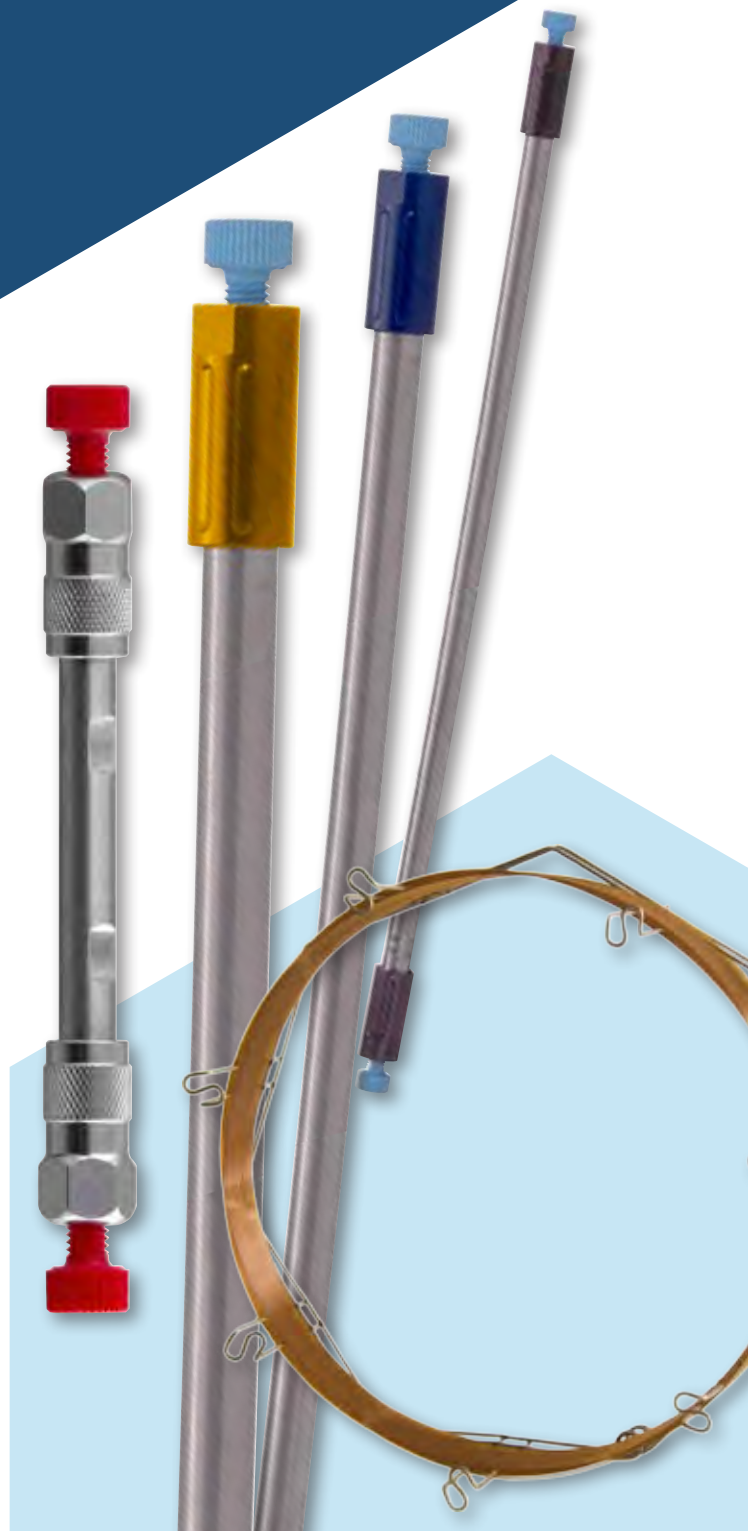
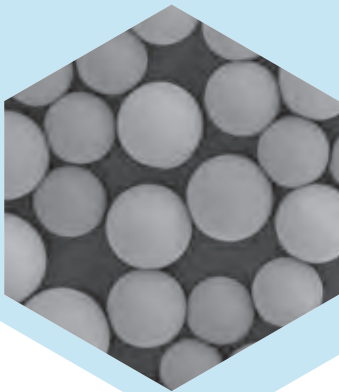




CHROMATOGRAPHY

Product Guide

Everything
for your
applications



ARIDON

CHROM
SHELL

ASTRA

WHAT IS NEW

ASTRA® HPLC columns

New ASTRA® HPLC columns are complementary to our ARION® brand. These columns offer not only a high-end-capped C18 phase, but also a unique DM phase with dual modification. Another novel phase C18-AQ offers dual chemistry bonding for analyses in aqueous mobile phases.

See page 50.



ARION® SAX/SCX phases

New ARION® SAX and SCX columns extend the HPLC column range into ion-exchanged chromatography.

See page 8.



ASTRA® guard cartridges

ASTRA® guard cartridges extend the successful AGS system.



Certificate No.: 2010195910

tayllorcox.com
ensure your certification

Certificate

Quality Management System

Chromservis s.r.o.

Identification No.: 25086227
Jakobiho 327/3
109 00 Praha-Petrovice - Petrovice
Site: Kamenice 771/34, 625 00 Brno
Hlubinská 12/1385, 702 00 Ostrava

has been examined and found in conformity with requirements of the standard

ISO 9001:2015

for the following range of activities:

**Trading in analytical instrumentation, control and detection technologies, chemicals and laboratory equipment.
Servicing analytical instrumentation, detection and measuring systems.
Consulting in the field of instrumentation analysis, gas detection and measuring systems.**

Date of the initial certification:	17. 10. 2011
Date of the current certification cycle:	15. 10. 2020
This certificate is valid until:	14. 10. 2023

Ing. Radek Nedvěd
Head of Certification Body
In Prague on 19 October 2020

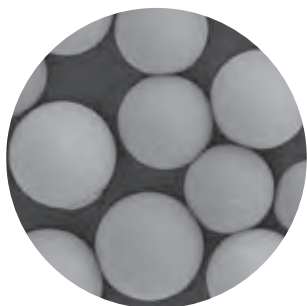


The certificate was issued by **TAYLLORCOX s.r.o.**
Na Florenci 1055/35, Staré Město - Praha 1, CZ 110 00, audit@tayllorcox.com, www.tayllorcox.cz
To check this certificate validity please call the phone number: +420 725 536 797
Member of: TAYLLORCOX UK Ltd., 75 King William St., EC4N, London, United Kingdom, audit@tayllorcox.com



As ARION® is one of the latest 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	5 µm	2.2 µm
Metal content	<10 ppm	<10 ppm
Temperature stability	100 °C*	100 °C*
Mean particle diameter	5.3 ± 0.9 µm	2.5 ± 0.5 µm
Proximity to the shape of a sphere	0.96 ± 0.04	0.97 ± 0.03

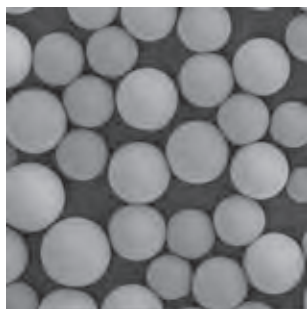
* Depends on mobile phase used and silica bonding.

ARION® phases	Particle size (µm)	Pore size (Å)	Surface area (m ² /g)	Carbon load	pH stability	Endcapping	100% aqueous mobile phase	USP code
Plus C18	1.7, 2.2, 3, 5, 10, 15	100	420	18 %	1.0 to 10	Multi-step	×	L1
Polar C18*	2.2, 3, 5, 10, 15	120	325	16 %	1.5 to 7	Multi-step	✓	L1
C8	3, 5	120	325	11 %	2.0 to 7	Single-step	×	L7
Phenyl-Butyl	2.2, 3, 5	100	300	12 %	1.5 to 7.5	Single-step	×	L11
NH ₂	2.2, 3, 5	120	325	5 %	2.0 to 6.5	Proprietary	×	L8
CN	3, 5, 10	120	325	8 %	2.0 to 7	Single-step	×	L10
HILIC Plus	2.2, 3, 5	100	420	-	1.5 to 7	Proprietary	✓	L3
Si	2.2, 3, 5, 10	100	420	-	1.5 to 7	-	×	L3
SAX	5	120	325	-	1.0 to 7.5	-	×	L14
SCX	5	120	325	-	1.0 to 7.5	-	×	L50

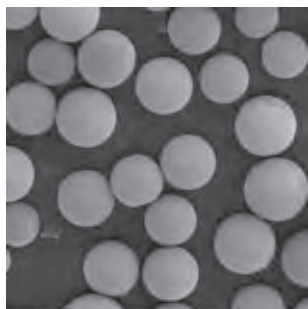
* Note: Unique selectivity for Amino Acid and small molecules.

What does ARION® quality look like?

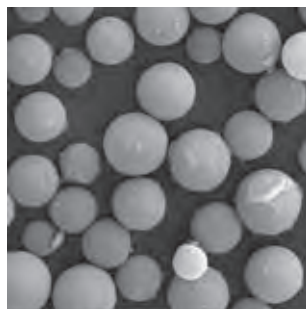
ARION® particles have a very tight distribution and the closest proximity to the shape of a spherical particle ($c=0.9618 \pm 0.0353$). This ensures high separation power and separation reproducibility.



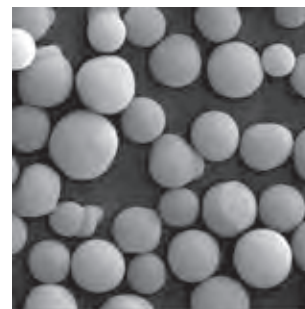
ARION®



Competitor L



Competitor X



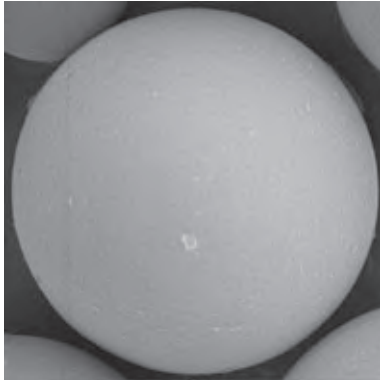
Competitor E

SEM HV analysis 20.0 kV, view field 30 µm (by independent laboratory)

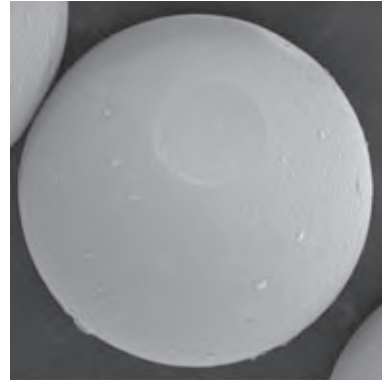
The ARION® medium does not include broken or “potato-shaped” particles. The silica spherical shape is unique; both surface uniformity and surface smoothness enable better packing into HPLC columns and therefore paramount chromatography resolution and reproducibility.

Up close

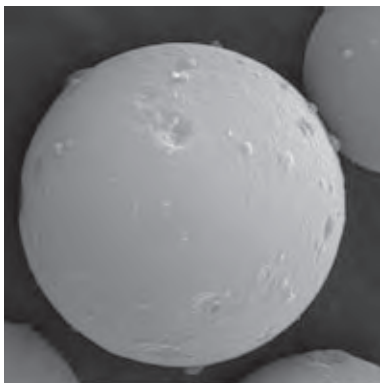
The 5-micron electron microscope field clearly shows the highest quality of ARION® 5µm particles.



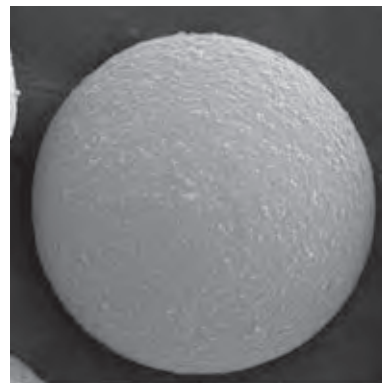
ARION® particle 5 µm



Competitor L particle 5 µm



Competitor X particle 5 µm

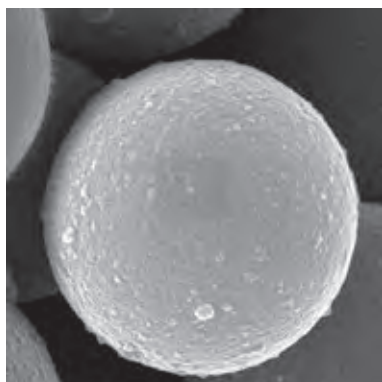


Competitor E particle 5 µm

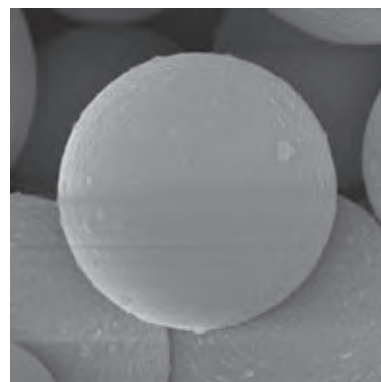
Main particle characteristics:

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

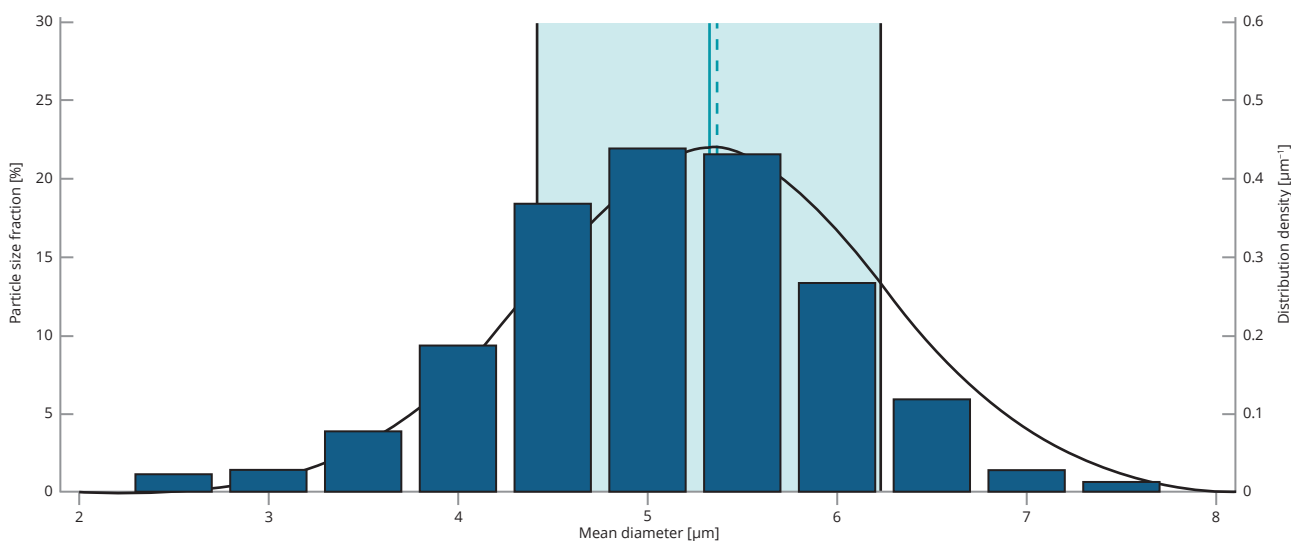
Particle size distribution



ARION® particle 1.7 µm



ARION® particle 2.2 µm

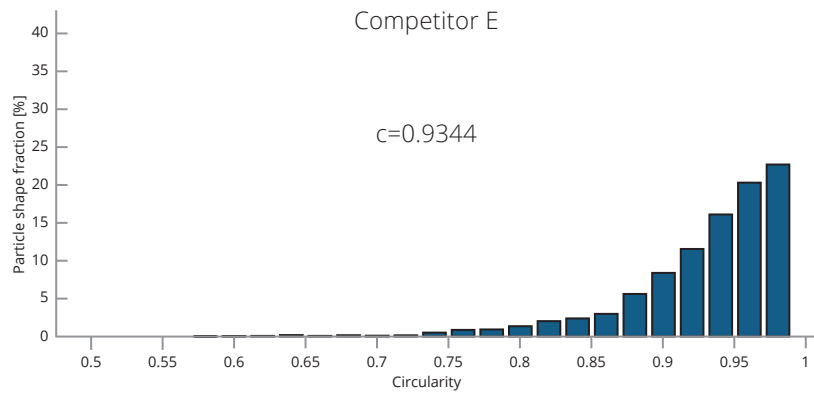
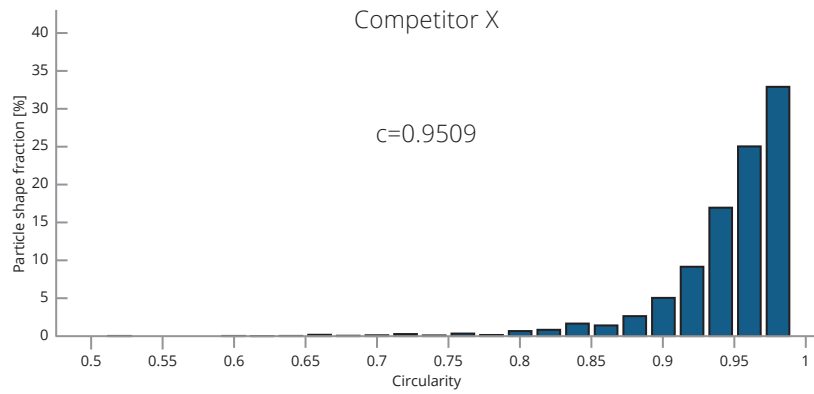
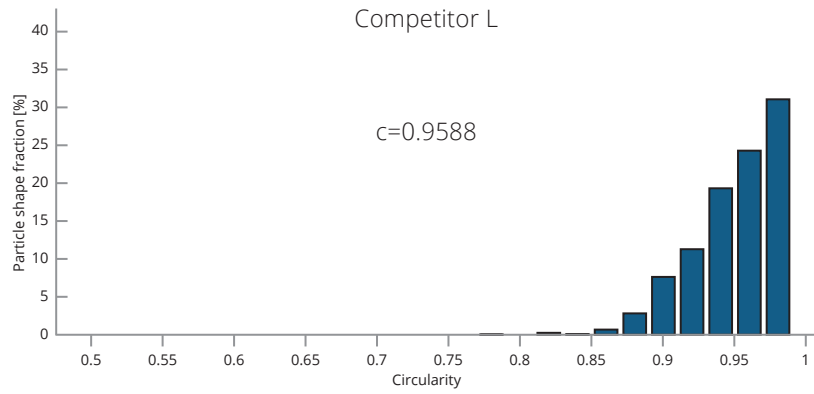
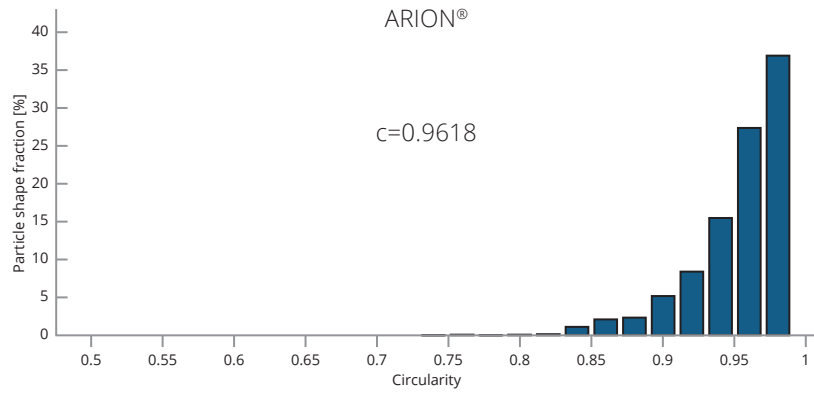


Particle size distribution of ARION® 5 µm particles shows a tight profile calculated from ferret figures by SEM.

ARION® column hardware:

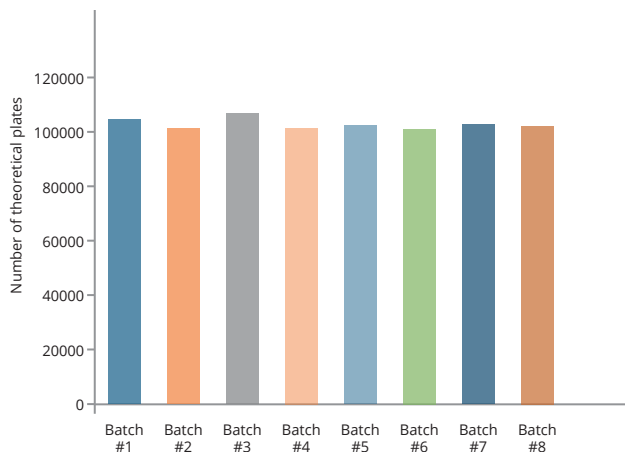
- Modern column hardware for easy handling in a narrow space.
- UHPLC grade Stainless Steel with an amazingly smooth internal surface.
- Colour coded fittings.

Circularity

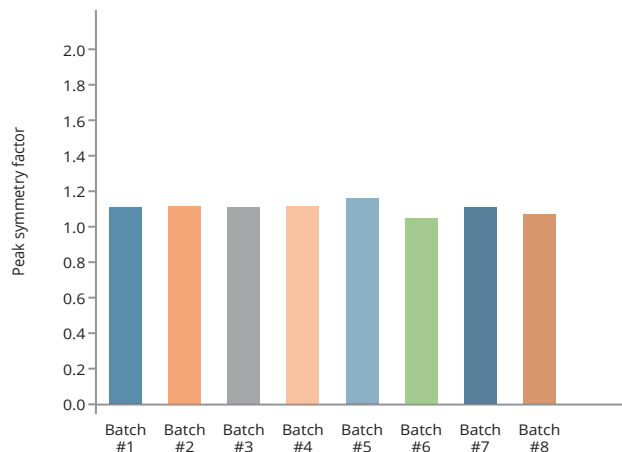


Batch to batch reproducibility

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



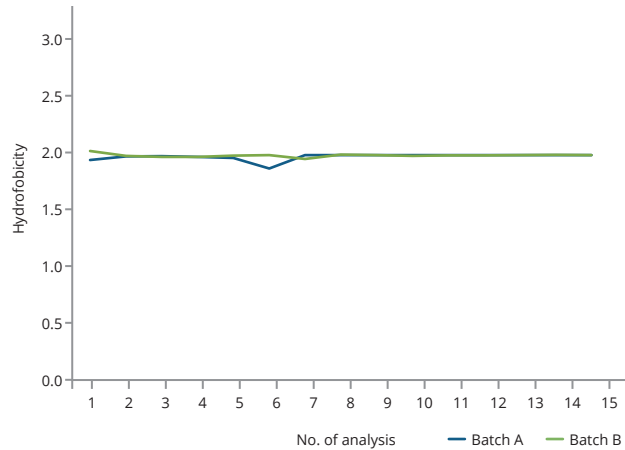
Theoretical plates reproducibility



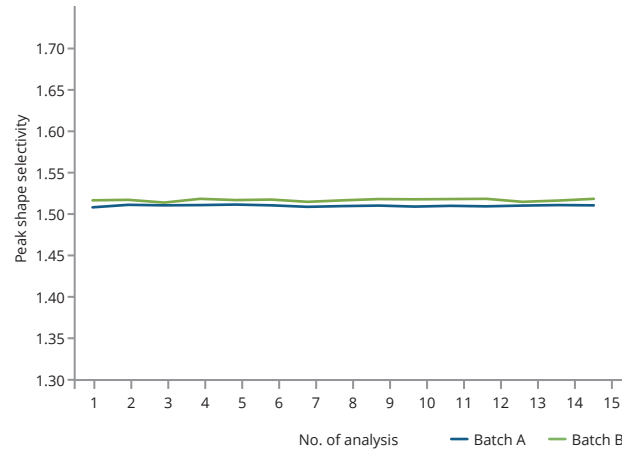
Symmetry reproducibility

Both the silanol activity and hydrofobicity tests are defined e.g. by the Engelhardt test. The hydrofobicity test is based on calculation of the ratio of retention factors $k_{\text{ethylbenzene}}/k_{\text{toluene}}$. 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 $k_{\text{triphenylene}}/k_{\text{o-terpenyl}}$.

