YMC-Triart

Versatile hybrid silica based (U)HPLC columns

YMC EUROPE GMBH
The Selectivity Company

Transfer

Scalable particles:
EASY
UHPLC ↔ HPLC

Flexible

YMC-Triart:
pH 1-12
Temperatures
up to 70°C

Universal

YMC-Triart
for acidic, basic and
neutral analytes

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YMC-Triart

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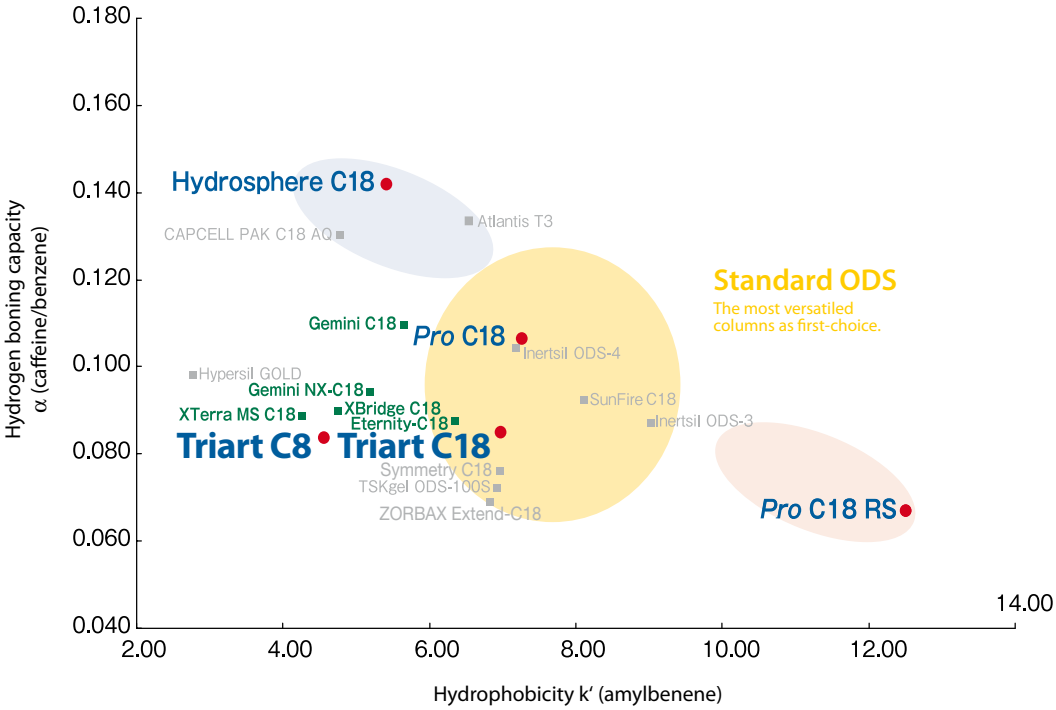
First choice column for method development



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.

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 addition narrow, symmetrical peak shapes are necessary in order to cope with rapid analysis of demanding samples. This has required manufacturers to seek more innovative ways to produce suitable stationary phases.

In order to meet these goals, YMC has developed a new particle technology. This is based on a multi-layered particle produced via a tightly controlled granulation technology which has been adapted from micro-reactor technology. The revolutionary production technique provides a multi-layer 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.

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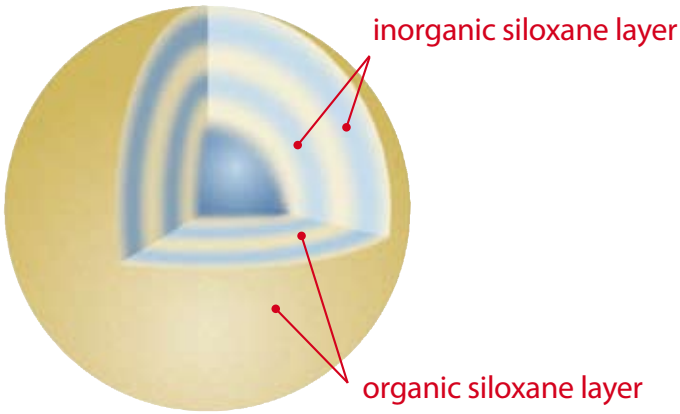
Particle technology

YMC-Triart is a multi-layered material prepared using tightly controlled particle formation technology which has been adapted from micro-reactor technology. This recently developed production process 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.

YMC-Triart hybrid structure



Specification

	YMC-Triart C18	YMC-Triart C8	Triart Phenyl	Triart PFP	YMC-Triart Diol-HILIC
Base	organic/inorganic silica				
Stationary phase	C18 (as USP L1)	C8 (as USP L7)	Phenyl (USP L11)	Pentafluoro-phenyl (USP L43)	Diol (USP L20)
Particle size	1.9, 3 and 5 µm				
Pore size	12 nm				
Bonding	polymeric type	polymeric type	monomeric type	monomeric type	monomeric type
End-capping	multi-stage hybrid groups	multi-stage hybrid groups	multi-stage hybrid groups	none	none
pH range	1 ~ 12	1 ~ 12	1 ~ 10	1 ~ 8	2 ~ 10
Temperature range	pH 1-7: 70 °C, pH 7-12: 50 °C	pH 1-7: 70 °C, pH 7-12: 50 °C	50°C	50°C	50°C

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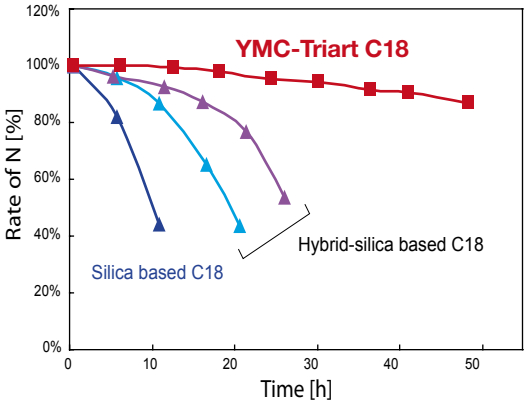
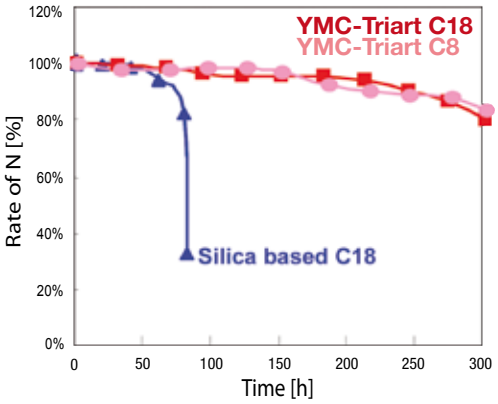
Versatile wide pH stability

Phosphate buffer (pH 11.5, 40 °C)



Column:	5 µm, 150 x 4.6 mm ID
Part-No.:	TA12S05-1546WT
Eluent:	50 mM K_2HPO_4-K_3PO_4 (pH 11.5) / methanol (90/10)
Flow rate:	1.0 ml/min
Sample:	benzyl alcohol

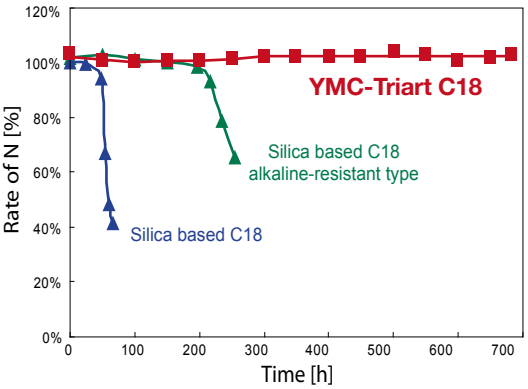
Triethylamine (pH 11.5, 40 °C)



Column:	5 µm, 150 x 4.6 mm ID
Part-No.:	TA12S05-1546WT
Eluent:	50 mM triethylamine (pH 11.5) / methanol (90/10)
Flow rate:	1.0 ml/min
Sample:	benzyl alcohol

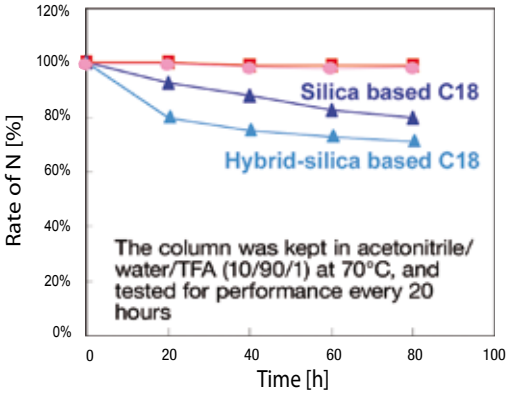
Durability at high temperature

pH 6.9, 70 °C



Column:	5 µm, 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	20 mM KH_2PO_4-K_2HPO_4 (pH 6.9) / acetonitrile (90/10)
Flow rate:	0.2 ml/min
Temperature:	70 °C
Sample:	phenol

pH 1, 70 °C



Column:	5 µm, 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	acetonitrile / water (60/40)
Flow rate:	0.2 ml/min
Temperature:	70 °C
Sample:	butyl benzoate

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

Application Data by courtesy YMC Co., Ltd.

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Transfer HPLC ↕ UHPLC

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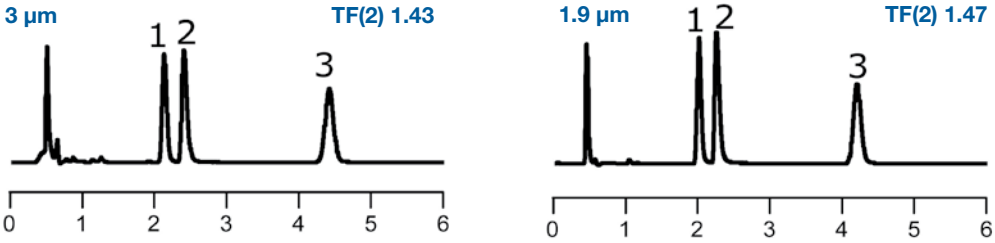
Secure your method transfer!

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 manufacture) have been observed.

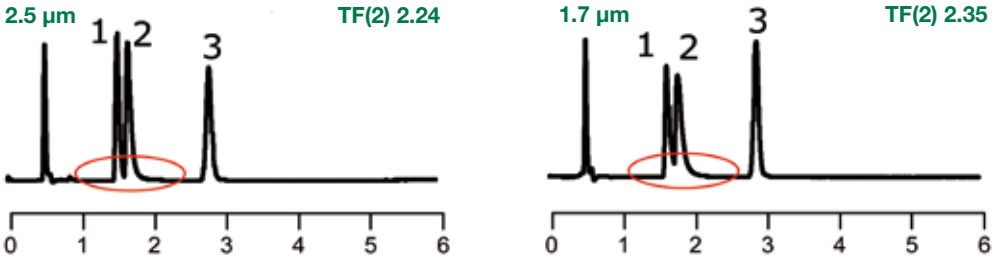
YMC-Triart C18



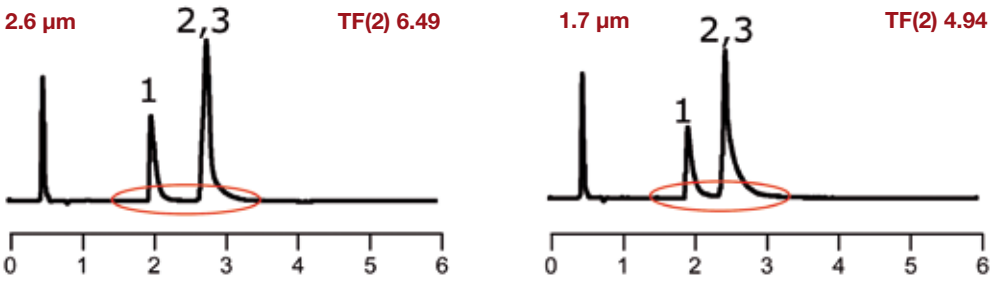
YMC has addressed this issue of method transfer. YMC-Triart columns show identical selectivity and excellent peak shapes for basic compounds for all 3.0 µm to 1.9 µm particle sizes. It allows predictable scale up from UHPLC to conventional HPLC and even to semi-preparative LC, and vice versa.

Case Studies*

X-Bridge BEH C18 and Acquity UPLC BEH C18



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_2PO_4-K_2HPO_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)

*There observations might not be representative for all applications but have been reported in some cases.

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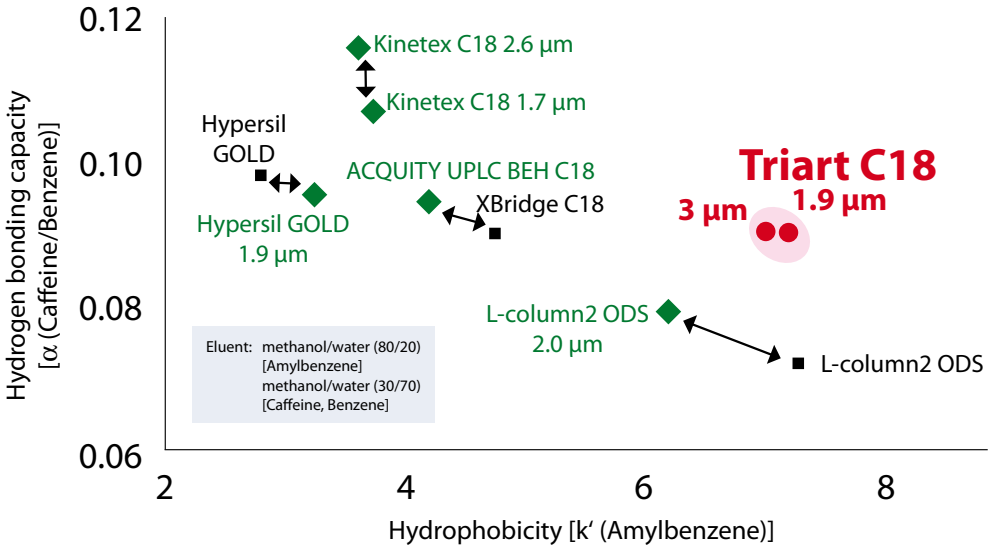
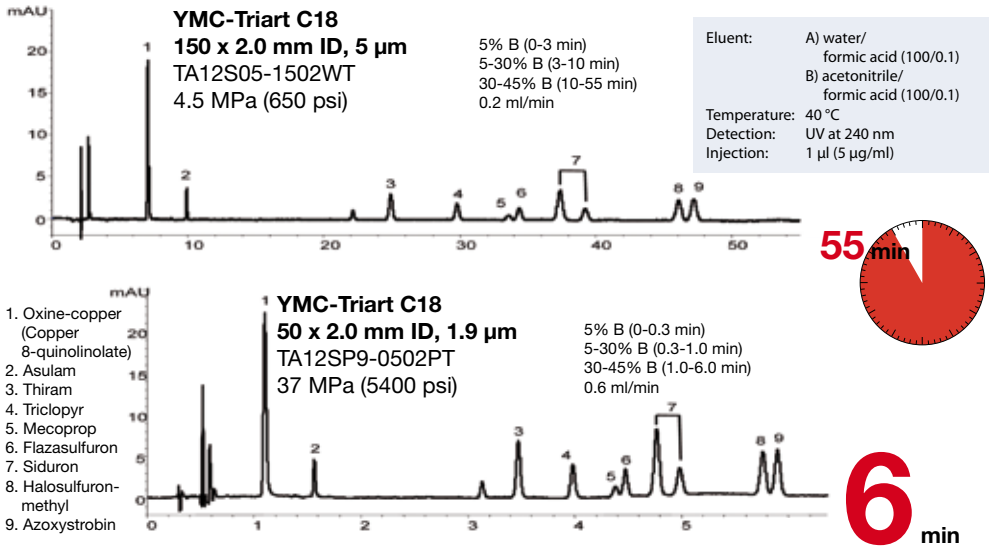
Evaluation of method transfer performance!



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

Method transfer between HPLC ↔ UHPLC



Application Data by courtesy YMC Co., Ltd.

