Contents

Silica-gel Products

silica-gel products are versatile HPLC columns and media based on the silica-gel for reversed-phase/ normal phase chromatography. Galaksil® products are made of spherical silica-gel particles which has low metal-ion content (<20 ppm) in total, high specific surface area and high mechanical strength. With unique chemical bonding technique, our products have excellent stability and reproducibility. They can meet the highest requirements for analysis and preparative applications.

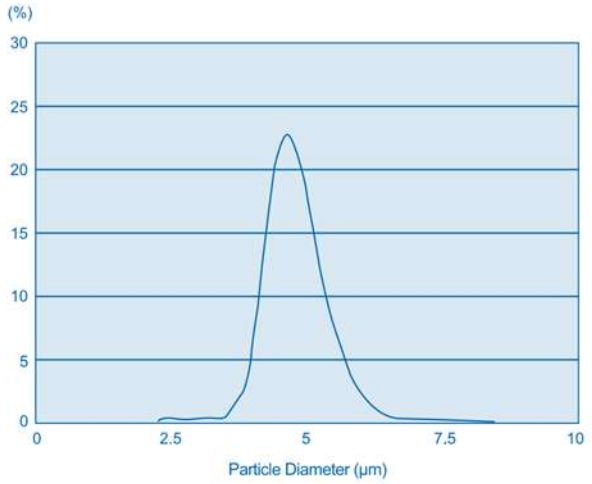
Advantages:

- Low silanol activity
- Uniform ligand binding
- Low metal content
- Narrow particle size
- Excellent stability

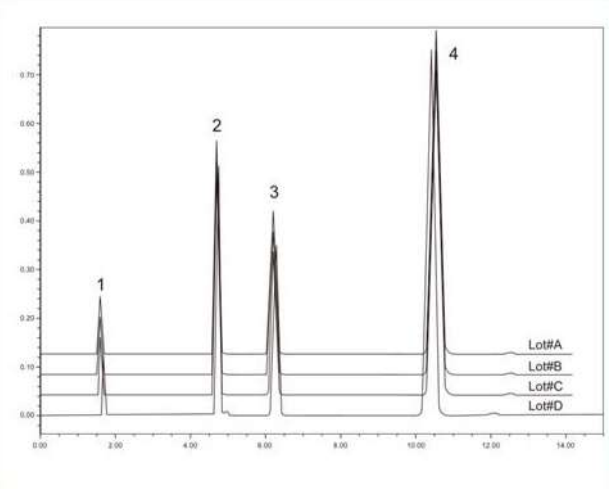
Galaksil® Silica Products

Products	Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
C18M	3/5/8/10 um	120Å	330m^2/g	16%	2-8
C18H	5/8/10 um	120Å	330m^2/g	20%	2-11
C18L	5 um	120Å	330m^2/g	13%	2-8
C8	3/5/10 um	120Å	330m^2/g	12%	2-8
NH_2	3/5/10 um	120Å	330m^2/g	4%	2-8
CN	3/5/10 um	120Å	330m^2/g	7%	2-8
Phenyl	3/5/10 um	120Å	330m^2/g	9%	2-8
Diol	5/10 um	120Å	330m^2/g	8%	2-8
AA	5/10 um	120Å	330m^2/g	19%	2-8
C4 Bio	5/10um	300Å	100m^2/g	3%	2-8
C8 Bio	5/10um	300Å	100m^2/g	5%	2-8
C18 Bio	5/10 um	300Å	100m^2/g	8%	2-8
SiO2	3/5/10 um	120Å	330m^2/g	-	2-8
SiO2	5 um	80/100/200Å	330m^2/g	-	2-8

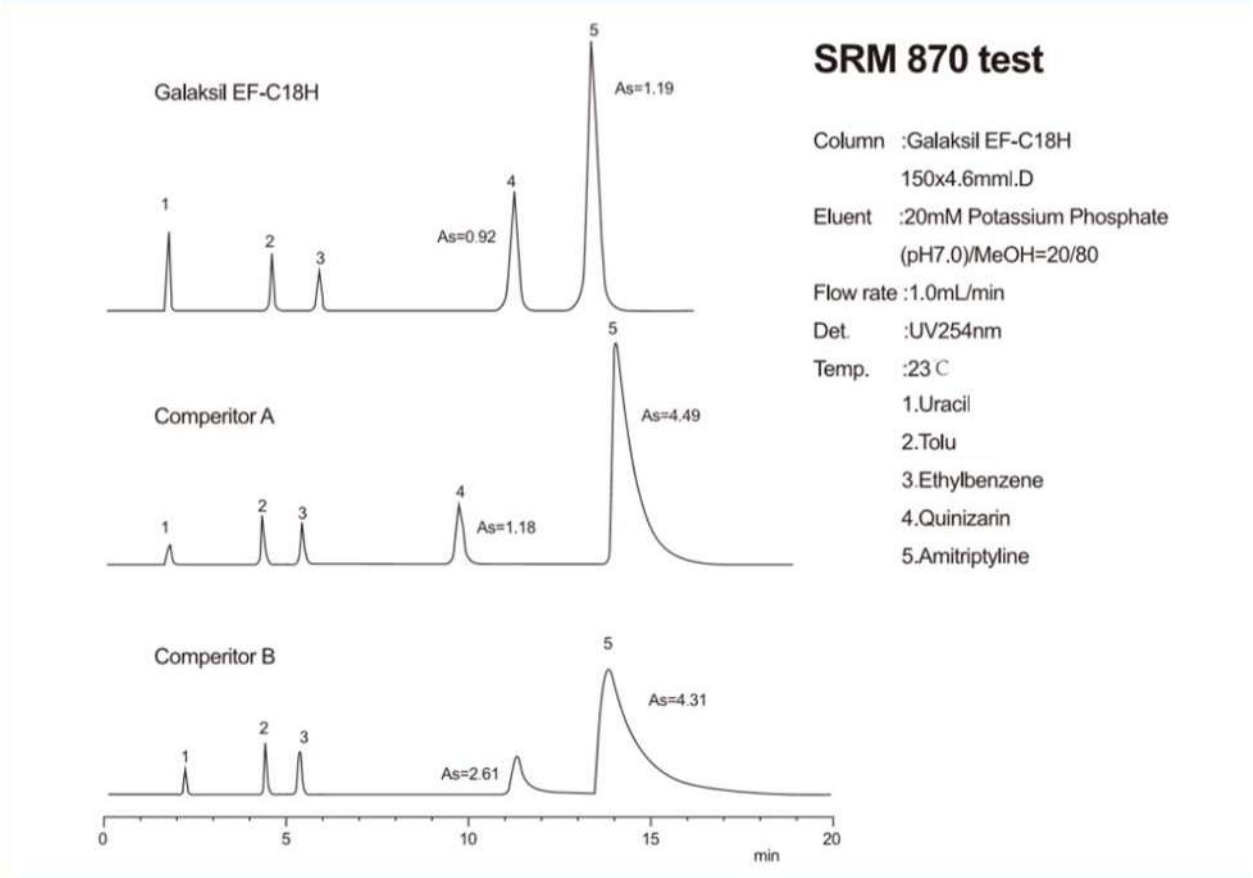
Distribution of particle size for Galaksil® C18 5 μm



Repeated injection tests for Galaksil® C18 5 μm



National Institute of Standards and Technology (NIST) SRM 870 Test



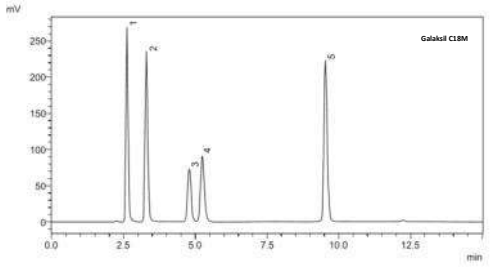
Galaksil® C18H can use in alkali environment with high pH CIP（Clean-in-Place）process. The isolation of toluene and ethylbenzene test shows the uniformities of binding ligands on the silica-gel substrate.

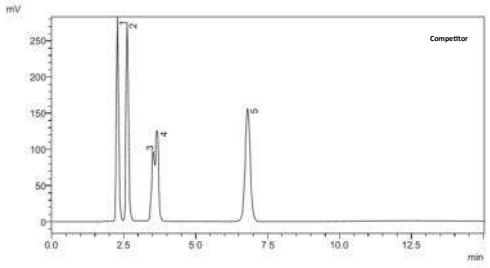
C18M

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/10um	120Å	330m^2/g	16%	2-8

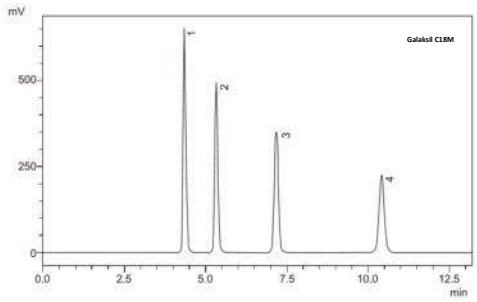
Application

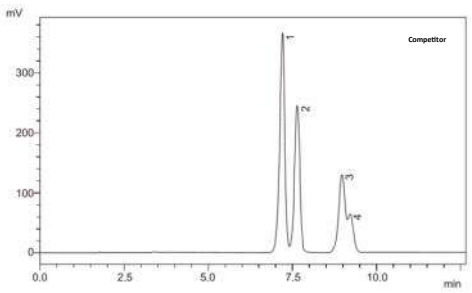




Nucleotide
Column: C18M 5μm 4.6×150mm
Competitor ODS 5μm 4.6×150mm
Mobile Phase:
phosphoric acid buffer / methyl alcohol
Flow Rate: 1ml/min
Wavelength: 254nm
Temp.: 25℃

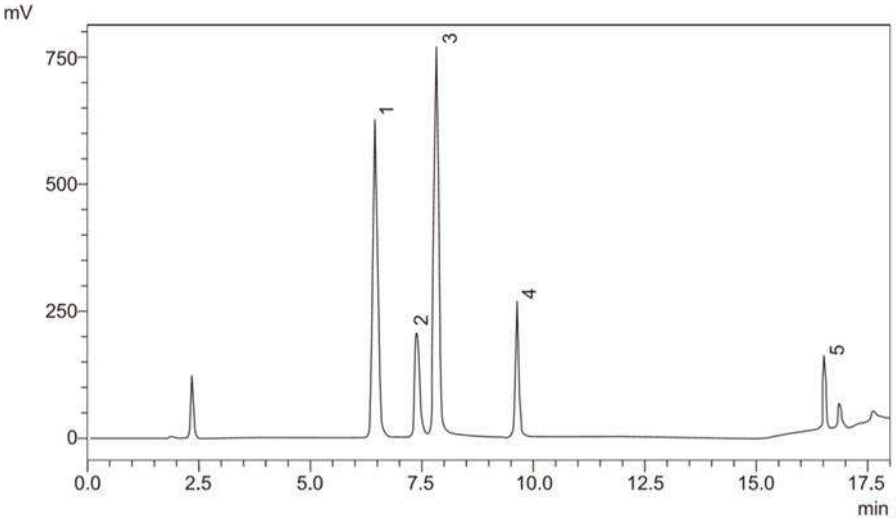
1 5′-cytidylic acid; 2 5′-uridylic acid;
3 5′-guanylic acid; 4 5′-inosinic acid;
5 5′-adenylic acid





Paraben
Column: EF-C18M 5μm
4.6×150mm
Competitor ODS 5μm
4.6×150mm
Mobile Phase: Water / methyl alcohol
Flow Rate: 1ml/min
Wavelength: 254nm
Temp.: 25℃

1 Methyl ester; 2 Ethyl ester;
3 Propyl ester; 4 Butyl ester



Water-soluble multivitamin
Column: C18M 5μm
4.6×150mm
Mobile Phase:
phosphoric acid buffer / acetonitrile
Flow Rate: 1ml/min
Wavelength: 210nm
Temp.: 25℃

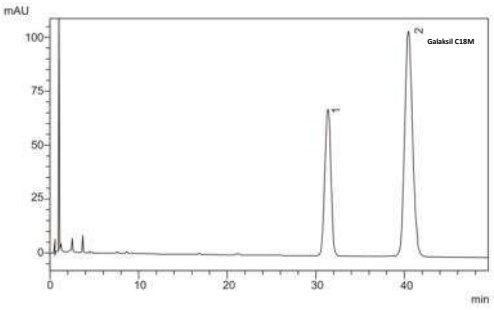
1 Pyridoxine;
2 VB1;
3 Nicotinamide;
4 Folic acid;
5 VB2

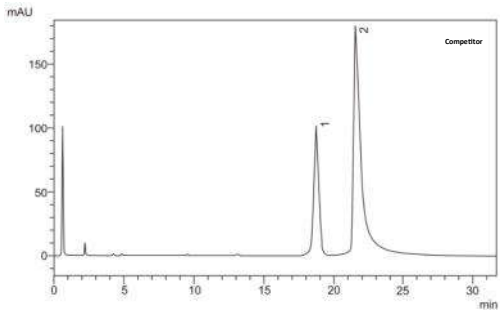
C18H

Parameters

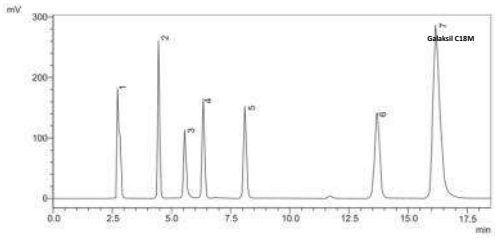
Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/10um	120Å	330m^2/g	20%	2-11

