CHROMATOGRAPHY

Product Guide

Everything for your applications

CHROMSERVIS

WHAT IS NEW

ASTRA® BDS and ASTRA® Sugar HPLC columns

New ASTRA® HPLC columns are complementary to our ARION® brand. These columns offer not only a high-endcapped C18, C18-BDS, C8-BDS and Phenyl Hexyl HP phases, but also a unique DNP phase with dual modification. Another novel phase C18-AQ offers dual chemistry bonding for analyses in aqueous mobile phases.

We extended ASTRA® HPLC columns with polymer based columns for sugar analysis. See page 4

ARION® HPLC columns and Guard system

We have extended range of ARION® HPLC columns with the PFP phase. New ARION® NH$_2$ cartridges extend the AQS system.
See page 18

LION™ GC columns

The family of GC column LION™ has grown by two stages. LN 624 Sil MS brings ARI II a higher temperature limit of 360/320 °C, lower background and longer lifetime. New LN FAME HT is a highly polar bonded phase with an increased temperature limit up to 280 °C, with the application being focused on the analysis of FAME and their isomers.
See details on page 76

SpeExtra™ MSPE columns

MSPE filters enable the quick and effective pretreatment of a sample using different types of membranes with 0.22 micrometer porosity and a suitable sorbent. They are a suitable replacement for 1–3 mL SPE columns. Pre-filled with sorbent and LL type extractor. With MSPE filters you will save time, use a minimum amount of solvents and perform more sample analyses than with conventional SPE columns.
See details on page 88

MetAmino® sample preparation kit

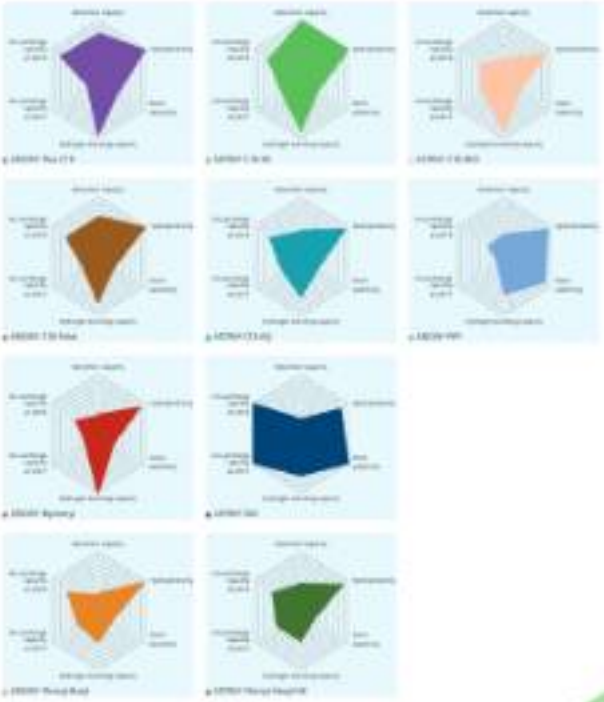
The MetAmino® kit offers an easy sample preparation method for your LC/MS or GC/MS analysis. It has been developed in the Czech Republic in co-operation with Biology Centre CAS.
See page 94

HPLC COLUMN SELECTION

HPLC column selectivity

The selectivity is defined as the capability of stationary phases to separate analytes under certain conditions. The selectivity mainly depends on the structure, metal content and modification of base silica gel, type of chemical bonding or kind of end capping. The HPLC column selectivity has been measured according to the Tanaka plots (Tanaka, N. et al., Journal of Chromatographic Science, 27 (1989), 721 - 728), shown below. This allows users a quick comparison of different phases in order to choose the best possible HPLC column for their application.

Property	Synonym	Measured parameter
Retention capacity	Hydrophobicity	k (pentylbenzene)
Hydrophobicity	Methylene selectivity	α (pentylbenzene, butylbenzene)
Steric selectivity	-	α (triphenylene, o-terphenyl)
Hydrogen bonding capacity	Capacity of silanol	α (caffeine, phenol)
Ion exchange capacity at pH=7	-	α (benzyl amine, phenol)
Ion exchange capacity at pH=3	-	α (benzyl amine, phenol)



ASTRA®

ASTRA® HPLC columns extend our AMOS® and CHROMSHELL® product lines. The ASTRA® has been developed in the Czech Republic to offer an alternate to a broad range of general HPLC columns. ASTRA® brings completely new and unique stationary phase with the polar embedded group to offer a complementary selectivity.

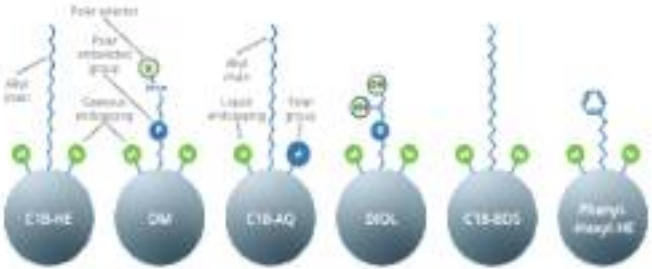
- Unique and high endcapped C18 phases
- 330 m²/g surface area (110 m²/g for BDS phases)
- Multi modal phase

ASTRA® Silicagel

Particle size	1 µm	3 µm	5 µm
Metal contents	<10 ppm	<10 ppm	<10 ppm
Mean pore size diameter	8.5 ± 1.5 µm	8.5 ± 1.5 µm	8.5 ± 1.5 µm
Porosity in the range of pores	0.67 ± 0.04	0.67 ± 0.03	0.67 ± 0.03

ASTRA® phases	Particle size [µm]	Pore size [Å]	Surface area [m²/g]	Carbon load	pH stability	Endcapping	100% aqueous mobile phase	USP code
C18-HE	1, 3, 5, 10	180	330	17 %	2 to 9	High	+	L1
C18-AQ	3, 5, 10	180	330	15 %	2 to 9	Mixed	✔	L1
C18-BDS	3, 5	180	110	12 %	2 to 9	Moderately	+	L1
C8-HE	5	180	330	11 %	2 to 9	High	+	L7
C8-BDS	3, 5	180	110	8 %	2 to 9	Moderately	+	L7
Phenyl-Hexyl-HE	3, 5	180	330	11 %	2 to 7.5	High	+	L11
DIOL	3, 5	180	330	12 %	2 to 9	High	+	-
SIL	3, 5	180	330	0 %	2 to 7.5	-	✔	L3

ASTRA® phases	Particle size [µm]	Crosslinking	Max. flow rate	Max. Pressure [bar]	Max. Temperature	USP code
Sugar C4-R	5, 10	Proprietary	1.5 mL/min	50	80	L26
Sugar HILIC	5, 10	Proprietary	1.5 mL/min	50	80	L77
Sugar MD	10	Proprietary	1.5 mL/min	50	80	-
Sugar NeoEC	10	Proprietary	1.5 mL/min	50	80	L58



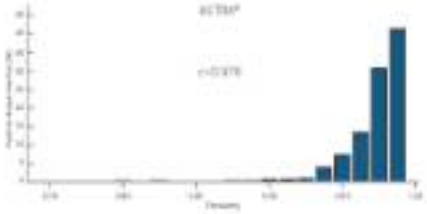
Up close

As with all phases developed by Chromatonix, ASTRA® HPLC column particles are continuously analyzed by SEM. The electron microscope shows the very high quality of ASTRA® 5 and 3µm particles.

ASTRA® particle 5 µm

ASTRA® particle 3 µm

ASTRA® particle 2 µm



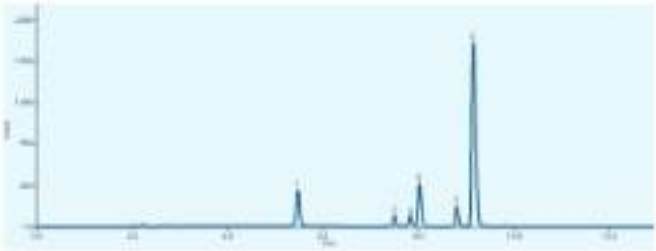
Main particle characteristics:

- Close proximity to a sphere
- Highly effective endcapping
- No broken particles
- Robustness to high pressures
- Lot to lot reproducibility
- Unique modern embedded phases

High endcapping | Low endcapping | Non endcapped

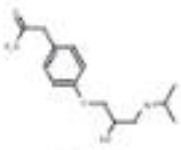
Beta Blockers

Beta Blockers are also known as beta-adrenergic blocking agents. They are used as a medication that reduces blood pressure.

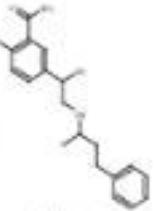


Standard mixture on ASTRA® C18-HS column

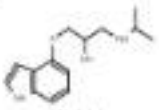
Columns	ASTRA® C18-HS, 5 µm			
Dimensions	150 mm × 4.6 mm			
Part numbers	437.C752.4608			
Mobile phase	A: Phosphate buffer 20mM pH 3.1 B: ACN			
Gradient elution	**Time**	**A (%)**	**B (%)**	**Flow rate (mL/L)**
	0	90	10	0.75
	3	80	20	1.00
	8	50	50	1.00
	12	30	70	1.00
	14	90	10	0.75
Flow rate	See gradient table (0.75-1 L)			
Temperature	25 °C			
Detection	UV @ 220 nm			
Analytes	1. Atenolol, CAS No. 29122-68-7 2. Pindolol, CAS No. 13523-86-9 3. Acebutolol, CAS No. 37517-30-9 4. Metoprolol, CAS No. 37350-58-6 5. Labetalol, CAS No. 36894-69-6 6. Propranolol, CAS No. 525-66-6			



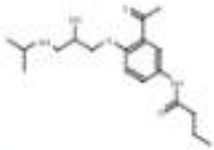
Atenolol



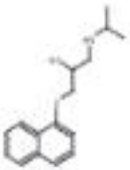
Labetalol



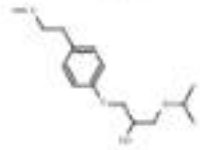
Pindolol



Acebutolol



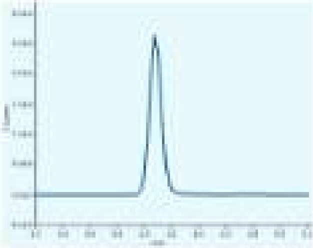
Propranolol



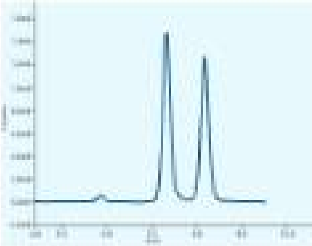
Metoprolol

API glucuronide by LC/MS

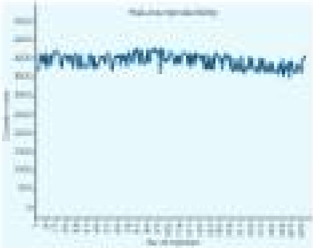
This application shows high ASTRA® HPLC column stability in the pharmacokinetic assay. API is used in hypolipidemic therapy adjusting cholesterol levels in the human body.



Scan 1 – API glucuronide



Scan 2 – API isomers



Plasma sample on ASTRA® C18-HE column

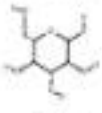
Column	ASTRA® C18-HL 3 µm
Dimensions	150 mm x 4.6 mm
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	0.45 mL/min
Temperature	Ambient
Injection volume	15 µL
Detection	MS/MS
Mode	ESI Negative 2500 eV
MS Temperature	[illegible]
Collision gas	Argon
Instrument	TSQ Quantum (Thermo Fisher Scientific)
Analytes	1. API (proprietary)

Compound name	Q1 (m/z)	Q3 (m/z)	Collision cell pressure	Collision energy
[illegible]	[illegible]	[illegible]	1.5 mTorr	[illegible]
API	[illegible]	[illegible]	1.5 mTorr	[illegible]

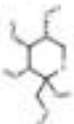
Sugars in infusion solutions

Sugars solutions in the form of infusions can be used to treat low blood sugar and water loss and as part of parenteral nutrition to optimize fluid, energy and nitrogen balance. As active ingredients of finished dosage forms, sugars should be controlled according to the strict requirements of pharmaceutical guidelines. In this application there are the results of the control of several solutions containing glucose, fructose and mannitol using Astra® Sugar Ca(3) column.

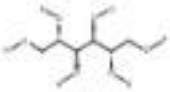
Column	ASTRA® Sugar Ca(3), 15 µm
Dimensions	300 mm × 8.0 mm
Part number	437-300-V580
Mobile phase	100% H$_2$O
Flow rate	0.8 ml/min
Temperature	80 °C
Injection volume	20 µL
Detection	RI (80) °C
Analytes	1. Glucose 2. Fructose 3. Mannitol



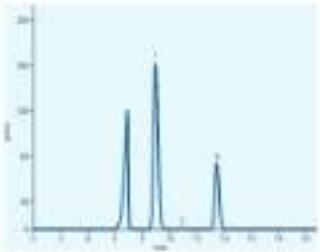
Glucose



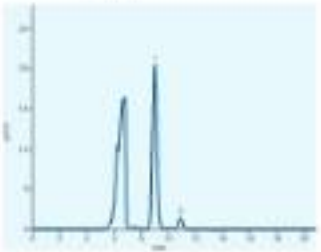
Fructose



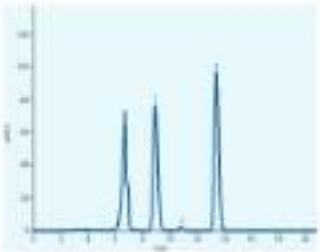
Mannitol



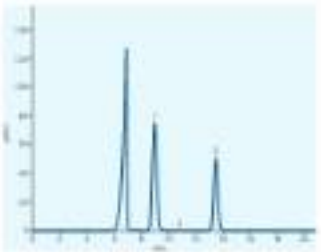
Test solution 1 on ASTRA® Sugar Ca(3) column



Test solution 2 on ASTRA® Sugar Ca(3) column



Test solution 3 on ASTRA® Sugar Ca(3) column



Test solution 4 on ASTRA® Sugar Ca(3) column

ASTRA®

PHARMA APPLICATIONS

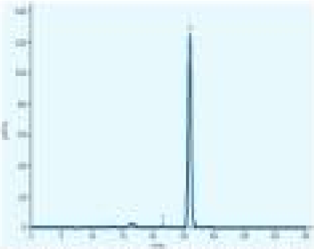
Sorbitol analysis according to Ph. Eur.

Sorbitol is a sugar alcohol commonly used as a sweetener and stabilizer in a wide range of pharmaceutical formulations. This application shows a method of control of sorbitol according to **Ph. Eur. Monograph 07/2019:0435**. Astra® Sugar Ca(S) column provides a perfect resolution factor and peak symmetry under the conditions of the pharmacopoeial method.

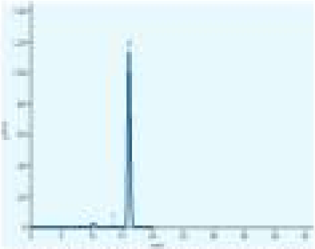
Column	ASTRA® Sugar Ca(S), 8 µm
Dimensions	[illegible]
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	0.5 mL/min and 0.75 mL/min
Temperature	[illegible]
Injection volume	[illegible]
Detection	[illegible]
Analytes	**1. Mannitol** **2. Sorbitol**

Mannitol

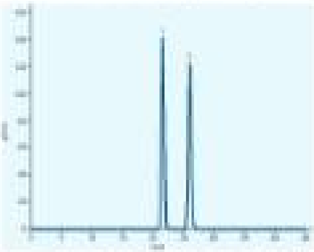
Sorbitol



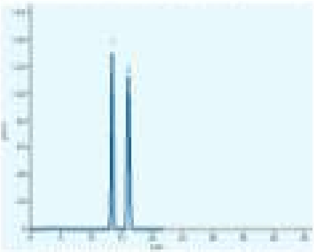
Test solution on ASTRA® Sugar Ca(S) column (0.5 mL/min)



Test solution on ASTRA® Sugar Ca(S) column (0.75 mL/min)



Reference solution (b) on ASTRA® Sugar Ca(S) column (0.5 mL/min)



Reference solution (b) on ASTRA® Sugar Ca(S) column (0.75 mL/min)

ASTRA®

Analysis of long-chain PFASs in biological sample matrix

PFASs are a group of synthetic organofluorine chemical compounds used in the production of fluoropolymer coatings and products such as furniture, adhesives, personal care products, food packaging, mobile phone screens, etc. Many PFASs pose health and environmental concerns because they are classified as persistent organic pollutants. The long-chain PFASs are due to higher bioaccumulative potential frequently detected in living organisms. This application shows a robust method of extraction and determination of the PFAS compounds in fish tissue samples, which can be a relevant exposure pathway to humans.

MSPE with 15 mg of C18 stationary phase and nylon frits was used to analyze 14 PFAS compounds in fish tissue samples. The MSPE sample preparation approach was compared with the reference extraction method without SPE based on Grabicova et al. 2018 [1]. Both sets of samples were fortified to 1 ng/g of PFAS. The MSPE method enhances the response of most of the analytes between 80–130 % (Fig. 1). Although sample preparation is more demanding than the reference method, the MSPE offers relevant signal improvement.

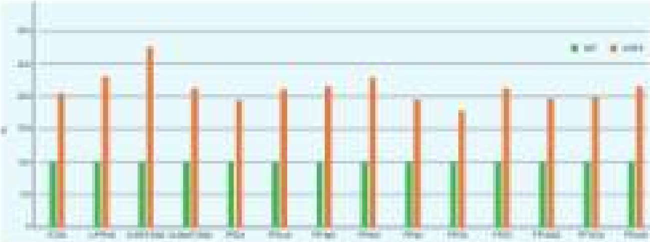
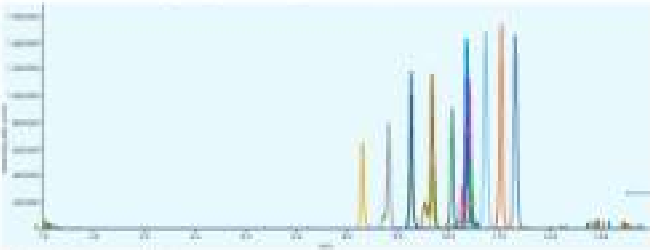


Fig 1. MSPE method relative signal improvement in comparison to the reference extraction method without SPE



Mixture of PFASs on ASTRA® column

References

[1] Grabicova K, Vojs Staňová A, Koba Ucun O, Borik A, Randak T, Grabic R. Development of a robust extraction procedure for the HPLC-ESI-HRPS determination of multi-residual pharmaceuticals in biota samples. Anal Chim Acta. 2018 Aug 17;1022:53-60. doi: 10.1016/j.aca.2018.04.011. Epub 2018 Apr 18. PMID: 29729738.

The application was developed in cooperation with the Faculty of Fisheries and Protection of Waters, Research Institute of Fish Culture and Hydrobiology, Laboratory of Environmental Chemistry and Biochemistry.

Analysis of long-chain PFASs in biological sample matrix

MSPE Method

MSPE Column	Mono Spin Sorbent® MSPE C18 column with 0.22 µm Nylon membrane, 15 mg/pk (MSP1B15-AA03)
Homogenization	TissueLyser II, Qiagen, Germany, 1800 RPM, 1 for 10 min
Extraction	ACN + 0.1% FA
Centrifugation	5804 gen, Eppendorf, Germany, 4000 rpm for 2 min
Reconstitution	20% + 0.1% FA
Dilution	Ultrapure water 1:4 v/v
MSPE Activation	20% + MeOH (2.0 mL)
MSPE Equilibration	20% + 0.1% FA
MSPE Extraction of analytes	2.0 mL of sample
MSPE Elution of analytes	2.0 mL ACN + 0.1% FA

MSPE column

LC-HRMS Method

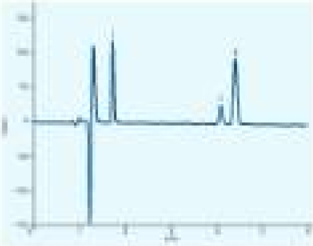
Column	ASTRA® C18 (4E, 2 µm)
Dimensions	75 mm × 2.1 mm
Part number	437-C752-4E21
Mobile phase	A: MQW + 10mM Ammonium Acetate B: Methanol + 10mM Ammonium Acetate

Gradient elution	**Time**	**A (%)**	**B (%)**	**Flow rate (µL/min)**
	0	80	10	300
	0.5	80	10	300
	8	40	60	300
	11	0	100	400
	14	0	100	400
	14.01	80	10	300
	16	80	10	300

Temperature	25°C
Injection volume	10 µL
Detection	Full scan (resolving power: 120 000, m/z 200), negative mode
Analytes	**1. L-PFPeS (perfluoropentanesulfonic acid)** **2. PFHxS (perfluorohexanesulfonic acid)** **3. PFOA (perfluorooctanoic acid)** **4. PFHpS (perfluoroheptanesulfonic acid)** **5. PFNA (perfluorononanoic acid)** **6. FOSA (perfluorooctanesulfonamide)** **7. PFOS (perfluorooctanesulfonic acid)** **8. PFDA (perfluorodecanoic acid)** **9. PFUdA (perfluoroundecanoic acid)** **10. N-MeFOSAA (2-(N-methylperfluorooctanesulfonamido)acetic acid)** **11. N-EtFOSAA (N-Ethyl-N-[(heptadecafluorooctyl)sulphonyl]glycine)** **12. PFDoA (perfluorododecanoic acid)** **13. PFTrDA (perfluorotridecanoic acid)** **14. PFTeDA (perfluorotetradecanoic acid)**

Stevia glycosides

Stevia rebaudiana Bertoni is a plant used for its sweet taste. It contains glycosides, which are used as sweeteners in the food industry.

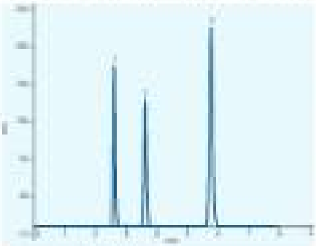


Column	ASTRA® C18-HS 5 µm
Dimensions	150 mm x 4.6 mm
Part number	[illegible]
Mobile phase	Acetonitrile + 0.1% formic acid / water (32 : 68 v/v) Isocratic elution
Flow rate	1.0 mL/min
Temperature	60 °C
Detection	UV@210 nm
Analytes	**1. Rebaudioside D** **2. Rebaudioside A** **3. Stevioside**

Standard on ASTRA® C18-HS

Amines

This application shows nice symmetry of various amines on ASTRA® C18-BDS.



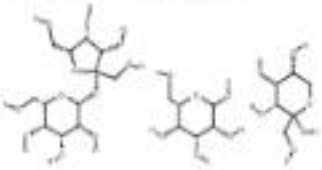
Column	ASTRA® C18-BDS 5 µm
Dimensions	150 mm x 4.6 mm
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	1.0 mL/min
Temperature	25 °C
Injection volume	5 µL
Detection	DAD @254 nm
Analytes	**1. Aniline** **2. 4-Ethylaniline** **3. N,N-dimethylaniline**

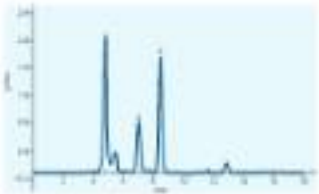
Standard on ASTRA® C18-BDS

Sugars control in tomatoes and ketchups

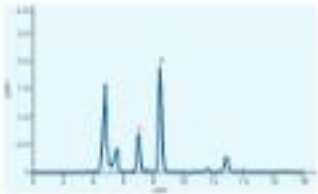
A taste of tomato products depends on content of the main food sugars, such as sucrose, glucose and fructose. Sugars are analysed continuously during the products manufacturing at the different steps of a process. The content of sugars in tomatoes is highly dependent on the geographical origin, harvest and transportation conditions. This application highlights the analysis of food sugars in several kinds of tomatoes and ketchups using ASTRA® Sugar Column.

