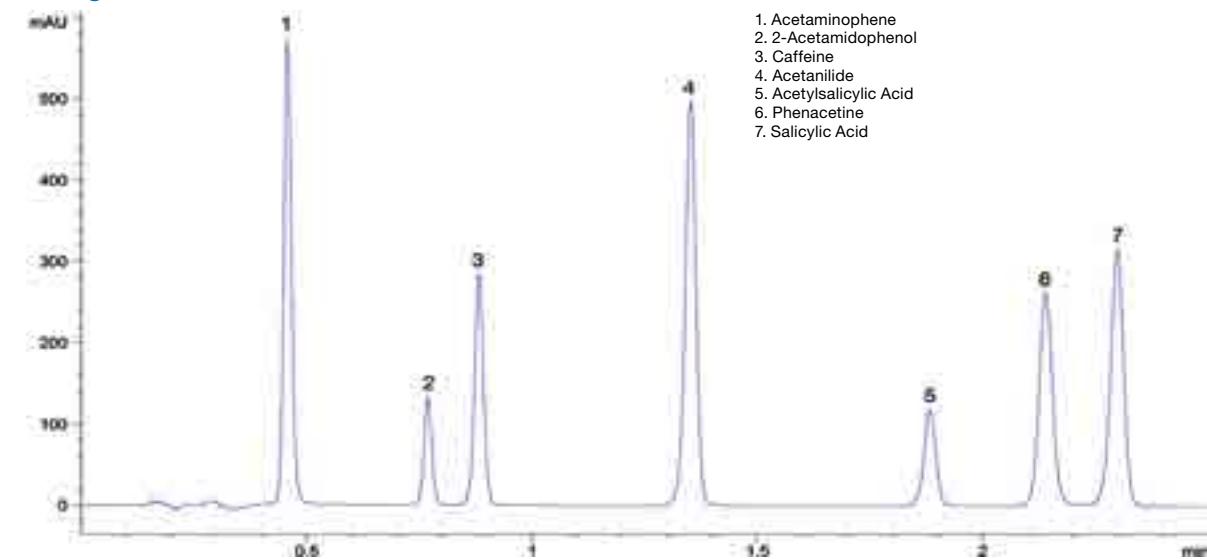
Gradient: min A B
0 100 0
1 50 50
1.5 50 50
1.7 10 90

Pharmaceuticals – UHPLC



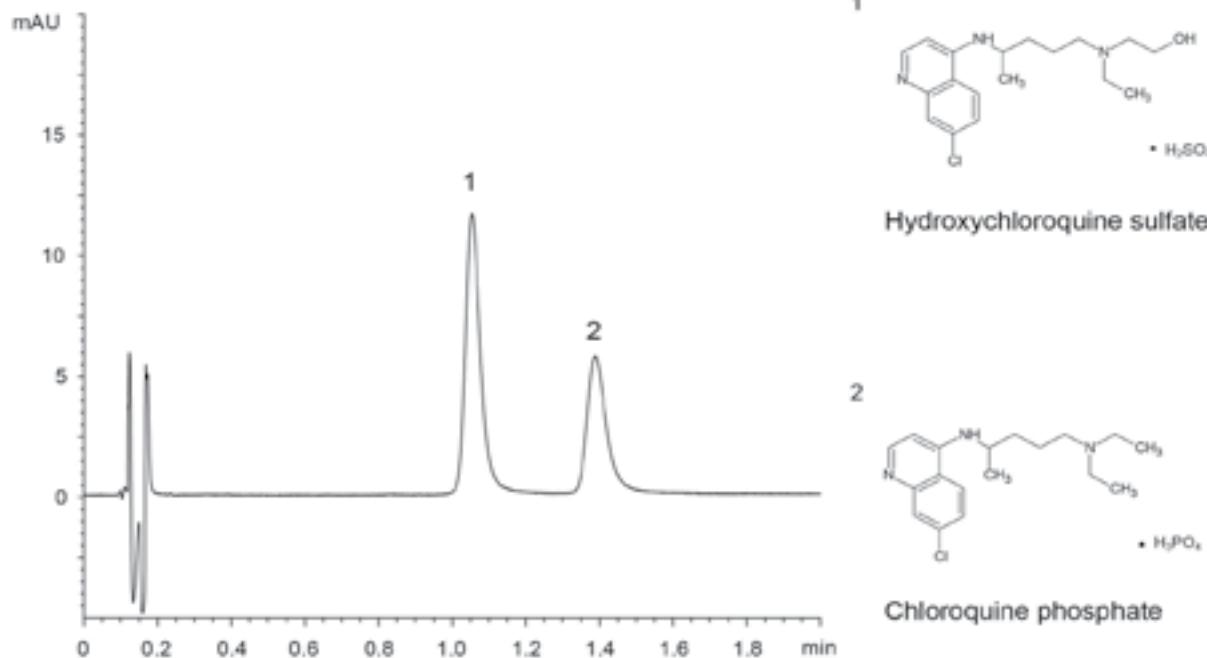
Pharmaceuticals – UHPLC

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 °C

Hydroxychloroquine and chloroquine

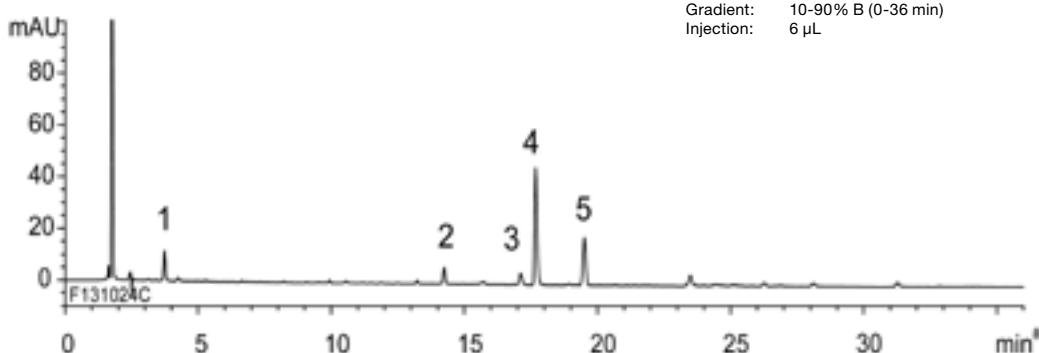


Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.0 mm ID
Part No.: TA12SP9-0502PT
Eluent: 20 mM HCOOH-HCOONH₄ (pH 4.3) / acetonitrile (90/10)
Flow rate: 1.0 mL/min
Detection: UV at 254 nm
Injection: 2 μ L (10 μ g/mL)
Temperature: 25 °C

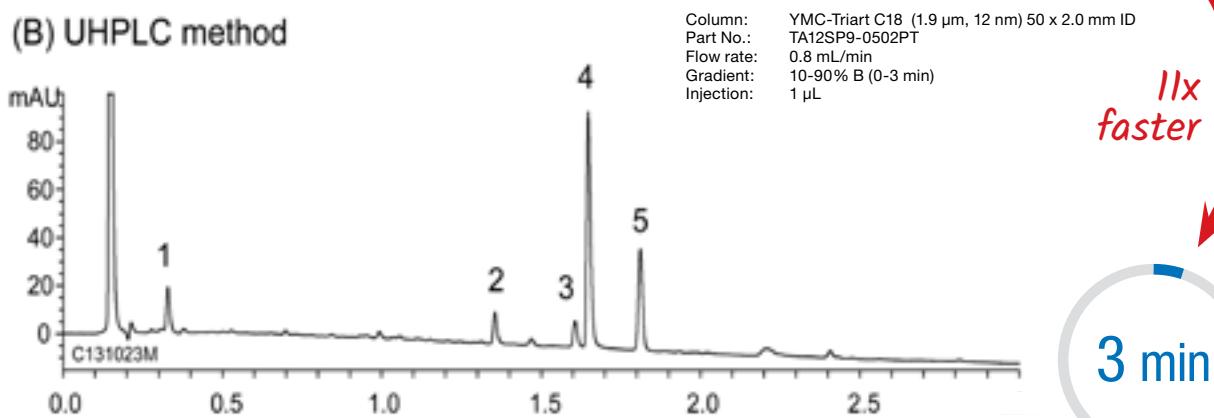
Pharmaceuticals – UHPLC

Duloxetine and its degradation products

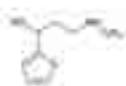
(A) HPLC method



(B) UHPLC method

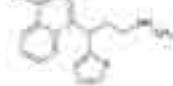


1.



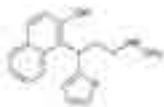
Amino alcohol
(3-Methylamino-1-thiophen-2-yl-propan-1-ol)

2.



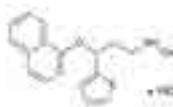
Para isomer
(4-(3-Methylamino-1-thiophen-2-yl-propyl)naphthalen-1-ol)

3.



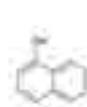
Ortho isomer
(2-(3-Methylamino-1-thiophen-2-yl-propyl)naphthalen-1-ol)

4.



Duloxetine hydrochloride

5.



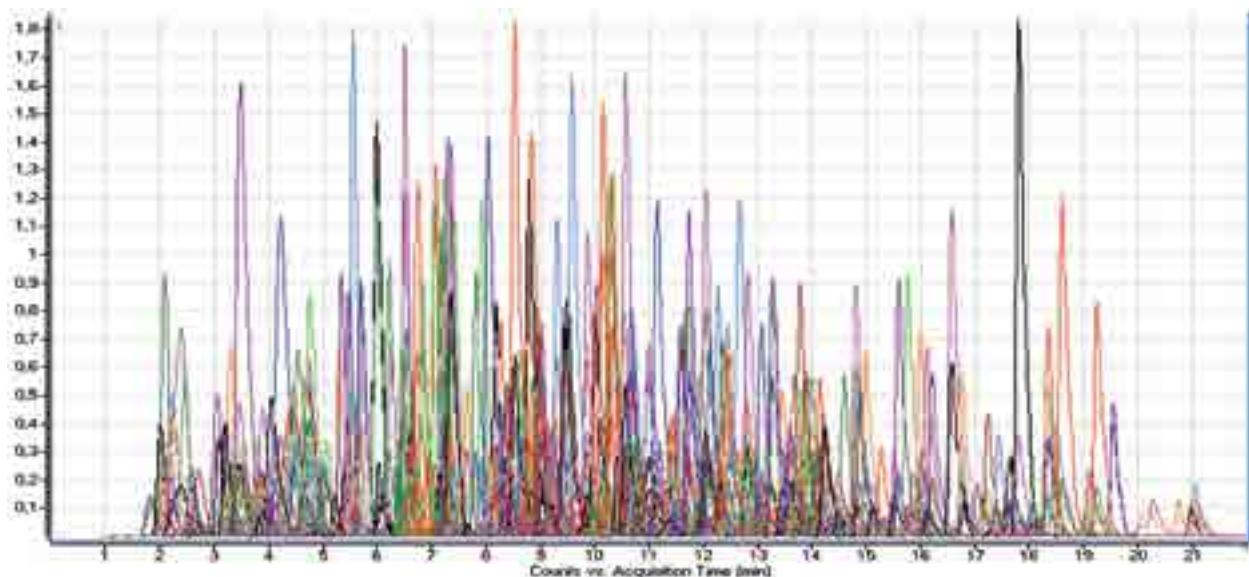
o-Naphthol

Eluent: A) 10 mM $\text{CH}_3\text{COONH}_4$ (pH 6.0)
B) acetonitrile
Detection: UV at 230 nm
Temperature: 30 °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

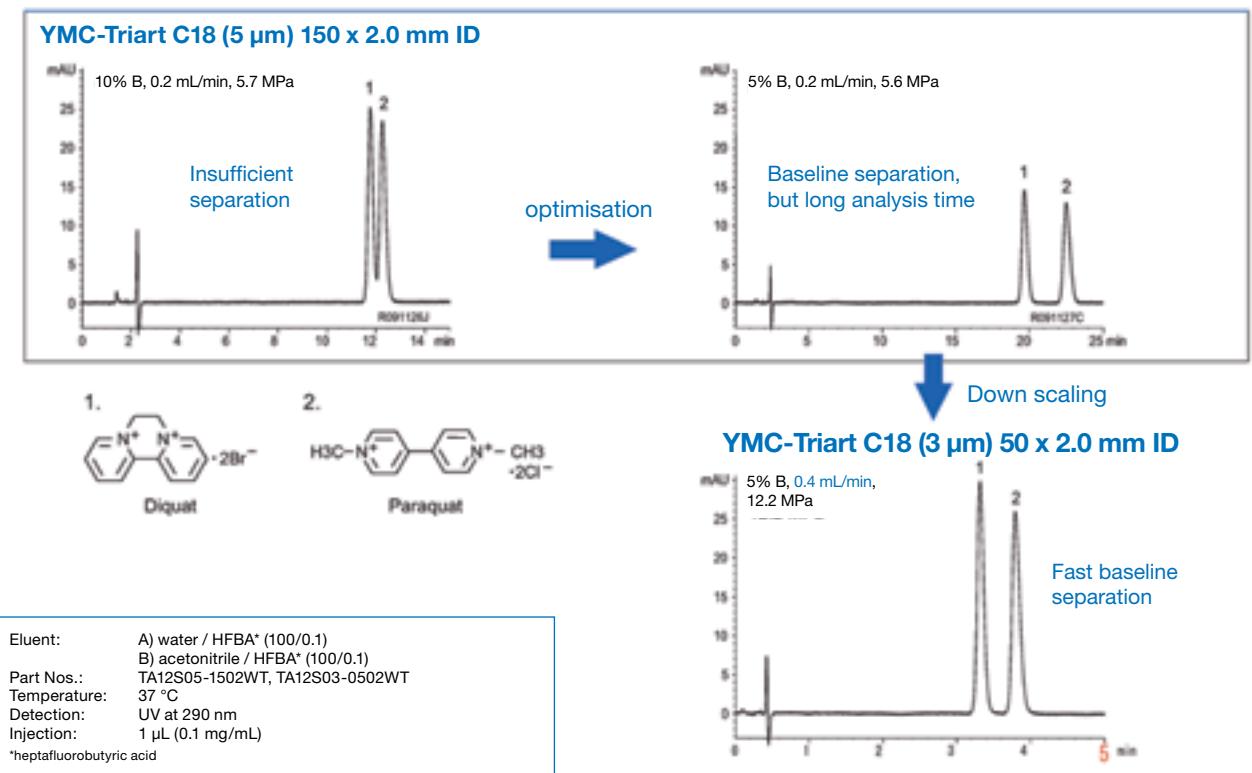
Analysis of 360 pesticides in a single run



Column:	YMC-Triart C18 (3 μ m, 12nm) 100 x 2.0 mm ID	Total run time:	30 min
Part No.:	TA12S03-1002WT	Flow rate:	0.25 mL/min
Eluent:	A) 5 mM ammonium formate / water B) 5 mM ammonium formate / methanol	Temperature:	45 °C
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	Injection:	5 μ L
		Sample:	100 ng/mL pesticide mix in acetonitrile

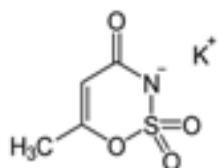
Application data by courtesy of: József László
WIREC, WESSLING International Research and Educational Centre Nonprofit Co. (Hungary)

Fast LC for conventional HPLC

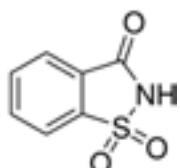


Food – LC / MS

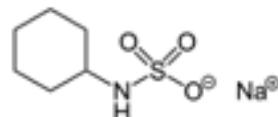
Determination of artificial sweeteners with LC-MS/MS



Acesulfame (K salt)

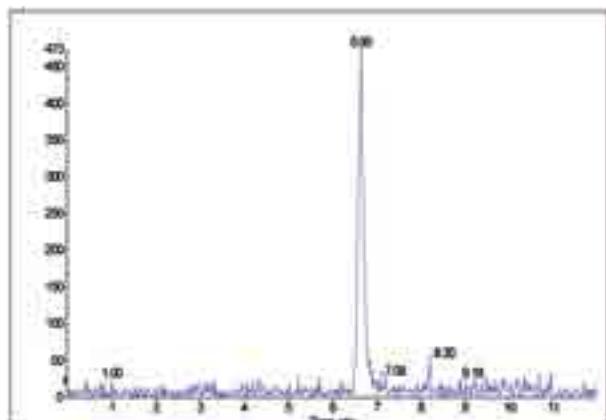


Saccharin

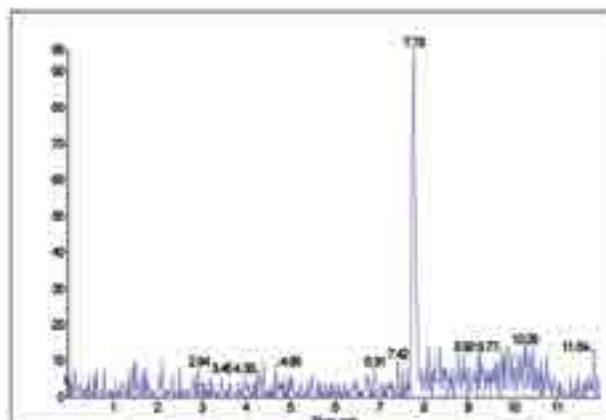


Cyclamate Na

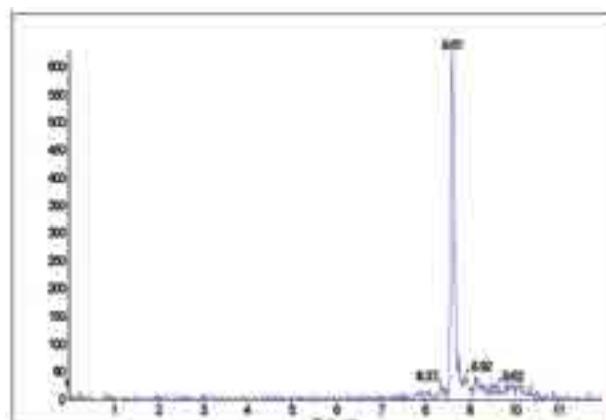
→ Non biological markers of wastewater entries in ground and surface water



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

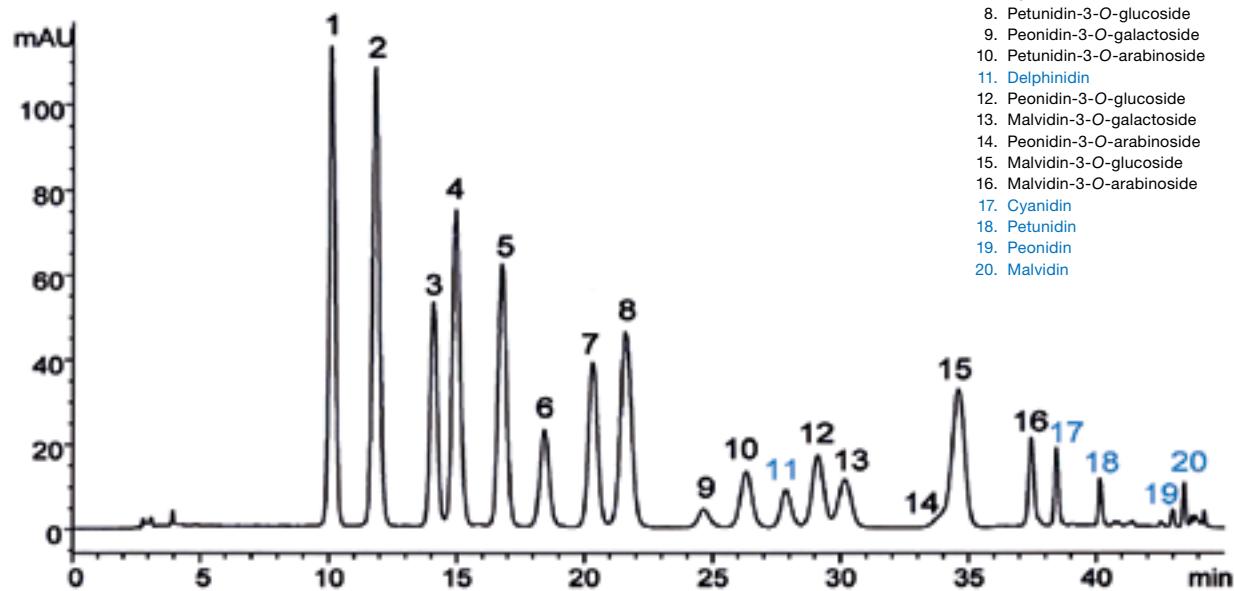
Column:	YMC-Triart C18, (1.9 µm, 12 nm) 100 x 3.0 mm ID
Part-No.:	TA12SP9-1003PT
LC-System:	Agilent 1100 HPLC system and CTC Analytics HTC-Pal Autosampler
MS/MS System:	Applied Biosystems MDS Sciex API 4000, ESI negative
Temperature:	35 °C
Flow:	0.3 mL/min
Injection:	40 µL, direct injection
Eluent:	A: water (containing 10 mmol NH_4 formate) B: methanol (containing 10 mmol NH_4 formate)
Gradient:	Time 0 6.0 6.1 12.0 % B 2 75 2 2

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

Analysis of anthocyanins and anthocyanidins

Anthocyanins: Indicated in black

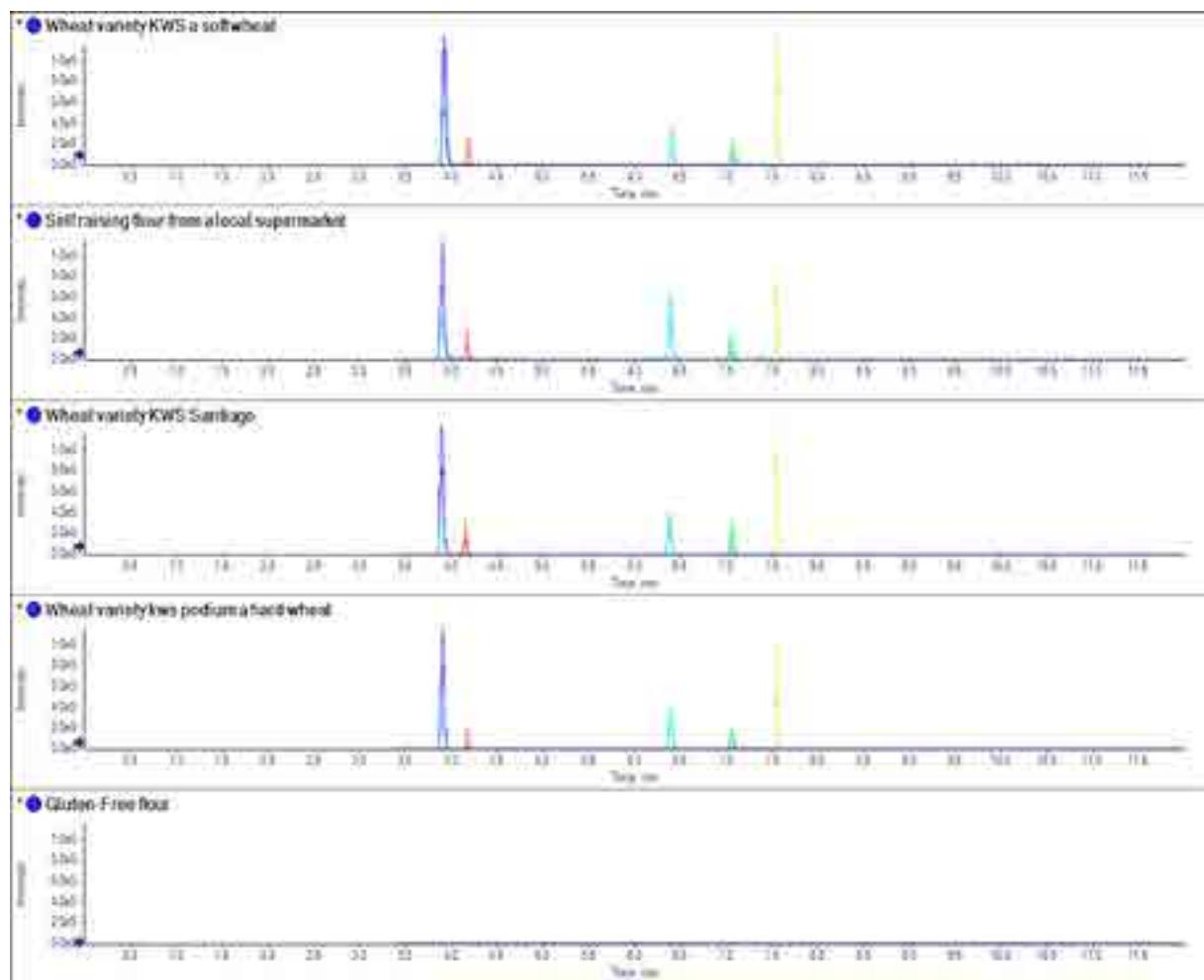
Anthocyanidins: Indicated in blue



Column: YMC-Triart C18 (5 µm, 12 nm) 250 x 4.6 mm ID
 Part No.: TA12S05-2546PTH
 Eluent:
 A) water / formic acid (90/10)
 B) acetonitrile / methanol / water / formic acid (22.5/22.5/40/10)
 Gradient:
 20-28% B (0-30 min),
 28-70% B (30-40 min),
 100% B (40-45 min)
 Flow rate: 1.0 mL/min
 Temperature: 25 °C
 Detection: UV/VIS at 535 nm
 Sample: commercial bilberry powder (1.25 mg/mL)

