

Sensitivity · Selectivity · Robustness

YMC Capillary Columns for MicroLC and NanoLC



Drug Discovery
Life Science
Bioanalysis
Food
Environmental



Introduction

Miniaturisation of liquid chromatography in combination with mass spectrometry has several advantages including improvements in sensitivity, especially at low concentration levels and dramatically reduced solvent consumption, compared to conventional HPLC or UHPLC.

With further method optimisation, run time can also be reduced and therefore more solvent or time can be saved. To meet the requirements of MicroLC/NanoLC YMC offers capillary columns especially designed for rapid high-resolution gradient chromatography.

Selectivity:

- All fully porous YMC-phases
- Phases for RP, NP, HILIC and SEC
- Variety of dimensions
- Particles from 1.9 to 5 μm

Sensitivity:

- Extremely low sample volumes and flow rates
- Compatible with most Micro-/NanoLC/MS systems
- Guard columns, also for trapping/desalting

Robustness:

- Long column lifetimes
- Exceptional column-to-column reproducibility
- Excellent lot-to-lot reproducibility



Contents

	page
Capillary column efficiencies	4–5
MicroLC applications	6–15
Clinical.....	6–7
Biopharma.....	8–9
Food.....	10–15
Solutions for small molecules	16–17
Columns for biomolecules	18–19
YMC capillary column hardware	20–21
Ordering information	22–26

Columns in micro format

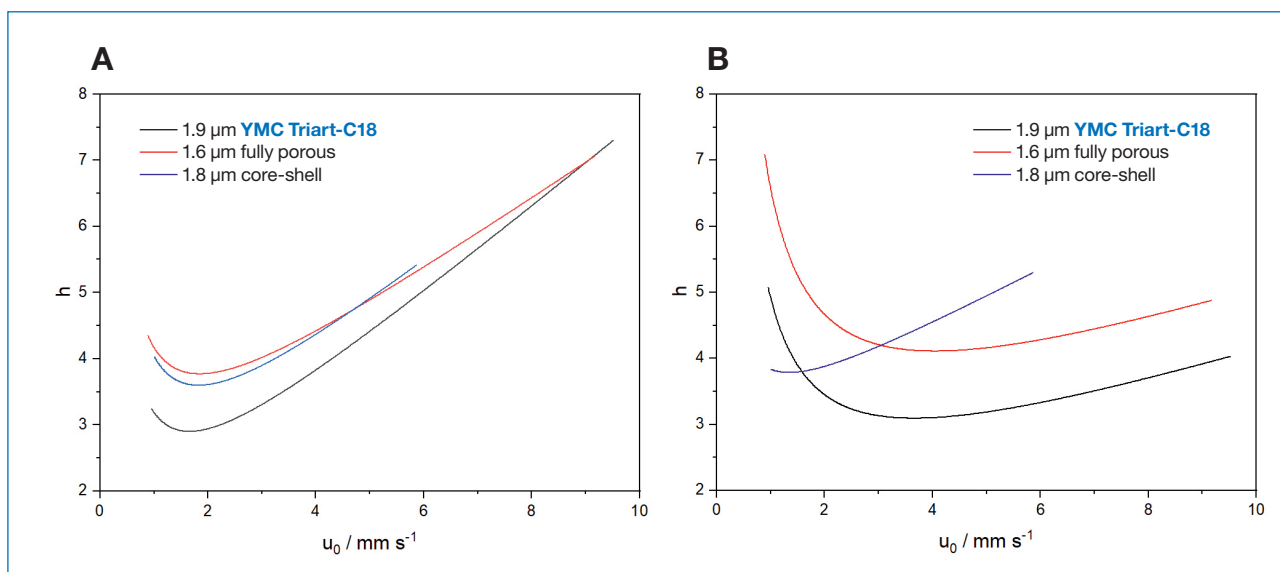
YMC MicroLC columns: highest efficiency

YMC-Triart C18 MicroLC columns packed with 1.9 μm particles show the highest column efficiency in an efficiency study using van Deemter analysis. Results for YMC MicroLC columns show:

- **increased resolution**
- **increased separation speed**
- **reduced solvent consumption**
- **reduced cycle times**

Highest Efficiency: Van Deemter analysis

The diagrams show the reduced plate heights (h) of a YMC-Triart C18 MicroLC column together with two other MicroLC columns as a function of the linear velocity at different %B. A low h -value means high column efficiency.

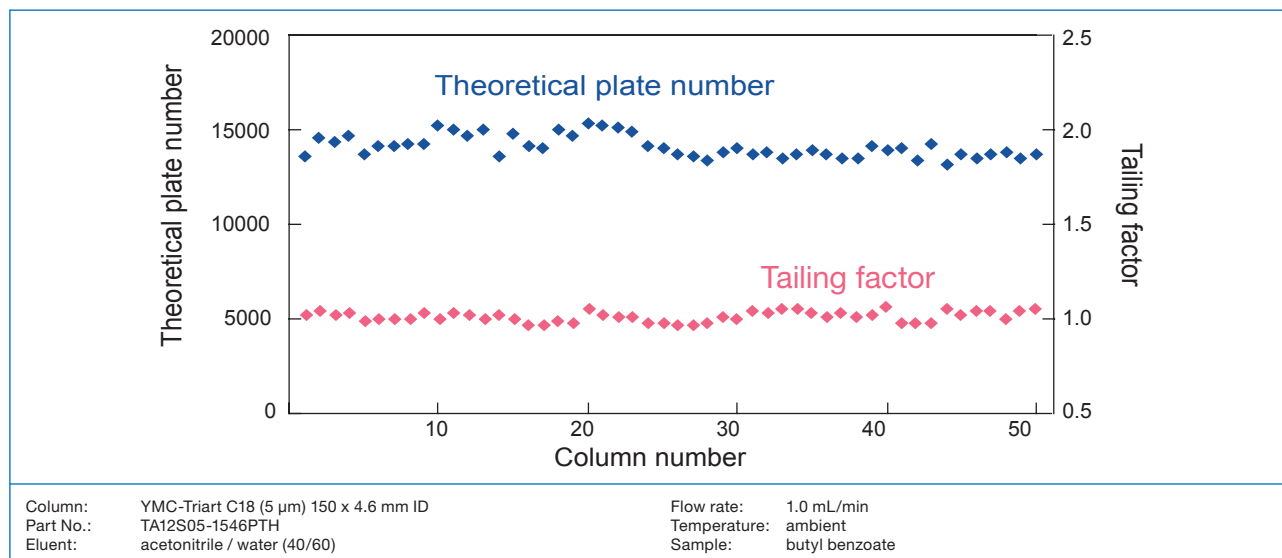


Van Deemter plots for naphthalene at retention factors of $k' = 2$ [A] and $k' = 11$ [B]. Experimental setup according to Hetzel et al. [1].

The YMC-Triart C18 MicroLC column shows the highest column efficiency for both retention factors of naphthalene. Neither the column packed with the nominally smaller fully porous particles, nor the one packed with the Core-Shell media show efficiencies approaching that of the YMC-Triart C18 column. Therefore, YMC-Triart MicroLC columns show higher efficiency.

Van Deemter plots by courtesy of: Tobias Werres, IUTA - Institut für Energie- und Umwelttechnik e. V., Duisburg, Germany.

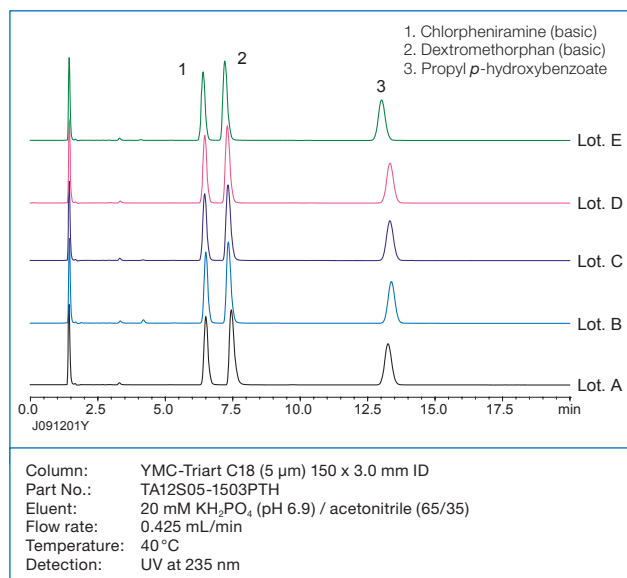
Excellent column-to-column reproducibility



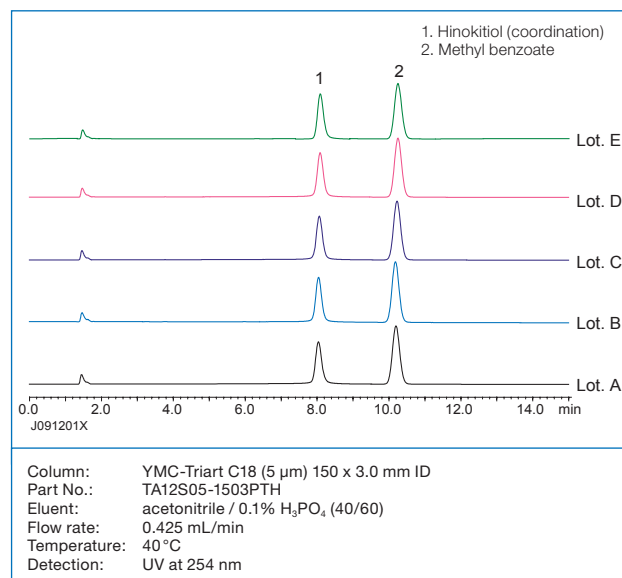
The reproducibility of packed columns is shown in terms of theoretical plate number (N) and tailing factor (Tf) for a number of different packed columns. The same is true for YMC capillary columns, which exhibit a very narrow range of variation, also due to the excellent lot-to-lot reproducibility of the packing material.

Excellent batch-to-batch reproducibility

Basic compounds



Coordination compounds

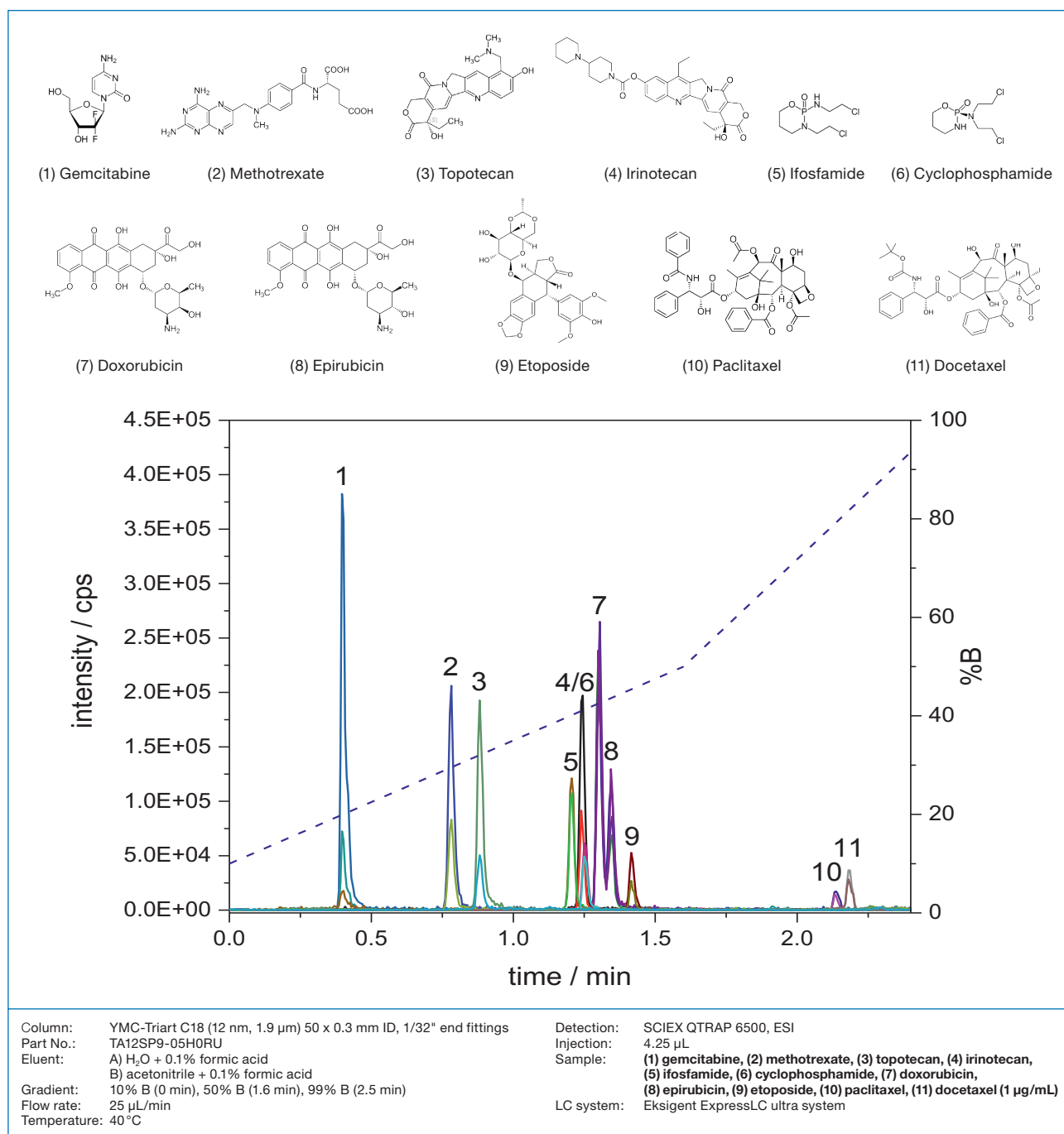


Excellent reproducibility of YMC-Triart phases is available even for the analysis of basic and coordination compounds which normally exhibit tailing and adsorption effects.

