

Bonna-Agela

HPLC Columns & Consumables



Official Website

Best Value
Guaranteed Product Quality
Innovation to Benefit Customers



**Sample
Preparation**

**Better
Solutions for
Chromatography**

**Chemical
Analysis**

Bonna-Agela Technologies — A Global Supplier for Chromatography Solutions



As Bonna-Agela is poised to enter its 11th year with confidence and pride in its innovative separation, purification, and sample preparation products, we would like to thank our many loyal customers for your continuous support and trust. With your support and our effort in delivering the highest quality products to you, our company has grown remarkably. This has allowed us to expand our research and development effort, and thus introduce more innovative products to better service your application needs.

We had tremendous accomplishments: We cataloged over one thousand different products. Our manufacturing and R&D operation were certified in compliance with ISO 9001 and passed many quality audits by customers and distributors, including VWR International. As a global wide company, we not only have our own international sales force but have also formed a marketing alliance with VWR. This will allow us to reach higher goals and to provide our customers with even better quality products and faster service in the new year.

Our mission statement and commitment:

- Provide products with our innovative technologies at the best performance to cost ratio.
- Deliver products with guaranteed quality.
- Provide global support with quick responses.

How to Place Orders

Our office is open from 9:00 am to 6:00 pm Eastern Standard Time, Monday through Friday.

To place an order or receive a quote, you may choose from the following contacts:

Bonna-Agela Technologies US

2038A Telegraph Rd.
Wilmington, DE 19808, USA
Tel: (302) 438 8798
Fax: (302) 636 9339
Website: <http://www.bonnaagela.com>
E-mail: info@bonnaagela.com

Bonna-Agela India

G-212, Second Floor, Sector-63, Noida-201301 (U.P), India
Phone : 91-120-4225466-71
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Bonna-Agela China

179 South Street, Teda West Zone, Tianjin 300462, China
Tel: +86(22)25321032/7023
Fax: +86(22)25321033

Please include the following information with your order or request: Account number (if you have one), purchase order number, contact name, organization name, shipping and billing address, telephone number, fax number or email address, product number, brief description and quantity, method of payment and preferred method of delivery. A written confirmation will be sent to you by email or fax. We accept business checks, wire transfers and major credit cards as methods of payment.

Checks:

Please make checks payable to:
Bonna-Agela Technologies Inc. and send to:
Bonna-Agela Technologies Inc.
2038A Telegraph Road, Wilmington, DE 19808, USA

Wire Transfer:

Please contact us by phone, fax or email for account information.

Credit Cards: (USA Only)

Please include card type and number, expiration date, and card holder name. Due to security concerns, please do not email the information. Please call or send a fax to provide your credit card information.

Terms and Conditions

PLEASE READ THESE TERMS BEFORE ORDERING. IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CONTACT US AND OUR STAFF WILL BE GLAD TO ASSIST YOU.

Acceptance and Availability

All orders placed are subject to the agreement of Bonna-Agela Technologies Inc. The catalogue does not constitute an engagement of the company to sell all listed products. You are guaranteed to be notified at the time of ordering if the ordered items are in back-order or discontinued.

Price and Payment

The prices are in effect at the time of printing. Bonna-Agela Technologies reserves the right to change the prices without notice, though we do our best to provide our customers with advance notice. The prices quoted at the time of ordering will be guaranteed. The general payment term is net 30 days, F.O.B., Newark, Delaware, USA. However we reserve the right to ask for prepayment if customers' account information is not satisfactory. A 1.5% per month service charge will be added to delinquent accounts. If a purchase order is less than \$1000.00, a \$50.00 extra charge will be added to the invoice.

Changes

Bonna-Agela Technologies reserves the right to change product specifications, quantities, designs or prices without prior notice and without liability for such changes.

Shipping Policy

The standard shipping method is 2-day FedEx within the United States and Canada. We will try to accommodate requests for other shipping methods if they are available. All shipping and handling charges will be billed separately. Should you receive damaged goods, it is imperative that you notify us immediately and save all packing materials for inspection by the carrier.

Application

All products in this catalog should be used for laboratory or manufacturing use only. They are not intended for direct medicinal or food use. Bonna-Agela Technologies assumes no liability for any misuse of the products.

Returns

Bonna-Agela Technologies tries to accommodate all requests for returns of unused goods. However, return of some items may be restricted by the original manufacturers. Please contact us for return authorization before returning any items. A restocking charge may apply to certain products.

Warranty

All Bonna-Agela Technologies products are warranted to be free of defects in materials and workmanship. They are not warranted for any other particular purpose. Bonna-Agela Technologies shall not under any circumstance be liable for any incidental, consequential or compensatory damage in conjunction with its products. The maximum liability shall not exceed the invoice price of the product.



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Introduction

Bonna-Agela HPLC columns cover a broad field of chemistry to meet nowadays challenging needs of rapid HPLC analysis, LC-MS application, separation in extreme pH conditions as well as conventional applications in pharmaceutical, environmental and food industries. Our HPLC columns are manufactured with innovative technologies in both media manufacturing and column packing steps for unique selectivity and unsurpassed reproducibility. Bonna-Agela HPLC columns are classified into eight categories:

1. **Unisol C18** - A type of true universal reversed phase column for separation of a broad range of molecules such as acidic, basic and neutral organic compounds. It is under a superior performance compared to other branded C18 phases in almost every aspect.
2. **Unisol C18(2)** The improved version of Unisol C18 phase. It has excellent balance of hydrophobicity, retention, resolution and contamination tolerance, and provides excellent reproducibility because it is less affected by the pH of the mobile phase and buffer concentration.
3. **Unisol Amide** - It has a unique HILIC mechanism to retain and separate molecules of strong polarities. Also it can be used as either a reversed-phase or normal phase column. It outperforms any other columns on the market in the HILIC category and is a top choice to separate very polar compounds for optimized retention.
4. **Optimix Series** –A class of column provides optimized selectivity and balanced retention for hydrophilic and hydrophobic organic compounds with mixed different phases, such as SCX/C18, SAX/C18, HILIC/C18, C8/C18. It extends the retention for polar molecules while decreasing excessive retention for very hydrophobic compounds.
5. **Durashell Series** – A class of column that can be used in different pH conditions ranged from pH1.0 to pH12.0.
6. **Venusil ASB Series** – This class of column is tailored for acidic (from pH0.8 to pH3) operation. It applies a stable bonding technology to ensure low bleeding of the stationary phase, so guarantees minimum baseline noise of LC-MS application.
7. **Bonshell Columns** – Bonshell columns represent a new level of performance through a core-shell structure. They are the best choice if you want to speed up your HPLC analysis without an expensive UHPLC instrument.
8. **Innoval Columns**-Innoval columns are packed with ultra pure silica particles which are prepared by an aggregation of ultra pure silica sols. This class of column from Bonna-Agela shows excellent reproducibility and high efficiency.

Bonna-Agela also carries a line of accessories, such as ultra-low dead volume guard columns, fittings, column selectors and thermostat chambers, etc. Moreover, Bonna-Agela HPLC column products are backed by industry-leading customer support.

HPLC Columns by Family

NEW Products!

Durashell C18-AM

Based on a new generation of silica and bonding technologies, Bonna-Agela technologies has developed new Durashell C18-AM columns. Firstly, silica gel made by inert processing techniques can be kept stable in alkaline mobile phase, significantly improving column lifetime compared with conventional silica; Secondly, the strong ability to identify stereoisomeric compounds, applicable to separation of structurally similar compounds, especially for analysis of a variety of impurities simultaneously in drug.

Characteristics: Pore Size: 100 Å; Specific Surface Area: 380 m²/g; Available Particle Size: 3 µm, 5 µm, 10µm. Carbon loading: 14 %; Double polar end-capped; pH=1.5-12.0

Main Features

- Wide pH range (1.5-12.0);
- Double polar end-capped, strong separation ability for polar compounds;
- Special bonding, strong ability to identify stereoisomeric compounds;
- Hydrophilic stationary phase, compatible with 100% aqueous mobile phase.

The determination of cefradine content and the inspection of related substance

Determination of cefradine content

Instrument: Agilent 1260;

Mobile Phase: Disodium hydrogen phosphate solution containing 0.027 mol/L octyl sulfonate (pH adjusted to 8.0 with phosphoric acid) - methanol (75 : 25, v/v);

Detector: UV 206nm;

Temperature: 30°C;

Injection: 10 µL;

Flow rate: 1.0 mL/min;

Column: Durashell C18-AM,
5 µm, 100 Å, 4.6 × 250 mm.

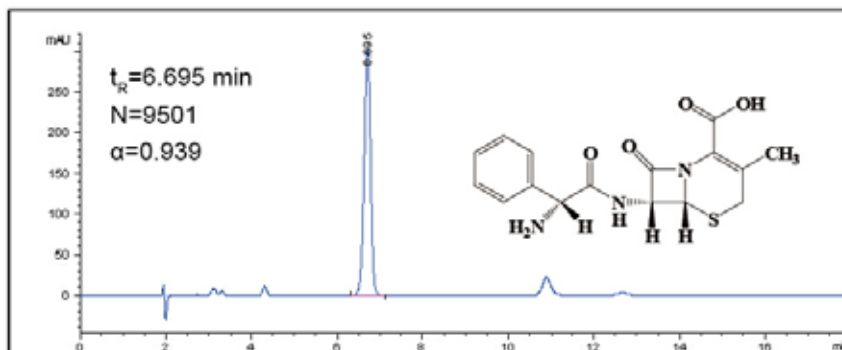


Fig.1 Chromatogram for determination of cefradine content with Durashell C18-AM

Inspection of related substance

Mobile Phase: Water- methanol-3.86% Sodium acetate solution -4% Acetic acid solution (1564:400:30:6);
Detector: UV 254 nm;
Temperature: 30°C;
Injection: 20 µL;
Flow rate: 1.0 mL/min;
Column: Durashell C18-AM, 5 µm, 100 Å; 4.6 × 250 mm

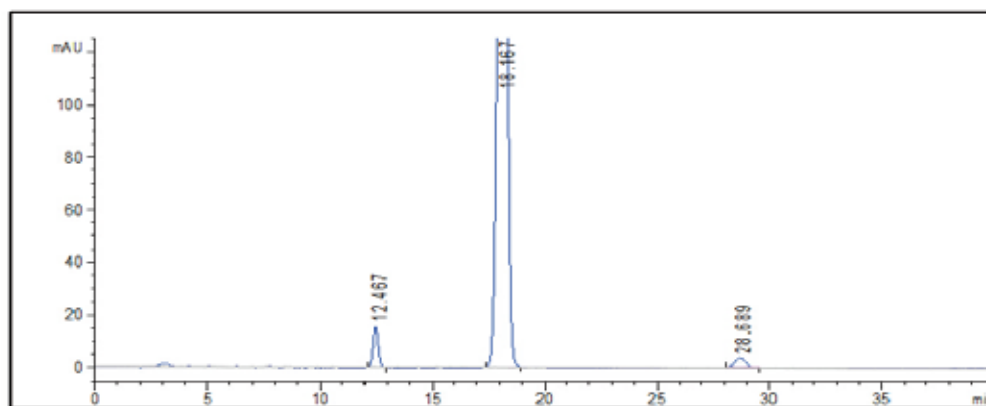


Fig.2 Chromatogram for inspection of related substances in cefradine sample solution with Durashell C18-AM

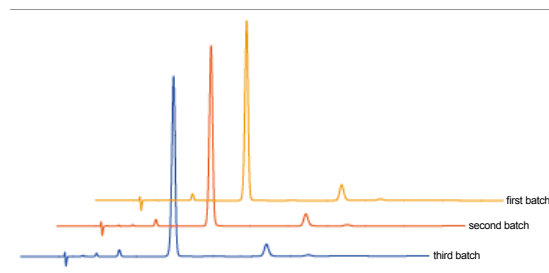
Results

Name	Retention time(min)	Related Retention Time	Separation Degree
Cephalexin	12.467	0.686	
Cefradine	18.167	1.000	10.91
Unknown Impurity	28.689	1.579	13.77

Notes

1. The retention time of Cefradine is 6.7 mins. Column efficiency is 9501. Tailing factor is 0.939. The resolutions of Cephalexin, Cefradine and Arginine peaks all meet the requirements of Pharmacopoeia;
2. During the inspection of related substances, two main impurities were detected , while the resolutions of each chromatographic peak all meet the requirements of Pharmacopoeia.

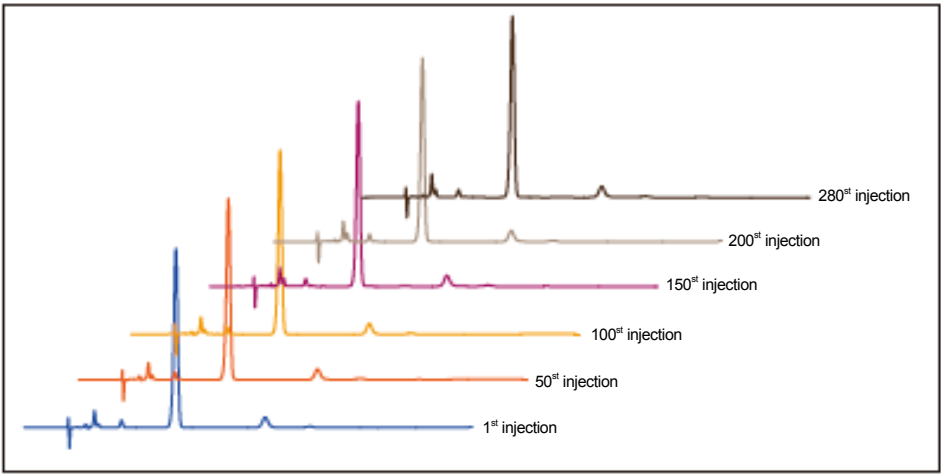
Good batch reproducibility





Long lifetime

To inspect the lifetime of Durashell C18-AM, the method of cefradine content determination was applied. The sample spiked with arginine was injected consecutively into Durashell C18-AM which was cleaned once per 80 injections. At the same time, the changes should be observed in cefradine peak's retention time, column efficiency and peak shape, as well as the resolution of arginine and the 4th unknown impurity, and if any of the changes was significant, then the test should be stopped. In this way, totally 280 injections were processed successfully.



The above figure shows, after 280 injections, there is no significant change in retention time, column efficiency, tailing factor. During the analysis of cefradine, due to the use of higher concentration of ion-pair reagents and buffer solution (total concentration of 54 mM) and alkaline mobile phase (pH 8.0), decline of a lot of other brand column was observed in peak retention and efficiency and impurity resolution in less than 50 injections. Although a certain brand alkali tolerant column has good stability in the first 80 injections, decrease was gradually appeared in retention, efficiency and resolution in the more injections, even it was unable to separate impurities near arginine in 4th 80 injections (totally about 240 injection). While Durashell C18-AM showed excellent durability, and still remained a stable retention, good separation and high column efficiency after the 1100 injections.

The determination of cefradine content and the inspection of related substance

Columns: Durashell C18-AM, 5 μ m, 100 Å, 4.6×100 mm;
Mobile phase A: 5.0 g Ammonium acetate dissolved in 1000 mL water;
Mobile phase B: Methanol;
Flow rate: 1.5 mL/min;
Detector: UV 260nm;
Temperature: 30°C;
Injection: 10 μ L;
Gradient:

Time(min)	A%	B%
0	70	30
2	70	30
17	30	70
22	30	70
22.1	70	30
30	70	30

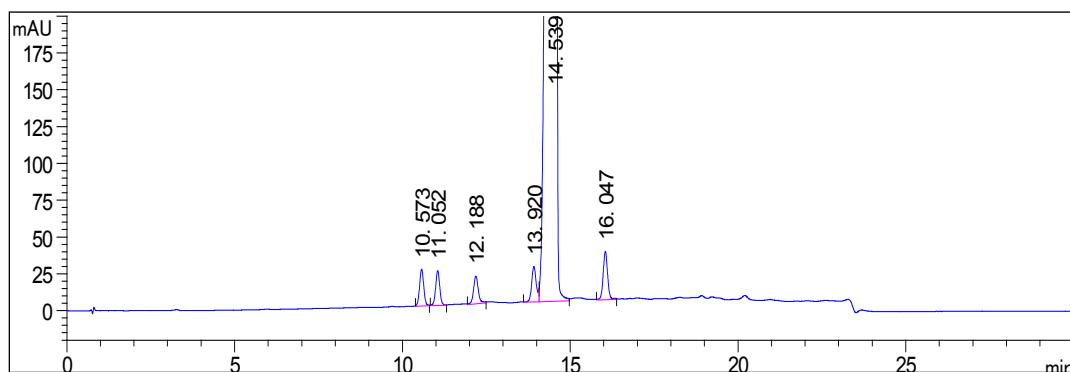


Fig.3 Chromatogram of impurities A, B, C, D, Risperidone, impurity E successively with Durashell C18-AM

The separation of the degradation product of lansoprazole according to USP

Column: Durashell C18-AM, 5 μ m, 100 Å, 4.6×250 mm;

Detector: UV, 285nm;

Temperature: 30°C;

Flow rate: 1.5 mL/min;

Injection: 40 μ L;

Mobile Phase A: Water

Mobile Phase B: Acetonitrile: water: triethylamine (160/40/1),

adjusted to pH 7.0 with phosphoric acid

Gradient:

Time(min)	A%	B%
0	0	10
40	40	80
50	50	80
51	51	10
60	60	10

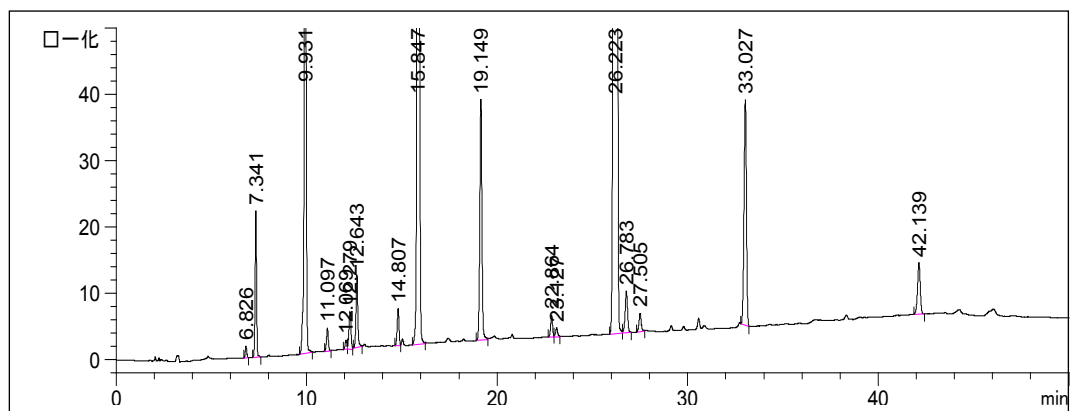


Fig.4 Chromatogram of degradation products of lansoprazole raw material with Durashell C18-AM



Ordering Information

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle size(μm)	Dimension(mm)	Durashell C18-AM
Fast analysis	3	2.1×30	DC930302-AM
Fast analysis	3	2.1×50	DC930502-AM
Fast analysis	3	2.1×100	DC931002-AM
Fast analysis	3	2.1×150	DC931502-AM
G	3	2.1×10, 4/pk	DC930102-AM
DCG	3	2.1×10, 4/pk	DC930102-AMS
Fast analysis	3	4.6×50	DC930505-AM
Fast analysis	3	4.6×100	DC931005-AM
Fast analysis	3	4.6×150	DC931505-AM
Analytical	5	2.1×30	DC950302-AM
Analytical	5	2.1×50	DC950502-AM
Analytical	5	2.1×100	DC951002-AM
Analytical	5	2.1×150	DC951502-AM
Analytical	5	4.6×50	DC950505-AM
Analytical	5	4.6×100	DC951005-AM
Analytical	5	4.6×150	DC951505-AM
Analytical	5	4.6×200	DC952005-AM
Analytical	5	4.6×250	DC952505-AM
G	5	4.6×10, 4/pk	DC950105-AM
DCG	5	4.6×10, 4/pk	DC950105-AMS
Semi-preparative	5	10×150	DC951510-AM
Semi-preparative	5	10×250	DC952510-AM
Preparative	5	21.2×50	DC950520-AM
Preparative	5	21.2×150	DC951520-AM
Preparative	5	21.2×250	DC952520-AM
G	5	10×10	DC950110-AMS
G	5	21.2×10	DC950120-AM
Preparative	5	30×100	DC951030-AM
Preparative	5	30×150	DC951530-AM
Preparative	5	30×250	DC952530-AM
Semi-preparative	10	10×150	DC901510-AM
Semi-preparative	10	10×250	DC902510-AM
Preparative	10	21.2×50	DC900520-AM
Preparative	10	21.2×150	DC901520-AM
Preparative	10	21.2×250	DC902520-AM
G	10	10×10	DC900110-AMS
G	10	21.2×10	DC900120-AM
Preparative	10	30×100	DC901030-AM
Preparative	10	30×150	DC901530-AM
Preparative	10	30×250	DC902530-AM
Preparative	10	50×150	DC901550-AM
Preparative	10	50×250	DC902550-AM

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

NEW Products!

Innoval ODS-2

Innoval ODS-2, a cost-effective column, uses high pure silica made by co-precipitation method, through silica surface deactivation patent of Bonna-Agela Technology and new bonding technique; provides equilibrated retention ability; guarantees better peak shapes for acidic, alkaline and neutral compounds; has a strong ability to identify the molecule shape of analyte and good separation ability for isomers because of the precisely control of three-dimensional structure of the bonded phase.

Characteristics: Pore Size: 100 Å; Specific Surface Area: 220 m²/g; Available Particle Size: 3µm, 5µm, 10µm. Carbon loading: 14 %; Double end-capped; pH=1.5-9.0

Main Features

1. Excellent mechanical strength, pressure tolerant(6000psi);
2. Lower surface area, fast separation speed, anti-pollution;
3. Uniform pore size, no dead pore, long lifetime;
4. Symmetrical peak shape and equilibrated separation for acidic, alkaline and neutral compounds
5. Good separation ability for isomers.
6. Hydrophilic, compatible with 100% aqueous mobile phase.

Determination of the extract from Ginkgo leaf

Column: Innoval ODS-2 (4.6×250 mm, 5 µm, 100 Å)

Brand A : 4.6×250 mm (5 µm, 100 Å)

Mobile Phase: A: 0.4% Phosphate, B: methanol; A: B=50: 50

Flow rate: 1.0 mL/min

Temperature: 30°C

Detector: UV 360 nm

Injection: 10 µL

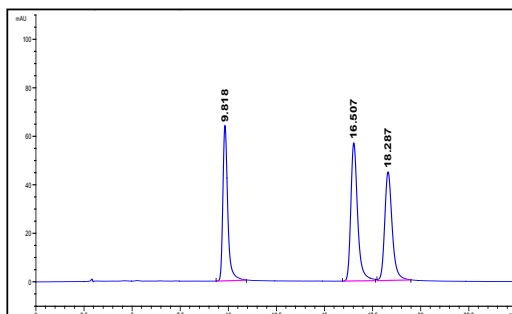


Fig.1 Chromatogram of Brand A

1. Quercetin 2. kaempferol 3. Isorhamnetin

Peak tailing of Quercetin: 1.451 Theoretical plate number: 8548

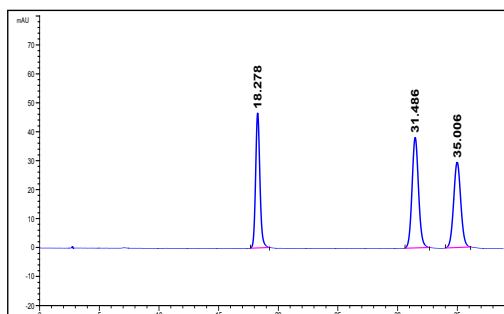


Fig.2 Chromatogram of Innoval ODS-2

1. Quercetin 2. kaempferol 3. Isorhamnetin

Peak tailing of Quercetin: 1.157; Theoretical plate number: 13253



Testing Results

	Brand A	Innoval ODS-2
Relative retention of Quercetin	1	1
Relative retention of kaempferol	1.68	1.72
Relative retention of Isorhamnetin	1.86	2

Conclusion: Innoval ODS-2 has a better performance than that of Brand A in theoretical plate number of quercetin and resolutions of quercetin, Isorhamnetin and kaempferol from Ginkgo leaves extract.

Order Information

Surface Area: 220 m²/g, Pore Size: 100 Å

Type	Particle size (μm)	Dimension (mm)	Innoval ODS-2
Analytical	5	4.6×50	IX950505-2
Analytical	5	4.6×100	IX951005-2
Analytical	5	4.6×150	IX951505-2
Analytical	5	4.6×250	IX952505-2
G	5	4.6×10	IX950105-2
DCG	5	4.6×10	IX950105-2S
Semi-preparative	5	10×150	IX951510-2
Semi-preparative	5	10×250	IX952510-2
G	5	10×10	IX950110-2S
Preparative	5	21.2×50	IX950520-2
Preparative	5	21.2×150	IX951520-2
Preparative	5	21.2×250	IX952520-2
Preparative	5	30×100	IX951030-2
Preparative	5	30×150	IX951530-2
Preparative	5	30×250	IX952530-2
G	5	21.2×10	IX950120-2
Analytical	10	4.6×250	IX902505-2
Semi-preparative	10	10×150	IX901510-2
Semi-preparative	10	10×250	IX902510-2
G	10	10×10	IX900110-2S
Preparative	10	21.2×50	IX900520-2
Preparative	10	21.2×150	IX901520-2
Preparative	10	21.2×250	IX902520-2
Preparative	10	30×100	IX901030-2
Preparative	10	30×150	IX901530-2
Preparative	10	30×250	IX902530-2
Preparative	10	50×150	IX901550-2
Preparative	10	50×250	IX902550-2
G	10	21.2×10	IX900120-2

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge Holder

NEW Products!

UHPLC Technology and Columns

Chromatography separation technology has been revolutionized by Ultra-Performance Liquid Chromatography (UHPLC) System. Sub-2 μm particles make UPLC analysis more quickly, and more sensitive than traditional liquid chromatography. Since 2014, Bonna-Agela has launched our UHPLC series columns and provided different kinds of bonding chemistry on several modified silica particles surface.

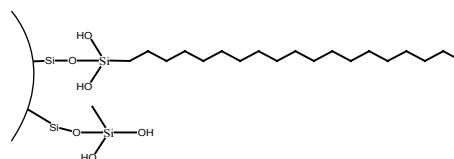
Bonna-Agela UHPLC columns are packed with 1.9 μm particles based on ultra pure silica prepared by aggregation of silica sols. This kind of silica has narrow size distribution and no dead pores whose pore size is smaller than 2nm. Bonna-Agela UHPLC family includes UHP AQ C18; UHP ASB C18, UHP Innoval C18 and UHP HILIC.

UHP AQ C18 is based on new spherical silica with high purity, with double layer surface modification technology, which reduces the interactions between polar analytes and silica surface significantly and subsequently symmetry for very basic compounds is maximized. UHP ASB C18 is bonded with unique bulky silanes that sterically protect the siloxane bond. UHP Innoval C18 is end-capped twice to ensure an inert stationary phase.

The UHPLC material is packed in newly designed column housings with extremely low void volume, which tolerate back-pressure up to more than 1000 bar or 15000 psi.

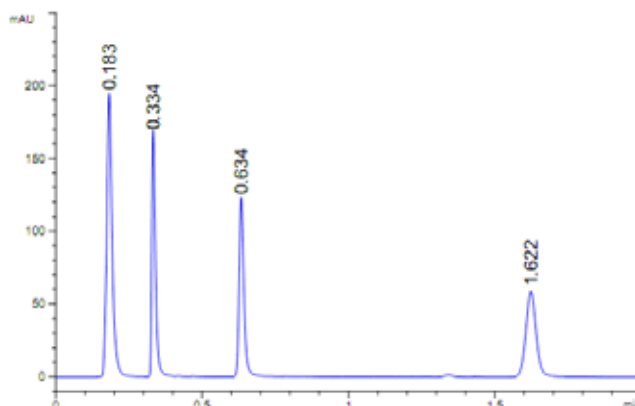
UHP AQ C18

Characteristics: Metal Impurity < 30 ppm; Pore Size: 100 Å;
Specific Surface Area: 240 m^2/g ; Available Particle Size: 1.9 μm .
Carbon Loading: 8%; Single end-capped; pH 1.5-9.0



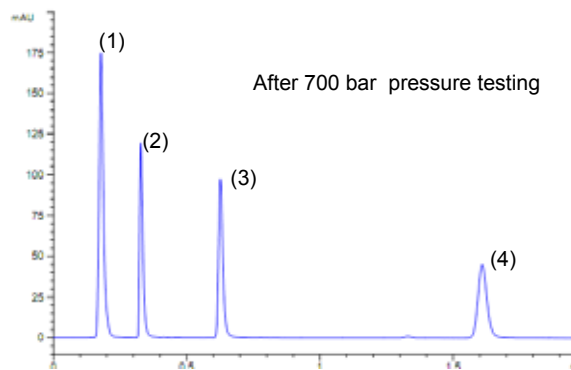
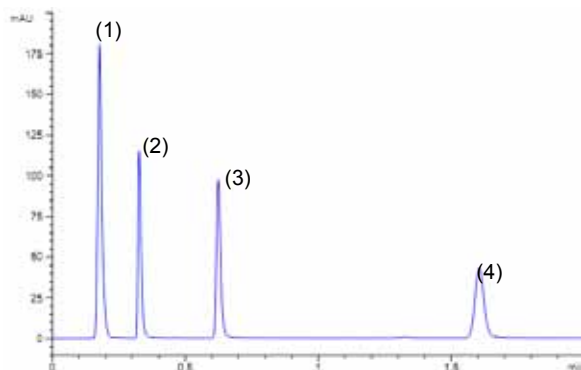
Main Features

- Greatly improved peak shape for basic compounds;
- 100 % water compatibility;
- Low pH stability: stable at pH as low as 1.5;
- Plate Count: 200000/m;
- Tailing Factor: 0.98-1.25;



Column: UHP AQ C18, 2.1x50 mm, 1.9 μm
Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase; 1.0 μL
Mobile phase: 50 % Acetonitrile / 50 % Water
Flow Rate: 0.5 mL/min
Pressure: 337 bar
Temperature: 30°C
Detector: UV 254 nm

Pressure test



Column: UHP AQ C18, 2.1×50 mm, 1.9 μ m

Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase

Mobile phase: 50% Acetonitrile / 50% Water

Flow Rate: 0.5 mL/min

Temperature: 30°C

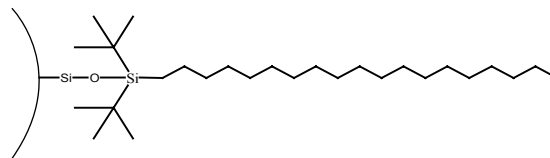
Detector: UV 254 nm

UHP ASB C18

Characteristics: Metal Impurity < 30 ppm; Pore Size: 100 Å;

Specific Surface Area 240 m²/g; Available Particle Size: 1.9 μ m.

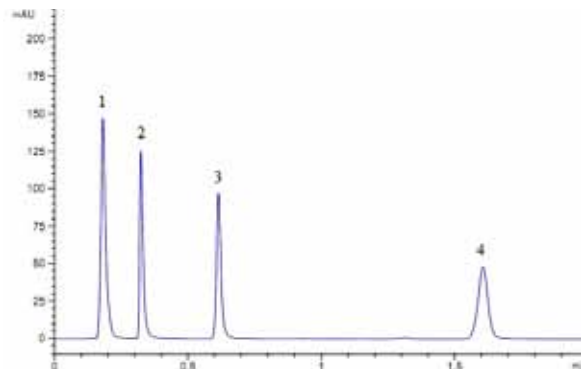
Carbon Loading: 8%; No end-capped; pH=0.8-7.5



Main Features

- Better performance under acid condition;
- Low pH stability: great stability even at pH=0.8
- Peak shape and efficiency: Excellent peak symmetry for basic compounds comparing to other brands' C18 phase columns
- Polar C18 phase: Very strong separation power for polar compounds
- 100% aqueous compatible: Much better peak shape, retention and efficiency

Balanced Retention for Hydrophilic and Hydrophobic Compounds



Column: UHP ASB C18, 2.1×50 mm, 1.9 μ m

Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase; 2 μ L

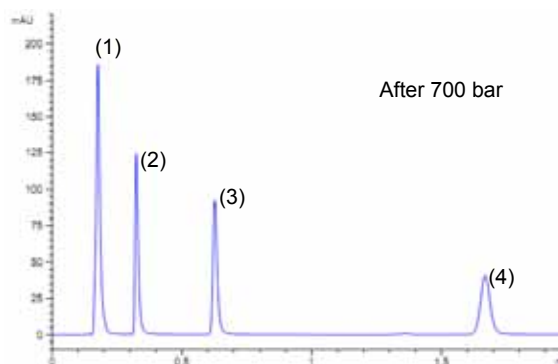
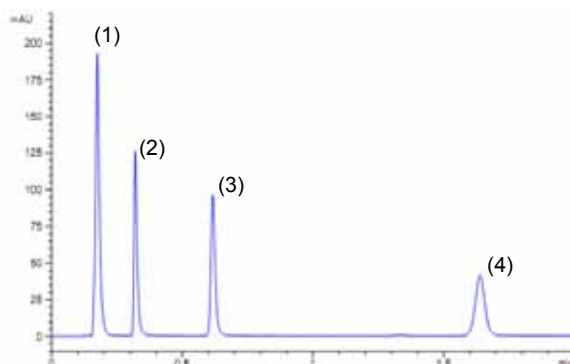
Mobile Phase: 50% Water; 50% Acetonitrile

Flow Rate: 0.5 mL/min

Detector: UV 254 nm

Temperature: 30°C

Pressure test

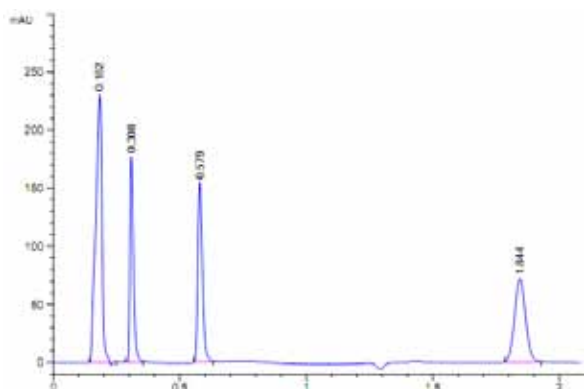
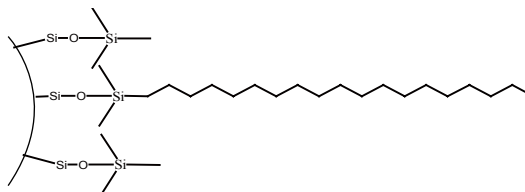


Column: UHP ASB C18, 2.1×50 mm, 1.9 μ m
Sample: Uracil (1) Phenol (2) Nitrobenzene (3) Naphthalene (4) in mobile phase
Mobile phase: 50% Acetonitrile / 50% Water
Flow Rate: 0.5 mL/min
Temperature: 30°C
Detector: UV 254 nm

UHP Innoval C18

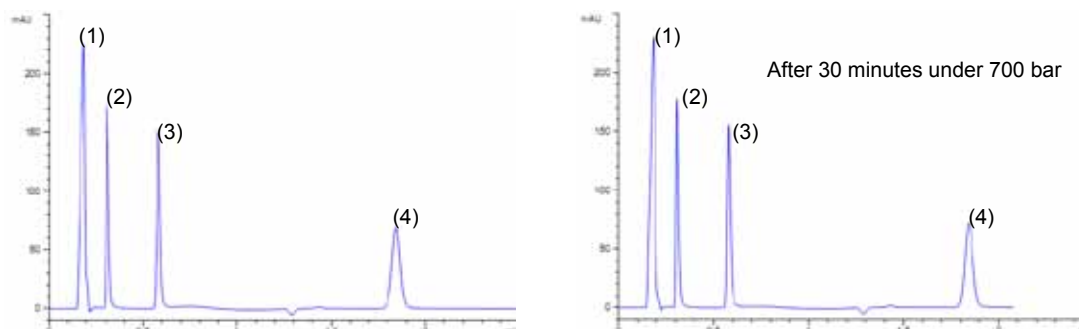
Characteristics:

Pore Size: 100 Å; Specific Surface Area: 240 m²/g;
Available Particle Size: 1.9 μ m. Carbon Loading: 14 %;
Double end-capped; pH=1.5-9.0



Column: UHP Innoval C18, 2.1 x 50 mm, 1.9 μ m
Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase; 1 μ L
Mobile phase: 50% Water, 50% ACN
Flow Rate: 0.5 mL/min
Pressure: 287 bar
Temperature: 30°C
Detector: UV 254 nm

Pressure tolerance test

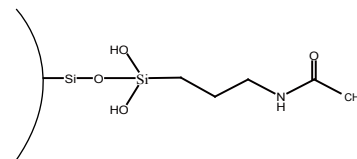


Column: UHP Innoval C18, 2.1 x 50 mm, 1.9 μ m;
 Sample: Uracil (1) Phenol (2) Nitrobenzene (3) Naphthalene (4) in mobile phase;
 Mobile phase: 50% Acetonitrile / 50% Water; Flow Rate: 0.5 mL/min
 Temperature: 30°C; Detector: UV 254 nm

UHP HILIC

The proprietary nano-surface treatment and bonding process of the packing materials leading to unique performance of the UHP HILIC columns.

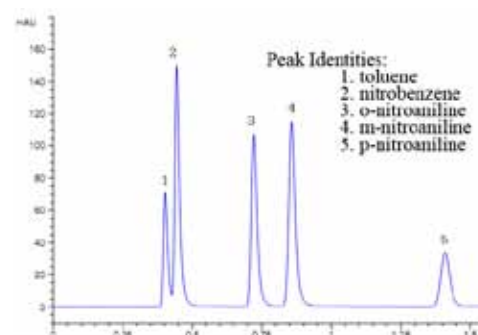
Characteristics: Metal Impurity < 30 ppm; Pore Size: 100 Å; Specific Surface Area: 240 m²/g; Available Particle Size: 1.9 μ m. Carbon Loading: 3%; No end-capped; pH=2.0-8.0



Main Features

- pH range (2.0-8.0)
- Compatibility with 100% aqueous mobile phase
- Superior retention for polar compounds

Column: UHP HILIC, 2.1 x 50 mm, 1.9 μ m;
 Mobile phase: 98.8% chlorobutane; 1% methanol; 0.2% water;
 Flow rate: 0.3 mL/min; Temperature: 30°C;
 Detector: UV 254 nm;



Ordering Information

Surface Area: 240 m²/g, Pore Size: 100 Å.

Type	Particle size (μ m)	Dimension (mm)	UHP AQ C18	UHP ASB C18	UHP Innoval C18	UHP HILIC
UHPLC	1.9	2.1×30	IA920302-0	IS920302-0	IX920302-0	IH920302-0
UHPLC	1.9	2.1×50	IA920502-0	IS920502-0	IX920502-0	IH920502-0
UHPLC	1.9	2.1×100	IA921002-0	IS921002-0	IX921002-0	IH921002-0
UHPLC	1.9	4.6×50	IA920505-0	IS920505-0	IX920505-0	IH920505-0
UHPLC	1.9	4.6×100	IA921005-0	IS921005-0	IX921005-0	IH921005-0

NEW Products!

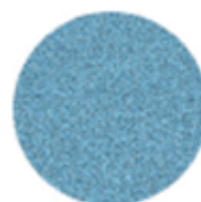
Bonshell Columns

-----A better choice to speed up your HPLC analysis

Bonshell columns represent a new level of performance through a core-shell structure. They are packed with uniform particles, and the structure of particles is 1.7 μm of solid core coated with 0.5 μm of porous layer. It is the best choice if you want to speed up your HPLC analysis without an expensive UHPLC instrument.



The structure of core-shell silica



The structure of traditional silica

Main features

- Core-shell technology;
- Stable at operating pressures up to 600 bar (9000 psi);
- High column efficiency as UHPLC column but low back pressure as conventional HPLC column.

Bonshell ASB C18 Columns

This C18 column has protective butyl side chains to enhance peak shape and separation of basic compounds under neutral and acidic conditions.

Main features

- Core-shell technology
- Stable at operating pressures up to 600 bar (9000 psi)
- Low pH stability: great stability even at pH=0.8
- Very strong separation power for polar compounds
- Compatibility with 100% aqueous mobile phase

Bonshell C18 Columns

This C18 column offers the hydrophobic retention and methylene selectivity chromatographers expected from a C18 column.



Bonshell AQ C18 Column

Main Features

- Core-shell technology
- Stable at operating pressures up to 600 bar (9000 psi)
- Very strong separation power for polar compounds and geometric isomer
- Compatibility with 100 % aqueous mobile phase
- Avoiding the redundant retention of strong non-polar compounds, such as fat soluble vitamin.

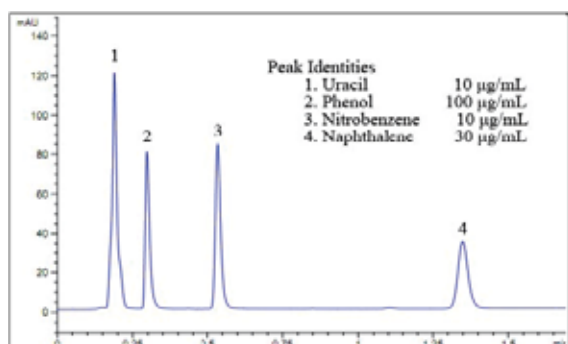
Stationary Phase Characteristics

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
Bonshell ASB C18	2.7 μm	90 Å	7%	150 m^2/g	No	1.0-7.5
Bonshell C18	2.7 μm	90 Å	10%	150 m^2/g	Double	1.5-9.0
Bonshell AQ C18	2.7 μm	90 Å	9%	150 m^2/g	Single	1.5-9.0

Extremely improve the column efficiency, analysis speed, resolution and sensitivity than columns packed with 3 μm or 5 μm particles

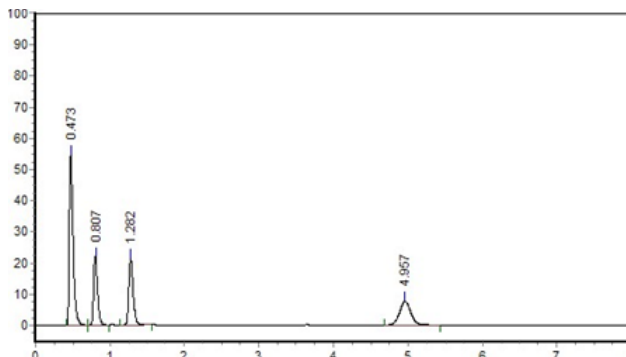
Generating much lower backpressure at optimal linear velocities of mobile phase, you can now achieve 2-3x's the column efficiencies of traditional fully porous 3 μm and 5 μm columns on any LC instrument.

2.7 μm Bonshell ASB C18



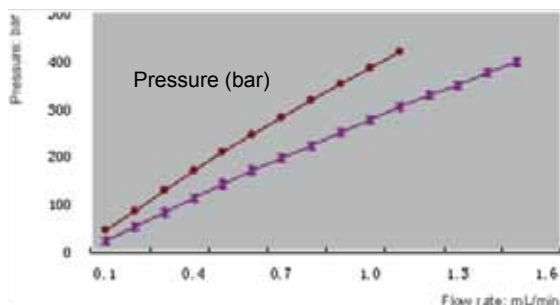
Column: 2.1×50 mm
 Mobile phase: 50% water and 50% ACN
 Flow rate: 0.5 mL/min
 Temperature: 30°C
 Detector: UV 254 nm

3 μm Venusil® ASB C18



Column: 2.1×50 mm
 Mobile phase: 50% water and 50% ACN
 Flow rate: 0.3 mL/min
 Temperature: 30°C
 Detector: UV 254 nm

Lower pressure

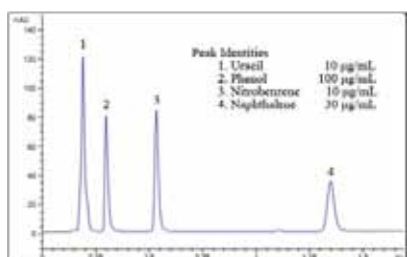


Column: 2.1× 50 mm, mobile phase: ACN : H₂O=70:30, 25°C

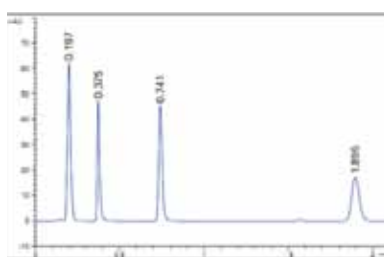
Red curve: sub-2 µm column

Purple curve: Bonshell

Compared to the same dimension UHPLC column, Bonshell column has a column pressure 40% lower and the same column efficiency. Also, it enjoys a faster separation.



2.7 µm Bonshell ASB C18



Sub-2 µm C18 column

Column: 2.1×50 mm

Mobile phase: 50% water and 50% ACN

Flow rate: 0.5 mL/min

Temperature: 30°C

Detector: UV 254 nm

	Bonshell ASB C18	2 µm traditional C18
Column efficiency	9600	9100
Pressure	175 bar	275 bar

Separation of fourteen 2,4-dinitrophenylhydrazone derivatives formaldehyde, acetaldehyde, acraldehyde, propylaldehyde, crotonaldehyde, butanone, butaldehyde, methacrolein, benzaldehyde, amyl aldehyde, toluyaldehyde, cyclohexanone, caproaldehyde

Sample: 13 DNPHs

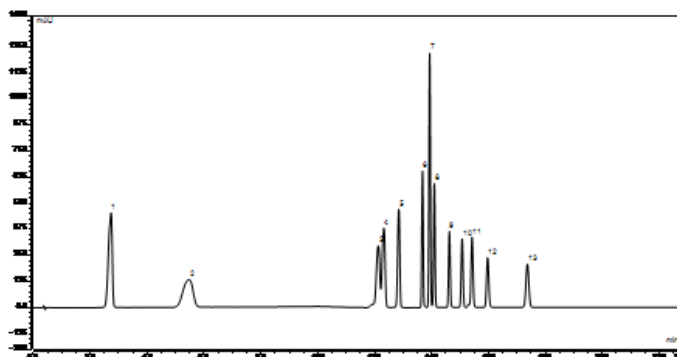
Column: Bonshell C18, 2.7 µm, 90Å, 4.6×100 mm

Detection: UV 360 nm

Flow rate: 1.2 mL/min

Mobile phase:

Time	Water%	ACN%
0	60	40
5	70	30
9	75	25
13	40	60

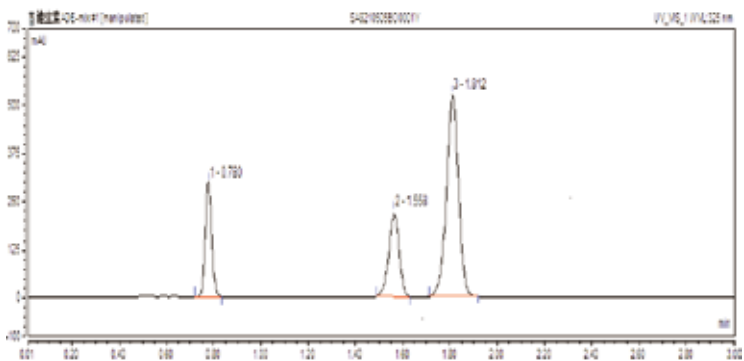




Separation of Vitamin A,D,E

Mobile phase: methanol
Flow rate: 1.0 mL/min
Injection: 20 μ L
Temperature: 30°C
Detector: UV, gradient

Analyte	Time/min	Wavelength/nm
Vitamin A	0.00	325
Vitamin D	1.10	264
Vitamin E	1.65	294



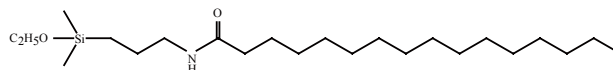
Peak	Analyte	Time/min	N	R	T
1	Vitamin A	0.780	3931	—	1.00
2	Vitamin D	1.558	6077	12.03	0.96
3	Vitamin E	1.812	6294	2.97	0.98

Order Information

Type	Particle size (μ m)	Dimension (mm)	Bonshell ASB C18	Bonshell C18	Bonshell AQ C18
Bonshell columns	2.7	2.1×30	SS920302-0	SC920302-0	SA920302-0
Bonshell columns	2.7	2.1×50	SS920502-0	SC920502-0	SA920502-0
Bonshell columns	2.7	2.1×100	SS921002-0	SC921002-0	SA921002-0
Bonshell columns	2.7	3.0×30	SS920303-0	SC920303-0	SA920303-0
Bonshell columns	2.7	3.0×50	SS920503-0	SC920503-0	SA920503-0
Bonshell columns	2.7	3.0×100	SS921003-0	SC921003-0	SA921003-0
Bonshell columns	2.7	4.6×50	SS920505-0	SC920505-0	SA920505-0
Bonshell columns	2.7	4.6×75	SS920805-0	SC920805-0	SA920805-0
Bonshell columns	2.7	4.6×100	SS921005-0	SC921005-0	SA921005-0

NEW Products!

Venusil® HLP C18

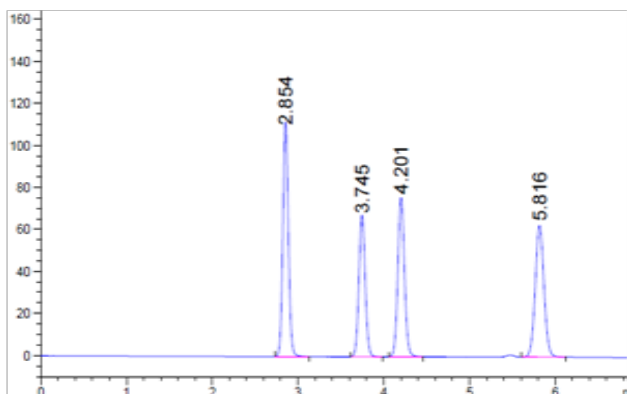


Venusil® HLP C18 column is the improved product for Venusil HLP. It is reversed-phase column based on Bonna-Agela's amide embedded technology. The stationary phase is made from ultra pure spherical silica particles bonded with alkyl chain molecules and embedded amide polar group which literally capped the silica's residual silanols to prevent their interaction with highly basic compounds. It can be utilized to replace Waters Symmetry Shield RP18, Agilent Bonus RP and Supelco Discovery RP-Amide C16.

Characteristics: Pore Size: 110 Å; Specific Surface Area: 340 m²/g; Available Particle Size: 3 µm, 5 µm. Carbon loading: 15%; No end-capped; pH=2.0-8.0

Main Features

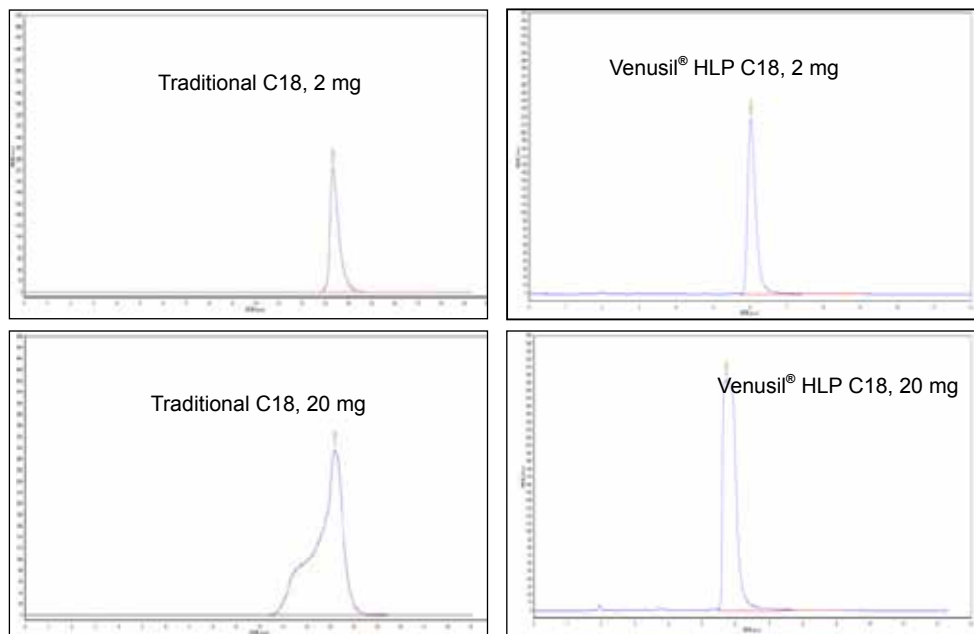
- Embedded polarity reverse phase chromatography
- Greatly improved peak shape for basic compounds
- Enhanced retention and separation of polar compounds and steric isomers
- Optimize the size of the pore size and specific surface area, better resistance to pollution



Column: Venusil® HLP C18, 4.6 x 250 mm, 5 µm, 110 Å,
Sample Uracil (1) Phenol (2) Nitrobenzene (3) and
Naphthalene (4) in mobile phase; 1 µL.
Mobile phase: 20% Water 80% Methanol
Flow Rate: 1.0 mL/min
Temperature: 25°C
Detector: UV 254 nm



High Loading Capacity



Column: Traditional C18, 21.2×150 mm, 5 μ m, 100 Å Venusil® HLP C18, 21.2×150 mm, 5 μ m, 100 Å
Sample: Amitriptyline; Mobile Phase: MeOH:0.1%; Formic acid=80:20
Flow Rate: 20 mL/min; Detector: UV 254 nm; Temperature: Ambient

Ordering Information

Surface Area: 340 m²/g, Pore Size: 110 Å

Type	Particle size (μ m)	Dimension (mm)	Venusil® HLP C18
Analytical	3	4.6×50	VHP930505-0
Analytical	3	4.6×100	VHP931005-0
Analytical	3	4.6×150	VHP931505-0
G	3	4.6×10, 4/pk	VHP930105-0
DCG	3	4.6×10, 4/pk	VHP930105-0S
Analytical	5	4.6×50	VHP950505-0
Analytical	5	4.6×100	VHP951005-0
Analytical	5	4.6×150	VHP951505-0
Analytical	5	4.6×200	VHP952005-0
Analytical	5	4.6×250	VHP952505-0
G	5	4.6×10, 4/pk	VHP950105-0
DCG	5	4.6×10, 4/pk	VHP950105-0S

G: Guard Cartridge

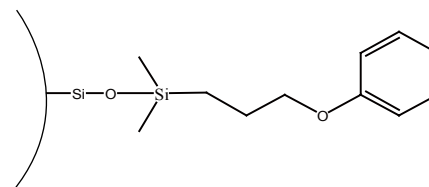
DCG: Direct-connection Guard Cartridge Holder

NEW Products!

Venusil® XBP Polar – Phenyl

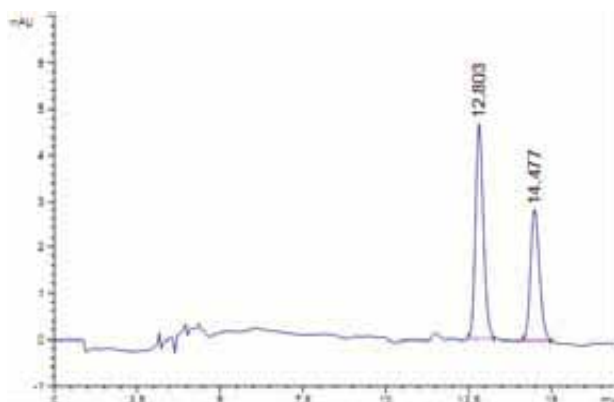
In reversed phase stationary phase carbon chain embedded polar group, raised the strong polarity and the strong basic compound selective. Polar groups blocked silicon alcohol group which greatly improved the peak shape.

Characteristics: Metal Impurity<30 ppm; Pore Size: 110 Å; Specific Surface Area: 340 m²/g; Available Particle Size: 5 µm. Carbon loading: 11% ; end-capped; pH=1.5-9.0



Main Features

- An Ether-linked Phenyl Column with Polar Endcapping
- Different selectivity compared with reversed-phase C18 or C8 column;
- Greater separation between polar and aromatic compounds with only slight differences chemically or structurally.



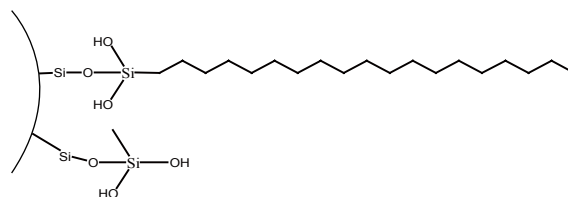
Sample: Pseudoephedrine hydrochloride Ephedrine hydrochloride 0.1 mg/mL;
Column: 4.6×250 mm; 5 µm;
Mobile phase: 1.16% Solution of ammonium acetate (pH=4.0): MeOH=94:6;
Detector: UV 257nm;
Injection : 20 µL

Type	Particle size (µm)	Dimension (mm)	Venusil XBP Polar – Phenyl
Analytical	5	2.1×50	VXP950502-A
Analytical	5	2.1×100	VXP951002-A
Analytical	5	2.1×150	VXP951502-A
Analytical	5	4.6×50	VXP950505-A
Analytical	5	4.6×100	VXP951005-A
Analytical	5	4.6×150	VXP951505-A
Analytical	5	4.6×250	VXP952505-A
G	5	4.6×10, 4/pk	VXP950105-A
DCG	5	4.6×10, 4/pk	VXP950105-AS

NEW Products!

Innoval AQ C18 Column

The Innoval AQ C18 is made by Bonna-Agela's patented Unisol Technology. This packing demonstrated unprecedented separation performance for compounds with a wide range of properties from hydrophilic to hydrophobic: polar, semi-polar and non-polar compounds.