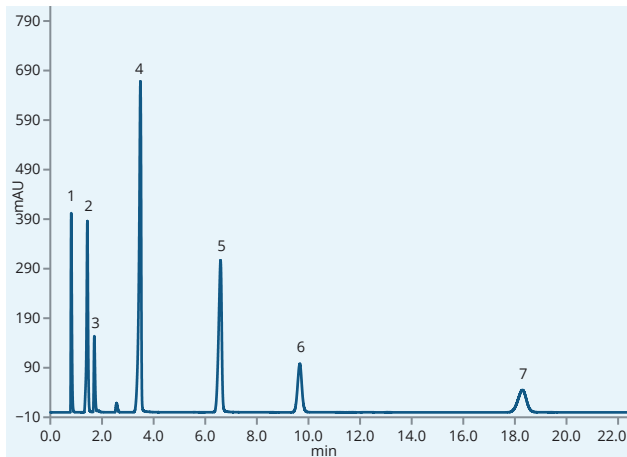


Hydrofobicity test

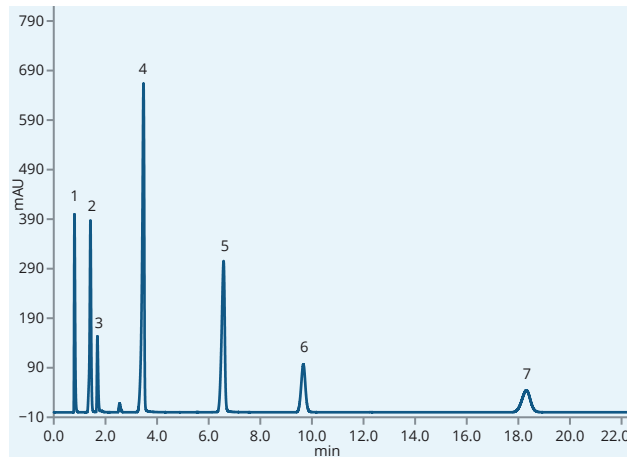


Peak shape selectivity

Batch to batch reproducibility



Batch A

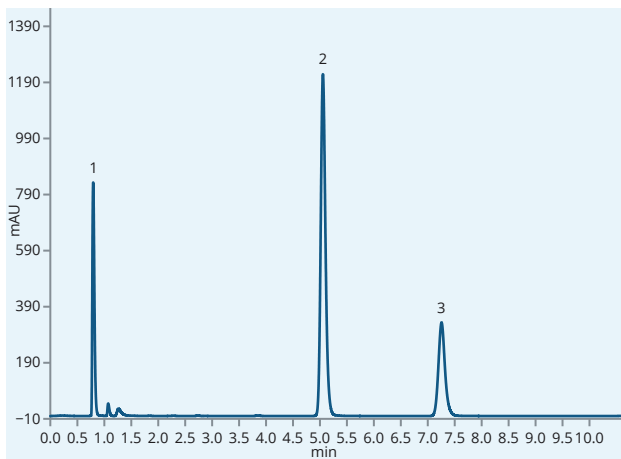


Batch B

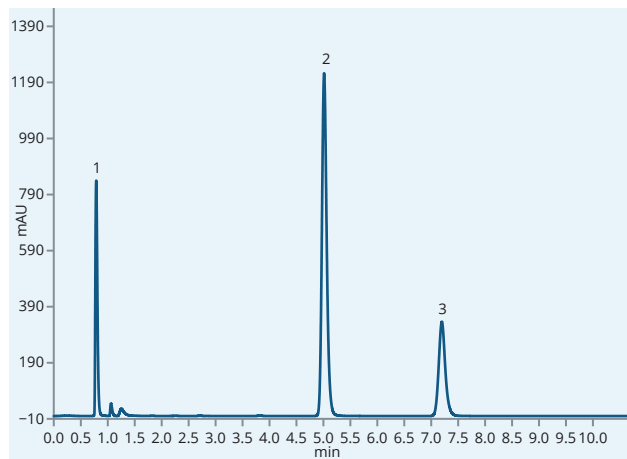
Analysis of two batches based on the Engelhardt test.

Column	ARION® Plus C18, 1.7 µm
Dimensions	100 mm × 2.1 mm
Mobile phase	Methanol : water 49/51 (v/v) Isocratic elution
Flow rate	0.3 ml/min
Temperature	40 °C

Analytes	1. Uracil (t_R) 2. Aniline 3. Phenol 4. N,N-dimethyl-aniline 5. p-Ethyl-aniline 6. Toluene 7. Ethylbenzene
-----------------	--



Batch A



Batch B

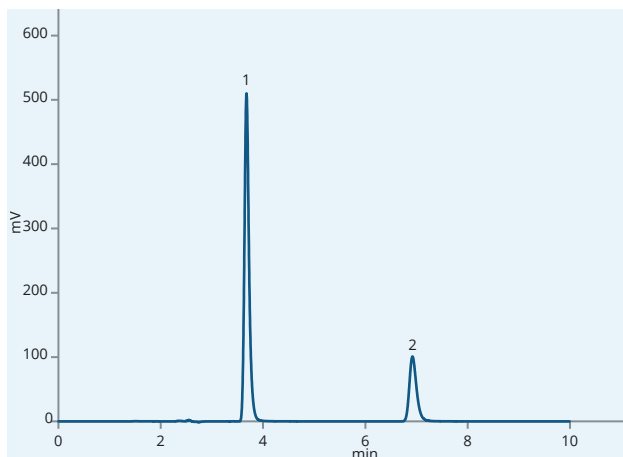
Analysis of two batches based on the Shape selectivity test.

Column	ARION® Plus C18, 1.7 µm
Dimensions	100 mm × 2.1 mm
Mobile phase	Methanol : water 79/21 (v/v) Isocratic elution
Flow rate	0.3 ml/min

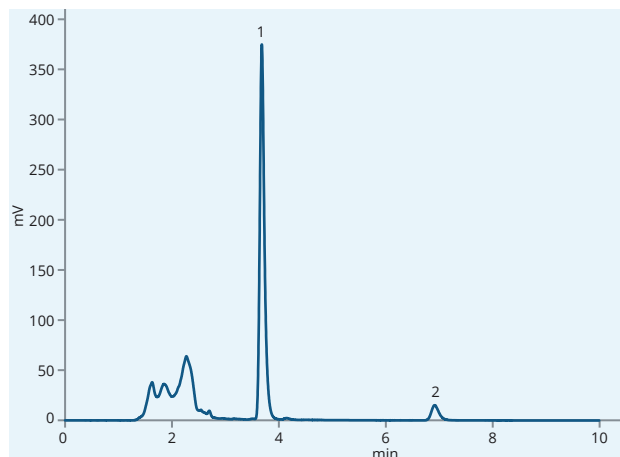
Temperature	40 °C
Analytes	1. Uracil (t_R) 2. Triphenylene 3. o-Terpenyl

Alcaloids – xanthine derivatives

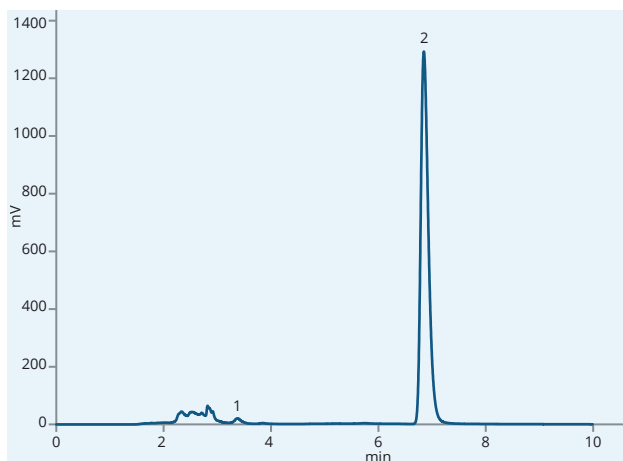
Xanthine alkaloids occur naturally in various plants, such as cocoa, tea and coffee trees. They are commonly used for their effects as mild stimulants. Xanthine alkaloids are monitored in food and drinks, e.g. in chocolate, cocoa powder, and energy drinks.



Theobromine and caffeine standard



Cocoa sample

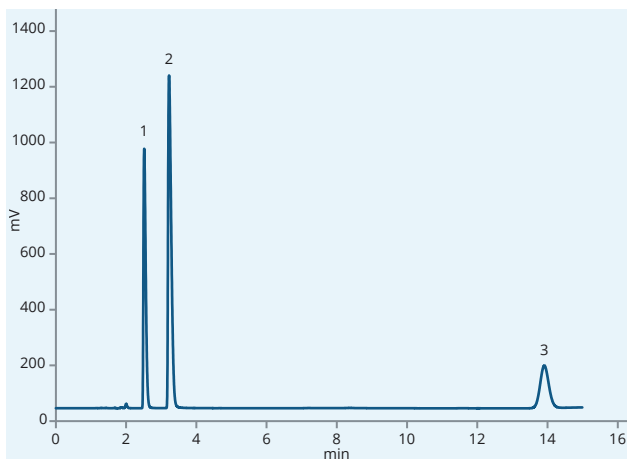


Energy drink

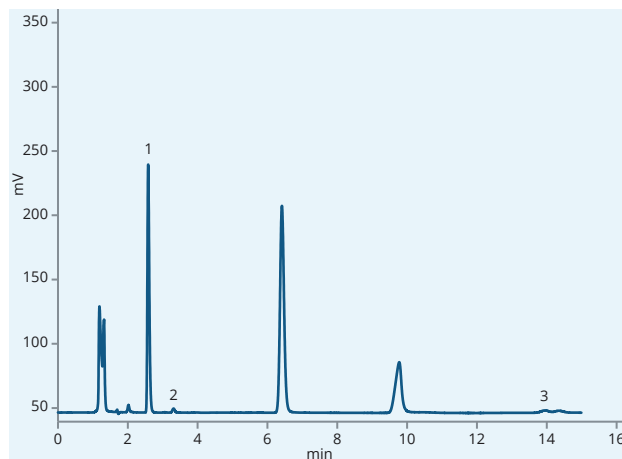
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Methanol : water 30/70 (v/v)
Flow rate	1.0 ml/min
Temperature	30 °C
Detection	UV @280 nm
Analytes	1. Theobromine 2. Caffeine

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

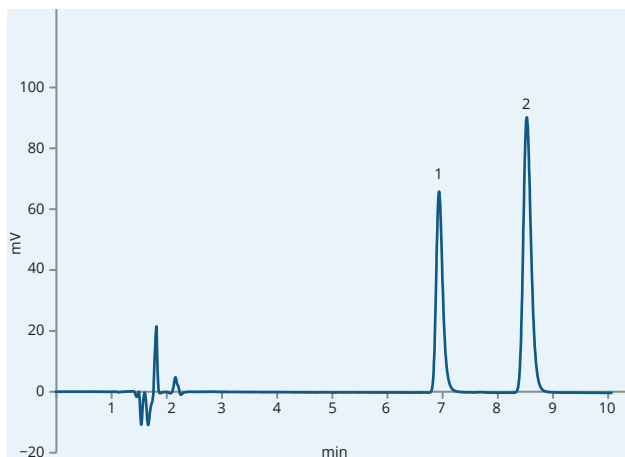


Energy drink

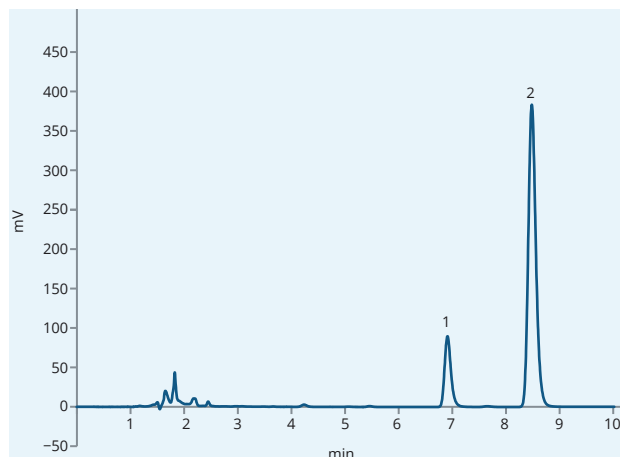
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	20 mM KH ₂ PO ₄ : ACN 90/10 (v/v)
Flow rate	2.0 ml/min
Temperature	30 °C
Detection	UV @220 nm
Analytes	1. Acesulfame-K (ACS-K) 2. Saccharin (SAC) 3. Aspartame (ASP)

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



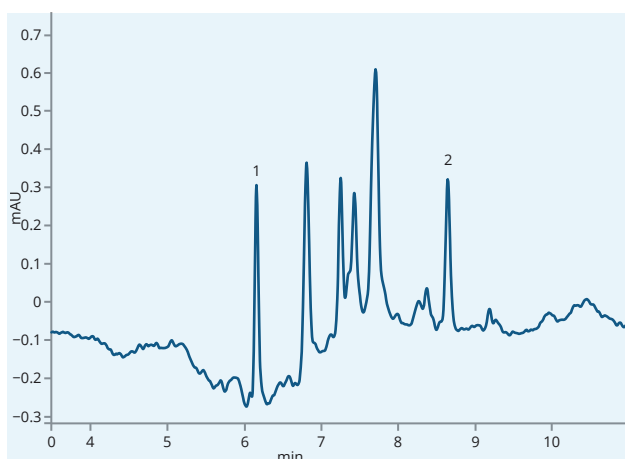
Fruit syrup sample

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Citrate buffer pH 4.1 : ACN : MeOH 70/20/10 (v/v/v)

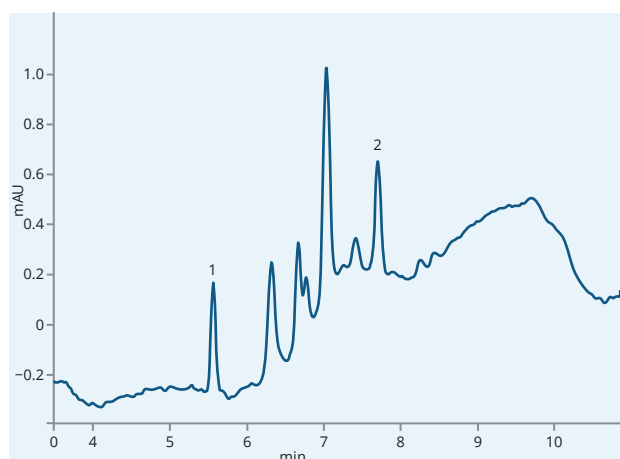
Flow rate	1.5 ml/min
Temperature	30 °C
Detection	UV @240 nm
Analytes	1. Sodium benzoate 2. Potassium sorbate

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



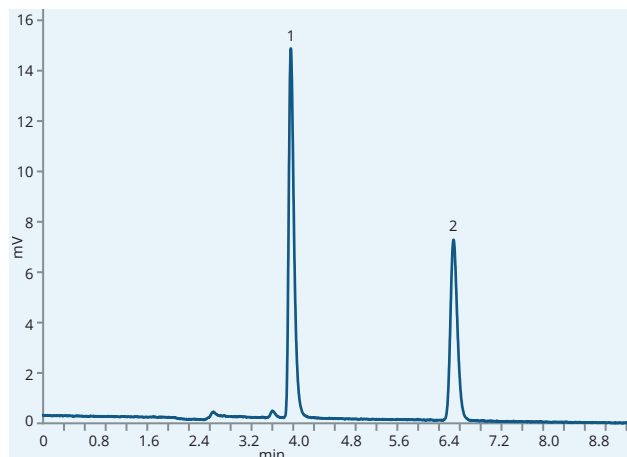
Matrix standard on competitive column (Competitor LI)

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Citrate buffer pH 4.1 : ACN : MeOH 70/20/10 (v/v/v)

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.

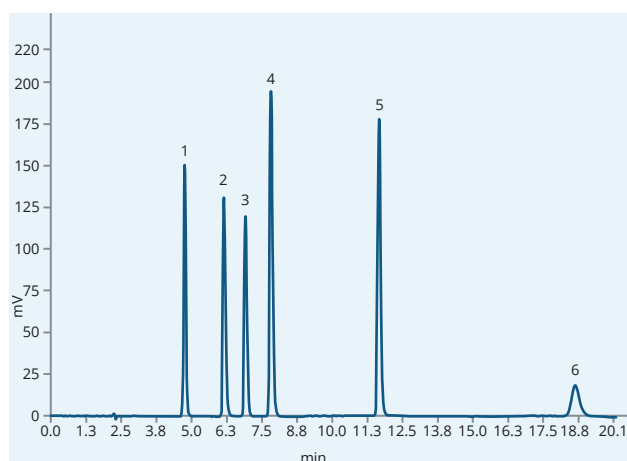


Column	ARION® Polar C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5721-LM46
Mobile phase	0.05% H ₃ PO ₄
Flow rate	1.0 ml/min
Temperature	30 °C
Detection	UV @207 nm
Analytes	1. Formic acid 2. Acetic acid

Standard mixture

Drink additives

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



Column	ARION® Plus C18, 5.0 µm
Dimensions	150 mm × 4.6 mm
Part number	ARI-5720-LK46
Mobile phase	Acetonitril : methanol : 17.5 mmol/l KH ₂ PO ₄ 0.1 mol/l NaOH > pH=6.0 gradient according table below*
Temperature	Ambient
Detection	UV @214 & 230 nm
Analytes	1. Acesulfame-K 2. Benzoic acid 3. Saccharin 4. Sorbic acid 5. Caffeine 6. Aspartame

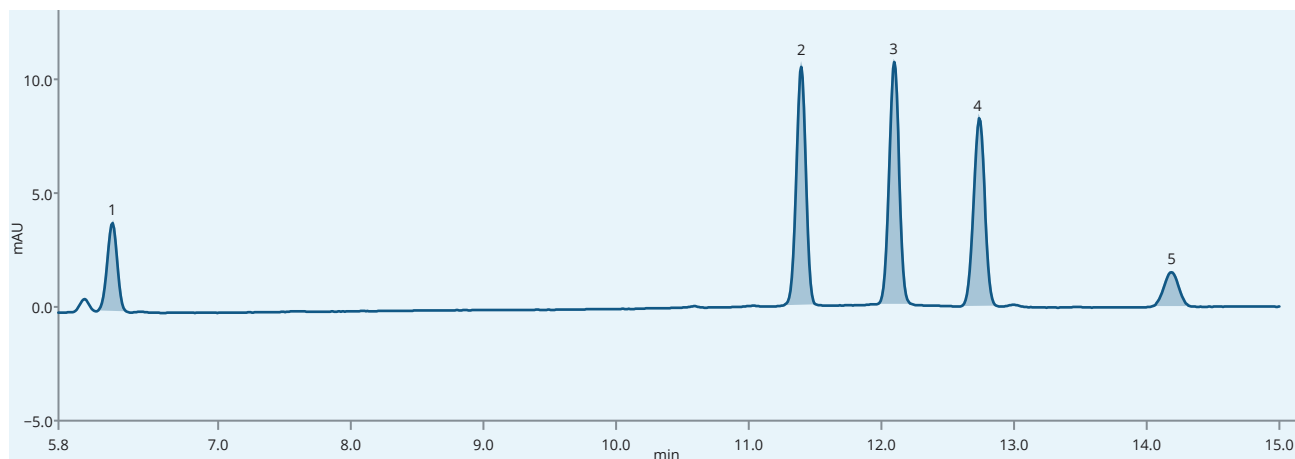
Standard mixture

* Gradient program

Time (min)	Flow rate (ml/min)	Wavelength (nm)	A (%) (Water)	B (%) 17.5M KH ₂ PO ₄	C (%) Acetonitrile	D (%) Methanol
0	1.3	230	0	90	2	8
7	1.5	214	0	80	8	12
14	1.5	214	0	80	8	12
15	1.3	214	0	90	2	8
17	1.3	214	0	90	2	8

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.

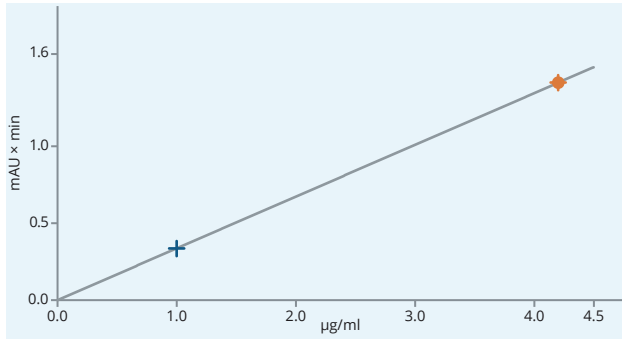


Standard on ARION® column

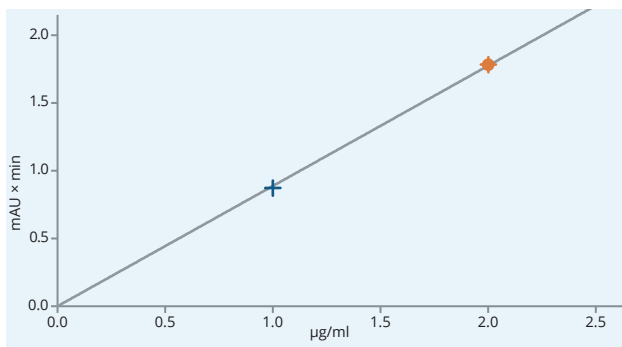
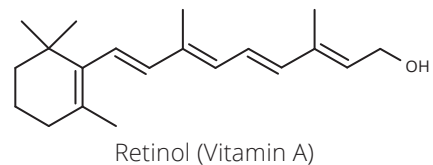
Column	ARION® Plus C18, 3 µm		
Dimensions	100 mm × 4.6 mm		
Part number	ARI-5720-II46		
Mobile phase	A: Water B: Methanol		
Gradient elution	Time	A (%)	B (%)
	0	15	85
	10	0	100
	18	0	100
Flow rate	1.0 ml/min		
Temperature	40 °C		
Injection volume	5.0 µl		
Detection	UV @284 nm		
Analytes	1. Retinol (Vitamin A) 2. Delta-tocopherol (D-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

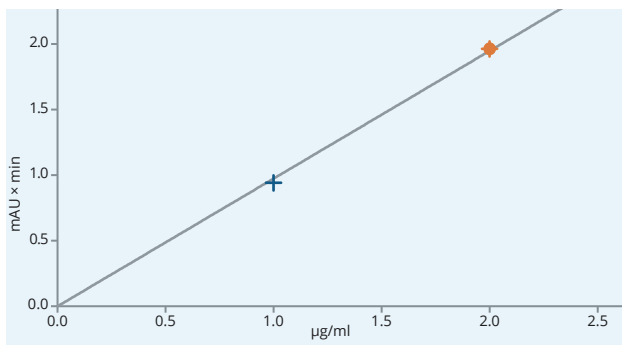
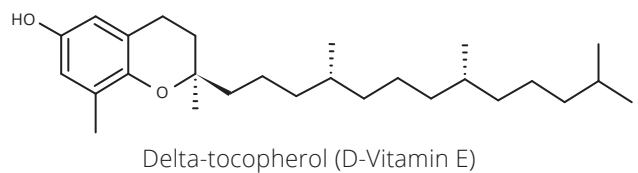
Calibration curves of analytes



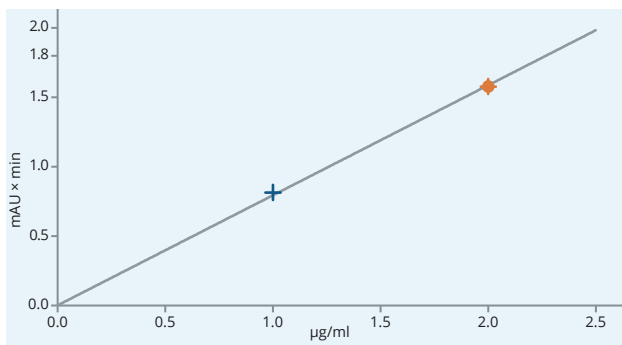
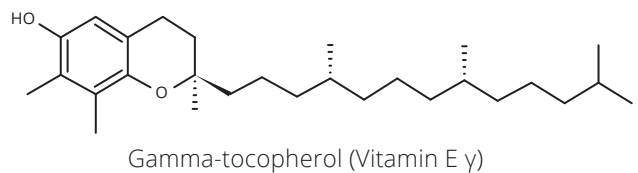
Retinol (Vitamin A)



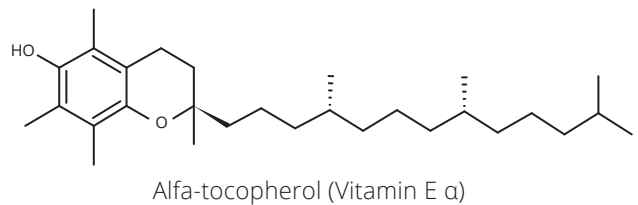
Delta-tocopherol (D-Vitamin E)



Gamma-tocopherol (Vitamin E γ)



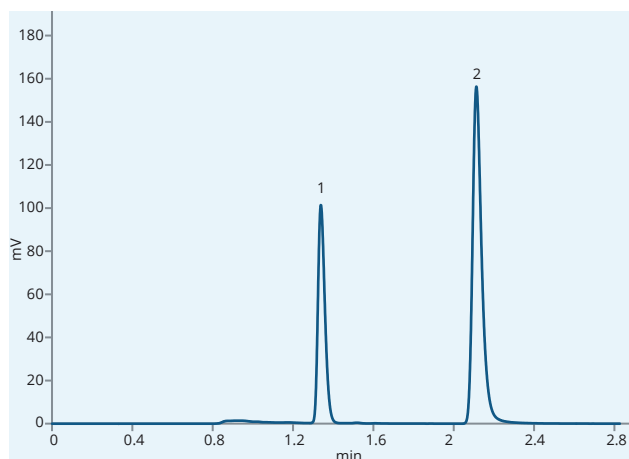
Alfa-tocopherol (Vitamin E α)



This application has been developed by WESSLING Hungary Kft.

Denatonium Benzoate

Denatonium benzoate (CAS Number 3734-33-6) is sold under various brand names, e.g. Denatrol, BITTERANT-b, BITTER+PLUS, Bitrex and Aversion. It is considered the most bitter compound by the whole world, which is why it is used as a denaturant of ethanol to prevent its misuse. This application shows fast isocratic elution to enhance productivity in the laboratory.

