YMC SEPARATION TECHNOLOGY PB-0052E

YMC-Triart C18

Versatile Hybrid Silica Based HPLC Column

Specifications

Base	: organic/inorganic hybrid silica	Carbon %	: 20 %
Stationary	: C18 (as USP-L1)	Bonding	: polymeric type
Particle	: 3 µm, 5 µm	End-capping	: multi-stage end-capping
Pore	: 12 nm	pH range	: pH 1 ~ 12

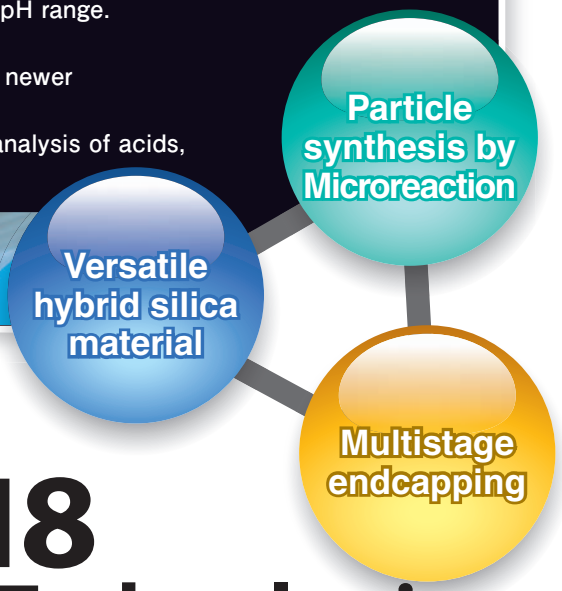
YMC Co., Ltd.
http://www.ymc.co.jp

Versatile Hybrid Silica Based HPLC Column

YMC-Triart C18

Rugged, long lasting, hybrid particle technology
Integration of triple artistic technologies

Feature	Benefit
• Hybrid silica base	▶ Usable over a wide pH range makes the column excellent for method development.
• Great chemical durability	▶ Long column lifetime over wide pH range. Low cost per analysis.
• Lower back pressure	▶ Ability to use on both older and newer instrumentation.
• Excellent resolution	▶ Rugged, first choice option for analysis of acids, bases and neutral compounds.



YMC-Triart C18
Integration of Three Technologies

YMC-Triart is a hybrid silica based ODS column emphasizing durability, low operating pressure, and excellent performance.
YMC-Triart C18 has been developed and is manufactured using state-of-the-art technologies that define materials, granulation and surface modification.

Versatile hybrid material 1

YMC-Triart C18 is a multi-layer hybrid particle consisting of two types of layers: a silica based layer (inorganic) and a hybrid polymer based layer (organic). This layered structure contributes to Triart's combined physical durability and chromatographic performance.

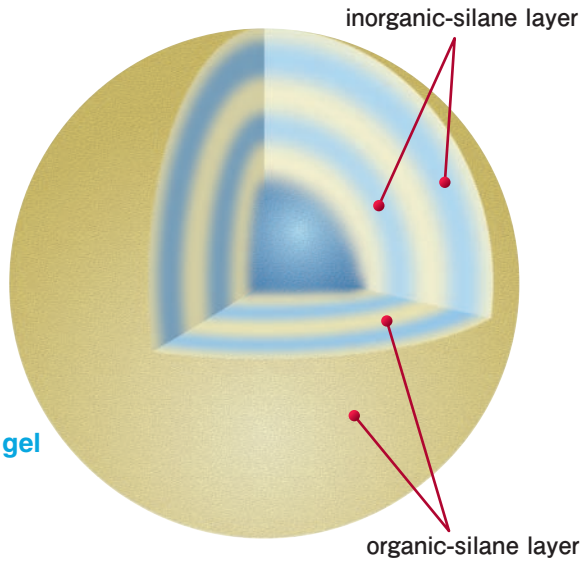
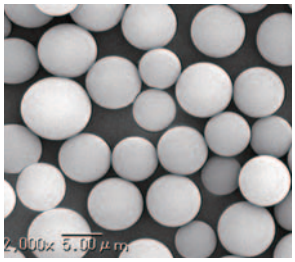


Image structure for hybrid-silica gel

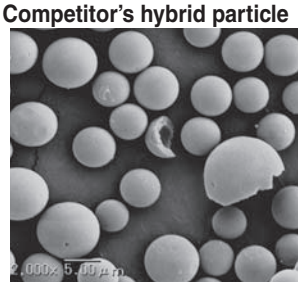
New granulation process by microreactor technology 2