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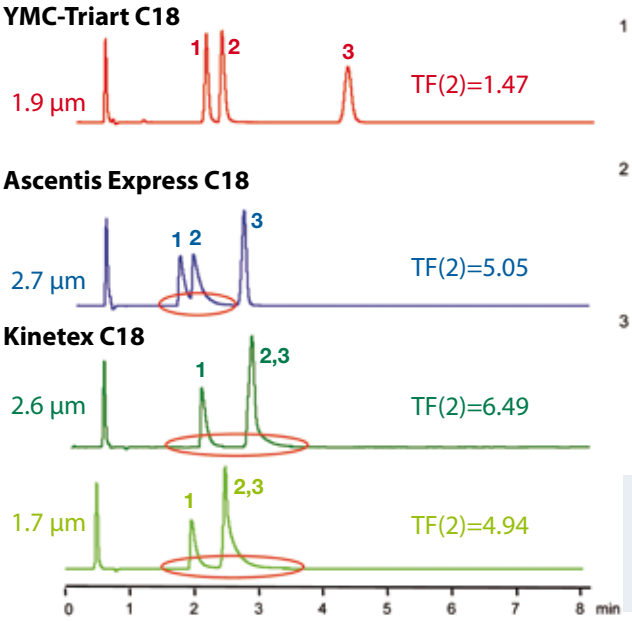
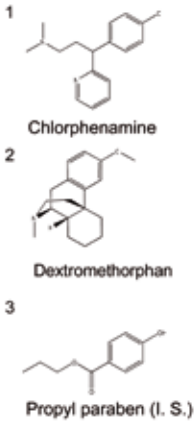
8 UHPLC

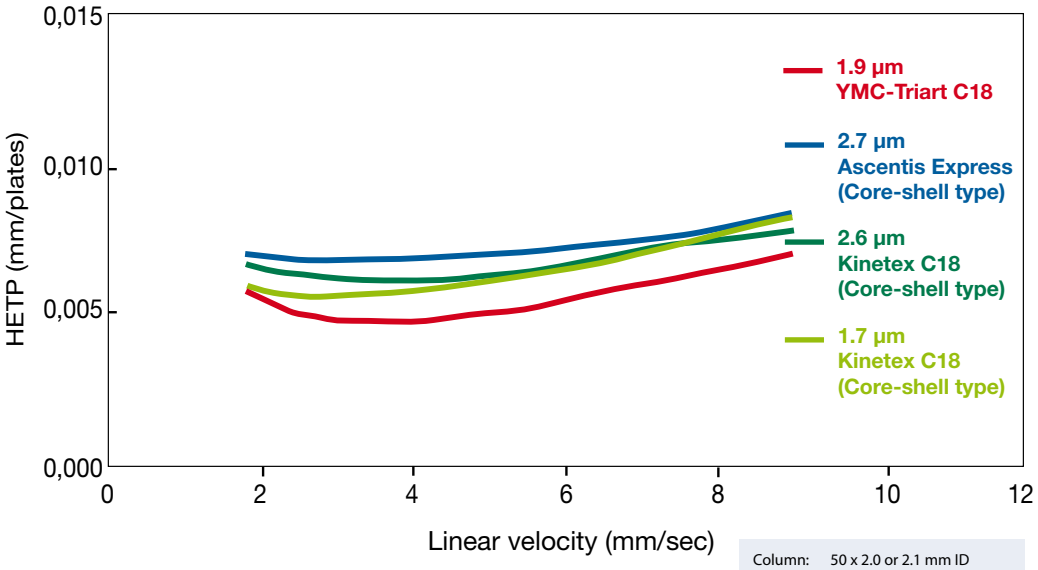
Higher resolution and good loadability





Column:	50 x 2.0 or 2.1 mm ID
Eluent:	20 mM KH_2PO_4-K_2HPO_4 (pH 6.9)/ acetonitrile (65/35)
Flow rate:	0.2 ml/min
Detection:	UV at 235 nm
Temperature:	40 °C

Lower HETP means higher resolution!



Column:	50 x 2.0 or 2.1 mm ID
Eluent:	acetonitrile / water (60/40)
Detection:	UV at 254 nm
Sample:	Butylbenzoate

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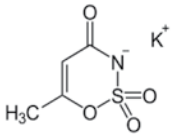
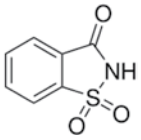
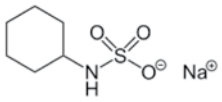
Determination of Artificial Sweeteners with LC-MS/MS



Acesulfame (K salt)

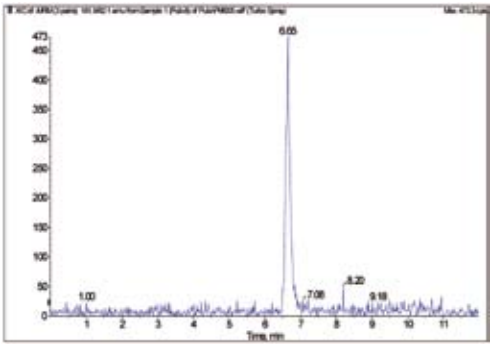


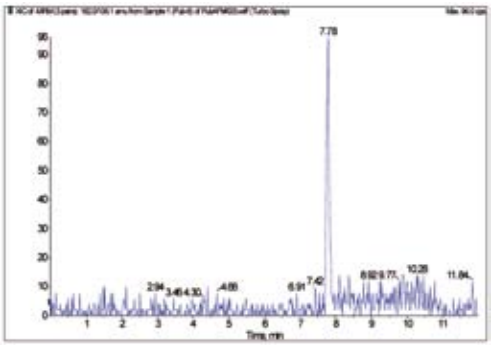
Saccharin

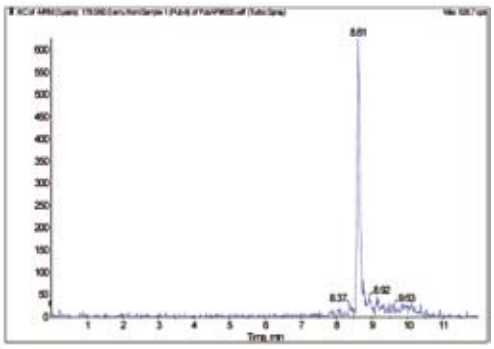


Cyclamate Na

➔ 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

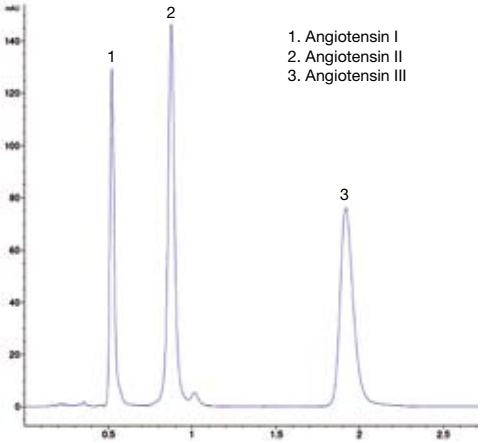

Extracted Ion Chromatogram (XIC) of Cyclamate Na, 0.1 µg/L

Column:	YMC-Triart C18, 12 nm, 1.9 µm, 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: H_2O (containing 10 mmol NH_4 formate)				
	B: MeOH (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, Helmoholtzstraße 22, Science Park I, D-89081 Ulm

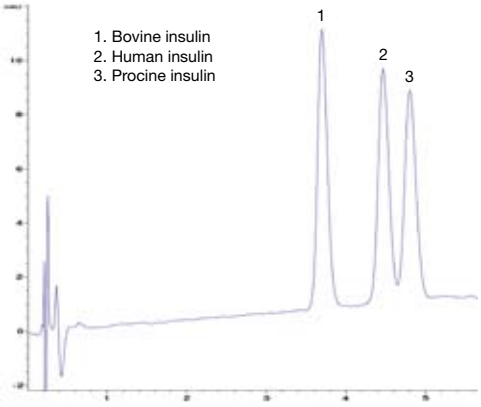
10 UHPLC

Angiotensin I, II and III



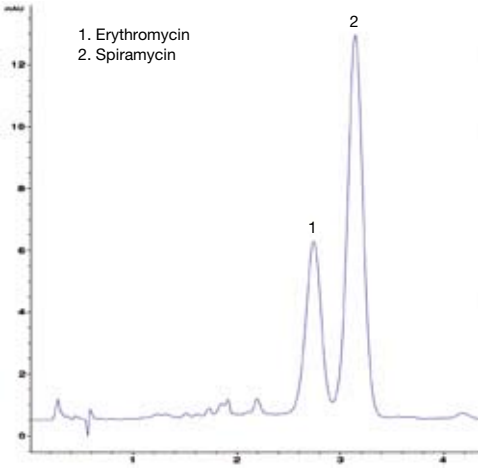
Column:	YMC-Triart C18, 1.9 µm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	20 mM KH_2PO_4 + K_2HPO_4 (pH 7.9) / acetonitrile (22/78)
Flow rate:	0.7 ml/min
Detection:	UV at 220 nm
Pressure:	720 bar
Injection:	0.5 µl
Temperature:	40 °C

Insulin



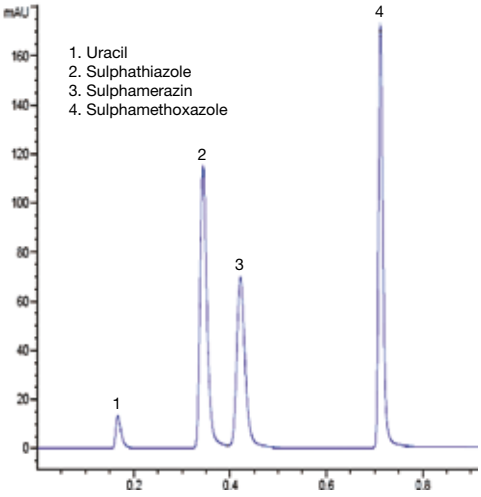
Column:	YMC-Triart C18, 1.9 µm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	A) H_2O + 0.1% TFA
	B) acetonitrile + 0.1% TFA
Gradient:	30% B (0 min); 30-32% B (0-5 min); 32% B (55 min)
Flow rate:	0.6 ml/min
Detection:	UV at 220 nm
Pressure:	611 bar
Injection:	0.5 µl
Temperature:	30 °C

Macrolide antibiotics



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

Sulpha drugs



Column:	YMC-Triart C18, 1.9 µm (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 µl
Temperature:	50 °C

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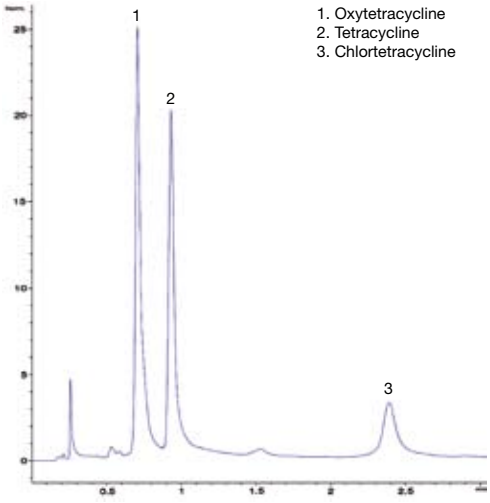
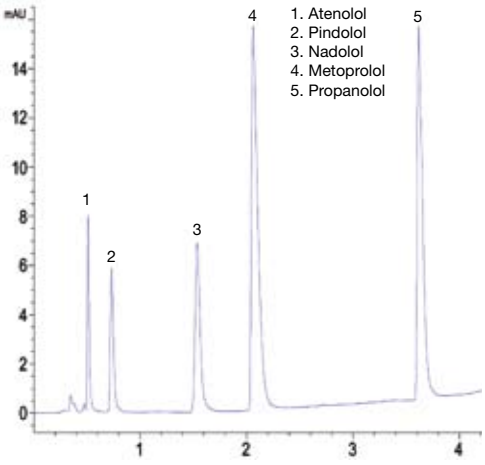
Tetracycline antibiotics



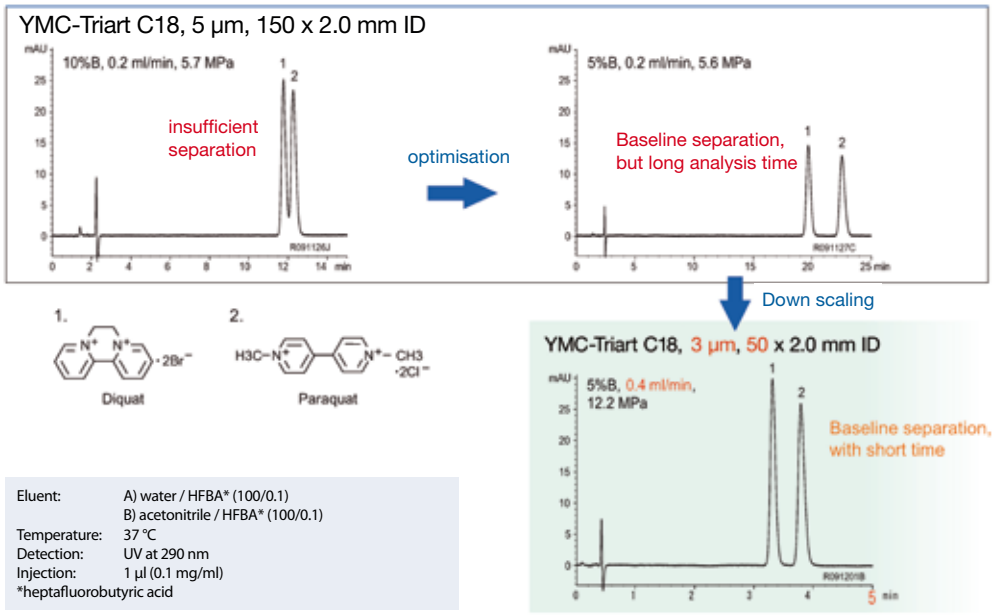
Column:	YMC-Triart C18, 1.9 µm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	5 mM NH_4CH_3COOH / acetonitrile (87/13)
Flow rate:	0.65 ml/min
Detection:	UV at 280 nm
Pressure:	662 bar
Injection:	1 µl
Temperature:	40 °C

Betablockers



Column:	YMC-Triart C18, 1.9 µm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	A) 20 mM NH_4CH_3COOH + ammonia (pH 9.0) B) acetonitrile
Gradient:	25% B (1.0 min); 75% B (1-6 min)
Flow rate:	0.35 ml/min
Detection:	UV at 254 nm
Pressure:	450 bar
Injection:	1 µl
Temperature:	40 °C

Fast LC for conventional HPLC



1. Diquat

2. Paraquat

Eluent:	A) water / HFBA* (100/0.1) B) acetonitrile / HFBA* (100/0.1)
Temperature:	37 °C
Detection:	UV at 290 nm
Injection:	1 µl (0.1 mg/ml)

*heptafluorobutyric acid

Application Data by courtesy YMC Co., Ltd.