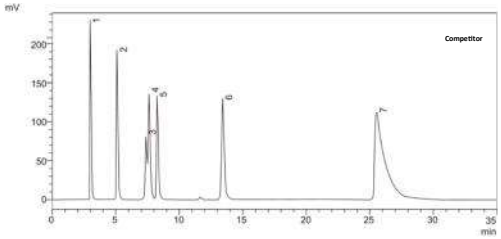
Application





Ibuprofen/Benzene ketone
Column: EF-C18H 5μm 4.6×150mm
Competitor 5μm 4.6×150mm
Mobile Phase:
phosphoric acid buffer / acetonitrile
Flow Rate: 2ml/min
Wavelength: 214nm
Temp.: 30℃

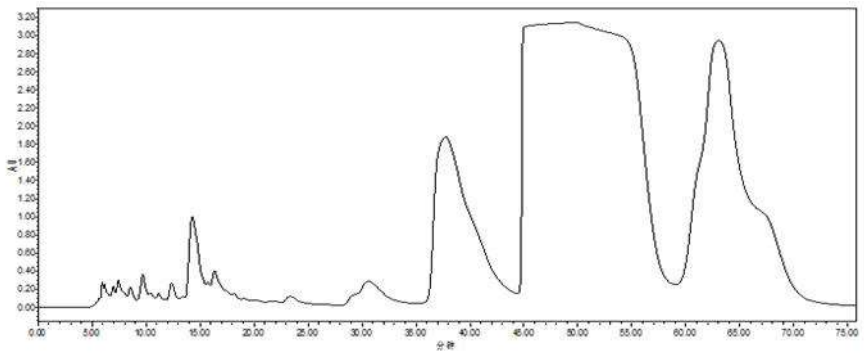




Polar/Nonpolar/ Neutral/Alkali Compounds
Column: EF-C18H 5μm 4.6×250mm
Competitor 5μm 4.6×250mm
Mobile Phase:
phosphoric acid buffer / methyl alcohol
Flow Rate: 1ml/min
Wavelength: 254nm
Temp.: 30℃

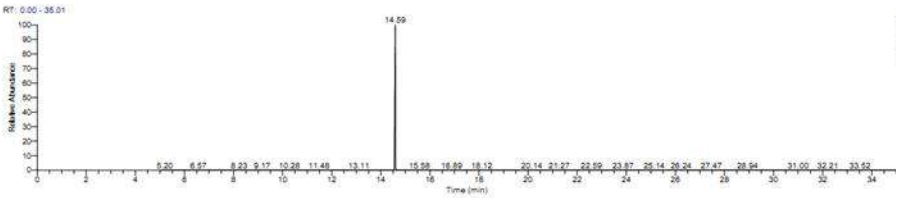
1 Uracil; 2 Butyl p-hydroxybenzoate;
3 Propranolol; 4 Di-propyl ortho-phthalate;
5 Naphthalene; 6 Acenaphthene;
7 Amitriptyline

The purification of EPA in fish oil



EPA in fish oil
Column: C18H 8μm
20×250mm
Sample: 90% EPA material

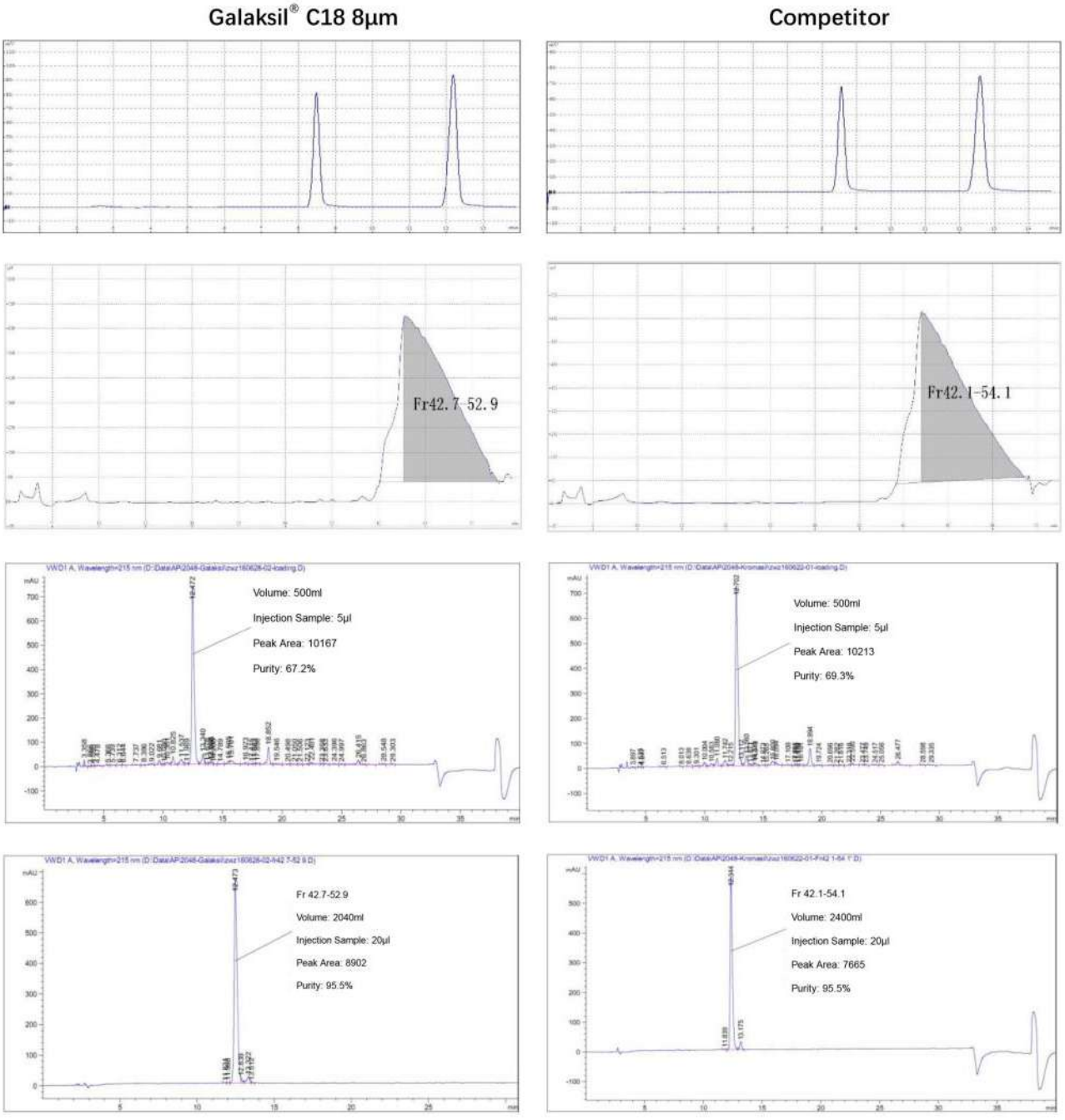
Finished sample
Purification: 99.7%



Peptides Purification Test

UP-C18H and word-leading competitive product in a peptides purification study. The re-sults show that the Galaksil® UP-C18H is similar to the competitive product.

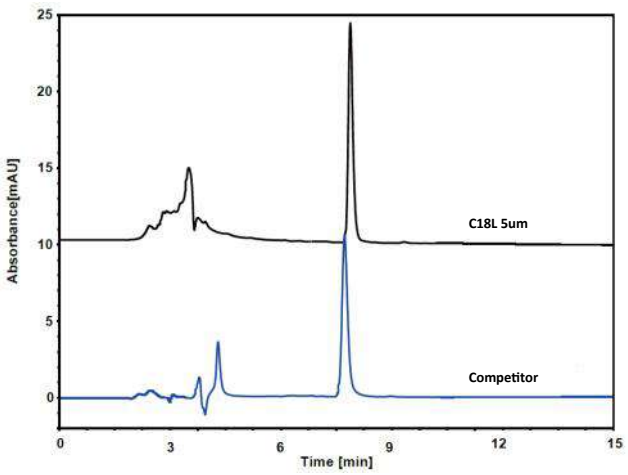
		Galaksil® C18	Competitor
Performance	Column Height (cm)	21.3	21.1
	Column Efficiency (TP)	70457	56935
Peptides	Injection Sample (g)	2.5	2.5
	Recovery (%)	89.3	90.0
	Purity(%)	95.5	95.5
	Freeze-dried product (g)	1.1302	1.1317



C18L

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
5um	120Å	330m^2/g	13%	2-8



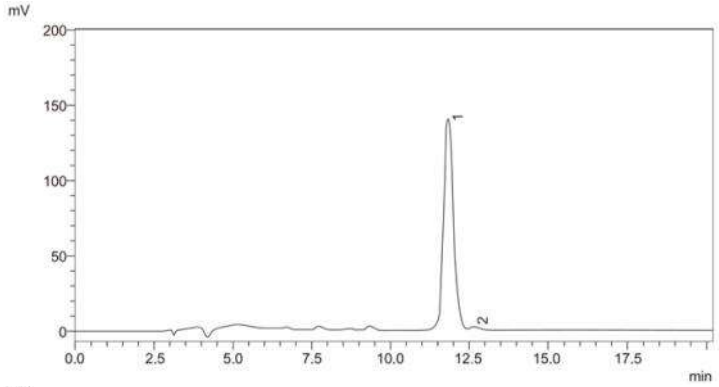
Tripeptide (5ppm)
Column: C18L 5μm 4.6×250mm
Mobile Phase: 70/30 v/v Water/MeCN
Injection: 25μL
Flow Rate: 1ml/min
Wavelength: 220nm
Temp.: 25℃

C8

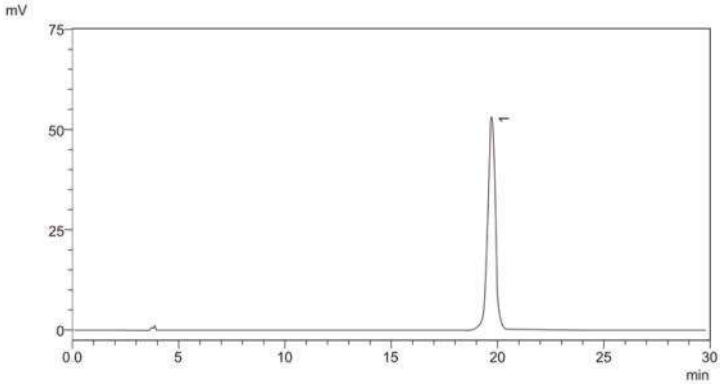
Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/8/10um	120Å	330m^2/g	12%	2-8

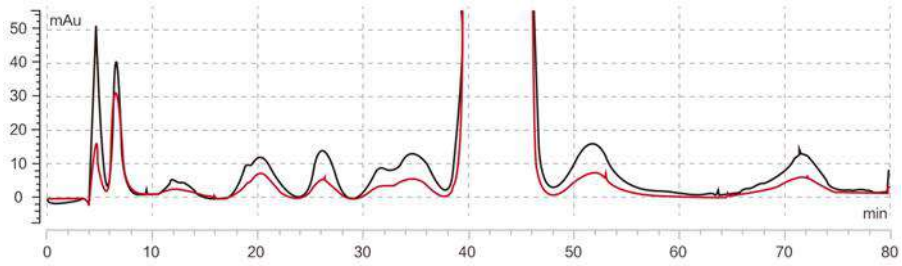
Application



Orlistat
Column: C8 5μm 4.6×250mm
Mobile Phase: water / EtOH
Flow Rate: 1ml/min
Wavelength: 203nm
Temp.: 25℃

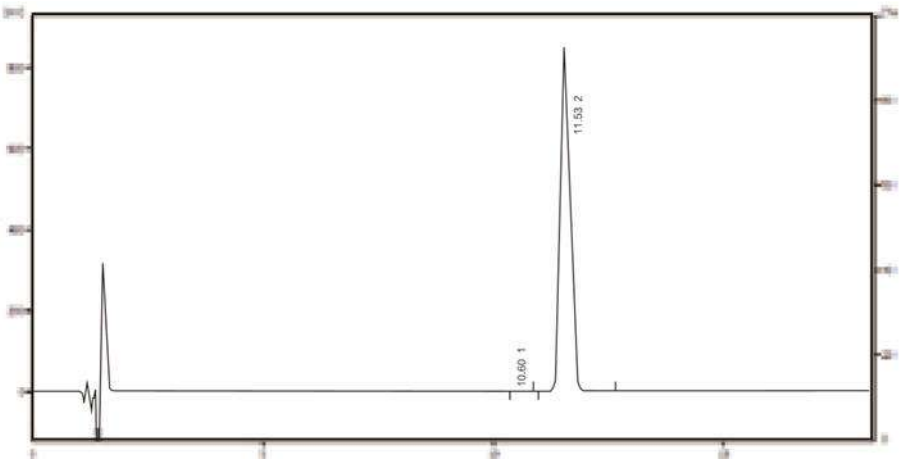


Omeprazole enteric-coated tablets
Column: C8 5μm 4.6×250mm
Mobile Phase: water / EtOH
Flow Rate: 1ml/min
Wavelength: 203nm
Temp.: 25 ℃