Homogeneous and uniform particle

Triart C18

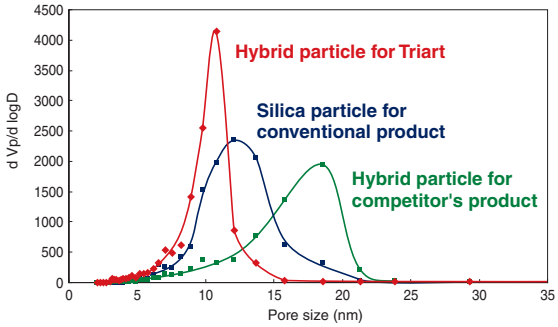


Competitor's hybrid particle



Use of microreactor technology produces homogeneous and uniform particles that results in low operating pressure and very reproducible surface modification making for the ultimate in column to column and lot to lot reproducibility.

Narrow pore distribution



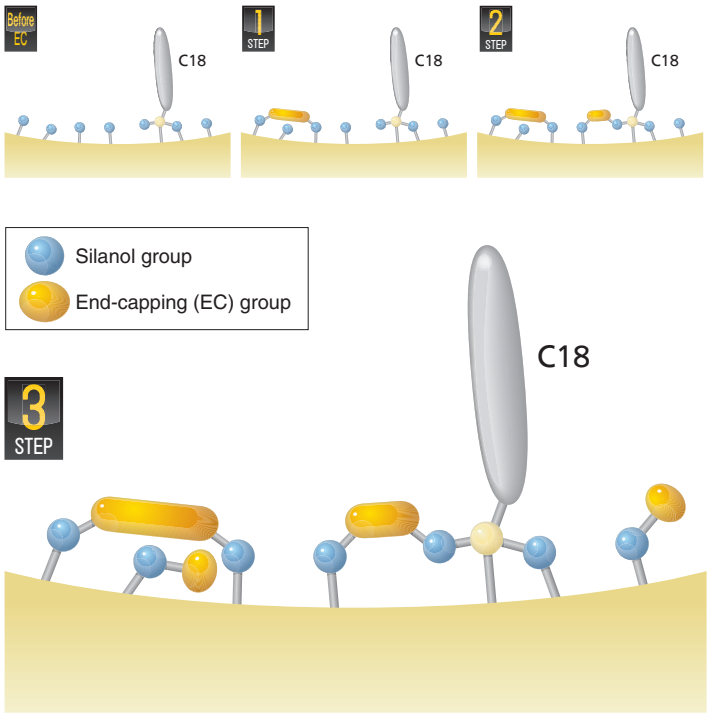
YMC-Triart C18 has a very narrow pore size distribution that enables narrow and reproducible peak shapes for analytes.

Surface modification technology 3

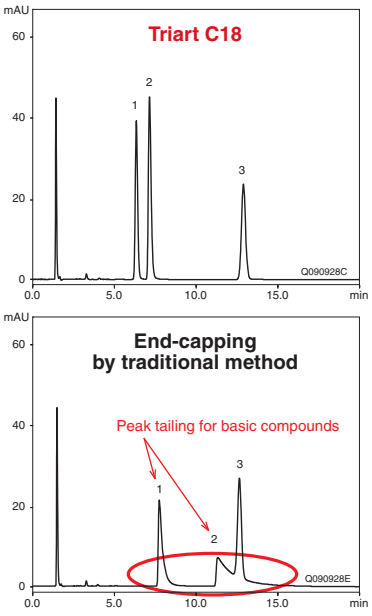
Multi-stage end-capping

End-capping methods employed for production of conventional products typically employ a single end-capping compound in one chemical step to "neutralize" highly reactive silanols. Unfortunately, highly reactive silanols are easily hydrolyzed and contribute to poor durability. Additionally, low reactive silanols end-cap stubbornly, producing a surface modification that is often non-reproducible, and leading to peak tailing. YMC-Triart C18 solves this problem by using a innovative, newly developed "measured multi-stage/multi-compound surface modification" technology which results in the thorough end-capping of all silanols that are accessible to analytes.