Column	ASTRA® Sugar Cat2, 5 µm
Dimensions	300 mm × 4.6 mm
Part number	AST-300-4680
Mobile phase	100% H2O
Flow rate	1.5 ml/min
Temperature	80 °C
Injection volume	5 µL
Detection	RID (ICT)
Analytes	1. Sucrose 2. Glucose 3. Fructose

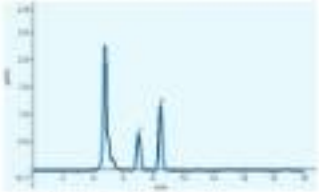




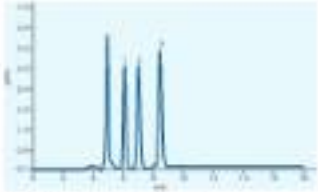
Sugars profile in small red tomatoes



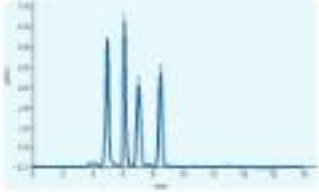
Sugars profile in big red tomatoes



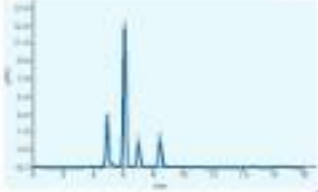
Sugars profile in small orange tomatoes



Sugars profile in ketchup Heinz spicy



Sugars profile in ketchup Heinz sweet



Sugars profile in ketchup Hellmann's delicate

ASTRA®

Ordering information

Analytical columns

[illegible] µm ASTRA® all dimensions in mm						AGS Guard System
Phase	**30 × 2.1**	**50 × 2.1**	**75 × 2.1**	**100 × 2.1**	**150 × 2.1**	**2.1 mm Cartridges**
[illegible]	On request	[illegible]	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	On request	[illegible]	[illegible]	[illegible]

[illegible] µm ASTRA® all dimensions in mm					AGS Guard System
Phase	**50 × 2.1**	**75 × 2.1**	**100 × 2.1**	**150 × 2.1**	**2.1 mm Cartridges**
[illegible]	On request	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	On request	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	On request	[illegible]	[illegible]
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	[illegible]	[illegible]	On request
[illegible]	On request	On request	On request	[illegible]	On request

[illegible] µm ASTRA® all dimensions in mm				AGS Guard System
Phase	**50 × 3.0**	**100 × 3.0**	**150 × 3.0**	**3.0 mm Cartridges**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	[illegible]	[illegible]
[illegible]	On request	[illegible]	On request	[illegible]
[illegible]	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	[illegible]	On request

[illegible] µm ASTRA® all dimensions in mm					AGS Guard System
Phase	**50 × 4.6**	**100 × 4.6**	**150 × 4.6**	**250 × 4.6**	**4.6 mm Cartridges**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	On request	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	On request	[illegible]	[illegible]	On request	[illegible]
[illegible]	On request	On request	[illegible]	On request	[illegible]
[illegible]	On request	On request	[illegible]	On request	[illegible]
[illegible]	On request	[illegible]	[illegible]	On request	[illegible]
[illegible]	On request	On request	[illegible]	[illegible]	On request

[illegible] µm ASTRA® all dimensions in mm						AGS Guard System
Phase	**30 × 2.1**	**50 × 2.1**	**50 × 3.0**	**100 × 3.0**	**150 × 3.0**	**[illegible] mm Cartridges**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	On request	[illegible]	On request	[illegible]
[illegible]	On request	On request	On request	On request	On request	[illegible]
[illegible]	On request	[illegible]	On request	[illegible]	[illegible]	[illegible]
[illegible]	On request	On request	On request	[illegible]	On request	On request

* [illegible]

ASTRA®

Ordering information

Analytical columns

5 µm ASTRA® all dimensions in mm		ASG Guard System
Phase	**250 × 4.6**	**4.0 mm Cartridges**
[illegible]	On request	[illegible]*
[illegible]	On request	[illegible]*
[illegible]	[illegible]	[illegible]*
[illegible]	[illegible]	[illegible]*
[illegible]	[illegible]	[illegible]*
[illegible]	On request	[illegible]*
[illegible]	On request	[illegible]*
[illegible]	On request	On request
[illegible]	[illegible]	[illegible]*

3 µm ASTRA® all dimensions in mm						ASG Guard System
Phase	**30 × 4.6**	**50 × 4.6**	**100 × 4.6**	**150 × 4.6**	**250 × 4.6**	**4.0 mm Cartridges**
[illegible]	[illegible]	On request	[illegible]	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	On request	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	On request	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	[illegible]	[illegible]	[illegible]	[illegible]*
[illegible]	On request	On request	On request	[illegible]	[illegible]	On request
[illegible]	On request	On request	On request	On request	[illegible]	[illegible]*

* [illegible]

8 µm ASTRA® all dimensions in mm		Guard column
Phase	**[illegible]**	**[illegible]**
Sugar [illegible]	[illegible]	[illegible]
Sugar [illegible]	On request	[illegible]

10 µm ASTRA® all dimensions in mm		Guard column
Phase	**[illegible]**	**[illegible]**
Sugar [illegible]	[illegible]	[illegible]
Sugar [illegible]	[illegible]	[illegible]
Sugar [illegible]	On request	On request
Sugar [illegible]	On request	On request

ASTRA® Sugar guard column

[illegible] µm ASTRA® all dimensions in mm		
Phase	**[illegible]**	**[illegible]**
[illegible]	[illegible]	[illegible]
[illegible]	On request	

ARION®

As ARION® is one of the fastest objects found in space, so it is also the best workhorse for your applications. Explore our new line of ARION® HPLC columns. What innovations does this column bring to you?

- Strict quality control of alkaline and metal content during the silica gel production
- Narrow particle size and pore size distribution
- Unique production process ensuring high lot-to-lot reproducibility
- Good stability at higher temperatures

ARION® Silicagel

Particle size	3 µm	5 µm
Metal content	< 10 ppm	< 10 ppm
Temperature stability	100 °C*	100 °C*
Mean particle diameter	3.1 ± 0.05 µm	5.1 ± 0.1 µm
Proximity to the shape of a sphere	0.96 ± 0.04	0.97 ± 0.03

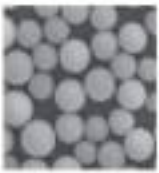
* Depends on mobile phase used and stress during

ARION® phases	Particle size (µm)	Pore size (Å)	Surface area (m²/g)	Carbon load	pH stability	Endcapping	100% aqueous mobile phase	USP code
Plus (18)	1.7, 2.2, 3.5, 5, 7, 10	100	400	18 %	1.5 to 7.5	Multi-step	+	L1
Pearl (C8)*	2.2, 3.5, 5, 10, 15	120	320	11 %	1.5 to 7	Multi-step	✔	L7
C8	3, 5	120	320	11 %	2.0 to 7	Single-step	+	L7
Alphyra	3, 5	100	320	12 %	2.0 to 7.5	Proprietary	✔	L11
Phenyl-Aryl	2.2, 3.5	100	380	12 %	1.5 to 7.5	Single-step	+	L11
DNP	5	100	400	14 %	1.5 to 7.5	Single-step	✔	L60
Aro	2.2, 3.5	120	320	9 %	2.0 to 8.0	Proprietary	+	L8
CN	3, 5, 10	120	320	8 %	2.0 to 7	Single-step	+	L10
HSSC Pro	2.2, 3.5	100	420	–	1.5 to 7	Proprietary	✔	L3
Si	2.2, 3.5, 5, 10	100	420	–	1.5 to 7	–	+	L3
Qbi	5	120	320	–	1.5 to 7.5	–	+	L14
SCX	5	120	320	–	1.5 to 7.5	–	+	L9

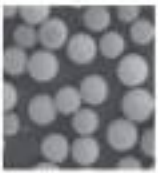
* Unsuitable only for strongly hydrophobic molecules

What does ARION® quality look like?

ARION® particles have a very tight distribution and the closest proximity to the shape of a spherical particle (=0.961 ± 0.035). This ensures high separation power and separation reproducibility.



ARION®



Competitor L

Competitor II

Competitor G

SEM 111 analysis 20.0 kV, www.fexil.30 µm (by independent laboratory)

The ARION® medium does not include broken or "potato-shaped" particles. The silica spherical shape is unique, both surface uniformity and surface smoothness enable better packing into HPLC columns and therefore paramount chromatography resolution and reproducibility.

Up close

The 5-micron electron microscope field clearly shows the highest quality of ARION® Sum particles

ARION® particle 5 µm

Competitor L particle 5 µm

Competitor X particle 5 µm

Competitor S particle 5 µm

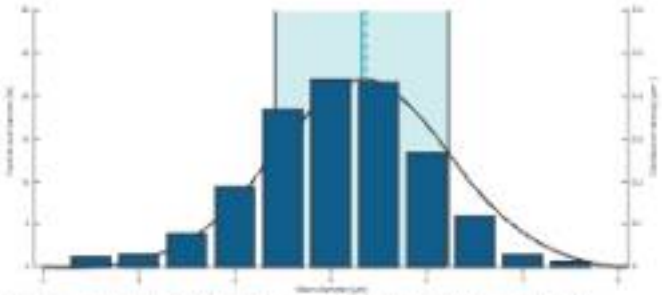
Main particle characteristics:

- The closest proximity to a sphere
- Unique surface smoothness shown in the pictures above
- Tight particle size distribution
- No broken particles
- No presence of sintered particles
- No "Moon craters or mountains"

Particle size distribution

ARION® particle 1.7 µm

ARION® particle 2.2 µm

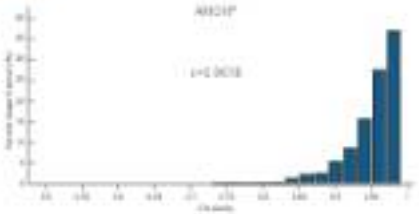


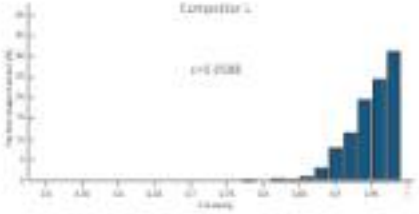
Particle size distribution of ARION® 5 µm particles shown as a light profile calculated from Kernel figures by SEM

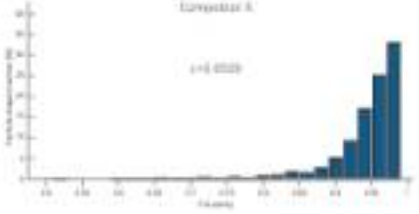
ARION® column hardware

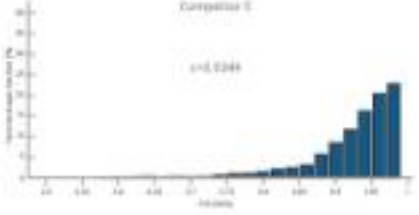
- Modern column hardware for easy handling in a narrow space
- UHPLC grade Stainless Steel with an amazingly smooth internal surface
- Colour coded fittings

Circularity



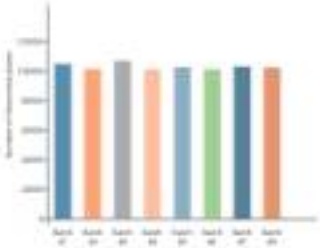




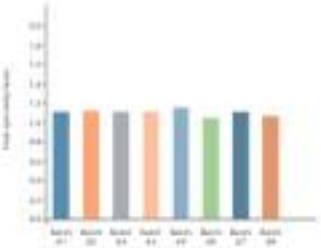


Batch to batch reproducibility

Batch to batch reproducibility is shown in the two bar graphs below. The 8 ea batches are strictly controlled and checked for symmetry and efficiency (number of theoretical plates/meter).



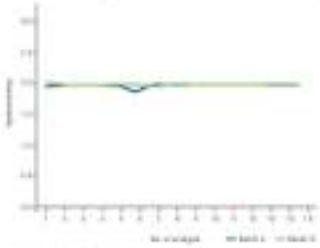
Theoretical plates reproducibility



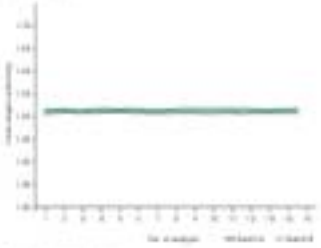
Symmetry reproducibility

Both the silanol activity and hydrofobicity tests are performed e.g. by the Engelhardt test. The hydrofobicity test is based on calculation of the ratio of retention factors $k_{\text{_____}}/k_{\text{_____}}$. The first picture of the Engelhardt test shows a comparison of 2 batches to UHPLC columns for 15 replicates.

Peak shape selectivity is based on a calculation of ratio of $k_{\text{_____}}/k_{\text{_____}}$

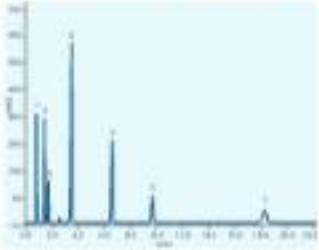


Hydrofobicity test

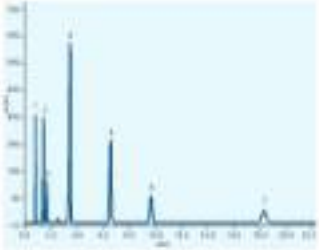


Peak shape selectivity

Batch to batch reproducibility



Batch A

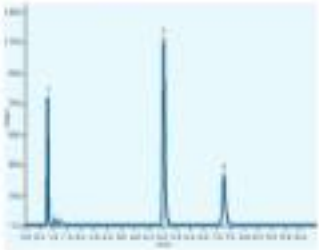


Batch B

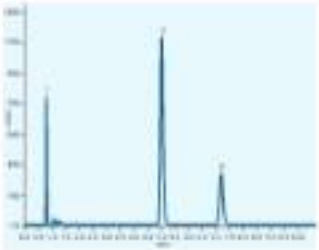
Analysis of two batches based on the Drug Health test

Column	ARION® Pur C18, 3 µm
Dimensions	100 mm × 2.1 mm
Mobile phase	Methanol : water (40:60 v/v) Isocratic elution
Flow rate	0.3 mL/min
Temperature	40 °C

Analytes	1. Uracil (t$_0$) 2. Aniline 3. Phenol 4. N,N-diethylaniline 5. p-Ethylaniline 6. Toluene 7. Ethylbenzene



Batch A



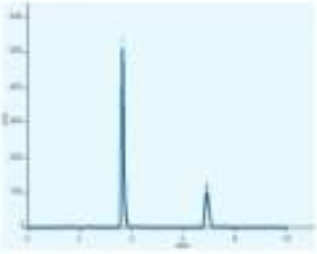
Batch B

Analysis of two batches based on the Shape selectivity test

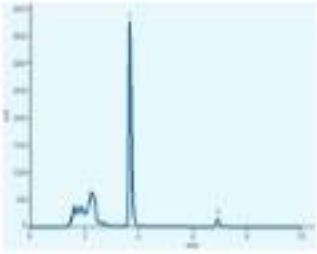
Column	ARION® Pur C18, 3 µm
Dimensions	100 mm × 2.1 mm
Mobile phase	Methanol : water (70:30 v/v) Isocratic elution
Flow rate	0.3 mL/min
Temperature	40 °C
Analytes	1. Uracil (t$_0$) 2. Triphenylene 3. o-Terphenyl

Alcaloids – xanthine derivatives

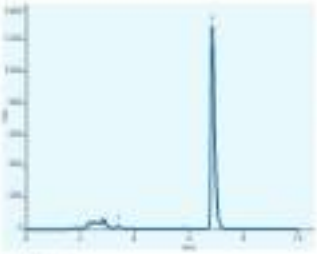
Xanthine alkaloids occur naturally in various plants, such as cocoa, tea and coffee trees. They are commonly used for their effects as mild stimulants. Xanthine alkaloids are mentioned in food and drinks e.g. in chocolate, cocoa powder, and energy drinks.



Theobromine and caffeine standard



Cocoa sample

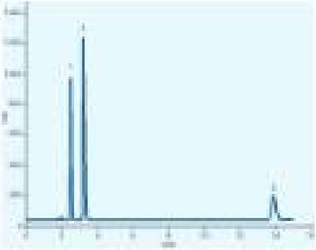


Energy drink

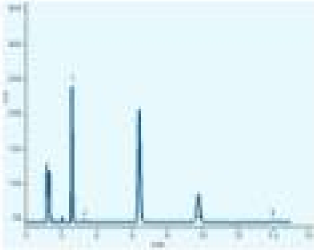
Column	Alltima™ Rapid C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	[illegible]
Mobile phase	Methanol : water (60:40 v/v)
Flow rate	1.0 mL/min
Temperature	30 °C
Detection	UV @ 280 nm
Analytes	1. Theobromine 2. Caffeine

Non-nutritive sweeteners

Low-calorie sweeteners are commonly used worldwide in the food and drink industry. The list of approved sweeteners varies from country to country. The most common method used to monitor these highly consumed products involves high performance liquid chromatography (HPLC or UHPLC).



Standard mixture



Energy drink

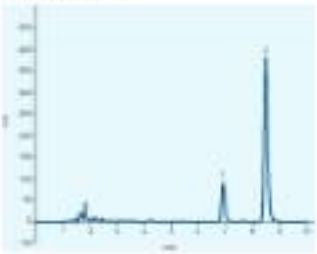
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	1.0 mL/min
Temperature	30 °C
Detection	[illegible]
Analytes	1. Acesulfame-K (ACE-K) 2. Saccharin (SAC) 3. Aspartame (ASP)

Preservatives in syrup

Sodium and potassium salts of benzoic acid and sorbic acid are well known food preservatives. The permitted amount in food is strictly regulated with the level depending on the food group. As an example, European regulation EC 1333/2008 sets the rules on food additives: definitions, conditions of use, labelling and procedures.

Standard mixture

Column	ARION® Plus C18, 3.2 µm
Dimensions	250 mm × 4.6 mm
Part number	AR-C7251-0846
Mobile phase	[illegible]

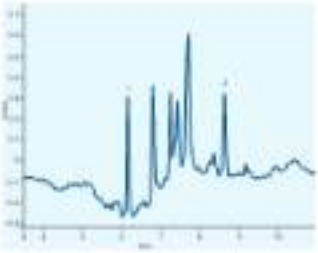


Real syrup sample

Flow rate	1.5 ml/min
Temperature	30 °C
Detection	UV @ 245 nm
Analytes	**1. Sodium benzoate** **2. Potassium sorbate**

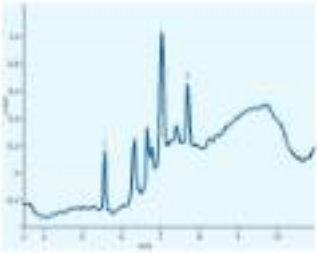
Preservatives in fats and oils

BHA is used as an antioxidant and preservative in food, animal feed, cosmetics and in rubber and petroleum products. BHT is also used as a preservative and, additionally, as a dietary supplement. BHA is generally recognized as being safe for use in food if the total amount does not exceed 0.02 % fat or oil (FDA). It is suspected of being a human carcinogen.



Matrix standard on ARION® column

Column	ARION® Plus C18, 3.2 µm
Dimensions	250 mm × 4.6 mm
Part number	AR-C7251-0846
Mobile phase	[illegible]

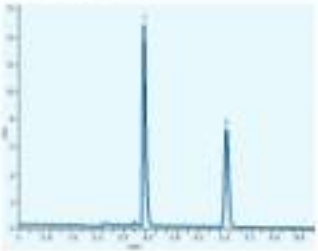


Matrix standard on competitive column (Competitor L)

Flow rate	Proprietary
Temperature	Proprietary
Detection	UV wavelength proprietary
Analytes	**1. BHA** **2. BHT**

Organic acids

The identification and quantitative analysis of major organic acids in fruits and vegetables is considered very important for the food and beverage industry. Organic acids play a significant role thanks to their influence on flavour, stability and keeping quality. Organic acids are generated during the aerobic oxidation of carbohydrates, proteins and fats in most biological systems.

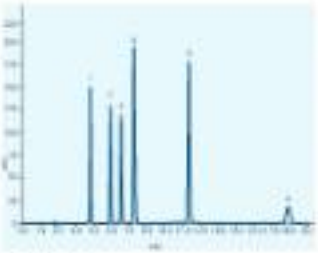


Standard mixture

Column	[illegible]
Dimensions	[illegible]
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	[illegible]
Temperature	[illegible]
Detection	[illegible]
Analytes	1. Formic acid 2. Acetic acid

Drink additives

This application shows the separation of three groups of compounds in parallel: non-nutritive sweeteners, preservatives (organic acids) and xanthine derivatives.



Standard mixture

Column	[illegible]
Dimensions	[illegible]
Part number	[illegible]
Mobile phase	[illegible]
Temperature	[illegible]
Detection	[illegible]
Analytes	1. Acesulfame-K 2. Benzoic acid 3. Saccharin 4. Sorbic acid 5. Caffeine 6. Aspartame

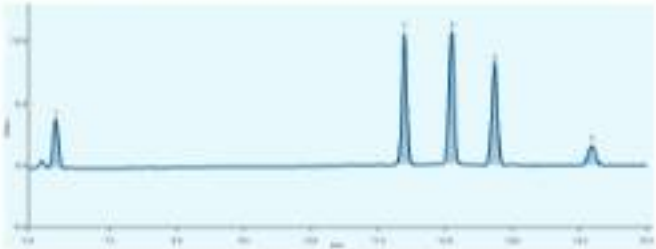
Standard mixture

* Gradient program

Time (min)	Flow rate (mL/min)	Wavelength (nm)	A (%) Water	B (%) [illegible]	C (%) Acetonitrile	D (%) Methanol
0	1.5	220	3	90	2	5
7	1.5	214	3	80	5	12
14	1.5	214	3	80	5	12
15	1.5	214	3	88	2	7
17	1.5	214	3	88	2	7

Vitamins A and E

Fat soluble vitamins are monitored not only in patient's samples, but are also the subject of quality control in various food and dietary supplements.

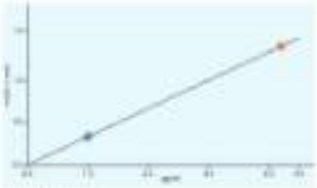


Standard on ARION® column

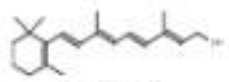
Column	ARION® Plus C18, 3 µm		
Dimensions	100 mm × 4.6 mm		
Part number	AR-1733-468		
Mobile phase	A: Water B: Methanol		
Gradient elution	**Time**	**A (%)**	**B (%)**
	0	15	85
	10	0	100
	18	0	100
Flow rate	1.5 mL/min		
Temperature	40 °C		
Injection volume	5.0 µL		
Detection	UV, 325 nm		
Analytes	1. Retinol (Vitamin A) 2. Delta-tocopherol (δ-Vitamin E) 3. Gamma-tocopherol (Vitamin E γ) 4. Alfa-tocopherol (Vitamin E α) 5. Alpha-Tocopheryl acetate (Vitamin E acetate)		

Vitamins A and E

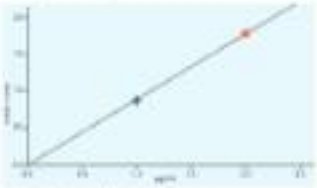
Calibration curves of analytes



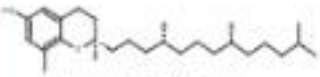
Retinol (Vitamin A)



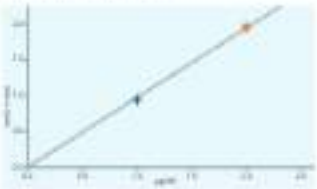
Retinol (Vitamin A)



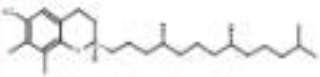
Delta tocopherol (D Vitamin E)



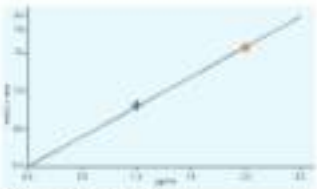
Delta tocopherol (D Vitamin E)



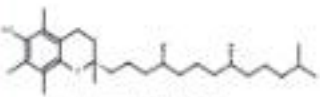
Gamma tocopherol (Vitamin E γ)



Gamma tocopherol (Vitamin E γ)



Alfa tocopherol (Vitamin E α)

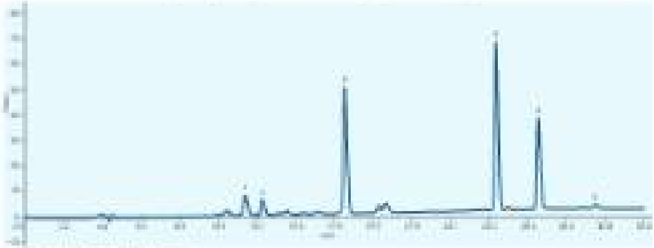


Alfa tocopherol (Vitamin E α)

This application has been developed by WESSLING Hungary Kft.

Wheat pigments

This application has been developed by ALGATECH, the Institute of Microbiology of the Academy of Sciences, Czech Republic. Chlorophylls and carotenoids are essential cofactors for oxygenic photosynthesis. As the content and stoichiometries of individual pigments can vary significantly in plant leaves under different environmental conditions, the quantification of pigments is important for understanding plant physiology, but also for food quality monitoring.

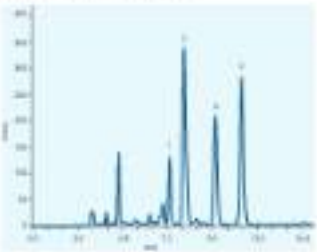


Wheat extract on ARION® column

Column	[illegible] 5 µm
Dimensions	250 mm × 4.6 mm
Part number	[illegible]
Mobile phase	A: Methanol : Acetonitrile : 0.25 M pyridine 50/25/25 (v/v/v) B: Methanol : Acetonitrile : Acetone 20/60/20 (v/v/v)
Gradient	Linear gradient of solvent B (0–100 %) in 25 min followed by 100 % solvent B
Flow rate	0.8 mL/min
Temperature	40 °C
Detection	DAD (440) nm
Analytes	**1. Neoxanthin** **2. Violaxanthin** **3. Lutein** **4. Chlorophyll b** **5. Chlorophyll a** **6. β-Carotene**

Bitter acids in hop

Alpha-bitter acids are precursors of iso-α-bitter acids that are formed during the brewing process. They are present in hops (Humulus Lupulus L.) and their content depends on plant species and growing conditions. Iso-α-bitter acids give an appreciable bitter taste to the beer.

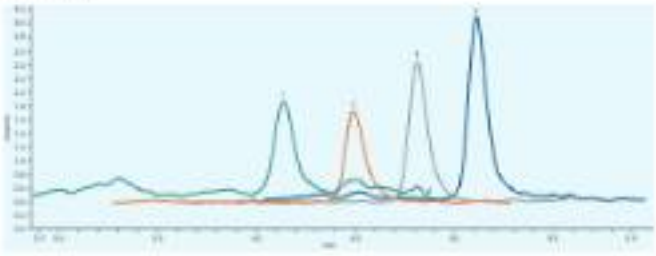


Column	[illegible]
Dimensions	[illegible]
Part number	[illegible]
Mobile phase	[illegible]
Flow rate	[illegible]
Temperature	[illegible]
Detection	[illegible]
Analytes	1. Cohumulone 2. Humulone 3. Colupulone 4. Lupulone

Alpha- & beta- acids in hop sample

Aflatoxins by LC/MS

Aflatoxins are Group 1 carcinogens and are a natural product of mould. Mycotoxins are monitored worldwide and allowed concentration limits depend not only on the territory, but also on the foodstuff matrix and are given by local administrations.