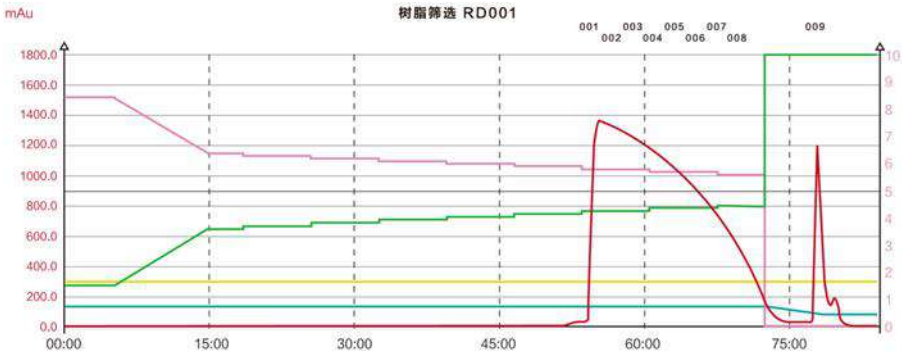


Orlistat
Column: EP-C8 10μm 10×250mm
Mobile Phase: EtOH solution
Flow Rate: 4ml/min
Wavelength: 195nm

Sample:
Dissolved raw material with methyl alcohol
Concentration: 50-60mg/ml



Finished sample
Purification: 99.8%
Single impurity < 0.1%
Recovery: ≥90%



Insulin

Column: C8 8μm 10×250mm

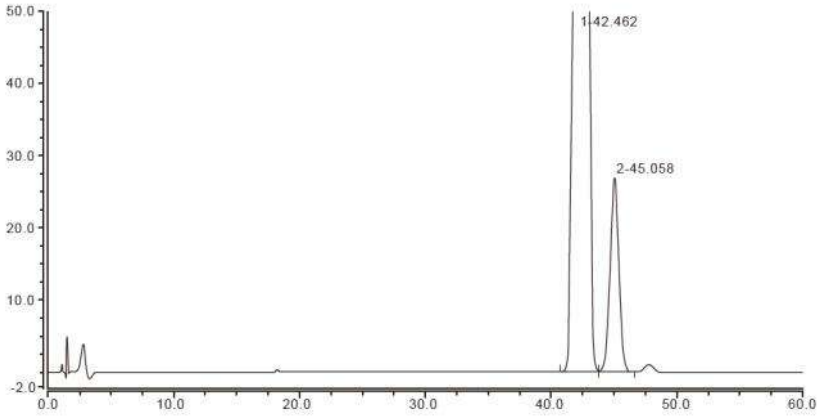
Time	A	B
0	85%	15%
5min	85%	15%
15min	64%	36%
225min	34%	66%

	Cycle	Injection	Purification	P1	P1c	P2
Galaksil® C8	1	100ml	99.76%	0.21%	0.02%	0.01%
		50ml	99.74%	0.22%	0.02%	0.02%
	2	50ml	99.75%	0.22%	0.02%	0.01%
	3	50ml	99.74%	0.22%	0.02%	0.01%
	4	50ml	99.74%	0.22%	0.02%	0.01%
	5	50ml	99.76%	0.21%	0.02%	0.01%
	6	50ml	99.75%	0.22%	0.02%	0.02%
	7	50ml	99.76%	0.21%	0.02%	0.02%
	8	50ml	99.74%	0.22%	0.02%	0.01%
	9	50ml	99.74%	0.22%	0.02%	0.02%

Phenyl

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
5/10um	120Å	330m^2/g	7%	2-8

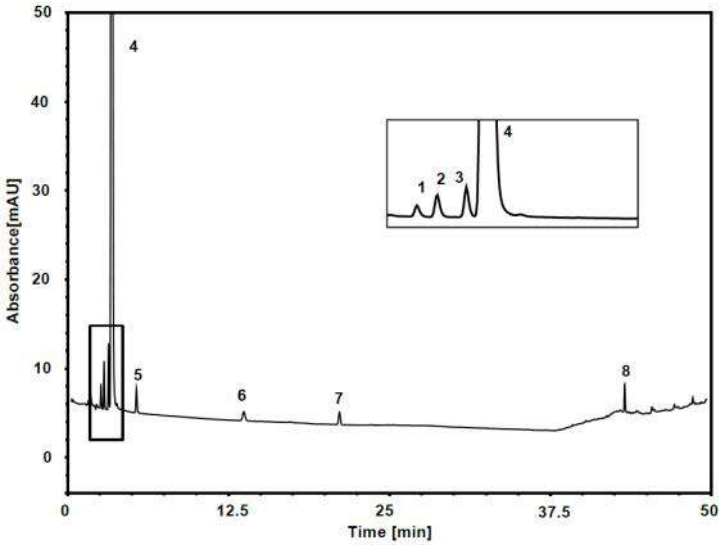


Roflumilast
Column: Phenyl 5μm 4.6×250mm
Mobile Phase: 60/40 v/v Water/MeCN
Injection: 10μL
Flow Rate: 1ml/min
Wavelength: 215nm
Temp.: 30℃

C18Bio

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
5/10um	300Å	100m^2/g	7%	2-8



Riboviron
Column: C18Bio, 5 μm 4.6×150 mm
Mobile Phase:
A) Na_2SO_4, pH2.5;
B) 40/60 v/v MeCN/Na_2SO_4, pH2.5
Gradient:

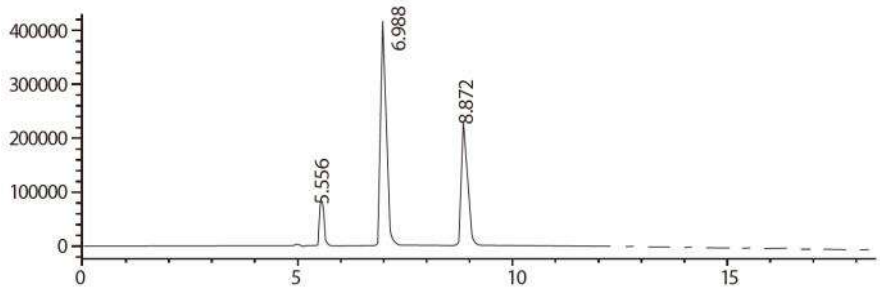
t (min)	%A	%B
0	100	0
15	100	0
25	87	13
35	87	13
50	0	100

Flow Rate: 1.0 mL/min
Temperature: 30℃
Injection: 10 μL
Detection: UV 220 nm
Peaks:
1. triazolinic acid;
2. Triazolamide;
3. Ribavirin acid;
4. Ribavirin;
5. Ribavirin 5 isomers;
6. Ribavirin methyl ester;
7. Ribavirin 5' - acetyl;
8. Ribavirin 5' - benzoyl

SiO_2

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/8/10um	80/100/120/200Å	300/330m^2/g	—	2-8

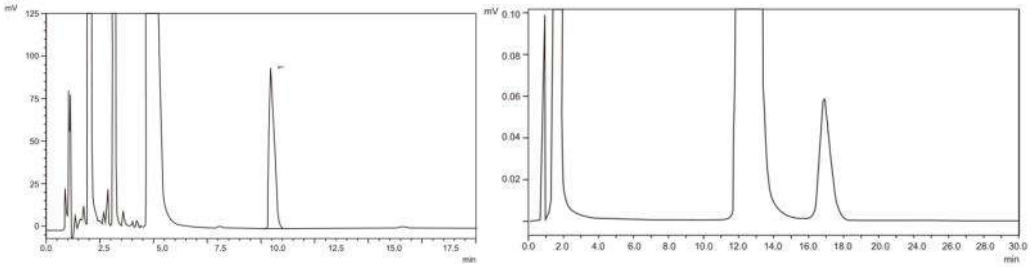


Maleic Maleic Fumaric Acid
Column: Galaksil SiO2 5μm 4.6×250mm
Mobile Phase:
N-hexane/THF/Trifluoroacetic acid =650/350/1.2
Injection: 20μl
Flow Rate: 0.8ml/min
Wavelength: 255nm
Temp.: 30°C

CN

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/10um	120Å	330m^2/g	7%	2-8

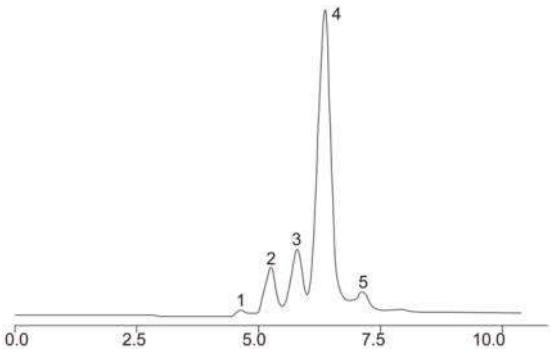


Benzalkonium Chloride
Column: Galaksil CN 5μm 4.6×150mm
Competitor CN 5μm 4.6×150mm
Mobile Phase:
phosphate buffer / acetonitrile
Flow Rate: 2.0ml/min
Wavelength: 214nm
Temp.: 35°C

NH_2

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/10um	120Å	330m^2/g	5%	2-8



Oligomaltose
Column: Galaksil NH_2 5μm 4.6×150mm
Mobile Phase: water/ acetonitrile
Flow Rate: 1ml/min
Detector: RID
Temp.: 40°C
Peak
1 glucose; 2 maltose; 3 maltodextrin; 4 maltotetraose;
5 maltopentaose

Protection Columns

4.6mm-10mm Protection Column

4.6mm-30mm Protection Column

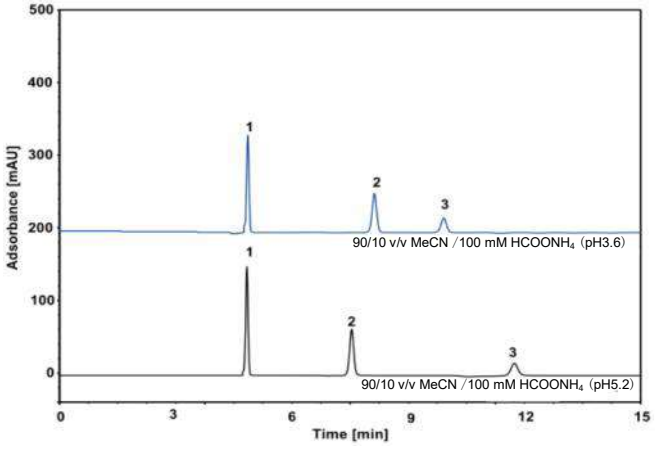
HILIC Columns

Hydrophilic interaction liquid chromatography (HILIC) is a chromatographic technique used to improve retention of very polar substances under reversed-phase chromatography conditions. HILIC has a wide variety of stationary phases, and in principle, any stationary phase with the polar surface can be used in HILIC mode. Therefore, stationary phases such as silica, amino (NH2), diol, amide (AM) and cyanogen (CN) packing materials can also be used as stationary phases for HILIC.

HILIC-Diol

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5/10um	120Å	330m^2/g	10%	2-8

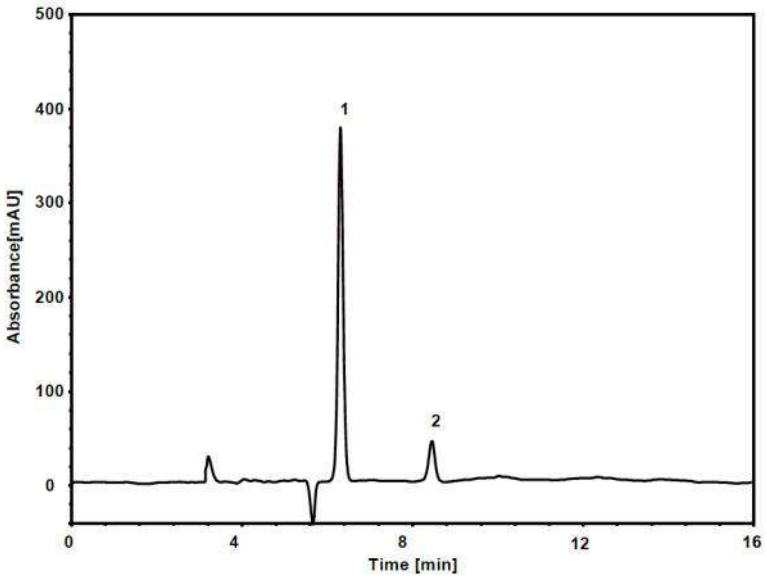


Column: HILIC-Diol 5 μm
Dimension: 4.6×250mm
Mobile phase:
Blue: 90/10 v/v MeCN /100 mM $HCOONH_4$ (pH3.6)
Black: 90/10 v/v MeCN /100 mM $HCOONH_4$ (pH5.2)
Flow rate: 1 mL/min
Temperature: 30℃
Injection: 5 μL
Detection: 218 nm
Peaks: 1. DICY
2. MET
3. Melamine