Reaction image for "multi-stage end-capping"



Evaluation of silanol activity



Ingredients in cough/cold medication

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

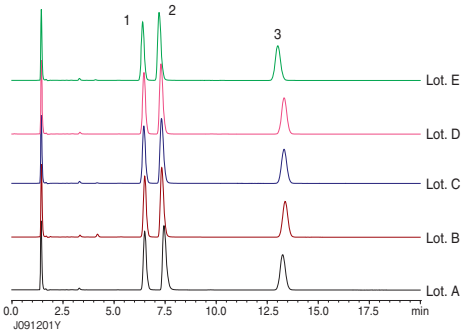
Column	: 5 µm, 150 X 3.0 mmI.D.
Eluent	: 20 mM KH_2PO_4-K_2HPO_4 (pH 6.9)/acetonitrile (65/35)
Flow rate	: 0.425 mL/min
Temperature	: 40°C
Detection	: UV at 235 nm

Quality Control
Excellent reproducibility

Packing Material

YMC-Triart C18 exhibits excellent lot to lot reproducibility for all types of compounds including difficult to chromatograph molecules that exhibit basic and coordination compound behavior.

Basic compounds



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

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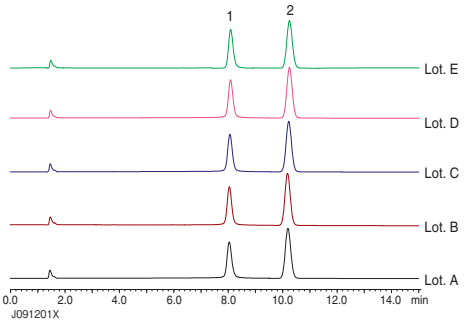
Flow rate	: 0.425 mL/min
Temperature	: 40℃
Detection	: UV at 235 nm

Coordination compounds

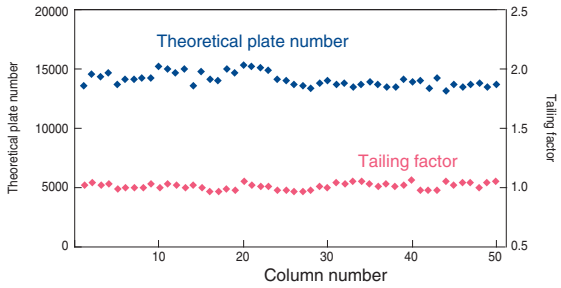


1. Hinokitiol
2. Methyl benzoate

Column	: 5 µm, 150 X 3.0 mmI.D.
Eluent	: acetonitrile/0.1% H_3PO_4 (40/60)
Flow rate	: 0.425 mL/min
Temperature	: 40℃
Detection	: UV at 254 nm

Packed Column

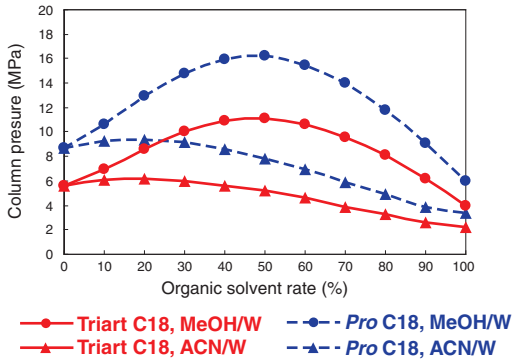
Rigid control of theoretical plate number (N) and tailing factor (Tf) are exhibited for each YMC-Triart C18 packed column.



Column	: 5 µm, 150 X 4.6 mmI.D.
Eluent	: acetonitrile/water (60/40)
Flow rate	: 1.0 mL/min
Temperature	: ambient
Sample	: butyl benzoate

Low back-pressure
Free from pressure problem

Column pressure and solvents

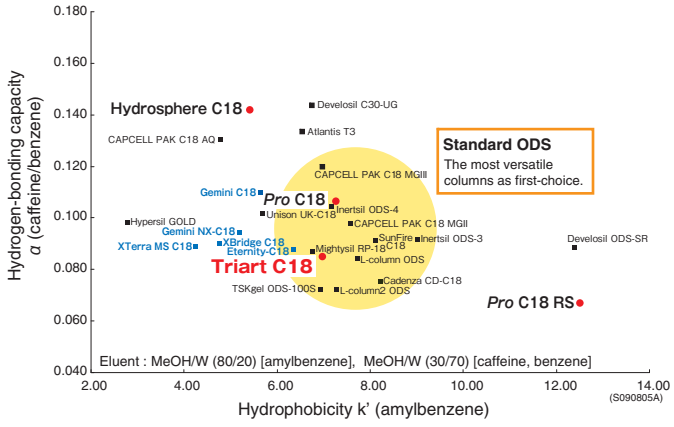


Column	: 5 µm, 150 X 4.6 mmI.D.
Eluent	: acetonitrile/water or methanol/water
Flow rate	: 1.0 mL/min
Temperature	: 25℃

YMC-Triart C18 is designed for use in all conditions. Even with higher viscosty methanol, YMC-Triart C18 can operate with lower pressure (typically 30% less than conventional columns).