Food – MicroLC

MicroLC-MS/MS analysis of gluten markers in flour



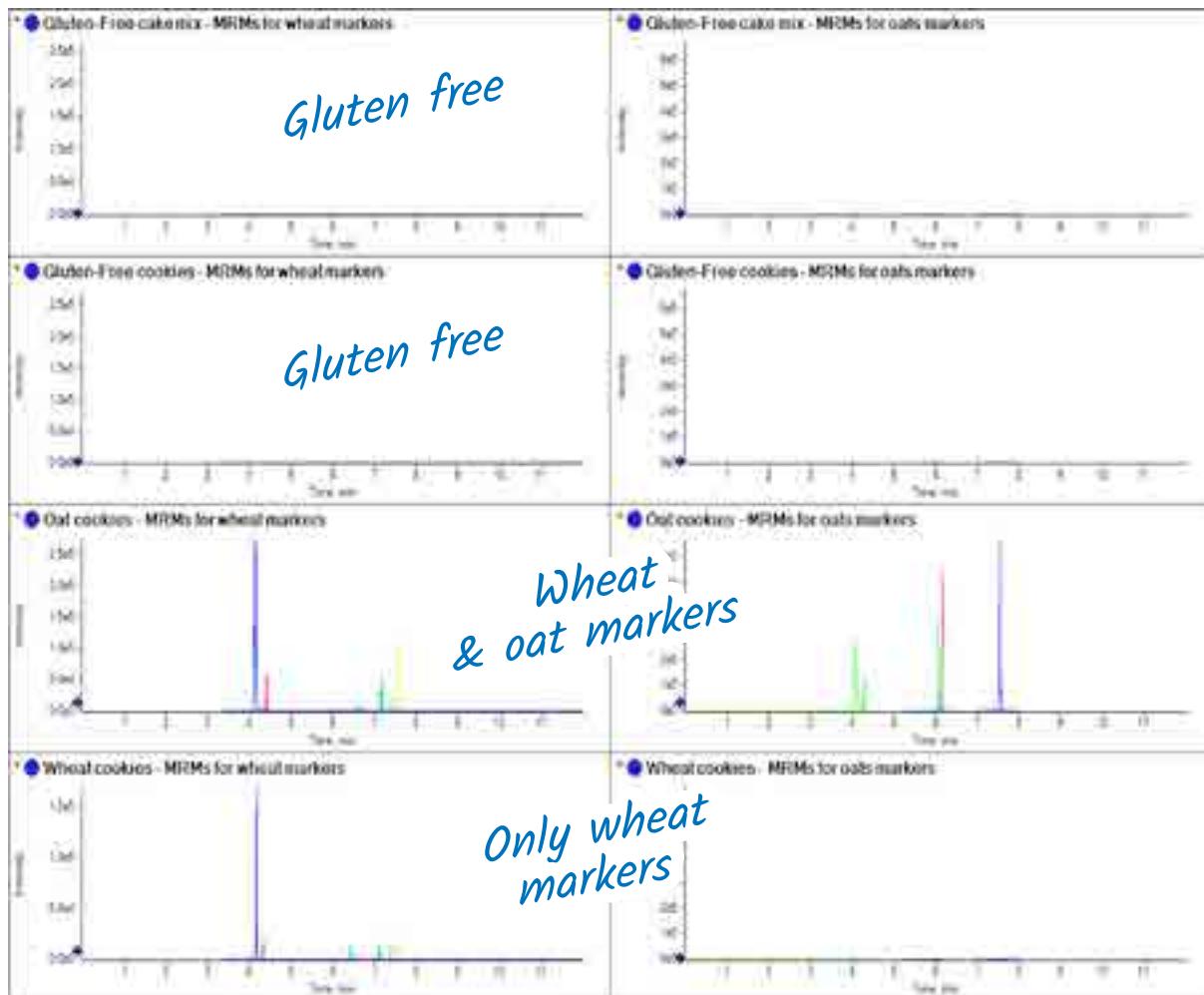
Column: YMC-Triart C18 (12 nm, 3 µm) 100 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-10J0RU
 Eluent:
 A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 5% B (0-1 min), 25% B (6 min), 95% B (8-9 min), 5% B (9.2-12 min)
 Flow rate: 25 µL/min
 Temperature: 40 °C
 Detection: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

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



Food – MicroLC

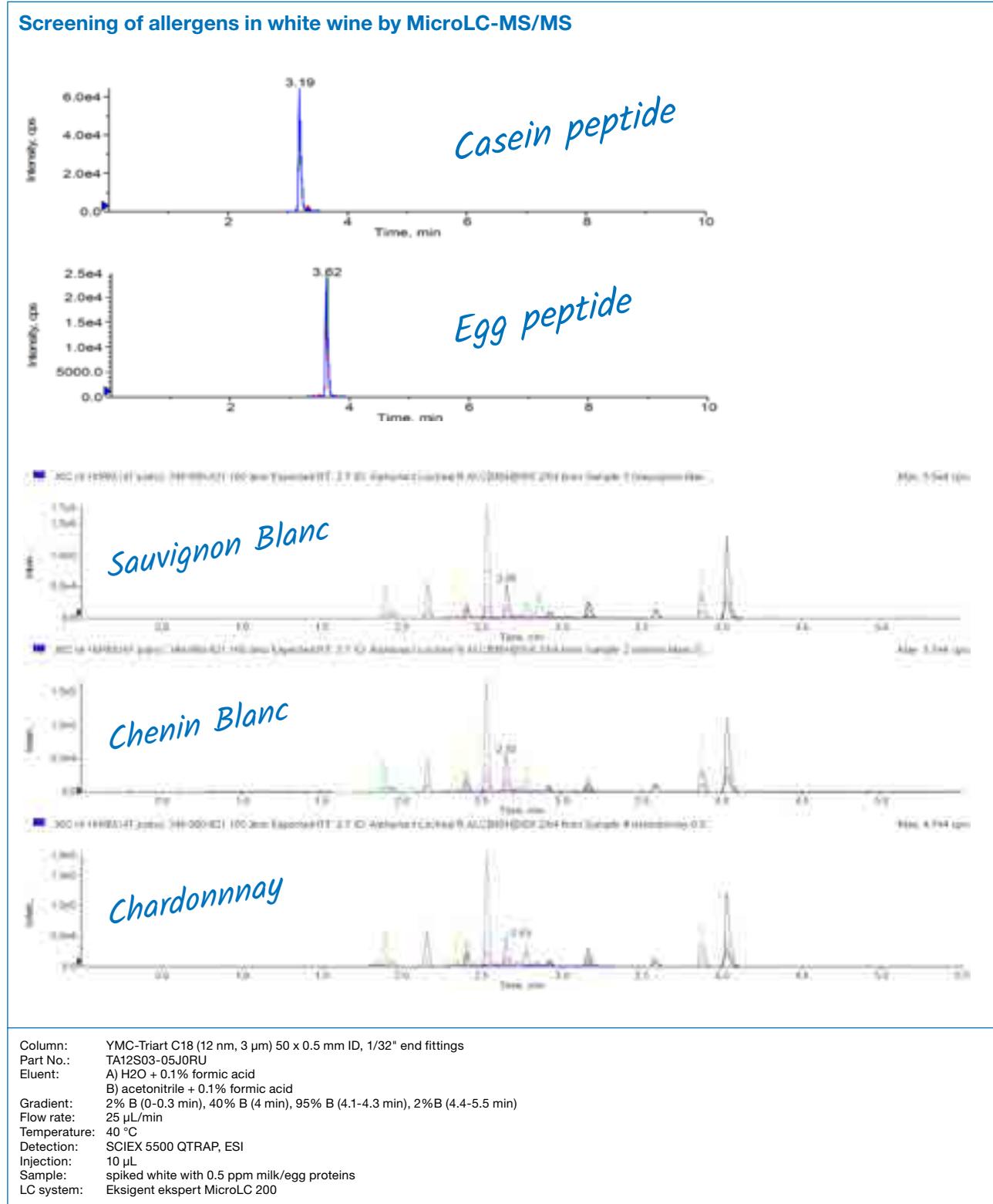
MicroLC-MS/MS analysis of wheat or oat markers for gluten in cookies



Column: YMC-Triart C18 (12 nm, 3 µm) 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 µL/min
 Temperature: 40 °C
 Detection: SCIEX 5500 QTRAP, ESI
 Injection: 10 µL
 LC system: Eksigent ekspert MicroLC 200

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

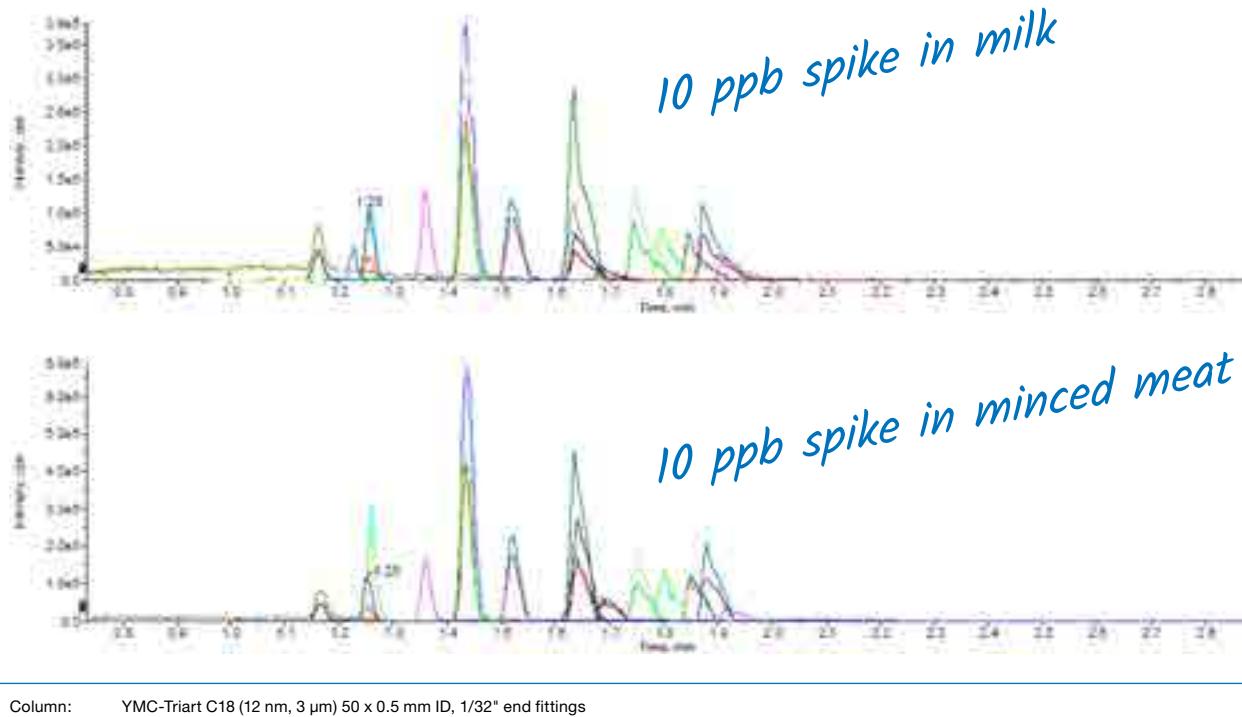
Food – MicroLC



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



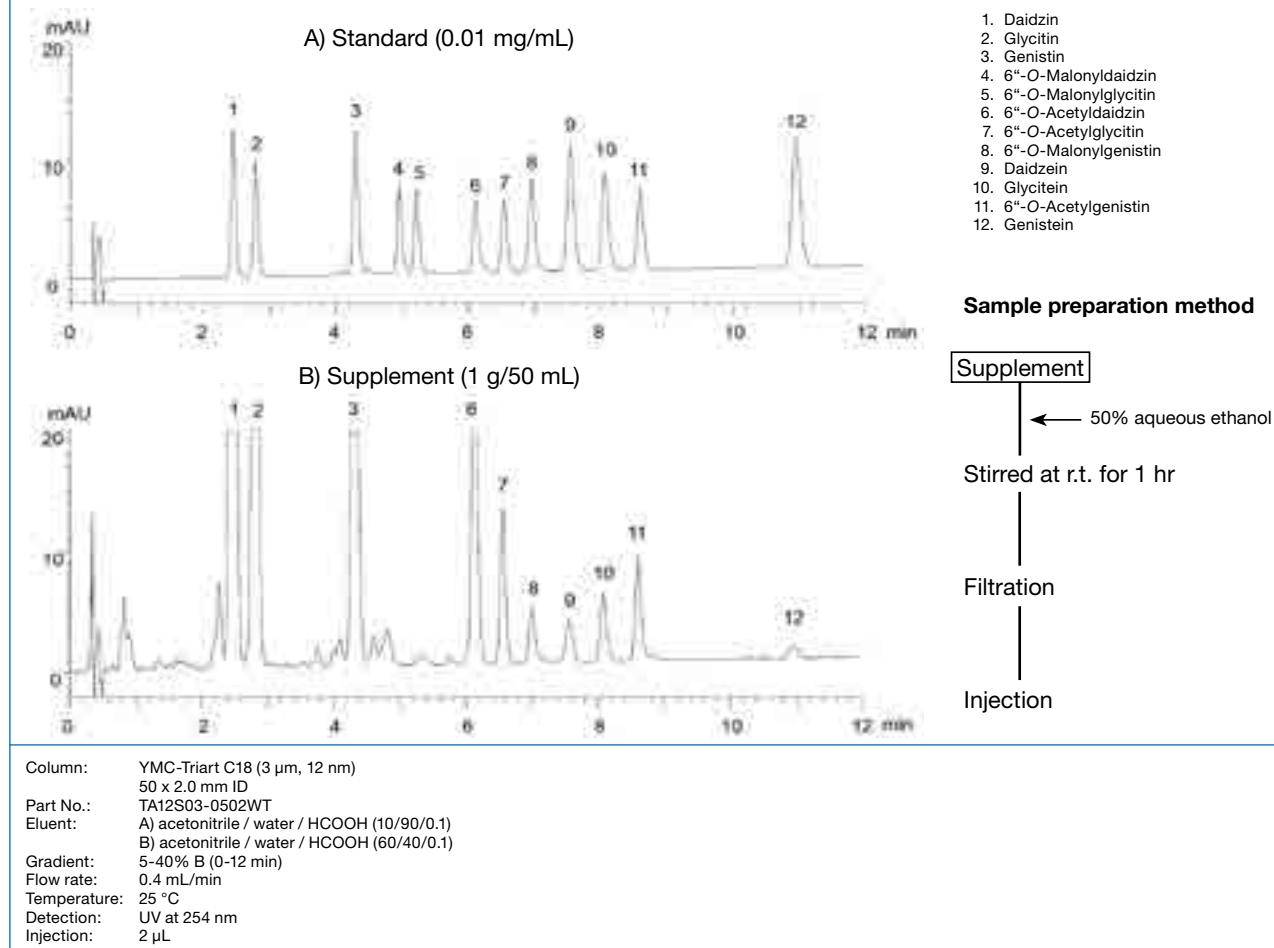
Column: YMC-Triart C18 (12 nm, 3 µm) 50 x 0.5 mm ID, 1/32" end fittings
 Part No.: TA12S03-05J0RU
 Eluent:
 A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 2% B (0-0.5 min), 65% B (1.7 min), 100% B (1.8-2.3 min), 2% B (2.4-3.5 min)
 Flow rate: 30 µL/min
 Temperature: 60 °C
 Detection: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

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

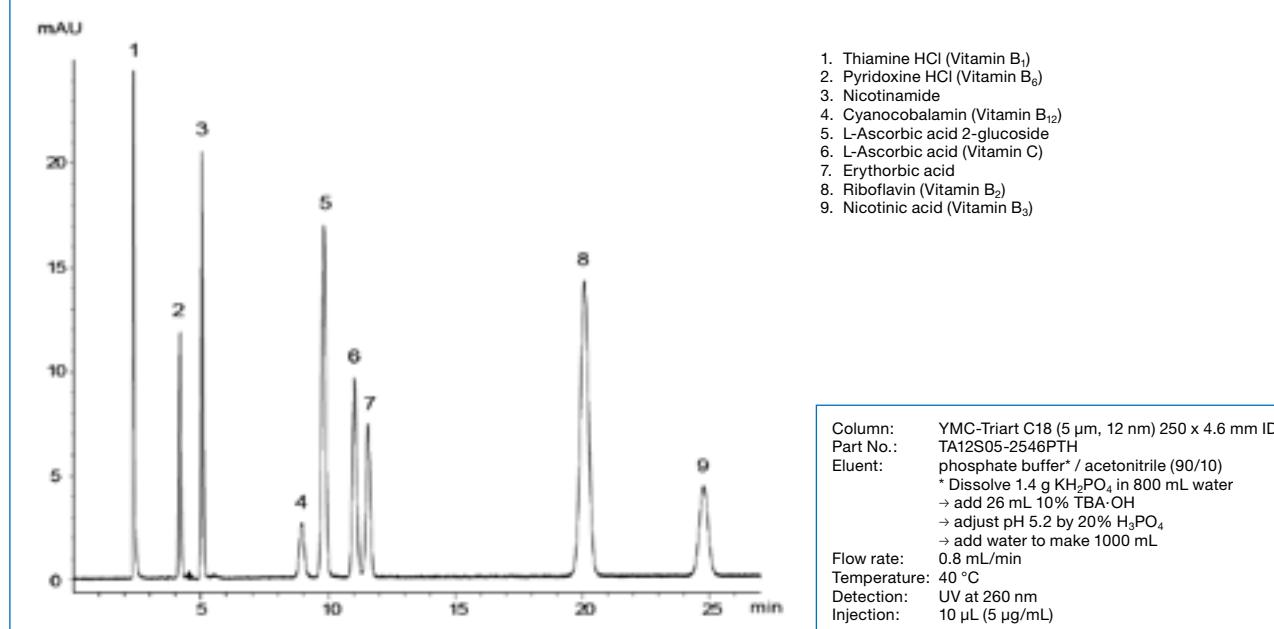


Food

Soy isoflavones in supplement



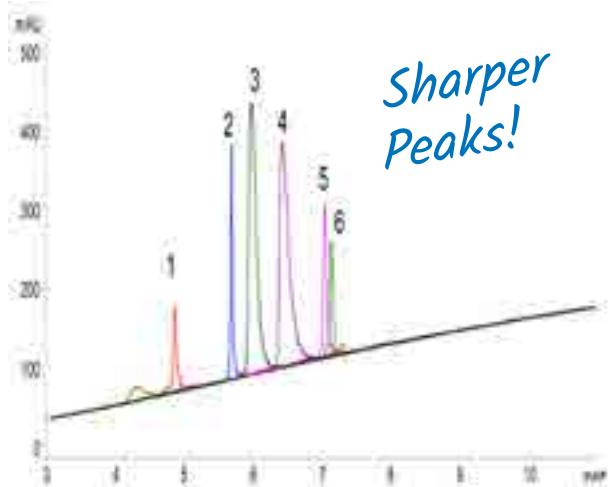
Separation of water-soluble vitamins



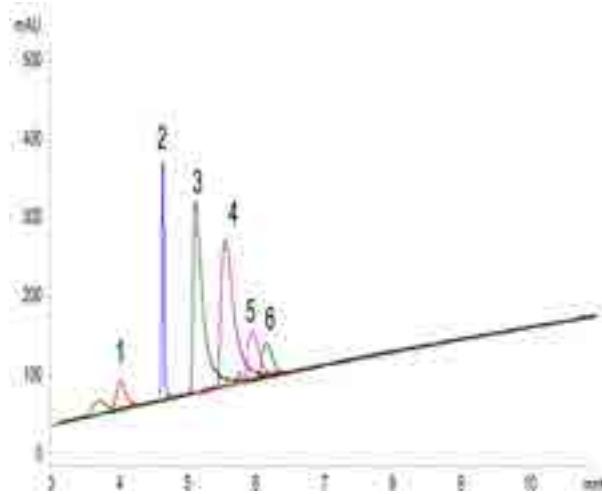
Life Science – Proteins

High sensitivity and sharp peaks under LC/MS compatible conditions

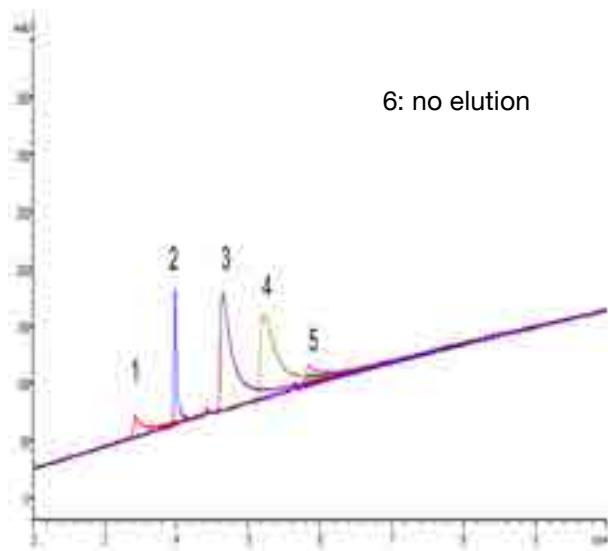
YMC-Triart Bio C4 (3 µm, 30 nm)



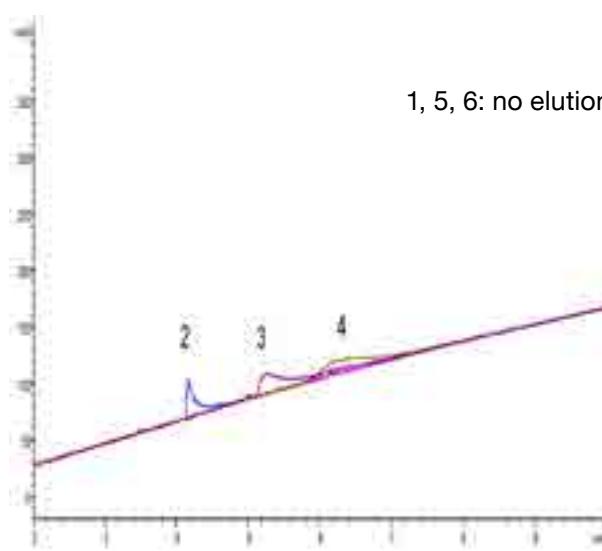
XBridge Protein BEH C4 (3.5 µm, 30 nm)



AdvanceBio RP-mAb C4 (3.5 µm, 45 nm)



Aeris widepore C4 (3.6 µm, 20 nm)



Column: 150 x 3.0 mm ID
 Eluent: A) water/formic acid (100/0.1)
 B) acetonitrile/formic acid (100/0.1)
 Gradient: 10-95% B (0-15 min)
 Temperature: 40 °C
 Detection: UV at 220 nm

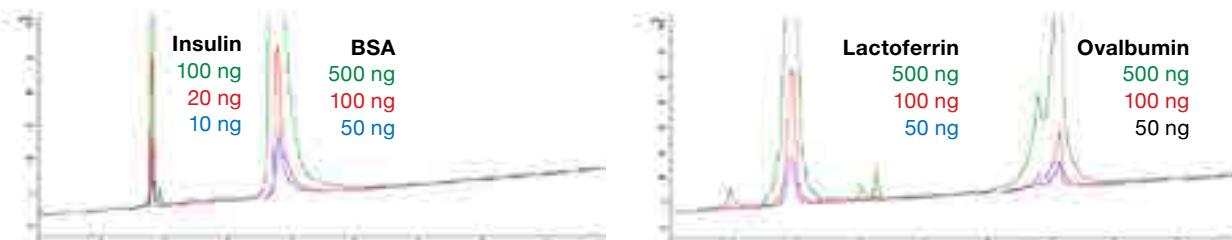
Sample:
 1. Cytochrome-C (Horse heart)
 2. Insulin (Bovine pancreas)
 3. Transferrin (Human)
 4. BSA
 5. β-Lactoglobulin (Bovine)
 6. α-Chymotrypsinogen A (Bovine pancreas)

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.