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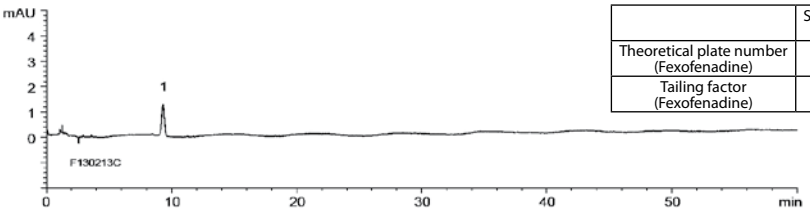
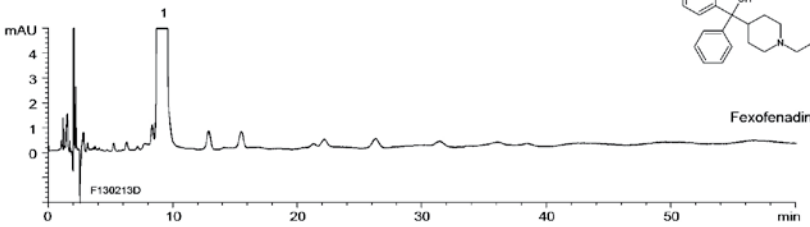
Fexofenadine hydrochloride (Japanese Pharmacopoeia)

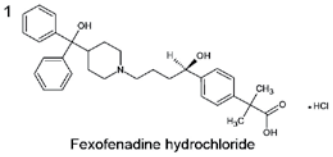
A) Standard solution *1 (0.001 mg/ml fexofenadine hydrochloride)



	System suitability requirement	result
Theoretical plate number (Fexofenadine)	≥ 8000	10100
Tailing factor (Fexofenadine)	≤ 2.0	1.00

B) Sample solution *1 (1 mg/ml fexofenadine hydrochloride)



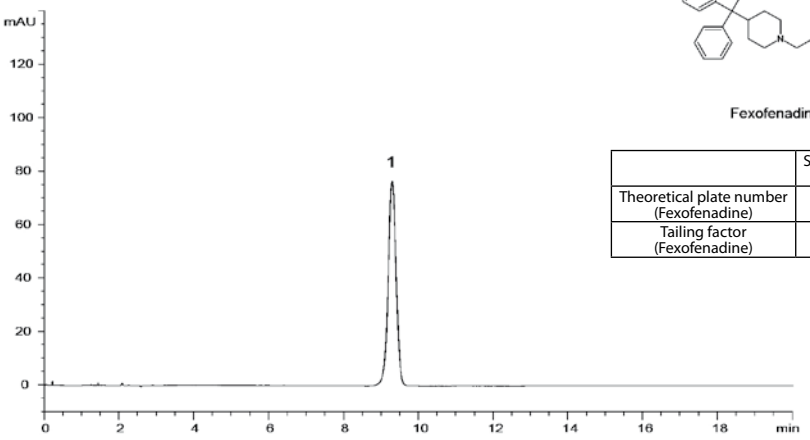


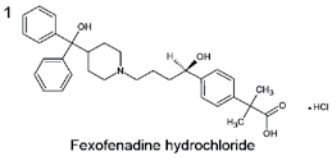
Fexofenadine hydrochloride

Column: YMC-Triart Phenyl, 5 µm, 12 nm (250 x 4.6 mm ID)
Part-No.: TPH12S05-2546WT
Eluent: acetonitrile / buffer *2 / triethylamine (350/650/3)
*2 *Dissolve 7.51 g of NaH_2PO_4-$2H_2O$ and 0.96 g of $NaClO_4$-H_2O in 1000 ml water, adjust pH 2.0 with H_3PO_4*
Flow rate: 2.0 ml/min *(adjust the flow rate so that the retention time of fexofenadine is about 9 min)*
Detection: UV at 220 nm
Injection: 20 µl
Temperature: 25 °C
(The Japanese Pharmacopoeia 16th; related substances)

*1 *All standard and sample solutions were prepared from fexofenadine hydrochloride supplied as a reagent for laboratory use.*

Standard solution *1 (0.06 mg/ml fexofenadine hydrochloride)





Fexofenadine hydrochloride

	System suitability requirement	result
Theoretical plate number (Fexofenadine)	≥ 8000	9500
Tailing factor (Fexofenadine)	≤ 2.0	0.98

Column: YMC-Triart Phenyl, 5 µm, 12 nm (250 x 4.6 mm ID)
Part-No.: TPH12S05-2546WT
Eluent: acetonitrile / buffer *2 / triethylamine (350/650/3)
*2 *Dissolve 7.51 g of NaH_2PO_4-$2H_2O$ and 0.96 g of $NaClO_4$-H_2O in 1000 ml water, adjust pH 2.0 with H_3PO_4*
Flow rate: 2.0 ml/min *(adjust the flow rate so that the retention time of fexofenadine is about 9 min)*
Detection: UV at 220 nm
Injection: 20 µl
Temperature: 25 °C
(The Japanese Pharmacopoeia 16th; assay)

*1 *Standard solutions was prepared from fexofenadine hydrochloride supplied as a reagent for laboratory use.*

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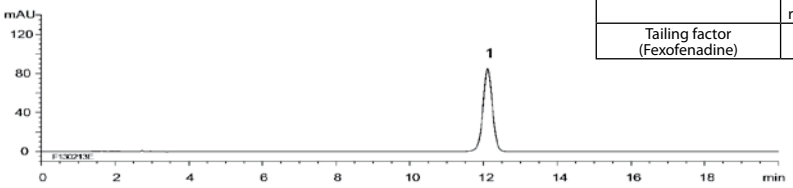
Fexofenadine hydrochloride (US Pharmacopoeia)

A) Assay preparation *1 (assay), Reference solution *1 (related compounds)

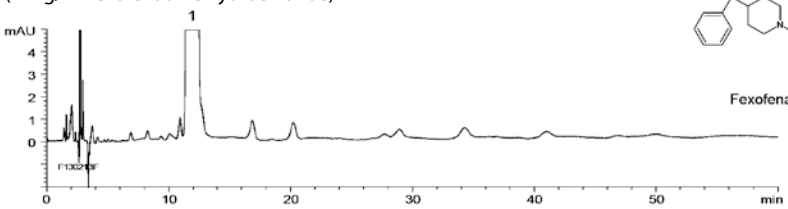
(0.06 mg/ml fexofenadine hydrochloride)

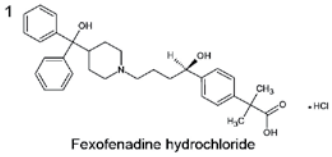


	System suitability requirement (assay)	result
Tailing factor (Fexofenadine)	≤ 2.0	1.00

B) Test solution *1 (related compounds)

(1 mg/ml fexofenadine hydrochloride)



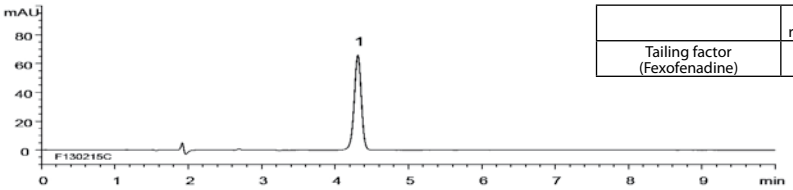


Fexofenadine hydrochloride

Column: YMC-Triart Phenyl, 5 µm, 12 nm (250 x 4.6 mm ID)
Part-No.: TPH12S05-2546WT
Eluent: acetonitrile / buffer *2 / triethylamine (350/650/3)
*2 *Dissolve 7.51 g of NaH_2PO_4-$2H_2O$ and 0.96 g of $NaClO_4$-H_2O in 1000 ml water, adjust pH 2.0 with H_3PO_4*
Flow rate: 1.5 ml/min
Detection: UV at 220 nm
Injection: 20 µl
Temperature: 25 °C
(The United States Pharmacopoeia 36th; assay, related compounds)

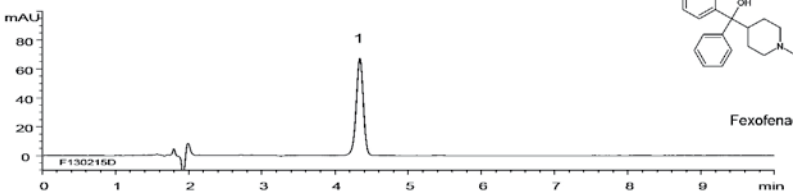
*1 *All standard and sample solutions were prepared from fexofenadine hydrochloride supplied as a reagent for laboratory use.*

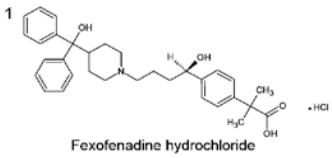
A) Standard solution *1 (0.015 mg/ml fexofenadine hydrochloride)



	System suitability requirement (assay)	result
Tailing factor (Fexofenadine)	≤ 2.0	0.95

B) Sample solution *2 (0.018 mg/ml fexofenadine hydrochloride)





Fexofenadine hydrochloride

Column: YMC-Triart Phenyl, 5 µm, 12 nm (250 x 4.6 mm ID)
Part-No.: TPH12S05-2546WT
Eluent: acetonitrile / buffer *3 (9/16)
*3 *Add 15 ml of acetonitrile/triethylamine (1/1) to 1000 ml of acetic acid/water (17/9983), adjust pH 5.25 with H_3PO_4*
Flow rate: 1.5 ml/min
Detection: UV at 220 nm
Injection: 20 µl
Temperature: 35 °C
(The United States Pharmacopoeia 36th; assay)

*1 *Standard solution was prepared from fexofenadine hydrochloride supplied as a reagent for laboratory use.*
*2 *Sample solution was prepared from fexofenadine hydrochloride tablets.*

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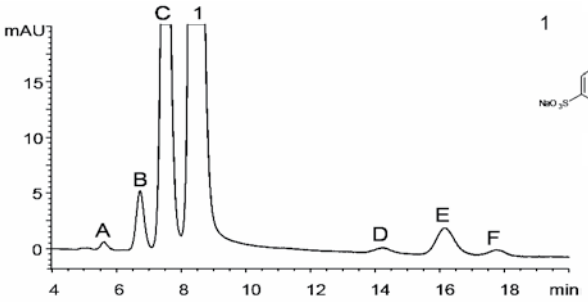
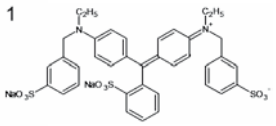
14 Triart Phenyl

Analysis of coal tar dye (Brilliant blue FCF) and its impurities

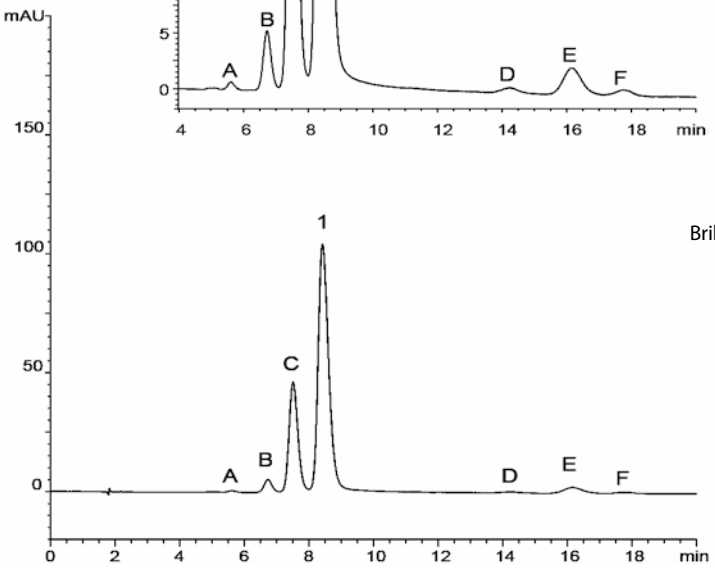
Enlarged chromatogram



1



Brilliant blue FCF



A-E:
Impurities in
Brilliant blue FCF reagent

Column:	YMC-Triart Phenyl, 5 µm, 12 nm (150 x 3.0 mm ID)
Part-No.:	TPH12S05-1503WT
Eluent:	0.1% phosphoric acid / methanol (55/45)
Flow rate:	0.425 ml/min
Detection:	UV at 630 nm
Injection:	2.0 µl
Temperature:	40 °C

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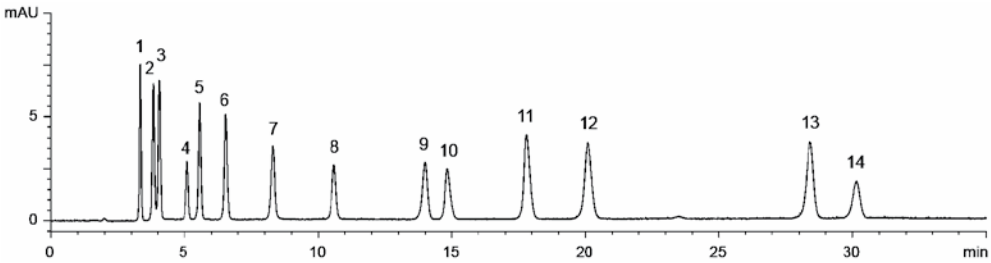
Triart PFP 15

Catecholamines, serotonin, and their precursors and metabolites



1 Noradrenaline hydrochloride (NA) (Norepinephrine hydrochloride)

2 3,4-Dihydroxymandelic acid (DOMA)

3 3,4-Dihydroxyphenylalanine (DOPA)

4 Tyrosine (Tyr)

5 Adrenaline hydrochloride (A) (Epinephrine hydrochloride)

6 Dopamine hydrochloride (DA)

7 Vanillylmandelic acid (VMA)

8 3-Methoxy-4-hydroxyphenylglycol (MHPG)

9 3,4-Dihydroxyphenylacetic acid (DOPAC)

10 3-Methoxytyramine hydrochloride (3MT)

11 Serotonin hydrochloride (5-Hydroxytryptamine hydrochloride, 5HT)

12 Tryptophan (Trp)

13 5-Hydroxyindoleacetic acid (5HIAA)

14 Homovanillic acid (HVA)

Column:	YMC-Triart PFP, 3 µm, 12 nm (150 x 3.0 mm ID)
Part-No.:	TPF12S03-1503WT
Eluent:	A) 10 mM formic acid
	B) methanol containing 10 mM formic acid
	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

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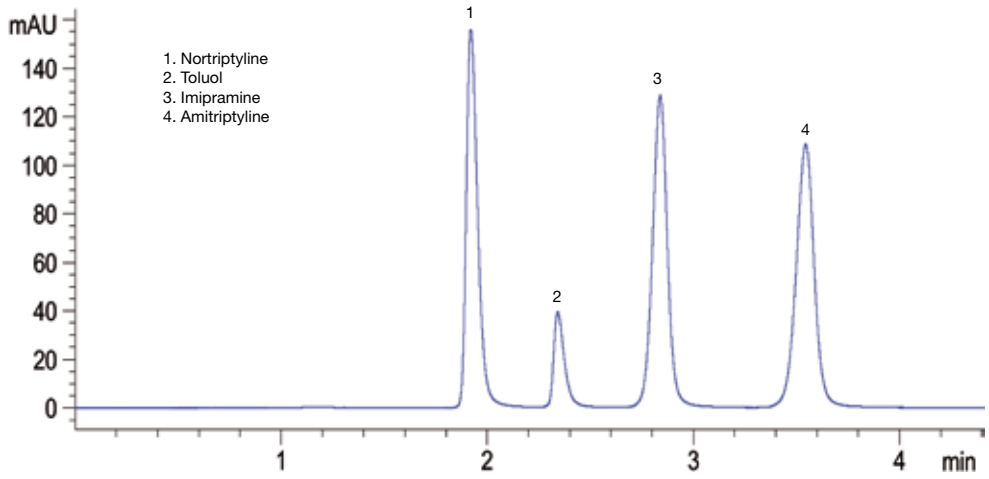
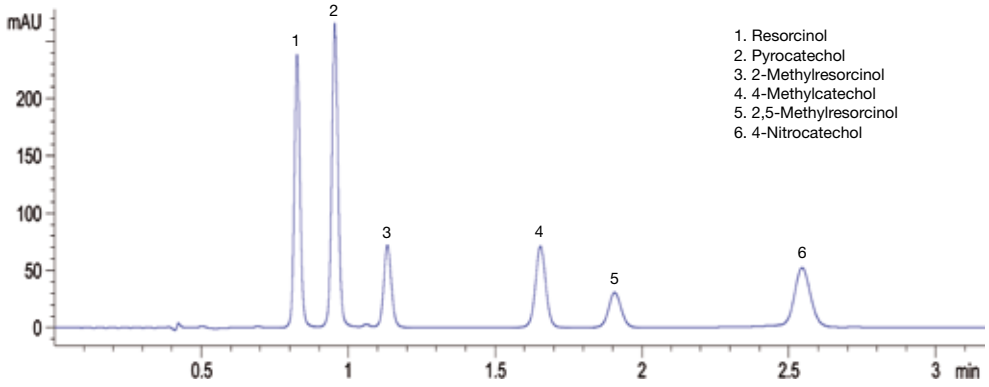
Antidepressants



