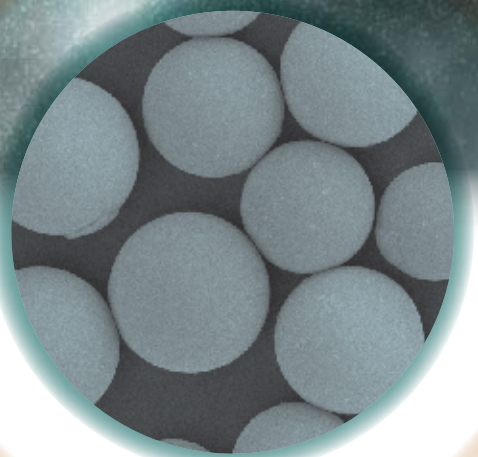


NEW ARION®

IS HERE TOGETHER

WITH CHROMSHELL®

WORKHORSE
FOR YOUR APPLICATIONS



ARION

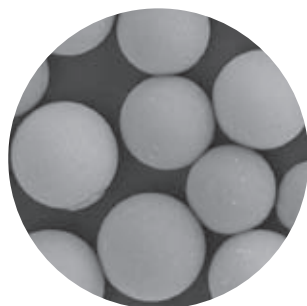
CHROMSHELL

ARION®



As ARION® is one of the latest objects found in space, so it is also the latest 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

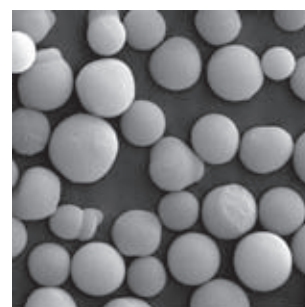
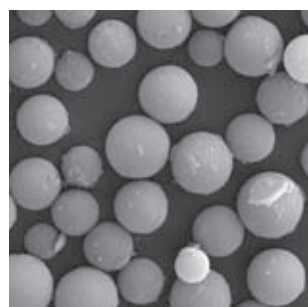
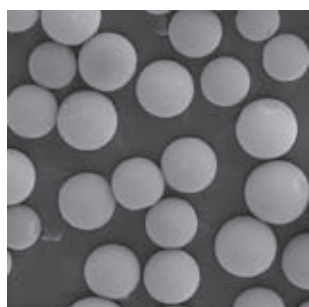
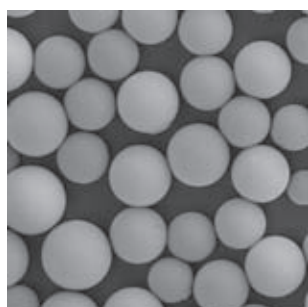
Particle size	5 µm	2.2 µm
Metal content	<10 ppm	<10 ppm
Temperature stability	100 °C*	100 °C*
Mean particle diameter	5.3 ± 0.9 µm	2.5 ± 0.5 µm
Proximity to the shape of a sphere	0.96 ± 0.04	0.97 ± 0.03

* 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

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

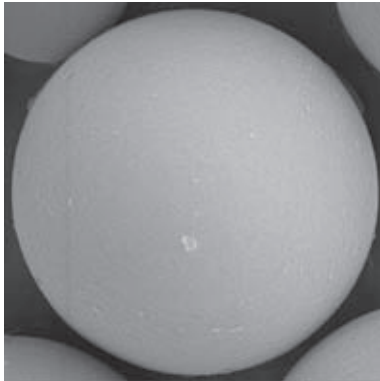
SEM HV analysis 20.0 kV, view field 30 µm (by independent laboratory)

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.

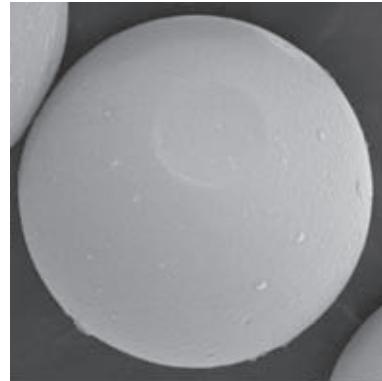
ARION®

UP CLOSE

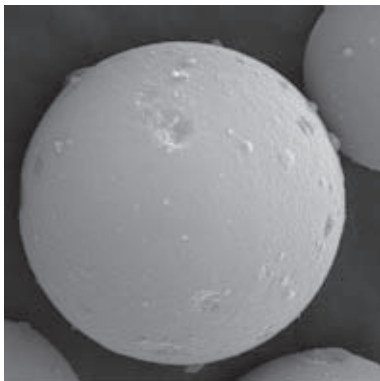
The 5-micron electron microscope field clearly shows the highest quality of ARION® 5µm particles.



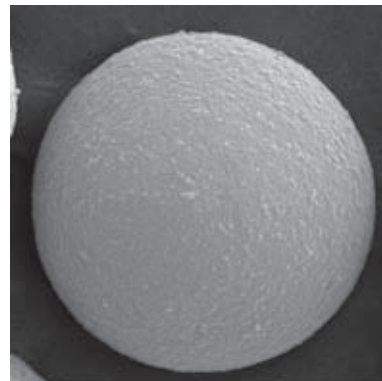
ARION® particle 5 µm



Competitor L particle 5 µm



Competitor X particle 5 µm

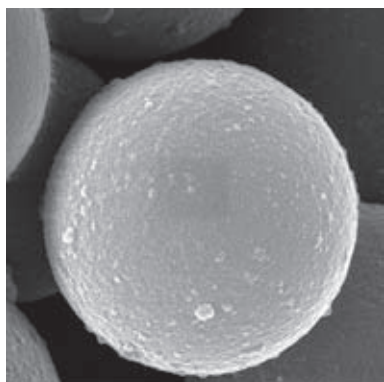


Competitor E particle 5 µm

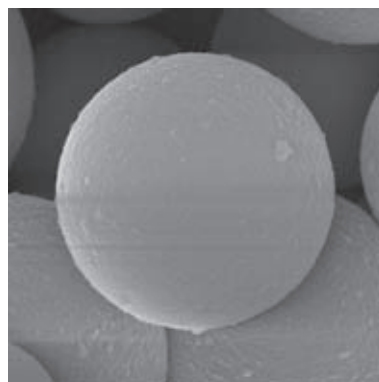
Main particle characteristics:

- 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".

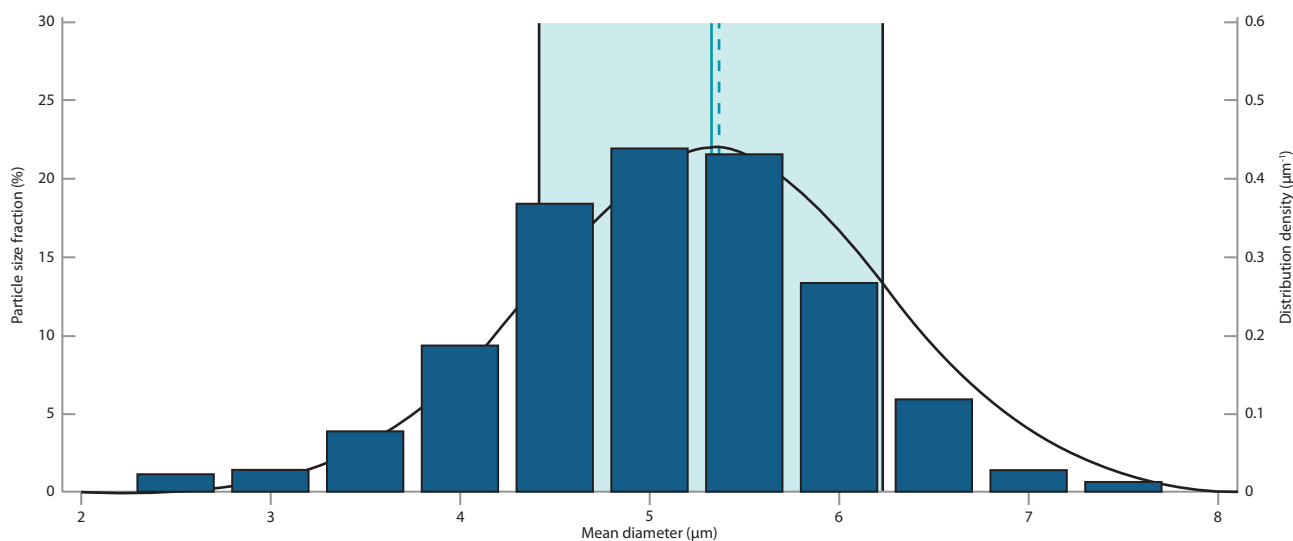
PARTICLE SIZE DISTRIBUTION



ARION® particle 1.7 µm



ARION® particle 2.2 µm

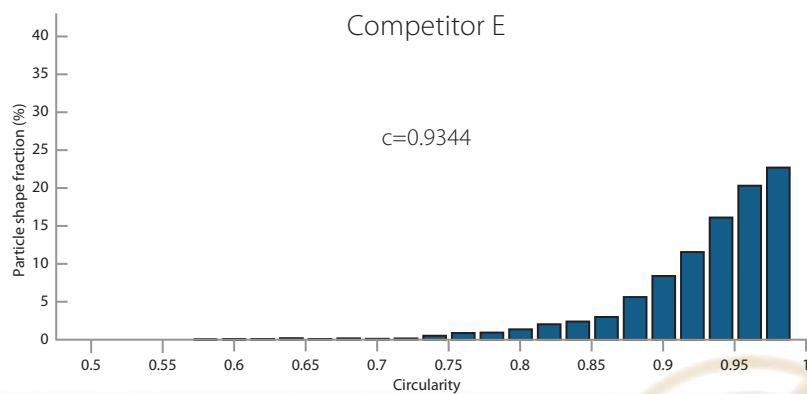
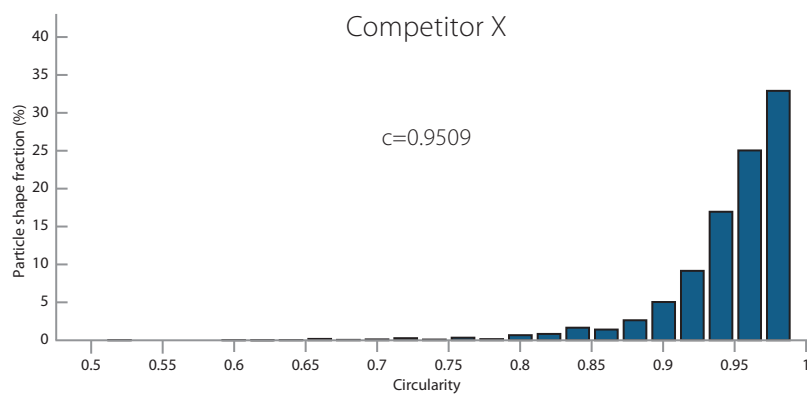
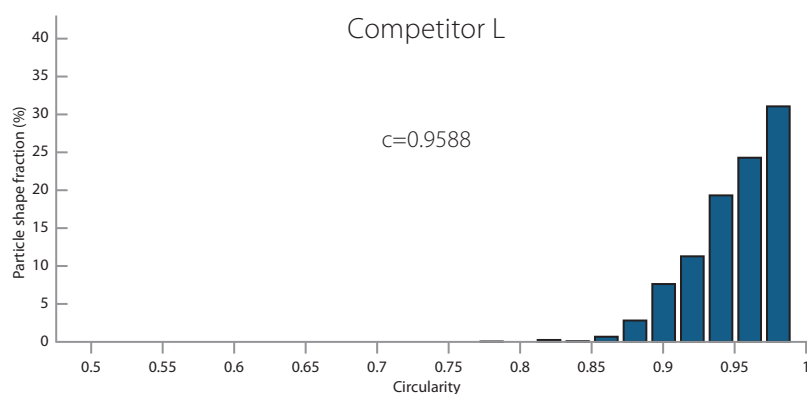
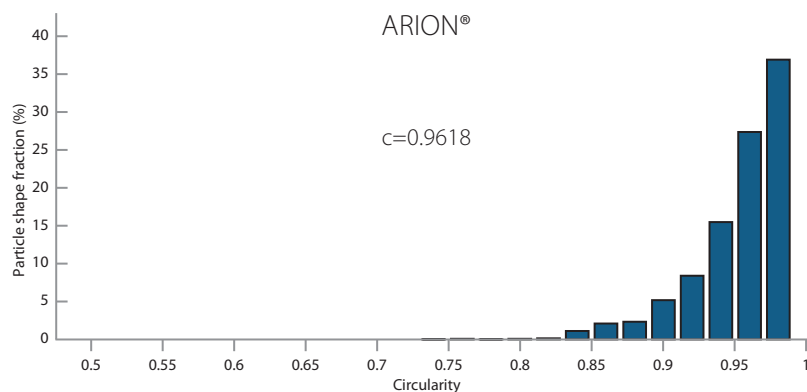


Particle size distribution of ARION® 5 µm particles shows a tight profile calculated from ferret figures by SEM.