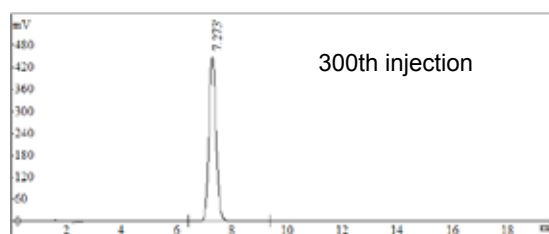
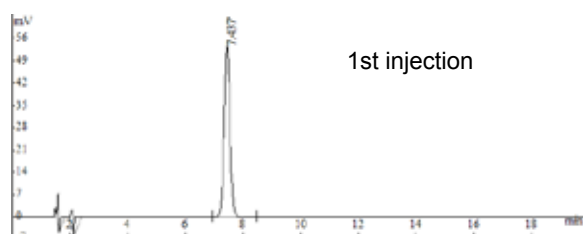
Main Features

- Strong separation performance for polar and isomer compounds
- Good pressure tolerance(6000 Psi)
- No dead pores, high stability and extended lifetime
- Lower surface area leading to good contamination tolerance
- 100 % aqueous compatibility

Characteristics

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
AQ C18	5,10 μm	100 $\text{\AA}$	15%	220 m^2/g	Single	1.5-9.0

Long life-time of Innoval AQ C18 because of its highly polar surface



Sample: Cefadroxil

Column: Innoval AQ C18, 5 μm , 100 $\text{\AA}$, 4.6 $\times$ 150 mm

Mobile phase A: 0.02 mol/L potassium phosphate; Mobile phase B: Methanol; A:B=98:2;

Flow rate: 1.0 mL/min;

Detector: 230 nm;

Temperature: 30°C;

Injection volume : 10 μL

Ordering Information

Surface Area: 220 m²/g, Pore Size: 100 Å

Type	Particle size (µm)	Dimension (mm)	Innoval AQ C18
Analytical	5	4.6×50	IA950505-0
Analytical	5	4.6×100	IA951005-0
Analytical	5	4.6×150	IA951505-0
Analytical	5	4.6×250	IA952505-0
G	5	4.6×10	IA950105-0
Semi-preparative	5	10×150	IA951510-0
Semi-preparative	5	10×250	IA952510-0
G	5	10×10	IA950110-0
Preparative	5	21.2×50	IA950520-0
Preparative	5	21.2×150	IA951520-0
Preparative	5	21.2×250	IA952520-0
Preparative	5	30×100	IA951030-0
Preparative	5	30×150	IA951530-0
Preparative	5	30×250	IA952530-0
G	5	21.2×10	IA950120-0
Analytical	10	4.6×250	IA902505-0
Semi-preparative	10	10×150	IA901510-0
Semi-preparative	10	10×250	IA902510-0
G	10	10×10	IA900110-0
Preparative	10	21.2×50	IA900520-0
Preparative	10	21.2×150	IA901520-0
Preparative	10	21.2×250	IA902520-0
Preparative	10	30×100	IA901030-0
Preparative	10	30×150	IA901530-0
Preparative	10	30×250	IA902530-0
Preparative	10	50×150	IA901550-0
Preparative	10	50×250	IA902550-0
G	10	21.2×10	IA900120-0

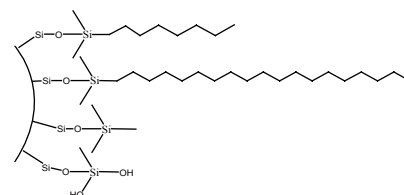
G: Guard Cartridge

DCG: Direct-connection Guard Cartridge Holder

NEW Products!

Unisol C18 (2) Columns

Unisol C18 (2) column is the improved product for Unisol C18. It is an universal reversed phase column through carefully optimizing the pore size, surface and carbon content and the Bonna-Agela's innovative surface modification and unique bonding processes. It has excellent balance retention for hydrophilic and hydrophobic analytes and also balance of separation ability and contamination tolerance. In addition, the Unisol C18 (2) column demonstrates good retention capability compounds with different polarity. Because the ionized silanols on the stationary surface of Unisol C18(2) are eliminated maximumly, so this column is less affected by the pH of mobile phase and buffer concentration. Finally, it is able to provide excellent reproducibility.



Characteristics:

Unisol C18(2): Metal Impurity<30 ppm; Pore Size: 110 Å; Specific Surface Area: 340 m²/g; Available Particle Size: 3 µm, 5 µm or 10 µm; Single end-capped; Carbon Loading:14%; pH=1.5-9.0

Main Features

- High density of deionized silanol: 100 % water compatible and enhanced retention and separation for polar isomer compounds
- Reduce of ionized silanols and blockage of metal ions: good peak shape for basic compounds
- Reduce of the quantity of ion exchange sites: less affected by the pH mobile phase and buffer concentration.
- Weakened nonspecific adsorption: Good tolerance of biological matrix.

The activity testing of silicon hydroxyl

The Unisol C18 (2) columns provide symmetric peak and good resolution for acidic, neutral and basic compounds at usual pH range. Retention of basic compound is less changed when the pH of mobile phase changes

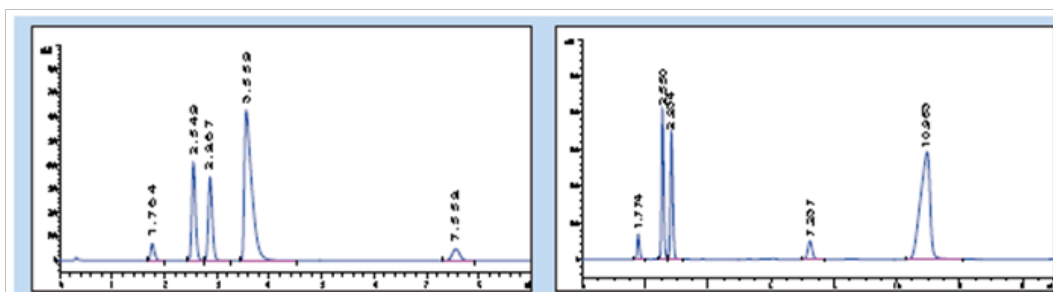
Sample: Uracil, Phenol, dimethylphthalate, naphthalene, amitriptyline

Mobile Phase: Methanol:20mM potassium phosphate buffer (pH2.6/pH5.8) =70: 30

Flow Rate: 1.00 mL/min

Temperature: 30°C

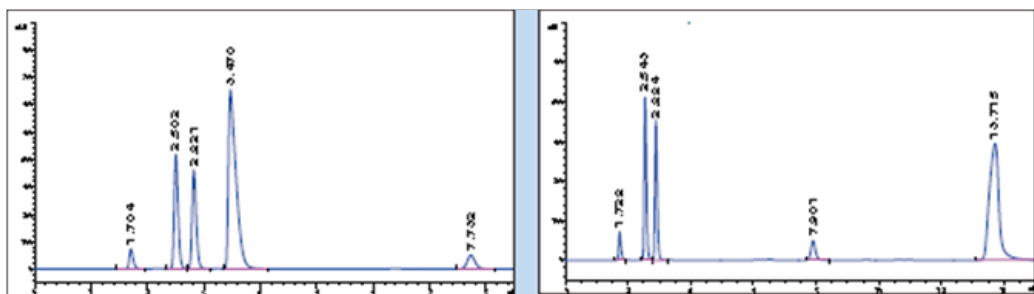
Detector: UV 254 nm



Unisol C18(2), 5 μ m, 4.6 $\times$ 250 mm

pH=2.6 Rt(amitriptyline)=3.559 min

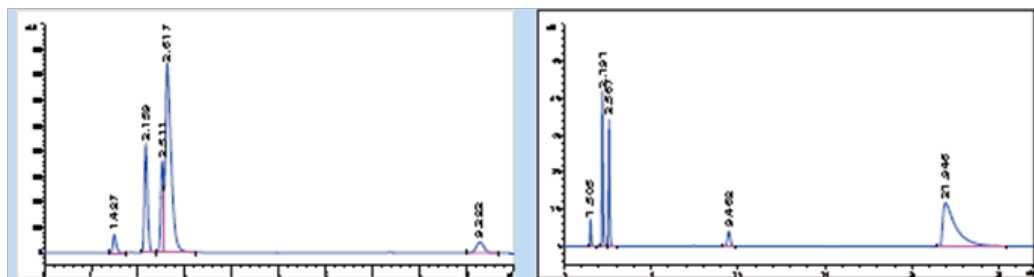
pH=5.8 Rt(amitriptyline)=10.963 min



Waters Atlantis T3, 5 μ m, 4.6 $\times$ 250 mm

pH=2.6 Rt(amitriptyline)=3.470 min

pH=5.8 Rt(amitriptyline)=13.715 min

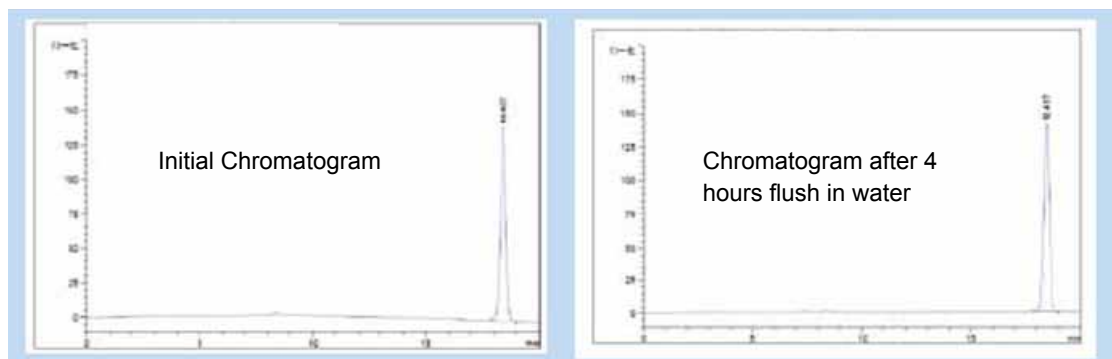


Brand P-HR, 5 μ m, 4.6 $\times$ 250 mm

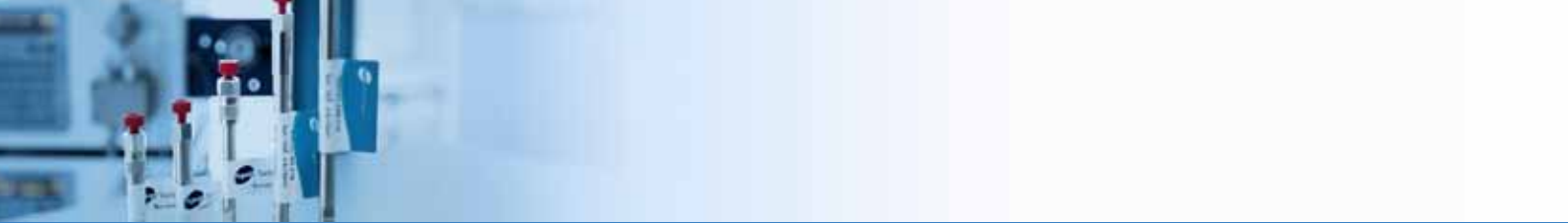
pH=2.6 Rt (amitriptyline) =2.617 min

pH=5.8 Rt (amitriptyline) =21.946 min

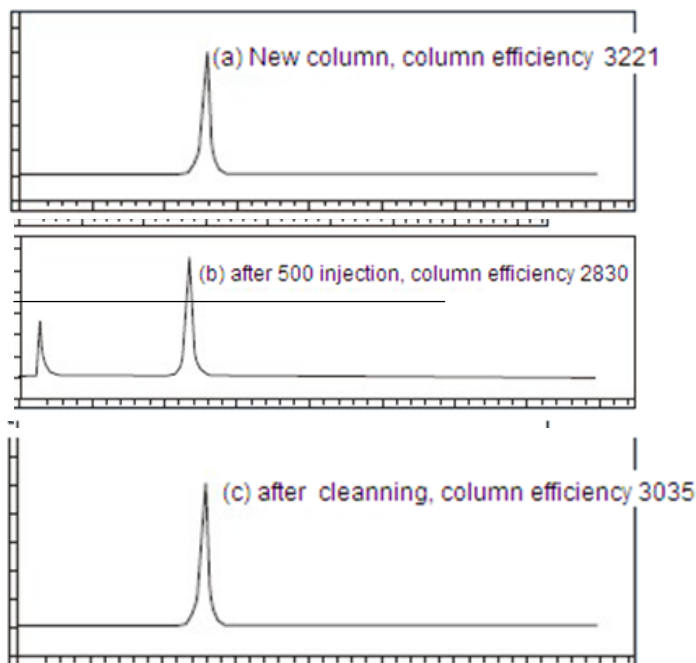
100 % Water compatible



Sample: uridine; Mobile Phase: water
Flow Rate: 1.00 mL/min, after stopping the pump for 5 minutes
Temperature: 30°C; Detector: UV 254 nm



Good tolerance of biological matrix



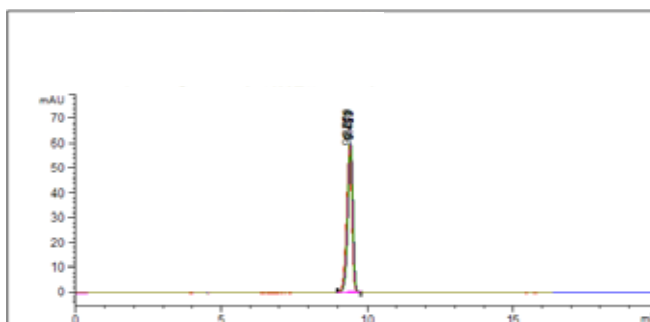
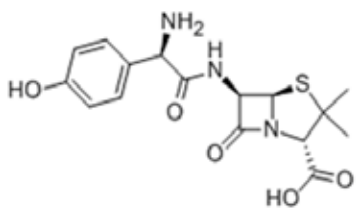
Column: Unisol C18(2), 5 μ m, 2.1 $\times$ 50 mm
 Sample: uridine in plasma
 Mobile Phase: 0.1% formic acid water
 Flow Rate: 0.3 mL/min,
 Temperature: 30°C
 After 500 injections, washing column 30 min with
 solution (methanol/0.1% formic acid =50:50) at 40°C,
 then wash column with solution
 (methanol/water=95:5) at 45°C.

024

HPLC Columns

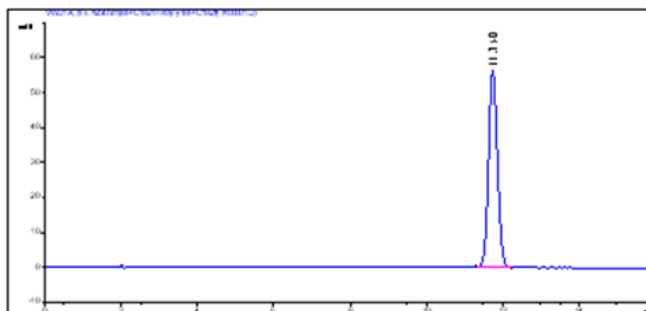
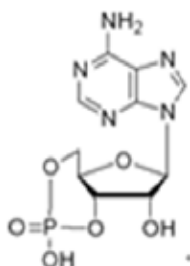
Applications

Amoxicillin



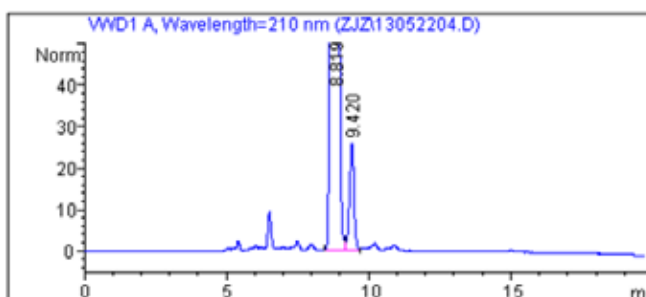
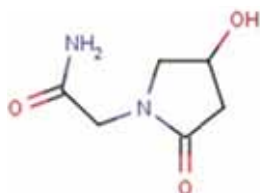
Unisol C18 (2), 5 μ m, 4.6 $\times$ 250 mm, 110 Å,
 Mobile phase: Acetonitrile:0.05M monopotassium phosphate =
 2.5:97.5(KOH pH=5.0)
 Flow rate: 1.0 mL/min
 Temperature: 30°C
 Injection: 20 μ L
 Detector: UV 254nm

Adenosine Cyclophosphate



Unisol C18(2), 5 μ m, 4.6 $\times$ 150 mm, 110 Å,
Mobile phase: MeOH: 20 mmol/L monopotassium phosphate
=10:90(pH=4.0)
Flow rate: 1.0 mL/min
Temperature: 30°C
Injection: 8 μ L
Detector: UV 254nm

Oxiracetam



Unisol C18(2), 5 μ m, 4.6 $\times$ 250 mm, 110 Å,
Mobile phase: MeOH: 0.05 mol/L monopotassium phosphate
Flow rate: 1.0 mL/min
Temperature: 30°C
Injection: 20 μ L
Detector: UV 210nm

Featured Products!

Unisol Technology and Column Products

Bonna-Agela's unique sol-gel process technology generates a uniform surface that produces an universal column applicable to many HPLC applications.

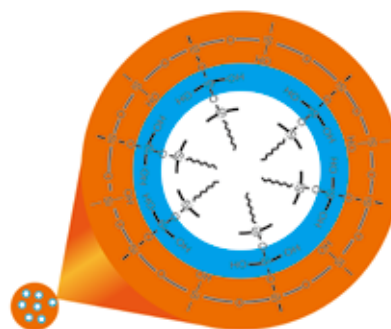
Peak tailing adversely affects chromatographic efficiency and reduces the accuracy and precision of the data. Peak tailing and insufficient retention of polar compounds are among the toughest problems for silica based reversed phase columns. High acidity of the surface silanols, non-uniformity of the surface, and non-uniformity of the bonding process are the three major causes of peak tailing.

Synthetic silica with high purity is typically obtained by hydrolyzing silicic acid esters followed by high temperature sinteration. The sintered silica is further leached with dilute acid to enrich silanol on the surface. The process does not generate a uniform, silanol covered surface. It will create some isolated silanol groups with very strong acidity or some "un-leached islands" during the leaching process. Furthermore, the high temperature procedure may cause the formation of micro-crystallization domains on the silica, further contributing to the nonuniformity of the surface.

Unisol process technology is specifically designed to solve these problems. In our patented Unisol process, gas phase tetramethoxy silane is adsorbed evenly on the silica surface. It is subsequently hydrolyzed by a controlled amount of moisture. A fresh layer of silanols is then formed by a mild heating process. This process produces a surface with low acidity and high uniformity, which is further bonded with a C18 silane, and then di-functional end-capped. The overall process yields an excellent HPLC stationary phase with a very smooth surface that is friendly to basic compounds (minimal ionic interactions) and polar compounds (provides significantly increased retention).

Main Features

- Greatly improved peak shape for basic compounds
- 100% water compatibility
- Significantly increased retention for highly water soluble compounds and balanced hydrophobicity in the reverse phase mode
- Elimination of excessive retention for polar compounds in the normal phase mode (few 'hot spots')



Featured Products! <

Unisol Column

A Slightly Polar, 100% Water Compatible and Universal Reverse Phase

An unique and universal Unisol C18 HPLC phase made by Bonna-Agela's patented Unisol Technology. This stationary phase demonstrated unprecedented separation performance for compounds with a wide range of properties from hydrophilic to hydrophobic: polar, semi-polar and non-polar compounds. We also offer C8 phase presenting different selections for various applications.

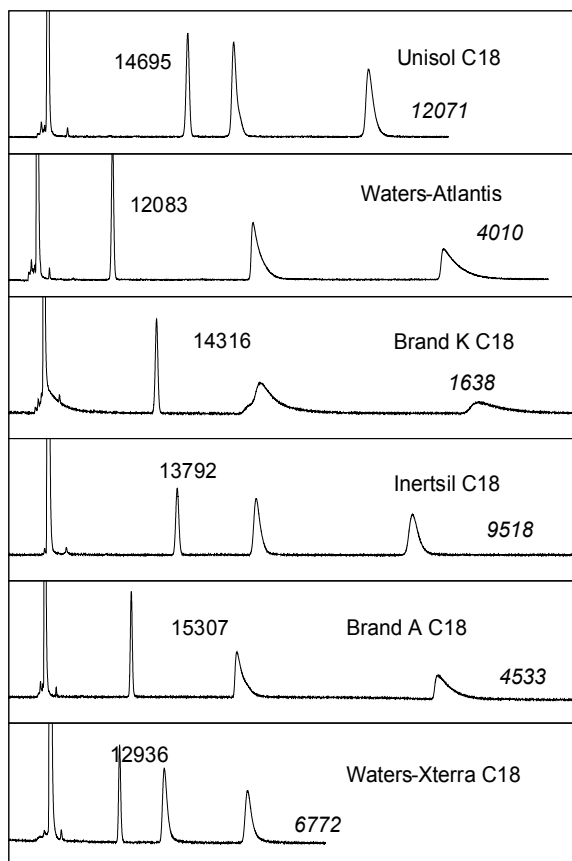
Main Features

- Great inertness and separation efficiency for basic compounds
- Enhanced retention of hydrophilic compounds
- 100% aqueous compatibility
- Robust and reproducible performance
- Wide pH range (1.5-9.0)
- Low bleeding and high sensitivity for LC-MS

Characteristics

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
Unisol C18	2.5, 3, 5, 10 μm	100 Å	18 %	410 m^2/g	Single	1.5-9.0
Unisol C8	3, 5, 10 μm	100 Å	13 %	410 m^2/g	No	1.5-9.0

Great Inertness and Efficiency for Basic Compounds



Sample: uracil, toluene, doxepin and amitriptyline

Column: 4.6×150 mm, 5 µm

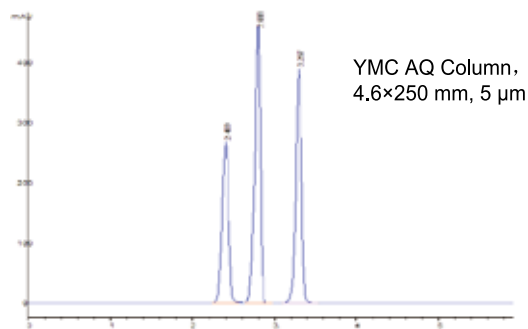
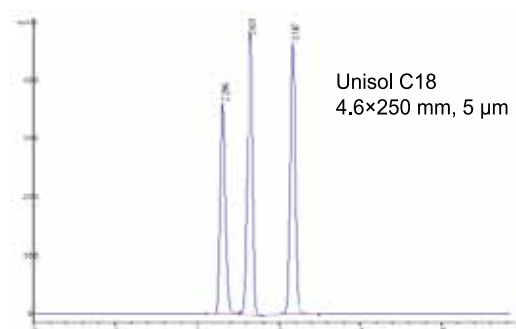
Mobile Phase: 10 mM sodium phosphate (pH=7.0) in 60% ACN

Temperature: 30°C

Flow Rate: 1 mL/min

The plate numbers in regular font are for toluene, the plate numbers in *italic* are for amitriptyline.

Good Retention for Polar Compounds



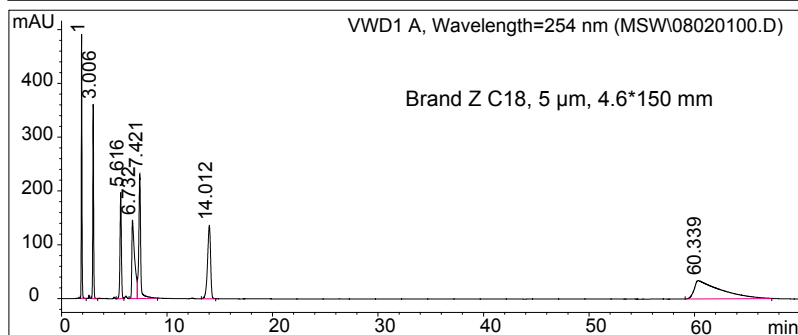
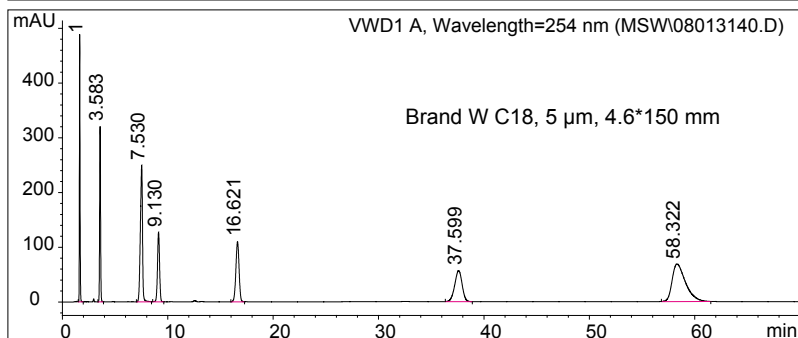
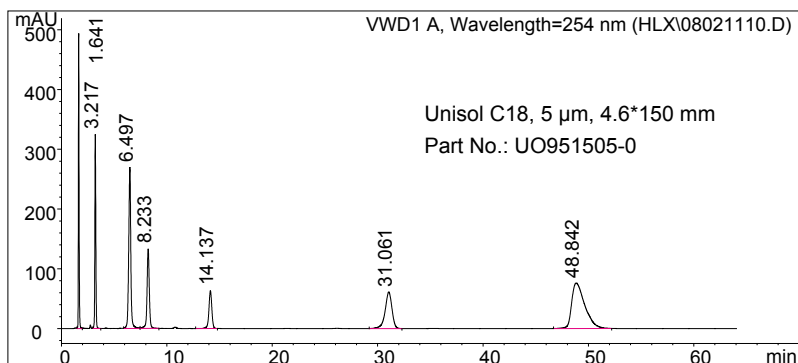
Mobile Phase: A: Water (Contain 0.01 mM NaH_2PO_4 and 0.01 mM Citric Acid, pH=4.5); B: ACN; A:B=95:5

Sample: Cytosine, Uracil, Guanine

Temperature: 35°C

Detector: UV 254 nm

Balanced Retention for Hydrophilic and Hydrophobic Compounds



Mobile Phase: 35% 20 mM KH_2PO_4 pH=7.0,
65% Methanol

Temperature: 23°C

Flow Rate: 1 mL/min

Detector: UV 254 nm

Sample: Uracil

Propranolol hydrochloride

Butyl Phthalate

Dimethyl Phthalate

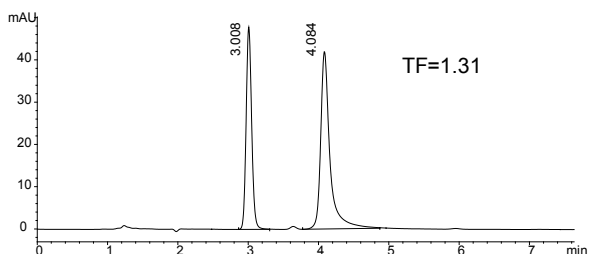
Naphthalene

Acenaphthene

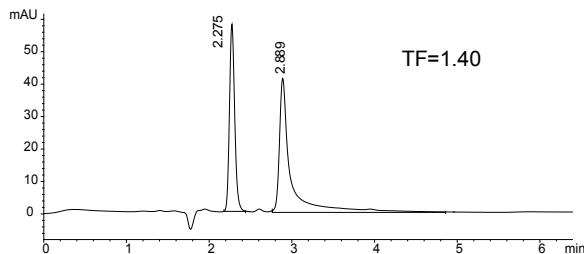
Amitriptyline

Extremely Low Metal Effects

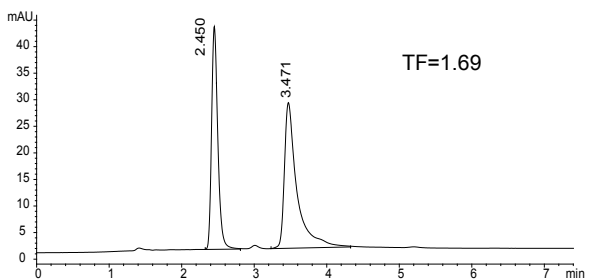
Unisol C18, 5 μ m, 4.6 $\times$ 150 mm



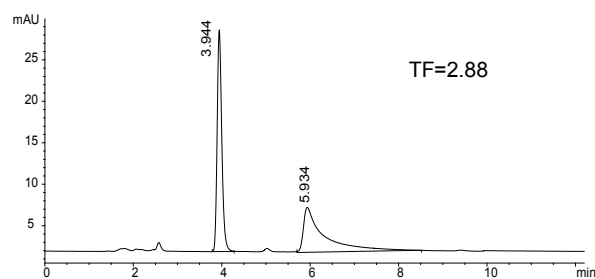
Brand W, AQ Column, 5 μ m, 4.6 $\times$ 150 mm



Brand H, C18 Column, 5 μ m, 4.6 $\times$ 150 mm

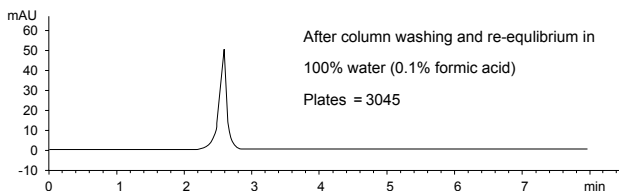
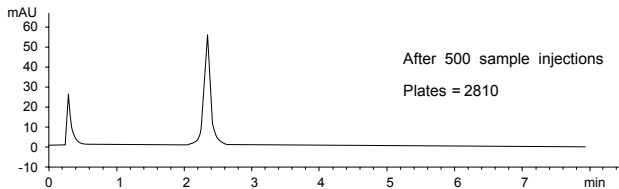
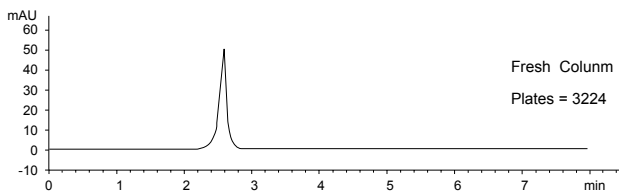


Brand Z, C18 Column, 5 μ m, 4.6 $\times$ 150 mm



Mobile Phase: A:Water; B:Methanol; A:B=65:35;
Flow Rate: 1 mL/min; Temperature: 25°C; Detector: UV 230 nm;
Sample: 2,7-Dihydroxynaphthalene, 2,3-Dihydroxynaphthalene

Good Tolerance of Directly Injected Biological Matrix



Uridine: uridine in calf blood plasma (diluted 20 times with 0.1% formic acid)

Injection: 1 μ L (not be cleaned up with SPE)

Column: Unisol C18, 2.1 $\times$ 50 mm, 5 μ m

Temperature: 30°C

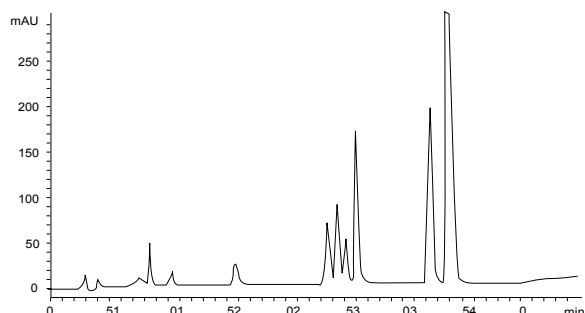
Flow Rate: 0.3 mL/min

Mobile Phase: 0.1% formic acid solution
(100% aqueous phase)

Run Time: 8 min

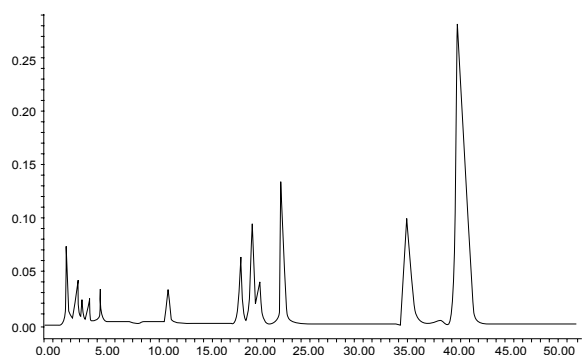
After 500 injection, wash with methanol/0.1% formic acid solution=50/50 for 30 mins, column temperature 40°C
rinse with 95% MeOH for 30 mins, column temperature 45°C.

Enable Methods to be Compatible with LC-MS



Analysis of Quaternary Ammonium Alkaloids from Copitidis with a Non-Volatile Ion Pair Reagent on Brand Z C18 Column.

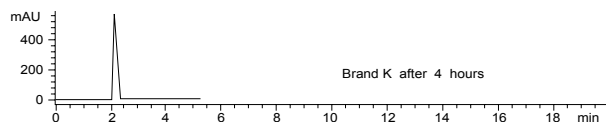
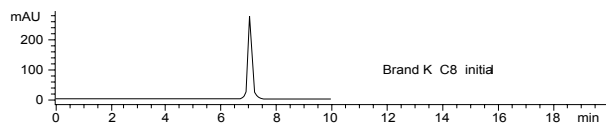
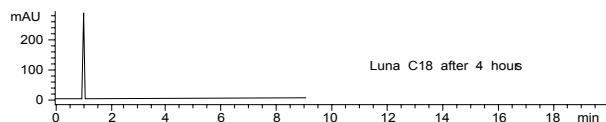
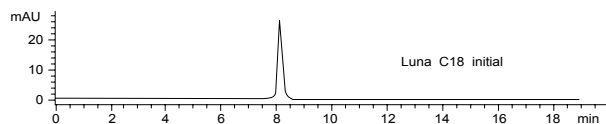
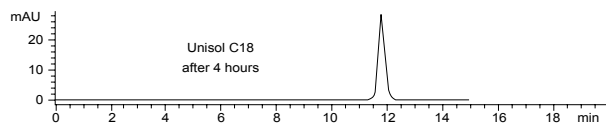
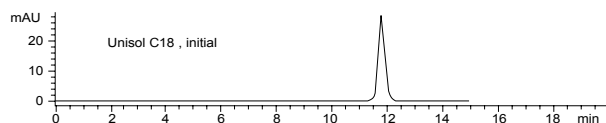
Mobile Phase: ACN:0.05 mol/L KH_2PO_4 in water=40:60, containing 0.015mol/L SDS



Analysis of Quaternary Ammonium Alkaloids from Copitidis without a Non-Volatile Ion Pair Reagent on Unisol C18 Column.

Mobile Phase: 0.2% TFA in water: Acetonitrile=75:25

Compatibility with 100% Aqueous Mobile Phase



Sample: Uridine

Column: 4.6×150 mm, 5 μm

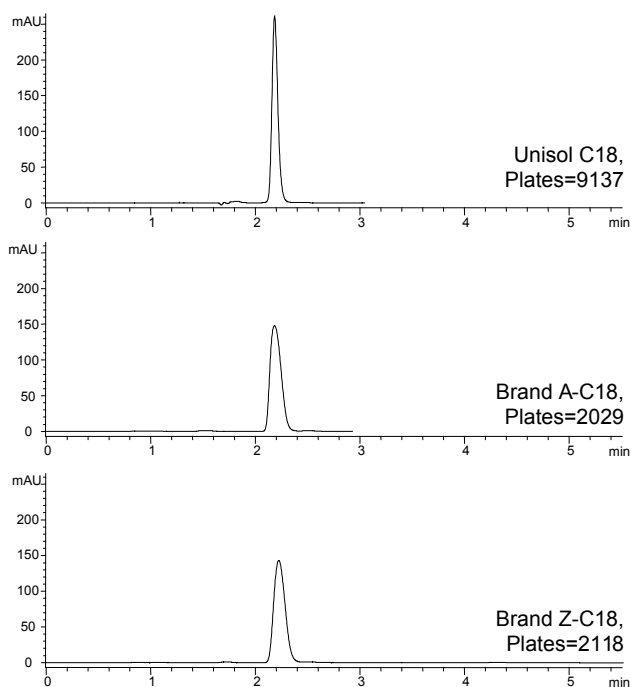
Mobile Phase: 100% water

Flow Rate: 1 mL/min; the flow was stopped for 5 minutes during the testing period for each column

Temperature: 30°C

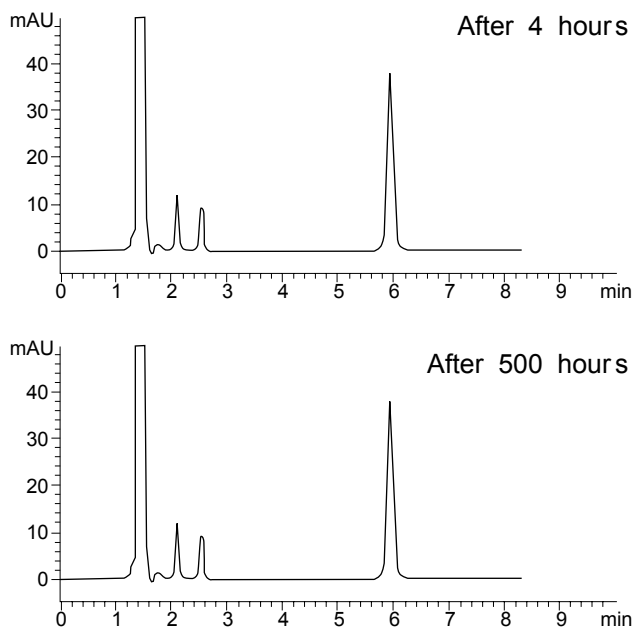


Greater Volume Loading Capacity Than Other Brands



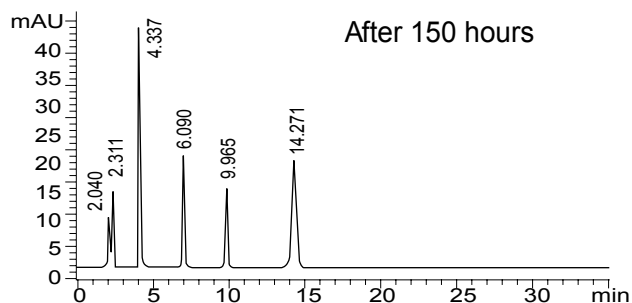
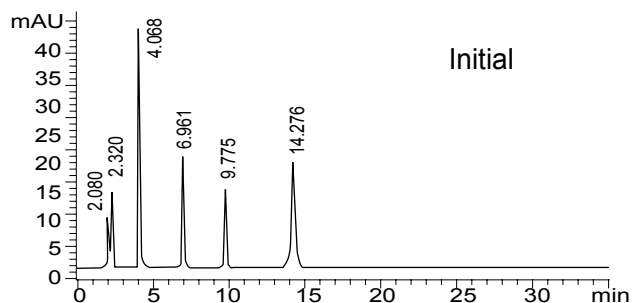
Large Volume Injection (Injection volume=100 μ L)
 Sample: 4-methoxybenzenesulfon amide,
 10 μ g/mL in MeOH/Water (1:1)
 Column: 4.6 $\times$ 150 mm, 5 μ m
 Mobile Phase: MeOH/Water
 Flow Rate: 1 mL/min
 Temperature: 30°C

Stability of Unisol C18 at pH=1.5



Sample: Uracil, Doxepin, Amitriptyline and Toluene.
 Column: Unisol C18, 4.6 $\times$ 150 mm, 5 μ m
 Mobile Phase: TFA (0.25%, pH=1.5) in 60% acetonitrile
 Flow Rate: 1 mL/min
 Temperature: 40°C

Perfect Peak Symmetry and Good Stability at Mid-pH for Basic Compounds



Sample: Uracil, Doxepin, Nortriptyline, Amitriptyline and Trimipramine

Column: Unisol C18, 4.6×250 mm, 5 µm

Mobile Phase: 0.01M sodium phosphate: ACN=25:75,
pH=7.0

Flow Rate: 1.3 mL/min.

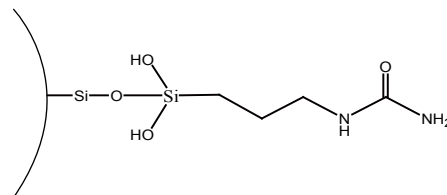
Temperature: 30°C

Featured Products!

Unisol Amide (HILIC)

Unisol Amide stationary phase is made from ultra pure spherical silica particles bonded with a neutral hydrophilic amide group. It can be used as normal phase, reversed phase or hydrophilic interaction HPLC. The Unisol Amide column is a suitable replacement for NH_2 and silica columns that are currently marketed as HILIC. Compared with traditional silica and NH_2 columns, the Unisol Amide column has better reproducibility and column lifetime. It is especially useful for the separation of strong hydrophilic compounds, whether they are acidic, basic or neutral. It is compatible with aqueous mobile phases in the pH range of 2.0-8.0. Unisol Amide presents unique selectivity for many molecules because of its difference in separation mechanism from most of the conventional stationary phases.

Characteristics: Metal Impurity < 30 ppm; No End-capped, pH=2.0-8.0. Pore Size 100 Å; Specific Surface Area: 410 m^2/g ; Carbon Loading 8%; Available Particle Size: 3 μm , 5 μm and 10 μm



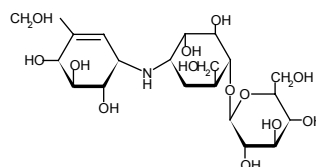
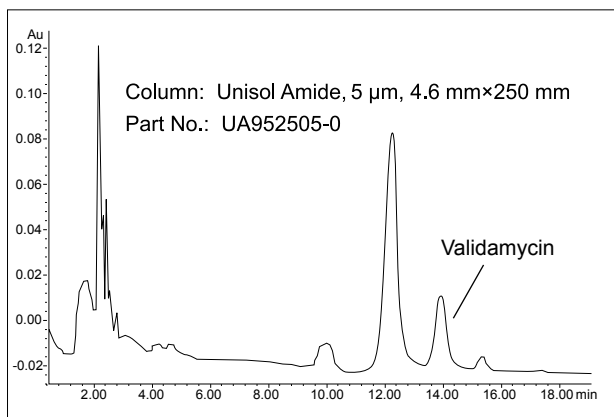
Main features

- Strong retention of polar compounds in HILIC mode
- Unique selectivity and complementary to conventional reversed phase and normal phase
- Can be used as reversed phase, normal phase and HILIC phase
- More robust and reproducible performance than silica and amino stationary phase
- 100% aqueous and 100% organic solvents compatible
- pH range (2.0-8.0)

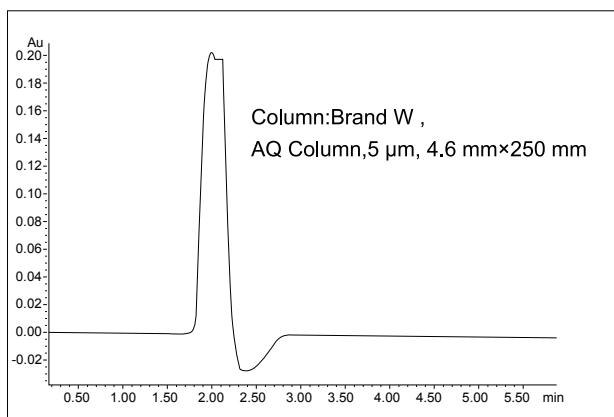
Applications

- Oligonucleotide
- Carbohydrates
- Amino acids and small molecules
- Other highly polar molecules

Separation of Validamycin



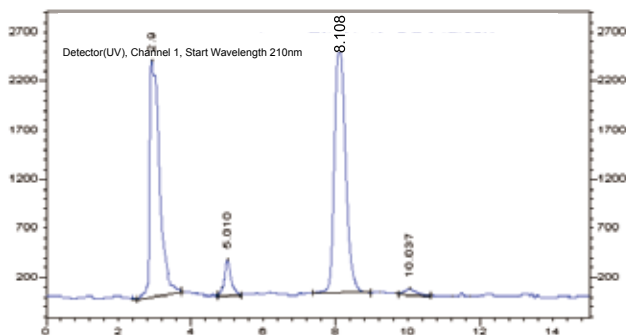
Mobile Phase: A: 0.1% TFA in Water; B: Acetonitrile
Gradient: 40% A to 85% A in 30 min
Flow Rate: 1 mL/min
Temperature: 25°C
Detector: UV 210 nm
Sample: Validamycin



Mobile Phase: A: 0.005M NaH_2PO_4 (pH=7.0);
B: MeOH; A:B=98:2

Flow Rate: 1 mL/min
Temperature: 25°C
Detector: UV 210 nm
Sample: Validamycin

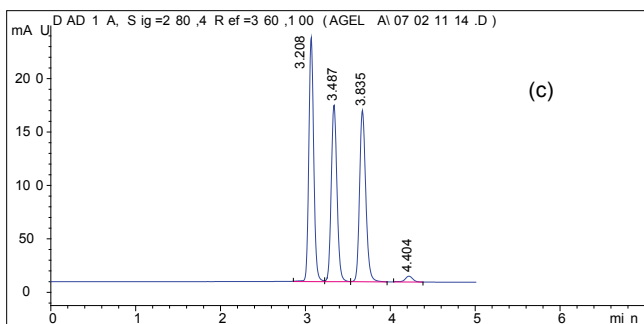
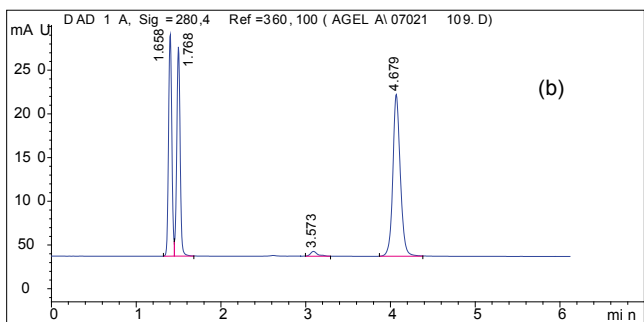
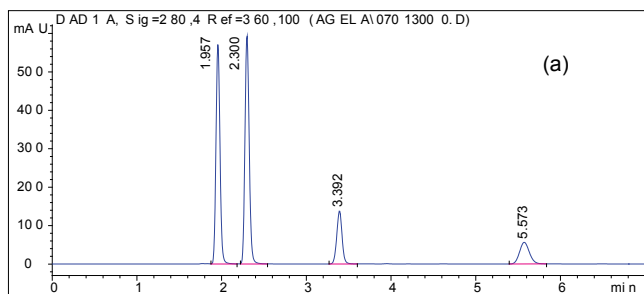
Separation of Shikimic Acid



Column: Unisol Amide, 5 μ m, 4.6 $\times$ 150 mm
Part No.: UA951505-0
Mobile Phase: A: 1% Fomic Acid in Water; B: Acetonitrile
Gradient: 60% A to 90% A in 20 min
Flow Rate: 1 mL/min
Temperature: 25°C
Detector: UV 210 nm
Sample: Shikimic Acid



Water-soluble Vitamins



(a) Unisol Amide, 5 μ m, 4.6 $\times$ 150 mm

Part No.: UA951505-0

(b) Brand W, NH₂ Column, 5 μ m, 4.6 $\times$ 150 mm

(c) Brand W Silica Column, 5 μ m, 4.6 $\times$ 150 mm

Mobile Phase: 0.1% TFA in Water: 0.1% TFA in Acetonitrile

=90:10

Flow Rate: 1 mL/min

Temperature: 30°C

Detector: UV 280 nm

Sample: VB1+VB6+VC+VB2

Ordering Information

Surface Area: 410 m²/g, Pore Size: 100 Å

Type	Particle Size (µm)	Dimension (mm)	Unisol C18	Unisol C18 (2)	Unisol C8	Unisol Amide (HILIC)
Fast analysis	2.5	2.1×30	UO920302-0			
Fast analysis	2.5	2.1×50	UO920502-0			
Fast analysis	2.5	2.1×100	UO921002-0			
Fast analysis	2.5	3.0×30	UO920303-0			
Fast analysis	2.5	3.0×50	UO920503-0			
Fast analysis	2.5	3.0×100	UO921003-0			
Fast analysis	2.5	4.6×50	UO920505-0			
Fast analysis	2.5	4.6×100	UO921005-0			
Fast analysis	3	2.1×30	UO930302-0	UO930302-2	UO830302-0	VH930302-0
Fast analysis	3	2.1×50	UO930502-0	UO930502-2	UO830502-0	VH930502-0
Fast analysis	3	2.1×100	UO931002-0	UO931002-2	UO831002-0	VH931002-0
Fast analysis	3	2.1×150	UO931502-0	UO931502-2	UO831502-0	VH931502-0
G	3	2.1×10, 4/pk	UO930102-0	UO930102-2	UO830102-0	VH930102-0
DCG	3	2.1×10, 4/pk	UO930102-0S	UO930102-2S	UO830102-0S	VH930102-0S
Fast analysis	3	3.0×30	UO930303-0	UO930303-2	UO830303-0	VH930303-0
Fast analysis	3	3.0×50	UO930503-0	UO930503-2	UO830503-0	VH930503-0
Fast analysis	3	3.0×100	UO931003-0	UO931003-2	UO831003-0	VH931003-0
Fast analysis	3	4.6×50	UO930505-0	UO930505-2	UO830505-0	VH930505-0
Fast analysis	3	4.6×100	UO931005-0	UO931005-2	UO831005-0	VH931005-0
Fast analysis	3	4.6×150	UO931505-0	UO931505-2	UO831505-0	VH931505-0
Analytical	5	0.5×50	UO9505005-0			
Analytical	5	2.1×30	UO950302-0	UO950302-2	UO850302-0	VH950302-0
Analytical	5	2.1×50	UO950502-0	UO950502-2	UO850502-0	VH950502-0
Analytical	5	2.1×100	UO951002-0	UO951002-2	UO851002-0	VH951002-0
Analytical	5	2.1×150	UO951502-0	UO951502-2	UO851502-0	VH951502-0
Analytical	5	3.0×30	UO950303-0	UO950303-2	UO850303-0	VH950303-0
Analytical	5	3.0×50	UO950503-0	UO950503-2	UO850503-0	VH950503-0
Analytical	5	3.0×100	UO951003-0	UO951003-2	UO851003-0	VH951003-0
Analytical	5	4.6×50	UO950505-0	UO950505-2	UO850505-0	VH950505-0
Analytical	5	4.6×100	UO951005-0	UO951005-2	UO851005-0	VH951005-0
Analytical	5	4.6×150	UO951505-0	UO951505-2	UO851505-0	VH951505-0
Analytical	5	4.6×250	UO952505-0	UO952505-2	UO852505-0	VH952505-0
G	5	4.6×10, 4/pk	UO950105-0	UO950105-2	UO850105-0	VH950105-0
DCG	5	4.6×10, 4/pk	UO950105-0S	UO950105-2S	UO850105-0S	VH950105-0S
Semi-preparative	5	10×150	UO951510-0	UO951510-2	UO851510-0	VH951510-0
Semi-preparative	5	10×250	UO952510-0	UO952510-2	UO852510-0	VH952510-0
Preparative	5	21.2×50	UO950520-0	UO950520-2	UO850520-0	VH950520-0
Preparative	5	21.2×150	UO951520-0	UO951520-2	UO851520-0	VH951520-0
Preparative	5	21.2×250	UO952520-0	UO952520-2	UO852520-0	VH952520-0
G	5	10×10	UO950110-0S	UO950110-2S	UO850110-0S	VH950110-0S
G	5	21.2×10	UO950120-0	UO950120-2	UO850120-0	VH950120-0
Preparative	5	30×100	UO951030-0	UO951030-2	UO851030-0	VH951030-0
Preparative	5	30×150	UO951530-0	UO951530-2	UO851530-0	VH951530-0
Preparative	5	30×250	UO952530-0	UO952530-2	UO852530-0	VH952530-0



Surface Area: 410 m²/g, Pore Size: 100 Å

Type	Particle Size (µm)	Dimension (mm)	Unisol C18	Unisol C18 (2)	Unisol C8	Unisol Amide (HILIC)
Semi-preparative	10	10×150	UO901510-0	UO901510-2	UO801510-0	VH901510-0
Semi-preparative	10	10×250	UO902510-0	UO902510-2	UO802510-0	VH902510-0
Preparative	10	21.2×50	UO900520-0	UO900520-2	UO800520-0	VH900520-0
Preparative	10	21.2×150	UO901520-0	UO901520-2	UO801520-0	VH901520-0
Preparative	10	21.2×250	UO902520-0	UO902520-2	UO802520-0	VH902520-0
G	10	10×10	UO900110-0S	UO900110-2S	UO800110-0S	VH900110-0S
G	10	21.2×10	UO900120-0	UO900120-2	UO800120-0	VH900120-0
Preparative	10	30×100	UO901030-0	UO901030-2	UO801030-0	VH901030-0
Preparative	10	30×150	UO901530-0	UO901530-2	UO801530-0	VH901530-0
Preparative	10	30×250	UO902530-0	UO902530-2	UO802530-0	VH902530-0
Preparative	10	50×150	UO901550-0	UO901550-2	UO801550-0	VH901550-0
Preparative	10	50×250	UO902550-0	UO902550-2	UO802550-0	VH902550-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Featured Products!

Venusil® ASB Series Columns (C1, C3, C8, C18 and phenyl)

The Venusil® ASB series columns are specially designed for the separation of polar compounds from low (extremely stable at pH=0.8) to medium pH. The stationary phase is bonded with unique bulky silanes that sterically protect the siloxane bond. We offer a line of bonding chemistry of C1, C3, C8, C18 or Phenyl groups presenting a broad selection of different polarity for various applications. These columns can be used to replace Zorbax SB series.

Main Features

- Low pH stability: great stability even at pH=0.8
- Peak shape and efficiency: Excellent peak symmetry for basic compounds comparing to other brand polar phase columns
- Polar C18 phase: Very strong separation power for polar compounds
- 100% aqueous compatible: Much better peak shape, retention and efficiency
- Five different bonded phases provide broad selectivity

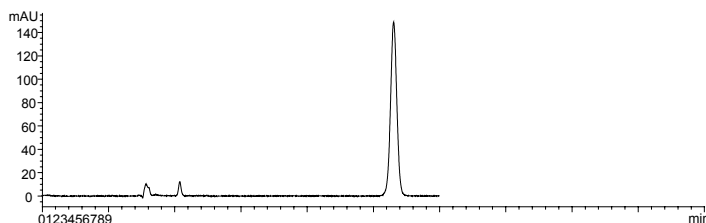
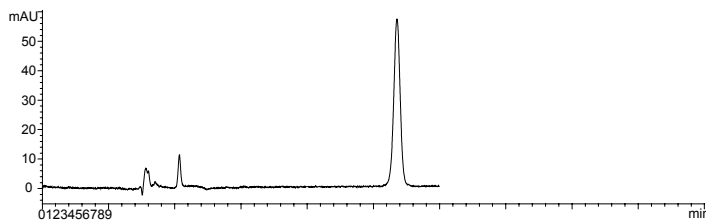
Venusil® ASB Column

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
C18	3,5,10 µm	150 Å	12%	200 m ² /g	No	0.8-7.5
C8	3,5,10 µm	150 Å	7%	200 m ² /g	No	1.0-7.5
C3	5 µm	150 Å	4%	200 m ² /g	No	1.0-7.5
C1	5 µm	150 Å	2%	200 m ² /g	No	1.0-7.5
phenyl	5 µm	150 Å	6%	200 m ² /g	No	1.0-7.5
C18(T)	5 µm	300 Å	5%	80 m ² /g	No	0.8-7.5
C8(T)	5 µm	300 Å	3%	80 m ² /g	No	1.0-7.5

039

HPLC Columns

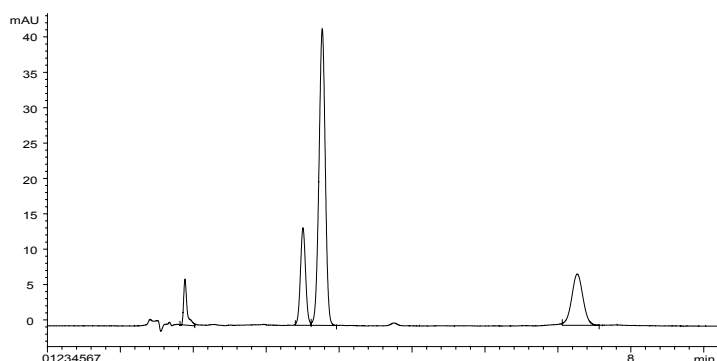
The Stability in the Low pH



Column: Venusil® ASB C18, 4.6×150 mm, 5 µm
Sample: Naphthol
Aging: 40°C, TFA in 80% methanol (pH=1.0), 400 hours
Mobile Phase: TFA in 80% methanol (pH=1.5)
Flow Rate: 1 mL/min
Injection: 5 µL
Temperature: 30°C



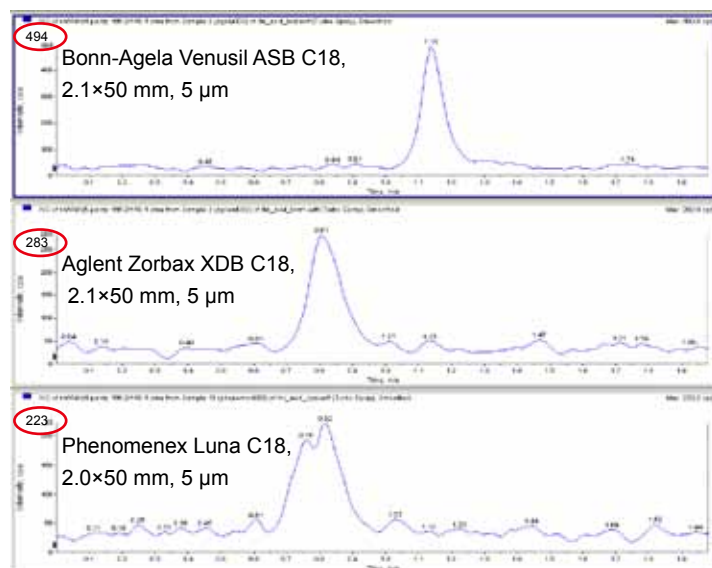
The Separation of Organic Acid



Column: Venusil® ASB C18, 4.6×150 mm, 5 µm
Sample: Vc, malonic acid, lactic acid and citric acid
Mobile Phase: 20 mM Phosphate buffer saline (PBS) ,
pH=2.0
Flow Rate: 1 mL/min
Injection: 5 µL
Detector: UV 210 nm

Highest LC-MS Sensitivity

2-3 times higher than many popular brands (*low bleeding, inert surface and high efficiency*)



Ordering Information

Surface Area: 200 m²/g, Pore Size: 150 Å

Type	Particle (µm)	Dimension (mm)	Venusil® ASB C18	Venusil® ASB C8	Venusil® ASB Phenyl	Venusil® ASB C3	Venusil® ASB C1
Analytical	3	2.1×30	VS930302-0	VS830302-0			
Analytical	3	2.1×50	VS930502-0	VS830502-0			
Analytical	3	2.1×100	VS931002-0	VS831002-0			
Analytical	3	2.1×150	VS931502-0	VS831502-0			
G	3	2.1×10, 4/pk	VS930102-0	VS830102-0			
DCG	3	2.1×10, 4/pk	VS930102-0S	VS830102-0S			
Analytical	3	4.6×50	VS930505-0	VS830505-0			
Analytical	3	4.6×100	VS931005-0	VS831005-0			
Analytical	3	4.6×150	VS931505-0	VS831505-0			
Analytical	5	2.1×30	VS950302-0	VS850302-0	VS650302-0	VS350302-0	VS150302-0
Analytical	5	2.1×50	VS950502-0	VS850502-0	VS650502-0	VS350502-0	VS150502-0
Analytical	5	2.1×100	VS951002-0	VS851002-0	VS651002-0	VS351002-0	VS151002-0
Analytical	5	2.1×150	VS951502-0	VS851502-0	VS651502-0	VS351502-0	VS151502-0
Analytical	5	4.6×50	VS950505-0	VS850505-0	VS650505-0	VS350505-0	VS150505-0
Analytical	5	4.6×100	VS951005-0	VS851005-0	VS651005-0	VS351005-0	VS151005-0
Analytical	5	4.6×150	VS951505-0	VS851505-0	VS651505-0	VS351505-0	VS151505-0
Analytical	5	4.6×250	VS952505-0	VS852505-0	VS652505-0	VS352505-0	VS152505-0
G	5	4.6×10, 4/pk	VS950105-0	VS850105-0	VS650105-0	VS350105-0	VS150105-0
DCG	5	4.6×10, 4/pk	VS950105-0S	VS850105-0S	VS650105-0S	VS350105-0S	VS150105-0S
Semi-preparative	5	10×150	VS951510-0	VS851510-0			
Semi-preparative	5	10×250	VS952510-0	VS852510-0			
Preparative	5	21.2×50	VS950520-0	VS850520-0			
Preparative	5	21.2×150	VS951520-0	VS851520-0			
Preparative	5	21.2×250	VS952520-0	VS852520-0			
G	5	10×10	VS950110-0S	VS850110-0S			
G	5	21.2×10	VS950120-0	VS850120-0			
Semi-preparative	10	10×150	VS901510-0	VS801510-0			
Semi-preparative	10	10×250	VS902510-0	VS802510-0			
Preparative	10	21.2×50	VS900520-0	VS800520-0			
Preparative	10	21.2×150	VS901520-0	VS801520-0			
Preparative	10	21.2×250	VS902520-0	VS802520-0			
G	10	10×10	VS900110-0S	VS800110-0S			
G	10	21.2×10	VS900120-0	VS800120-0			
Preparative	10	30×100	VS901030-0	VS801030-0			
Preparative	10	30×150	VS901530-0	VS801530-0			
Preparative	10	30×250	VS902530-0	VS802530-0			
Preparative	10	50×150	VS901550-0	VS801550-0			
Preparative	10	50×250	VS902550-0	VS802550-0			

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge



Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle (µm)	Dimension (mm)	Venusil® ASB C18	Venusil® ASB C8
Analytical	5	2.1×30	VS950302-T	VS850302-T
Analytical	5	2.1×50	VS950502-T	VS850502-T
Analytical	5	2.1×100	VS951002-T	VS851002-T
Analytical	5	2.1×150	VS951502-T	VS851502-T
Analytical	5	4.6×50	VS950505-T	VS850505-T
Analytical	5	4.6×100	VS951005-T	VS851005-T
Analytical	5	4.6×150	VS951505-T	VS851505-T
Analytica	5	4.6×250	VS952505-T	VS852505-T
G	5	4.6×10, 4/pk	VS950105-T	VS850105-T
DCG	5	4.6×10, 4/pk	VS950105-TS	VS850105-TS

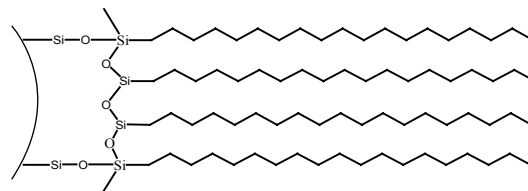
G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Featured Products!