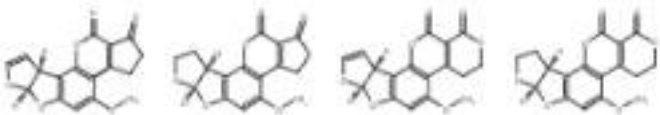


Stress test – test mixture on ARION® column

Column	ARION® Pur C18, 2.2 µm
Dimensions	100 mm × 2.1 mm
Part number	68.4703.827
Mobile phase	A: 5 mM ammonium formate + 0.2% formic acid B: Methanol + 0.2% formic acid
Gradient elution	Time / B (%): 0.0 / 70 0.5 / 70 8.0 / 5 10.5 / 5 10.6 / 70
Flow rate	0.35 mL/min
Temperature	40 °C
Analytes	1. Aflatoxin B1 2. Aflatoxin B2 3. Aflatoxin G1 4. Aflatoxin G2

MS method:

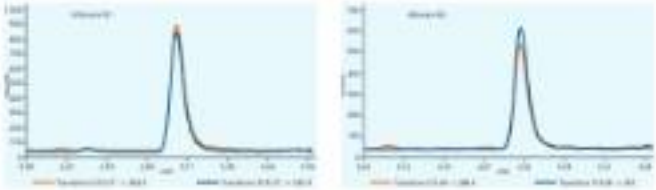
Compound name	Precursor ion	Product ion	Collision energy
Aflatoxin B1	313.07	285.0	22
Aflatoxin B2	315.07	287.0	25
Aflatoxin G1	329.05	243.0	28
Aflatoxin G2	331.06	313.0	22



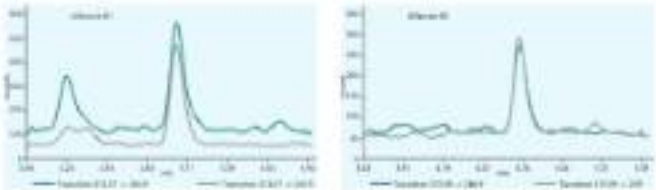
Aflatoxin B1 | Aflatoxin B2 | Aflatoxin G1 | Aflatoxin G2

Aflatoxins by LC/MS

This page shows analyses of peppers and Brazil nuts.



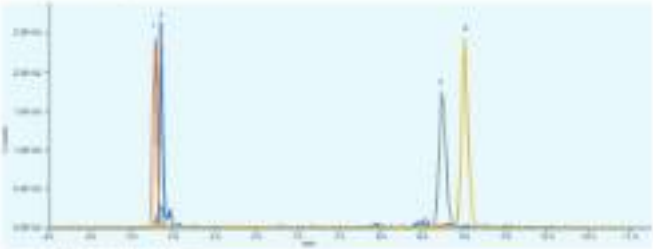
LC/MS analyses of aflatoxins in Brazil nuts



LC/MS analyses of aflatoxins in peppers

Vitamin D in dry blood spot

Vitamin D is a group of steroids that have various effects on the human body and support the immune system. This application shows LC/MS/MS separation of the hydroxylated and non-hydroxylated forms of vitamin D2 and vitamin D3. The amount of their hydroxylated forms determines the total vitamin D in a blood sample. Non-hydroxylated forms of vitamin D2 and vitamin D3 are important for food analysis. The LC/MS/MS chromatogram shows the separation of all the above mentioned analytes.



Standard mixture on ARION® column

Chromatography method:

Column	ARION® Diol C18 2.2 µm		
Dimensions	100 mm × 2.1 mm		
Part number	AR-C22100		
Mobile phase	A: H2O 0.1% formic acid B: MeOH 0.1% formic acid		
Gradient elution	**Time**	**A (%)**	**B (%)**
	0.0	10	90
	2.0	0	100
	7.0	0	100
	7.1	10	90
	12.0	10	90
Flow rate	0.4 ml/min		
Temperature	20 °C		
Injection volume	10 µL		
Detection	LC/MS/MS		
Analytes	1. 25-OH-Vitamin D3 2. 25-OH-Vitamin D2 3. Vitamin D2 4. Vitamin D3		

Vitamin D in dry blood spot

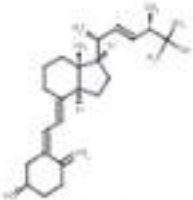
MS method:

Ionization	Positive (ESI)
Collision gas	Nitrogen

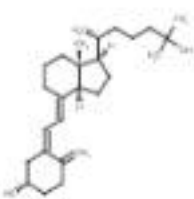
MRM transition	**Analyte**	**Q1 [Da]**	**Q3 [Da]**
	25-OH-Vitamin D2	413.32	355.30
	25-OH-Vitamin D3	401.32	365.40
	Vitamin D2	397.40	379.30
	Vitamin D3	385.32	259.40

Dwell time	100 ms

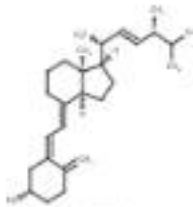
The application was developed by Dr. Thinkes.



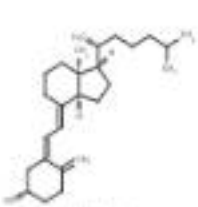
25-OH-Vitamin D2



25-OH-Vitamin D3



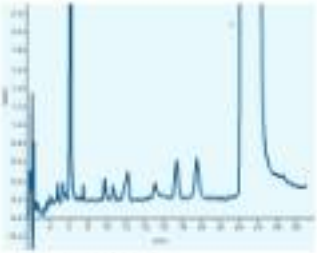
Vitamin D2



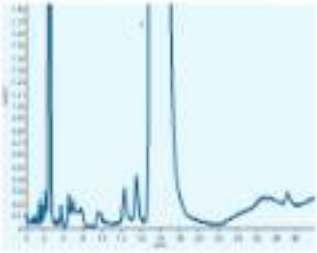
Vitamin D3

Pharmaceutical drugs

Penicillin is a well known antibiotic discovered by Alexander Fleming, which was isolated from the mold Penicillium notatum. The application shows better separation of impurities in pharmaceutical production.



Separation on ARION® column

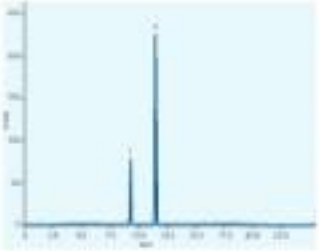


Separation on competitive column (Competitor U)

Column	ARION® Plus C18, 3.0 µm
Dimensions	250 mm × 4.6 mm
Part number	AR-1733-U468
Mobile phase	Solvent mixture (proprietary)
Flow rate	1.2 mL/min
Detection	UV @ 210 nm
Analytes	**1. Penicillin**

Ipidacrine

Ipidacrine is a drug inhibitor of acetylcholinesterase produced for the treatment of memory disorders caused by various diseases. It was first synthesized by the National Research Centre for Biologically Active Compounds (Russian Federation).

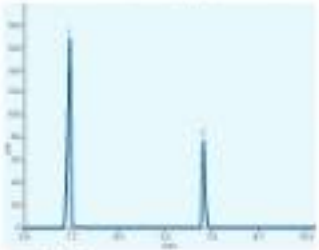


Standard mixture

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5125-4646
Mobile phase	Proprietary
Flow rate	Proprietary
Temperature	Proprietary
Detection	DAD
Analytes	**1. Impurity A** **2. Ipidacrine**

Ibuprofen

Ibuprofen is a substance from a group of non-steroidal anti-inflammatory drugs. In order for the drug release to be targeted on the basis of pH change (gradual release for up to 30 days), binding to a polymeric carrier is used.

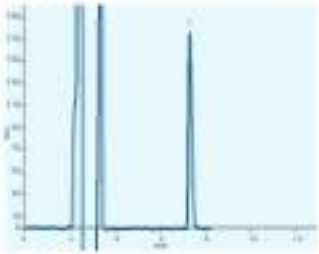


Standard mixture

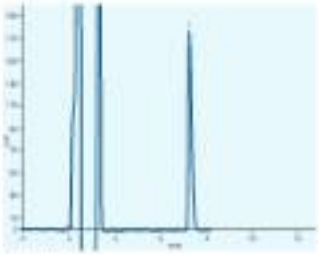
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5125-4646
Mobile phase	ACN : water 50:50 (v/v) + 0.1% formic acid Isocratic elution
Flow rate	1.2 mL/min
Temperature	Ambient
Detection	UV @ 265 nm
Analytes	**1. Ibuprofen as polymer carrier** **2. Ibuprofen**

Pharmaceutical drugs

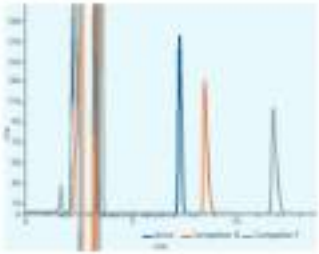
Tamsulosin hydrochloride is used to treat the symptoms of an enlarged prostate. Tamsulosin hydrochloride is an alpha-blocker which is used to treat the symptoms of an enlarged prostate by relaxing the muscles of the prostate and bladder. Tamsulosin is sold under various trade names, e.g. Flomax, Urimax, Cernilin XL, Mesir LP, Prostanil MR, Tamsin and Folusin. Shown below is a chromatogram of the determination of the tamsulosin hydrochloride content according to the proprietary method.



Standard mixture



Drug sample

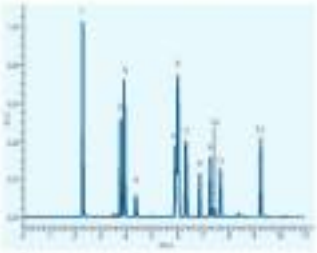


Comparison of fully porous particles

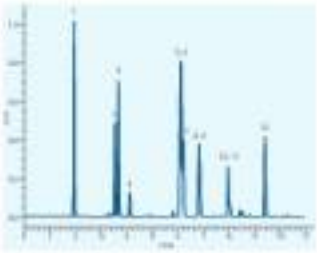
Column:	[illegible]
Dimensions:	[illegible]
Part number:	[illegible]
Mobile phase	[illegible]
Flow rate	[illegible]
Temperature	[illegible]
Detection	[illegible]
Analytes	**1. Tamsulosin hydrochloride**

Fluorinated compounds

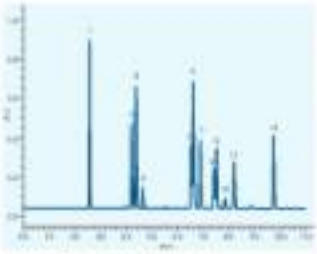
This application shows the ARION® column overcomes a co-elution of two critical pairs of fluoro- and des-fluoro compounds. Separation of these compounds is problematic in general.



Sample on ARION® column



Sample on Competitive hybrid column "B"

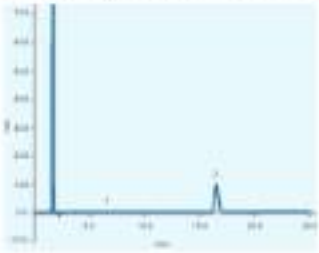


Sample on Competitive hybrid column "C"

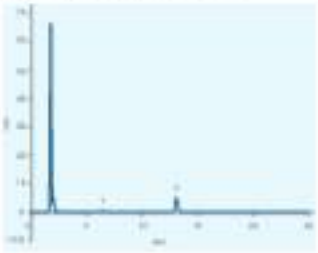
Column	ARION® Pur C18, 20 µm		
Dimensions	150 mm × 4.6 mm		
Part number	A013720-046		
Mobile phase	A: 0.1% formic acid solution (1 mL of formic acid in 1000 mL of MilliQ water) B: ACN		
Gradient station	**Time**	**A (%)**	**B (%)**
	0	60	40
	9	20	80
	10	5	95
	14	5	95
	14.1	60	40
	15.5	60	40
Flow rate	1.0 mL/min		
Temperature	30 °C		
Detection	UV @ 275 nm		
Analytes	5. fluoro-compound 6. fluoro-compound 7. Des-fluoro-compound 8. Des-fluoro-compound All other compounds are confidential.		

Veterinary drugs

Tiamulin hydrogen fumarate is a semisynthetic drug with an antibacterial effect. It is used to treat animal diseases, such as swine dysentery (caused by *Brachyspira hyodysenteriae*), swine pneumonia or mycoplasmal arthritis. Tiamulin is also used for the prevention and treatment of chronic respiratory diseases in domestic chickens and turkeys.

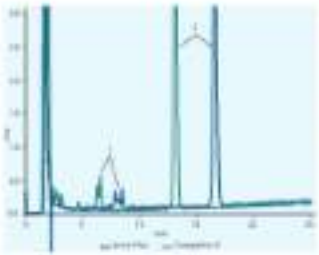


Sample – 2R premix on ARION® column



Sample – 2R premix on competitive column (Competitor 5)

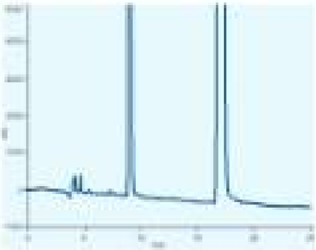
Column	
Dimensions	
Part number	
Mobile phase	
Analytes	1. Impurities 2. Tiamulin hydrogen fumarate



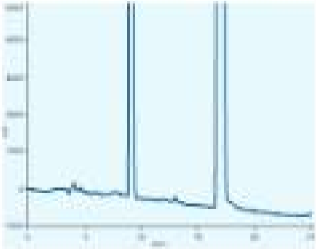
Detailed view on impurities

Veterinary drugs

Trimethoprim and Sulfamethazine are veterinary drugs used to treat animals of various species with gastrointestinal and respiratory tract infections. This drug is used in diseases of various species of animals.



Standard on ARION® column



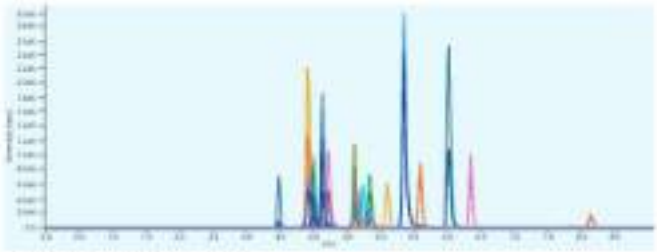
Drug sample

Column	ARION Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	[illegible]
Mobile phase	0.1% TEA : Methanol : ACN 80/10/10 (v/v/v) [illegible]
Flow rate	1.0 mL/min
Temperature	30 °C
Detection	UV @254 nm
Analytes	1. Trimethoprim 2. Sulfamethazine sodium

Opioids and Tramadol and their metabolites by LC/MS

This application shows the LC/MS method for the most common opioids and their metabolites analyzed by toxicological labs.

Substance		
	Codeine CAS Number 76-57-3	**Hydromorphone** CAS Number 466-99-9
	Morphine CAS Number 57-27-2	**Oxymorphone** CAS Number 76-41-5
	6-O-Acetylmorphine **6-Monoacetylmorphine** CAS Number 2784-73-8	**Hydrocodone** CAS Number 125-29-1
	Morphine-3-glucuronide CAS Number 20290-10-2	**Norbuprenorphine** CAS Number 52485-79-7
	Buprenorphine CAS Number 52485-79-7	**Noroxycodone** CAS Number 76-41-5
	Dihydrocodeine CAS Number 125-28-0	**Norfentanyl** CAS Number 1609-66-1
	Fentanyl CAS Number 437-38-7	**Oxycodone** CAS Number 76-42-6
	Acetylfentanyl CAS Number 3258-84-2	**Meperidine, Pethidine** CAS Number 57-42-1
	Naloxone CAS Number 465-65-6	**Tramadol** CAS Number 27203-92-5
	Naltrexone CAS Number 16590-41-3	**Methadone** CAS Number 76-99-3
		EDDP CAS Number 30223-73-5



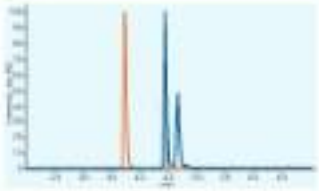
Standard mixture on ARION® column (50 ng/µL)

Opioids and Tramadol and their metabolites by LC/MS

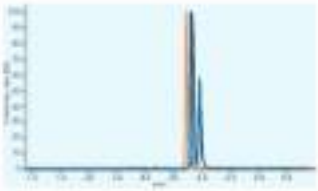
Column	HILIC Plus (3), 3 µm
Dimensions	50 mm × 3.0 mm
Part number	48-1730-030
Mobile phase	A: 1% ammonium formate in water B: Methanol : 1% ammonium formate in ACN (10/90) (v/v)

Gradient elution	**Time**	**A (%)**	**B (%)**
	0	100	0
	1	100	0
	6	70	30
	8	10	90
	8.1	100	0

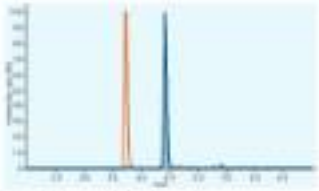
Flow rate	0.5 mL/min
Temperature	30 °C
Detection	MS/MS
Analytes	**See MS/MS method**



Codeine (300.1 → 152.0)



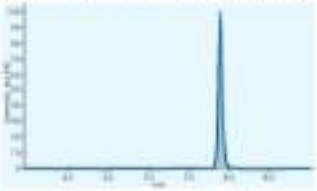
Morphine (286.1 → 152.0)

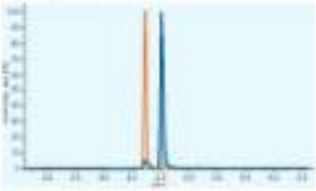


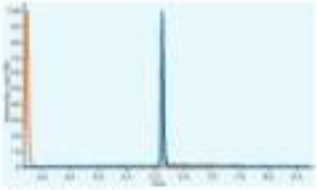
6-O-Acetylmorphine (328.1 → 165.0)

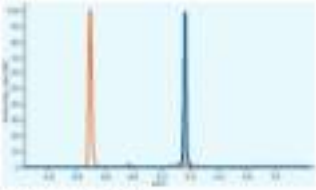
Morphine-6-glucuronide (462.2 → 286.2)

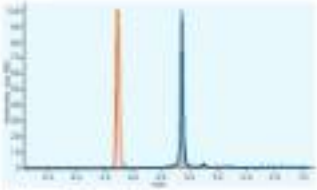
Opioids and Tramadol and their metabolites by LC/MS

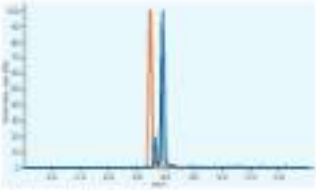


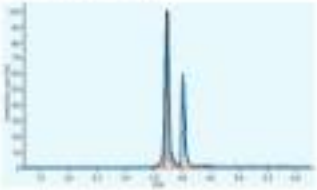


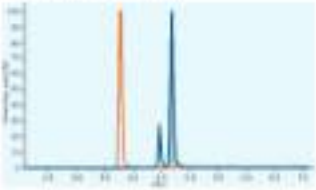




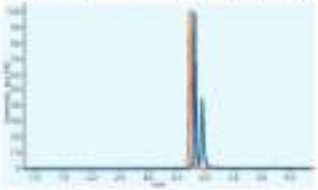


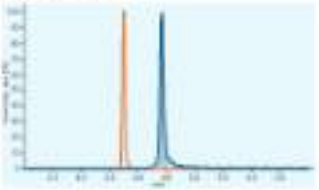


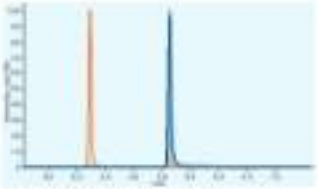


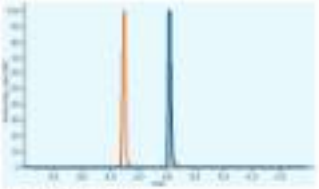


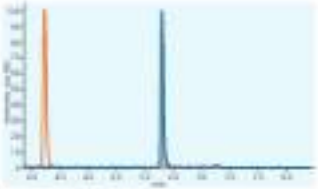
Opioids and Tramadol and their metabolites by LC/MS











Opioids and Tramadol and their metabolites by LC/MS

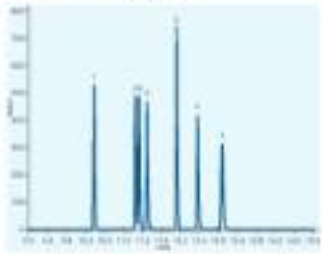
MS/MS method

Compound name	Precursor mass	Fragment mass	Type	Collision energy
Codeine	300.1	152.0	Quantifier	35 eV
	300.1	165.1	Qualifier	35 eV
Morphine	286.1	152.0	Quantifier	35 eV
	286.1	165.1	Qualifier	35 eV
6-O-Acetylmorphine	328.1	152.0	Quantifier	35 eV
	328.1	211.0	Qualifier	35 eV
Morphine-3-glucuronide	462.2	286.2	Qualifier	35 eV
	462.2	201.1	Qualifier	35 eV
Buprenorphine	468.2	84.0	Quantifier	35 eV
	468.2	414.0	Qualifier	35 eV
Dihydrocodeine	302.2	199.2	Quantifier	35 eV
	302.2	171.2	Qualifier	35 eV
Fentanyl	337.2	105.1	Quantifier	35 eV
	337.2	188.2	Qualifier	35 eV
Acetylfentanyl*	323.2	188.1	Quantifier	35 eV
	323.2	105.1	Qualifier	35 eV
Tapentadol	222.1	202.1	Quantifier	35 eV
	222.1	203.1	Qualifier	35 eV
Naltrexone	342.1	285.0	Quantifier	35 eV
	342.1	268.1	Qualifier	35 eV
Hydromorphone	286.1	185.0	Quantifier	35 eV
	286.1	157.0	Qualifier	35 eV
Oxycodone	316.2	241.1	Quantifier	35 eV
	316.2	298.1	Qualifier	35 eV
Hydrocodone	300.1	199.0	Quantifier	35 eV
	300.1	128.0	Qualifier	35 eV
Norbuprenorphine*	414.4	82.0	Quantifier	35 eV
	414.4	84.0	Qualifier	35 eV
Naloxone	328.1	212.0	Quantifier	35 eV
	328.1	310.0	Qualifier	35 eV
Naltrexone*	312.1	84.1	Quantifier	35 eV
	312.1	56.1	Qualifier	35 eV
Oxycodone	316.1	241.1	Quantifier	35 eV
	316.1	256.1	Qualifier	35 eV
Meperidine (Pethidine)	248.1	220.1	Quantifier	35 eV
	248.1	174.0	Qualifier	35 eV
Tramadol	264.1	58.1	Quantifier	35 eV
	264.1	42.1	Qualifier	35 eV
Methadone	310.1	265.0	Quantifier	35 eV
	310.1	105.0	Qualifier	35 eV
EDDP*	278.1	234.1	Quantifier	35 eV
	278.1	186.1	Qualifier	35 eV

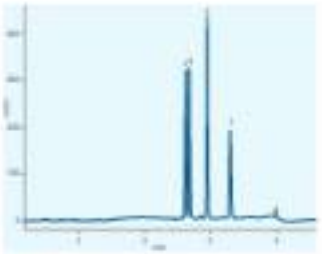
* Not shown in chromatogram
Non-narcotic standard (Naltrexone)

Cannabinoids

Cannabinoids have become more and more popular thanks to their health effects and the decriminalization of their use. Analytical columns that can offer a suitable resolution play an important role. The challenge is to achieve the separation of the critical pair – CBD and CBG.



Standard on ARION® Plus C18, 1.7 µm



Fast method – standard on ARION® Plus C18, 3.0 µm

Columns	ARION® Plus C18, 1.7 µm		
Dimensions	100 mm × 2.1 mm		
Part numbers	SR-1733-B01		
Mobile phase	A: Water B: Acetonitrile		
Gradient elution	**Time**	**A (%)**	**B (%)**
	0	70	30
	1	70	30
	9	50	50
	10	10	90
	13	10	90
	14	70	30
	16	70	30
Flow rate	0.3 mL/min		
Temperature	30 °C		
Detection	DAD (@220 nm		
Analytes	1. CBDV 2. CBG 3. CBD 4. THCV 5. CBN 6. THC 7. CBC		

Columns	ARION® Plus C18, 3.0 µm		
Dimensions	150 mm × 4.6 mm		
Part numbers	SR-1733-A99		
Mobile phase	A: Acetonitrile B: Water with formic acid (0.1%)		
Gradient elution	**Time**	**A (%)**	**B (%)**
	0	35	65
	2.0	35	65
	2.1	100	0
	5.3	100	0
	5.5	35	65
	11.0	35	65
Flow rate	1.0 mL/min		
Temperature	40 °C		
Injection volume	20 µL		
Detection	DAD (@220 nm		
Analytes	2. CBG 3. CBD 5. CBN 7. CBC		

The analytes were performed using Lipomed reference materials.