ARION® column hardware:

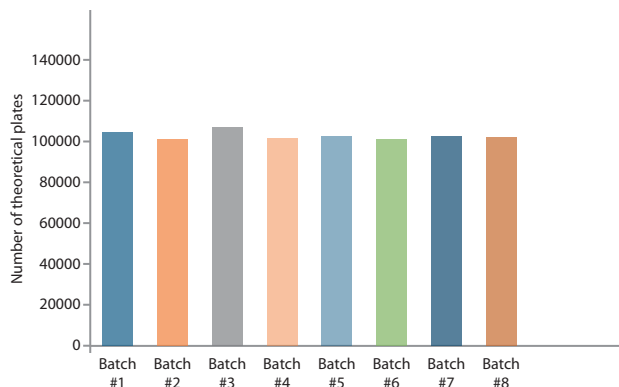
- Modern column hardware for easy handling in a narrow space.
- UHPLC grade Stainless Steel with an amazingly smooth internal surface.
- Colour coded fittings.

CIRCULARITY

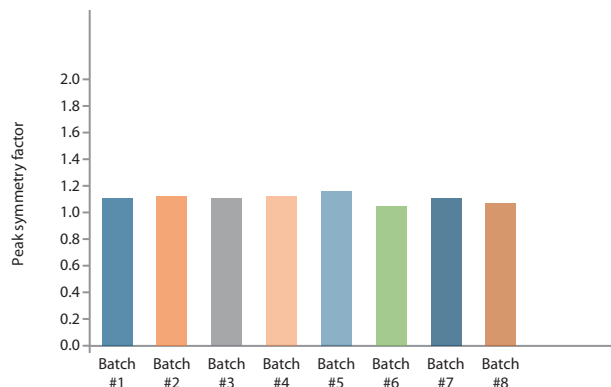


BATCH TO BATCH REPRODUCIBILITY

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).



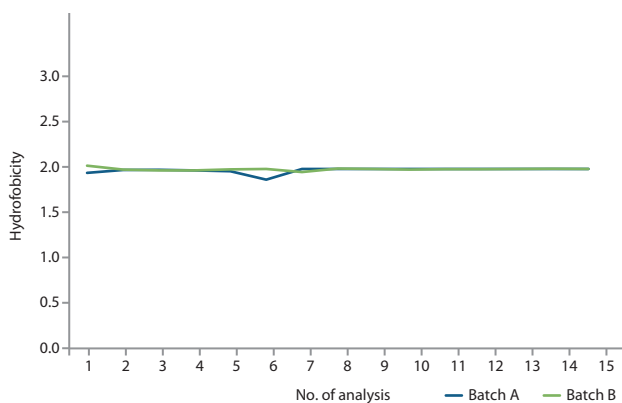
Theoretical plates reproducibility



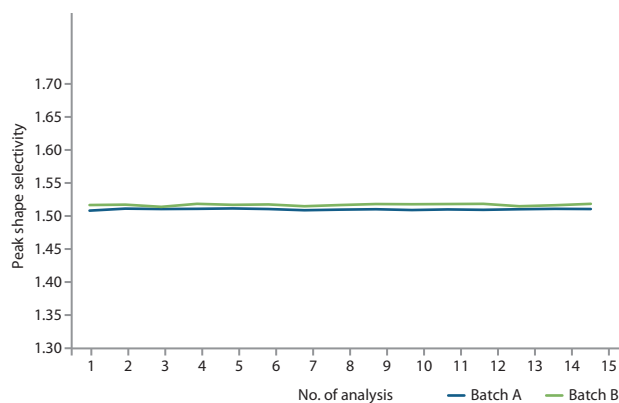
Symmetry reproducibility

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 $k_{\text{triphenylene}}/k_{\text{o-terphenyl}}$.

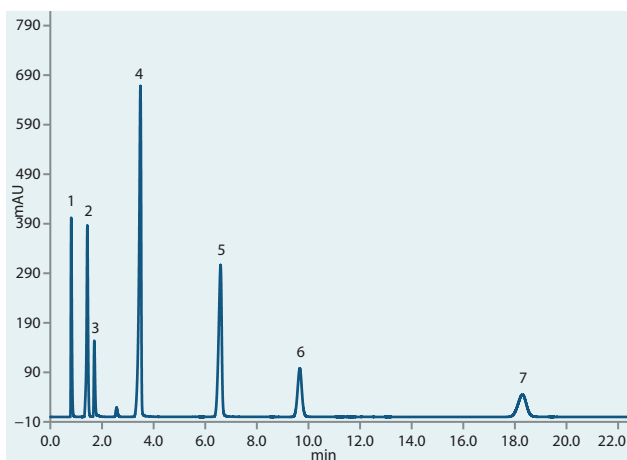


Hydrofobicity test

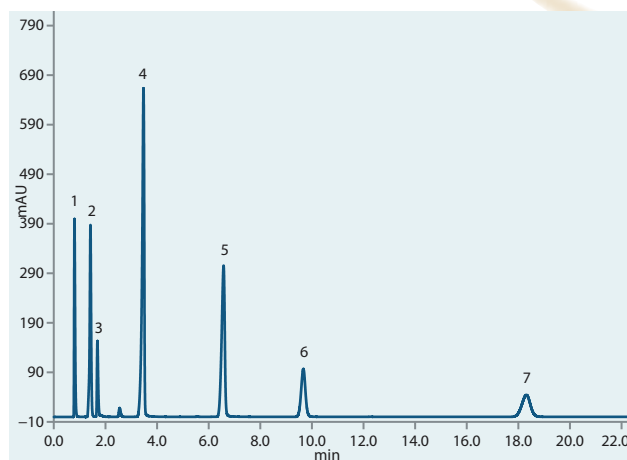


Peak shape selectivity

BATCH TO BATCH REPRODUCIBILITY



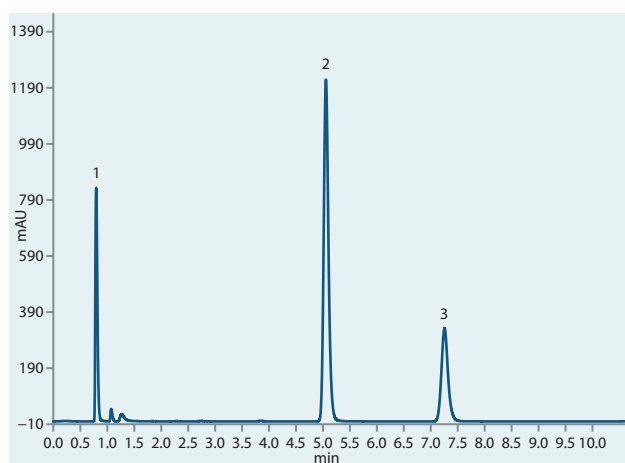
Batch A



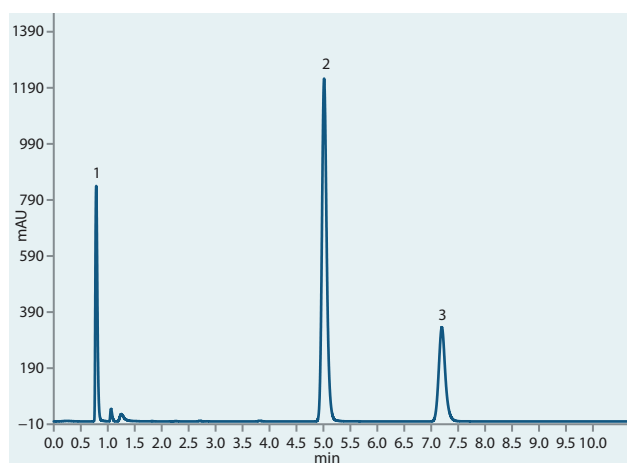
Batch B

Analysis of two batches based on the Engelhardt test.

Column	ARION® Plus C18, 1.7 µm, 100 × 2.1 mm
Conditions	Methanol : water 49:51 (v/v), isocratic, 0.3 ml/min, 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

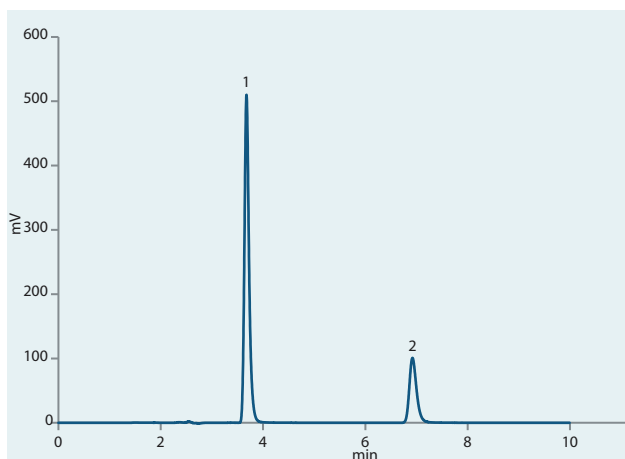
Analysis of two batches based on the Shape selectivity test.

Column	ARION® Plus C18, 1.7 µm, 100 × 2.1 mm
Conditions	Methanol : water 79:21 (v/v), isocratic, 0.3 ml/min, 40 °C
Analytes	1. Uracil (t_r) 2. Triphenylene 3. o-Terpenyl

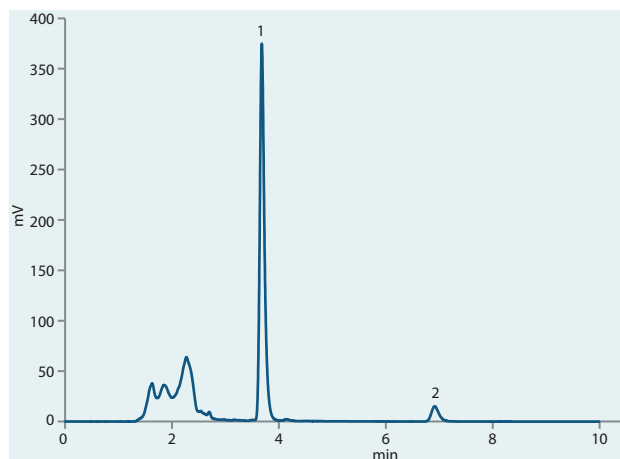
ARION® - APPLICATIONS

ALCALOIDS - XANTHINE DERIVATIVES

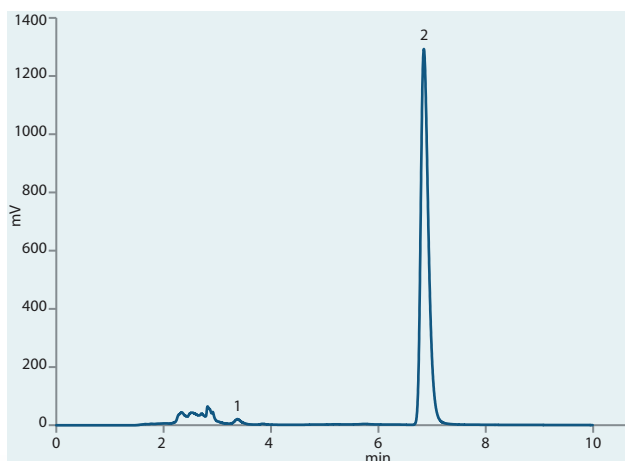
Xanthine alkaloids occur naturally in various plants, such as cocoa, tea and coffee trees. They are commonly used for their effects as mild stimulants. Xanthine alkaloids are monitored in food and drinks, e.g. in chocolate, cocoa powder, and energy drinks.



