

Versatile UHPLC columns

YMC
EUROPE GMBH
The Selectivity Company

YMC-Triart



Transfer

EASY
UHPLC ↔ HPLC
100 MPa /
1000 bar

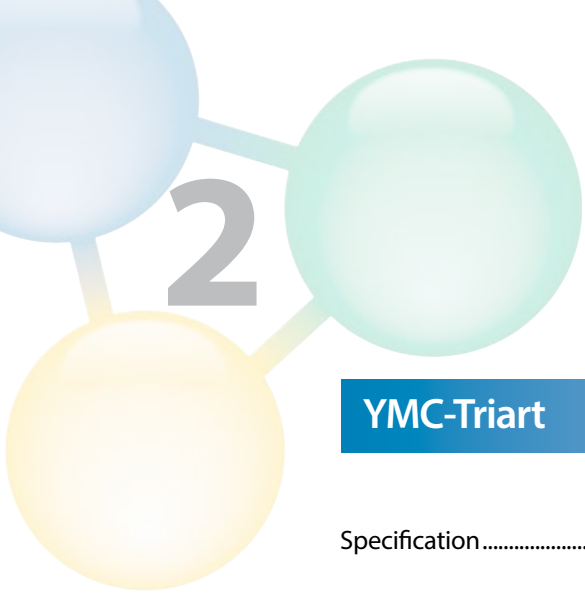
Flexible

pH = 1 – 12
Temperature
up to 70°C

Universal

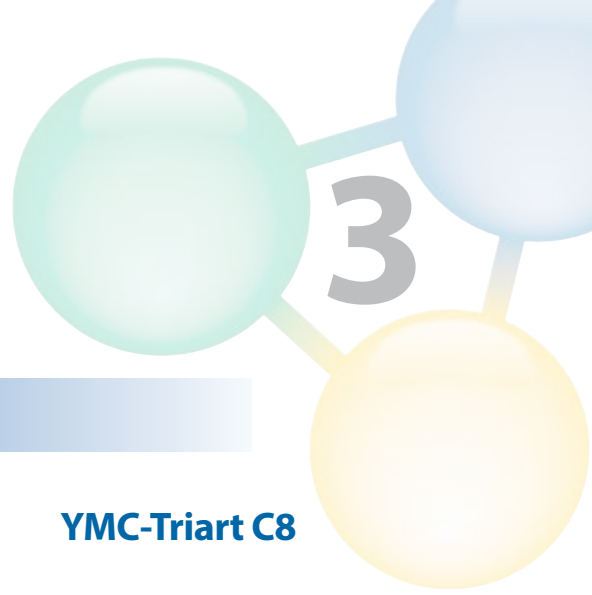
YMC-Triart
for acidic, basic and
neutral analytes

www.ymc.de



YMC-Triart

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Phases

YMC-Triart C18



C18

versatile applications
first choice for
method development
100% aqueous eluents
pH-stable 1 - 12

YMC-Triart C18 ExRS



C18 ExRS

extended pH and stability
hydrophobic substances
positional isomers

YMC-Triart C8



C8

alternative to C18
short retention time
pH-stable 1 - 12

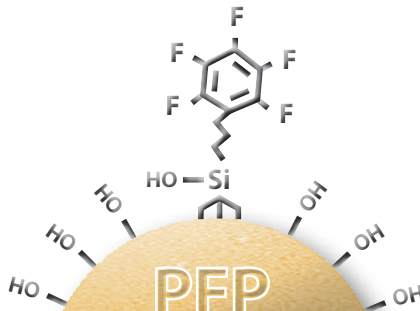
YMC-Triart Phenyl



Phenyl

aromatic compounds
(Π -electron acceptor)
conjugated systems
100% aqueous eluents

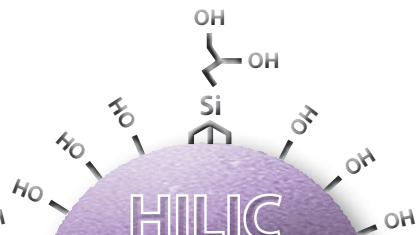
YMC-Triart PFP



PFP

aromatic compounds
(Π -electron donor)
cis-trans isomer
polar halogenated compounds
100% aqueous eluents

YMC-Triart Diol-HILIC

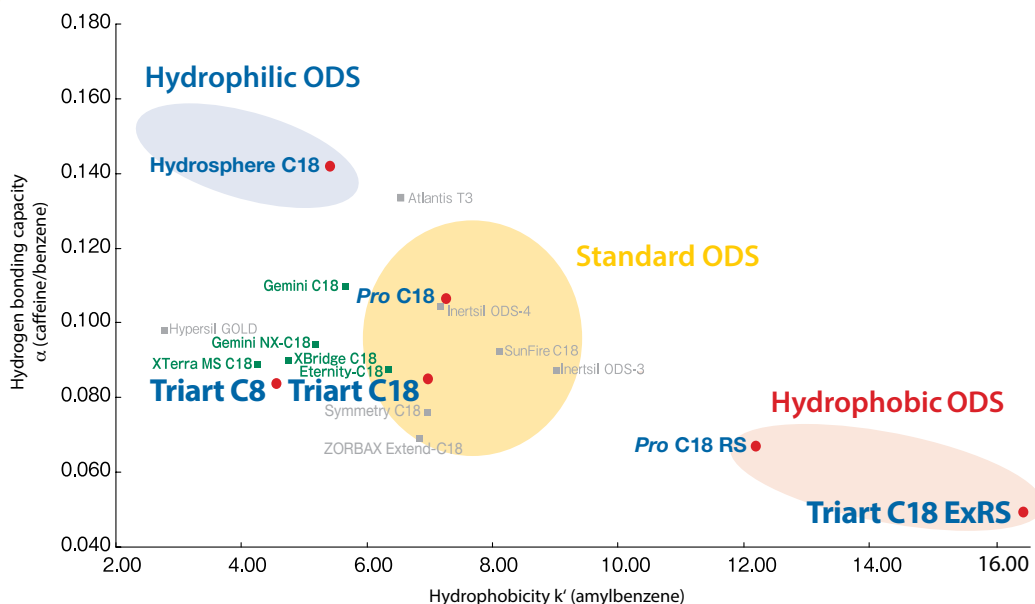


HILIC

good alternative for
very polar compounds
100% aqueous eluents

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First choice column for method development



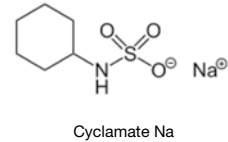
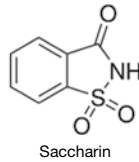
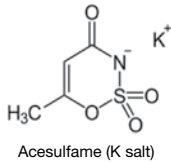
Conventional hybrid silica-based ODS columns tend to be less hydrophobic than silica-based columns. YMC-Triart C18 has a higher carbon load, giving it a hydrophobicity comparable to that of standard ODS columns, thereby making it a "versatile first-choice" column for method development.

Whereas YMC-Triart C18 ExRS is designed to provide contrastive separation characteristics!

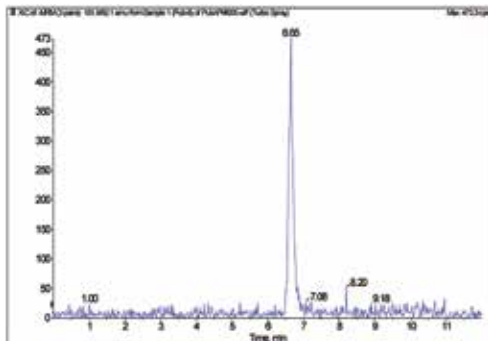
Specification

	YMC-Triart C18	YMC-Triart C18 ExRS	YMC-Triart C8	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)	Phenyl (USP L11)	Pentafluorophenyl (USP L43)	Diol (USP L20)
Particle size	1.9, 3 and 5 μm					
Pore size	12 nm	8 nm	12 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
Bonding	polymeric type					
Endcapping	multi-stage hybrid groups	multi-stage hybrid groups	multi-stage hybrid groups	multi-stage hybrid groups	none	none
pH range	1 ~ 12	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	pH 1-7: 70 °C, pH 7-12: 50 °C	50 °C	50 °C	50 °C