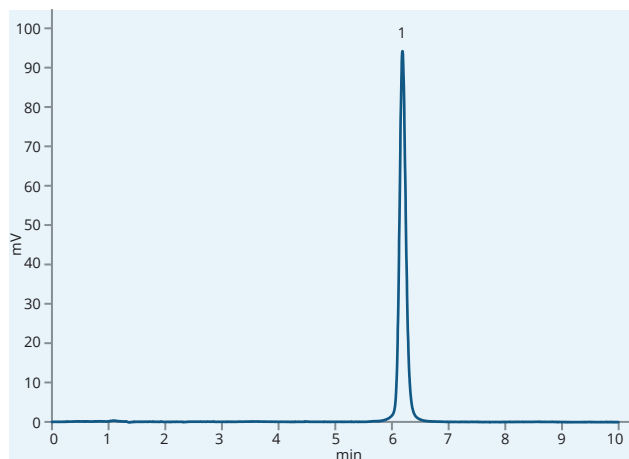


Ethanol sample

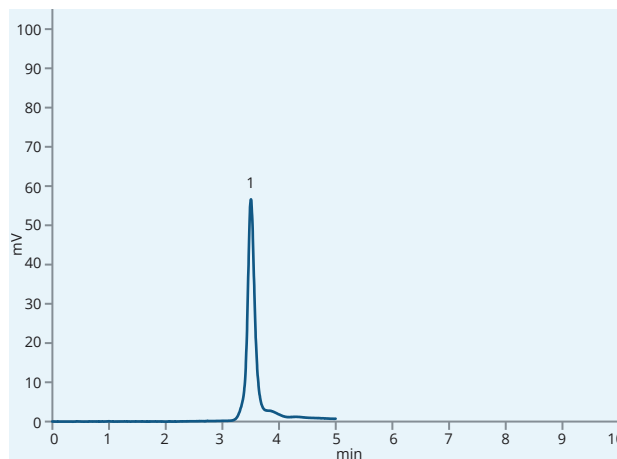
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	A : B 50/50 (v/v) A: Acetonitrile B: 0.5% H ₃ PO ₄ in mili-Q water, (pH = 2) Isocratic elution
Flow rate	2.0 ml/min
Temperature	Ambient
Detection	UV @230 nm (ref. 550 nm, 100 nm BW)
Analytes	1. Benzoic acid 2. Denatonium

HMF in syrup

5-Hydroxymethylfurfural (5-HMF) is formed from fructose or glucose by the heat treatment of food. HMF and its derivatives/metabolites are genotoxic, mutagenic and may be carcinogenic, which is why HMF is analysed in various food matrices, such as in fruit and vegetable products, instant coffee and honey.



Standard mixture on ARION® column

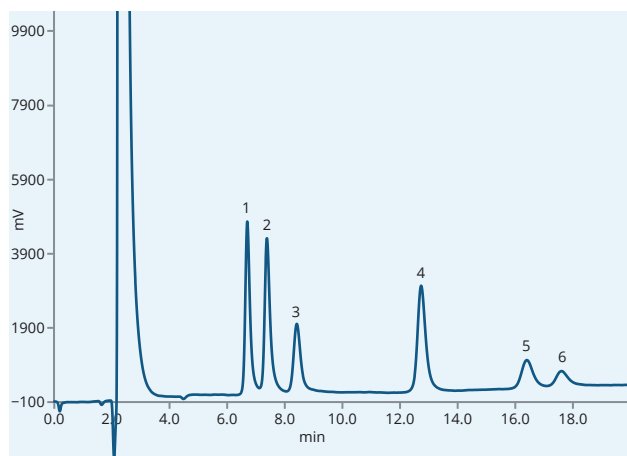


Comparison with core-shell column (Competitor K)

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Methanol : water 10/90 (v/v) Isocratic elution
Flow rate	1.5 ml/min
Temperature	30° C
Detection	UV @285 nm
Analytes	1. Hydroxymethylfurfural

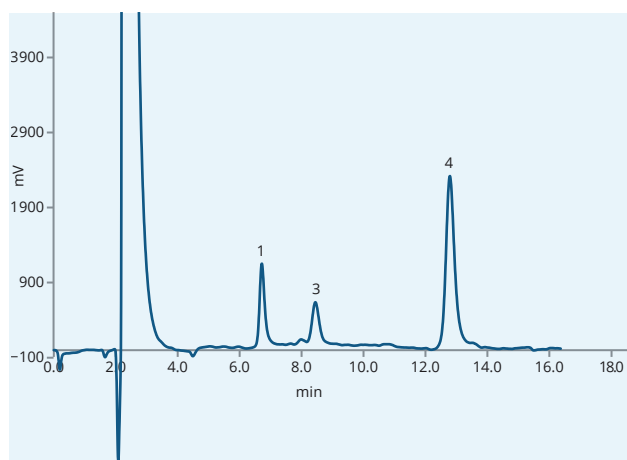
Monosaccharides, disaccharides and sugar alcohol

The analysis of saccharides and sugar alcohol is one of the most common criteria in food and beverage analyses in the QC departments of manufacturers and the monitoring of authorities. This analysis of sugars and sugar alcohols is also used to detect food and beverage adulteration.

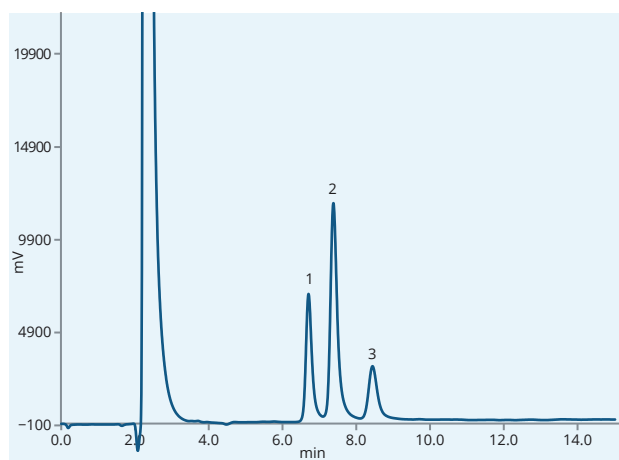


Column	ARION® NH ₂ , 5 μm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5736-LM46
Mobile phase	ACN/water 75/25 (v/v) Isocratic elution
Flow rate	1.5 ml/min
Temperature	35 °C
Detection	RID
Analytes	1. Fructose 2. Sorbitol 3. Glucose 4. Sucrose 5. Maltose 6. Lactose

Analysis of standard on ARION® column



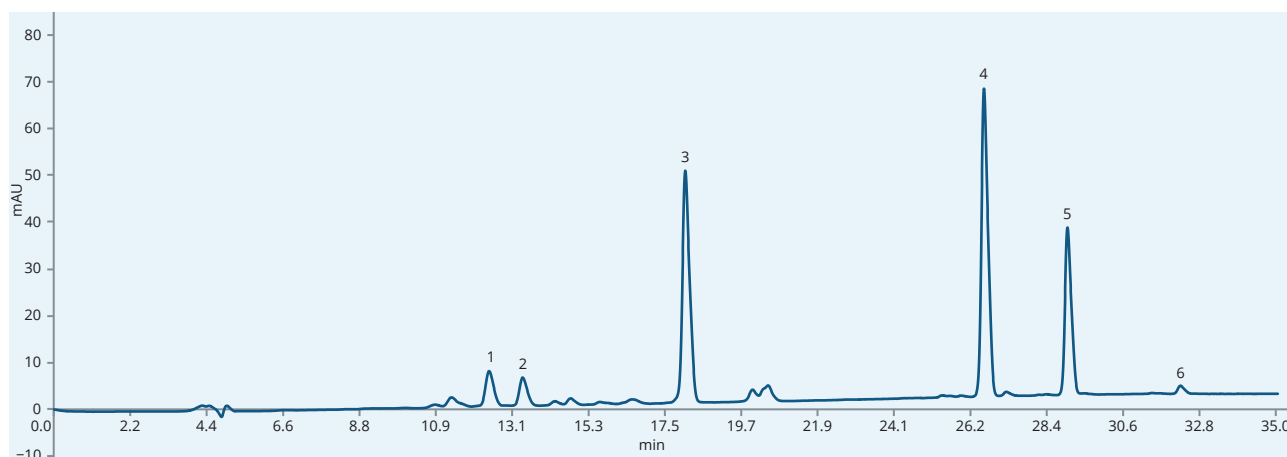
Analysis of carrot juice on ARION® column



Analysis of Aronia (chokeberry) juice on ARION® column

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 are 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.

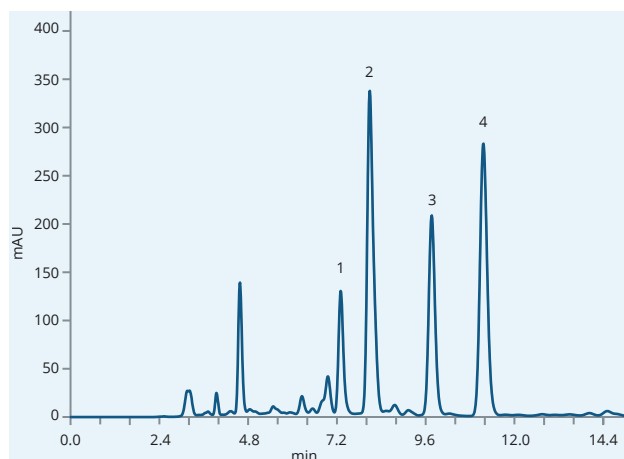


Wheat extract on ARION® column

Column	ARION® C8, 5 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5734-LM46
Mobile phase	A: Methanol : Acetonitrile : 0.25M pyridine 32/14/54 (v/v/v) B: Methanol : Acetonitrile : Acetone 20/60/20 (v/v/v)
Gradient	Linear gradient of solvent B (60–100 % in 25 min) followed by 100 % solvent B
Flow rate	0.8 ml/min
Temperature	40 °C
Detection	DAD @450 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.

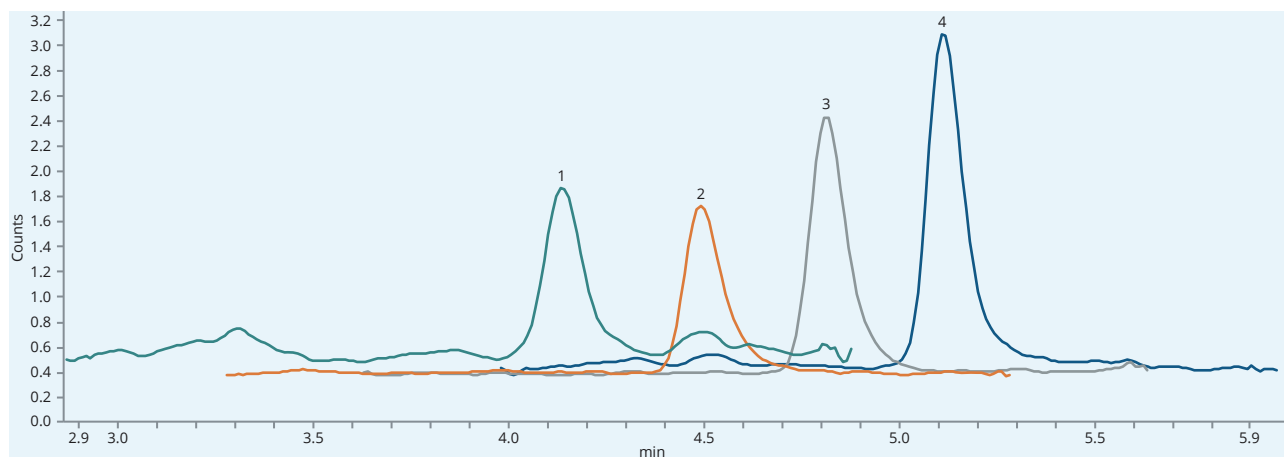


Alpha- & beta- acids in hop sample

Column	ARION® Plus C18, 5.0 μ m
Dimensions	250 mm \times 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	MeOH : water : phosphoric acid 850/150/5 (v/v/v) Isocratic elution
Flow rate	0.8 ml/min
Temperature	40 °C
Detection	UV @314 nm
Analytes	1. Co-humulone 2. Humulone 3. Co-lupulone 4. Lupulone

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 food/feed matrix and are given by local administrations.

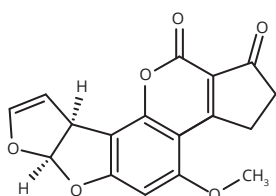


Stress test – test mixture on ARION® column

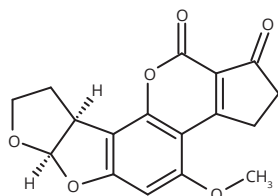
Column	ARION® Plus C18, 2.2 µm												
Dimensions	100 mm × 2.1 mm												
Part number	ARI-5720-EI21												
Mobile phase	A: 5mM ammonium formate / 0.2% formic acid B: Methanol / 0.2% formic acid												
Gradient elution	<table border="1"> <thead> <tr> <th>Time</th> <th>A (%)</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>70</td> </tr> <tr> <td>0.5</td> <td>70</td> </tr> <tr> <td>8.0</td> <td>0</td> </tr> <tr> <td>10.5</td> <td>0</td> </tr> <tr> <td>10.6</td> <td>70</td> </tr> </tbody> </table>	Time	A (%)	0.0	70	0.5	70	8.0	0	10.5	0	10.6	70
Time	A (%)												
0.0	70												
0.5	70												
8.0	0												
10.5	0												
10.6	70												
Flow rate	0.35 ml/min												
Temperature	40 °C												
Analytes	<ol style="list-style-type: none"> 1. Aflatoxin B1 2. Aflatoxin B2 3. Aflatoxin G1 4. Aflatoxin G2 												

MS method:

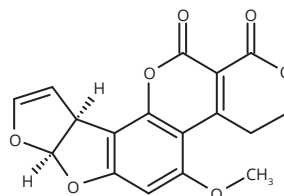
Compound name	Precursor Ion	Product Ion	Collision energy
Aflatoxin B1	313.07	284.9	25
Aflatoxin B1	313.07	240.9	45
Aflatoxin B2	315.09	286.9	33
Aflatoxin B2	315.09	259	33
Aflatoxin G1	329.07	310.9	25
Aflatoxin G1	329.07	198.9	57
Aflatoxin G2	331.08	312.9	25
Aflatoxin G2	331.08	189.1	49



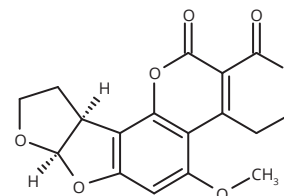
Aflatoxin B1



Aflatoxin B2



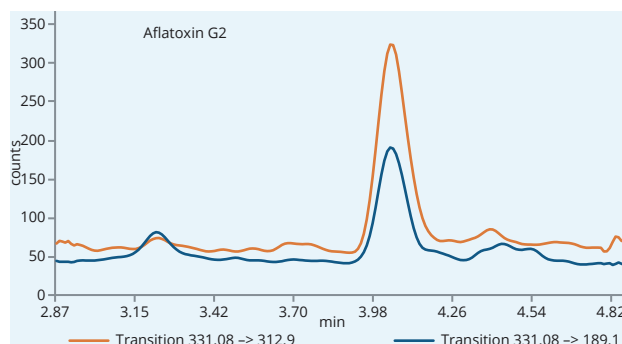
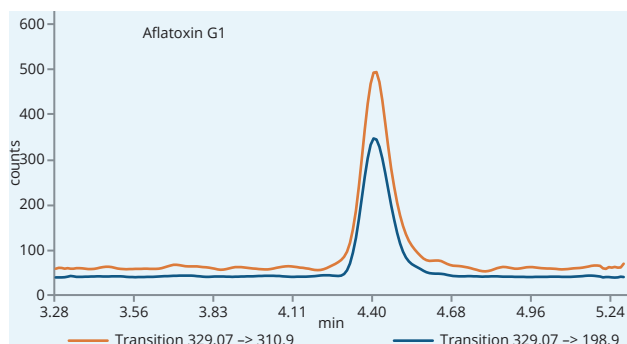
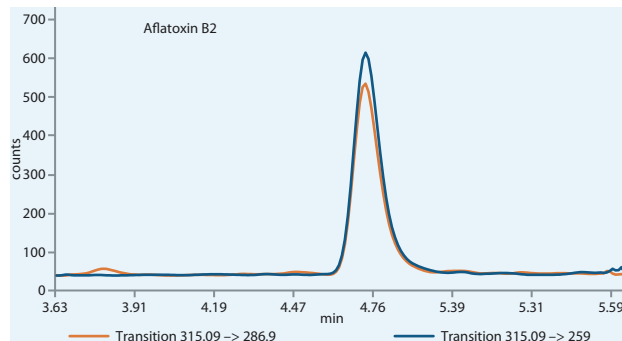
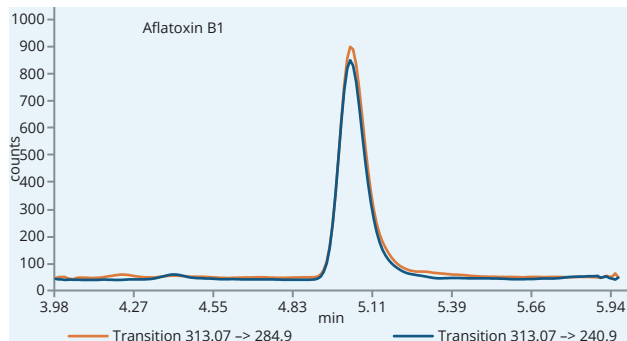
Aflatoxin G1



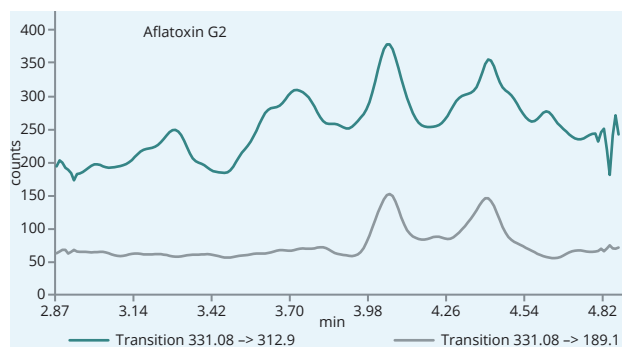
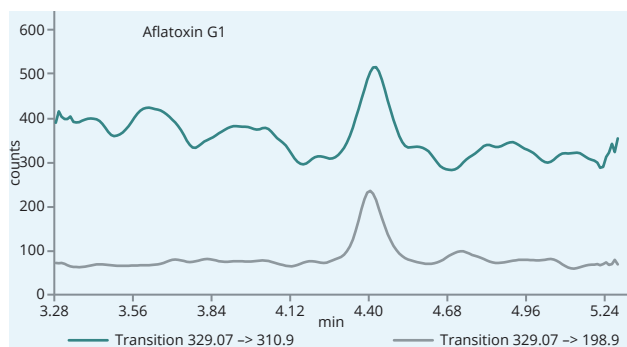
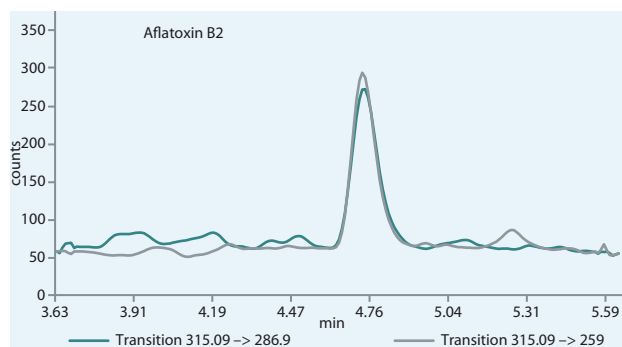
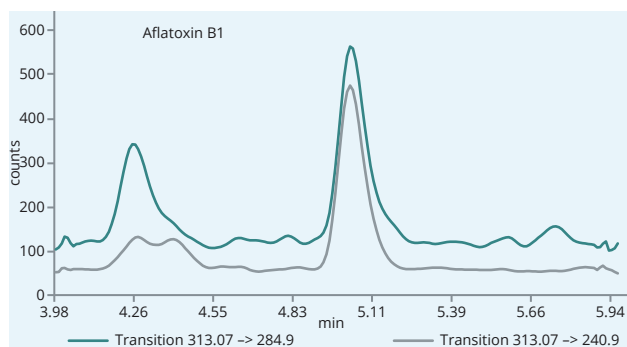
Aflatoxin G2

Aflatoxins by LC/MS

This page shows analyses of peppers and Brazil nuts.



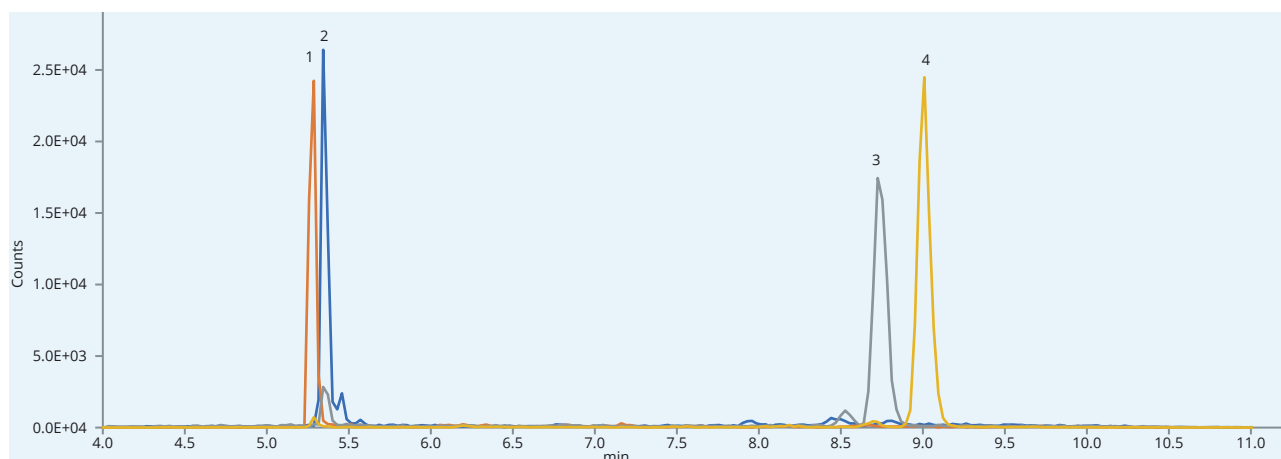
LC/MS analyses of aflatoxins in Brazil nuts



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:

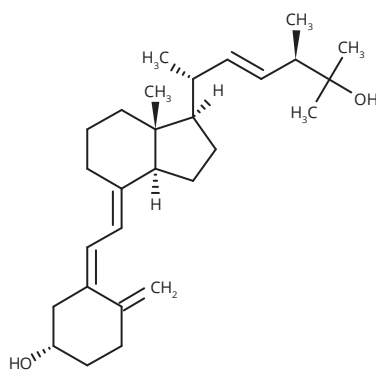
Column	ARION® Polar C18, 2.2 µm		
Dimensions	100 mm × 2.1 mm		
Part number	ARI-5720-EI21		
Mobile phase	A: H ₂ O, 0.1% formic acid B: MeOH, 0.1% formic acid		
Gradient elution	Time	A (%)	B (%)
	0.0	70	30
	2.0	0	100
	7.0	0	100
	7.1	30	70
	12.0	30	70
Flow rate	0.4 ml/min		
Temperature	25 °C		
Injection volume	10 µl		
Detection	UV @280 nm		
Analytes	1. 25-OH-Vitamin D3 2. 25-OH-Vitamin D2 3. Vitamin D2 4. Vitamin D3		

Vitamin D in dry blood spot

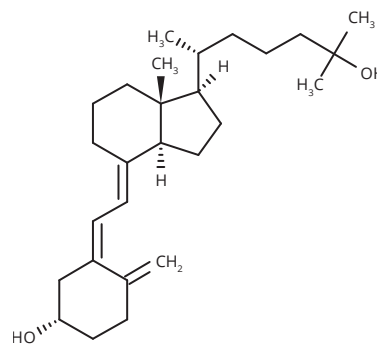
MS method:

Ionisation	Positive APCI		
Collision gas	Nitrogen		
MRM transition	Analyte	Q1 (Da)	Q3 (Da)
	25-OH-Vitamin D2	413.32	395.30
	25-OH-Vitamin D3	401.22	365.40
	Vitamin D2 397.44	379.20	
	Vitamin D3 385.32	259.40	
Dwell time	150 ms		

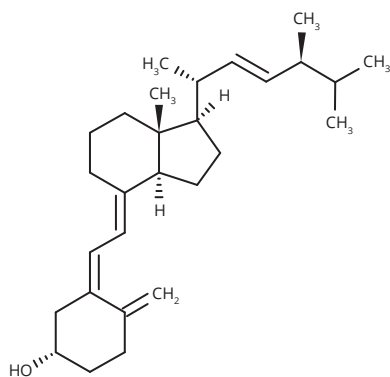
This application was developed by Ján Šmoldas.