Ordering information

UHPLC and LC/MS columns

1.7 µm ARION® all dimensions in mm							ARION® Guard Cartridge*
Phase		30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	5 × 2.1
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

1.7 µm ARION® all dimensions in mm						ARION® Guard Cartridge*
Phase		30 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	inquire**

1.7 µm ARION® all dimensions in mm						ARION® Guard Cartridge*
Phase		30 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	5 × 4.6
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	inquire**

2.2 µm ARION® all dimensions in mm							ARION® Guard Cartridge*
Phase		30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	5 × 2.1
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phenyl-Butyl	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NH_2	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HILIC Plus	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Si	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2.2 µm ARION® all dimensions in mm						ARION® Guard Cartridge*
Phase		50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	5 × 2.1
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phenyl-Butyl	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NH_2	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HILIC Plus	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Si	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2.2 µm ARION® all dimensions in mm						ARION® Guard Cartridge*
Phase		50 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	5 × 4.6
Plus C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phenyl-Butyl	■	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NH_2	■	[illegible]	[illegible]	[illegible]	[illegible]	inquire**
HILIC Plus	■	[illegible]	[illegible]	[illegible]	[illegible]	inquire**
Si	■	[illegible]	[illegible]	[illegible]	[illegible]	inquire**

* [illegible]
** [illegible]

ARION®

Ordering information

Analytical columns

2 µm ARION® (all dimensions in mm)							ARION® Guard Cartridge*
Phase		50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	250 × 2.1	5 × 2.1
Plus C18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
C8		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
Biphenyl		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
Phenyl-Hexyl		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
NH_2		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
CN		[illegible]	[illegible]	[illegible]	[illegible]	–	Inquire**
HILIC Plus		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
Si		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]

3 µm ARION® (all dimensions in mm)							ARION® Guard Cartridge*
Phase		50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	250 × 3.0	5 × 3.0
Plus C18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C8		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Biphenyl		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Phenyl-Hexyl		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NH_2		–	–	[illegible]	[illegible]	–	[illegible]
CN		–	–	[illegible]	[illegible]	–	Inquire**
HILIC Plus		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]
Si		[illegible]	[illegible]	[illegible]	[illegible]	–	[illegible]

5 µm ARION® (all dimensions in mm)								ARION® Guard Cartridge*
Phase		50 × 4.6	75 × 4.6	100 × 4.6	125 × 4.6	150 × 4.6	250 × 4.6	5 × 4.6
Plus C18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Polar C18		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
C8		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
Biphenyl		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
Phenyl-Hexyl		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
NH_2		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]
CN		[illegible]	–	[illegible]	–	[illegible]	–	Inquire**
HILIC Plus		[illegible]	[illegible]	[illegible]	–	[illegible]	–	[illegible]
Si		[illegible]	[illegible]	[illegible]	–	[illegible]	[illegible]	[illegible]

* [illegible]
** [illegible]

ARION®

Ordering information

Analytical columns

[illegible] ARION® (all dimensions in mm)	30 × 2.1	50 × 2.1	100 × 2.1	150 × 2.1	ARION® Guard Cartridge* 5 × 2.1
Phase					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	–	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	–	–	[illegible]	[illegible]
[illegible]	–	–	–	[illegible]	Inquire**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] ARION® (all dimensions in mm)	30 × 3.0	50 × 3.0	75 × 3.0	100 × 3.0	ARION® Guard Cartridge* 5 × 4.0
Phase					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	–	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	[illegible]	[illegible]	Inquire**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	–	[illegible]	–
[illegible]	–	[illegible]	–	[illegible]	–

[illegible] ARION® (all dimensions in mm)	[illegible] × 4.6	150 × 4.6	250 × 4.6	ARION® Guard Cartridge* 5 × 4.6
Phase				
[illegible]	[illegible]	[illegible]	–	[illegible]
[illegible]	–	[illegible]	–	[illegible]
[illegible]	–	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	–	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	–	[illegible]	–	[illegible]
[illegible]	–	[illegible]	–	Inquire**
[illegible]	–	[illegible]	–	[illegible]
[illegible]	–	[illegible]	–	[illegible]
[illegible]	–	[illegible]	[illegible]	–
[illegible]	–	[illegible]	[illegible]	–

* [illegible]

** [illegible]

Ordering information

Analytical columns

5 µm ARION® (dimensions in mm)						ARION® Guard Cartridges*
Phase		**125 × 4.6**	**80 × 4.6**	**50 × 4.6**	**75 × 4.6**	**5 × 4.0**
Pha C18		ARI-5125-LAN	ARI-5120-LAN	ARI-5150-LAN	ARI-5175-LAN	AGS-5125-4D4
Polar C18		ARI-5721-LAN	ARI-5721-LAN	ARI-5721-LAN	ARI-5721-LAN	AGS-5721-4D4
C8		ARI-5744-LAN	-	-	-	AGS-5731-4D4
Styrenyl		ARI-5868-LAN	ARI-5868-LAN	ARI-5868-LAN	ARI-5868-LAN	AGS-5731-4D4
Phenyl-Aryl		-	-	-	-	AGS-5731-4D4
SIL		ARI-5874-LAN	ARI-5874-LAN	ARI-5874-LAN	ARI-5874-LAN	AGS-5731-4D4
NH2		-	-	-	-	AGS-5731-4D4
CN		-	-	-	-	inquire**
HILIC Plus		-	ARI-5736-LAN	ARI-5736-LAN	ARI-5736-LAN	AGS-5731-4D4
SI		-	ARI-5730-LAN	ARI-5730-LAN	ARI-5730-LAN	AGS-5731-4D4
SAX		-	-	ARI-5806-LAN	-	inquire
SCX		-	-	ARI-5796-LAN	-	inquire

3 µm ARION® (dimensions in mm)						ARION® Guard Cartridges*
Phase		**100 × 4.6**	**125 × 4.6**	**150 × 4.6**	**250 × 4.6**	**3 × 4.0**
Pha C18		ARI-5730-LAN	ARI-5730-LAN	ARI-5730-LAN	ARI-5730-LAN	AGS-5731-3D4
Polar C18		ARI-5721-LAN	-	ARI-5721-LAN	ARI-5721-LAN	AGS-5731-3D4
C8		ARI-5744-LAN	ARI-5744-LAN	ARI-5744-LAN	ARI-5744-LAN	AGS-5731-3D4
Styrenyl		ARI-5868-LAN	ARI-5868-LAN	ARI-5868-LAN	ARI-5868-LAN	AGS-5731-4D4
Phenyl-Aryl		ARI-5795-LAN	-	ARI-5795-LAN	ARI-5795-LAN	AGS-5731-3D4
SIL		ARI-5874-LAN	ARI-5874-LAN	ARI-5874-LAN	ARI-5874-LAN	AGS-5731-3D4
NH2		ARI-5798-LAN	-	ARI-5798-LAN	ARI-5798-LAN	AGS-5731-3D4
CN		ARI-5797-LAN	-	ARI-5797-LAN	ARI-5797-LAN	inquire**
HILIC Plus		ARI-5736-LAN	-	ARI-5736-LAN	ARI-5736-LAN	AGS-5731-4D4
SI		ARI-5730-LAN	-	ARI-5730-LAN	ARI-5730-LAN	AGS-5731-4D4
SAX		ARI-5806-LAN	-	ARI-5806-LAN	ARI-5806-LAN	inquire
SCX		ARI-5796-LAN	-	ARI-5796-LAN	ARI-5796-LAN	inquire

Note: other dimensions on inquire.

* ARION® Guard Cartridges require ARION® Guard Holder p/n ARI-5731-4D4 (supplied without cartridges).
** The use of polar phase guard cartridges depends on the application. Please contact us.

ARION® column test mixture 1 for RP columns
p/n ARI-MIX-1

4 components in Acetonitrile / Water (70:30), 1 mL ampoule

Uracil	CAS 66-22-8	10 mg/L
Acetophenone	CAS 98-86-2	200 mg/L
Toluene	CAS 108-88-3	1000 mg/L
Naphthalene	CAS 91-20-3	1000 mg/L

ARION® column test mixture 5 for EXCLUSION/HILIC phases
p/n ARI-MIX-5

3 components in Acetonitrile, ampoule

Acetophenone	CAS 98-86-2	500 mg/L
Uracil	CAS 66-22-8	100 mg/L
Cytosine	CAS 71-30-7	200 mg/L

ARION® column test mixture 2
p/n ARI-MIX-2

7 components in Methanol, 1 mL ampoule

Uracil	CAS 66-22-8	200 mg/L
Aniline	CAS 62-53-3	1000 mg/L
Phenol	CAS 108-95-2	2000 mg/L
2,6-Dinitrotoluene	CAS 121-14-2	400 mg/L
4-Ethylaniline	CAS 589-16-2	2000 mg/L
Toluene	CAS 108-88-3	1000 mg/L
Triphenylene	CAS 217-59-4	1000 mg/L

Ordering information

Semi-preparative and preparative columns

Type ARION® all dimensions in mm						ARION Guard Cartridges
Phase	**250 × 10**	**50 × 21.2**	**100 × 21.2**	**150 × 21.2**	**250 × 21.2**	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]**
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	inquire*
Phenyl-Hexyl	-	-	-	-	[illegible]	inquire*
Si	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]**

Preparative columns

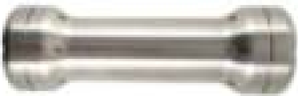
Type ARION® all dimensions in mm					ARION Guard Cartridges
Phase	**[illegible]**	**[illegible]**	**[illegible]**	**[illegible]**	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	inquire*
Phenyl-Hexyl	-	-	[illegible]	[illegible]	inquire*
Si	[illegible]	[illegible]	[illegible]	[illegible]	inquire*

* [illegible]
** [illegible]

Semi-preparative column 250 × 10 mm

Preparative column 250 × 21.2 mm

Preparative column 250 × 30 mm



Preparative column 250 × [illegible] mm

ARION®

Ordering information

Preparative columns

10 µm ARION® all dimensions in mm					ARION® Guard Cartridge
Phase	150 × 4.6	250 × 4.6	150 × 10	250 × 10	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
[illegible]	-	-	-	[illegible]	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridge
Phase	50 × 21.2	100 × 21.2	150 × 21.2	250 × 21.2	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridge
Phase	100 × 30	150 × 30	250 × 30	250 × 50	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*

* [illegible]

Ordering information

Preparative columns

[illegible] µm ARION® all dimensions in (mm)					ARION® Guard Cartridges
Phase	**150 × 4.6**	**250 × 4.6**	**150 × 10**	**250 × 10**	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*

[illegible] µm ARION® all dimensions in (mm)					ARION® Guard Cartridges
Phase	**50 × 21.2**	**100 × 21.2**	**150 × 21.2**	**250 × 21.2**	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*

[illegible] µm ARION® all dimensions in (mm)					ARION® Guard Cartridges
Phase	**50 × 30**	**100 × 30**	**150 × 30**	**250 × 30**	
Plus C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*
Polar C18	[illegible]	[illegible]	[illegible]	[illegible]	Inquire*

[illegible]

* [illegible]

Product support

Not found the information you require? The ARION® website www.arionchromatography.com serves as your support source.

Application database
The ARION® website has a search engine to find an application based on different keywords, e.g. component name, trivial name, formula etc.

Product selection guide
The section catalogue offers you text engine as well as sorting the required HPLC columns based on various parameters (column dimensions, particle size, surface chemistry ...).

Distributor finder
The ARION® website includes a world map with an active finder of your distributor, who will support you with technical and price information.

Certificate download
If you cannot find your column certificate, please contact your local distributor or download the certificate from the **Downloads section**.

ARION® BIO

ARION® BIO columns have been developed for the protein, polypeptide and peptide characterization and purification. They are offered with C18 and C4 stationary phases. ARION® C18-BIO phase is intended to separate weakly hydrophobic oligopeptides and peptides up to 50 kDa. ARION® C4-BIO HPLC columns are designed for highly hydrophobic proteins and polypeptides from 50 to 150 kDa.

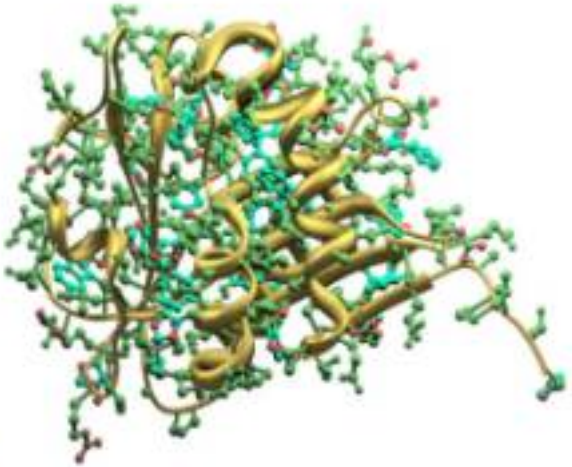
- Biomolecule separation up to 150 kDa
- Pre-columns with corresponding media
- Scale-up to 15 µm

ARION® BIO Silicagel

Particle size	15 µm	5 µm	3 µm
Metal content	<20 ppm	<20 ppm	<20 ppm
Temperature stability	60 °C*	60 °C*	60 °C*
Mean particle diameter	15.0 – 17 µm	5.3 – 5.5 µm	3.5 – 3.7 µm

* Depends on mobile phase used and concentration

ARION® BIO phase	Particle size (µm)	Pore size (Å)	Surface area (m²/g)	Carbon load	pH stability	Endcapping	100% aqueous mobile phase	USP code
C18-BIO	3, 5, 15	300	110	11 %	1.5 to 7.5	Single-end	+	L1
C4-BIO	3, 5	300	110	4.5 %	1.5 to 7.5	Single-end	+	L26
Diol-BIO	5	300	110	n/a	1.5 to 7.5	Single-end	+	L7

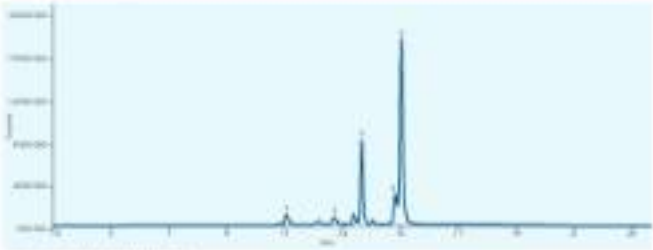


Lactoferrin in bovine milk

Lactoferrin (LF) is a glycoprotein, which is one of the group of transferrins. It is an iron-binding protein with a mass of 80 kDa. Lactoferrin has microbial properties against many microorganisms (bacteria, viruses and fungi, including parasites). It is one of the non-specific components of the immune system and has antitumor and anti-inflammatory properties.

Lactoferrin is widely represented in various animal fluids, mainly milk, saliva and tears. It is separated from bovine milk to produce this key ingredients of infant formulae. Lactoferrin is also used as a food supplement to support the natural immune system, gut microbiome and healthy skin.

Substance	Lactoferrin (LF)
Synonym	Lactotransferrin (LTF)



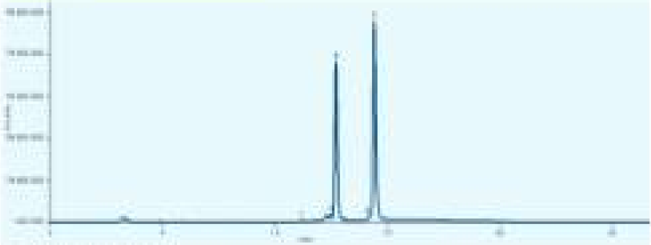
Lactoferrin analysis in bovine milk

Column	ARION® CX-BIO, 5 µm				
Dimensions	250 mm × 4.0 mm				
Part number	48-1840-1484				
Mobile phase	A: 100% acetonitrile (ACN) B: 95 % ACN + 5 % (v/v) 0.1 % TFA C: 5 % ACN + 95 % (v/v) 0.1 % TFA				
Gradient elution	**Retention (min)**	**Flow (mL/min)**	**%A**	**%B**	**%C**
	0.0	0.5	0.0	20.0	80.0
	0.1	0.5	0.0	30.0	70.0
	6.0	0.5	0.0	35.0	65.0
	10.0	0.5	5.0	40.0	55.0
	15.0	0.5	0.0	50.0	50.0
	30.0	0.5	0.0	20.0	80.0
	35.0	0.5	0.0	20.0	80.0
Temperature	30 °C				
Detection	0.3 nl (UV/Vis) nm*				
Injection volume	10 µL				
Analytes	1. Lysozyme 2. Lactoferrin 3. α-Lactalbumin (Lactalbumin) 4. β-LgB (β-Lactoglobulin B) 5. β-LgA (β-Lactoglobulin A)				

* The detection can be at 214 nm or 280 nm

Lactoferrin in goat's milk

Substance	[illegible]
Synonym	[illegible]



Lactoferrin analysis in goat's milk

Column	[illegible]				
Dimensions	[illegible]				
Part number	[illegible]				
Mobile phase	[illegible]				
Gradient elution	Retention (min)	Flow (mL/min)	%A	%B	%C
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Temperature	[illegible]				
Detection	[illegible]				
Injection volume	[illegible]				
Analytes	1. Lysozyme 2. Lactoferrin 3. α-La (α-Lactalbumin) 4. [illegible] 5. [illegible]				

[illegible]

ARION® BIO

Ordering information

Peptides and oligopeptides columns

ARION® BIO C18 all dimensions in mm				ARION® Guard Cartridge¹
Phase	100 × 4.6	150 × 4.6	250 × 4.6	
3 µm	[illegible]	[illegible]	[illegible]	[illegible]
5 µm	[illegible]	[illegible]	[illegible]	[illegible]
10 µm	-	-	[illegible]	-

ARION® BIO C18 all dimensions in mm					ARION® Guard Cartridge¹
Phase	100 × 3.0	150 × 3.0	50 × 2.1	100 × 2.1	
3 µm	-	-	[illegible]	[illegible]	-
5 µm	[illegible]	[illegible]	-	[illegible]	[illegible]

ARION® BIO C8 all dimensions in mm		ARION® Guard Cartridge¹
Phase	150 × 4.6	
3 µm	[illegible]	-

Proteins and polypeptides

ARION® BIO C4 all dimensions in mm					ARION® Guard Cartridge¹
Phase	50 × 4.6	100 × 4.6	150 × 4.6	250 × 4.6	
3 µm	-	-	[illegible]	-	[illegible]
5 µm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ARION® BIO C4 all dimensions in mm				ARION® Guard Cartridge¹
Phase	50 × 2.1	150 × 2.1	250 × 2.1	
5 µm	[illegible]	[illegible]	[illegible]	[illegible]

¹ [illegible]

Semipreparative columns

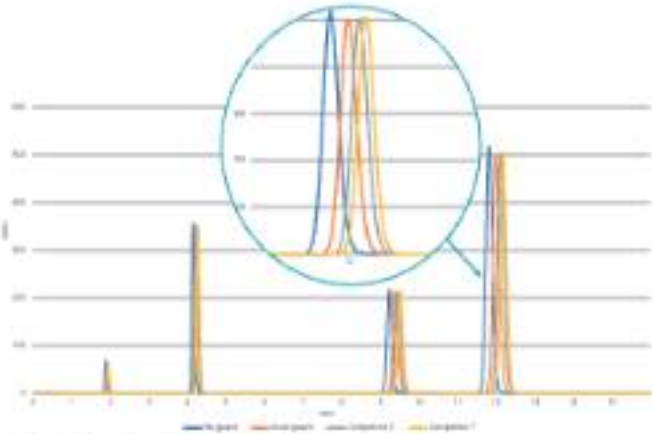
ARION® BIO C4 all dimensions in mm			ARION® Guard Cartridge¹
Phase	150 × 10	250 × 10	-
5 µm	[illegible]	[illegible]	-

Guard column system

The ARION® Guard System (AGS) is a universal guard system, which can be connected to almost any column hardware on the market. It is easy to use and it offers the shortest retention time shift of analytes in comparison with other major manufacturers. The AGS consists of a Guard holder and Guard cartridge, which is offered with various silica materials according to the stationary phase in the HPLC column used.

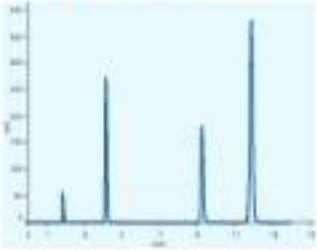
- Universal – fits virtually any column on the market
- The **lowest influence on retention times** compared with other guard systems
- Small size for easier installation in the column oven
- **Any orientation** of the cartridge
- Pressure rating up to **100 bar**
- Higher cartridge capacity

AGS system holder

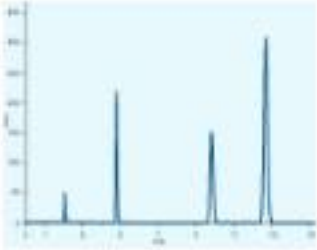


Comparison of guard systems from various manufacturers

Guard column system



ARION® Plus with ARION® Guard System



ARION® Polar with ARION® Guard System

Both chromatograms above show the separation of Uracil, Acetophenone, Toluene and Naphthalene with the ARION® Guard system in Acetonitrile/Water (65:35) at 254 nm. The ARION® Guard system does not affect column performance. It does not show any influence on peak symmetry or column resolution.
A higher sorbent bed (5 × 4 mm ID) offers a **raised capacity** without needing to couple two cartridges together. All this ensures lower running costs.

ARION® Guard exploded view

ARION®

Guard System Selection Guide

Material	Pore size	pH Stability	Column ID 2.1–3.0 (3.0 × 2.1 mm)  Package of 3 pcs	Column ID 3.0–4.6 (5.0 × 4.6 mm)  Package of 3 pcs	100% aqueous mobile phase
RP 1.7 µm	100 Å	1 to 10	AGS-5731-[illegible]	—	–
RP 2.2 µm	100 Å	1 to 10	AGS-5731-[illegible]	—	✓
RP 3.5 µm	100 Å	1 to 10	AGS-5731-[illegible]	AGS-5731-[illegible]	✓
RP 5.0 µm	100 Å	1 to 10	AGS-5731-[illegible]	AGS-5731-[illegible]	✓
HILIC 2.2 µm	100 Å	1.5 to 7	AGS-5731-[illegible]	—	DMW*
HILIC 3.5 µm	100 Å	1.5 to 7	AGS-5731-[illegible]	AGS-5731-[illegible]	DMW*
HILIC 5.0 µm	100 Å	1.5 to 7	AGS-5731-[illegible]	AGS-5731-[illegible]	DMW*
NP 2.2 µm	100 Å	n/a	AGS-5731-[illegible]	—	n/a
NP 3.5 µm	100 Å	n/a	AGS-5731-[illegible]	AGS-5731-[illegible]	n/a
NP 5.0 µm	100 Å	n/a	AGS-5731-[illegible]	AGS-5731-[illegible]	n/a
PAL 2.2 µm	120 Å	2 to 6.5	AGS-5731-[illegible]	—	✓
PAL 3.5 µm	120 Å	2 to 6.5	AGS-5731-[illegible]	AGS-5731-[illegible]	✓
PAL 5.0 µm	120 Å	2 to 6.5	AGS-5731-[illegible]	AGS-5731-[illegible]	✓
BIO RP 3.5 µm	300 Å	1.5 to 7	AGS-5731-[illegible]	AGS-5731-[illegible]	–
BIO RP 5.0 µm	300 Å	1.5 to 7	AGS-5731-[illegible]	AGS-5731-[illegible]	–

* [illegible]

Ferrules for ARION® Guard System

Material	Pressure	10 pcs
PEEK	[illegible] bar*	AGS-5731-[illegible]
Stainless Steel, Type 316	[illegible] bar	AGS-5731-[illegible]

* [illegible]

AGS Holder with PEEK ferrule
p/n AGS-5731-[illegible]

AGS Holder with Stainless Steel ferrule
p/n AGS-5731-[illegible]

Guard system for preparative columns

Preparative guard column system (PGS) is intended to use with 10 mm, 21.2 mm and 30 mm ID preparative HPLC columns.

Preparative Guard System Holders

ID	Description	Part number
10 mm	ARION Preparative 10 mm Guard System, Holder only for ID 10 mm	PGS-SBH-001
21.2 mm	ARION Preparative 10 mm Guard System, Holder only for ID 21.2 mm	PGS-SBH-002
30 mm	ARION Preparative 10 mm Guard System, Holder only for ID 30 mm	PGS-SBH-003

Preparative Guard System cartridges

5 µm AGE all dimensions in mm			
Phase	10 × 10	10 × 21.2	10 × 30
C18	PGS-5810-C18	PGS-5810-C18	PGS-5810-C18
C18 Polar	On request	PGS-5810-AQ5	PGS-5810-AQ5
CN	On request	PGS-5810-CN5	On request
Phenyl-Hexyl	On request	On request	On request
Biphenyl	On request	PGS-5810-LC05	On request
Si	On request	PGS-5810-SI5	PGS-5810-SI5

Preparative Guard System cartridges

10 µm AGE all dimensions in mm			
Phase	10 × 10	10 × 21.2	10 × 30
C18	PGS-5810-C18	PGS-5810-C18	PGS-5810-C18
C18 Polar	PGS-5810-AQ8	PGS-5810-AQ8	PGS-5810-AQ8
CN	On request	On request	On request
Phenyl-Hexyl	PGS-5810-PH8	PGS-5810-PH8	On request
Biphenyl	On request	On request	On request
Si	On request	On request	PGS-5810-SI8

Preparative Guard System cartridges

15 µm AGE all dimensions in mm			
Phase	10 × 10	10 × 21.2	10 × 30
C18	PGS-5810-C18	PGS-5810-C18	On request
C18 Polar	PGS-5810-AQ8	PGS-5810-AQ8	On request
CN	On request	On request	On request
Phenyl-Hexyl	PGS-5810-PH8	PGS-5810-PH8	On request
Biphenyl	On request	On request	On request
Si	On request	On request	On request

PGS holder
p/n PGS-5810-030

Preparative guard system cartridge

CHROMSHELL®

CHROMSHELL® extends the ARIES® phases in the area of core-shell technology (CST: superficially Porous Particles). These columns use an ultra high purity silica of 2.6 µm particles.

- Ultrapure silica with low metal content.
- Maximum pressure 600 bar.
- Temperature stability up to 80 °C.

Base silica	2.6 µm
Temperature stability	80 °C
Core-Particle diameter	2.14 ± 0.15 µm
Porosity to the shape of a sphere	0.35 ± 0.04

CHROMSHELL® phases	Particle size (µm)	Pore size (Å)	Surface area (m²/g)	Carbon load	pH-stability	100% aqueous mobile phase	Endcapping	USP code
C18 Plus	2.6	95	120	9 %	1.5 to 7.5	+	Single-end	L1
C18-XB	2.6	95	120	9 %	2.5 to 8.0	+	Single-end	L1
C18 Polar	2.6	95	120	9.5 %	1.5 to 7.5	✓	Mixed	L1

A C18 phase with a balanced retention profile with the highest hydrophobicity.

pH-Range	1.5 to 7.5
USP Code	L1

A hydrophobic C18 phase with a specific surface treatment for high temperature applications.

pH-Range	2.5 to 8.0
USP Code	L1

A polar end-capped developed for mid-polar and polar retention together with stability in the 100% aqueous mobile phase.

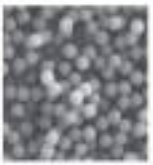
pH-Range	1.5 to 7.5
USP Code	L1

Up close

The 2.6 micron electron microscope field clearly shows the superlative quality of CHROMSHELL® particles

CHROMSHELL®
(100 × 100 µm)

Competitor A
(100 × 100 µm)



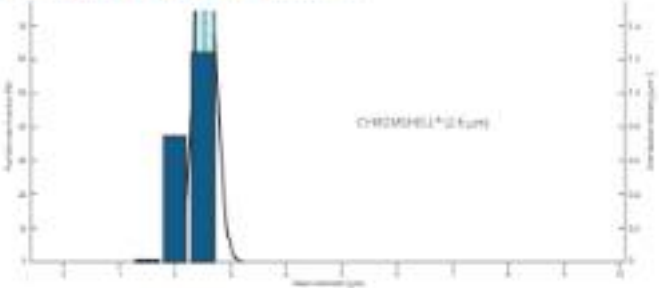
CHROMSHELL®
(30 × 30 µm)

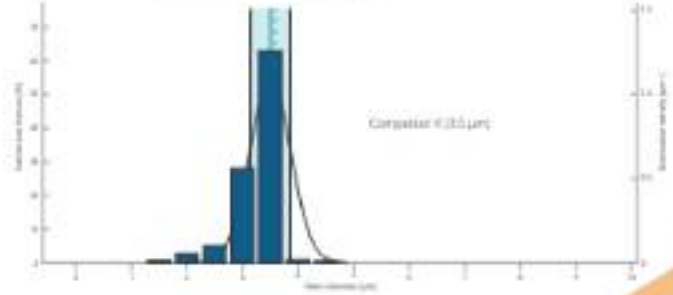
Competitor A
(30 × 30 µm)

The main particle characteristics

- High proximity to a sphere
- Tight particle size distribution
- No fewer particles
- No presence of clustered particles
- Particle uniformity/homogeneity

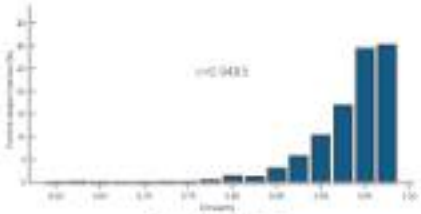
Particle size distribution





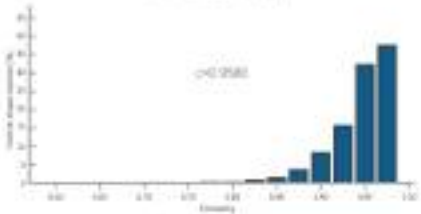
Circularity & surface smoothness

The core-shell particles were subjected to SEM analysis to determine circularity and surface smoothness.