Standard ODS
Best balance between *α* and k'

Comparison of *α*/k' of columns in market



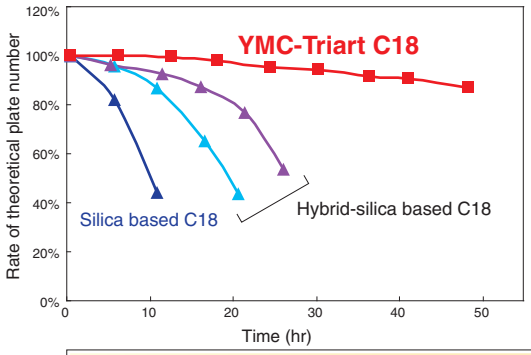
Conventional hybrid silica based ODS columns tend to be less hydrophobic than silica based columns. YMC-Triart C18 has a favorable carbon balance and may be used as a "versatile first-choice" method development column.

Great durability

Wide pH range and long lifetime

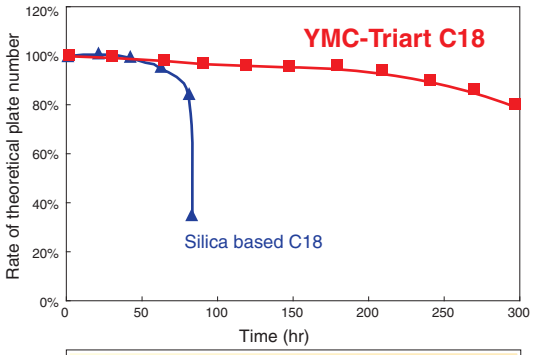
Durability in high pH

Phosphate buffer (pH 11.5, 40 °C)



Column	: 5 µm, 150 X 4.6 mmI.D.
Eluent	: 50 mM K_2HPO_4-K_3PO_4 (pH 11.5)/methanol (90/10)
Flow rate	: 1.0 mL/min
Temperature	: 40°C
Sample	: benzyl alcohol

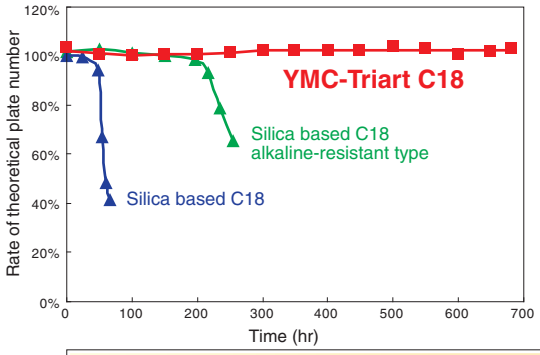
Triethylamine (pH 11.5, 40 °C)



Column	: 5 µm, 150 X 4.6 mmI.D.
Eluent	: 50 mM triethylamine (pH 11.5)/methanol (90/10)
Flow rate	: 1.0 mL/min
Temperature	: 40°C
Sample	: benzyl alcohol

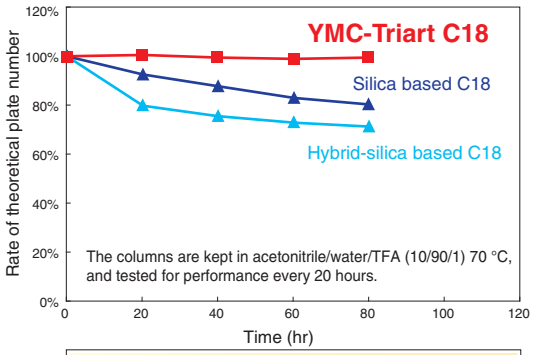
Durability in high temperature

pH 6.9, 70°C



Column	: 5 µm, 50 X 2.0 mmI.D.
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



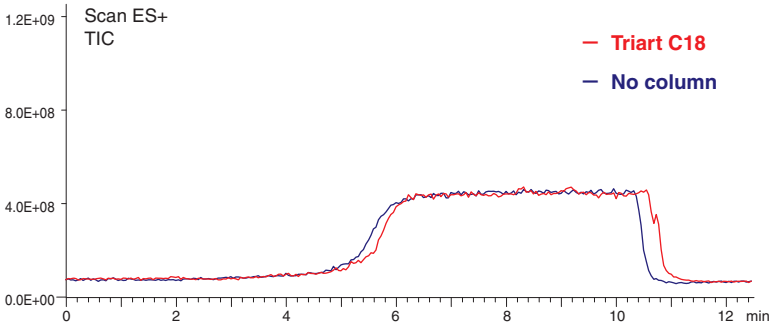
Test conditions	Column	: 5 µm, 50 X 2.0 mmI.D.
	Eluent	: acetonitrile/water (60/40)
	Flow rate	: 0.2 mL/min
	Temperature	: 37°C
	Sample	: butyl benzoate

YMC-Triart C18 shows great chemical stability provided by newly developed hybrid silica. Even in high pH or high temperature conditions, the lifetime of YMC-Triart C18 is more than 10X greater than conventional ODS columns.