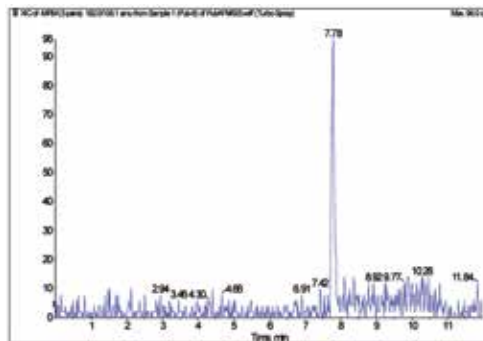
Determination of Artificial Sweeteners with LC-MS/MS



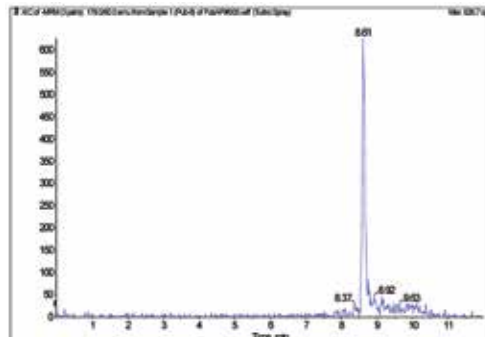
→ Non biological markers of wastewater entries in ground and surface water



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: water (containing 10 mmol NH₄ formate)
 B: methanol (containing 10 mmol NH₄ formate)
 Gradient:

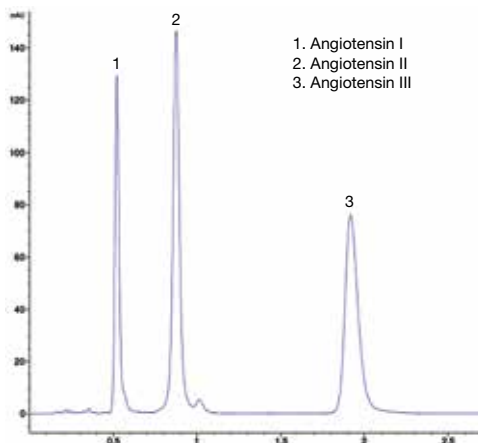
Time	0	6.0	6.1	12.0
% B	2	75	2	2

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

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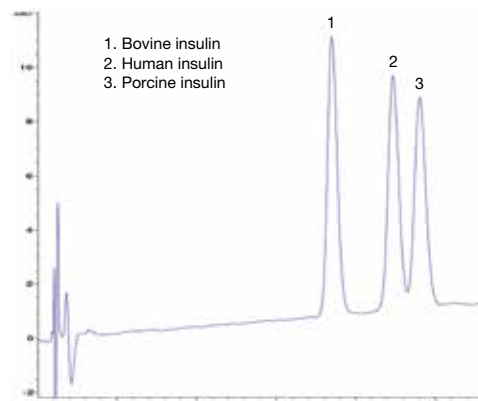
UHPLC

Angiotensin I, II and III



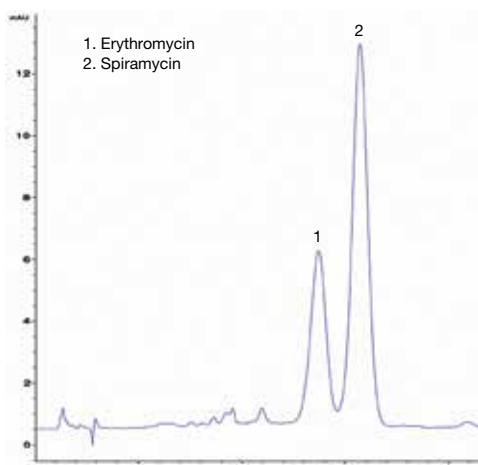
Column: YMC-Triart C18, 1.9 μ m (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: 20 mM KH_2PO_4 + K_2HPO_4 (pH 7.9) / acetonitrile (22/78)
Flow rate: 0.7 ml/min
Detection: UV at 220 nm
Injection: 0.5 μ l
Temperature: 40 $^\circ\text{C}$

Insulin



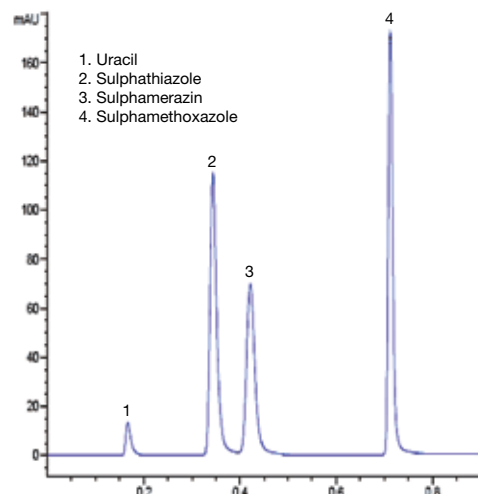
Column: YMC-Triart C18, 1.9 μ m (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: A) water + 0.1% TFA
B) acetonitrile + 0.1% TFA
Gradient: 30% B (0 min); 30-32% B (0-5 min); 32% B (55 min)
Flow rate: 0.6 ml/min
Detection: UV at 220 nm
Injection: 0.5 μ l
Temperature: 30 $^\circ\text{C}$

Macrolide antibiotics



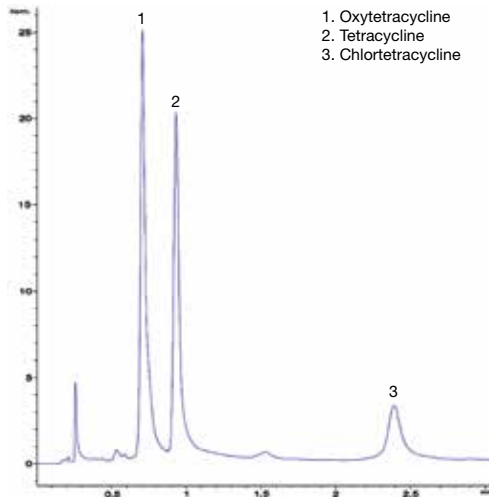
Column: YMC-Triart C18, 1.9 μ m (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: A) 20 mM K_2HPO_4 + 20 mM KH_2PO_4 (pH 7.9)
B) acetonitrile
Gradient: 60% B (0.5 min); 60-70% B (0.5-1.5 min); 70% B (3.5 min)
Flow rate: 0.45 ml/min
Detection: UV at 210 nm
Injection: 1 μ l
Temperature: 50 $^\circ\text{C}$

Sulpha drugs



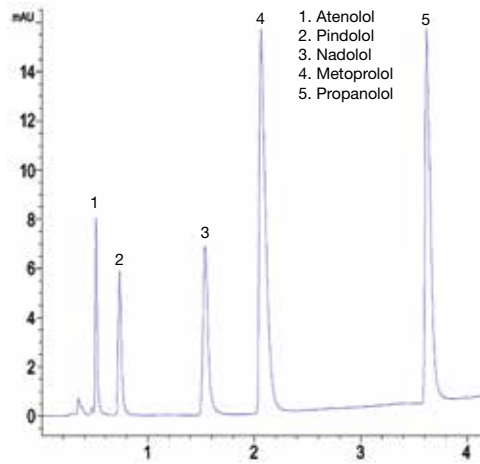
Column: YMC-Triart C18, 1.9 μ m (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: water + formic acid (pH 2.5) / acetonitrile (75/25)
Flow rate: 0.75 ml/min
Detection: UV at 280 nm
Injection: 0.5 μ l
Temperature: 50 $^\circ\text{C}$

Tetracycline antibiotics



Column: YMC-Triart C18, 1.9 μm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: 5 mM $\text{NH}_4\text{CH}_2\text{COOH}$ / acetonitrile (87/13)
Flow rate: 0.65 ml/min
Detection: UV at 280 nm
Injection: 1 μl
Temperature: 40 $^\circ\text{C}$

Betablockers

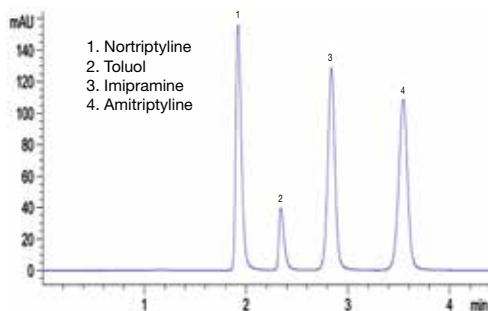


Column: YMC-Triart C18, 1.9 μm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: A) 20 mM $\text{NH}_4\text{CH}_2\text{COOH}$ + ammonia (pH 9.0)
B) acetonitrile
Gradient: 25% B (1.0 min); 75% B (1-6 min)
Flow rate: 0.35 ml/min
Detection: UV at 254 nm
Injection: 1 μl
Temperature: 40 $^\circ\text{C}$