[1] T. Hetzel, et al., Characterization of the efficiency of microbore liquid chromatography columns by van Deemter and kinetic plot analysis, *J.Sep.Sci.* (2016).

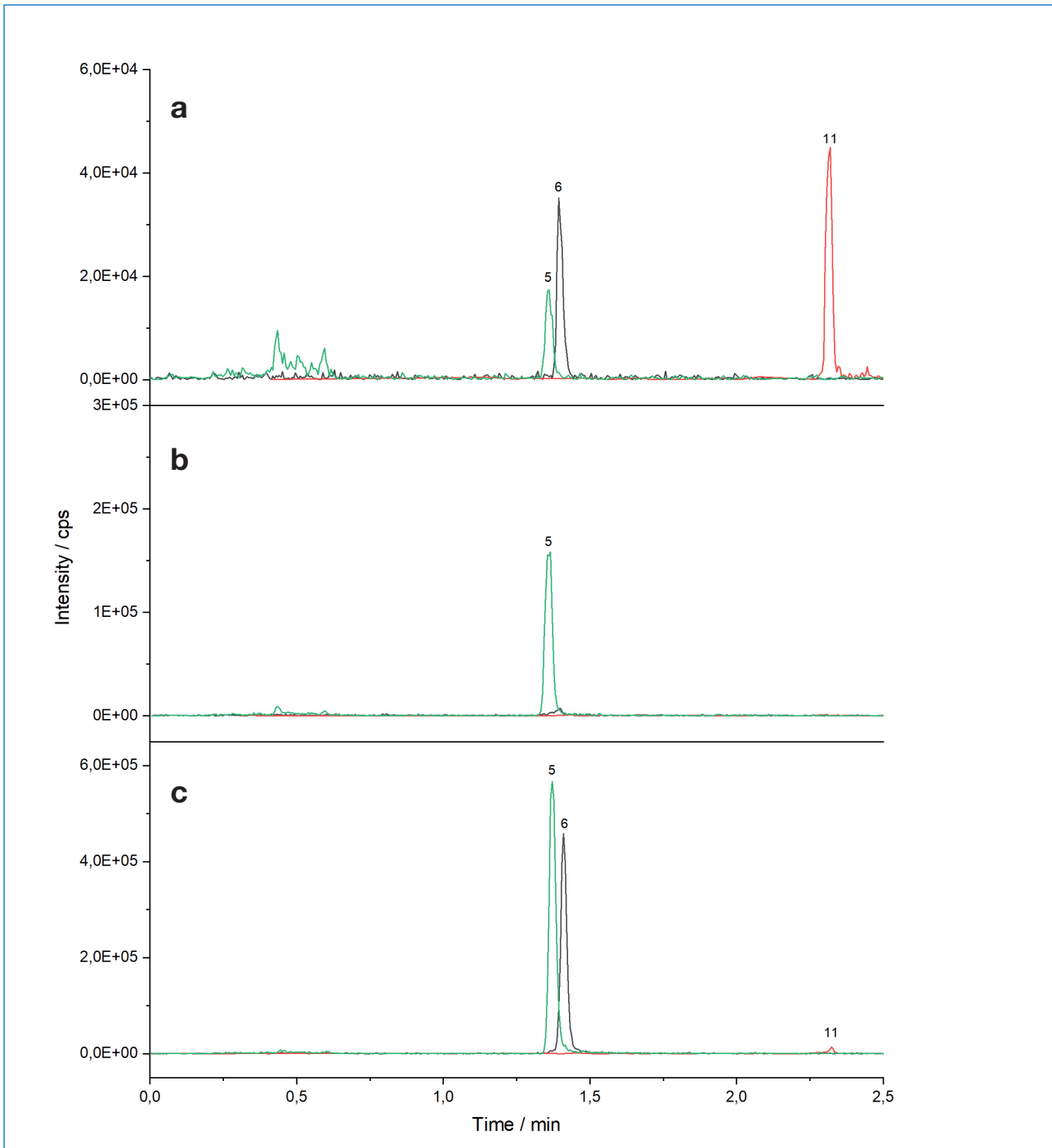
Analysis of antineoplastic drugs from wipe samples

Standards of 11 antineoplastic drugs



Separation of the standard samples containing 11 antineoplastic drugs. As the German substance-independent reference value for wipe samples is 0.1 ng/cm² the method was optimised to a LOQ of 0.01 ng/mL as described before by Hetzel et al [1].

Wipe samples from different hospital locations



Chromatograms for 3 different real wipe samples taken from different locations in a hospital and application areas in hospital wards according to Hetzel et al. The applicability of the developed method according to Hetzel et al. for real samples and the possibility to use this method in the daily life of the pharmaceutical sector is shown [1].

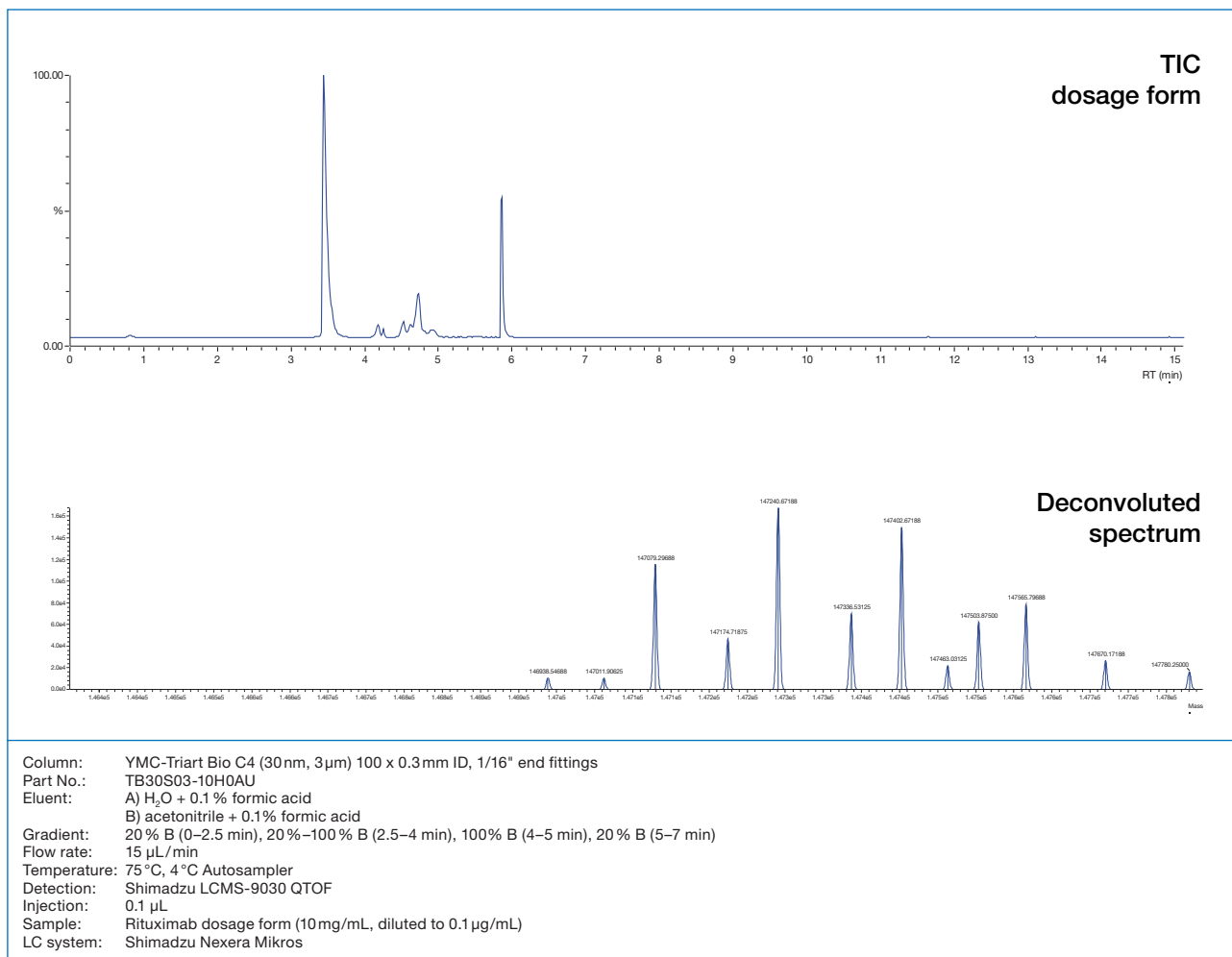
Application data by courtesy of: Thorsten Teutenberg, IUTA - Institut für Energie- und Umwelttechnik e. V., Duisburg, Germany.

[1] T. Hetzel, et al., *Micro-liquid chromatography mass spectrometry for the analysis of antineoplastic drugs from wipe samples*, *Anal. Bioanal. Chem.* (2016).

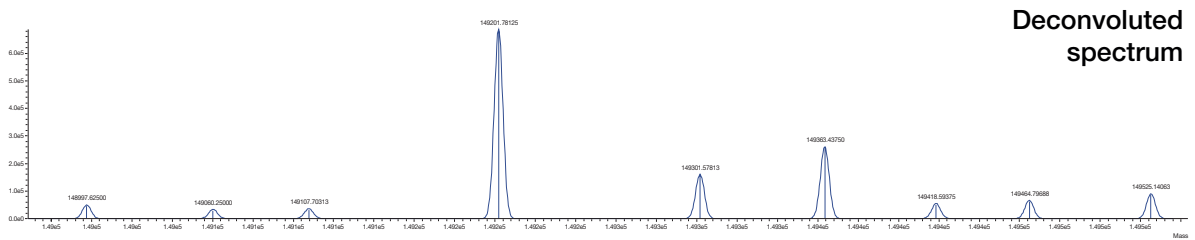
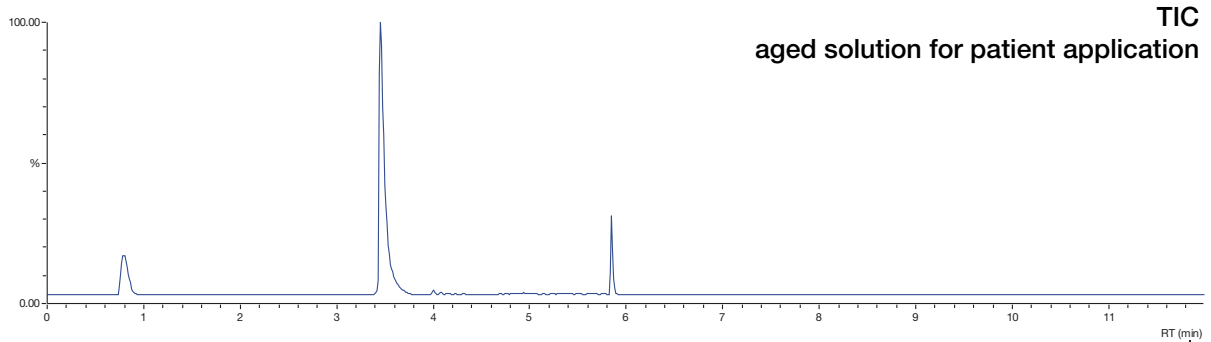
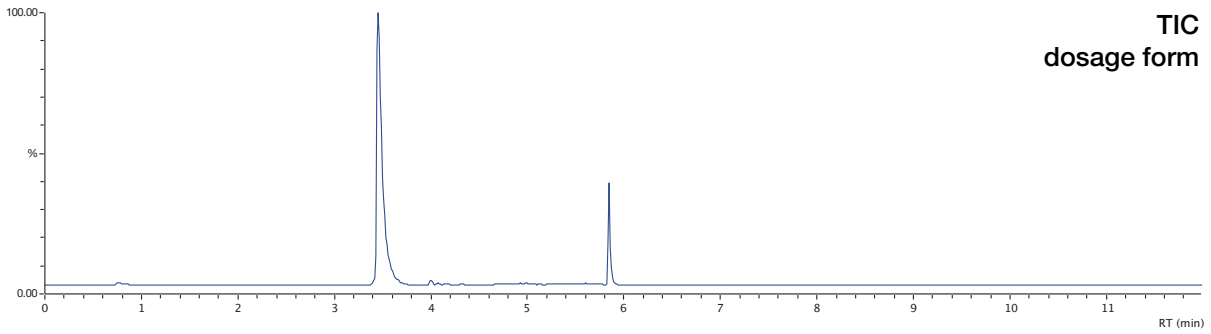
Commercial monoclonal antibodies by microLC-MS