HILIC-Amide

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5um	120Å	300m^2/g	7.5%	2-7



Glycine & Methionine

Column: HILIC-Amide, 5 μm

Dimension: 4.6×250 mm

Mobile Phase: 75/25 v/v AcCN / 25 mM MSP, pH5.5

Flow Rate: 1.0 mL/min

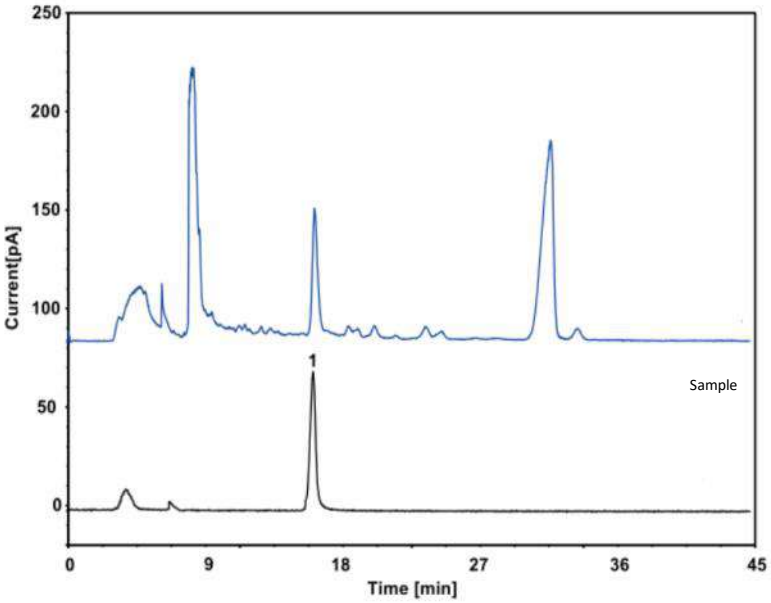
Temperature: 35 ℃

Injection: 10 μL

Detection: UV 210 nm

Peaks: 1. Glycine

2. Methionine



Column: HILIC-Amide 5 μm

Dimension: 4.6×250mm

Mobile phase:

80/10 v/v MeCN /100 mM CH_3COOH

Flow rate: 0.5 mL/min

Temperature: 20℃

Injection: 10 μL

Detection: CDA

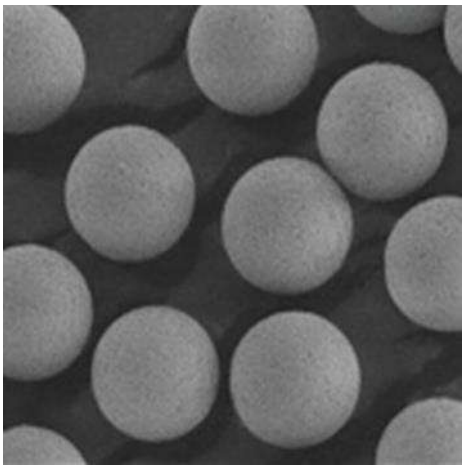
Peaks: 1. Stachydrine

HILIC-Imidazole

Parameters

Particle Size	Pore Size	Surface Area	Carbon Content	pH Range
3/5um	120Å	300m^2/g	5. 5%	2-7

Sepromax® A50



Sepromax® A50 is designed for analysis and purification of monoclonal antibodies (mAbs). Compared to traditional agarose media Sepromax® A50 has the advantages of high dynamic binding capacity (DBC), long service life, and less shedding of ligand. NaOH (0.1-0.5M) can be used for clean-in-Place (CIP) .

The ligand of Sepromax® A50 is recombinant protein A (rProtein A) immobilized on the surface of macro-porous PS/DVB microsphere substrate. The rProtein A has better alkali-resisting ability that ensures stability in high pH conditions. With our hydrophilic treatment and binding technology, we eliminated non-specific binding PS-DVB surface. Hence, Sepromax® A50 is extremely useful for purification process of monoclonal antibodies.

Advantages:

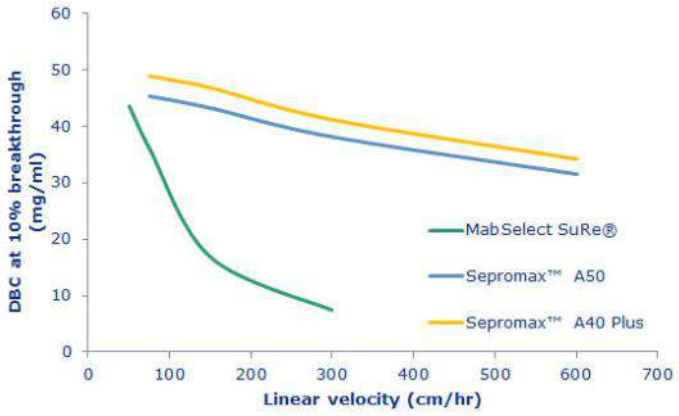
- High rigidity, low backpressure, suitable for small-scale and large-scale mAb purification
- Outstanding high dynamic binding capacity at low residence time
- Excellent alkali resistance, 0.1-0.5 M NaOH for CIP
- Long lifetime, low ligand leakage
- High batch stability

Parameter

Support Matrix	Poly(styrene/divinylbenzene) (PS-DVB)
Ligand	Recombinant Protein A
Ave. Particle size	50μm
Dynamic Binding Capacity (DBC)	Approx. 40 mg human IgG/ml media (Determined at 10% breakthrough by frontal analysis at a mobile phase velocity of 500 cm/h in a column with a bed height of 5 cm, Residence
Shrinkage/Swelling	< 1% from 1-100% organic solvent
pH range (Long term)	pH 2-10
Maximum Operating Pressure	1500 psi (100 bar / 10 MPa)
Cleaning Agents	0.1-0.5M NaOH
Temperature Stability	4-40 °C
Delivery Conditions	20% ethanol (2-8°C)

DBC vs. Linear Flow Rate Curve

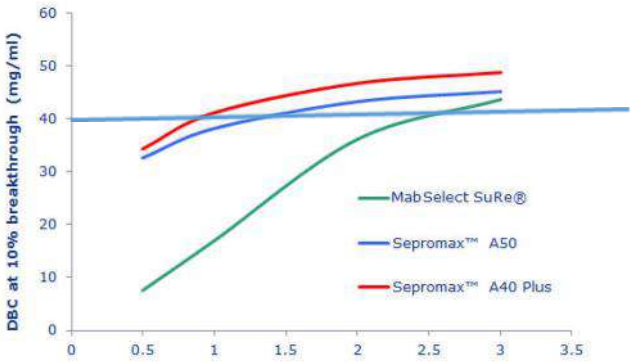
DBC of Sepromax® A50 do not decrease with the increase of flow rate.



Condition	
System:	AKTA® Purifier10
Buffer:	20 mM PB, 0.15 M NaCl pH 7.4
Eluant:	0.1 M Gly-HCl, pH 2.5
CIP Solvent:	0.5 M NaOH
Sample:	1.0 mg/ml hIgG

DBC vs. Residence Time Curve

Column efficiency of Sepromax® A50 is much higher compare with competitive product.



DBC=40 mg/ml, RT=1.3 min (Sepromax® A50), RT=2.4min (competitive product).

Column height=10cm, F =460cm/h (Sepromax® A50), F =250 cm/h (competitive product).

F=300 cm/h, H=6.5cm (Sepromax® A50), H =12 cm (competitive product).

$$RT = \frac{H \times 60}{F}$$

Note: *Because of the difference of columns, residence time (RT) is more suitable for DBC description. F is for flow rate, H is for column height.*

DBC in High Sample Concentration

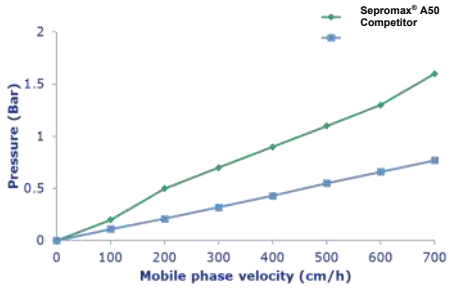
DBC of Sepromax® A50 is about 20-50% higher than competitive product with high IgG concentration injection under 2 minutes residence time (RT).

Test Condition	
Sample:	hIgG
Column:	7 mm I.D. x 2.5 cm (1mL)
Condition:	0.02 mol/L Na_3PO_4 buffer (pH 7.4) + 0.15 mol/L NaCl
DBC：	Base on breakthrough curve (allow 5% leakage)

Residence time (min)	Flow rate (ml/min)	DBC @ 5% BT			
		IgG conc. at 5g/L		IgG conc. at 10g/L	
		Sepromax® A50	Competitor	Sepromax® A50	Competitor
1.92	0.5	30.3	27.4	30.3	24.5
0.96	1.0	26.8	15.3	26.7	14.5
0.64	1.5	23.2	9.8	23.4	10.8

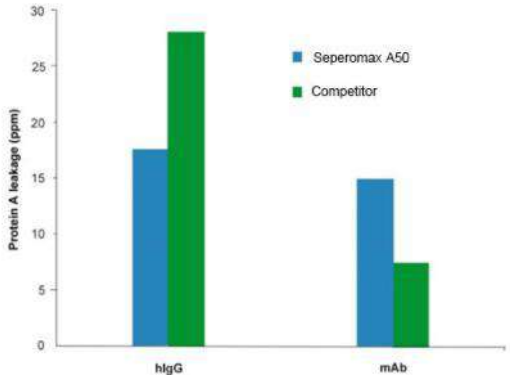
Pressure vs. Flow Rate Curve

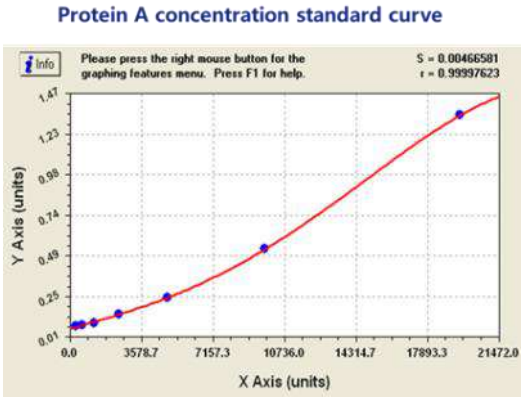
The back pressure of Sepromax® A50 is less than competitive product. Sepromax® A50 is more suitable for industrial purification process.



Protein A Ligand Leakage Test (ELISA)

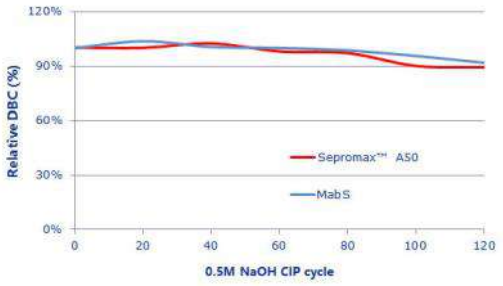
Samples: 20mg hIgG/ml-resin, 9mg mAb/ml-resin； ELISA test: Cygnus F400 kit





NaOH Clean-in-Place Test

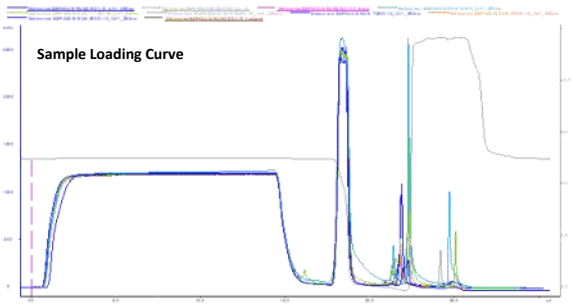
After 120 cycles of 0.5M NaOH CIP, the relative DBC is still stay in high level.