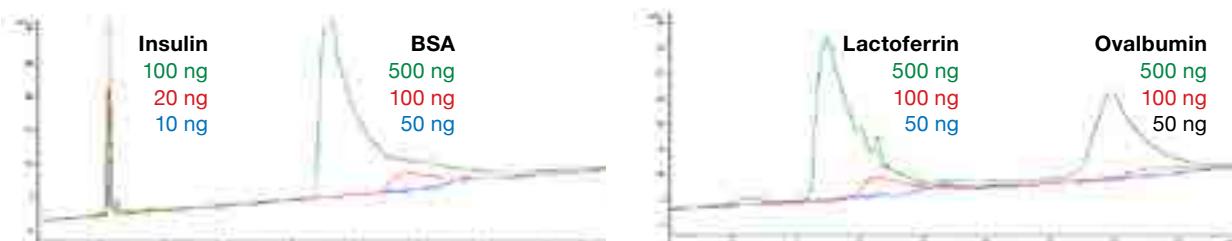
Life Science – Proteins

Ideal for Microanalysis

YMC-Triart Bio C4 (1.9 µm, 30 nm)



Aeris widepore C4 (3.6 µm, 20 nm)

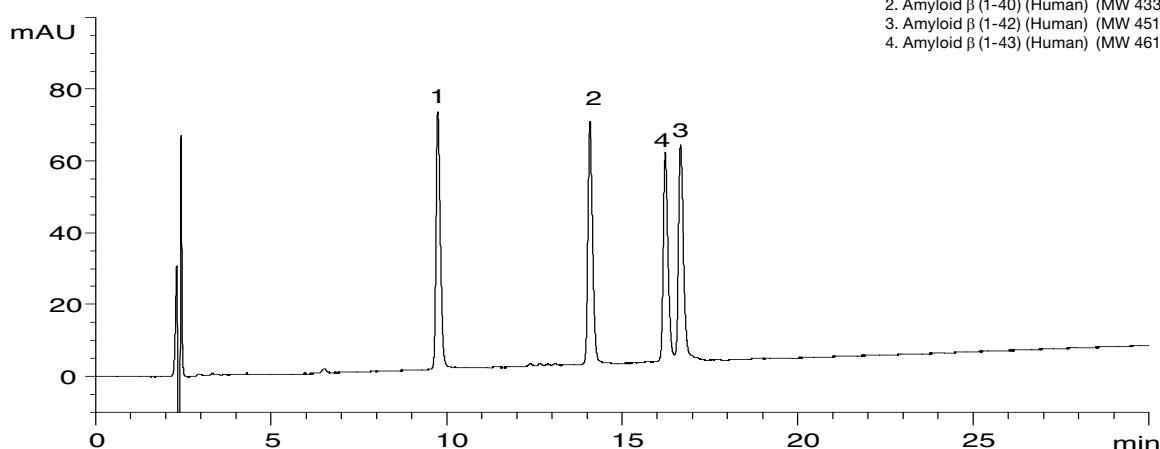


Column: 150 x 2.1 mm ID
 Eluent: A) water/TFA (100/0.05)
 B) acetonitrile/TFA (100/0.05)
 Gradient: 25-60% B (0-15 min), 90% (15-20 min), 25% (20-35 min)

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



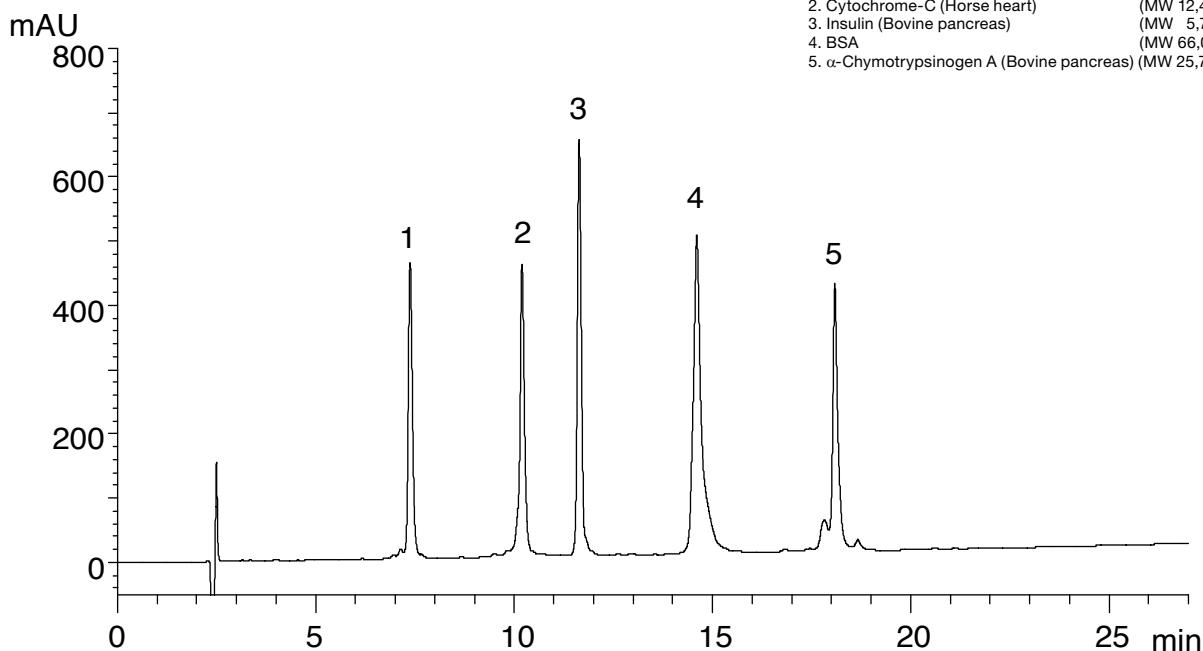
Amyloid β (1-43) : Asp-Ala-Glu-Phe-Arg-His-Asp-Ser-Gly-Tyr-Glu-Val-His-His-Gln-Lys-Leu-Val-Phe-Phe-Ala-Glu-Asp-Val-Gly-Ser-Asn-Lys-Gly-Ala-Ile-Ile-Gly-Leu-Met-Val-Gly-Gly-Val-Val-Ile-Ala-Thr

Column: YMC-Triart Bio C4 (3 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: 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 µL (each 0.1 mg/mL)

Life Science – Proteins

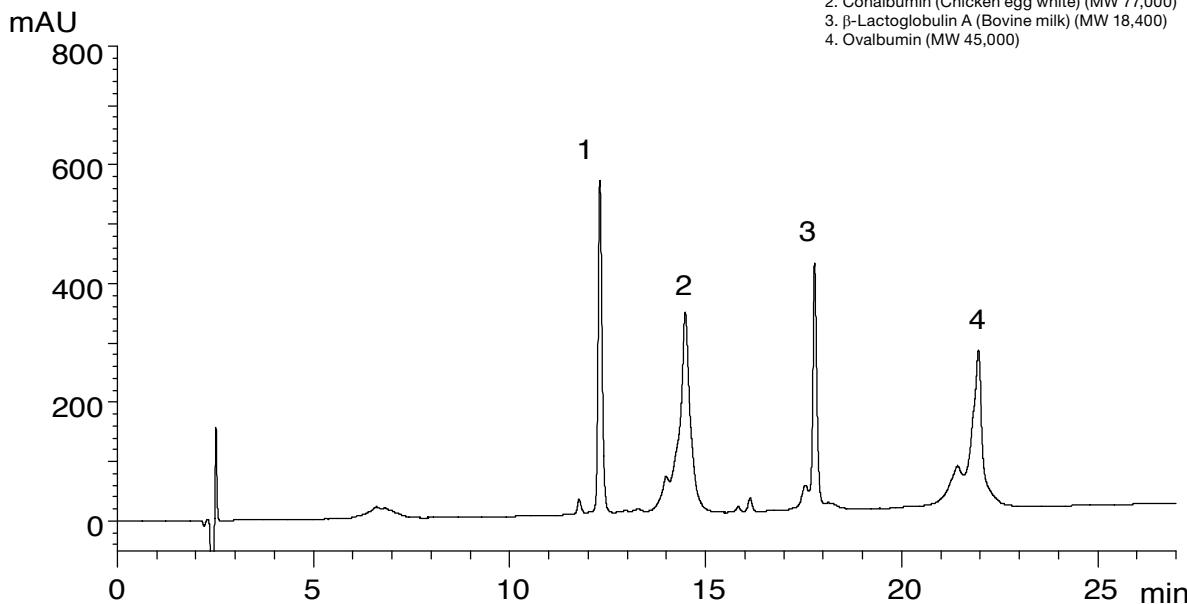
Proteins (MW 5,700 ~ 66,000)



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

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

Proteins (MW 14,300 ~ 77,000)



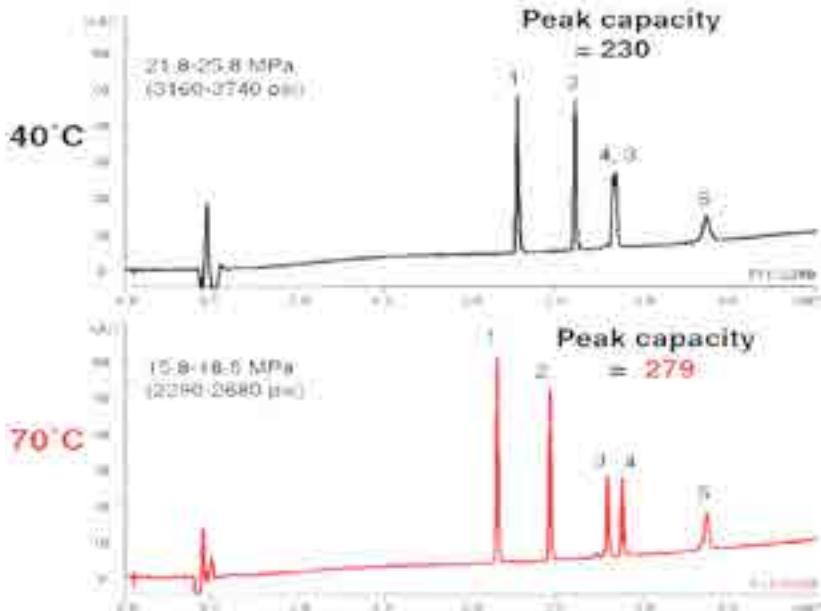
Column: YMC-Triart Bio C4 (5 μ m, 30 nm) 150 x 3.0 mm ID
Part No.: TB30S03-1503PTH
Eluent: A) water/TFA (100/0.1)
B) acetonitrile/TFA (100/0.1)
Gradient: 20-60% B (0-27 min), 90% B (27-35 min)

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

Life Science – Proteins

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

Mixture A (MW 500–18,400)

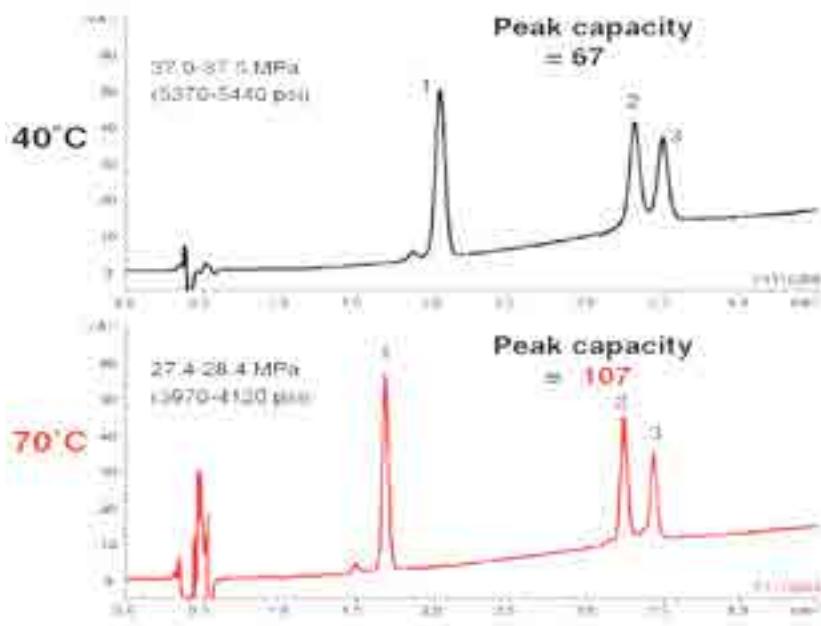


Analytes	MW	Peak width 1/2 (min)	
		40 °C	70 °C

Mixture A

1. Oxytocin	1,007	0.017	0.014
2. Leu-Enkephalin	556	0.015	0.015
3. β-Endorphin	3,465	—	0.016
4. Insulin	5,733	—	0.015
5. β-Lactoglobulin A	18,400	0.043	0.030

Mixture B (MW 14,300–25,700)



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

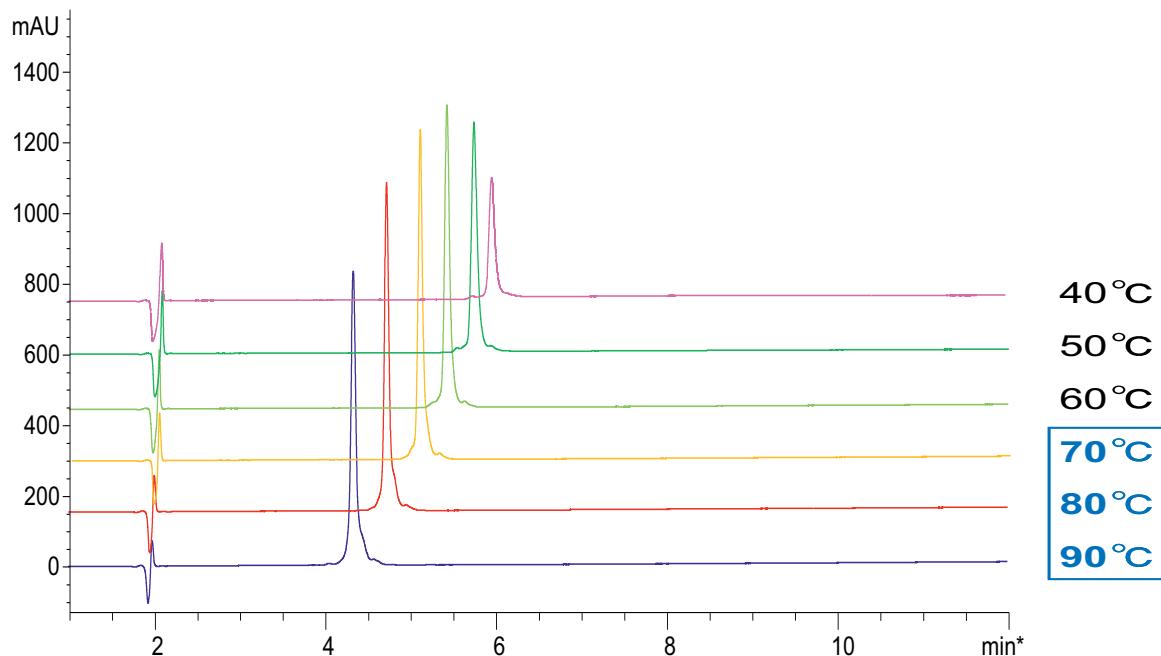
Column: YMC-Triart C18 (1.9 µm, 12 nm) 50 x 2.0 mm ID
 Part-No.: TA12SP9-0502PT
 Eluent: A) water / TFA (100/0.1)
 B) acetonitrile / TFA (100/0.1) - mixture A
 B) acetonitrile / 2-propanol / TFA (50/50/0.1) - mixture B
 Gradient: 10-80% B (0-5 min) - mixture A
 30-60% B (0-5 min) - mixture B

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

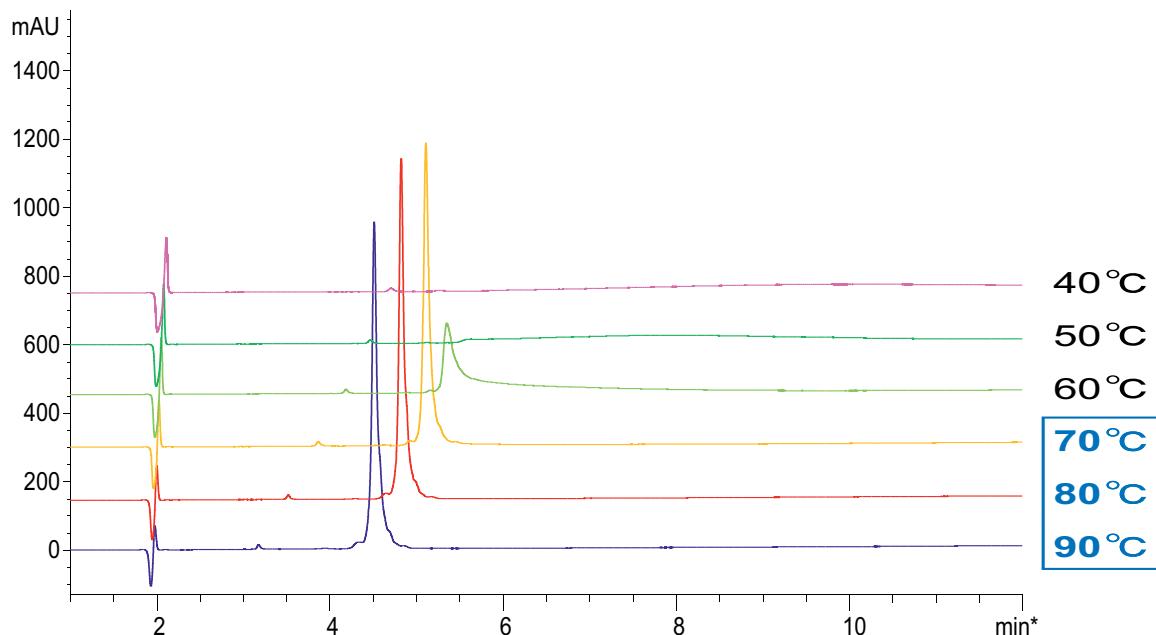
PC (peak capacity) = 1 + (gradient time / peak width*)
 *peak width = $2W_{0.5}$ average

Life Science – Antibodies

Adalimumab (MW: ca. 148 kDa)



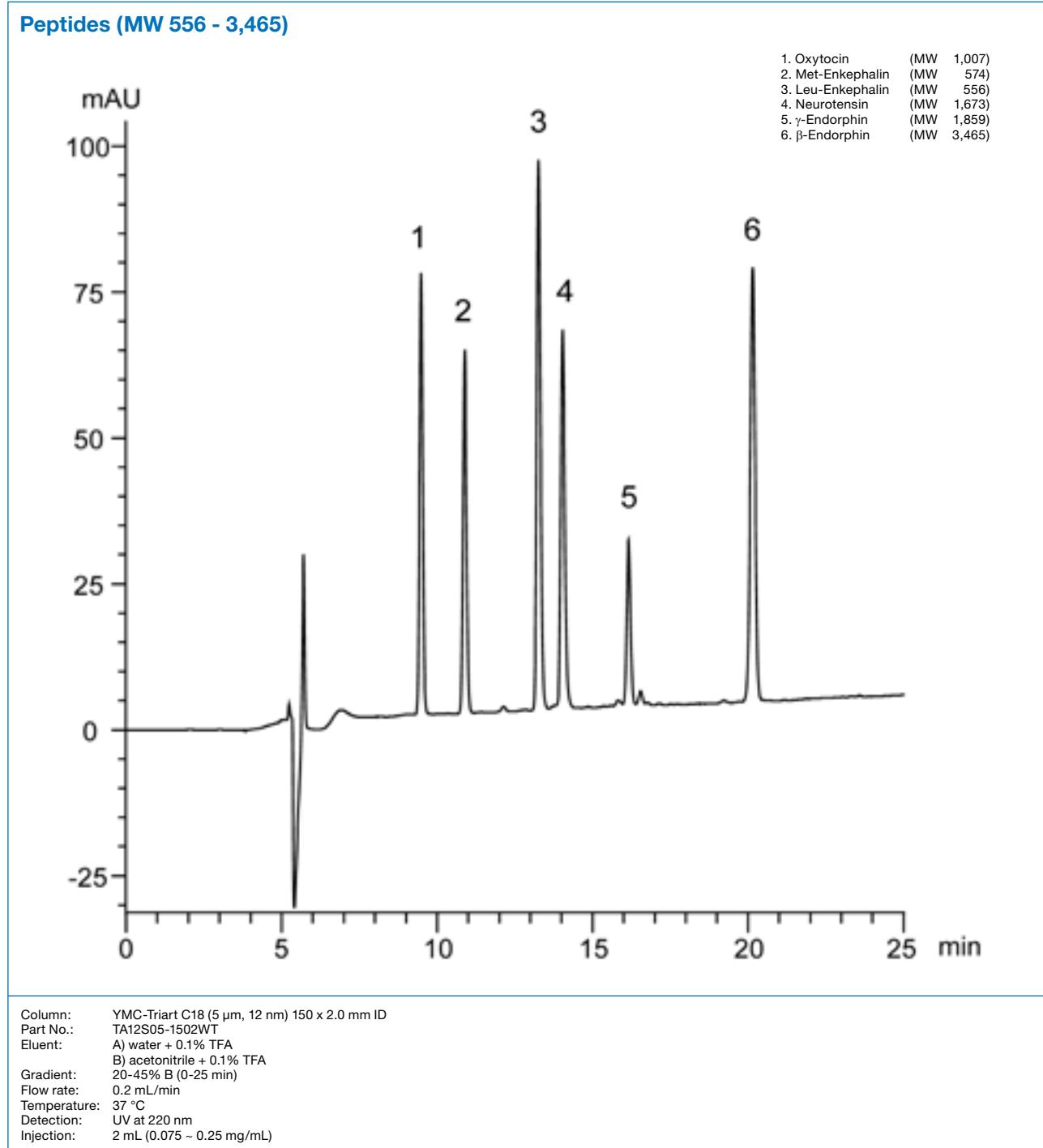
Bevacizumab (MW: ca. 148 kDa)