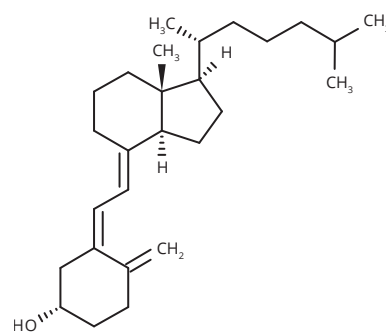
25-OH-Vitamin D2



25-OH-Vitamin D3



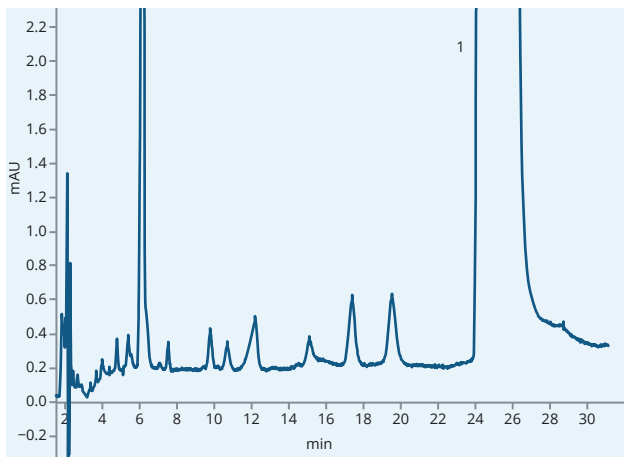
Vitamin D2



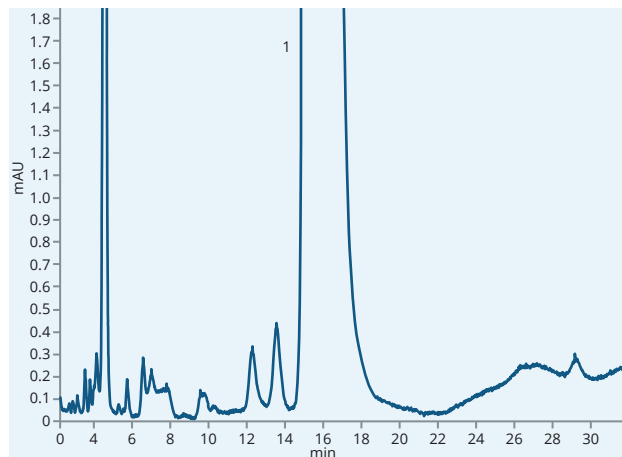
Vitamin D3

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

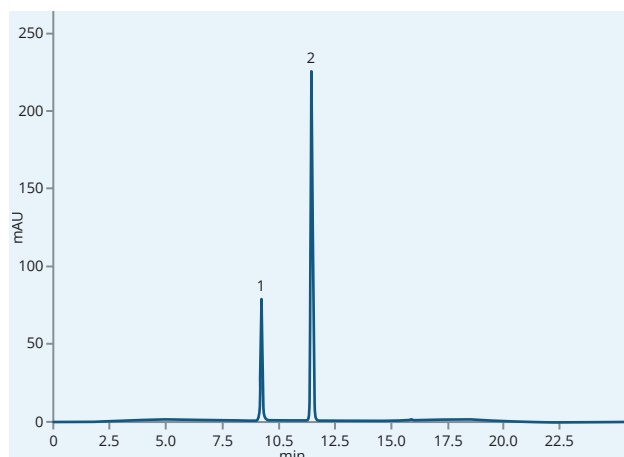


Separation on competitive column (Competitor LI)

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Gradient elution (proprietary)
Flow rate	1.2 ml/min
Detection	UV @254 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).

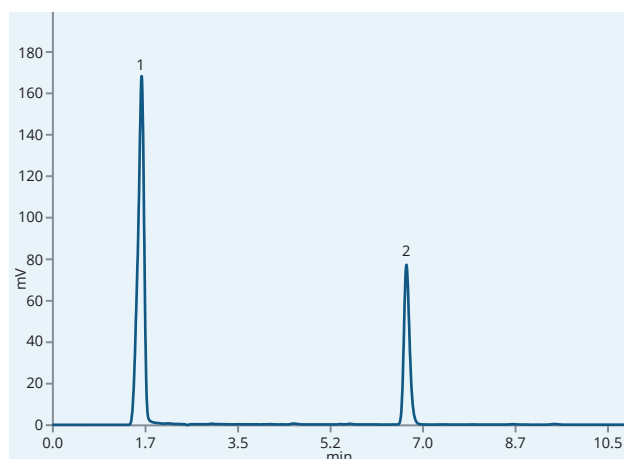


Standard mixture

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
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.

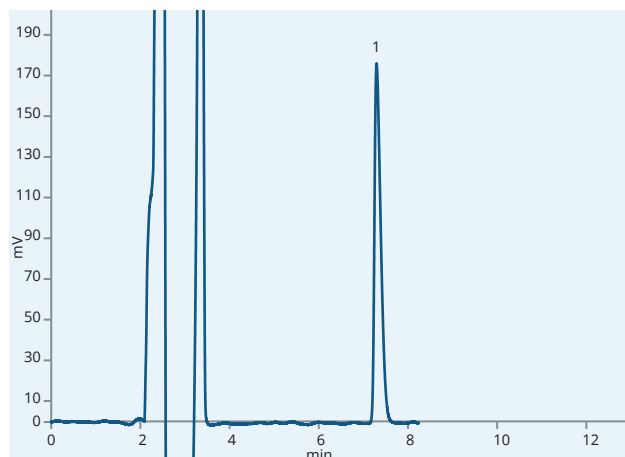


Standard mixture

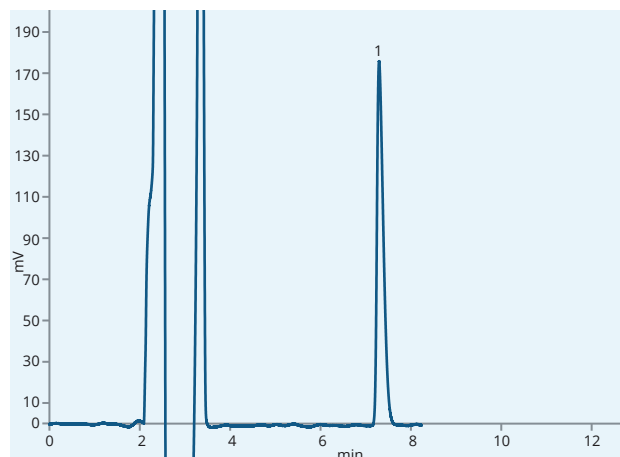
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	ACN : water 70/30 (v/v) + 0.1% formic acid Isocratic elution
Flow rate	1.0 ml/min
Temperature	Ambient
Detection	UV @265 nm
Analytes	1. Ibuprofen on polymer carrier 2. Ibuprofen

Pharmaceutical drugs

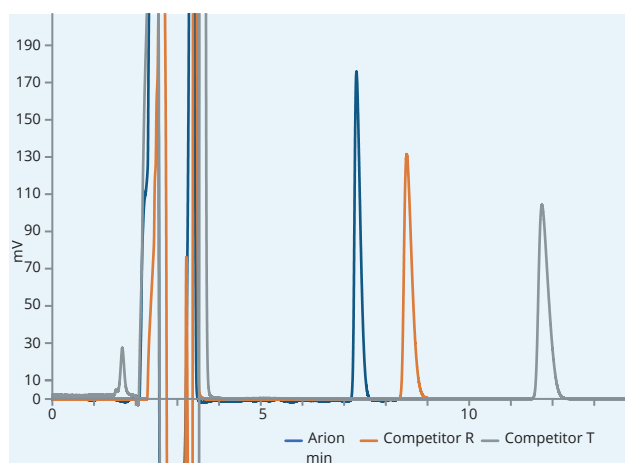
Tamsulosin hydrochloride is used to treat the symptoms of an enlarged prostate. Tamsulosin hydrochloride is an alpha-blocker which is used to treat the symptoms of an enlarged prostate by relaxing the muscles of the prostate and bladder. Tamsulosin is sold under various trade names, e.g. Flomax, Urimax,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



Standard mixture



Drug sample

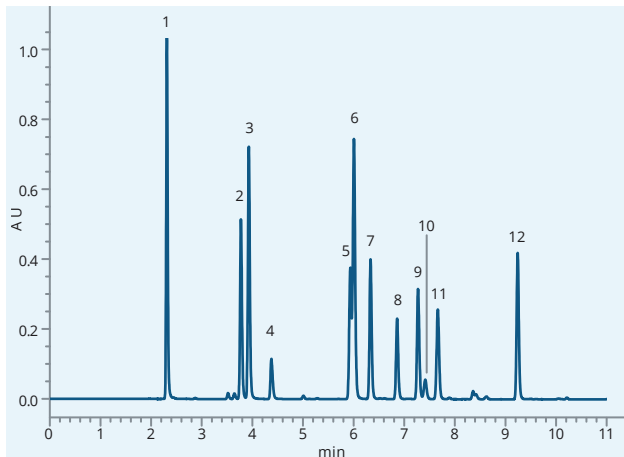


Comparison of fully porous particles

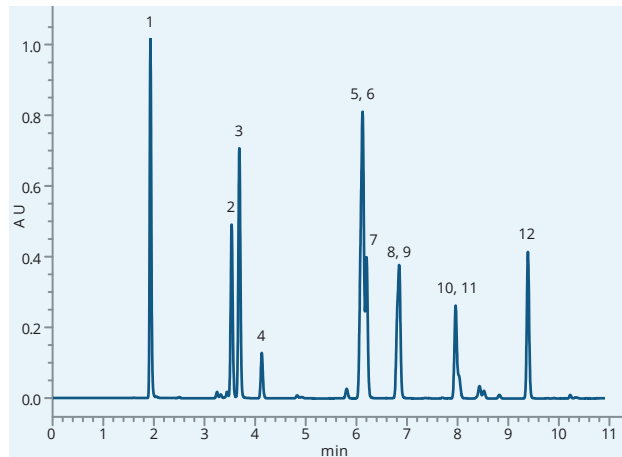
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Acetate buffer : acetonitrile
Flow rate	1.0 ml/min
Temperature	30 °C
Detection	UV @225 nm
Analytes	1. Tamsulosin hydrochloride

Fluorinated compounds

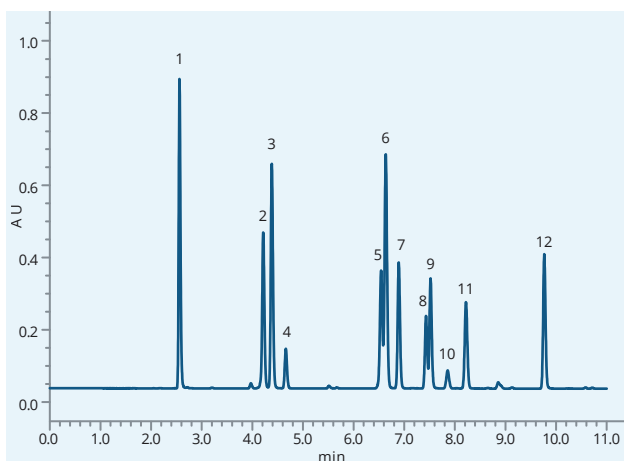
This application shows the ARION® column overcomes a co-elution of two critical pairs of fluoro- and des-fluoro-compounds. Separation of these compounds is problematic in general.



Sample on ARION® column



Sample on Competitive hybrid column TE

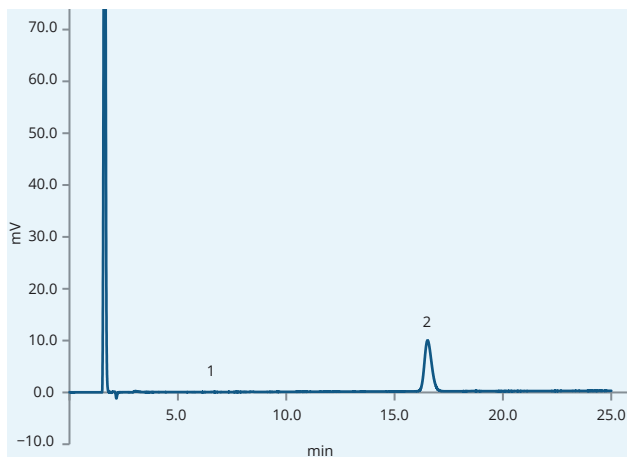


Sample on Competitive hybrid column TS

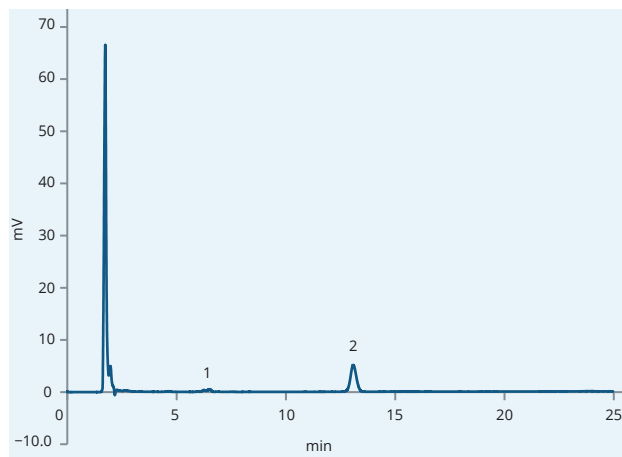
Column	ARION® Plus C18, 3.0 µm	
Dimensions	150 mm × 4.6 mm	
Part number	ARI-5720-IK46	
Mobile phase	A: 0.1% formic acid (dissolve 1 ml of formic acid in 1000 ml of Milli-Q water) B: ACN	
Gradient elution	Time	A (%) B (%)
	0	60 40
	9	20 80
	10	5 95
	14	5 95
	14.1	60 40
	15.5	60 40
Flow rate	1.0 ml/min	
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

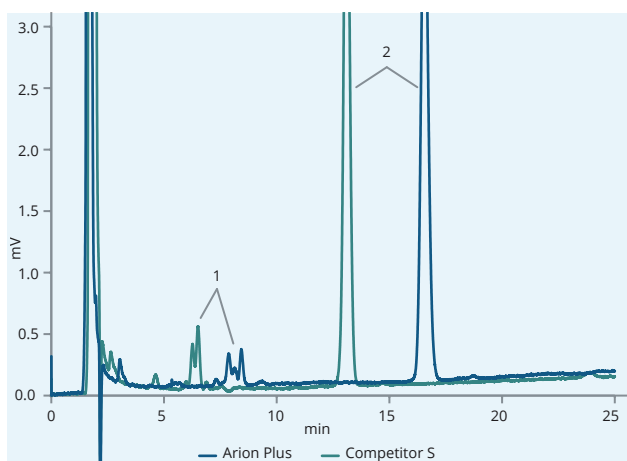
Tiamulin hydrogen fumarate is a semisynthetic drug with an antibacterial effect. It is used to treat animal diseases, such as swine dysentery (caused by *Brachyspira hyodysenteriae*), swine pneumonia or mycoplasmal arthritis. Tiamulin is also used for the prevention and treatment of chronic respiratory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



Sample – 2% premix on ARION® column



Sample – 2% premix on competitive column (Competitor S)

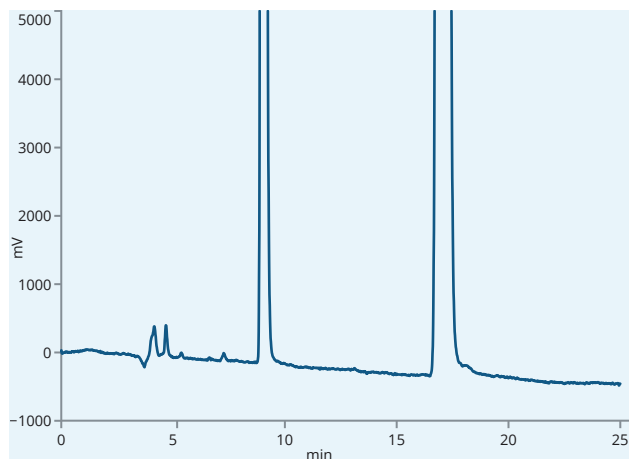


Detailed view on impurities

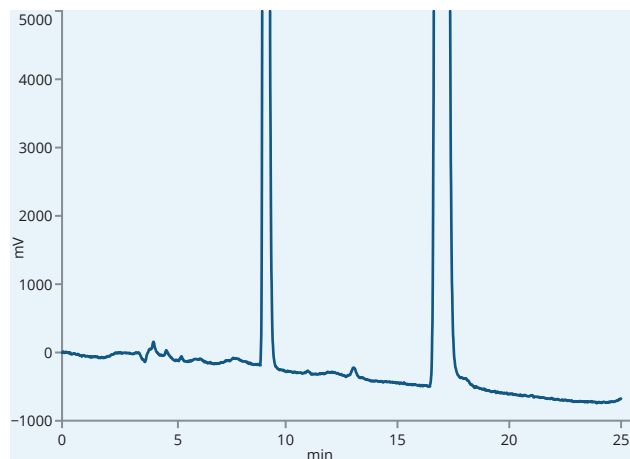
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Confidential, optimized method of Czech Pharmacopoeia (2017, 6.0:1659)
Analytes	1. Impurities 2. Tiamulin hydrogen fumarate

Veterinary drugs

Trimetoprim 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

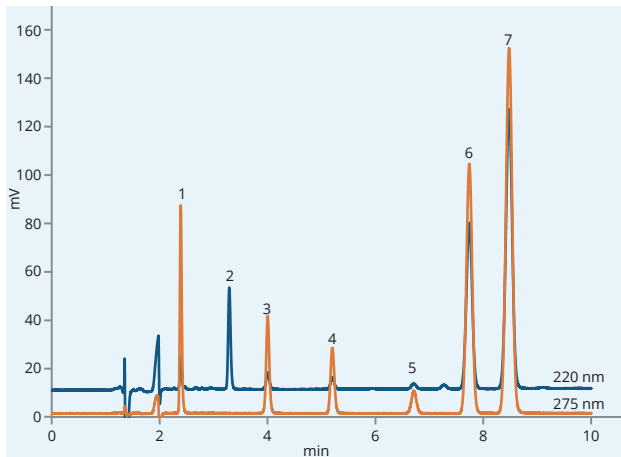


Drug sample

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	0.1% TEA : Methanol : ACN 80/10/10 (v/v/v) Isocratic elution
Flow rate	1.0 ml/min
Temperature	40 °C
Detection	UV @254 nm
Analytes	1. Trimetoprim 2. Sulfamethazine sodium

Furans in transformer oil

Furans analysis, together with an oil soluble metal deactivator, is an important analysis used to monitor the degradation of the winding insulation in the transformers. The presence of furans in transformer oils show the stage of the insulation degradation and a need for transformer replacement.



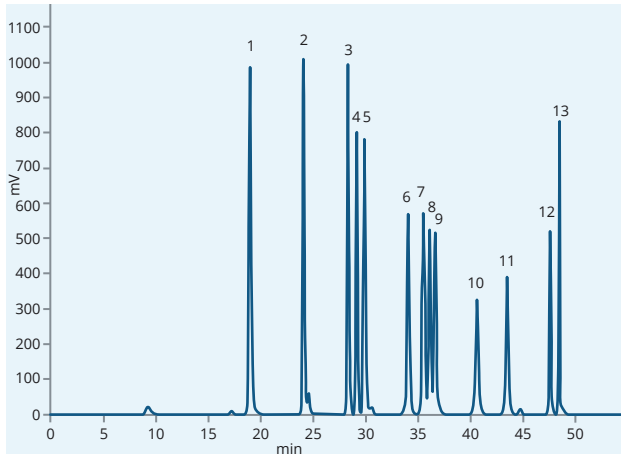
Mixture of furans and passivator in water

Column	ARION® Plus C18, 3.0 µm
Dimensions	150 mm × 4.6 mm
Part number	ARI-5720-IK46
Mobile phase	Ammonium acetate 20 mM, pH 8.5 (ammonia) : ACN 80/20 (v/v) Isocratic elution
Flow rate	1.0 ml/min
Temperature	30 °C
Detection	UV @220, 275 nm
Analytes	1. 5-Hydroxymethyl-2-furaldehyde (5HMF) 2. 2-Furfuryl alcohol (2FOL) 3. 2-Furaldehyde (2FAL) 4. 2-Acetyl furan (2ACF) 5. 5-Methylfurfural (5MEF) 6. + 7. Ciba® Irgamet® 39 isomers*

* Ciba® Irgamet® 39 isomers:
 N,N-bis(2-ethylhexyl)-4-methyl-1H-benzotriazol-1-amine
 N,N-bis(2-ethylhexyl)-5-methyl-1H-benzotriazol-1-amine

Aldehyde/Ketone DNPH derivatives

Carbonyl compounds are part of the group of parameters which are analyzed in the workplace. Occupational hygiene and contract laboratories mostly use the HPLC method for aldehydes and ketones analysis. HPLC separation requires the derivatization with 2,4-dinitrophenyl hydrazine.



DNPH derivatives standard

Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Methanol : water
Flow rate	0.2 ml/min
Temperature	40 °C
Detection	UV @360 nm
Analytes	<ol style="list-style-type: none"> 1. Formaldehyde-2,4-DNPH 2. Acetaldehyde-2,4-DNPH 3. Acetone-2,4-DNPH 4. Acrolein-2,4-DNPH 5. Propionaldehyde-2,4-DNPH 6. Crotonaldehyde-2,4-DNPH 7. Methacrolein-2,4-DNPH 8. 2-Butanone-2,4-DNPH 9. Butyraldehyde-2,4-DNPH 10. Benzaldehyde-2,4-DNPH 11. Valeraldehyde-2,4-DNPH 12. m-Tolualdehyde-2,4-DNPH 13. Hexaldehyde-2,4-DNPH

Opioids and Tramadol and their metabolites by LC/MS

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

Substance:
Codeine,

CAS Number 76-57-3

Morphine,

CAS Number 57-27-2

6-O-Acetylmorphine,
6-Monoacetylmorphine,

CAS Number 2784-73-8

Morphine-6-glucuronide,

CAS Number 20290-10-2

Buprenorphine,

CAS Number 52485-79-7

Dihydrocodeine,

CAS Number 125-28-0

Fentanyl,

CAS Number 437-38-7

Acetylfentanyl,

CAS Number 3258-84-2

Naloxone,

CAS Number 465-65-6

Naltrexone,

CAS Number 16590-41-3

Hydromorphone,

CAS Number 466-99-9

Oxymorphone,

CAS Number 76-41-5

Hydrocodone,

CAS Number 125-29-1

Norbuprenorphine,

CAS Number 78715-23-8

Norcodeine,

CAS Number 467-15-2

Norfentanyl,

CAS Number 1609-66-1

Oxycodone,

CAS Number 76-42-6

Meperidine, Pethidine,

CAS Number 57-42-1

Tramadol,

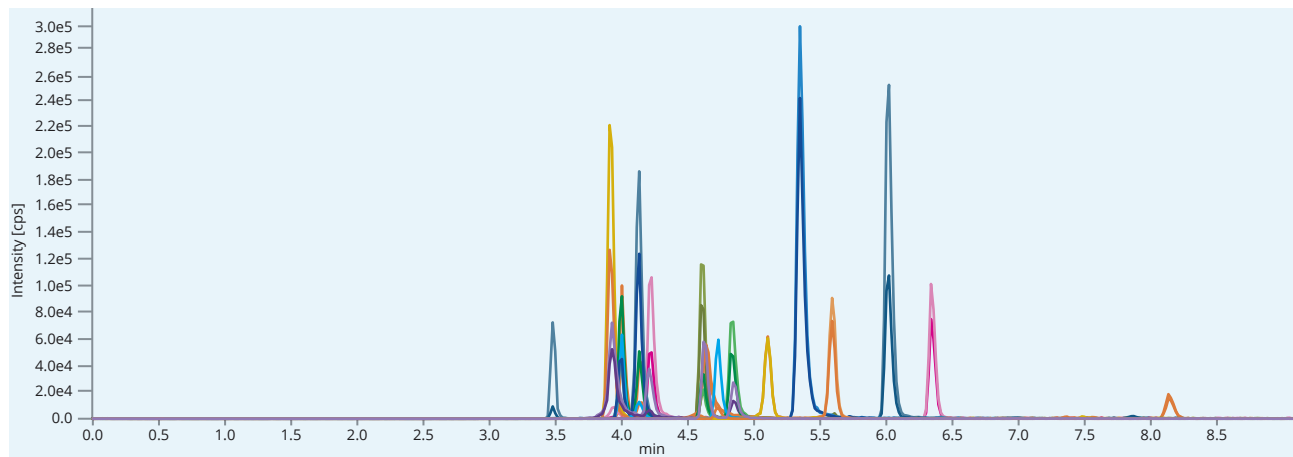
CAS Number 27203-92-5

Methadone,

CAS Number 76-99-3

EDDP,

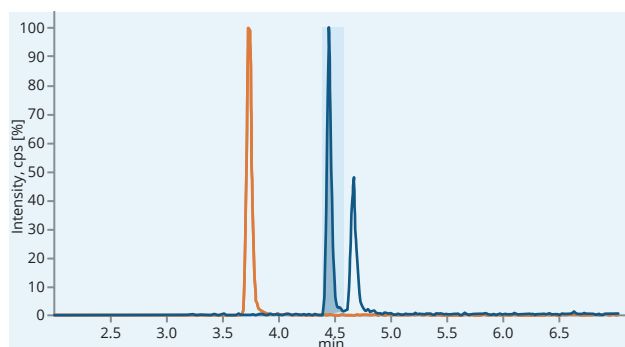
CAS Number 30223-73-5



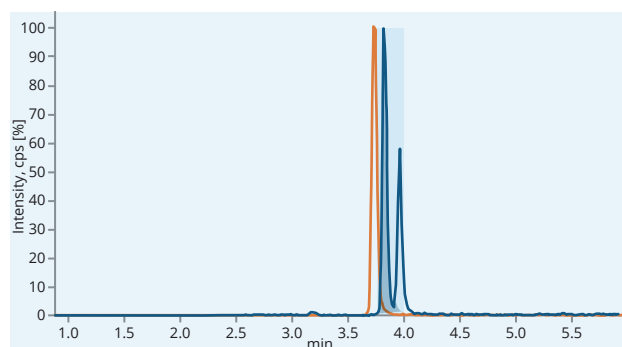
Standard mixture on ARION® column (50 mg/l)

Opioids and Tramadol and their metabolites by LC/MS

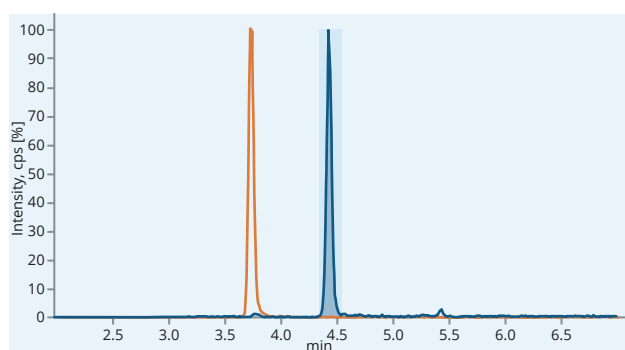
Column	ARION® Plus C18, 3 µm		
Dimensions	50 mm × 3.0 mm		
Part number	ARI-5720-IG30		
Mobile phase	A: 1% ammonium formate in water B: Methanol : 1% ammonium formate in ACN 50/50 (v/v)		
Gradient elution	Time	A (%)	B (%)
	0	100	0
	1	100	0
	6	10	90
	8	10	90
	8.1	100	0
Flow rate	0.5 ml/min		
Temperature	30 °C		
Detection	MS/MS		
Analytes	See MS/MS method		