In cooperation with Shimadzu Europa

Rituximab (MabThera®)



Bevacizumab (Avastin®)

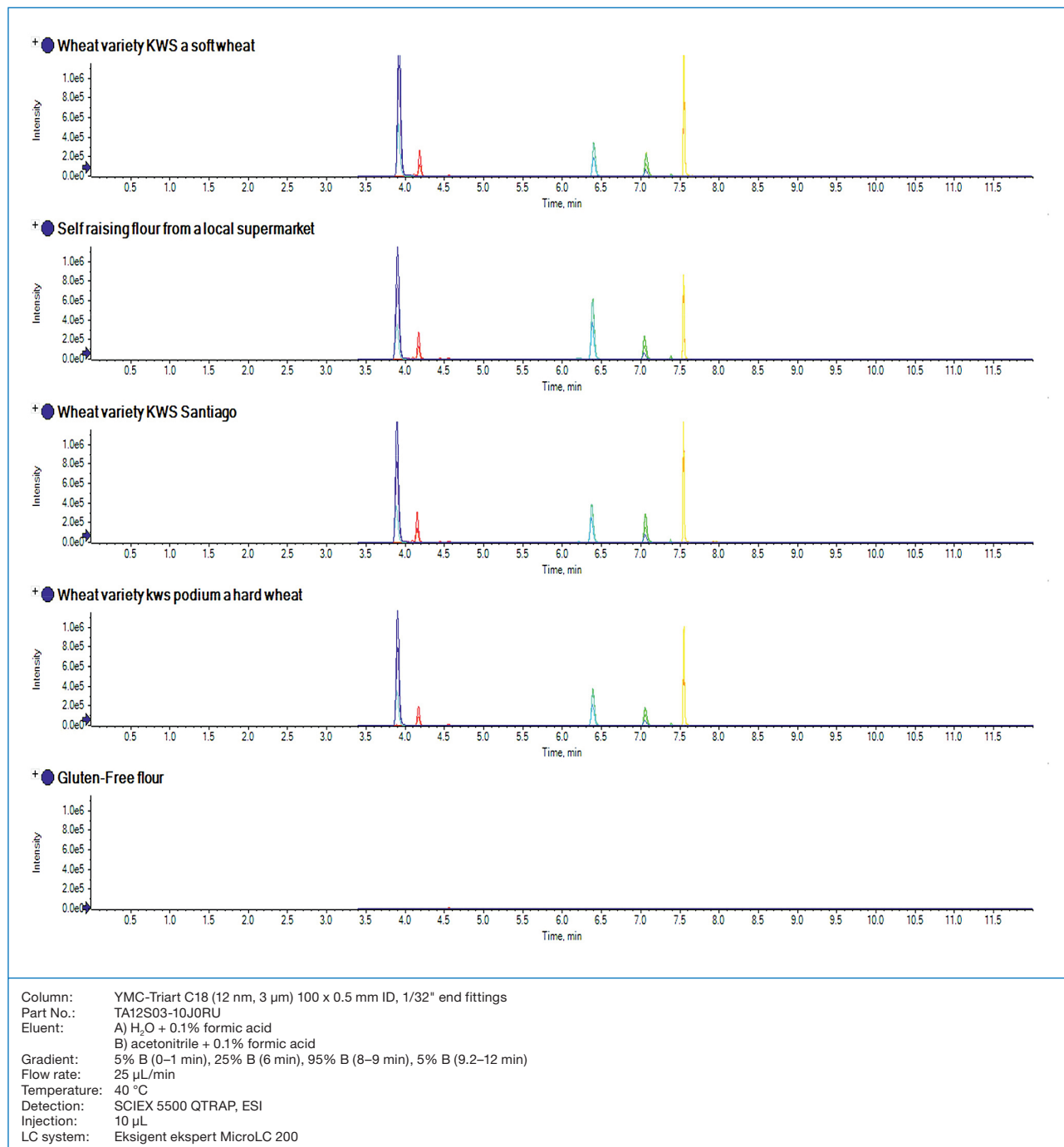


Column: YMC-Triart Bio C4 (30 nm, 3 µm) 100 x 0.3 mm ID, 1/16" end fittings
 Part No.: TB30S03-10H0AU
 Eluent: A) H₂O + 0.1% formic acid
 B) acetonitrile + 0.1% formic acid
 Gradient: 20% B (0–2.5 min), 20%–100% B (2.5–4 min), 100% B (4–5 min), 20% B (5–7 min)
 Flow rate: 15 µL/min
 Temperature: 75 °C, 4 °C Autosampler
 Detection: Shimadzu LCMS-9030 QTOF
 Injection: 0.1 µL
 Sample: Bevacizumab dosage form (10 mg/mL, diluted to 0.1 µg/mL)
 Bevacizumab solution for patient application (3 mg/mL, diluted to 0.03 µg/mL)
 LC system: Shimadzu Nexera Mikros

Chromatograms of intact monoclonal antibodies, Rituximab and Bevacizumab, both in dosage form. The aged solution (about 6 month old) for patient application showed an additional peak, but the MAb is still intact. This demonstrates that use of microLC-MS is possible to monitor amount and stability of, for example, patient solutions for injection.

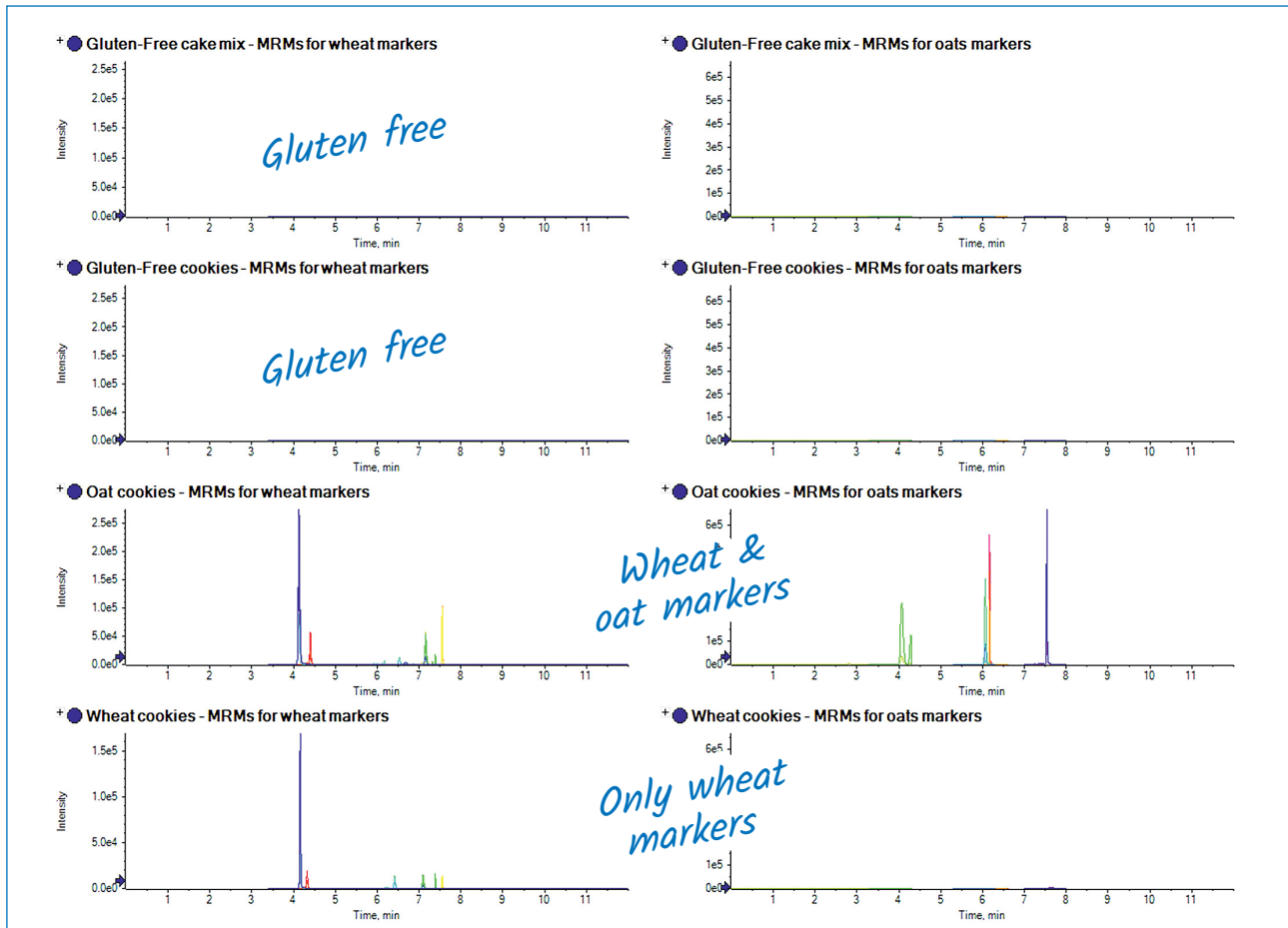
Gluten markers in flour and cookies

MicroLC-MS/MS analysis of gluten markers in flour



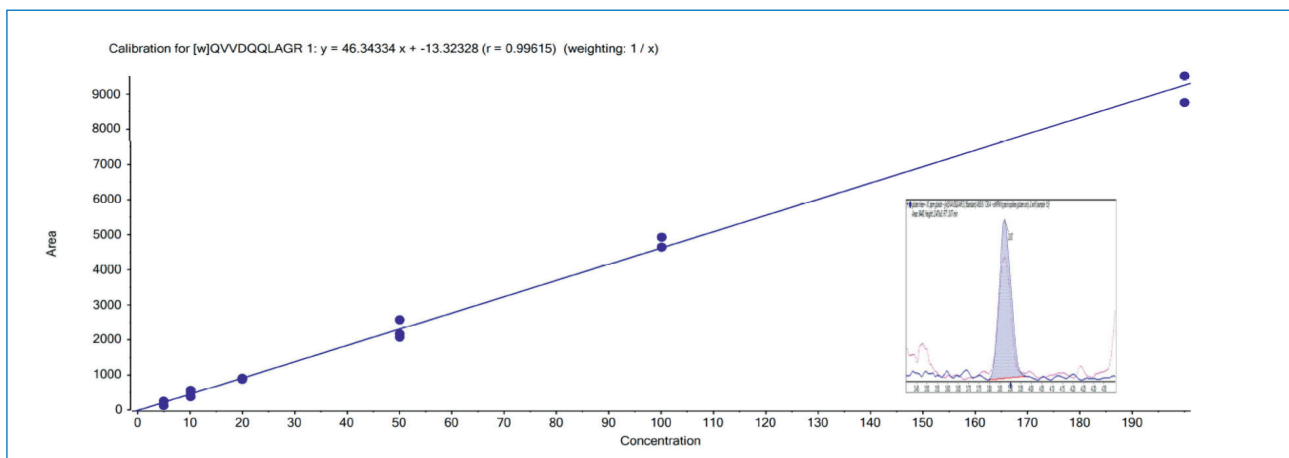
The comparison of separate extracts of several samples of wheat obtained from single variety grain samples, as well as a sample of gluten-free flour and the self raising flour obtained from a local supermarket.