Column: YMC-Triart Bio C4 (3 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:
 Time [min] Eluent B [%]
 0 30
 15 60
 30 90

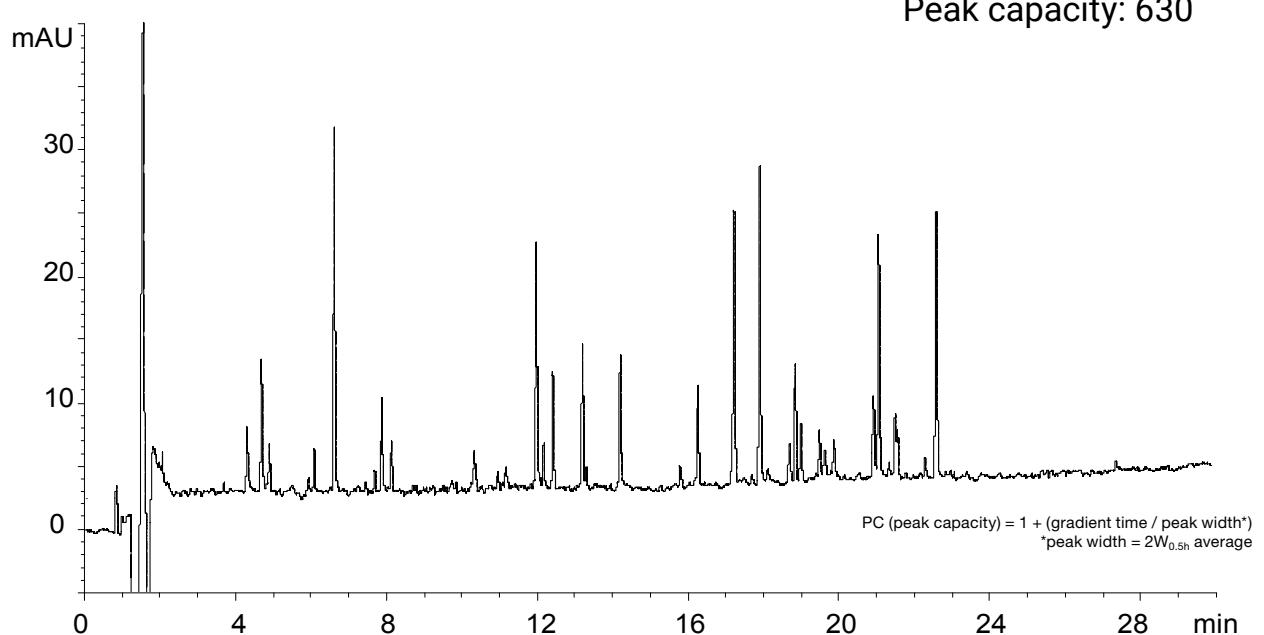
Flow rate: 0.4 mL/min
 Detection: UV at 220 nm
 Injection: 4 µL (0.5 mg/mL)

Life Science – Peptides



Life Science – Peptides

Peptide mapping



Column: YMC-Triart C18 (1.9 μ m, 12 nm) 200 x 2.0 mm ID (Two coupled 100 x 2.0 mm ID)
Part No.: TA12SP9-1002PT (2x)
Eluent: A) water/TFA (100/0.1)
B) acetonitrile/TFA (100/0.08)
Gradient: 5-40% B (0-30 min)
Flow rate: 0.4 mL/min
Temperature: 70 °C
Detection: UV at 220 nm
Injection: 20 μ L
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*

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

mAU

150

100

50

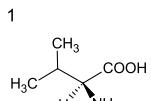
0

0

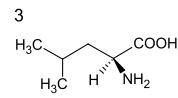
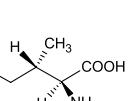
1

2

3



L-Valine



L-Leucine

2

2

4

6

min

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

mAU

500

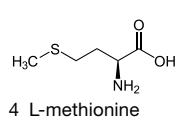
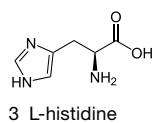
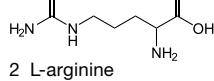
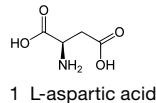
400

300

200

100

0



3

2

3

4

3

4

5

min

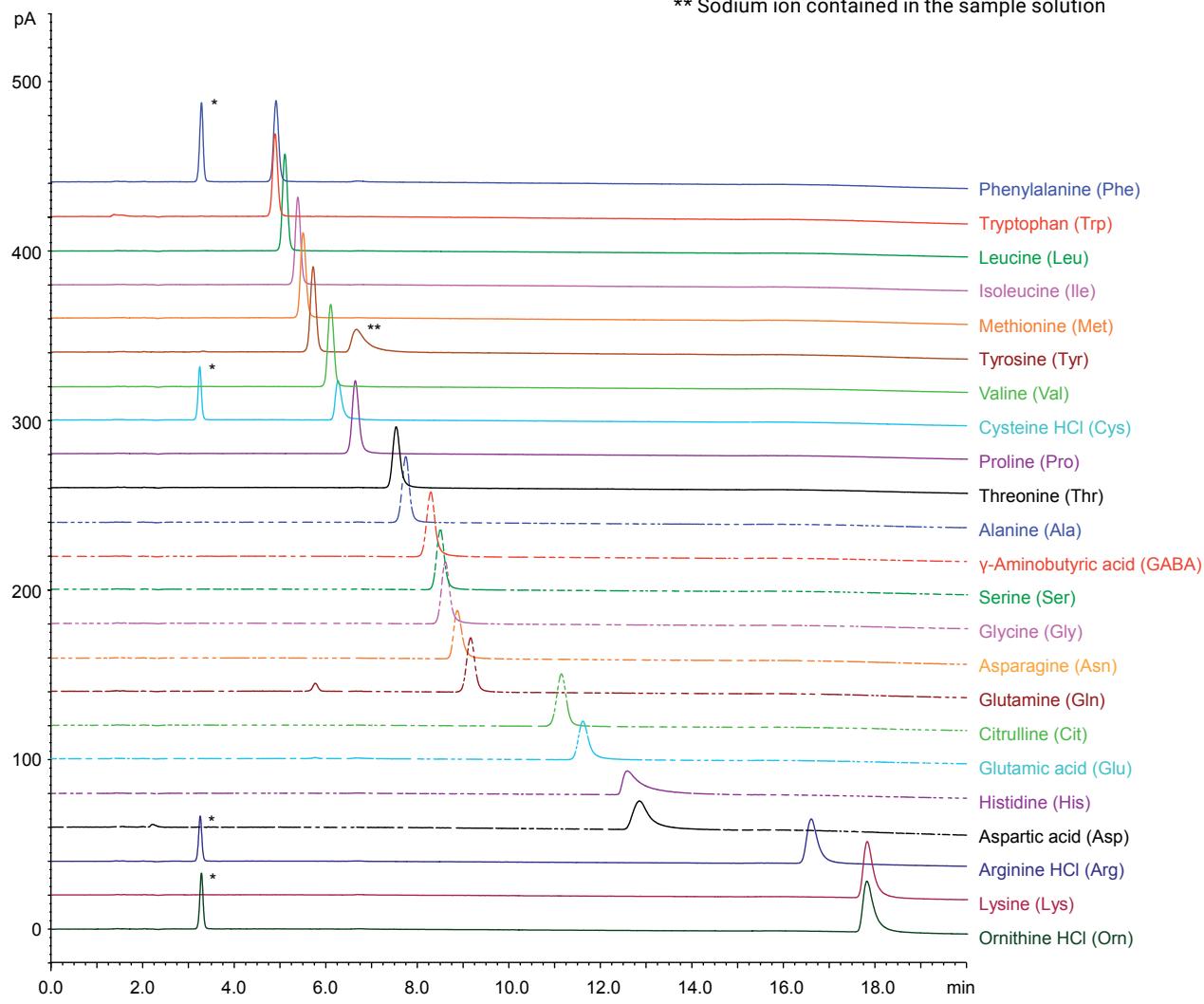
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 150 x 3.0 mm ID
 Part No.: TA12SP9-1503PT
 Eluent: 40 mM K₂HPO₄ (pH 7.0)
 Flow rate: 0.3 mL/min
 Temperature: 20 °C
 Detection: UV at 210 nm
 Injection: 2 μ L (1 mg/mL)

Life Science – Amino Acids

Free amino acids in HILIC mode

* Chloride ion contained in the sample solution

** Sodium ion contained in the sample solution



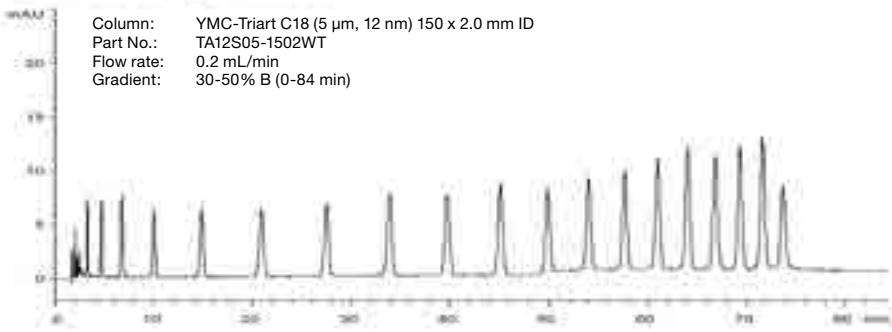
Column:	YMC-Triart Diol-HILIC (5 μ m, 12 nm) 150 x 4.6 mm ID
Part No.:	TDH12S05-1546PTH
Eluent:	A) 100 mM HCOOH-HCOONH ₄ (pH 3.6) B) acetonitrile
Gradient:	83-80% B (0-12 min), 80-68% B (12-20 min)
Flow rate:	1.0 mL/min
Temperature:	40 °C
Detection:	Corona® CAD® (Charged Aerosol Detector)
Injection:	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

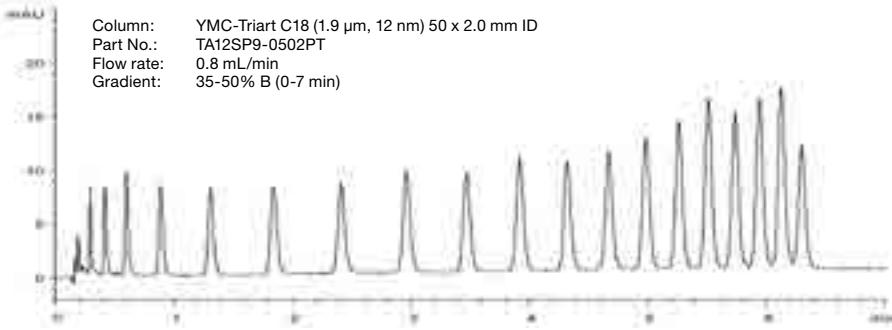


80 min

11x faster

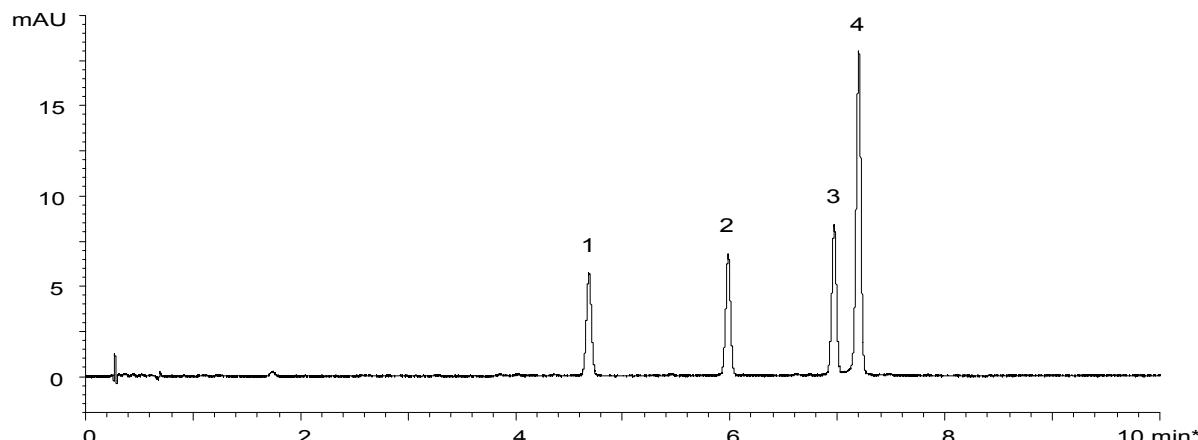
7 min

UHPLC method



Eluent: A) 10 mM di-n-butylamine-acetic acid (pH 6.0)
B) methanol
Detection: UV at 269 nm
Injection: 1 μ L (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)

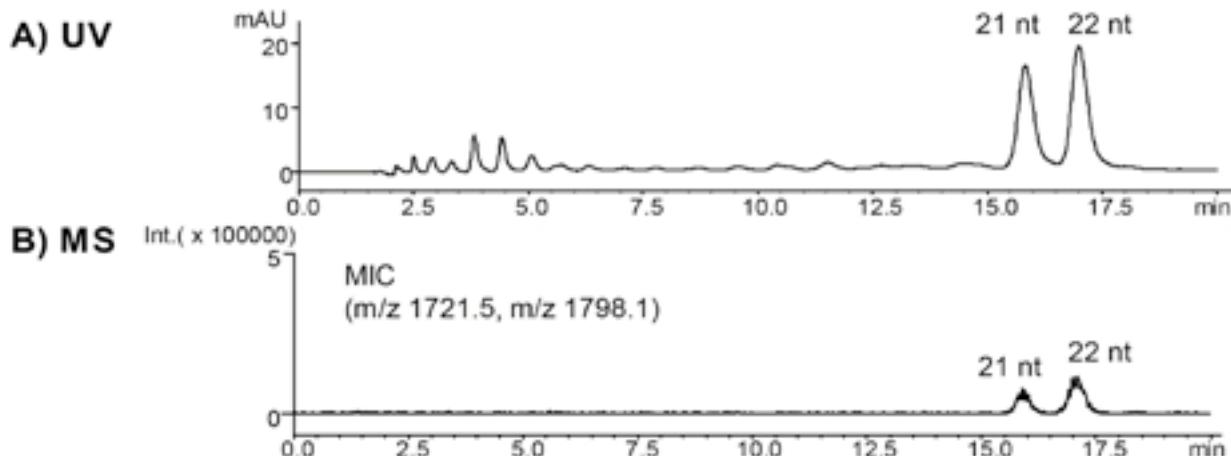
Column: YMC-Triart C18 (1.9 μ m, 12 nm) 50 x 2.1 mm ID
Part No.: TA12SP9-05Q1PT
Eluent: A) 200 mM HFIP*-8 mM triethylamine
B) methanol
Gradient: 10-20% B (0-10 min)
*hexafluoroisopropanol

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

Courtesy of M. Yamada, SHIMADZU CORPORATION

Life Science – Oligonucleotides

LC/MS analysis of miRNA

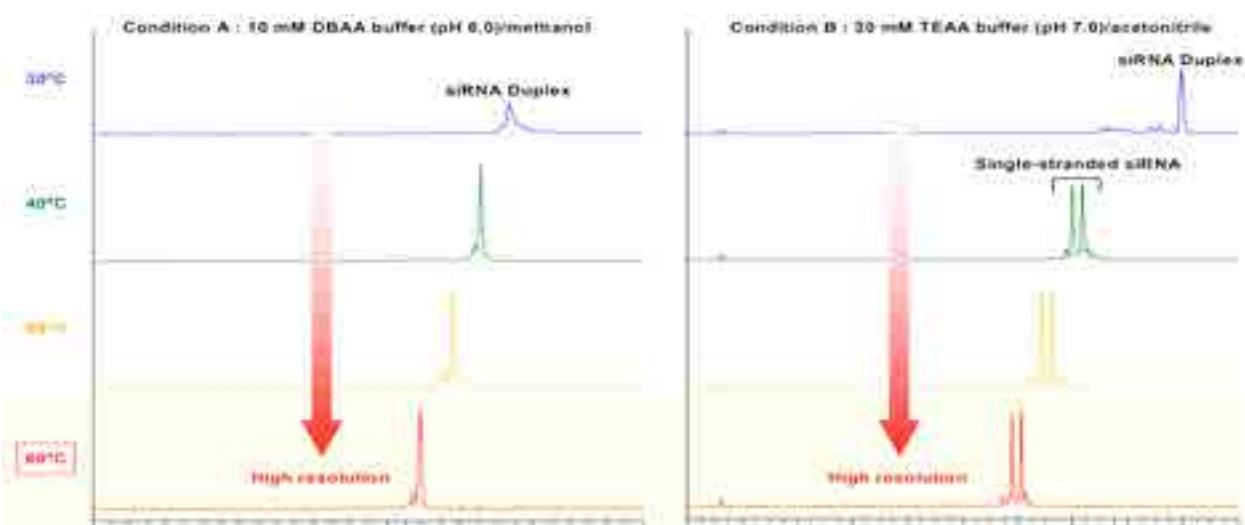


5'-pUGG AGU GUG ACA AUG GUG UUG-3' (21 nt, MW 6890.1)
5'-pUGG AGU GUG ACA AUG GUG UUG U-3' (22 nt, MW 7196.3)

Column:	YMC-Triart C18 (3 μ m, 12 nm), 150 x 2.0 mm ID	Temperature:	30°C
Part No.:	TA12S03-1502WT	Detection:	A) UV at 260 nm
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)	B) ESI-negative mode	
Gradient:	62-72% B (0-20 min)	Injection:	4 μ L (5 nmol/mL)
Flow rate:	0.2 mL/min	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



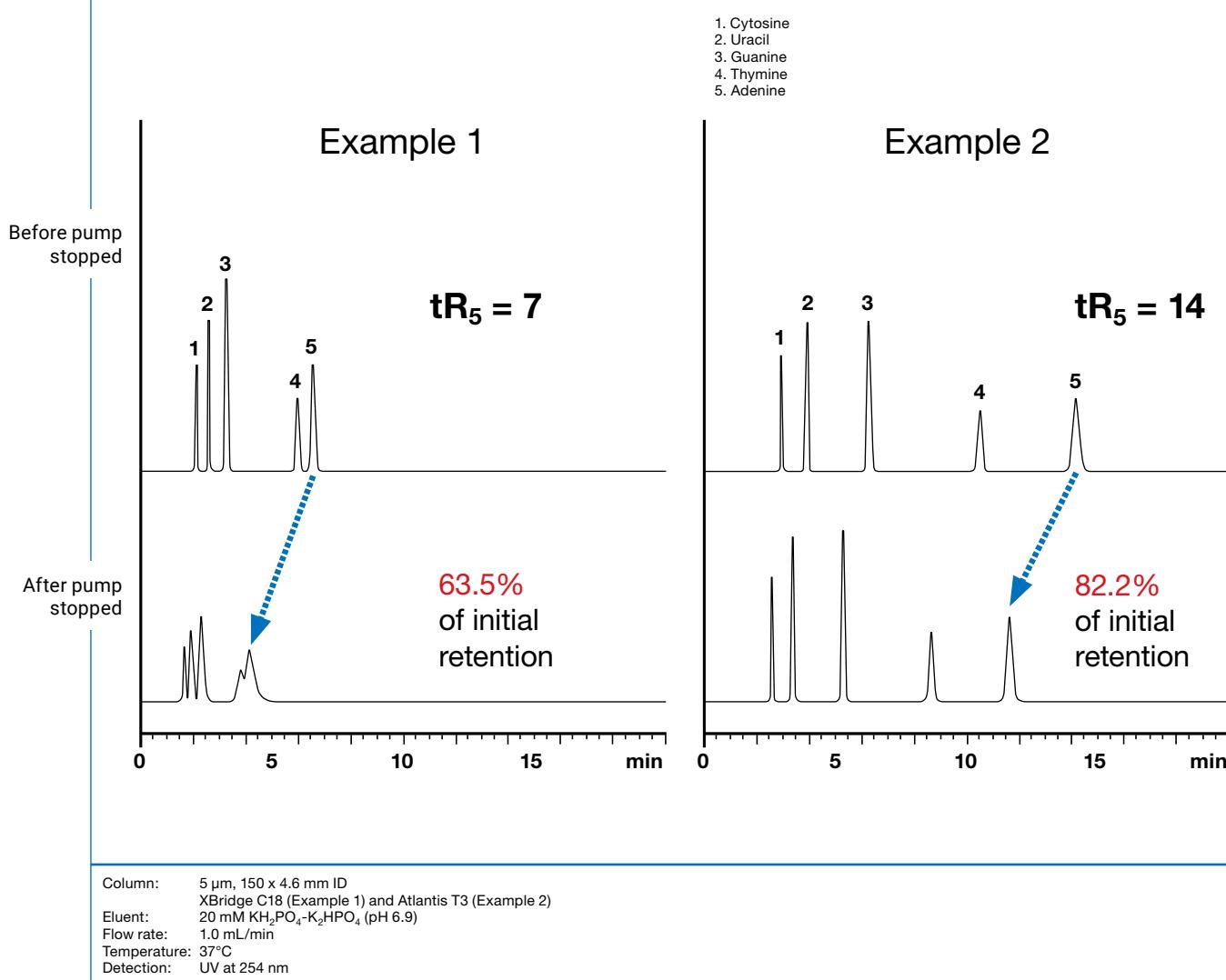
Column:	YMC-Triart C18 (1.9 μ m, 12 nm) 100 x 2.0 mm ID
Part No.:	TA12SP9-1002PT
Flow rate:	0.2 mL/min
Detection:	UV at 269 nm
Injection:	1 μ L (5 nmol/mL)
System:	Agilent 1290

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?