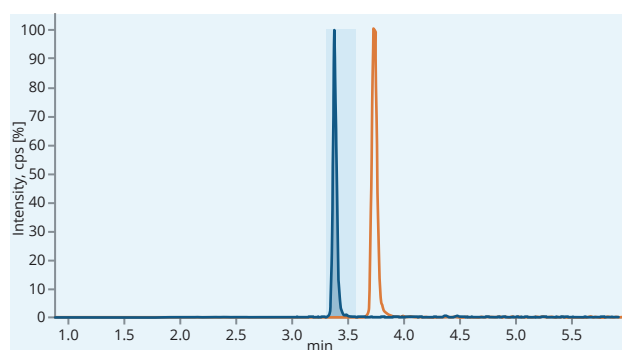
Codeine (300.1->152.0)



Morphine (286.1 -> 152.0)

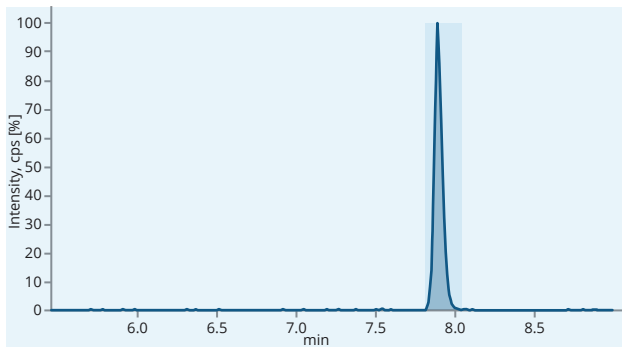


6-O-Acetylmorphine (328.1 -> 165.0)

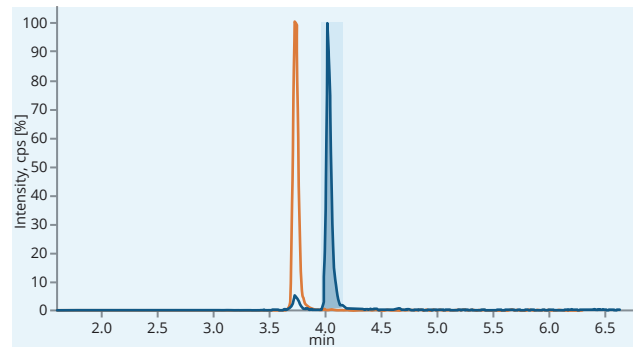


Morphine-6-glucuronide (462.2 -> 286.2)

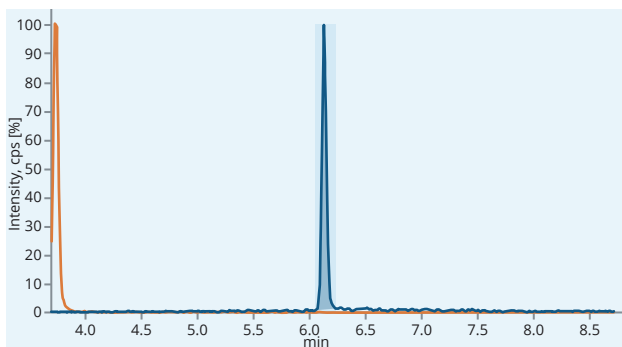
Opioids and Tramadol and their metabolites by LC/MS



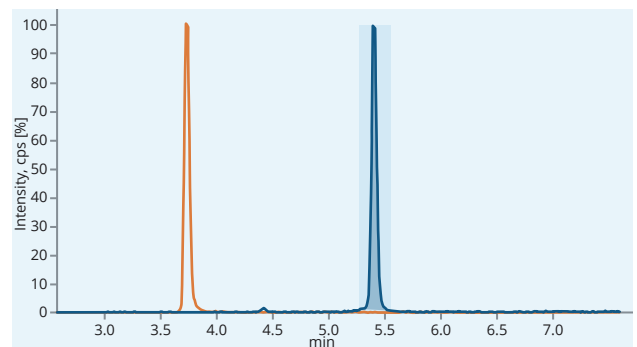
Buprenorphine (468.2 -> 396.0)



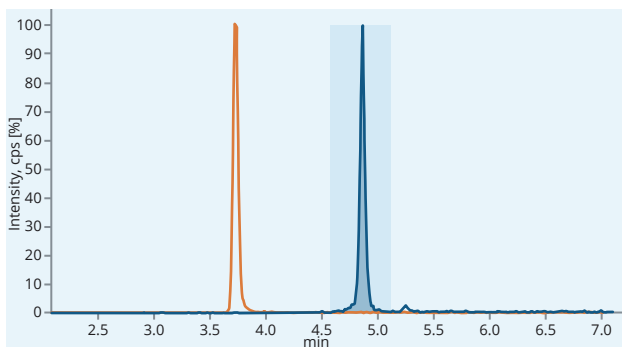
Dihydrocodeine (302.2 -> 199.2)



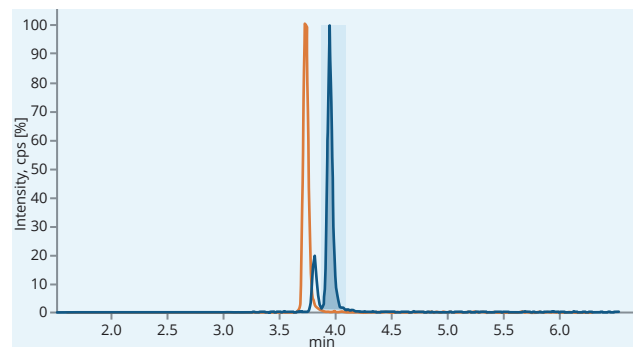
Fentanyl (337.2 -> 105.1)



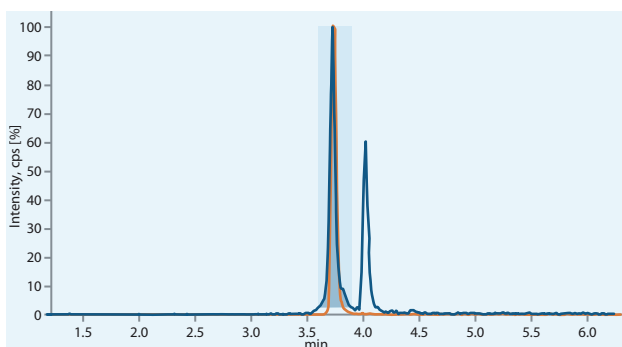
Naloxone (328.1 ->212.1)



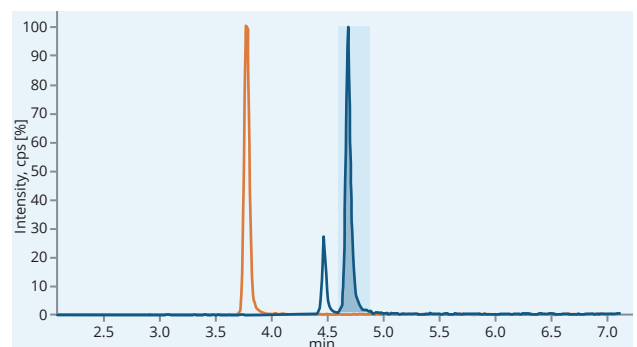
Naltrexone (342.1 -> 267.2)



Hydromorphone (286.1 -> 185.0)

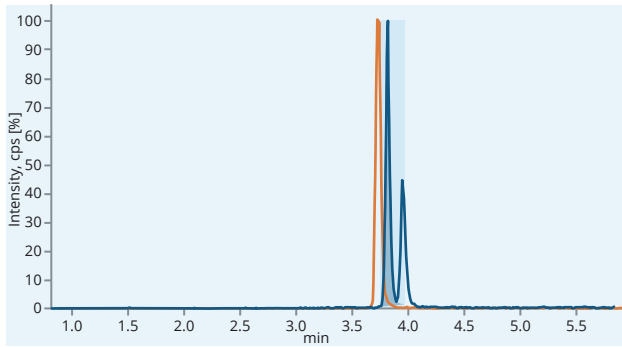


Oxycodone (302.0 -> 227.1)

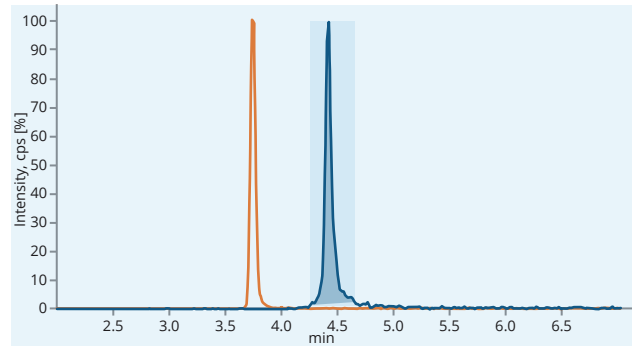


Hydrocodone (300.1 -> 199.0)

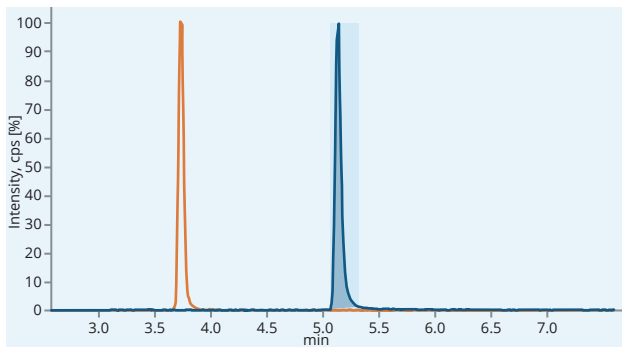
Opioids and Tramadol and their metabolites by LC/MS



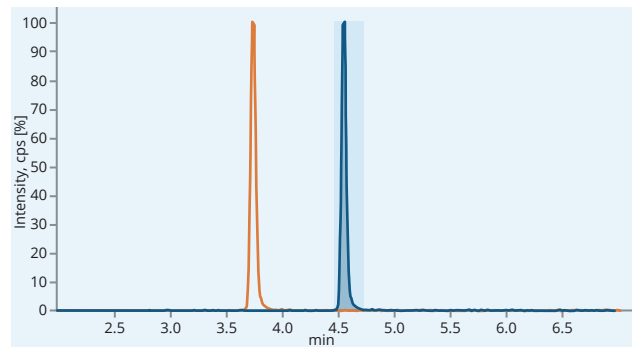
Norcodeine (286.1 -> 152.0)



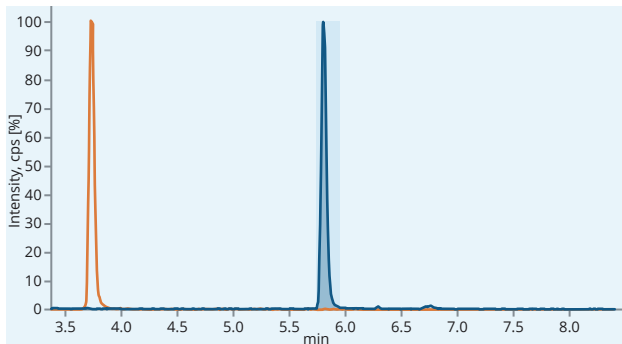
Oxycodone (316.1 -> 241.1)



Meperidine (Pethidine) (248.1 -> 220.1)



Tramadol (264.1 -> 58.1)



Methadone (310.1 -> 265.0)

Opioids and Tramadol and their metabolites by LC/MS

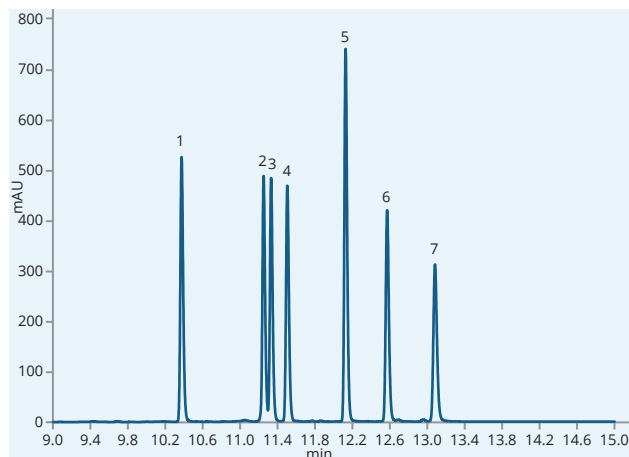
MS/MS method

Compound name	Precursor Mass	Fragment mass	Type	Collision energy
Codeine	300.1	152.0	Quantifier	35 ± 15 eV
	300.1	165.1	Qualifier	35 ± 15 eV
Morphine	286.1	152.0	Quantifier	35 ± 15 eV
	286.1	165.1	Qualifier	35 ± 15 eV
6-O-Acetylmorphine	328.1	165.0	Quantifier	35 ± 15 eV
	328.1	211.0	Qualifier	35 ± 15 eV
Morphine-6-glucuronide	462.2	286.2	Qualifier	35 ± 15 eV
	462.2	201.1	Qualifier	35 ± 15 eV
Buprenorphine	468.2	396.0	Quantifier	35 ± 15 eV
	468.2	414.0	Qualifier	35 ± 15 eV
Dihydrocodeine	302.2	199.2	Quantifier	35 ± 15 eV
	302.2	171.2	Qualifier	35 ± 15 eV
Fentanyl	337.2	105.1	Quantifier	35 ± 15 eV
	337.2	188.2	Qualifier	35 ± 15 eV
Acetylfentanyl*	323.1	188.1	Quantifier	35 ± 15 eV
	323.1	105.1	Qualifier	35 ± 15 eV
Naloxone	328.1	212.1	Quantifier	35 ± 15 eV
	328.1	253.1	Qualifier	35 ± 15 eV
Naltrexone	342.1	267.2	Quantifier	35 ± 15 eV
	342.1	282.1	Qualifier	35 ± 15 eV
Hydromorphone	286.1	185.0	Quantifier	35 ± 15 eV
	286.1	157.0	Qualifier	35 ± 15 eV
Oxymorphone	302.0	227.1	Quantifier	35 ± 15 eV
	302.0	198.1	Qualifier	35 ± 15 eV
Hydrocodone	300.1	199.0	Quantifier	35 ± 15 eV
	300.1	128.0	Qualifier	35 ± 15 eV
Norbuprenorphine*	414.3	55.0	Quantifier	35 ± 15 eV
	414.3	83.0	Qualifier	35 ± 15 eV
Norcodeine	286.1	152.0	Quantifier	35 ± 15 eV
	286.1	165.0	Qualifier	35 ± 15 eV
Norfentanyl*	233.1	84.1	Quantifier	35 ± 15 eV
	233.1	150.1	Qualifier	35 ± 15 eV
Oxycodone	316.1	241.1	Quantifier	35 ± 15 eV
	316.1	256.1	Qualifier	35 ± 15 eV
Meperidine (Pethidine)	248.1	220.1	Quantifier	35 ± 15 eV
	248.1	174.0	Qualifier	35 ± 15 eV
Tramadol	264.1	58.1	Quantifier	35 ± 15 eV
	264.1	42.2	Qualifier	35 ± 15 eV
Methadone	310.1	265.0	Quantifier	35 ± 15 eV
	310.1	105.0	Qualifier	35 ± 15 eV
EDDP*	278.1	234.1	Quantifier	35 ± 15 eV
	278.1	186.1	Qualifier	35 ± 15 eV

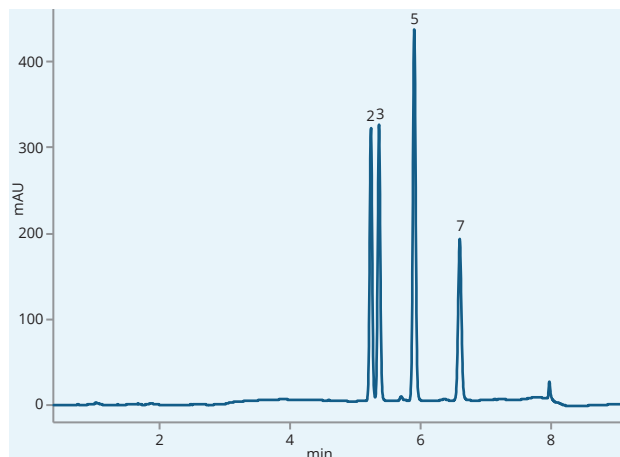
* Not shown in chromatogram. Note: Internal standard: Morphine D6.

Cannabinoids

Cannabinoids have become more and more popular thanks to their health effects and the decriminalisation 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	ARI-5720-BI21		
Mobile phase	A: Water B: Acetonitrile		
Gradient elution	Time	A (%)	B (%)
	0	70	30
	1	70	30
	5	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	ARI-5720-IK46		
Mobile phase	A: Acetonitrile B: Water with formic acid (0.1%)		
Gradient elution	Time	A (%)	B (%)
	0	30	70
	0.3	30	70
	2.3	100	0
	5.3	100	0
	8.3	30	70
	11.0	30	70
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 analyses were performed using Lipomed reference materials.

Ordering information

UHPLC and LC/MS columns

1.7 µm ARION® all dimensions in mm						ARION® Guard Cartridges*
Phase	30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	5 × 2.1
Plus C18	ARI-5720-BD21	ARI-5720-BG21	ARI-5720-BH21	ARI-5720-BI21	ARI-5720-BK21	AGS-5731-RA2

1.7 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	
Plus C18	ARI-5720-BG30	ARI-5720-BH30	ARI-5720-BI30	ARI-5720-BK30	Inquire**

1.7 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	50 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	5 × 2.1
Plus C18	ARI-5720-BG46	ARI-5720-BH46	ARI-5720-BI46	ARI-5720-BK46	AGS-5731-RA2

2.2 µm ARION® all dimensions in mm						ARION® Guard Cartridges*
Phase	30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	5 × 2.1
Plus C18	ARI-5720-ED21	ARI-5720-EG21	ARI-5720-EH21	ARI-5720-EI21	ARI-5720-EK21	AGS-5731-RB2
Polar C18	ARI-5721-ED21	ARI-5721-EG21	ARI-5721-EH21	ARI-5721-EI21	ARI-5721-EK21	AGS-5731-RB2
Phenyl-Butyl	ARI-5735-ED21	ARI-5735-EG21	ARI-5735-EH21	ARI-5735-EI21	ARI-5735-EK21	AGS-5731-RB2
NH ₂	ARI-5736-ED21	ARI-5736-EG21	ARI-5736-EH21	ARI-5736-EI21	ARI-5736-EK21	Inquire**
HILIC Plus	ARI-5738-ED21	ARI-5738-EG21	ARI-5738-EH21	ARI-5738-EI21	ARI-5738-EK21	AGS-5731-HB2
Si	ARI-5739-ED21	ARI-5739-EG21	ARI-5739-EH21	ARI-5739-EI21	ARI-5739-EK21	AGS-5731-NB2

2.2 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	5 × 2.1
Plus C18	ARI-5720-EG30	ARI-5720-EH30	ARI-5720-EI30	ARI-5720-EK30	AGS-5731-RB2
Polar C18	ARI-5721-EG30	ARI-5721-EH30	ARI-5721-EI30	ARI-5721-EK30	AGS-5731-RB2
Phenyl-Butyl	ARI-5735-EG30	ARI-5735-EH30	ARI-5735-EI30	ARI-5735-EK30	AGS-5731-RB2
NH ₂	ARI-5736-EG30	ARI-5736-EH30	ARI-5736-EI30	ARI-5736-EK30	Inquire**
HILIC Plus	ARI-5738-EG30	ARI-5738-EH30	ARI-5738-EI30	ARI-5738-EK30	AGS-5731-HB2
Si	ARI-5739-EG30	ARI-5739-EH30	ARI-5739-EI30	ARI-5739-EK30	AGS-5731-NB2

2.2 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	50 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	5 × 4.0
Plus C18	ARI-5720-EG46	ARI-5720-EH46	ARI-5720-EI46	ARI-5720-EK46	AGS-5731-RC4
Polar C18	ARI-5721-EG46	ARI-5721-EH46	ARI-5721-EI46	ARI-5721-EK46	AGS-5731-RC4
Phenyl-Butyl	ARI-5735-EG46	ARI-5735-EH46	ARI-5735-EI46	ARI-5735-EK46	AGS-5731-RC4
NH ₂	ARI-5736-EG46	ARI-5736-EH46	ARI-5736-EI46	ARI-5736-EK46	Inquire**
HILIC Plus	ARI-5738-EG46	ARI-5738-EH46	ARI-5738-EI46	ARI-5738-EK46	Inquire**
Si	ARI-5739-EG46	ARI-5739-EH46	ARI-5739-EI46	ARI-5739-EK46	Inquire**

Ordering information

Analytical columns

3 µm ARION® all dimensions in mm							ARION® Guard Cartridges*
Phase	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1	250 × 2.1	5 × 4.0	
Plus C18	ARI-5720-IG21	ARI-5720-IH21	ARI-5720-II21	ARI-5720-IK21	ARI-5720-IM21	AGS-5731-RC2	
Polar C18	ARI-5721-IG21	ARI-5721-IH21	ARI-5721-II21	ARI-5721-IK21	–	AGS-5731-RC2	
C8	ARI-5734-IG21	ARI-5734-IH21	ARI-5734-II21	ARI-5734-IK21	–	AGS-5731-RC2	
Phenyl-Butyl	ARI-5735-IG21	ARI-5735-IH21	ARI-5735-II21	ARI-5735-IK21	–	AGS-5731-RC2	
NH ₂	ARI-5736-IG21	ARI-5736-IH21	ARI-5736-II21	ARI-5736-IK21	–	Inquire**	
CN	ARI-5737-IG21	ARI-5737-IH21	ARI-5737-II21	ARI-5737-IK21	–	Inquire**	
HILIC Plus	ARI-5738-IG21	ARI-5738-IH21	ARI-5738-II21	ARI-5738-IK21	–	AGS-5731-HC2	
Si	ARI-5739-IG21	ARI-5739-IH21	ARI-5739-II21	ARI-5739-IK21	–	AGS-5731-NC2	

3 µm ARION® all dimensions in mm							ARION® Guard Cartridges*
Phase	50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0	250 × 3.0	5 × 4.0	
Plus C18	ARI-5720-IG30	ARI-5720-IH30	ARI-5720-II30	ARI-5720-IK30	ARI-5720-IM30	AGS-5731-RC4	
Polar C18	ARI-5721-IG30	ARI-5721-IH30	ARI-5721-II30	ARI-5721-IK30	ARI-5721-IM30	AGS-5731-RC4	
C8	ARI-5734-IG30	ARI-5734-IH30	ARI-5734-II30	ARI-5734-IK30	–	AGS-5731-RC4	
Phenyl-Butyl	ARI-5735-IG30	ARI-5735-IH30	ARI-5735-II30	ARI-5735-IK30	ARI-5735-IM30	AGS-5731-RC4	
NH ₂	–	–	ARI-5736-II30	ARI-5736-IK30	–	Inquire**	
CN	–	–	ARI-5737-II30	ARI-5737-IK30	–	Inquire**	
HILIC Plus	ARI-5738-IG30	ARI-5738-IH30	ARI-5738-II30	ARI-5738-IK30	–	AGS-5731-HC4	
Si	ARI-5739-IG30	ARI-5739-IH30	ARI-5739-II30	ARI-5739-IK30	–	AGS-5731-NC4	

3 µm ARION® all dimensions in mm							ARION® Guard Cartridges*
Phase	50 × 4.6	75 × 4.6	100 × 4.6	125 × 4.6	150 × 4.6	250 × 4.6	5 × 4.0
Plus C18	ARI-5720-IG46	ARI-5720-IH46	ARI-5720-II46	ARI-5720-IJ46	ARI-5720-IK46	ARI-5720-IM46	AGS-5731-RC4
Polar C18	ARI-5721-IG46	ARI-5721-IH46	ARI-5721-II46	–	ARI-5721-IK46	ARI-5721-IM46	AGS-5731-RC4
C8	ARI-5734-IG46	ARI-5734-IH46	ARI-5734-II46	–	ARI-5734-IK46	ARI-5734-IM46	AGS-5731-RC4
Phenyl-Butyl	ARI-5735-IG46	ARI-5735-IH46	ARI-5735-II46	–	ARI-5735-IK46	ARI-5735-IM46	AGS-5731-RC4
NH ₂	ARI-5736-IG46	ARI-5736-IH46	ARI-5736-II46	–	ARI-5736-IK46	ARI-5736-IM46	Inquire**
CN	ARI-5737-IG46	–	ARI-5737-II46	–	ARI-5737-IK46	–	Inquire**
HILIC Plus	ARI-5738-IG46	ARI-5738-IH46	ARI-5738-II46	–	ARI-5738-IK46	–	AGS-5731-HC4
Si	ARI-5739-IG46	ARI-5739-IH46	ARI-5739-II46	–	ARI-5739-IK46	ARI-5739-IM46	AGS-5731-NC4

* ARION® Guard cartridges require ARION® Guard Holder p/n AGS-5731-000 (supplied without cartridges).