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



It is possible to detect markers in processed food and also distinguish between varieties. In the oat cookies, wheat and oats markers were detected while in the wheat cookies only wheat peptide markers were found. The gluten-free products were actually gluten free, as no markers were detectable.

Calibration of gliadin

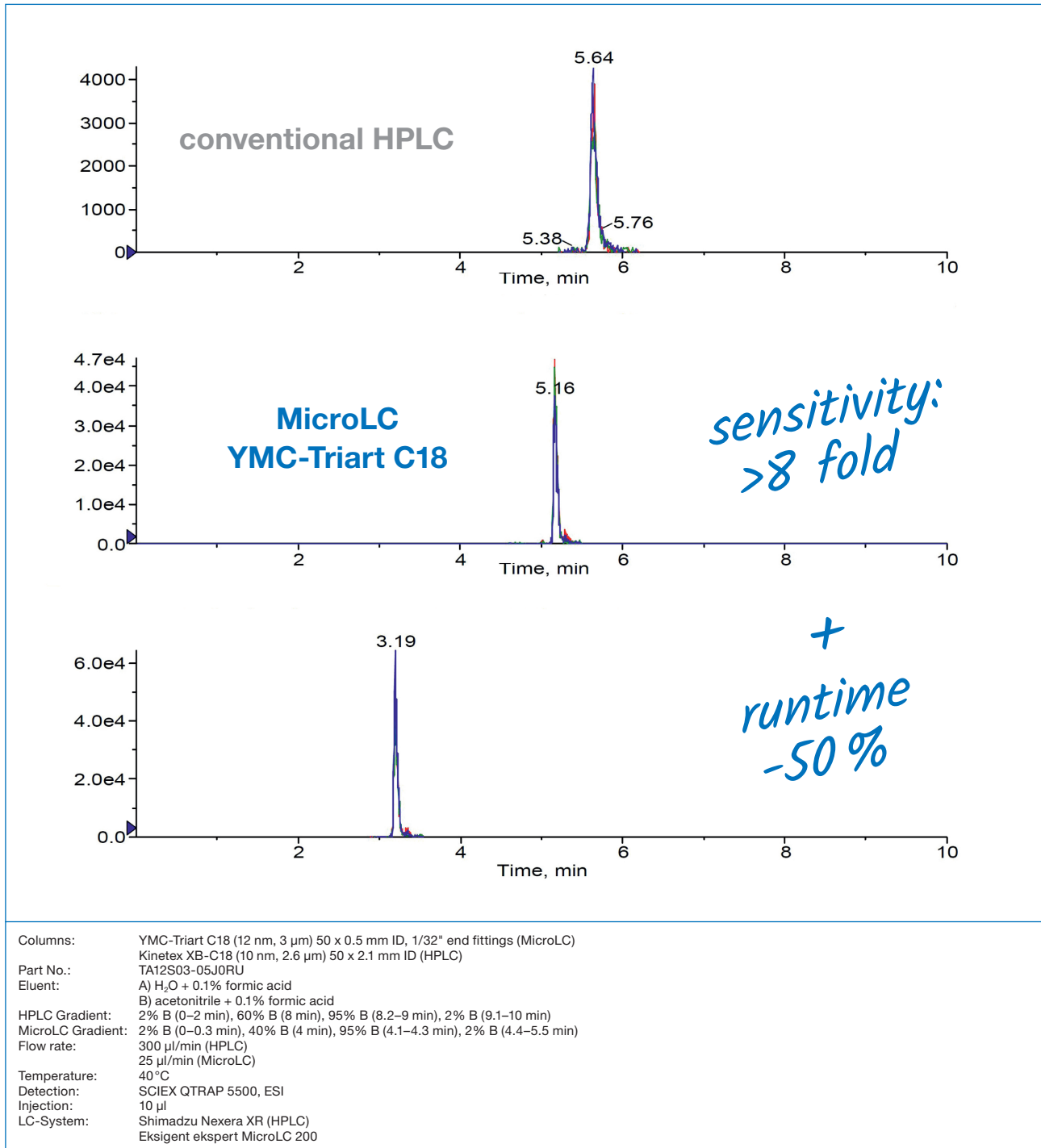


The calibration line obtained from the spiking of gliadin, a specific wheat protein, into gluten-free wheat from the range of 5–200 ppm. Inlaid in the calibration line is the chromatogram for the 10 ppm spike of gliadin into gluten-free flour.

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

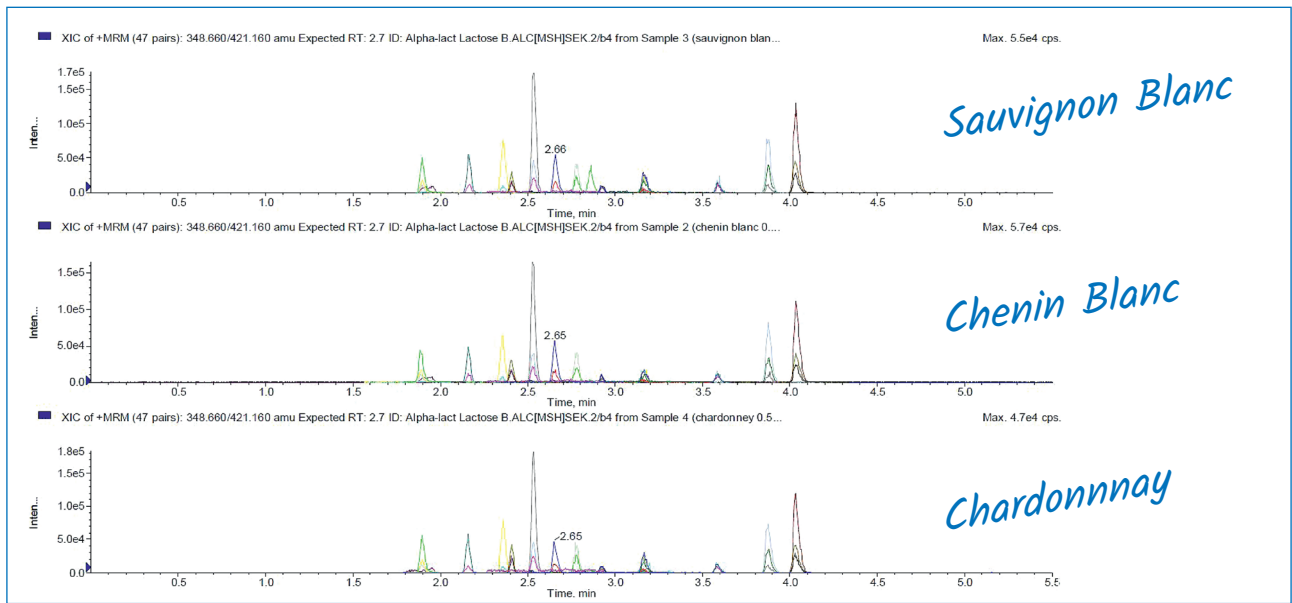
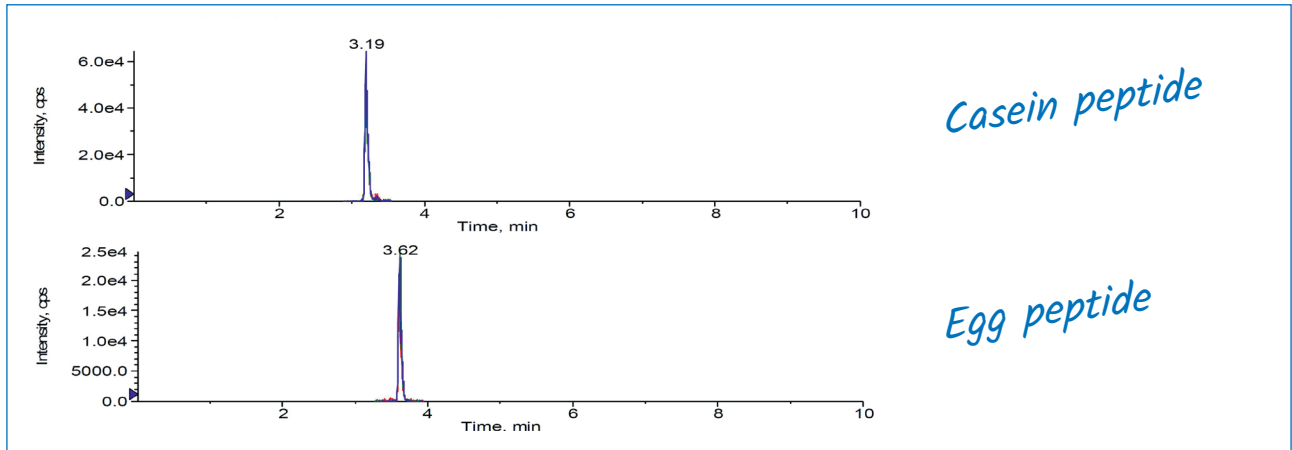
Allergens in wine

Casein peptide analysis in white wine by HPLC and microLC

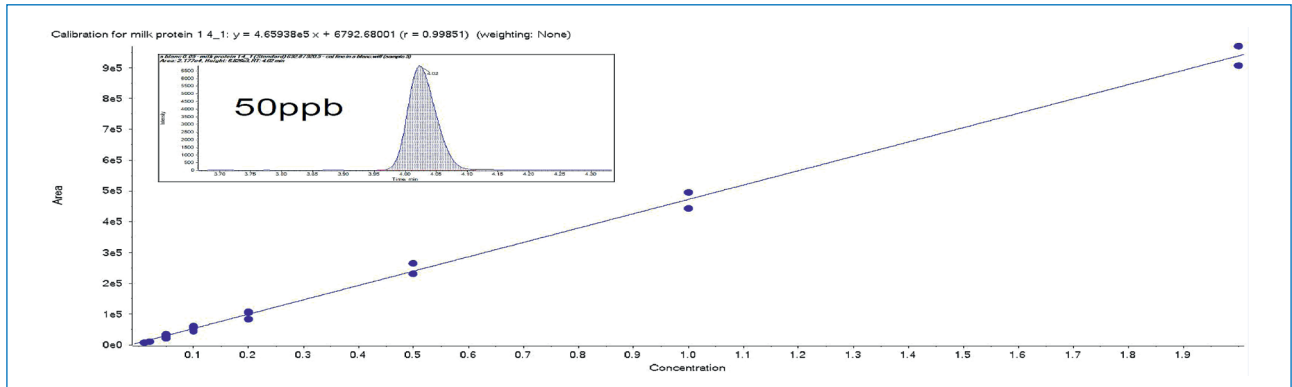


Comparison of HPLC vs. MicroLC using a white wine spiked with 1 ppm casein peptide. By using an optimised microLC method the sensitivity can be increased by >8 fold, while the runtime can be reduced by 50%.

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



White wine samples spiked with 0.5 ppm samples of milk and egg peptides were analysed. 3 different wines were analysed using the benefit of the microLC-MS/MS approach with the additional advantage of a multi allergen screening.