CHROMSHELL® (2.6 µm)

Detail view on particle



Competitor X (2.5 µm)

Detail view on particle up close

Ordering information

2.6 µm CHROMSHELL®
all dimensions in mm

Phase		30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1
C18 Plus		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C18 HB		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C18 Polar		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2.6 µm CHROMSHELL®
all dimensions in mm

Phase		30 × 3.0	50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	250 × 3.0
C18 Plus		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
C18 HB		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
C18 Polar		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-

2.6 µm CHROMSHELL®
all dimensions in mm

Phase		50 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	250 × 4.6
C18 Plus		[illegible]	[illegible]	[illegible]	[illegible]	-
C18 HB		[illegible]	[illegible]	[illegible]	[illegible]	-
C18 Polar		[illegible]	[illegible]	[illegible]	[illegible]	-

Chemicals of emerging concern (CECs) in river water

Chemical pollution causes enormous damage to the aquatic environment. The simultaneous determination of pollutants with different physico-chemical properties, such as pesticides, metabolites, personal care products, plastic related chemicals, is always challenging. The application shows a sensitive LC/MS method for the fast determination of a diverse group of pollutants in river water.

Substance	
	Desisopropylatrazine CAS number 1007-28-9
	Hexazinone CAS number 51235-04-2
	Simazine CAS number 122-34-9
	Atrazine CAS number 1912-24-9
	Terbuthylazine CAS number 5915-41-3
	Terbutryn CAS number 886-50-0
	Prometryn CAS number 7287-19-6
	Metolachlor CAS number 51218-45-2
	Metazachlor CAS number 67129-08-2
	Diuron CAS number 330-54-1
	Isoproturon CAS number 34123-59-6
	Chlortoluron CAS number 15545-48-9
	Desethylterbuthylazine CAS number 30125-63-4
	[illegible]
	Tebuconazole CAS number 107534-96-3
	Propiconazole CAS number 60207-90-1
	Ametryn CAS number 834-12-8
	Epoxiconazole CAS number 133855-98-8
	Cybutryne (Irgarol) CAS number 28159-98-0
	Siduron CAS number 1982-49-6
	Chlorfenvinphos CAS number 470-90-6
	Ethofumesate CAS number 26225-79-6
	Linuron CAS number 330-55-2
	Pendimethalin CAS number 40487-42-1
	Fenthion CAS number 55-38-9
	Dichlorvos CAS number 62-73-7

Substance	
	Quinoxyfen CAS number 124495-18-7
	Thiamethoxam CAS number 153719-23-4
	Imidacloprid CAS number 138261-41-3
	Clothianidin CAS number 210880-92-5
	Fenpropimorph CAS number 67564-91-4
	Carbendazim CAS number 10605-21-7
	Thiacloprid CAS number 111988-49-9
	Spiroxamine CAS number 118134-30-8
	Metamitron CAS number 41394-05-2
	Propazine CAS number 139-40-2
	Thiophanate-methyl CAS number 23564-05-8
	(4-Chloro-2-methylphenoxy)acetic acid (MCPA), CAS number 94-74-6
	Mecoprop (R/S-MCPP), CAS number 93-65-2
	2,4-Dichlorophenoxyacetic acid (2,4-D), CAS number 94-75-7
	4-(4-Chloro-2-methylphenoxy)butanoic acid (MCPB), CAS number 94-81-5
	Dichlorprop (2,4-DP), CAS number 120-36-5
	Bentazone CAS number 25057-89-0
	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T), CAS number 93-76-5
	Perfluorooctanesulfonic acid (PFOS), CAS number 1763-23-1
	Desethylatrazine (Deethylatrazine), CAS number 6190-65-4
	Methiocarb CAS number 2032-65-7

Column	CHROMSHELL C18 Plus 2.7 µm		
Dimensions	50 mm × 2.1 mm		
Part number	[illegible]		
Mobile phase	A: 5 mM ammonium formate in water B: 5 mM ammonium formate in MeOH		
Gradient elution	**Time (min)**	**%A**	**%B**
	0	100	0
	2	100	0
	7	0	100
	9	0	100
	9.1	100	0
	11	100	0
Flow rate	0.350 mL/min		
Temperature	40 °C		
Detection	MS/MS Low Mass		
Injection volume	100 µL		
Analytes	See MS/MS method		

Chemicals of emerging concern (CECs) in river water

Validated parameters	LOD, µg/L	LOQ, µg/L
desethylatrazine	4.5	15.0
hexazinon	2.3	8.7
terbutryn	3.5	11.6
atrazine	2.1	7.1
tetrachlorvinphos	3.8	12.6
terbuthylazine	3.1	11.7
prometryn	3.7	12.3
metolachlor	4.9	16.2
metazachlor	3	9.8
diuron	3.6	12.0
aspartame	4	13.2
chlorotoluron	2.8	9.3
desmethylterbuthylazine	2.3	7.7
acesulfam	4	13.3
isoxaflutole	3.2	10.6
propyzamide	3	10.0
phenytoin	3.5	11.6
spironolactone	2.7	8.9
cybutryne	3.9	13.0
warfarin	4.3	14.3
pirimiphos-ethyl	2	6
tetrachlorvinphos	5.6	18.5
tetrahydrofurfuryl	2.7	8.9
linuron	3.7	11.6
pendimethalin	5.1	16.8
fenitrooxon	2.3	7.6
clofibric acid	6.8	20.7
cyanogen	3	10.1
thiamethoxam	3.3	11
metalaxyl-M	3.3	11
carbamazepine	5.8	19.3
bezafibrate	4.5	15.1
fenazaquin	4.9	16.6
ibuprofen	3.6	12.1
isoproturon	2.5	8.5
propazin	3.5	11.8
Bisphenol A	5.2	17.4
4-chloro-2-methylphenoxyacetic acid	5.1	16.8
fenpropimorph	4	20.1
2,4-dichlorophenoxyacetic acid	5.8	19.3
4-(4-chloro-2-methylphenoxy)butanoic acid	6	20.1
diclofenac	6	20
bentazone	2	6.8
2,4,5-trichlorophenoxyacetic acid	3.9	13.2
methiocarb	4.9	16.4
perfluorooctanesulfonic acid	5.2	18.1

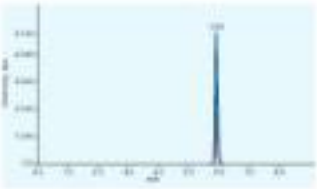
* The LOD values are calculated from real chromatograms of river water samples and not from standards.

Chemicals of emerging concern (CECs) in river water

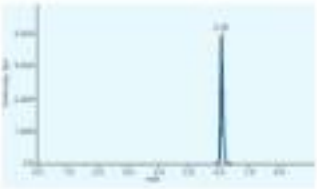
Internal standard are used:

Bentazone D5 RT: 4.22
Isoproturon D6 RT: 6.35
Simazine D10 RT: 5.84

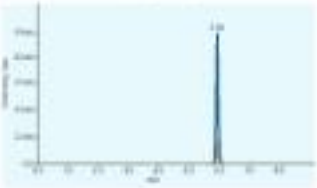
(+) Qualifier 244.9 > 152.3 (-18.0 V), Quantifier 244.9 > 181.0 (-18.0 V)
(+) Qualifier 213.3 > 78.2 (27.0 V), Quantifier 213.3 > 52.2 (51.0 V)
(+) Qualifier 212.1 > 137.1 (25.0 V), Quantifier 212.1 > 194.0 (25.0 V)



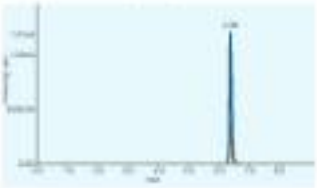
Mecoprop RT: 5.01
(-) Qualifier 213.0 > 141.0 (-18.0 V),
Quantifier 215.0 > 143.0 (-18.0 V)



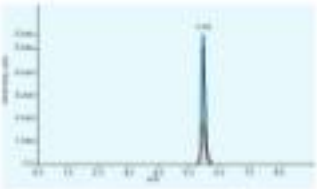
2,4,5-Trichlorophenoxyacetic acid RT: 5.07
(-) Qualifier 252.7 > 194.9 (-16.0 V),
Quantifier 254.7 > 196.8 (-16.0 V)



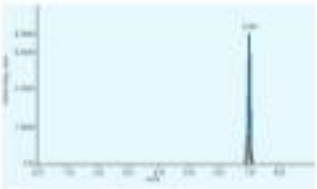
Diclofenac RT: 5.82
(-) Qualifier 293.0 > 250.0 (-18.0 V),
Quantifier 293.0 > 249.8 (-52.6 V)



4-(4-Chloro-2-methylphenoxy)butanoic acid RT: 6.1
(-) Qualifier 227.1 > 141.0 (-12.0 V),
Quantifier 229.0 > 143.0 (-12.0 V)

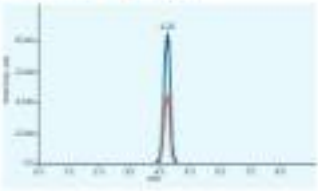


(4-Chloro-2-methylphenoxy)acetic acid RT: 5.48
(-) Qualifier 199.0 > 141.0 (-20.0 V),
Quantifier 201.0 > 143.0 (-20.0 V)

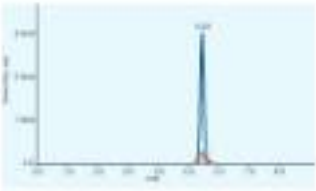


Perfluorooctanesulfonic acid RT: 7.11
(-) Qualifier 498.8 > 79.8 (-118.0 V),
Quantifier 498.8 > 98.8 (-98.0 V)

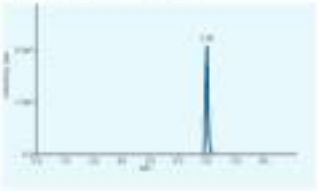
Chemicals of emerging concern (CECs) in river water



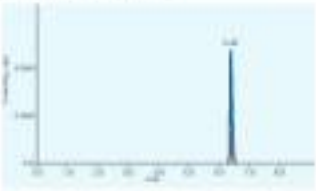
Bentazone RT: 4.22
(+) Qualifier 239.0 > 132.0 [30.0 V],
Quantifier 239.0 > 197.1 [30.0 V]



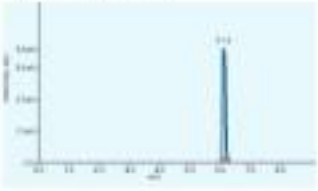
2,4-Dichlorophenoxyacetic acid RT: 5.44
(-) Qualifier 219.0 > 161.0 [-18.0 V],
Quantifier 219.0 > 125.0 [-35.0 V]



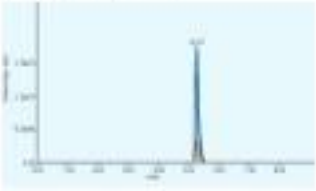
Simazine RT: 5.0
(+) Qualifier 202.1 > 132.1 [33.0 V],
Quantifier 202.1 > 104.3 [33.0 V]



Isoproturon RT: 6.30
(+) Qualifier 207.2 > 72.1 [29.0 V],
Quantifier 207.2 > 46.1 [31.0 V]

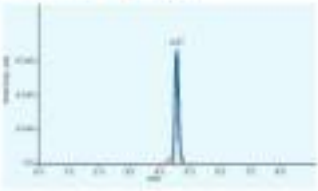


Desethylterbuthylazine RT: 6.1
(+) Qualifier 202.1 > 146.0 [33.0 V],
Quantifier 202.1 > 79.0 [50.0 V]

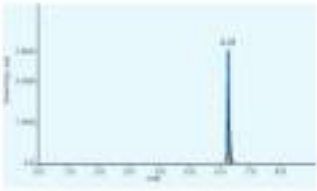


Carbendazim RT: 5.16
(+) Qualifier 192.2 > 160.2 [27.0 V],
Quantifier 192.2 > 132.1 [41.0 V]

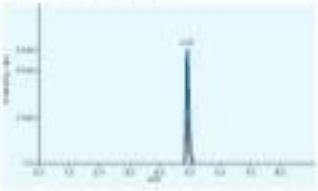
Chemicals of emerging concern (CECs) in river water



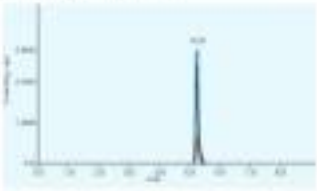
Desisopropylatrazine RT: 4.08
(+) Qualifier 174.1 > 104.1 (31.0 V)
Quantifier 174.1 > 96.1 (27.0 V)



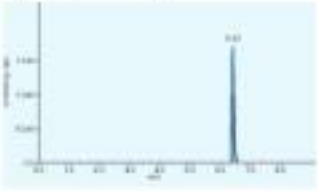
Chromolaene RT: 6.21
(+) Qualifier 213.1 > 122.2 (31.0 V)
Quantifier 213.1 > 44.2 (21.0 V)



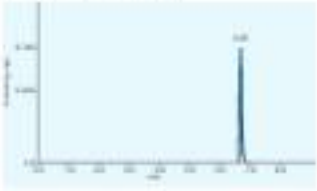
Metamitron RT: 4.8
(+) Qualifier 203.2 > 175.1 (33.0 V)
Quantifier 203.2 > 104.1 (33.0 V)



Desethylatrazine RT: 5.1
(+) Qualifier 188.1 > 146.2 (21.0 V)
Quantifier 188.1 > 104.1 (33.0 V)

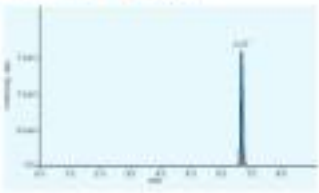


Diuron RT: 6.36
(+) Qualifier 233.1 > 72.0 (31.0 V)
Quantifier 205.1 > 72.1 (37.0 V)

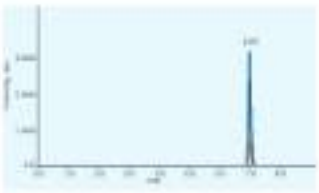


Propazin RT: 6.33
(+) Qualifier 230.1 > 188.0 (25.0 V)
Quantifier 230.1 > 146.0 (33.0 V)

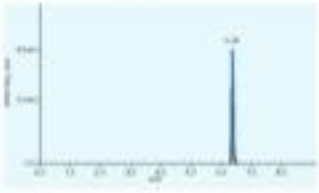
Chemicals of emerging concern (CECs) in river water



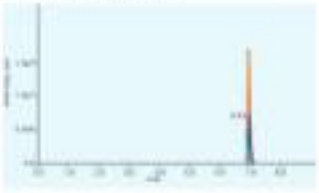
Ametryn RT: 6.03
(+) Qualifier 228.2 > 186.2 (23.0 V)
Quantifier 228.2 > 96.1 (39.0 V)



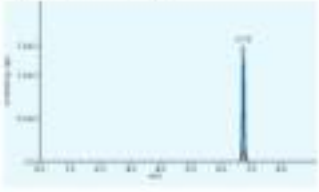
Atenolol RT: 3.23
(+) Qualifier 224.1 > 148.1 (27.0 V)
Quantifier 270.3 > 224.3 (27.0 V)



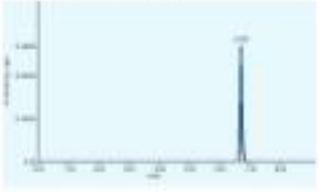
Atrazine RT: 6.31
(+) Qualifier 216.1 > 174.0 (23.0 V)
Quantifier 216.1 > 104.1 (35.0 V)



Fluoxetyn RT: 6.6
(+) Qualifier 262.2 > 203.1 (19.0 V)
Quantifier 262.2 > 148.1 (35.0 V)

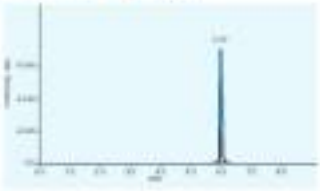


Terbutylazine RT: 6.1
(+) Qualifier 230.1 > 174.1 (23.0 V)
Quantifier 230.1 > 104.1 (41.0 V)

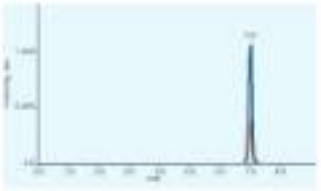


Warfarin RT: 6.63
(+) Qualifier 225.1 > 159.2 (18.0 V)
Quantifier 225.1 > 121.1 (29.0 V)

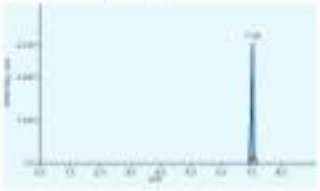
Chemicals of emerging concern (CECs) in river water



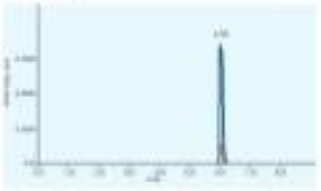
Diclofenac RT: 5.88
(+) Qualifier 220.9 > 180.1 (15.0 V)
Quantifier 220.9 > 127.2 (23.0 V)



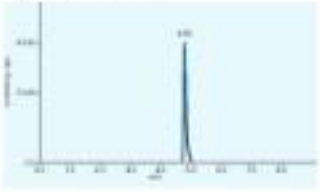
Alachlor RT: 7.10
(+) Qualifier 270.1 > 238.2 (17.0 V)
Quantifier 270.1 > 162.2 (28.0 V)



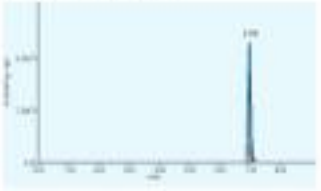
Cyhalothrin RT: 5.98
(+) Qualifier 254.2 > 196.2 (15.0 V)
Quantifier 254.2 > 83.2 (39.0 V)



Hexazinone RT: 5.84
(+) Qualifier 253.2 > 171.2 (27.0 V)
Quantifier 253.2 > 85.1 (34.0 V)

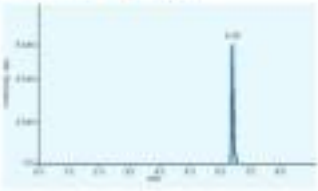


Clothianidin RT: 4.17
(+) Qualifier 250.0 > 169.1 (17.0 V)
Quantifier 250.0 > 132.0 (21.0 V)

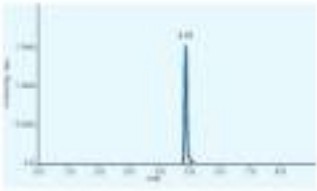


Terbutryn RT: 6.01
(+) Qualifier 242.2 > 186.1 (28.0 V)
Quantifier 242.2 > 68.1 (57.0 V)

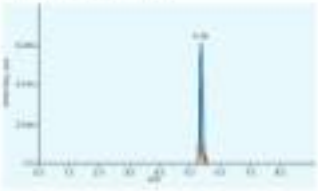
Chemicals of emerging concern (CECs) in river water



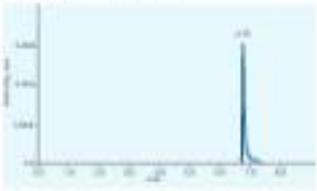
Metolachlor RT: 6.35
(+) Qualifier 278.2 > 134.2 (21.0 V)
Quantifier 278.2 > 210.2 (17.0 V)



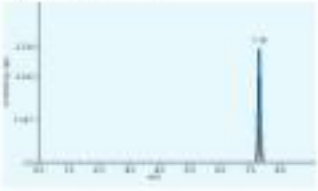
Imidacloprid RT: 4.62
(+) Qualifier 256.2 > 209.0 (25.0 V)
Quantifier 256.2 > 175.2 (25.0 V)



Diuron RT: 5.23
(+) Qualifier 233.1 > 126.1 (33.0 V)
Quantifier 233.1 > 99.1 (57.0 V)



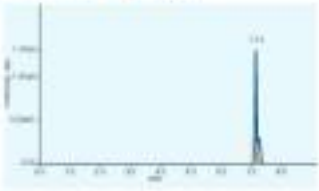
Linuron RT: 6.6
(+) Qualifier 248.1 > 160.0 (25.0 V)
Quantifier 248.1 > 182.1 (21.0 V)

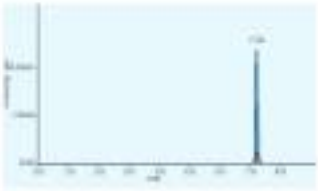


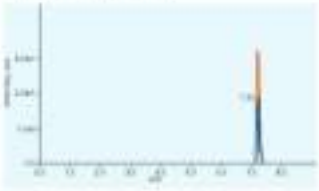
Spiroxamine RT: 7.1
(+) Qualifier 298.4 > 144.2 (21.0 V)
Quantifier 298.4 > 100.2 (43.0 V)

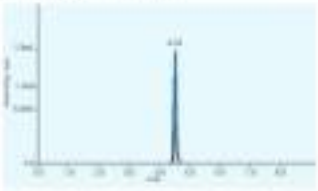
Fenpropimorph RT: 7.93
(+) Qualifier 304.0 > 147.0 (30.0 V)
Quantifier 304.0 > 117.0 (71.0 V)

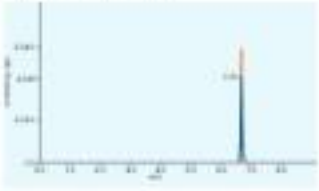
Chemicals of emerging concern (CECs) in river water

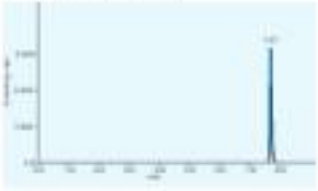




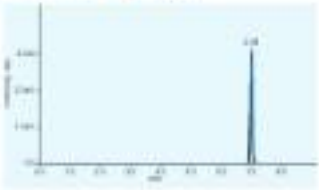




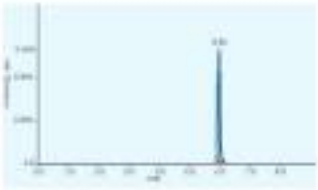




Chemicals of emerging concern (CECs) in river water

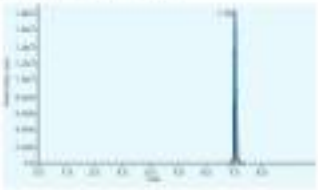


Spironolactone RT: 8.9
(+) Qualifier 330.0 > 121.0 [27.0 V]
Quantifier 330.0 > 191.1 [55.0 V]

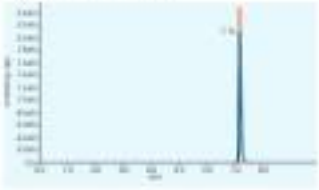


Fluoxetine methyl RT: 5.84
(+) Qualifier 344.0 > 151.0 [25.0 V]
Quantifier 344.0 > 192.0 [21.0 V]

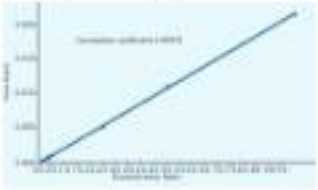
Fexofenadine RT: 7.55
(+) Qualifier 502.2 > 212.1 [15.0 V]
Quantifier 502.2 > 194.2 [21.0 V]



Metoclopramide RT: 3.0
(+) Qualifier 284.2 > 252.2 [21.0 V]
Quantifier 284.2 > 170.2 [33.0 V]



Fenofibrate RT: 7.1
(+) Qualifier 378.0 > 149.0 [33.0 V]
Quantifier 378.0 > 233.0 [16.0 V]

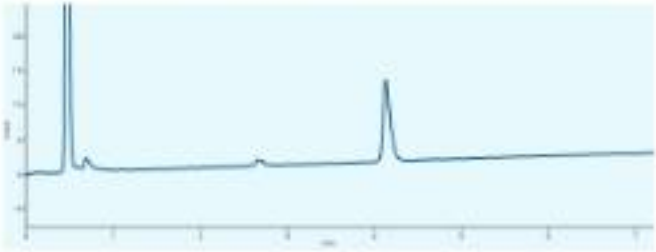


Example of calibration curve for 4-(4-Chloro-2-methylphenoxy)butanoic acid (MCPB)

Author of this application: Chiltern River Basin, United Kingdom

Tween 80

Tween 80 is used to stabilize aqueous solutions with drugs and also as an emulgator in the pharma industry. It is also used as an additive in vaccine production. Currently it is added to Covid19 vaccines.



Analysis of hydrolyzed PS-80 on CHROMSHELL® C18-AB

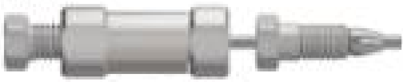
Column	[illegible]
Dimensions	[illegible]
Part number	[illegible]
Mobile phase	Proprietary
Temperature	Proprietary
Injection volume	[illegible]
Detection	[illegible]
Analytes	**1. Tween 80**

Column protection

CHROMSHELL® UHPLC columns can be protected by means of a guard system or by using an appropriate guard column filter (in-line filter).
The ARION® Guard System (AGS) is ideal for the protection of CHROMSHELL® UHPLC columns. We recommend it as an easy and less expensive solution in comparison with high pressure guard systems. The AGS can be used with pressures up to **800 bar**. More details about this guard system are on page 50.
Protection can be perfectly ensured by installing a pre-column filter holder with a 0.2 µm or 0.5 µm frit. This in-line filter can withstand pressures of up to 1375 bar and is easy to use. The filter holder consists of a two-piece body and replaceable filter – a metal frit.