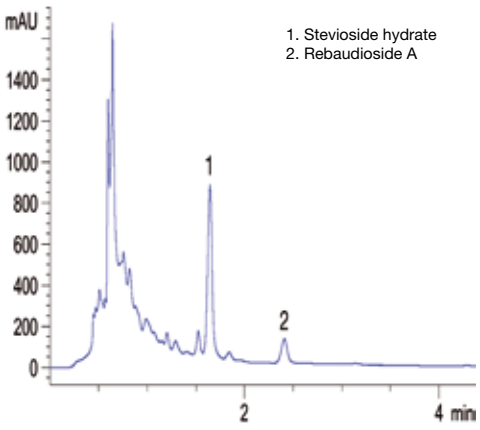
Column: YMC-Triart Phenyl, 1.9 µm (100 x 2.0 mm ID)
Part-No.: TPH12SP9-1002PT
Eluent: methanol / 25 mM KH_2PO_4 (pH 6.0) (65/35)
Flow rate: 0.4 ml/min
Detection: UV at 254 nm
Injection: 2 µl
Temperature: 25 °C

Resorcinol



Column: YMC-Triart PFP, 1.9 µm (100 x 2.0 mm ID)
Part-No.: TPF12SP9-1002PT
Eluent: 0.1% formic acid / acetonitrile + 0.1% formic acid (85/15)
Flow rate: 0.8 ml/min
Detection: UV at 270 nm
Injection: 0.5 µl
Temperature: 25 °C

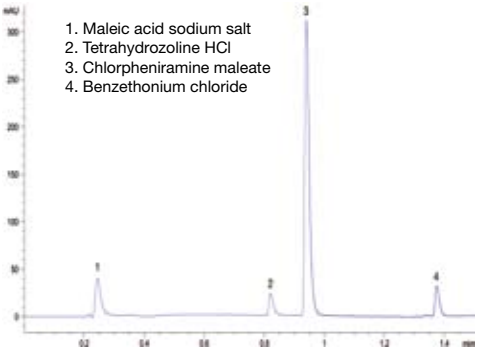
Stevia leaves



1. Stevioside hydrate
2. Rebaudioside A

Column:	YMC-Triart Diol-HILIC, 1.9 µm (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 µl
Temperature:	30 °C

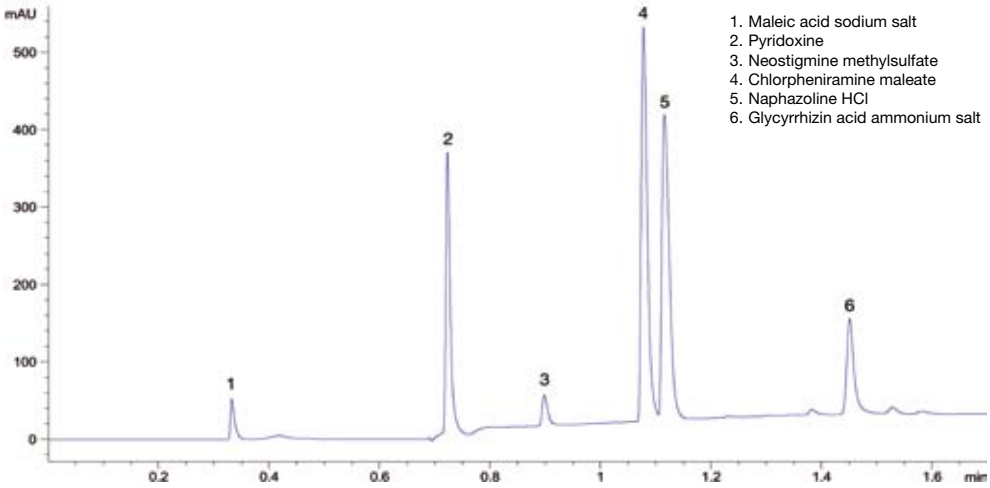
Nasal Spray



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

Column:	YMC-Triart C18, 1.9 µm, 12 nm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	A) trifluoro acetic acid 0,05% / 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 µl
Temperature:	40 °C

Eye drop formulation



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

Column:	YMC-Triart C18, 1.9 µm, 12 nm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	A trifluoroacetic acid (0.05%) B) acetonitrile
Flow rate:	0.6 ml/min
Detection:	UV at 265 nm
Injection:	0.5 µl
Temperature:	40 °C

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

Application Data by courtesy YMC Co., Ltd.

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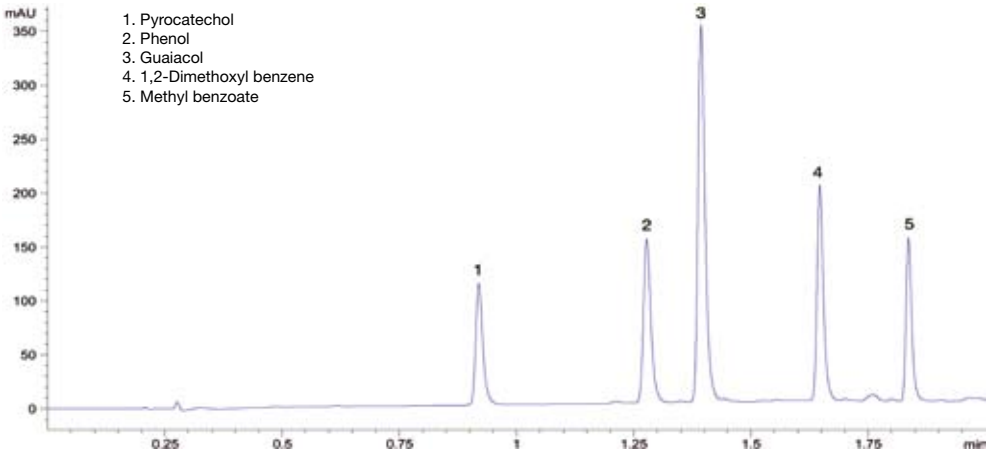
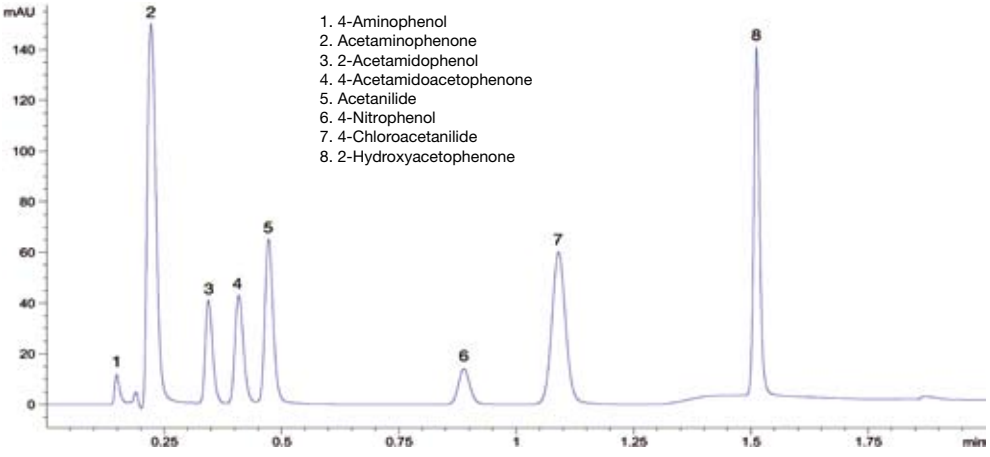
Guaiacol and impurities



1. Pyrocatechol
2. Phenol
3. Guaiacol
4. 1,2-Dimethoxyl benzene
5. Methyl benzoate

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

Paracetamol



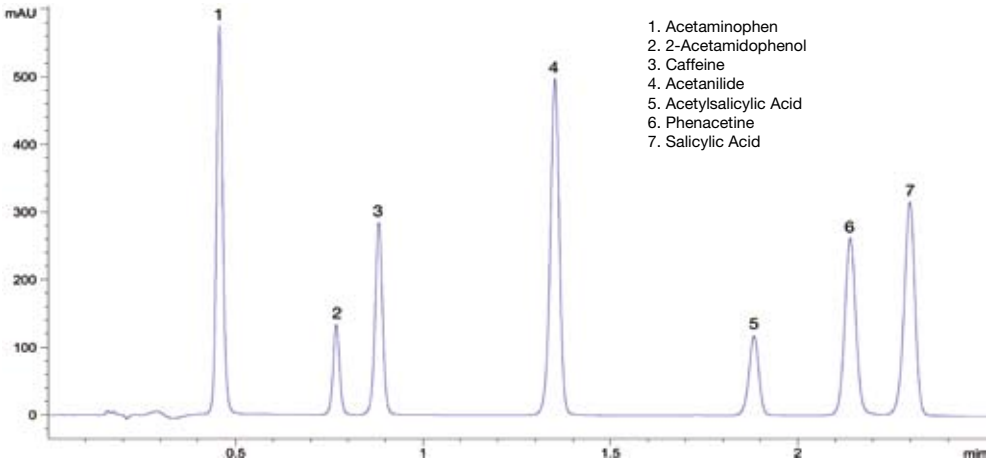
1. 4-Aminophenol
2. Acetaminophenone
3. 2-Acetamidophenol
4. 4-Acetamidoacetophenone
5. Acetanilide
6. 4-Nitrophenol
7. 4-Chloroacetanilide
8. 2-Hydroxyacetophenone

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

Gradient:

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

7 Analgesics

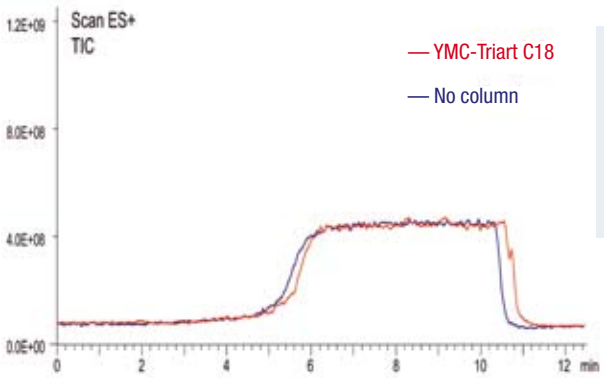


1. Acetaminophen
2. 2-Acetamidophenol
3. Caffeine
4. Acetanilide
5. Acetylsalicylic Acid
6. Phenacetine
7. Salicylic Acid

Column:	YMC-Triart C18, 1.9 µm, 12 nm (50 x 2.0 mm ID)
Part-No.:	TA12SP9-0502PT
Eluent:	formic acid / acetonitrile (50/50)
Flow rate:	0.8 ml/min
Pressure:	610 bar
Detection:	UV at 240 nm
Injection:	1 µl
Temperature:	40 °C

Application Data by courtesy YMC Co., Ltd.

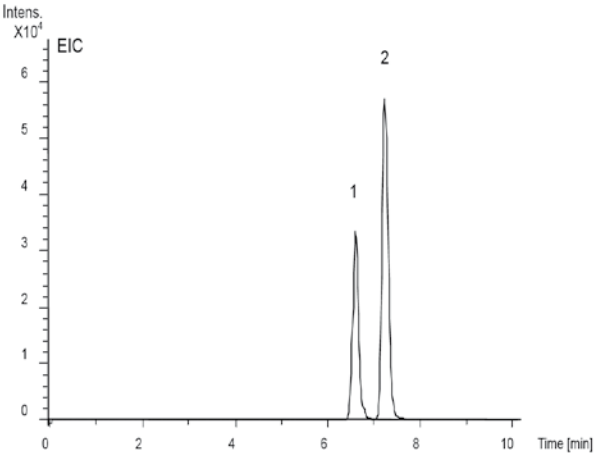
LC/MS compatibility



Column:	5 µm, 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	A) water / formic acid (100/0.1) B) acetonitrile / formic acid (100/0.1) 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)

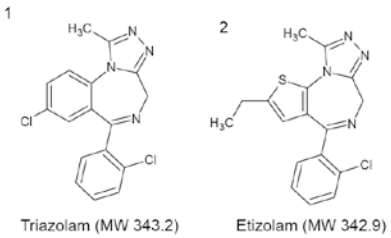
Column bleeding, caused by the fragments of stationary phase, is the main reason for background noise and restrictions on detection limits. No bleed is observed in the test of total ion current (TIC) measured by LC/MS with blank or with YMC-Triart C18. So in terms of the signal/noise ratio (S/N ratio),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

LC/MS analysis of benzodiazepine derivates



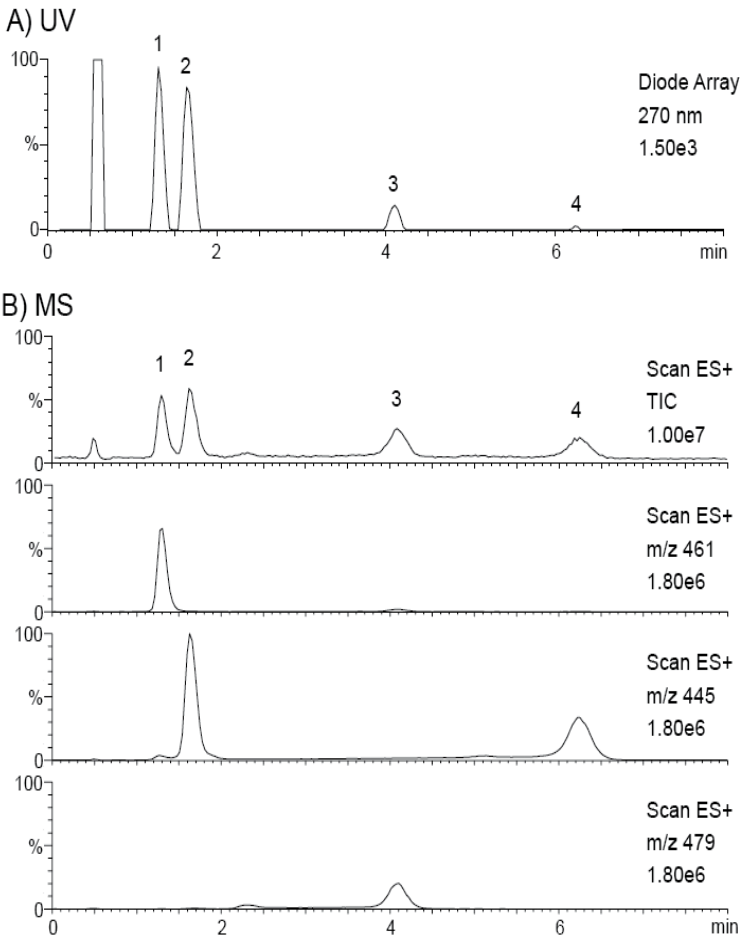
Peak 1: 100ng_ml_RB4_01_2291.d: EIC 343.051±0.01+All MS
Peak 2: 100ng_ml_RB4_01_2291.d: EIC 343.078±0.01+All MS

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

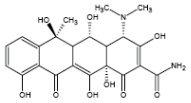


Column:	YMC-Triart C18 (5 µm, 12 nm) 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	A) 10 mM formic acid B) acetonitrile
Gradient:	25-50% B (0-10 min)
Flow rate:	0.2 ml/min
Temperature:	40 °C
Detection:	Bruker Daltonics micrOTOF, ESI, positive mode
Injection:	5 µl (100 ng/ml)

LC/MS analysis of tetracycline antibiotics

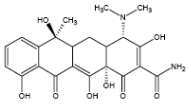


1



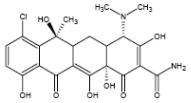
Oxytetracycline
(MW 460.4)

2



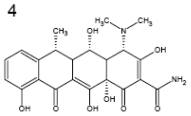
Tetracycline
(MW 444.4)

3

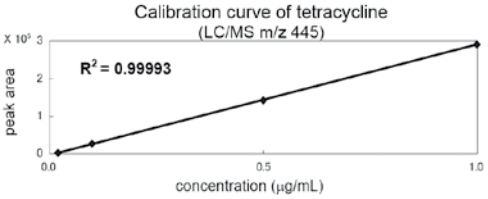


Chlortetracycline
(MW 478.8)

4



Doxycycline
(MW 444.4)



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 µg/ml)

Application Data by courtesy YMC Co., Ltd.