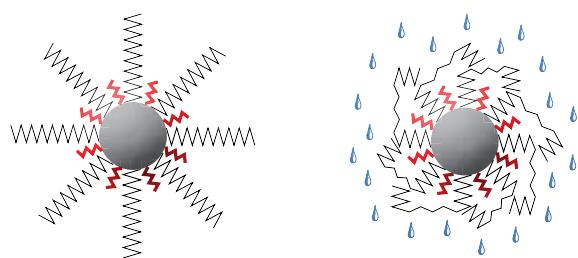


Image of C18 surface hydration

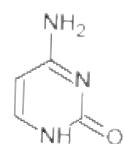
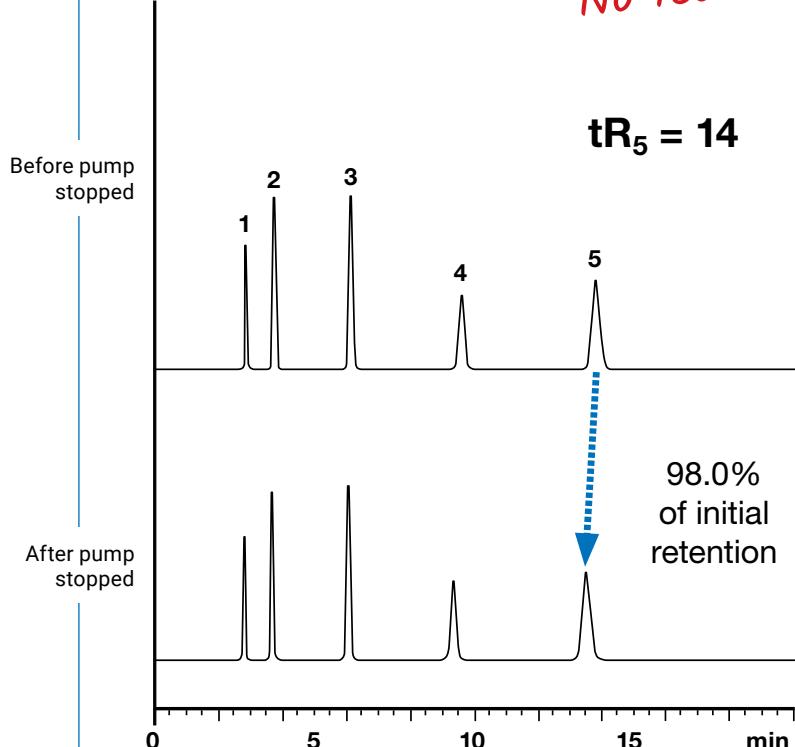
The columns used for applications involving 100% aqueous buffers provide shorter retention times after the flow was stopped between analyses. This behaviour is caused by poor hydration of the phase. Polar compounds cannot easily distribute between the mobile phase and the stationary phase.

YMC-Triart "AQ" | YMC-Triart C18

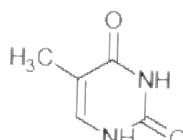
Solution with YMC-Triart C18

Reproducible stable performance!

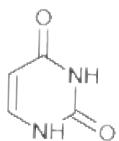
No retention time changes!



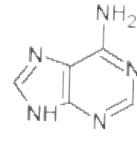
1. Cytosine



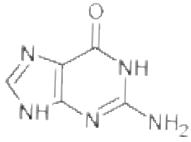
4. Thymine



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 KH₂PO₄-K₂HPO₄ (pH 6.9)
 Flow rate: 1.0 mL/min
 Temperature: 37°C
 Detection: UV at 254 nm

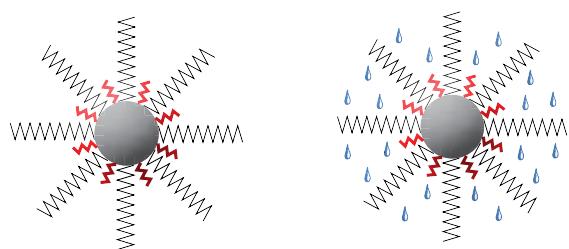
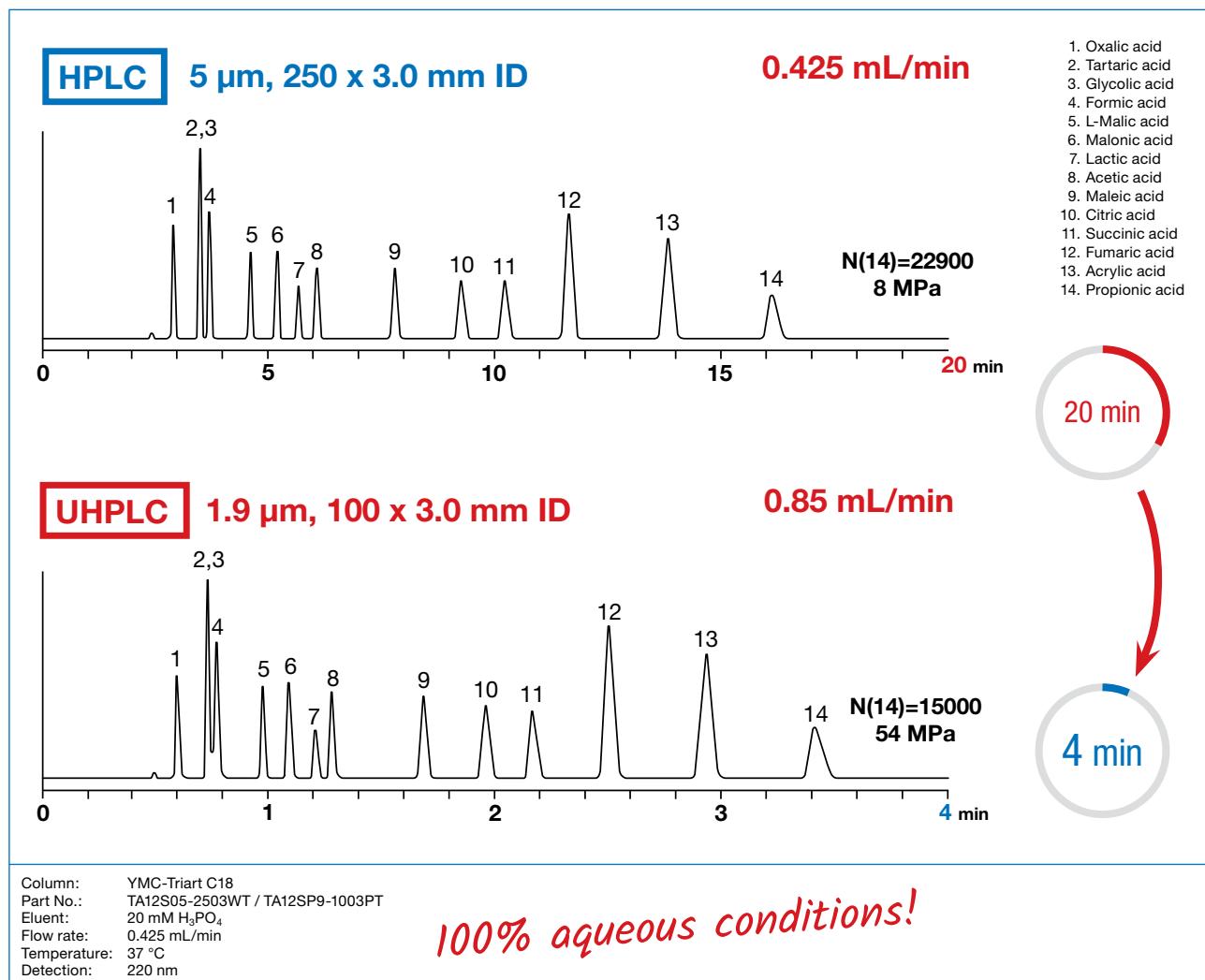


Image of C18 surface hydration

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!



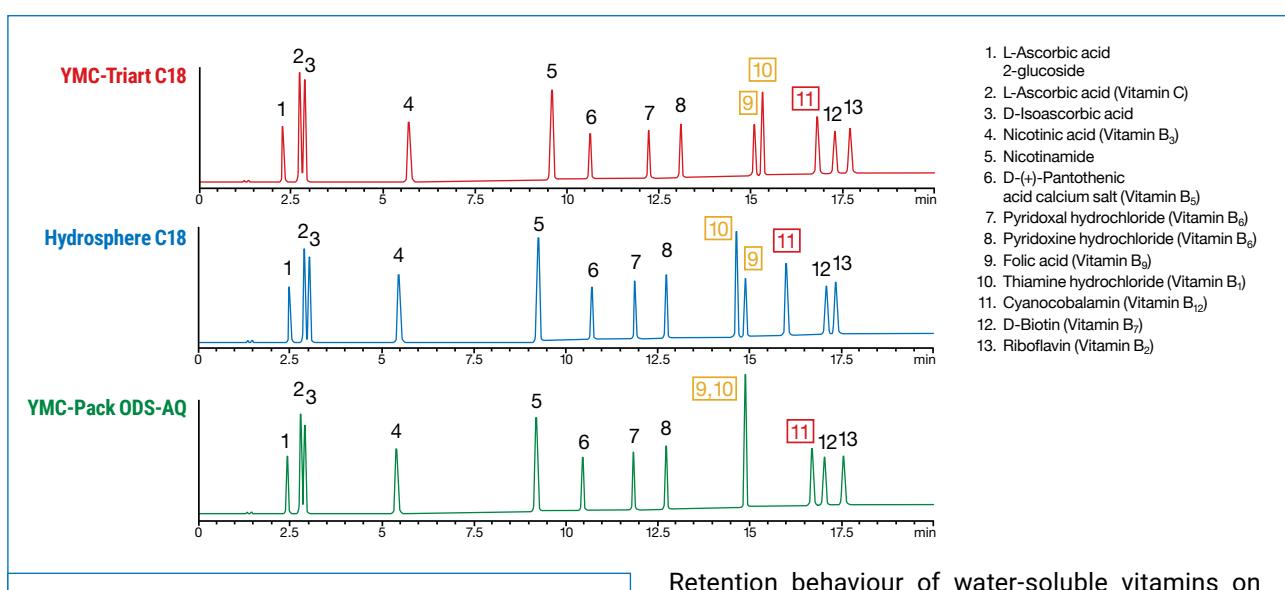
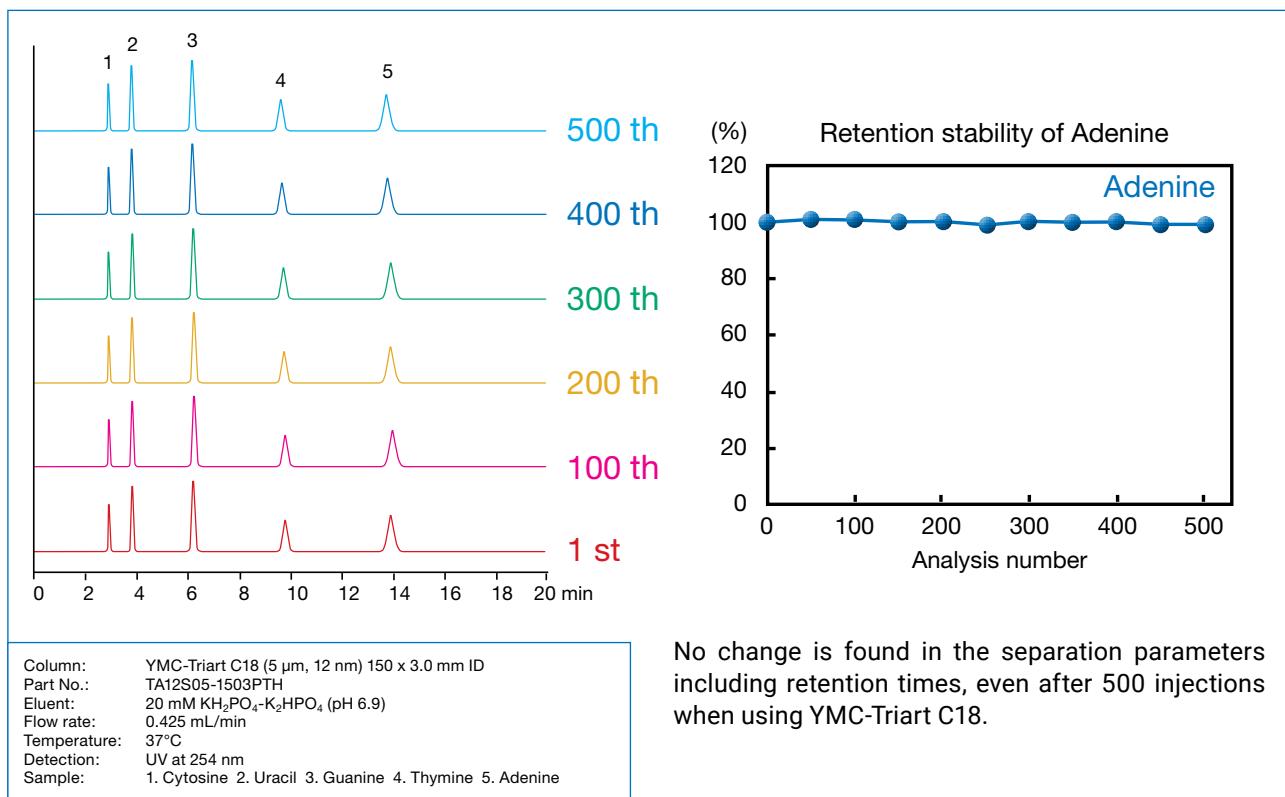
Stable under harsh conditions: pH 1-12 and temperature up to 90 °C.

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



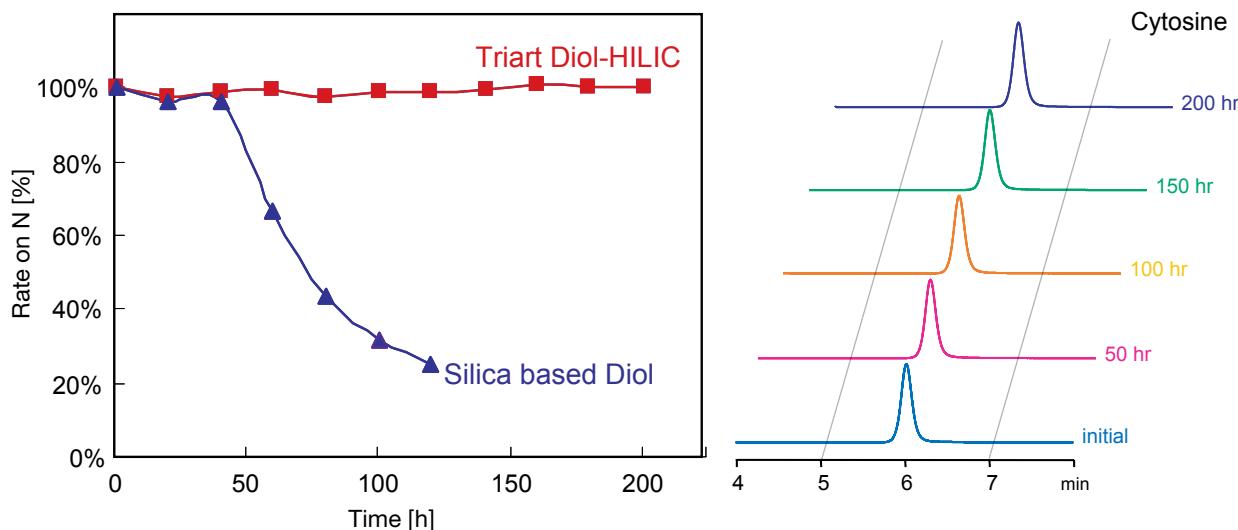
Column:	3 μ m, 150 x 3.0 mm ID
Part No.:	TA12S05-1503PTH
Eluent:	A) 20 mM KH ₂ PO ₄ -H ₃ PO ₄ (pH 2.8) containing 5 mM CH ₃ (CH ₂) ₅ SO ₃ Na B) 20 mM KH ₂ PO ₄ -H ₃ PO ₄ (pH 2.8) / acetonitrile (80/20) containing 5 mM CH ₃ (CH ₂) ₅ SO ₃ Na
Flow rate:	0.425 mL/min
Temperature:	40 °C
Detection:	210 nm

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

HILIC

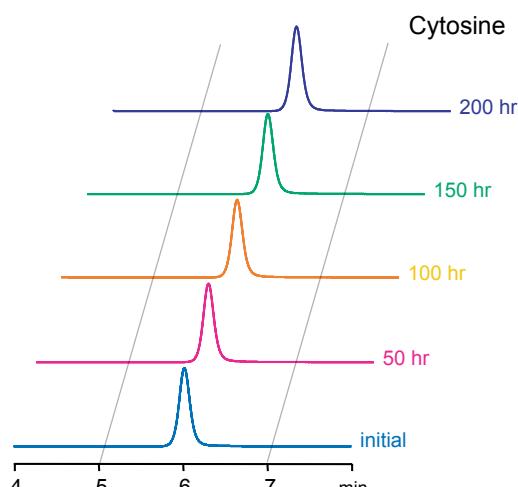
Great stability and reproducibility at high pH

Stability at high pH (pH 11, 50 °C)*



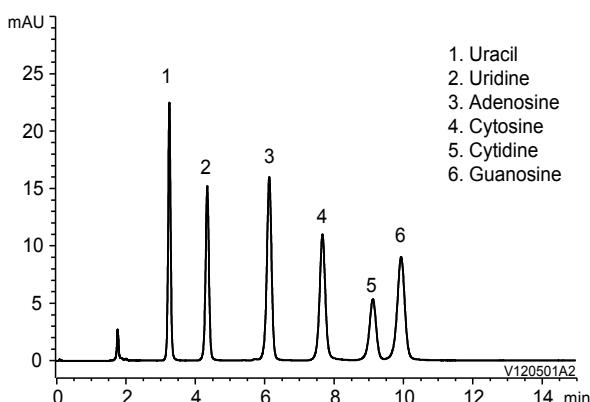
* pH ≤ 10 is recommended for regular use

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



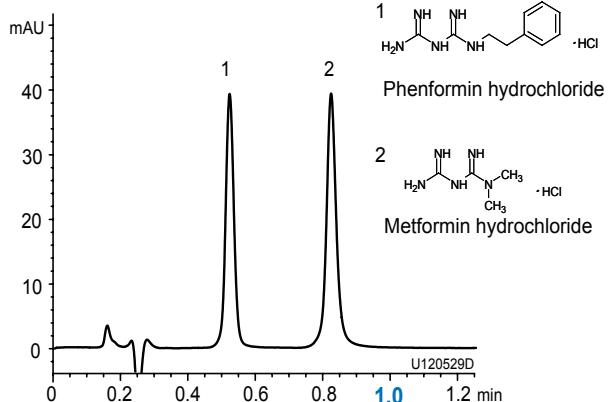
YMC-Triart Diol-HILIC offers highly reproducible separations even at high pH and high temperature. The lifetime of YMC-Triart Diol-HILIC is much longer than that of conventional silica-based Diol columns.

Nucleosides and bases



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

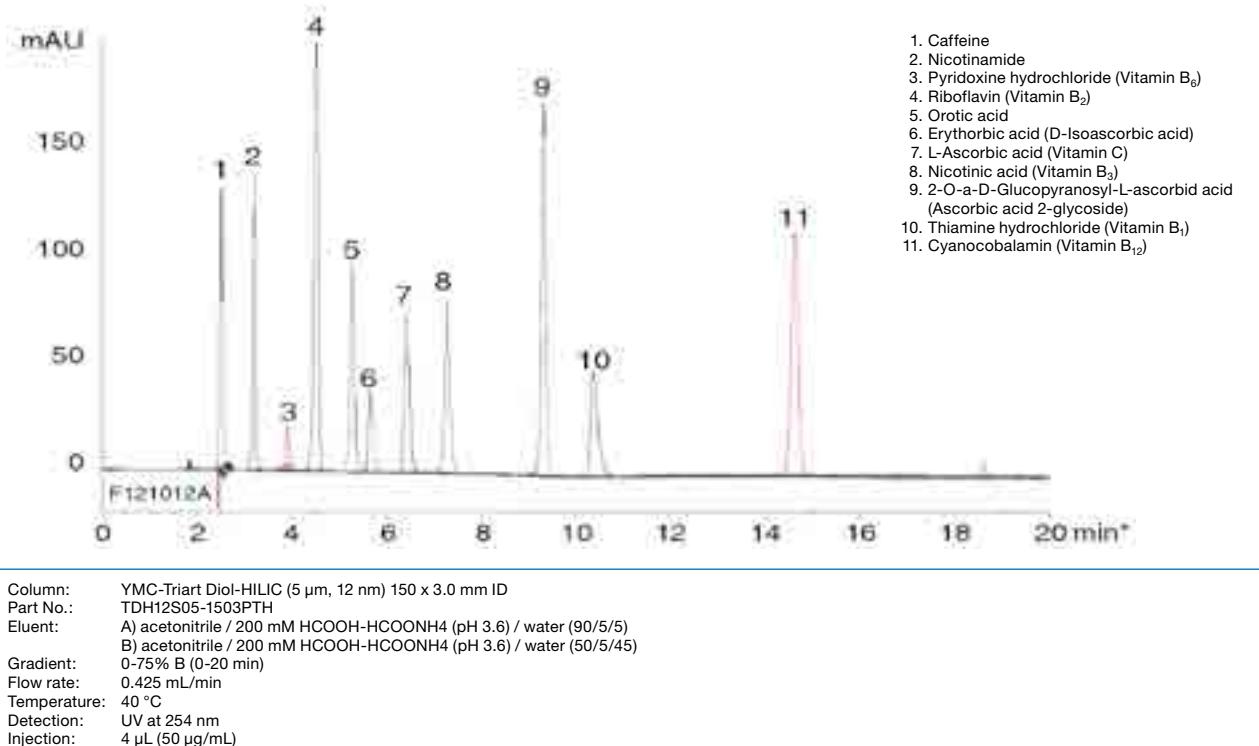
Diabetes drugs



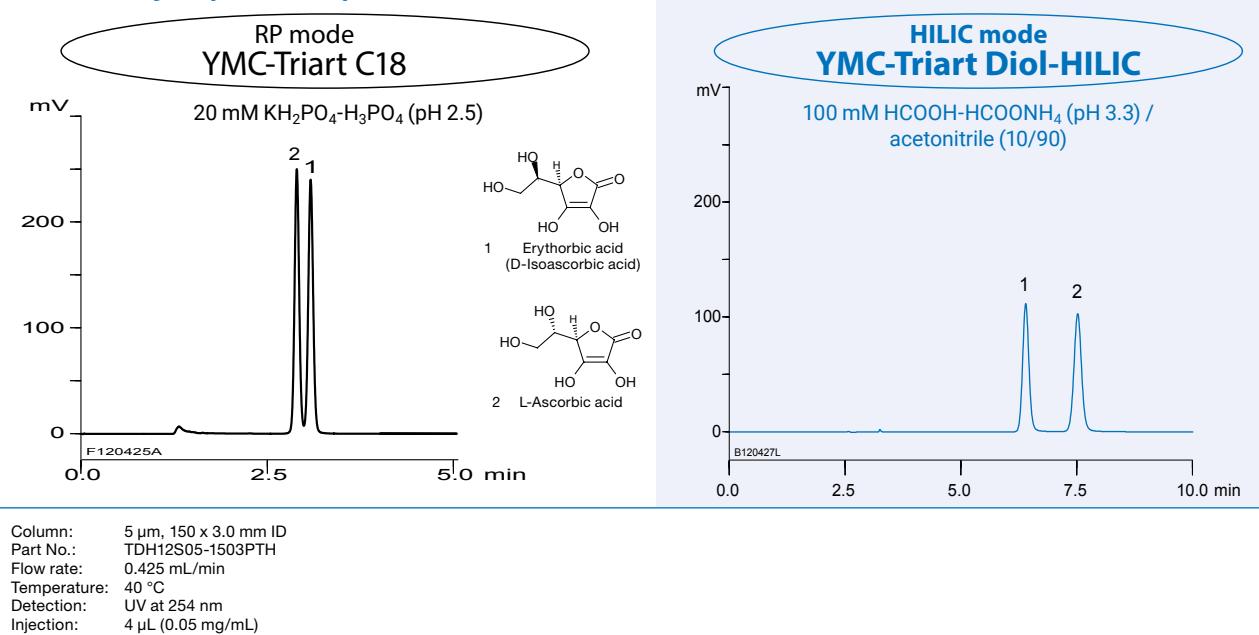
Column: YMC-Triart Diol-HILIC (1.9 µm, 12 nm) 50 x 2.0 mm ID
 Part No.: TDH12SP9-0502PT
 Eluent: 100 mM HCOOH-HCOONH₄ (pH 3.7) / acetonitrile (10/90)
 Flow rate: 0.8 mL/min
 Temperature: 25 °C
 Detection: UV at 235 nm
 Injection: 2 µL (10 µg/mL)

HILIC

Water soluble vitamins



Polar and hydrophilic compounds



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.