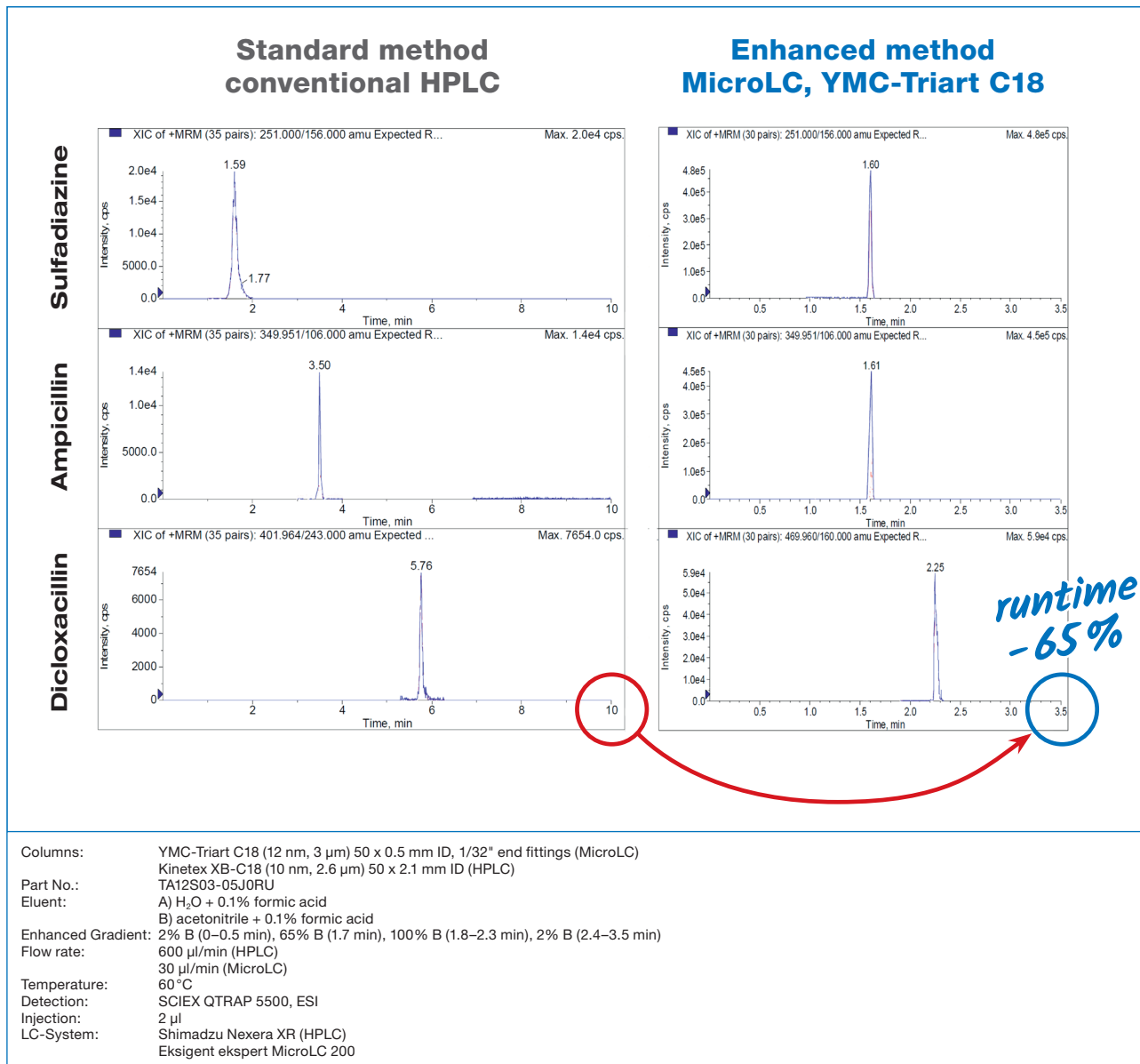


A casein peptide is spiked into a Sauvignon Blanc (0.05-2 ppm) to demonstrate linearity and sensitivity. Linearity is provided without use of any internal standards. The inset chromatogram for 50 ppb spiked sample demonstrates highest sensitivity.

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

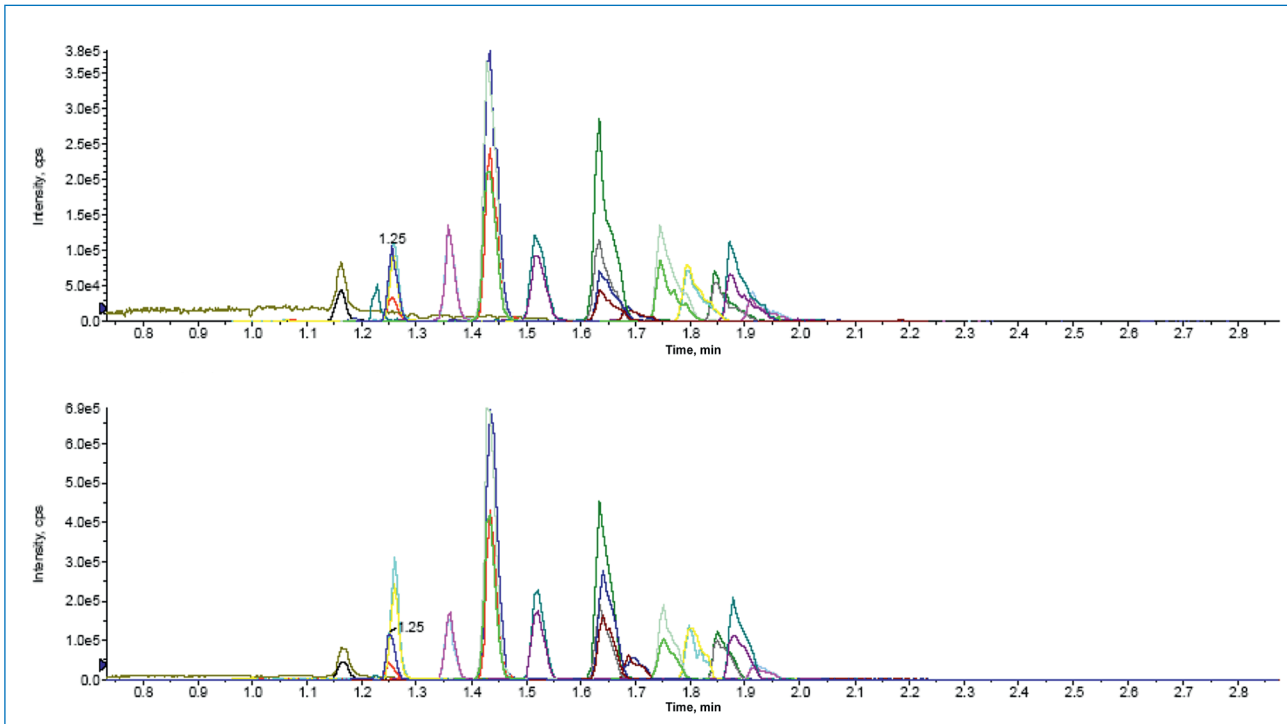
Veterinary drug residues in food

Veterinary drug standards analysed by HPLC and microLC



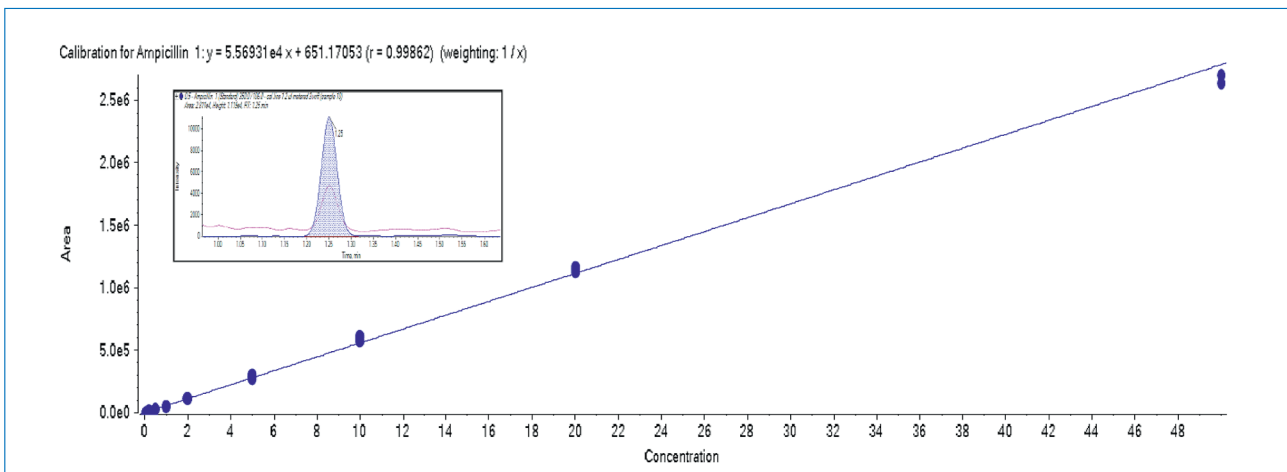
Comparison of 3 different 1 ppb standard solutions separated by a standard HPLC method using a Core-Shell C18 column (left) and the MicroLC method using a YMC-Triart C18 microLC column (right).

MicroLC-MS/MS analysis of 15 different veterinary drugs in milk and meat



In the final analysis a total of 32 multiple reaction monitoring (MRM) transitions were evaluated for 15 veterinary drug residues over a 3.5 minute runtime on the YMC-Triart C18 column. Milk and meat samples have been spiked at a 10 ppb level with standard compounds. The recoveries from meat were generally higher and it shows that recoveries are affected by the matrix.

Ampicillin calibration curve



Linearity and sensitivity of this method is demonstrated for Ampicillin from 0.05-50 ppb. Linearity is provided without use of any internal standards. The inset chromatogram for a 0.5 ppb spiked sample demonstrates the high level of sensitivity.