Main features and benefits:

- Minimized dead volume
- Easy installation and use
- Pressure rating up to **1375 bar**
- Works with 1/16-inch column connections from all manufacturers
- Spare frits with various porosities



FGS in-line filter

In-line filter selection guide

The FGS in-line filter made from 316 stainless steel is designed to reduce the number of connections compared with standard pre-column filters.
The in-line filter guarantees a very small dead volume thanks to the small bore size (0.15 mm in the body and nut). The total length is 46.5 mm.

Replacement frits

FGS in-line filter holder

Description	Amount	Internal volume	Part number
FGS in-line filter holder for 0.2 µm frit (including one spare frit)	1 pc	[illegible]	[illegible]
FGS in-line filter holder for 0.5 µm frit (including one spare frit)	1 pc	[illegible]	[illegible]

Replacement frits

Description	Amount	Frit volume	Frit OD	Part number
FGS stainless steel frit for in-line filter 0.2 µm, OD 1.85 mm	[illegible]	[illegible]	[illegible]	[illegible]
FGS stainless steel frit for in-line filter 0.5 µm, OD 1.85 mm	[illegible]	[illegible]	[illegible]	[illegible]

Note: [illegible]

Exploded view

LION™

LION™ GC columns have arrived to offer you a broad range of stationary phases and flexibility in capillary dimensions. What benefits do these GC capillary columns bring you?

- Strict quality control, each column individually tested
- Column box includes column test mixture and scoring wafer
- High flexibility in column dimensions and film thickness
- Customer specific columns on request
- 5" and 3.5" cages available

LION™ stationary phases

Phase name	Stationary phase composition	Max. temp. *
[illegible]	100% Dimethyl polysiloxane	[illegible]
[illegible]	5% Phenyl 95% methyl polysiloxane	[illegible]
[illegible]	20% Phenyl 80% methyl polysiloxane	[illegible]
[illegible]	35% Phenyl 65% methyl polysiloxane	[illegible]
[illegible]	50% Phenyl 50% methyl polysiloxane	[illegible]
[illegible]	Trifluoropropyl methyl polysiloxane	[illegible]
[illegible]	6% Cyanopropyl phenyl 94% methyl polysiloxane	[illegible]
[illegible]	6% Cyanopropyl phenyl 94% methyl polysiloxane	[illegible]
[illegible]	14% Cyanopropyl phenyl 86% methyl polysiloxane	[illegible]
[illegible]	50% Cyanopropyl 25% phenyl 25% methyl polysiloxane	[illegible]
[illegible]	Polyethylene glycol (PEG)	[illegible]
[illegible]	Polyethylene glycol (PEG) [illegible]	[illegible]
[illegible]	Acid modified polyethylene glycol (PEG)	[illegible]
[illegible]	Base modified polyethylene glycol (PEG)	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	100% Cyanopropyl polysiloxane	[illegible]
[illegible]	100% Dimethyl polysiloxane - low bleeding	[illegible]
[illegible]	5% Phenyl 95% methyl polysiloxane - low bleeding	[illegible]
[illegible]	Diphenylene methyl polysiloxane - extra low bleeding [illegible]	[illegible]
[illegible]	Diphenylene methyl polysiloxane - extra low bleeding	[illegible]
[illegible]	Proprietary phase for [illegible] - low bleeding	[illegible]
[illegible]	35% Phenyl 65% methyl polysiloxane - low bleeding	[illegible]
[illegible]	50% Phenyl 50% methyl polysiloxane - low bleeding	[illegible]
[illegible]	6% Cyanopropyl phenyl 94% methyl polysiloxane - low bleeding	[illegible]
[illegible]	6% Cyanopropyl phenyl 94% methyl polysiloxane - low bleeding	[illegible]
[illegible]	14% Cyanopropyl phenyl 86% methyl polysiloxane - low bleeding	[illegible]
[illegible]	25% Cyanopropyl 25% phenyl 50% methyl polysiloxane - low bleeding	[illegible]
[illegible]	Polyethylene glycol (PEG) - low bleeding	[illegible]
[illegible]	100% Dimethyl polysiloxane - high temperature	[illegible]
[illegible]	5% Phenyl 95% methyl polysiloxane - high temperature	[illegible]
[illegible]	[illegible] high temperature phase	[illegible]
[illegible]	35% Phenyl 65% methyl polysiloxane - high temperature	[illegible]
[illegible]	50% Phenyl 50% methyl polysiloxane - high temperature	[illegible]
[illegible]	[illegible] - high temperature	[illegible]
[illegible]	14% Cyanopropyl phenyl 86% methyl polysiloxane - high temperature	[illegible]
[illegible]	Polyethylene glycol (PEG) - high temperature	[illegible]
[illegible]	[illegible] polysiloxane - high temperature	[illegible]

Cross reference guide

Standard GC phases

LION®	Agilent / Varian	Macherey-Nagel	Phenomenex	Restek	SGE	Supelco	UPS Method Classification
LM1	DB-1, HP-1, CP-Sil 5 CB	OPTIMA-1	ZB-1	Rtx-1	BP-1	SPB-1, Equity-1	G1, G2, G9, G38
LM5	DB-5, HP-5, CP-Sil 8 CB	OPTIMA-5	ZB-5	Rtx-5	BP-5	SPB-5, Equity-5	G27, G36, G41
LM15	CP-Sil 13 CB	–	–	–	–	–	–
LM20	–	–	–	Rtx-20	–	SPB-20	G38, G39
LM35	DB-35, HP-35	–	ZB-35	Rtx-35	–	SPB-35, SPB-608	G38, G39, G43
LM17	DB-17, HP-17, DB-608, CP-Sil 24 CB	OPTIMA-17	ZB-50	Rtx-17	BPX-50	SPB-50	G9, G17
LM200	DB-200, DB-210, HP-200 ms	OPTIMA-210	–	Rtx-200	–	–	G9
LM624	DB-624, HP-624, VF-624ms	OPTIMA 1301, OPTIMA 624	ZB-624	Rtx-1301, Rtx-624	BP-624	SPB-624, Volatile	G43
LM1301	DB-624, HP-624, VF-624ms	OPTIMA 1301, OPTIMA 624	ZB-624	Rtx-1301, Rtx-624	BP-624	SPB-624, Volatile	G43
LM1701	DB-1701, HP-1701, 1701 (DB/HP), CP-Sil 19 CB	OPTIMA 1701	ZB-1701	Rtx-1701	BP-10	SPB-1701, Equity-1701	G46
LM225	DB-225, HP-225	OPTIMA 225	–	Rtx-225	BP-225	SPB-225	G7, G19, G20
LM-WAX	DB-Wax, HP-Wax, CP-Wax 52 CB	OPTIMA WAX	ZB-WAX	Rtx-Wax	BP-20	–	G14, G15, G16
LM-WAX Plus	ZB-WAX plus	–	ZB-WAXplus	Stabilwax	–	–	G14, G15, G16
LM-FFAP	DB-FFAP	–	ZB-FFAP	Stabilwax-DA	BP-21	Nukol	G14, G15, G16, G25, G35, G36
LM-WAX IN	CAM, CP-BenchWax	–	–	Stabilwax-DB	–	–	–
LM-20	DB-23, VF-23ms	–	–	Rtx-2330	BPX-70	BP-2330, SP2330, 2331/31	G8
LM-WAX	HP-88, CP-Sil 88	–	ZB-WAX	Rtx-2330	BPX-70	SP-2560	G5, G6, G43

GC/MS low bleed phases

LION®	Agilent / Varian	Macherey-Nagel	Phenomenex	Restek	SGE	Supelco	UPS Method Classification
LM1 MS	DB-1 ms (UI), HP-1 ms, VF-1 ms	OPTIMA-1 MS Accent	ZB-1 ms	Rxi-1 ms	BP-1	Equity-1	G1, G2, G9, G38
LM5 MS	VF-5 ms	OPTIMA-5 MS	ZB-5 ms	Rxi-5 MS	BPX-5	Equity-5	G27, G36, G41
LM5 MS plus	DB-5 ms UI, VF-5 ms	OPTIMA-5 MS Accent	ZB-5 MSplus, ZB-SemiVolatiles	Rxi-5 MS	–	SLB-5 ms	G27, G36, G41
LM5 SIMS	DB-5 ms, VF-5 ms	OPTIMA-5 MS Accent	ZB-5 ms	Rxi-5Sil MS	–	SLB-5 ms	G27, G36, G41
LM-WAX IP	DB-WAX	OPTIMA WAX	ZB-WAX IP(1)	Rxi-WAX	–	–	–
LM-35 MS	DB-35 ms UI, VF-35 ms	OPTIMA-35 MS	ZB-MultiResidue 2, ZB-50	Rxi-35 Sil MS	BPX-35, BPX-608	–	G38, G39, G43
LM-17 MS	DB-17 ms, VF-17 ms	OPTIMA-17 MS	–	Rxi-17 Sil MS	BPX-50	–	G9, G17
LM-225 MS	DB-225 ms	–	–	–	–	–	G7, G19
LM-624 MS, LM-624 35 MS	VF-1301 ms, VF-624 ms	OPTIMA-624 LB	–	Rtx-624 Sil MS	–	–	G43
LM-WAX MS	VF-WAXMSms, VF-WAX ms	–	ZB-WAX	Stabilwax MS	–	–	G14, G15, G16

*Not all phases may exist. Ask your local distributor for information.

High temperature GC phases

LION™	Agilent / Varian	Markey-Nagel	Phenomenex	Restek	SGE	Supelco	UPS Method Classification
LN-1 HT	DB-1 HT	-	ZB-1 HT Inferno	Rtx-1HT	-	-	G1, G2, G9, G38
LN-5 HT	DB-5 HT	OPTIMA 5 HT	ZB-5 HT Inferno	Rtx-5HT	-	-	G27, G36, G41
LN-8 HT	-	-	-	-	HT8	-	-
LN-35 HT	-	-	ZB-35HT Inferno	-	-	-	G28, G32, G42
LN-17 HT	DB-17HT	-	-	-	-	-	G3, G17
LN-170 HT	-	-	-	-	-	-	G46
LN-WAX HT	DB-HeavyWax	-	-	-	-	-	G14, G15, G16
LN-50 HT	DB-17HT	-	-	Rtx-65TG	-	-	-
LN-FAME HT	-	-	-	-	-	-	G5, G6, G44

Recent developments

LION™ WAX HT

- Up to 280 °C for columns ID 0.25 to 0.32 mm
- Up to 300 °C for columns ID 0.10 mm (Fast GC)

LION™ WAX Plus

- Up to 270 °C
- Higher inertness
- Compatible with water injections

LION™ FAME HT

- Up to 280 °C
- Crosslinked 100% Cyanopropyl Polysiloxane Phase

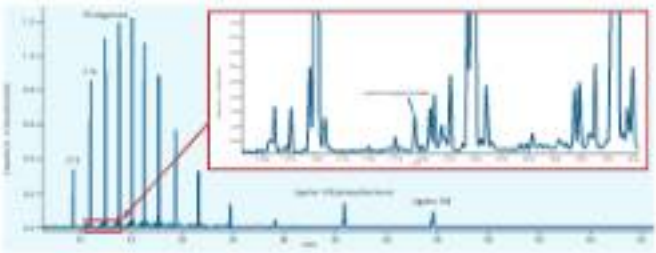
LION™ 624 Sil MS

- Up to 300/320 °C
- Longer lifetime
- Better stability

Phases Polarity chart

Non-intentionally added substances (NIAS) in food simulants

2,4-di-tert-butylphenol is the degradation/hydrolysis product from the antioxidant Irgafos 168



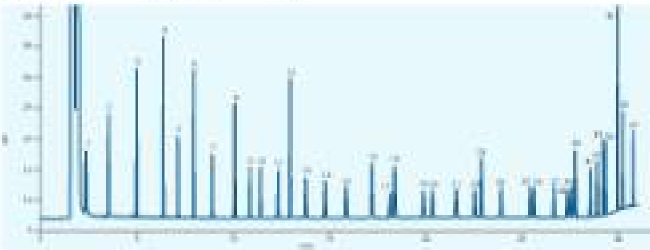
PE sample which has been migrated in 95% ethanol 10 days under 40 °C

Column	[redacted]
Dimensions	[redacted]
Part number	[redacted]
Injection volume	[redacted]
Injector temperature	[redacted]
Column flowrate	[redacted]
Total flow	[redacted]
Oven program	[redacted]
Detection	[redacted]
Ionization energy	[redacted]
Interface temperature	[redacted]
Acquisition	[redacted]

FAME

Fatty acids are carboxylic acids with a long aliphatic carbon chain typically found in lipids. These acids differ by the number of carbon atoms in the chain and the number of double bonds in the chain. According to the number of double bonds we distinguish saturated fatty acids (SFA), monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA). Trans fatty acids are unsaturated fatty acids in which at least one double bond is in the trans position.
Capillary column LION™ LN-FAME was designed to provide the required polarity by the high cyanopropyl phase (G48). In this application note you can see a fast, robust and reproducible baseline separation of the 37 most common FAMEs.

Substance	Fatty Acid Methyl Esters (see table below)



FAME standard on LION™ LN-FAME capillary column

Column	LION™ LN-FAME
Dimensions	30 m × 0.25 mm × 0.20 µm
Part number	[illegible]
Injection volume	1 µl [illegible]
Injector temperature	[illegible] °C
Injection mode	Split, Split ratio [illegible]
Column flowrate	Carrier Gas: Hydrogen, constant flow 1 ml/min
Oven program	[illegible] °C, hold [illegible] min [illegible] °C/min, [illegible] °C, hold [illegible] min [illegible] °C/min, [illegible] °C, hold [illegible] min [illegible] °C/min, [illegible] °C, hold [illegible] min [illegible] °C/min, [illegible] °C, hold 1 min
Detection	FID [illegible] °C Air [illegible] ml/min Hydrogen [illegible] ml/min Make-up gas (nitrogen) [illegible] ml/min
Sample	Supelco 37 FAME mix in DCM (dilution [illegible])
Analytes	**See table below**

This application was developed by the University of Technology Brno, Faculty of Chemistry.

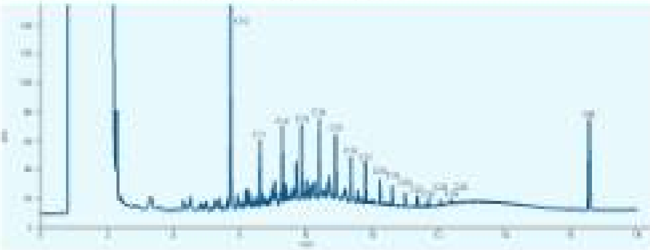
FAME

Peak No.	Compound name	Compound ID	Retention time (min)
1	Butanoic Acid, Methyl Ester	C4:0	2.587
2	Hexanoic Acid, Methyl Ester	C6:0	3.114
3	Octanoic Acid, Methyl Ester	C8:0	4.068
4	Decanoic Acid, Methyl Ester	C10:0	5.385
5	Undecanoic Acid Methyl Ester	C11:0	7.113
6	Dodecanoic Acid, Methyl Ester	C12:0	7.887
7	Tridecanoic Acid, Methyl Ester	C13:0	8.583
8	Myristic Acid Methyl Ester	C14:0	13.075
9	Myristoleic Acid, Methyl Ester	C14:1 cis 9	13.848
10	Pentadecanoic Acid Methyl Ester	C15:0	11.410
11	cis-10-Pentadecenoic Acid Methyl Ester	C15:1 cis 10	12.870
12	Hexadecanoic Acid Methyl Ester	C16:0	12.959
13	Palmitoleic Acid Methyl Ester	C16:1 cis 9	13.762
14	Heptadecanoic Acid Methyl Ester	C17:0	14.771
15	cis-10-Heptadecenoic Acid Methyl Ester	C17:1 cis 10	15.852
16	Stearic Acid Methyl Ester	C18:0	17.523
17	Oleic Acid Methyl Ester	C18:1 trans 9	18.121
18	Oleic Acid Methyl Ester	C18:1 cis 9	18.398
19	Linoelaidic Acid Methyl Ester	C18:2 trans 9,12	19.886
20	Linoleic Acid Methyl Ester	C18:2 cis 9,12	20.345
21	γ-Linolenic Acid Methyl Ester	C18:3 cis 6,9,12	21.979
22	α-Linolenic Acid Methyl Ester	C18:3 cis 9,12,15	22.553
23	Arachidic Acid Methyl Ester	C20:0	22.913
24	cis-11-Eicosenoic Acid Methyl Ester	C20:1 cis 11	23.851
25	cis-11,14-Eicosadienoic Acid Methyl Ester	C20:2 cis 11,14	25.403
26	Heneicosanoic Acid Methyl Ester	C21:0	25.630
27	cis-8,11,14-Eicosatrienoic Acid Methyl Ester	C20:3 cis 8,11,14	26.682
28	Arachidonic Acid Methyl Ester	C20:4 cis 5,8,11,14	27.378
29	cis-11,14,17-Eicosatrienoic Acid Methyl Ester	C20:3 cis 11,14,17	27.581
30	Behenic Acid Methyl Ester	C22:0	27.862
31	Erucic Acid Methyl Ester	C22:1 cis 13	28.546
32	cis-5,8,11,14,17-Eicosapentaenoic Acid Methyl Ester	C20:5 cis 5,8,11,14,17	28.901
33	cis-13,16-Docosadienoic Acid Methyl Ester	C22:2 cis 13,16	29.218
34	Tricosanoic Acid Methyl Ester	C23:0	29.337
35	Lignoceric Acid Methyl Ester	C24:0	29.975
36	Nervonic Acid Methyl Ester	C24:1 cis 15	30.230
37	cis-4,7,10,13,16,19-Docosahexaenoic Acid Methyl Ester	C22:6 cis 4,7,10,13,16,19	30.781

Total Petroleum Hydrocarbons (C10–C40 index)

Total petroleum hydrocarbons index (TPH) is a typical environmental analysis. It has replaced the infrared spectroscopy method using problematic solvents, i.e. freons. This gas chromatography analysis (GC) monitors hydrocarbons between n-decane and n-tetracontane. These two hydrocarbons are used as the range marker and injection efficiency control. Additionally, the GC method has an important advantage – this can show a type of hydrocarbon contamination (e.g. gasoline, naphtha, motor oil) and weathering status (when n-alkanes disappear during their stay in the environment).

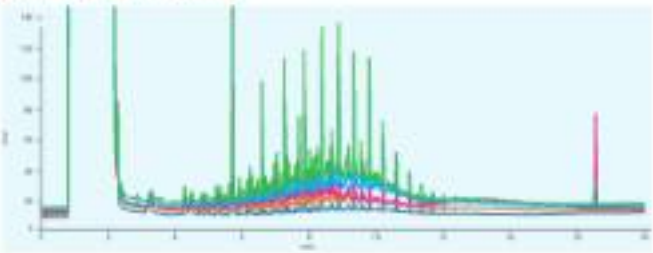
Substances	Total petroleum hydrocarbons in the range of C10 to C40



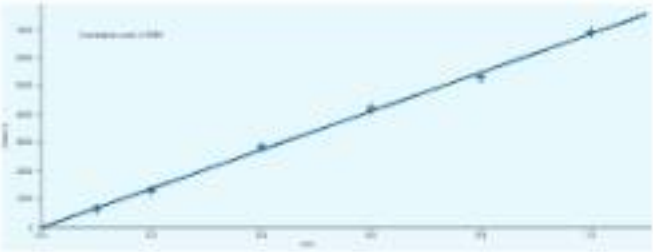
Calibration standard on LION™ LN-5HT capillary column

Column	LION™ LN-5HT
Dimensions	[illegible]
Part number	[illegible]
Injection volume	1 µL
Injector temp.	[illegible]
Injection mode	[illegible]
Column flowrate	[illegible]
Oven program	40 °C, hold 4 min [illegible] [illegible]
Detection	FID [illegible] Air: [illegible] Hydrogen: [illegible] Make up gas (nitrogen): [illegible]
Instrument	[illegible]

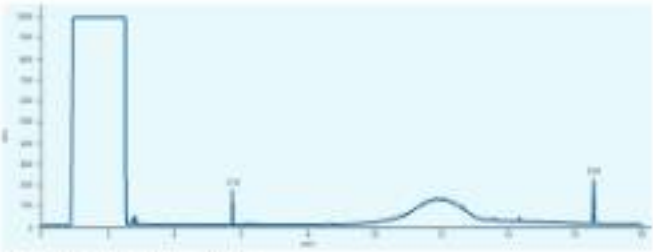
Total Petroleum Hydrocarbons (C10–C40 index)



Calibration standards for 5 level calibration



Calibration curve



Analysis of sewer water with presence of TPH

Note: More applications are available in LION™ GC columns brochure and at www.lcmaterials.eu

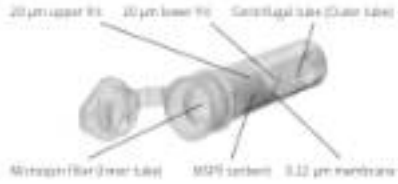
MSPE

MSPE columns enable the quick and effective preparation of a sample using different types of membranes with 0.22 micrometer porosity and a suitable sorbent. They are a suitable replacement for 1–3 mL SPE columns, tips filled with sorbent and LL-type extraction. With MSPE columns you will save time, use a minimum amount of solvents and perform more sample analyses than with conventional SPE columns. Another advantage is high accuracy and repeatability due to the precise weighing of the sorbent. It is also no longer necessary to use an SPE manifold, a micro centrifuge is sufficient.

Speed up your sample preparation

- Simple and fast sample preparation
- 2 in 1 – micro solid phase extraction and filtration in one step
- SPE manifold replaced by use of centrifuge

MSPE – unique technology



General sample preparation workflow

Note: The workflow may vary depending on your application.

Ordering information

C18 MSPE Spinline™ [illegible]			
Membrane	15 mg	30 mg	50 mg
Nylon	[illegible]	[illegible]	[illegible]
PTFE hydrophilic	[illegible]	[illegible]	[illegible]
PTFE hydrophobic	On request	[illegible]	[illegible]
PVDF	[illegible]	[illegible]	[illegible]
MCE	[illegible]	[illegible]	[illegible]

C18-E MSPE Spinline™ [illegible]			
Membrane	15 mg	30 mg	50 mg
Nylon	[illegible]	[illegible]	On request
PTFE hydrophilic	On request	[illegible]	[illegible]
PTFE hydrophobic	On request	[illegible]	[illegible]
PVDF	On request	[illegible]	[illegible]
MCE	[illegible]	[illegible]	[illegible]

HLB MSPE Spinline™ [illegible]				
Membrane	5 mg	10 mg	15 mg	30 mg
Nylon	[illegible]	[illegible]	[illegible]	[illegible]
PTFE hydrophilic	[illegible]	[illegible]	[illegible]	On request
PTFE hydrophobic	[illegible]	[illegible]	On request	On request
PVDF	[illegible]	[illegible]	On request	[illegible]
MCE	[illegible]	[illegible]	[illegible]	[illegible]

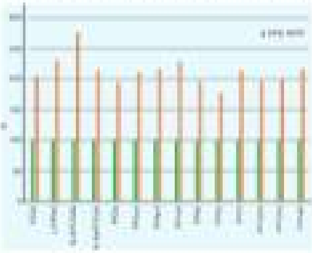
WAX MSPE Spinline™ [illegible]		
Membrane	15 mg	30 mg
Nylon	[illegible]	[illegible]
PTFE hydrophilic	[illegible]	[illegible]
PTFE hydrophobic	[illegible]	[illegible]
PVDF	[illegible]	[illegible]
MCE	[illegible]	[illegible]

SAX MSPE Spinline™ [illegible]		
Membrane	15 mg	30 mg
Nylon	On request	On request
PTFE hydrophilic	[illegible]	On request
PTFE hydrophobic	On request	On request
PVDF	On request	On request
MCE	On request	On request

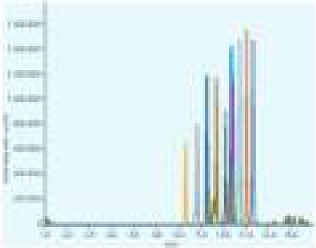
Accessories		
Description	Amount	Part number
[illegible]	[illegible]	[illegible]
[illegible]	1 pc	[illegible]
Vortex Mini, [illegible]	1 pc	[illegible]
Vortex Mini, [illegible]	1 pc	[illegible]
Vortex Mini [illegible]	1 pc	[illegible]

MSPE columns

Analysis of long-chain PFASs in biological sample matrix



MSPE method shows signal improvement in comparison to the reference extraction method without SPE [illegible]



Mixture of PFASs on [illegible] column

MSPE Method

MSPE Column	[illegible]
Homogenization	[illegible]
Extraction	[illegible]
Centrifugation	[illegible]
Reconstitution	[illegible]
Dissolution	[illegible]
MSPE Activation	[illegible]
MSPE Equilibration	[illegible]
MSPE Extraction of analytes	[illegible]
MSPE elution of analytes	[illegible]

[illegible]

LC-HRMS Method

Column	[illegible]			
Dimensions	[illegible]			
Part number	[illegible]			
Mobile phase	[illegible]			
Gradient elution	**Time**	**A (%)**	**B (%)**	**Flow rate (µl/min)**
	0	90	10	350
	0.5	90	10	350
	6	40	60	350
	11	0	100	400
	14	0	100	400
	14.01	90	10	350
	16	90	10	350
Temperature	[illegible]			
Injection volume	[illegible]			
Detection	[illegible]			

Substances

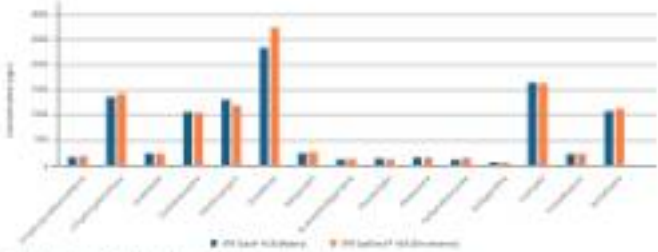
1. **L-PFPeS (perfluoropentanesulfonic acid),** CAS number 2706-91-4
2. **PFHxS (perfluorohexanesulfonic acid),** CAS number 355-46-4
3. **PFOA (perfluorooctanoic acid),** CAS number 335-67-1
4. **PFHpS (perfluoroheptanesulfonic acid),** CAS number 375-92-8
5. **PFNA (perfluorononanoic acid),** CAS number 375-95-1
6. **FOSA (perfluorooctanesulfonamide),** CAS number 754-91-6
7. **PFOS (perfluorooctanesulfonic acid),** CAS number 1763-23-1
8. **PFDA (perfluorodecanoic acid),** CAS number 335-76-2
9. **PFUdA (perfluoroundecanoic acid),** CAS number 2058-94-8
10. **N-MeFOSAA (2-(N-methylperfluorooctanesulfonamido) acetic acid),** CAS number 2355-31-9
11. **N-EtFOSAA (N-Ethyl-N-((heptadecafluorooctyl) sulphonyl)glycine,** CAS number 2991-50-6
12. **PFDoA (perfluorododecanoic acid),** CAS number 307-55-1
13. **PFTrDA (perfluorotridecanoic acid),** CAS number 72629-94-8
14. **PFTeDA (perfluorotetradecanoic acid),** CAS number 376-06-7

This application was developed in cooperation with the Faculty of Fisheries and Protection of Waters, Research Institute of Fish Culture and Hydrobiology, Laboratory of Environmental Chemistry and Biochemistry

SPEEXTRA™

SPE columns

SpeExtra® is a new range of SPE columns for your sample preparation.
Florisil® and HLB columns are suitable for use in the environmental and toxicology area. The SpeExtra® HLB SPE column is based on a modified polymer of 130Å pore size. It offers a high surface area of 1825 m²/g. The working pH range is from pH 1 to pH 15. The loading capacity is 20 %. It has been developed to clean a broad range of hydrophobic/hydrophilic compounds across various matrices (plasma, urine, oil, water etc.).