Venusil® PAH

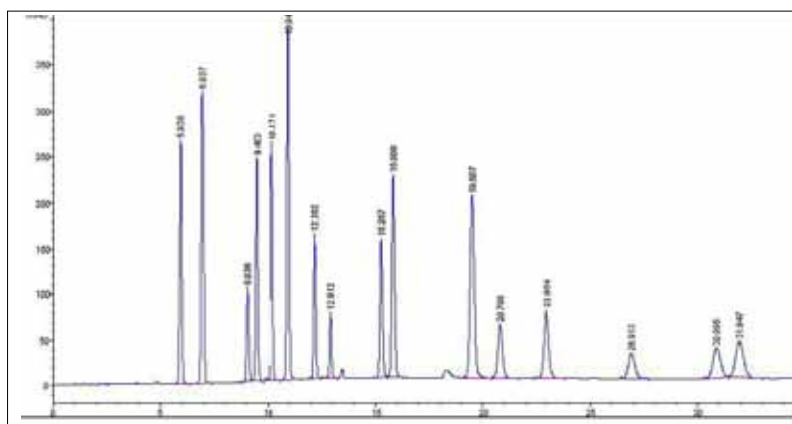
Venusil® PAH column is a polymerically bonded C18 column. It is recommended for the separation of PAHs and steric isomers of the aromatic compounds. PAHs are considered as priority pollutants and the analysis of these potentially carcinogenic compounds in water, soil and food is of major importance.



Characteristics: Metal Impurity <30 ppm; Pore Size: 200 Å; Specific Surface Area: 200 m²/g; Available Particle Size: 5 µm, Carbon Loading: 17%; No end-capped; pH=1.5-9.0

Main Features

- High resolution separation of PAHs
- Robust and reproducible performance
- Good for applications requiring separation of geometric isomers



1. Naphthalen;
2. Acenaphene;
3. Acenaphthylene;
4. Fluorene;
5. Anthracene;
6. Phenanthrene;
7. Fluoranthene;
8. Pyrene;
9. Benzoanthracene;
10. Chrysene;
11. Benzo[b]fluorathene;
12. Benzo[k]fluorathene;
13. Benzo[a]Pyrene;
14. Benzo[g,h,i]Pyrene;
15. Dibenzo(a,h)anthracene;
16. Indeno [1,2,3,-cd] pyrene

Sample: 16 PAHs (MeOH:methylene chloride=1:1)
Column: Venusil® PAH, 5 µm, 200 Å, 4.6×250 mm
Detector: UV 254 nm
Flow Rate: 1.2 mL/min
Mobile Phase:

Time (min)	MeOH (%)	H ₂ O (%)
0	85	15
2	85	15
7	95	5
40	95	5

Ordering Information

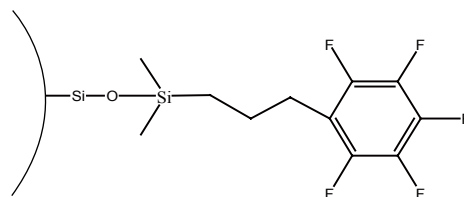
Surface Area: 200 m²/g, Pore Size: 200 Å

Type	Particle size (µm)	Dimension (mm)	Venusil PAH
Analytical	5	4.6×250	VP952505-L
G	5	4.6×10, 4/pk	VP950105-L

Featured Products!

Venusil® PFP---USP L43

Venusil® PFP (Pentafluorophenyl) columns deliver the performance of Venusil® columns by providing excellent peak shape while also offering alternative selectivity of reversed phase chromatography compared to alkyl chain phases. Venusil® PFP columns help to extend the range of selectivities of reversed phase chromatography. This phase will increase retention and resolution, and is particularly suitable for separation of halogenated species as well as compounds containing hydroxyl, carboxyl, nitro or other polar groups. The additional mechanisms of the PFP phase, such as steric selectivity of the analyte species and dipole interactions, offer alternative selectivity.

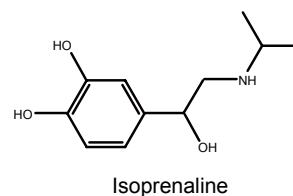
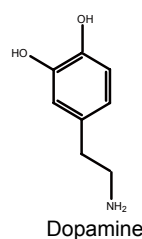
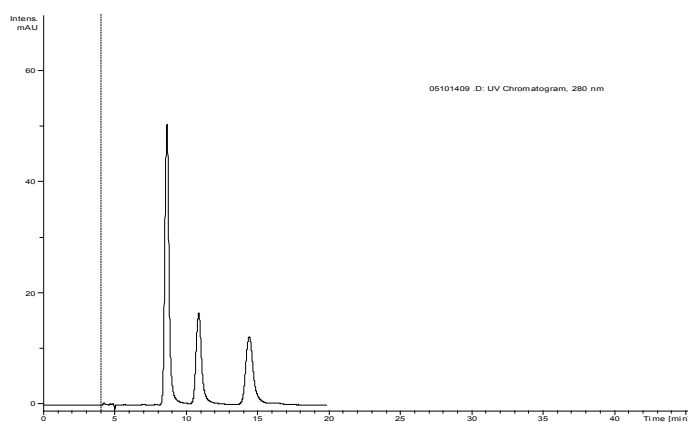


Characteristics: Metal Impurity < 30 ppm; Pore Size: 120 Å; Specific Surface Area: 320 m²/g; Available Particle Size: 3 µm, 5 µm. No end-capped; pH=2.0-8.0

Main Features

- Extra retention for halogenated species
- Unique selectivity for compounds containing benzyl, nitrobenzol and conjugate system
- Excellent peak shape and sensitivity for positional isomers and polar analytes
- Analysis of complex taxane samples

Dopamine and Its Metabolin



Sample: Dopamine, isoprenaline and soprenaline
 Column: Venusil® PFP, 4.6×250 mm, 5 µm
 Part No.: VF952505-0
 Mobile Phase: MeOH: CH₃COOH /CH₃COONH₄
 Buffer (pH 4.5) =15:85
 Detector: UV 280 nm
 Flow Rate: 0.8 mL/min

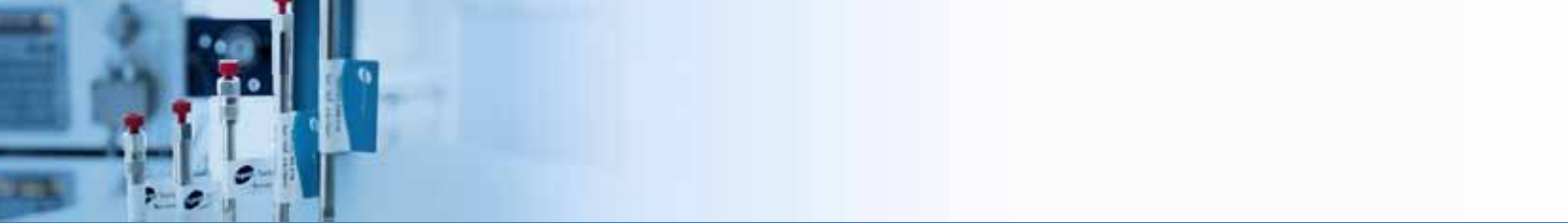
Ordering Information

Surface Area: 320 m²/g, Pore Size: 120 Å

Type	Particle size (µm)	Dimension (mm)	Venusil PFP
Analytical	3	4.6×50	VF930505-0
Analytical	3	4.6×100	VF931005-0
Analytical	3	4.6×150	VF931505-0
G	3	4.6×10, 4/pk	VF930105-0
DCG	3	4.6×10, 4/pk	VF930105-0S
Analytical	5	4.6×50	VF950505-0
Analytical	5	4.6×100	VF951005-0
Analytical	5	4.6×150	VF951505-0
Analytical	5	4.6×200	VF952005-0
Analytical	5	4.6×250	VF952505-0
G	5	4.6×10, 4/pk	VF950105-0
DCG	5	4.6×10, 4/pk	VF950105-0S

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge Holder



Featured Products!

Venusil® XBP COOH

Venusil® XBP COOH columns are made of high pure spherical silica particle, bonded with carboxylic acid functional group. They can be used for separation of basic, water-soluble compounds and bio-molecules.

Characteristics:

Metal Impurity < 30 ppm; Pore Size 100 Å; Specific Surface Area: 380 m²/g; Available Particle Size: 5 µm, Carbon Loading: 3.0%; No end-capped; pH=2.0-8.0

Sample: Melamine in ACN; 10 µL.

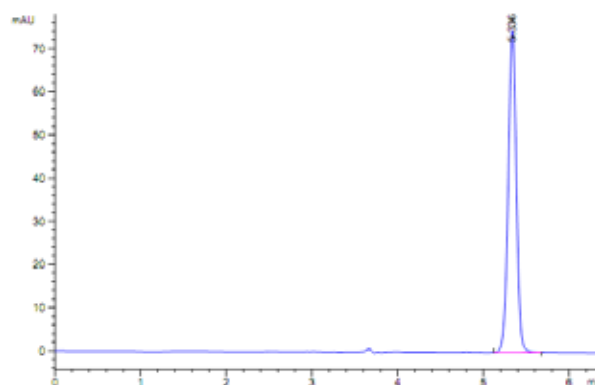
Column: Venusil® XBP COOH, 4.6×250 mm, 5 µm

Mobile phase: ACN / 50 mmol KH₂PO₄ (pH4.28) = 30 / 70

Flow Rate: 1.0 mL/min

Temperature: 30°C

Detector: UV 240 nm



Ordering Information

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle size (µm)	Dimension (mm)	Venusil XBP COOH
Analytical	5	2.1×30	VO950302-0
Analytical	5	2.1×50	VO950502-0
Analytical	5	2.1×100	VO951002-0
Analytical	5	2.1×150	VO951502-0
Analytical	5	4.6×50	VO950505-0
Analytical	5	4.6×100	VO951005-0
Analytical	5	4.6×150	VO951505-0
Analytical	5	4.6×250	VO952505-0
G	5	4.6×10, 4pk	VO950105-0
DCG	5	4.6×10, 4pk	VO950105-0S

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Featured Products!

Innoval Columns

Innoval columns are packed with ultra pure silica particles which are prepared by aggregation of ultra pure silica sols . This class of columns from Bonna-Agela shows excellent reproducibility and high efficiency. A variety of functional groups are bonded to this silica for broad applications. Innoval family includes C18, AQ C18 (Innoval AQ is a new product in innoval family, find its details at page 12) and Silica.

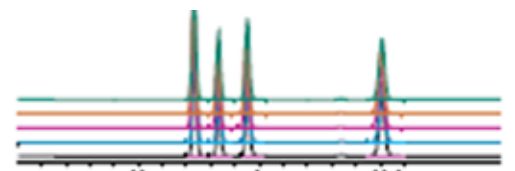
Main Features

- Good pressure tolerance(6000 Psi)
- No dead pores, high stability and extended lifetime
- Lower surface area leading to good contamination tolerance

Characteristics

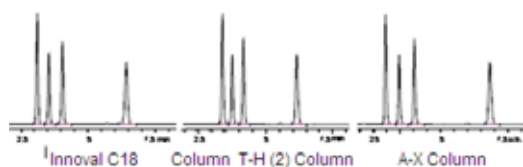
Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
Innoval C18	5,10 µm	100 Å	14%	220 m ² /g	Double	1.5-9.0
Innoval Silica	5,10 µm	100 Å	/	220 m ² /g	No	1.0-7.0

Batch-to-Batch Reproducibility

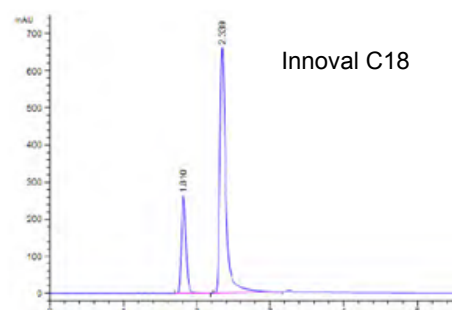
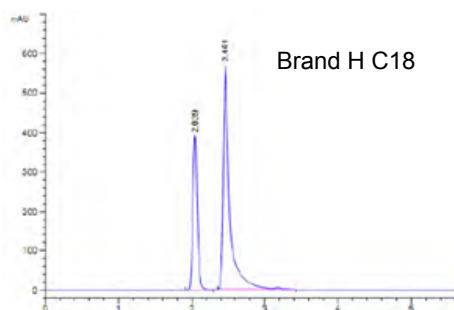


Column: Innoval C18, 5 µm, 4.6×250 mm
Sample: uracil, phenol, nitrobenzene, naphthalene
Mobile Phase: acetonitrile/water= 85/15
Flow Rate: 0.8 mL/min
Detection: UV, 254 nm
Temperature: 25°C

Column efficiency test

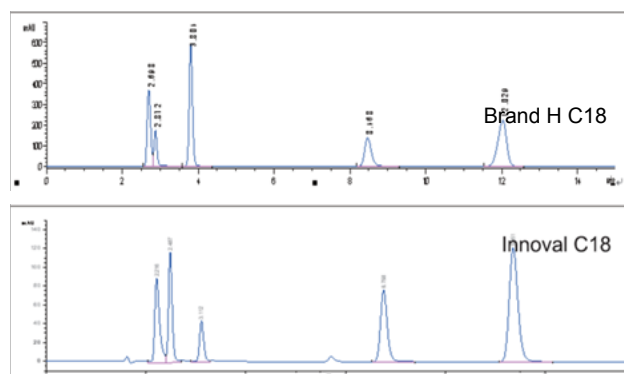
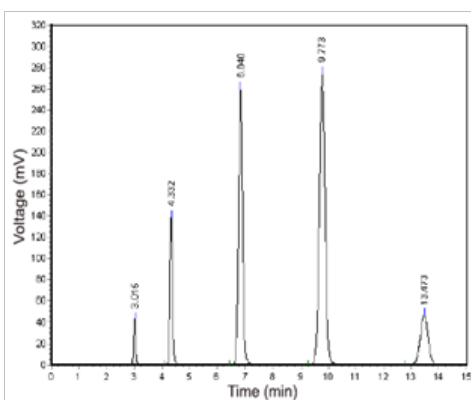


Metal sensitivity testing
Column: Innoval C18, 5 µm, 4.6×150 mm
Sample: 2,7-dihydroxynaphthalene and 2,3-dihydroxynaphthalene mixed standard
Mobile Phase: Methanol /water= 65/35;
Flow Rate: 1.0 mL/min
Detector: UV 230 nm
Temperature: 35°C
Sample Loading: 1 µL



The test show that Innoval C18 has a lower metal content than Brand H C18.

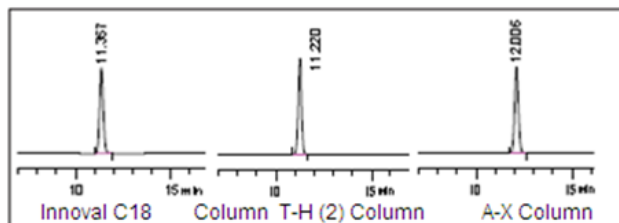
Compounds	Column	RT(min)	TF
2,7-dihydroxynaphthalene	Brand H C18	2.039	1.146
	Innoval C18	1.810	1.263
2,3-dihydroxynaphthalene	Brand H C18	2.461	2.259
	Innoval C18	2.339	1.713



Column: Innoval C18, 5 μ m, 4.6 $\times$ 150 mm
 Sample: toluene, nitrobenzene, o-nitroaniline, m-nitroaniline and p-nitroaniline
 Mobile Phase: Isooctane:ethanol: water=85: 15: 0.3
 Flow Rate: 1.00 mL/min
 Temperature: Ambient
 Detector: UV 254 nm

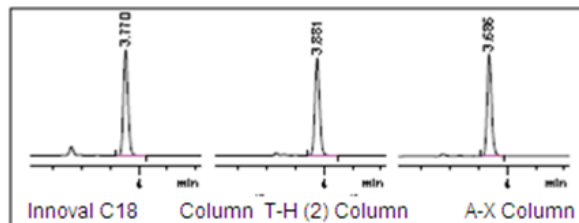
Column: Innoval C18, 5 μ m, 4.6 $\times$ 150 mm
 Sample: pyridine (basic), phenol(acid), acetophenone (neutral), N,N-dimethylaniline, toluene
 Flow Phase: Methanol /25 mM sodium acetate(acetic acid pH 5.0): 60/40
 Flow Rate: 1.0 mL/min;
 Detector: UV 254 nm;
 Temperature: 25°C

The content of ferulic acid (acid samples)



Column: Innoval C18, 5 μ m, 4.6 $\times$ 250 mm
Flow Phase: ACN/0.085% phosphoric acid:17/83
Flow Rate: 1.0 mL/min
Detector: UV 316 nm
Temperature: 25°C

The content of fluconazole (alkaline samples)



Column: Innoval C18, 5 μ m, 4.6 $\times$ 250 mm
Flow Phase: MeOH/phosphas (pH 7.1):45/55
Flow Rate: 1.0 mL/min;
Detector: UV 261 nm;
Temperature: 30°C

Order Information

Surface Area: 220 m²/g, Pore Size: 100 Å

Type	Particle size (μ m)	Dimension (mm)	Innoval Silica	Innoval C18
Analytical	5	4.6 $\times$ 50	ISi 950505-0	IX950505-0
Analytical	5	4.6 $\times$ 100	ISi 951005-0	IX951005-0
Analytical	5	4.6 $\times$ 150	ISi 951505-0	IX951505-0
Analytical	5	4.6 $\times$ 250	ISi 952505-0	IX952505-0
G	5	4.6 $\times$ 10	ISi 950105-0	IX950105-0
Semi-preparative	5	10 $\times$ 150	ISi 951510-0	IX951510-0
Semi-preparative	5	10 $\times$ 250	ISi 952510-0	IX952510-0
G	5	10 $\times$ 10	ISi 950110-0S	IX950110-0S
Preparative	5	21.2 $\times$ 50	ISi 950520-0	IX950520-0
Preparative	5	21.2 $\times$ 150	ISi 951520-0	IX951520-0
Preparative	5	21.2 $\times$ 250	ISi 952520-0	IX952520-0
Preparative	5	30 $\times$ 100	ISi 951030-0	IX951030-0
Preparative	5	30 $\times$ 150	ISi 951530-0	IX951530-0
Preparative	5	30 $\times$ 250	ISi 952530-0	IX952530-0
G	5	21.2 $\times$ 10	ISi 950120-0	IX950120-0
Analytical	10	4.6 $\times$ 250	ISi 902505-0	IX902505-0
Semi-preparative	10	10 $\times$ 150	ISi 901510-0	IX901510-0
Semi-preparative	10	10 $\times$ 250	ISi 902510-0	IX902510-0
G	10	10 $\times$ 10	ISi 900110-0S	IX900110-0S
Preparative	10	21.2 $\times$ 50	ISi 900520-0	IX900520-0
Preparative	10	21.2 $\times$ 150	ISi 901520-0	IX901520-0
Preparative	10	21.2 $\times$ 250	ISi 902520-0	IX902520-0
Preparative	10	30 $\times$ 100	ISi 901030-0	IX901030-0
Preparative	10	30 $\times$ 150	ISi 901530-0	IX901530-0
Preparative	10	30 $\times$ 250	ISi 902530-0	IX902530-0
Preparative	10	50 $\times$ 150	ISi 901550-0	IX901550-0
Preparative	10	50 $\times$ 250	ISi 902550-0	IX902550-0
G	10	21.2 $\times$ 10	ISi 900120-0	IX900120-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge Holder

Featured Products!

Durashell Column

Bonna-Agela's Durashell series columns have a wide pH range from 1.5 to 12.0. Different from the current marketed products which also can be used at high pH, Durashell columns employ a hybrid technology on the stationary phase surface, followed by molecular modifications.

The patented technology produces a strong hydrophobic protective layer over the silica surface, allowing the columns to be used at extremely high and low pH. It also reduces excessive hydrophobic interactions between the stationary phase and the analytes by reducing the bonding density, and yet maintains great interfacial kinetics for high efficiency. The product line of Durashell stationary phases include C18, C8, phenyl and NH₂. We also develop a new phase Durashell C18(L). It gives a good performance by decreasing the surface area to achieve the balance of the separation ability and the lifetime of the column.

Characteristics

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style
Durashell C18	3,5,10 µm	100 Å	21%	380 m ² /g	Double
Durashell C18(L)	3,5,10 µm	150 Å	14%	200 m ² /g	Double
Durashell C8	3,5,10 µm	100 Å	14%	380 m ² /g	Single
Durashell phenyl	3,5,10 µm	100 Å	13%	380 m ² /g	Single
Durashell NH ₂	3,5,10 µm	100 Å	9%	380 m ² /g	No

Main Features

- Wide pH range (1.5-12.0)
- Minimal silanol activity
- Better efficiency than many other high pH compatible columns
- High loading capacity for basic compounds for preparative applications

The cross-reference for Agela HPLC columns

Bonna-Agela	Waters
Durashell C18	/
Durashell C18 (L)	XBridge C18
Durashell RP	XTerra MS C18

Durashell C18 Vs Brand G C18

Column: Bonna-Agela Durashell (C18) , 5 µm, 100 Å, 4.6x100 mm
Brand G C18, 5 µm, 110 Å, 4.6x100 mm

Column efficiency test

Mobile phase: MeOH: H₂O=85:15

Flow rate: 0.8 mL/min

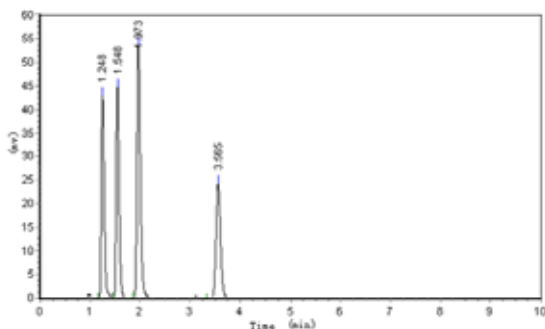
Sample: Uracil, Phenol, Nitrobenzene, Naphthalene

Injection: 1 µL

Detector: UV 254 nm

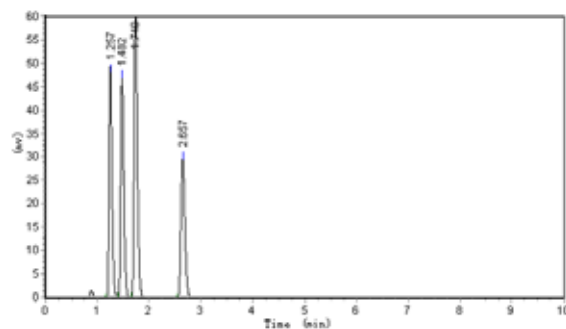
Temperature: 30°C

Bonna-Agela Durashell C18



The four peaks are uracil, phenol, nitrobenzene and naphthalene, respectively.
According to Naphthalene's peak, N=7281, TF=1.11, Rt=3.565.

Brand G C18



The four peaks are uracil, phenol, nitrobenzene and naphthalene, respectively.
According to Naphthalene's peak, N=5205, TF=1.239, Rt=2.657.

Test of basic compounds under basic condition:

Mobile phase: MeOH: 0.1% Ammonia =70: 30

Flow rate: 1.0 mL/min

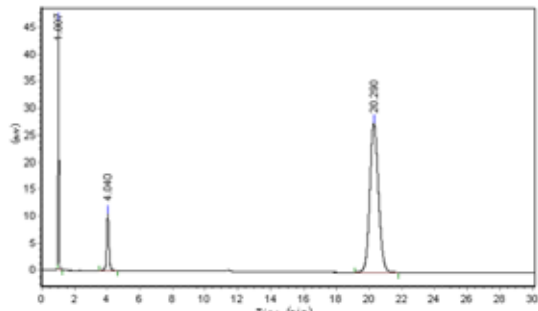
Injection: 2 µL

Detection wavelength: 254 nm

Temperature: 30°C

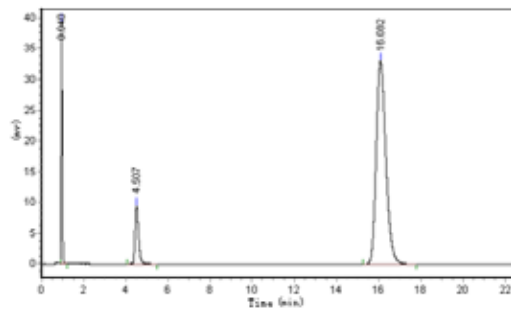
Sample: 6 mg Uracil, 426 mg Propranolol Hydrochloride and 79 mg Amitriptyline dissolved in 100 mL mobile phase

Bonna-Agela Durashell C18



The last peak is Amitriptyline: Tf=1.108

Brand G



The last peak is Amitriptyline: Tf=1.241

Peak No.	Compound	Retention time	N	Tf	Asymmetry
3	Amitriptyline	20.290	7061.023	1.108	1.217

Peak No.	Compound	Retention time	N	Tf	Asymmetry
3	Amitriptyline	16.082	5926.937	1.241	1.397



Test of basic compounds under acid condition:

Mobile phase: MeOH: 1% Acetic acid (pH=3.72 adjusted with Triethylamine) =70:30

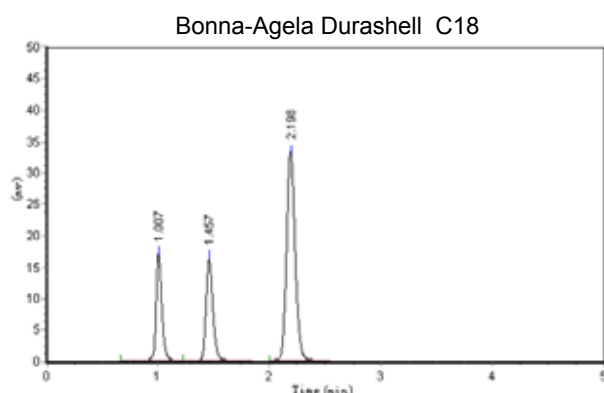
Flow rate: 1.0 mL/min

Injection: 2 µL

Detector: UV 254 nm

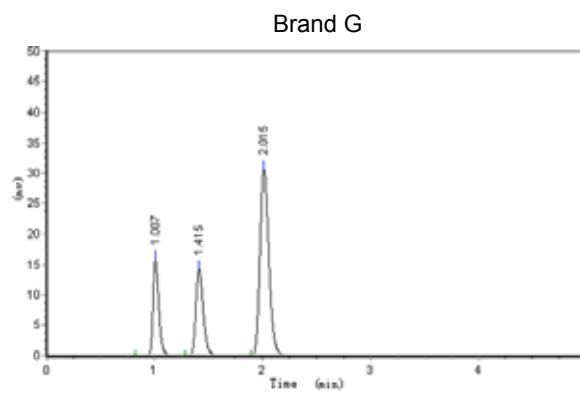
Temperature: 30°C

Sample: 3 mg Uracil, 285 mg Propranolol Hydrochloride and 13 mg Amitriptyline dissolved in 100 mL mobile phase



The last peak Amitriptyline : Tf=1.122

Peak No.	Compound	Retention time	N	Tf	Asymmetry
3	Amitriptyline	2.198	3706	1.122	1.238



The last peak Amitriptyline : Tf=1.229

Peak No.	Compound	Retention time	N	Tf	Asymmetry
3	Amitriptyline	2.015	2777	1.229	1.372

The maximum volume of sample loading onto Durashell C18 and Brand G C18

Mobile phase: MeOH: 0.1% Ammonia =70:30

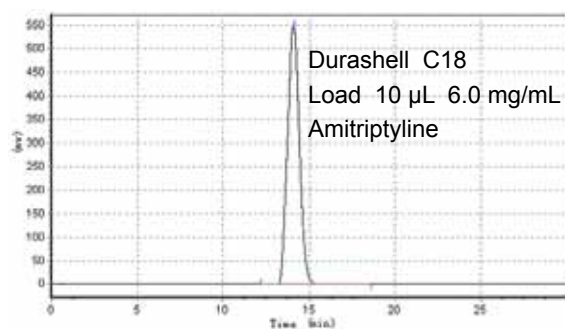
Flow rate: 1.5 mL/min

Injection: 10 µL

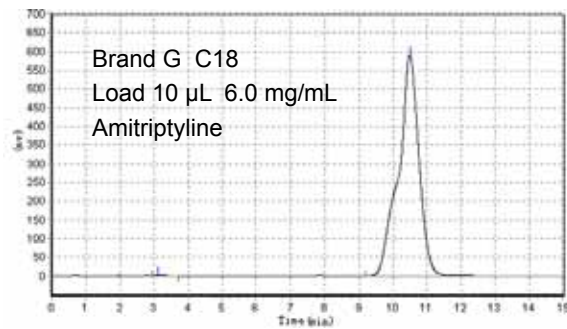
Detector: UV 254 nm

Temperature: 30°C

Sample: Amitriptyline dissolved in mobile phase



Peak No.	Compound	Retention time	N	Tf	Asymmetry
1	Amitriptyline	14.132	2226	1.091	1.105



Peak No.	Compound	Retention time	N	Tf	Asymmetry
1	Amitriptyline	10.498	1959	0.883	0.722

Column efficiency test

Compared to Brand G C18, Durashell C18 has a higher efficiency and better peak shape.

Column	Retention time/min	N	Tf
Durashell C18	3.565	7282	1.11
Brand G C18	2.567	5206	1.239

Test of basic compounds under basic condition

Compared to Brand G, Durashell C18 has a stronger retention and a better peak shape.

Column	Retention time(Amitriptyline)/min	Tf
Durashell C18	20.29	1.108
Brand G C18	16.082	1.241

Test of basic compounds under acid condition

Compared to Brand G C18, Durashell C18 has a better peak shape.

Column	Amitriptyline (min.)	Tf
Durashell C18	2.198	1.122
Brand G C18	2.015	1.229

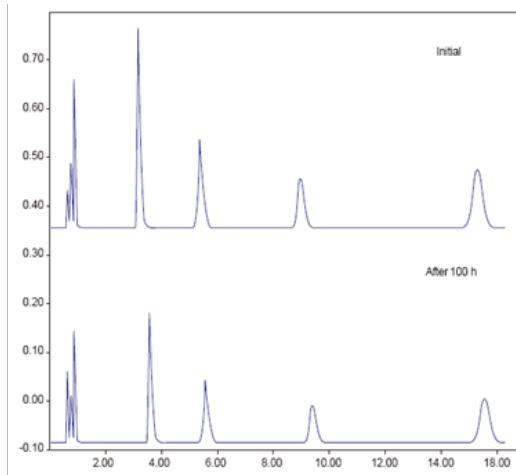
The maximum volume of sample loading onto Durashell and Brand G

The maximum amount of sample loading onto Durashell C18 is 0.06 mg while that of Brand G C18 is 0.05 mg.

Sample amount (mg)		0.06
Durashell C18	Rt (min.)	14.132
	Tf	1.091
Brand G C18	Rt (min.)	10.498
	Tf	0.883

High pH Stability of Durashell C18

Column: Durashell C18; 4.6×150 mm, 5 µm, 100 Å
Mobile Phase: 50% ACN/50% 0.05 M Ammonia (pH=9.0)
Flow Rate: 1.5 mL/min
Sample: doxepin, nortriptyline, amitriptyline and trimipramine
Temperature: 35°C

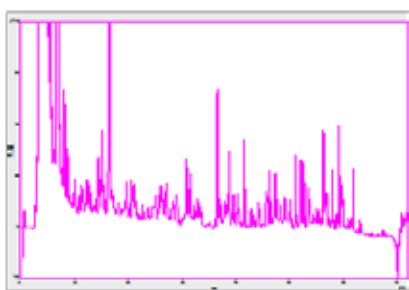


Featured Products!

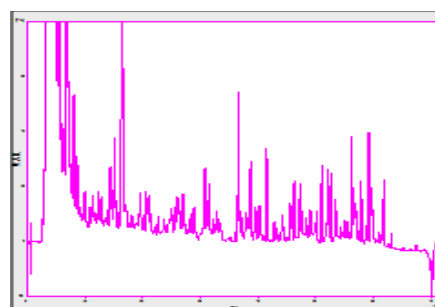
Durashell C18(L)

Column: Durashell C18(L), 4.6x250 mm, 5 μ m, 150 Å
 Mobile Phase: A: 2% ACN (pH=10.0) B: 98% ACN (pH=10.0)
 Flow Rate: 0.7 mL/min
 Sample: BSA peptide fragment
 Temperature: 45°C

Time	A	B
0	95%	5%
5	92%	8%
40	82%	18%
62	68%	32%
64	5%	95%
68	5%	95%
72	95%	5%

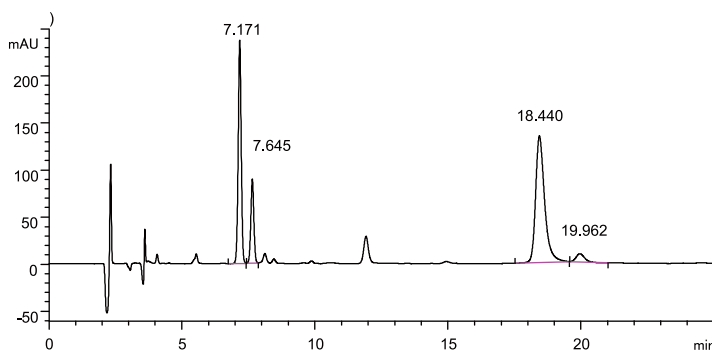


First injection



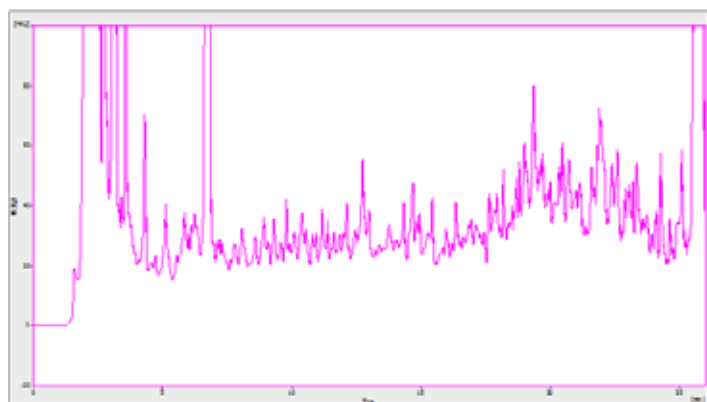
One thousandth injection

VB6, dihydralazine sulfate and VB1 in Compound Reserpine Tablets



HPLC Column: Durashell C18(L), 5 μ m, 150 Å, 4.6x250 mm
 Buffer solution: 0.11% sodium hexanesulfonate and 0.02% sodium
 Heptanesulfonate (acetic acid pH=3.5)
 Mobile Phase: Buffer solution: methanol:
 ACN=80:10:10
 Temperature: 30°C;
 Flow Rate: 1.0 mL/min;
 Injection: 20 μ L;
 Detector: UV 210 nm

Rat liver protein extracts of enzyme peptides

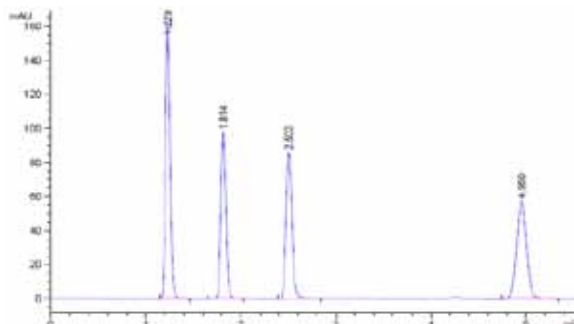


Sample: 200 μ g Rat liver protein extract enzyme peptides
 Column: Durashell C18 (L), 5 μ m, 150 Å, 4.6x250 mm
 Mobile Phase: A: 2% ACN (pH=10.0) B: 98% ACN (pH=10.0)
 Flow Rate: 1.5 mL/min
 Temperature: 60°C
 Detector: UV 214 nm

Time	A	B
0	95%	5%
2	92%	8%
13	82%	18%
22	68%	32%
23	5%	95%
24	5%	95%
36	95%	5%

Featured Products!

Durashell C8



Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase; 2 μ L.

Column: Durashell C8, 4.6 $\times$ 100 mm, 3 μ m

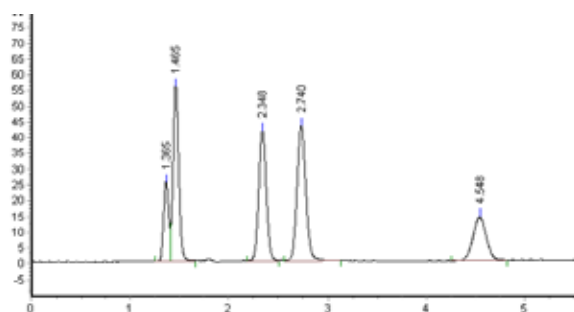
Mobile phase: 30% Water, 70% MeOH

Flow Rate: 1.0 mL/min

Temperature: 30°C

Detector: UV 254 nm

Durashell NH2



Sample: toluene, nitrobenzene, *o*-nitroaniline, *m*-nitroaniline and *p*-nitroaniline in mobile phase; 1 μ L.

Column: Durashell NH₂, 4.6 $\times$ 50 mm, 3 μ m

Mobile phase: 98.8% chlorobutane; 1% methanol; 0.2% water

Flow Rate: 0.5 mL/min

Temperature: 30°C

Detector: UV 254 nm

Applications

Glucosamine Hydrochloride Tablets

HPLC Column: Durashell NH₂, 5 μ m, 100 Å, 4.6 $\times$ 150 mm

Buffer solution: Dissolve 3.5 g dipotassium hydrogen phosphate with 500 mL water, and add 0.25 mL ammonia, dilution to 1000 mL with water

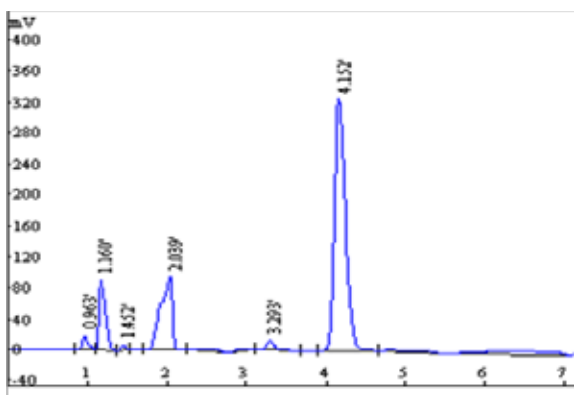
Mobile Phase: Buffer solution: ACN=30:70

Temperature: 30°C

Flow Rate: 1.5 mL/min

Injection: 10 μ L

Detector: UV 195 nm



Glycerin, Fructose, Glucose and Cane sugar

HPLC Column: Durashell NH₂, 5 μ m, 100 Å, 4.6 $\times$ 250 mm

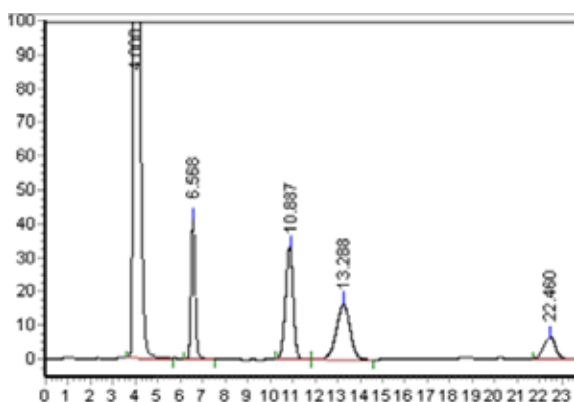
Mobile Phase: Water:ACN =23:77

Flow Rate: 1.0 mL/min

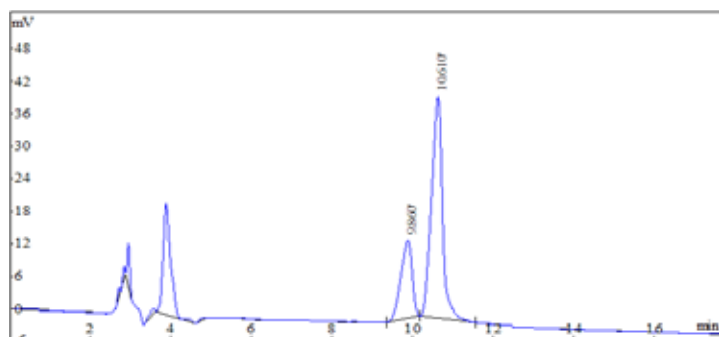
Temperature: 30°C

Injection: 10 μ L

Detector: Refractive index detector

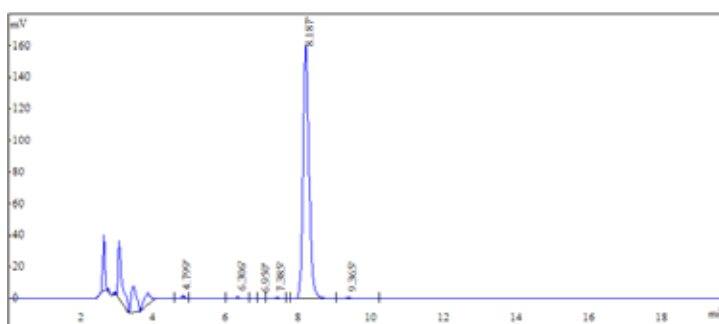


2- Glycerin 3- Fructose 4- Glucose 5- Cane sugar



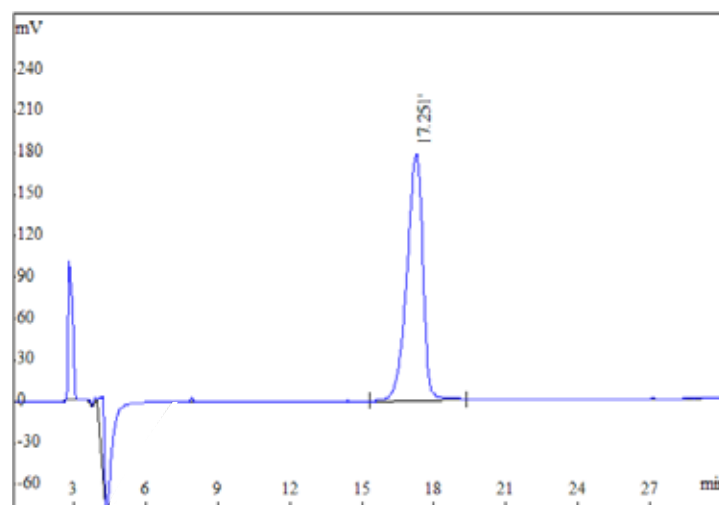
Glucose and Sorbitol

HPLC Column: Durashell NH₂, 5 μ m, 100 Å, 4.6×250 mm
 Mobile Phase: Water:ACN =15:85
 Flow Rate: 1.0 mL/min
 Temperature: 30°C
 Injection: 20 μ L
 Detector: UV 195 nm



4-Hydroxy-D-phenylglycine

HPLC Column: Durashell NH₂, 5 μ m, 100 Å, 4.6×250 mm
 Mobile Phase: ACN: 0.05 mol/L sodium acetate (acetic acid pH=3.0) =75:25
 Flow Rate:1.0 mL/min
 Temperature: 30°C
 Injection: 20 μ L
 Detector: UV 254 nm



Sialic acid

HPLC Column: Durashell NH₂, 5 μ m, 100Å, 4.6×250 mm
 Mobile Phase: ACN: 0.02 mol/L ammonium acetate(acetic acid pH=5.6) =60:40
 Flow Rate: 1.0 mL/min
 Temperature: 30°C
 Injection: 20 μ L
 Detector: UV 254 nm

Durashell RP

Bonna-Agela's Durashell RP column is the first-generation product designed for applications in a wide pH range from 1.5 to 11.0. By using multifunctional bonding techniques, a strongly hydrophobic protective layer can be covered on the silica gel surface, which effectively prevents the destruction of the alkaline solution onto the silica.

Ordering Information

Others:

Surface Area: 380 m²/g, Pore Size: 100 Å

Durashell RP and Durashell C18(L): Surface Area: 200 m²/g, Pore Size: 150 Å

Type	Particle size (μm)	Dimension (mm)	Durashell C18	Durashell C18 (L)	Durashell Phenyl	Durashell NH ₂	Durashell C8	Durashell RP
Fast analysis	3	2.1×30	DC930302-0	DC930302-L	DC630302-0	DN830302-0	DC830302-0	DS930302-0
Fast analysis	3	2.1×50	DC930502-0	DC930502-L	DC630502-0	DN830502-0	DC830502-0	DS930502-0
Fast analysis	3	2.1×100	DC931002-0	DC931002-L	DC631002-0	DN831002-0	DC831002-0	DS931002-0
Fast analysis	3	2.1×150	DC931502-0	DC931502-L	DC631502-0	DN831502-0	DC831502-0	DS931502-0
G	3	2.1×10, 4/pk	DC930102-0	DC930102-L	DC630102-0	DN830102-0	DC830102-0	DS930102-0
DCG	3	2.1×10, 4/pk	DC930102-0S	DC930102-LSDC630102-0S	DC630102-0S	DN830102-0S	DC830102-0S	DS930102-0S
Fast analysis	3	4.6×50	DC930505-0	DC930505-L	DC630505-0	DN830505-0	DC830505-0	DS930505-0
Fast analysis	3	4.6×100	DC931005-0	DC931005-L	DC631005-0	DN831005-0	DC831005-0	DS931005-0
Fast analysis	3	4.6×150	DC931505-0	DC931505-L	DC631505-0	DN831505-0	DC831505-0	DS931505-0
Analytical	5	2.1×30	DC950302-0	DC950302-L	DC650302-0	DN850302-0	DC850302-0	DS950302-0
Analytical	5	2.1×50	DC950502-0	DC950502-L	DC650502-0	DN850502-0	DC850502-0	DS950502-0
Analytical	5	2.1×100	DC951002-0	DC951002-L	DC651002-0	DN851002-0	DC851002-0	DS951002-0
Analytical	5	2.1×150	DC951502-0	DC951502-L	DC651502-0	DN851502-0	DC851502-0	DS951502-0
Analytical	5	4.6×50	DC950505-0	DC950505-L	DC650505-0	DN850505-0	DC850505-0	DS950505-0
Analytical	5	4.6×100	DC951005-0	DC951005-L	DC651005-0	DN851005-0	DC851005-0	DS951005-0
Analytical	5	4.6×150	DC951505-0	DC951505-L	DC651505-0	DN851505-0	DC851505-0	DS951505-0
Analytical	5	4.6×200	DC952005-0	DC952005-L	DC652005-0	DN852005-0	DC852005-0	DS952005-0
Analytical	5	4.6×250	DC952505-0	DC952505-L	DC652505-0	DN852505-0	DC852505-0	DS952505-0
G	5	4.6×10, 4/pk	DC950105-0	DC950105-L	DC650105-0	DN850105-0	DC850105-0	DS950105-0
DCG	5	4.6×10, 4/pk	DC950105-0S	DC950105-LSDC650105-0S	DC650105-0S	DN850105-0S	DC850105-0S	DS950105-0S
Semi-preparative	5	10×150	DC951510-0	DC951510-L	DC651510-0	DN851510-0	DC851510-0	DS951510-0
Semi-preparative	5	10×250	DC952510-0	DC952510-L	DC652510-0	DN852510-0	DC852510-0	DS952510-0
Preparative	5	21.2×50	DC950520-0	DC950520-L	DC650520-0	DN850520-0	DC850520-0	DS950520-0
Preparative	5	21.2×150	DC951520-0	DC951520-L	DC651520-0	DN851520-0	DC851520-0	DS951520-0
Preparative	5	21.2×250	DC952520-0	DC952520-L	DC652520-0	DN852520-0	DC852520-0	DS952520-0
G	5	10×10	DC950110-0S	DC950105-0LSDC650110-0S	DC650110-0S	DN850110-0S	DC850110-0S	DS950110-0S
G	5	21.2×10	DC950120-0	DC950120-L	DC650120-0	DN850120-0	DC850120-0	DS950120-0
Preparative	5	30×100	DC951030-0	DC951030-L	DC651030-0	DN851030-0	DC851030-0	DS951030-0
Preparative	5	30×150	DC951530-0	DC951530-L	DC651530-0	DN851530-0	DC851530-0	DS951530-0
Preparative	5	30×250	DC952530-0	DC952530-L	DC652530-0	DN852530-0	DC852530-0	DS952530-0
Semi-preparative	10	10×150	DC901510-0	DC901510-L	DC601510-0	DN801510-0	DC801510-0	DS901510-0
Semi-preparative	10	10×250	DC902510-0	DC902510-L	DC602510-0	DN802510-0	DC802510-0	DS902510-0
Preparative	10	21.2×50	DC900520-0	DC900520-L	DC600520-0	DN800520-0	DC800520-0	DS900520-0
Preparative	10	21.2×150	DC901520-0	DC901520-L	DC601520-0	DN801520-0	DC801520-0	DS901520-0
Preparative	10	21.2×250	DC902520-0	DC902520-L	DC602520-0	DN802520-0	DC802520-0	DS902520-0
G	10	10×10	DC900110-0S	DC900110-LSDC600110-0S	DC600110-0S	DN800110-0S	DC800110-0S	DS900110-0S
G	10	21.2×10	DC900120-0	DC900120-L	DC600120-0	DN800120-0	DC800120-0	DS900120-0
Preparative	10	30×100	DC901030-0	DC901030-L	DC601030-0	DN801030-0	DC801030-0	DS901030-0
Preparative	10	30×150	DC901530-0	DC901530-L	DC601530-0	DN801530-0	DC801530-0	DS901530-0
Preparative	10	30×250	DC902530-0	DC902530-L	DC602530-0	DN802530-0	DC802530-0	DS902530-0
Preparative	10	50×150	DC901550-0	DC901550-L	DC601550-0	DN801550-0	DC801550-0	DS901550-0
Preparative	10	50×250	DC902550-0	DC902550-L	DC602550-0	DN802550-0	DC802550-0	DS902550-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Featured Products!

Optimix Family of HPLC Columns

Conventional silica based HPLC stationary phases are usually bonded with mono-type alkyl chain molecules, e.g., C18, C8, etc. Recent studies have revealed that synergistic effects can be obtained when the bonded surface consists of C18 mixed with a shorter chain such as C8, amide or nitro-phenyl, etc. These new products offer different selectivity, coordinating multi-functionality, as well as a spacer effect (C18/C8).

It is difficult to produce a uniformly bonded C18 surface on silica due to steric hindrance of the bulky C18 chain. This problem can be easily overcome when the surface is bonded with mixed chain lengths, C18 and a shorter silane. As a result, there are many advantages: improved surface uniformity, better penetration of molecules during partitioning due to less steric hindrance, and different selectivity compared to a mono-chain type stationary phase.

As one of the leaders in separation technologies, Bonna-Agela Technologies has innovatively developed a family of non-ionic, mixed-phase HPLC/SFC columns.

Optimix C18/Amide

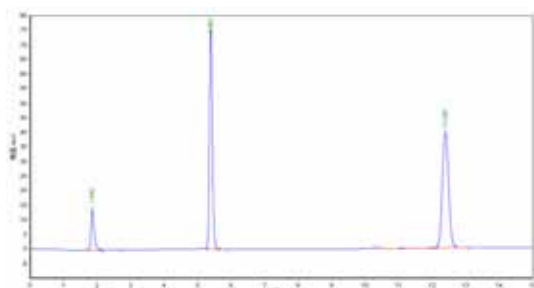
A mixed-phase of C18 and propionic amide provides unique selectivity which allows extremely polar and non-polar compounds to be analyzed in a single run under isocratic conditions.

Characteristics: Pore Size: 100 Å; Available Particle Size: 3 µm, 5 µm; pH=2.0-8.0

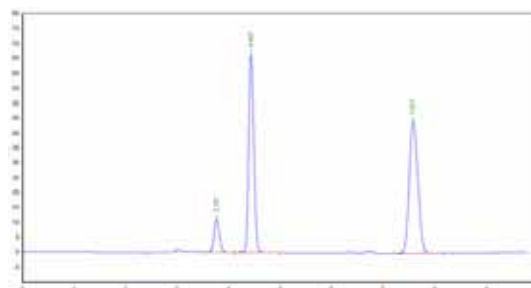
Features

- Unique selectivity
- Balanced retention for extremely polar and non-polar compounds
- Greater retention for polar compounds due to coordinating effects of C18 and amide
- Minimal tailing for basic compounds compared to any other type of columns, due to suppression of silanol effects by the amide group.

Bring extremely polar and non-polar analytes closer to shorten the analysis time under isocratic conditions



Optimix C18/C8



Optimix C18 / Amide=1/1

HPLC conditions

Column: 4.6×250 mm, 5 µm, 100 Å

Mobile Phase: ACN:Water=70:30

Flow: 1.0 mL/min

Detector: UV 195nm

Injection: 10 µL

Sample: Glucose, Nitrobenzene and Naphthalene

Featured Products!

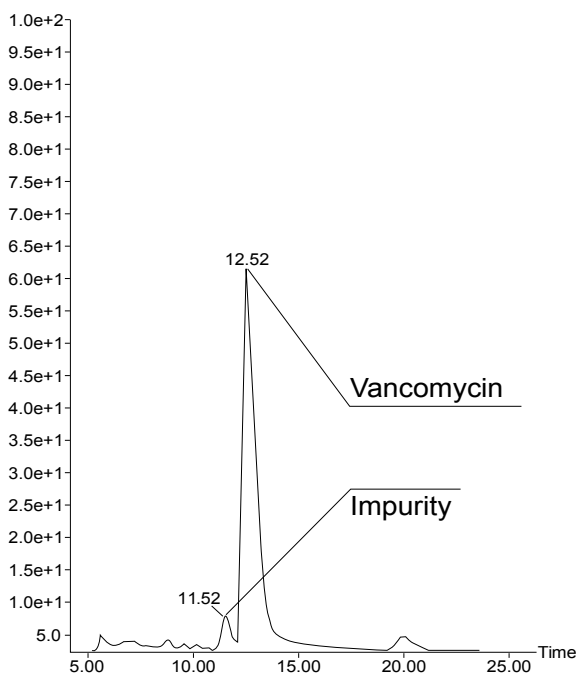
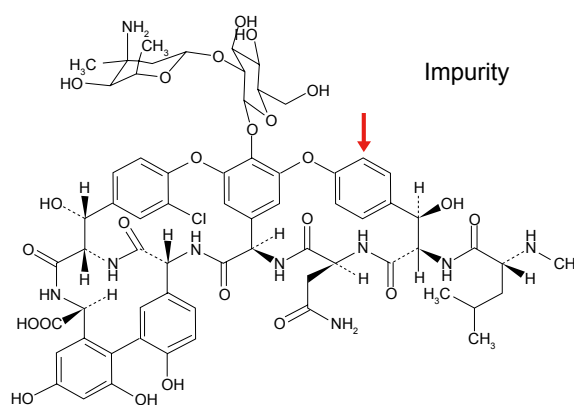
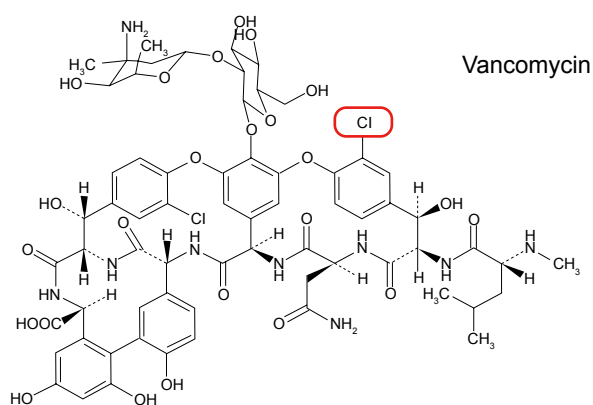
Optimix C18/C8

Improved performance from a mixed-phase C18/C8 (1:1) column compared to mono-chain C18 or C8 columns
Characteristics: Pore Size:100 Å; Available Particle Size: 5 µm; pH=1.5-9.0

Main Features

- Alternative selectivity;
- Improved selectivity for stereo isomers, better differentiation of molecular shapes;
- Better peak shape due to uniformity of the bonding;
- Balanced hydrophilicity and hydrophobicity: extended retention for polar compounds; non-excessive retention for strong hydrophobic compounds.

Analysis of Vancomycin and Its Impurity



Column: Optimix C18/C8, 4.6×250 mm, 5 µm
Part No.: OP952505-OC
Mobile Phase: A: 0.7% TEA and 3% Acetic Acid in Water

B: Methanol; C: THF; A:B:C(88:10:2)

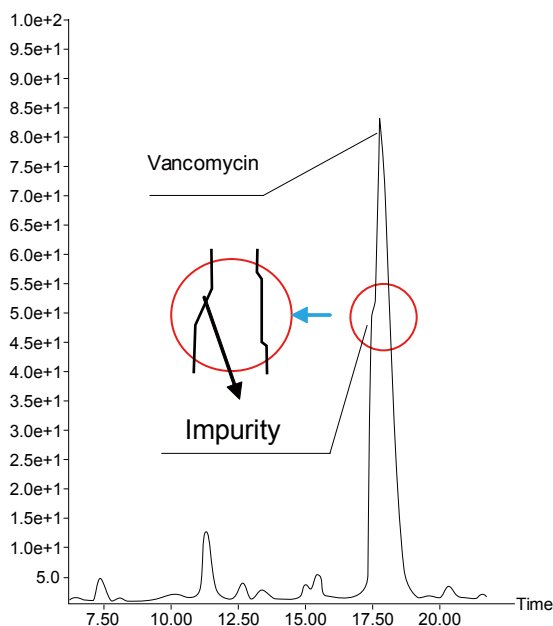
Flow Rate: 1 mL/min

Temperature: 25°C

Detector: UV 210 nm

Sample: Vancomycin+Impurity

Featured Products!