Theobromine and caffeine standard



Cocoa sample



Energy drink

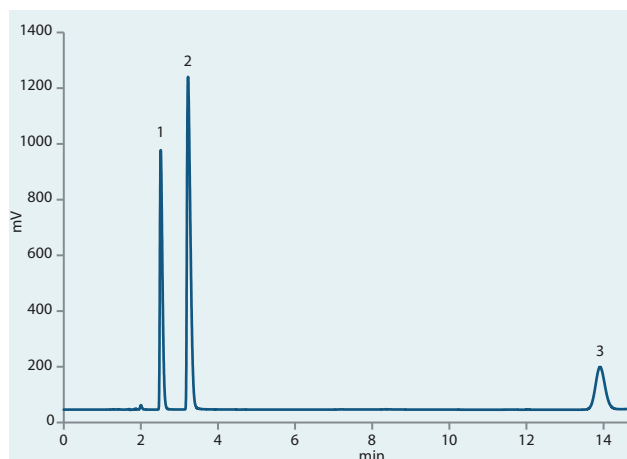
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Methanol : water 30:70 (v/v)
Flow rate	1.0 ml/min
Temperature	30 °C
Detection	UV @280 nm
Analytes	1. Theobromine 2. Caffeine



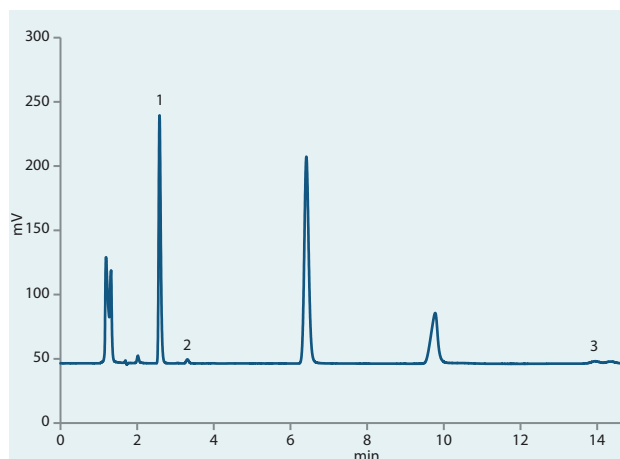
ARION® - APPLICATIONS

NON-NUTRITIVE SWEETENERS

Low-caloric value 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



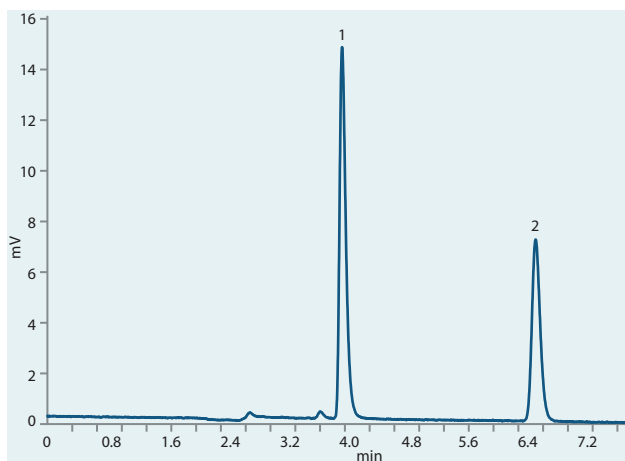
Energy drink

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)

ARION® - APPLICATIONS

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

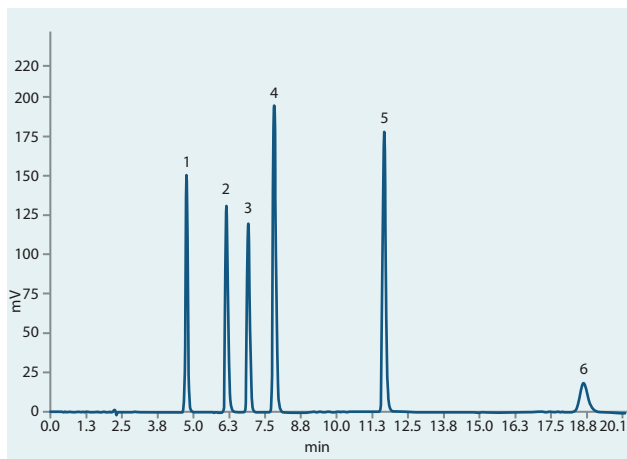
Standard mixture



ARION® - APPLICATIONS

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

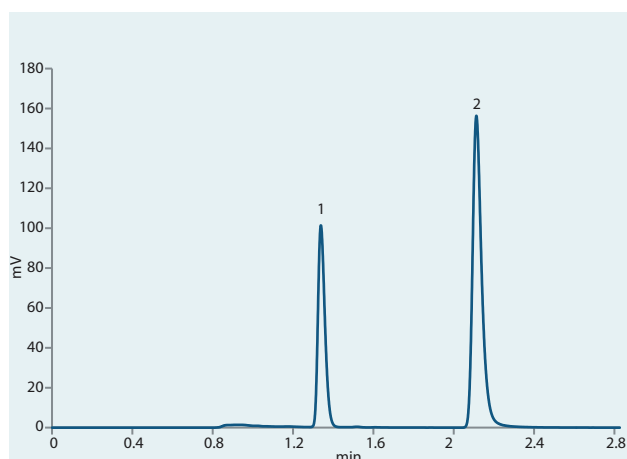
Time (min)	Flow rate (ml/min)	Wavelength (nm)	A (%) (Water)	B (%) 17.5M KH ₂ PO ₄	C (%) Acetonitrile	D (%) Methanol
0	1.3	230	0	90	2	8
7	1.5	214	0	80	8	12
14	1.5	214	0	80	8	12
15	1.3	214	0	90	2	8
17	1.3	214	0	90	2	8



ARION® - APPLICATIONS

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.



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) isocratic elution A – Acetonitrile B – 0.5% H ₃ PO ₄ in mili-Q water, (pH = 2)
Flow rate	2.0 ml/min
Temperature	Ambient
Detection	UV @230 nm (ref. 550 nm, 100 nm BW)
Analytes	1. Benzoic acid 2. Denatonium

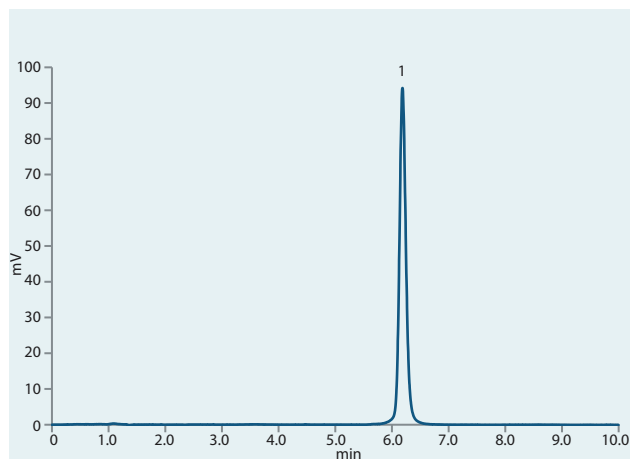
Ethanol sample



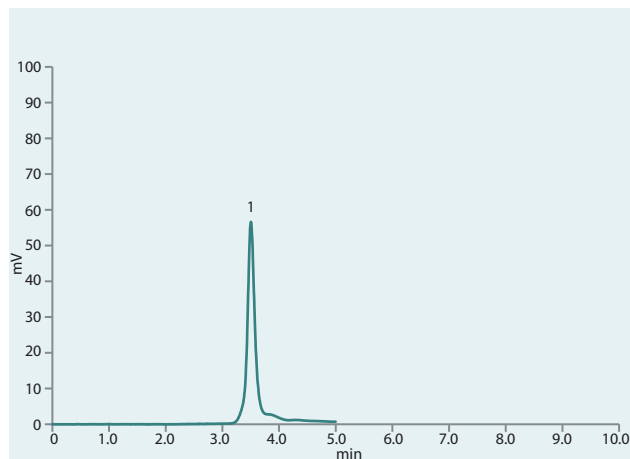
ARION® - APPLICATIONS

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)

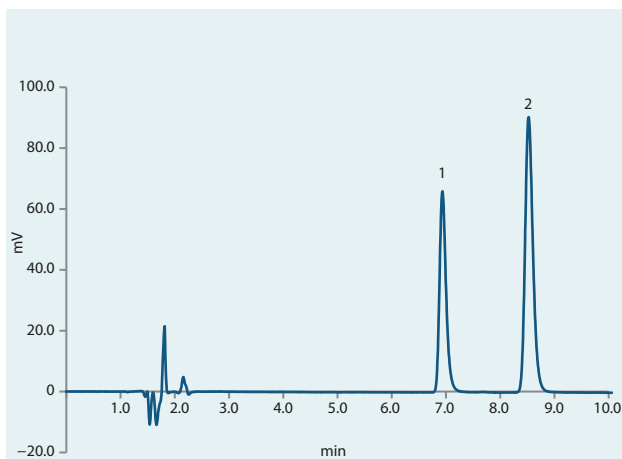
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Methanol : water 10:90 (v/v), isocratic elution
Flow rate	1.5 ml/min
Temperature	30° C
Detection	UV @285 nm
Analytes	1. Hydroxymethylfurfural



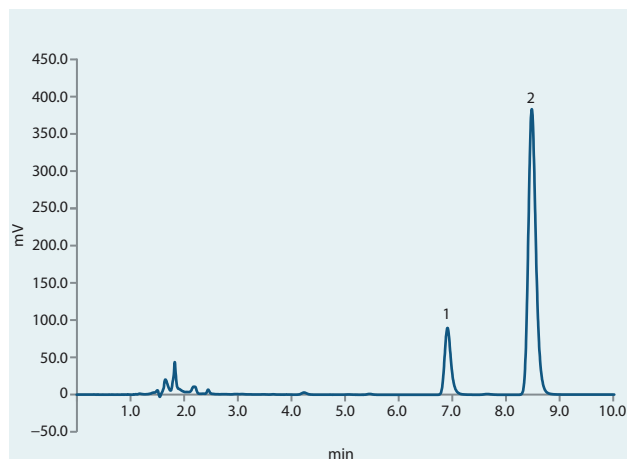
ARION® - APPLICATIONS

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

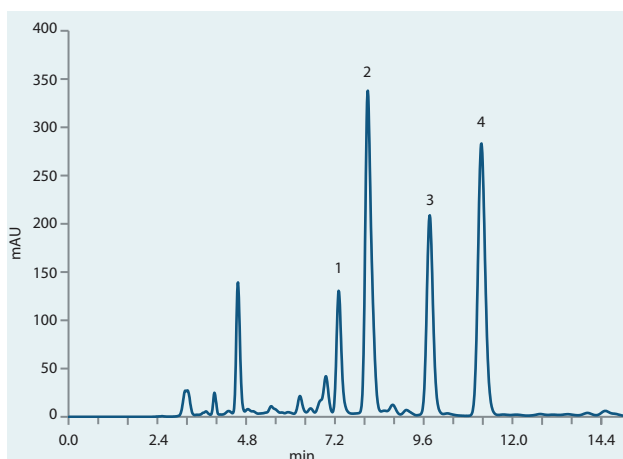
Column	ARION® Plus C18, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Citrate buffer pH 4.1 : ACN : MeOH 70:20:10 (v/v)
Flow rate	1.5 ml/min
Temperature	30 °C
Detection	UV @240 nm
Analytes	1. Sodium benzoate 2. Potassium sorbate



ARION® - APPLICATIONS

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.



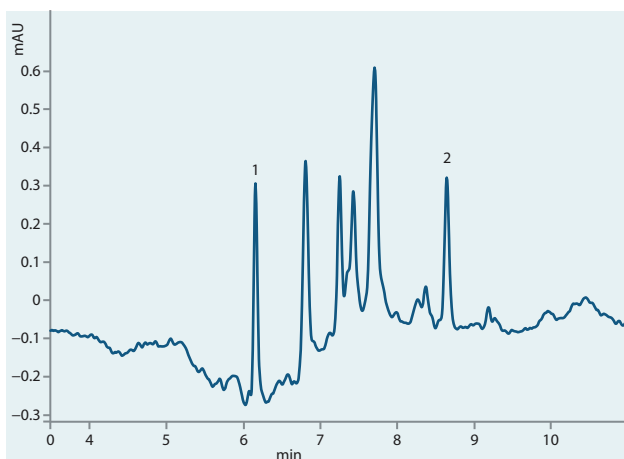
Alpha- & beta- acids in hop sample

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), isocratic
Flow rate	0.8 ml/min
Temperature	40 $^{\circ}$ C
Detection	UV @314 nm
Analytes	1. Co-humulone 2. Humulone 3. Co-lupulone 4. Lupulone

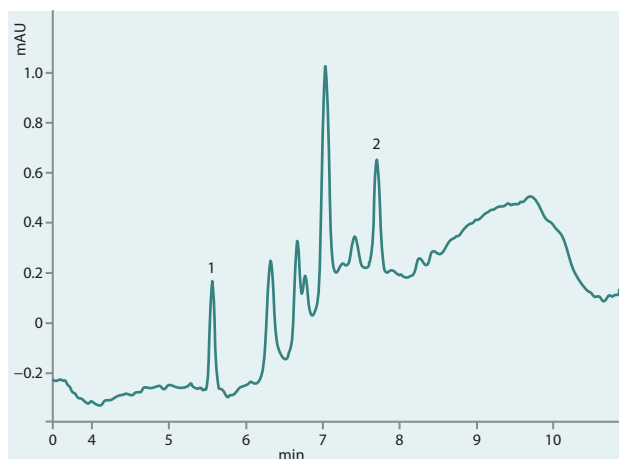
ARION® - APPLICATIONS

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



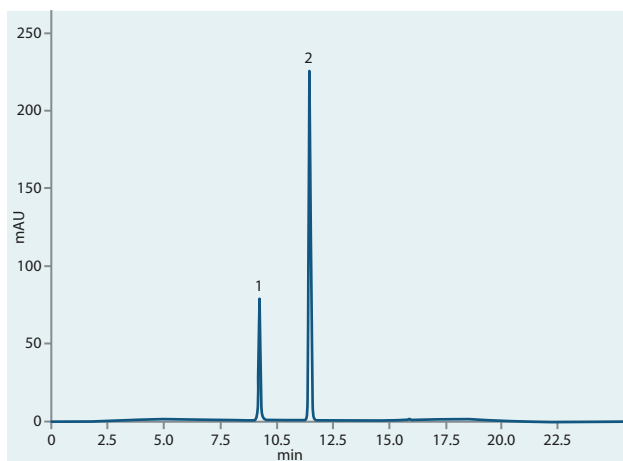
Matrix standard on competitive column
(Competitor LI)

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

ARION® - APPLICATIONS

PHARMACEUTICAL DRUGS

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).