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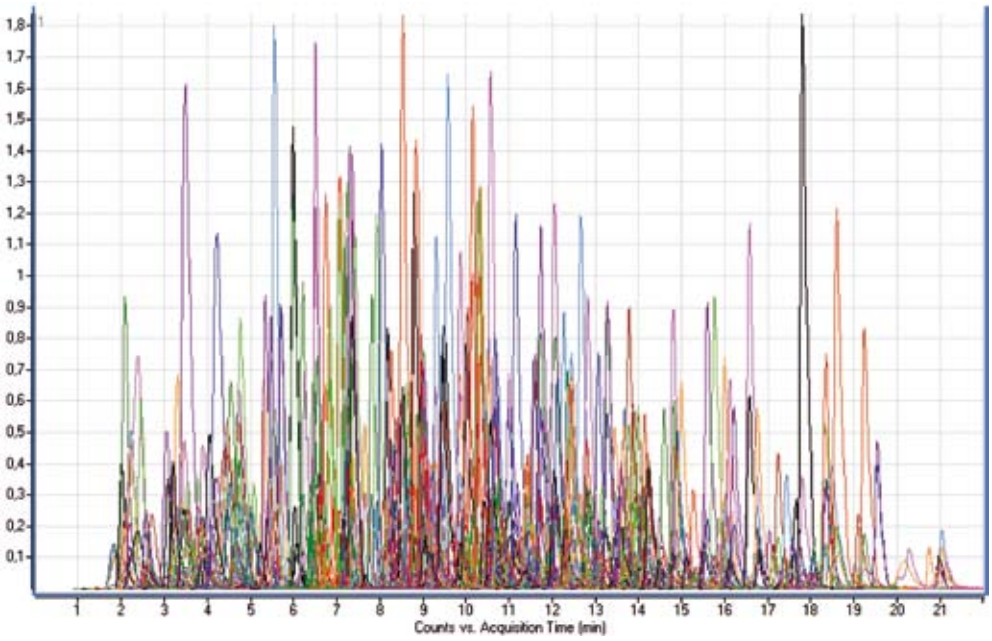
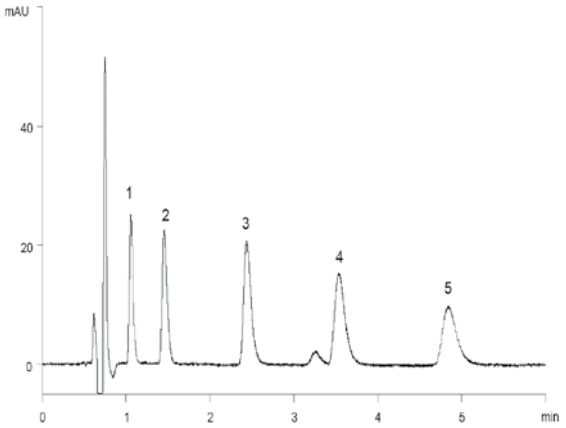
Analysis of 360 pesticides in a single run



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

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

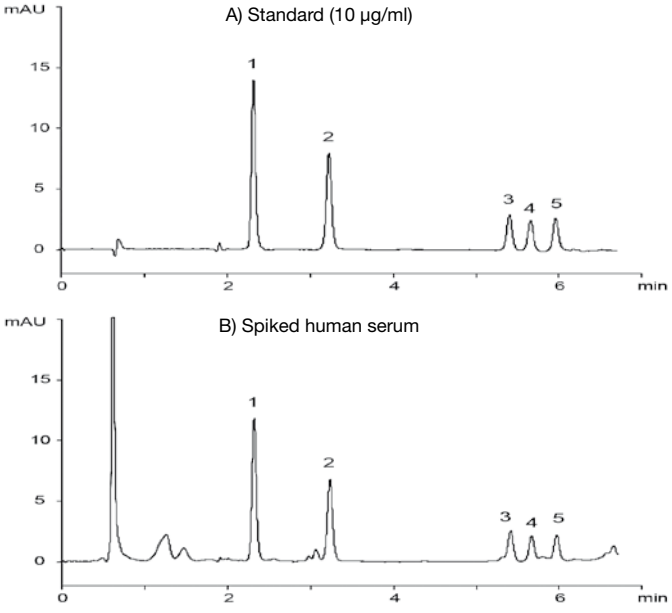
Separation of alkaloids



1. Scopolamine
2. Atropine
3. Cinchonine
4. Quinine
5. Dihydroquinine

Column:	YMC-Triart C18 (5 µm, 12 nm) 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	20 mM CH_3COOH-CH_3COONH_4 (pH 4.9) / acetonitrile (80/20)
Flow rate:	0.2 ml/min
Temperature:	40 °C
Detection:	UV at 220 nm
Injection:	1 µl (0.02-0.1 mg/ml)

Barbiturates in human serum



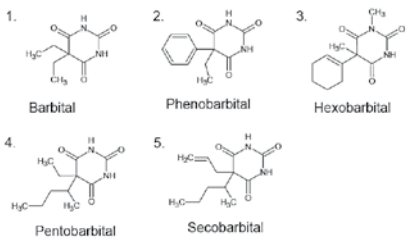
Solid-phase extraction method
YMC Dispo SPE C18 100 mg/1ml

Condition
2 ml methanol
2 ml water

Load
500 µl spiked human serum solution (each 10 µg)

Elute
500 µl methanol/water (85/15)

Dilute
500 µl 20 mM ammonium formate buffer (pH 9.5)

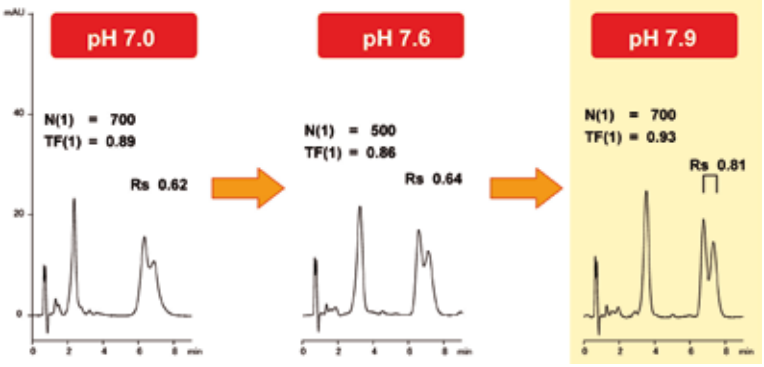


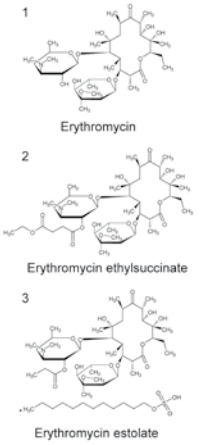
Column:	YMC-Triart C18 (5 µm, 12 nm) 50 x 2.0 mm ID
Part-No.:	TA12S05-0502WT
Eluent:	A) 20 mM $HCOONH_4$-NH_3 (pH 9.5) B) methanol
Gradient:	0-90% B (0-7 min)
Flow rate:	0.2 ml/min
Temperature:	25 °C
Detection:	UV at 240 nm
Injection:	1 µl

Application Data by courtesy YMC Co., Ltd.

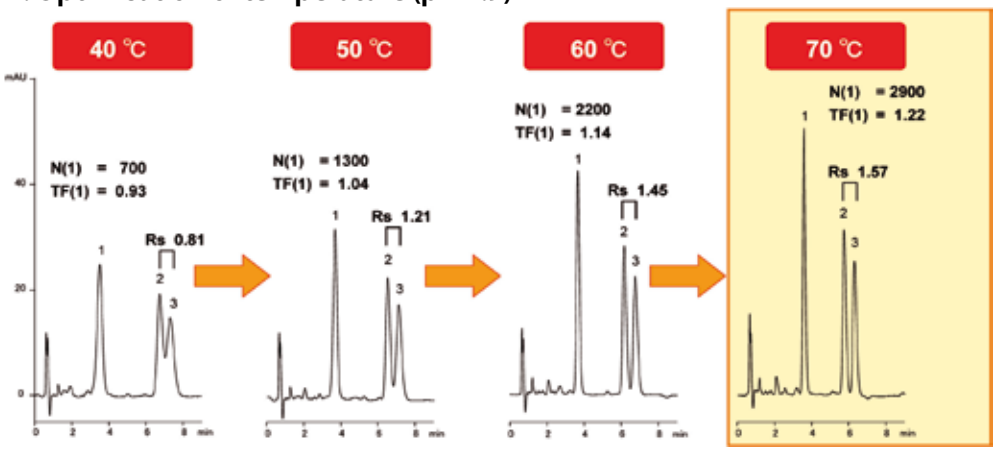
Erythromycin at elevated pH and temperature

1. Optimisation of pH

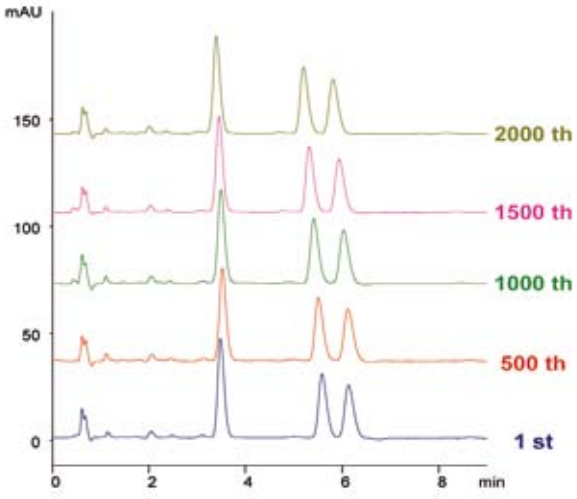




2. Optimisation of temperature (pH 7.9)



3. Stability test: pH 7.9, 70 °C



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

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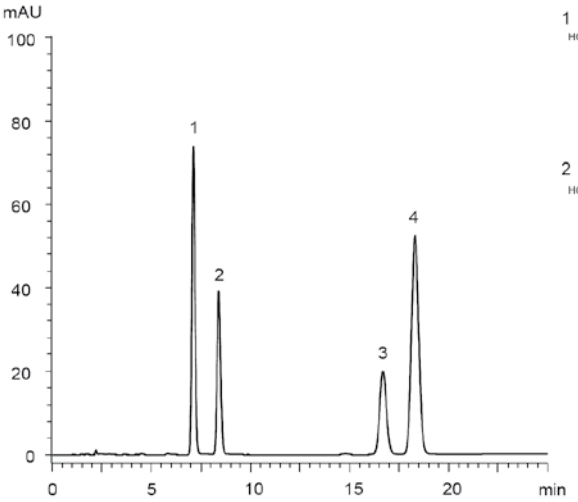
Separation of flavonoids



1 Daidzein

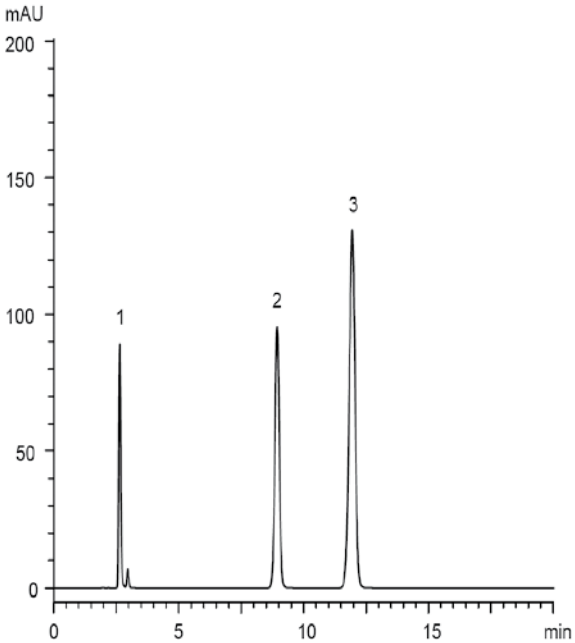
2 Luteolin

3 Kaempferol

4 Baicalein

Column:	YMC-Triart C18 (5 µm, 12 nm)
Dimension:	150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	acetonitrile / 10 mM H_3PO_4 (30/70)
Flow rate:	0.425 ml/min
Temperature:	37 °C
Detection:	UV at 280 nm
Injection:	2 µl (50 µg/ml)

Separation of aromatic carboxylic acids



1 Salicylic acid

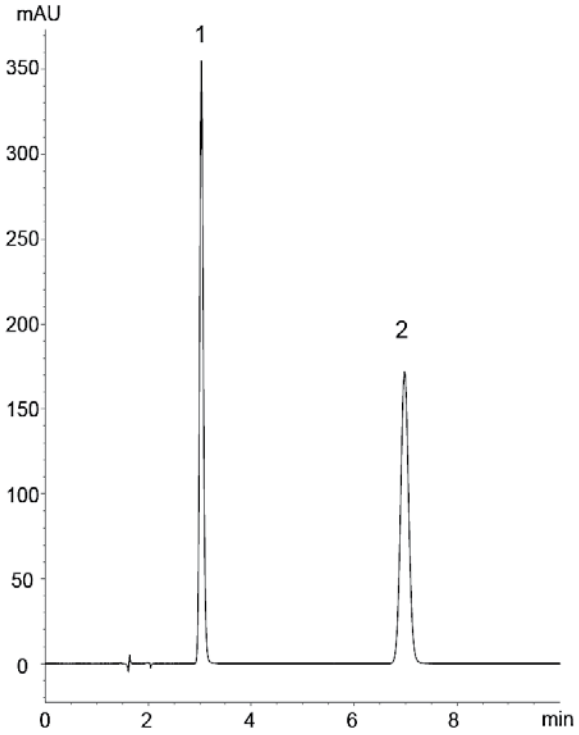
2 Methyl *p*-hydroxybenzoate (I.S.)

3 *trans*-Cinnamic acid

Column:	YMC-Triart C18 (5 µm, 12 nm)
Dimension:	150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	10 mM CH_3COOH-CH_3COONH_4 (pH 4.2) / acetonitrile (75/25)
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 254 nm
Injection:	4 µl (0.02 ~ 0.3 mg/ml)

Application Data by courtesy YMC Co., Ltd.

Aciclovir syrup and injection



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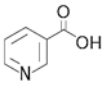
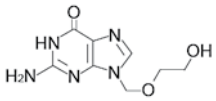


Nicotinic acid

2.



Aciclovir

Column:	YMC-Triart C18 (5 µm, 12 nm) 150 x 4.6 mm ID
Part-No.:	TA12S05-1546WT
Eluent:	phosphate buffer* / methanol (95/5) *Dissolve 1.45 g of H_3PO_4 and 25 ml of 1 mol/l CH_3COOH in water to make 900 ml → adjust pH 2.5 by 1 mol/l NaOH → add water to make 1000 ml
Flow rate:	1.0 ml/min
Temperature:	25 °C
Detection:	UV at 254 nm
Injection:	20 µl (0.05 mg/ml, 0.032 mg/ml)

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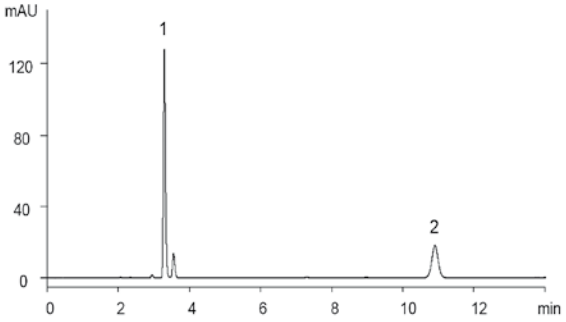
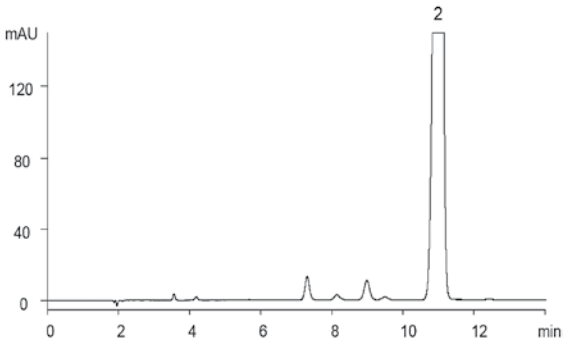
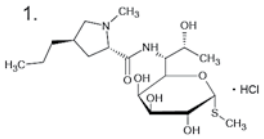
Clindamycin hydrochloride



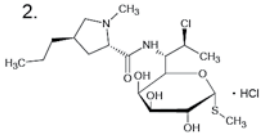


1.