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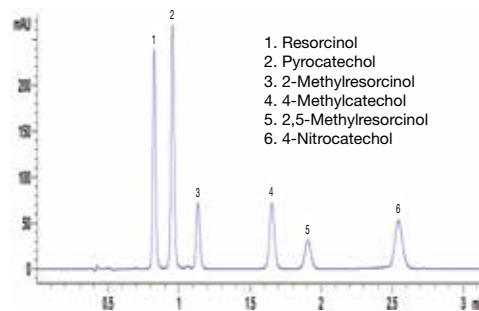
UHPLC

Antidepressants



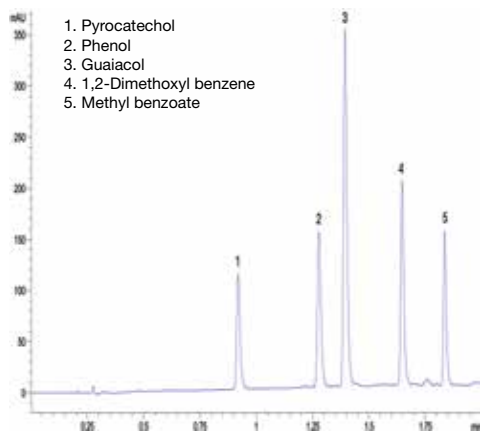
Column: YMC-Triart Phenyl, 1.9 μ m (100 x 2.0 mm ID)
Part-No.: TPH12SP9-1002PT
Eluent: methanol / 25 mM KH_2PO_4 (pH 6.0) (65/35)
Flow rate: 0.4 ml/min
Detection: UV at 254 nm
Injection: 2 μ l
Temperature: 25 $^\circ\text{C}$

Resorcinol



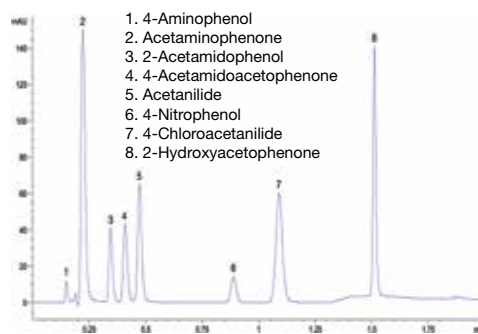
Column: YMC-Triart PFP, 1.9 μ m (100 x 2.0 mm ID)
Part-No.: TPF12SP9-1002PT
Eluent: water + 0.1% formic acid / acetonitrile + 0.1% formic acid (85/15)
Flow rate: 0.8 ml/min
Detection: UV at 270 nm
Injection: 0.5 μ l
Temperature: 25 $^\circ\text{C}$

Guaiacol and impurities



Column: YMC-Triart C18, 1.9 μ m, 12 nm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: water / acetonitrile (50/50)
Flow rate: 0.7 ml/min
Detection: UV at 254 nm
Injection: 0.5 μ l
Temperature: 40 $^\circ\text{C}$

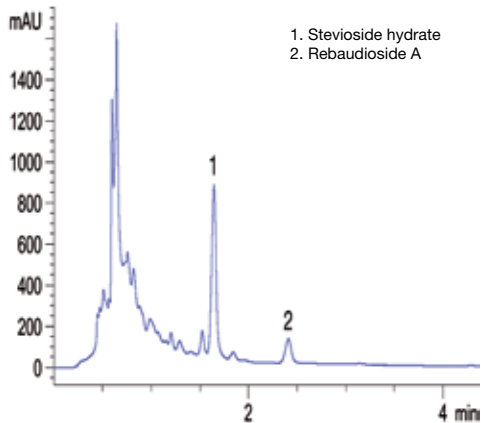
Paracetamol



Column: YMC-Triart C18, 1.9 μ m, 12 nm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: A) water + formic acid (pH 2.5) / B) acetonitrile
Flow rate: 0.7 ml/min
Detection: UV at 254 nm
Injection: 0.5 μ l
Temperature: 40 $^\circ\text{C}$
Gradient:

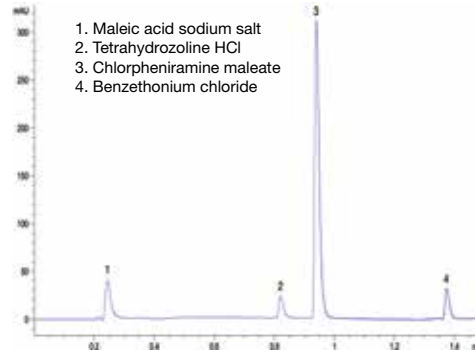
min	A	B
0	70	30
1	70	30
1.5	20	80
2	20	80

Stevia leaves



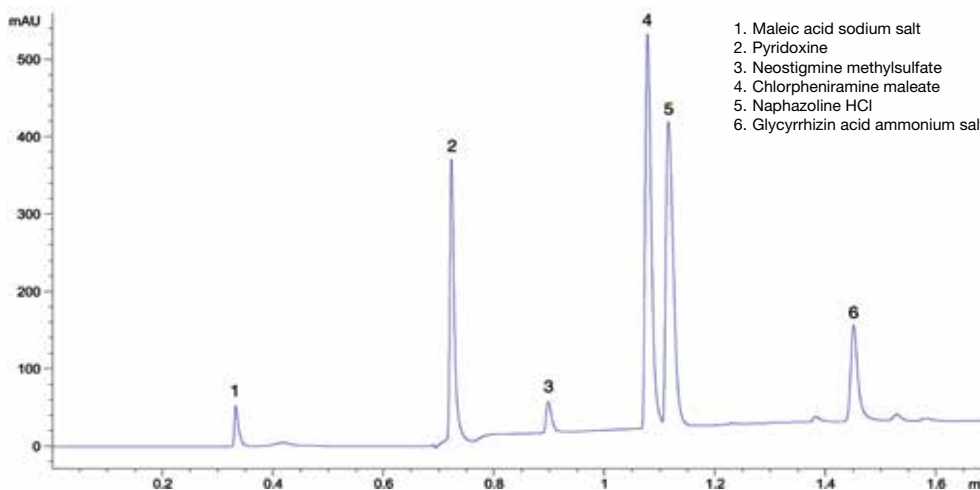
Column: YMC-Triart Diol-HILIC, 1.9 μ m (100 x 3.0 mm ID)
Part-No.: TDH12SP9-1003PT
Eluent: acetonitrile / water (85/15)
Flow rate: 1 ml/min
Detection: UV at 200 nm
Injection: 2 μ l
Temperature: 30 $^{\circ}$ C

Nasal Spray



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

Eye drop formulation



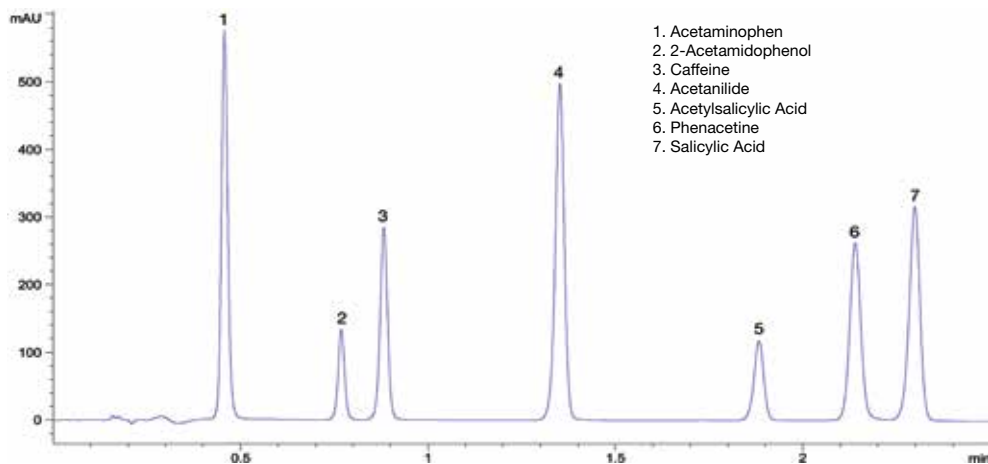
Column: YMC-Triart C18, 1.9 μ m, 12 nm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: A) water + 0.05% TFA
B) acetonitrile
Flow rate: 0.6 ml/min
Detection: UV at 265 nm
Injection: 0.5 μ l
Temperature: 40 $^{\circ}$ C

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

Application Data by courtesy YMC Co., Ltd.