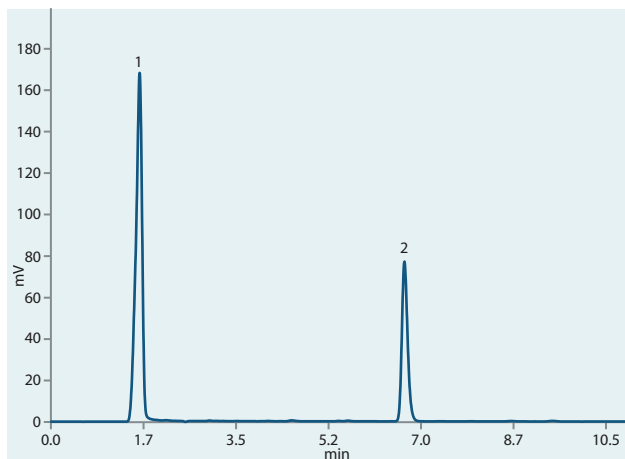
Standard mixture

Column	ARION® Plus C18, 5.0 μ m
Dimensions	250 mm \times 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Proprietary
Flow rate	Proprietary
Temperature	Proprietary
Detection	DAD
Analytes	1. Impurity A 2. Ipidacrine

ARION® - APPLICATIONS

PHARMACEUTICAL DRUGS

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.



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

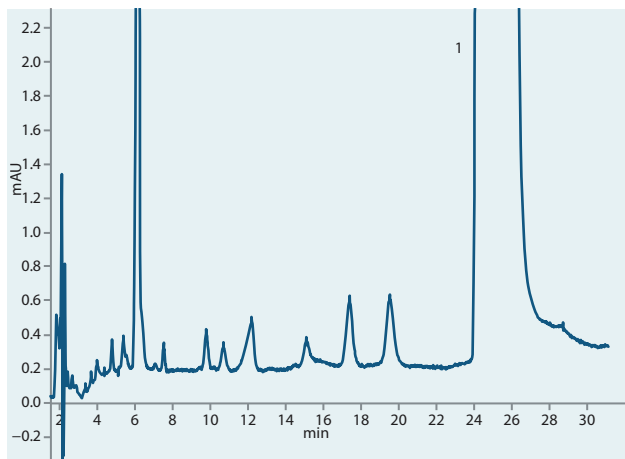
Standard mixture



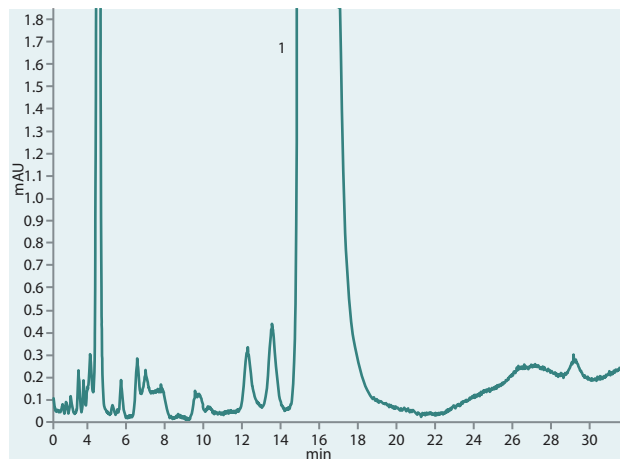
ARION® - APPLICATIONS

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)

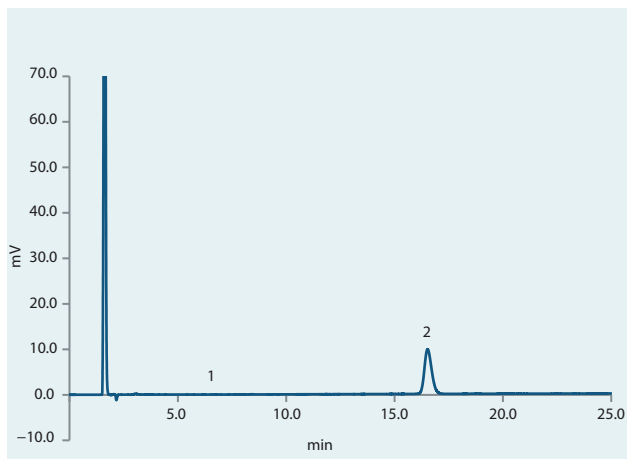
Column	ARION® Plus C18, 5.0 μ m
Dimensions	250 mm x 4.6 mm
Part number	ARI-5720-LM46
Mobile phase	Gradient elution (proprietary)
Flow rate	1.2 ml/min
Detection	UV @254 nm
Analytes	1. Penicillin



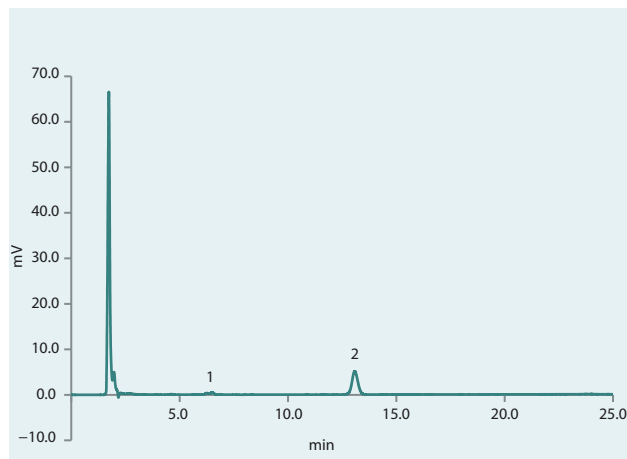
ARION® - APPLICATIONS

VETERINARY DRUGS

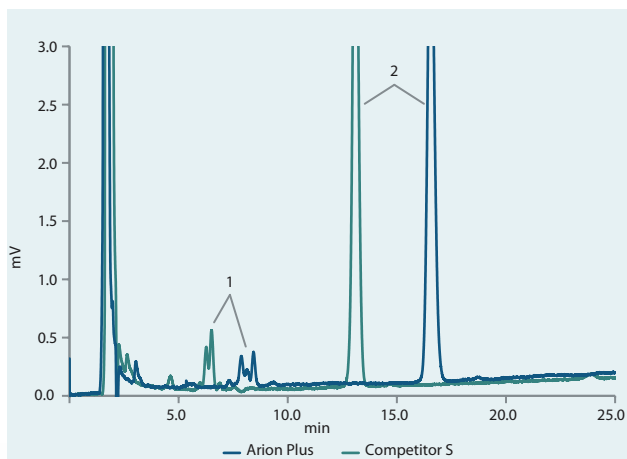
Tiamulin hydrogen fumarate is a semisynthetic drug with an antibacterial effect. It is used to treat animal diseases, such as swine dysentery (caused by *Brachyspira hyodysenteriae*), swine pneumonia or mycoplasmal arthritis. Tiamulin is also used for the prevention and treatment of chronic respiratory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



Sample – 2% premix on ARION® column



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



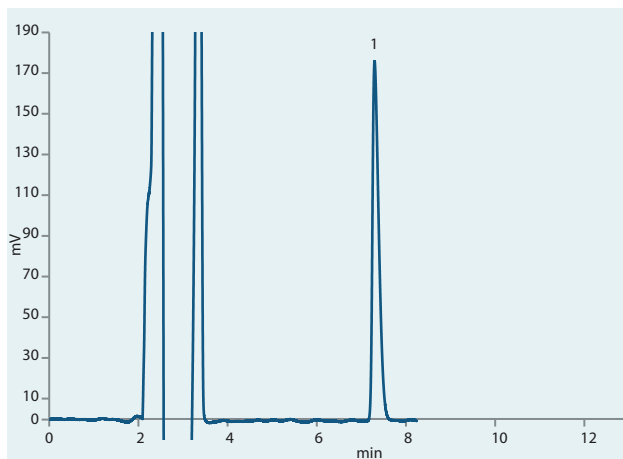
Detailed view on impurities

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

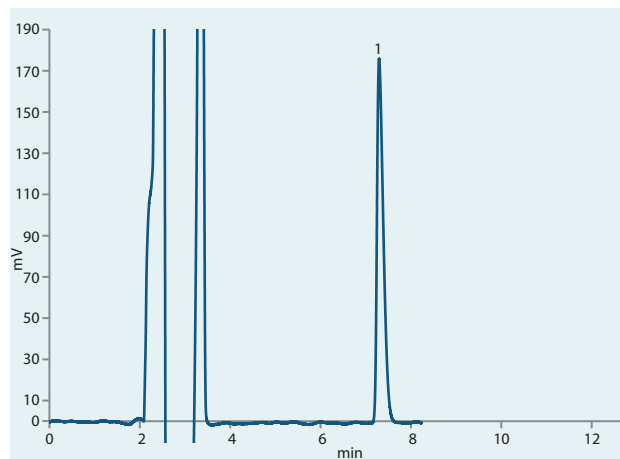
ARION® - APPLICATIONS

PHARMACEUTICAL DRUGS

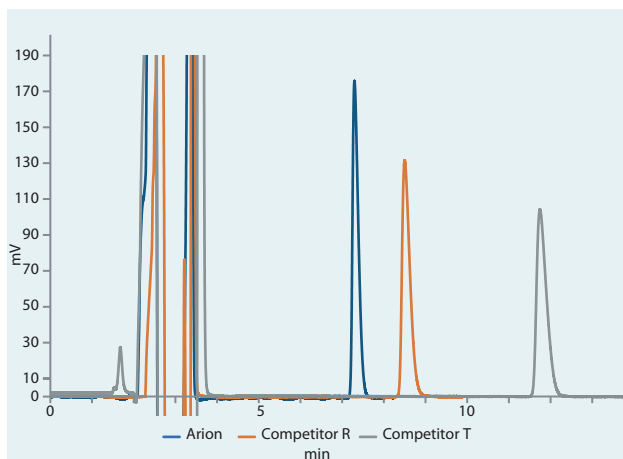
Tamsulosin hydrochloride is used to treat the symptoms of an enlarged prostate. Tamsulosin hydrochloride is an alpha-blocker which is used to treat the symptoms of an enlarged prostate by relaxing the muscles of the prostate and bladder. Tamsulosin is sold under various trade names, e.g. Flomax, Urimax, 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



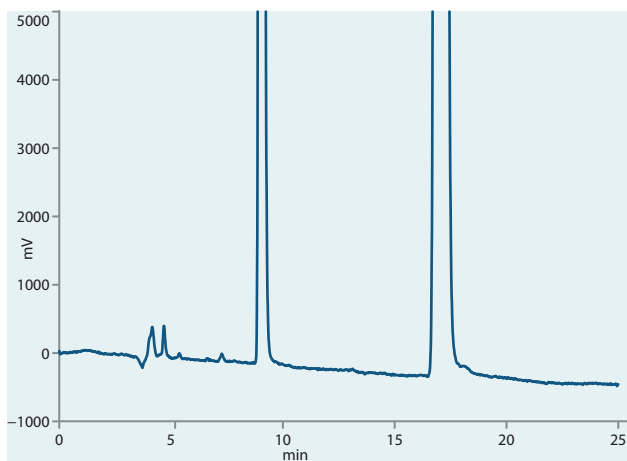
Comparison of fully porous particles

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

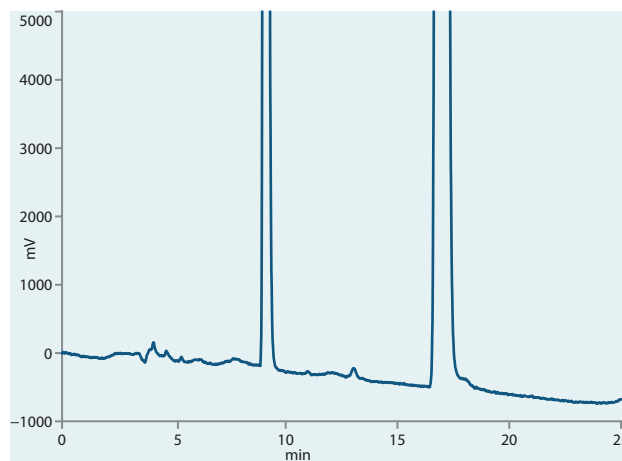
ARION® - APPLICATIONS

VETERINARY DRUGS

Trimetoprim and Sulfamethazine are veterinary drug used to treat animals of various species with gastro-intestinal and respiratory tract infections. This drug is used in diseases of various species of animals.