**The use of appropriate guard cartridge depends on the application. Please contact us.

Ordering information

Analytical columns

5 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	30 × 2.1	50 × 2.1	100 × 2.1	150 × 2.1	5 × 4.0
Plus C18	ARI-5720-LD21	ARI-5720-LG21	ARI-5720-LI21	ARI-5720-LK21	AGS-5731-RD2
Polar C18	ARI-5721-LD21	ARI-5721-LG21	ARI-5721-LI21	ARI-5721-LK21	AGS-5731-RD2
C8	-	-	-	ARI-5734-LK21	AGS-5731-RD2
Phenyl-Butyl	ARI-5735-LD21	ARI-5735-LG21	ARI-5735-LI21	ARI-5735-LK21	AGS-5731-RD2
NH ₂	-	-	-	ARI-5736-LK21	Inquire**
CN	-	-	-	ARI-5737-LK21	Inquire**
HILIC Plus	ARI-5738-LD21	ARI-5738-LG21	ARI-5738-LI21	ARI-5738-LK21	AGS-5731-HD2
Si	ARI-5739-LD21	ARI-5739-LG21	ARI-5739-LI21	ARI-5739-LK21	AGS-5731-ND2

5 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	30 × 3.0	50 × 3.0	75 × 3.0	100 × 3.0	5 × 4.0
Plus C18	ARI-5720-LD30	ARI-5720-LG30	ARI-5720-LH30	ARI-5720-LI30	AGS-5731-RD4
Polar C18	ARI-5721-LD30	ARI-5721-LG30	ARI-5721-LH30	ARI-5721-LI30	AGS-5731-RD4
C8	-	ARI-5734-LG30	-	ARI-5734-LI30	AGS-5731-RD4
Phenyl-Butyl	ARI-5735-LD30	ARI-5735-LG30	ARI-5735-LH30	ARI-5735-LI30	AGS-5731-RC4
NH ₂	-	ARI-5736-LG30	ARI-5736-LH30	ARI-5736-LI30	Inquire**
CN	-	ARI-5737-LG30	ARI-5737-LH30	ARI-5737-LI30	Inquire**
HILIC Plus	ARI-5738-LD30	ARI-5738-LG30	ARI-5738-LH30	ARI-5738-LI30	AGS-5731-HD4
Si	ARI-5739-LD30	ARI-5739-LG30	ARI-5739-LH30	ARI-5739-LI30	AGS-5731-ND4
SAX	-	ARI-5806-LG30	-	ARI-5806-LI30	-
SCX	-	ARI-5799-LG30	-	ARI-5799-LI30	-

5 µm ARION® all dimensions in mm				ARION® Guard Cartridges*
Phase	125 × 3.0	150 × 3.0	250 × 3.0	5 × 4.0
Plus C18	ARI-5720-LJ30	ARI-5720-LK30	-	AGS-5731-RD4
Polar C18	-	ARI-5721-LK30	-	AGS-5731-RD4
C8	-	ARI-5734-LK30	ARI-5734-LM30	AGS-5731-RD4
Phenyl-Butyl	-	ARI-5735-LK30	-	AGS-5731-RC4
NH ₂	-	ARI-5736-LK30	-	Inquire**
CN	-	ARI-5737-LK30	-	Inquire**
HILIC Plus	-	ARI-5738-LK30	-	AGS-5731-HD4
Si	-	ARI-5739-LK30	-	AGS-5731-ND4
SAX	-	ARI-5806-LK30	ARI-5806-LM30	-
SCX	-	ARI-5799-LK30	ARI-5799-LM30	-

* ARION® Guard cartridges require ARION® Guard Holder p/n AGS-5731-000 (supplied without cartridges).

**The use of appropriate guard cartridge depends on the application. Please contact us.



Ordering information

Analytical columns

5 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	125 × 4.0	30 × 4.6	50 × 4.6	75 × 4.6	5 × 4.0
Plus C18	ARI-5720-LJ40	ARI-5720-LD46	ARI-5720-LG46	ARI-5720-LH46	AGS-5731-RD4
Polar C18	ARI-5721-LJ40	ARI-5721-LD46	ARI-5721-LG46	ARI-5721-LH46	AGS-5731-RD4
C8	ARI-5734-LJ40	-	-	-	AGS-5731-RD4
Phenyl-Butyl	-	-	-	-	AGS-5731-RD4
NH ₂	-	-	-	-	Inquire**
CN	-	-	-	-	Inquire**
HILIC Plus	-	ARI-5738-LD46	ARI-5738-LG46	ARI-5738-LH46	AGS-5731-HD4
Si	-	ARI-5739-LD46	ARI-5739-LG46	ARI-5739-LH46	AGS-5731-ND4
SAX	-	-	ARI-5806-LG46	-	Inquire
SCX	-	-	ARI-5799-LG46	-	Inquire

5 µm ARION® all dimensions in mm					ARION® Guard Cartridges*
Phase	100 × 4.6	125 × 4.6	150 × 4.6	250 × 4.6	5 × 4.0
Plus C18	ARI-5720-LI46	ARI-5720-LJ46	ARI-5720-LK46	ARI-5720-LM46	AGS-5731-RD4
Polar C18	ARI-5721-LI46	-	ARI-5721-LK46	ARI-5721-LM46	AGS-5731-RD4
C8	ARI-5734-LI46	-	ARI-5734-LK46	ARI-5734-LM46	AGS-5731-RD4
Phenyl-Butyl	ARI-5735-LI46	-	ARI-5735-LK46	ARI-5735-LM46	AGS-5731-RD4
NH ₂	ARI-5736-LI46	-	ARI-5736-LK46	ARI-5736-LM46	Inquire**
CN	ARI-5737-LI46	-	ARI-5737-LK46	ARI-5737-LM46	Inquire**
HILIC Plus	ARI-5738-LI46	-	ARI-5738-LK46	ARI-5738-LM46	AGS-5731-HD4
Si	ARI-5739-LI46	-	ARI-5739-LK46	ARI-5739-LM46	AGS-5731-ND4
SAX	ARI-5806-LI46	-	ARI-5806-LK46	ARI-5806-LM46	Inquire
SCX	ARI-5799-LI46	-	ARI-5799-LK46	ARI-5799-LM46	Inquire

Note: Other dimensions on request.

* ARION® Guard cartridges require ARION® Guard Holder p/n AGS-5731-000 (supplied without cartridges).

** The use of appropriate guard cartridge depends on the application. Please contact us.

ARION® column test mixture 1

p/n ARI-MIX-1

4 components in Acetonitrile / Water (75/25), 1.5 ml ampoule

Uracil	[CAS:66-22-8]	20 mg/l
Acetophenone	[CAS:98-86-2]	200 mg/l
Toluene	[CAS:108-88-3]	10000 mg/l
Naphthalene	[CAS:91-20-3]	9000 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
N,N-Dimethylaniline	[CAS:121-69-7]	400 mg/l
4-Ethylaniline	[CAS:589-16-2]	2000 mg/l
Toluene	[CAS:108-88-3]	10000 mg/l
Ethylbenzene	[CAS:100-41-4]	10000 mg/l

Ordering information

Semi-preparative and preparative columns

5 µm 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	ARI-5720-LM1X	ARI-5720-LG2Y	ARI-5720-LI2Y	ARI-5720-LK2Y	ARI-5720-LM2Y	Inquire*
Polar C18	ARI-5721-LM1X	ARI-5721-LG2Y	ARI-5721-LI2Y	ARI-5721-LK2Y	ARI-5721-LM2Y	Inquire*
Phenyl-Butyl	-	-	-	-	ARI-5735-LM2Y	Inquire*
Si	ARI-5739-LM1X	ARI-5739-LG2Y	ARI-5739-LI2Y	ARI-5739-LK2Y	ARI-5739-LM2Y	Inquire*

Preparative columns

5 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	100 × 30	150 × 30	250 × 30	250 × 50	
Plus C18	ARI-5720-LI3X	ARI-5720-LK3X	ARI-5720-LM3X	ARI-5720-LM5X	Inquire*
Polar C18	ARI-5721-LI3X	ARI-5721-LK3X	ARI-5721-LM3X	ARI-5721-LM5X	Inquire*
Phenyl-Butyl	-	-	ARI-5735-LM3X	ARI-5735-LM5X	Inquire*
Si	ARI-5739-LI3X	ARI-5739-LK3X	ARI-5739-LM3X	ARI-5739-LM5X	Inquire*

* The use of appropriate guard cartridge depends on the application. Please contact us.



Semi-preparative column 250 × 10



Preparative column 250 × 21.2



Preparative column 250 × 30



Preparative column 250 × 50

Ordering information

Preparative columns

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	150 × 4.6	250 × 4.6	150 × 10	250 × 10	
Plus C18	ARI-5720-PK46	ARI-5720-PM46	ARI-5720-PK1X	ARI-5720-PM1X	Inquire*
Polar C18	ARI-5721-PK46	ARI-5721-PM46	ARI-5721-PK1X	ARI-5721-PM1X	Inquire*
Si	-	-	-	ARI-5739-PM1X	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	50 × 21.2	100 × 21.2	150 × 21.2	250 × 21.2	
Plus C18	ARI-5720-PG2Y	ARI-5720-PI2Y	ARI-5720-PK2Y	ARI-5720-PM2Y	Inquire*
Polar C18	ARI-5721-PG2Y	ARI-5721-PI2Y	ARI-5721-PK2Y	ARI-5721-PM2Y	Inquire*
Si	ARI-5739-PG2Y	ARI-5739-PI2Y	ARI-5739-PK2Y	ARI-5739-PM2Y	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	100 × 30	150 × 30	250 × 30	250 × 50	
Plus C18	ARI-5720-PI3X	ARI-5720-PK3X	ARI-5720-PM3X	ARI-5720-PM5X	Inquire*
Polar C18	ARI-5721-PI3X	ARI-5721-PK3X	ARI-5721-PM3X	ARI-5721-PM5X	Inquire*
Si	ARI-5739-PI3X	ARI-5739-PK3X	ARI-5739-PM3X	ARI-5739-PM5X	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	150 × 4.6	250 × 4.6	150 × 10	250 × 10	
Plus C18	ARI-5720-QK46	ARI-5720-QM46	ARI-5720-QK1X	ARI-5720-QM1X	Inquire*
Polar C18	ARI-5721-QK46	ARI-5721-QM46	ARI-5721-QK1X	ARI-5721-QM1X	Inquire*
Si	ARI-5739-QK46	ARI-5739-QM46	ARI-5739-QK1X	ARI-5739-QM1X	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	50 × 21.2	100 × 21.2	150 × 21.2	250 × 21.2	
Plus C18	ARI-5720-QG2Y	ARI-5720-QI2Y	ARI-5720-QK2Y	ARI-5720-QM2Y	Inquire*
Polar C18	ARI-5721-QG2Y	ARI-5721-QI2Y	ARI-5721-QK2Y	ARI-5721-QM2Y	Inquire*
Si	ARI-5739-QG2Y	ARI-5739-QI2Y	ARI-5739-QK2Y	ARI-5739-QM2Y	Inquire*

10 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	50 × 30	100 × 30	150 × 30	250 × 30	
Plus C18	ARI-5720-QG3X	ARI-5720-QI3X	ARI-5720-QK3X	ARI-5720-QM3X	Inquire*
Polar C18	ARI-5721-QG3X	ARI-5721-QI3X	ARI-5721-QK3X	ARI-5721-QM3X	Inquire*
Si	ARI-5739-QG3X	ARI-5739-QI3X	ARI-5739-QK3X	ARI-5739-QM3X	Inquire*

* The use of appropriate guard cartridge depends on the application. Please contact us.

Ordering information

Preparative columns

15 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	150 × 4.6	250 × 4.6	150 × 10	250 × 10	
Plus C18	ARI-5720-QK46	ARI-5720-QM46	ARI-5720-QK1X	ARI-5720-QM1X	Inquire*
Polar C18	ARI-5721-QK46	ARI-5721-QM46	ARI-5721-QK1X	ARI-5721-QM1X	Inquire*

15 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	50 × 21.2	100 × 21.2	150 × 21.2	250 × 21.2	
Plus C18	ARI-5720-QG2Y	ARI-5720-QI2Y	ARI-5720-QK2Y	ARI-5720-QM2Y	Inquire*
Polar C18	ARI-5721-QG2Y	ARI-5721-QI2Y	ARI-5721-QK2Y	ARI-5721-QM2Y	Inquire*

15 µm ARION® all dimensions in mm					ARION® Guard Cartridges
Phase	50 × 30	100 × 30	150 × 30	250 × 30	
Plus C18	ARI-5720-QG3X	ARI-5720-QI3X	ARI-5720-QK3X	ARI-5720-QM3X	Inquire*
Polar C18	ARI-5721-QG3X	ARI-5721-QI3X	ARI-5721-QK3X	ARI-5721-QM3X	Inquire*

Note: Bulk media available on request for 10 and 15 µm particles, in quantities: 10 g, 100 g, 1 kg.

* The use of appropriate guard cartridge depends on the application. Please contact us.

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. compound 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.



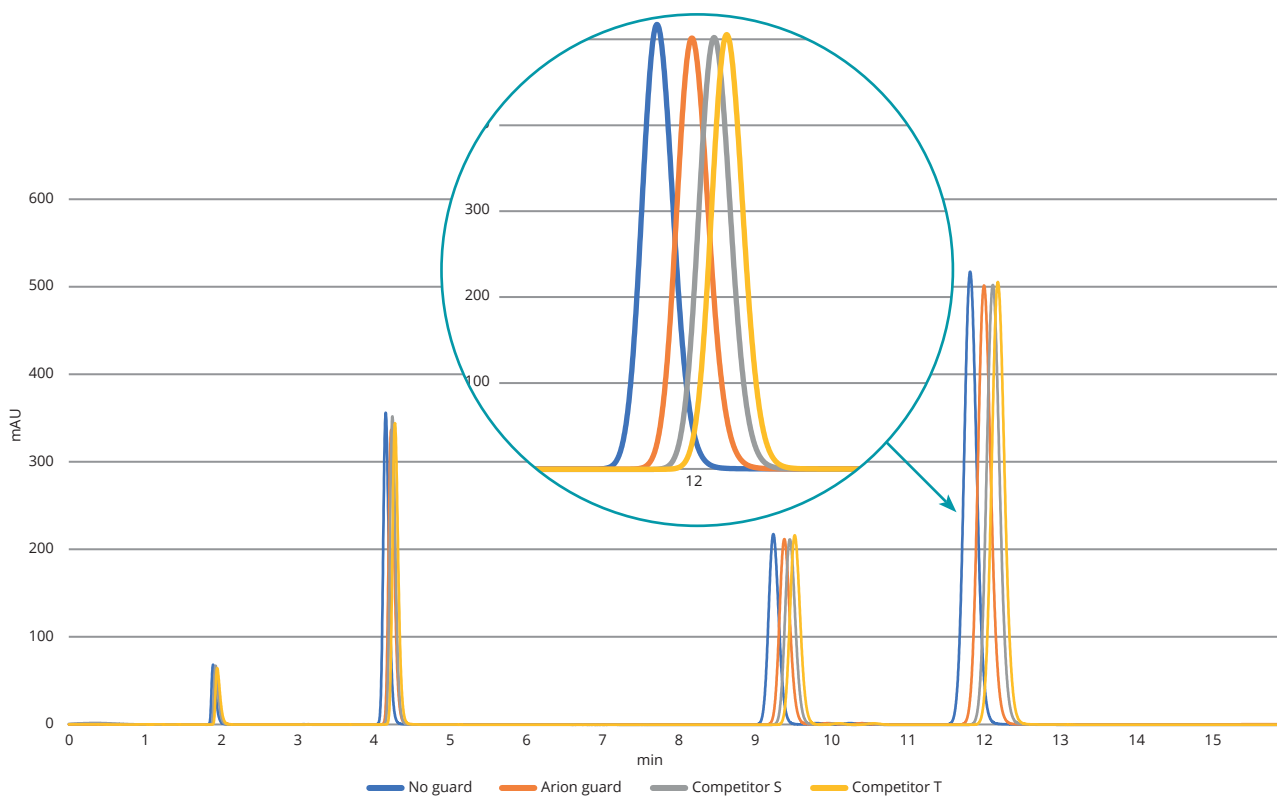
Guard column system

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 **900 bar**.
- Higher cartridge capacity.

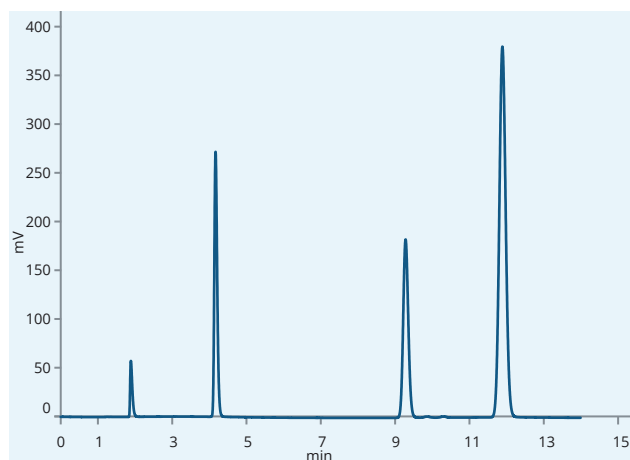


AGS-5731-000

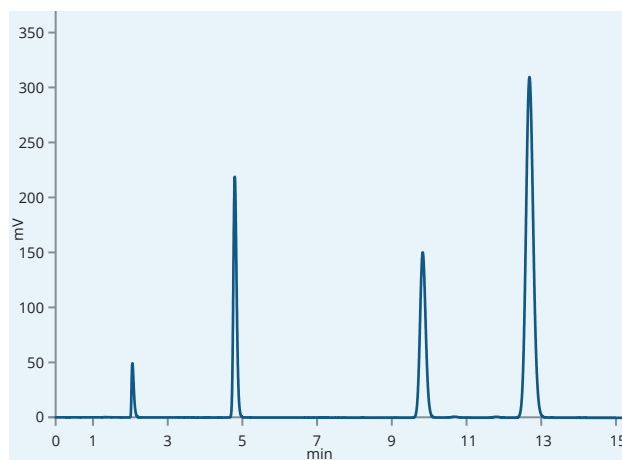


Comparison of guard systems from various manufacturers

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.



Guard System Selection Guide

Material	Pore size	pH Stability	Column ID 2.1-3.0 5.0 × 2.1 mm  Package of 3 pcs	Column ID 3.0-4.6 5.0 × 4.0 mm  Package of 3 pcs	100% aqueous mobile phase
RP 1.7 µm	100 Å	1 to 10	AGS-5731-RA2	–	×
RP 2.2 µm	100 Å	1 to 10	AGS-5731-RB2	–	✓
RP 3.0 µm	100 Å	1 to 10	AGS-5731-RC2	AGS-5731-RC4	✓
RP 5.0 µm	100 Å	1 to 10	AGS-5731-RD2	AGS-5731-RD4	✓
HILIC 2.2 µm	100 Å	1.5 to 7	AGS-5731-HB2	–	OM/W*
HILIC 3.0 µm	100 Å	1.5 to 7	AGS-5731-HC2	AGS-5731-HC4	OM/W*
HILIC 5.0 µm	100 Å	1.5 to 7	AGS-5731-HD2	AGS-5731-HD4	OM/W*
NP 2.2 µm	100 Å	n/a	AGS-5731-NB2	–	n/a
NP 3.0 µm	100 Å	n/a	AGS-5731-NC2	AGS-5731-NC4	n/a
NP 5.0 µm	100 Å	n/a	AGS-5731-ND2	AGS-5731-ND4	n/a

* OM/W – Organic modifier (water-miscible)/water mobile phase recommended.

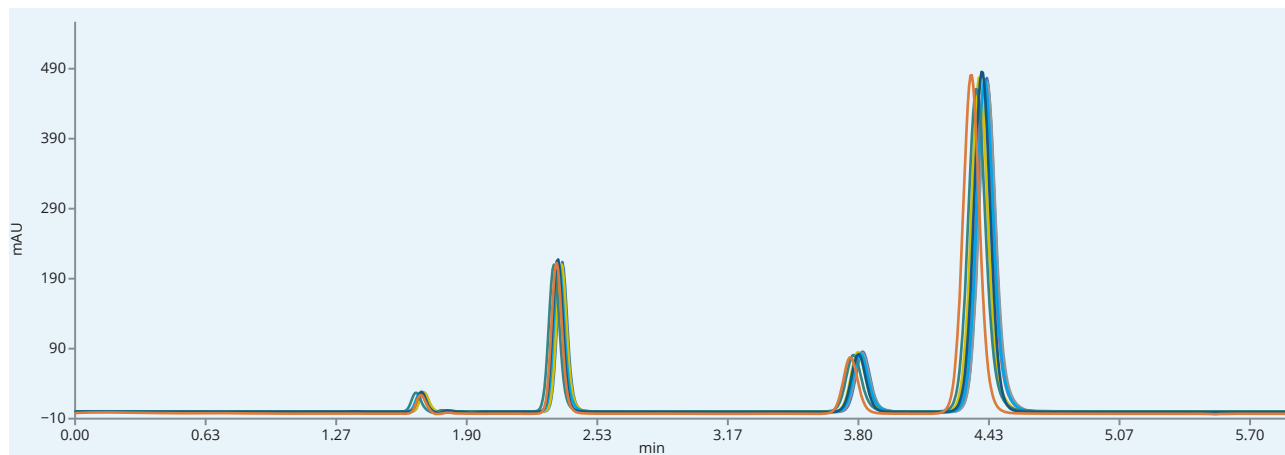
Ferrules for ARION® Guard System

Material	Pressure	10 pcs
PEEK	<400 bar*	AGS-5731-Y00
Stainless Steel, Type 316	<689 bar	AGS-5731-Z00

* Maximum pressure of PEEK ferrules depends on the tubing used. Max. pressure of 400 bar is for 1/16" OD tubing with ID 0.05 to 0.18 mm. ARION® Guard System includes one Stainless Steel ferrule in standard package.

Guard system for ASTRA® columns

The AGS system has been extended with cartridges for ASTRA® HPLC columns (see page 57). The cartridges have the same dimensions and are fully compatible with the AGS holder.



Production reproducibility of ASTRA® guard cartridges

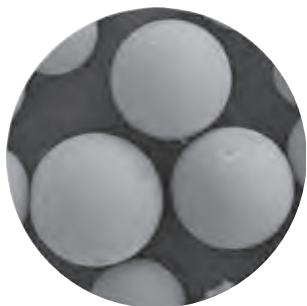
Guard system for CHROMSHELL® columns

The ARION® Guard System (AGS) is ideal for the protection of CHROMSHELL® UHPLC columns as well. We recommend it as an easy and less expensive solution in comparison with high pressure guard systems. But for some applications the high pressure guard system would be essential. See the FGS in-line filter on page 64.



ASTRA® HPLC columns extend our ARION® 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.

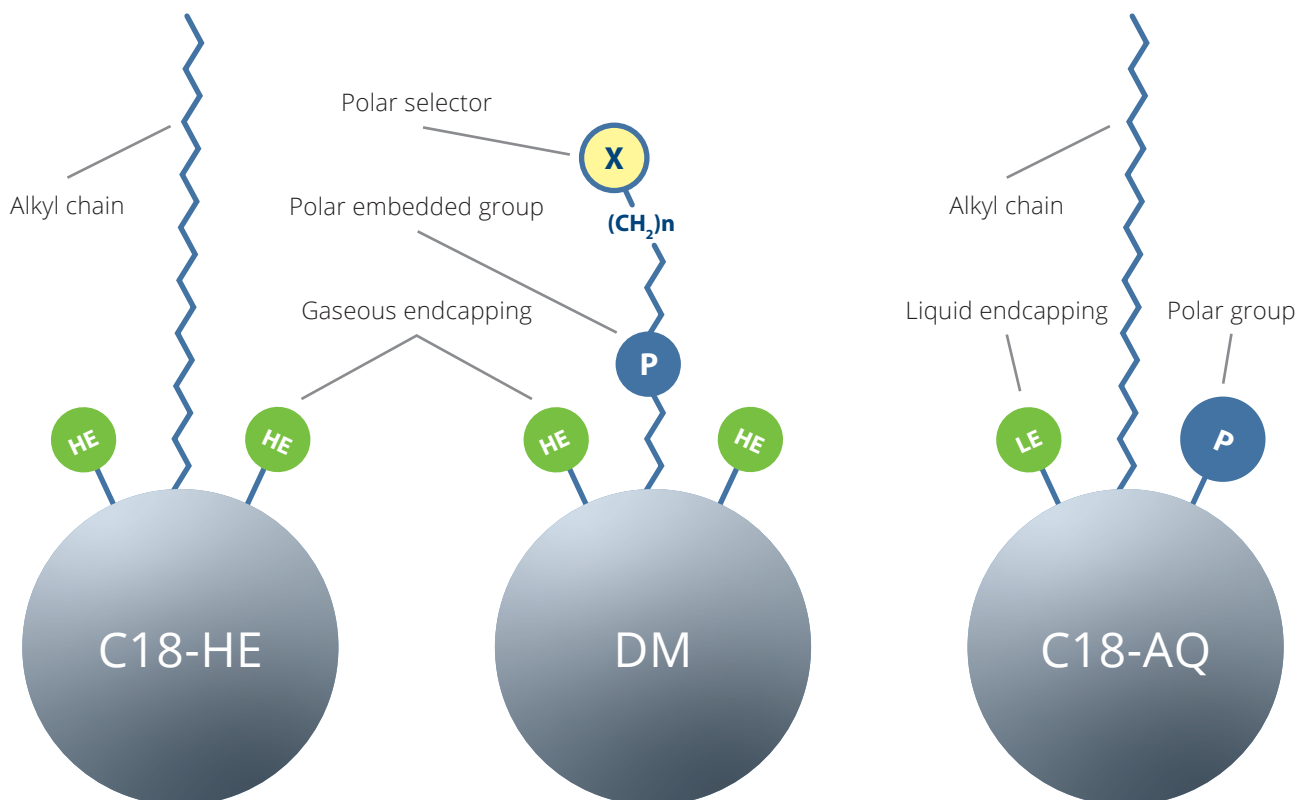
- Unique and high endcapped C18 phases.
- 330 m²/g surface area.