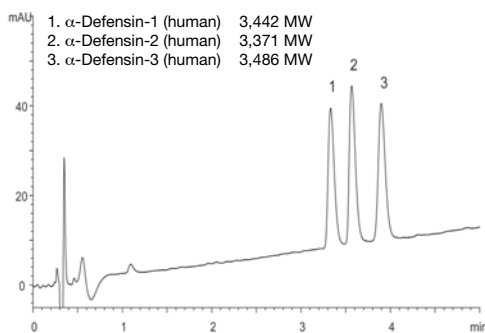
10 UHPLC

7 Analgesics



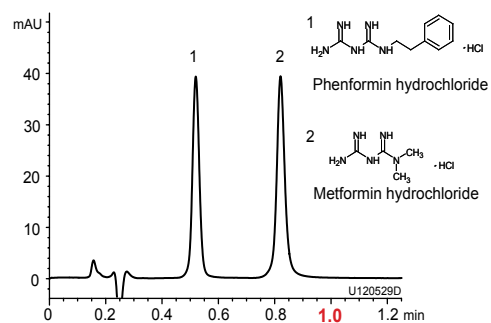
Column: YMC-Triart C18, 1.9 μm , 12 nm (50 x 2.0 mm ID)
Part-No.: TA12SP9-0502PT
Eluent: water + formic acid (pH 2.5) / acetonitrile (50/50)
Flow rate: 0.8 ml/min
Detection: UV at 240 nm
Injection: 1 μl
Temperature: 40 $^{\circ}\text{C}$

Antimicrobial peptides



Column: YMC-Triart C18 (1.9 μm , 12 nm)
50 x 2.0 mm ID
Part-No.: TA12SP9-0502PT
Eluent: A) water + 0.1% formic acid
B) 2-propanol / acetonitrile (50/50) + 0.8% formic acid
10-25% B (0-10 min)
Flow rate: 0.4 ml/min
Temperature: 70 $^{\circ}\text{C}$
Detection: UV at 220 nm
Injection: 1 μl (50 $\mu\text{g}/\text{ml}$)

Diabetes drugs

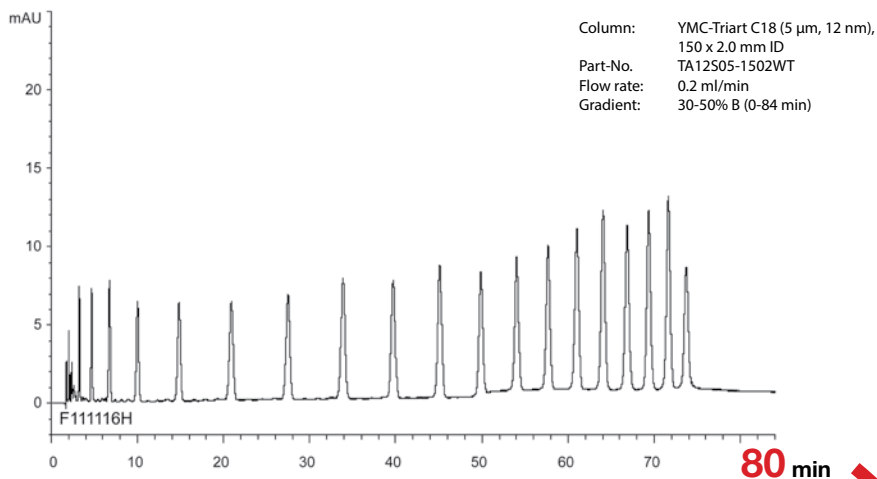


Column: YMC-Triart Diol-HILIC (1.9 μm , 12 nm)
50 x 2.0 mm ID
Part-No.: TDH12SP9-0502PT
Eluent: 100mMHCOOH-HCOONH₄(pH3.7)/acetonitrile(10/90)
Flow rate: 0.8 ml/min
Temperature: 25 $^{\circ}\text{C}$
Detection: UV at 235 nm
Injection: 2 μl (10 $\mu\text{g}/\text{ml}$)

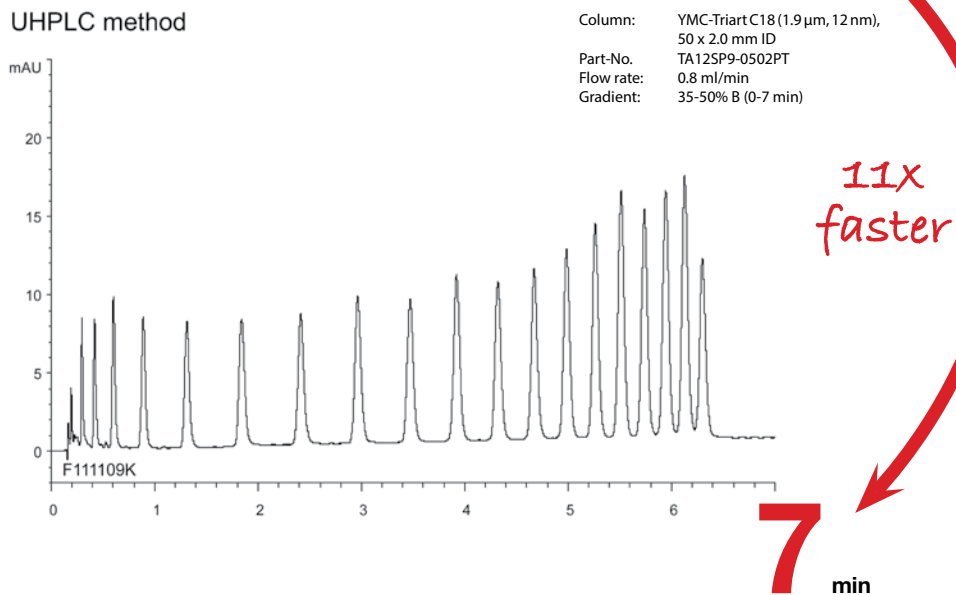
Application Data by courtesy YMC Co., Ltd.

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

Conventional LC method



UHPLC method

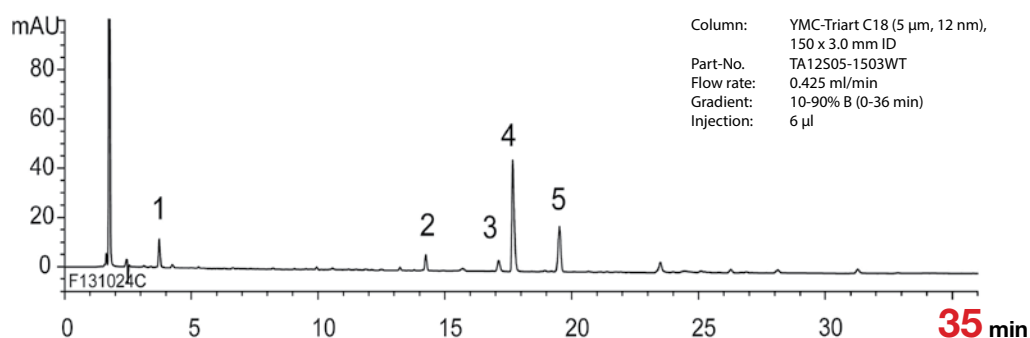


Eluent: A) 10 mM di-n-butylamine-acetic acid (pH 6.0)
 B) methanol
 Detection: UV at 269 nm
 Injection: 1 μ l (5 nmol/ml)
 Temperature: 37 $^{\circ}$ C

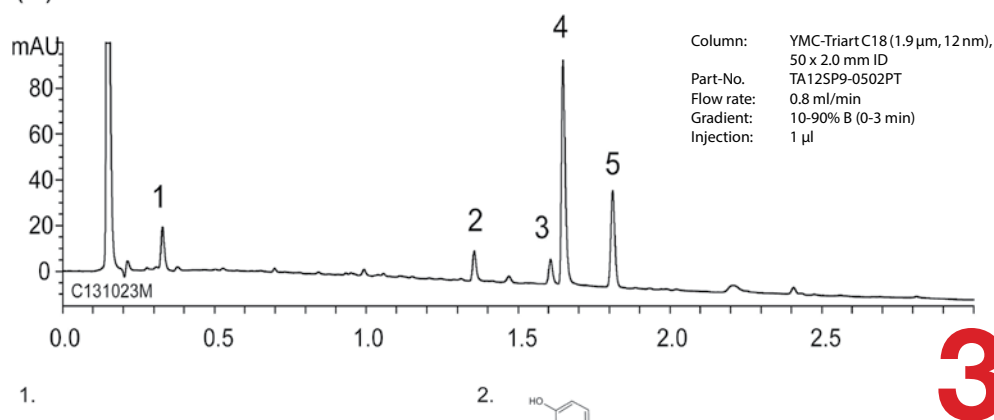
12 UHPLC

Duloxetine and its degradation products

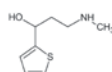
(A) HPLC method



(B) UHPLC method



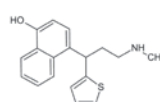
1.