Reduced column bleed

Operate at high sensitivity

Bleed test by LC/MS



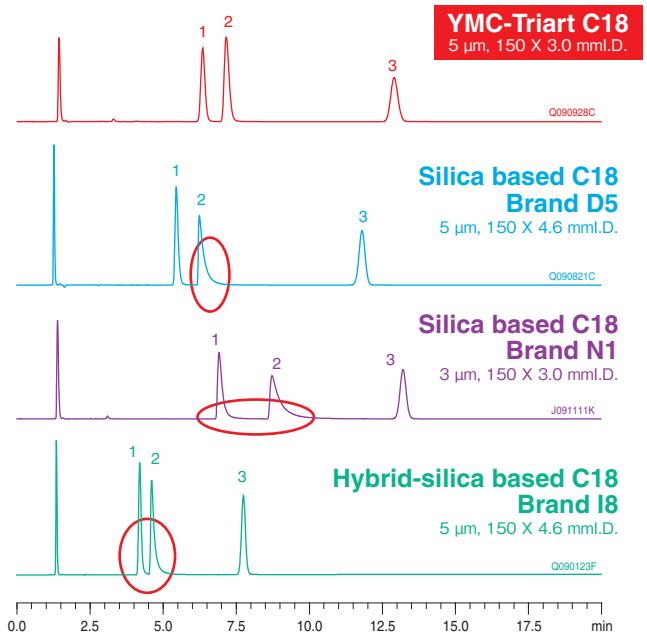
Column	: 5 µm, 50 X 2.0 mmI.D.
Eluent	: A) water/formic acid (100/0.1) B) acetonitrile/formic acid (100/0.1) 5%B (0-1 min), 5-100%B (1-5 min), 100%B (5-10 min), 100-5%B (10-10.1 min), 5%B (10.1-12.5 min)
Flow rate	: 0.4 mL/min
Temperature	: 40°C
Detection	: ESI positive, TIC (Mass Range: 50-1000)

Bleeding of stationary phase can often contribute to high background signals when employing MS and other hyphenated detection techniques. In the example cited above, use of a 2 x 50 mm YMC-Triart C18 column shows no contribution to the signal observed by the MS positive total ion current (TIC) trace. Such performance allows for low limits of detection (high S/N ratio) for MS and other detection techniques. The inherent hybrid particle strength is also superior to conventional silica materials for detection techniques that are sensitive to particle degradation.

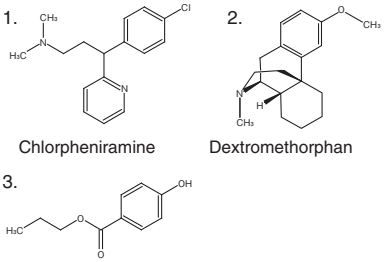
Excellent resolution

Without adsorption and tailing

Analysis of basic compounds



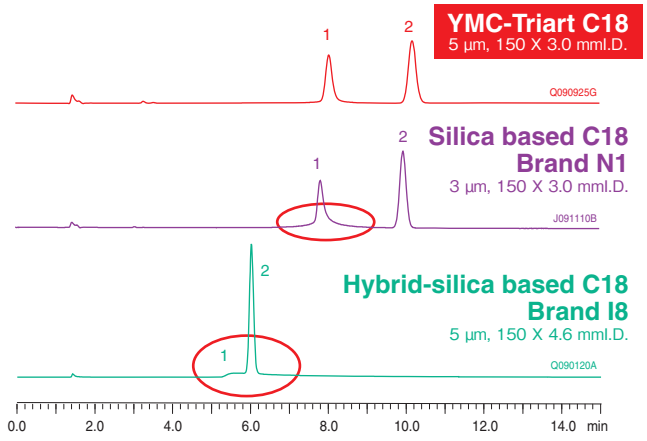
Ingredients in a cough/cold medication



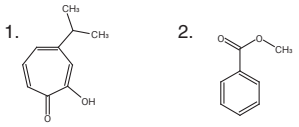
Column	: 150 X 3.0 mmI.D. or 150 X 4.6 mmI.D.
Eluent	: 20 mM KH_2PO_4-K_2HPO_4 (pH 6.9)/acetonitrile (65/35)
Flow rate	: 0.425 mL/min for 3.0 mmI.D. 1.0 mL/min for 4.6 mmI.D.
Temperature	: 40°C
Detection	: UV at 235 nm