Comparison of SpeExtra™ with Waters Oasis® HLB cartridges

SpeExtra™ C18	Sorbent mass mg	Particle size µm	Volume mL	Part Number	Box
	50	55	1	SPE-SIL-C18-01-01	50 pcs
	100	55	1	SPE-SIL-C18-01	100 pcs
	100	55	3	SPE-SIL-C18-03	50 pcs
	200	55	3	SPE-SIL-C18-03	50 pcs
	200	55	6	SPE-SIL-C18-06	50 pcs
	500	55	3	SPE-SIL-C18-03-05	50 pcs
	500	55	6	SPE-SIL-C18-06	50 pcs

SpeExtra™ C8	Sorbent mass mg	Particle size µm	Volume mL	Part Number	Box
	50	55	1	SPE-SIL-C8-01-01	50 pcs
	100	55	1	SPE-SIL-C8-01	100 pcs
	100	55	3	SPE-SIL-C8-03	50 pcs
	200	55	3	SPE-SIL-C8-03	50 pcs
	500	55	3	SPE-SIL-C8-03-05	50 pcs
	500	55	6	SPE-SIL-C8-06	50 pcs

SPE columns

SpeExtra™ Phenyl	Sorbent Mass mg	Particle size µm	Volume mL	Part Number	Box
	100	55	1	SPE-SIL-PH-01	100 pcs
	100	55	3	SPE-SIL-PH-03	50 pcs
	200	55	3	SPE-SIL-PH-03	50 pcs
	200	55	6	SPE-SIL-PH-06	50 pcs
	500	55	6	SPE-SIL-PH-06	50 pcs

SpeExtra™ HLB Clinical	Sorbent mass mg	Particle size µm	Volume mL	Part Number	Box
	30	85	1	SPE-SIL-HLB-01	50 pcs

SPE columns

SpeExtra™ HLB Divinyl	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	30	30	1	SPE-5804-A001	50 pcs.
	60	60	1	SPE-5804-C001	50 pcs.
	30	30	3	SPE-5804-AA03	50 pcs.
	60	60	3	SPE-5804-C03	50 pcs.
	150	30	6	SPE-5804-A06	30 pcs.
	150	60	6	SPE-5804-C06	30 pcs.
	200	30	6	SPE-5804-AC06	30 pcs.
	200	30	6	SPE-5804-AC06	30 pcs.
	200	30	6	SPE-5804-4C34-B	200 pcs.
	200	60	6	SPE-5804-CC06	30 pcs.
	200	60	6	SPE-5804-CC06	30 pcs.
	400	30	6	SPE-5804-A006	30 pcs.
	400	60	6	SPE-5804-C006	30 pcs.

SpeExtra™ HCX	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	200	50	3	SPE-5847-CC03	50 pcs.

SpeExtra™ SAX	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	50	50	1	SPE-5818-D001	50 pcs.
	100	50	1	SPE-5818-D001	100 pcs.
	100	50	3	SPE-5818-D003	50 pcs.
	200	50	3	SPE-5818-D203	50 pcs.
	500	50	3	SPE-5818-D503	50 pcs.
	1000	50	6	SPE-5818-D106	30 pcs.

SpeExtra™ SCX	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	50	50	1	SPE-5819-D001	50 pcs.
	100	50	1	SPE-5819-D001	100 pcs.
	100	50	3	SPE-5819-D003	50 pcs.
	200	50	3	SPE-5819-D203	50 pcs.
	500	50	3	SPE-5819-D503	50 pcs.

SpeExtra™ WAX	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	30	30	1	SPE-5808-A001	50 pcs.
	100	30	3	SPE-5808-A003	50 pcs.
	150	30	6	SPE-5808-A006	30 pcs.
	200	30	6	SPE-5808-AC06	30 pcs.
	300	30	6	SPE-5808-A006	30 pcs.

SpeExtra™ Florisil® (pesticide grade)	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	1000	150/250	6	SPE-5809-1006	30 pcs.
	1000	150/250	15	SPE-5809-1601	20 pcs.
	500	150/250	6	SPE-5809-1605	30 pcs.

SpeExtra™ Florisil® (ultra pure)	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	2000	150/250	15	SPE-5809-1601	20 pcs.

SPE columns

SpeExtra™ II	Sorbent Mass mg	Particle size µm	Volume ml	Part Number	Box
	100	50	3	SPE-SW12-0301	50 pcs.
	200	50	6	SPE-SW12-0306	50 pcs.
	500	50	6	SPE-SW12-0506	50 pcs.

12 position Vacuum SPE manifold (p/n SPE-SW12-0006)

EasyFlash™

Flash columns

Chromatographic Introduced Flash chromatography columns for high performance purifications. New EasyFlash™ columns offer high efficiency for a fast separation and isolation of reaction products and intermediates.
We offer wide range from 4 g up to 1500 g EasyFlash™ columns with various silicagel types - spherical and irregular.

Size [g]	EasyFlash™ Silica HS	EasyFlash™ Silica HR		EasyFlash™ Silica SI	
	15 µm	25 µm	15 µm	25 µm	15 µm
4	FLC-5003-AE1	FLC-5005-AE	FLC-5005-AE1	FLC-5004-AE1	FLC-5004-AE1
12	FLC-5003-AE2	FLC-5005-AE2	FLC-5005-AE2	FLC-5004-AE2	FLC-5004-AE2
25	FLC-5003-AE3	FLC-5005-AE3	FLC-5005-AE3	FLC-5004-AE3	FLC-5004-AE3
40	FLC-5003-AE4	FLC-5005-AE4	FLC-5005-AE4	FLC-5004-AE4	FLC-5004-AE4
80	FLC-5003-AE5	FLC-5005-AE5	FLC-5005-AE5	FLC-5004-AE5	FLC-5004-AE5
120	FLC-5003-AE6	FLC-5005-AE6	FLC-5005-AE6	FLC-5004-AE6	FLC-5004-AE6
220	FLC-5003-AE7	FLC-5005-AE7	FLC-5005-AE7	FLC-5004-AE7	FLC-5004-AE7
330	FLC-5003-AE8	FLC-5005-AE8	FLC-5005-AE8	FLC-5004-AE8	FLC-5004-AE8
800	FLC-5003-AE9	FLC-5005-AE9	n/a	FLC-5004-AE9	n/a
1500	FLC-5003-AEA	FLC-5005-AEA	n/a	FLC-5004-AEA	n/a

Size [g]	EasyFlash™ Alumina Basic	EasyFlash™ Alumina Neutral	EasyFlash™ NH2		
	50/50 µm	50/50 µm	50 µm	30 µm	15 µm
4	FLC-5006-AE1	FLC-5007-AE1	FLC-5050-AE1	FLC-5052-AE1	FLC-5051-AE1
12	FLC-5006-AE2	FLC-5007-AE2	FLC-5050-AE2	FLC-5052-AE2	FLC-5051-AE2
25	FLC-5006-AE3	FLC-5007-AE3	FLC-5050-AE3	FLC-5052-AE3	FLC-5051-AE3
40	FLC-5006-AE4	FLC-5007-AE4	FLC-5050-AE4	FLC-5052-AE4	FLC-5051-AE4
80	FLC-5006-AE5	FLC-5007-AE5	FLC-5050-AE5	FLC-5052-AE5	FLC-5051-AE5
120	FLC-5006-AE6	FLC-5007-AE6	FLC-5050-AE6	FLC-5052-AE6	FLC-5051-AE6
220	FLC-5006-AE7	FLC-5007-AE7	FLC-5050-AE7	FLC-5052-AE7	FLC-5051-AE7
330	FLC-5006-AE8	FLC-5007-AE8	FLC-5050-AE8	FLC-5052-AE8	FLC-5051-AE8
800	FLC-5006-AE9	FLC-5007-AE9	FLC-5050-AE9	FLC-5052-AE9	n/a
1500	FLC-5006-AEA	FLC-5007-AEA	FLC-5050-AEA	FLC-5052-AEA	n/a

Size [g]	EasyFlash™ C18 High Performance			EasyFlash™ C18-AQ		EasyFlash™ SIL	EasyFlash™ OH
	15 µm	25 µm	15 µm	15 µm	15 µm	50 µm	50 µm
4	FLC-5045-AE1	FLC-5046-AE1	FLC-5045-AA1	FLC-5041-AE1	FLC-5041-AA1	FLC-5052-AE1	FLC-5053-AE1
12	FLC-5045-AE2	FLC-5046-AE2	FLC-5045-AA2	FLC-5041-AE2	FLC-5041-AA2	FLC-5052-AE2	FLC-5053-AE2
25	FLC-5045-AE3	FLC-5046-AE3	FLC-5045-AA3	FLC-5041-AE3	FLC-5041-AA3	FLC-5052-AE3	FLC-5053-AE3
40	FLC-5045-AE4	FLC-5046-AE4	FLC-5045-AA4	FLC-5041-AE4	FLC-5041-AA4	FLC-5052-AE4	FLC-5053-AE4
80	FLC-5045-AE5	FLC-5046-AE5	FLC-5045-AA5	FLC-5041-AE5	FLC-5041-AA5	FLC-5052-AE5	FLC-5053-AE5
120	FLC-5045-AE6	FLC-5046-AE6	FLC-5045-AA6	FLC-5041-AE6	FLC-5041-AA6	FLC-5052-AE6	FLC-5053-AE6
220	FLC-5045-AE7	FLC-5046-AE7	FLC-5045-AA7	FLC-5041-AE7	FLC-5041-AA7	FLC-5052-AE7	FLC-5053-AE7
330	FLC-5045-AE8	FLC-5046-AE8	FLC-5045-AA8	FLC-5041-AE8	FLC-5041-AA8	FLC-5052-AE8	FLC-5053-AE8
800	FLC-5045-AE9	FLC-5046-AE9	n/a	FLC-5041-AE9	n/a	FLC-5052-AE9	FLC-5053-AE9
1500	FLC-5045-AEA	FLC-5046-AEA	n/a	FLC-5041-AEA	n/a	FLC-5052-AEA	FLC-5053-AEA

Size [g]	EasyFlash™ Diol
	50 µm
4	FLC-5049-AE1
12	FLC-5049-AE2
25	FLC-5049-AE3
40	FLC-5049-AE4
80	FLC-5049-AE5
120	FLC-5049-AE6
220	FLC-5049-AE7
330	FLC-5049-AE8
800	FLC-5049-AE9
1500	FLC-5049-AEA

EasyFlash™ column

METAMINO®

Sample preparation kit

MetAmino® kits offer an easy sample preparation method for your LC/MS or GC/MS analysis. MetAmino® kits include derivatization reagents and all clean-up accessories to prepare your sample for injection. They eliminate time consuming sample preparation procedures.
The new clean-up procedure uses a special material as the end step. The other advantage is that the derivatization procedure enables the extension of the analyte list. Contact us for further details.

- 19 amino acids, polyamines, biogen amines and ureic cycles in 25 minutes (sample preparation and analysis time)
- Easy sample preparation
- Unique clean-up step
- LC/MS and GC/MS kit
- NIST library for GC/MS available
- Possible extension to other analytes on request

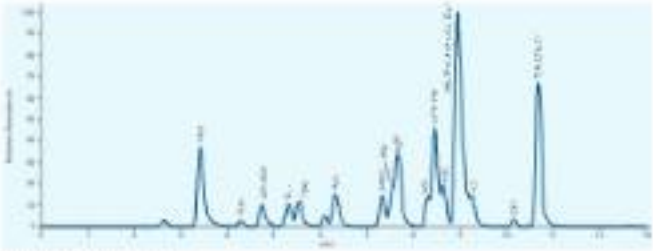
LC/MS kit

No.	Name	Synonym	Quantification	Ionic	MRM	Precursor	Quantifier	CE	Qualifier	CE
1	L-Alanine			+	90.1>44.1	90	44.1	13		
2	L-Arginine			+	175.1>70.1	175	70.1	21	175.1>116.1	13
3	L-Asparagine			+	133.1>87.1	133	87.1	13	133.1>74.1	21
4	L-Aspartic acid			+	134.1>88.1	134	88.1	13	134.1>74.1	21
5	Carnosine			+	227.1>110.1	227	110.1	21	227.1>156.1	13
6	L-Citrulline			+	176.1>70.1	176	70.1	21	176.1>159.1	13
7	L-Cystine			+	241.0>152.0	241	152.0	13	241.0>74.1	21
8	L-Glutamic acid			+	148.1>84.1	148	84.1	13	148.1>102.1	13
9	L-Glutamine			+	147.1>84.1	147	84.1	13	147.1>130.1	13
10	Glycine			+	76.1>30.1	76	30.1	13		
11	L-Histidine			+	156.1>110.1	156	110.1	13	156.1>93.1	21
12	L-Isoleucine			+	132.1>86.1	132	86.1	13	132.1>69.1	21
13	L-Leucine			+	132.1>86.1	132	86.1	13	132.1>69.1	21
14	L-Lysine			+	147.1>84.1	147	84.1	13	147.1>130.1	13
15	L-Methionine			+	150.1>104.1	150	104.1	13	150.1>133.1	13
16	L-Ornithine			+	133.1>70.1	133	70.1	21	133.1>116.1	13
17	L-Phenylalanine			+	166.1>120.1	166	120.1	13	166.1>103.1	21
18	L-Proline			+	116.1>70.1	116	70.1	13	116.1>43.1	21
19	L-Serine			+	106.1>60.1	106	60.1	13	106.1>88.1	13
20	L-Threonine			+	120.1>74.1	120	74.1	13	120.1>102.1	13
21	L-Tryptophan			+	205.1>188.1	205	188.1	13	205.1>146.1	21
22	L-Tyrosine			+	182.1>136.1	182	136.1	13	182.1>119.1	21
23	L-Valine			+	118.1>72.1	118	72.1	13	118.1>55.1	21
24	1-Methylhistidine	1MH		+	170.1>124.1	170	124.1	13	170.1>96.1	21
25	3-Methylhistidine	3MH		+	170.1>124.1	170	124.1	13	170.1>96.1	21
26	3-Aminoisobutyric acid	BAIB		+	104.1>58.1	104	58.1	13	104.1>87.1	13
27	4-Aminobutyric acid	GABA		+	104.1>87.1	104	87.1	13	104.1>69.1	21
28	Alpha-aminoadipic acid	AAA		+	162.1>84.1	162	84.1	13	162.1>116.1	13
29	Anserine			+	241.1>109.1	241	109.1	21	241.1>170.1	13
30	Asymmetric dimethylarginine	ADMA		+	203.2>46.1	203	46.1	21	203.2>70.1	21
31	Beta-alanine	BALA		+	90.1>44.1	90	44.1	13		
32	Cystathionine			+	223.1>134.1	223	134.1	13	223.1>88.1	21
33	Dihydroxyphenylalanine	DOPA		+	198.1>152.1	198	152.1	13	198.1>181.1	13
34	Ethanolamine			+	62.1>44.1	62	44.1	13		
35	Hydroxyproline	HYP		+	132.1>86.1	132	86.1	13	132.1>68.1	21
36	Kynurenine	KYN		+	209.1>192.1	209	192.1	13	209.1>94.1	21
37	Methionine sulfone			+	182.1>136.1	182	136.1	13	182.1>165.1	13
38	Methionine sulfoxide			+	166.1>120.1	166	120.1	13	166.1>149.1	13
39	Monomethylarginine	MMA		+	189.2>70.1	189	70.1	21	189.2>172.1	13
40	Ornithine	ORN		+	133.1>70.1	133	70.1	21	133.1>116.1	13
41	Phosphoethanolamine	PEA		+	142.1>44.1	142	44.1	13	142.1>125.1	13
42	Phosphoserine	PSER		+	186.1>140.1	186	140.1	13	186.1>88.1	21
43	Sarcosine	SARC		+	90.1>44.1	90	44.1	13		
44	Symmetric dimethylarginine	SDMA		+	203.2>46.1	203	46.1	21	203.2>172.1	13
45	Taurine	TAU		+	126.1>108.1	126	108.1	13	126.1>44.1	21
46	Taurocholic acid	TCA		+	516.3>124.1	516	124.1	13	516.3>80.1	13
47	Taurodeoxycholic acid	TDCA		+	500.3>124.1	500	124.1	13	500.3>80.1	13
48	Taurohyocholic acid	THCA		+	516.3>124.1	516	124.1	13	516.3>80.1	13
49	Tauroursodeoxycholic acid	TUDCA		+	500.3>124.1	500	124.1	13	500.3>80.1	13
50	Trimethylamine N-oxide	TMAO		+	76.1>58.1	76	58.1	13		
51	Urea			+	61.1>44.1	61	44.1	13		
52	Acetylcarnitine	C2		+	204.1>85.1	204	85.1	21	204.1>145.1	13
53	Butyrylcarnitine	C4		+	232.2>85.1	232	85.1	21	232.2>145.1	13
54	Carnitine	C0		+	162.1>85.1	162	85.1	21	162.1>103.1	13
55	Decanoylcarnitine	C10		+	316.3>85.1	316	85.1	21	316.3>145.1	13
56	Decenoylcarnitine	C10:1		+	314.3>85.1	314	85.1	21	314.3>145.1	13
57	Dodecanoylcarnitine	C12		+	344.3>85.1	344	85.1	21	344.3>145.1	13
58	Dodecenoylcarnitine	C12:1		+	342.3>85.1	342	85.1	21	342.3>145.1	13
59	Hexanoylcarnitine	C6		+	260.2>85.1	260	85.1	21	260.2>145.1	13
60	Hexenoylcarnitine	C6:1		+	258.2>85.1	258	85.1	21	258.2>145.1	13
61	Hydroxybutyrylcarnitine	C4OH		+	248.2>85.1	248	85.1	21	248.2>145.1	13
62	Hydroxydecanoylcarnitine	C10OH		+	332.3>85.1	332	85.1	21	332.3>145.1	13
63	Hydroxydecenoylcarnitine	C10:1OH		+	330.3>85.1	330	85.1	21	330.3>145.1	13
64	Hydroxydodecanoylcarnitine	C12OH		+	360.3>85.1	360	85.1	21	360.3>145.1	13
65	Hydroxydodecenoylcarnitine	C12:1OH		+	358.3>85.1	358	85.1	21	358.3>145.1	13
66	Hydroxyhexanoylcarnitine	C6OH		+	276.2>85.1	276	85.1	21	276.2>145.1	13
67	Hydroxyhexenoylcarnitine	C6:1OH		+	274.2>85.1	274	85.1	21	274.2>145.1	13
68	Hydroxyoctanoylcarnitine	C8OH		+	304.3>85.1	304	85.1	21	304.3>145.1	13
69	Hydroxyoctenoylcarnitine	C8:1OH		+	302.3>85.1	302	85.1	21	302.3>145.1	13
70	Hydroxypalmitoylcarnitine	C16OH		+	416.4>85.1	416	85.1	21	416.4>145.1	13
71	Hydroxypalmitoleylcarnitine	C16:1OH		+	414.4>85.1	414	85.1	21	414.4>145.1	13
72	Hydroxytetradecanoylcarnitine	C14OH		+	388.3>85.1	388	85.1	21	388.3>145.1	13
73	Hydroxytetradecenoylcarnitine	C14:1OH		+	386.3>85.1	386	85.1	21	386.3>145.1	13
74	Isobutyrylcarnitine	C4		+	232.2>85.1	232	85.1	21	232.2>145.1	13
75	Isovalerylcarnitine	C5		+	246.2>85.1	246	85.1	21	246.2>145.1	13
76	Octanoylcarnitine	C8		+	288.3>85.1	288	85.1	21	288.3>145.1	13
77	Octenoylcarnitine	C8:1		+	286.3>85.1	286	85.1	21	286.3>145.1	13
78	Palmitoylcarnitine	C16		+	400.4>85.1	400	85.1	21	400.4>145.1	13
79	Palmitoleylcarnitine	C16:1		+	398.4>85.1	398	85.1	21	398.4>145.1	13
80	Propionylcarnitine	C3		+	218.2>85.1	218	85.1	21	218.2>145.1	13
81	Tetradecanoylcarnitine	C14		+	372.3>85.1	372	85.1	21	372.3>145.1	13
82	Tetradecenoylcarnitine	C14:1		+	370.3>85.1	370	85.1	21	370.3>145.1	13
83	Tiglylcarnitine	C5:1		+	244.2>85.1	244	85.1	21	244.2>145.1	13
84	Trimethylaminobutyric acid	TMABA		+	146.1>87.1	146	87.1	13	146.1>58.1	21
85	Acetylornithine			+	175.1>70.1	175	70.1	21	175.1>158.1	13
86	Adenine			+	136.1>119.1	136	119.1	13	136.1>92.1	21
87	Adenosine			+	268.1>136.1	268	136.1	13	268.1>119.1	21
88	Adenosine monophosphate	AMP		+	348.1>136.1	348	136.1	13	348.1>119.1	21
89	Cytidine			+	244.1>112.1	244	112.1	13	244.1>95.1	21
90	Cytidine monophosphate	CMP		+	324.1>112.1	324	112.1	13	324.1>95.1	21
91	Deoxyadenosine			+	252.1>136.1	252	136.1	13	252.1>119.1	21
92	Deoxyadenosine monophosphate	dAMP		+	332.1>136.1	332	136.1	13	332.1>119.1	21
93	Deoxycytidine			+	228.1>112.1	228	112.1	13	228.1>95.1	21
94	Deoxycytidine monophosphate	dCMP		+	308.1>112.1	308	112.1	13	308.1>95.1	21
95	Deoxyguanosine			+	268.1>152.1	268	152.1	13	268.1>135.1	21
96	Deoxyguanosine monophosphate	dGMP		+	348.1>152.1	348	152.1	13	348.1>135.1	21
97	Deoxythymidine			+	243.1>127.1	243	127.1	13	243.1>81.1	21
98	Deoxythymidine monophosphate	dTMP		+	323.1>127.1	323	127.1	13	323.1>81.1	21
99	Deoxyuridine			+	229.1>113.1	229	113.1	13	229.1>96.1	21
100	Deoxyuridine monophosphate	dUMP		+	309.1>113.1	309	113.1	13	309.1>96.1	21
101	Guanine			+	152.1>135.1	152	135.1	13	152.1>110.1	21
102	Guanosine			+	284.1>152.1	284	152.1	13	284.1>135.1	21
103	Guanosine monophosphate	GMP		+	364.1>152.1	364	152.1	13	364.1>135.1	21
104	Hypoxanthine			+	137.1>110.1	137	110.1	13	137.1>119.1	21
105	Inosine			+	269.1>137.1	269	137.1	13	269.1>110.1	21
106	Inosine monophosphate	IMP		+	349.1>137.1	349	137.1	13	349.1>110.1	21
107	Thymidine			+	243.1>127.1	243	127.1	13	243.1>81.1	21
108	Thymidine monophosphate	TMP		+	323.1>127.1	323	127.1	13	323.1>81.1	21
109	Thymine			+	127.1>110.1	127	110.1	13	127.1>42.1	21
110	Uracil			+	113.1>96.1	113	96.1	13	113.1>70.1	21
111	Uridine			+	245.1>113.1	245	113.1	13	245.1>96.1	21
112	Uridine monophosphate	UMP		+	325.1>113.1	325	113.1	13	325.1>96.1	21
113	Xanthine			+	153.1>136.1	153	136.1	13	153.1>110.1	21
114	Xanthosine			+	285.1>153.1	285	153.1	13	285.1>136.1	21
115	Xanthosine monophosphate	XMP		+	365.1>153.1	365	153.1	13	365.1>136.1	21
116	Acetylputrescine			+	131.1>72.1	131	72.1	21	131.1>114.1	13
117	Cadaverine			+	103.1>86.1	103	86.1	13	103.1>69.1	21
118	Diaminopimelic acid	DAPA		+	191.1>174.1	191	174.1	13	191.1>128.1	21
119	Homocitrulline			+	190.1>84.1	190	84.1	21	190.1>173.1	13
120	Hydroxylysine			+	163.1>84.1	163	84.1	21	163.1>146.1	13
121	Putrescine			+	89.1>72.1	89	72.1	13	89.1>55.1	21
122	Spermidine			+	146.2>72.1	146	72.1	21	146.2>129.1	13
123	Spermine			+	203.2>129.1	203	129.1	21	203.2>112.1	13

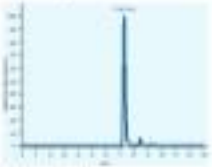
Note 1) * Collision energy

LC/MS separation

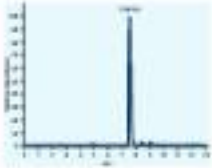
The chromatogram shown below displays TIC and some of the analyte MRMs



Chromatogram of 24 amino acids



β-ABA (259.1–260.1)

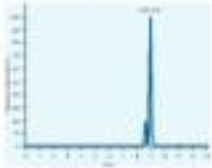


PRO (271.1–272.1)

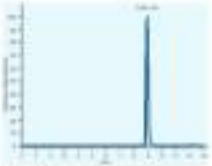
MET (305.1–306.1)

GRN (388.1–389.1)

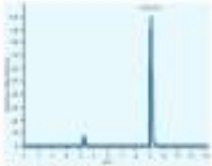
TRP (390.1–391.1)



HIS (410.1–411.1)



LYS (420.1–421.1)



PHE (321.1–322.1)

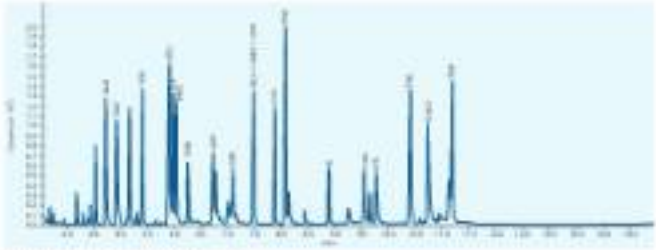
ASP (345.1–346.1)

GC/MS kit

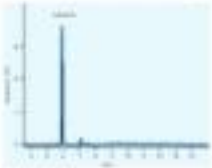
[illegible]
[illegible]

GC/MS separation

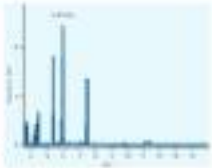
A typical chromatogram of the amino acid standard solution is loaded in the kit.