Amino alcohol

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

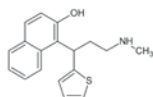
2.



Para isomer

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

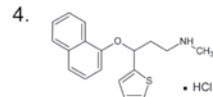
3.



Ortho isomer

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

4.



Duloxetine hydrochloride

5.



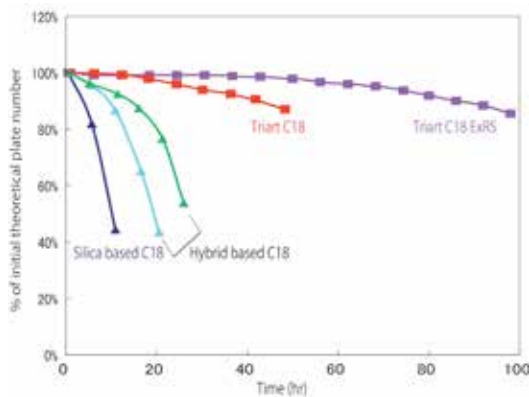
α -Naphthol

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

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

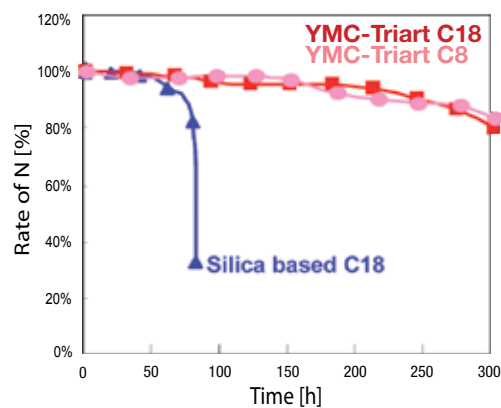
Versatile wide pH stability

Phosphate buffer (pH 11.5, 40 °C)



Column: 5 µm, 150 x 4.6 mm ID
 Part-No.: TA12S05-1546WT
 Eluent: 50 mM K₂HPO₄-K₃PO₄ (pH 11.5) / methanol (90/10)
 Flow rate: 1.0 ml/min
 Sample: benzyl alcohol

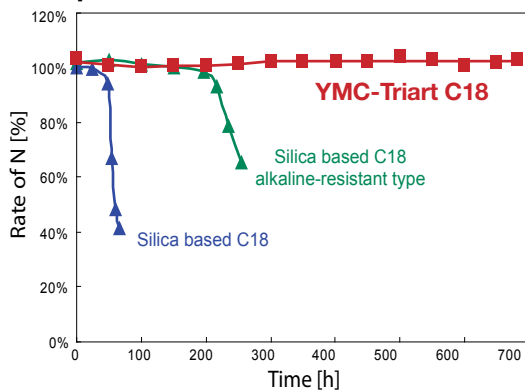
Triethylamine (pH 11.5, 40 °C)



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

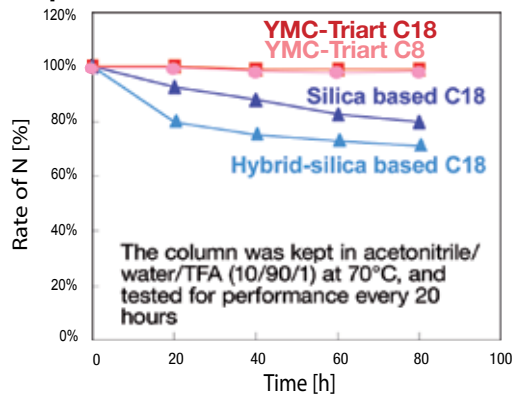
Stability at high temperature

pH 6.9, 70 °C



Column: 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, 70 °C



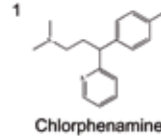
Column: 5 µm, 50 x 2.0 mm ID
 Part-No.: TA12S05-0502WT
 Eluent: acetonitrile / water (60/40)
 Flow rate: 0.2 ml/min
 Temperature: 70 °C
 Sample: butyl benzoate

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.

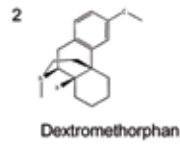
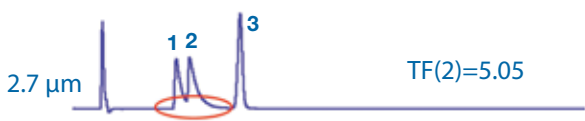
Application Data by courtesy YMC Co., Ltd.

Higher resolution and good loadability

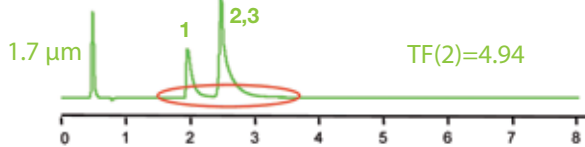
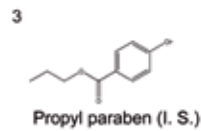
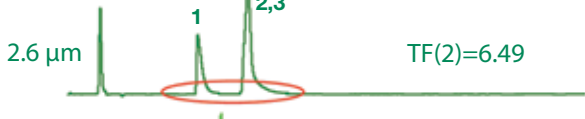
YMC-Triart C18



Ascentis Express C18

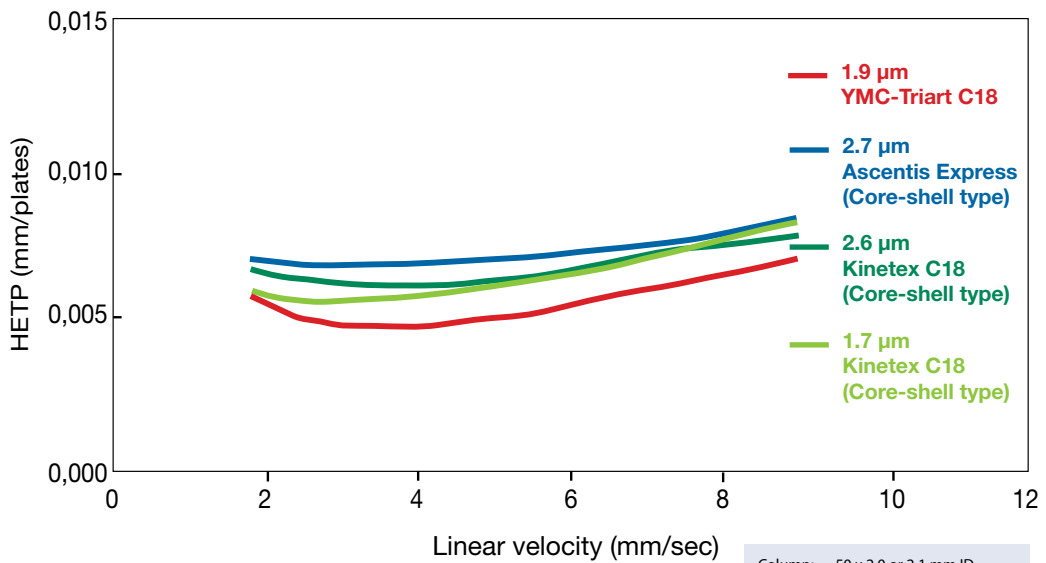


Kinetex C18



Column: 50 x 2.0 or 2.1 mm ID
 Eluent: 20 mM KH₂PO₄-K₂HPO₄ (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!



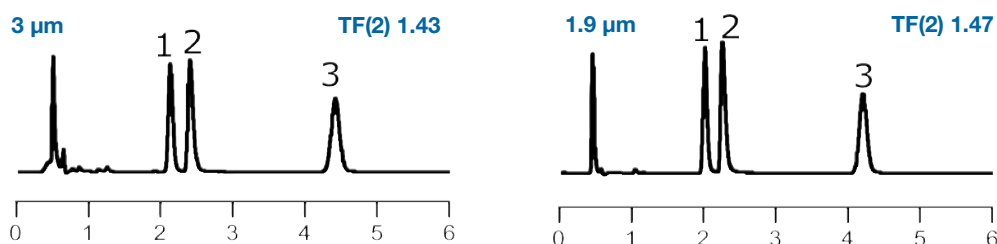
Column: 50 x 2.0 or 2.1 mm ID
 Eluent: acetonitrile / water (60/40)
 Detection: UV at 254 nm
 Sample: Butylbenzoate

Application Data by courtesy YMC Co., Ltd.