Column: Brand W C18 Column, 4.6×250 mm, 5 μm

Mobile Phase: USP 24

A: 0.2% TEA (pH3.2)-Acetonitrile-THF(92:7:1)

B: 0.2% TEA (pH3.2)-Acetonitrile-THF(70:29:1)

Gradient: USP 24

Time(min)	0	12	20	22	23	30
B%	0	0	100	100	0	0

Optimix C18/SCX

Characteristics: Pore Size:100 Å; Available Particle Size: 3 μm, 5 μm; pH=2.0-8.0

Main Features:

- Mix-phase of SCX and C18
- Balanced retention for polar (basic) and non-polar; very useful for analysis of multi-components
- Unique selectivity
- LC-MS compatible due to reduced ion strength

Application in Melamine Detection

Standard Curve

HPLC Conditions :

Column: Venusil® AS-T(SCX/C18), 2.1×150 mm, 5 μm

Mobile Phase:

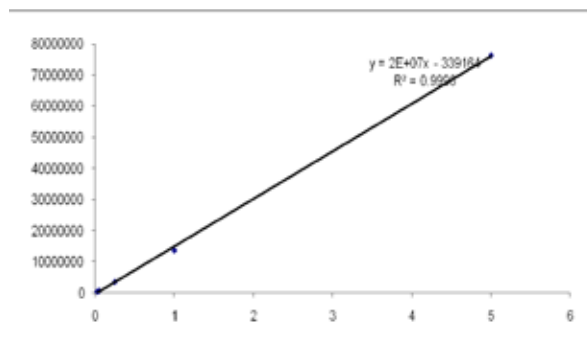
Buffer (10mM ammonium acetate pH=3.0): acetonitrile (50: 50)

Detector: UV 240 nm

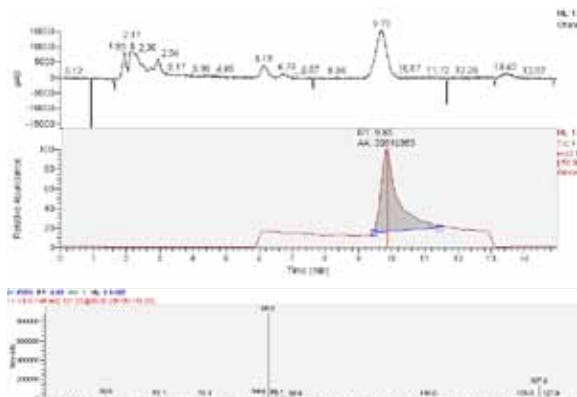
Flow Rate: 0.2 mL/min, Injection: 10 μL

Mass Conditions:

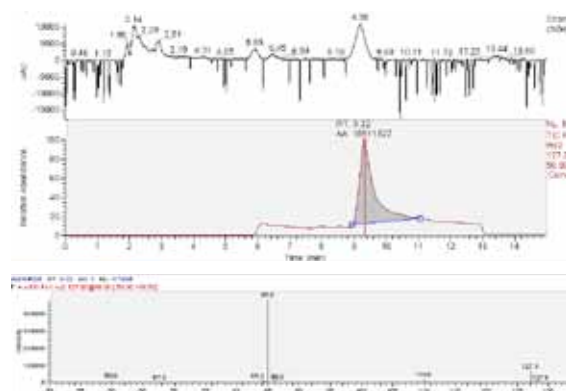
ESI, 5KV, Capillary 300°C, 15V, 35 arb, Positive Ion, range (m/z) 50~140



Melamine Standard



Milk Sample



Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Dimension (mm)	Particle size (µm)	Optimix C18/C8 (1:1)	Optimix C18/amide (1:1)	Optimix C18/phenyl (1:1)
Analytical	2.1×30	5	OP950302-OC	OP950302-AM	OP950302-PH
Analytical	2.1×50	5	OP950502-OC	OP950502-AM	OP950502-PH
Analytical	2.1×100	5	OP951002-OC	OP951002-AM	OP951002-PH
Analytical	2.1×150	5	OP951502-OC	OP951502-AM	OP951502-PH
Analytical	4.6×50	5	OP950505-OC	OP950505-AM	OP950505-PH
Analytical	4.6×100	5	OP951005-OC	OP951005-AM	OP951005-PH
Analytical	4.6×150	5	OP951505-OC	OP951505-AM	OP951505-PH
Analytical	4.6×200	5	OP952005-OC	OP952005-AM	OP952005-PH
Analytical	4.6×250	5	OP952505-OC	OP952505-AM	OP952505-PH
G	4.6×10, 4/pk	5	OP950105-OC	OP950105-AM	OP950105-PH
DCG	4.6×10, 4/pk	5	OP950105-OCS	OP950105-AMS	OP950105-PHS
Fast analysis	2.1×30	3		OP930302-AM	
Fast analysis	2.1×50	3		OP930502-AM	
Fast analysis	2.1×100	3		OP931002-AM	
Fast analysis	2.1×150	3		OP931502-AM	
G	2.1×10, 4/pk	3		OP930102-AM	
DCG	2.1×10, 4/pk	3		OP930102-AMS	
Fast analysis	4.6×50	3		OP930505-AM	
Fast analysis	4.6×100	3		OP931005-AM	
Fast analysis	4.6×150	3		OP931505-AM	

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Featured Products!

Chiral Columns

Normal phase chiral columns from Bonna-Agela Technologies are based on modified celluloses and starches. This type of chiral columns represents the most effective means of analyzing chiral compounds and obtaining pure enantiomers, i.e., e.e. purity >99% enantiomeric excess.

Main Features

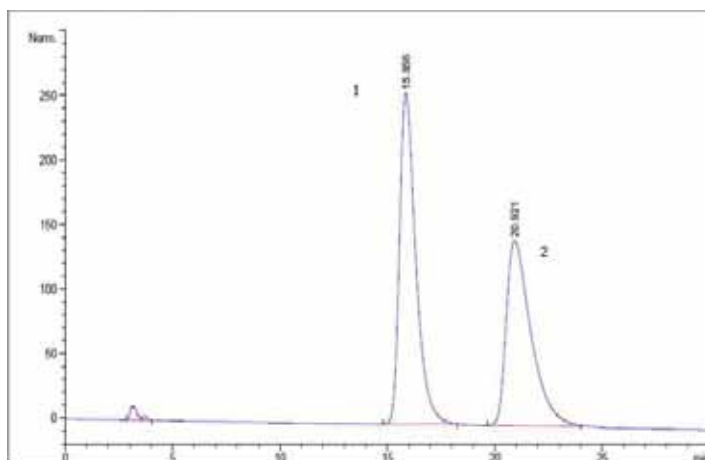
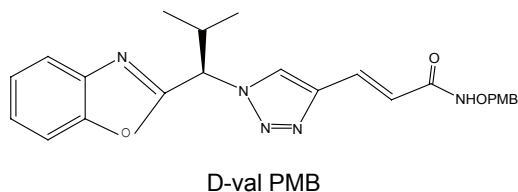
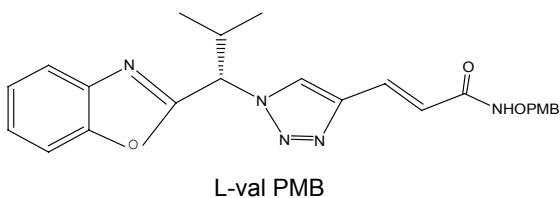
- Hydrogen bonding, π - π and the "embedded" composite integrated mechanism
- Venusil CA and CO columns are applicable to separate 80 % chiral compounds
- Wide selectivity and high loading capacity

Venusil® CA

Coating Materials: Amylose - (3,5-dimethylphenyl carbamate)

Applications: Amide, Aromatic, carbonyl-group, nitro-group, sulfonyl-group, cyano-group, hydroxide radical, amine and carboxylic acid compounds

Example



1, L-Val PMB; 2, D-Val PMB

Column: Venusil CA, 4.6×250 mm, 5 μ m, 1000 Å

Mobile Phase: Hexane: Isopropanol=80:20

Detector: UV 254nm

Flow Rate: 1.0 mL/min

Temperature: 25°C

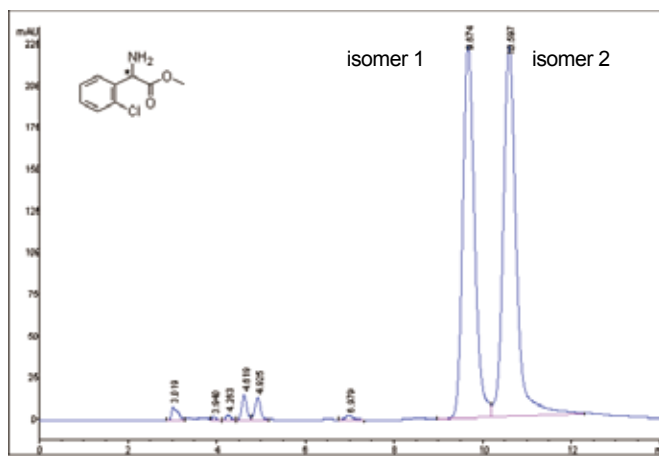
Featured Products!

Venusil® CO

Coating Materials: Cellulose - (3,5 - dimethylphenyl carbamate)

Applications: a phase suitable for the separation of beta-blockers and steroids, such as DHA, chlorine heart acyl amines, flavanones, metoprolol, etc

Example



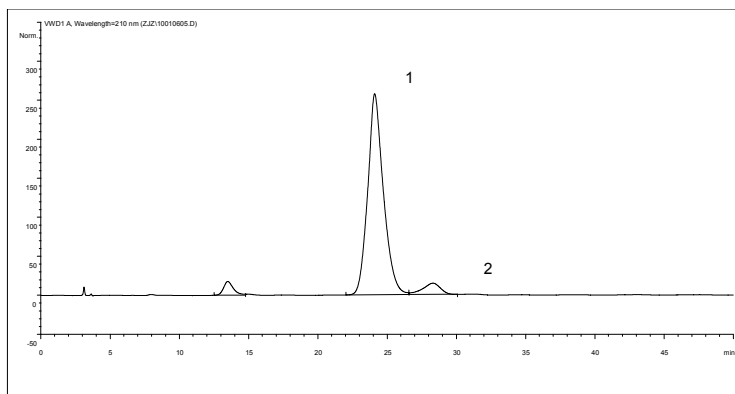
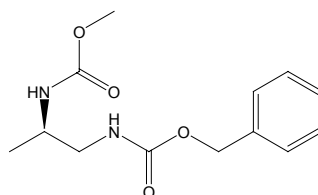
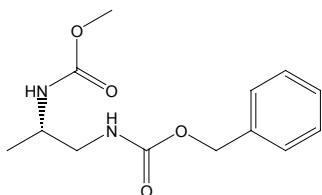
Column: Venusil CO, 4.6×250 mm, 5 µm, 1000 Å
Mobile Phase: Hexane:Isopropanol=98:2
Flow Rate: 1.0 mL/min
Detector: UV 220nm
Temperature: 25°C

Venusil® CJ

Coating Materials: Cellulose - [4 - methyl benzoate]

Applications: the Venusil CJ column is used for the separation of carbonyl, amido, aryl, nitro, cyano, sulfonyl, hydroxyl, amine and carboxylic acid compounds.

Example



Column: Venusil CJ, 4.6×250 mm, 5 µm, 1000 Å
Mobile Phase: Hexane:Isopropanol=93:7
Flow Rate: 1.0 mL/min
Detector: UV 210nm
Temperature: 30°C

Featured Products!

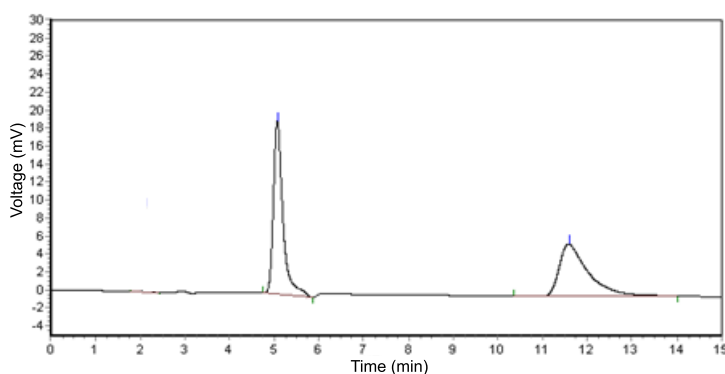
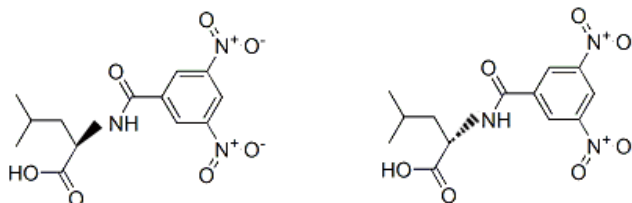
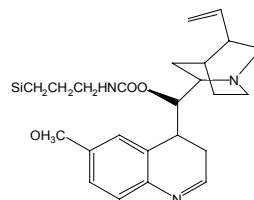
Chiral Amide-1

Chiral Amide-1 is packed with 5 μm , 300 Å silica bonded with a chiral compound whose structure is demonstrated as below:

Main Features

- Can be used as reversed phase or normal phase
- Unique selectivity and high resolution
- More stable and longer column lifetime

Example: N-(3,5-Dinitrobenzoyl)-DL-leucine



Column: Chiral Amide-1, 5 μm , 300 Å, 4.6×150 mm
 Mobile Phase: Methonal/10 mM KH_2PO_4 (pH=6.86)
 +0.5 mM Tetrabutyl ammonium hydroxide=30/70
 Flow Rate: 1.0 mL/min
 Detector: UV 254 nm
 Injection: 5 μL

Ordering Information

Type	Particle size (μm)	Dimension (mm)	Venusil CA	Venusil CO	Venusil CJ	Chiral Amide-1
Analytical	5	4.6×150	VCA951505-0	VCO951505-0	VCJ951505-0	AM951505-1
Analytical	5	4.6×250	VCA952505-0	VCO952505-0	VCJ952505-0	AM952505-1
Preparative	5	21.2×250	VCA952520-0	VCO952520-0	VCJ952520-0	AM952520-1
Preparative	5	30×250	VCA952530-0	VCO952530-0	VCJ952530-0	AM952530-1
Analytical	10	4.6×250	VCA902505-0P	VCO902505-0P	VCJ902505-0P	
Preparative	10	21.2×250	VCA902520-0P	VCO902520-0P	VCJ902520-0P	
Preparative	10	30×250	VCA902530-0P	VCO902530-0P	VCJ902530-0P	

Standard Products! <

Venusil® Family of HPLC Columns

----- A Full Line Products of High Quality

Introduction of Venusil HPLC Columns

Venusil HPLC columns are manufactured from the ultra pure spherical silica particles. The outstanding properties of the HPLC phases are the results of subjecting high quality silica to Bonna-Agela's innovative surface modification and unique bonding processes. Our proprietary nanosurface modification generates a very smooth and even surface. This reduces the interaction between the silica surface and polar compounds, resulting in symmetric peak shape even for very basic compounds. Based on this technology, a series of unique columns was developed to meet the tough requirements for the analysis of highly polar compounds. Lot-to-lot reproducibility is ensured by a stable bonding/end-capping process. The uniform, spherical particles have a nominal surface area of 380 m²/g, 200 m²/g or 80 m²/g, with a controlled pore size of 100 Å, 150 Å or 300 Å, respectively. All columns are packed by using a consistent slurry packing process to achieve uniform and stable beds for maximum column efficiency, lifetime and column-to-column reproducibility.

Unprecedented Experience in Chromatography

You will experience unprecedented performance by using Venusil columns for your HPLC separations

Best Peak Symmetry and Efficiency

The Venusil columns generate symmetric peaks with high efficiency over their entire applicable pH range, outperforming competitors.

The pH-independent high performance feature of Venusil columns allows scientists to establish rugged methods with flexible choice of pH.

Comparison of Specifications

	Waters Symmetry-C18 4.6×150 mm, 5 µm	Zorbax XDB-C18 4.6×150 mm, 5 µm	Venusil XBP C18 (2) 4.6×150 mm, 5 µm
Spec. on efficiency	N/A	8000	12000
Spec. on tailing factor(toluene)	N/A	0.98-1.25	0.98-1.12
Spec. on tailing factor-amitriptyline	1.8	N/A(typically 1.5-2.0)	1.4
Spec. on selectivity(amitriptyline/acenaphthene)	+/- 10 %	N/A	+/- 7 %
pH range	2.0-8.0	2.0-9.0	1.5-9.0
Specific Surface	300	180	380
Carbon %	16 %	12 %	18 %

Characteristics of Venusil Columns

Benefit to the Columns' users

Perfect peak symmetry, independent of pH and mobile phase	Highest flexibility for any application, better sensitivity, greater confidence on HPLC results
Broad pH range (1.0-10.5)	Flexibility for method development
Compatible with 100 % aqueous mobile phase	Maximum versatility
Highest surface coverage	Tolerance of large volume and mass injection
A wide variety of chemistries	Broad selection of polarity and maximum versatility
Minimum buffer concentration needed	Better sensitivity for LC/MS, extended column lifetime
Tightest specification	Better reproducibility, greater confidence on the HPLC results
Excellent column efficiency	Better and faster separation
Great column lifetime	Lower cost; greater convenience



Standard Products!

Expanding the Capabilities with the Venusil Family of C18 Columns

Bonna-Agela Technologies has developed a series of high quality C18 stationary phases to meet a wide range of application needs. These columns contain an ultra pure silica subjected to our patented surface deactivation process. By altering the column chemistry, we are able to tune the surface properties of the silica particles and alter selectivity to meet a variety of application requirements.

Many of our columns have very unique properties to address some special needs. Here are some examples:

Venusil XBP C18 (2): a phase designed for balanced adsorption to avoid excessive retention of hydrophobic compounds:

- Great peak symmetry for all types of compounds
- Improved separation of stereo isomers
- Extremely narrow specification during manufacturing to offer high column-to-column reproducibility
- Non-excessive retention for hydrophobic peaks (less peak broadening of later eluted compounds compared to other columns)

Venusil XBP C18: a phase designed for maximum hydrophobicity and high pH tolerance:

- The highest carbon loading and the most hydrophobic column on the market.
- High pH tolerance
- Not suggested for samples containing highly hydrophobic compounds

Venusil XBP C18 (L): a phase designed for larger molecules and highly hydrophobic compounds:

- Larger pore size and lower surface area
- Accelerated elution for highly hydrophobic compounds
- Easier column clean-up for samples containing hydrophobic impurities or samples extracted by non-polar solvents
- Better choice for molecules > 500 Dalton

Venusil AQ C18: a phase designed for polar and semi-polar compounds, to be compatible with 100 % water :

- Compatible with 100 % aqueous to 100 % organic mobile phases
- Applicable to a variety of analytes: from very polar to non-polar
- Operates over a wide pH range: 1.5~9.0
- Applicable to a wide range of sample types: plasma, urine, drug formulation and food extraction
- Available in a range of column diameters suitable for LC-MS, conventional analytical, and preparative scale

Venusil ASB C18: a phase designed for low pH, low bleeding (high sensitivity for LC-MS) and strong separation power for polar compounds:

- Extremely low pH stability: lowest pH limit can reach 0.8 at 70 °C
- Extremely low bleeding offering high sensitivity for LC-MS under acidic conditions
- Compatible with 100 % aqueous to 100 % organic mobile phases
- Non-encapped but with low surface acidity/activity compared to other non-encapped stationary phases

Standard Products!

Venusil® XBP C18 (2) Series Columns

Venusil XBP C18 (2) column's packing material is made with ultra pure silica. The silica surface is processed with Bonna-Agela's patented surface deactivation technology, followed by a unique bonding process which can reduce the carbon content while maintaining a uniform bonding coverage. The Venusil XBP C18 column does not have excessive retention for highly hydrophobic compounds, and it is great for the separation of acidic, basic, and neutral compounds. Moreover, this column also has superb resolution power for isomers. The perfect peak symmetry offered by this RP column makes it a great first-choice for HPLC method development.

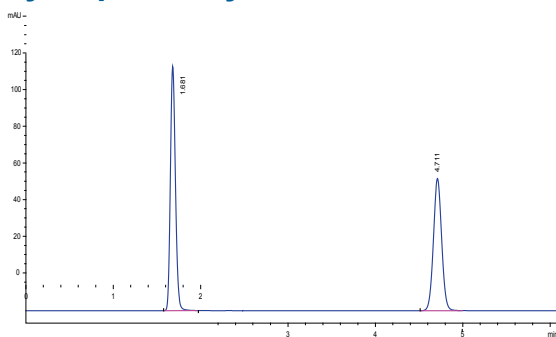
Characteristics:

- Particle Size: 5 μm , 3 μm , 10 μm
- Specific Surface: 380 m^2/g
- Pore Size: 100 $\text{\AA}$
- Carbon Loading: 18%
- Double End-capping
- pH Range: 1.5-9.0
- Performance: Efficiency > 80,000/m (5 μm)
- TF: 0.98-1.12

Main Features:

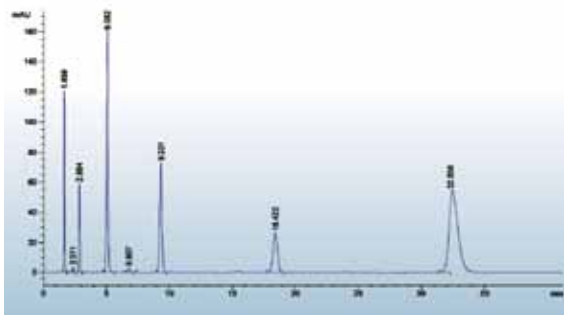
- Balanced hydrophobic adsorption which results in a broader suitability
- Stronger separation power for isomers
- Great column-to-column and batch-to-batch reproducibility
- Perfect symmetry for basic, acidic and neutral compounds

Hydrophobicity Test



Column: Venusil XBP C18 (2), 4.6×150 mm, 5 μm
Sample: Uracil, Toluene
Mobile Phase: MeOH: 25 mM $\text{KH}_2\text{PO}_4/\text{K}_2\text{HPO}_4$ (pH=6.0)=80:20
Detector: UV 254 nm
Flow Rate: 1 mL/min

Inertness Test

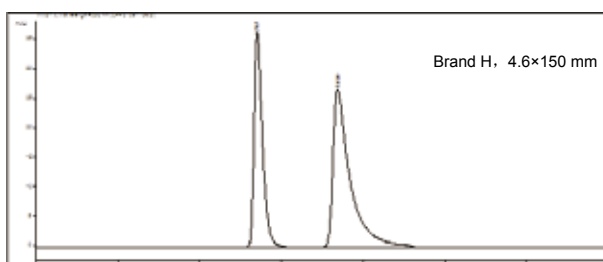
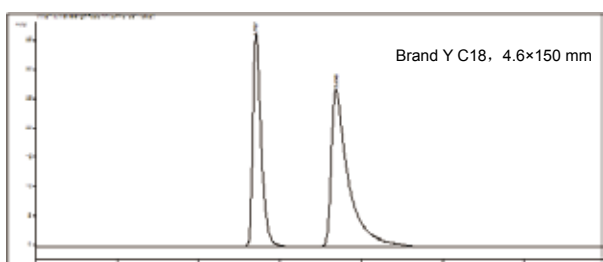
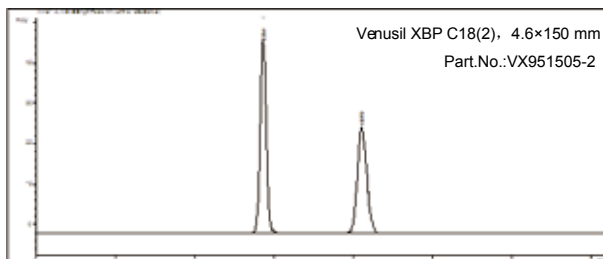


Column: Venusil XBP C18 (2), 4.6×150 mm, 5 μm
Sample: Amitriptyline
Mobile Phase: $\text{NaH}_2\text{PO}_4/\text{Na}_2\text{HPO}_4$ (20 mM, pH=6.9):
MeOH=29:71
Detector: UV 254 nm
Flow Rate: 1 mL/min

Amitriptyline is a strong basic antidepressant. It is recognized as a compound difficult to obtain good peak shape; But the XBP C18(2) column performed outstandingly and gave a great peak symmetry (TF=1.12).

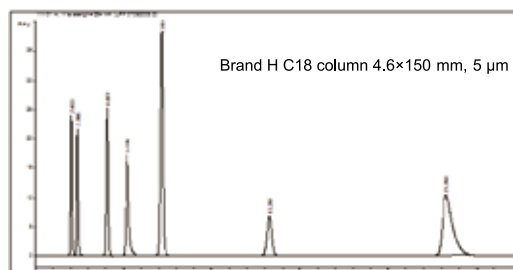
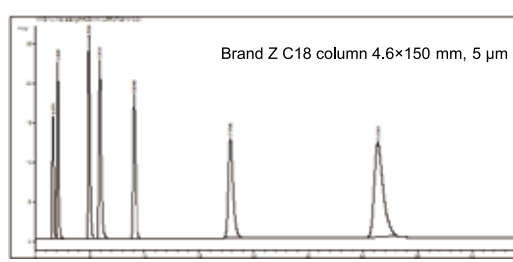
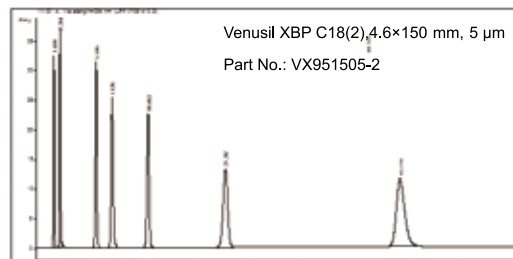


Extremely Low Metal Effects



Mobile Phase: Water:Methanol=65:35
Flow Rate: 1 mL/min
Temperature: 35°C
Detection: UV 230 nm
Sample: 2,3-Dihydroxynaphthalene
+ 2,7-Dihydroxynaphthalene

Selectivity of Basic Compounds



Mobile Phase: MeOH: Acetic Acid/ sodium acetate aq.
(pH=5.0) = 60:40
Flow Rate: 1 mL/min
Temperature: 30°C
Detection: UV 254 nm
Sample: p-Methyl benzoic acid, Pyridine, Phenol,
Acetophenone, Amino-dimethyl benzene and Toluene

Ordering Information

Surface Area: 380 m²/g; Pore Size: 100 Å

Type	Particle size(μm)	Dimension(mm)	Venusil XBP C18 (2)
Analytical	5	2.1×30	VX950302-2
Analytical	5	2.1×50	VX950502-2
Analytical	5	2.1×100	VX951002-2
Analytical	5	2.1×150	VX951502-2
Analytical	5	4.6×50	VX950505-2
Analytical	5	4.6×100	VX951005-2
Analytical	5	4.6×150	VX951505-2
Analytical	5	4.6×250	VX952505-2
G	5	4.6×10, 4/pk	VX950105-2
DCG	5	4.6×10, 4/pk	VX950105-2S

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Standard Products!

Venusil® XBP Series Columns

Venusil XBP C18 columns have the maximum bonding density and therefore provide highest hydrophobicity or lowest polarity. This allows for the least interaction between the analytes and the silanol groups. Venusil XBP columns have extraordinary column stability at high pHs.

Characteristics

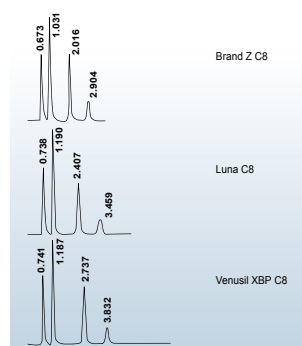
Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped sty	pH range
C18	3,5,10 µm	100 Å	22%	380 m ² /g	Double	1.5-10.0
C18(L)	3,5,10 µm	150 Å	15%	200 m ² /g	Double	1.5-9.0
C18(T)	3,5,10 µm	300 Å	8%	80 m ² /g	Double	1.5-10.0
C8	3,5,10 µm	100 Å	14%	380 m ² /g	Single	1.5-8.5
C18 (A)	3,5,10 µm	120 Å	20%	340 m ² /g	Double	1.5-9.0
C8(L)	3,5,10 µm	150 Å	8%	200 m ² /g	Single	1.5-8.5
C8(T)	3,5,10 µm	300 Å	4%	80 m ² /g	Single	1.5-8.5
C4	3,5,10 µm	100 Å	7%	380 m ² /g	No	1.5-8.5
C1	3,5,10 µm	100 Å	3%	380 m ² /g	No	1.5-8.5
NH ₂	3,5,10 µm	100 Å	6%	380 m ² /g	No	2.0-8.5
phenyl	3,5,10 µm	100 Å	12%	380 m ² /g	No	1.5-8.5
CN	3,5,10 µm	100 Å	5%	380 m ² /g	Single	2.0-9.0
Silica	3,5,10 µm	100 Å	/	380 m ² /g	No	1.0-7.0
Silica(L)	3,5,10 µm	150 Å	/	200 m ² /g	No	1.0-6.0
Silica(T)	3,5,10 µm	300 Å	/	80 m ² /g	No	1.0-6.0

Main Features

- Inertness: one of most base-friendly columns.
- Efficiency: excellent at any applicable pH.
- Large volume injection: maintain very high efficiency with very large injection volumes.
- Broad pH range (1.5~10.0): low pH, 0.2% TFA; high pH, 0.010 M triethylamine.

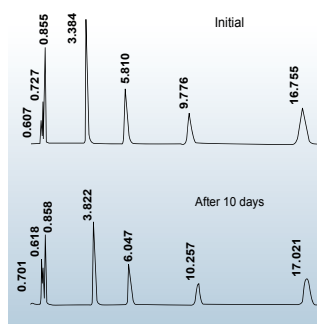
Other Venusil XBP Columns: A complete line of stationary phases include C8, C4, C1, NH₂, Phenyl, CN, Silica, SCX, SAX;

Quality of Column Packing



Sample: uracil, phenol, chloronitrobenzene, toluene (in methanol/water=50/50)
Column: 2.1×50 mm, 5 µm
Mobile Phase: methanol: water=65:35
Flow Rate: 0.20 mL/min
Detector: UV 254nm
Temperature: 30°C

Perfect Peak Symmetry and Great Lifetime of the Column for Basic Compounds at Mid-pH



Sample: Uracil, Doxepin, Nortriptyline, Amitriptyline, Trimipramine
Column: Venusil XBP-C18, 4.6×150 mm, 5 µm
Mobile Phase: 0.01M sodium phosphate:ACN=50:50, pH=7.6
Flow Rate: 1.5 mL/min
Detector: UV 254nm
Temperature: 45°C

Comparison of C8 Phases

	Plates (Toluene)	Tailing Factor
Brand Z-C8	3805	1.12
Brand L C8	2546	1.15
Venusil XBP C8	4012	1.03

Standard Products!

Ordering Information

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle (µm)	Dimension (mm)	Venusil XBP C18	Venusil XBP C18 (A)	Venusil XBP C8	Venusil XBP C4	Venusil XBP C1
Fast analysis	3	2.1×30	VX930302-0	VX930302-A	VX830302-0		
Fast analysis	3	2.1×50	VX930502-0	VX930502-A	VX830502-0		
Fast analysis	3	2.1×100	VX931002-0	VX931002-A	VX831002-0		
Fast analysis	3	2.1×150	VX931502-0	VX931502-A	VX831502-0		
G	3	2.1×10, 4/pk	VX930102-0	VX930102-A	VX830102-0		
DCG	3	2.1×10, 4/pk	VX930102-OS	VX930102-AS	VX830102-OS		
Fast analysis	3	4.6×50	VX930505-0	VX930505-A	VX830505-0		
Fast analysis	3	4.6×100	VX931005-0	VX931005-A	VX831005-0		
Fast analysis	3	4.6×150	VX931505-0	VX931505-A	VX831505-0		
Analytical	5	2.1×30	VX950302-0	VX950302-A	VX850302-0	VX450302-0	VX150302-0
Analytical	5	2.1×50	VX950502-0	VX950502-A	VX850502-0	VX450502-0	VX150502-0
Analytical	5	2.1×100	VX951002-0	VX951002-A	VX851002-0	VX451002-0	VX151002-0
Analytical	5	2.1×150	VX951502-0	VX951502-A	VX851502-0	VX451502-0	VX151502-0
Analytical	5	4.6×50	VX950505-0	VX950505-A	VX850505-0	VX450505-0	VX150505-0
Analytical	5	4.6×100	VX951005-0	VX951005-A	VX851005-0	VX451005-0	VX151005-0
Analytical	5	4.6×150	VX951505-0	VX951505-A	VX851505-0	VX451505-0	VX151505-0
Analytical	5	4.6×200	VX952005-0	VX952005-A	VX852005-0	VX452005-0	VX152005-0
Analytical	5	4.6×250	VX952505-0	VX952505-A	VX852505-0	VX452505-0	VX152505-0
G	5	4.6×10, 4/pk	VX950105-0	VX950105-A	VX850105-0	VX450105-0	VX150105-0
DCG	5	4.6×10, 4/pk	VX950105-OS	VX950105-AS	VX850105-OS	VX450105-OS	VX150105-OS
Semi-preparative	5	10×150	VX951510-0	VX951510-A	VX851510-0		
Semi-preparative	5	10×250	VX952510-0	VX952510-A	VX852510-0		
Preparative	5	21.2×50	VX950520-0	VX950520-A	VX850520-0		
Preparative	5	21.2×150	VX951520-0	VX951520-A	VX851520-0		
Preparative	5	21.2×250	VX952520-0	VX952520-A	VX852520-0		
G	5	10×10	VX950110-OS	VX950110-AS	VX850110-OS		
G	5	21.2×10	VX950120-0	VX950120-A	VX850120-0		
Preparative	5	30×100	VX951030-0	VX951030-A	VX851030-0		
Preparative	5	30×150	VX951530-0	VX951530-A	VX851530-0		
Preparative	5	30×250	VX952530-0	VX952530-A	VX852530-0		
Semi-preparative	10	10×150	VX901510-0		VX801510-0		
Semi-preparative	10	10×250	VX902510-0		VX802510-0		
Preparative	10	21.2×50	VX900520-0		VX800520-0		
Preparative	10	21.2×150	VX901520-0		VX801520-0		
Preparative	10	21.2×250	VX902520-0		VX802520-0		
G	10	10×10	VX900110-OS		VX800110-OS		
G	10	21.2×10	VX900120-0		VX800120-0		
Preparative	10	30×100	VX901030-0		VX801030-0		
Preparative	10	30×150	VX901530-0		VX801530-0		
Preparative	10	30×250	VX902530-0		VX802530-0		
Preparative	10	50×150	VX901550-0		VX801550-0		
Preparative	10	50×250	VX902550-0		VX802550-0		

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Standard Products!

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle (µm)	Dimension (mm)	Venusil XBP NH ₂	Venusil XBP Phenyl	Venusil XBP CN	Venusil XBP Silica
Analytical	5	2.1×30	VN850302-0	VX650302-0	VC950302-0	VSi950302-0
Analytical	5	2.1×50	VN850502-0	VX650502-0	VC950502-0	VSi950502-0
Analytical	5	2.1×100	VN851002-0	VX651002-0	VC951002-0	VSi951002-0
Analytical	5	2.1×150	VN851502-0	VX651502-0	VC951502-0	VSi951502-0
Analytical	5	4.6×50	VN850505-0	VX650505-0	VC950505-0	VSi950505-0
Analytical	5	4.6×100	VN851005-0	VX651005-0	VC951005-0	VSi951005-0
Analytical	5	4.6×150	VN851505-0	VX651505-0	VC951505-0	VSi951505-0
Analytical	5	4.6×200	VN852005-0	VX652005-0	VC952005-0	VSi952005-0
Analytical	5	4.6×250	VN852505-0	VX652505-0	VC952505-0	VSi952505-0
G	5	4.6×10, 4/pk	VN850105-0	VX650105-0	VC950105-0	VSi950105-0
DCG	5	4.6×10, 4/pk	VN850105-0S	VX650105-0S	VC950105-0S	VSi950105-0S

Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle (µm)	Dimension (mm)	Venusil XBP C18	Venusil XBP C8	Venusil XBP C4	Venusil XBP C1
Analytical	5	2.1×30	VX950302-T	VX850302-T	VX450302-T	VX150302-T
Analytical	5	2.1×50	VX950502-T	VX850502-T	VX450502-T	VX150502-T
Analytical	5	2.1×100	VX951002-T	VX851002-T	VX451002-T	VX151002-T
Analytical	5	2.1×150	VX951502-T	VX851502-T	VX451502-T	VX151502-T
Analytical	5	4.6×50	VX950505-T	VX850505-T	VX450505-T	VX150505-T
Analytical	5	4.6×100	VX951005-T	VX851005-T	VX451005-T	VX151005-T
Analytical	5	4.6×150	VX951505-T	VX851505-T	VX451505-T	VX151505-T
Analytical	5	4.6×200	VX952005-T	VX852005-T	VX452005-T	VX152005-T
Analytical	5	4.6×250	VX952505-T	VX852505-T	VX452505-T	VX152505-T
G	5	4.6×10, 4/pk	VX950105-T	VX850105-T	VX450105-T	VX150105-T
DCG	5	4.6×10, 4/pk	VX950105-TS	VX850105-TS	VX450105-TS	VX150105-TS
Semi-preparative	5	10×150	VX951510-T	VX851510-T		
Semi-preparative	5	10×250	VX952510-T	VX852510-T		
Preparative	5	21.2×50	VX950520-T	VX850520-T		
Preparative	5	21.2×150	VX951520-T	VX851520-T		
Preparative	5	21.2×250	VX952520-T	VX852520-T		
G	5	10×10	VX950110-TS	VX850110-TS		
G	5	21.2×10	VX950120-T	VX850120-T		



Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle (µm)	Dimension (mm)	Venusil XBP NH ₂	Venusil XBP Phenyl	Venusil XBP CN	Venusil XBP Silica
Analytical	5	2.1×30	VN850302-T	VX650302-T	VC950302-T	VSi950302-T
Analytical	5	2.1×50	VN850502-T	VX650502-T	VC950502-T	VSi950502-T
Analytical	5	2.1×100	VN851002-T	VX651002-T	VC951002-T	VSi951002-T
Analytical	5	2.1×150	VN851502-T	VX651502-T	VC951502-T	VSi951502-T
Analytical	5	4.6×50	VN850505-T	VX650505-T	VC950505-T	VSi950505-T
Analytical	5	4.6×100	VN851005-T	VX651005-T	VC951005-T	VSi951005-T
Analytical	5	4.6×150	VN851505-T	VX651505-T	VC951505-T	VSi951505-T
Analytical	5	4.6×200	VN852005-T	VX652005-T	VC952005-T	VSi952005-T
Analytical	5	4.6×250	VN852505-T	VX652505-T	VC952505-T	VSi952505-T
G	5	4.6×10, 4/pk	VN850105-T	VX650105-T	VC950105-T	VSi950105-T
DCG	5	4.6×10, 4/pk	VN850105-TS	VX650105-TS	VC950105-TS	VSi950105-TS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Venusil® XBP(L) Series Columns

XBP C18(L) has an identical bonded phase as XBP C18. However, XBP C18(L) has relatively low surface area which allows compounds to have shorter retention times. These columns are an excellent alternative to Hypersil BDS C18, Hypersil BDS C8; Zorbax XDB C18, Zorbax XDB C8 which relatively could have too much retention.

XBP C18(L) have relatively larger pore size (150 Å) and are suitable for the separation of large molecules.

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
C18(L)	3,5,10 µm	150 Å	15%	380 m ² /g	Double	1.5-9.0
C8(L)	3,5,10 µm	150 Å	8%	200 m ² /g	Single	1.5-8.5
Silica(L)	3,5,10 µm	150 Å	/	200 m ² /g	No	1.0-6.0

Ordering Information

Surface Area: 200 m²/g, Pore Size: 150 Å

Type	Particle (µm)	Dimension (mm)	Venusil XBP C18(L)	Venusil XBP C8(L)	Venusil XBP Silica(L)
Analytical	5	2.1×30	VX950302-L	VX850302-L	VSi950302-L
Analytical	5	2.1×50	VX950502-L	VX850502-L	VSi950502-L
Analytical	5	2.1×100	VX951002-L	VX851002-L	VSi951002-L
Analytical	5	2.1×150	VX951502-L	VX851502-L	VSi951502-L
Analytical	5	4.6×50	VX950505-L	VX850505-L	VSi950505-L
Analytical	5	4.6×100	VX951005-L	VX851005-L	VSi951005-L
Analytical	5	4.6×150	VX951505-L	VX851505-L	VSi951505-L
Analytical	5	4.6×250	VX952505-L	VX852505-L	VSi952505-L
G	5	4.6×10, 4/pk	VX950105-L	VX850105-L	VSi950105-L
DCG	5	4.6×10, 4/pk	VX950105-LS	VX850105-LS	VSi950105-LS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Standard Products! <

Venusil® AQ C18 Columns

The Venusil AQ C18 column is designed for the separation of polar, medium-polar and non-polar compounds from low to medium pH. This column is more polar than XBP C18, but less polar than ASB C18. With a special surface treatment, Venusil AQ C18 is made to be compatible with 100% aqueous mobile phases, and it can be used to replace Waters Symmetry C18, Inertsil C18, Zorbax SB, Atlantis d C18, and other AQ columns. This column suits for a pH range of 1.5-9.0.

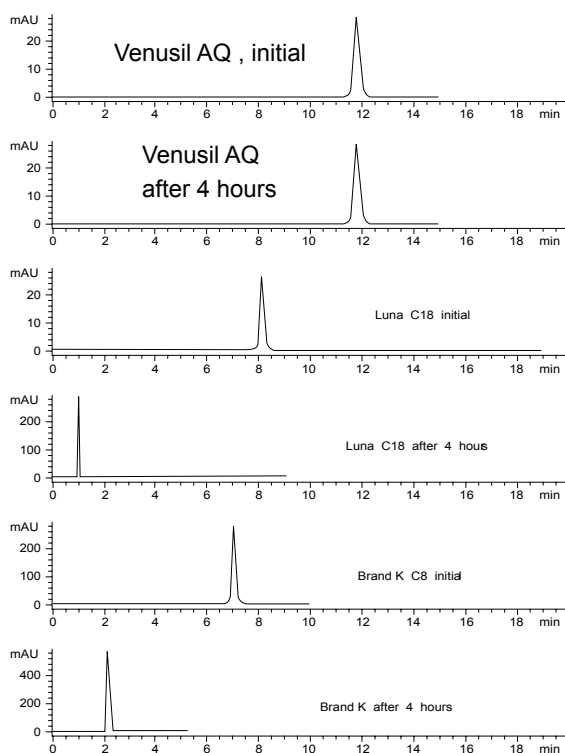
Characteristics

Carbon Loading: 18%, Characteristics: Pore Size: 100 Å; Specific Surface Area: 380 m²/g; Available Particle Size: 3 µm, 5 µm or 10 µm; Single end-capped; pH=1.5-9.0

Main Features

- Inertness: one of the most base-friendly columns, excellent peak symmetry for basic compounds.
- Efficiency: The best column for polar compounds at any pH.
- Large volume injection: maintains very high efficiency even if the injection volume is exceptionally large.
- 100% water compatible: very unique for a universal C18 column; much better peak shape, retention, and efficiency than other brand AQ columns.
- Low pH stability (pH=1.5): better stability than most of the popular brand columns (including other brand AQ columns) on the market.

Compatibility with 100 % Aqueous Mobile Phase



Sample: Uridine

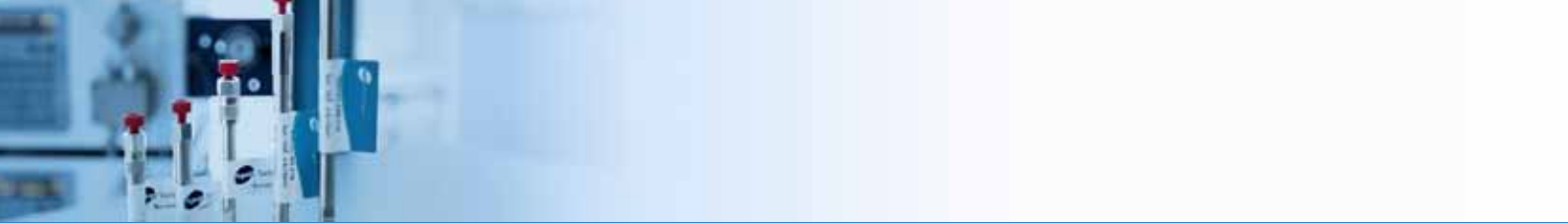
Column: 4.6x150 mm, 5 µm

Mobile Phase: 100 % water

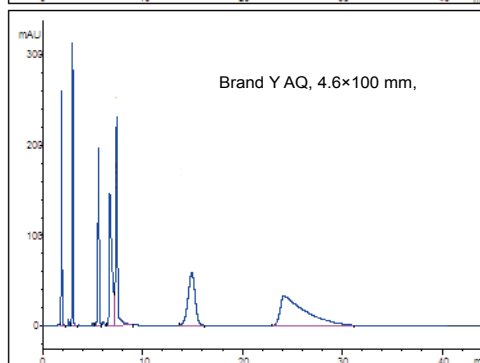
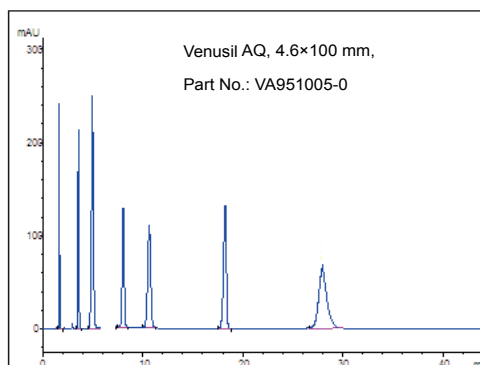
Flow Rate: 1 mL/min; the flow was stopped for 5 minutes during the testing period for each column

Detector: UV 254nm

Temperature: 30°C



Balanced Retention for Hydrophilic and Hydrophobic Compounds



Mobile Phase: 20.0 mM $\text{KH}_2\text{PO}_4/\text{K}_2\text{HPO}_4$ (pH=7.0) :
Methanol = 35:65

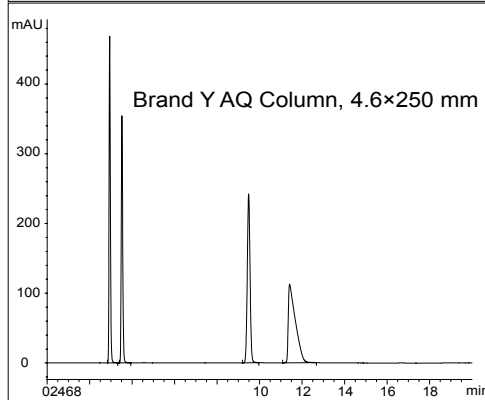
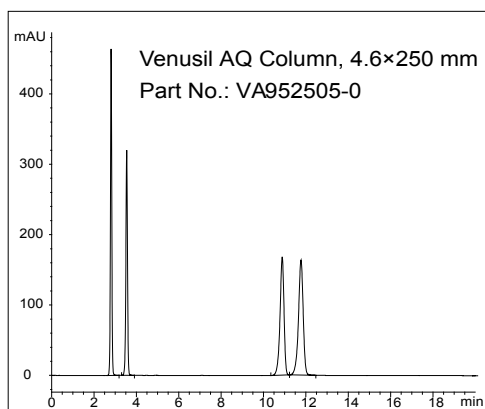
Flow Rate: 1 mL/min

Detector: UV 254 nm

Sample: uracil, propranolol hydrochloride, butyl phthalate, dimethyl phthalate, naphthalene, acenaphthene and amitriptyline

Temperature: 23°C

Great Peak Shape for All Type of Compounds



Mobile Phase: 1% Acetic Acid (pH=2.57): MeOH=50 : 50

Flow Rate: 1 mL/min

Temperature: 30°C

Detector: UV 275 nm

Sample: Uracil, Paracetamol, acetophenone and
2-Hydroxybenzoic acid

Ordering Information

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle (μm)	Dimension (mm)	Venusil AQ C18
Fast analysis	3	2.1×30	VA930302-0
Fast analysis	3	2.1×50	VA930502-0
Fast analysis	3	2.1×100	VA931002-0
Fast analysis	3	2.1×150	VA931502-0
G	3	2.1×10, 4/pk	VA930102-0
DCG	3	2.1×10, 4/pk	VA930102-0S
Fast analysis	3	4.6×50	VA930505-0
Fast analysis	3	4.6×100	VA931005-0
Fast analysis	3	4.6×150	VA931505-0
Analytical	5	2.1×30	VA950302-0
Analytical	5	2.1×50	VA950502-0
Analytical	5	2.1×100	VA951002-0
Analytical	5	2.1×150	VA951502-0
Analytical	5	4.6×50	VA950505-0
Analytical	5	4.6×100	VA951005-0
Analytical	5	4.6×150	VA951505-0
Analytical	5	4.6×250	VA952505-0
G	5	4.6×10, 4/pk	VA950105-0
DCG	5	4.6×10, 4/pk	VA950105-0S
Semi-preparative	5	10×150	VA951510-0
Semi-preparative	5	10×250	VA952510-0
Preparative	5	21.2×50	VA950520-0
Preparative	5	21.2×150	VA951520-0
Preparative	5	21.2×250	VA952520-0
G	5	10×10	VA950110-0S
G	5	21.2×10	VA950120-0
Preparative	5	30×100	VA951030-0
Preparative	5	30×150	VA951530-0
Preparative	5	30×250	VA952530-0
Semi-preparative	10	10×150	VA901510-0
Semi-preparative	10	10×250	VA902510-0
Preparative	10	21.2×50	VA900520-0
Preparative	10	21.2×150	VA901520-0
Preparative	10	21.2×250	VA902520-0
G	10	10×10	VA900110-0S
G	10	21.2×10	VA900120-0
Preparative	10	30×100	VA901030-0
Preparative	10	30×150	VA901530-0
Preparative	10	30×250	VA902530-0
Preparative	10	50×150	VA901550-0
Preparative	10	50×250	VA902550-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Standard Products!

Venusil® SCX Columns

SCX Column: made by spherical silica particles of the highest purity (>99.999%), bonded with aromatic sulfonic acid group. They can be used for the separation of basic, water-soluble compounds and bio-molecules.

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
SCX	5 µm	150 Å	6%	200 m ² /g	No	2.0-8.0
SCX(T)	5 µm	300 Å	3.5%	80 m ² /g	No	2.0-8.0

Ordering Information

Surface Area: 200 m²/g, Pore Size: 150 Å

Type	Particle (µm)	Dimension (mm)	Venusil SCX
Analytical	5	4.6×100	VSc951005-0
Analytical	5	4.6×150	VSc951505-0
Analytical	5	4.6×250	VSc952505-0
G	5	4.6×10, 4/pk	VSc950105-0
DCG	5	4.6×10, 4/pk	VSc950105-0S

Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle (µm)	Dimension (mm)	Venusil SCX
Analytical	5	4.6×100	VSc951005-T
Analytical	5	4.6×150	VSc951505-T
Analytical	5	4.6×250	VSc952505-T
G	5	4.6×10, 4/pk	VSc950105-T
DCG	5	4.6×10, 4/pk	VSc950105-TS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Venusil® SAX Columns

SAX Column: the stationary phase is made with high pure spherical silica particles and bonded with quaternary amine groups. The column can be used for the separation of acidic, water-soluble compounds and bio-molecules.

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
SAX	5 µm	100 Å	6%	380 m ² /g	No	2.0-8.0
SAX(T)	5 µm	300 Å	1.0%	80 m ² /g	No	2.0-8.0

Ordering Information

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle (µm)	Dimension (mm)	Venusil SAX
Analytical	5	4.6×100	VSa951005-0
Analytical	5	4.6×150	VSa951505-0
Analytical	5	4.6×250	VSa952505-0
G	5	4.6×10, 4/pk	VSa950105-0
DCG	5	4.6×10, 4/pk	VSa950105-0S

Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle (µm)	Dimension (mm)	Venusil SAX
Analytical	5	4.6×100	VSa951005-T
Analytical	5	4.6×150	VSa951505-T
Analytical	5	4.6×250	VSa952505-T
G	5	4.6×10, 4/pk	VSa950105-T
DCG	5	4.6×10, 4/pk	VSa950105-TS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Standard Products! <

Venusil® Diol

Venusil Diol column is based on ultra high purity silica gel matrix. Dihydroxypropane groups chemically bonded to porous silica particle. Because the glycol base is less hydrophilic than pure silica silanol, it has a different selectivity from silica column. It can be widely used for polarity of natural products, herbicides and metabolites, low sugar and lipid analysis.

Characteristics: Metal Impurity<30 ppm; Pore Size: 100 Å; Specific Surface Area: 380 m²/g; Available Particle Size: 5 µm. No end-capped; pH=2.0-8.0

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Particle size (µm)	Dimension (mm)	Venusil Diol
Analytical	5	2.1×50	VD950502-0
Analytical	5	2.1×100	VD951002-0
Analytical	5	2.1×150	VD951502-0
Analytical	5	4.6×50	VD950505-0
Analytical	5	4.6×100	VD951005-0
Analytical	5	4.6×150	VD951505-0
Analytical	5	4.6×250	VD952505-0
G	5	4.6×10, 4/pk	VD950105-0
DCG	5	4.6×10, 4/pk	VD950105-0S

Standard Products!

Promosil Family of HPLC Columns

Phase	Particle size	Pore size	Carbon loading	Surface Area	End-capped style	pH range
C18	5	100 Å	18	320 m ² /g	Double	1.5-9.0
C8	5	100 Å	10	320 m ² /g	Double	2.0-8.0
NH ₂	5	100 Å	4	320 m ² /g	No	2.0-8.0
CN	5	100 Å	5	320 m ² /g	Single	2.0-8.0
Silica	5	100 Å	/	320 m ² /g	No	1.0-6.0

Promosil C18

Using the silica of high pure and high mechanical strength, the Promosil C18 series columns are made with high pure monosilane through Bonna-Agela Technologies' well controlled bonding process. They have high surface bonding coverage and are completely capped. The carbon content is as much as 18%. They are stable at pH range 1.5-9.0 showing good peak shape for acidic and basic compounds. They have excellent tolerance to contamination and long life-time. They are the best choice of high performance-to-cost value.

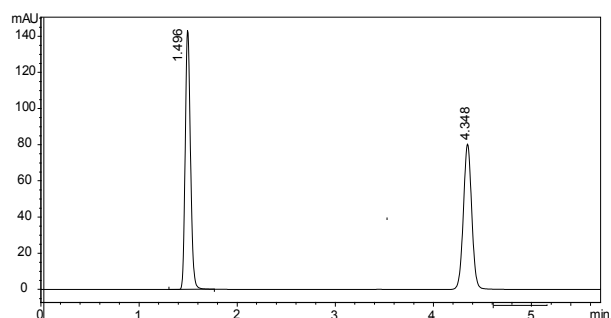
Characteristics

- High pure silica, Metal Impurity<10 ppm
- Average Particle Size: 5 µm
- Specific Surface: 320 m²/g
- Pore Size: 100 Å
- Carbon Loading: 18%
- pH Range: 1.5-9.0
- Plate Count: >80,000/m
- Tailing Factor: 0.98-1.20

Main Features

- Double End-capped, Good Inertness
- Good Stability and Reproducibility
- Excellent Performance-to-cost Value

Hydrophobicity Test



Column: Promosil C18, 4.6×150 mm, 5 µm

Sample: Uracil, Toluene

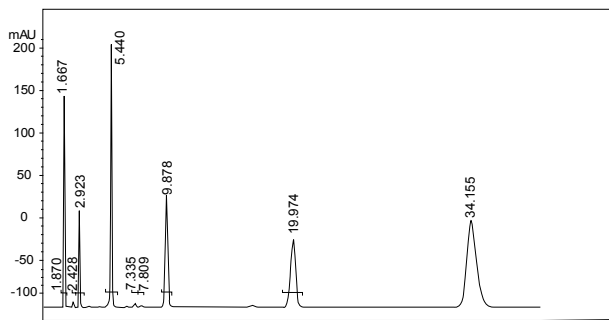
Mobile Phase: MeOH: 25mM KH₂PO₄/K₂HPO₄ (pH=6.0)=80:20

Detector: UV 254 nm

Flow Rate: 1 mL/min

Standard Products! <

Hydrophobicity Test



Column: Promosil C18, 4.6×150 mm, 5 µm

Sample: Amitriptyline

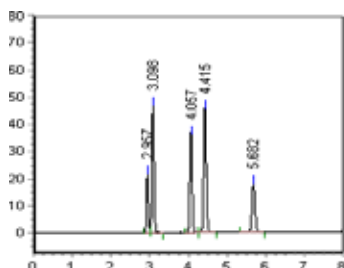
Mobile Phase: $\text{NaH}_2\text{PO}_4/\text{Na}_2\text{HPO}_4$ (20 mM, pH=6.9):

MeOH=32:68

Detector: UV 254 nm

Flow Rate: 1 mL/min

Promosil C8



Column: Promosil C8, 4.6×250 mm

Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase 1 µL .

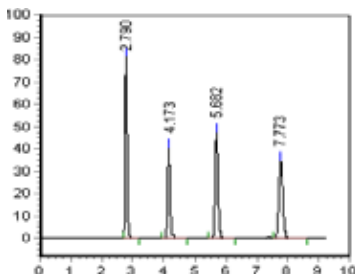
Mobile phase: 15% Water, 85% Methanol

Flow Rate: 1.0 mL/min

Temperature: 30°C

Detector: UV 254 nm

Promosil CN



Column: Promosil CN, 4.6×250 mm

Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase 1 µL.

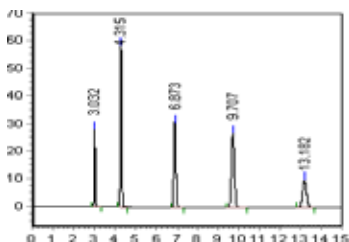
Mobile phase: 45% Water, 55% Methanol

Flow Rate: 1.0 mL/min

Temperature: 30°C

Detector: UV 254 nm

Promosil Silica



Column: Promosil Silica, 4.6×250 mm

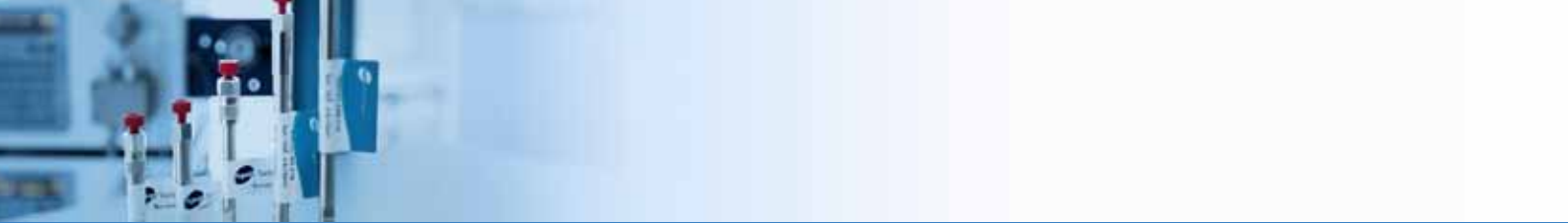
Sample: toluene, nitrobenzene, o-nitroaniline, m-nitroaniline and p-nitroaniline in mobile phase 1 µL.