YMC-Triart C18's innovative surface modification technology results in excellent peak shapes even for the basic compounds that often exhibit tailing shapes on conventional silica and hybrid silica based ODS columns.

Analysis of coordination compounds



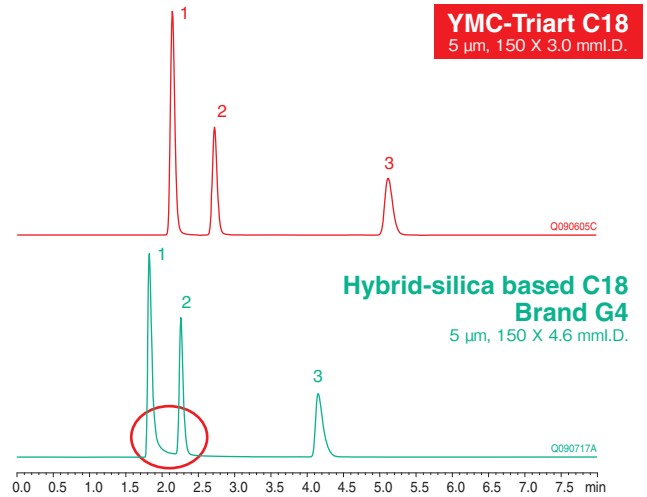
Hinokitiol



Column	: 150 X 3.0 mmI.D. or 150 X 4.6 mmI.D.
Eluent	: acetonitrile/0.1% H_3PO_4 (40/60)
Flow rate	: 0.425 mL/min for 3.0 mmI.D. 1.0 mL/min for 4.6 mmI.D.
Temperature	: 40°C
Detection	: UV at 254 nm

YMC-Triart C18 has an extremely low level of metal impurities, much lower than conventional products.
YMC-Triart C18 is able to provide excellent peak shape for coordination compounds.

Analysis of acidic compounds



Organic acid

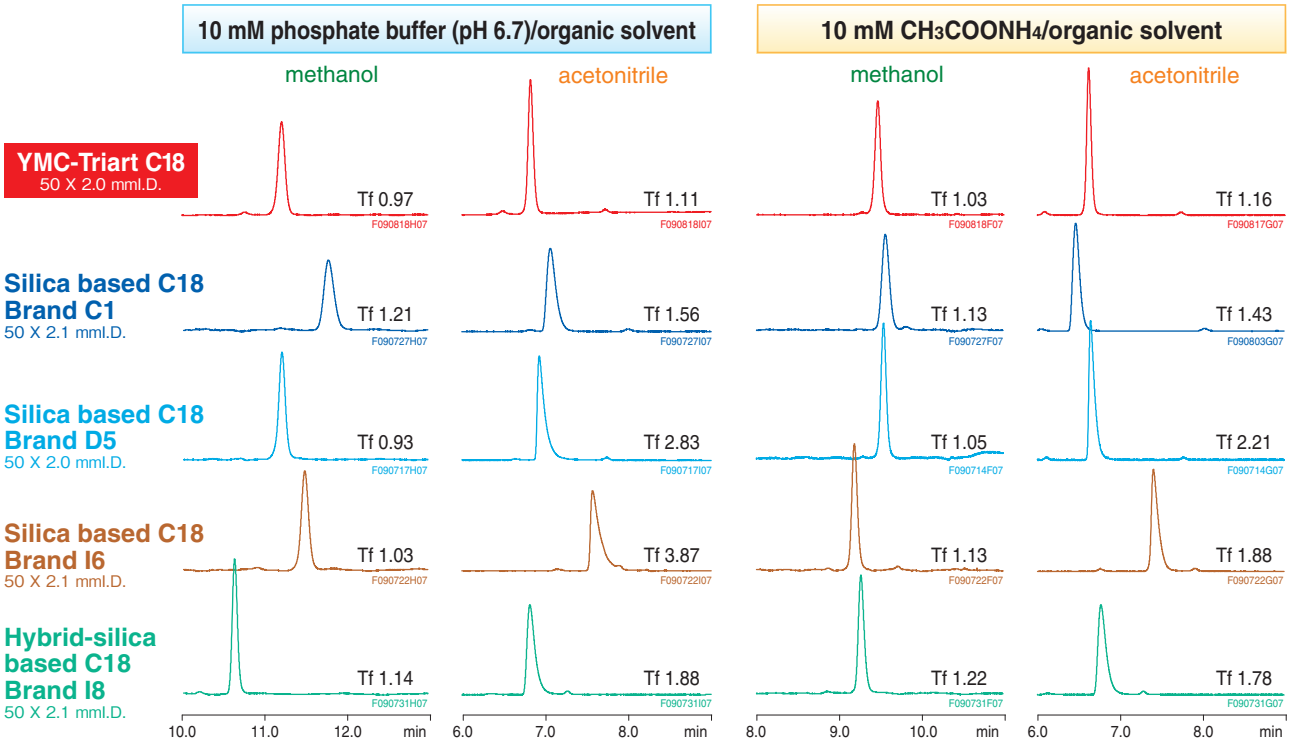
1. Formic acid
2. Acetic acid
3. Propionic acid