Lincomycin hydrochloride

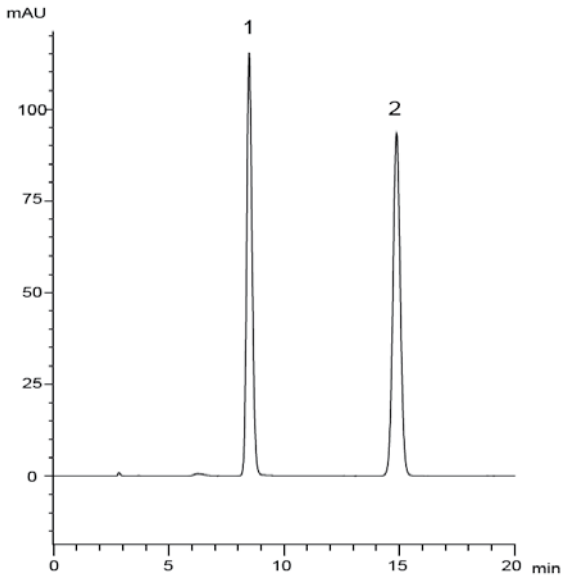
2.



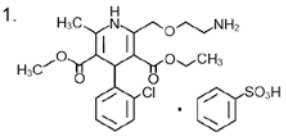
Clindamycin hydrochloride

Column:	YMC-Triart C18 (5 µm, 12 nm)
Dimension:	250 x 4.6 mm ID
Part-No.:	TA12S05-2546WT
Eluent:	50 mM KH_2PO_4 (pH 7.5 adjusted by 8 M KOH) / acetonitrile (55/45)
Flow rate:	1.0 ml/min
Temperature:	25 °C
Detection:	UV at 210 nm
Injection:	10 µl

Analysis of amlodipine besilate

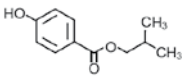


1.



Amlodipine besilate

2.

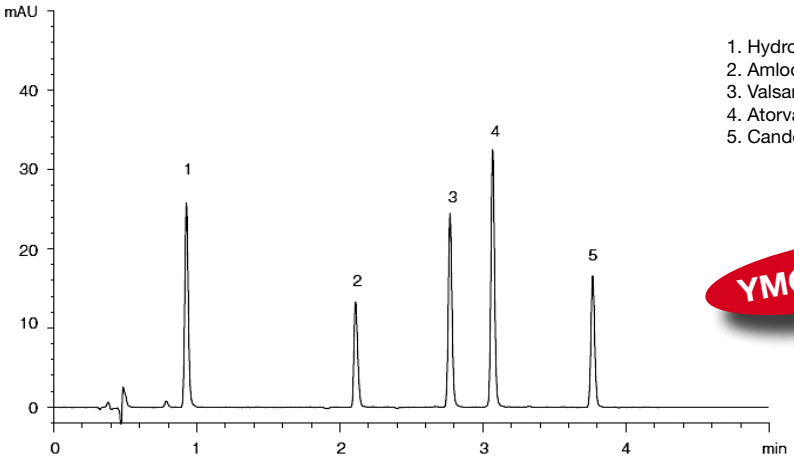


Isobutyl *p*-hydroxybenzoate

Column:	YMC-Triart C18 (5 µm, 12 nm)
Dimension:	150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	10 mM CH_3COOH-CH_3COONH_4 (pH 4.2) / acetonitrile (75/25)
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 254 nm
Injection:	4 µl (0.02 ~ 0.3 mg/ml)

Application Data by courtesy YMC Co., Ltd.

Basic drugs

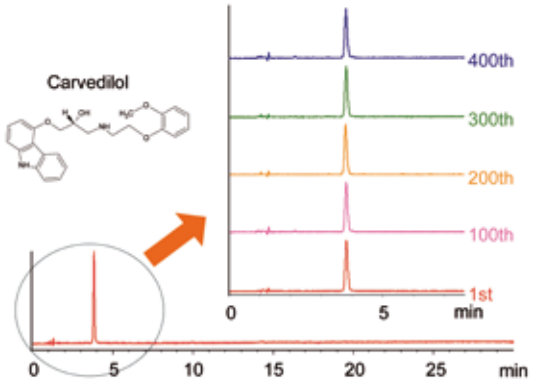


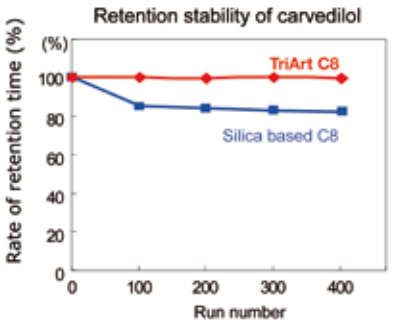
1. Hydrochlorothiazide
2. Amlodipine besilate
3. Valsartan
4. Atorvastatin calcium hydrate
5. Candesartan cilexetil

YMC-Triart C8

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

Sequential analysis of Carvedilol





YMC-Triart C8

Column:	YMC-Triart C8 (5 µm, 150 x 2.0 mm ID)
Part-No.:	TO12S05-1502WT
Eluent:	phosphate buffer (pH 2.0)* / acetonitrile (65/35) *Dissolve 2.72 g of KH_2PO_4 in 900 ml water, adjust pH 2.0 with H_3PO_4 and add water to make 1000 ml
Flow rate:	0.28 ml/min (adjust the flow rate so that the retention time of carvedilol is about 4 min)
Temperature:	55 °C
Detection:	UV at 240 nm

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

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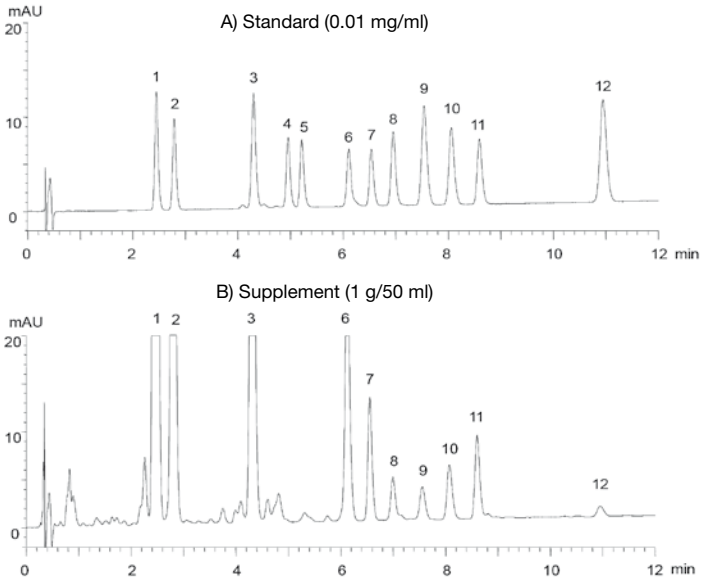
Soy isoflavones in supplement



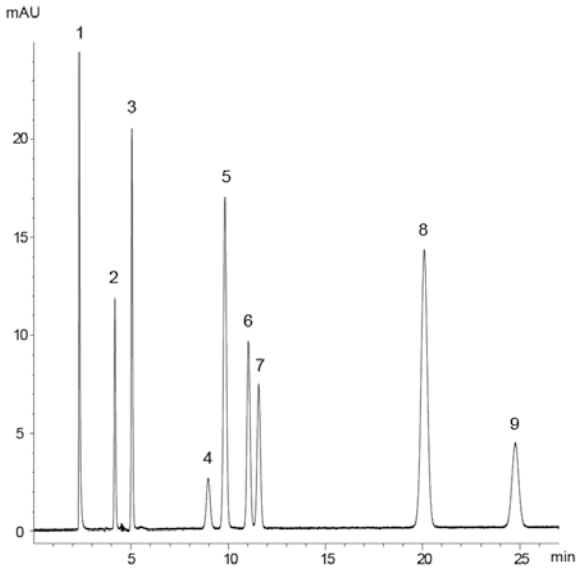
1. Daidzin
2. Glycitin
3. Genistin
4. 6“-*O*-Malonyldaidzin
5. 6“-*O*-Malonylglycitin
6. 6“-*O*-Acetyldaidzin
7. 6“-*O*-Acetylglycitin
8. 6“-*O*-Malonylgenistin
9. Daidzein
10. Glycitein
11. 6“-*O*-Acetylgenistin
12. Genistein

Column:	YMC-Triart C18 (3 µm, 12 nm) 50 x 2.0 mm ID	Gradient:	5-40% B (0-12 min)
Part-No.:	TA12S03-0502WT	Flow rate:	0.4 ml/min
Eluent:	A) acetonitrile / water / HCOOH (10/90/0.1) B) acetonitrile / water / HCOOH (60/40/0.1)	Temperature: Detection: Injection:	25 °C UV at 254 nm 2 µl

Sample preparation method

Supplement
← 50% aqueous ethanol
Stirred at r.t. for 1 hr
Filtration
Injection

Separation of water-soluble vitamins



1. Thiamine HCl (Vitamin B_1)
2. Pyridoxine HCl (Vitamin B_6)
3. Nicotinamide
4. Cyanocobalamin (Vitamin B_{12})
5. L-Ascorbic acid 2-glucoside
6. L-Ascorbic acid (Vitamin C)
7. Erythorbic acid
8. Riboflavin (Vitamin B_2)
9. Nicotinic acid

Column:	YMC-Triart C18 (5 µm, 12 nm) 250 x 4.6 mm ID
Part-No.:	TA12S05-2546WT
Eluent:	phospate buffer* / acetonitrile (90/10) * Dissolve 1.4 g KH_2PO_4 in 800 ml water → add 26 ml 10% TBA·OH → adjust pH 5.2 by 20% H_3PO_4 → add water to make 1000 ml
Flow rate:	0.8 ml/min
Temperature:	40 °C
Detection:	UV at 260 nm
Injection:	10 µl (5 µg/ml)

Application Data by courtesy YMC Co., Ltd.

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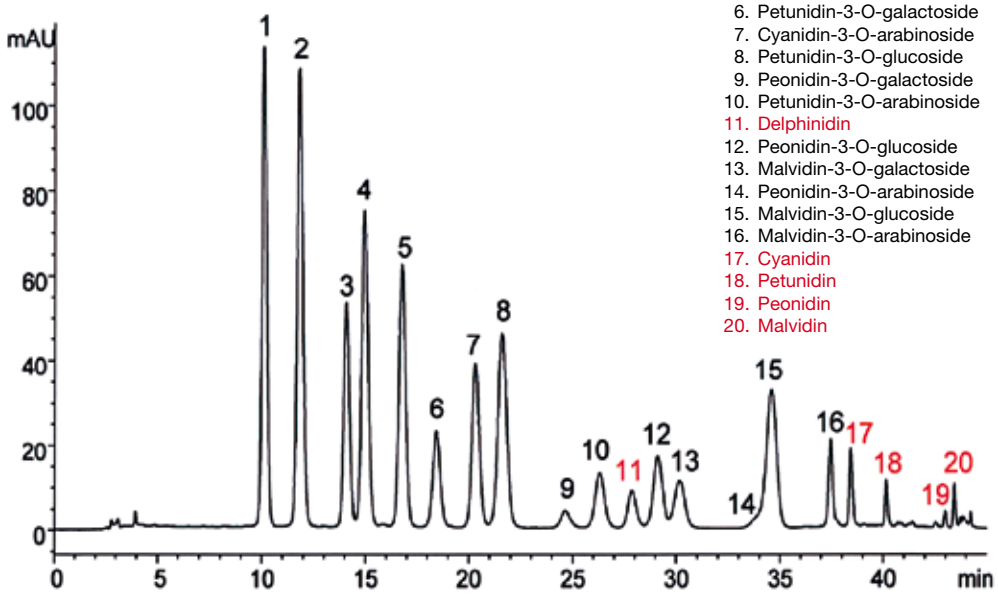
Analysis of anthocyanins and anthocyanidins

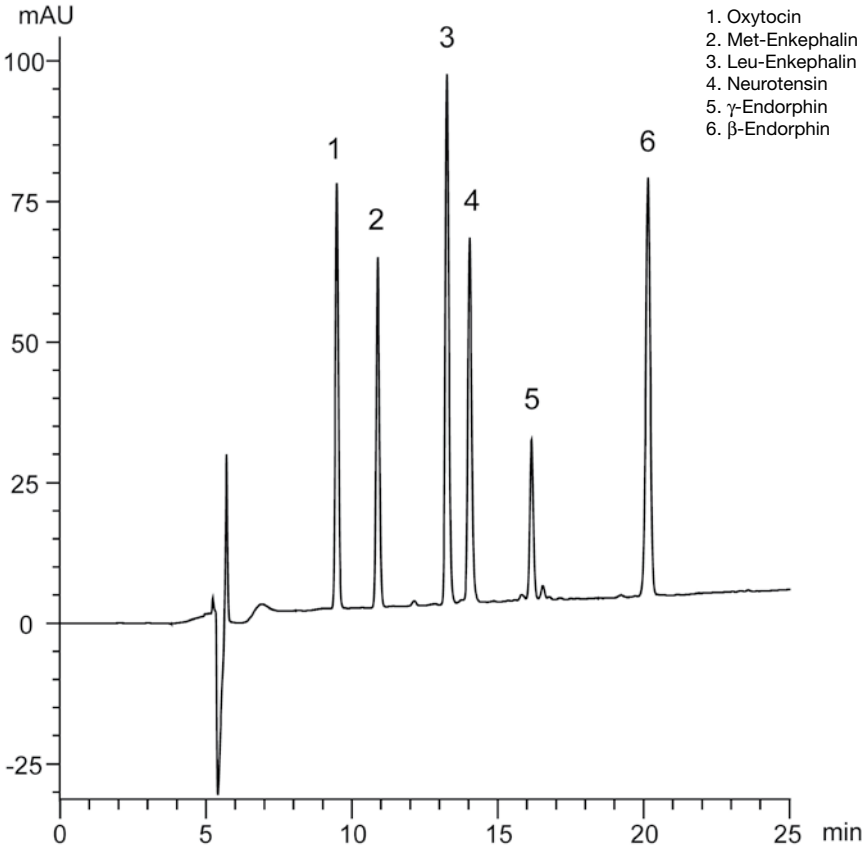
Anthocyanins: Indicated in black
Anthocyanidins: Indicated in red



1. Delphinidin-3-O-galactoside
2. Delphinidin-3-O-glucoside
3. Cyanidin-3-O-galactoside
4. Delphinidin-3-O-arabinoside
5. Cyanidin-3-O-glucoside
6. Petunidin-3-O-galactoside
7. Cyanidin-3-O-arabinoside
8. Petunidin-3-O-glucoside
9. Peonidin-3-O-galactoside
10. Petunidin-3-O-arabinoside
11. Delphinidin
12. Peonidin-3-O-glucoside
13. Malvidin-3-O-galactoside
14. Peonidin-3-O-arabinoside
15. Malvidin-3-O-glucoside
16. Malvidin-3-O-arabinoside
17. Cyanidin
18. Petunidin
19. Peonidin
20. Malvidin

Column:	YMC-Triart C18 (5 µm, 12 nm) 250 x 4.6 mm ID
Part-No.:	TA12S05-2546WT
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)

Peptides (MW 556 - 3,465)



1. Oxytocin (MW 1,007)
2. Met-Enkephalin (MW 574)
3. Leu-Enkephalin (MW 556)
4. Neurotensin (MW 1,673)
5. γ-Endorphin (MW 1,859)
6. β-Endorphin (MW 3,465)

Column:	YMC-Triart C18 (5 µm, 12 nm)	Flow rate:	0.2 ml/min
Dimension:	150 x 2.0 mm ID	Temperature:	37 °C
Part-No.:	TA12S05-1502WT	Detection:	UV at 220 nm
Eluent:	A) water / TFA (100/0.1) B) acetonitrile / TFA (100/0.1) 20-45% B (0-25 min)	Injection:	2 ml (0.075 ~ 0.25 mg/ml)

Application Data by courtesy YMC Co., Ltd.