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.

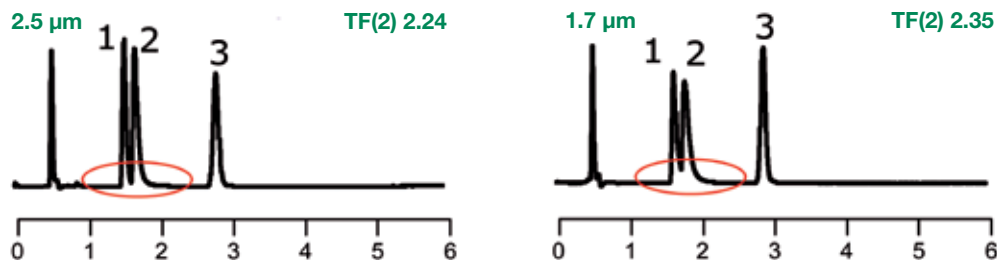
YMC-Triart C18



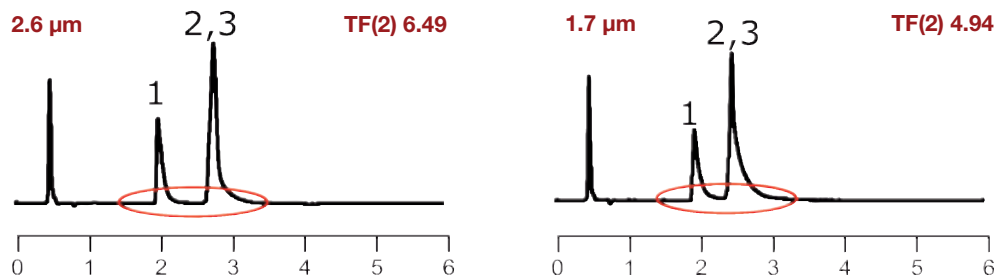
YMC has addressed this issue of method transfer. YMC-Triart columns show identical selectivity and excellent peak shapes for basic compounds for all 3.0 µm to 1.9 µm particle sizes. It allows predictable scale up from UHPLC to conventional HPLC and even to semi-preparative LC, and vice versa.

Case Studies*

X-Bridge BEH C18 and Acquity UPLC BEH C18



Kinetex™ C18



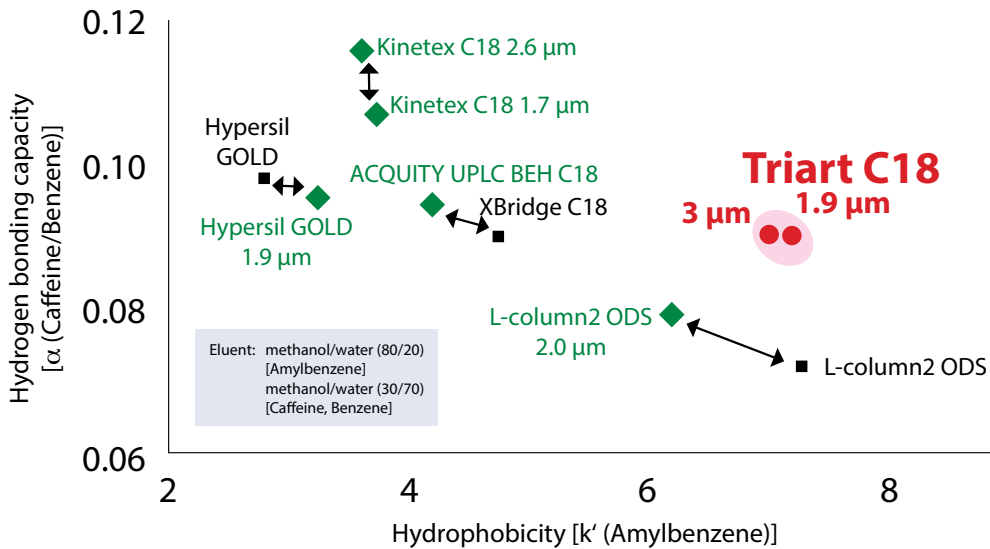
Kinetex™ C18 columns show significant peak tailing and have limited scalability due to lack of larger particle sizes.

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

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

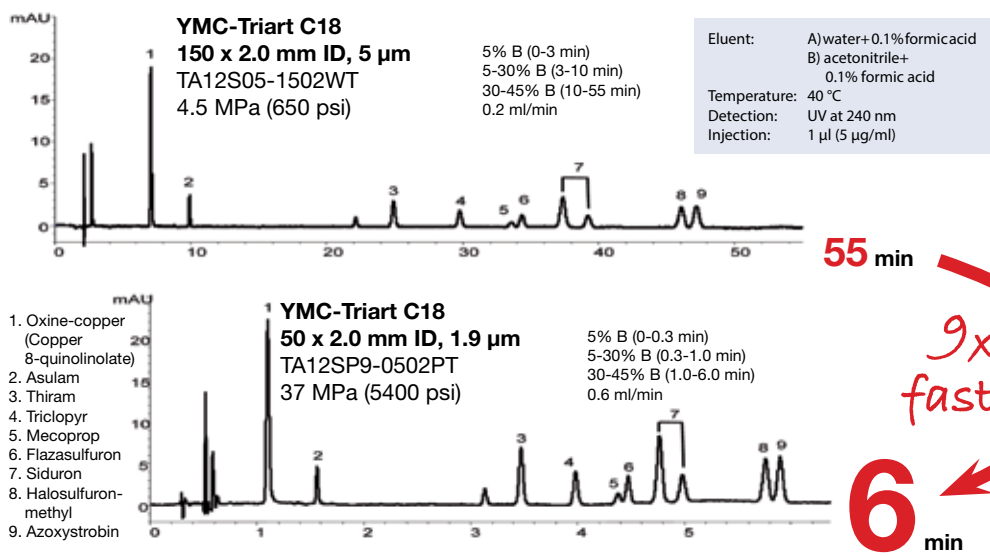
*There observations might not be representative for all applications, but have been reported in specific cases.

Evaluation of method transfer performance!



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

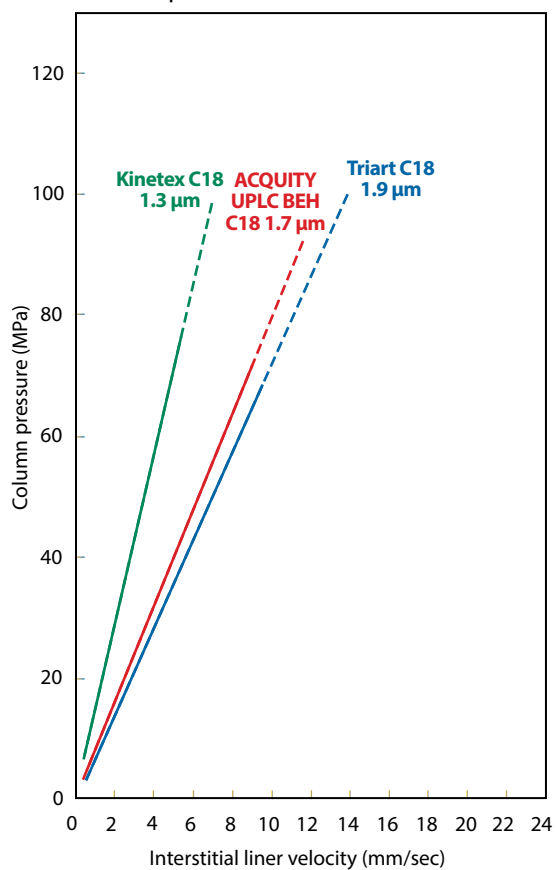
Method transfer between HPLC ↔ UHPLC



Application Data by courtesy YMC Co., Ltd.