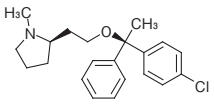
Column	: 150 X 3.0 mmI.D. or 150 X 4.6 mmI.D.
Eluent	: acetonitrile/0.1% H_3PO_4 (5/95)
Flow rate	: 0.425 mL/min for 3.0 mmI.D. 1.0 mL/min for 4.6 mmI.D.
Temperature	: 37°C
Detection	: UV at 210 nm

YMC-Triart C18 is synthesized utilizing methodology borrowed from microreactor technology. This synthesis technique allows for a reduction of impurities that contribute to peak tailing during the analysis of some types of acidic compounds.

Excellent versatility
buffer-independency

Comparison of clemastine analysis with conventional columns





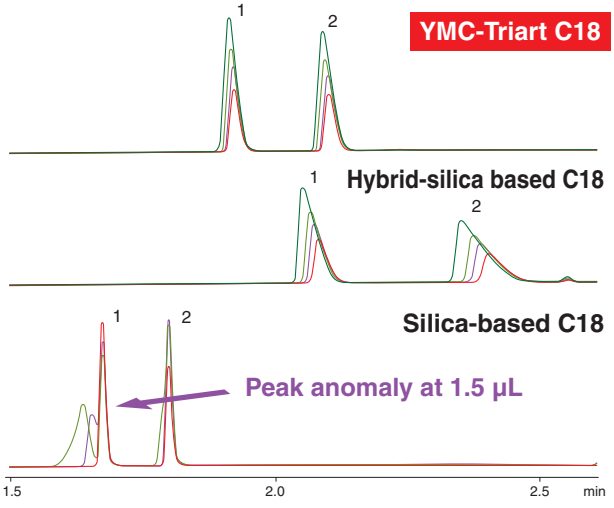
Clemastine

Column	: 5 µm, 50 X 2.0 mmI.D. or 50 X 2.1 mmI.D.
Eluent	: A) 10 mM KH_2PO_4-K_2HPO_4 (pH 6.7) or 10 mM CH_3COONH_4 (pH 6.7) B) methanol or acetonitrile 5-90%B (0-10 min), 90%B (10-15 min)
Flow rate	: 0.2 mL/min
Temperature	: 25℃
Detection	: UV at 230 nm

Clemastine is a well known basic compound which can easily tail on conventional ODS columns. YMC-Triart C18 can separate clemastine sharply using many buffer/solvent combinations.

Improvement of loadability
Minimizing strong solvent/sample loading effects

Influence on peak shapes by injection volume

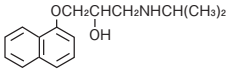


solvent for sample
acetonitrile

injection volume
1.0 µL
1.5 µL
2.0 µL
3.0 µL

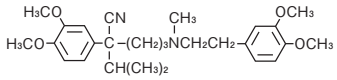
Column	: 5 µm, 50 X 2.0 mmI.D. or 2.1 mmI.D.
Eluent	: A) water/formic acid (100/0.1) B) acetonitrile/formic acid (100/0.1) 5%B (0-0.5 min), 5-100%B (0.5-2.5 min)
Flow rate	: 0.4 mL/min
Temperature	: 40℃
Detection	: UV at 275 nm

1.



Propranolol (50 µg/mL)

2.