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

Solutions for small molecules

Phase overview YMC-Triart

YMC-Triart C18



C18

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

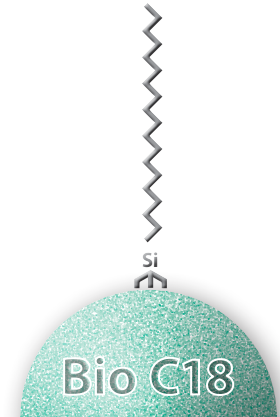
YMC-Triart C18 ExRS



C18ExRS

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

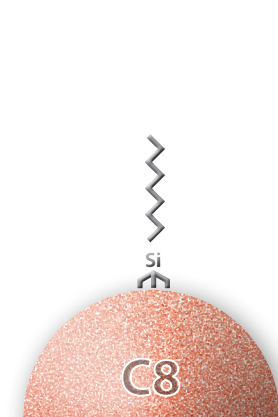
YMC-Triart Bio C18



Bio C18

- peptides/proteins
- 300 Å widepore
- pH 1–12/90 °C max.
- 100% aqueous eluents

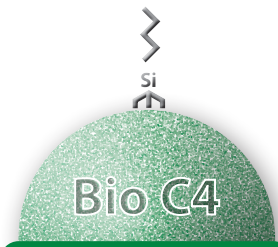
YMC-Triart C8



C8

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

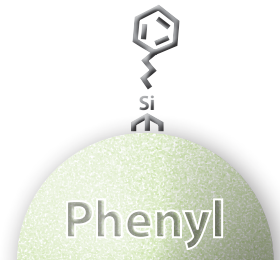
YMC-Triart Bio C4



Bio C4

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

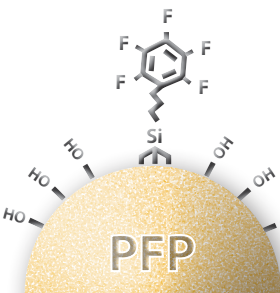
YMC-Triart Phenyl



Phenyl

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


YMC-Triart PFP



PFP

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

YMC-Triart Diol-HILIC



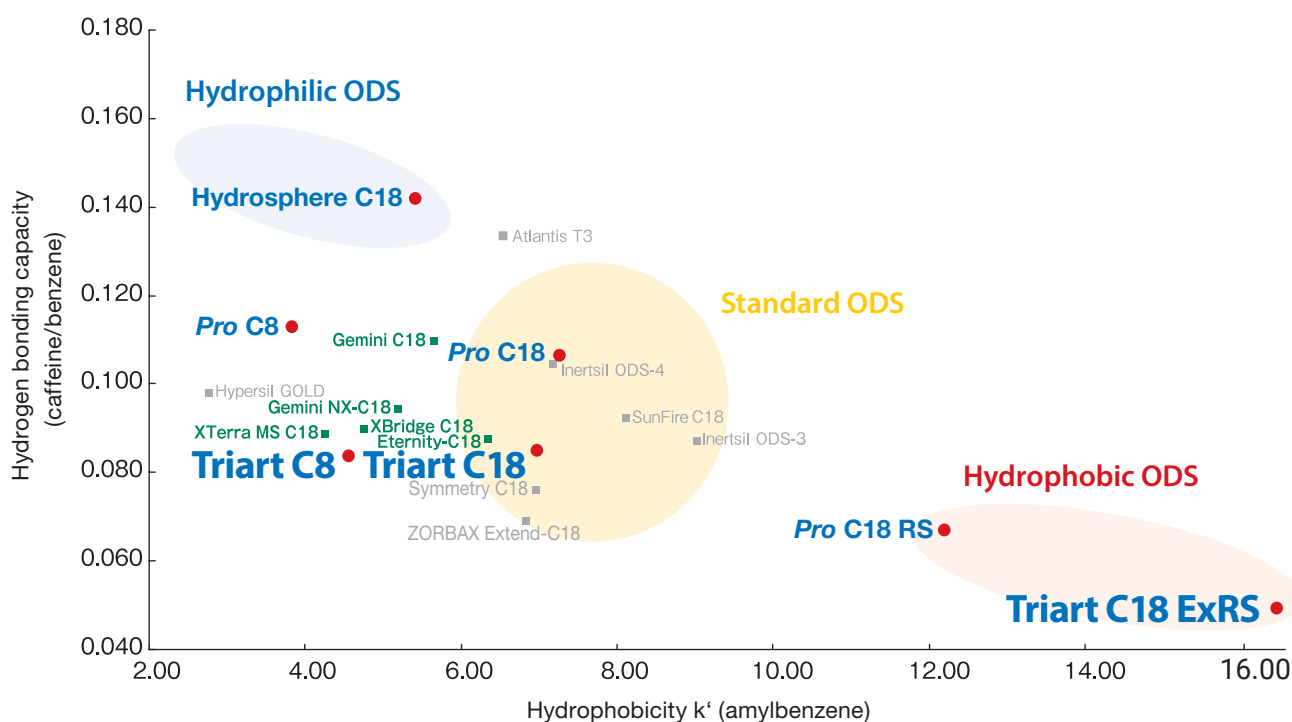
HILIC

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

Specification YMC-Triart

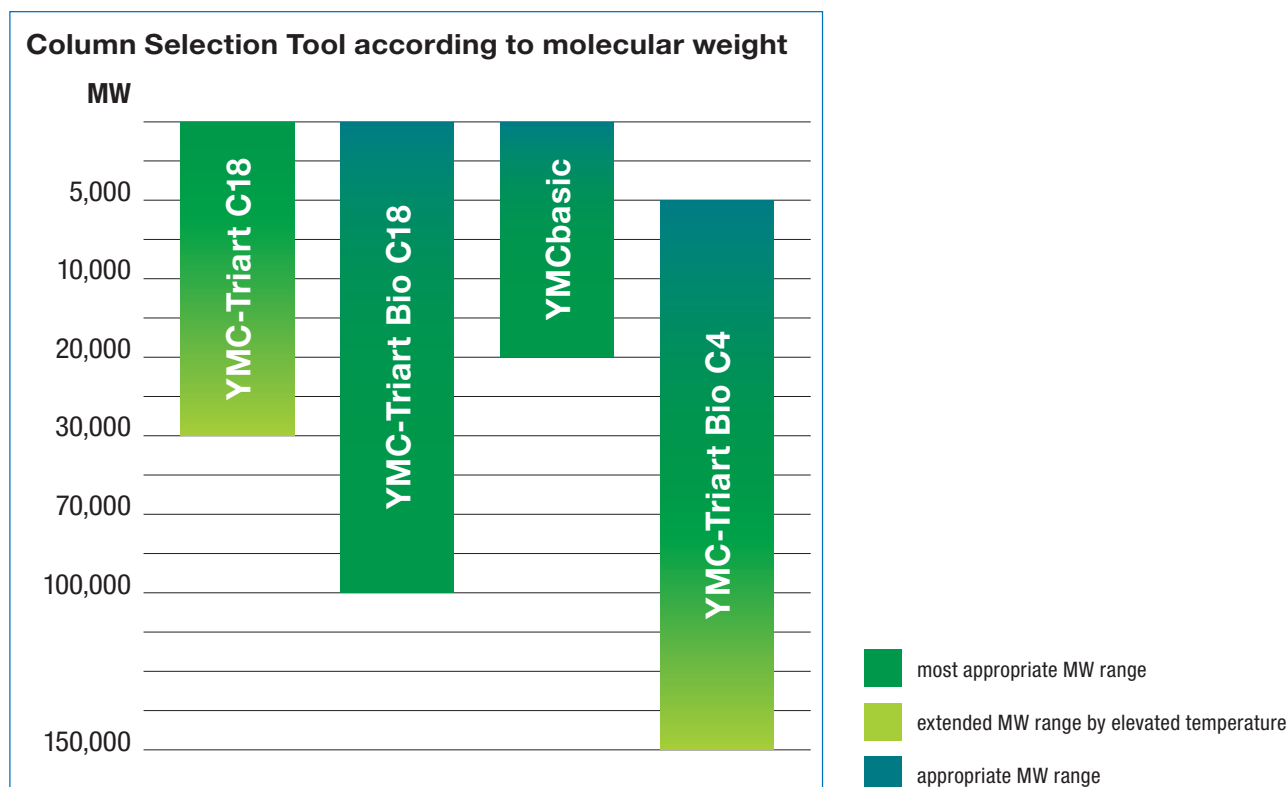
	C18	C18 ExRS	Bio C18	C8	Bio C4	Phenyl	PFP	Diol-HILIC
Base	organic/inorganic silica							
Stationary phase	C18 (USP L1)	C18 (USP L1)	C18 (USP L1)	C8 (USP L7)	C4 (USP L26)	Phenyl (USP L11)	Penta-fluorophenyl (USP L43)	Diol (USP L20)
Particle size	1.9, 3 and 5 μm							
Pore size	12 nm	8 nm	30nm	12nm	30nm	12nm	12nm	12nm
Specific surface	360m ² /g	430m ² /g	—	360m ² /g	—	360m ² /g	360m ² /g	360m ² /g
Carbon content	20 %	25 %	—	17 %	—	17 %	15 %	—
Bonding	trifunctional							
Endcapping	multi-stage	multi-stage	multi-stage	multi-stage	multi-stage	multi-stage	none	none
pH range	1 ~ 12	1 ~ 12	1 ~ 12	1 ~ 12	1 ~ 10	1 ~ 10	1 ~ 8	2 ~ 10
Temperature range	pH<7: 90°C pH>7: 50°C	pH<7: 90°C pH>7: 50°C	pH<7: 90°C pH>7: 50°C	pH<7: 90°C pH>7: 50°C	pH<7: 90°C pH>7: 50°C	50°C	50°C	50°C
100% aqueous eluents	✓	✗	✓	✗	✓	✓	✓	✓

First choice for method development



Columns for biomolecules

BioLC phase selection



C4 and C8 selectivities for proteins (and peptides) and antibodies

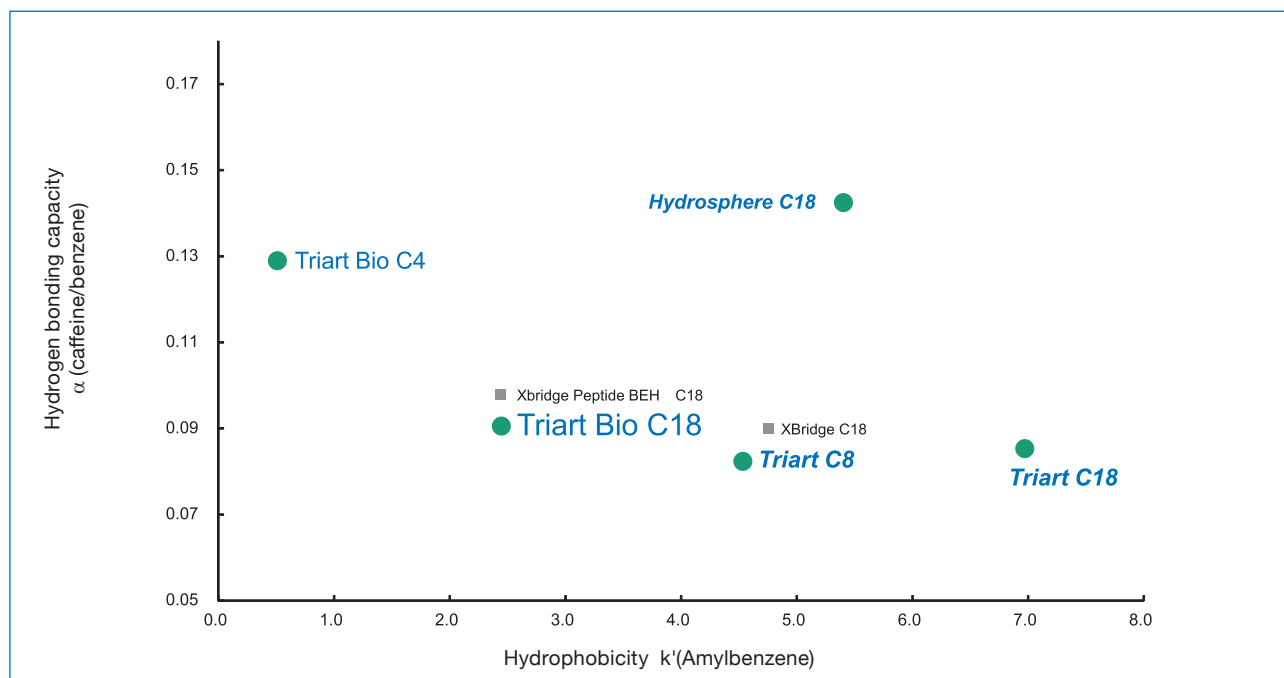
	YMC-Triart Bio C4	YMC basic
Modification	C4 (USP L26)	C8 (USP L7)
Particle Size / μm	1.9, 3, 5	3, 5
Pore Size / nm	30	20
pH range	1.0–10.0	2.0–7.5
Temperature range	pH < 7: 90 °C pH > 7: 50 °C	50 °C

C18 selectivities for peptides (and proteins)

	YMC-Triart C18	YMC-Triart Bio C18
Modification	C18 (USP L1)	C18 (USP L1)
Particle Size / μm	1.9, 3, 5	1.9, 3, 5
Pore Size / nm	12	30
pH range	1.0–12.0	1.0–12.0
Temperature range	pH < 7: 90 °C pH > 7: 50 °C	pH < 7: 90 °C pH > 7: 50 °C

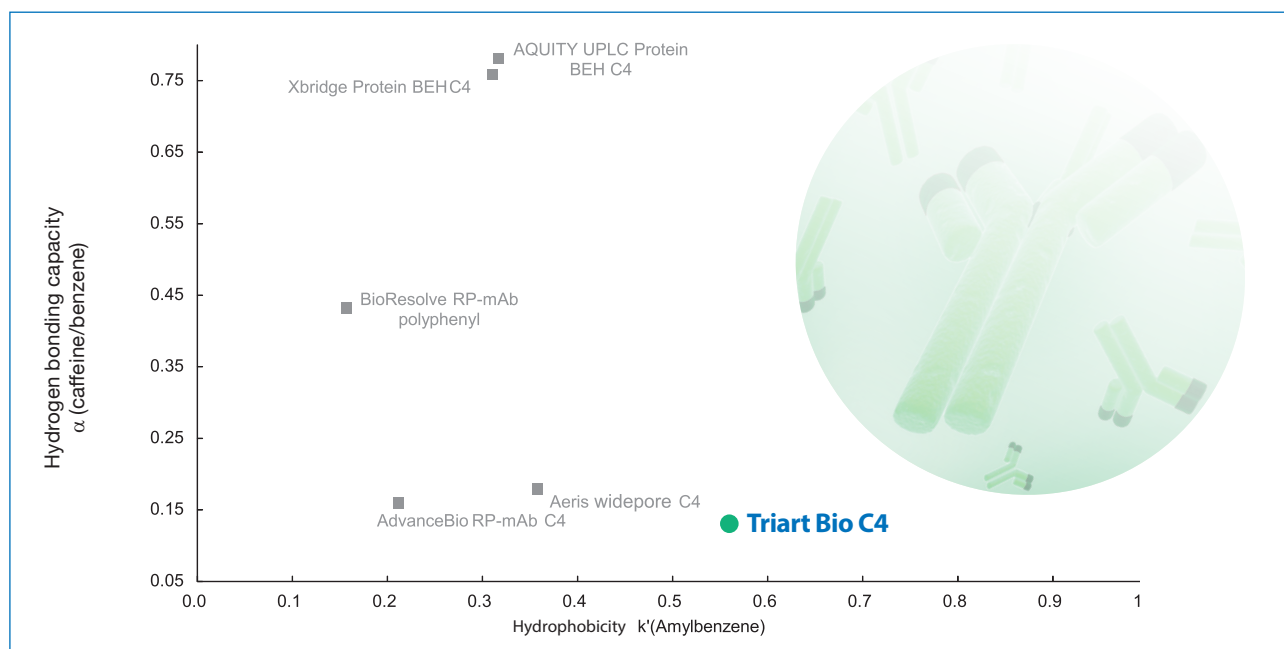
BioLC selectivities

Ideal Selectivity for biomolecules



YMC-Triart Bio C18 shows a selectivity between that of YMC-Triart Bio C4 and regular YMC-Triart C18/C8 with 12nm pore. This feature perfectly supplements the existing products.