ASTRA® Silicagel

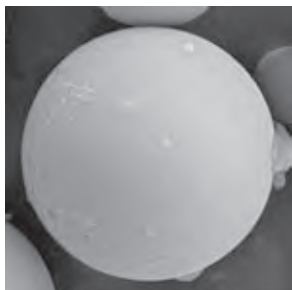
Particle size	5 µm	3 µm
Metal content	<10 ppm	<10 ppm
Mean particle diameter	4.6 ± 1.2 µm	3.0 ± 0.7 µm
Proximity to the shape of sphere	0.97 ± 0.04	0.97 ± 0.03

ASTRA® phases	Particle size (µm)	Pore size (Å)	Surface area (m ² /g)	Carbon load	pH stability	Endcapping	100% aqueous mobile phase	USP code
C18-HE	3, 5	100	330	17 %	2 to 9	High	×	L1
C18-AQ	3, 5	100	330	13 %	2 to 9	Mixed	✓	L1
DM	3, 5	100	330	12 %	2 to 9	High	×	-

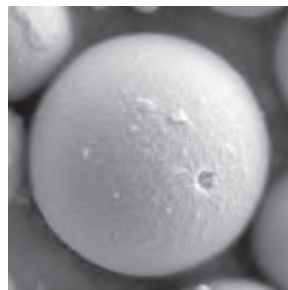


Up close

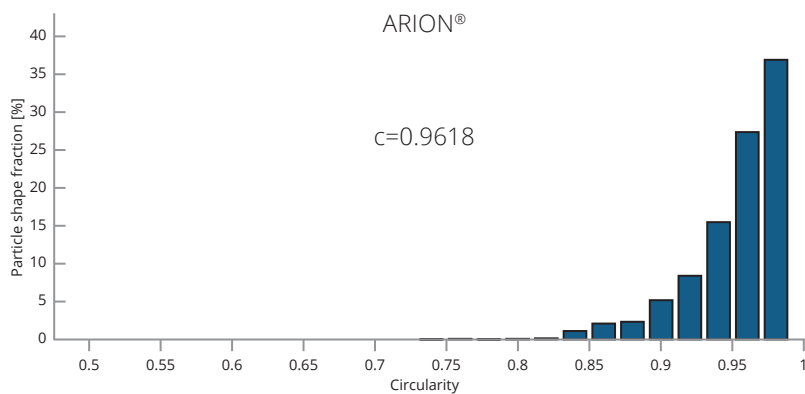
As with all phases developed by Chromservis, ASTRA® HPLC column particles are continuously analysed by SEM. The electron microscope shows the very high quality of ASTRA® 3 and 5µm particles.



ASTRA® particle 5 µm



ASTRA® particle 3 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.

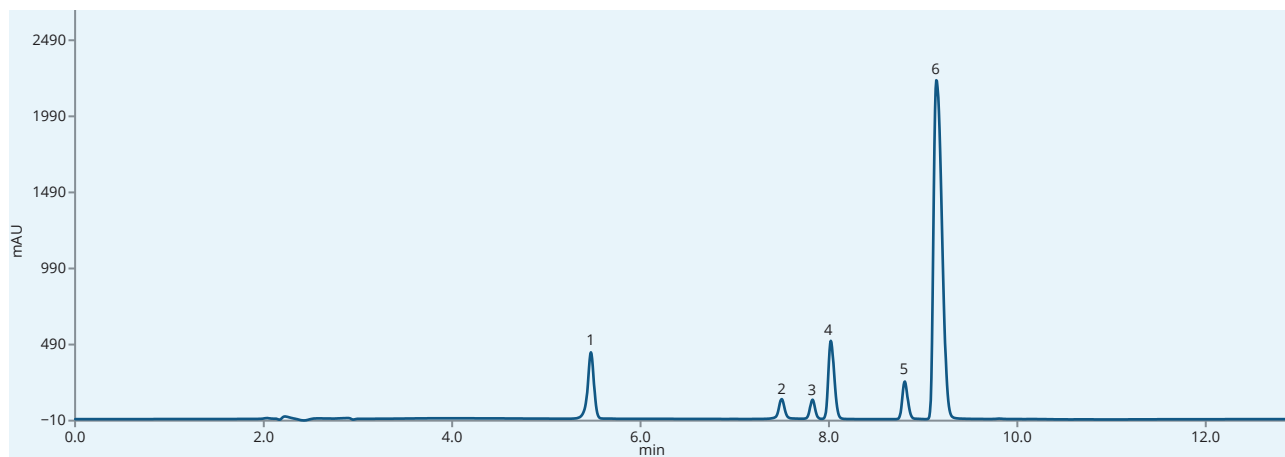
ASTRA® column hardware

- Electropolished with very low Ra reduces wall effect
- Rated up to 20000 psi (1300 bar), ideal for the UHPLC applications



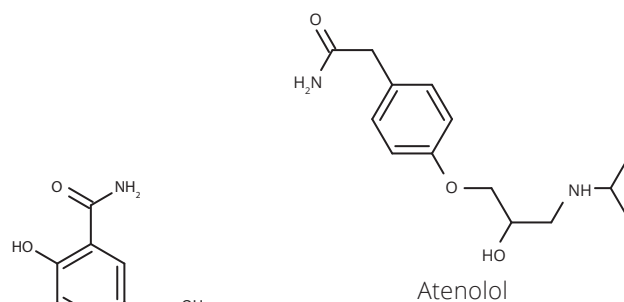
Beta Blockers

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

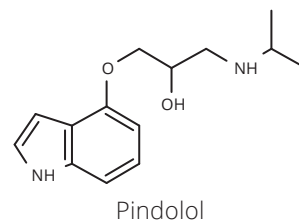


Standard mixture on ASTRA® C18-HE column

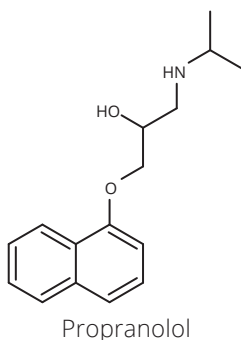
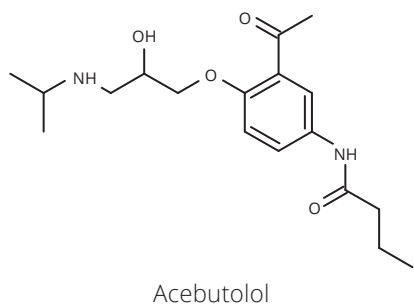
Columns	ASTRA® C18-HE, 5 µm			
Dimensions	150 mm × 4.6 mm			
Part numbers	AST-5732-LK46			
Mobile phase	A: Phosphate buffer 20mM, pH 2.5 B: ACN			
Gradient elution	Time	A (%)	B (%)	Flow rate (ml/l)
	0	95	5	0.75
	3	85	15	1.00
	8	50	50	1.00
	12	95	5	1.00
	13	95	5	0.75
Flow rate	See gradient table (ml/l)			
Temperature	25 °C			
Detection	UV @250 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			



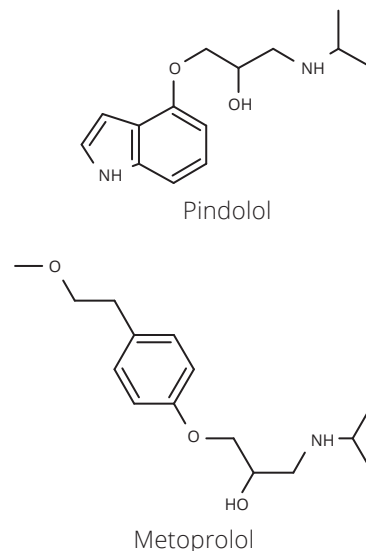
Labetalol



Pindolol



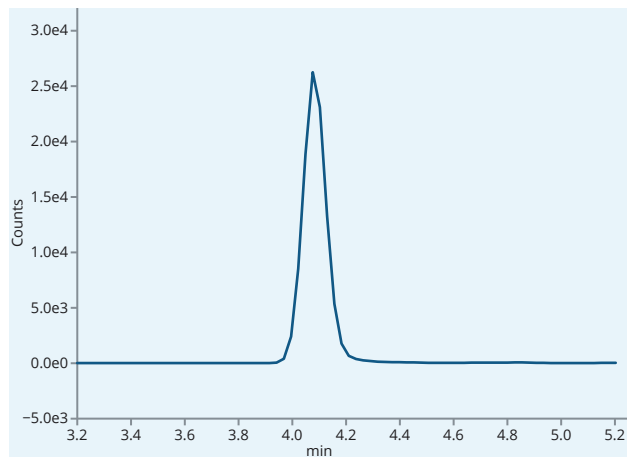
Propranolol



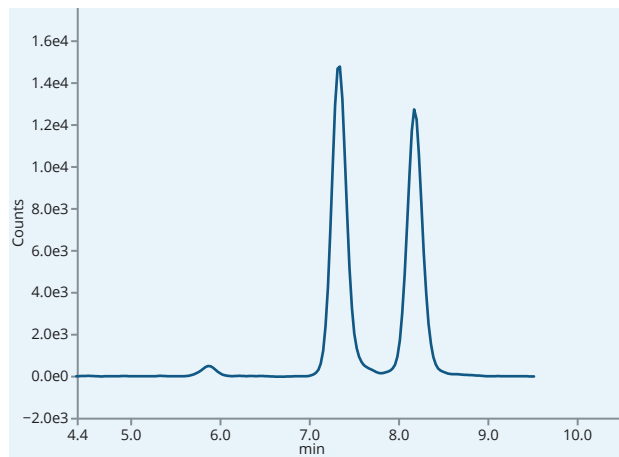
Metoprolol

API glucuronide by LC/MS

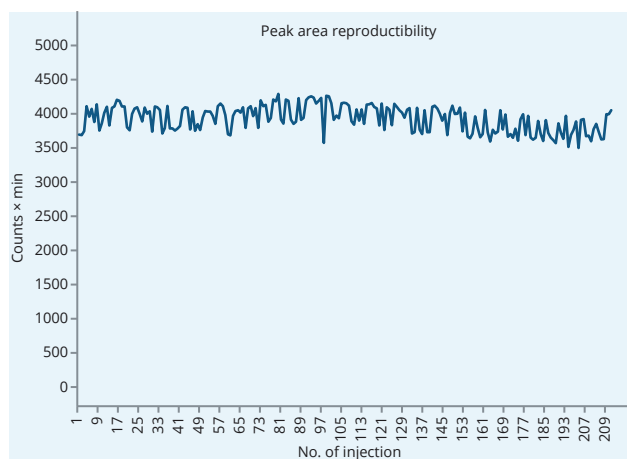
This application shows high ASTRA[®] HPLC column stability in the pharmacokinetic assay. API is used in hypolipidemic therapy adjusting cholesterol levels in the human body.



Scan 1 – API glucuronide



Scan 2 – API isomers



Plasma sample on ASTRA[®] C18-HE column

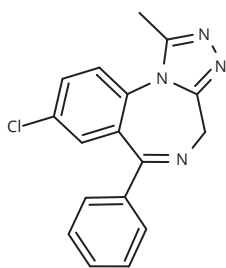
Column	ASTRA [®] C18-HE, 5 µm
Dimensions	150 mm × 4.6 mm
Part number	AST-5732-LK46
Mobile phase	MeOH : ACN : Water : 0.1% NH ₄ OH 25/50/20/5 (v/v/v/v) Isocratic elution
Flow rate	0.45 ml/min
Temperature	Ambient
Injection volume	15 µl
Detection	MS/MS
Mode	ESI, Negative 2500 eV
MS Temperature	350 °C (capillary), 380 °C (vaporizer)
Collision gas	Argon
Instrument	TSQ Quantiva (Thermo Fisher Scientific)
Analytes	1. API (proprietary)

Compound name	Q1 (m/z)	Q2 (m/z)	Collision cell pressure	Collision energy
API Glucuronide D4	588	275	2 mTorr	29 eV
API D	412	275	2 mTorr	29 eV

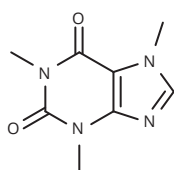
Clonazepam

Xanax is an benzodiazepine alprazolam-based anxiolytic. Counterfeit Xanax may contain caffeine as a main component, as well as clonazepam and flualprazolam, both of which have a strong sedative effect, are able to cause amnesia, and belong to the group of new psychoactive drugs.

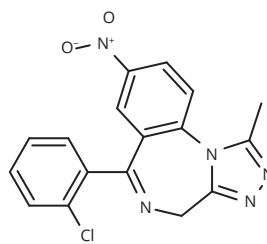
Substance Alprazolam, CAS Number 28981-97-7
 Caffeine, CAS Number 58-08-2
 Clonazepam, CAS Number 33887-02-4
 Flualprazolam, CAS Number 28910-91-0



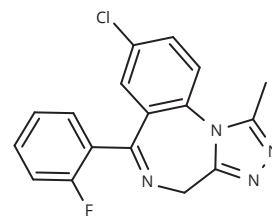
Alprazolam



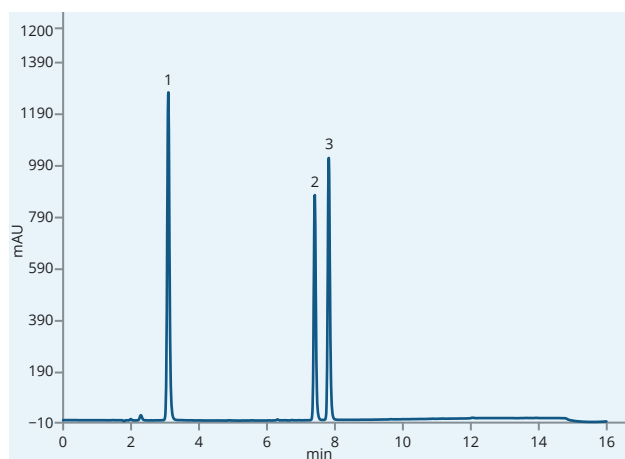
Caffeine



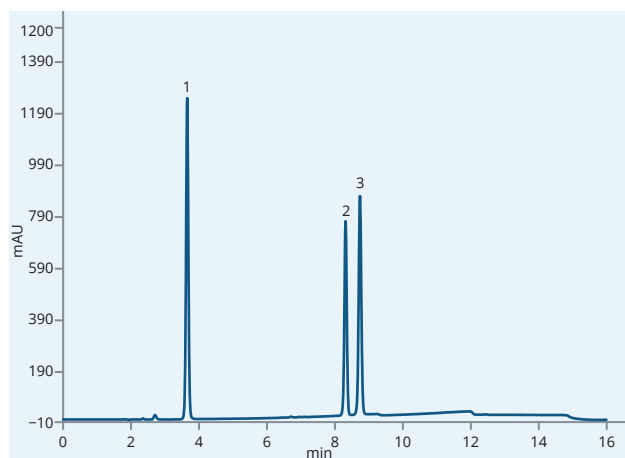
Clonazepam



Flualprazolam



Sample on ASTRA® C18-HE HPLC column

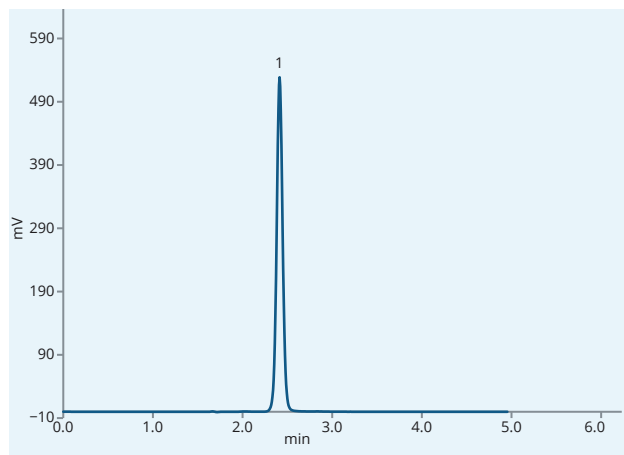


Sample on ASTRA® DM HPLC column

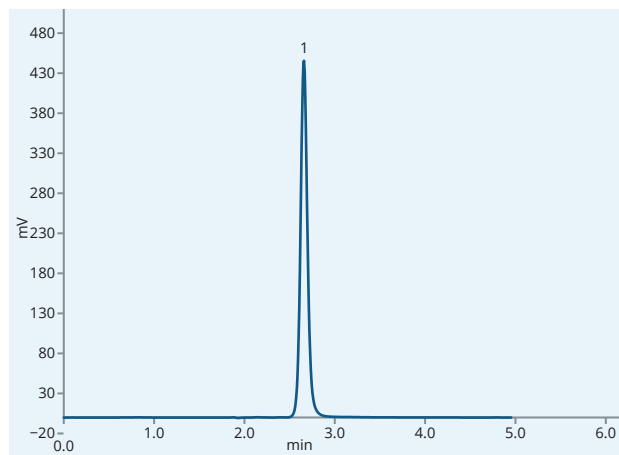
Column	ASTRA® C18-HE, 5 µm / ASTRA® DM, 5 µm			
Dimensions	150 mm × 4.6 mm (for both columns)			
Part number	AST-5732-LK46 / AST-5810-LK46			
Mobile phase	A: H ₂ O / 0.1% HCOOH + 2 mM HCOONH ₄ B: CH ₃ CN / 0.1% HCOOH			
Gradient elution	Time	A (%)	B (%)	Flow rate (ml/min)
	0	80	20	1.0
	2	80	20	1.0
	8	20	80	1.0
	11.5	20	80	1.0
	12	80	20	1.0
	15	80	20	1.0
Flow rate	1 ml/min			
Temperature	20 °C			
Injection volume	10 µl			
Detection	UV @254 nm			
Analytes	1. Caffeine 2. Clonazepam 3. Flualprazolam			

HMF in Infusion Solution

The levels of the degradation product, 5-hydroxymethylfurfural (5-HMF), in Dextrose Injection is an important determination in pharmaceutical formulas and pharmacokinetic studies. ASTRA® DM shows better retention for polar compounds.

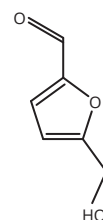


Standard mixture on ASTRA® C18-HE column



Standard mixture on ASTRA® DM column

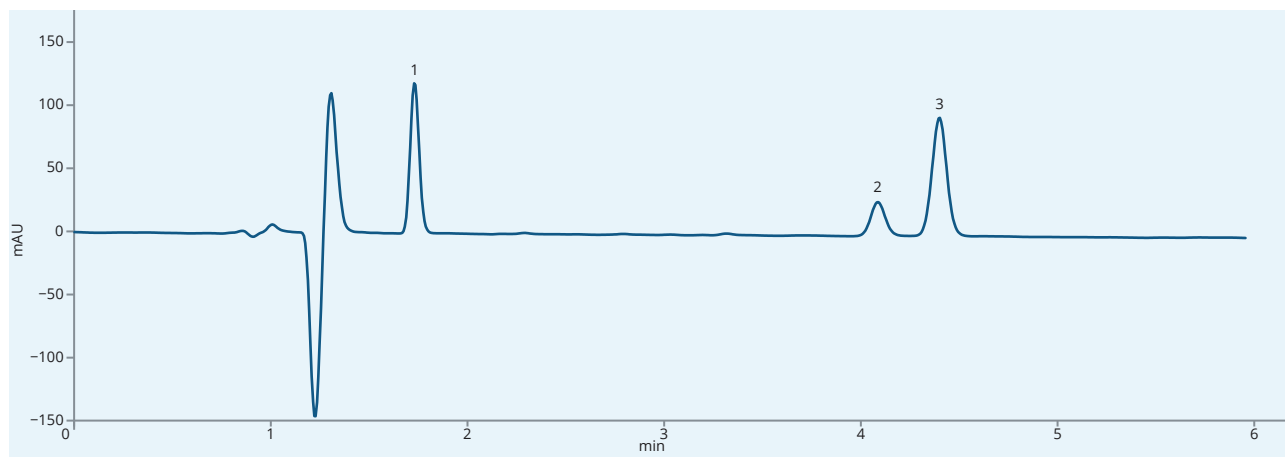
Column	ASTRA® C18-HE, 5 µm / ASTRA® DM, 5 µm
Dimensions	150 mm × 4.6 mm / 150 mm × 4.6 mm
Part number	AST-5732-LK46 / AST-5810-LK46
Mobile phase	Methanol : water 40/60 (v/v) Isocratic elution
Flow rate	1.0 ml/min
Temperature	25 °C
Injection volume	2.5 µl
Detection	UV @284 nm
Analytes	1. 5-Hydroxymethylfurfural



5-Hydroxymethylfurfural

Stevia glycosides

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



Standard on ASTRA® C18-HE

Column	ASTRA® C18-HE, 5 µm
Dimensions	150 mm × 4.6 mm
Part number	AST-5732-LK46
Mobile phase	Acetonitrile + 0.1% formic acid : water (32 % : 68 % v/v) Isocratic elution
Flow rate	1.6 ml/min
Temperature	65 °C
Detection	UV @210 nm
Analytes	1. Rebaudioside D 2. Rebaudioside A 3. Stevioside

Ordering information

Analytical columns

3 µm ASTRA® all dimensions in mm				AGS Guard System
Phase	50 × 2.1	100 × 2.1	150 × 2.1	2.1 mm Cartridges
C18-HE	AST-5732-IG21	AST-5732-II21	AST-5732-IK21	AGS-5731-RC2*
C18-AQ	Coming soon	Coming soon	Coming soon	Coming soon
DM	Coming soon	Coming soon	Coming soon	Coming soon

3 µm ASTRA® all dimensions in mm						AGS Guard System
Phase	100 × 3.0	150 × 3.0	100 × 4.6	150 × 4.6	250 × 4.6	4.0 mm Cartridges
C18-HE	AST-5732-II30	AST-5732-IK30	AST-5732-II46	AST-5732-IK46	On request	AGS-5790-RD4*
C18-AQ	Coming soon	Coming soon	Coming soon	Coming soon	On request	-
DM	Coming soon	Coming soon	Coming soon	Coming soon	-	-

5 µm ASTRA® all dimensions in mm						AGS Guard System
Phase	100 × 3.0	150 × 3.0	100 × 4.6	150 × 4.6	250 × 4.6	4.0 mm Cartridges
C18-HE	AST-5732-LI30	AST-5732-LK30	AST-5732-LI46	AST-5732-LK46	AST-5732-LM46	AGS-5790-RD4*
C18-AQ	AST-5832-LI30	AST-5832-LK30	AST-5832-LI46	AST-5832-LK46	AST-5832-LM46	-
DM	AST-5810-LI30	AST-5810-LK30	AST-5810-LI46	AST-5810-LK46	AST-5810-LM46	AGS-5790-RD4*

* AGS Guard System cartridges require AGS Holder (p/n AGS-5731-000). The holder is supplied with a stainless steel ferrule. For applications up to 400 bar, the PEEK ferrule is recommended for use (p/n AGS-5731-Y00).



AGS-5790-RD4

CHROMSHELL®



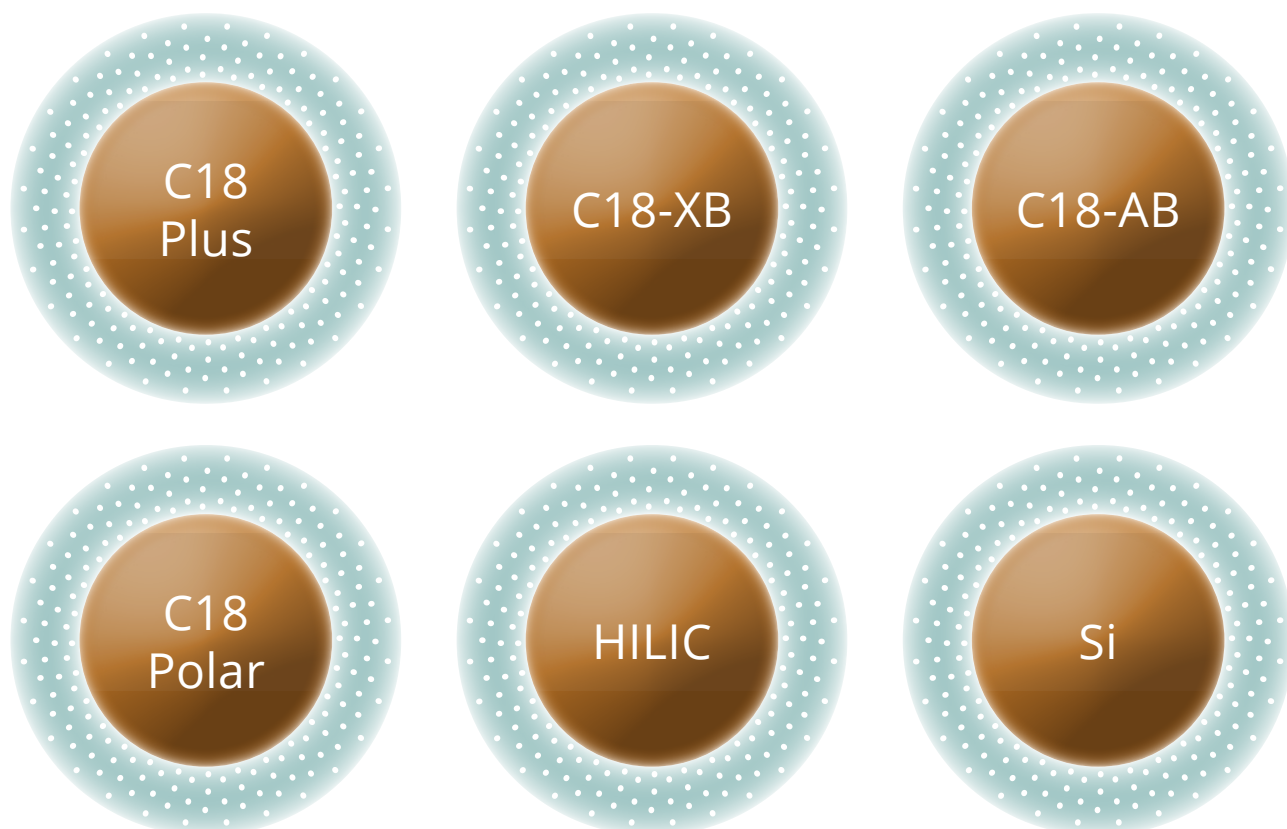
CHROMSHELL® extends the ARION® phases in the area of core-shell technology. These columns use an ultra high purity silica of 2.6 µm particles.