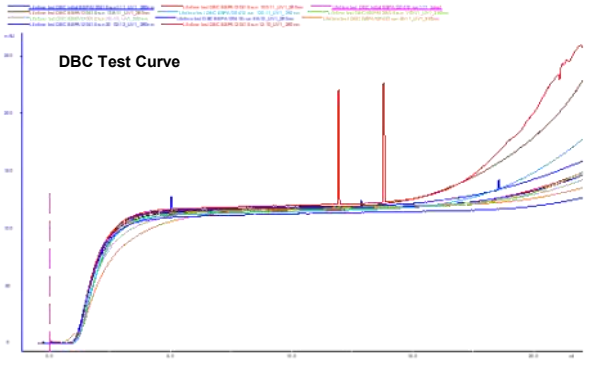


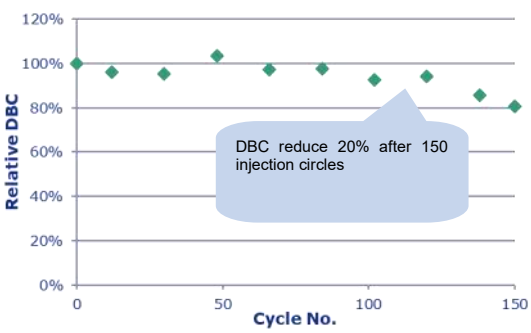
Alkali Resistance Test (150 Cycle Lifetime)

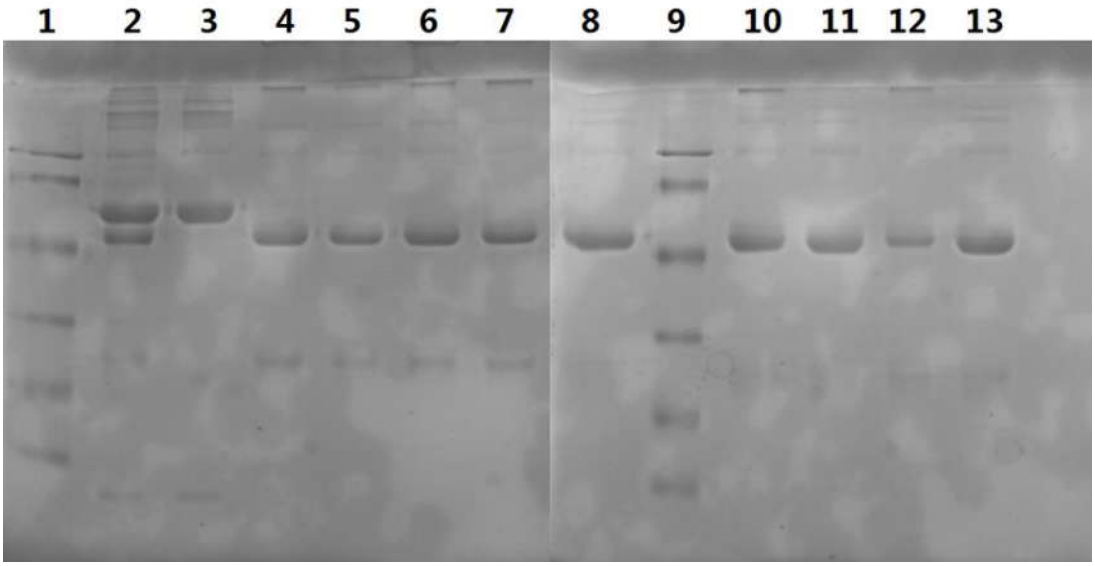
Do CIP after purification process, measure DBC each 18 injection cycles.

Step	solution	CV
Equilibration	20 mM PB，0.15M NaCl，pH7.4	5CV
Loading	1mg/ml hIgG+ BSA/Lysozyme	RT=0.6min，50%DBC
Washing	20 mM PB，0.15M NaCl，pH7.4	5CV
Elution	0.1M Gly-HCl，pH3.0	5CV
CIP	0.1M NaOH	4CV, 15min









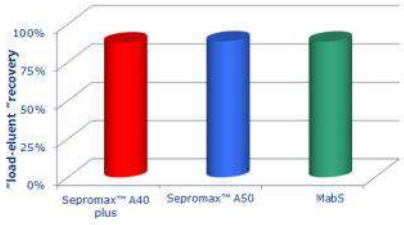
Lane
1：Marker
2：Sample
3：Flow through
4：Run 4
5：Run 21
6：Run 39
7： Run 57
8： Run 75
9：Marker
10： Run 95
11： Run 111
12： Run 129
13： Run 148

Load-Eluent Recovery

With the rProtein A ligand fully functional, Sepromax® A50 delivers high recovery of purified antibodies.

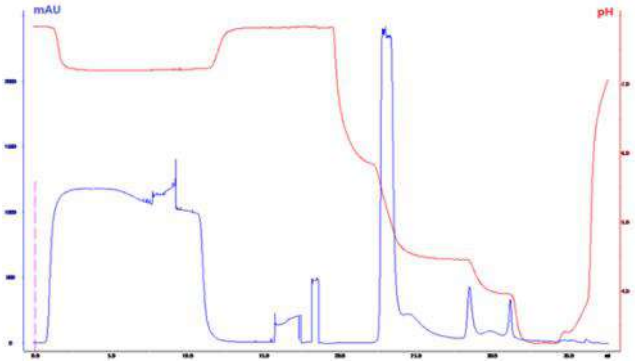
Sample: 1.0mg/ml γ-globulin

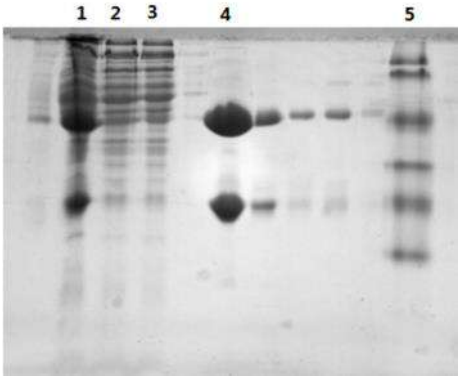
	Load (μg)	Eluent (μg)	Recovery (%)
Sepromax® A50	37.65	33.16	88.07
Sepromax® A40 Plus	36.01	31.97	88.61
Competitor	33.96	30.09	88.81



mAb Purification Test

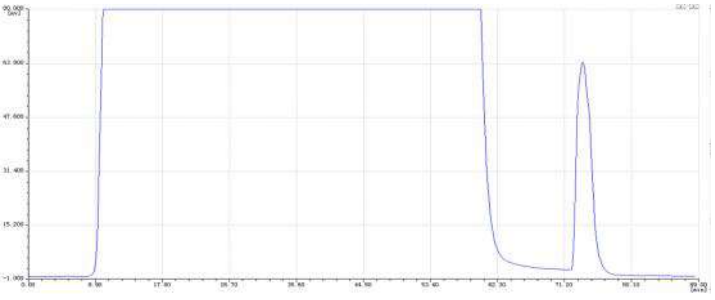
Sample: monoclonal antibody from murine





Lane
1 Ascites treatment fluid (reduction) 2 break through (reduction)
3 break through (reduction) 4 eluent (reduction) 5 marker

Fc protein Purification Test



Media	Sepromax A 50 affinity media
Column	1.0 × 2.5cm，column volume 2mL
Sample	Fc protein Xsupernatant(2.0g/L)
Loading buffer	10mM PB+0.2M NaCl, pH 7.5
Elution buffer	20mM Sodium Citrate+0.2M NaCl, pH3.7
Flow rate	115 cm/h

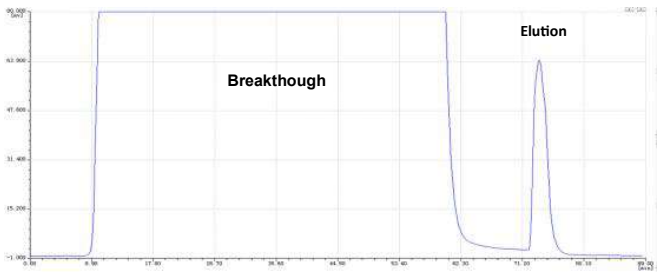
Impurity Removal Test (HCP&DNA)

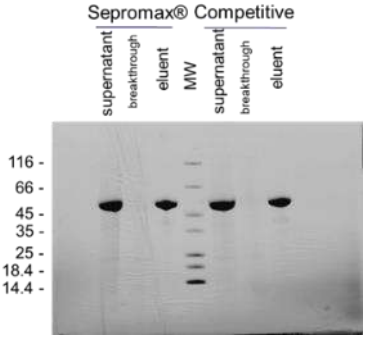
In the production of mAb's for pharmaceutical applications, residue of host protein (HCP) and DNA are an important indicators of quality. Protein A affinity chromatography is an efficient method to remove these residual impurities.

Media	1.0 × 2.5cm，column volume 2mL Sepromax A50
Sample	Fc protein Xsupernatant(2.0g/L)
Loading buffer	10mM PB+0.2M NaCl, pH 7.5
Elution buffer	20mM Sodium Citrate+0.2M NaCl, pH3.7
Flow rate	115 cm/h

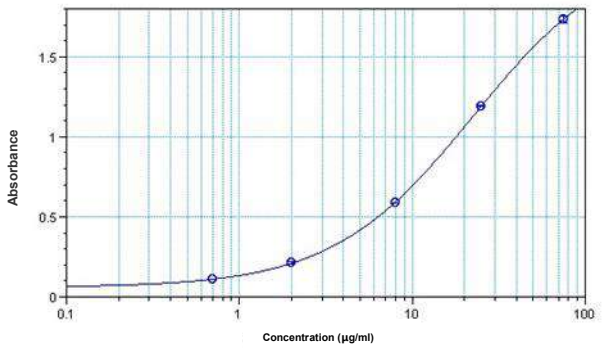
Result:

HCP (ng/mg)	Sepromax® A50	Competitor
supernatant	1754.3	1716.5
rPA Eluate	1.9	4.5
Reduction	9.2×10^2	3.8×10^2





Standard Curve of HCP



Standard HCP μg

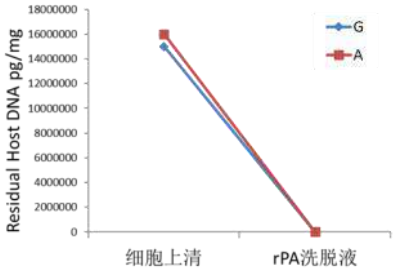
Sample	Concentration	Wells	Values	MeanValue	Std.Dev.	CV%
HC01	0.000	A4	0.052	0.056	0.004	8.0
		A5	0.059			
HC02	0.700	B4	0.112	0.112	0.000	0.3
		B5	0.113			
HC03	2.000	C4	0.206	0.212	0.008	4.0
		C5	0.218			
HC04	8.000	D4	0.588	0.589	0.001	0.3
		D5	0.590			
HC05	25.000	E4	1.190	1.192	0.003	0.2
		E5	1.194			
HC06	75.000	F4	1.751	1.734	0.023	1.3
		F5	1.718			

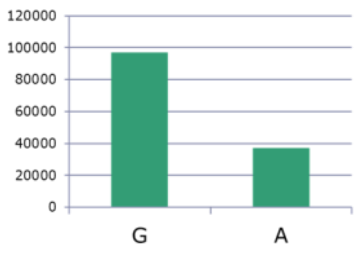
Smallest standard value: 0.056
Largest standard value: 1.734

DNA Removal Test

DNA test kit: AB (4413713)

QPCR — using magnetic beads extracted DNA from sample. Prepare PCR reaction mixture with DNA extraction solution and standard solution. Using Bio-rad real-time PCR for reaction and fluorescence assay.





rDNA (pg/mg)	Sepromax ® A40 plus G	Competitor A
Cell supernatant	1.5×10^7	1.6×10^7
rProtein A eluate	154.4	431.3
Reduction	9.7×10^4	3.7×10^4

Regulatory Support Files, RSF

All regulatory support documents based on FDA reporting requirements that can assist customers in process development, validation and preparation of SOPs.

Absolut® A Column

Absolut® A column is designed for fast analysis of monoclonal antibody (mAb) concentration (titer) in affinity chromatography. Alkali resistant recombinant Protein A (rProtein A) ligand used in this product has specific binding ability to the Fc region of immunoglobulins. The matrix of Absolut® A is PS-DVB (Polystyrene Divinylbenzene) particles, which are highly cross-linked for enhanced mechanical stability and particle strength. Compared to agarose base, hydrophilic PS-DVB has a higher dynamic binding capacity (DBC) and longer lifetime. Hence, Absolut A is an excellent choice for mAbs titer analysis.

Advantages

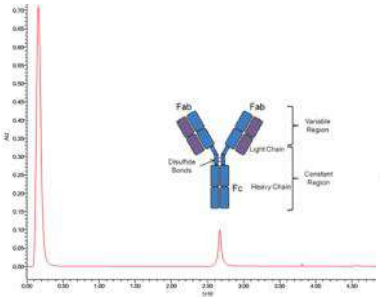
- Direct use on HPLC instruments
- High dynamic binding capacity, quick mass transfer
- Minimum nonspecific absorption, accurate determination
- Fast analysis cycle time: 2–5 minutes
- Satisfactory linearity in wide concentration range: 0.02-10 mg/ml
- Long lifetime
- Alkali resistance: 0.1-0.5 M NaOH cleaning conditions

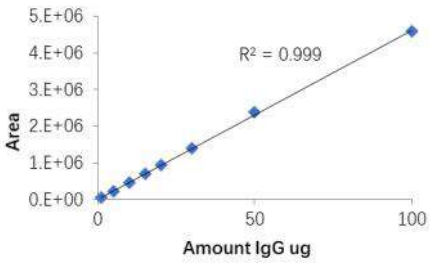
Parameter

	Absolut® A	Absolut® A Plus
Column Size	2.0mm ID × 30mm L; 4.6mm ID × 50mm L	
Column Tube Material	316L Stainless steel, PEEK	
Support Matrix	Polystyrene Divinylbenzene (PS-DVB)	
Ligand	Recombinant Protein A	
Particle Size	30μm	20μm
Shipping Solution	0.02 M sodium phosphate, pH 7.0, 0.02% sodium azide	
pH range	pH 2-10	
Maximum Pressure	1000 psi	
Cleaning Agents	0.1-0.5M NaOH	
Cycle Time	2-5 minutes	
Temperature Stability	4-40 °C	

Excellent Linearity

Quantitative analysis for antibody fermentation broth by Absolut® A.