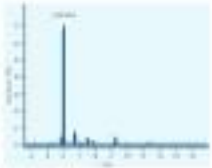
Chromatogram of standard solution (above)



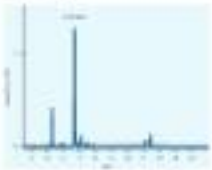
LEU (EC 31.2)



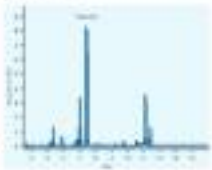
ILE (EC 28.9)



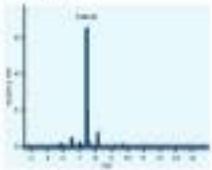
PRO (EC 26.6)



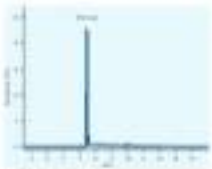
ASP (EC 21.4)



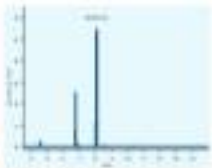
GLU (EC 28.2)



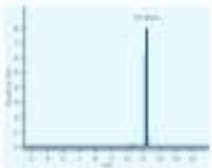
MET (EC 13.6)



4-HYP (EC 31.2)



PHE (EC 91)



TRP (EC 13.6)

AAA (EC = Concentration, Chromatogram)

METAMINO®

Ordering information

Sample preparation kit (CF)	Part number	Samples
MetAmino® sample preparation LC-MS start-up kit CF	[illegible]	100
MetAmino® sample preparation GC-MS start-up kit CF	[illegible]	100
MetAmino® sample preparation LC-MS basic kit CF	[illegible]	400
MetAmino® sample preparation GC-MS basic kit CF	On request	400
MetAmino® sample preparation LC-MS reagent kit	[illegible]	100
MetAmino® sample preparation GC-MS reagent kit	[illegible]	100

Metabolite sample preparation kit (CF)

- Derivatization reagents
- Derivatization centrifugal filters (set of 100/400 pcs)
- 2mL screw top vials (set of 100/400 pcs)
- Micro tube rack
- LC-MS or GC-MS column
- Sample preparation manual

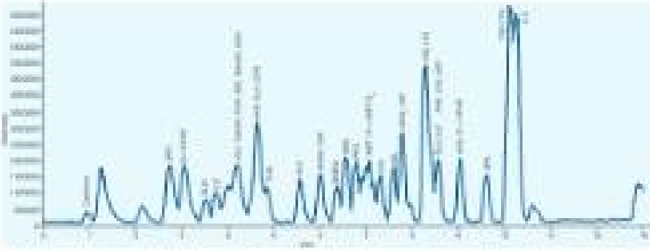


Fig. 1: Standard mixture – LC MetAmino® kit, mass extracted chromatogram, 5 nmol SD1 and SD2 according to the manual [2]

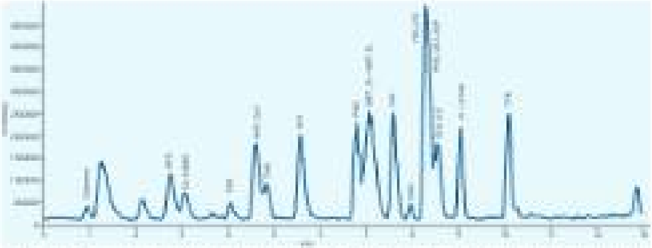
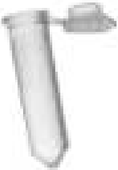


Fig. 2: Fish feed hydrolysate – LC MetAmino® kit, mass extracted chromatogram (30 µg of sample after neutralization)

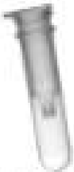
CENTRIFUGAL FILTERS

Centrifugal filters: Nano-Spin and Micro-Spin (including Micro/Nano-Spin tubes) with a porosity of 0.2 µm and 0.45 µm are suitable for sample purification, pre-filtration, removal of particles and clearing of impurities in samples using membranes (Nylon, PTFE, PVDF, PP, CA, NC, PES).

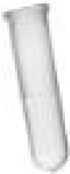


Micro-Spin tube

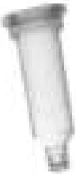
Micro-Spin filter



Nano-Spin filter and tube



Nano-Spin tube



Nano-Spin filter

Description	Membrane	Capacity	Amount	Part number
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CENTRIFUGAL FILTERS

Centrifugal filters Midi-Spin and Maxi-Spin (including spin tube) with a porosity of 0.2 µm and 0.45 µm are suitable for sample purification, pre-filtration, removal of particles and cleaning of impurities in samples using membranes (Nylon, PTFE, PVDF, PES, CA, MC, RC).

Midi-Spin

Maxi-Spin

Description	Membrane	Capacity	Amount	Part number
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SYRINGE FILTERS

CHS Filterpure syringe filters are suitable for filtering solutions and solvent solutions, where it is necessary to have a low content of extractable substances. The membranes (Nylon, PTFE, PVDF, MCE, PES) have good chemical resistance and high strength.

CHS FilterPure

Description	Membrane	Diameter	Amount	Part number
CHS FilterPure GD syringe filter, 13 mm, 0.22 µm	GD	13 mm	100 pcs	CHS-SFGD-13/22
CHS FilterPure GD syringe filter, 13 mm, 0.45 µm	GD	13 mm	100 pcs	CHS-SFGD-13/45
CHS FilterPure GD syringe filter, 25 mm, 0.22 µm	GD	25 mm	100 pcs	CHS-SFGD-25/22
CHS FilterPure GD syringe filter, 25 mm, 0.45 µm	GD	25 mm	100 pcs	CHS-SFGD-25/45
CHS FilterPure GD syringe filter, 33 mm, 0.22 µm	GD	33 mm	100 pcs	CHS-SFGD-33/22
CHS FilterPure GD syringe filter, 33 mm, 0.45 µm	GD	33 mm	100 pcs	CHS-SFGD-33/45
CHS FilterPure Nylon Syringe Filter, 13 mm, 0.22 µm	Nylon	13 mm	100 pcs	CHS-SFN-13/22
CHS FilterPure Nylon Syringe Filter, 13 mm, 0.45 µm	Nylon	13 mm	100 pcs	CHS-SFN-13/45
CHS FilterPure Nylon Syringe Filter, 25 mm, 0.22 µm	Nylon	25 mm	100 pcs	CHS-SFN-25/22
CHS FilterPure Nylon Syringe Filter, 25 mm, 0.45 µm	Nylon	25 mm	100 pcs	CHS-SFN-25/45
CHS FilterPure Nylon Syringe Filter, 33 mm, 0.22 µm	Nylon	33 mm	100 pcs	CHS-SFN-33/22
CHS FilterPure Nylon Syringe Filter, 33 mm, 0.45 µm	Nylon	33 mm	100 pcs	CHS-SFN-33/45
CHS FilterPure PES Syringe Filter, Yellow, 13 mm, 0.22 µm	PES	13 mm	100 pcs	CHS-SFPES-13/22
CHS FilterPure PES Syringe Filter, Yellow, 13 mm, 0.45 µm	PES	13 mm	100 pcs	CHS-SFPES-13/45
CHS FilterPure PES Syringe Filter, Yellow, 25 mm, 0.22 µm	PES	25 mm	100 pcs	CHS-SFPES-25/22
CHS FilterPure PES Syringe Filter, Yellow, 25 mm, 0.45 µm	PES	25 mm	100 pcs	CHS-SFPES-25/45
CHS FilterPure PES Syringe Filter, Yellow, 33 mm, 0.22 µm	PES	33 mm	100 pcs	CHS-SFPES-33/22
CHS FilterPure PES Syringe Filter, Yellow, 33 mm, 0.45 µm	PES	33 mm	100 pcs	CHS-SFPES-33/45
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 13 mm, 0.22 µm	PVDF	13 mm	100 pcs	CHS-SFPVDF-13/22
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 13 mm, 0.45 µm	PVDF	13 mm	100 pcs	CHS-SFPVDF-13/45
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 25 mm, 0.22 µm	PVDF	25 mm	100 pcs	CHS-SFPVDF-25/22
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 25 mm, 0.45 µm	PVDF	25 mm	100 pcs	CHS-SFPVDF-25/45
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 33 mm, 0.22 µm	PVDF	33 mm	100 pcs	CHS-SFPVDF-33/22
CHS FilterPure hydrophilic PVDF Syringe Filter, Blue, 33 mm, 0.45 µm	PVDF	33 mm	100 pcs	CHS-SFPVDF-33/45
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 13 mm, 0.22 µm	PTFE hydrophilic	13 mm	100 pcs	CHS-SFPTFE-13/22
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 13 mm, 0.45 µm	PTFE hydrophilic	13 mm	100 pcs	CHS-SFPTFE-13/45
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 25 mm, 0.22 µm	PTFE hydrophilic	25 mm	100 pcs	CHS-SFPTFE-25/22
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 25 mm, 0.45 µm	PTFE hydrophilic	25 mm	100 pcs	CHS-SFPTFE-25/45
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 33 mm, 0.22 µm	PTFE hydrophilic	33 mm	100 pcs	CHS-SFPTFE-33/22
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 33 mm, 0.45 µm	PTFE hydrophilic	33 mm	100 pcs	CHS-SFPTFE-33/45
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 13 mm, 0.22 µm	PTFE hydrophobic	13 mm	100 pcs	CHS-SFPTFE-13/22H
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 13 mm, 0.45 µm	PTFE hydrophobic	13 mm	100 pcs	CHS-SFPTFE-13/45H
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 25 mm, 0.22 µm	PTFE hydrophobic	25 mm	100 pcs	CHS-SFPTFE-25/22H
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 25 mm, 0.45 µm	PTFE hydrophobic	25 mm	100 pcs	CHS-SFPTFE-25/45H
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 33 mm, 0.22 µm	PTFE hydrophobic	33 mm	100 pcs	CHS-SFPTFE-33/22H
CHS FilterPure hydrophilic PTFE Syringe Filter, Red, 33 mm, 0.45 µm	PTFE hydrophobic	33 mm	100 pcs	CHS-SFPTFE-33/45H

VIALS and CAPS

2mL crimp vials

Description	Qty	Part number
Crimp vials		
2mL crimp vials, 12 x 32 mm, clear	100 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, clear with label	100 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, amber with label	100 pcs	[illegible]

Description	Qty	Part number
Caps for 1mL crimp vials		
11mm Al. crimp caps with centre hole/PTFE	100 pcs	[illegible]
11mm Al. crimp caps with centre hole/PTFE	100 pcs	[illegible]
11mm Al. crimp caps with centre hole/PTFE	1000 pcs	[illegible]
11mm Al. crimp caps with centre hole/ orange silicone/PTFE	100 pcs	[illegible]
11mm Al. crimp caps with centre hole/ orange silicone/PTFE	1000 pcs	[illegible]
11mm Al. crimp caps with cut-in aperture/PTFE	100 pcs	[illegible]
11mm Al. crimp caps with cut-in aperture/PTFE	1000 pcs	[illegible]
11mm Al. crimp caps with centre PTFE/silicone/PTFE	100 pcs	[illegible]
11mm Al. crimp caps with centre PTFE/silicone/PTFE	1000 pcs	[illegible]

Description	Qty	Part number
Combo pack vials crimp seals + caps with septa		
2mL crimp vials, 12 x 32 mm, clear and 11 mm Al. crimp caps with centre orange silicone/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, clear and 11 mm Al. crimp caps with cut-out centre silicone/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, clear and 11 mm Al. crimp caps with centre rubber/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, clear and 11 mm Al. crimp caps with centre silicone/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, amber with caps and 11 mm Al crimp caps with centre orange silicone/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, amber with caps and 11 mm Al crimp caps with cut-out centre silicone/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, amber with caps and 11 mm Al crimp caps with centre rubber/PTFE	1000 pcs	[illegible]
2mL crimp vials, 12 x 32 mm, amber with clear and 11mm Al crimp caps with centre silicone/PTFE	1000 pcs	[illegible]

2mL crimp vials

Description	Qty	Part number
Inserts for crimp vials and for short thread robotic vials		
250 µL, 5.6 x 29 mm, conical glass inserts with plastic feet	100 pcs	[illegible]
250 µL, 5.6 x 31 mm, conical glass inserts without plastic feet	1000 pcs	[illegible]
250 µL, 5.6 x 29 mm, conical plastic inserts with plastic feet	100 pcs	[illegible]
400 µL, 5.6 x 31 mm glass inserts with flat bottom	100 pcs	[illegible]

2 mL crimp vials

250 µL Insert CHS-INS-030

2mL screw robotic vials

Description	Qty	Part number
Short thread 2mL robotic screw vials		
2mL short thread robotic screw vials, 12 x 32 mm, clear with cut label	100 pcs	CAS-2-32C
2mL short thread robotic screw vials, 12 x 32 mm, clear with label	100 pcs	CAS-2-32CL
2mL short thread robotic screw vials, 12 x 32 mm, amber with label	100 pcs	CAS-2-32AL

Description	Qty	Part number
Caps for short thread 2mL robotic screw vials		
Blue plastic caps for robotic vials with septa rubber/PTFE	100 pcs	CAS-PS-007-1
Blue plastic caps for robotic vials with septa silicone/PTFE	100 pcs	CAS-PS-07-C
Blue plastic caps for robotic vials with septa silicone/PTFE	1000 pcs	CAS-PS-07-M
Blue plastic caps for robotic vials with bonded septa silicone/PTFE	100 pcs	CAS-PS-007-C
Blue plastic caps for robotic vials with bonded septa silicone/PTFE	1000 pcs	CAS-PS-007-M
Blue plastic caps for robotic vials with bonded 2 x 3 septa silicone/PTFE	100 pcs	CAS-PS-007-2x3-C
Blue plastic caps for robotic vials with pre-slit septa silicone/PTFE	100 pcs	CAS-PS-07-C1
Blue plastic caps for robotic vials with pre-slit septa silicone/PTFE	1000 pcs	CAS-PS-07-M
Blue plastic caps for micro vials with bonded pre-slit 2x3 septa silicone/PTFE	100 pcs	CAS-PS-007-2x3-C1

Description	Qty	Part number
Spare septa 9 mm for caps for short thread robotic screw vials		
9mm septa silicone/PTFE	100 pcs	CAS-9-07-C
9mm septa silicone/PTFE	1000 pcs	CAS-9-07-M
9mm septa PTFE/silicone/PTFE	100 pcs	CAS-9-7/7-C
9mm septa PTFE/silicone/PTFE	1000 pcs	CAS-9-7/7-M

Description	Qty	Part number
Combo pack vials short thread robotic vials + caps with septa		
Short thread 2mL robotic screw vials, 12 x 32 mm, clear with plain and blue plastic caps with septa silicone/PTFE	1000 pcs	CAS-2-SWC-007-BLUE-C
Short thread 2mL robotic screw vials, 12 x 32 mm, clear with label and blue plastic caps with bonded septa silicone/PTFE	1000 pcs	CAS-2-SWC-007-BLUE-CBND
Short thread 2mL robotic screw vials, 12 x 32 mm, clear with plain and blue plastic caps with pre-slit septa silicone/PTFE	1000 pcs	CAS-2-SWC-007-BLUE-PC
Short thread 2mL robotic screw vials, 12 x 32 mm, amber with label and blue plastic caps with septa silicone/PTFE	1000 pcs	CAS-2-SWA-007-BLUE-C
Short thread 2mL robotic screw vials, 12 x 32 mm, amber with label and blue plastic caps with pre-slit septa silicone/PTFE	1000 pcs	CAS-2-SWA-007-BLUE-PC

Note: Robotic short thread vials fit a number of auto injection systems, caps with pre-slit septa are right for these instruments.

4mL screw vials

Description	Qty	Part number
Screw vials 4 mL, 13-425 thread		
4mL screw vials, 15 × 45 mm, clear without label	100 pcs	[illegible]
4mL screw vials, 15 × 45 mm, clear with label	100 pcs	[illegible]
4mL screw vials, 15 × 45 mm, amber with label	100 pcs	[illegible]

Description	Qty	Part number
Caps for 4mL screw vials, 13-425 thread		
13-425 [illegible] plastic caps with septa silicone/PTFE	100 pcs	[illegible]
13-425 [illegible] plastic caps with septa silicone/PTFE	1000 pcs	[illegible]
13-425 [illegible] plastic caps with pre-slit septa silicone/PTFE	100 pcs	[illegible]

Description	Qty	Part number
Spare septa 13 mm for caps 13-425 thread		
13 mm septa silicone/PTFE	100 pcs	[illegible]
13 mm septa silicone/PTFE	1000 pcs	[illegible]

Headspace crimp vials

Description	Qty	Part number
Headspace crimp vials		
10mL headspace crimp vials, 23 × 46 mm, clear, rounded bottom	100 pcs	[illegible]
10mL headspace crimp vials, 23 × 46 mm, clear, flat bottom	100 pcs	[illegible]
20mL headspace crimp vials, 23 × 75 mm, clear, rounded bottom	100 pcs	[illegible]
20mL headspace crimp vials, 23 × 75 mm, clear, flat bottom	100 pcs	[illegible]
20mL headspace crimp vials, 23 × 75 mm, amber, rounded bottom	100 pcs	[illegible]

Description	Qty	Part number
20mm bimetallic crimp caps for headspace vials		
20mm bimetallic crimp caps with septa silicone/PTFE	100 pcs	[illegible]
20mm bimetallic crimp caps with septa silicone/PTFE	1000 pcs	[illegible]
20mm bimetallic crimp caps with septa silicone translucent [illegible]/PTFE	100 pcs	[illegible]
20mm bimetallic crimp caps with septa silicone translucent [illegible]/PTFE	1000 pcs	[illegible]

Description	Qty	Part number
20mm magnetic steel crimp caps for headspace vials		
20mm magnetic steel crimp caps with septa silicone/PTFE	100 pcs	[illegible]
20mm magnetic steel crimp caps with septa silicone/PTFE	1000 pcs	[illegible]
20mm magnetic steel crimp caps with [illegible] septa silicone/PTFE	100 pcs	[illegible]
20mm magnetic steel crimp caps with [illegible] septa silicone/PTFE	1000 pcs	[illegible]

Description	Qty	Part number
20mm aluminium crimp caps for headspace vials		
20mm aluminium crimp caps with septa silicone/PTFE	100 pcs	[illegible]
20mm aluminium crimp caps with septa silicone/PTFE	1000 pcs	[illegible]
20mm aluminium crimp caps with [illegible] septa silicone/PTFE	100 pcs	[illegible]
20mm aluminium crimp caps with [illegible] septa silicone/PTFE	1000 pcs	[illegible]
20mm aluminium crimp caps with septa silicone translucent [illegible]/PTFE	100 pcs	[illegible]
20mm aluminium crimp caps with septa silicone translucent [illegible]/PTFE	1000 pcs	[illegible]

Description	Qty	Part number
Spare septa 20mm for crimp headspace vials		
20mm septa silicone/PTFE, thickness [illegible]	100 pcs	[illegible]
20mm septa silicone/PTFE, thickness [illegible]	1000 pcs	[illegible]
20mm septa silicone translucent [illegible]/PTFE, thickness [illegible]	100 pcs	[illegible]
20mm septa silicone translucent [illegible]/PTFE, thickness [illegible]	1000 pcs	[illegible]

[illegible]

Headspace vials

VIALS and CAPS

Headspace screw vials

Description	Qty	Part number
Headspace screw vials		
10mL headspace screw vials, 22 × 45 mm, clear, round bottom	100 pcs	[illegible]
20mL headspace screw vials, 22 × 75 mm, clear, round bottom	100 pcs	[illegible]

Description	Qty	Part number
Magnetic caps with septa for screw headspace vials		
Magnetic caps with silicone/PTFE septa for screw headspace vials, thickness 2 mm	100 pcs	[illegible]
Magnetic caps with silicone/PTFE septa for screw headspace vials, thickness 1.5 mm	100 pcs	[illegible]

Description	Qty	Part number
Spare septa 18 mm for screw headspace vials		
18mm septa silicone/PTFE for screw headspace vials, thickness 3 mm	100 pcs	[illegible]
18mm septa silicone/PTFE for screw headspace vials, thickness 3 mm	1000 pcs	[illegible]
18mm septa silicone/PTFE for screw headspace vials, thickness 1.3 mm	100 pcs	[illegible]
18mm septa silicone/PTFE for screw headspace vials, thickness 1.3 mm	1000 pcs	[illegible]

Description	Qty	Part number
Spare magnetic caps for screw headspace vials		
Magnetic cap for screw headspace vials	100 pcs	[illegible]

Screw headspace caps with septa

Crimping and decapping tools

Manual Crimpers and Decappers

- Easily viewed adjustment knob
- Strong light weight plastic body
- Bottom pull handle design prevents wobbling

High Power Crimping Tool

Fastest and most powerful CRS crimping tool

- Strong enough for all steel and magnetic caps
- Designed with external power source and cord (no battery)
- Uses interchangeable jaw sets (ordered separately)

Manual crimpers	Qty	Part number
20mm Crimper	1 pc	[illegible]
11mm Crimper	1 pc	[illegible]
13mm Crimper	1 pc	[illegible]
13mm Crimper for Flip Off Caps*	1 pc	[illegible]
20mm Crimper	1 pc	[illegible]
20mm Crimper for Flip Off Caps*	1 pc	[illegible]

* Not to use with 11mm caps

Manual decappers	Qty	Part number
11mm Decapper	1 pc	[illegible]
13mm Decapper	1 pc	[illegible]
20mm Decapper	1 pc	[illegible]

High power electronic tool	Qty	Part number
High Power Electronic Crimping Tool**	1 pc	[illegible]
20mm Crimper jaw	1 pc	[illegible]
11mm Crimper jaw	1 pc	[illegible]
13mm Crimper jaw	1 pc	[illegible]
13mm Crimper jaw for Flip Off Caps*	1 pc	[illegible]
20mm Crimper jaw	1 pc	[illegible]
20mm Crimper jaw for Flip Off Caps*	1 pc	[illegible]
11mm Decapper jaw	1 pc	[illegible]
13mm Decapper jaw	1 pc	[illegible]
20mm Decapper jaw	1 pc	[illegible]

* Not to use with 11mm caps

** Jaws need to be ordered separately

Manual crimper

High power electric crimper

CONTENTS

Chromservis HPLC columns corresponding to Pharmacopoeia methods

USP Code	Description	Corresponding column
L1	Chemically bonded to porous or nonporous microparticles or superficially porous particles of silica gel. 1.5–10 µm in diameter, or a monolithic rod.	ARION® Pur C18 ARION® Pur C18 ADTRAP C18 AQ ADTRAP C18 ADS ADTRAP C18 HR CHROMSPHERE™ C18 PUR CHROMSPHERE™ C18 HR CHROMSPHERE™ C18 Polar
L3	Porous silica particles or superficially porous particles, 1.5–10 µm in diameter, or a monolithic rod.	ARION® Sil-C Plus ARION® Si ADTRAP Si
L7	Octylsilane chemically bonded to totally porous or superficially porous silica particles 1.5–10 µm in diameter, or a monolithic rod.	ARION® C8 ADTRAP C8 AQ ADTRAP C8 ADS
L8	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 1.5–10 µm in diameter, or a monolithic silica rod.	ARION® NH2
L9	Irregular or spherical, totally porous silica gel having a chemically bonded strongly acidic cation exchange coating, 3 to 10 µm in diameter.	ARION® SCX
L10	Nitrile groups chemically bonded to porous silica particles or superficially porous particles, 1.5–10 µm in diameter, or a monolithic silica rod.	ARION® CN
L11	Phenyl groups chemically bonded to porous or superficially porous silica particles, 1.5–10 µm in diameter, or a monolithic silica rod.	ARION® Butenyl ARION® Phenyl-Hexyl ECTRA® Phenyl-Hexyl HR
L13	Silica gel having a chemically bonded, strongly basic quaternary ammonium anion exchange coating, 5–10 µm in diameter.	ARION® SAX
L17	Strong cation exchange resin consisting of sulfonated, cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 5–12 µm in diameter.	ADTRAP Sugar H84
L19	Strong cation exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, 5–15 µm in diameter.	ADTRAP Sugar Ca56
L20	Dihydroxypropane groups chemically bonded to porous silica particles, 1.5–10 µm in diameter, or a monolithic silica rod.	ADTRAP Diol
L21	Pentafluorophenyl groups chemically bonded to porous or superficially porous silica particles by a propyl spacer, 1.5–10 µm in diameter.	ARION® PFP
L26	Butylsilane chemically bonded to totally porous silica particles, 1.5–10 µm in diameter, or a monolithic silica rod.	ARION® C4

Use our application database. The Chromservis website has a search engine to find an application based on different keywords, e.g. compound name, trivial name, formula etc.

OUR BROCHURES

NOTES

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CHROMSERVIS DataApex

Some chromatograms were evaluated by Clarity® Chromatography Station (DataApex Ltd.)
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