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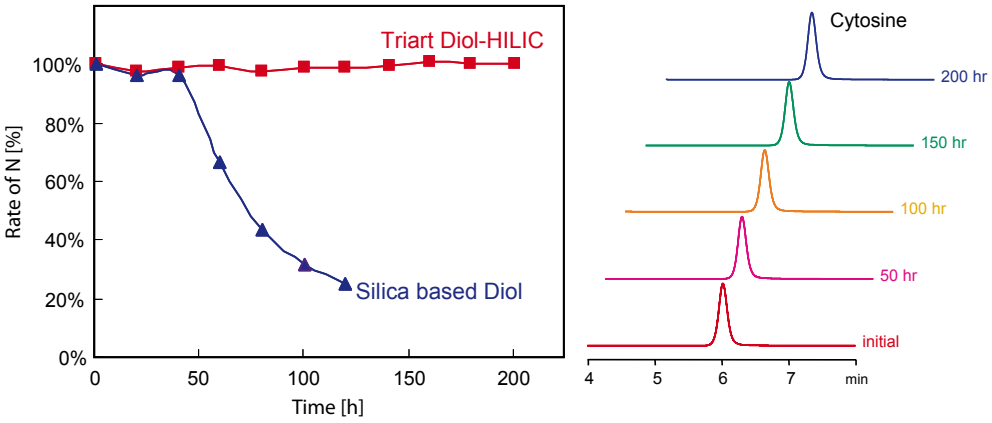
Great durability and reproducibility at high pH

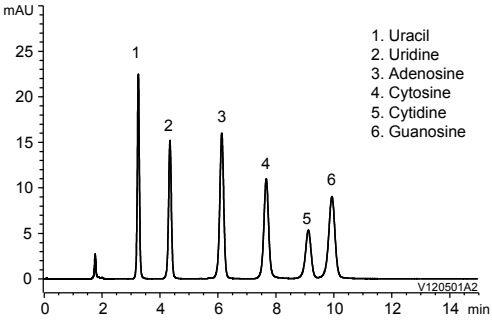
Durability in high pH (pH 11, 50 °C)



Column:	5 µm, 150 x 4.6 mm ID	Flow rate:	1.0 ml/min
Part-No.:	TDH12S05-1546WT	Temperature:	50 °C
Eluent:	acetonitrile / water / NH_3 (90/10/0.1) pH 11.3	Sample:	Cytosine

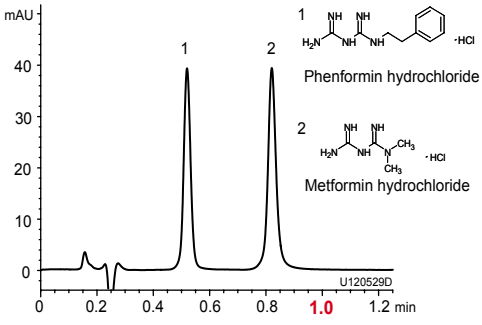
Triart Diol-HILC offers highly reproducible separations even at high pH and high temperature. The lifetime of Triart Diol-HILC is much longer than that of conventional silica-based Diol columns.

Nucleosides and bases



Column:	YMC-Triart Diol-HILIC (5 µm, 12 nm) 150 x 3.0 mm ID
Part-No.:	TDH12S05-1503WT
Eluent:	100 mM CH_3COONH_4 / 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:	100mMHCOOH-HCOONH$_4$(pH3.7)/acetonitrile(10/90)
Flow rate:	0.8 ml/min
Temperature:	25 °C
Detection:	UV at 235 nm
Injection:	2 µl (10 µg/ml)

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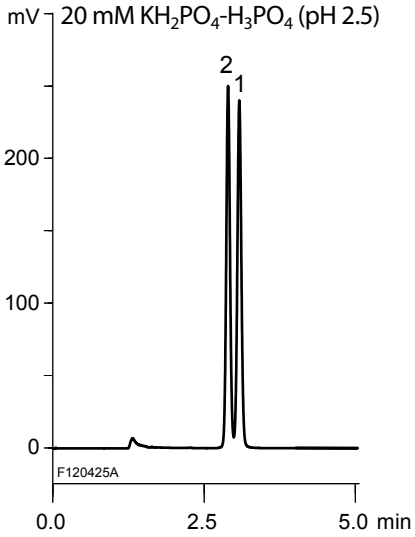
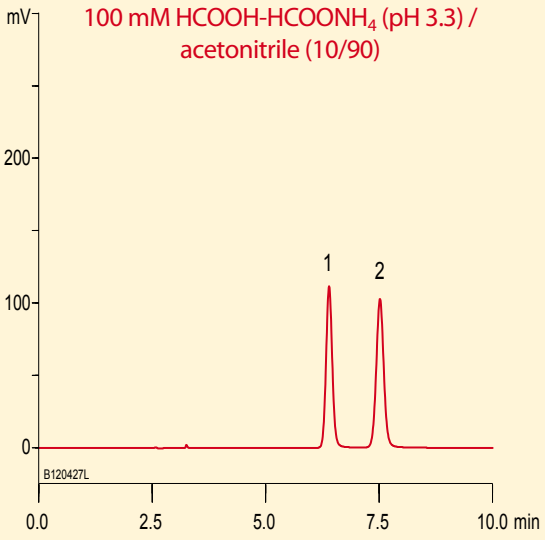
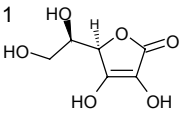
Polar and hydrophilic compounds

RP mode
YMC-Triart C18

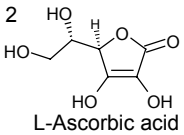


HILIC mode
YMC-Triart Diol-HILIC





Erythorbic acid
(D-Isoascorbic acid)



L-Ascorbic acid

Column:	5 µm, 150 x 3.0 mm ID
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 254 nm
Injection:	4 µl (0.05 mg/ml)

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, Triart Diol-HILIC shows strong retention and good resolution of these compounds with mobile phase containing 90% organic solvent.

Application Data by courtesy YMC Co., Ltd.

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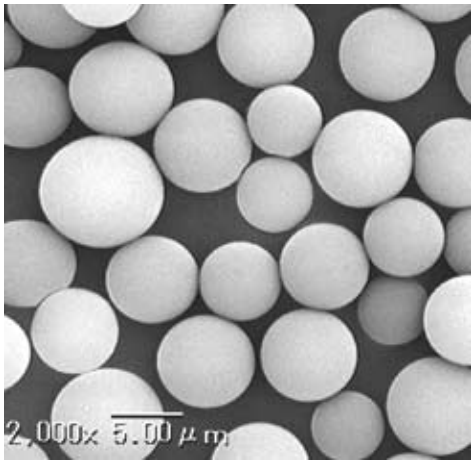
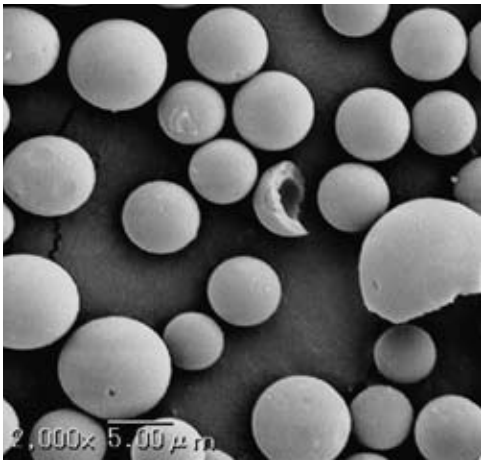
YMC-Triart: Improved quality of particles

Uniform spherical particles

YMC-Triart

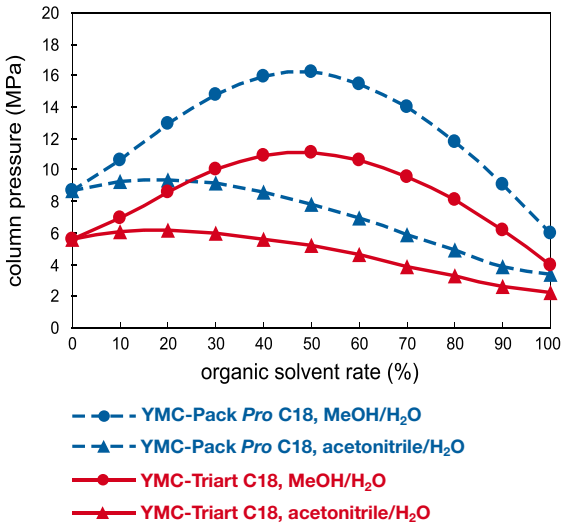


X-Bridge HILIC



The new uniform spherical particle support is used for YMC-Triart C18 and C8. The particle is 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



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

The revolutionary production technique, adapted from micro-reactor flow technology, produces a multi-layered 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).

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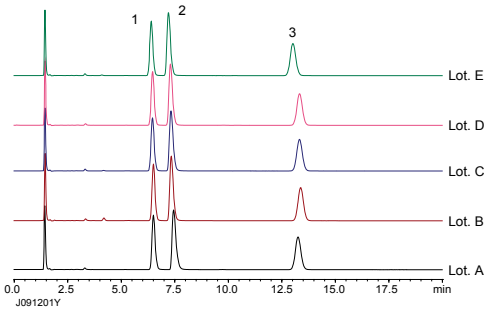
Batch-to-Batch reproducibility

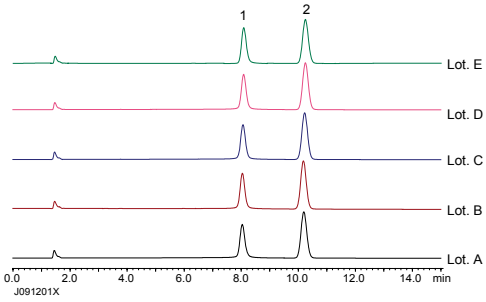
Excellent reproducibility of YMC-Triart phases is available even for the analysis for basic and coordination compounds which normally exhibit tailing and adsorption effects.

Basic compounds



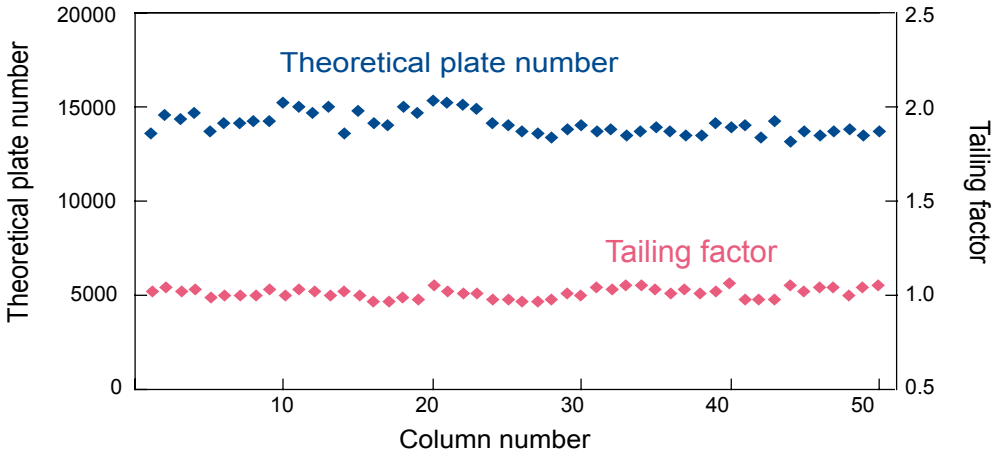
Column:	YMC-Triart C18, 5 µm, 150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	20 mM KH_2PO_4 (pH 6.9) / acetonitrile (65/35)
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 235 nm

Coordination compounds



Column:	YMC-Triart C18, 5 µm, 150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	acetonitrile / 0.1% H_3PO_4 (40/60)
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 254 nm

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.



Column:	YMC-Triart C18, 5 µm, 150 x 4.6 mm ID
Part-No.:	TA12S05-1546WT
Eluent:	acetonitrile / water (40/60)
Flow rate:	1.0 ml/min
Temperature:	ambient
Sample:	butyl benzoate

Application Data by courtesy YMC Co., Ltd.

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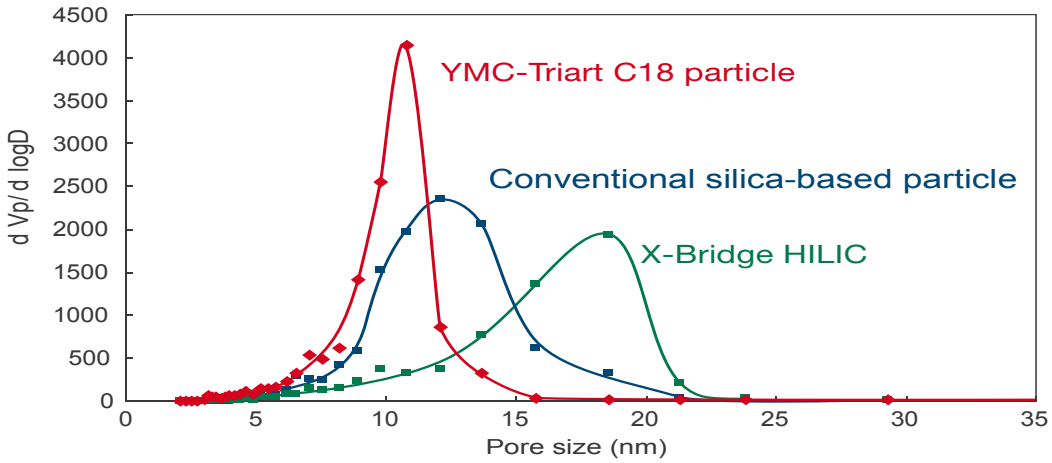
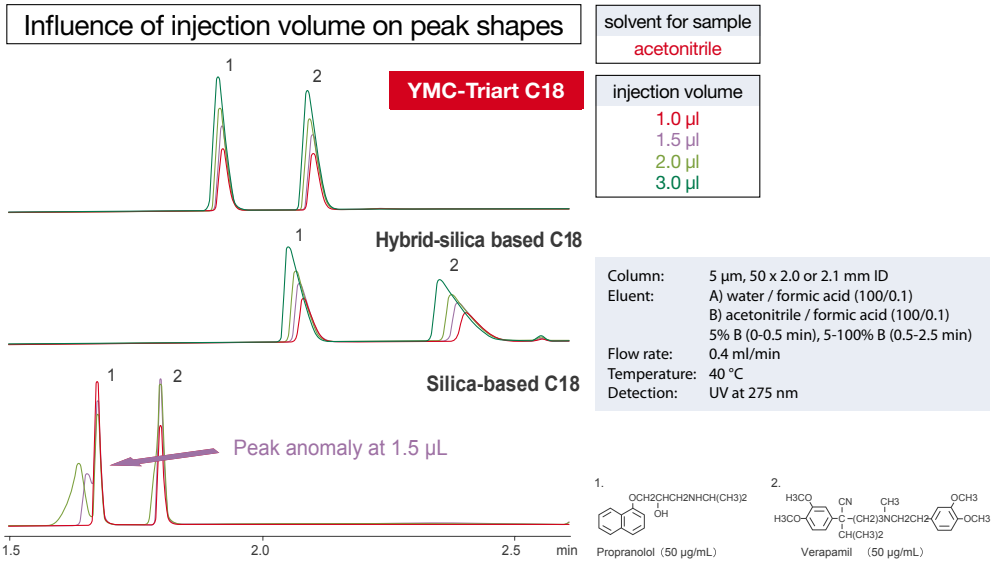
Narrow pore distribution



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

Improved loadability



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

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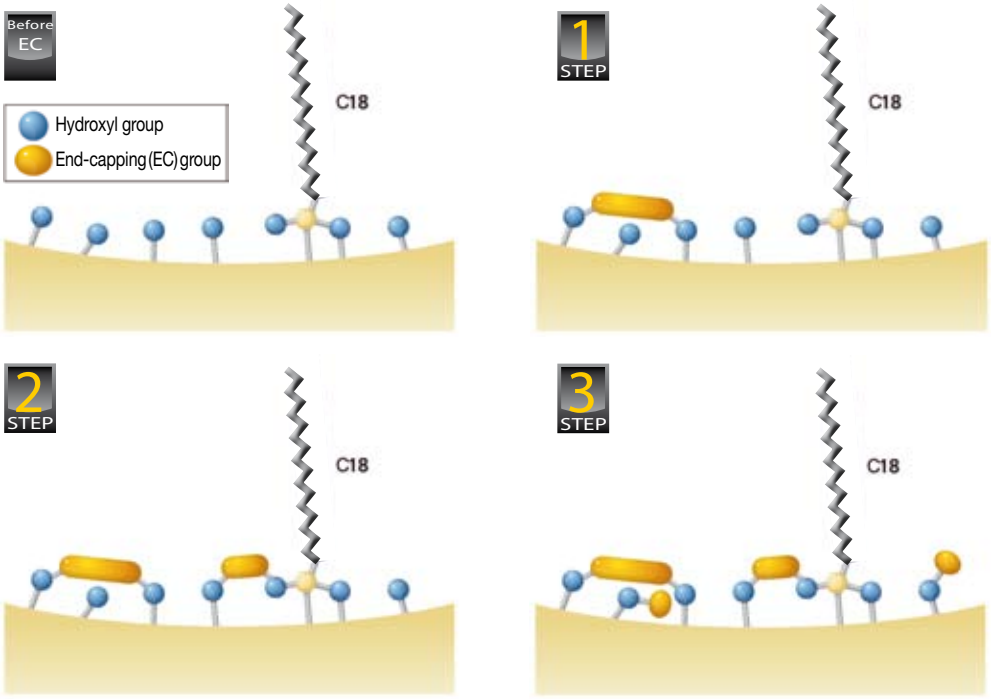
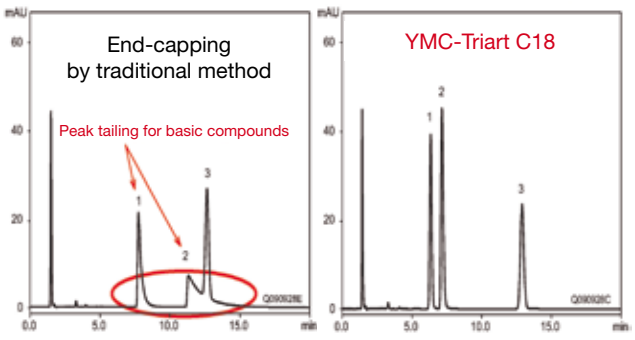
Multi-stage endcapping

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 capping-compound in one step. However, the highly reactive silanols can be hydrolysed easily which contributes to the poor durability. The less reactive silanols are hard to endcap which results in poor resolution due to peak tailing.