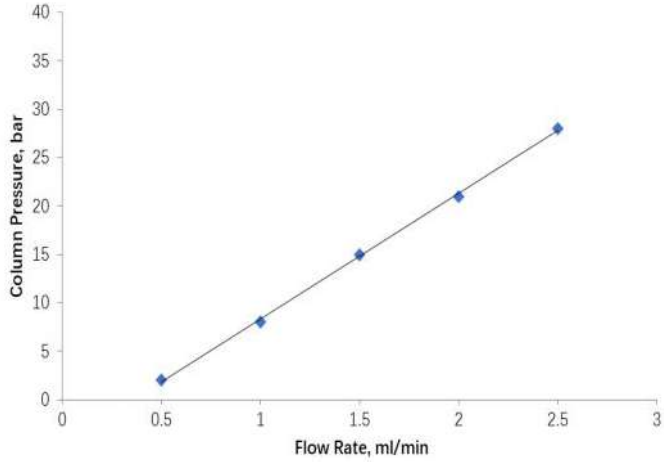




Column: Absolut A 2×30mm
Eluent A: 20mM PB, 150mM NaCl, pH7.4
Eluent B: 0.1%HCl, 150mM NaCl
Gradient: 0% B for 1.0 min, 100% B for 2.0 min, 0% B for 2.0 min
Flow rate: 1ml/min
Sample: mAb

Flow Rate and Pressure

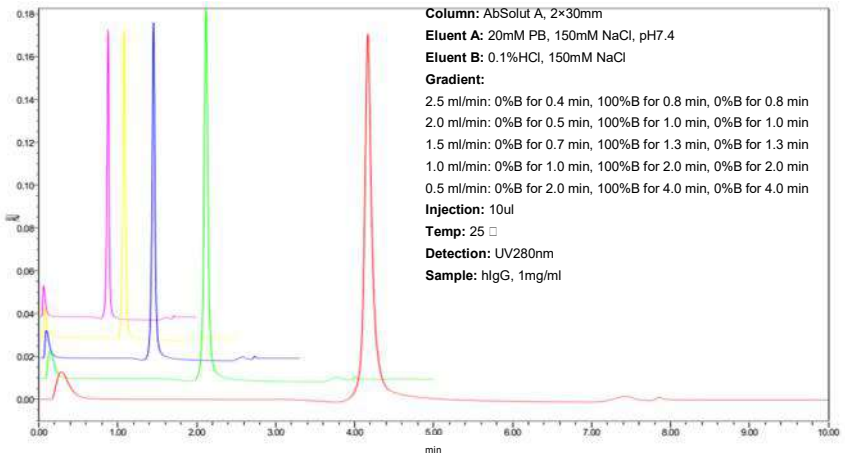
The operating flow rate is 0.5-3 ml/min as recommended for HPLC system.



Column: AbSolut A, 2.0×30mm
Eluent A: 20mM PB, 150mM NaCl, pH7.4
Eluent B: 0.1%HCl, 150mM NaCl
Temp: 25 □
System: Waters 1525 pump

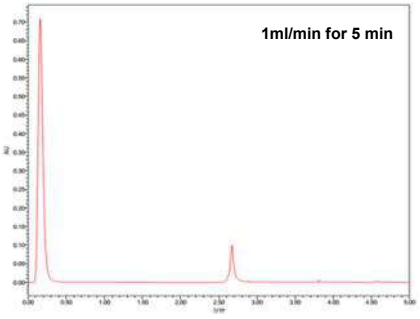
Flexible Choice of Flow Rate

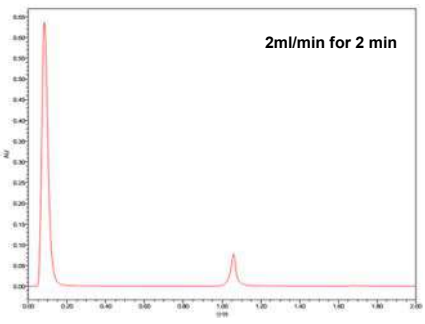
The ratio of bounded and unbounded IgG has almost no effect on the flow rate.



Column: AbSolut A, 2×30mm
Eluent A: 20mM PB, 150mM NaCl, pH7.4
Eluent B: 0.1%HCl, 150mM NaCl
Gradient:
2.5 ml/min: 0%B for 0.4 min, 100%B for 0.8 min, 0%B for 0.8 min
2.0 ml/min: 0%B for 0.5 min, 100%B for 1.0 min, 0%B for 1.0 min
1.5 ml/min: 0%B for 0.7 min, 100%B for 1.3 min, 0%B for 1.3 min
1.0 ml/min: 0%B for 1.0 min, 100%B for 2.0 min, 0%B for 2.0 min
0.5 ml/min: 0%B for 2.0 min, 100%B for 4.0 min, 0%B for 4.0 min
Injection: 10ul
Temp: 25 □
Detection: UV280nm
Sample: hIgG, 1mg/ml

Normally, the flow rate is 1ml/min for 5 min analysis. Large samples, 2ml/min for 2 min analysis.

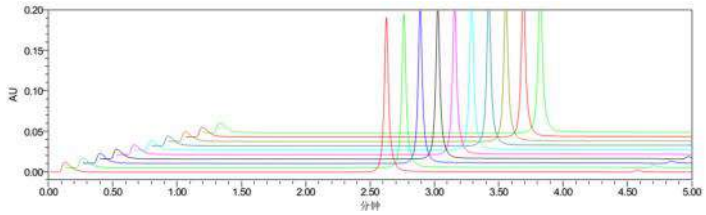




Flow rate ml/min	Total Area	Unbound Area	Unbound Relative Area %	IgG Area	IgG Relative Area %
0.5	1459568	145807	9.99	1313761	90.01
1.0	743661	75069	10.09	668592	89.91
1.5	492377	49715	10.01	442662	89.90
2.0	376354	39877	10.06	336477	89.40
2.5	322735	32984	10.22	289751	89.78

Stability Test

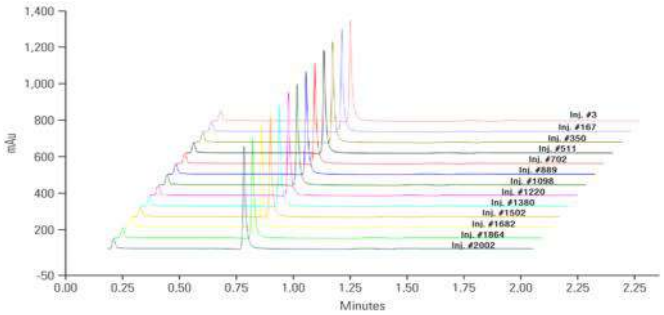
Performance test for 10 different Absolut®m A columns.



No.	RT (min)	Peak Area	Peak Height	TP	As
1	2.652	537586	190057	29507	1.10
2	2.641	536434	187236	26529	1.21
3	2.602	533688	186841	27349	1.12
4	2.599	531408	188244	29147	1.05
5	2.622	534911	187224	26901	0.98
6	2.647	540382	188746	26862	1.19
7	2.626	531906	188743	27855	1.08
8	2.628	540015	189618	28034	1.11
9	2.610	541372	188711	26567	1.16
10	2.623	527072	185477	26420	1.20

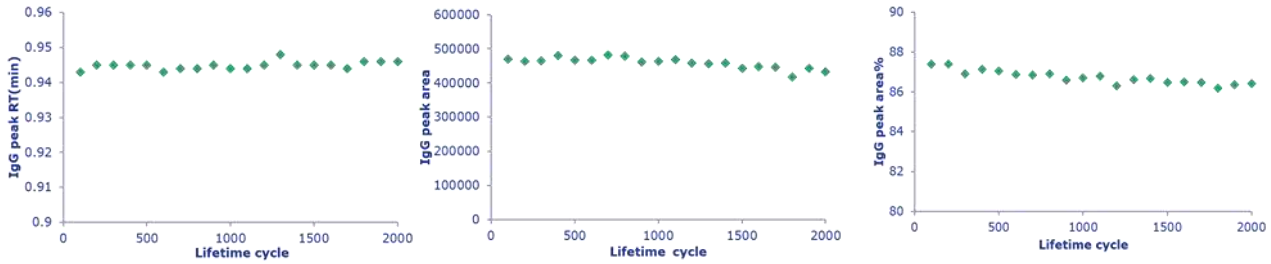
Long Lifetime

Stacking chart after 2000 analysis cycles.



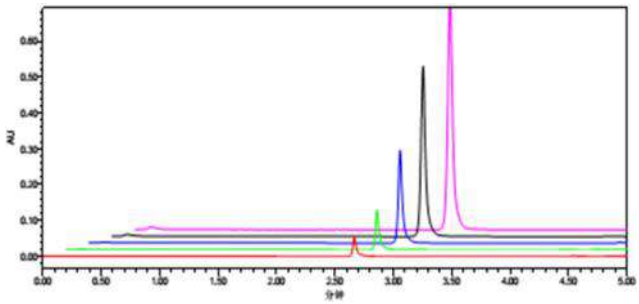
Test Condition	
Column	AbSolut A, 2×30 mm
Eluent A	50 mM Sodium Phosphate, 150 mM NaCl, pH 7.0
Eluent B	0.1% HCl, 150 mM NaCl, pH 1.9
Flow rate	2.0 ml/min
Gradient	0% B for 0.2 min, 100% B for 0.60 min, 0% B for 1.20 min
Temperature	25□
Detection	280 nm
Injection volume	10 uL
Sample	hIgG, 1 mg/mL

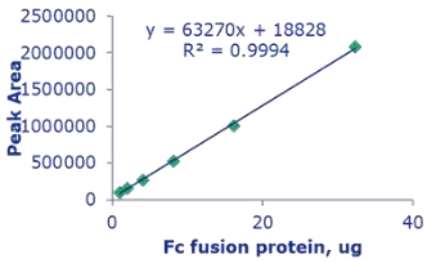
Statistical analysis of data demonstrates.



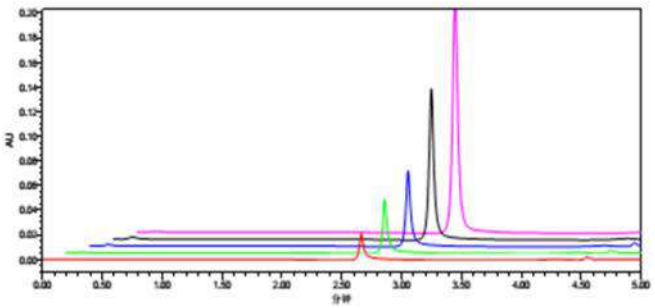
Application Cases

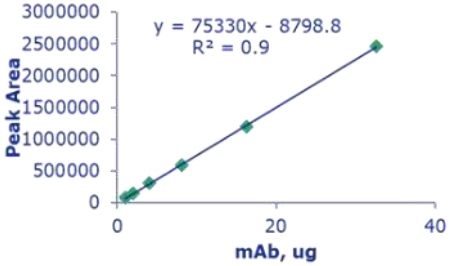
Fc Fusion Protein sample





Monoclonal antibody sample





GLK-gel Agarose Media

GLK-gel Agarose media offer the high specificity and selectivity for biomolecular separations and purifications. Affinity separation can often remove contaminants difficult to eliminate using other chromatographic procedures. Purifications up to several orders of magnitude can be achieved in a single step.

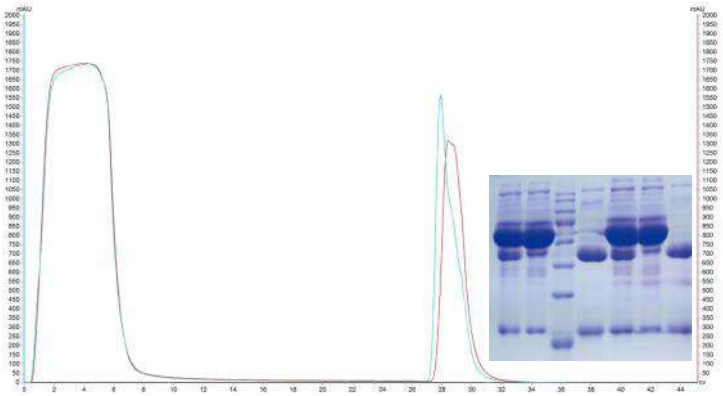
Advantages

- Stable bonding
- Low ligand leaching
- NaOH CIP

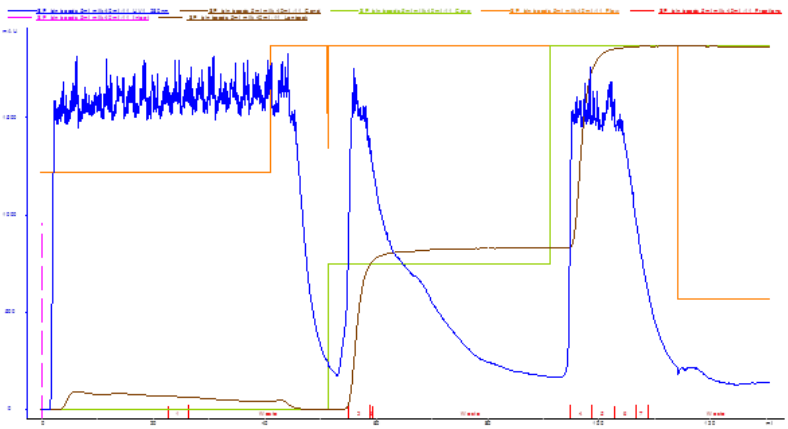
	Pr A 4FF	Pr G 4FF	IgM 6HP	IgY 6HP
Substrate	4% cross-linked agarose		6% cross-linked agarose	
Ligand	rProtein A	rProtein G	IgM	IgY
Particle Size	90μm (45-165μm)		37μm (25-45μm)	
Capacity (DBC)	20mg hIgG/ml	25mg hIgG/ml	5mg hIgG/ml	20mg hIgG/ml
pH Stability	2-10 (Short) 3-9 (Long)		2-13 (Short) 3-11 (Long)	
Max. Pressure	0.3MPa			
Flow Rate	300cm/h	300cm/h	150cm/h	150cm/h
Storage	4-8 °C, 20% EtOH			

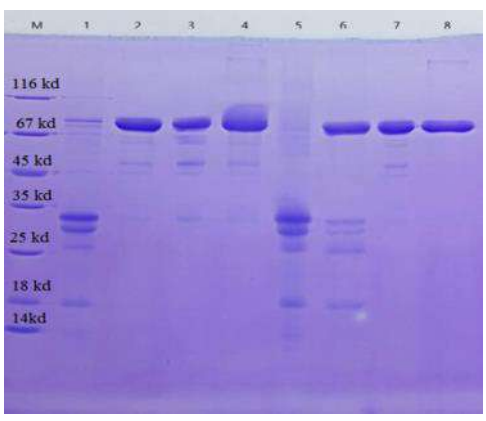
Purification of IgG in human serum

Sample: 5ml human serum with five times dilution (different buffers)
Column: HT01 1.0ml Protein G 4FF
Balance: A 0.02 M PB pH7.0;
B 0.02M PB, 0. 3M NaCl pH 7.0
Elution: 0.1 M Glycine-HCl pH2.7
Flow Rate: 0.25m/min (sampling), 1ml/min



Protein Purification





GLK-gel Ni Affinity Media

GLK-gel Ni affinity media are a nickel metal chelating chromatography media with IDA/NTA/TED ion high cross-linked agarose. GLK gel Ni Affinity Media have advantages of excellent stability, biocompatibility, solvent compatibility, large capacity, good selectivity, high resolution natural generation and low cost.