- Ultrapure silica with low metal content.
- Various chemistries including HILIC for a broad range of applications.
- 130 m²/g surface area.

Metal content	<10 ppm
Temperature stability	100 °C
Mean Particle diameter	2.54 ± 0.18 µm
Proximity to the shape of a sphere	0.95 ± 0.04

CHROMSHELL® phases	Particle size (µm)	Pore size (Å)	Surface area (m ² /g)	Carbon load	pH stability	100% aqueous mobile phase	Endcapping	USP code
C18 Plus	2.6	85	130	9 %	1.5 to 7.5	×	Single-step	L1
C18-XB	2.6	85	130	8 %	1.5 to 8.0	×	Single-step	L1
C18-AB	2.6	85	130	6 %	1.5 to 8.0	×	Mixed	L1
C18 Polar	2.6	85	130	6.5 %	1.5 to 7.0	✓	Mixed	L1
HILIC	2.6	85	130	-	1.5 to 7.0	-	Proprietary	L3
Si	2.6	85	130	-	1.5 to 7.0	-	-	L3

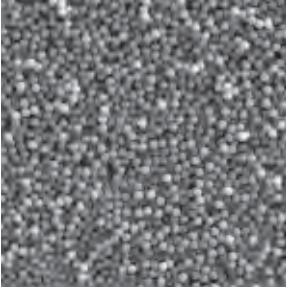
Note: Phase description in detail on page 61.



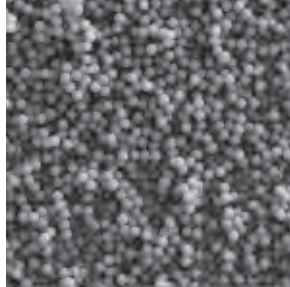
CHROMSHELL®

Up close

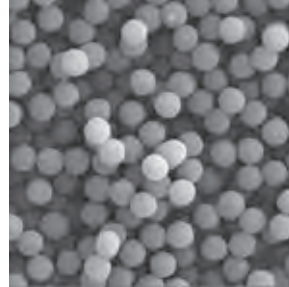
The 2.6-micron electron microscope field clearly shows the superlative quality of CHROMSHELL® particles.



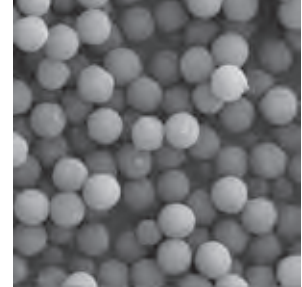
CHROMSHELL®
(100 × 100 μm)



Competitor K
(100 × 100 μm)



CHROMSHELL®
(30 × 30 μm)

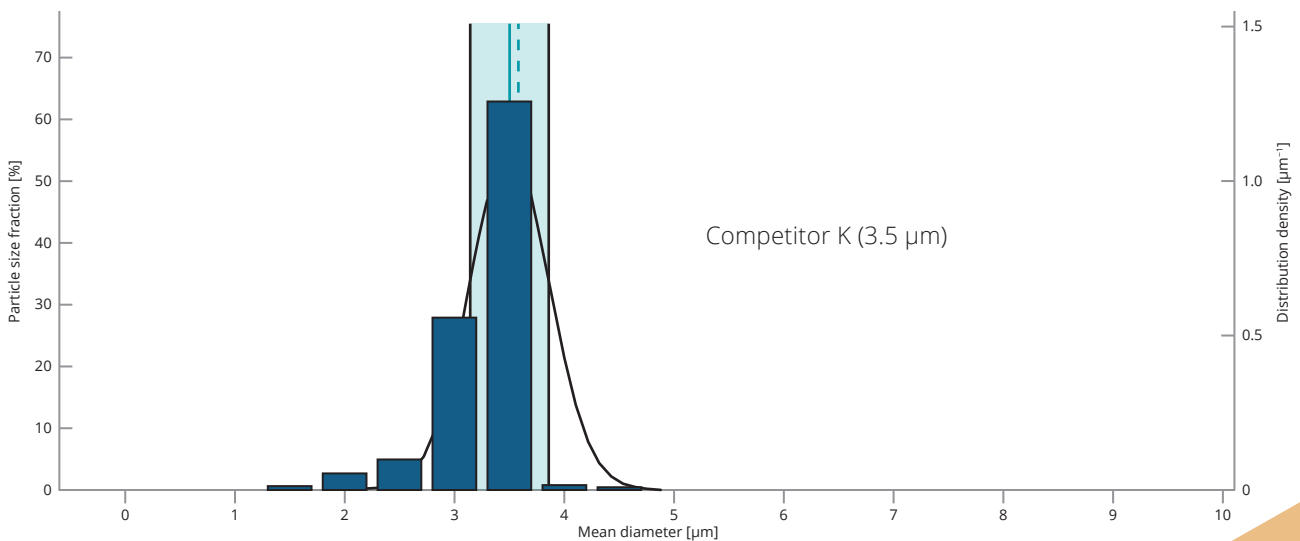
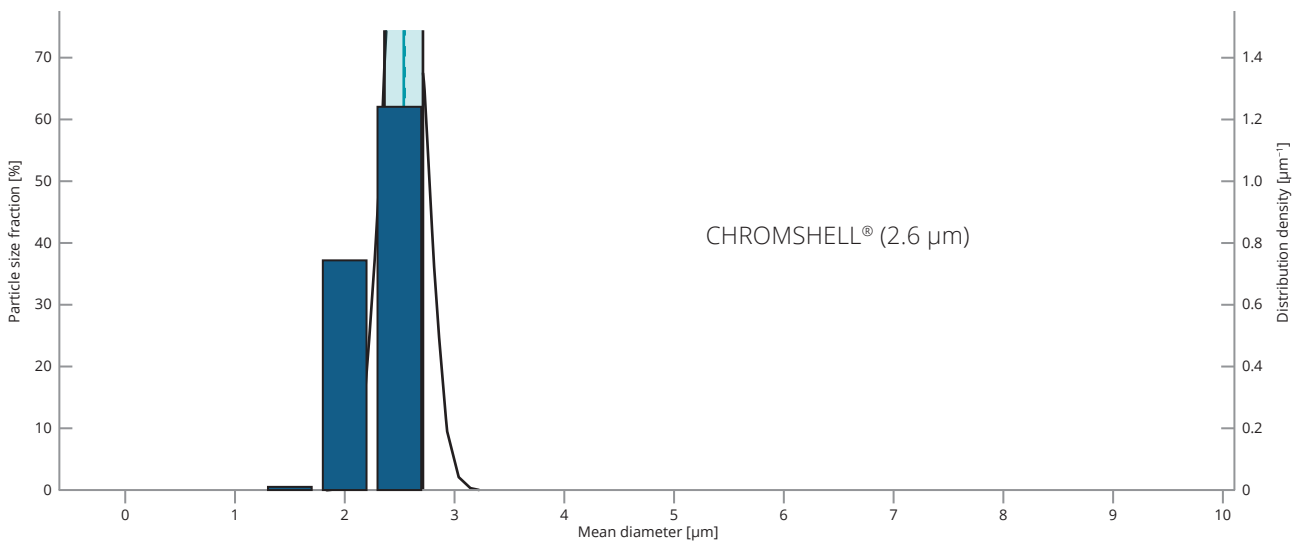


Competitor K
(30 × 30 μm)

The main particle characteristics:

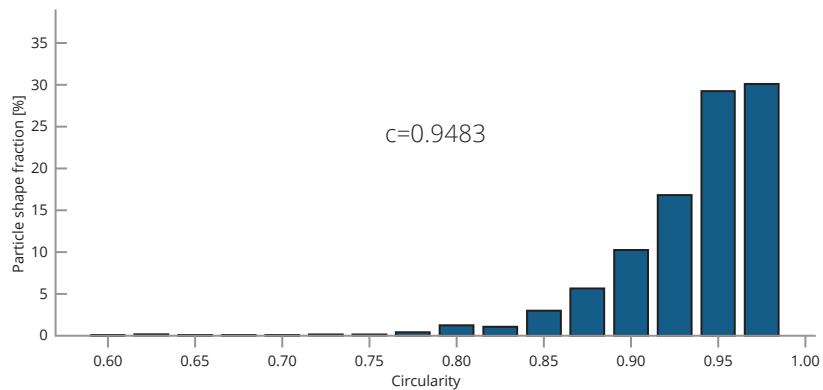
- High proximity to a sphere.
- Tight particle size distribution.
- No broken particles.
- No presence of clustered particles.
- Particle uniformity/homogeneity.

Particle size distribution

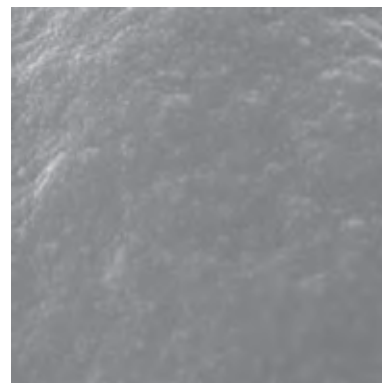


Circularity & surface smoothness

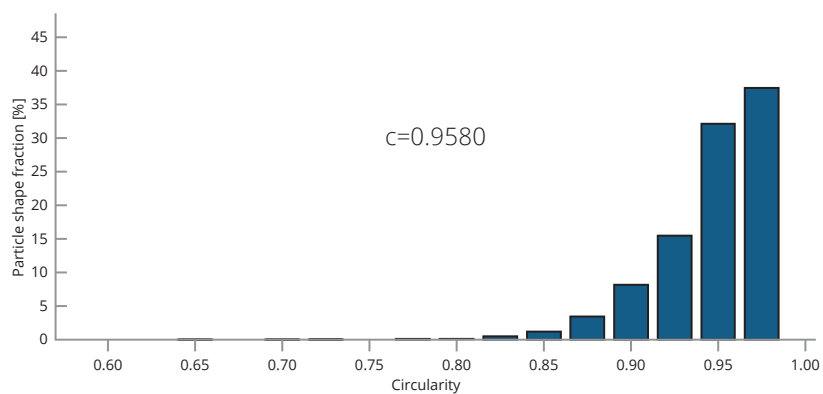
The core-shell particles were subjected to SEM analysis to determine circularity and surface smoothness.



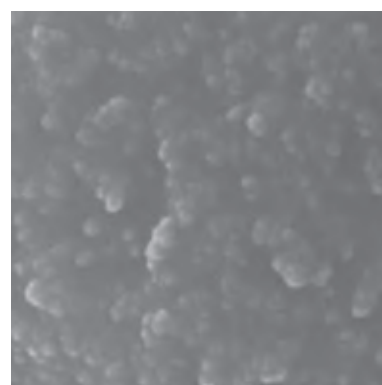
CHROMSHELL® (2.6 μm)



Detail view on pores



Competitor K (3.5 μm)



Detail view on pores up close

CHROMSHELL®

Ordering information

CHROMSHELL® C18 Plus

Designed for the separation of non-polar compounds. This column serves a broad range of analytical purposes; it is the column of **first choice**.

CHROMSHELL® C18-XB

Specific surface treatment. Suitable for the separation of non-polar compounds. The stationary phase has a highly hydrophobic surface. C18-XB shows excellent **stability at high temperature**.

CHROMSHELL® C18-AB

Proprietary surface treatment. Designed for the **separation of mid- & non-polar compounds**. The C18-AB shows excellent mechanical stability that offers an excellent tool for analyses under acidic or basic conditions.

CHROMSHELL® C18 Polar

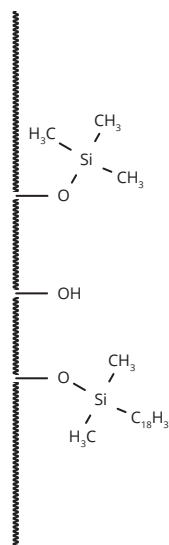
Polar endcapping. Suitable for the separation of mid- & polar analytes. It shows excellent **stability under 100% aqueous mobile phase conditions**.

CHROMSHELL® HILIC Plus

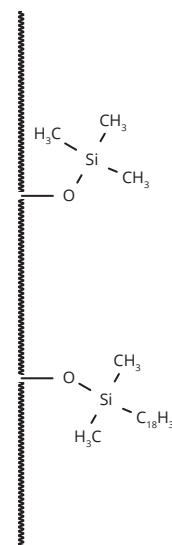
The HILIC Plus is designed for the aqueous normal phase separation of water-soluble compounds. This phase is an excellent alternative to RP purification for highly polar compounds.

CHROMSHELL® Si

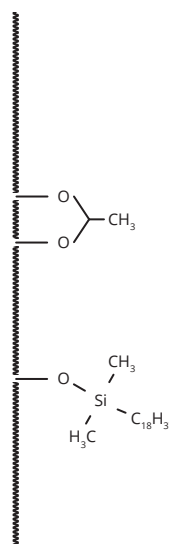
Suitable for non-ionic, polar organic compounds.



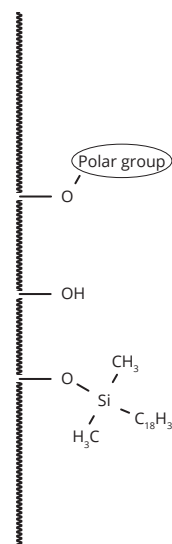
Core-shell C18 Plus



Core-shell C18-XB



Core-shell C18-AB



Core-shell C18 Polar

Ordering information

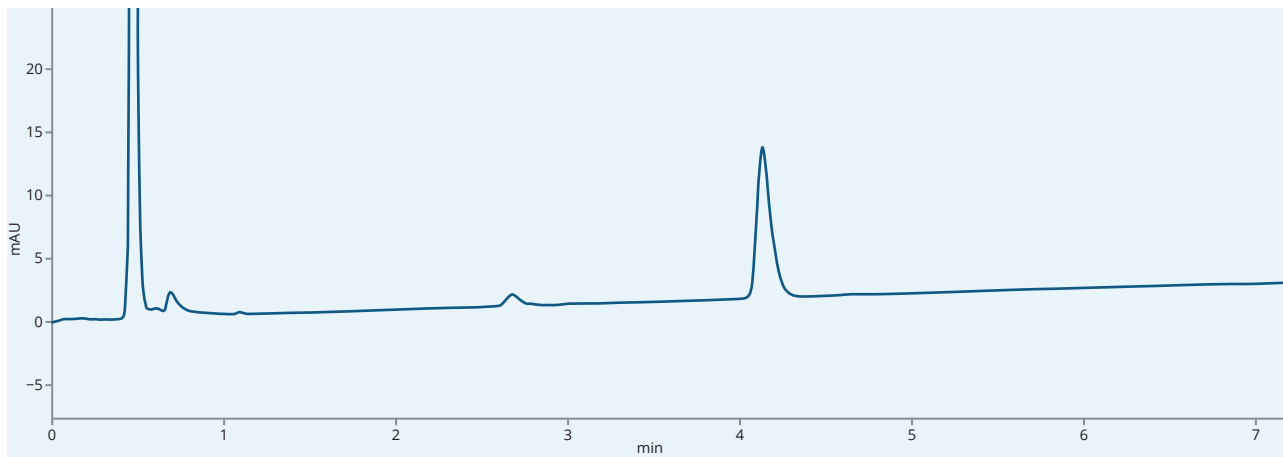
2.6 µm CHROMSHELL® all dimensions in mm						
Phase		30 × 2.1	50 × 2.1	75 × 2.1	100 × 2.1	150 × 2.1
C18 Plus	■	CSH-5722-GD21	CSH-5722-GG21	CSH-5722-GH21	CSH-5722-GI21	CSH-5722-GK21
C18-XB	■	CSH-5749-GD21	CSH-5749-GG21	CSH-5749-GH21	CSH-5749-GI21	CSH-5749-GK21
C18-AB	■	CSH-5750-GD21	CSH-5750-GG21	CSH-5750-GH21	CSH-5750-GI21	CSH-5750-GK21
C18 Polar	■	CSH-5751-GD21	CSH-5751-GG21	CSH-5751-GH21	CSH-5751-GI21	CSH-5751-GK21
HILIC Plus	■	CSH-5752-GD21	CSH-5752-GG21	CSH-5752-GH21	CSH-5752-GI21	CSH-5752-GK21
Si	■	CSH-5753-GD21	CSH-5753-GG21	CSH-5753-GH21	CSH-5753-GI21	CSH-5753-GK21

2.6 µm CHROMSHELL® all dimensions in mm						
Phase		30 × 3.0	50 × 3.0	75 × 3.0	100 × 3.0	150 × 3.0
C18 Plus	■	CSH-5722-GD30	CSH-5722-GG30	CSH-5722-GH30	CSH-5722-GI30	CSH-5722-GK30
C18-XB	■	CSH-5749-GD30	CSH-5749-GG30	CSH-5749-GH30	CSH-5749-GI30	CSH-5749-GK30
C18-AB	■	CSH-5750-GD30	CSH-5750-GG30	CSH-5750-GH30	CSH-5750-GI30	CSH-5750-GK30
C18 Polar	■	CSH-5751-GD30	CSH-5751-GG30	CSH-5751-GH30	CSH-5751-GI30	CSH-5751-GK30
HILIC Plus	■	CSH-5752-GD30	CSH-5752-GG30	CSH-5752-GH30	CSH-5752-GI30	CSH-5752-GK30
Si	■	CSH-5753-GD30	CSH-5753-GG30	CSH-5753-GH30	CSH-5753-GI30	CSH-5753-GK30

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	■	CSH-5722-GG46	CSH-5722-GH46	CSH-5722-GI46	CSH-5722-GK46	CSH-5722-GM46
C18-XB	■	CSH-5749-GG46	CSH-5749-GH46	CSH-5749-GI46	CSH-5749-GK46	CSH-5749-GM46
C18-AB	■	CSH-5750-GG46	CSH-5750-GH46	CSH-5750-GI46	CSH-5750-GK46	CSH-5750-GM46
C18 Polar	■	CSH-5751-GG46	CSH-5751-GH46	CSH-5751-GI46	CSH-5751-GK46	CSH-5751-GM46
HILIC Plus	■	CSH-5752-GG46	CSH-5752-GH46	CSH-5752-GI46	CSH-5752-GK46	CSH-5752-GM46
Si	■	CSH-5753-GG46	CSH-5753-GH46	CSH-5753-GI46	CSH-5753-GK46	CSH-5753-GM46

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-XB

Column	CHROMSHELL® C18-XB, 2.6 μ m
Dimensions	100 mm \times 4.6 mm
Part number	CSH-5749-GI46
Mobile phase	Proprietary
Temperature	Proprietary
Injection volume	2.5 μ l
Detection	UV @195 nm
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 **900 bar**. More details about this guard system are on page 46.

Protection can be perfectly ensured by installing a pre-column filter holder with a 0.2µm or 0.5µm 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 1/16inch 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	Internal volume	Part number
FGS in-line filter holder for 0.2µm frit (including encased type frit), 1 pc	0.59 µl	FGS-5782-0R0
FGS in-line filter holder for 0.5µm frit (including encased type frit), 1 pc	0.61 µl	FGS-5782-0S0

Replacement frits

Description	Frit volume	Frit OD	Part number (pack of 5 pcs)
FGS stainless steel frit for in-line filter 0.2 µm, ID 1.96 mm, 5 pcs	0.11 µl	1.96 mm	FGS-5782-SRB
FGS stainless steel frit for in-line filter 0.5 µm, ID 1.96 mm, 5 pcs	0.13 µl	1.96 mm	FGS-5782-SSB

Note: The frit consists of stainless steel frit and PEEK ring. The ring has 2.92 mm OD. The frit porosity values are only nominal. They do not reflect maximum pore size of the frit.



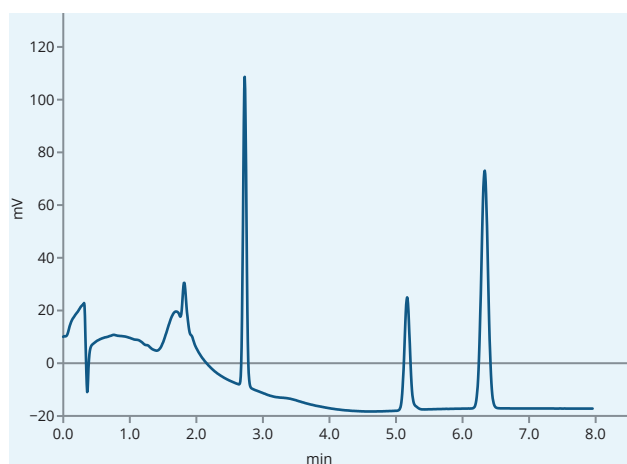
Exploded view

COLUMN CARE

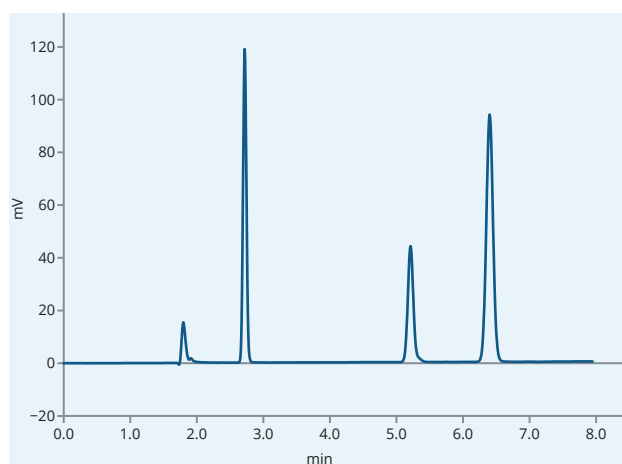
Each HPLC column requires a care depending on the stationary phase used. Column care guides for ARION®, ASTRA® and CHROMSHELL® columns are available at our website www.arionchromatography.com.

Column conditioning

Column conditioning is very important before you start to use it. All columns require standard procedure for HPLC column conditioning. Use low flow rate with the mobile phase and flush the column with at least 5 column volumes. Some phases require even more – 10 column volumes. The chromatograms below show a difference between conditioned and unconditioned HPLC column.



Column without conditioning



Column after conditioning

If you need another information, contact our technical department.

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

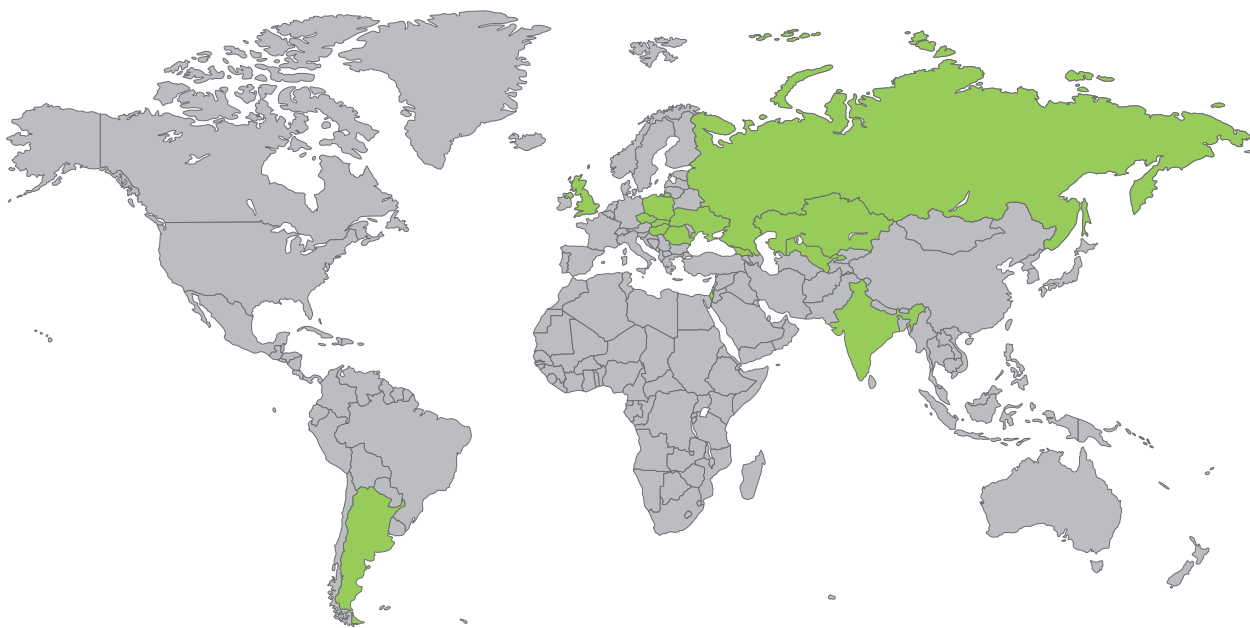
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Chromatography
 Product Guide
 Version 3.21

Some chromatograms were evaluated by Clarity™
 Chromatography Station (DataApex Ltd.)
 www.arionchromatography.com