Mobile phase: Isooctane:ethanol:water = 85:15:0.3

Flow Rate: 1.00 mL/min

Temperature: Room temperature

Detector: UV 254 nm



Standard Products!

Ordering Information

Surface Area: 320 m²/g, Pore Size: 100 Å

Dimension (mm)	Particle (μm)	Promosil C18	Promosil C8	Promosil NH ₂	Promosil CN	Promosil Silica
2.1×30	5	PM950302-0	PM850302-0	PM750302-0	PM550302-0	PM050302-0
2.1×50	5	PM950502-0	PM850502-0	PM750502-0	PM550502-0	PM050502-0
2.1×100	5	PM951002-0	PM851002-0	PM751002-0	PM551002-0	PM051002-0
2.1×150	5	PM951502-0	PM851502-0	PM751502-0	PM551502-0	PM051502-0
4.6×50	5	PM950505-0	PM850505-0	PM750505-0	PM550505-0	PM050505-0
4.6×100	5	PM951005-0	PM851005-0	PM751005-0	PM551005-0	PM051005-0
4.6×150	5	PM951505-0	PM851505-0	PM751505-0	PM551505-0	PM051505-0
4.6×250	5	PM952505-0	PM852505-0	PM752505-0	PM552505-0	PM052505-0
G 4.6×10, 4/pk	5	PM950105-0	PM850105-0	PM750105-0	PM550105-0	PM050105-0
DCG 4.6×10, 4/pk	5	PM950105-0S	PM850105-0S	PM750105-0S	PM550105-0S	PM050105-0S

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

HPLC Accessories and Supplies

HPLC Fitting and Tubing

Cat.No.	Material	Tubing Size/Nut Threads
AF-120	PEEK	1/16", 10-32
PM1960	PEEK	1/16"OD, 0.010 " (0.25mm) ID, 1 m
PM1945R	PEEK	1/16"OD, 0.005" (125um) ID, 1 m



Cat.No.: AF-120

Automatic Column Selector

- Connect up to 6 HPLC columns
- Controllable by both panel keys and computer
- Easy key operation for setting method and sequence
- Compact design and easy access to columns
- Compatible with any HPLC



Cat.No.: LC-08

HPLC Column Heater

Technical specification

Cat.No.	CC-100
Dimensions (H×W×D)	510 mm×110 mm×65 mm
Operating Temperature	Between 5°C and 60°C
Temperature Accuracy	±0.1°C
Compatible Column Quantity and Length	2×300 mm
Power	220 V/50 Hz/1 A
Weight	4 Kg



Cat.No.: CC-100

UV Lamps

Bonna-Agela Technologies offers UV lamps of the same or better quality as a low cost replacement for many of those manufactured by original HPLC manufacturers, such as Shimadzu.





Shimadzu

Original Instrument Part Number	Bonna-Agela Lamps Part Number
SPD-10A, 2000 h	SHL001
LC2010, 2000 h	SHL002
SPD-20A, 2000 h	SHL003
UV AA	SUV001

Pipettes and Accessories



Mechanical Pipette (Fixed Volume)

Cat No.	Volume (μL)	Cat No.	Volume (μL)
A722001	5	A722030	200
A722004	10	A722035	250
A722010	20	A722040	500
A722015	25	A722045	1000
A722020	50	A722050	2000
A722025	100	A722055	5000

Mechanical Pipette (Adjustable Volume)

Single Channel Pipette

Cat No.	Volume (μL)	Increment (μL)	Cat No.	Volume (μL)	Increment (μL)
A720005	0.1-2.5	0.05	A720070	20-200	1
A720000	0.5-10	0.1	A720030	50-200	1
A720020	5-50	0.5	A720060	100-1000	5
A720080	2-20	0.5	A720040	200-1000	5
A720050	10-100	1	A720110	1000-5000	50

8-Channel Pipette

Cat No.	Volume (μL)	Increment (μL)
A720210	0.5-10	0.1
A720220	5-50	0.5
A720240	50-300	5

12-Channel Pipette

Cat No.	Volume (μL)	Increment (μL)
A720310	0.5-10	0.1
A720320	5-50	0.5
A720340	50-300	5

Pipette Tips

Cat No.	Qty	Cat No.	Qty
AD781348	FT10μL	AD780019	FT1000μL
AD781349	FT10μL	AD780020	FT1000μL
AD780006	FT300μL	AD780046	FT1200μL
AD780007	FT300μL		

HPLC Column Selection Guide

Column Selection Parameters

Stationary Phases

- Reversed Phase [C18 (Unisol, XBP, AQ, ASB), C8 (XBP, ASB), C4, Phenyl]: most HPLC analytical and preparative separations; use shorter chain if the retention is too high on C18 columns; use shorter chain (C8, C4) for proteins and larger peptides.
- Normal Phase [Silica, Amino], SAX, SCX: for those not applicable on reversed phase; polysaccharides(amino), ion-exchange chromatography, some preparative needs.
- Bi-mode [Cyano, Venusil HILIC]: can be used in both reversed and normal phase modes, alternative selectivity to hydrocarbon-based reversed phases, inert and better reproducibility than silica columns.

Particle Size

- 3 μm : fast analysis, high throughput analytical applications, micro/nano HPLC
- 5 μm : analytical and semi-preparative separation
- 10 μm : preparative separation

Particle Size

- Narrow pore (100-150 Å): MW<3000
- Large pore (300-500 Å): 3000<MW<50000
- Mega pore (1000 Å): MW>50000

Column Length

- Short (30 mm, 50 mm): high throughput analysis and purification, pre-separation
- Regular (100 mm, 150 mm, 250 mm): more complex sample, larger injection volume

Column Diameter

- Capillary (0.5 mm, 1.0 mm): LC-MS, micro-HPLC, very small sample volume
- Analytical (2.1 mm, 4.6 mm, 10 mm): standard HPLC, analytical and mini-prep
- Preparative (21.2 mm, 30 mm, 50 mm): preparative HPLC

Basic Considerations in Choosing HPLC Columns

Analyte

- **Molecular Weight** – small molecule (<3000), narrow pore; medium molecule (3000- 50000), large pore; large molecule (>50000), mega pore.
- **Solubility in aqueous solutions** – very hydrophilic, use AQ C18, ASB C18 or Unisol Amide; very hydrophobic, use shorter chain phases (C8, C4, Phenyl, CN); in between, use AQ C18, ASB C18, XBP C18 or Phenyl.
- **Difference between the compounds to be separated** – by polarity, use AQ C18, ASB C18, cyano, HILIC; by shape or regio-isomer, use XBP C18, phenyl.

Mobile Phase

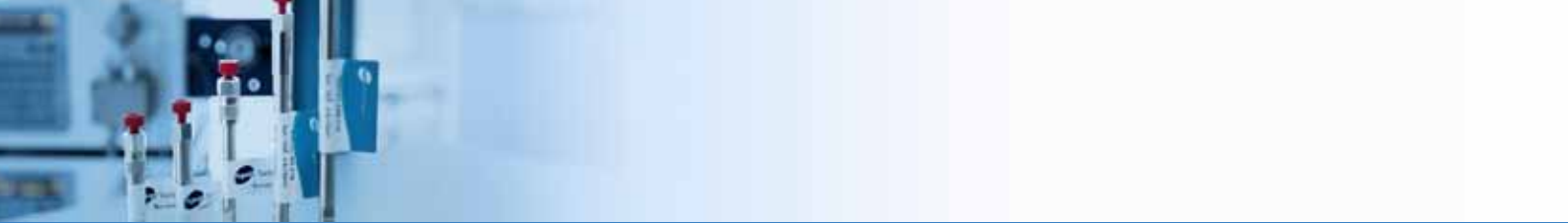
- **Solution solvent**: 97-100 % aqueous solution, AQ C18 or ASB C18; normal phase mode with aqueous mobile phase, Amide column.
- **pH**: pH<2, ASB C18; pH>9, XBP C18, Durashell series; pH=2.0-9.0, most of other phases; (check the pH range for each column before use!)
- **Salt concentration**: high salt concentration>0.1 M (should be avoided if possible), XBP C18 (2), SCX, SAX.

Sample

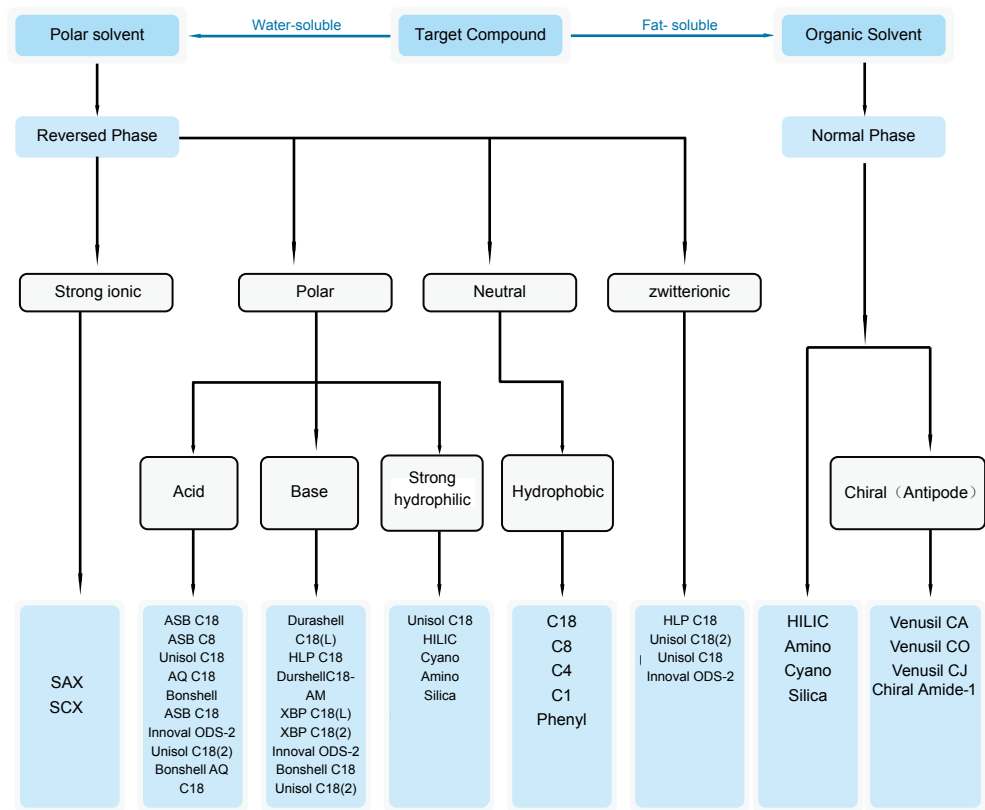
- Analyte mass/concentration: high mass load, larger diameter column (>10 mm for preparative).
- Sample volume: small volume, small diameter; large volume, large diameter and length.
- Sample complexity: simple separation, short column; complex separation, long column.

Instrument and Application

- Traditional HPLC analysis: 3 μm , 5 μm ; 4.6x100 mm, 4.6x150 mm, 4.6x250 mm
- High throughput analysis: 3 μm , 5 μm ; 2.1x30 mm, 2.1x50 mm, 4.6x50 mm.
- LC-MS application: 3 μm , 5 μm ; 1.0x30 mm, 1.0x50 mm, 2.1x30 mm, 2.1x50 mm, 2.1x100 mm.
- Micro HPLC: 3 μm , 5 μm ; 0.5x30 mm, 0.5x50 mm, 0.5x100 mm.
- Preparative HPLC: 5 μm , 10 μm ; 21.2x50 mm, 21.2x150 mm, 21.2x250 mm, 30x150 mm, 30x250 mm, 50x250 mm.



Bonna-Agela HPLC Column Selection Guide



Comparison of Technical Properties for C18 Phases

Stationary Phase	Particle (µm)	Pore (Å)	Surface (m²/g)	Carbon load(%)	End Capping	ultra Pure Silica
Unisol C18	5	100	380	17	double	yes
Unisol C18(2)	5	110	340	14	Single	yes
Venusil XBP C18	5	100	380	22	double	yes
Venusil AQ C18	5	100	380	18	yes	yes
Venusil XBP C18(2)	5	100	380	18	yes	yes
Venusil XBP C18(L)	5	150	200	15	double	yes
Venusil ASB C18	5	150	200	12	no	yes
Promosil C18	5	100	320	18	double	yes
ZORBAX SB C18	5	80	180	10	no	yes
ZORBAX XDB C18	5	80	180	12	yes	yes
Waters SunFire C18	5	100	340	16	yes	yes
Waters Symmetry C18	5	100	335	19	yes	yes
Waters XTerra MS C18	5	125	—	15.5	yes	—
Hypersil BDS C18	5	130	175	11	yes	no
Hypersil ODS	5	120	170	10	yes	no
Inertsil ODS	5	100	350	14	yes	no
Inertsil ODS3	5	100	450	15	yes	yes
Kromasil C18	5	100	340	19	yes	special
Supelco Discovery C18	5	180	200	12	yes	yes
Luna C18(2)	5	100	400	17.5	yes	yes

Cross-reference for Bonna-Agela HPLC Columns

Contrastive Columns		Bonna-Agela Columns
Manufacture	Columns	Columns
Waters GL Sciences	Atlantis T3 Insertsil ODS-4	Unisol C18(2) 1. Good separation for polar compounds, 100 % aqueous compatibility 2. Good peak shape for basic compounds 3. Resistant for basic biological matrix
Waters Phenomenex GL Sciences GL Sciences YMC Grace Grace Grace	Atlantis-(d)C18 Synergi Hydro RP Insertsil ODS-3 Insertsil ODS-3V YMC Pack ODS-AQ Alltima HP C18 AQ Prevail C18 Prevail OA(organic acid)	Unisol C18 1. 100 % aqueous compatibility 2. Great inertness and efficiency for basic compound
Waters Supelco Grace Thermo	Spherisorb ODS-2 Discovery-C18 Alltima HP C18 Hypersil BDS	Venusil XBP C18 (L) 1. Low surface area, anti-contaminate 2. Good choice for sample with complex matrix which will contaminate stationary phase.
Phenomenex Supelco	Luna-C18 Asentics-C18	Venusil XBP C18 1. high surface area, high C % (23 %) 2. high hydrophobicity 3. good choice for polar or neutral compounds. not suitable for high polar compounds
Phenomenex	Luna-C18(2)	Venusil XBP C18(2) 1. C % (18 %) 2. avoid the strong retention of lipophilic compound
Waters Waters GL Sciences YMC	Symmetry C18 Sunfire C18 Insertsil ODS-2 YMC Pack PRO	Venusil XBP C18(A) 1. Pore size: 120 Å area: 340 m ² /g. 2. Universal column
Phenomenex GL Sciences	Jupiter 300-C18 Insertsil WP 300-C18	Venusil XBP C18(T) 1. Pore size: 300 Å 2. Good choice for polypeptide and protein samples (M>3000)
Waters Agilent	Xterra Extend	Durashell RP 1. Multi function group bonded 2. Wide pH range(1.5-12.0) 3. Large sample loading in high pH situation, suitable for basic compounds separation
Waters	Xbridge	Durashell C18(L) 1. Hybrid surface 2. Wide pH range (1.5-12.0) 3. Long life time in high pH environment 4. High loading capacity for basic compounds for preparative applications
Phenomenex	Gemini	Durashell C18 1. Wide pH range (1.5-12.0) 2. High loading capacity for basic compounds for preparative applications
Waters Agilent Grace Merck	Resolve C18 SB-C18 Prevail OA(organic acid) LiChrospher RP C18	Venusil ASB C18 1. Good choice for the separation of polar compounds in low or mid pH environment. 2. 100 % aqueous compatibility



Contrastive Columns		Bonna-Agela Columns
Manufacture	Columns	Columns
Agilent	SB-Aq	Venusil ASB C8 1. Good choice for the separation of polar compounds in low or mid pH environment. 2. 100 % aqueous compatibility
Agilent Thermo	XDB-C18 Hypersil ODS2	Innoval ODS-2 1. High stability and extended lifetime 2. Contamination tolerance 3. Excellent dispersion and high recovery
Agilent Waters Supelco	Bonus-RP Shield RP 18 Discovery RP-Amide C16	Venusil HLP 1. Greatly improved peak shape for basic compounds. 2. Enhanced retention and separation of polar compounds and steric isomers. 3. High loading capacity for polar compounds
Phenomenex	Luna NH ₂	Venusil XBP NH₂ 1. Can be used as reversed phase or normal phase. 2. Good choice for the separation of carbohydrates.
Waters Phenomenex	Spherisorb CN Luna CN	Venusil XBP CN 1. Can be used as reversed phase or normal phase. 2. Good choice for the polar compounds
Waters Phenomenex	Spherisorb Si Luna silica	Venusil XBP Silica low metal content
Waters Merck Kromasil	Spherisorb ODS-2 LiChrospher RP C18 Endcapped Kromasil C18	Promosil C18 1. High price ratio 2. pH range 1.5-9.0
Waters	Spherisorb Si	Promosil Silica NP column with high cost efficiency
Phenomenex	Luna SCX	Venusil SCX 1. Bonded with sulfo group. 2. Good choice for basic compounds, water soluble polar compounds and bio-molecular
Agilent	SAX	Venusil SAX 1. Bonded with quaternary amine group 2. Good choice for basic compounds, water soluble polar compounds and bio-molecular
Phenomenex	Luna PFP	Venusil PFP 1. Excellent performance in the separation of aromatic, a heterocyclic compound, halides, 2. Widely used in Chinese pharmaceutical.
Waters	ACQUITY HSS C18	UHP Innoval C18 Pressure: 600 bar (9000 psi)
Waters Agilent	ACQUITY HSS C18 SB SB-C18 1.8 μm	UHP ASB C18 1. Pressure: 600 bar (9000 psi) 2. Good choice for the separation of polar compounds in low or mid pH environment. 3. 100 % aqueous compatibility
Agilent	Poreshell 120SB-C18	Bonshell ASBC18 1. Narrow particle size distribution 2. Long life time 3. Large sample loading 4. Contamination-resistant 5. Solvent saving 6. High efficiency

Contrastive Columns		Bonna-Agela Columns
Manufacture	Columns	Columns
Phenomenex	Synergi Polar-Phenyl	Venusil XBP Polar-Phenyl Good choice for high polar and aromatic compounds
Phenomenex	Synergi Max-RP	Venusil XBP C12 Good choice for basic compounds in mid pH envirnment
Daicel Chiral	CHIRALCEL AD-H	Venusil CA For the compounds with amide group, aromatic group, carbonyl group, nitro group, sulfonyl group, cyano group and hydroxyl group, as well as amine and carboxylic acid
Daicel Chiral	CHIRALCEL OD-H	Venusil CO For β blockers and steroids
Daicel Chiral	CHIRALCEL OJ-H	Venusil CJ For the compounds with amide group, aromatic group, carbonyl group, nitro group, sulfonyl group, cyano group and hydroxyl group, as well as amine and carboxylic acid

USP Column Selection Guide

L01 Octadecyl silane (ODS or C18) chemically bonded to porous silica or ceramic particles, 1.5~10 µm in diameter.

Brand	Particle(µm)	Figure
Unisol C18	3, 5, 10	sphere
Venusil ASB C18	3, 5, 10	sphere
Venusil XBP C18	3, 5, 10	sphere
Venusil XBP C18 (2)	5	sphere
Venusil XBP C18 (L)	5	sphere
Durashell C18	3, 5, 10	sphere
Durashell C18-AM	3, 5, 10	sphere
Durashell C18(L)	3, 5, 10	sphere
Promosil C18	5	sphere
Bonshell C18	2.7	core-shell
Innoval ODS-2	5, 10	sphere

L02 Octadecyl silane (ODS or C18) chemically bonded to silica gel of a controlled surface porosity bonded to a solid spherical core, 30~50 µm in diameter.

Brand	Particle(µm)	Figure
C18 bulk media	50	Irregular

L03 Porous silica particles, 1.5~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP Silica	3, 5, 10	sphere
Venusil XBP Silica(L)	5	sphere
Promosil Silica	5	sphere
Innoval Silica	5,10	sphere

L04 Silica gel of a controlled surface porosity bonded to a solid spherical core, 30~50 µm in diameter.

Brand	Particle(µm)	Figure
Bulk media(Silica)	30~50	Irregular

L05 Alumina of controlled surface porosity bonded to a solid spherical core, 30~50 µm in diameter.

L06 Strong cation exchanger packing-sulfonated fluoro-carbon polymer coated on a solid spherical core, 30~50 µm in diameter.

L07 Octyl silane (C8) chemically bonded to porous silica particles, 1.5~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil ASB C8	3, 5, 10	sphere
Venusil XBP C8	3, 5, 10	sphere
Venusil XBP C8(L)	5	sphere
Bonshell C8	2.7	sphere

L08 An essentially monomolecular layer of amino-propylsilane (NH₂) chemically bonded to totally porous silica gel support, 3~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP NH ₂	3, 5	sphere
Promosil NH ₂	5	sphere
Drushell NH ₂	5	shpere

L09 3~10 µm irregular, totally porous silica gel having a chemically bonded strongly acidic cation exchanger coating (SCX).

Brand	Particle(µm)	Figure
Venusil SCX	5	sphere

L10 Nitrile groups (CN) chemically bonded to porous silica particles, 3~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP CN	3, 5	sphere

L11 Phenyl groups chemically bonded to porous silica particles, 1.5~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP Phenyl	3, 5	sphere
Venusil ASB Phenyl	5	sphere

L12 A strong anion exchanger packing madeby chemically bonding a quaternary amine to a solid silica spherical core, 30~50 µm in diameter.

L13 Trimethylsilane (C1) chemically bonded to porous silica particles, 3~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP C1	3, 5	sphere
Venusil ASB C1	5	sphere

L14 Silica gel, 5~10 µm in diameter having a chemically bonded, strongly basic quaternary ammonium anion exchanger (SAX) coating.

Brand	Particle(µm)	Figure
Venusil SAX	5	sphere

L15 Hexylsilane (C6) chemically bonded to a totally porous silica particle, 3~10 µm in diameter.

L16 Dimethylsilane (C2) chemically bonded to a totally porous silica particles, 5~10 µm in diameter.

- L17** Strong cation exchange resin consisting of sulfonated, cross-linked styrene divinylbenzene copolymer in the hydrogen form, 7~11 µm in diameter.
- L18** Amino (NH₂) and Cyano (CN) groups chemically bonded to porous silica particles, 3~10 µm in diameter.
- L19** Strong cation exchange resin consisting of sulfonated, cross-linked styrene divinyl benzene copolymer in the calcium form, about 9 µm in diameter.
- L20** Dihydroxypropane groups chemically bonded to porous silica particles, 3~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil Diol	5	sphere

- L21** A rigid, spherical styrene-divinylbenzene copolymer, 5~10 µm in diameter.
- L22** A cation-exchange resin made of porous polystyrene with sulfonic acid groups, 5~10 µm in diameter.
- L23** An anion exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, about 10 µm in diameter.
- L24** A semi-rigid hydrophilic gel consisting of vinyl polymers with numerous hydroxyl groups on the matrix surface, 32~63 µm in diameter.
- L25** Packing having the capacity to separate compounds with a molecular weight range from 100 to 5000 (as determined by polyethylene oxide), applied to neutral, anionic and cationic water-soluble polymers. A polymethacrylate resin base, cross-linked with polyhydroxylated ether surface contained some residual carboxyl groups was found suitable.
- L26** Butyl silane (C4) chemically bonded to porous silica particles, 5~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil XBP C4	3, 5	sphere

- L27** Porous silica particles, 30~50 µm in diameter.

Brand	Particle(µm)	Figure
Bulk media(Silica)	50	Irregular

- L28** A multifunctional support which consists of a high purity, 100 Å, spherical silica substrate that has been bonded with anionic functionality in addition to a conventional reversed-phase C8 functionality.
- L29** Gamma alumina, reversed-phase, low carbon percentage by weight alumina-based polybutadiene spherical particulate, 5 µm in diameter with a pore diameter of 80 Å.
- L30** Ethyl silane chemically bonded to a totally porous silica particle, 5~10 µm in diameter.
- L31** A strong anion-exchange resin-quaternary amine bonded on latex particles attached to a core of 8.5µm macroporous particles having a pore size of 2000 Å and consisting of ethylvinylbenzene cross-linked with 55 % divinyl benzene.
- L32** A chiral-ligand exchange packing-L proline/copper complex covalently bonded to an irregularly shaped silica particles, 5~10 µm in diameter.
- L33** Packing having the capacity to separate proteins of 4000 to 40000 daltons. It is spherical, silica-based and processed to provide pH stability.
- L34** Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, about 9 µm in diameter.
- L35** Zirconium-stabilized spherical silica packing with a hydrophilic (diol-type) molecular mono layer bonded phase having a pore size of 150 Å.
- L36** 3,5-dinitrobenzoyl derivative of L-phenylglycine covalently bonded to a 5 µm aminopropyl silica.
- L37** Packing having the capacity to separate proteins by molecular size over a range of 2000-40000 daltons. It is a polymethacrylate gel.
- L38** A methacrylate-based size-exclusion packing for water soluble samples.
- L39** A hydrophilic-polyhydroxy methacrylate gel of totally porous spherical resin.



L40 Cellulose tris 3,5-dimethylphenyl carbamate coated porous silica particles, 5~20 µm in diameter.

Brand	Particle(µm)	Figure
Venusil CO	5	sphere

L41 Immobilized α1-acid glycoprotein on spherical silica particles, 5 µm in diameter.

L42 Octylsilane and octadecylsilane groups chemically bonded to porous silica particles, 5 µm in diameter.

Brand	Particle(µm)	Figure
Optimix C18/C8	3, 5	sphere

L43 Pentafluorophenyl groups chemically bonded to silica particles, 5~10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil PFP	5	sphere

L44 A multifunctional support, which consists of a high purity, 60 Å, spherical silica substrate that has been bonded with a cationic exchanger, sulfonic acid functionality in addition to a reversed- phase C8 functionality.

L45 Beta cyclodextrin bonded to porous silica particles, 5~10 µm in diameter.

L46 Polystyrene/divinylbenzene substrate agglomerated with quaternary amine functionalized latex beads, 10 µm in diameter.

L47 High capacity anion-exchange microporous substrate, fully functionalized with a trimethylamine group, 8 µm in diameter.

L48 Sulfonated, cross-linked polystyrene with an outer layer of submicron, porous, anion-exchange microbeads, 15 µm in diameter.

L49 A reversed-phase packing made by coating a thin layer of polybutadiene on to spherical porous zirconia particles, 3 to 10 µm in diameter.

L50 Multifunction resin with reversed-phase retention and strong anion-exchange functionalities. The resin consists of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 3 to 15µm in diameter, and a surface area of not less than 350 m²/g, substrate is coated with quaternary ammonium functionalized latex particles consisting of styrene cross-linked with divinylbenzene.

L51 Amylose tris-3,5-dimethylphenyl carbamate-coated, porous, spherical, silica particles, 5 to 10 µm in diameter.

Brand	Particle(µm)	Figure
Venusil CA	5	Irregular

L52 A strong cation exchange resin made of porous silica with sulfopropyl groups, 5 to 10 µ in diameter

L53 Weak cation-exchange resin consisting of ethylvinylbenzene, 55% cross-linked with divinylbenzene copolymer, 3 to 15 µm in diameter. Substrate is surface grafted with carboxylic acid and /or phosphoric acid functionalized monomers. Capacity not less than 500 µEq/column.

L54 A size exclusion medium made of covalent bonding of dextran to highly cross-linked porous agarose beads, about 13 µm in diameter

L55 A strong cation exchange resin made of porous silica coated with polybutadiene-maleic acid copolymer, about 5 µ in diameter

L56 Propyl silane chemically bonded to totally porous silica particles, 3 to 10 µm in diameter

L57 A chiral-recognition protein, ovomucoid, chemically bonded to silica particles, about 5 µm in diameter, having a pore size of 120 angstroms

L58 Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the sodium form, about 6 to 30 µm in diameter
Packing having the capacity to separate proteins by

L59 molecular weight over the range of 5 to 7000 kDa. It is spherical (5 - 10 µm), silica-based, and processed to provide hydrophilic characteristics and pH stability
Spherical, porous silica gel, 10 µm or less in diameter,

L60 the surface of which has been covalently modified with alkyl amide groups and endcapped
A hydroxide selective strong anion-exchange resin

L61 consisting of a highly cross-linked core of 13 µm microporous particles having a pore size less than 10 Angstrom units and consisting of ethylvinylbenzene cross-linked with 55% divinylbenzene with a latex coating composed of 85 nm diameter microbeads bonded with alkanol quaternary ammonium ions (6%) C30 silane bonded phase on a fully porous spherical

L62 silica, 3 to 15 µm in diameter

Ordering Information by the Type of Stationary Phases

Reversed Phase Columns

Reversed Phase Columns for Small Molecules

Dimension (mm)	Particle size (μm)	UHP AQ C18	UHP ASB C18	UHP Innoval C18	UHP HILIC
		UHP AQ C18 100 Å; 240 m ² /g C%=8	UHP ASB C18 100 Å; 240 m ² /g C%=8	UHP Innoval C18 100 Å; 240 m ² /g C%=14	UHP HILIC 100 Å; 240 m ² /g C%=3
2.1×30	1.9	IA920302-0	IS920302-0	IX920302-0	IH920302-0
2.1×50	1.9	IA920502-0	IS920502-0	IX920502-0	IH920502-0
2.1×100	1.9	IA921002-0	IS921002-0	IX921002-0	IH921002-0
4.6×50	1.9	IA920505-0	IS920505-0	IX920505-0	IH920505-0
4.6×100	1.9	IA921005-0	IS921005-0	IX921005-0	IH921005-0

Dimension (mm)	Particle size (μm)	Bonshell ASB C18	Bonshell C18
		90 Å, 150 m ² /g, C%=7	90 Å, 150 m ² /g, C%=10
2.1×30	2.7	SS920302-0	SC920302-0
2.1×50	2.7	SS920502-0	SC920502-0
2.1×100	2.7	SS921002-0	SC921002-0
3.0×30	2.7	SS920303-0	SC920303-0
3.0×50	2.7	SS920503-0	SC920503-0
3.0×100	2.7	SS921003-0	SC921003-0
4.6×50	2.7	SS920505-0	SC920505-0
4.6×75	2.7	SS920805-0	SC920805-0
4.6×100	2.7	SS921005-0	SC921005-0

Analytical Columns

Dimension (mm)	Promosil C18	Promosil C8	Promosil CN	Venusil XBP Phenyl	Venusil XBP C4	Venusil XBP C1	Venusil XBP CN
	General C18, 100 Å, 320 m ² /g; C%=18	General C8, 100 Å, 320 m ² /g; C%=10	100 Å, 320 m ² /g, C%=5	100 Å, 380 m ² /g, C%=12	100 Å, 380 m ² /g, C%=7	100 Å, 380 m ² /g; C%= 3	100 Å, 380 m ² /g, C%=5
2.1×30	PM950302-0	PM850302-0	PM550302-0	VX650302-0	VX450302-0	VX150302-0	VC950302-0
2.1×50	PM950502-0	PM850502-0	PM550502-0	VX650502-0	VX450502-0	VX150502-0	VC950502-0
2.1×100	PM951002-0	PM851002-0	PM551002-0	VX651002-0	VX451002-0	VX151002-0	VC951002-0
2.1×150	PM951505-0	PM851505-0	PM551505-0	VX651502-0	VX451502-0	VX151502-0	VC951502-0
3.0×30	PM950303-0	PM850303-0	PM550303-0	VX650303-0	VX450303-0	VX150303-0	VC950303-0
3.0×50	PM950503-0	PM850503-0	PM550503-0	VX650503-0	VX450503-0	VX150503-0	VC950503-0
3.0×100	PM951003-0	PM851003-0	PM551003-0	VX651003-0	VX451003-0	VX151003-0	VC951003-0
3.0×150	PM951503-0	PM851503-0	PM551503-0	VX651503-0	VX451503-0	VX151503-0	VC951503-0
4.6×50	PM950505-0	PM850505-0	PM550505-0	VX650505-0	VX450505-0	VX150505-0	VC950505-0
4.6×100	PM951005-0	PM851005-0	PM551005-0	VX651005-0	VX451005-0	VX151005-0	VC951005-0
4.6×150	PM951505-0	PM851505-0	PM551505-0	VX651505-0	VX451505-0	VX151505-0	VC951505-0
4.6×200	PM952005-0	PM852005-0	PM552005-0	VX652005-0	VX452005-0	VX152005-0	VC952005-0
4.6×250	PM952505-0	PM852505-0	PM552505-0	VX652505-0	VX452505-0	VX152505-0	VC952505-0
G 4.6×10, 4/pk	PM950105-0	PM850105-0	PM550105-0	VX650105-0	VX450105-0	VX150105-0	VC950105-0
DCG 4.6×10, 4/pk	PM950105-0S	PM850105-0S	PM550105-0S	VX650105-0S	VX450105-0S	VX150105-0S	VC950105-0S



Dimension (mm)	Particle size (µm)	Venusil XBP C18 (2)	Venusil XBP C18 (L)	Venusil XBP Polar – Phenyl	Innoval C18	Innoval AQ	Venusil HLP C18	Venusil PFP	Venusil PAH
		100 Å, 380 m ² /g, C%=18	150 Å, 200 m ² /g; C%=15	110 Å, 340 m ² /g; C%=15	5 µm, 100 Å, 220 m ² /g; C%=15	100 Å, 220 m ² /g C%=15%	110 Å, 340 m ² /g; C%=15	120 Å, 320 m ² /g;	200 Å, 200 m ² /g; C%=17
4.6×50	3						VHP930505-0		
4.6×100	3						VHP931005-0		
4.6×150	3						VHP931505-0		
G 4.6×10, 4/pk	3						VHP930105-0		
DCG 4.6×10, 4/pk	3						VHP930105-0S		
2.1×30	5	VX950302-2	VX950302-L		IX950302-0	IA950302-0			
2.1×50	5	VX950502-2	VX950502-L	VXP950502-A	IX950502-0	IA950502-0			
2.1×100	5	VX951002-2	VX951002-L	VXP951002-A	IX951002-0	IA951002-0			
2.1×150	5	VX951502-2	VX951502-L	VXP951502-A	IX951502-0	IA951502-0			
3.0×30	5	VX950303-2	VX950303-L		IX950303-0	IA950303-0			
3.0×50	5	VX950503-2	VX950503-L		IX950503-0	IA950503-0			
3.0×100	5	VX951003-2	VX951003-L		IX951003-0	IA951003-0			
3.0×150	5	VX951503-2	VX951503-L		IX951503-0	IA951503-0			
4.6×50	5	VX950505-2	VX950505-L	VXP950505-A	IX950505-0	IA950505-0	VHL950505-0	VF950505-0	
4.6×100	5	VX951005-2	VX951005-L	VXP951005-A	IX951005-0	IA951005-0	VHL951005-0	VF951005-0	
4.6×150	5	VX951505-2	VX951505-L	VXP951505-A	IX951505-0	IA951505-0	VHL951505-0	VF951505-0	
4.6×200	5	VX952005-2	VX952005-L		IX952005-0	IA952005-0	VHL952005-0	VF952005-0	
4.6×250	5	VX952505-2	VX952505-L	VXP952505-A	IX952505-0	IA952505-0	VHL952505-0	VF952505-0	VP952505-L
G 4.6×10, 4/pk	5	VX950105-2	VX950105-L	VXP950105-A	IX950105-0	IA950105-0	VHL950105-0	VF950105-0	VP950105-L
DCG 4.6×10, 4/pk	5	VX950105-2S	VX950105-LS	VXP950105-AS	IX950105-0S	IA950105-0S	VHL950105-0S	VF950105-0S	VP950105-LS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Dimension (mm)	Particle Size (µm)	Venusil ASB C18	Venusil AQ C18	Unisol C18	Unisol C18(2)	Durashell RP	Durashell C18	Durshell C18 (L)	Venusil XBP C18	Venusil XBP C8
		150 Å, 200 m ² /g, C%=12	100 Å, 380 m ² /g, C%=18	100 Å, 410 m ² /g, C%=18	110 Å, 340 m ² /g, C%=14	150 Å, 200 m ² /g, C%=15	100 Å, 380 m ² /g, C%=21	150 Å, 380 m ² /g, C%=14	100 Å, 380 m ² /g, C%=22	100 Å, 380 m ² /g, C%=14
2.1×30	3	VS930302-0	VA930302-0	UO930302-0	UO930302-2	DS930302-0	DC930302-0	DC930302-L	VX930302-0	VX830302-0
2.1×50	3	VS930502-0	VA930502-0	UO930502-0	UO930502-2	DS930502-0	DC930502-0	DC930502-L	VX930502-0	VX830502-0
2.1×100	3	VS931002-0	VA931002-0	UO931002-0	UO931002-2	DS931002-0	DC931002-0	DC931002-L	VX931002-0	VX831002-0
2.1×150	3	VS931502-0	VA931502-0	UO931502-0	UO931502-2	DS931502-0	DC931502-0	DC931502-L	VX931502-0	VX831502-0
G 2.1×10, 4/pk	3	VS930102-0	VA930102-0	UO930102-0	UO930102-2	DS930102-0	DC930102-0	DC930102-L	VX930102-0	VX830102-0
DCG 2.1×10, 4/pk	3	VS930102-0S	VA930102-0S	UO930102-0S	UO930102-2S	DS930102-0S	DC930102-0S	DC930102-LS	VX930102-0S	VX830102-0S
3.0×30	3	VS930303-0	VA930303-0	UO930303-0	UO930303-2	DS930303-0	DC930303-0	DC930303-L	VX930303-0	VX830303-0
3.0×50	3	VS930503-0	VA930503-0	UO930503-0	UO930503-2	DS930503-0	DC930503-0	DC930503-L	VX930503-0	VX830503-0
3.0×100	3	VS931003-0	VA931003-0	UO931003-0	UO931003-2	DS931003-0	DC931003-0	DC931003-L	VX931003-0	VX831003-0
3.0×150	3	VS931503-0	VA931503-0	UO931503-0	UO931503-2	DS931503-0	DC931503-0	DC931503-L	VX931503-0	VX831503-0
4.6×50	3	VS930505-0	VA930505-0	UO930505-0	UO930505-2	DS930505-0	DC930505-0	DC930505-L	VX930505-0	VX830505-0
4.6×100	3	VS931005-0	VA931005-0	UO931005-0	UO931005-2	DS931005-0	DC931005-0	DC931005-L	VX931005-0	VX831005-0
4.6×150	3	VS931505-0	VA931505-0	UO931505-0	UO931505-2	DS931505-0	DC931505-0	DC931505-L	VX931505-0	VX831505-0
2.1×30	5	VS950302-0	VA950302-0	UO950302-0	UO950302-2	DS950302-0	DC950302-0	DC950302-L	VX950302-0	VX850302-0
2.1×50	5	VS950502-0	VA950502-0	UO950502-0	UO950502-2	DS950502-0	DC950502-0	DC950502-L	VX950502-0	VX850502-0
2.1×100	5	VS951002-0	VA951002-0	UO951002-0	UO951002-2	DS951002-0	DC951002-0	DC951002-L	VX951002-0	VX851002-0
2.1×150	5	VS951502-0	VA951502-0	UO951502-0	UO951502-2	DS951502-0	DC951502-0	DC951502-L	VX951502-0	VX851502-0
3.0×30	5	VS950303-0	VA950303-0	UO950303-0	UO950303-2	DS950303-0	DC950303-0	DC950303-L	VX950303-0	VX850303-0
3.0×50	5	VS950503-0	VA950503-0	UO950503-0	UO950503-2	DS950503-0	DC950503-0	DC950503-L	VX950503-0	VX850503-0
3.0×100	5	VS951003-0	VA951003-0	UO951003-0	UO951003-2	DS951003-0	DC951003-0	DC951003-L	VX951003-0	VX851003-0
3.0×150	5	VS951503-0	VA951503-0	UO951503-0	UO951503-2	DS951503-0	DC951503-0	DC951503-L	VX951503-0	VX851503-0
4.6×50	5	VS950505-0	VA950505-0	UO950505-0	UO950505-2	DS950505-0	DC950505-0	DC950505-L	VX950505-0	VX850505-0
4.6×100	5	VS951005-0	VA951005-0	UO951005-0	UO951005-2	DS951005-0	DC951005-0	DC951005-L	VX951005-0	VX851005-0
4.6×150	5	VS951505-0	VA951505-0	UO951505-0	UO951505-2	DS951505-0	DC951505-0	DC951505-L	VX951505-0	VX851505-0
4.6×200	5	VS952005-0	VA952005-0	UO952005-1	UO952005-2	DS952005-0	DC952005-0	DC952005-L	VX952005-0	VX852005-0
4.6×250	5	VS952505-0	VA952505-0	UO952505-0	UO952505-2	DS952505-0	DC952505-0	DC952505-L	VX952505-0	VX852505-0
G 4.6×10, 4/pk	5	VS950105-0	VA950105-0	UO950105-0	UO950105-2	DS950105-0	DC950105-0	DC950105-L	VX950105-0	VX850105-0
DCG 4.6×10, 4/pk	5	VS950105-0S	VA950105-0S	UO950105-0S	UO950105-2S	DS950105-0S	DC950105-0S	DC950105-LS	VX950105-0S	VX850105-0S
10×150	5	VS951510-0	VA951510-0	UO951510-0	UO951510-2	DS951510-0	DC951510-0	DC951510-L	VX951510-0	VX851510-0
10×250	5	VS952510-0	VA952510-0	UO952510-0	UO952510-2	DS952510-0	DC952510-0	DC952510-L	VX952510-0	VX852510-0
21.2×50	5	VS950520-0	VA950520-0	UO950520-0	UO950520-2	DS950520-0	DC950520-0	DC950520-L	VX950520-0	VX850520-0
21.2×150	5	VS951520-0	VA951520-0	UO951520-0	UO951520-2	DS951520-0	DC951520-0	DC951520-L	VX951520-0	VX851520-0
21.2×250	5	VS952520-0	VA952520-0	UO952520-0	UO952520-2	DS952520-0	DC952520-0	DC952520-L	VX952520-0	VX852520-0
G 10×10	5	VS950110-0S	VA950110-0S	UO950110-0S	UO950110-2S	DS950110-0S	DC950110-0S	DC950110-LS	VX950110-0S	VX850110-0S
G 21.2×10	5	VS950120-0	VA950120-0	UO950120-0	UO950120-2	DS950120-0	DC950120-0	DC950120-L	VX950120-0	VX850120-0
30×100	5	VS951030-0	VA951030-0	UO951030-0	UO951030-2	DS951030-0	DC951030-0	DC951030-L	VX951030-0	VX851030-0
30×150	5	VS951530-0	VA951530-0	UO951530-0	UO951530-2	DS951530-0	DC951530-0	DC951530-L	VX951530-0	VX851530-0
30×250	5	VS952530-0	VA952530-0	UO952530-0	UO952530-2	DS952530-0	DC952530-0	DC952530-L	VX952530-0	VX852530-0
10×150	10	VS901510-0	VA901510-0	UO901510-0	UO901510-2	DS901510-0	DC901510-0	DC901510-L	VX901510-0	VX801510-0
10×250	10	VS902510-0	VA902510-0	UO902510-0	UO902510-2	DS902510-0	DC902510-0	DC902510-L	VX902510-0	VX802510-0
21.2×50	10	VS900520-0	VA900520-0	UO900520-0	UO900520-2	DS900520-0	DC900520-0	DC900520-L	VX900520-0	VX800520-0
21.2×150	10	VS901520-0	VA901520-0	UO901520-0	UO901520-2	DS901520-0	DC901520-0	DC901520-L	VX901520-0	VX801520-0
21.2×250	10	VS902520-0	VA902520-0	UO902520-0	UO902520-2	DS902520-0	DC902520-0	DC902520-L	VX902520-0	VX802520-0
G 10×10	10	VS900110-0S	VA900110-0S	UO900110-0S	UO900110-2S	DS900110-0S	DC900110-0S	DC900110-LS	VX900110-0S	VX800110-0S
G 21.2×10	10	VS900120-0	VA900120-0	UO900120-0	UO900120-2	DS900120-0	DC900120-0	DC900120-L	VX900120-0	VX800120-0
30×100	10	VS901030-0	VA901030-0	UO901030-0	UO901030-2	DS901030-0	DC901030-0	DC901030-L	VX901030-0	VX801030-0
30×150	10	VS901530-0	VA901530-0	UO901530-0	UO901530-2	DS901530-0	DC901530-0	DC901530-L	VX901530-0	VX801530-0
30×250	10	VS902530-0	VA902530-0	UO902530-0	UO902530-2	DS902530-0	DC902530-0	DC902530-L	VX902530-0	VX802530-0
50×150	10	VS901550-0	VA901550-0	UO901550-0	UO901550-2	DS901550-0	DC901550-0	DC901550-L	VX901550-0	VX801550-0
50×250	10	VS902550-0	VA902550-0	UO902550-0	UO902550-2	DS902550-0	DC902550-0	DC902550-L	VX902550-0	VX802550-0



Dimension (mm)	Particle Size (µm)	Venusil ASB C8	Venusil ASB C3	Venusil ASB C1	Durashell C8
		150 Å, 200 m ² /g, C%=7	150 Å, 200 m ² /g, C%=4	150 Å, 200 m ² /g, C%=2	100 Å, 380 m ² /g, C%=14
2.1×30	3	VS830302-0	VS330302-0	VS130302-0	DC830302-0
2.1×50	3	VS830502-0	VS330502-0	VS130502-0	DC830502-0
2.1×100	3	VS831002-0	VS331002-0	VS131002-0	DC831002-0
2.1×150	3	VS831502-0	VS331502-0	VS131502-0	DC831502-0
G 2.1×10, 4/pk	3	VS830102-0	VS330102-0	VS130102-0	DC830102-0
DCG 2.1×10, 4/pk	3	VS830102-0S	VS330102-0S	VS130102-0S	DC830102-0S
3.0×30	3	VS830303-0	VS330303-0	VS130303-0	DC830303-0
3.0×50	3	VS830503-0	VS330503-0	VS130503-0	DC830503-0
3.0×100	3	VS831003-0	VS331003-0	VS131003-0	DC831003-0
3.0×150	3	VS831503-0	VS331503-0	VS131503-0	DC831503-0
4.6×50	3	VS830505-0	VS330505-0	VS130505-0	DC830505-0
4.6×100	3	VS831005-0	VS331005-0	VS131005-0	DC831005-0
4.6×150	3	VS831505-0	VS331505-0	VS131505-0	DC831505-0
2.1×30	5	VS850302-0	VS350302-0	VS150302-0	DC850302-0
2.1×50	5	VS850502-0	VS350502-0	VS150502-0	DC850502-0
2.1×100	5	VS851002-0	VS351002-0	VS151002-0	DC851002-0
2.1×150	5	VS851502-0	VS351502-0	VS151502-0	DC851502-0
3.0×30	5	VS850303-0	VS350303-0	VS150303-0	DC850303-0
3.0×50	5	VS850503-0	VS350503-0	VS150503-0	DC850503-0
3.0×100	5	VS851003-0	VS351003-0	VS151003-0	DC851003-0
3.0×150	5	VS851503-0	VS351503-0	VS151503-0	DC851503-0
4.6×50	5	VS850505-0	VS350505-0	VS150505-0	DC850505-0
4.6×100	5	VS851005-0	VS351005-0	VS151005-0	DC851005-0
4.6×150	5	VS851505-0	VS351505-0	VS151505-0	DC851505-0
4.6×200	5	VS852005-0	VS352005-0	VS152005-0	DC852005-1
4.6×250	5	VS852505-0	VS352505-0	VS152505-0	DC852505-0
G 4.6×10, 4/pk	5	VS850105-0	VS350105-0	VS150105-0	DC850105-0
DCG 4.6×10, 4/pk	5	VS850105-0S	VS350105-0S	VS150105-0S	DC850105-0S

Reversed Phase Columns for Large Molecules

Particle Size: 5 µm; Surface Area: 80 m²/g; Pore Size: 300 Å;

Column Type	Dimension (mm)	Venusil XBP Phenyl	Venusil XBP C4	Venusil XBP C1	Venusil XBP CN
Analytical	2.1×30	VX650302-T	VX450302-T	VX150302-T	VC950302-T
Analytical	2.1×50	VX650502-T	VX450502-T	VX150502-T	VC950502-T
Analytical	2.1×100	VX651002-T	VX451002-T	VX151002-T	VC951002-T
Analytical	2.1×150	VX651502-T	VX451502-T	VX151502-T	VC951502-T
Analytical	3.0×30	VX650303-T	VX450303-T	VX150303-T	VC950303-T
Analytical	3.0×50	VX650503-T	VX450503-T	VX150503-T	VC950503-T
Analytical	3.0×100	VX651003-T	VX451003-T	VX151003-T	VC951003-T
Analytical	3.0×150	VX651503-T	VX451503-T	VX151503-T	VC951503-T
Analytical	4.6×50	VX650505-T	VX450505-T	VX150505-T	VC950505-T
Analytical	4.6×100	VX651005-T	VX451005-T	VX151005-T	VC951005-T
Analytical	4.6×150	VX651505-T	VX451505-T	VX151505-T	VC951505-T
Analytical	4.6×200	VX652005-T	VX452005-T	VX152005-T	VC952005-T
Analytical	4.6×250	VX652505-T	VX452505-T	VX152505-T	VC952505-T
G	4.6×10, 4/pk	VX650105-T	VX450105-T	VX150105-T	VC950105-T
DCG	4.6×10, 4/pk	VX650105-TS	VX450105-TS	VX150105-TS	VC950105-TS

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Column Type	Dimension (mm)	Venusil XBP Phenyl	Venusil XBP C4	Venusil XBP C1	Venusil XBP CN
Preparative	10×150	VX651510-T	VX451510-T	VX151510-T	VC951510-T
Preparative	10×250	VX652510-T	VX452510-T	VX152510-T	VC952510-T
Preparative	21.2×50	VX650520-T	VX450520-T	VX150520-T	VC950520-T
Preparative	21.2×150	VX651520-T	VX451520-T	VX151520-T	VC951520-T
Preparative	21.2×250	VX652520-T	VX452520-T	VX152520-T	VC952520-T
G	10×10	VX650110-TS	VX450110-TS	VX150110-TS	VC950110-TS
G	21.2×10	VX650120-T	VX450120-T	VX150120-T	VC950120-T

Particle Size: 5 µm; Surface Area: 80 m²/g; Pore Size: 300 Å;

Column Type	Dimension (mm)	Venusil ASB C18	Venusil ASB C8	Venusil XBP C18	Venusil XBP C8
		extreme low pH tolerance (0.8-7.5), low bleed	C8 for low pH and low bleed	highest hydrophobicity	General RP
Analytical	2.1×30	VS950302-T	VS850302-T	VX950302-T	VX850302-T
Analytical	2.1×50	VS950502-T	VS850502-T	VX950502-T	VX850502-T
Analytical	2.1×100	VS951002-T	VS851002-T	VX951002-T	VX851002-T
Analytical	2.1×150	VS951502-T	VS851502-T	VX951502-T	VX851502-T
Analytical	3.0×30	VS950303-T	VS850303-T	VX950303-T	VX850303-T
Analytical	3.0×50	VS950503-T	VS850503-T	VX950503-T	VX850503-T
Analytical	3.0×100	VS951003-T	VS851003-T	VX951003-T	VX851003-T
Analytical	3.0×150	VS951503-T	VS851503-T	VX951503-T	VX851503-T
Analytical	4.6×50	VS950505-T	VS850505-T	VX950505-T	VX850505-T
Analytical	4.6×100	VS951005-T	VS851005-T	VX951005-T	VX851005-T
Analytical	4.6×150	VS951505-T	VS851505-T	VX951505-T	VX851505-T
Analytical	4.6×200	VS952005-T	VS852005-T	VX952005-T	VX852005-T
Analytical	4.6×250	VS952505-T	VS852505-T	VX952505-T	VX852505-T
G	4.6×10, 4/pk	VS950105-T	VS850105-T	VX950105-T	VX850105-T
DCG	4.6×10, 4/pk	VS950105-TS	VS850105-TS	VX950105-TS	VX850105-TS
Preparative	10×150	VS951510-T	VS851510-T	VX951510-T	VX851510-T
Preparative	10×250	VS952510-T	VS852510-T	VX952510-T	VX852510-T
Preparative	21.2×50	VS950520-T	VS850520-T	VX950520-T	VX850520-T
Preparative	21.2×150	VS951520-T	VS851520-T	VX951520-T	VX851520-T
Preparative	21.2×250	VS952520-T	VS852520-T	VX952520-T	VX852520-T
G	10×10	VS950110-TS	VS850110-TS	VX950110-TS	VX850110-TS
G	21.2×10	VS950120-T	VS850120-T	VX950120-T	VX850120-T

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge



Normal Phase Columns

Normal Phase Columns for Small Molecules

Particle Size: 5 μm

Type	Particle Size(μm)	Dimension (mm)	Unisol Amide (HILIC)	Venusil XBP Silica (HILIC II)	Venusil XBP NH ₂ (HILIC III)	Venusil XBP CN	Venusil Diol
			100 Å, 410 m ² /g;	100 Å, 380 m ² /g;	100 Å, 380 m ² /g;	100 Å, 380 m ² /g;	100 Å, 380 m ² /g;
Analytical	5	2.1×30	VH950302-0	VS950302-0	VN850302-0	VC950302-0	VD950302-0
Analytical	5	2.1×50	VH950502-0	VS950502-0	VN850502-0	VC950502-0	VD950502-0
Analytical	5	2.1×100	VH951002-0	VS951002-0	VN851002-0	VC951002-0	VD951002-0
Analytical	5	2.1×150	VH951502-0	VS951502-0	VN851502-0	VC951502-0	VD951502-0
Analytical	5	3.0×30	VH950303-0	VS950303-0	VN850303-0	VC950303-0	VD950303-0
Analytical	5	3.0×50	VH950503-0	VS950503-0	VN850503-0	VC950503-0	VD950503-0
Analytical	5	3.0×100	VH951003-0	VS951003-0	VN851003-0	VC951003-0	VD951003-0
Analytical	5	3.0×150	VH951503-0	VS951503-0	VN851503-0	VC951503-0	VD951503-0
Analytical	5	4.6×50	VH950505-0	VS950505-0	VN850505-0	VC950505-0	VD950505-0
Analytical	5	4.6×100	VH951005-0	VS951005-0	VN851005-0	VC951005-0	VD951005-0
Analytical	5	4.6×150	VH951505-0	VS951505-0	VN851505-0	VC951505-0	VD951505-0
Analytical	5	4.6×200	VH952005-0	VS952005-0	VN852005-0	VC952005-0	VD952005-0
Analytical	5	4.6×250	VH952505-0	VS952505-0	VN852505-0	VC952505-0	VD952505-0
G	5	4.6×10, 4/pk	VH950105-0	VS950105-0	VN850105-0	VC950105-0	VD950105-0
DCG	5	4.6×10, 4/pk	VH950105-OS	VS950105-OS	VN850105-OS	VC950105-OS	VD950105-OS
Semi-preparative	5	10×150	VH951510-0	VS951510-0	VN851510-0	VC951510-0	
Semi-preparative	5	10×250	VH952510-0	VS952510-0	VN852510-0	VC952510-0	
Preparative	5	21.2×50	VH950520-0	VS950520-0	VN850520-0	VC950520-0	
Preparative	5	21.2×150	VH951520-0	VS951520-0	VN851520-0	VC951520-0	
Preparative	5	21.2×250	VH952520-0	VS952520-0	VN852520-0	VC952520-0	
G	5	10×10	VH950110-OS	VS950110-OS	VN850110-OS	VC950110-OS	
G	5	21.2×10	VH950120-0	VS950120-0	VN850120-0	VC950120-0	
Preparative	5	30×100	VH951030-0	VS951030-0	VN851030-0	VC951030-0	
Preparative	5	30×150	VH951530-0	VS951530-0	VN851530-0	VC951530-0	
Preparative	5	30×250	VH952530-0	VS952530-0	VN852530-0	VC952530-0	
Semi-preparative	10	10×150	VH901510-0	VS901510-0	VN801510-0	VC901510-0	
Semi-preparative	10	10×250	VH902510-0	VS902510-0	VN802510-0	VC902510-0	
Preparative	10	21.2×50	VH900520-0	VS900520-0	VN800520-0	VC900520-0	
Preparative	10	21.2×150	VH901520-0	VS901520-0	VN801520-0	VC901520-0	
Preparative	10	21.2×250	VH902520-0	VS902520-0	VN802520-0	VC902520-0	
G	10	10×10	VH900110-OS	VS900110-OS	VN800110-OS	VC900110-OS	
G	10	21.2×10	VH900120-0	VS900120-0	VN800120-0	VC900120-0	
Preparative	10	30×100	VH901030-0	VS901030-0	VN801030-0	VC901030-0	
Preparative	10	30×150	VH901530-0	VS901530-0	VN801530-0	VC901530-0	
Preparative	10	30×250	VH902530-0	VS902530-0	VN802530-0	VC902530-0	
Preparative	10	50×150	VH901550-0	VS901550-0	VN801550-0	VC901550-0	
Preparative	10	50×250	VH902550-0	VS902550-0	VN802550-0	VC902550-0	

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Type	Particle Size (μm)	Dimension (μm)	Promosil Silica	Promosil CN	Promosil NH ₂	Durashell NH ₂
100 Å, 320 m ² /g,	100 Å, 320 m ² /g,	100 Å, 320 m ² /g,	100 Å, 320 m ² /g,	100 Å, 320 m ² /g,	100 Å, 320 m ² /g,	100 Å, 380 m ² /g,
Analytical	5	2.1×30	PM050302-0	PM550302-0	PM750302-0	DN850302-0
Analytical	5	2.1×50	PM050502-0	PM550502-0	PM750502-0	DN850502-0
Analytical	5	2.1×100	PM051002-0	PM551002-0	PM751002-0	DN851002-0
Analytical	5	2.1×150	PM051502-0	PM551502-0	PM751505-0	DN851502-0
Analytical	5	3.0×30	PM050303-0	PM550303-0	PM750303-0	DN850303-0
Analytical	5	3.0×50	PM050503-0	PM550503-0	PM750503-0	DN850503-0
Analytical	5	3.0×100	PM051003-0	PM551003-0	PM751003-0	DN851003-0
Analytical	5	3.0×150	PM051503-0	PM551503-0	PM751503-0	DN851503-0
Analytical	5	4.6×50	PM050505-0	PM550505-0	PM750505-0	DN850505-0
Analytical	5	4.6×100	PM051005-0	PM551005-0	PM751005-0	DN851005-0
Analytical	5	4.6×150	PM051505-0	PM551505-0	PM751505-0	DN851505-0
Analytical	5	4.6×200	PM052005-0	PM552005-0	PM752005-0	DN852005-0
Analytical	5	4.6×250	PM052505-0	PM552505-0	PM752505-0	DN852505-0
G	5	4.6×10, 4/pk	PM050105-0	PM550105-0	PM750105-0	DN850105-0
DCG	5	4.6×10, 4/pk	PM050105-0S	PM550105-0S	PM750105-0S	DN850105-0S
Semi-preparative	5	10×150	PM051510-0			DN851510-0
Semi-preparative	5	10×250	PM052510-0			DN852510-0
Preparative	5	21.2×50	PM050520-0			DN850520-0
Preparative	5	21.2×150	PM051520-0			DN851520-0
Preparative	5	21.2×250	PM052520-0			DN852520-0
G	5	10×10	PM050110-0S			DN850110-0S
G	5	21.2×10	PM050120-0			DN850120-0
Preparative	5	30×100	PM051030-0			DN851030-0
Preparative	5	30×150	PM051530-0			DN851530-0
Preparative	5	30×250	PM052530-0			DN852530-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge



Normal Phase Columns for Large Molecules

Ultra Pure Silica; Surface Area: 80 m²/g; Pore Size: 300 Å

Type	Particle Size(μm)	Dimension (mm)	Venusil XBP NH ₂	Venusil Diol	Venusil XBP CN	Unisol Amide (HILIC)	Venusil XBP Silica
Analytical	5	2.1×30	VN850302-T	VD950302-T	VC950302-T	VH950302-T	VSi950302-T
Analytical	5	2.1×50	VN850502-T	VD950502-T	VC950502-T	VH950502-T	VSi950502-T
Analytical	5	2.1×100	VN851002-T	VD951002-T	VC951002-T	VH951002-T	VSi951002-T
Analytical	5	2.1×150	VN851502-T	VD951502-T	VC951502-T	VH951502-T	VSi951502-T
Analytical	5	3.0×30	VN850303-T	VD950303-T	VC950303-T	VH950303-T	VSi950303-T
Analytical	5	3.0×50	VN850503-T	VD950503-T	VC950503-T	VH950503-T	VSi950503-T
Analytical	5	3.0×100	VN851003-T	VD951003-T	VC951003-T	VH951003-T	VSi951003-T
Analytical	5	3.0×150	VN851503-T	VD951503-T	VC951503-T	VH951503-T	VSi951503-T
Analytical	5	4.6×50	VN850505-T	VD950505-T	VC950505-T	VH950505-T	VSi950505-T
Analytical	5	4.6×100	VN851005-T	VD951005-T	VC951005-T	VH951005-T	VSi951005-T
Analytical	5	4.6×150	VN851505-T	VD951505-T	VC951505-T	VH951505-T	VSi951505-T
Analytical	5	4.6×200	VN852005-T	VD952005-T	VC952005-T	VH952005-T	VSi952005-T
Analytical	5	4.6×250	VN852505-T	VD952505-T	VC952505-T	VH952505-T	VSi952505-T
G	5	4.6×10, 4/pk	VN850105-T	VD950105-T	VC950105-T	VH950105-T	VSi950105-T
G	5	4.6×10, 4/pk	VN850105-TS	VD950105-TS	VC950105-TS	VH950105-TS	VSi950105-TS
Semi-preparative	5	10×150	VN851510-T		VC951510-T		VSi951510-T
Semi-preparative	5	10×250	VN852510-T		VC952510-T		VSi952510-T
Preparative	5	21.2×50	VN850520-T		VC950520-T		VSi950520-T
Preparative	5	21.2×150	VN851520-T		VC951520-T		VSi951520-T
Preparative	5	21.2×250	VN852520-T		VC952520-T		VSi952520-T
G	5	10×10	VN850110-TS		VC950110-TS		VSi950110-TS
G	5	21.2×10	VN850120-T		VC950120-T		VSi950120-T
Preparative	5	30×100	VN851030-T		VC951030-T		VSi951030-T
Preparative	5	30×150	VN851530-T		VC951530-T		VSi951530-T
Preparative	5	30×250	VN852530-T		VC952530-T		VSi952530-T

Ion-exchange Columns

Type	Particle Size (µm)	Dimension (mm)	Venusil SAX	Venusil SCX
Analytical	5	4.6×100	100 Å, 380 m ² /g VSa951005-0	150 Å, 200 m ² /g VSc951005-0
Analytical	5	4.6×150	VSa951505-0	VSc951505-0
Analytical	5	4.6×250	VSa952505-0	VSc952505-0
G	5	4.6×10, 4/pk	VSa950105-0	VSc950105-0
DCG	5	4.6×10, 4/pk	VSa950105-0S	VSc950105-0S

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Surface Area: 80 m²/g, Pore Size: 300 Å

Type	Particle Size (µm)	Dimension (mm)	Venusil SAX	Venusil SCX
Analytical	5	4.6×100	VSa951005-T	VSc951005-T
Analytical	5	4.6×150	VSa951505-T	VSc951505-T
Analytical	5	4.6×250	VSa952505-T	VSc952505-T
G	5	4.6×10, 4/pk	VSa950105-T	VSc950105-T
DCG	5	4.6×10, 4/pk	VSa950105-TS	VSc950105-TS

Mixed Phase Columns

Surface Area: 380 m²/g, Pore Size: 100 Å

Type	Dimension (mm)	Particle size (µm)	Optimix C18/C8 (1:1)	Optimix C18/amide (1:1)	Optimix C18/phenyl (1:1)
Analytical	2.1×30	5	OP950302-OC	OP950302-AM	OP950302-PH
Analytical	2.1×50	5	OP950502-OC	OP950502-AM	OP950502-PH
Analytical	2.1×100	5	OP951002-OC	OP951002-AM	OP951002-PH
Analytical	2.1×150	5	OP951502-OC	OP951502-AM	OP951502-PH
Analytical	4.6×50	5	OP950505-OC	OP950505-AM	OP950505-PH
Analytical	4.6×100	5	OP951005-OC	OP951005-AM	OP951005-PH
Analytical	4.6×150	5	OP951505-OC	OP951505-AM	OP951505-PH
Analytical	4.6×200	5	OP952005-OC	OP952005-AM	OP952005-PH
Analytical	4.6×250	5	OP952505-OC	OP952505-AM	OP952505-PH
G	4.6×10, 4/pk	5	OP950105-OC	OP950105-AM	OP950105-PH
DCG	4.6×10, 4/pk	5	OP950105-OCS	OP950105-AMS	OP950105-PHS
Fast analysis	2.1×30	3		OP930302-AM	
Fast analysis	2.1×50	3		OP930502-AM	
Fast analysis	2.1×100	3		OP931002-AM	
Fast analysis	2.1×150	3		OP931502-AM	
G	2.1×10, 4/pk	3		OP930102-AM	
DCG	2.1×10, 4/pk	3		OP930102-AMS	
Fast analysis	4.6×50	3		OP930505-AM	
Fast analysis	4.6×100	3		OP931005-AM	
Fast analysis	4.6×150	3		OP931505-AM	

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge



Type	Dimension (mm)	Particle size (µm)	Optimix C18/ SCX (1:1)	Optimix C18/ SAX (1:1)	Optimix C18/ Nitrophenyl (1:1)
Fast analysis	2.1×30	3	OP930302-SC		
Fast analysis	2.1×50	3	OP930502-SC		
Fast analysis	2.1×100	3	OP931002-SC		
Fast analysis	2.1×150	3	OP931502-SC		
G	2.1×10, 4/pk	3	OP930102-SC		
DCG	2.1×10, 4/pk	3	OP930102-SCS		
Fast analysis	4.6×50	3	OP930505-SC		
Fast analysis	4.6×100	3	OP931005-SC		
Fast analysis	4.6×150	3	OP931505-SC		
Analytical	2.1×30	5	OP950302-SC	OP950302-SA	OP950302-NP
Analytical	2.1×50	5	OP950502-SC	OP950502-SA	OP950502-NP
Analytical	2.1×100	5	OP951002-SC	OP951002-SA	OP951002-NP
Analytical	2.1×150	5	OP951502-SC	OP951502-SA	OP951502-NP
Analytical	4.6×50	5	OP950505-SC	OP950505-SA	OP950505-NP
Analytical	4.6×100	5	OP951005-SC	OP951005-SA	OP951005-NP
Analytical	4.6×150	5	OP951505-SC	OP951505-SA	OP951505-NP
Analytical	4.6×200	5	OP952005-SC	OP952005-SA	OP952005-NP
Analytical	4.6×250	5	OP952505-SC	OP952505-SA	OP952505-NP
G	4.6×10, 4/pk	5	OP950105-SC	OP950105-SA	OP950105-NP
DCG	4.6×10, 4/pk	5	OP950105-SCS	OP950105-SAS	OP950105-NPS

Size Exclusion Columns (Silica Based)

Type	Dimension (mm)	Particle Size (µm)	GF	GF 300	GF amide	GFamide-300
			ultra pure, high porosity; bonded 100 Å,	ultra pure, high porosity; bonded 300 Å,	ultra pure, high porosity; bonded with amide 100 Å,	ultra pure, high porosity; bonded with amide 300 Å,
Analytical	4.6x150	5	GF151505-0	GF351505-0	GF151505-A	GF351505-A
Analytical	4.6x250	5	GF152505-0	GF352505-0	GF152505-A	GF352505-A
Analytical	4.6x150	10	GF101505-0	GF301505-0	GF101505-A	GF301505-A
Analytical	4.6x250	10	GF102505-0	GF302505-0	GF102505-A	GF302505-A
Semi-prep.	10x150	5	GF151510-0	GF351510-0	GF151510-A	GF351510-A
Semi-prep.	10x250	5	GF152510-0	GF352510-0	GF152510-A	GF352510-A
Semi-prep.	10x150	10	GF101510-0	GF301510-0	GF101510-A	GF301510-A
Semi-prep.	10x250	10	GF102510-0	GF302510-0	GF102510-A	GF302510-A

Chiral Columns

Particle size: 5 µm; Pore Size: 1000 Å

Type	Dimension (mm)	Venusil CA	Venusil CO	Venusil CJ
Analytical	4.6×150	VCA951505-0	VCO951505-0	VCJ951505-0
Analytical	4.6×250	VCA952505-0	VCO952505-0	VCJ952505-0
G	4.6×10, 4/pk	VCA950105-0	VCO950105-0	VCJ950105-0
DCG	4.6×10, 4/pk	VCA950105-0S	VCO950105-0S	VCJ950105-0S
Preparative	21.2×250	VCA952520-0	VCO952520-0	VCJ952520-0
G	10×10	VCA950110-0S	VCO950110-0S	VCJ950110-0S
G	21.2×10	VCA950120-0	VCO950120-0	VCJ950120-0

G: Guard Cartridge

DCG: Direct-connection Guard Cartridge

Particle size: 5 µm; Pore Size: 300 Å

Type	Dimension (mm)	Chiral Amide-1
Analytical	4.6×150	AM951505-1
Analytical	4.6×250	AM952505-1
G	4.6×10, 4/pk	AM950105-1
DCG	4.6×10, 4/pk	AM950105-1S
Preparative	21.2×250	AM952520-1
G	10×10	AM950110-1S
G	21.2×10	AM950120-1

Guard Cartridge Holder

Guard Cartridge Holder provides convenient, economic and effective protection, to prolong HPLC lifetime and ensure the reproducibility of the analysis results. With the use of HPLC, high performance liquid chromatography column will decline in separation efficiency and increase in column pressure. The main reason is due to the pollution of small amount of packing at inlet section, and the column bed of HPLC has not been damaged. The use of guard cartridge holder is equivalent to add additional packing in front of columns and thus protect the whole HPLC column.

Non Direct-connection Guard Cartridge Holder

Non Direct-connection Guard Cartridge Holder connects with column through a section of the pipeline and the joint, the traditional design is compatible with all the HPLC columns.

Type	Dimension (mm)	P/N
Analytical	4.6	CH-100
Analytical	2.1	CH-50



Type	Dimension (mm)	P/N
Preparative	10	SH-150



Type	Dimension (mm)	P/N
Preparative	20	CH-200



Direct-connection Guard Cartridge Holder

The direct-connection guard cartridge holder is easier to use than ever, and can be used in multiple times. It directly connects with the column inlet, and no need to connect with other pipeline, achieve excellent chromatographic performance with minimum dead volume.

Advantages

- Direct-connection design does not require additional connectors;
- Quick and easy installation of manpower;
- Easily replace the guard cartridge core.

Type	Dimension (mm)	P/N
Analytical	4.6 /2.1	SH-100





Selected Solutions for Popular Applications

Solutions for Highly Water Soluble Compounds

Venusil AQ C18
Venusil ASB C18
Unisol Amide

It is known that highly water-soluble compounds always have difficulties in HPLC analysis, such as lack of retention, bad peak shape and inconsistent results. A large scientific effort has been made in developing HPLC stationary phases to provide solutions to these problems. However, no single stationary phase may resolve all these difficulties. Bonna-Agela Technologies has developed a series of stationary phases along with development schemes to help chemists systematically develop methods for the analysis of highly water-soluble compounds. Some application examples are included as a guide to your column selection.

Venusil AQ C18 is a slightly-polar C18 column, and it is our most versatile high aqueous reversed phase column. Venusil AQ C18 has a broad pH suitability (1.5-9.0) and thus can be your first option for most of your HPLC applications. Venusil ASB C18 suits for pH range of 0.8-7.5. The column's stationary phase is non-end capped polar C18 and good for low pH conditions. Unisol Amide (HILIC) has a pH range of 2.0-8.0. Unisol Amide column's stationary phase is modified with strong hydrophilic and neutral functionalities, and it provides hydrophilic interaction with the analytes. Unisol Amide provides the strongest retention of hydrophilic compounds among these three types of columns.

In general, your method development may start with a Venusil AQ C18 column and a mobile phase containing a mixture of methanol or acetonitrile with an aqueous acidic buffer solution (pH=2.0-5.0). This approach may be applicable to the HPLC analysis of more than 50% of small molecules (<2000 daltons). If required, you can minimize the percentage of the stronger organic mobile phase to increase retention by using up to 100 % aqueous acidic buffer mobile phase. In the cases that you achieve adequate retention, but not enough resolution for the compounds of your interest, you may choose to adjust mobile phase ratio, mobile phase pH (very effective for ionizable compounds), or choose to replace the column with a Venusil ASB C18 or Unisol Amide for an alternative selectivity. Figure 1 shows an HPLC separation of four organic acids using Venusil AQ C18 column in 100% aqueous mobile phase at pH=2.0.

In the cases that you cannot achieve adequate retention after analysis in 100% aqueous mobile phase using the Venusil AQ C18, you have the following options depending on the type of compounds. For acidic compounds, you may try ASB C18 columns and lower the pH to further reduce the solubility of the compounds in water. For such low pH applications, TFA is the preferred acidic modifier. TFA may give you the highest retention of both acidic and basic compounds than other organic or inorganic acidic modifiers. If necessary, you may also try a Unisol Amide column in HILIC mode for even higher retention and/or different selectivity. When using a Unisol Amide column, it will behave like a NP column. More polar compounds will elute later than less polar compounds. Figure 2 shows a good separation of highly water-soluble shikimic acid and related substances using a Unisol Amide column. The retention of these compounds was not adequate for analysis on either an AQ C18 or an ASB C18 column.

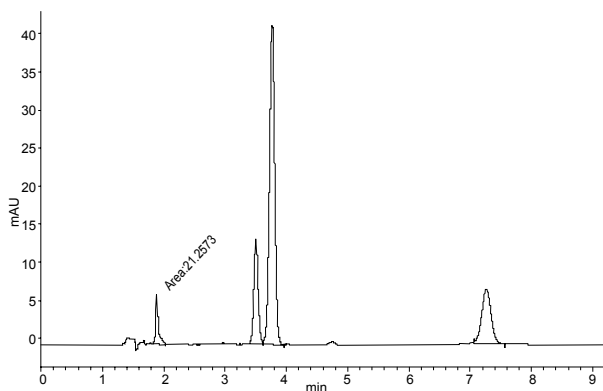
For basic compounds, you may start with an AQ C18 column. For compounds with $pK_a > 9$, another alternative is to use a Unisol Amide column in place of the AQ C18 column and operate at pH (2.0-7.0). Figure 3 shows that even with a 100% aqueous mobile phase, validamycin (basic and highly water soluble) still has poor retention on an AQ C18 column. However, a Unisol Amide column operating at pH=2.0 in the hydrophilic interaction mode resulted in a suitable separation.

For neutral compounds, changing pH will have a limited effect on retention. If a suitable method cannot be developed using an AQ C18 column, an ASB C18 or Unisol Amide column may be required.

Usually during method development, the desired retention is achieved first, then the mobile phase pH and ratio is further adjusted to get the desired resolution. When the desired retention or resolution cannot be obtained for highly water soluble compounds using an AQ C18 or ASB C18 column, a Unisol Amide column will be a good alternative. Unisol Amide columns offer completely different selectivity from reversed phase columns and offer much higher retention.

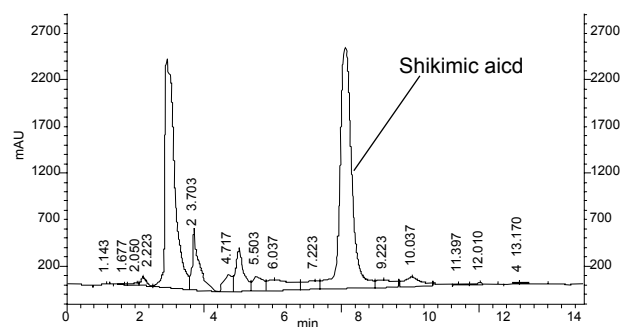
The multiple selection of columns and this comprehensive method development scheme for the separation of highly water-soluble compounds will allow you to develop HPLC methods at ease.

HPLC Separation of Organic Acids



Sample: Vitamin C, malonic acid, lactic acid, citric acid.
Column: Venusil AQ C18, 4.6x150 mm, 5 μ m
Mobile Phase: 20 mmol phosphate buffer, pH=2.0
Detector: UV 210 nm
Flow Rate: 1.0 mL/min
Temperature: 30°C

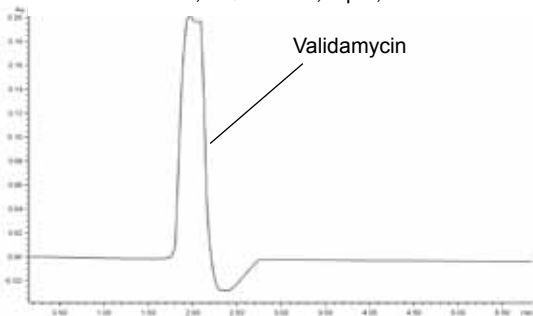
HPLC Analysis of Shikimic Acid (3,4,5-Trihydroxy-1-cyclohexene-1-carboxylic Acid)



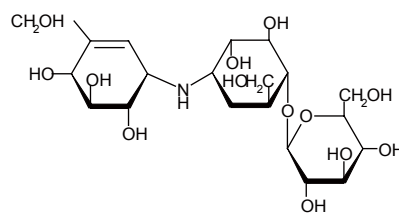
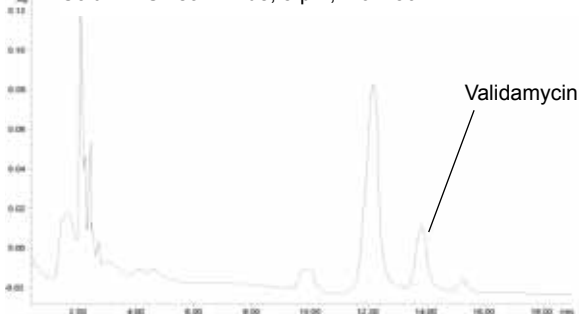
Column: Unisol Amide (HILIC), 4.6x250 mm, 5 μ m
Mobile Phase: ACN/1% formic acid 90-60% in 20 min
Detector: UV 210 nm
Flow Rate: 1.0 mL/min
Temperature: 30°C

HPLC Analysis of Validamycin Raw Products

Column: Brand W, AQ Column, 5 μ m, 4.6x250 mm

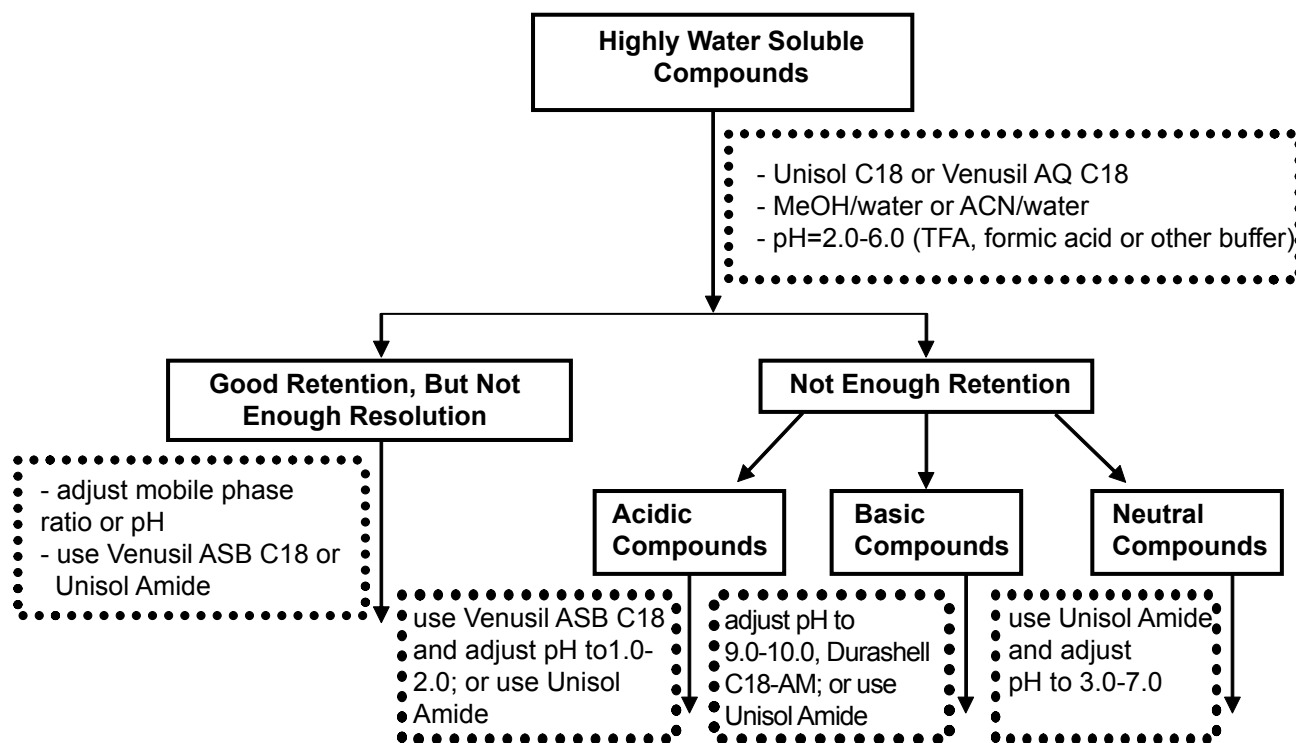


Column: Unisol Amide, 5 μ m, 4.6x250 mm



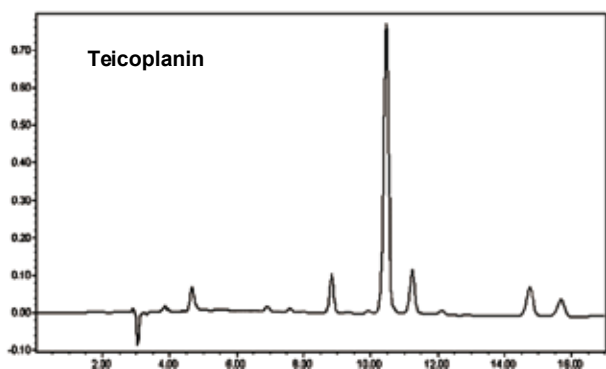
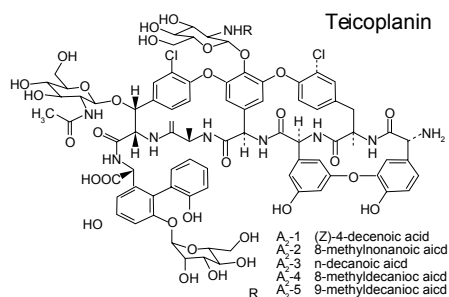
Validamycin

Mobile Phase: A:0.1% TFA in Water
B:Acetonitrile
Gradient: 40% A to 85% A in 30 min
Flow Rate: 1 mL/min
Temperature: 25°C
Detector: UV 210 nm
Sample: Validamycin

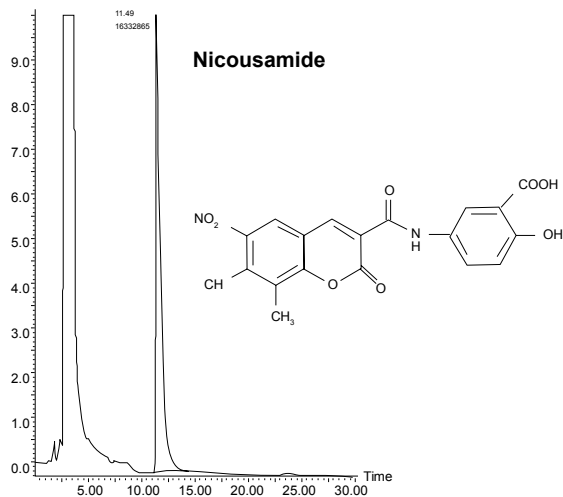


Other Stationary Phases from Bonna-Agela Technologies for Hydrophilic Compounds Separation:

Unisol C18



Column: Unisol C18, 4.6×150 mm
 Mobile Phase: A: NH₄AC Buffer (Adjust pH=6.0)
 B: ACN
 Gradient: 10% B to 60% B in 20 min.
 Flow Rate: 1.0 mL/min
 Sample: Teicoplanin+Impurity
 Detector: UV 254nm
 Temperature: 35°C



Column: Unisol C18, 4.6×150 mm (UO951505-0)
 Mobile Phase: Water:ACN:THF (50:50:1, 0.1% H₃PO₄)
 Flow Rate: 1 mL/min
 Sample: Nicousamide
 Detector: UV 254 nm



HILIC Column Family From Bonna-Agela Technologies

Unisol Amide (Bonna-Agela HILIC)

Venusil XBP Silica (Bonna-Agela HILIC II)

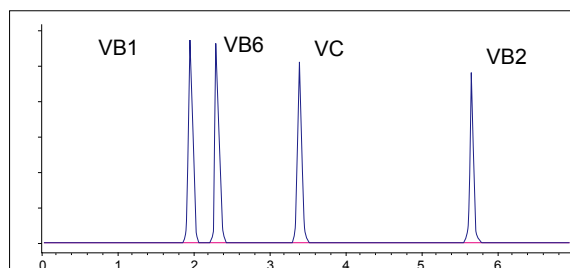
Venusil XBP NH₂ (Bonna-Agela HILIC III)

Comparison

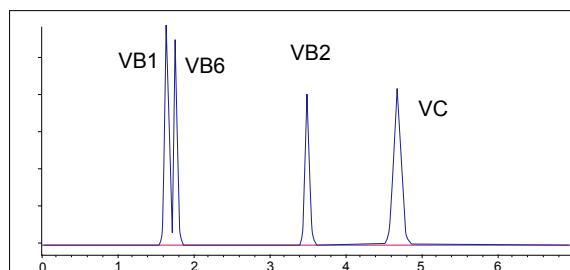
- **Selectivity**
XBP silica is slightly acidic (pH=5.6); while Unisol Amide is slightly basic (pH=7.0-9.0), and XBP NH₂ is more basic (pH=9.2). XBP silica has stronger retention of basic compounds, while Unisol Amide and XBP NH₂ have better retention of acidic compounds.
Unisol Amide has a balanced retention power for neutral, acidic and basic compounds, and thus the highest versatility.
- **Reproducibility and Lifetime**
Unisol Amide has the best reproducibility and lifetime because of a bonded and close-to-neutral protection layer.

Water-soluble Vitamins

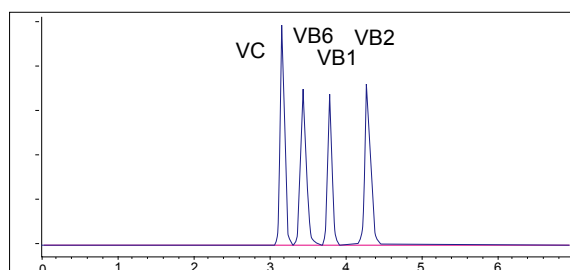
- Selectivity comparison on 3 columns
- Stability comparison of Unisol Amide and Brand W silica



Unisol Amide Column,
4.6 × 150 mm, 5 μm



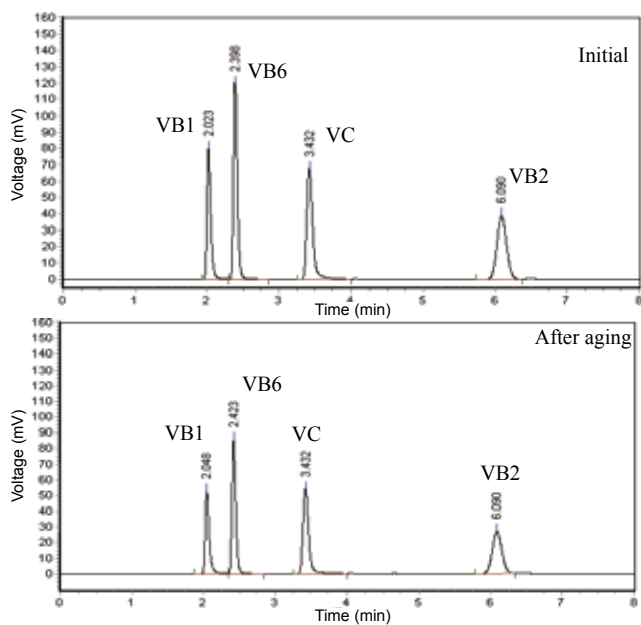
XBP NH₂ Column,
4.6 × 150 mm, 5 μm



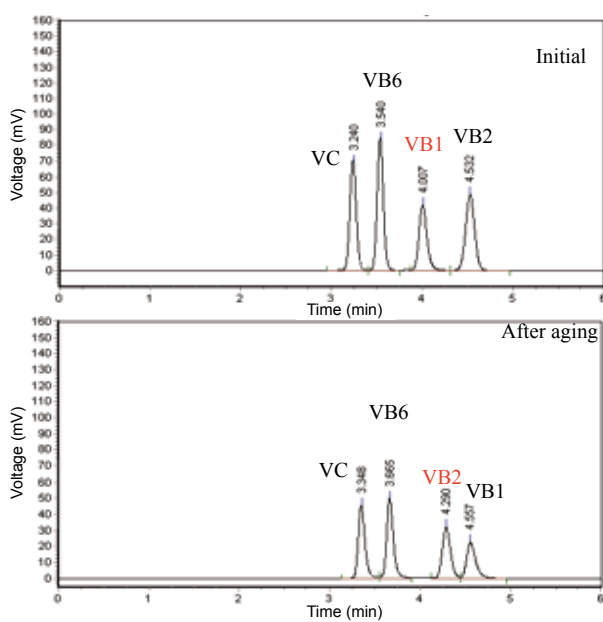
XBP Silica Column,
4.6 × 150 mm, 5 μm

Mobile Phase: A:0.1% TFA in Water;
B:0.1% TFA in Acetonitrile; A:B=90:10
Flow Rate: 1 mL/min
Temperature: 30°C
Detector: UV 280 nm
Sample: VB1+VB6+VC+VB2

Stability Comparison of Unisol Amide and Venusil XBP Silica



Unisol Amide, 4.6×150 mm, 5 µm



Brand W Silica, 4.6×150 mm, 5 µm

Samples: VB1, VB6, VC and VB2

Aging Conditions:

MeOH: 20 mM NaH₂PO₄ (pH=7.0) = 40:60; 1.0 mL/min; Temperature: 40°C

HPLC Conditions:

Mobile Phase: 0.1%TFA:ACN = 90:10;

Detector: UV 280 nm; Flow Rate: 1.0 mL/min; Temperature: 30°C; Injection: 2 µL

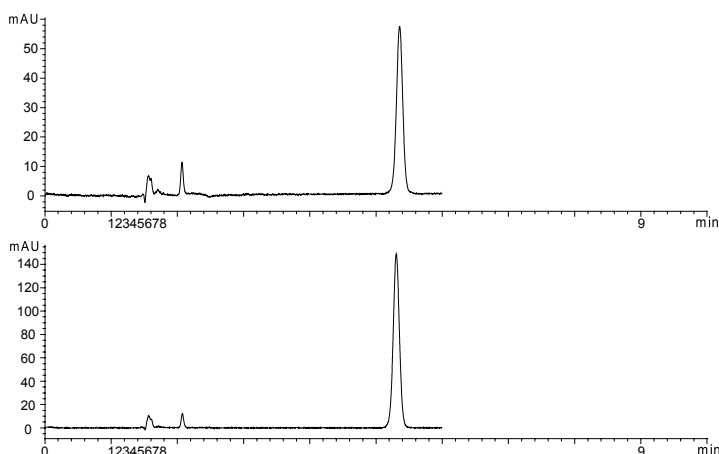


Solutions for Low pH and High pH Applications

Bonna-Agela Technologies offers a family of stationary phases for applications at extremely low or extremely high pH. These columns extend the capability of reversed phase HPLC columns to a typical pH range of 0.8-12.0, and provide more options for your applications and method development needs.

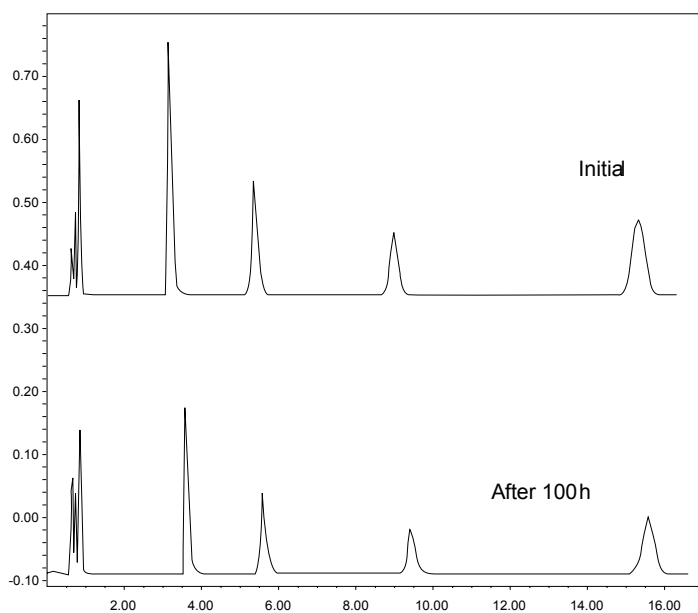
- Venusil ASB C18 (pH:0.8-7.5);
- Venusil ASB C8 (pH:1.0-7.5);
- Durashell C18 (pH:1.5-12.0)

Low pH Stability of Venusil ASB C18



Column: Venusil ASB C18, 4.6×150 mm, 5 μ m
Sample: Naphthol
Aging: 40°C, TFA in 80% methanol (pH=1.0), 400 hours
Mobile Phase: TFA in 80% methanol (pH=1.5)
Flow Rate: 1.0 mL/min
Injection: 5 μ L
Temperature: 30°C

High pH Stability of Durashell C18



Column: Durashell C18, 4.6×150 mm, 5 μ m
Flow Rate: 1.5 mL/min, ACN: 0.05 M Ammonia
(pH=9.0)=50:50
Sample: Doxepin, nortriptyline, amitriptyline, trimipramine
Temperature: 35°C

Solutions for LC-MS

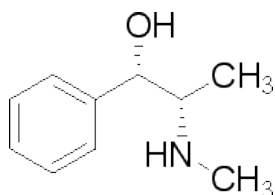
Bonna-Agela Technologies provides columns that can meet the needs of LC-MS applications. The most popular LC-MS columns from Bonna-Agela include:

- Unisol C18 (versatile).
- Venusil ASB C18 and ASB C8 (extremely low bleeding and long lifetime at low pH).
- Unisol Amide (for extremely polar compounds).

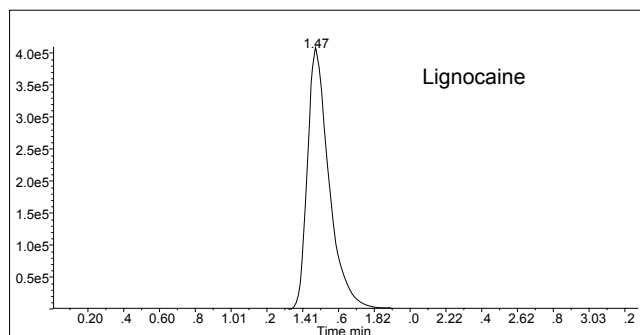
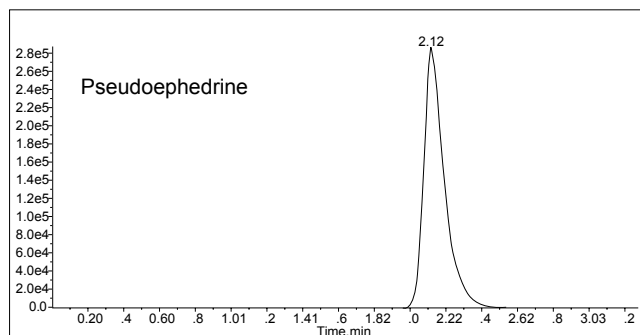
Benefits

- Low bleeding and symmetric peak shape→Sensitivity.
- High retention for polar compounds→Sensitivity, versatility, and low ion suppression for bioanalytical analysis.
- Compatible with 100% water to 100% organic solvents→Simplified method development effort.
- Stability→Long column life means a reduced cost for customers.

Pseudoephedrine in Plasma



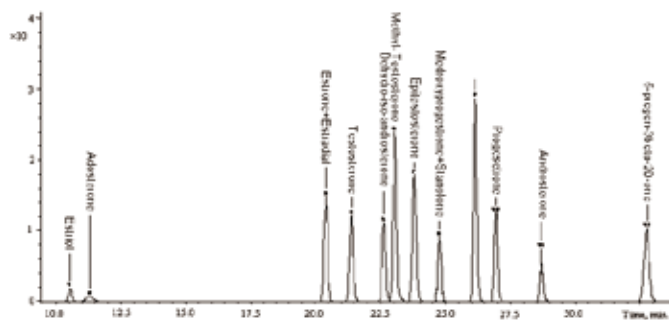
Pseudoephedrine



Mass System: API Qtrap 3200, Applied Biosystem
Mass Condition: Positive Ion Mode, MRM
HPLC Column: Venusil ASB C18, 2.1×50 mm, 5 μm
Sample: Sample prepared by SPE (Cleanert PCX 60 mg/3 mL)
Mobile Phase: A:1% Formic Acid in Water;
B:Methanol;
Gradient: 20% B to 95% B in 2 min, hold for 0.5 min, then
switch to A:B (20:80)
Flow Rate: 0.5 mL/min
Temperature: 25°C

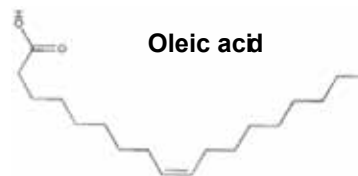
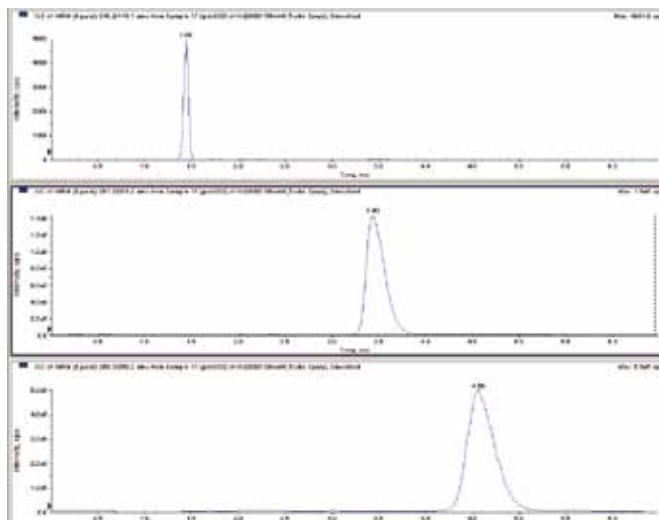


Analysis of 14 Kinds of Hormone



Mass System: Agilent 1100 Series LC/MSD Trap
HPLC Column: Venusil XBP C18, 2.1×150 mm, 5 μm
Sample: Estriol, Adosterone, Estrone+Estradiol, Testosterone, Dehydro-iso-androsterone Methyl-Testosterone, Epitestosterone, Medroxyprogesterone+Stanoalone, Progesterone, Andosterone, 5-pregen-3beta-20-one
Mobile Phase: A:Water; B:MeOH
Gradient: 40% B to 80% B in 24 min, then hold for 12 min.
Flow Rate: 0.8 mL/min
Temperature: 25°C

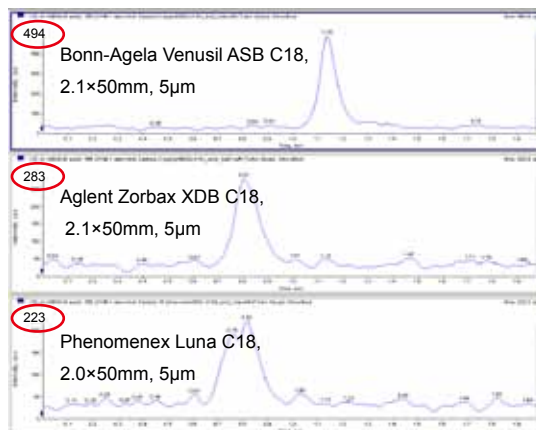
Oleic Acid in Plasma



Mass System: API Qtrap 3200, Applied Biosystem
Mass Condition: Negative Ion Mode, MRM
HPLC Column: Venusil ASB C18, 2.1×50 mm, 5 μm
Sample: Sample prepared by SPE (Cleanert PEP 60 mg/3mL)
Mobile Phase: A:13 mmol/L ammonium acetate aq., B:Acetonitrile
Gradient: 5% B to 95% B in 2 min, hold for 2 min, switch to A:B (95:5) then hold for 2 min.
Flow Rate: 0.8 mL/min
Temperature: 25°C

Highest LC-MS Sensitivity

2-3 times higher than many popular brands (*low bleed, inert surface and high efficiency*)

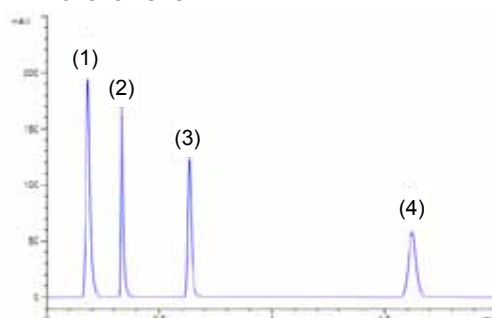


Solutions for Fast Analysis

Bonna-Agela Technologies provides two approaches for fast HPLC analysis with shorter run times and higher column efficiency.

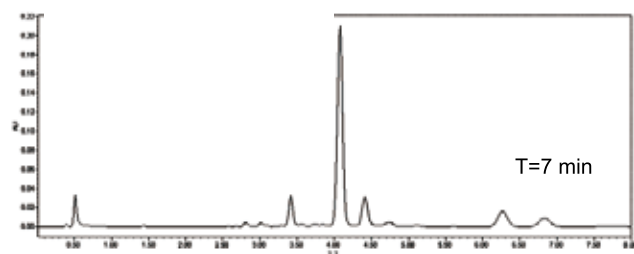
Small particle size or fused-core technology

- UHP AQ C18
- UHP ASB C18
- UHP Innoval C18
- UHP HILIC
- Bonshell ASB C18
- Bonshell C18

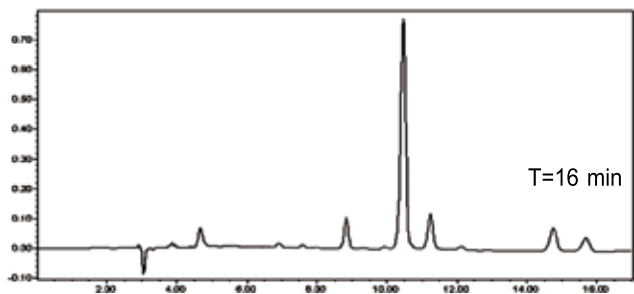


Column: UHP AQ C18, 2.1×50 mm, 2 μ m
Sample: Uracil (1) Phenol (2) Nitrobenzene (3) and Naphthalene (4) in mobile phase; 1.0 μ L
Mobile phase: 50% Acetonitrile / 50% Water
Flow Rate: 0.5 mL/min
Pressure: 337 bar
Temperature: 30°C
Detector: UV 254 nm

Comparison of the analysis for Teicoplanin and impurity on Bonshell C18 and conventional C18 column



Mobile Phase: A: NH_4AC Buffer (Adjust pH=6.0)
B: ACN
HPLC Column: Bonshell C18, 4.6 × 50 mm, 2.7 μ m
Gradient: 5% B to 45% B in 10 min.
Flow Rate: 1.0 mL/min
Sample: Teicoplanin+Impurity
Detector: UV 254nm
Temperature: 35°C



Mobile Phase: A: NH_4AC Buffer (Adjust pH=6.0)
B: ACN
HPLC Column: Conventional C18, 4.6 × 150 mm, 5 μ m
Gradient: 10% B to 60% B in 20 min.
Flow Rate: 1.0 mL/min
Sample: Teicoplanin+Impurity
Detector: UV 254nm
Temperature: 35°C

Solutions for Bio-molecules

Bonna-Agela Technologies offers a broad line of HPLC columns for Bio-molecules, including reversed phase, normal phase, ion-exchange, HILIC and size exclusion columns. All columns' packing materials are made of ultra pure silica, bonded with pure silanes to ensure the surface inertness.

General guide for the column selection

1. Small peptide: C18, C8, C4; 100 Å or 150 Å
2. Large peptide and proteins: C8, C4, 300 Å; ion-exchange; HILIC; size exclusion
3. Mono- and oligo-saccharides: ion-exchange; NH_2 ; HILIC
4. Polysaccharides: ion-exchange; size exclusion
5. Oligo-nuclei: ion-exchange; reverse phase
6. Nuclei acids: ion-exchange; size exclusion

See the section of "ordering information by type of stationary phase" for ordering or call our technical staff for helps in selecting the columns you need.

Solutions for Preparative HPLC (Refer to Purification Section for More Information)

Bonna-Agela Technologies offer a full line of preparative HPLC columns to meet a variety of application needs.

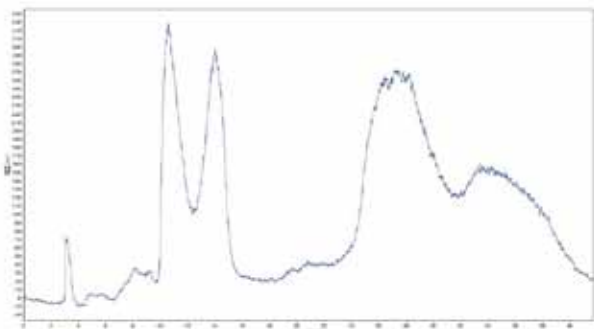
Our preparative columns feature

1. Great scalability
2. Excellent bed stability
3. High loading capacity
4. Broad solvent compatibility from 100% aqueous to 100% organic solvents (Unisol C18, Unisol Amide and Venusil ASB C18)
5. Broad pH range (1.0-12.0) of Durashell series
6. Unique selectivity of Unisol Amide and Venusil ASB C18

Unisol Amide

a unique phase from Bonna-Agela Technologies that offers a good alternative selectivity to reversed phase columns and an excellent solution for purifying highly polar compounds.

Preparation of Polysaccharide



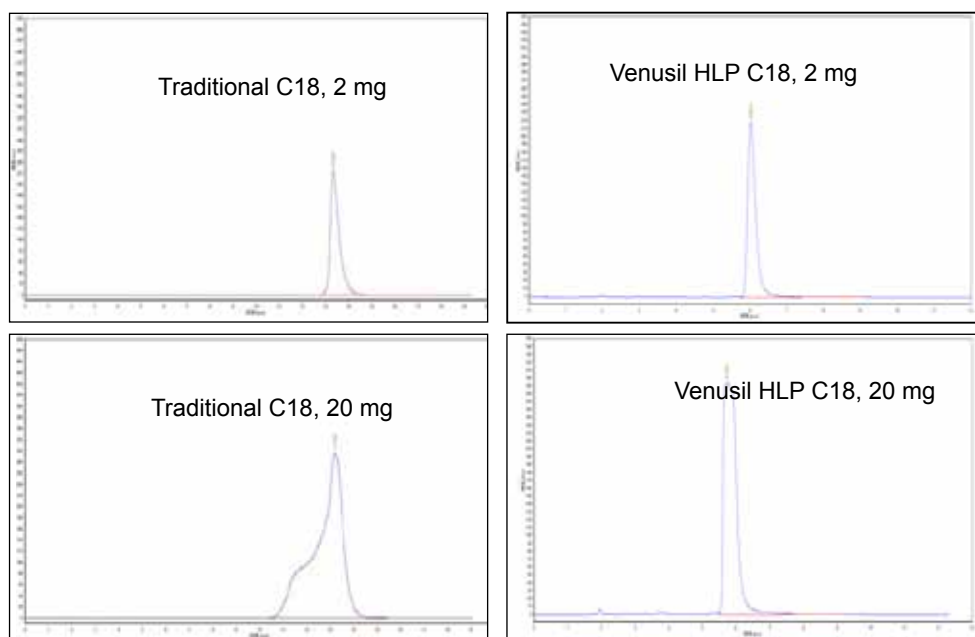
Sample Polysaccharide
 Column: Unisol Amide 5 μm 100 Å, 10×250 mm
 Mobile phase: A (acetonitrile): B (water) = 80:20
 Flow Rate: 5 mL/min
 Sample Loading: 200 μL
 ELSD: 0.3 mpa, 80°C

Durashell series: a high pH tolerance enable the use of high pH mobile phase, which results in great improvement of peak shape and loadability for basic compounds.

Venusil HLP C18

Bonded with alkyl chain molecules and embedded amide polar group that literally capped the silica's residual silanols from interacting with highly basic analytes.

High Loading Capacity



Column: Traditional C18, 5 μm , 100 Å, 21.2×150 mm
Venusil HLP C18, 5 μm , 100 Å, 21.2×150 mm

Sample: Amitriptyline

Mobile Phase: MeOH: 0.1% Formic acid=80:20

Flow Rate: 20 mL/min

UV Detector: UV 254 nm

Temperature: Ambient

Solutions for SFC

Bonna-Agela Technologies offer a broad line of normal phase columns of different selectivity for SFC applications, including:

- Unisol Amide
- Venusil XBP NH_2
- Venusil XBP Silica
- Venusil XBP CN
- Venusil XBP Nitrophenyl

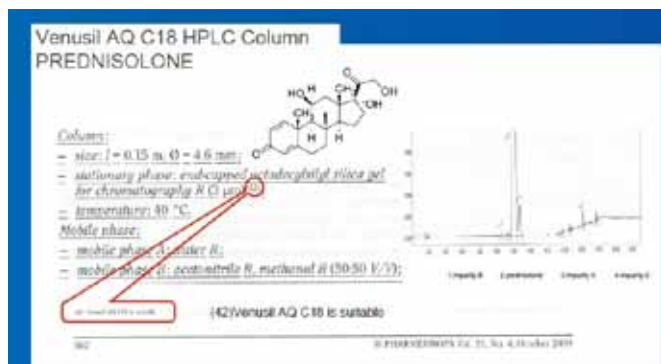
They are all made of high pure silica materials and are packed using our robust and reproducible process to ensure high efficiency and extended lifetime.

See the section of "Ordering Information by Type of Stationary Phase" for ordering or call our technical staff for helps.

Applications

1. European and American Pharmacopeia

1.1 Venusil AQ C18 HPLC Column Recommended in European Pharmacopoeia

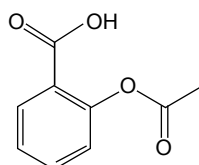


1.2 Acetylsalicylic acid and its related compounds

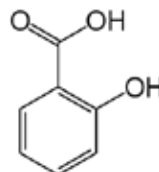
European Pharmacopoeia 7.0, 2523-2524

Requirements: Resolution factor (R) between target and its impurity is > 6 .

Acetylsalicylic acid



Impurity Salicylic acid



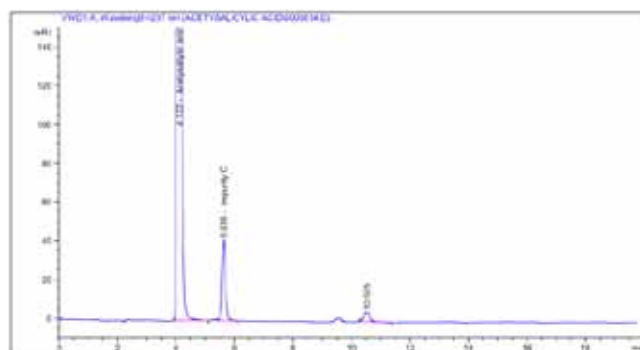
Column: Innoval C18, 4.6 x 250 mm, 5 μ m

Mobile phase: phosphate - acetonitrile - water (2:400:600).

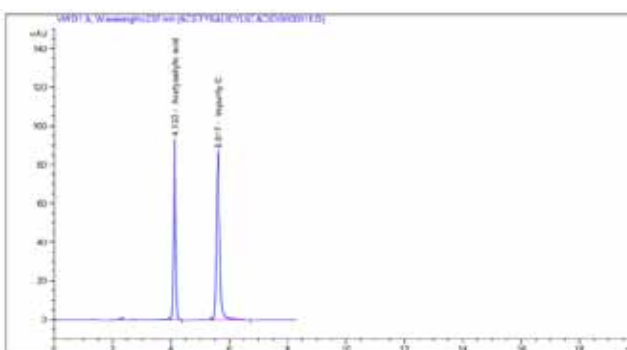
Detector: UV 237 nm,

Column temperature: 35°C,

Flow rate: 1 mL/min, injection volume 10 μ L.



Sample profile of acetylsalicylic acid

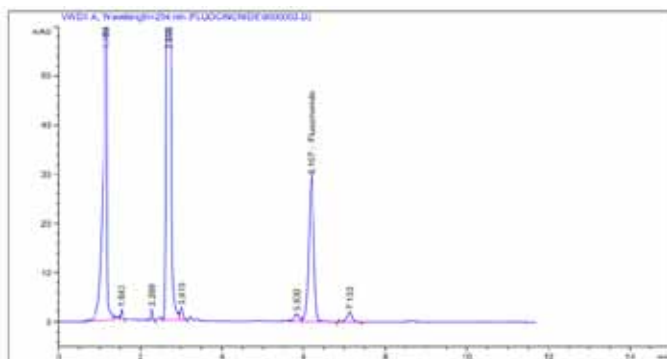


Chromatogram of system suitability test

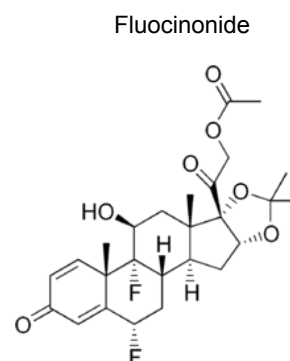
1.3 Assay test of Fluocinonide Cream

USP34-NF 29, 2862

Requirements: Plate counts should be no less than 4500 for fluocinonide



Sample profile of fluocinonide cream



Column: Venusil ASB C18, 4.6 x 250 mm, 5 μ m

Mobile phase: water: acetonitrile (50:50),

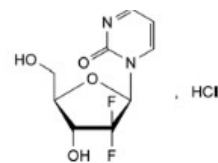
Detector: UV 254 nm, Column temperature: 35°C, Flow rate: 2 mL/min,

Injection volume: 20 μ L.

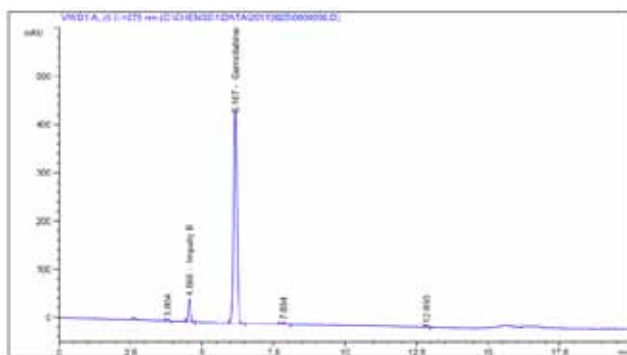
1.4 The gemcitabine hydrochloride and its related compounds

European Pharmacopoeia 7.0, 2088-2089

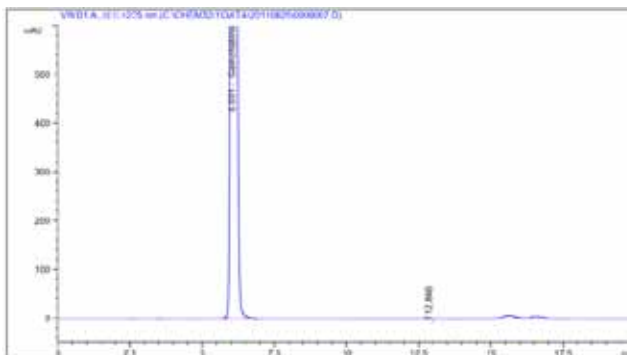
Requirements: Resolution factor (R) should be > 8 for the compound and its impurity



gemcitabine hydrochloride



Chromatogram of system suitability test



Sample profile of gemcitabine hydrochloride

Column: Venusil ASB C8, 4.6 x 250 mm

Detector: UV 275 nm,

Column temperature: 30°C,

Flow rate: 1.2 mL/min,

Injection volume: 20 μ L

Mobile Phase A: 0.1 mol/L NaH₂PO₄ (adjust pH to 2.5 with H₃PO₄)

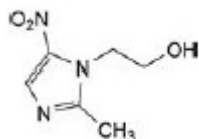
Mobile Phase B: methanol

Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
0-8	97	3
8-13	97→50	3→50
13-20	50	50

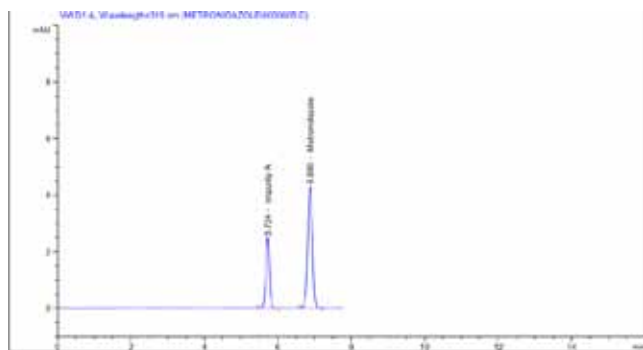
1.5 The metronidazole and its related compounds

European Pharmacopoeia 7.0, 2500

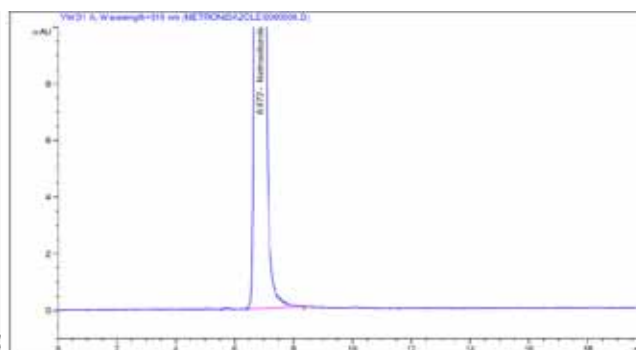
Requirements: Resolution factor (R) for metronidazole and its impurity should be > 2.0.



metronidazole hydrochloride



Chromatogram of system suitability test



Sample profile of metronidazole hydrochloride

Column: Venusil AQ C18, 4.6 x 250 mm, 5 μ m

Mobile phase: 0.01 mol/L of KH_2PO_4 solution: methanol (70:30)

Detector: UV 315 nm,

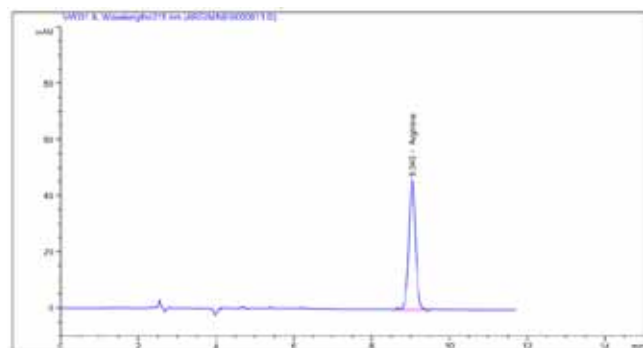
Column temperature: 30°C,

Flow rate: 1 mL/min, injection volume 10 μ L

1.6 Arginine

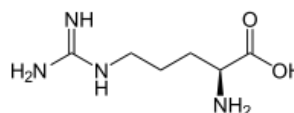
USP34-NF 29, 1079

Requirements: Plate counts for Arginine should be > 1500.