Standard on ARION® column



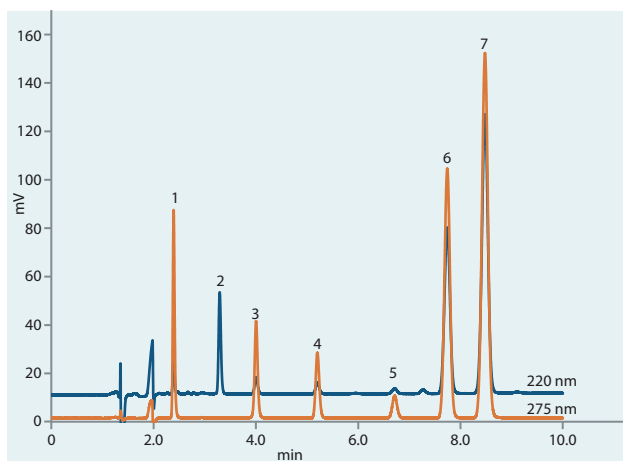
Drug sample

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

ARION® - APPLICATIONS

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	Isocratic, Ammonium acetate 20 mM, pH 8.5 (ammonia) : ACN 80:20 (v/v)
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*

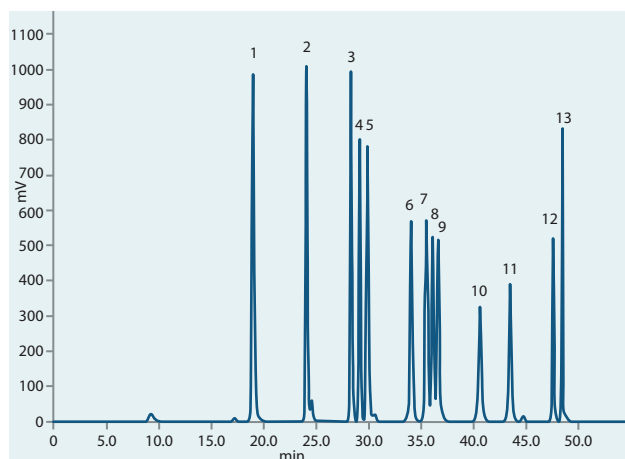
* Ciba® Irgamet® 39 isomers:
N,N-bis(2-ethylhexyl)-4-methyl-1H-benzotriazol-1-amine
N,N-bis(2-ethylhexyl)-5-methyl-1H-benzotriazol-1-amine



ARION® - APPLICATIONS

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.



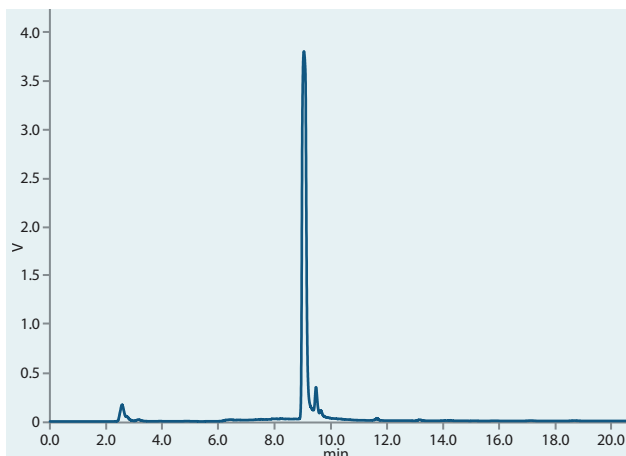
DNPH derivatives standard

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	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. Veleraldehyde-2,4-DNPH 12. m-Tolualdehyde-2,4-DNPH 13. Hexaldehyde-2,4-DNPH

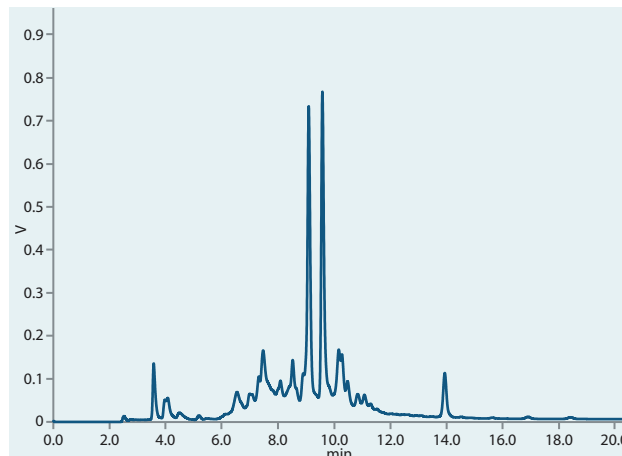


ARION® - APPLICATIONS

REACTION MONITORING IN ORGANIC SYNTHESIS



Reaction mixture A



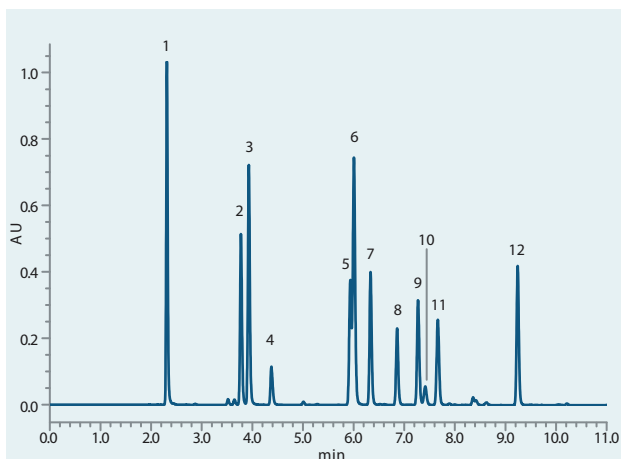
Reaction mixture B

Column	ARION® Phenyl-Butyl, 5.0 µm
Dimensions	250 mm × 4.6 mm
Part number	ARI-5735-LM46
Mobile phase	A – Acetonitrile, B – 1% acetic acid
Gradient	Time A 0 min 30 % 5 min 95 % 15 min 95 % 16 min 30 % 20 min 30 %
Flow rate	1.0 ml/min
Temperature	40 °C
Detection	ECD, bipolar, 6000 mV, 10 Hz
Analytes	Proprietary

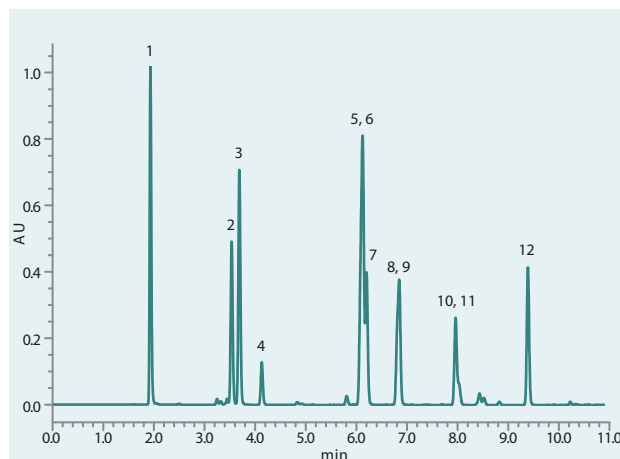
ARION® - APPLICATIONS

FLUORINATED COMPOUNDS

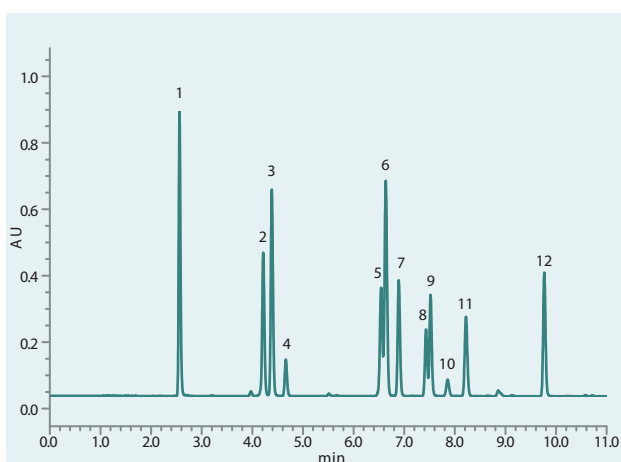
This application shows the ARION® column overcomes a co-elution of two critical pairs of fluoro- and des-fluoro-compounds. Separation of these compounds is problematic in general.



Sample on ARION® column



Sample on Competitive hybrid column TE



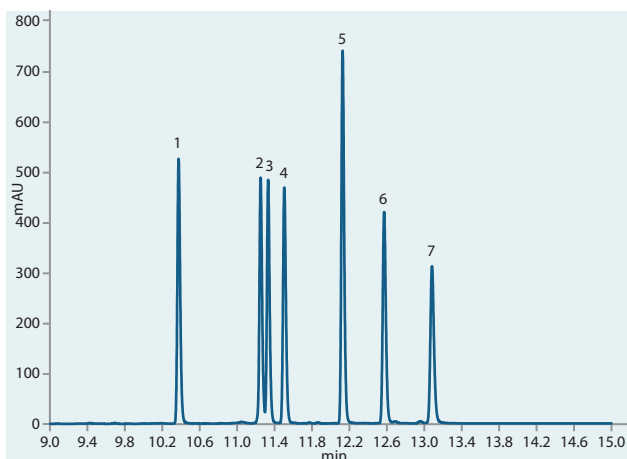
Sample on Competitive hybrid column TS

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.		

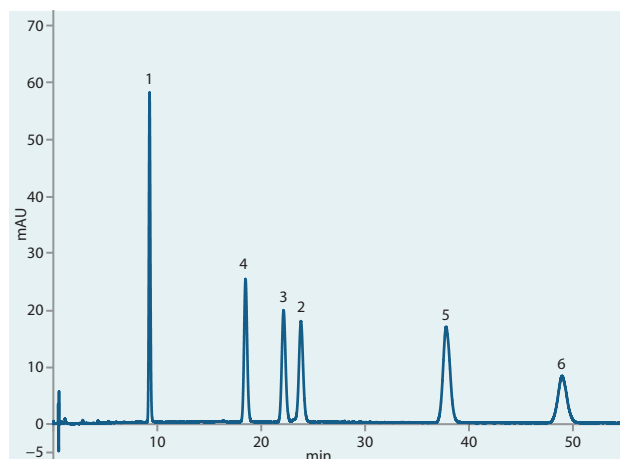
ARION® - APPLICATIONS

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



Standard on ARION® Plus C18, 1.7 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, 1.7 µm	
Dimensions	100 mm × 2.1 mm	
Part numbers	ARI-5720-BI21	
Mobile phase	Water : acetonitrile 50:50 (v/v)	
Flow rate	0.5 ml/min	
Temperature	40 °C	
Detection	DAD @220 nm	
Analytes	1. CBDV 2. CBG 3. CBD 4. THCV 5. CBN 6. THC 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	150 × 4.6	250 × 4.6	5 × 4.0
Plus C18	■	ARI-5720-IG46	ARI-5720-IH46	ARI-5720-II46	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

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	150 × 3.0	250 × 3.0	5 × 4.0
Plus C18	■	ARI-5720-LD30	ARI-5720-LG30	ARI-5720-LH30	ARI-5720-LI30	ARI-5720-LK30	–	AGS-5731-RD4
Polar C18	■	ARI-5721-LD30	ARI-5721-LG30	ARI-5721-LH30	ARI-5721-LI30	ARI-5721-LK30	–	AGS-5731-RD4
C8	■	–	ARI-5734-LG30	–	ARI-5734-LI30	ARI-5734-LK30	ARI-5734-LM30	AGS-5731-RD4
Phenyl-Butyl	■	ARI-5735-LD30	ARI-5735-LG30	ARI-5735-LH30	ARI-5735-LI30	ARI-5735-LK30	–	AGS-5731-RC4
NH ₂	■	–	ARI-5736-LG30	ARI-5736-LH30	ARI-5736-LI30	ARI-5736-LK30	–	Inquire**
CN	■	–	ARI-5737-LG30	ARI-5737-LH30	ARI-5737-LI30	ARI-5737-LK30	–	Inquire**
HILIC Plus	■	ARI-5738-LD30	ARI-5738-LG30	ARI-5738-LH30	ARI-5738-LI30	ARI-5738-LK30	–	AGS-5731-HD4
Si	■	ARI-5739-LD30	ARI-5739-LG30	ARI-5739-LH30	ARI-5739-LI30	ARI-5739-LK30	–	AGS-5731-ND4

* 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

5 µm ARION® all dimensions in mm							ARION® Guard Cartridges*
Phase	30 × 4.6	50 × 4.6	75 × 4.6	100 × 4.6	150 × 4.6	250 × 4.6	5 × 4.0
Plus C18	ARI-5720-LD46	ARI-5720-LG46	ARI-5720-LH46	ARI-5720-LI46	ARI-5720-LK46	ARI-5720-LM46	AGS-5731-RD4
Polar C18	ARI-5721-LD46	ARI-5721-LG46	ARI-5721-LH46	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-LD46	ARI-5738-LG46	ARI-5738-LH46	ARI-5738-LI46	ARI-5738-LK46	ARI-5738-LM46	AGS-5731-HD4
Si	ARI-5739-LD46	ARI-5739-LG46	ARI-5739-LH46	ARI-5739-LI46	ARI-5739-LK46	ARI-5739-LM46	AGS-5731-ND4

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

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	100 × 50	150 × 50	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	100 × 50	150 × 50	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.