GLK-gel Ni NTA/NTA+

GLK gel Ni IMAC/IMAC+ media use Ni^{2+} to interact with amino acids (histidine, cysteine, tryptophan) on the side chain of protein. It is suitable for the separation and purification of His tag proteins and biomolecules interacting with Ni^{2+}.

Substrate	6% high cross-linked agarose
Particle Size	90μm (45-165μm) GLK Ni IMAC/NTA; 37μm(25-45μm) GLK Ni IMAC/NTA+
Binding Capacity	Approx. 40 mg His (tag protein)/ml media
pH Stability	3-12 (Working); 2-14 (Cleaning)
Max. Pressure	0.3MPa
Chemical Stability	0.01M HCl; 0.01M NaOH (one week);1M NaOH; 70%EtOH(12 hours); 2% SDS(1 hour); 30% isopropanol (0.5 hour)
Storage	4-15 °C, 20°C EtOH

His tag Protein Purification

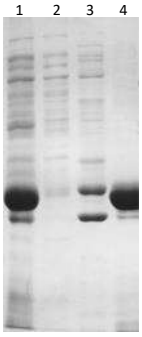
Column: 1ml

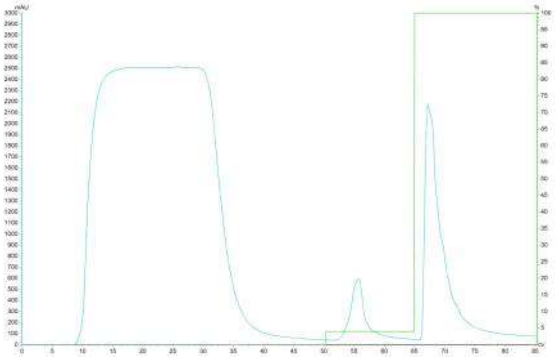
Sample: E. coli cracking supernatant (His tag protein)

Equilibrium liquid: 0.02MPB、0.5MNaC1，pH 7.4

Elution: 0.02MPB、0. M NaCl、 Imidazole, pH 7.4，
Flow Rate: 1ml/min

1. Original; 2. Breakthough; 3. Elution(4%B); 4. Elution(100%B)





GLK-gel Ni IDA

Substrate	6% high cross-linked agarose
Particle Size	90μm (45-165μm)
Binding Capacity	Approx. 45 mg His (tag protein)/ml media
pH Stability	3-12 (Working); 2-14 (Cleaning)
Max. Pressure	0.3MPa
Chemical Stability	Common aqueous solutions and buffers. Avoid chelating agents (EDTA, EGTA) and reducing agents (DTT, DTE)
Storage	4-15 °C, 20°C EtOH

Application Case

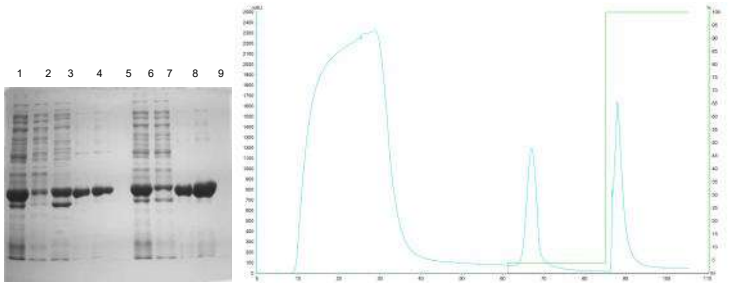
Column: 1ml

Sample: E. coli cracking supernatant (His tag protein)

Equilibrium liquid: 0.02MPB、0.5MNaC1，pH 7.4

Elution: 0.02MPB、0. M NaCl、 Imidazole, pH 7.4

Flow Rate: 1ml/min



1. Original; 2. Breakthough; 3. Elution(4%B); 4. Elution(100%B); 5. Elution (100%B); 7. Original; 8. Breakthough; 9. Elution(4%B); 10. Elution(100%B)
No imidazole in 1-5. 0.02M imidazole in 7-10.

GLK-gel Ni TED

Tolerance of higher reducing agents and chelating agents, eukaryotic secreted expression of His tag protein can loading without prior treatment, maximum protect the activity of protein.
Direct use NaOH for cleaning without nickel removal, reduce cleaning time.
Lower nickel shedding, no need for repeated regeneration.

Substrate	6% high cross-linked agarose
Particle Size	90μm (45-165μm)
Binding Capacity	Approx. 20 mg His (tag protein)/ml media
pH Stability	3-12 (Working); 2-14 (Cleaning)
Max. Pressure	0.3MPa
Chemical Stability	0.01M hydrochloric acid; 0.01M sodium hydroxide (one week); 20mM EDTA; 10mM DTT; 1M sodium hydroxide; 8M urea; 100mM EDTA; 0.5m imidazole (2 hours); 6M guanidine hydrochloride (24 hours); 30% isopropanol (20 min)
Storage	4-15 °C, 20°C EtOH

GLKgel Benzamidine Affinity Media

GLK-gel Benzamidine Affinity Media is used for serine protease purification, agarose microspheres combine with broad spectrum inhibitor of serine protease (p - aminophenyl methyl ether).

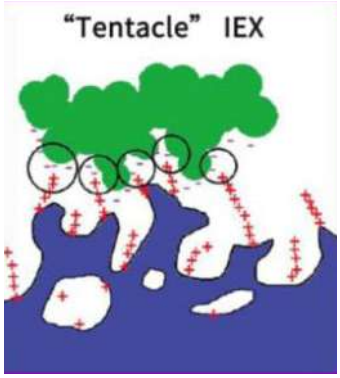
	Benzamidine 4FF-HS	Benzamidine 6FF
Substrate	4% cross-linked agarose	6% agarose
Ligand	Para amphenamidine	Para amphenamidine
Particle Size	90μm (45-165μm)	
Capacity	35mg trypsin /ml	13mg trypsin/ml
pH Stability	1-9 (Short) 2-8 (Long)	
Max. Pressure	0.3MPa	0.02MPa
Flow Rate	300cm/h	300cm/h
Storage	4-8 °C, 0.05M acetate buffer, 20% EtOH , pH4.0	

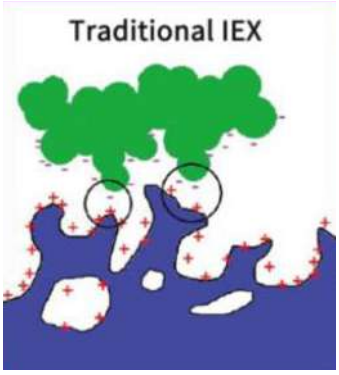
PS-DVB Ion-exchange Media

Alkali-resistance Type

Sepromax® ion-exchange media are based on large pore PS-DVB particles. It has excellent mechanical property and can withstand pressures up to 10 MPA. Their 1000Å pore size allows low mass transform of biomacromolecules. These particles have been modified with GALAK unique coating technology and become hydrophilic completely.

Sepromax® IEX media carry “tentacle” surface structures. Functional groups are covalently bonded on the surface in the form of linear polymer chains. This structure enables macromoleculesn such as antibodies, viruses and plasmids to interact more effectively to the functional groups of the media, increasing the binding capacity significantly. “Tentacle” structure also effectively reduces the non-specific interaction between biomolecules and media, thus improving the recovery of target molecules.





Advantages:

- Rigid particles, low backpressure, suitable for large-scale purification processes.
- High flow rate, high loading capacity, high purification efficiency.
- Excellent chemical stability, alkali stable under CIP and long lifetime.

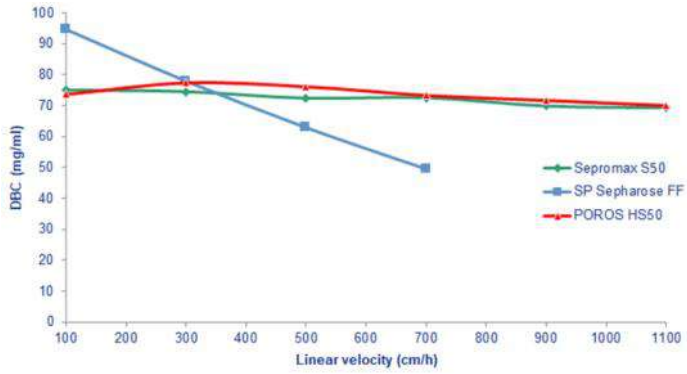
Parameter

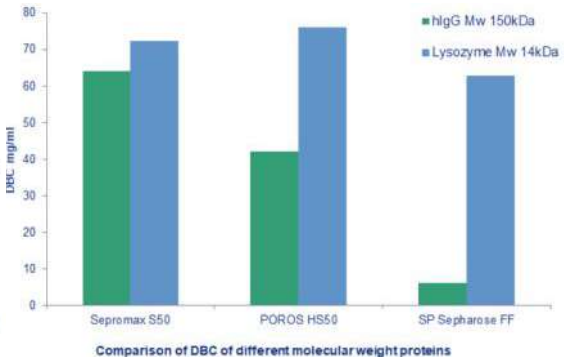
	Sepromax® S50	Sepromax® CM50	Sepromax® Q50	Sepromax® D50
Substrate	Rigid, PS-DVB microspheres			
Particle Size	50um (35-85μm)			
Ligand	$-SO^{3-}$	-COO-	$-N^{+}(CH_3)_3$	$-N^{+}H(CH_3)_2$
Ph Range	2-12	6-12	2-12	2-9
pKa	1	4.5	13	8-9
Dynamic Capacity	60mg hIgG/ml	80mg Lysozyme/ml	100mg Lysozyme/ml	100mg BSA/ml
Max Pressure	1500 psi (100 bar or 10 MPa)			
pH Stability	1-14			
Storage	20% EtOH,4-30°C			

* DBC (Dynamic Binding Capacity): frontal analysis @ 10%, 300cm/h, 5cm column height

High Loading Capacity

In high linear velocity, Sepromax® S50 has excellent binding capacity. This leads to use of a smaller column and faster cycle time.

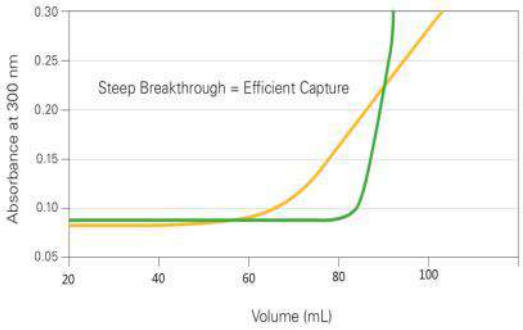




Break-though Curve

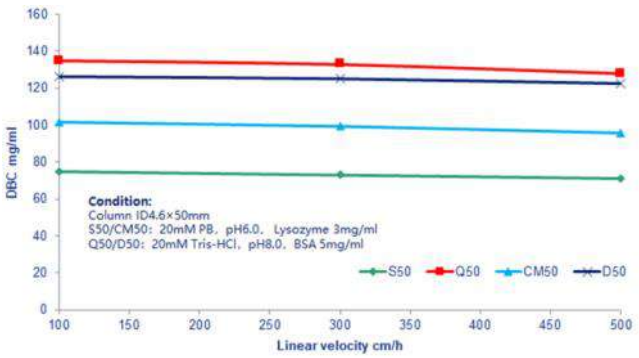
The capture efficiency of Sepromax® S50 was measured by the fronted break-though curves at 5% and 10%.