Low hydrophobicity and hydrogen capacity



YMC-Triart Bio C4 is based on the robust, well-established organic/hybrid particle. It provides low hydrophobicity and lower hydrogen bonding capacity compared to other BioLC columns.

Column hardware

YMC capillary column hardware



- All fully porous YMC phases available
- Compatible with several Nano-/MicroLC/MS systems, e.g. from Eksigent/Sciex (ExpressLC ultra/Ekspert MicroLC 200) or Shimadzu (Nexera Mikros)
- Suitable for extremely low sample volumes and low flow rates
- Fused silica inner body
- Stainless steel outer body for microLC columns (0.3/0.5 mm ID)
- Polymer coating is used for nanoLC columns (0.1/0.075 mm ID)

Dimensions

IDs [μm]
500
300
100
75

Lengths [mm]
50
75
100
150

Particle sizes [μm]*
1.9
2.0
3.0
5.0

*Not all dimension/particle size combinations are possible. · Other dimensions are available on request.

Connection options

All columns are available with 2 connection options:

1/16" connections (10–32 thread), e.g. for Shimadzu Nexera Mikros

1/32" connections (6–40 thread) for Eksigent/Sciex

Pressure limits

Pressure stability of the column is dependent on particle size:

2–5 μm : 550 bar / 7,975 psi

1.9 μm : 600 bar / 8,700 psi.

Typical flow rates

IDs [μm]	Typical flow rates for RP*
500	10–30 $\mu\text{L}/\text{min}$
300	3–10 $\mu\text{L}/\text{min}$
100	300–500 nL/min
75	100–300 nL/min

Depending on length and particle size. In HILIC mode it is recommended flow rates should be reduced by half.

Guard/trap columns



Supplied in packs of 3 together with a column coupler.

Suitable for:

- ▶ guard columns for challenging matrices (with column coupler)
- ▶ trapping columns for use in desalting or trap and elute procedures (without a coupler)

Column coupler



1/16" coupler



1/32" coupler

A custom-made stainless-steel column coupler is supplied with every pack of 3 capillary guard cartridges to guarantee the optimum connection with low dead volume. Every coupler can be purchased separately, if required.



1/32" guard column coupled to a 1/32" analytical column.

Ordering information

Part numbers for YMC-Triart columns

YMC capillary columns are available with 1/16" (10–32 thread) or with 1/32" (6–40 thread) connections. All column part numbers indicate the connection size by use of additional terminal letters:

1/16" fittings end with **-AU**

1/32" fittings end with **-RU**

Order codes YMC-Triart columns

PLEASE NOTE:

Part numbers for 1/16" connections are shown.
To order 1/32" connections, simply exchange AU by RU.
Columns with 1/32" connection are available with 300 µm or 500 µm ID.

YMC-Triart 1.9 µm, 1/16"1/32" fitting, microLC capillary columns (max. pressure 600 bar)

Phase	Column ID [µm]	Column length [mm]				Guard columns* with 5 mm length
		50	75	100	150	(pack of 3)
C18	300	TA12SP9-05H0AU	TA12SP9-L5H0AU	TA12SP9-10H0AU	TA12SP9-15H0AU	TA12SP9-E5H0AU
	500	TA12SP9-05J0AU	TA12SP9-L5J0AU	TA12SP9-10J0AU	TA12SP9-15J0AU	TA12SP9-E5J0AU
C18 ExRS	300	TAR08SP9-05H0AU	TAR08SP9-L5H0AU	TAR08SP9-10H0AU	TAR08SP9-15H0AU	TAR08SP9-E5H0AU
	500	TAR08SP9-05J0AU	TAR08SP9-L5J0AU	TAR08SP9-10J0AU	TAR08SP9-15J0AU	TAR08SP9-E5J0AU
Bio C18	300	TA30SP9-05H0AU	TA30SP9-L5H0AU	TA30SP9-10H0AU	TA30SP9-15H0AU	TA30SP9-E5H0AU
	500	TA30SP9-05J0AU	TA30SP9-L5J0AU	TA30SP9-10J0AU	TA30SP9-15J0AU	TA308SP9-E5J0AU
C8	300	T012SP9-05H0AU	T012SP9-L5H0AU	T012SP9-10H0AU	T012SP9-15H0AU	T012SP9-E5H0AU
	500	T012SP9-05J0AU	T012SP9-L5J0AU	T012SP9-10J0AU	T012SP9-15J0AU	T012SP9-E5J0AU
Bio C4	300	TB30SP9-05H0AU	TB30SP9-L5H0AU	TB30SP9-10H0AU	TB30SP9-15H0AU	TB30SP9-E5H0AU
	500	TB30SP9-05J0AU	TB30SP9-L5J0AU	TB30SP9-10J0AU	TB30SP9-15J0AU	TB30SP9-E5J0AU
Phenyl	300	TPH12SP9-05H0AU	TPH12SP9-L5H0AU	TPH12SP9-10H0AU	TPH12SP9-15H0AU	TPH12SP9-E5H0AU
	500	TPH12SP9-05J0AU	TPH12SP9-L5J0AU	TPH12SP9-10J0AU	TPH12SP9-15J0AU	TPH12SP9-E5J0AU
PPF	300	TPF12SP9-05H0AU	TPF12SP9-L5H0AU	TPF12SP9-10H0AU	TPF12SP9-15H0AU	TPF12SP9-E5H0AU
	500	TPF12SP9-05J0AU	TPF12SP9-L5J0AU	TPF12SP9-10J0AU	TPF12SP9-15J0AU	TPF12SP9-E5J0AU
Diol-HILIC	300	TDH12SP9-05H0AU	TDH12SP9-L5H0AU	TDH12SP9-10H0AU	TDH12SP9-15H0AU	TDH12SP9-E5H0AU
	500	TDH12SP9-05J0AU	TDH12SP9-L5J0AU	TDH12SP9-10J0AU	TDH12SP9-15J0AU	TDH12SP9-E5J0AU

* no holder required, comes with a column coupler

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

Phase	Column ID [µm]	Column length [mm]				Guard columns* with 5 mm length (pack of 3)
		50	75	100	150	
C18	75	TA12S03-05E8AU	TA12S03-L5E8AU	TA12S03-10E8AU	TA12S03-15E8AU	—
	100	TA12S03-05F0AU	TA12S03-L5F0AU	TA12S03-10F0AU	TA12S03-15F0AU	—
	300	TA12S03-05H0AU	TA12S03-L5H0AU	TA12S03-10H0AU	TA12S03-15H0AU	TA12S03-E5H0AU
	500	TA12S03-05J0AU	TA12S03-L5J0AU	TA12S03-10J0AU	TA12S03-15J0AU	TA12S03-E5J0AU
C18 ExRS	75	TAR08S03-05E8AU	TAR08S03-L5E8AU	TAR08S03-10E8AU	TAR08S03-15E8AU	—
	100	TAR08S03-05F0AU	TAR08S03-L5F0AU	TAR08S03-10F0AU	TAR08S03-15F0AU	—
	300	TAR08S03-05H0AU	TAR08S03-L5H0AU	TAR08S03-10H0AU	TAR08S03-15H0AU	TAR08S03-E5H0AU
	500	TAR08S03-05J0AU	TAR08S03-L5J0AU	TAR08S03-10J0AU	TAR08S03-15J0AU	TAR08S03-E5J0AU
Bio C18	75	TA30S03-05E8AU	TA30S03-L5E8AU	TA30S03-10E8AU	TA30S03-15E8AU	—
	100	TA30S03-05F0AU	TA30S03-L5F0AU	TA30S03-10F0AU	TA30S03-15F0AU	—
	300	TA30S03-05H0AU	TA30S03-L5H0AU	TA30S03-10H0AU	TA30S03-15H0AU	TA30S03-E5H0AU
	500	TA30S03-05J0AU	TA30S03-L5J0AU	TA30S03-10J0AU	TA30S03-15J0AU	TA30S03-E5J0AU
C8	75	T012S03-05E8AU	T012S03-L5E8AU	T012S03-10E8AU	T012S03-15E8AU	—
	100	T012S03-05F0AU	T012S03-L5F0AU	T012S03-10F0AU	T012S03-15F0AU	—
	300	T012S03-05H0AU	T012S03-L5H0AU	T012S03-10H0AU	T012S03-15H0AU	T012S03-E5H0AU
	500	T012S03-05J0AU	T012S03-L5J0AU	T012S03-10J0AU	T012S03-15J0AU	T012S03-E5J0AU
Bio C4	75	TB30S03-05E8AU	TB30S03-L5E8AU	TB30S03-10E8AU	TB30S03-15E8AU	—
	100	TB30S03-05F0AU	TB30S03-L5F0AU	TB30S03-10F0AU	TB30S03-15F0AU	—
	300	TB30S03-05H0AU	TB30S03-L5H0AU	TB30S03-10H0AU	TB30S03-15H0AU	TB30S03-E5H0AU
	500	TB30S03-05J0AU	TB30S03-L5J0AU	TB30S03-10J0AU	TB30S03-15J0AU	TB30S03-E5J0AU
Phenyl	75	TPH12S03-05E8AU	TPH12S03-L5E8AU	TPH12S03-10E8AU	TPH12S03-15E8AU	—
	100	TPH12S03-05F0AU	TPH12S03-L5F0AU	TPH12S03-10F0AU	TPH12S03-15F0AU	—
	300	TPH12S03-05H0AU	TPH12S03-L5H0AU	TPH12S03-10H0AU	TPH12S03-15H0AU	TPH12S03-E5H0AU
	500	TPH12S03-05J0AU	TPH12S03-L5J0AU	TPH12S03-10J0AU	TPH12S03-15J0AU	TPH12S03-E5J0AU
PPF	75	TPF12S03-05E8AU	TPF12S03-L5E8AU	TPF12S03-10E8AU	TPF12S03-15E8AU	—
	100	TPF12S03-05F0AU	TPF12S03-L5F0AU	TPF12S03-10F0AU	TPF12S03-15F0AU	—
	300	TPF12S03-05H0AU	TPF12S03-L5H0AU	TPF12S03-10H0AU	TPF12S03-15H0AU	TPF12S03-E5H0AU
	500	TPF12S03-05J0AU	TPF12S03-L5J0AU	TPF12S03-10J0AU	TPF12S03-15J0AU	TPF12S03-E5J0AU
Diol-HILIC	75	TDH12S03-05E8AU	TDH12S03-L5E8AU	TDH12S03-10E8AU	TDH12S03-15E8AU	—
	100	TDH12S03-05F0AU	TDH12S03-L5F0AU	TDH12S03-10F0AU	TDH12S03-15F0AU	—
	300	TDH12S03-05H0AU	TDH12S03-L5H0AU	TDH12S03-10H0AU	TDH12S03-15H0AU	TDH12S03-E5H0AU
	500	TDH12S03-05J0AU	TDH12S03-L5J0AU	TDH12S03-10J0AU	TDH12S03-15J0AU	TDH12S03-E5J0AU