Verapamil (50 µg/mL)

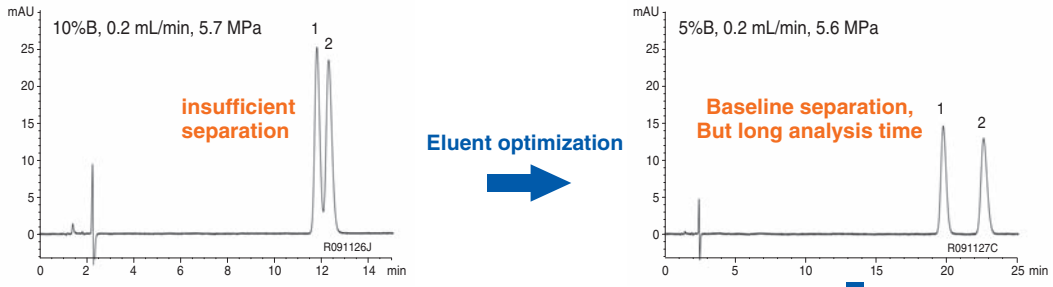
YMC-Triart C18 has better loadability than traditional columns. This can be important for difficult to solubilize samples that need higher concentrations of organic solvent for solubilization prior to analysis.

Application

Utilization of 3 micron YMC-Triart C18

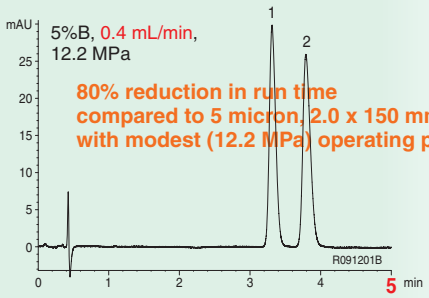
Fast analysis of paraquat and diquat

YMC-Triart C18 5 µm, 150 X 2.0 mmI.D.

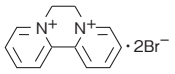


Downsizing

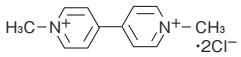
YMC-Triart C18 3 µm, 50 X 2.0 mmI.D.



1. Diquat



2. Paraquat



Eluent	: A) water/HFBA* (100/0.1) B) acetonitrile/HFBA* (100/0.1)
Temperature	: 37℃
Detection	: UV at 290 nm
Injection	: 1 µL (0.1 mg/mL)

*heptafluorobutyric acid

Ordering Information

Analytical column YMC-Triart C18

Particle (µm)	Pore (nm)	Column size I.D.X Length(mm)	Product Code
3	12	2.0X30	TA12S03-0302WT
		2.0X50	TA12S03-0502WT
		2.0X75	TA12S03-L502WT
		2.0X100	TA12S03-1002WT
		2.0X150	TA12S03-1502WT
		3.0X50	TA12S03-0503WT
		3.0X100	TA12S03-1003WT
		3.0X150	TA12S03-1503WT
		4.6X50	TA12S03-0546WT
		4.6X75	TA12S03-L546WT
		4.6X100	TA12S03-1046WT
		4.6X150	TA12S03-1546WT
5	12	2.0X30	TA12S05-0302WT
		2.0X50	TA12S05-0502WT
		2.0X75	TA12S05-L502WT
		2.0X100	TA12S05-1002WT
		2.0X150	TA12S05-1502WT
		3.0X50	TA12S05-0503WT
		3.0X75	TA12S05-L503WT
		3.0X100	TA12S05-1003WT
		3.0X150	TA12S05-1503WT

Analytical column YMC-Triart C18

Particle (µm)	Pore (nm)	Column size I.D.X Length(mm)	Product Code
5	12	4.6X50	TA12S05-0546WT
		4.6X75	TA12S05-L546WT
		4.6X100	TA12S05-1046WT
		4.6X150	TA12S05-1546WT
		4.6X250	TA12S05-2546WT

Guard cartridge column

(inner diameter 2.0 mm : 2-pack inner diameter 4.0 mm : 3-pack)

3	12	2.0X10	TA12S03-0102CC
		4.0X23	TA12S03-G304CC
5	12	2.0X10	TA12S05-0102CC
		4.0X23	TA12S05-G304CC

Cartridge holder will need to be purchased separately before using this product for the first time

Guard cartridge holder

cartridge holder for 2.0 mm I.D.	XPCHSMW
cartridge holder for 4.0 mm I.D.	XPCHW

Semi-preparative column YMC-Actus Triart C18

5	12	20X50	TA12S05-0520WX
		20X100	TA12S05-1020WX
		30X50	TA12S05-0530WX
		30X100	TA12S05-1030WX

YMC

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