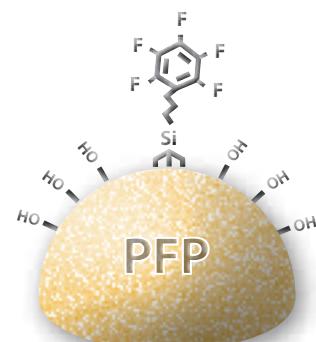
SFC

Phases for SFC

YMC-Triart Diol



YMC-Triart PFP



YMC-Triart C18



YMC-Triart SIL



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*			

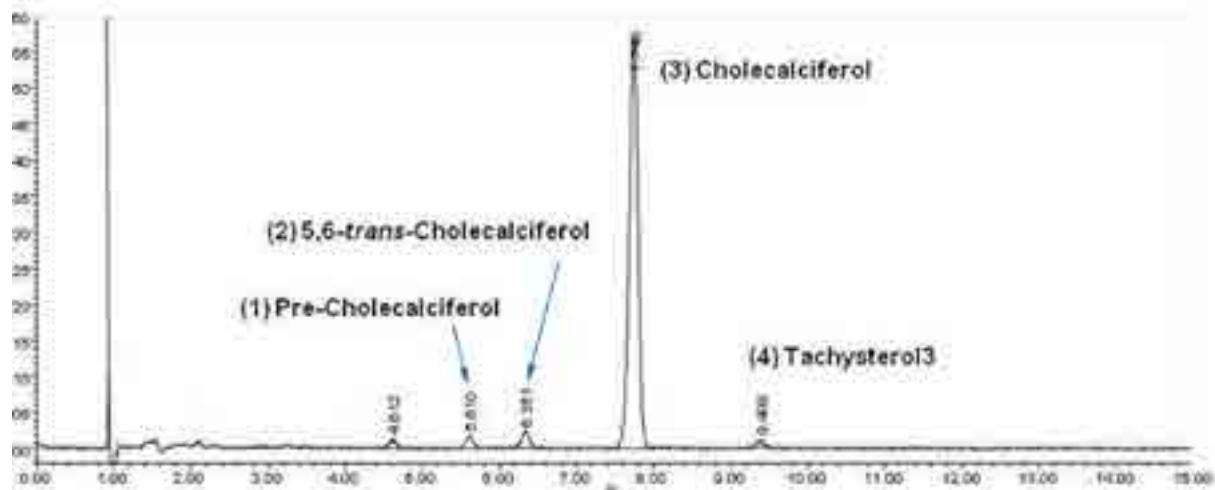
*a statement is available to confirm the usability in SFC mode

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.

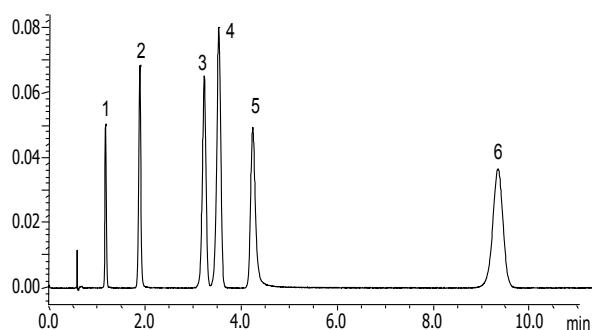
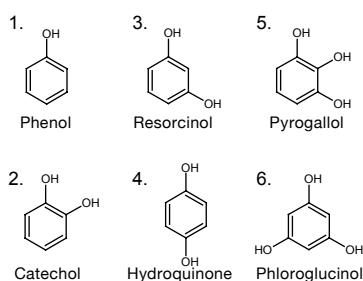
Rapid analysis of vitamin D₃ and related substances in nutritional products



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

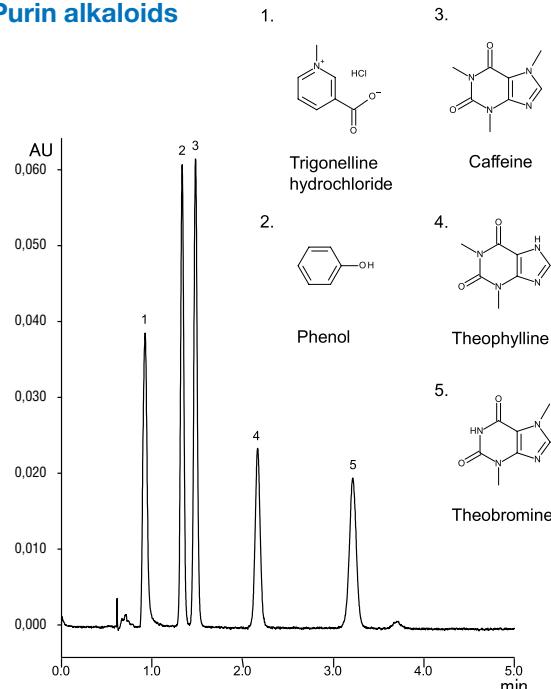
Trade quality and stressed samples used were supplied by DSM Nutritional Products, Site Sisseln (CH)

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)

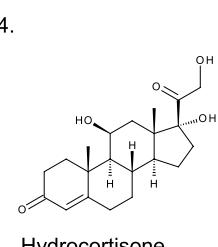
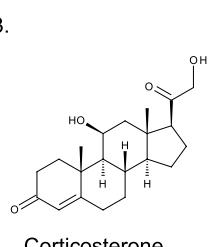
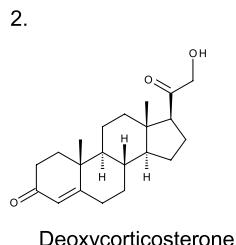
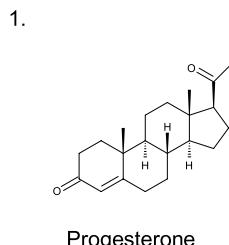
Purin alkaloids



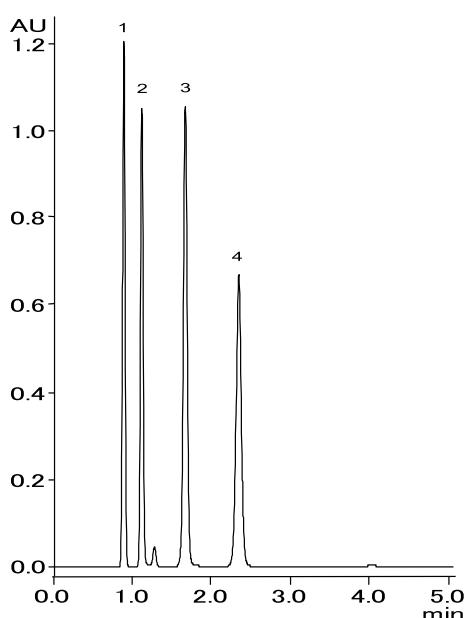
Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDN12S05-1546PTH
 Eluent: CO₂/methanol (90/10)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 230 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.085 ~ 5.7 mg/mL)

SFC

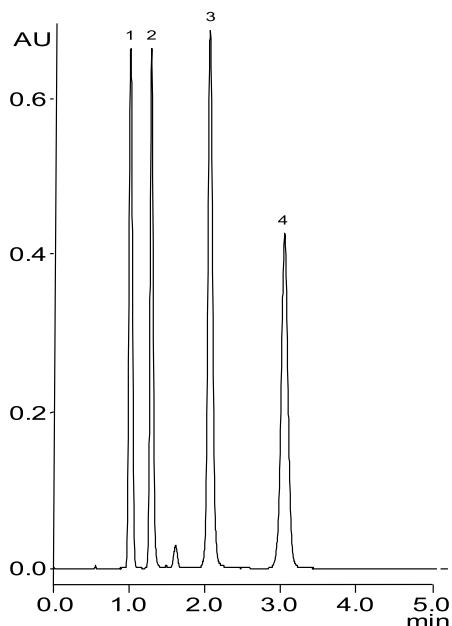
Steroids using different modifiers



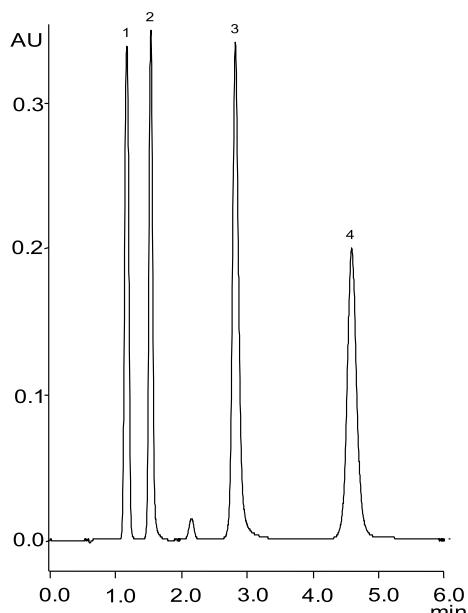
Methanol



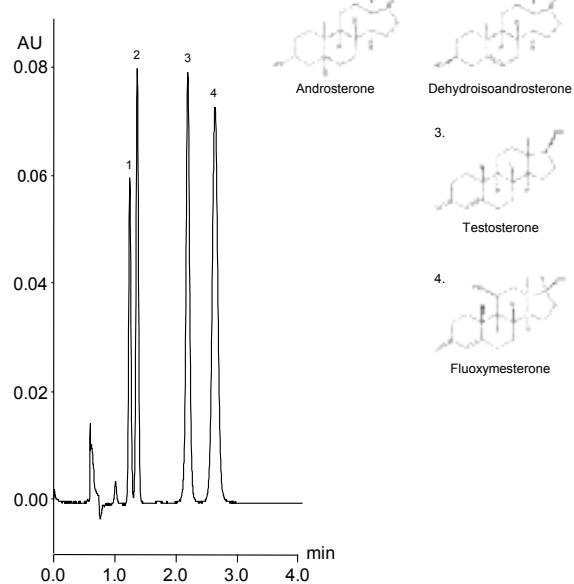
Ethanol



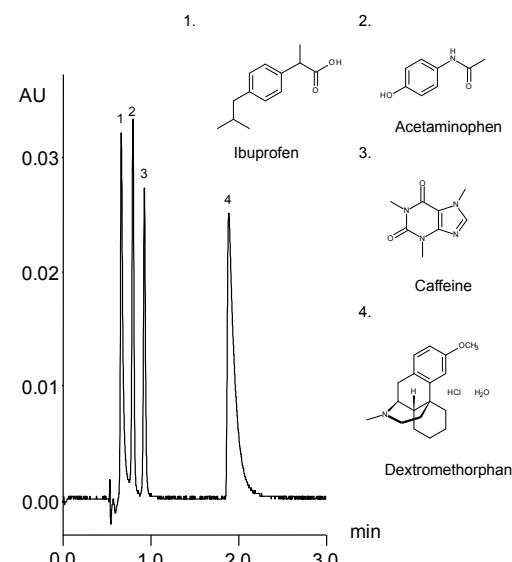
Isopropanol



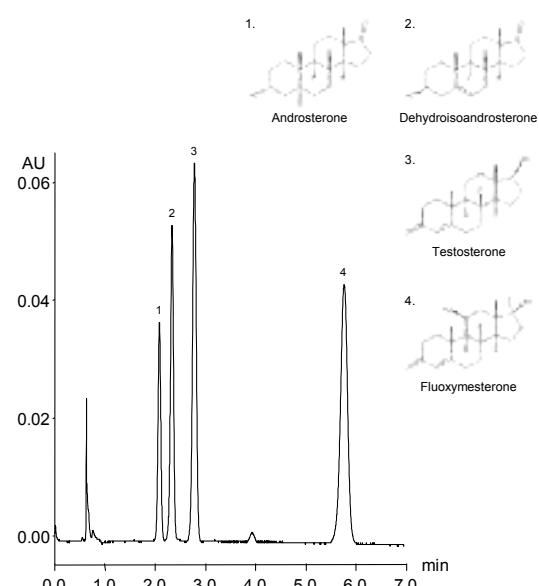
Column: YMC-Triart Diol (5 μ m, 12 nm) 150 x 4.6 mm ID
 Part No.: TDN12S05-1546PTH
 Eluent: CO₂/alcohol (80/20)
 Flow rate: 3.0 mL/min
 Temperature: 40 °C
 Detection: UV at 254 nm
 Back pressure: 13.8 MPa (2000 psi)
 Injection: 5 μ L (0.8 mg/mL)

Androgens

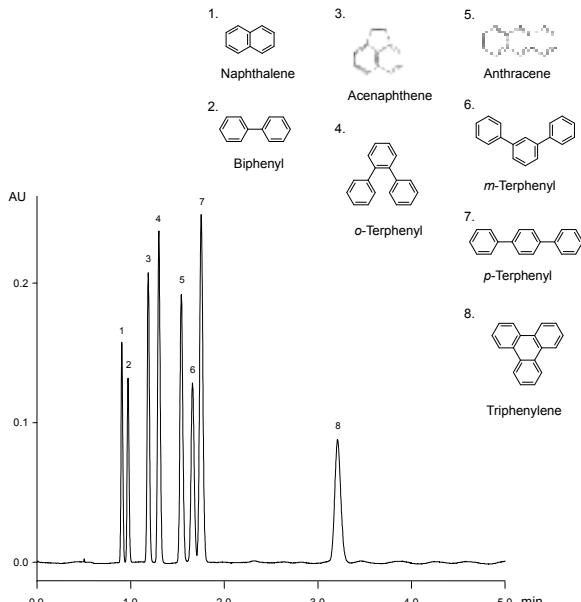
Column: YMC-Triart PFP (5 μ m, 12 nm) 150 x 4.6 mm ID
Part No.: TPF12S05-1546PTH
Eluent: CO₂/ethanol (90/10)
Flow rate: 3.0 mL/min
Temperature: 40 °C
Detection: UV at 254 nm
Back pressure: 13.8 MPa (2000 psi)
Injection: 5 μ L (0.56 mg/mL ~ 6.7 mg/mL)

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

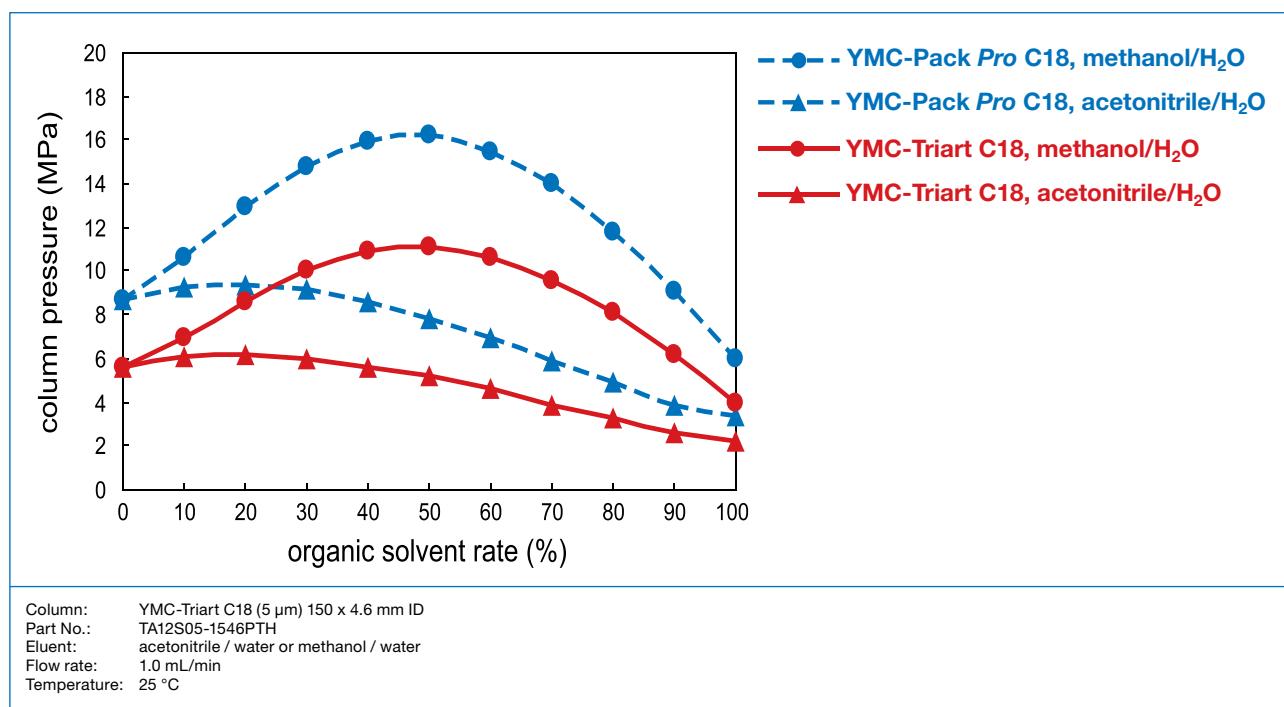


by courtesy of YMC Co., Ltd.

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).

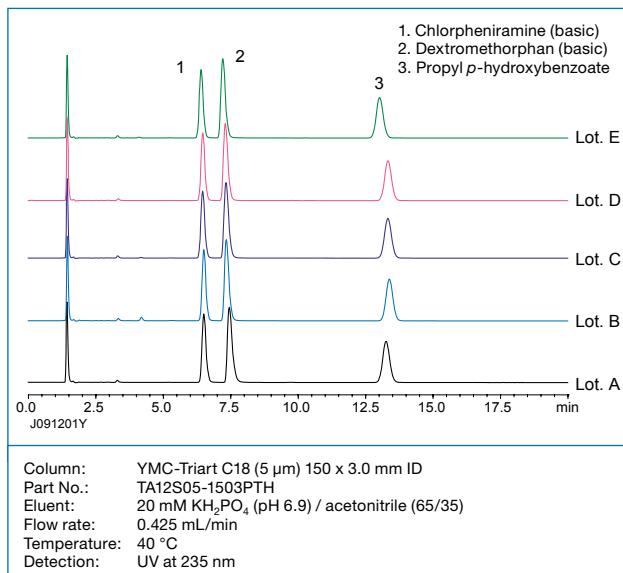
QC Data – Excellent reproducibility

Batch-to-batch reproducibility

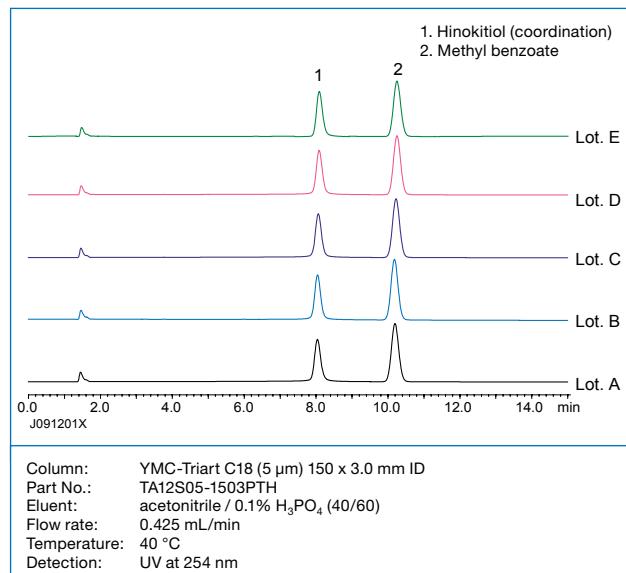
Excellent reproducibility of YMC-Triart phases is available even for the analysis of basic and coordination

compounds which normally exhibit tailing and adsorption effects.

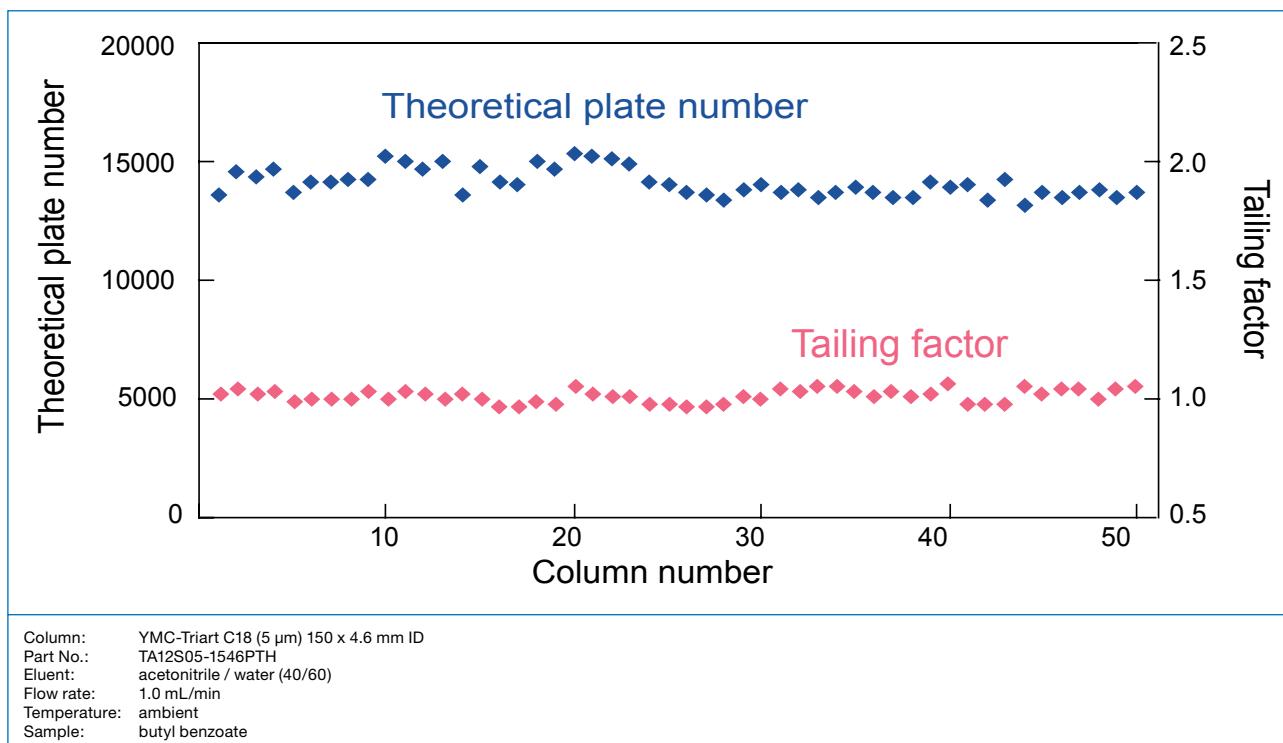
Basic compounds



Coordination compounds

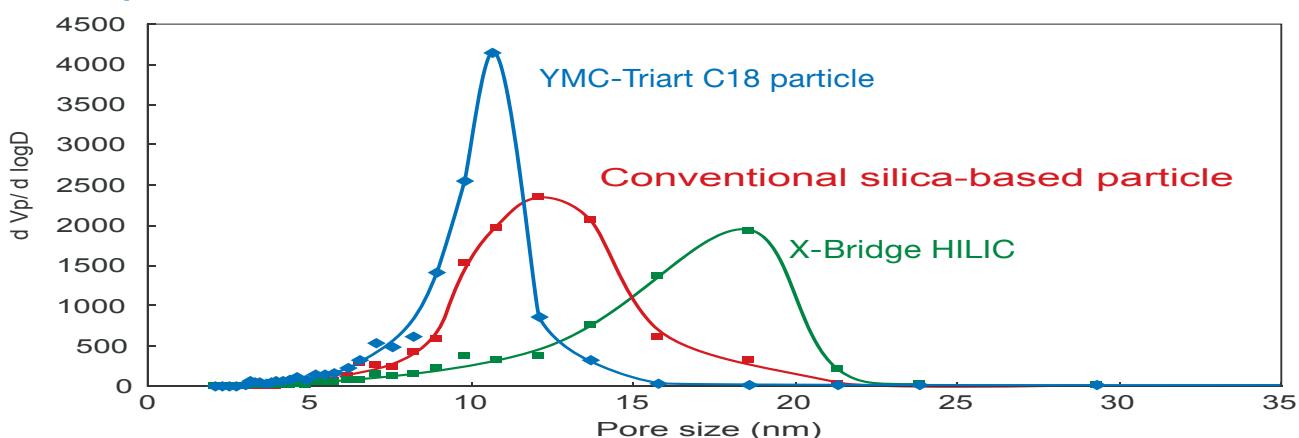


The reproducibility of packed columns is shown below in terms of theoretical plate number (N) and tailing factor (Tf). YMC-Triart packed columns exhibit a very narrow range of variation.