YMC-Triart C18, C8 and Phenyl phases use a new innovation in end capping called "multistage end-capping" for its surface modification process. By using a number of compounds with the different reactivities in successive steps, all silanols can be capped to the maximum extent.



The chromatographic result of a "good" end-capping is demonstrated:



Ingredients in cough/cold medication:

1. Chlorpheniramine
2. Dextromethorphan
3. Propyl *p*-hydroxybenzoate

Column:	5 µm, 150 x 3.0 mm ID
Part-No.:	TA12S05-1503WT
Eluent:	20 mM KH_2PO_4-K_2HPO_4 (pH 6.9) / acetonitrile (65/35)
Flow rate:	0.425 ml/min
Temperature:	40 °C
Detection:	UV at 235 nm

Application Data by courtesy YMC Co., Ltd.

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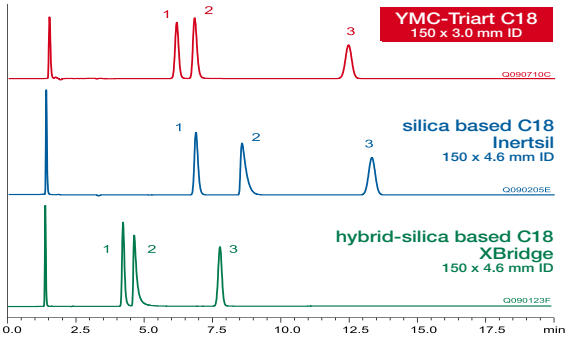
Basic compounds



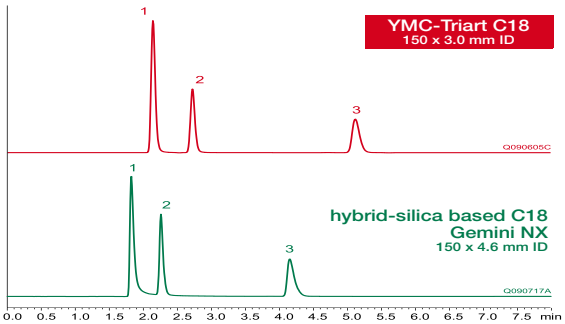
Ingredients in a cough/cold medication

1. Chlorpheniramine
2. Dextromethorphan
3. Propyl p-hydroxybenzoate

Column:	5 µm, 150 x 3.0 or 150 x 4.6 mm ID
Eluent:	20 mM KH_2PO_4-K_2HPO_4 (pH 6.9) / acetonitrile (65/35)
Flow rate:	0.425 ml/min for 3.0 mm ID 1.0 ml/min for 4.6 mm ID
Temperature:	40 °C
Detection:	UV at 235 nm

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



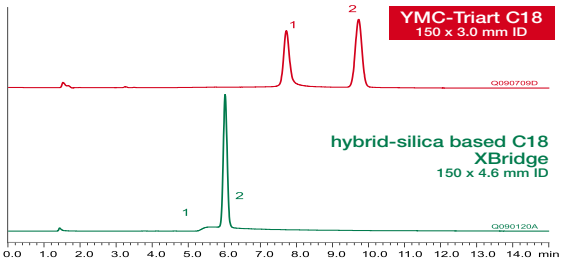
Organic acid

1. Formic acid
2. Acetic acid
3. Propionic acid

Column:	5 µm, 150 x 3.0 or 150 x 4.6 mm ID
Eluent:	methanol / 0.1% H_3PO_4 (5/95)
Flow rate:	0.425 ml/min for 3.0 mm ID 1.0 ml/min for 4.6 mm ID
Temperature:	37 °C
Detection:	UV at 210 nm

YMC-Triart phases is 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



Hinokitiol

1. Hinokitiol
2. Methyl benzoate

Column:	5 µm, 150 x 3.0 or 150 x 4.6 mm ID
Eluent:	acetonitrile / 0.1% H_3PO_4 (40/60)
Flow rate:	0.425 ml/min for 3.0 mm ID 1.0 ml/min for 4.6 mm ID
Temperature:	40 °C
Detection:	UV at 254 nm

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

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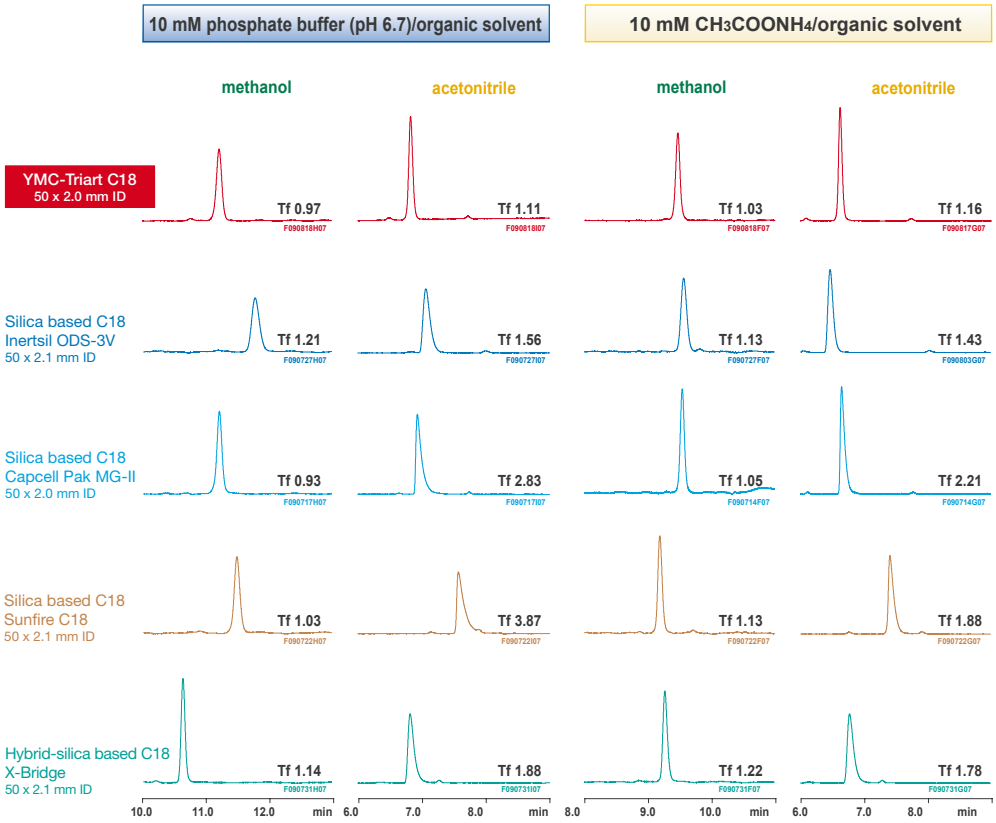
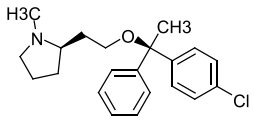
Comparison of clemastine analysis





Clemastine

Column:	5 µm, 50 x 2.0 or 50 x 2.1 mm ID
Eluent:	A) 10 mM KH_2PO_4-K_2HPO_4 (pH 6.7) or 10 mM CH_3COONH_4
	B) methanol or acetonitrile
	5-90% B (0-10 min), 90% B (10-15 min)
Flow rate:	0.2 ml/min
Temperature:	25 °C
Detection:	UV at 230 nm

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

Application Data by courtesy YMC Co., Ltd.

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Ordering information

YMC-Triart 1.9 µm UHPLC columns

Phase	Column ID (mm)	Column length (mm) 30	50	75	100	150	Guard cartridges* with 5 mm length (pack of 3)
C18	2.0	TA12SP9-0302PT	TA12SP9-0502PT	TA12SP9-L502PT	TA12SP9-1002PT	TA12SP9-1502PT	TA12SP9-E5Q1CC
	3.0	—	TA12SP9-0503PT	TA12SP9-L503PT	TA12SP9-1003PT	TA12SP9-1503PT	TA12SP9-E503CC
C8	2.0	TO12SP9-0302PT	TO12SP9-0502PT	TO12SP9-L502PT	TO12SP9-1002PT	TO12SP9-1502PT	TO12SP9-E5Q1CC
	3.0	—	TO12SP9-0503PT	TO12SP9-L503PT	TO12SP9-1003PT	TO12SP9-1503PT	TO12SP9-E503CC
Phenyl	2.0	—	TPH12SP9-0502PT	—	TPH12SP9-1002PT	—	TPH12SP9-E5Q1CC
	3.0	—	—	—	—	—	TPH12SP9-E503CC
PFP	2.0	—	TPF12SP9-0502PT	—	TPF12SP9-1002PT	—	TPF12SP9-E5Q1CC
	3.0	—	—	—	—	—	TPF12SP9-E503CC
HILIC	2.0	—	TDH12SP9-0502PT	—	TDH12SP9-1002PT	—	TDH12SP9-E5Q1CC
	3.0	—	TDH12SP9-0503PT	—	TDH12SP9-1003PT	—	TDH12SP9-E503CC

*Guard cartridge holder required, part no. XPCHUHP

YMC-Triart 3 µm analytical columns

Phase	Column ID (mm)	Column length (mm) 50	75	100	150	250	Guard cartridges* with 10 mm length (pack of 5)
C18	2.0	TA12S03-0502WT	TA12S03-L502WT	TA12S03-1002WT	TA12S03-1502WT	—	TA12S03-01Q1GC
	3.0	TA12S03-0503WT	TA12S03-L503WT	TA12S03-1003WT	TA12S03-1503WT	—	TA12S03-0103GC
	4.6	TA12S03-0546WT	TA12S03-L546WT	TA12S03-1046WT	TA12S03-1546WT	TA12S03-2546WT	TA12S03-0104GC
C8	2.0	TO12S03-0502WT	TO12S03-L502WT	TO12S03-1002WT	TO12S03-1502WT	—	TO12S03-01Q1GC
	3.0	TO12S03-0503WT	TO12S03-L503WT	TO12S03-1003WT	TO12S03-1503WT	—	TO12S03-0103GC
	4.6	TO12S03-0546WT	TO12S03-L546WT	TO12S03-1046WT	TO12S03-1546WT	TO12S03-2546WT	TO12S03-0104GC
Phenyl	2.0	TPH12S03-0502WT	—	—	TPH12S03-1502WT	—	TPH12S03-01Q1GC
	3.0	—	—	TPH12S03-1003WT	TPH12S03-1503WT	—	TPH12S03-0103GC
	4.6	TPH12S03-0546WT	TPH12S03-L546WT	TPH12S03-1046WT	TPH12S03-1546WT	—	TPH12S03-0104GC
PFP	2.0	TPF12S03-0502WT	—	—	TPF12S03-1502WT	—	TPF12S03-01Q1GC
	3.0	—	—	TPF12S03-1003WT	TPF12S03-1503WT	—	TPF12S03-0103GC
	4.6	TPF12S03-0546WT	TPF12S03-L546WT	TPF12S03-1046WT	TPF12S03-1546WT	—	TPF12S03-0104GC
HILIC	2.0	TDH12S03-0502WT	—	TDH12S03-1002WT	TDH12S03-1502WT	—	TDH12S03-01Q1GC
	3.0	TDH12S03-0503WT	—	TDH12S03-1003WT	TDH12S03-1503WT	—	TDH12S03-0103GC
	4.6	—	—	TDH12S03-1046WT	TDH12S03-1546WT	—	TDH12S03-0104GC

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

YMC-Triart 5 µm analytical columns

Phase	Column ID (mm)	Column length (mm) 50	75	100	150	250	Guard cartridges* with 10 mm length (pack of 5)
C18	2.0	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
C8	2.0	TO12S05-0502WT	TO12S05-L502WT	TO12S05-1002WT	TO12S05-1502WT	—	TO12S05-01Q1GC
	3.0	TO12S05-0503WT	TO12S05-L503WT	TO12S05-1003WT	TO12S05-1503WT	—	TO12S05-0103GC
	4.6	TO12S05-0546WT	TO12S05-L546WT	TO12S05-1046WT	TO12S05-1546WT	TO12S05-2546WT	TO12S05-0104GC
Phenyl	2.0	—	—	—	TPH12S05-1502WT	—	TPH12S05-01Q1GC
	3.0	TPH12S05-0503WT	—	—	—	—	TPH12S05-0103GC
	4.6	TPH12S05-0546WT	—	TPH12S05-1046WT	TPH12S05-1546WT	TPH12S05-2546WT	TPH12S05-0104GC
PFP	2.0	—	—	—	TPF12S05-1502WT	—	TPF12S05-01Q1GC
	3.0	TPF12S05-0503WT	—	—	—	—	TPF12S05-0103GC
	4.6	TPF12S05-0546WT	—	TPF12S05-1046WT	TPF12S05-1546WT	TPF12S05-2546WT	TPF12S05-0104GC
HILIC	2.0	—	—	—	TDH12S05-1502WT	—	TDH12S05-01Q1GC
	3.0	—	—	—	TDH12S05-1503WT	—	TDH12S05-0103GC
	4.6	—	—	—	TDH12S05-1546WT	TDH12S05-2546WT	TDH12S05-0104GC

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

Ordering Information

YMC-Triart, 12 nm, 5 µm in ACTUS high-throughput semipreparative hardware

Phase	Column ID (mm)	Column length (mm)				
		50	75	100	150	250
C18	20.0	TA12S05-0520WX	—	TA12S05-1020WX	TA12S05-1520WX	TA12S05-2520WX
	30.0	TA12S05-0530WX	TA12S05-L530WX	TA12S05-1030WX	TA12S05-1530WX	TA12S05-2530WX
C8	20.0	TO12S05-0520WX	—	TO12S05-1020WX	TO12S05-1520WX	TO12S05-2520WX
	30.0	TO12S05-0530WX	TO12S05-L530WX	TO12S05-1030WX	TO12S05-1530WX	TO12S05-2530WX

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
	—	—		—	—

Available in pack sizes 100 g, 500 g, 1 kg, 5 kg

Please inquire for the corresponding brochures:

YMC-Triart for AQ applications (16 p.)

YMC-Triart Prep Brochure (12 p.)

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44_07/2013