Low column back pressure

Column pressure curve



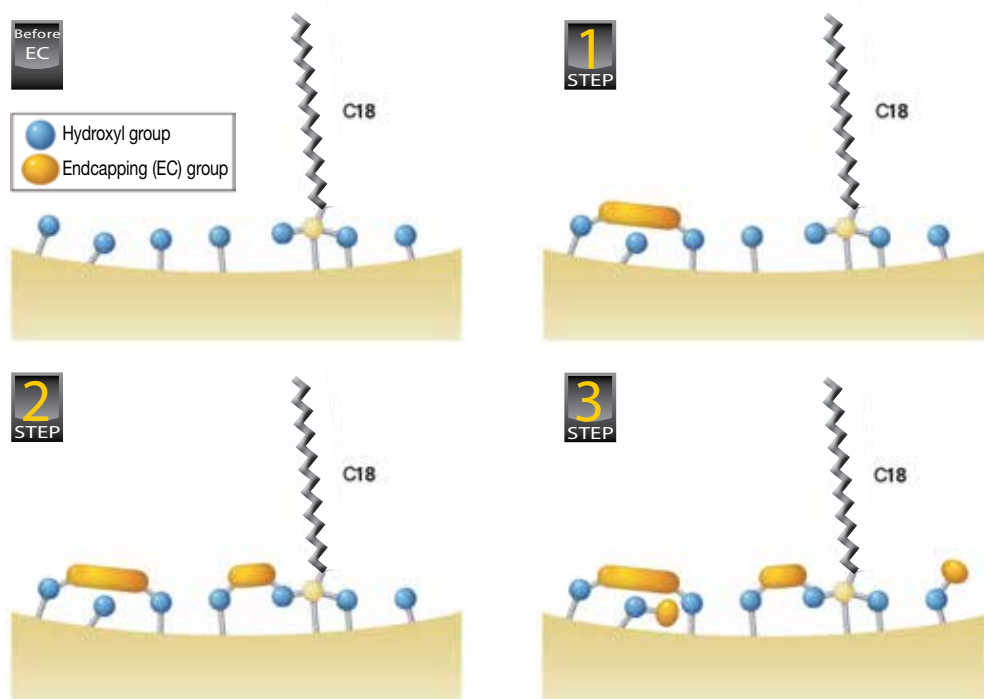
YMC-Triart C18 1.9 µm columns exhibit lower back pressures compared to other UHPLC columns.

A column with a lower initial back pressure can have a longer lifetime than a column with a higher starting back pressure. This results in higher flow rates being possible with a corresponding saving in analysis time.

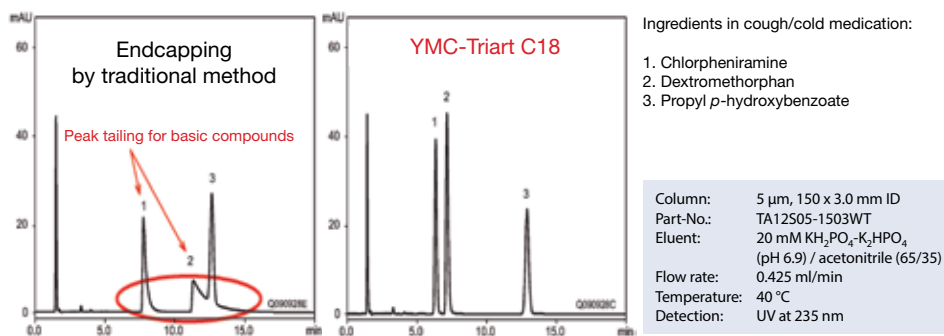
Multi-stage endcapping

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 stability. 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 endcapping called "multi-stage endcapping" 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.

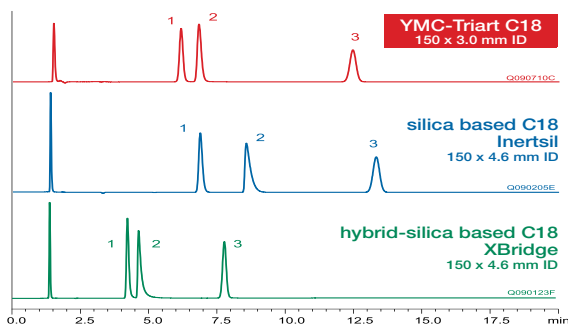


The chromatographic result of a "good" endcapping is demonstrated:



Application Data by courtesy YMC Co., Ltd.

Basic compounds



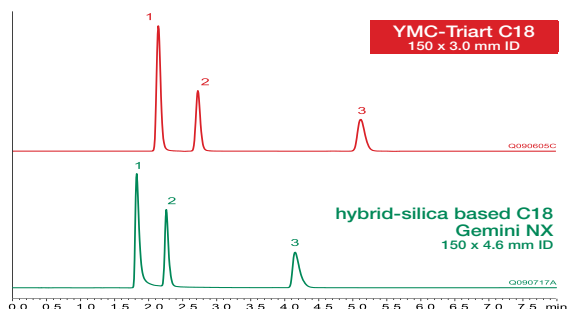
Ingredients in a cough/cold medication

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

Column: 5 μ m, 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 $^\circ\text{C}$
 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



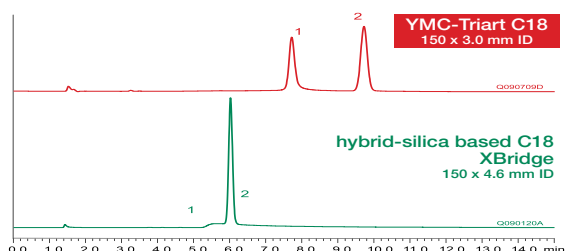
Organic acid

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

Column: 5 μ m, 150 x 3.0 or 150 x 4.6 mm ID
 Eluent: methanol / water + 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 $^\circ\text{C}$
 Detection: UV at 210 nm

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



Hinokitiol

1. Hinokitiol
2. Methyl benzoate

Column: 5 μ m, 150 x 3.0 or 150 x 4.6 mm ID
 Eluent: acetonitrile / water + 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 $^\circ\text{C}$
 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.

Application Data by courtesy YMC Co., Ltd.

Substance index

A	page	D	page	M	page
Acesulfame K	5	α -Defensin-1 (human)	10	Macrolide antibiotics	6
4-Acetamidoacetophenone	8	α -Defensin-2 (human)	10	Maleic acid sodium salt	9
2-Acetamidophenol	8,10	α -Defensin-3 (human)	10	Mecoprop	16
Acetaminophen	10	Dextromethorphan		Metformin hydrochloride	10
Acetaminophenone	8		14,15,18,19	Methyl benzoate	8,19
Acetanilide	8,10	1,2-Dimethoxyl benzene	8	4-Methylcatechol	8
Acetic acid	19	Duloxetine	12	2-Methylresorcinol	8
Acetylsalicylic acid	10	Duloxetine (amino alcohol)	12	2,5-Methylresorcinol	8
Acidic compounds	19	Duloxetine (para isomer)	12	Metoprolol	7
Agrochemicals	16	Duloxetine (ortho isomer)	12		
4-Aminophenol	8	Duloxetine hydrochloride	12	N	
Amitriptyline	8			Nadolol	7
Angiotensin I	6	E		Naphazoline HCl	9
Angiotensin II	6	Erythromycin	6	α -Naphthol	12
Angiotensin III	6			Neostigmine methylsulfate	9
Antidepressants	8	F		4-Nitrocatechol	8
Artificial sweeteners	5	Flazasulfuron	16	4-Nitrophenol	8
Asulam	16	Formic acid	19	Nortriptyline	8
Atenolol	7			O	
Azoxystrobin	16	G		Oligonucleotides	11
		Glycyrrhizin acid ammonium		Organic acids	19
B		salt	9	Oxine-copper	16
Basic compounds	19	Guaiacol	8	Oxytetracycline	7
Benzethonium chloride	9			P	
Betablockers	7	H		Paracetamol	8
Bovine insulin	6	Halosulfuronmethyl	16	Pesticides	16
C		Hinokitiol	19	Phenacetine	10
Caffeine	10	Human insulin	6	Phenoformin hydrochloride	10
Chlorphenamine	14	2-Hydroxyacetophenone	8	Phenol	8
Chlorpheniramine	9,15,18,19			Pindolol	7
4-Chloroacetanilide	8	I		Porcine insulin	6
Chlortetracycline	7	Imipramine	8	Propranolol	7
Copper 8-quinolinolate	16	Insulin	6	Propionic acid	19
Cyclamate Na	5				