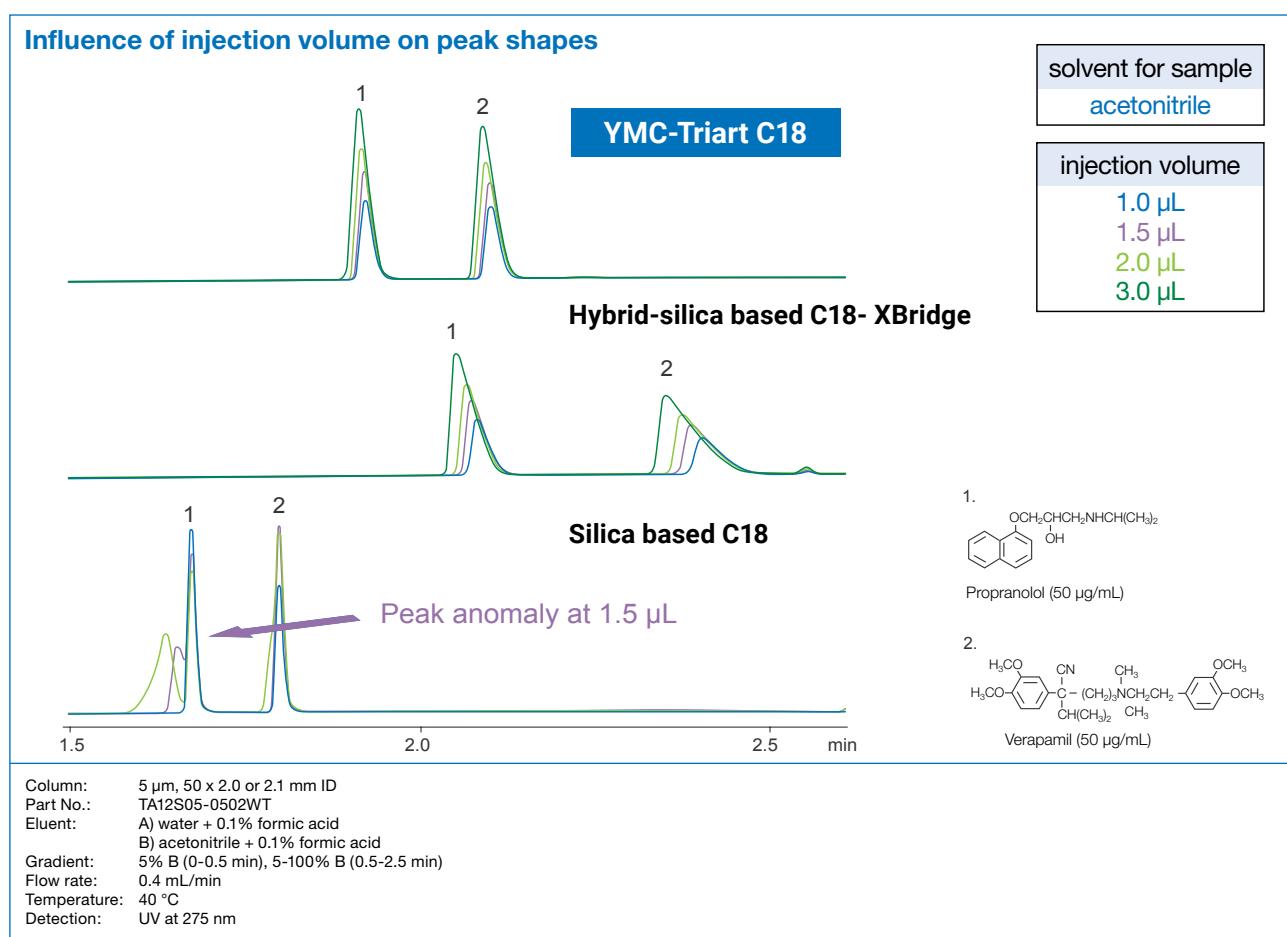
QC Data – High loadability

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



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

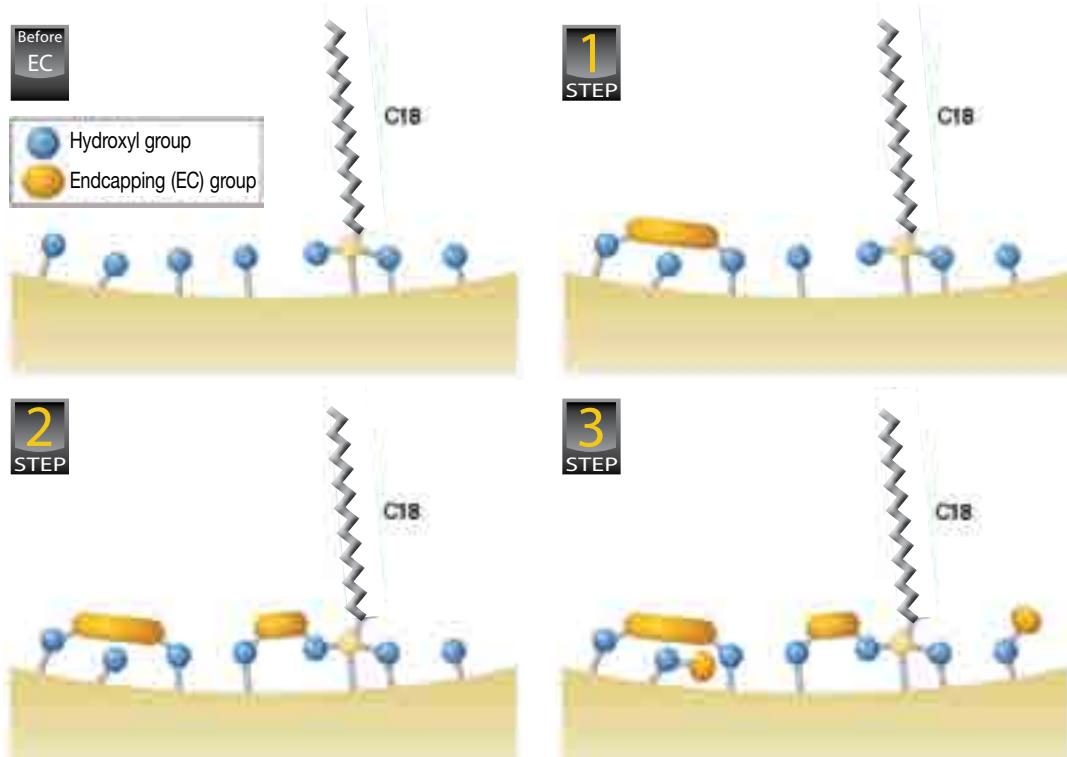
Multi-stage endcapping

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.

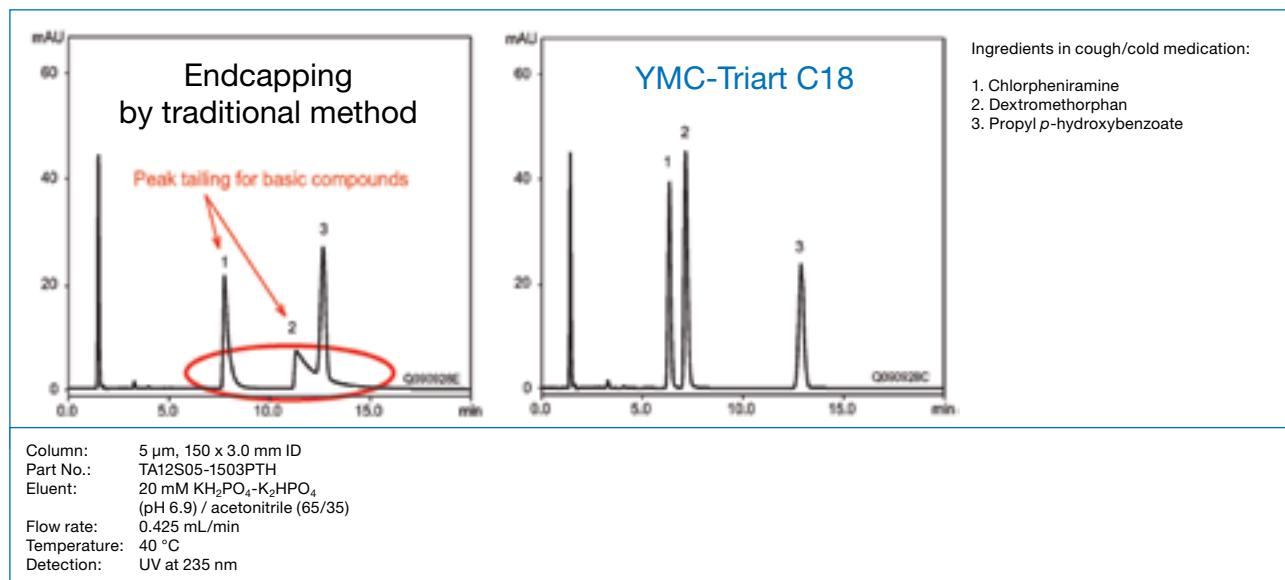
However, the highly reactive silanols can be hydrolysed easily which contributes to the poor stability. The less reactive silanols are hard to endcap which

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.

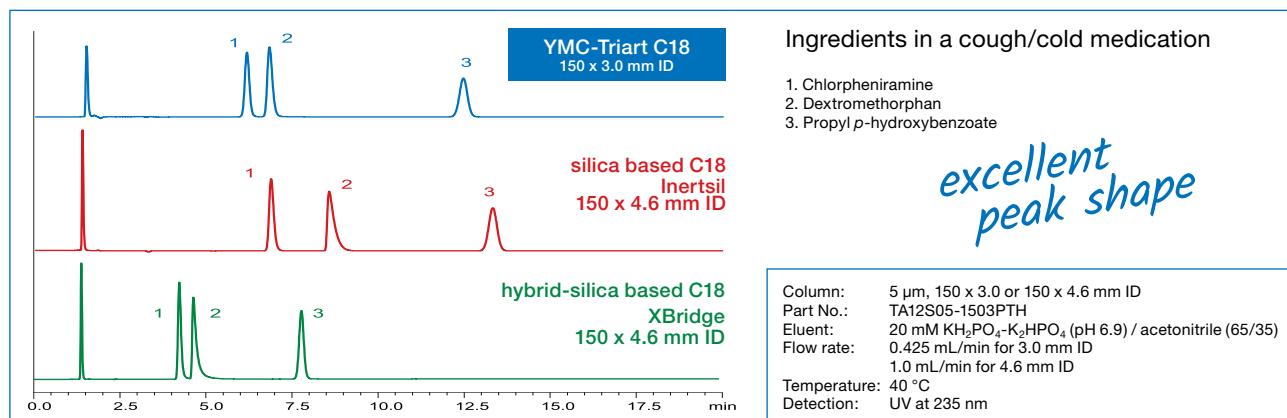


The chromatographic result of a “good” endcapping is demonstrated:



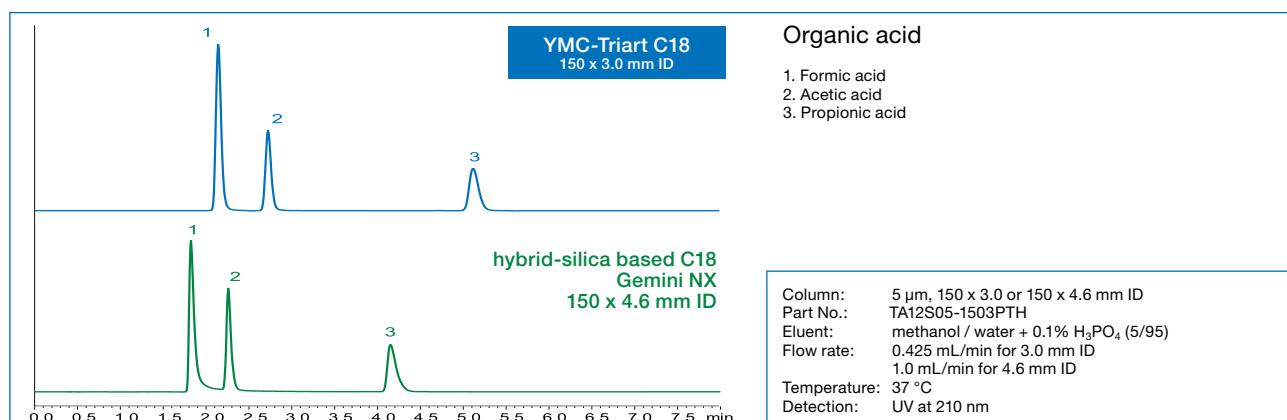
QC Data – Symmetric peaks

Basic compounds



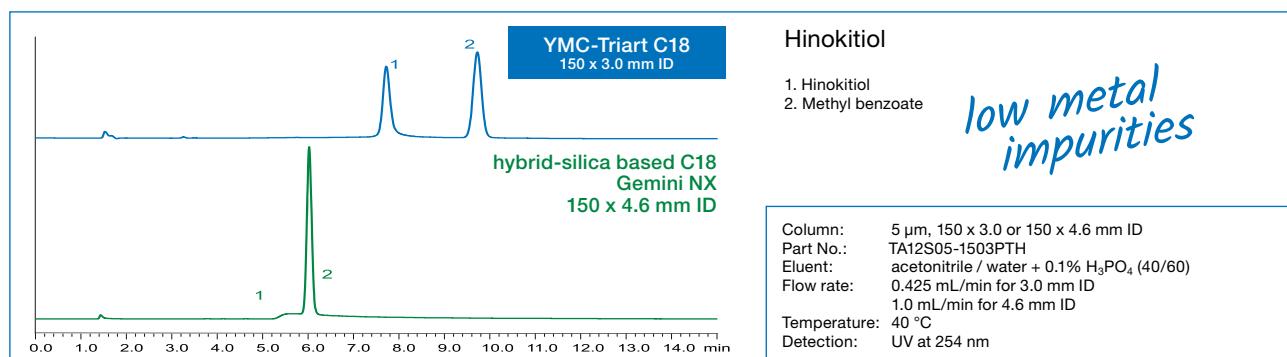
The innovative surface modification technology results in excellent peak shapes even for basic compounds that often exhibit peak tailing with conventional silica- and hybrid silica-based reversed phase columns.

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.

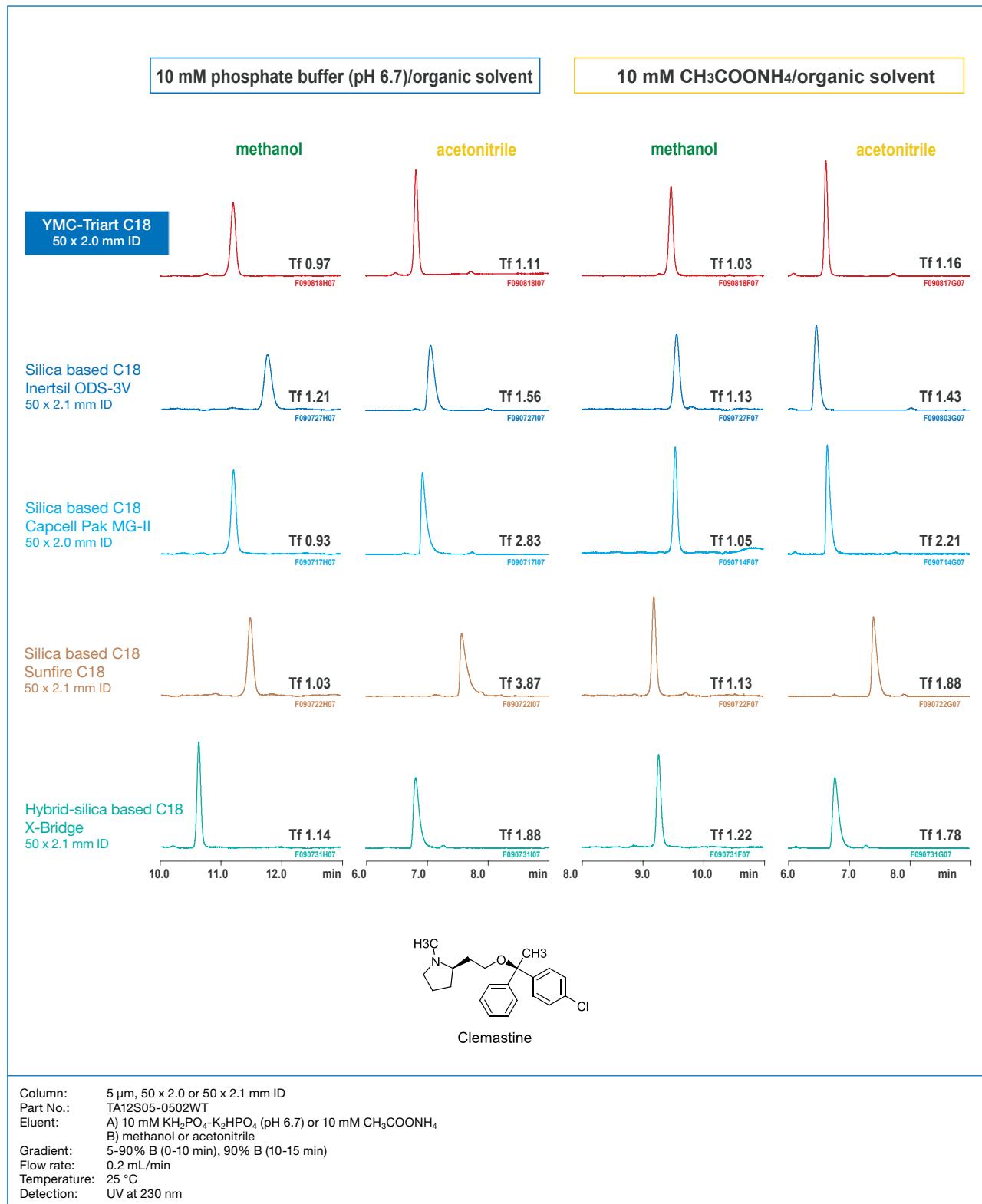
Coordinating compounds



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



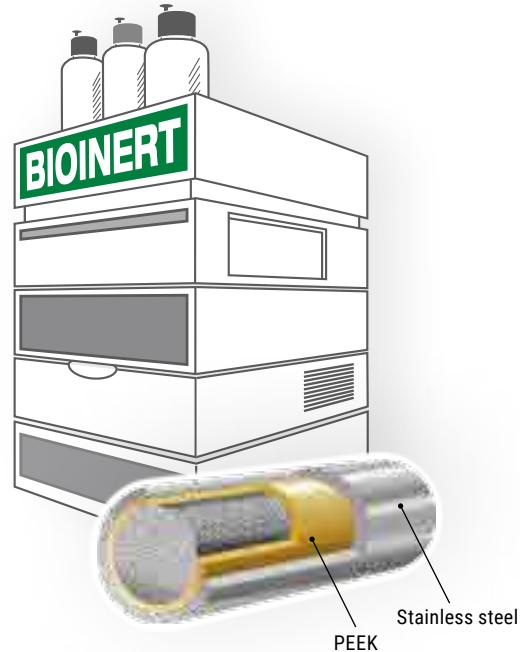
Clemastine is a well-known basic compound which readily exhibits peak tailing with conventional ODS columns. YMC-Triart C18 provides sharp separations with many different buffer/solvent compositions.

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.

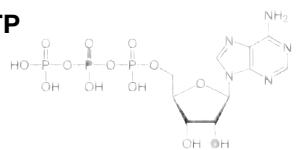


Metal coordinating compounds, which have a phosphate group in their structure, tend to show poor peak shape due to interactions with metals, such as the stainless steel in column bodies and frits. By using the metal-free column hardware, better peak shapes can

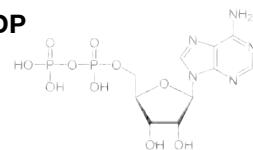
be expected. Nucleotides with phosphate groups also show better peak shapes when compared to the regular column hardware. The YMC-Triart metal-free column hardware is very suitable for highly sensitive analyses using LC/MS.