ARION®

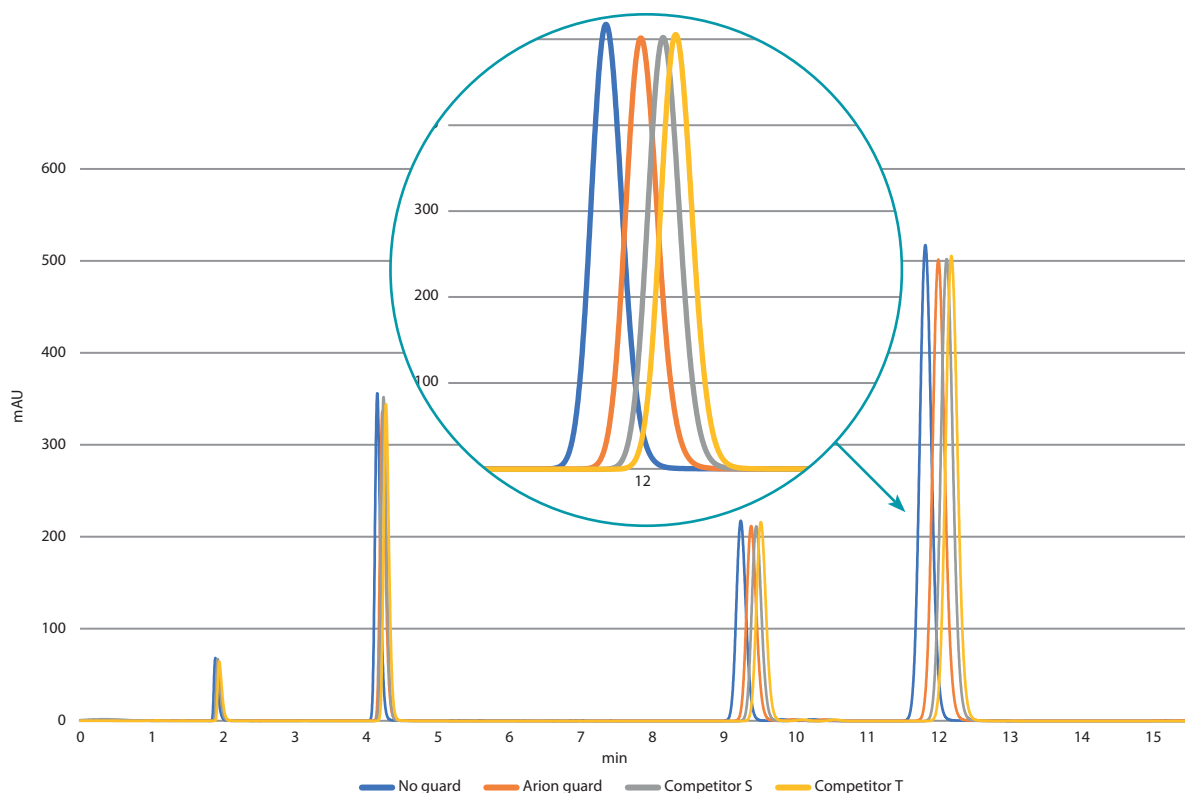
GUARD COLUMN SYSTEM

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 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.



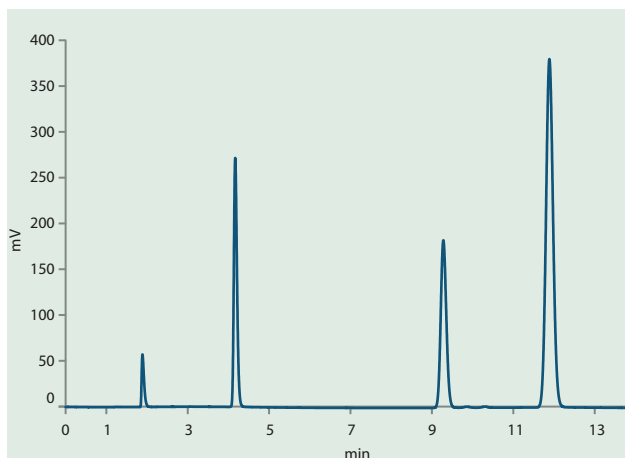
AGS-5731-000



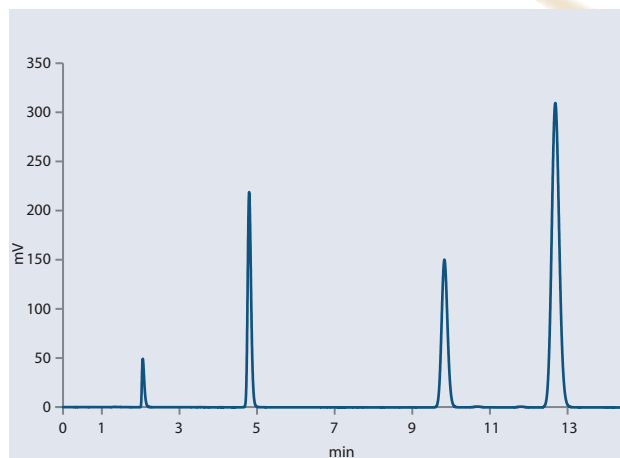
Comparison of guard systems from various manufacturers

ARION®

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	Column ID 3.0–4.6 5.0 × 4.0 mm	100% aqueous mobile phase
			 Package of 3 pcs	 Package of 3 pcs	
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, 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 PEEK ferrule in standard package.

CHROMSHELL®



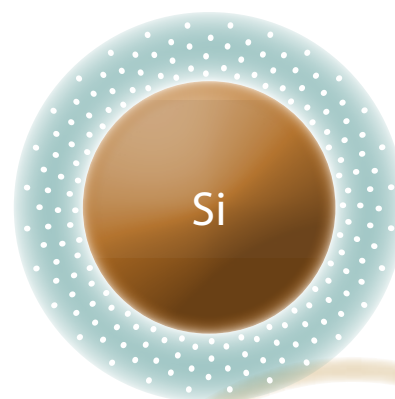
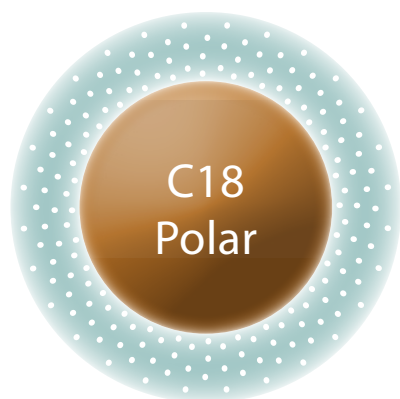
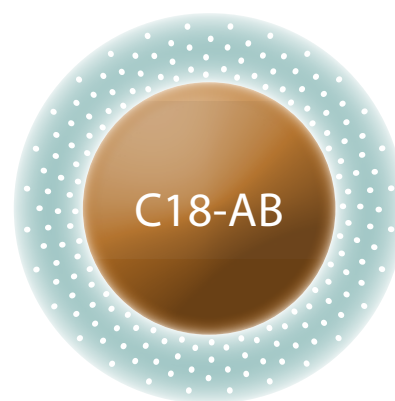
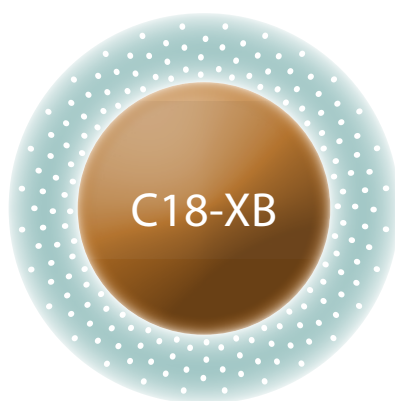
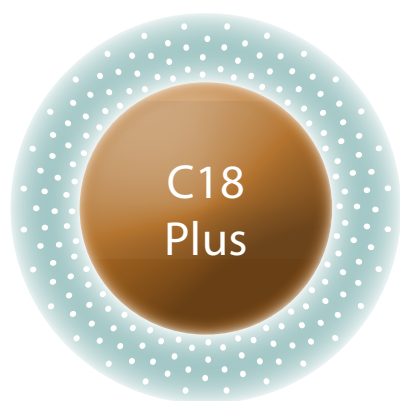
CHROMSHELL® extends the ARION® phases in the area of core-shell technology. These columns use an ultra high purity silica of 2.6 µm particles.

- 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
CHROMSHELL® C18 Plus	2.6	85	130	9 %	1.5 to 7.5	×	Single-step	L1
CHROMSHELL® C18-XB	2.6	85	130	8 %	1.5 to 8.0	×	Single-step	L1
CHROMSHELL® C18-AB	2.6	85	130	6 %	1.5 to 8.0	×	Mixed	L1
CHROMSHELL® C18 Polar	2.6	85	130	6.5 %	1.5 to 7.0	✓	Mixed	L1
CHROMSHELL® HILIC	2.6	85	130	–	1.5 to 7.0	–	Proprietary	L3
CHROMSHELL® Si	2.6	85	130	–	1.5 to 7.0	–	–	L3

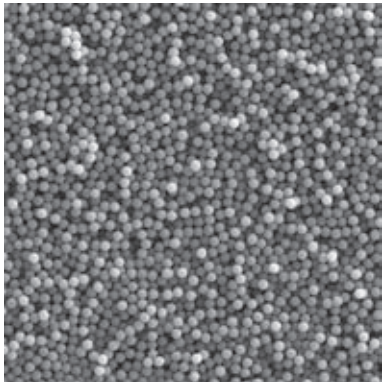
Note: Phase description in detail on page 46.



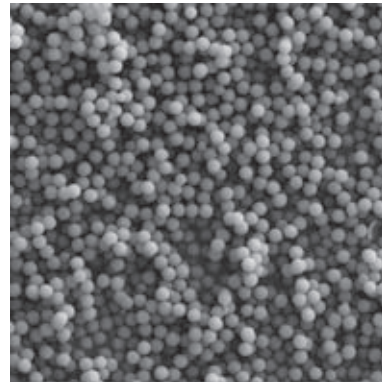
CHROMSHELL®

UP CLOSE

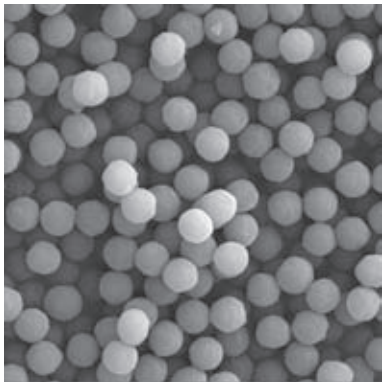
The 2.6-micron electron microscope field clearly shows the superlative quality of CHROMSHELL® particles.



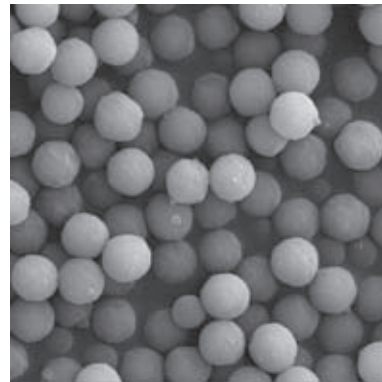
CHROMSHELL® (100 × 100 μm)



Competitor K (100 × 100 μm)



CHROMSHELL® (30 × 30 μm)



Competitor K (30 × 30 μm)

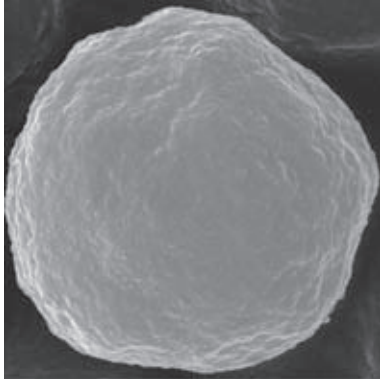
The main particle characteristics:

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

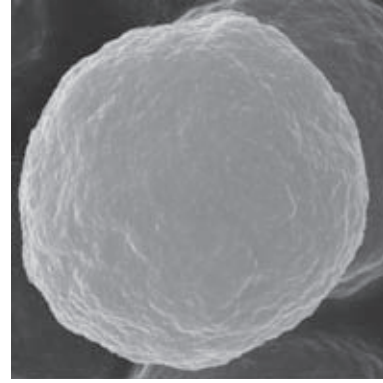
CHROMSHELL®

PARTICLE SIZE DISTRIBUTION

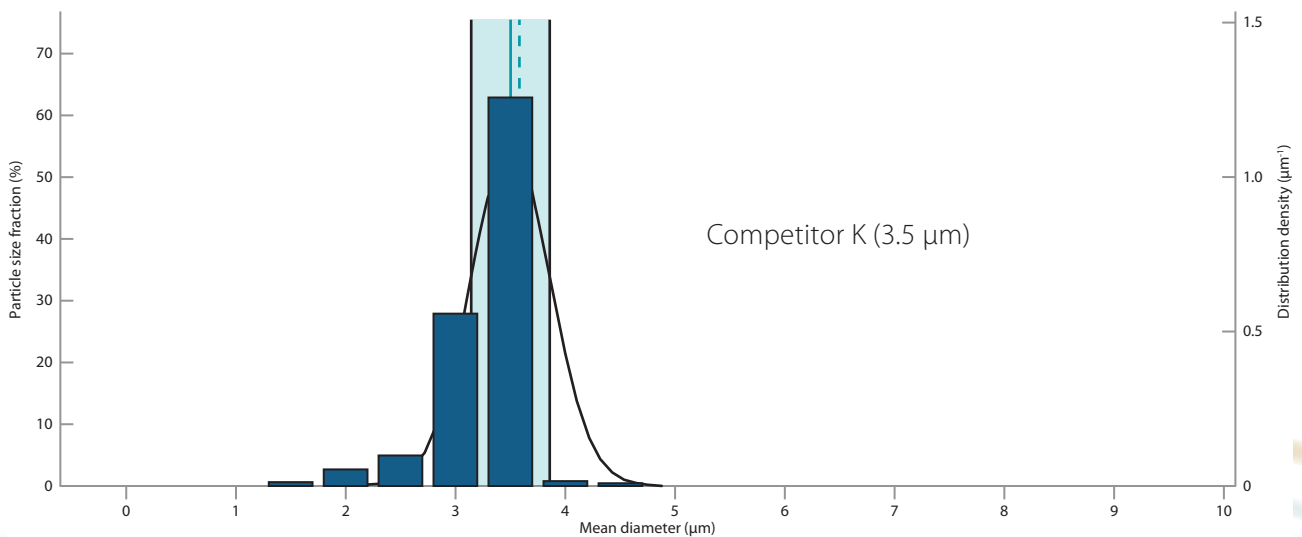
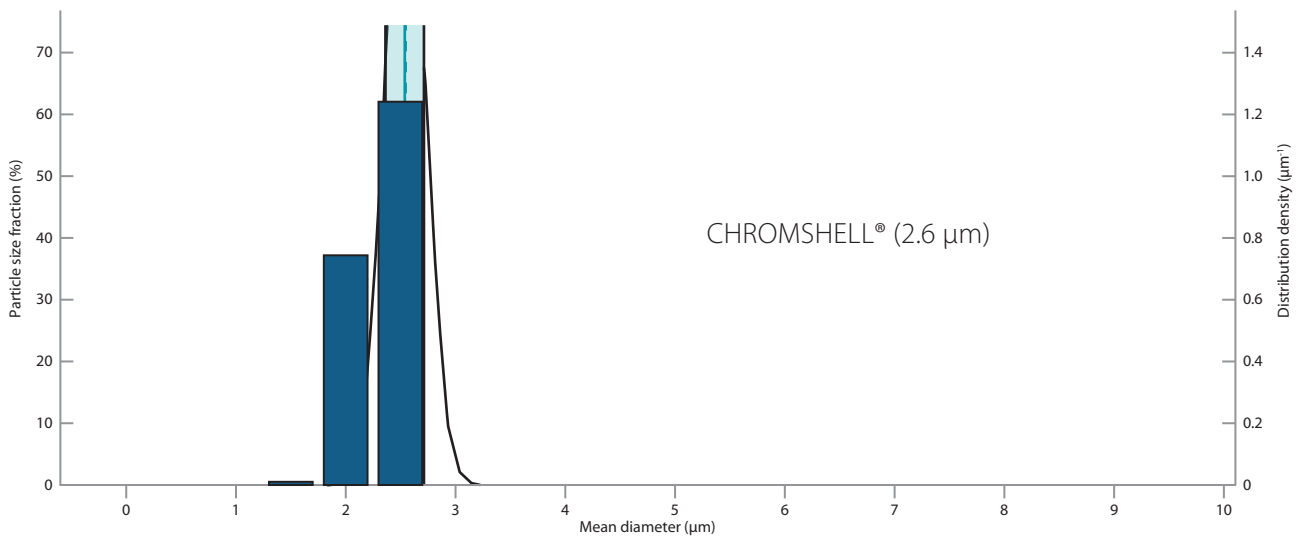
The SEM pictures show a comparison of different CHROMSHELL® particles in the field of $3 \times 3 \mu\text{m}$.



View A



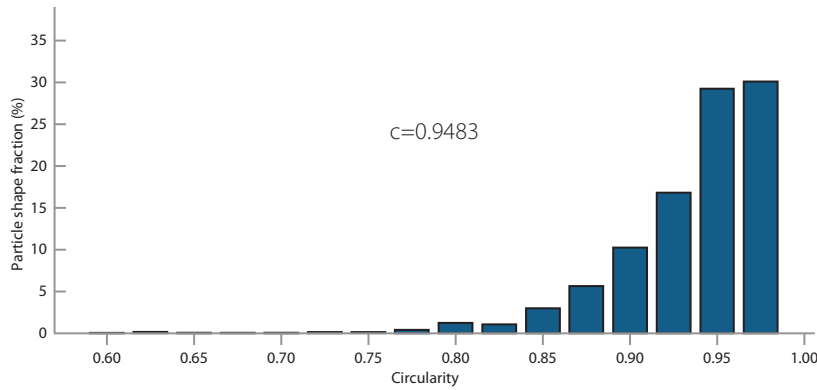
View B



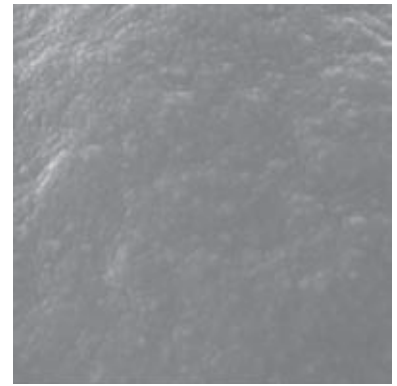
CHROMSHELL®

CIRCULARITY & SURFACE SMOOTHNESS

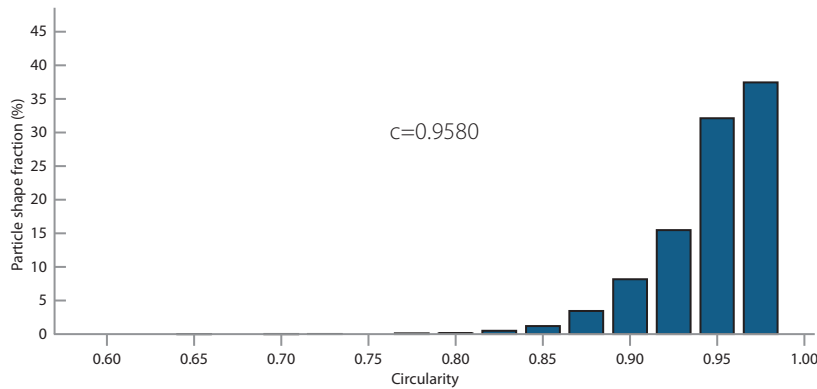
The core-shell particles were subjected to SEM analysis to determine circularity and surface smoothness.



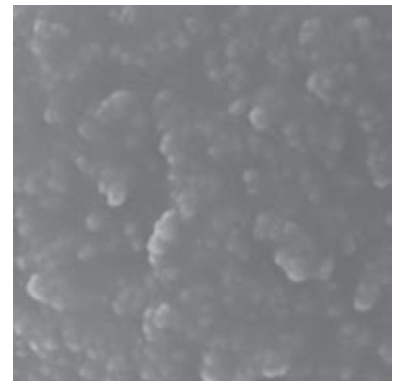
CHROMSHELL® (2.6 μm)



Detail view on pores



Competitor K (3.5 μm)

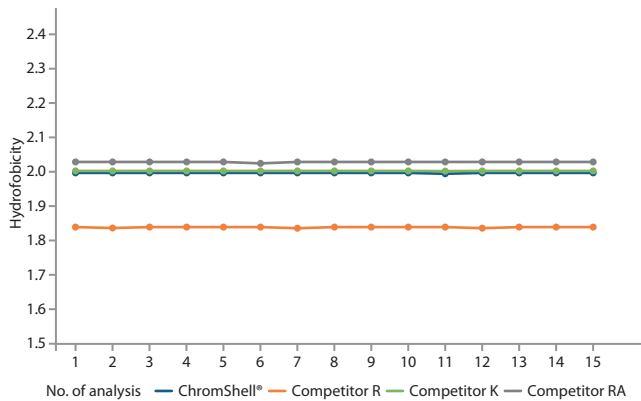


Detail view on pores

CHROMSHELL®

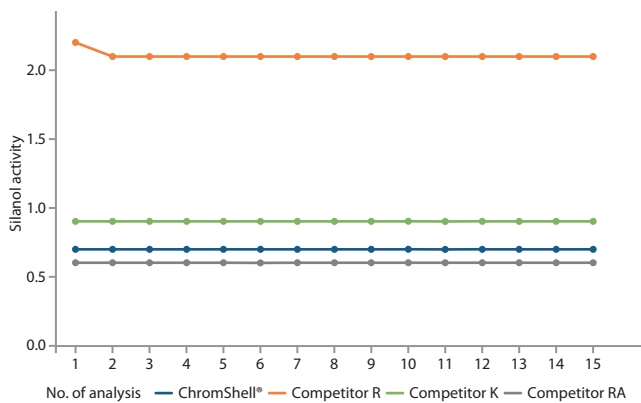
SILANOL ACTIVITY & HYDROFOBICITY

Both the silanol activity and hydrofobicity tests are defined e.g. by the Engelhardt test. The hydrofobicity test is based on a calculation of the ration of retention factors $k_{\text{ethylbenzene}}/k_{\text{toluene}}$. The first picture of the Engelhardt test shows a comparison of 3 various core-shell columns for 15 replicates.

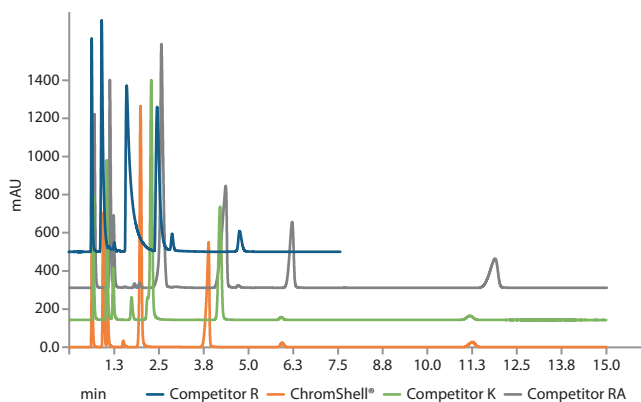


Engelhardt test

The silanol activity is defined as an asymmetry of p-ethylaniline at 5 % of peak height, as shown in the line graph below.



Silanol activity

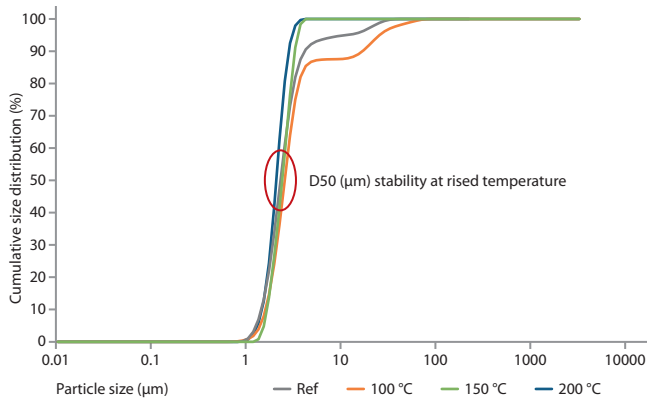


Comparison of core-shell columns – silanol activity test

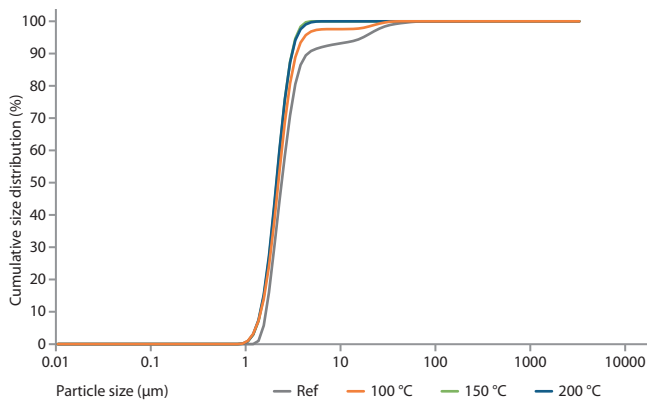
CHROMSHELL®

TEMPERATURE STABILITY

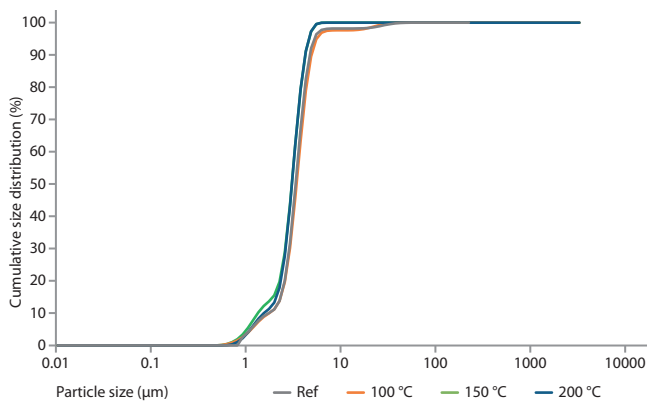
The CHROMSHELL® particles were tested for temperature stability. The bulk media were heated to 3 elevated temperatures: 100 °C, 150 °C and 200 °C. The graph below shows the stability of mean diameter D50. It shows a slight change in particle size distribution.