Substance index

P	page	S	page	T	page
Propyl paraben	14,15	Saccharin	5	Tetracycline antibiotics	7
Propyl p-hydroxybenzoate	18,19	Salicylic acid	10	Tetrahydrozoline HCl	9
Pyridoxine HCl	9	Siduron	16	Thiram	16
Pyrocatechol	8	Spiramycin	6	Toluol	8
		Stevioside hydrate	9	Triclopyr	16
		Sulpha drugs	6		
R		Sulphamerazin	6	U	
Rebaudioside A	9	Sulphamethoxazole	6	Uracil	6
Resorcinol	8	Sulphathiazole	6		

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Ordering information

YMC-Triart 1.9 µm UHPLC columns

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
	3.0	—	—	TA12SP9-0503PT	TA12SP9-L503PT	TA12SP9-1003PT	TA12SP9-1503PT	TA12SP9-E503CC
C18 ExRS	2.1	TAR08SP9-02Q1PT	TAR08SP9-H3Q1PT	TAR08SP9-05Q1PT	TAR08SP9-L5Q1PT	TAR08SP9-10Q1PT	TAR08SP9-15Q1PT	TAR08SP9-E5Q1CC
	3.0	—	—	TAR08SP9-0503PT	TAR08SP9-L503PT	TAR08SP9-1003PT	TAR08SP9-1503PT	TAR08SP9-E503CC
C8	2.0	TO12SP9-0202PT	TO12SP9-0302PT	TO12SP9-0502PT	TO12SP9-L502PT	TO12SP9-1002PT	TO12SP9-1502PT	TO12SP9-E5Q1CC
	3.0	—	—	TO12SP9-0503PT	TO12SP9-L503PT	TO12SP9-1003PT	TO12SP9-1503PT	TO12SP9-E503CC
Phenyl	2.0	TPH12SP9-0202PT	TPH12SP9-0302PT	TPH12SP9-0502PT	TPH12SP9-L502PT	TPH12SP9-1002PT	TPH12SP9-1502PT	TPH12SP9-E5Q1CC
	3.0	—	—	TPH12SP9-0503PT	TPH12SP9-L503PT	TPH12SP9-1003PT	TPH12SP9-1503PT	TPH12SP9-E503CC
PPF	2.0	TPF12SP9-0202PT	TPF12SP9-0203PT	TPF12SP9-0502PT	TPF12SP9-L502PT	TPF12SP9-1002PT	TPF12SP9-1502PT	TPF12SP9-E5Q1CC
	3.0	—	—	TPF12SP9-0503PT	TPF12SP9-L503PT	TPF12SP9-1003PT	TPF12SP9-1503PT	TPF12SP9-E503CC
HILIC	2.0	—	—	TDH12SP9-0502PT	TDH12SP9-L502PT	TDH12SP9-1002PT	—	TDH12SP9-E5Q1CC
	3.0	—	—	TDH12SP9-0503PT	TDH12SP9-L503PT	TDH12SP9-1003PT	—	—

*Guard cartridge holder required, part no. XPCHUHP

Other dimensions on demand. For more details please contact us: Phone +49 (0)2064-427-0 or E-Mail info@ymc.de

Other brochures

Please inquire for the complementing brochures:

YMC-Triart for AQ applications (16 p.)



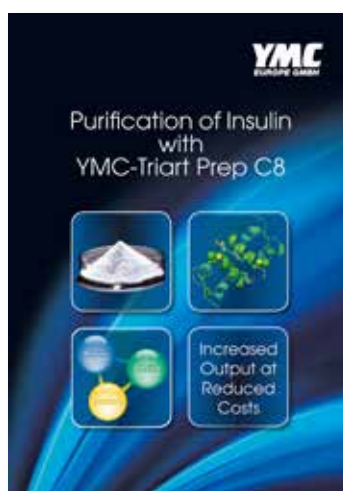
YMC-Triart Prep Brochure (12 p.)

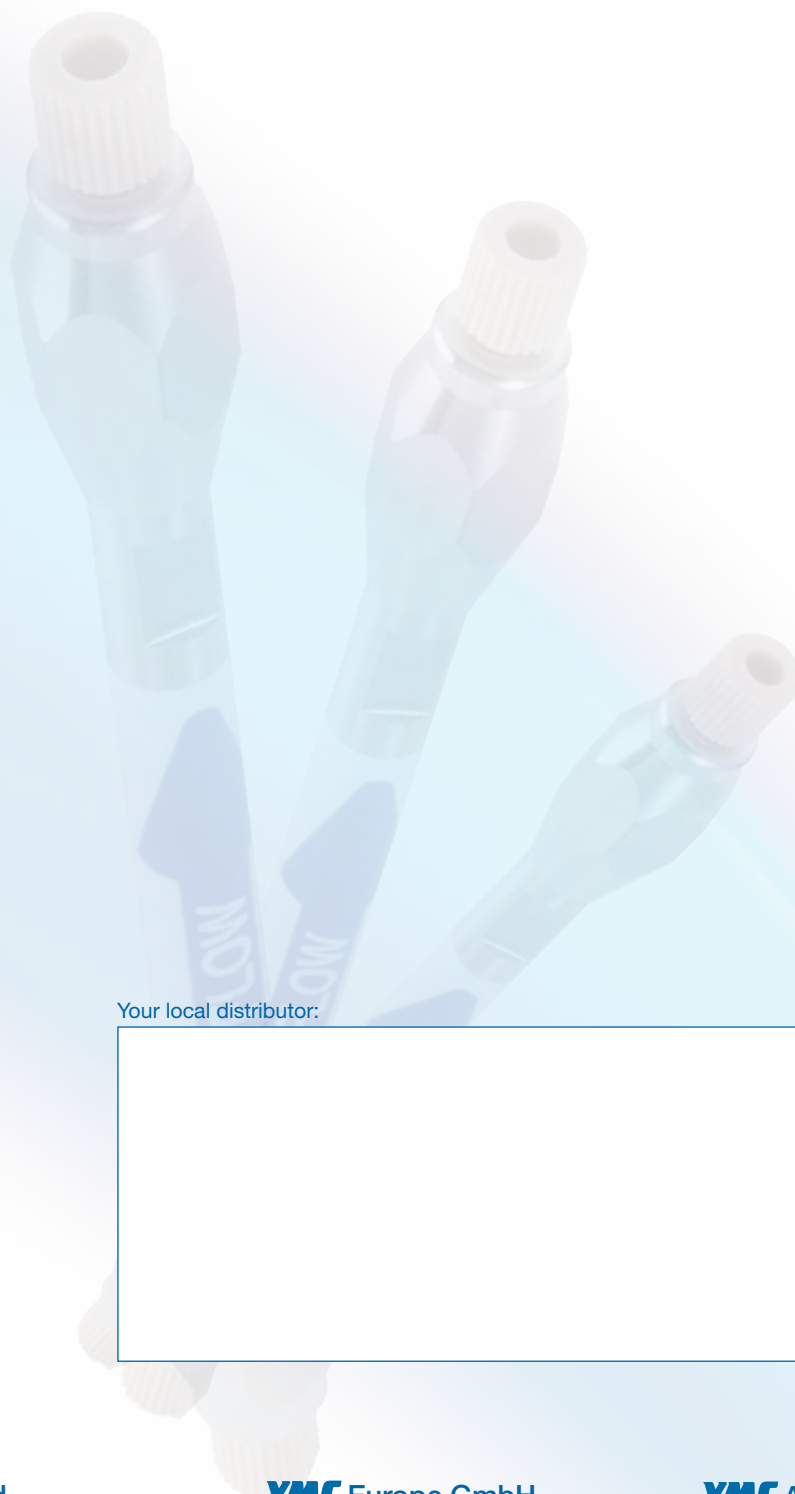


YMC-Triart Brochure (52 p.)

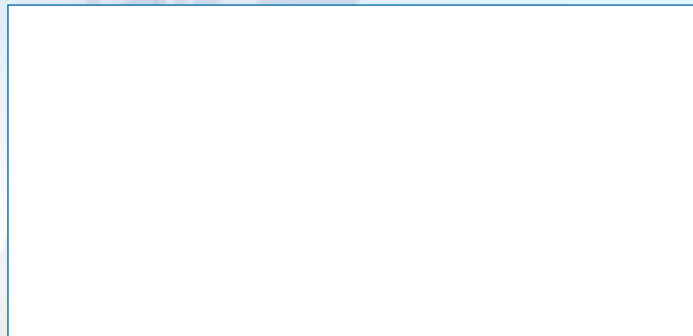


Purification of Insulin with YMC-Triart Prep C8 (16 p.)





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