Chromatographic profile of system suitability test

Arginine



Column: Promosil C8, 4.6 x 250 mm

Mobile phase: acetonitrile -0.5 mg/mL octane sodium phosphate buffer (5:95)

Phosphate buffer prepare: 6.9 mg/mL NaH_2PO_4 (pH =3.5)

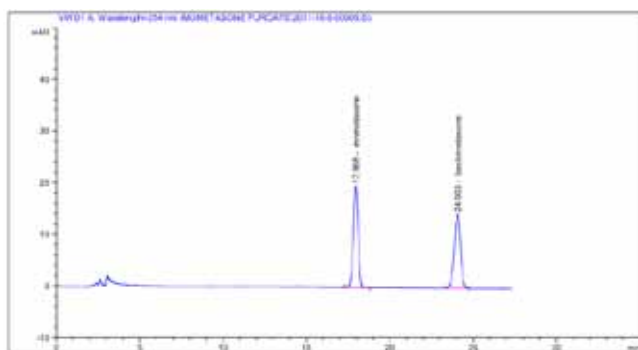
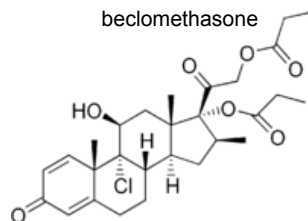
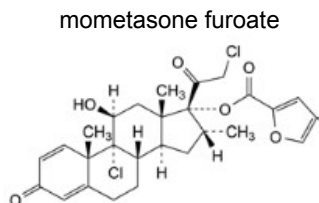
Detector: UV 215 nm, Column temperature: 35°C,

Flow rate: 0.8 mL/min, Injection volume: 10 μ L

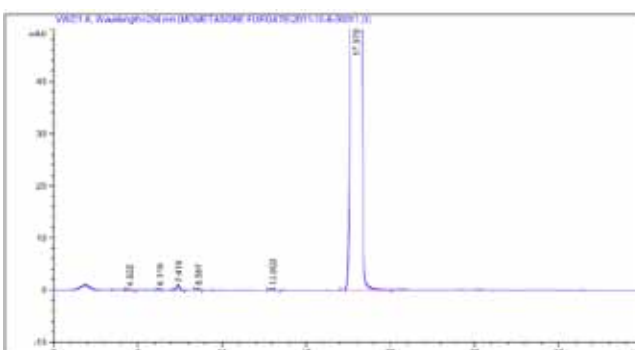
1.7 Mometasone furoate and its related compounds

European Pharmacopoeia 7.0, 2523-2524

Requirements: Resolution factor (R) for mometasone and beclomethasone should be > 6.



Profile of system suitability test



Sample profile

Column: Venusil XBP (L) C18, 4.6 x 250 mm, 5 μ m

Detector: UV 254 nm

Column temperature: 35°C,

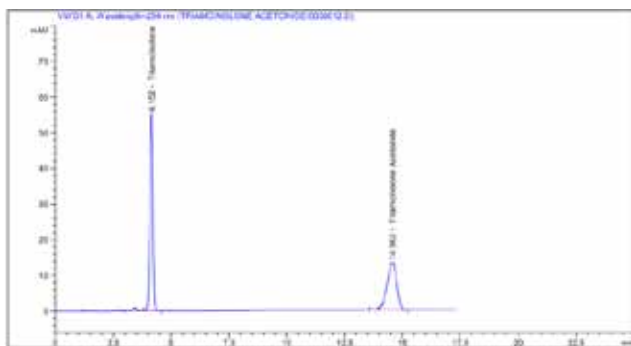
Flow rate: 1 mL/min,

Injection volume: 20 μ L

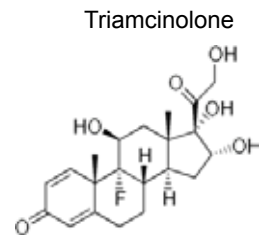
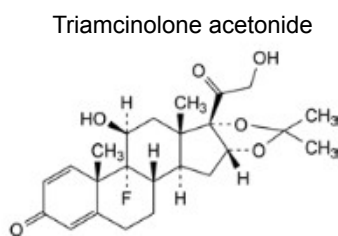
1.8 Triamcinolone acetonide and its related compounds

European Pharmacopoeia 7.0, 3128-3129

Requirements: Resolution factor (R) between triamcinolone acetonide and triamcinolone is >15; Retention of triamcinolone acetonide is around 17 minutes; and for triamcinolone, retention time is ~ 5 minutes.



Chromatogram of system suitability test



Column: Innoval C18, 4.6 x 250 mm, 5 μ m

Mobile phase: methanol: water (525:475)

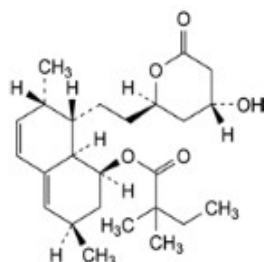
Detector: UV 254 nm, Column temperature: 35°C,

Flow rate: 1.5 mL/min, Injection volume: 20 μ L

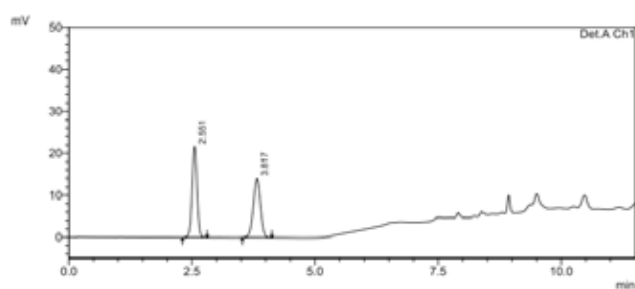
1. 9 Simvastatin and its related compounds

European Pharmacopoeia 7.0, 2906-2907

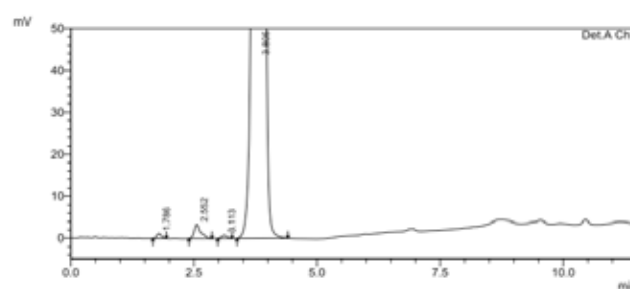
Requirements: Resolution factor (R) for simvastatin and its impurity should be > 4.



Simvastatin



Chromatographic profile of system suitability test for simvastatin



Chromatographic profile of simvastatin sample

Column: Venusil AQ C18, 4.6 x 33 mm, 3 μ m

Mobile phase A: 0.1% phosphoric acid: acetonitrile (50:50)

Mobile phase B: 0.1% phosphoric acid in acetonitrile

Detector: UV 238nm,

Column temperature: 30°C, Flow Rate: 3.0 mL/min, Sample

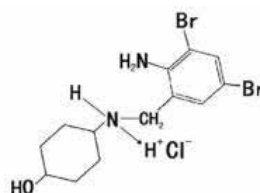
Loading: 5 μ L

Time (min)	Mobile phase A (%)	Mobile phase B (%)
0-4.5	100	0
4.5-4.6	100→95	0→5
4.6-8.0	95→25	5→75
8.0-11.5	25	75

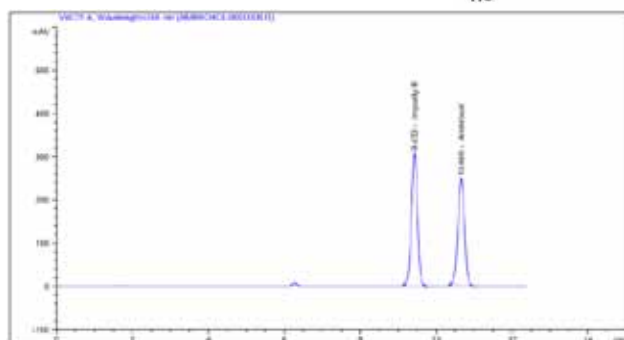
1.10 Ambroxol Hydrochloride

European Pharmacopoeia 7.0, 1365-1366

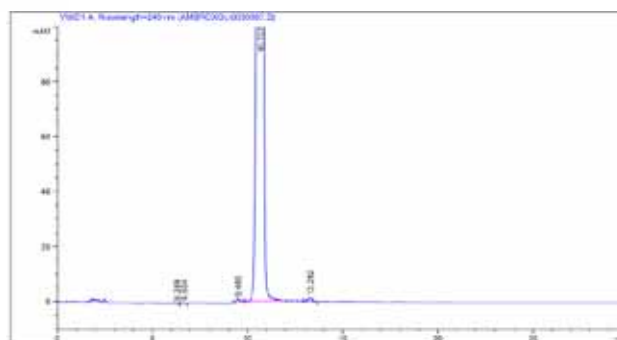
Requirements: Resolution factor (R) for ambroxol hydrochloride and its impurity should be > 4.



Ambroxol Hydrochloride



Chromatogram of system suitability test



Chromatographic profile of ambroxol hydrochloride sample

Column: Venusil XBP C18, 4.6 x 250 mm, 5 µm

Mobile phase: phosphate buffer (Add 1.32 g NH_4PO_4 in 900 mL water, adjust the pH to 7.0, reconstitute the volume to 1000 mL) : acetonitrile (50:50).

Detector: UV 248 nm

Column Temperature: 30°C

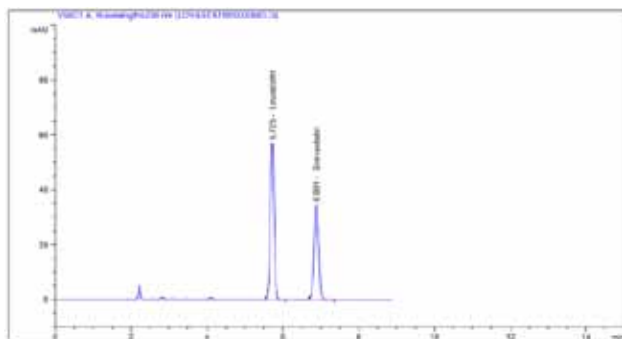
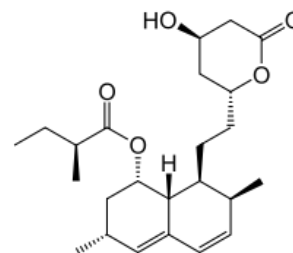
Flow Rate: 1 mL/min

Sample Loading: 20 µL

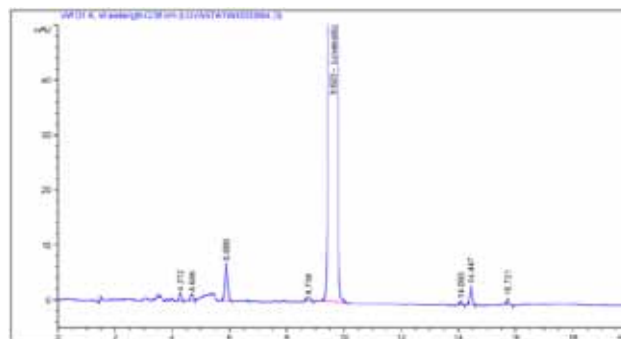
1.11 Lovastatin

European Pharmacopoeia 7.0, 2384-2385

Requirements: Resolution factor (R) for lovastatin and simvastatin should be > 5.



System suitability test



Profile of lovastatin and simvastatin sample

Column: Venusil ASB C8, 4.6 x 250 mm

Mobile Phase A: 0.1% H_3PO_4 aq., B: Acetonitrile

Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
0-7	40	60
7-9	40→35	60→65
9-15	35→10	65→90
15-20	10	90

Detector: UV 238 nm

Column Temperature: 35°C

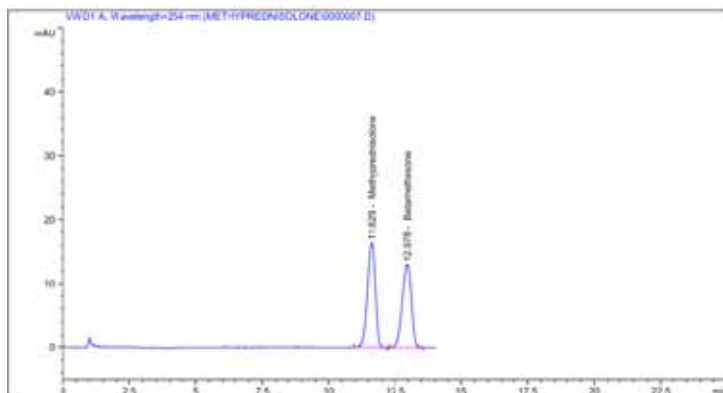
Flow Rate: 1.5 mL/min

Sample Loading: 10 µL

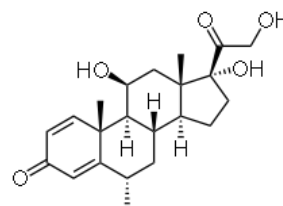
1.12 Methylprednisolone

European Pharmacopoeia 7.0, 2481-2482

Requirements: Resolution factor (R) between methylprednisolone and betamethasone is > 1.5; Retention of methylprednisolone is around 11.5 minutes; and for betamethasone, retention time is ~ 12.5 minutes.



Profile of system suitability test



Column: Innoval C18 x 250 mm, 5 μ m

Mobile Phase A: water- acetonitrile (75: 25), mobile phase B: acetonitrile

Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
0-15	100	0
15-40	40→35	60→65

Detector: UV 254 nm

Column Temperature: 45°C

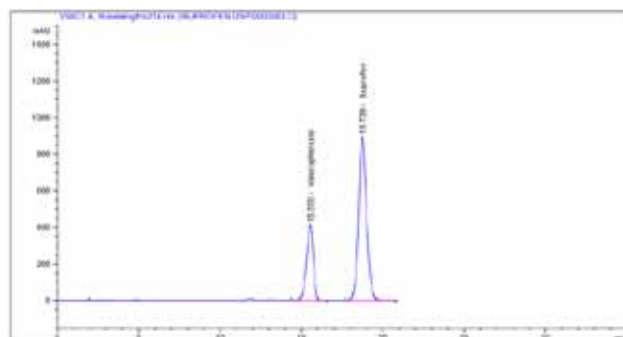
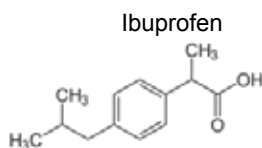
Flow Rate: 2.5 mL/min

Sample Loading: 20 μ L

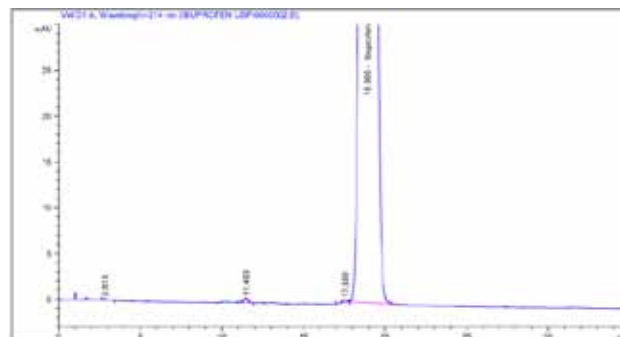
1.13 Ibuprofen

USP34-NF29, 3099

Requirements: Resolution factor (R) for ibuprofen and valerophenone should be > 2.



Chromatogram of system suitability test



Chromatogram of ibuprofen sample

Column: Venusil ASB C18, 4.6 x 150 mm, 5 μ m

Mobile Phase: Water (adjust pH to 2.5 with H₃PO₄)-Acetonitrile (1340: 680~66: 34)

Detector: UV 214 nm

Column Temperature: 35°C

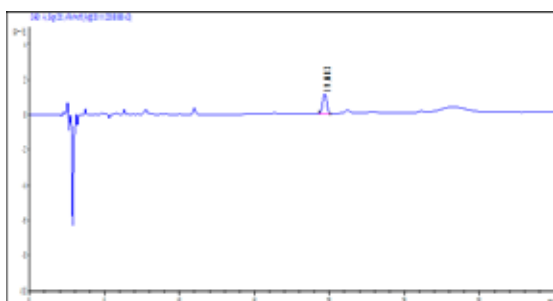
Flow Rate: 2 mL/min

Sample Loading: 5 μ L

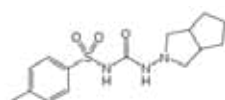
1.14 Gliclazide

European Pharmacopoeia 7.0, 2096

Requirements: Retention of gliclazide is around 6 minutes



Profile of gliclazide sample



Column : Venusil XBP C8, 4.6 x 250 mm

Mobile phase: triethylamine: trifluoroacetic acid: acetonitrile:
water = 1:0.1:45:55

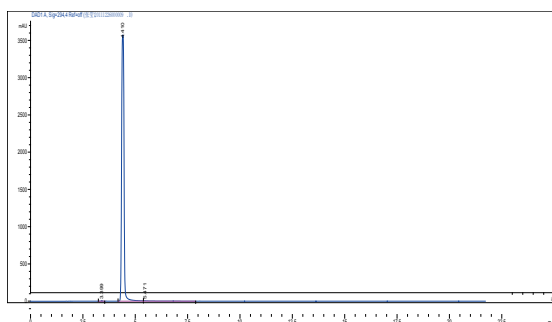
Detector: UV 235 nm

Column Temperature: 35°C

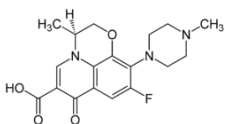
Flow Rate: 0.9 mL/min

Sample Loading: 20 µL

1.15 Levofloxacin



Profile of levofloxacin sample



Column : Venusil XBP C18 L, 4.6×250 mm

Buffer salts: NH₄COOH 4 g and NaClO₄ 7 g dissolved in 1 L water,
add 2 mL triethylamin, adjust pH to 6.6 with H₃PO₄

Solvent: Acetonitrile: buffer salts = 20:80

Mobile Phase A: Acetonitrile: buffer salts = 2:98

Mobile Phase B: Acetonitrile : water = 90:10

Time (min)	Mobile Phase A (%)	Mobile Phase B (%)
0	90	10
2	90	10
15	85	15
35	70	30
40	60	40
45	50	50
46	90	10
55	90	10

Detector: UV 294 nm

Column Temperature: 30°C

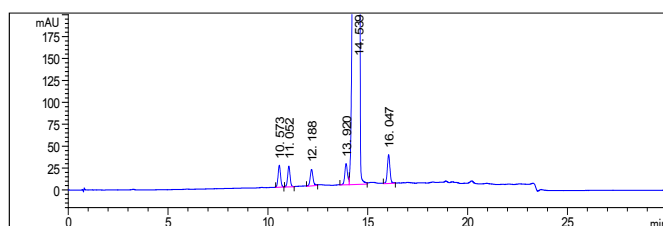
Flow Rate: 1.0 mL/min

Sample Loading: 10 µL

1.16 Analysis of Risperidone

Column: Durashell C18-AM (5 μ m, 100Å, 4.6*100mm) ;
 Mobile phase A: 5.0g Ammonium acetate dissolved in 1000 mL water;
 Mobile phase B: Methanol;
 Flow rate: 1.5 mL/min;
 Detector: UV 260nm;
 Temperature: 30°C;
 Injection: 10 μ L;
 Gradient:

Time (min)	A%	B%
0	70	30
2	70	30
17	30	70
22	30	70
22.1	70	30
30	70	30



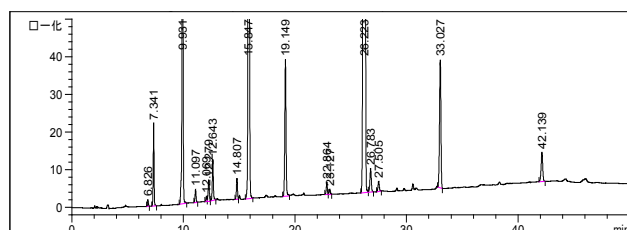
Chromatogram of system suitability test of Risperidone

Note: Peaks are in order of impurities A, B, C, D, Risperidone, impurity E successively.

1.17 Separation of lansoprazole Degradation Product According to USP

Column: Durashell C18-AM (5 μ m, 100 Å, 4.6x250 mm);
 Detector: UV 285 nm;
 Temperature: 30°C;
 Flow rate: 1.5 mL/min;
 Injection: 40 μ L;
 Mobile phase A: Water
 Mobile phase B: Acetonitrile: water: triethylamine (160/40/1,v/v), adjusted to pH 7.0 with phosphoric acid
 Gradient:

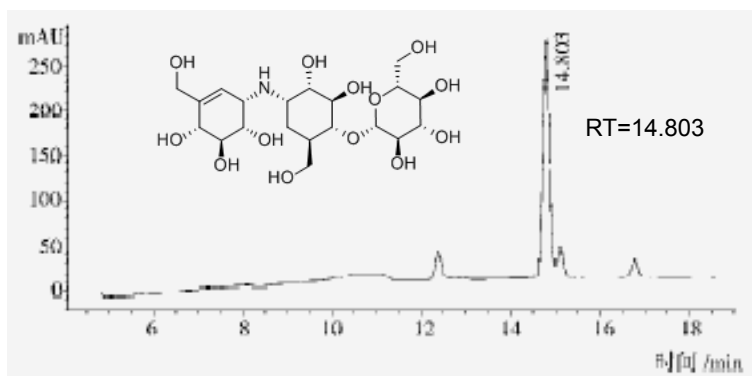
Time (min)	A%	B%
0	90	10
40	20	80
50	20	80
51	90	10
60	90	10



Chromatogram of lansoprazole raw material degradation products with Durashell C18-AM

2. HILIC Applications

2.1 Validamycin A

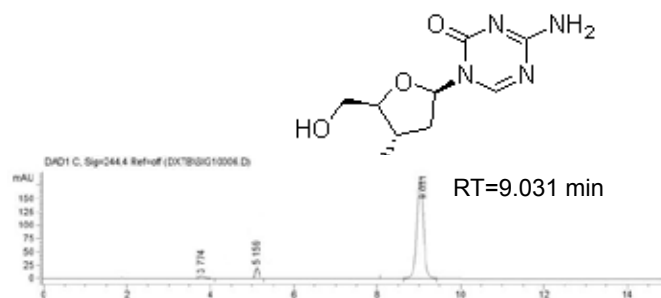


Column: Unisol Amide,
4.6 × 250 mm, 5 μm, 100 Å
Mobile Phase A: Water,
B: Acetonitrile
Flow Rate: 1.0 mL/min

Time (min)	B%
0	40
30	85

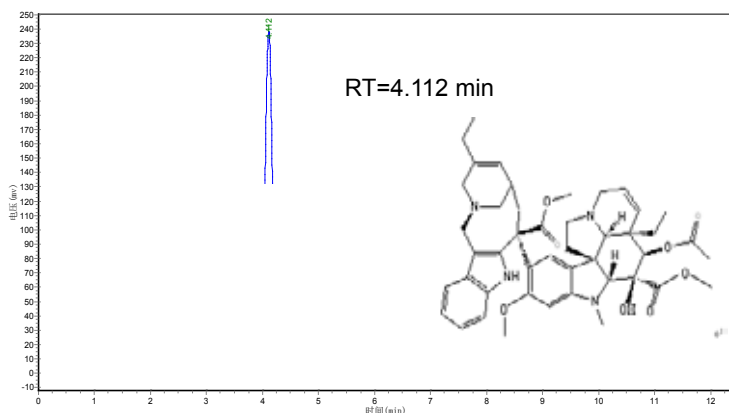
Detector: UV 210 nm
Temperature: 30°C
Sample Loading: 10 μL

2.2 Decitabine



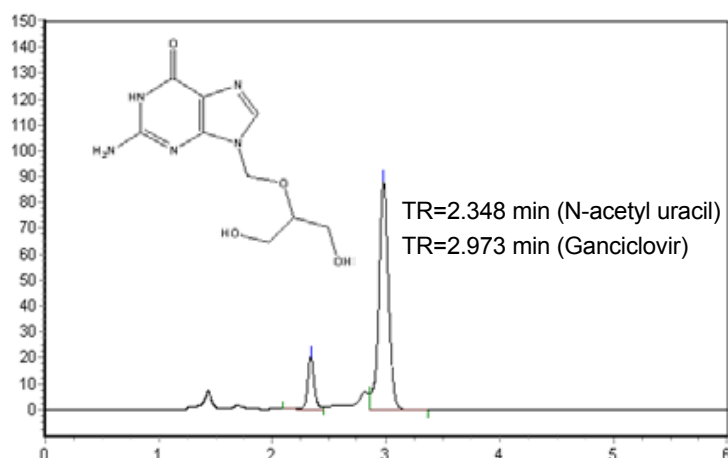
Column: Unisol Amide
4.6 × 150 mm, 5 μm, 100 Å
Mobile Phase:
Acetonitrile: Water=96:4
Flow Rate: 1.0 mL/min
Detector: UV 244 nm
Temperature: 30°C
Sample Loading: 10 μL

2.3 Vinorelbine



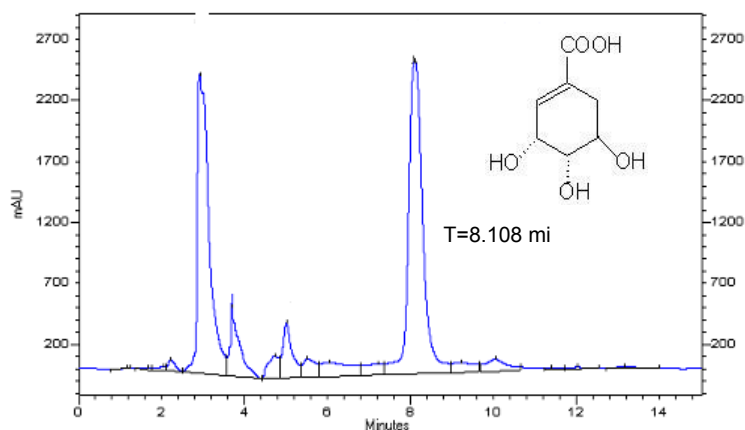
Column: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase:
5 mmol/L Ammonium acetate (pH = 7.4):
methanol =20:80
Flow Rate: 1.0 mL/min
Detector: UV 267 nm
Column Temperature: 30°C
Sample Loading: 10 μL

2.4 Ganciclovir



Column: Unisol Amide
4.6×150 mm, 5 μm, 100 Å
Mobile Phase: 10 mmol/L NaH₂PO₄ (pH7.0)
: Acetonitrile=35:65
Flow Rate: 1.0 mL/min
Detector: UV 254 nm
Column Temperature: 23°C
Sample Loading: 10 μL

2.5 Shikimic Acid

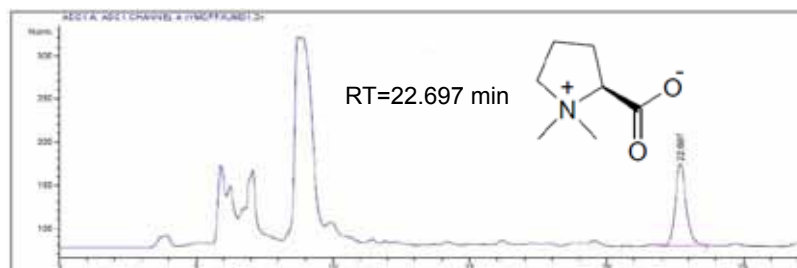


Columns: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase A: 1% Formic acid,
B: acetonitrile
Flow Rate: 1.0 mL/min
Detector: UV 210 nm
Column Temperature: 20°C
Sample Loading: 10 μL

Time (min)	B %
0	60
20	90

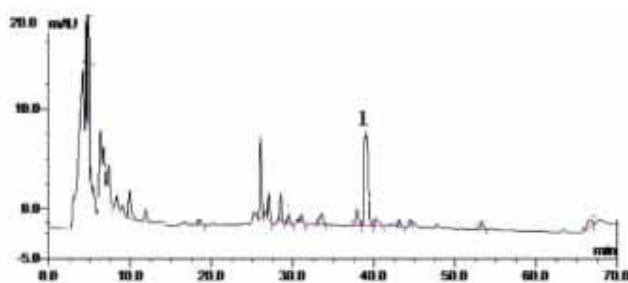
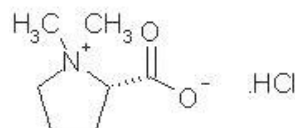
2.6 Stachydrine hydrochloride (in Motherwort)

The method has adopted in Chinese Pharmacopoeia



Columns: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase:
Acetonitrile: 0.2% acetic acid solution (80:20)
Flow Rate: 0.5 mL/min
Detector: ELSD
Column Temperature: 20°C
Sample Loading: 20 μL

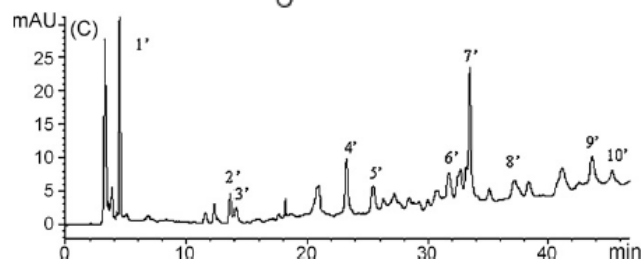
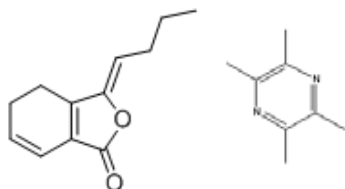
2.7 Stachydrine hydrochloride



Columns: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile phase: methanol: acetic acid = 0.2% (82:18)
Flow Rate: 1.0 mL/min
Detector: ELSD
Column Temperature: 30°C
TR=38.759 min
Sample Loading: 5 μL

KUANG yan, LI Zhi-hao, ZHENG fang, Determination of Stachydrine Hydrochloride in Chanhou Zhuyu Tablets by HPLC-ELSD, GUIDING JOURNAL OF TRADITIONAL CHINESE MEDICINE AND PHARMACOLOGY. 2010, 16(12), 89~91.

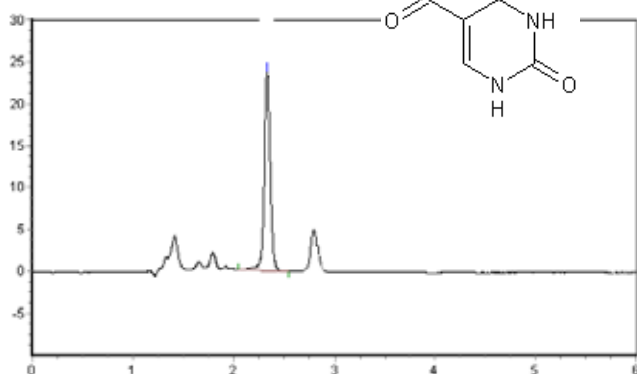
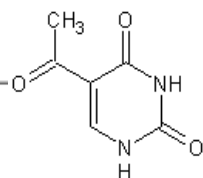
2.8 Ligusticum wallichii



Column: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase:
Methanol: 0.2% acetic acid = 82: 18
Flow Rate: 1.0 mL/min
Detector: ELSD
Column Temperature: 30°C
Sample Loading: 5 μL

Yu Jin, Tu Liang, Qing Fu, Yuan-Sheng Xiao, Jia-Tao Feng, Yan-Xiong Ke, Xin-Miao Liang, Fingerprint analysis of ligusticum chuanxiong using hydrophilic interaction chromatography and reversed-phase liquid chromatography. Journal of Chromatography A, 2008, 1216(2009): 2136~2141

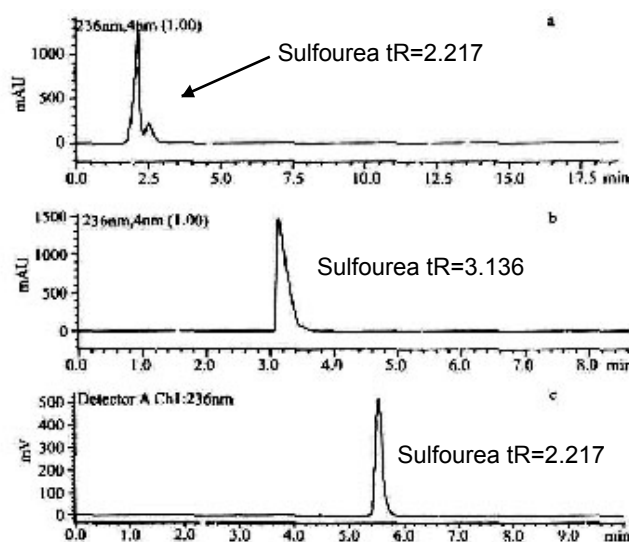
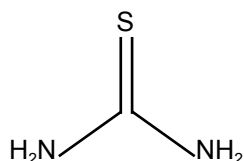
2.9 Uracil



Column: Unisol Amide
4.6×150 mm, 5 μm, 100 Å
Mobile Phase:
10 mmol NaH₂PO₄ (pH7.0): ACN =35:65
Flow Rate: 1.0 mL/min
Detector: UV, 254 nm
Column Temperature: 23°C
Sample Loading: 10 μL

TR=2.340 (N- Acetyl uracil)
TR=2.811(uracil)

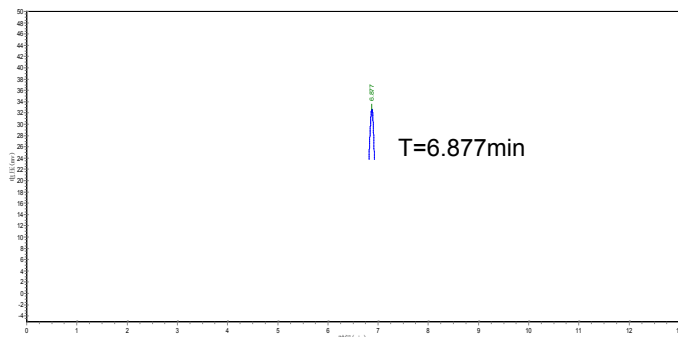
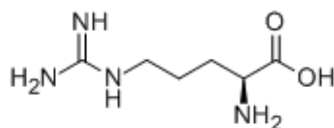
2.10 Sulfocarbamide



Column: Unisol Amide
 4.6×250 mm, 5 μ m, 100 Å
 Mobile Phase: Acetonitrile: Water = 97:3
 Flow Rate: 1.0 mL/min
 Detector: UV 236 nm
 Column Temperature: 23°C
 Sample Loading: 10 μ L

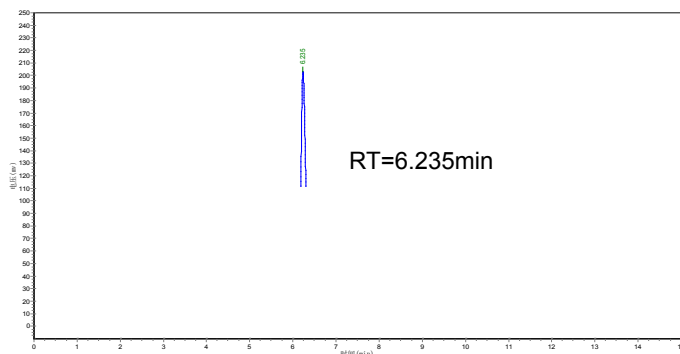
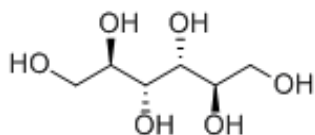
Fig. a
 Column: Brand W C18
 Mobile Phase : A/B= water: ACN = 90 /10
 Fig. b
 Column: Brand W C18
 Mobile Phase: 0.1 % formic acid in water
 Fig. c
 Column: Unisol Amide
 Mobile Phase: A/B = water:ACN = 3:97

2.11 Arginine



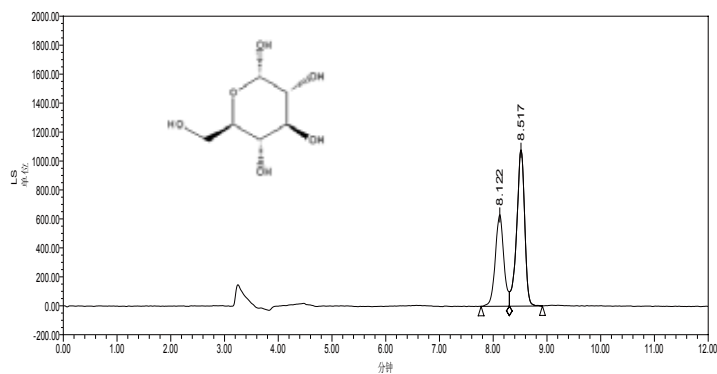
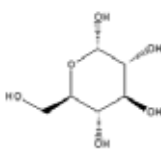
Column: Unisol Amide
 4.6×250 mm, 5 μ m, 100 Å
 Mobile Phase:
 0.05 mol KaH_2PO_4 : ACN = 40:60
 Flow Rate: 1.0 mL/min
 Detector: UV 220 nm
 Column Temperature: 30°C
 Sample Loading: 10 μ L

2.12 Mannitol



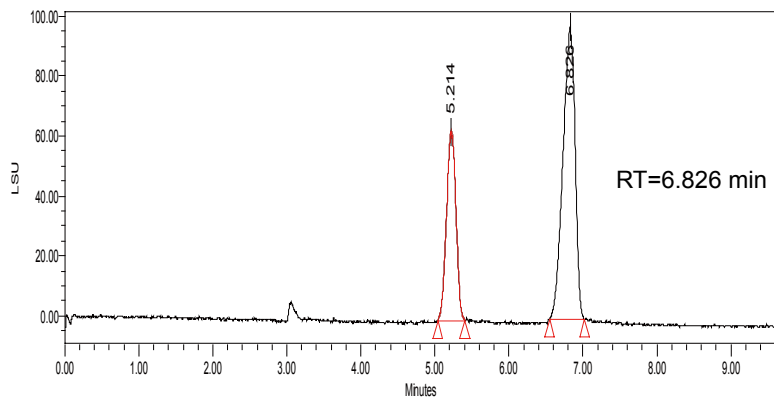
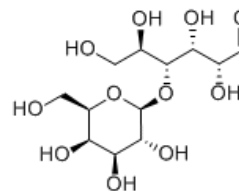
Column: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase: water
Flow Rate: 0.5 mL/min
Detector: ELSD
Column Temperature: 40°C
Sample Loading: 2 μL

2.13 Glucose



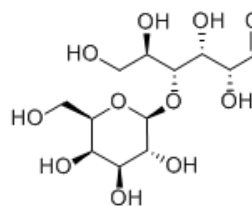
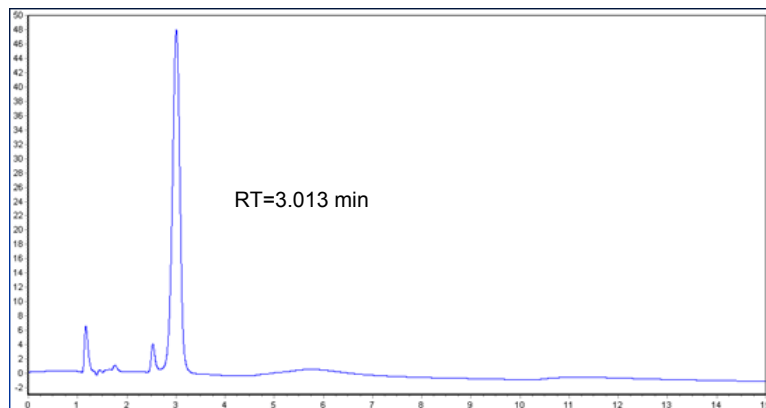
Column: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase:
ACN: water =80: 20
Flow Rate: 1.0 mL/min
Detector: ELSD
Column Temperature: 30°C
Sample Loading: 10 μL
RT=8.122 min (α-D Glucose)
RT=8.511 min (β-D- Glucose)

2.14 Lactose



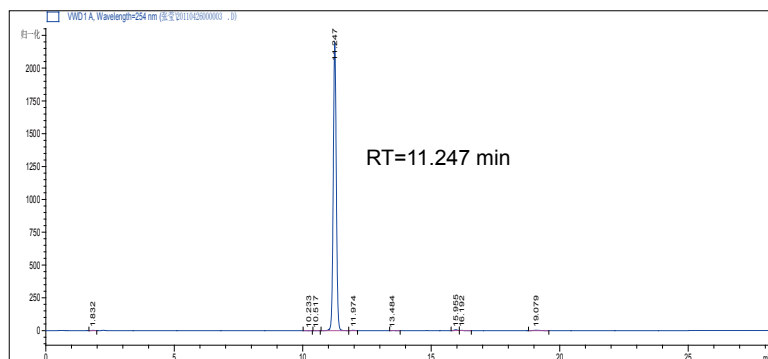
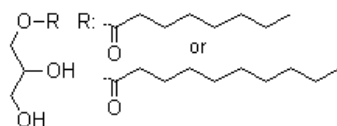
Column: Unisol Amide
4.6×250 mm, 5 μm, 100 Å
Mobile Phase:
ACN: water =75:25
Flow Rate: 1.0 mL/min
Detector: ELSD
Column Temperature: 60°C
Sample Loading: 20 μL

2.15 Acarbose



Column: Unisol Amide
 4.6×150 mm, 5 μm, 100 Å
 Mobile Phase:
 ACN : KH₂PO₄(4.4 mmol/L)
 -Na₂HPO₄ (2.0 mmol/L) = 70 : 30
 Flow Rate: 1.5 mL/min
 Detector: UV 210nm
 Column Temperature: 35°C
 Sample Loading: 20 μL

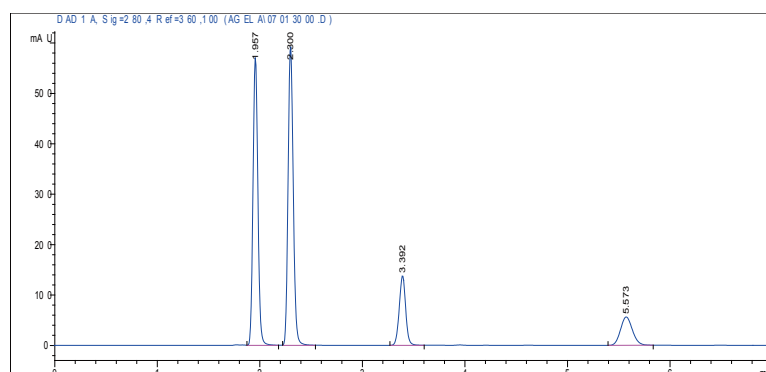
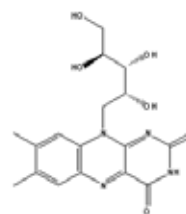
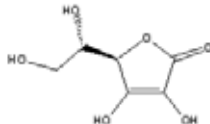
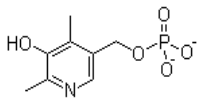
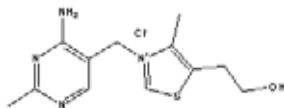
2.16 Simple lipids



Column: Unisol Amide
 4.6×150 mm, 5 μm, 100 Å
 Mobile Phase
 A: CAN, B: 10 mmol/L NH₄OAc
 Flow Rate: 1.0 mL/min
 Detector: UV 254 nm
 Column Temperature: 25°C
 Sample Loading: 10 μL

Time (min)	B%
5	4
16	20
28	4

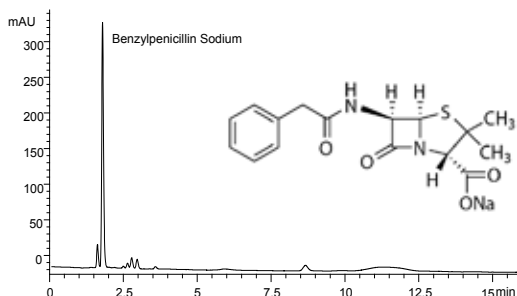
2.17 Water-soluble vitamins



Column: Unisol Amide,
 4.6×150 mm, 5 μm, 100 Å
 Mobile Phase:
 0.1%TFA in water: 0.1%
 TFA in ACN =90:10
 Flow Rate: 1.0 mL/min
 Detector: UV 280 nm,
 Column Temperature: 30°C
 Sample Loading: 10 μL
 RT=3.392 min (VC), RT=5.573 min (VB2)
 RT=1.957 min (VB1) RT=2.300 min (VB6)

3. Antibiotics

3.1 Benzylpenicillin Sodium



Column: Unisol C18, 4.6×150 mm, 5 μm

Part No.: UO951505-0

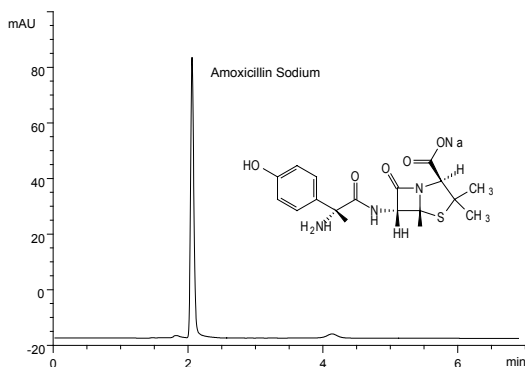
Mobile Phase: 0.1 mol/L potassium dihydrogen phosphate buffer
(pH=2.5):ACN=70:30

Detector: UV 225 nm

Flow Rate: 1 mL/min

Injection: 4 μL

3.2 Amoxicillin Sodium



Column: Unisol C18, 4.6×150 mm, 5 μm

Part No.: UO951505-0

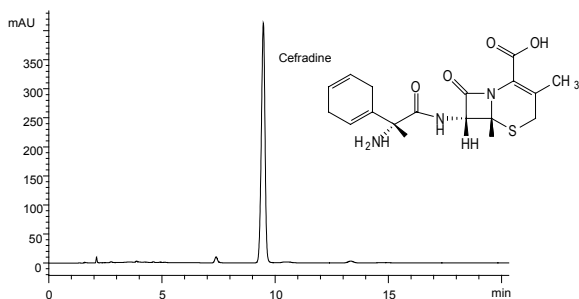
Mobile Phase: Phosphate buffer
(0.05 mol/L, pH=5.0): ACN=97.5:2.5

Detector: UV 254 nm

Flow Rate: 1 mL/min

Injection: 5 μL

3.3 Cefradine



Column: Unisol C18, 4.6×150 mm, 5 μm

Part No.: UO951505-0

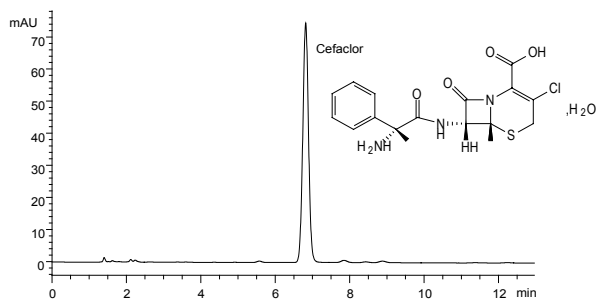
Mobile Phase: Water:MeOH:3.86% sodiumacetate solution
/4%acetic acid solution=742:240:15:3

Detector: UV 254 nm

Flow Rate: 1 mL/min

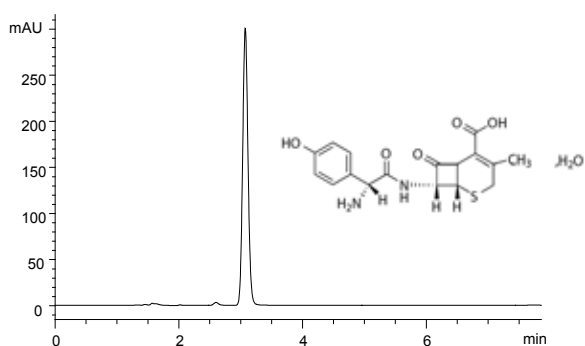
Injection: 2 μL

3.4 Cefaclor



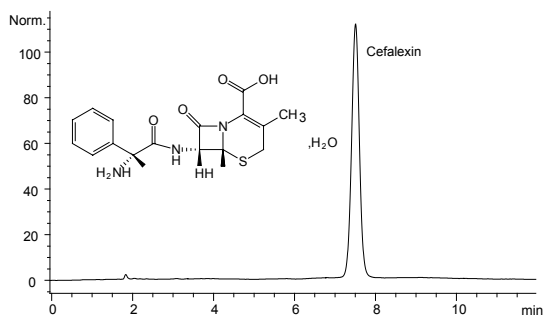
Column: Unisol C18, 4.6×150 mm, 5 μm
 Part No.: UO951505-0
 Mobile Phase: 0.05 mM phosphate
 buffer (pH=3.4):ACN=92:8
 Detector: UV 254 nm
 Flow Rate: 1 mL/min
 Injection: 5 μL

3.5 Cefadroxil



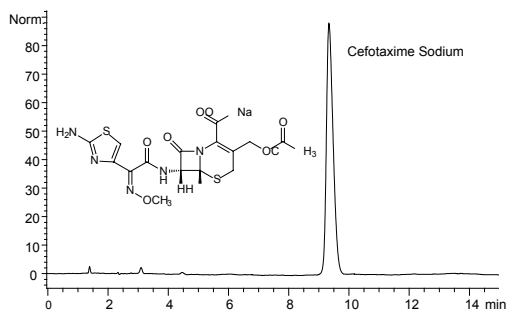
Column: Unisol C18, 4.6×150 mm, 5 μm
 Part No.: UO951505-0
 Mobile Phase: 0.05 mM phosphate
 buffer (pH=5.5):ACN=96:4
 Detector: UV 230 nm
 Flow Rate: 1 mL/min
 Injection: 2 μL

3.6 Cefalexin



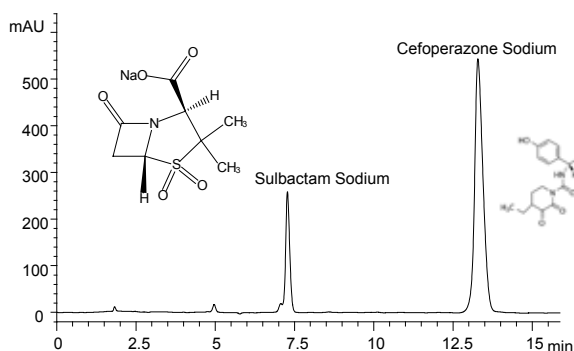
Column: Unisol C18, 4.6×150 mm, 5 μm
 Part No.: UO951505-0
 Mobile Phase: Water:MeOH: 3.86%
 sodium acetate solution/4%
 acetic acid solution=742:240:15:3
 Detector: UV 254 nm
 Flow Rate: 1 mL/min
 Injection: 2 μL

3.7 Cefotaxime Sodium



Column: Unisol C18, 4.6×150 mm, 5 μm
 Part No.: UO951505-0
 Mobile Phase: phosphate buffer
 (0.4 mM MKH_2PO_4 +8 mM K_2HPO_4)/MeOH=89:11
 Detector: UV 254 nm
 Flow Rate: 1 mL/min
 Injection: 2 μL

3.8 Sulbactam Sodium + Cefoperazone Sodium



Column: Venusil XBP C18, 4.6×250 mm, 5 μm

Part No.: VX952505-0

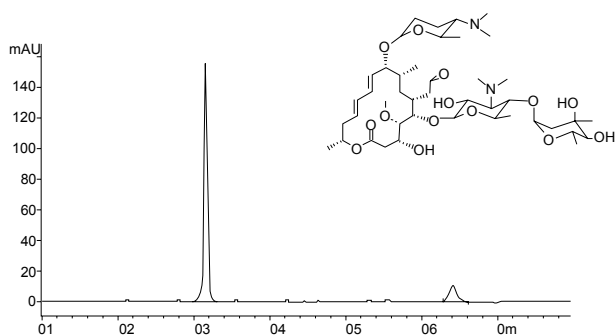
Mobile Phase: 0.005 mol/L TABOH (adjust pH=5.0
with H₃PO₄): ACN=70:30

Detector: UV 220 nm

Flow Rate: 1 mL/min

Injection: 2 μL

3.9 Acetylspiramycin



Column: Unisol C18, 4.6×250 mm, 5 μm

Part No.: UO952505-0

Mobile Phase: ACN:NaClO₄/H₃PO₄ (pH=2.2)=30:70

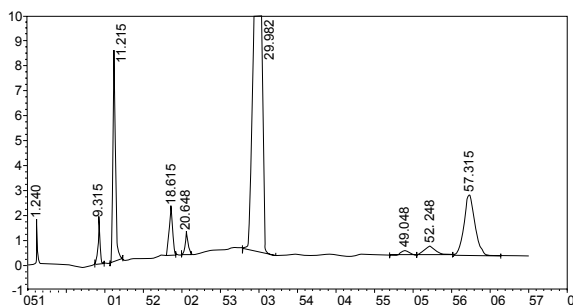
Temperature: 30°C

Flow Rate: 0.8 mL/min

Detector: UV 232nm

Injection: 20 μL

3.10 Meleumycin



Column: Venusil XBP C8, 4.6×150 mm, 5 μm

Part No.: VX851505-0

Mobile Phase: ammonium formate (0.2 mol/L, adjust to
pH=7.3 with TEA):ACN=62:38

Detector: UV 232 nm

Flow Rate: 1 mL/min

Temperature: 30°C

3.11 Inspection of karats Amphotericin and Its Related Substance

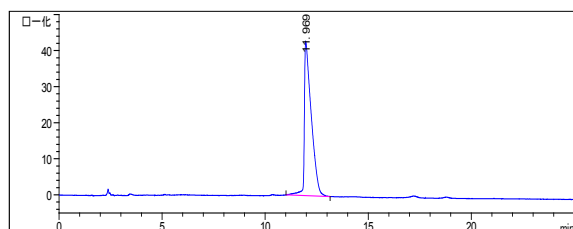


Fig.1 Chromatogram of Flumorph sample of karats amphotericin and its related substance

Column: Innoval-ODS(2) (5μm, 100Å, 4.6*250mm);

Buffer solution : 9.11g potassium dihydrogen phosphate dissolved in 1000 mL water, added adjusted to pH 5.5 with 2.0 mL triethylamine and a certain amount of phosphoric acid;

Mobile phase: buffer solution: acetonitrile = 600:400;

Flow rate: 1.0 mL/min;

Temperature: 45°C;

Detector: UV 210nm;

Injection: 20 μL;

Sample: 1.0 mg/mL (dissolved in mobile phase).

3.12 Inspection of Ambroxol Hydrochloride Tablet

Sample Preparation

1 piece of ambroxol hydrochloride tablet was dissolved in mobile phase and diluted to the concentration of 1.0 mg/mL of ambroxol hydrochloride. Then the solution was filtered and collected as the test solution.

About 5.0 mg of ambroxol hydrochloride reference substance was dissolved with 0.2 mL methanol and was added with 40 μ L of formaldehyde water solution (1 $\rightarrow$ 100). After shaking gently, the mixed solution was placed in water bath at 60 $^{\circ}$ C for 5 min, then dried by nitrogen blow. The residue was dissolved with 5.0 mL of water and then diluted with 20 mL of mobile phase to get the ambroxol hydrochloride system suitability test solution.

Chromatographic conditions

Column: Innoval ODS(2) (5 μ m, 100 $\text{\AA}$, 4.6 $\times$ 250 mm);

Mobile Phase: 0.01 mol/L diammonium phosphate solution:acetonitrile = 1:1;

Temperature: 30 $^{\circ}$ C;

Detector: UV 248nm;

Flow rate: 1.0 mL/min;

Injection: 20 μ L.