CHROMSHELL® silica stability



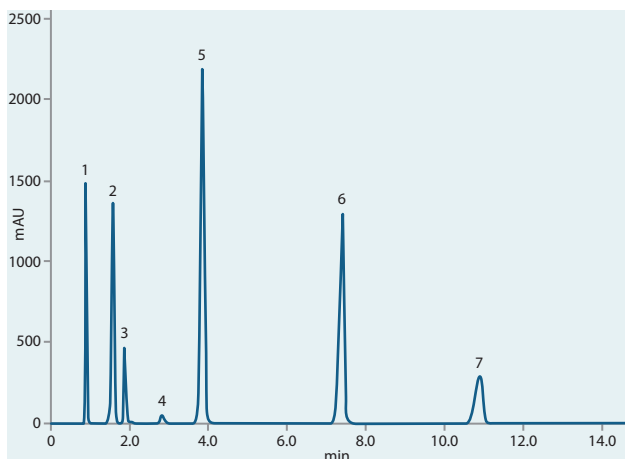
Competitor C



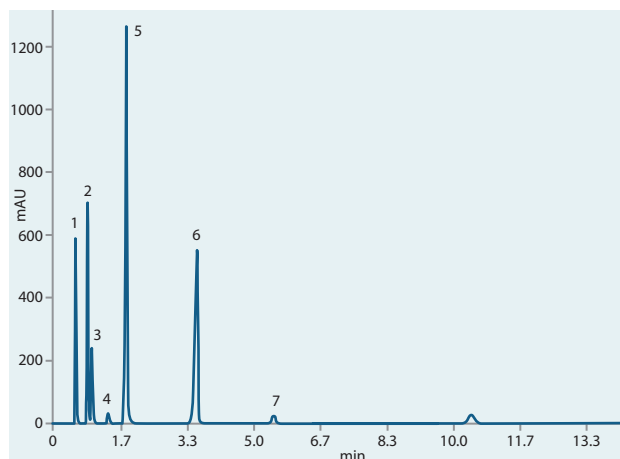
Competitor K

CHROMSHELL®

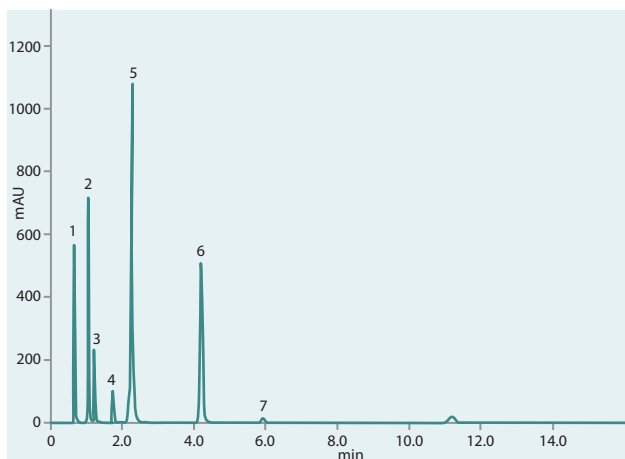
COMPARISON OF THE CORE-SHELL & FULLY POROUS COLUMNS



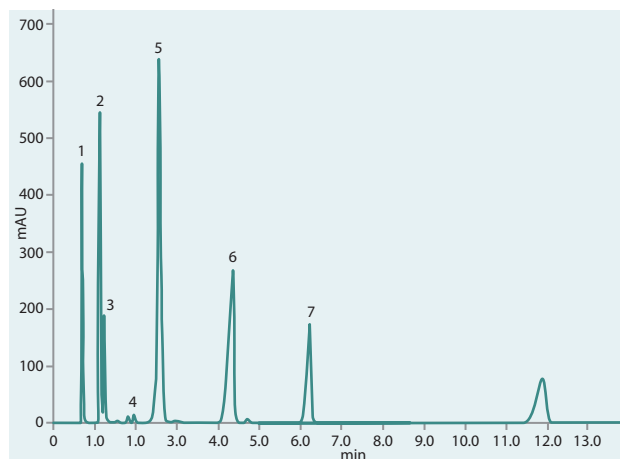
ARION® Plus C18, 1.7 μ m 100 \times 2.1 mm



CHROMSHELL® C18 Plus, 2.6 μ m 100 \times 2.1 mm



Core-shell (Competitor K), 2.6 μ m 100 \times 2.1 mm



Core-shell (Competitor RA), 2.7 μ m 100 \times 2.1 mm

Note: All the chromatograms are normalized to maximum peak intensity.

Columns	All tested phases: C18
Dimensions	100 mm \times 2.1 mm
Part numbers	ARI-5720-IK46 & CSH-5722-GI21
Mobile phase	Methanol : water (49 : 51) isocratic
Flow rate	0.3 ml/min
Temperature	40 °C
Detection	UV @250 nm
Analytes	1. Uracil (t_r) 2. Aniline 3. Phenol 4. N,N-dimethyl-aniline 5. p-Ethyl-aniline 6. Toluene 7. Ethylbenzene

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 under 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

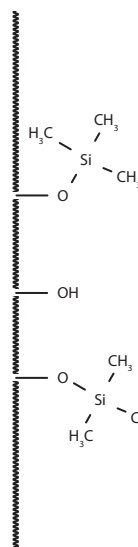
Polar endcapping. Suitable for the separation of mid- & polar analytes. It shows excellent **stability under 100% aqueous mobile phase conditions**.

CHROMSHELL® HILIC Plus

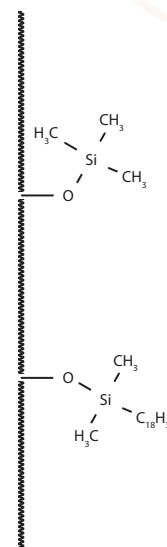
The HILIC Plus is designed for the aqueous normal phase separation of water-soluble compounds. This phase is an excellent alternative to RP purification for highly polar compounds.

CHROMSHELL® Si

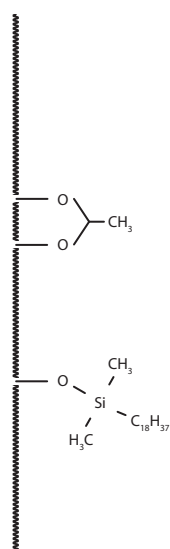
Suitable for non-ionic, polar organic compounds.



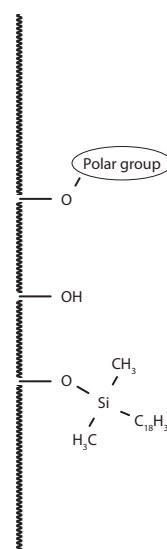
Core-shell C18 Plus



Core-shell C18-XB



Core-shell C18-AB



Core-shell C18 Polar

CHROMSHELL®

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

CHROMSHELL®

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 36.

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

CHROMSHELL®

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.

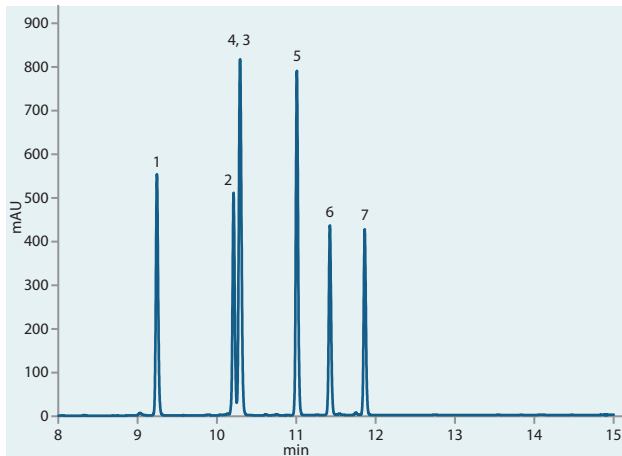


Exploded view

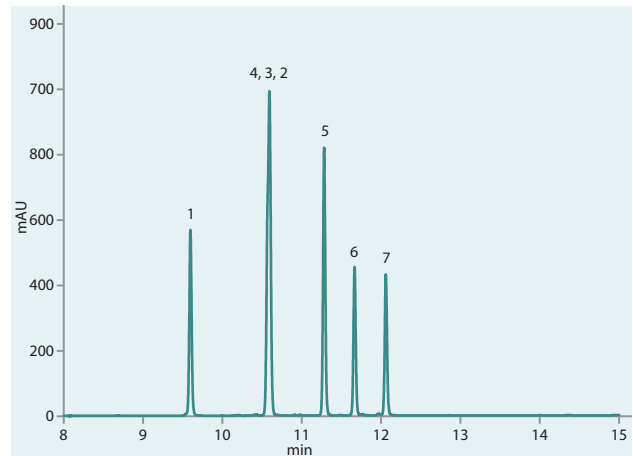
CHROMSHELL® - APPLICATIONS

CANNABINOIDS

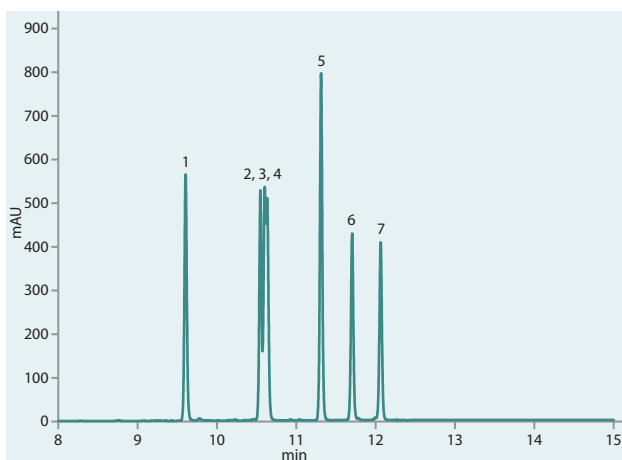
Cannabinoids have become more and more popular thanks to their health effects and the decriminalisation of their use. Analytical columns that can offer a suitable resolution play an important role. The challenge is to achieve the separation of critical pairs – CBD and CBG. While CHROMSHELL® shows a coelution of THCV + CBD, the other two core-shell columns show a coelution of THCV+CBD+CBG.



CHROMSHELL® C18 Plus, 2.6 µm



Competitor K

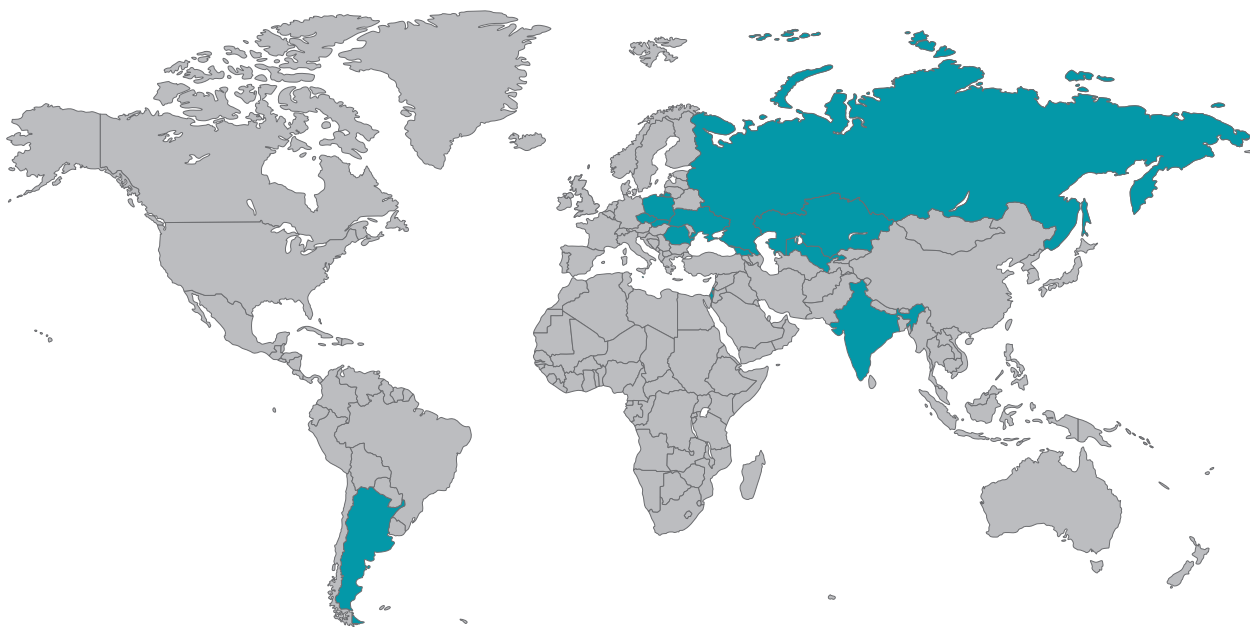


Competitor R



The analyses were performed using Lipomed reference materials.

Columns	Core-shell C18		
Dimensions	100 mm × 2.1 mm		
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		



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SHIM-POL A.M. BORZYMOWSKI
E.Borzymowska-Reszka, A.Reszka,
Spółka Jawna

ul. Lubomirskiego 5, 05-080 Izabelin
Tel. 22 20 60 900, biuro@shim-pol.pl
www.shim-pol.pl

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