Improved sensitivity for coordination compounds

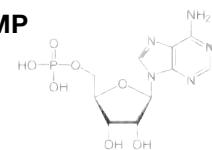
1. ATP



2. ADP

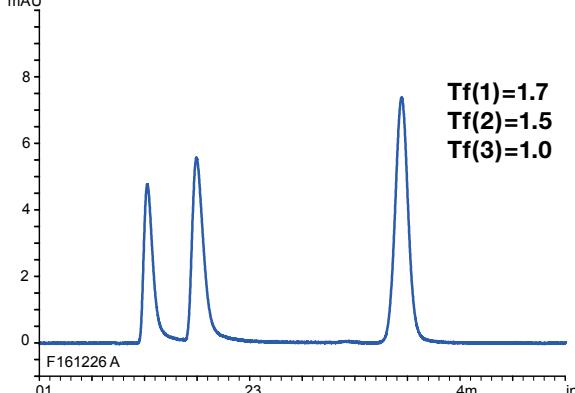


3. AMP



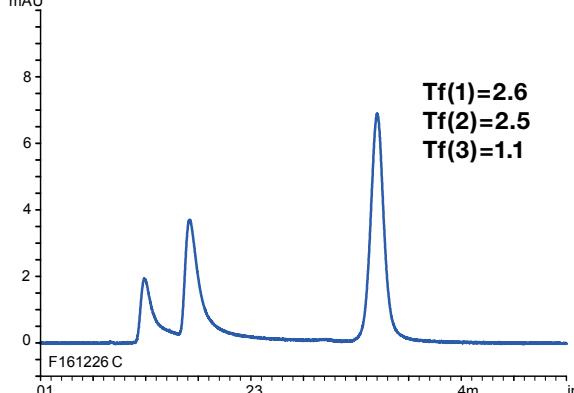
mAU

Metal-free column



mAU

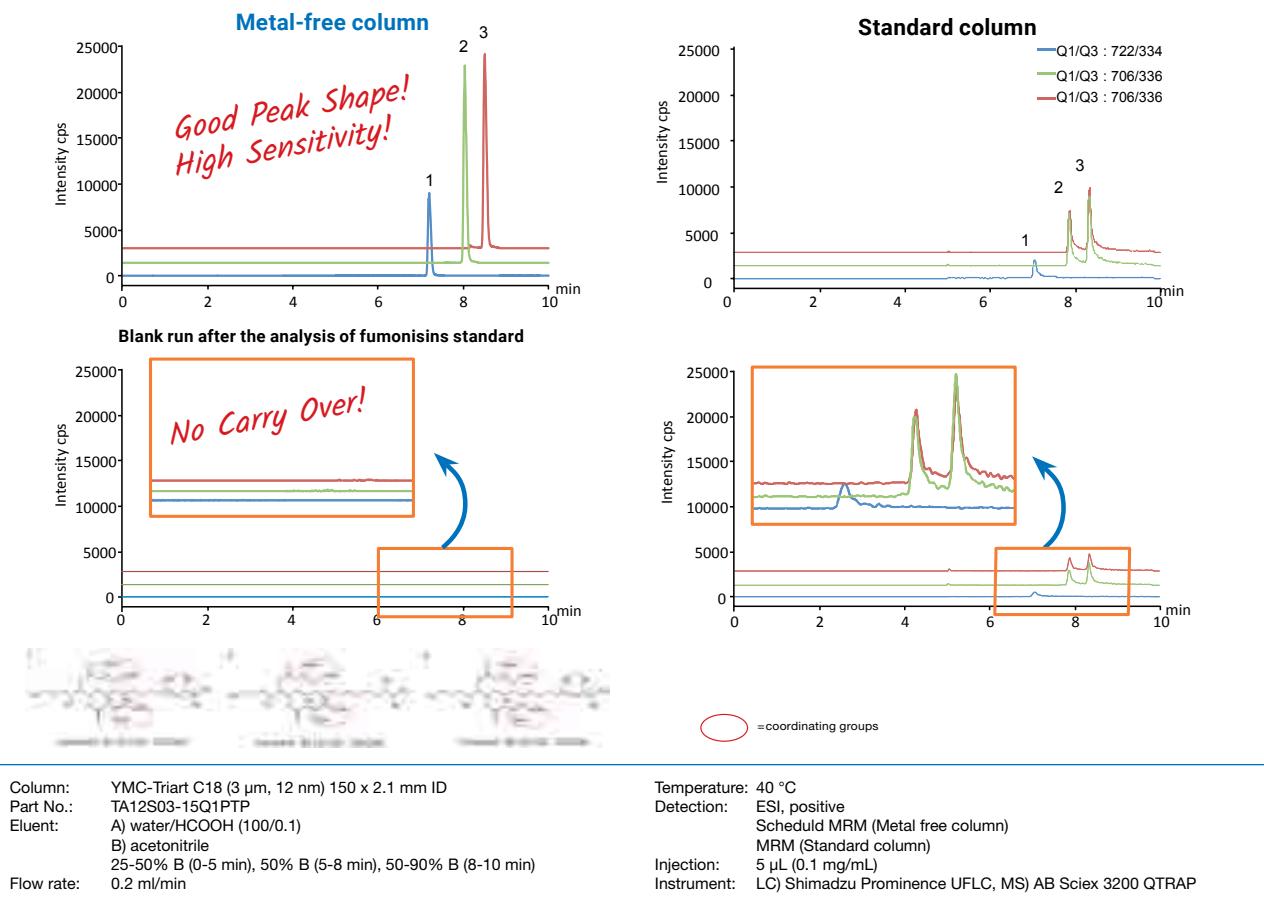
Standard column



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 HCOONH₄
 Flow rate: 0.21 mL/min
 Temperature: 25 °C
 Detection: UV at 265 nm
 Injection: 1 µL (10 mg/mL)
 System: bioinert/"metal-free" HPLC system

Column hardware for bioseparations and coordinating compounds

Improved LC/MS results



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
Manufacturer	IDEX Health & Science LLC	IDEX Health & Science LLC	YMC Co., Ltd.
Pressure rating	131 MPa / 1,310 bar	131 MPa / 1,310 bar	42 MPa / 420 bar
Product code	e.g. UPFP-6050250	e.g. UPFP-YM7050250	XRP0204

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	D-Biotin	53	8, 10, 14, 55, 59, 61, 64	Glycitin	38
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Acidic compounds	Catecholamines	23	Doxycycline	2-Hydroxyacetophenone	29
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Adenosine monophosphate (AMP)	Chlortetracycline	13, 26	β-Endorphin	21-Hydroxyprogesterone	19
Adenosine triphosphate (ATP)	Cholecalciferol	16, 17, 57	γ-Endorphin	Hydroquinone	57
Adrenaline hydrochloride (A)	Pre-Cholecalciferol	57	Epinephrine hydrochloride	5-Hydroxytryptamine	
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Angiotensin III	Cortisone	19	Estrone		
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Anthocyanins	Cyanidin-3-O-arabinoside	33		Lactic acid	52
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Arachidonic acid	Cyanidin-3-O-glucoside	33	F	β-Lactoglobulin A	39, 41, 42
L-Arginine (Arg)	Cyanocobalamin	38, 53, 55	Flazasulfuron	L-Leucine (Leu)	46, 47
L-Ascorbic acid	Cyclamate Na	32	Fluoxymestrone	Leu-Enkephalin	42, 44
L-Ascorbic acid	L-Cysteine (Cys)	47	Folic acid	Formic acid	52, 64
2-glucoside	Cytidine	54	53	Linoleic acid	18
L-Asparagine (Asn)	Cytosine	51, 53, 54	Fumaric acid	α-Linolenic acid	18
L-Aspartic acid (Asp)			Fumonisin B1-3	γ-Linolenic acid	18
Asulam	D			L-Lysine (Lys)	22, 47
Atenolol	Daidzein	38	G	Lysozyme	39, 41, 42
Atorvastatin calcium hydrate	Daidzin	38	Genistein	M	
Avastin	Dehydroisoandrosterone	58	Genistin	Macrolide antibiotics	25
Azoxystrobin	Delphinidin	33	L-Glutamic acid (Glu)	Maleic acid sodium salt	27
	Delphinidin-3-O-arabinoside	33	L-Glutamine (Gln)	L-Malic acid	52
B	Delphinidin-3-O-galactoside	33	Gluten markers	Malonic acid	52
Benzethonium chloride	Delphinidin-3-O-glucoside	33	Glycidic acid	6"-O-Malonyldaidzin	38
Betablockers	Deoxycorticosterone	58	L-Glycine (Gly)		

Substance index

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

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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 (pack of 3)
		20	30	50	75	100	150	
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	T012SP9-0202PT	T012SP9-0302PT	T012SP9-0502PT	T012SP9-L502PT	T012SP9-1002PT	T012SP9-1502PT	T012SP9-E5Q1CC**
	2.1	T012SP9-02Q1PT	T012SP9-03Q1PT	T012SP9-05Q1PT	T012SP9-L5Q1PT	T012SP9-10Q1PT	T012SP9-15Q1PT	T012SP9-E5Q1CC**
	3.0	—	—	T012SP9-0503PT	T012SP9-L503PT	T012SP9-1003PT	T012SP9-1503PT	T012SP9-E503CC
Bio C4	2.0	TB30SP9-0202PT	TB30SP9-0302PT	TB30SP9-0502PT	TB30SP9-L502PT	TB30SP9-1002PT	TB30SP9-1502PT	TB30SP9-E5Q1CC**
	2.1	TB30SP9-02Q1PT	TB30SP9-03Q1PT	TB30SP9-05Q1PT	TB30SP9-L5Q1PT	TB30SP9-10Q1PT	TB30SP9-15Q1PT	TB30SP9-E5Q1CC**
	3.0	—	—	TB30SP9-0503PT	TB30SP9-L503PT	TB30SP9-1003PT	TB30SP9-1503PT	TB30SP9-E503CC
Phenyl	2.0	TPH12SP9-0202PT	TPH12SP9-0302PT	TPH12SP9-0502PT	TPH12SP9-L502PT	TPH12SP9-1002PT	TPH12SP9-1502PT	TPH12SP9-E5Q1CC**
	2.1	TPH12SP9-02Q1PT	TPH12SP9-03Q1PT	TPH12SP9-05Q1PT	TPH12SP9-L5Q1PT	TPH12SP9-10Q1PT	TPH12SP9-15Q1PT	TPH12SP9-E5Q1CC**
	3.0	—	—	TPH12SP9-0503PT	TPH12SP9-L503PT	TPH12SP9-1003PT	TPH12SP9-1503PT	TPH12SP9-E503CC
PFP	2.0	TPF12SP9-0202PT	TPF12SP9-0302PT	TPF12SP9-0502PT	TPF12SP9-L502PT	TPF12SP9-1002PT	TPF12SP9-1502PT	TPF12SP9-E5Q1CC**
	2.1	TPF12SP9-02Q1PT	TPF12SP9-03Q1PT	TPF12SP9-05Q1PT	TPF12SP9-L5Q1PT	TPF12SP9-10Q1PT	TPF12SP9-15Q1PT	TPF12SP9-E5Q1CC**
	3.0	—	—	TPF12SP9-0503PT	TPF12SP9-L503PT	TPF12SP9-1003PT	TPF12SP9-1503PT	TPF12SP9-E503CC
Diol-HILIC	2.0	TDH12SP9-0202PT	TDH12SP9-0302PT	TDH12SP9-0502PT	TDH12SP9-L502PT	TDH12SP9-1002PT	TDH12SP9-1502PT	TDH12SP9-E5Q1CC**
	2.1	TDH12SP9-02Q1PT	TDH12SP9-03Q1PT	TDH12SP9-05Q1PT	TDH12SP9-L5Q1PT	TDH12SP9-10Q1PT	TDH12SP9-15Q1PT	TDH12SP9-E5Q1CC**
	3.0	—	—	TDH12SP9-0503PT	TDH12SP9-L503PT	TDH12SP9-1003PT	—	—
Diol (SFC)	2.0	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 (µm)	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	(pack of 5)	
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	T012S03-02Q1PTH	T012S03-H3Q1PTH	T012S03-05Q1PTH	T012S03-L5Q1PTH	T012S03-10Q1PTH	T012S03-15Q1PTH	—	T012S03-01Q1GC	
	3.0	—	—	T012S03-0503PTH	T012S03-L503PTH	T012S03-1003PTH	T012S03-1503PTH	—	T012S03-0103GC	
	4.6	—	T012S03-H346PTH	T012S03-0546PTH	T012S03-L546PTH	T012S03-1046PTH	T012S03-1546PTH	T012S03-2546PTH	T012S03-0104GC	
Bio C4	2.1	TB30S03-02Q1PTH	TB30S03-H3Q1PTH	TB30S03-05Q1PTH	TB30S03-L5Q1PTH	TB30S03-10Q1PTH	TB30S03-15Q1PTH	—	TB30S03-01Q1GC	
	3.0	—	—	TB30S03-0503PTH	TB30S03-L503PTH	TB30S03-1003PTH	TB30S03-1503PTH	—	TB30S03-0103GC	
	4.6	—	TB30S03-H346PTH	TB30S03-0546PTH	TB30S03-L546PTH	TB30S03-1046PTH	TB30S03-1546PTH	TB30S03-2546PTH	TB30S03-0104GC	
Phenyl	2.1	TPH12S03-02Q1PTH	TPH12S03-H3Q1PTH	TPH12S03-05Q1PTH	TPH12S03-L5Q1PTH	TPH12S03-10Q1PTH	TPH12S03-15Q1PTH	—	TPH12S03-01Q1GC	
	3.0	—	—	TPH12S03-0503PTH	TPH12S03-L503PTH	TPH12S03-1003PTH	TPH12S03-1503PTH	—	TPH12S03-0103GC	
	4.6	—	TPH12S03-H346PTH	TPH12S03-0546PTH	TPH12S03-L546PTH	TPH12S03-1046PTH	TPH12S03-1546PTH	TPH12S03-2546PTH	TPH12S03-0104GC	
PFP	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	TA12S03-1001PTP	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	T012S03-05Q1PTP	T012S03-10Q1PTP	T012S03-15Q1PTP
	4.6	T012S03-0546PTP	T012S03-1046PTP	T012S03-1546PTP
Bio C4	2.1	TB30S03-05Q1PTP	TB30S03-10Q1PTP	TB30S03-15Q1PTP
	4.6	TB30S03-0546PTP	TB30S03-1046PTP	TB30S03-1546PTP
Phenyl	2.1	TPH12S03-05Q1PTP	TPH12S03-10Q1PTP	TPH12S03-15Q1PTP
	4.6	TPH12S03-0546PTP	TPH12S03-1046PTP	TPH12S03-1546PTP
PFP	2.1	TPF12S03-05Q1PTP	TPF12S03-10Q1PTP	TPF12S03-15Q1PTP
	4.6	TPF12S03-0546PTP	TPF12S03-1046PTP	TPF12S03-1546PTP
Diol-HILIC	2.1	TDH12S03-05Q1PTP	TDH12S03-10Q1PTP	TDH12S03-15Q1PTP
	4.6	TDH12S03-0546PTP	TDH12S03-1046PTP	TDH12S03-1546PTP

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

Phase	Column ID (mm)	Column length (mm)							Guard cartridges* with 10 mm length
		20	30	50	75	100	150	250	(pack of 5)
C18	2.0	TA12S03-0202WT	TA12S03-0302WT	TA12S03-0502WT	TA12S03-L502WT	TA12S03-1002WT	TA12S03-1502WT	—	TA12S03-01Q1GC
	3.0	—	—	TA12S03-0503WT	TA12S03-L503WT	TA12S03-1003WT	TA12S03-1503WT	—	TA12S03-0103GC
	4.6	—	—	TA12S03-0546WT	TA12S03-L546WT	TA12S03-1046WT	TA12S03-1546WT	TA12S03-2546WT	TA12S03-0104GC
C8	2.0	T012S03-0202WT	T012S03-0302WT	T012S03-0502WT	T012S03-L502WT	T012S03-1002WT	T012S03-1502WT	—	T012S03-01Q1GC
	3.0	—	—	T012S03-0503WT	T012S03-L503WT	T012S03-1003WT	T012S03-1503WT	—	T012S03-0103GC
	4.6	—	—	T012S03-0546WT	T012S03-L546WT	T012S03-1046WT	T012S03-1546WT	T012S03-2546WT	T012S03-0104GC
Phenyl	2.0	TPH12S03-0202WT	TPH12S03-0302WT	TPH12S03-0502WT	TPH12S03-L502WT	TPH12S03-1002WT	TPH12S03-1502WT	—	TPH12S03-01Q1GC
	3.0	—	—	TPH12S03-0503WT	TPH12S03-L503WT	TPH12S03-1003WT	TPH12S03-1503WT	—	TPH12S03-0103GC
	4.6	—	—	TPH12S03-0546WT	TPH12S03-L546WT	TPH12S03-1046WT	TPH12S03-1546WT	TPH12S03-2546WT	TPH12S03-0104GC
PFP	2.0	TPF12S03-0202WT	TPF12S03-0302WT	TPF12S03-0502WT	TPF12S03-L502WT	TPF12S03-1002WT	TPF12S03-1502WT	—	TPF12S03-01Q1GC
	3.0	—	—	TPF12S03-0503WT	TPF12S03-L503WT	TPF12S03-1003WT	TPF12S03-1503WT	—	TPF12S03-0103GC
	4.6	—	—	TPF12S03-0546WT	TPF12S03-L546WT	TPF12S03-1046WT	TPF12S03-1546WT	TPF12S03-2546WT	TPF12S03-0104GC
Diol-HILIC	2.0	TDH12S03-0202WT	TDH12S03-0302WT	TDH12S03-0502WT	TDH12S03-L502WT	TDH12S03-1002WT	TDH12S03-1502WT	—	TDH12S03-01Q1GC
	3.0	—	—	TDH12S03-0503WT	TDH12S03-L503WT	TDH12S03-1003WT	TDH12S03-1503WT	—	TDH12S03-0103GC
	4.6	—	—	TDH12S03-0546WT	TDH12S03-L546WT	TDH12S03-1046WT	TDH12S03-1546WT	TDH12S03-2546WT	TDH12S03-0104GC

Ordering information

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

Phase	Column ID (µm)	Column length (mm)				Guard columns** with 5 mm length
		50	75	100	150	(pack of 3)
C18	75	TA12S03-05E8AU	TA12S03-L5E8AU	TA12S03-10E8AU	TA12S03-15E8AU	—
	100	TA12S03-05F0AU	TA12S03-L5F0AU	TA12S03-10F0AU	TA12S03-15F0AU	—
	300	TA12S03-05H0AU	TA12S03-L5H0AU	TA12S03-10H0AU	TA12S03-15H0AU	TA12S03-E5H0AU
	500	TA12S03-05J0AU	TA12S03-L5J0AU	TA12S03-10J0AU	TA12S03-15J0AU	TA12S03-E5J0AU
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	TO12S03-05E8AU	TO12S03-L5E8AU	TO12S03-10E8AU	TO12S03-15E8AU	—
	100	TO12S03-05F0AU	TO12S03-L5F0AU	TO12S03-10F0AU	TO12S03-15F0AU	—
	300	TO12S03-05H0AU	TO12S03-L5H0AU	TO12S03-10H0AU	TO12S03-15H0AU	TO12S03-E5H0AU
	500	TO12S03-05J0AU	TO12S03-L5J0AU	TO12S03-10J0AU	TO12S03-15J0AU	TO12S03-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	50 x 2.1 mm	1.9 µm	TATOTPHSP9-05Q1PT
		3 µm	TATOTPHS03-05Q1PTH
C18 / PFP / Diol-HILIC	50 x 2.1 mm	1.9 µm	TATPFTDHSP9-05Q1PT
		3 µm	TATPFTDHS03-05Q1PTH

Ordering information

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

Phase	Column ID (mm)	Column length (mm)								Guard cartridges* with 10 mm length
		20	33	50	75	100	150	250	(pack of 5)	
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	T012S05-02Q1PTH	T012S05-H3Q1PTH	T012S05-05Q1PTH	T012S05-L5Q1PTH	T012S05-10Q1PTH	T012S05-15Q1PTH	—	T012S05-01Q1GC	
	3.0	—	—	T012S05-0503PTH	T012S05-L503PTH	T012S05-1003PTH	T012S05-1503PTH	—	T012S05-0103GC	
	4.6	—	T012S05-H346PTH	T012S05-0546PTH	T012S05-L546PTH	T012S05-1046PTH	T012S05-1546PTH	T012S05-2546PTH	T012S05-0104GC	
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 4.6	TA12S05-05Q1PTP TA12S05-0546PTP	TA12S05-10Q1PTP TA12S05-1046PTP	TA12S05-15Q1PTP TA12S05-1546PTP
C18 ExRS	2.1 4.6	TAR08S05-05Q1PTP TAR08S05-0546PTP	TAR08S05-10Q1PTP TAR08S05-1046PTP	TAR08S05-15Q1PTP TAR08S05-1546PTP
C8	2.1 4.6	T012S05-05Q1PTP T012S05-0546PTP	T012S05-10Q1PTP T012S05-1046PTP	T012S05-15Q1PTP T012S05-1546PTP
Bio C4	2.1 4.6	TB30S05-05Q1PTP TB30S05-0546PTP	TB30S05-10Q1PTP TB30S05-1046PTP	TB30S05-15Q1PTP TB30S05-1546PTP
Phenyl	2.1 4.6	TPH12S05-05Q1PTP TPH12S05-0546PTP	TPH12S05-10Q1PTP TPH12S05-1046PTP	TPH12S05-15Q1PTP TPH12S05-1546PTP
PFP	2.1 4.6	TPF12S05-05Q1PTP TPF12S05-0546PTP	TPF12S05-10Q1PTP TPF12S05-1046PTP	TPF12S05-15Q1PTP TPF12S05-1546PTP
Diol-HILIC	2.1 4.6	TDH12S05-05Q1PTP TDH12S05-0546PTP	TDH12S05-10Q1PTP TDH12S05-1046PTP	TDH12S05-15Q1PTP 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)
XPCHSPW1 (10 mm ID)

**Max. pressure 100 bar

Ordering information

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

Phase	Column ID (µm)	Column length (mm)				Guard columns** with 5 mm length
		50	75	100	150	(pack of 3)
C18	75	TA12S05-05E8AU	TA12S05-L5E8AU	TA12S05-10E8AU	TA12S05-15E8AU	—
	100	TA12S05-05F0AU	TA12S05-L5F0AU	TA12S05-10F0AU	TA12S05-15F0AU	—
	300	TA12S05-05H0AU	TA12S05-L5H0AU	TA12S05-10H0AU	TA12S05-15H0AU	TA12S05-E5H0AU
	500	TA12S05-05J0AU	TA12S05-L5J0AU	TA12S05-10J0AU	TA12S05-15J0AU	TA12S05-E5J0AU
C18 ExRS	75	TAR08S05-05E8AU	TAR08S05-L5E8AU	TAR08S05-10E8AU	TAR08S05-15E8AU	—
	100	TAR08S05-05F0AU	TAR08S05-L5F0AU	TAR08S05-10F0AU	TAR08S05-15F0AU	—
	300	TAR08S05-05H0AU	TAR08S05-L5H0AU	TAR08S05-10H0AU	TAR08S05-15H0AU	TAR08S05-E5H0AU
	500	TAR08S05-05J0AU	TAR08S05-L5J0AU	TAR08S05-10J0AU	TAR08S05-15J0AU	TAR08S05-E5J0AU
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	(pack of 2)
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	T012S05-0520WX	T012S05-L520WX	T012S05-1020WX	T012S05-1520WX	T012S05-2520WX	T012S05-0120CC
	30	T012S05-0530WX	T012S05-L530WX	T012S05-1030WX	T012S05-1530WX	T012S05-2530WX	T012S05-0130CC
	50	T012S05-0553DX	—	T012S05-1053DX	T012S05-1553DX	T012S05-2553DX	T012S05-0553DXG**
Bio C4	20	TB30S05-0520WX	TB30S05-L520WX	TB30S05-1020WX	TB30S05-1520WX	TB30S05-2520WX	TB30S05-0120CC
	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**
PFP	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)

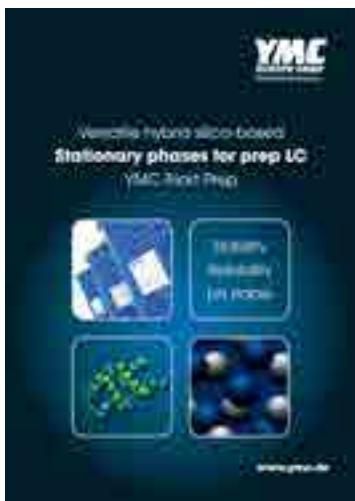
YMC-Triart, preparative bulk media

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

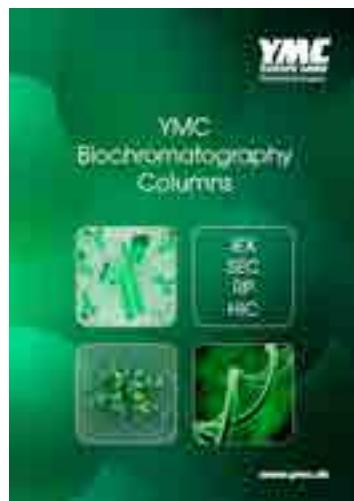
NOTE: customised particle sizes and pore sizes are available on request.

Contact YMC Europe GmbH for further details.

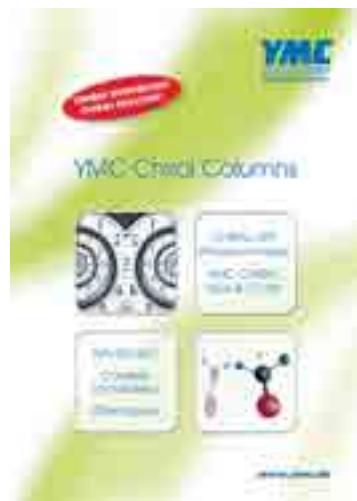
Please inquire for the corresponding catalogues



YMC-Triart Prep



YMC Biochromatography Columns



YMC Chiral Columns

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