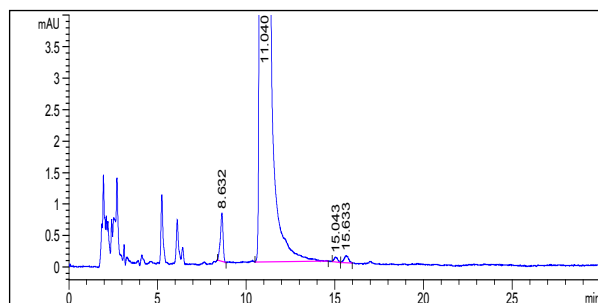


Fig.1 Chromatogram of related substance test of ambroxol hydrochloride tablets

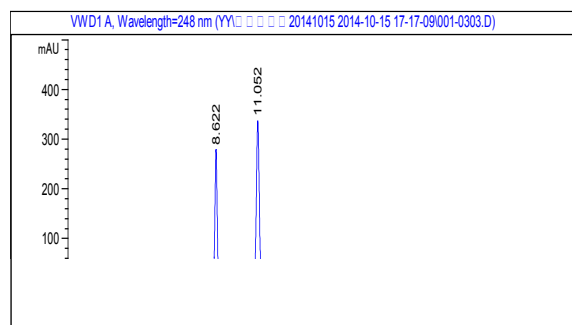
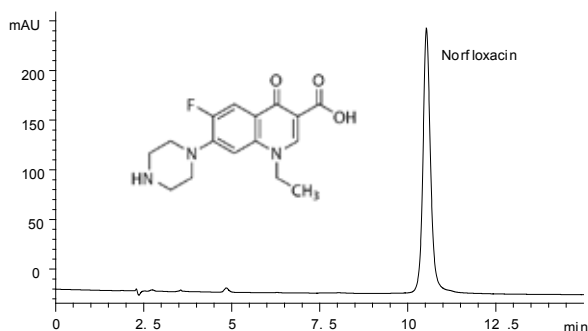


Fig.2 Chromatogram of system suitability test of ambroxol hydrochloride tablets

4. Synthetic Antimicrobial Agents

4.1 Norfloxacin



Column: Venusil XBP C18, 4.6×250 mm, 5 μm

Part No.: VX952505-0

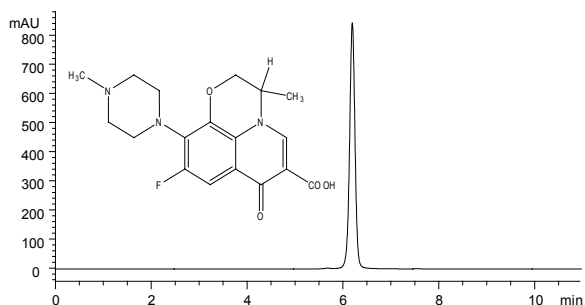
Mobile Phase: H₃PO₄ (0.025 mol/L, adjust to pH=3.0 with TEA):ACN=87:13

Detector: UV 278 nm

Flow Rate: 1 mL/min

Injection: 20 μL

4.2 Ofloxacin



Column: Venusil XBP C18, 4.6×250 mm, 5 μm

Part No.: VX952505-0

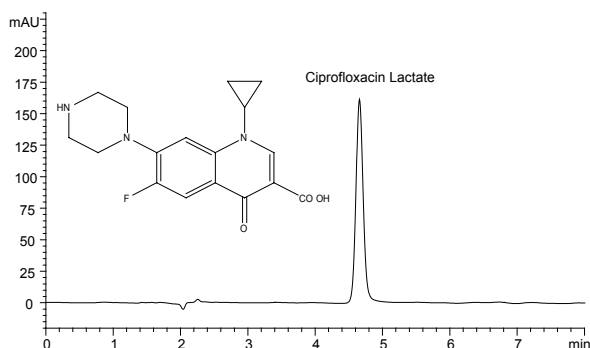
Mobile Phase: NH₄AC/KClO₄ (40 mM, pH=2.0): ACN=85:15

Detector: UV 294 nm

Flow Rate: 1 mL/min

Injection: 4 μL

4.3 Ciprofloxacin Lactate



Column: Venusil XBP C18, 4.6×150 mm, 5 μm

Part No.: VX951505-0

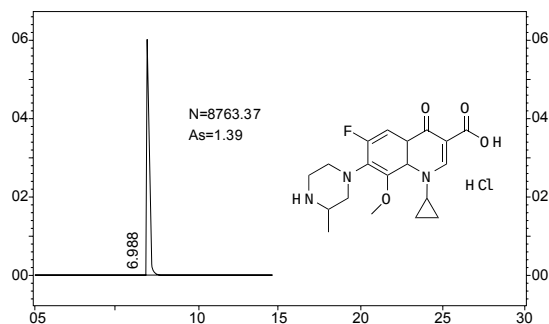
Mobile Phase: Citric acid buffer (0.05 mol/L, adjust to pH=3.5 with TFA):ACN=82:28

Detector: UV 277 nm

Flow Rate: 1 mL/min

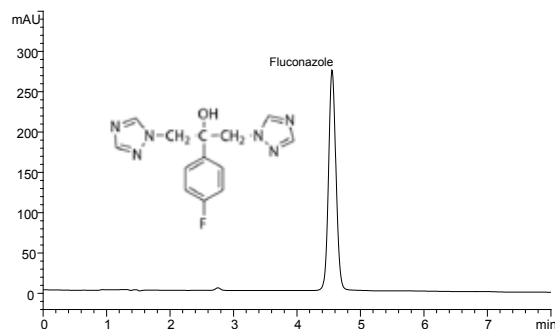
Injection: 10 μL

4.4 Gatifloxacin hydrochloride



Column: Venusil XBP C18(L), 4.6×150 mm, 5 μm
 Part No: VX951505-L
 Mobile Phase: 1% TEA(pH=4.5):ACN=87:13
 Detector: UV 325 nm
 Flow Rate: 1.5 mL/min
 Injection: 10 μL
 Temperature: 40°C

4.5 Fluconazole



Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: KH₂PO₄ buffer (adjust to pH=7.0 with NaOH): MeOH=55:45
 Detector: UV 260 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL

4.6 Separation of Flumorph Isomer

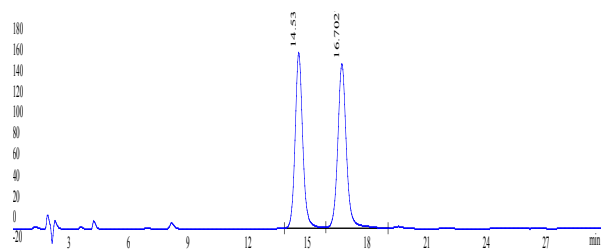


Fig.1 Chromatogram of flumorph isomers with Durashell C18-AM

Column: Durashell C18-AM (3 μm, 100 Å, 2.1×150 mm);
 Mobile phase: Methanol: water =(55/45, v/v);
 Flow rate: 0.2 ml/min;
 Detector: UV 254nm;
 Temperature: 25°C;
 Sample: 0.03mg/ml
 Injection: 20 μL;

4.7 Separation of Flumorph Isomer

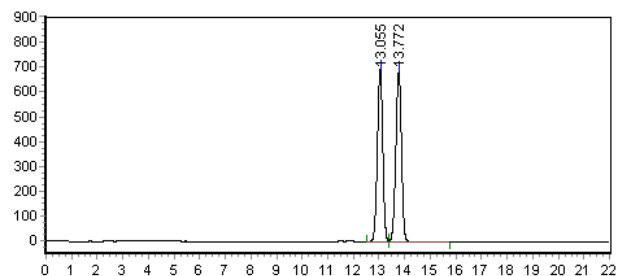
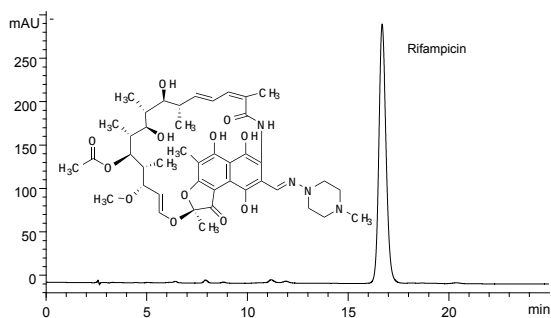


Fig.1 Chromatogram of flumorph isomer with Innoval ODS(2)

Column: Innoval ODS(2) (5 μm, 100 Å, 4.6×250 mm)
 Mobile Phase: Acetonitrile: water = 40:60, v/v;
 Detector: UV 254nm;
 Flow rate: 1.0 mL/min;
 Injection: 10 μL;
 Sample: 0.33 mg/ml(dissolved in mobile phase)
 Temperature: 30°C

5. Anti-virus Medicine

5.1 Rifampicin



Column: Venusil XBP C8, 4.6×250 mm, 5 μm

Part No.: VX852505-0

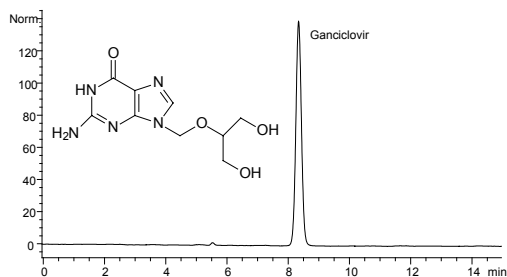
Mobile Phase: MeOH/ACN/KH₂PO₄ 0.075 mol/L/citric acid
1 mol/L=30:30:36:4

Detector: UV 254 nm

Flow Rate: 1 mL/min

Injection: 2 μL

5.2 Ganciclovir



Column: Unisol C18, 4.6×150 mm, 5 μm

Part No.: UO951505-0

Mobile Phase: Water:MeOH=95:5

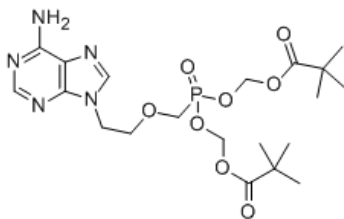
Detector: UV 252 nm

Flow Rate: 1 mL/min

Injection: 2 μL

5.3 Inspection of Adefovir Dipivoxil and Its Related Substance

Adefovir dipivoxil; Molecular weight 501.47; Formula: C₂₀H₃₂N₅O₈P;



nn: Durashell C18-AM (5 μm, 100 Å; 4.6×250 mm);

Buffer solution: 0.15 mol/L dipotassium hydrogen phosphate solution, adjusted to pH 6.0 with phosphoric acid;

Mobile phase: Acetonitrile: buffer solution =33:67,v/v;

Detector: UV 261 nm;

Temperature: 30°C;

Flow rate: 1.0 mL/min;

Injection: 20 μL.

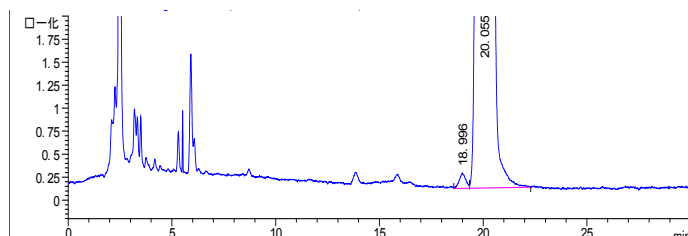
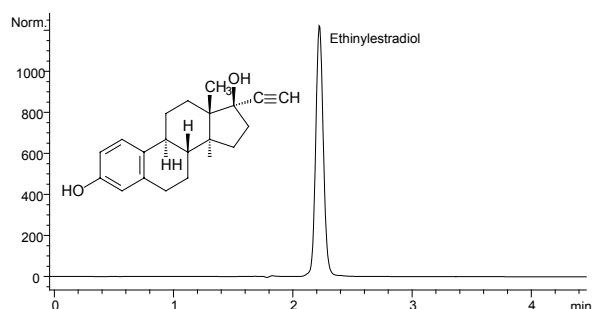


Fig.1 Chromatogram of system suitability test of Adefovir dipivoxil

Peak No	Compound	Retention Time(min)	Tailing Factor	N	Reference
1	Unknown			16371	Figure 1
2	Impurity	18.996	0.94	20508	Figure 1
	Adefovir dipivoxil	20.055	1.04		

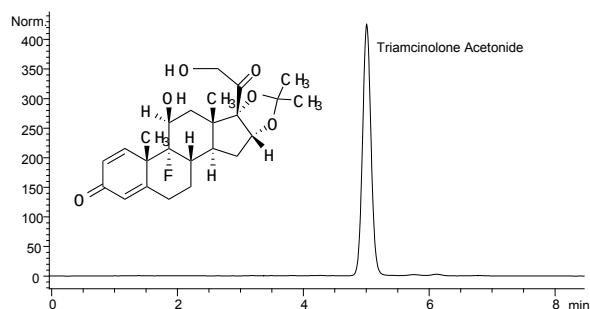
6. Steroid Hormones

6.1 Ethinylestradiol



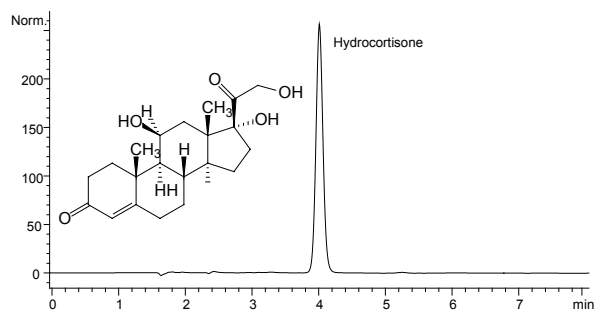
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: MeOH:Water=70:30
Detector: UV 281 nm
Flow Rate: 1 mL/min
Injection: 2 μL

6.2 Triamcinolone Acetonide



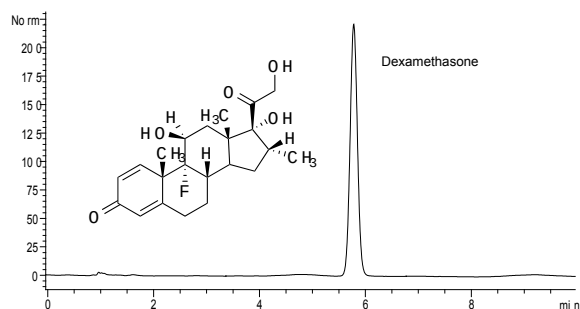
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: MeOH:Water=21:19
Detector: UV 240 nm
Flow Rate: 1 mL/min
Injection: 2 μL

6.3 Hydrocortisone



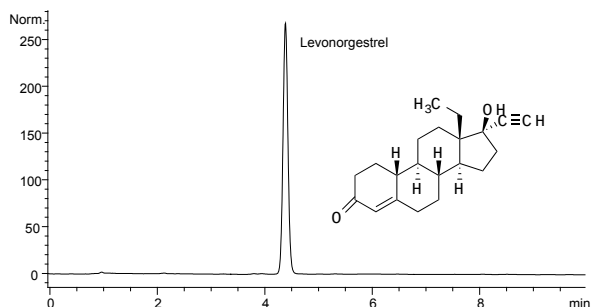
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: MeOH:Water=70:30
Detector: UV 240 nm
Flow Rate: 1 mL/min
Injection: 10 μL

6.4 Dexamethasone

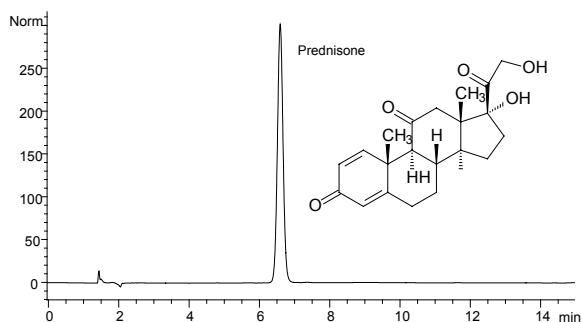


Column: Venusil XBP C18, 4.6×150 mm, 5 μm
Part No.: VX951505-0
Mobile Phase: Citric acid buffer (0.05 mol/L, adjust to pH=3.5 with TFA):ACN=82:28
Detector: UV 277 nm
Flow Rate: 1 mL/min
Injection: 10 μL

6.5 Levonorgestrel

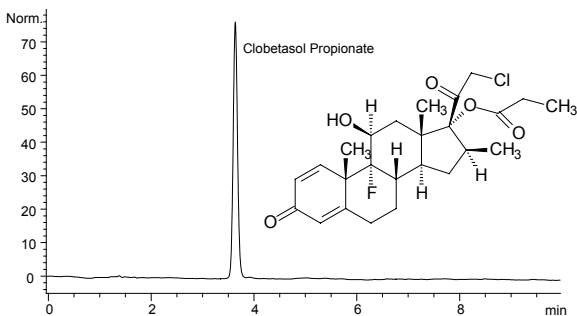


Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: Water:ACN=30:70
Detector: UV 240 nm
Flow Rate: 1 mL/min
Injection: 2 μL



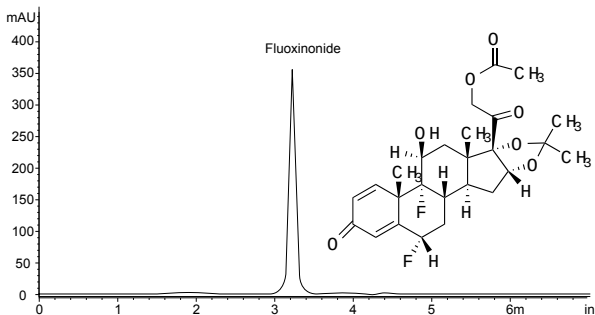
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: Water:THF:MeOH=668:250:62
Detector: UV 254 nm
Flow Rate: 1 mL/min
Injection: 2 μL

6.6 Clobetasol Propionate



Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: Phosphate buffer 0.05 mol/L, pH=2.5/ACN
/MeOH=425:475:100
Detector: UV 240 nm
Flow Rate: 1 mL/min
Injection: 2 μL

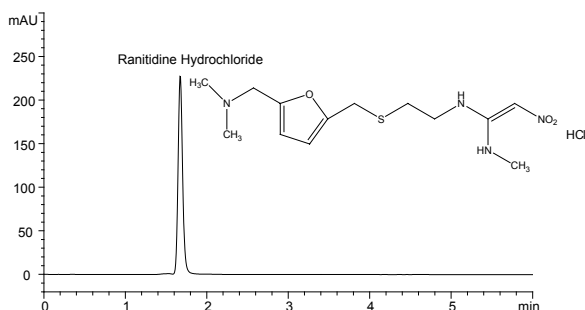
6.7 Fluocinonide



Column: Venusil XBP C18, 4.6×150 mm, 5 μm
Part No.: VX951505-0
Mobile Phase: MeOH:ACN:Water=60:10:30
Detector: UV 240 nm
Flow Rate: 1 mL/min
Injection: 10 μL

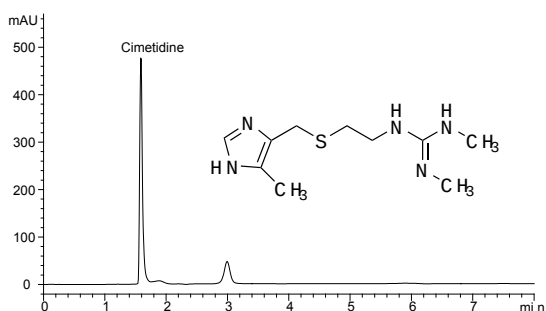
7. Medicine for Gastric Ulcer

7.1 Ranitidine Hydrochloride



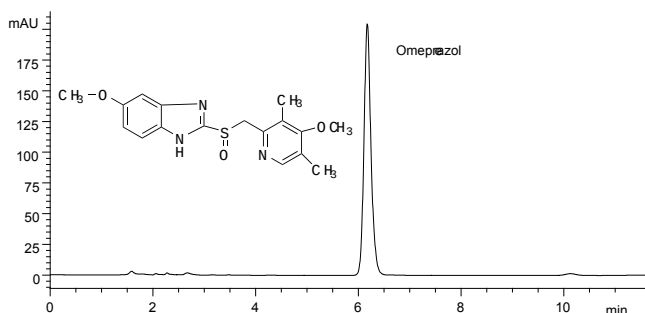
Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: MeOH:0.77% Ammonium acetate aq.=
 285:115
 Detector: UV 320 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL

7.2 Cimetidine



Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: MeOH:Water:H₃PO₄:TFA
 =200:800:0.3:0.2
 Detector: UV 220 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL

7.3 Omeprazole



Column: Venusil XBP C8, 4.6×250 mm, 5 μm
 Part No.: VX852505-0
 Mobile Phase: NaH₂PO₄ Buffer (0.01 mol/L, adjust to
 pH7.6 with H₃PO₄): ACN=60:40
 Detector: UV 302 nm
 Flow Rate: 1 mL/min
 Injection: 4 μL

7.4 Separation of Omeprazole and Omeprazole Sulfonamide Compounds

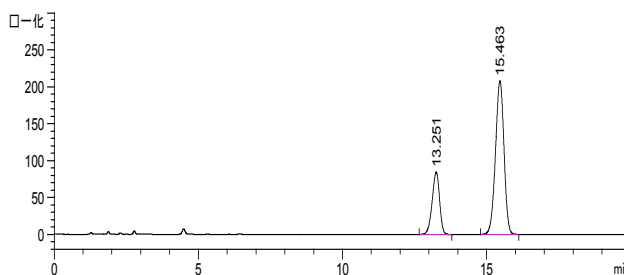
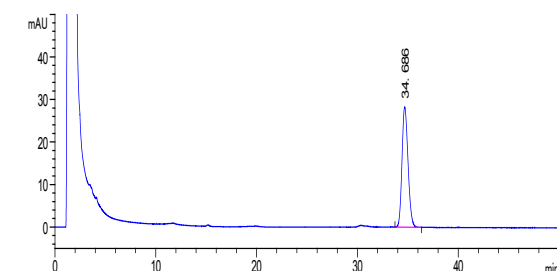


Fig.1 Chromatogram of Omeprazole and Omeprazole sulfonamide compounds
 (peaks are in order of omeprazole sulfonamide compounds and omeprazole successively)

Column: Durashell C18-AM (5 μm, 100 Å, 4.6×150 mm);
 Mobile phase: Phosphate buffer solution:acetonitrile
 =(74/26, v/v);
 Flow rate: 1.0 mL/min;
 Detector: UV 280nm;
 Temperature: 25°C;
 Injection: 20 μL.

7.5 Determination of Vitamin E in Compound Amino Acid and Vitamin Capsules



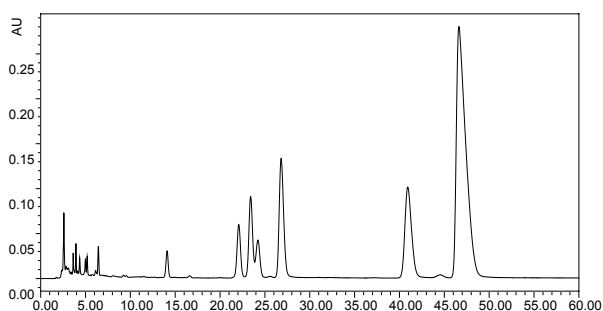
Column: Durashell C18-AM (5 μ m, 100Å, 4.6*250mm);
Mobile phase: methanol: acetonitrile: isopropanol: 2% of acetic acid in water= 40: 30: 20: 10,v/v;
Flow rate: 1.5 mL/min;
Temperature: 40°C;
Injection: 20 μ L;
Detector: UV 265nm;

Fig.1 Chromatogram of vitamin E in compound amino acid and vitamin capsules



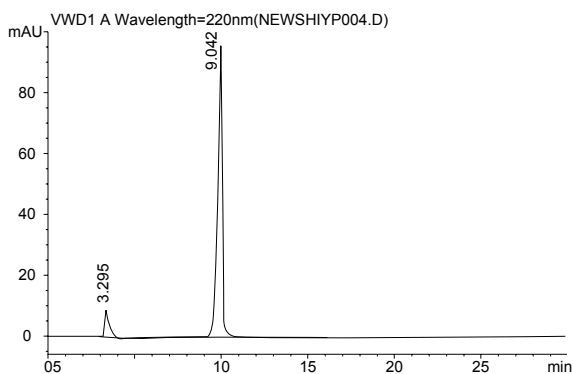
8. Analysis of Alkaloids

8.1 Quaternary Ammonium Alkaloids from Coptidis



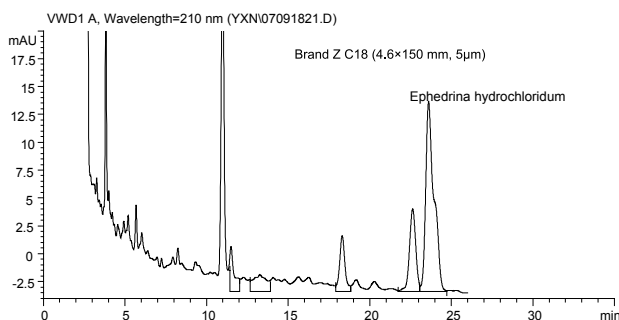
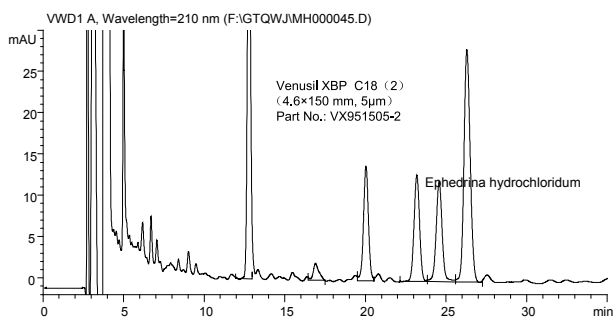
Column: Unisol C18, 4.6×250 mm, 5 μm
Part No.: UO952505-0
Mobile Phase: Water(0.3% TEA): ACN=75:25
Detector: UV 254 nm
Flow Rate: 1 mL/min
Temperature: 25°C

8.2 Matrine



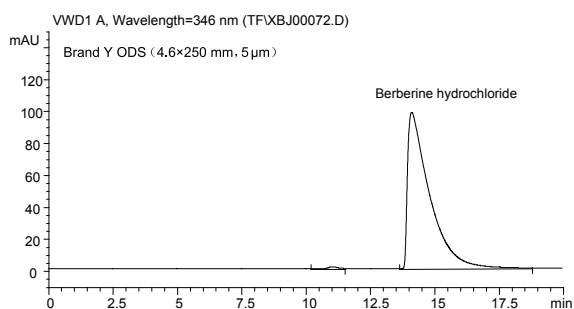
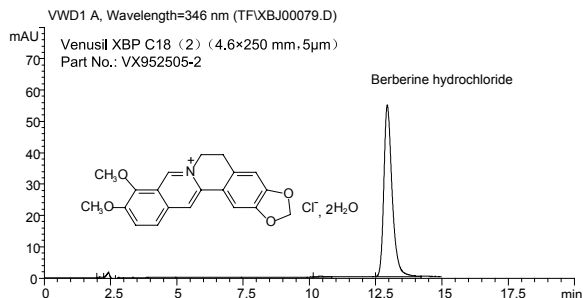
Column: Venusil XBP NH₂, 4.6×250 mm, 5 μm
Part No.: VN852505-0
Mobile Phase: ACN:Ethanol:3% H₃PO₄
aq.=80:10:10
Detector: UV 220 nm
Flow Rate: 1 mL/min
Injection: 20 μL

8.3 Ephedrine from Coptidis



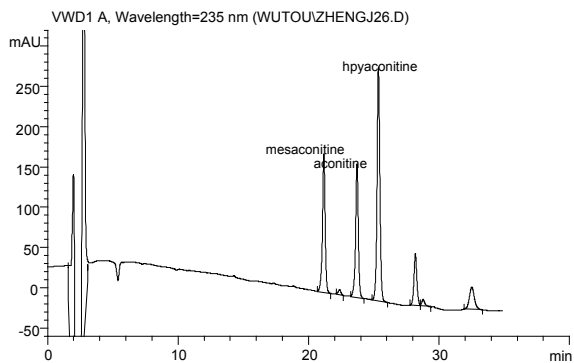
Mobile Phase: ACN:SDS/H₃PO₄=40:60
Detector: UV 210 nm
Flow Rate: 1 mL/min

8.4 Berberine Hydrochloride From Phellodendron



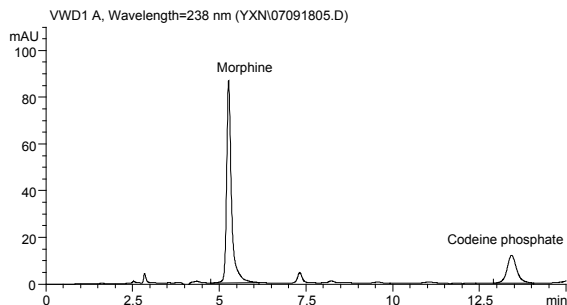
Mobile Phase: ACN:1% TFA=35:65
Detector: UV 346 nm
Flow Rate: 1 mL/min

8.5 Aconitine, Mesaconitine and Hypaconitin



Column: Promosil C18, 4.6×250 mm, 5 μm
Part No.: PM952505-0
Mobile Phase: ACN: 2% Acetate (adjust pH=6.5 with TEA)=15:85
Detector: UV 235 nm
Flow Rate: 1 mL/min

8.6 Berberine from Phellodendron

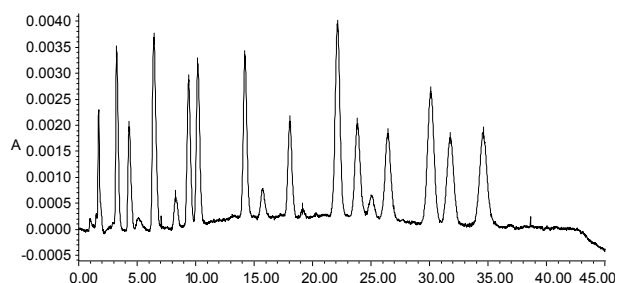


Column: Venusil XBP C18(2), 4.6×250 mm, 5 μm
Part No.: VX952505-2
Mobile Phase: MeOH: CH₃COONa aq. (0.03mol/L, adjust pH to 3.5 with Acetic acid)=15:85
Detector: UV 238 nm
Flow Rate: 1 mL/min



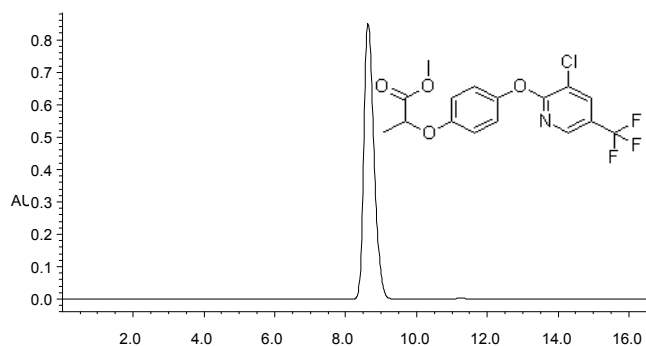
9. Agricultural Chemical

9.1 Analysis of 14 Herbicides



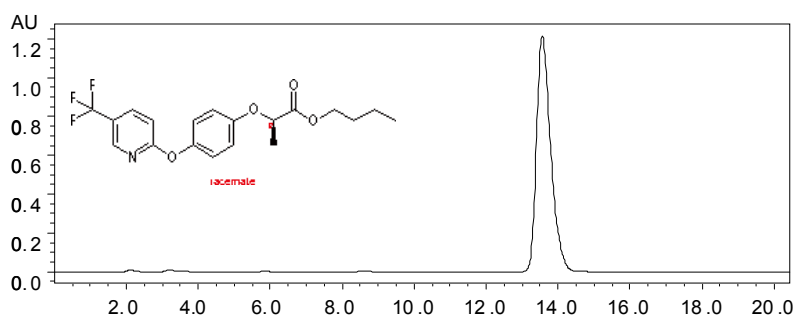
Sample: dazomet Cymoxanil Triadimefon Tebuconazole
 Thiophanate-Methyl hexaconazole flutriafol
 Iprodione Metalaxyl Procymidone carboxin
 Prochlora Diethofencar Triadimenol
 1,2,3,6-tetrahydro-N-(trichloromethylthio)phthalimide
 Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: A: Ammonium acetate buffer; B:ACN
 Gradient: 40% B to 45% B in 8 min, hold for 40 min.
 Detector: UV 225 nm Flow Rate: 1 mL/min
 Injection: 20 μL Temperature: 25°C

9.2 Haloxyfop-P-methyl



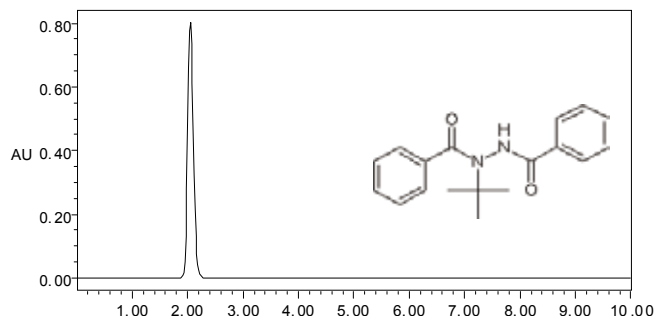
Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: ACN:Water=70:30
 Detector: UV 225 nm
 Flow Rate: 1 mL/min
 Injection: 5 μL
 Temperature: 25°C

9.3 Fluazifop-p-butyl



Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: ACN:Water=70:30
 Detector: UV 225 nm
 Flow Rate: 1 mL/min
 Injection: 5 μL
 Temperature: 25°C

9.4 1,2-Dibenzoyl-1-tert-butylhydrazine



Column: Venusil XBP C18, 4.6×150 mm, 5 μm
 Part No.: VX951505-0
 Mobile Phase: Water:MeOH=25:75
 Detector: UV 254 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL
 Temperature: 25°C

10. Analysis of Amino Acids

Column: Venusil AA, 4.6×250 mm, 5 μm

Part No.: AA952505-0

Mobile Phase: A: 0.1 mol/L CH₃COONa (Adjust pH=6.5 with Acetic Acid):Acetonitrile (93:7)

B:Water: Acetonitrile (4:1)

Gradient:

Time(min)	0	11	13.9	14	29	29.1	37	37.1	45
%B	0	7	12	15	34	100	100	0	0

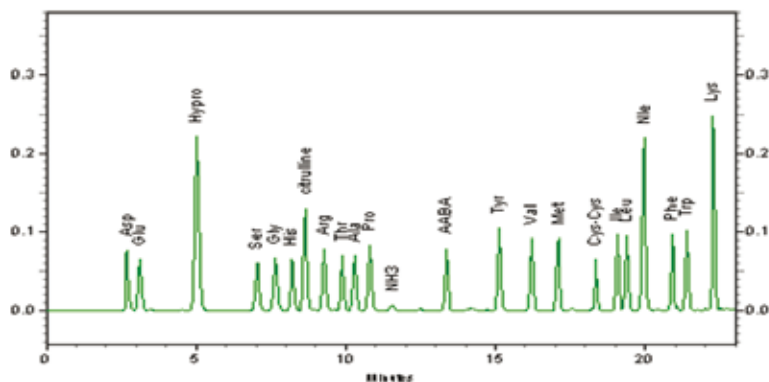
Flow Rate: 1 mL/min

Detector: UV 254 nm

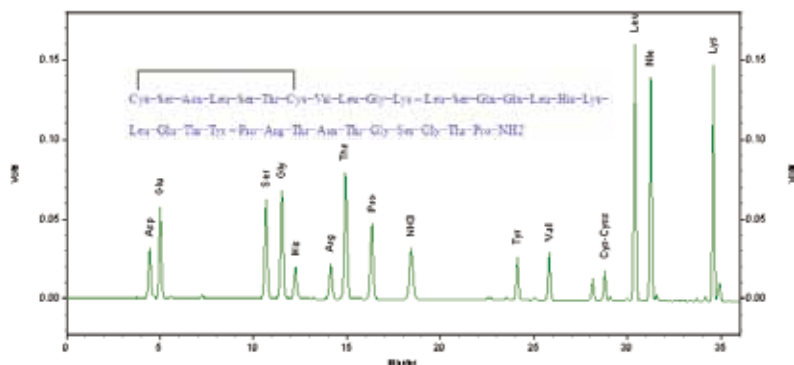
Temperature: 40°C

Sample: PTC-AA (derivatization of amino acids with PITC)

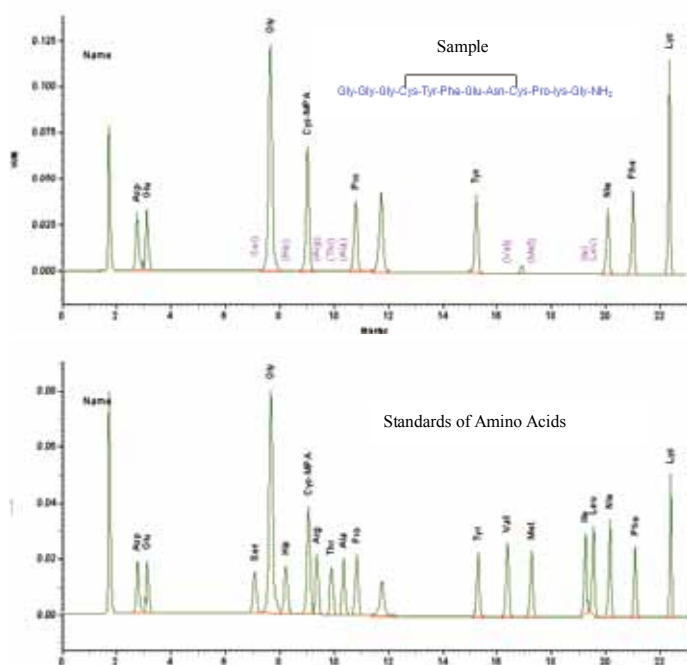
10.1 Standards of Amino Acids



10.2 Amino Acids from Salmon Calcitonin

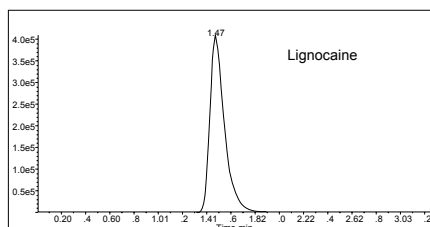
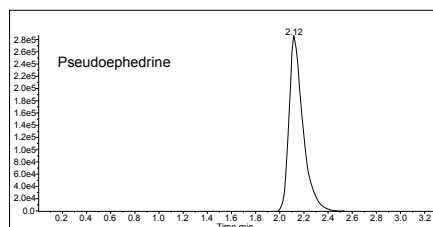
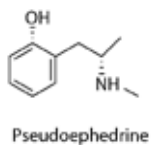


10.3 Amino Acid from Terlipressin



11. Applications in LC-MS

11.1 Pseudoephedrine for Plasma



Mass System: API Qtrap 3200 Applied Biosystem

Mass Condition: ESI+ mode, MRM

HPLC Column: Venusil ASB C18, 2.1 mm×50 mm; Part No.:VS950502-0;

Sample: Prepared sample by SPE(Cleanert PCX)

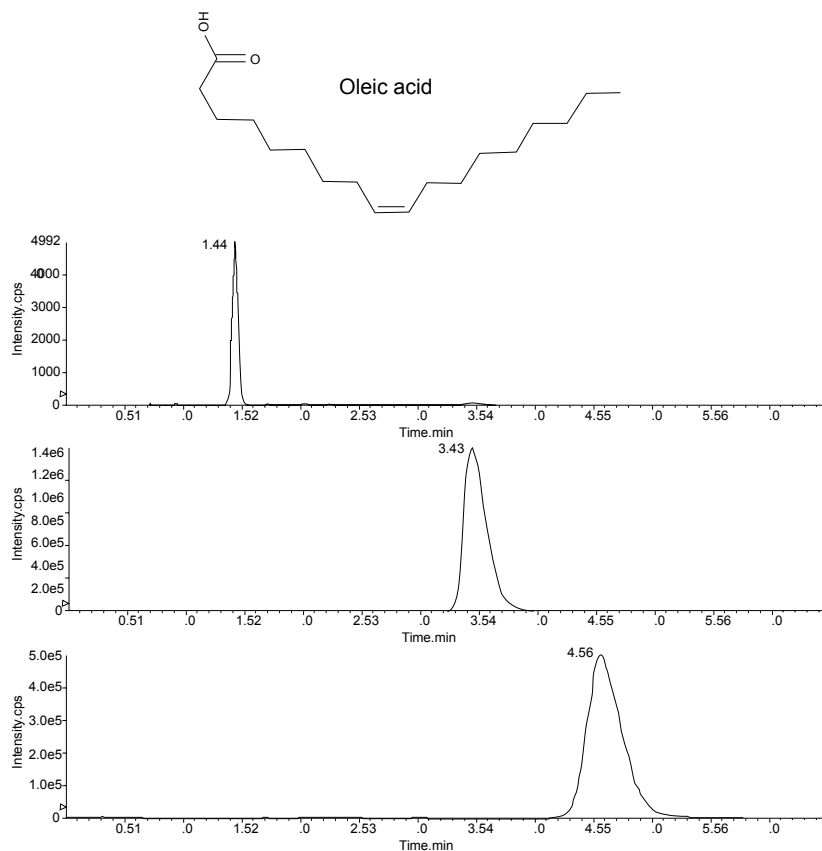
Mobile Phase: A:1% Formic Acid in Water; B:Methanol

Gradient: 20% B to 95% B in 2 min, hold for 0.5 min, then switch to A:B (20:80)

Flow Rate: 0.5 mL/min

Temperature: 25°C

11.2 Oleic Acid in Plasma



Mass System: API Qtrap 3200 Applied Biosystem

Mass Condition: ESI- mode, MRM

HPLC Column: Venusil ASB C18, 2.1mm×50 mm; Part No.: VS950502-0

Sample: Prepared sample by SPE (Cleanert PEP)

Mobile Phase: A:13 mmol/L ammonium acetate aq.; B:Acetonitrile

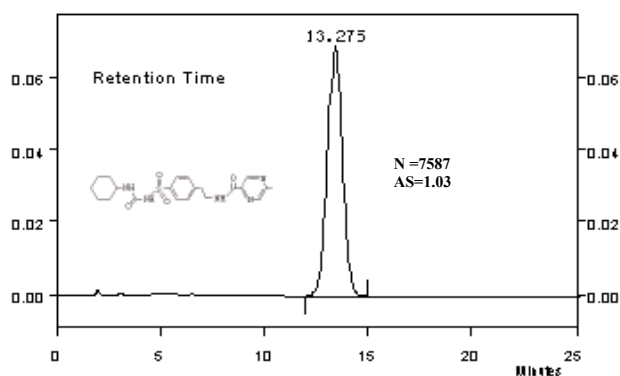
Gradient: 5% B to 95% B in 2 min, hold for 2 min, switch to A:B(95:5) then hold for 2 min.

Flow Rate: 0.8 mL/min

Temperature: 25°C

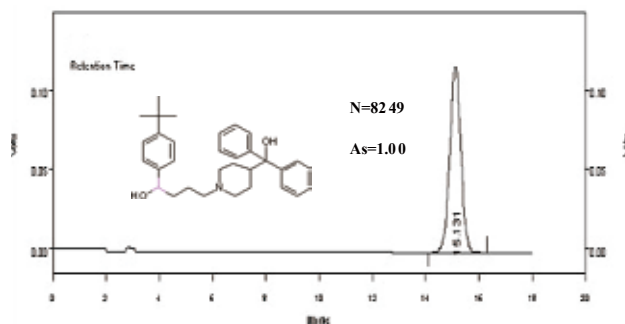
12. Others

12.1 Glipizide



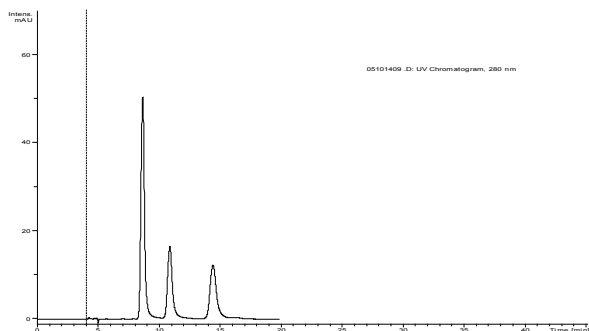
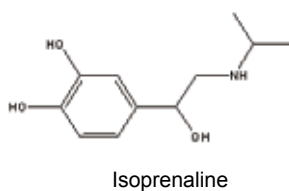
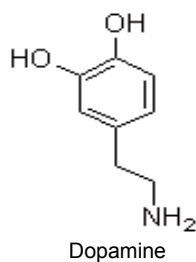
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: Phosphate Buffer 0.1 mol/L,
pH 6.0:MeOH=55:45
Flow Rate: 1 mL/min
Injection: 20 μL

12.2 Terfenadine



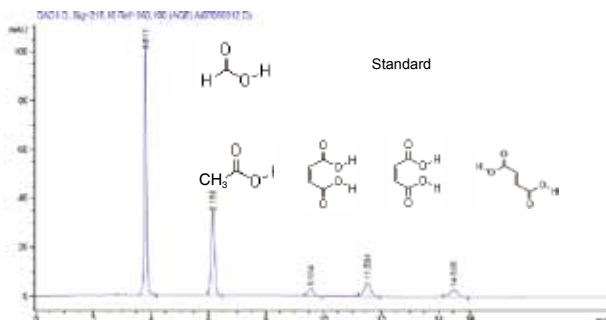
Column: Unisol C18, 4.6×150 mm, 5 μm
Part No.: UO951505-0
Mobile Phase: MeOH:H₃PO₄/Triethylamine
(0.1mol/L)=80:20
Detector: UV 254 nm
Flow Rate: 1 mL/min
Injection: 10 μL

12.3 Dopamine and Its Metabolin



Sample: Dopamine, Isoprenaline, Soprenaline
Column: Venusil PFP, 4.6×250 mm, 5 μm
Part No.: VF952505-0
Mobile Phase: MeOH:CH₃COOH/CH₃COONH₄
Buffer(pH 4.5)=15:85
Detector: UV 280 nm
Flow Rate: 0.8 mL/min

12.4 Organic Acids



Sample: Formic acid, acetic acid, maleic acid, succinic acid, fumaric acid

Column: Unisol C18, 4.6×250 mm, 5 μm

Part No.: UO952505-0

Mobile Phase: 0.02M NH₄AC Aq.:MeOH=95:5

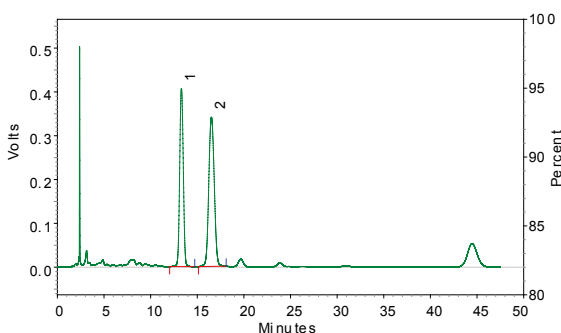
Detector: UV 215 nm

Flow Rate: 1 mL/min

Injection: 10 μL

Temperature: 20°C

12.5 Catechins in Leaves



Sample: Extract of leaves

Column: Unisol C18, 4.6×250 mm, 5 μm

Part No.: UO952505-0

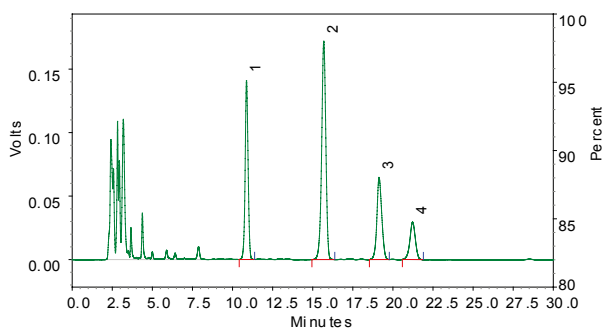
Mobile Phase: 0.02% H₃PO₄:MeOH=81:19

Detector: UV 278 nm

Flow Rate: 1 mL/min

Temperature: 40°C

12.6 Saccharin Sodium in Milk Powder



Sample: Benzoic acid, 2,4-Hexadienoic acid, Sodium saccharine, milk powder

Column: Unisol C18, 4.6×250 mm, 5 μm

Part No.: UO952505-0

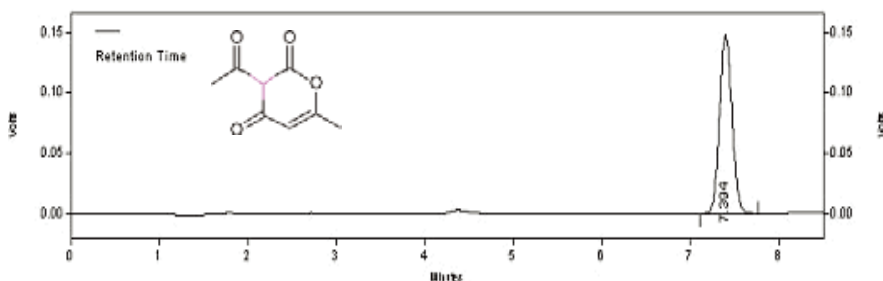
Mobile Phase: MeOH:CH₃COONH₄(0.02 M)=5:95

Detector: UV 230 nm

Flow Rate: 1 mL/min

Temperature: 30°C

12.7 DHA in the Health Food



Column: Unisol C18, 4.6×250 mm, 5 μm

Part No.: UO952505-0

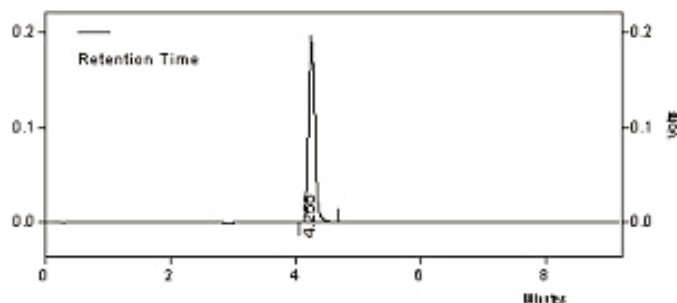
Mobile Phase: MeOH:Water=80:20

Detector: UV 254 nm

Flow Rate: 1 mL/min

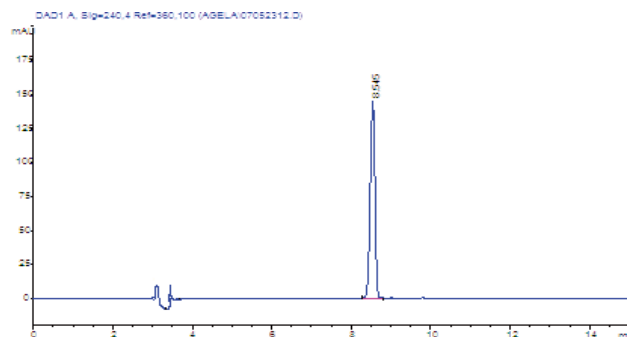
Injection: 10 μL

12.8 Tartrazine in Food



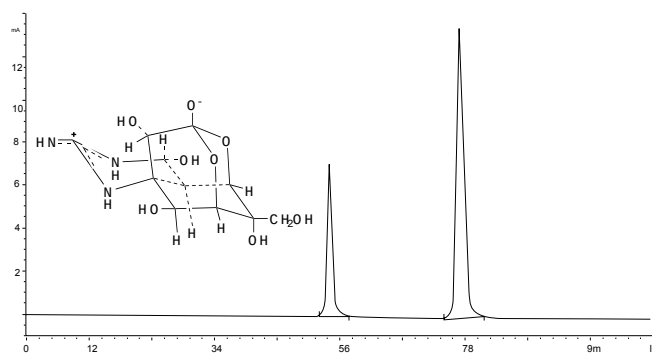
Column: Unisol C18, 4.6×250 mm, 5 μm
 Part No.: UO952505-0
 Mobile Phase: A: Ammonium acetate
 buffer pH 4.0; B: MeOH
 Gradient: 35%B to 50%B in 5 min.
 Detector: UV 254 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL

12.9 Melamine in Feed



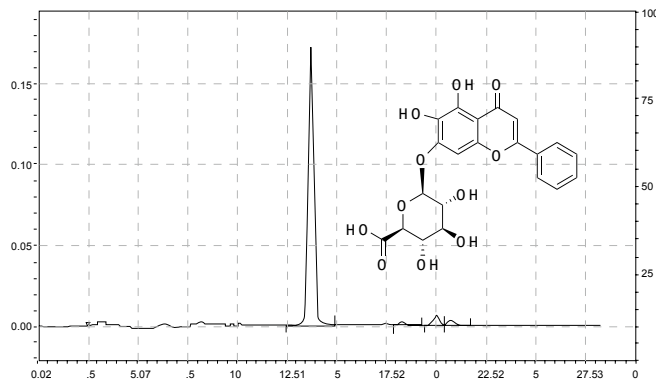
Column: Venusil ASB C18, 4.6×250 mm, 5 μm
 Part No.: VS952505-0
 Mobile Phase: 10 mM Citric acid+10 mM
 Perfluorooctane sulfonate
 (pH=3.0): ACN=85:15
 Detector: UV 240 nm
 Flow Rate: 1 mL/min
 Injection: 10 μL
 Temperature: 40°C

12.10 Tetrodotoxin(TTX)



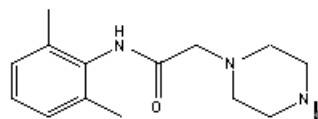
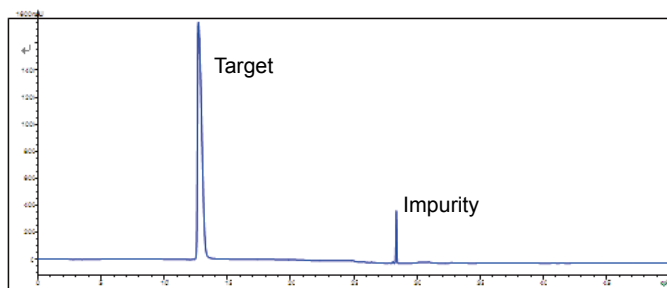
Column: Venusil ASB C18, 4.6×250 mm, 5 μm
 Part No.: VS952505-0
 Mobile Phase: 0.02% H₃PO₄: MeOH=40:60
 Detector: UV 200 nm
 Flow Rate: 0.5 mL/min
 Temperature: 25°C

12.11 Baicalin



Column: Venusil ASB C18, 4.6×150 mm, 5 μm
 Part No.: VS951505-0
 Mobile Phase: MeOH:1% acetic acid=50:50
 Detector: UV 274 nm
 Flow Rate: 1 mL/min
 Injection: 5 μL

12.12 2 - piperazine-N-(2,6-dimethylphenyl) acetamide



Conditions:

Column: Durashell-C18, 4.6×250 mm, 5 μm, 100 Å

Mobile phase: A: Phosphate buffer (pH=7.0)

B: Acetonitrile

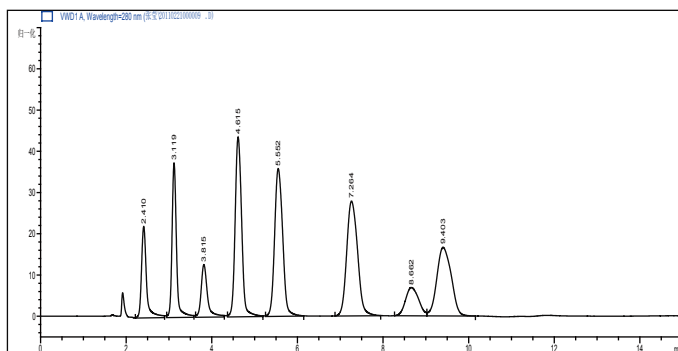
Flow rate: 1.0 mL/min

Detector: UV220 nm

Temperature: 30°C

Injection: 5 μL

12.13 Dyes



- 1: p- Phenylenediamine; 2: 4-Aminophenol;
3: methylbenzene 2,5Phenylenediamine;
4: Hydroquinone; 5: m-Aminophenol; 6: o-Phenylenediamine;
7: 1, 4 Phenylenediamine; 8: p- methylaminophenol.

Conditions:

Column: Durashell-C18, 4.6×150 mm, 5 μm, 100 Å
Mobile phase: 10% TEOA (pH=7.7) : Acetonitrile = 95:5

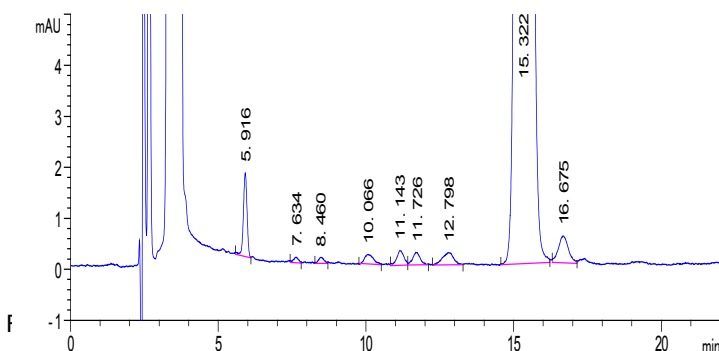
Flow rate: 1.0 mL/min

Detector: UV280 nm

Temperature: 20°C

Injection: 2 μL

12.14 Inspection of Mecobalamin Injection and Its Related Substance



Conditions:

Column: Durashell C18-AM (5 μm, 100 Å, 4.6×250 mm);
Mobile phase: 0.03 mol/L potassium dihydrogen phosphate (adjusted to pH 4.5 with 0.2 mol/L sodium hydroxide): acetonitrile = 84:16, v/v;

Detector: UV 342nm

Flow rate: 1.0 mL/min;

Temperature: 30°C

Injection: 20 μL

APPENDIX

Procedures for Column Regeneration



Due to interactions between the stationary phase and sample components, HPLC columns may occasionally require cleaning or regeneration. The following conditions apply to silica-based columns. Flow rates should be 1/5-1/2 of the typical flow rate.

To estimate the column volume, use the following equation:

$$V = \pi r^2 \times L$$

V = Column Volume in mL
r = Column Radius in cm
L = Column Length in cm

UNBONDED SILICA COLUMNS (SILICA)	Rinse with 10 column volumes each of: Hexane, Methylene Chloride, Isopropanol, Methylene Chloride. Mobile phase: Flush column with 30 mL 2.5% 2,2-dimethoxy- propane and 2.5% glacial acetic acid in hexane
REVERSED PHASE COLUMNS (C18, C8, C4, C2, C1, PHENYL, CN and NH₂)	Rinse with 10 column volumes of: 95% Water/5% Acetonitrile (for buffer removal) followed by 95% Acetonitrile/5% Water mobile phase
REVERSED PHASE PROTEIN/PEPTIDE COLUMNS (C18, C8, C5, C4 and PHENYL)	Rinse with 20 column volumes of mobile phase with buffer removed run gradient (2x): A) 0.1% Aqueous TFA in Water B) 0.1% TFA in Acetonitrile/Isopropanol (1:2), 25% B to 100% B for 30 minutes Equilibrate with 10 column volumes of mobile phase.
BONDED NORMAL PHASE COLUMNS (CN, NH₂ and DIOL)	Rinse with 10 column volumes each of: Chloroform, Isopropanol, Methylene chloride, mobile phase. Exception: Recommended for cleaning Amino when used in reversed phase mode: 1. Flush with at least 30 column volumes of Water (HPLC grade) 2. Re-equilibrate to Mobile phase conditions.
GFC/SEC COLUMNS FOR PROTEINS	(300X7.8mm size columns) Rinse with 5 column volumes of: 0.1M Phosphate buffer pH=3.0. For strongly retained proteins: Run 100% Water to 100 % Acetonitrile to 100% Water over 60 minutes or wash with 5 column volumes of SDS or 6M Guanidine Thiocyanate or 10% DMSO
ION-EXCHANGE COLUMNS (SAX, SCX, NH₂ and DEAE)	Rinse with 10 column volumes of: 5 Column Volumes of Water 10 Column Volumes of Phosphate buffer pH=7.0 5 Column Volumes of Water 10 Column Volumes of Methanol 10 Column Volumes of Water For protein removal Follow the above procedure with this exception: Substitute 10 column volumes of Methanol with 10 column volumes of 5M Urea or 5M Guanidine Thiocyanate

Methods of Maintaining Good Column Lifetime and Performance

- Inject only well-prepared (filtration, liquid/liquid extraction, SPE) clean samples
- Minimize pressure surge; avoid mechanical and thermo shock
- Use guard columns or on-line filtration
- Flush columns frequently using an appropriate program
- Remove unstable and strongly retained components of no-interest from samples
- Use low pH (1.0-6.0) mobile phase if possible
- Use organic buffer when operating at medium to high pH (6.0-10.0)
- Avoid elevated temperature unless it is necessary
- Add 200 ppm sodium azide in aqueous mobile phase to suppress the growth of the bacteria
- Wash out all buffer salts with highly aqueous solution, such as 5% methanol in water, and store the columns in high organic solution for overnight or long time storage

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