* no holder required, comes with a column coupler

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

Phase	Column ID [µm]	Column length [mm]				Guard columns* with 5 mm length (pack of 3)
		50	75	100	150	
C18	75	TA12S05-05E8AU	TA12S05-L5E8AU	TA12S05-10E8AU	TA12S05-15E8AU	—
	100	TA12S05-05F0AU	TA12S05-L5F0AU	TA12S05-10F0AU	TA12S05-15F0AU	—
	300	TA12S05-05H0AU	TA12S05-L5H0AU	TA12S05-10H0AU	TA12S05-15H0AU	TA12S05-E5H0AU
	500	TA12S05-05J0AU	TA12S05-L5J0AU	TA12S05-10J0AU	TA12S05-15J0AU	TA12S05-E5J0AU
C18 ExRS	75	TAR08S05-05E8AU	TAR08S05-L5E8AU	TAR08S05-10E8AU	TAR08S05-15E8AU	—
	100	TAR08S05-05F0AU	TAR08S05-L5F0AU	TAR08S05-10F0AU	TAR08S05-15F0AU	—
	300	TAR08S05-05H0AU	TAR08S05-L5H0AU	TAR08S05-10H0AU	TAR08S05-15H0AU	TAR08S05-E5H0AU
	500	TAR08S05-05J0AU	TAR08S05-L5J0AU	TAR08S05-10J0AU	TAR08S05-15J0AU	TAR08S05-E5J0AU
Bio C18	75	TA30S05-05E8AU	TA30S05-L5E8AU	TA30S05-10E8AU	TA30S05-15E8AU	—
	100	TA30S05-05F0AU	TA30S05-L5F0AU	TA30S05-10F0AU	TA30S05-15F0AU	—
	300	TA30S05-05H0AU	TA30S05-L5H0AU	TA30S05-10H0AU	TA30S05-15H0AU	TA30S05-E5H0AU
	500	TA30S05-05J0AU	TA30S05-L5J0AU	TA30S05-10J0AU	TA30S05-15J0AU	TA30S05-E5J0AU
C8	75	T012S05-05E8AU	T012S05-L5E8AU	T012S05-10E8AU	T012S05-15E8AU	—
	100	T012S05-05F0AU	T012S05-L5F0AU	T012S05-10F0AU	T012S05-15F0AU	—
	300	T012S05-05H0AU	T012S05-L5H0AU	T012S05-10H0AU	T012S05-15H0AU	T012S05-E5H0AU
	500	T012S05-05J0AU	T012S05-L5J0AU	T012S05-10J0AU	T012S05-15J0AU	T012S05-E5J0AU
Bio C4	75	TB30S05-05E8AU	TB30S05-L5E8AU	TB30S05-10E8AU	TB30S05-15E8AU	—
	100	TB30S05-05F0AU	TB30S05-L5F0AU	TB30S05-10F0AU	TB30S05-15F0AU	—
	300	TB30S05-05H0AU	TB30S05-L5H0AU	TB30S05-10H0AU	TB30S05-15H0AU	TB30S05-E5H0AU
	500	TB30S05-05J0AU	TB30S05-L5J0AU	TB30S05-10J0AU	TB30S05-15J0AU	TB30S05-E5J0AU
Phenyl	75	TPH12S05-05E8AU	TPH12S05-L5E8AU	TPH12S05-10E8AU	TPH12S05-15E8AU	—
	100	TPH12S05-05F0AU	TPH12S05-L5F0AU	TPH12S05-10F0AU	TPH12S05-15F0AU	—
	300	TPH12S05-05H0AU	TPH12S05-L5H0AU	TPH12S05-10H0AU	TPH12S05-15H0AU	TPH12S05-E5H0AU
	500	TPH12S05-05J0AU	TPH12S05-L5J0AU	TPH12S05-10J0AU	TPH12S05-15J0AU	TPH12S05-E5J0AU
PPF	75	TPF12S05-05E8AU	TPF12S05-L5E8AU	TPF12S05-10E8AU	TPF12S05-15E8AU	—
	100	TPF12S05-05F0AU	TPF12S05-L5F0AU	TPF12S05-10F0AU	TPF12S05-15F0AU	—
	300	TPF12S05-05H0AU	TPF12S05-L5H0AU	TPF12S05-10H0AU	TPF12S05-15H0AU	TPF12S05-E5H0AU
	500	TPF12S05-05J0AU	TPF12S05-L5J0AU	TPF12S05-10J0AU	TPF12S05-15J0AU	TPF12S05-E5J0AU
Diol-HILIC	75	TDH12S05-05E8AU	TDH12S05-L5E8AU	TDH12S05-10E8AU	TDH12S05-15E8AU	—
	100	TDH12S05-05F0AU	TDH12S05-L5F0AU	TDH12S05-10F0AU	TDH12S05-15F0AU	—
	300	TDH12S05-05H0AU	TDH12S05-L5H0AU	TDH12S05-10H0AU	TDH12S05-15H0AU	TDH12S05-E5H0AU
	500	TDH12S05-05J0AU	TDH12S05-L5J0AU	TDH12S05-10J0AU	TDH12S05-15J0AU	TDH12S05-E5J0AU

* no holder required, comes with a column coupler

PLEASE NOTE:

For use with Eksigent/Sciex MicroLC systems, order columns with 1/32" (6–40 thread) end-fittings. Use the following tube connectors, Eksigent 6/40 Fitting P/N 5019621 or VICI No Twist One-Piece Fitting P/N ZNF.5FPK(-5) or Optimize EXP®2 Fitting Kit P/N 15-19-04927.

Part numbers for further YMC columns

The specific part number for a given column consists of two parts describing the phase and dimension/hardware details:

Phase – Dimension/hardware

Both parts of the part number can be taken from the tables below:

A selection of YMC RP phases (first part of part number)

Phase	Particle size [μm]	Part number
YMC-Pack Pro C18, 12 nm	2	AS12S02-
	3	AS12S03-
	5	AS12S05-
Hydrosphere C18, 12 nm	2	HS12S02-
	3	HS12S03-
	5	HS12S05-
YMC-Pack Pro C18 RS, 8 nm	3	RS08S03-
	5	RS08S05-
YMC-Pack ODS-A, 12 nm	3	AA12S03-
	5	AA12S05-
YMC-Pack ODS-AQ, 12 nm	3	AQ12S03-
	5	AQ12S05-
YMC-Pack Pro C8, 12 nm	3	OS12S03-
	5	OS12S05-
YMC-Pack Pro C4, 12 nm	3	BS12S03-
	5	BS12S05-

A selection of YMC HILIC/NP phases (first part of part number)

Phase	Particle size [μm]	Part number
YMC-Pack SIL, 12 nm	3	SL12S03-
	5	SL12S05-
YMC-Pack PVA-Sil, 12 nm	5	PV12S05-
YMC-Pack Polyamine II, 12 nm	5	PB12S05-
YMC-Pack NH ₂ , 12 nm	3	NH12S03-
	5	NH12S05-
YMC-Pack Diol (NP), 12 nm	3	DN12S03-
	5	DN12S05-
YMC-Pack CN, 12 nm	3	CN12S03-
	5	CN12S05-

A selection of YMC BioLC phases (first part of part number)

Phase	Particle size [µm]	Part number
YMCbasic, 20 nm	3	BA99S03-
	5	BA99S05-
YMC-SEC MAB, 25 nm	3	DLM25S03-
YMC-Pack Diol-60, 6 nm	3	DL06S03-
	5	DL06S05-
YMC-Pack Diol-120, 12 nm	3	DL12S03-
	5	DL12S05-
YMC-Pack Diol-200, 20 nm	2	DL20S02-
	3	DL20S05-
	5	DL20S05-
YMC-Pack Diol-300, 30 nm	2	DL30S02-
	3	DL30S05-
	5	DL30S05-

Dimension/hardware selection (second part of PN)*

Fiting	Column ID [µm]	Column length [mm]				Guard columns with 5 mm length (pack of 3)
		50	75	100	150	
1/16"	500	-05J0AU	-L5J0AU	-10J0AU	-15J0AU	-E5J0AU
	300	-05H0AU	-L5H0AU	-10H0AU	-15H0AU	-E5H0AU
	100	-05F0AU	-L5F0AU	-10F0AU	-15F0AU	–
	75	-05E8AU	-L5E8AU	-10E8AU	-15E8AU	–
1/32"	500	-05J0RU	-L5J0RU	-10J0RU	-15J0RU	-E5J0RU
	300	-05H0RU	-L5H0RU	-10H0RU	-15H0RU	-E5H0RU

*Not all phase and hardware combinations might be possible.

EXAMPLE:

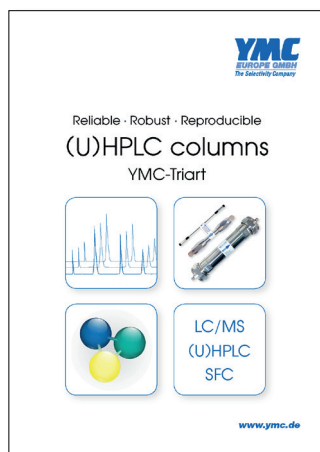
YMC-Pack Pro C18, 12 nm, 3µm, 100 mm x 300µm, 1/16" end fittings

First part: **AS12S03-**
 Second part: **-10H0AU**
 Part number: **AS12S03-10H0AU**

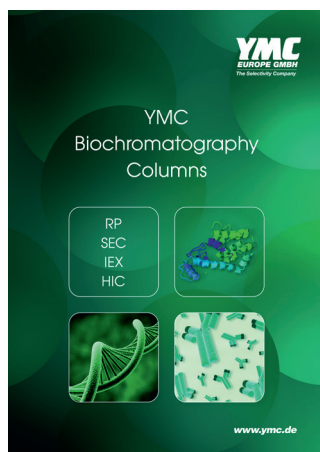
Optional 1/16" column coupler
 made of PCTFE (max. pressure 276 bar / 4,000 psi) available: P/N K.U-281.



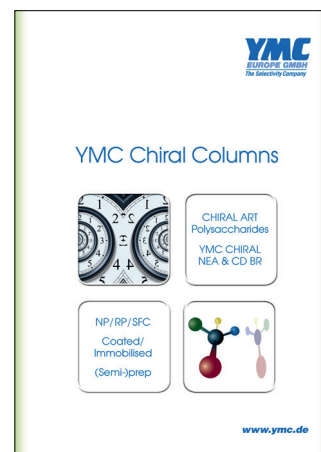
Please request the following catalogues



(U)HPLC columns
YMC-Triart



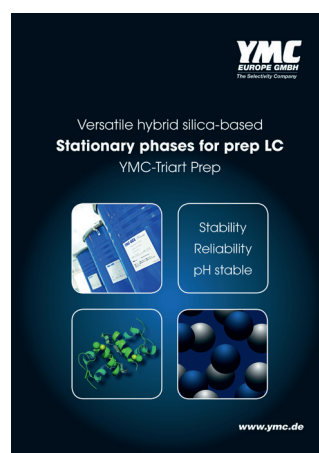
YMC Biochromatography
Columns



YMC Chiral
Columns



BioPro IEX Resins



YMC-Triart Prep

Trademarks

The following brands, trademarks, or service marks are the property of the listed company and/or its subsidiaries.

Every effort has been taken to ensure this list is accurate at the time of printing this brochure.

Acquity UPLC BEH, Atlantis T3, Bio Resolve RP mAb, SunFire C18, Symmetry C18, XBridge BEH, XBridge Peptide BEH, XBridge Protein BEH, XTerra MS C18 are trademarks of Waters Corp.

Express ultra and ekspert are trademarks of AB Sciex Pte. Ltd.

Advance BioRP-mAb C4, Zorbax Extend are trademarks of Agilent Technologies, Inc.

Kinetex, Aeris, Gemini are trademarks of Phenomenex, Inc.

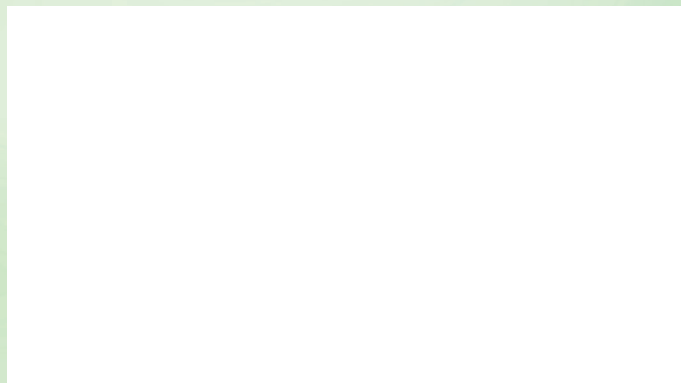
Kromasil Eternity is a trademark of Nouryon.

Inertsil ODS-3 is a trademark of GL Science, Inc.

Hypersil GOLD is a trademark of Thermo Fisher Scientific.

Nexera Mikros is a trademark of Shimadzu Corp.

Your local distributor:



YMC Europe GmbH

Schöttmannshof 19
D-46539 Dinslaken
Germany
Phone +49(0)2064 427-0, Fax +49(0)2064427-222
www.ymc.de

YMC Schweiz GmbH

Im Wasenboden 8
4056 Basel
Switzerland
Phone +41(0)61 561 8050, Fax +41(0)61 561 8059
www.ymc-schweiz.ch

YMC CO., LTD.

YMC Karasuma-Gojo Bld. 284 Daigo-cho,
Karasuma Nishiiru Gojo-dori Shimogyo-ku,
Kyoto 600-8106 Japan
Phone +81(0)75342 4515, Fax +81(0)75342 4550
www.ymc.co.jp