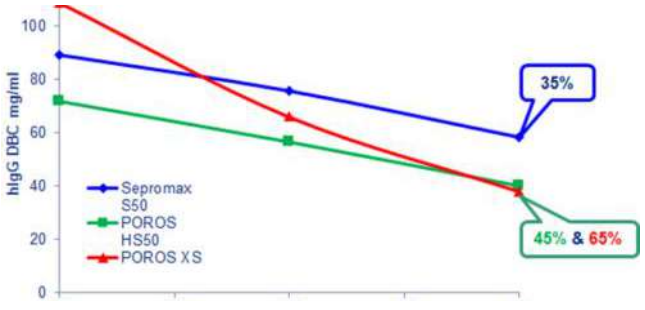
The break-though point of protein penetration curve of polysaccharide type media is relatively earlier.



Excellent Stability

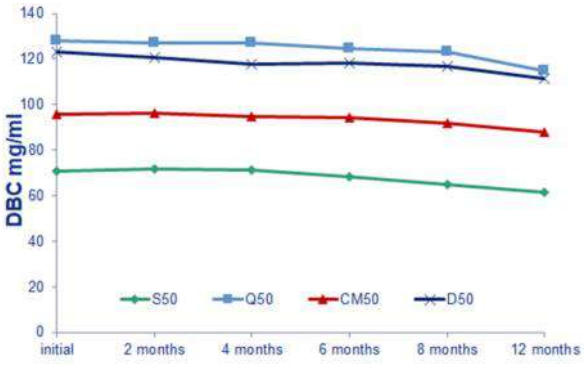
The dynamic binding capacity (DBC) of Sepromax® IEX will not decrease significantly with high linear flow rate. When flow rate increased from 100cm/h to 500cm/h, Sepromax® S50 can maintain 65% of its DBC at 100cm/h.

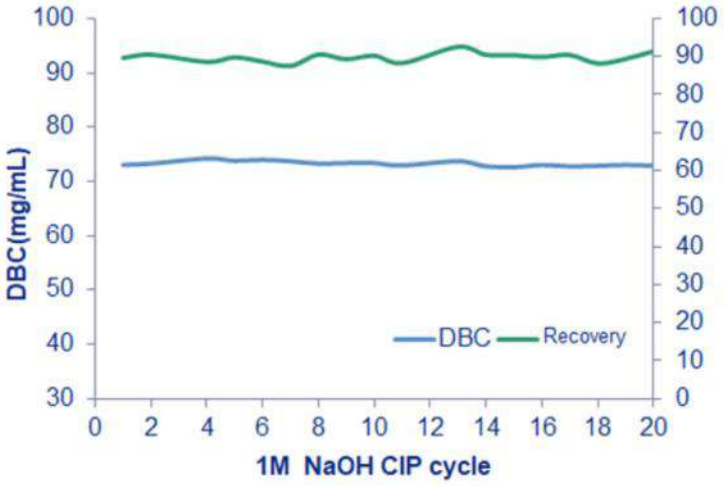


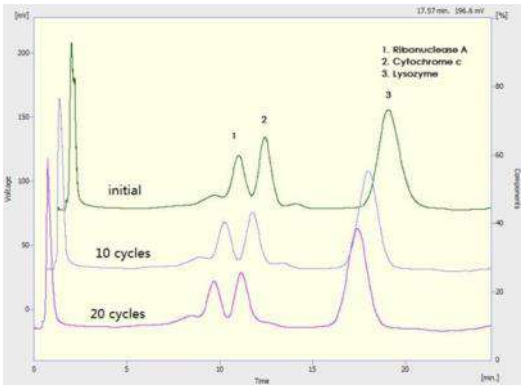


Stability under CIP Condition

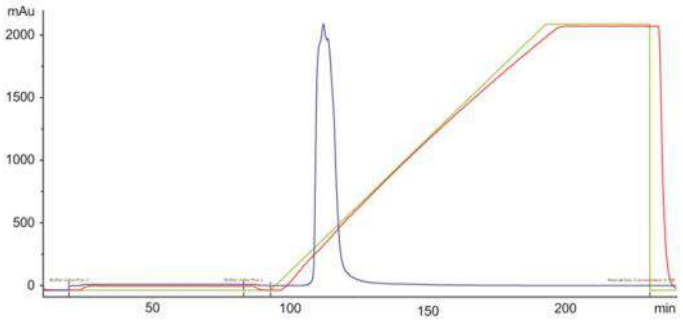
Clean-in-place (CIP) is a very important process in protein purification in biopharmaceutical industry. Sepromax® IEX media shows excellent chemical stability under harsh CIP conditions. In the experiment, 1M NaOH solution was selected to soak the four ion exchange media, and the loading was evaluated at regular intervals. After soaking for one year, the loading capacity of the four media did not decrease significantly.

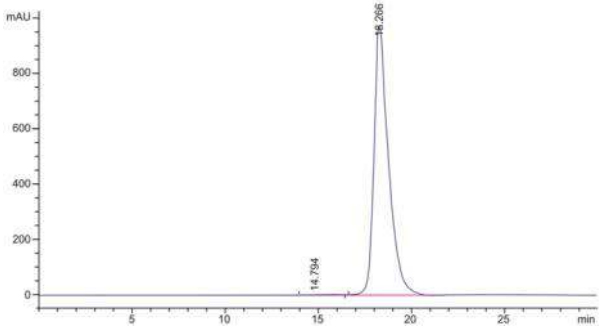






Monoclonal Antibody Purification





Purify of finished product: 99.5%

Column: 2.5cm Height, 5ml CV

Medium: Sepromax® S50

Sample: Mab, Protein A elution pool 150 ml

Buffer A: 20 mM NaAc-HAC, pH 6.0

Buffer B: 20 mM NaAc-HAC, pH 6.0+ 1 M NaCl

Flow rate: 2 ml/min

Gradient: 0%-100% B (20 CV)

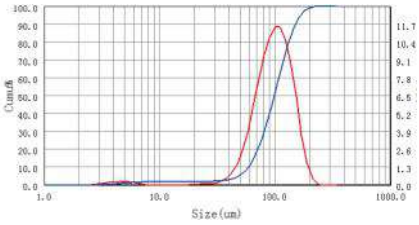
System: AKTA explorer100

Order Information

Sepromax® Resin: 10ml to 50L

Ion-exchange Agarose Media

GALAK provide agarose based ion-exchange media such as SP, Q, ANX, MMA, MMC, CM, DEAE to meet different purification needs.



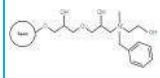
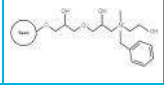
GLKgel Strong Cation IEX SP Media

	SP 6BB	SP 6FF	SP 6HF	SP 6HP	SP 6XL	SP HPR
Substrate	6% cross-linked Agarose		High-rigid Agarose	6% cross-linked Agarose	6% cross-linked Agarose with glucan	High-rigid Agarose
Particle Size	200μm (165-300μm)	90μm (45-165μm)	90μm (45-165μm)	37μm (25-45μm)	90μm (45-165μm)	37μm (25-45μm)
Ligand	$-CH_2CH_2CH_2SO_3^-$					
Loading Capacity	180-250μmol H^+/ml resin		140-200μmol H^+/ml resin	150-200μmol H^+/ml resin	180-250μmol H^+/ml resin	130-160μmol H^+/ml resin
pH Stability	4-13 (Long) 3-14 (Short)		4-12 (Long) 3-14 (Short)	4-13 (Long) 3-14 (Short)		4-12 (Long) 3-14 (Short)
Pressure	⩽0.3MPa					⩽0.5MPa
Flow Rate	1800cm/h	700 cm/h	100 cm/h	150 cm/h	700 cm/h	400 cm/h
Chemical Stability	All common buffer, 1.0m sodium hydroxide, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer					
Storage	0.2M NaAc, 20% EtOH, 4-30°C					

GLKgel Strong Anion IEX Q Media

	Q 6BB	Q 6FF	Q 6HF	Q 6HP	Q 6XL	Q HPR
Substrate	6% cross-linked Agarose		High-rigid Agarose	6% cross-linked Agarose	6% cross-linked Agarose with glucan	High-rigid Agarose
Particle Size	200μm (165-300μm)	90μm (45-165μm)	90μm (45-165μm)	37μm (25-45μm)	90μm (45-165μm)	37μm (25-45μm)
Ligand	$-N^+(CH_3)_3$					
Loading Capacity	180-250μmol Cl^-/ml resin		160-200μmol Cl^-/ml resin	140-200μmol Cl^-/ml resin	180-250μmol Cl^-/ml resin	150-180μmol Cl^-/ml resin
pH Stability	2-12 (Long Period) 2-14 (Short Period)		2-12 (Long) 2-14 (Short)	2-12 (Long) 2-14 (Short)		2-12 (Long) 2-14 (Short)
Pressure	⩽0.3MPa					⩽0.5MPa
Flow Rate	1800cm/h	700 cm/h	1000 cm/h	150 cm/h	700 cm/h	400 cm/h
Chemical Stability	All common buffer, 1.0m sodium hydroxide, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer					
Storage	20% EtOH, 4-30°C					

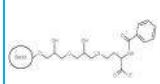
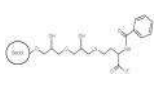
GLKgel Strong Anion IEX MMA Media

	Substrate	Particle Size	Ligand	Capacity	pH Stability	pH Stability	Flow Rate
MMA 6HF	High Rigid Agarose	90μm (45-165μm)		90-120μmol Cl^-/ml resin	2-14 (Long) 4-12 (Short)	⩽0.5 MPa	1000 cm/h
MMA HPR	High Rigid Agarose	37μm (25-45μm)		80-110μmol Cl^-/ml resin	2-14 (Long) 4-12 (Short)	⩽0.5 MPa	400 cm/h
Chemical Stability	All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer						
Storage	20% EtOH, 4-30°C						

GLKgel Weak Cation IEX CM Media

	CM 6FF	CM 6HF	CM 6HP	CM 6XL
Substrate	6% cross-linked Agarose	High-rigid Agarose	6% cross-linked Agarose	6% cross-linked Agarose with glucan
Particle Size	90μm (45-165μm)	90μm (45-165μm)	37μm (25-45μm)	90μm (45-165μm)
Ligand	$-O-CH_2COO^-$			
Capacity	90-130μmol H^+/ml resin	90-120μmol H^+/ml resin	80-110μmol H^+/ml resin	180-250μmol H^+/ml resin
pH Stability	4-13 (Long) 2-14 (Short)	4-12 (Long) 3-14 (Short)	4-13 (Long) 2-14 (Short)	
Pressure	⩽0.3 MPa	⩽0.5MPa	⩽0.3 MPa	
Flow Rate	700 cm/h	1000 cm/h	150 cm/h	700 cm/h
Chemical Stability	All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer			
Storage	20% EtOH, 4-30°C			

GLKgel Weak Cation IEX MMC Media

	Substrate	Particle Size	Ligand	Capacity	pH Stability	pH Stability	Flow Rate
MMC 6HF	High Rigid Agarose	90μm (45-165μm)		70-90μmol H^+/ml resin	2-14 (Long) 3-12 (Short)	⩽0.5 MPa	1000 cm/h
MMC HPR	High Rigid Agarose	37μm (25-45μm)		60-80μmol H^+/ml resin	2-14 (Long) 3-12 (Short)	⩽0.5 MPa	400 cm/h
Chemical Stability	All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer						
Storage	20% EtOH, 4-30d						

GLKgel Weak Anion IEX DEAE Media

	DEAE 6FF	DEAE 6HF	DEAE 6HP	DEAE 6XL
Substrate	6% cross-linked Agarose	High-rigid Agarose	6% cross-linked Agarose	6% cross-linked Agarose
Particle Size	90μm (45-165μm)	90μm (45-165μm)	37μm (25-45μm)	90μm (45-165μm)
Ligand	$-N^+(CH_3)_3$			
Capacity	110-160μmol Cl^-/ml resin	290-350μmol Cl^-/ml resin	90-130μmol Cl^-/ml resin	110-160μmol Cl^-/ml resin
pH Stability	2-13 (Long) 1-14 (Short)	2-12 (Long) 2-14 (Short)	2-13 (Long) 1-14 (Short)	
Pressure	⩽0.3 MPa	⩽0.5MPa	⩽0.3 MPa	
Flow Rate	700 cm/h	1000 cm/h	150 cm/h	700 cm/h
Chemical Stability	All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer			
Storage	20% EtOH, 4-30°C			

GLKgel Weak Anion IEX ANX Media

	Substrate	Particle Size	Ligand	Capacity	pH Stability	pH Stability	Flow Rate
ANX 4FF	4% cross-linked Agarose	90μm (45-165μm)	$-N^+(C_2H_5)_2H$	130-170μmol Cl^-/ml resin	3-10 (Long) 2-14 (Short)	⩽0.3 MPa	250 cm/h
Chemical Stability	All common buffer, 1.0m NaOH, 8.0m urea, 6.0m guanidine hydrochloride, 70% ethanol Avoid using oxidant, cationic detergent, cationic buffer						
Storage	20% EtOH, 4-30°C						

Moderately Purified Fusion Protein

Sample: 20ml e. coli lysate

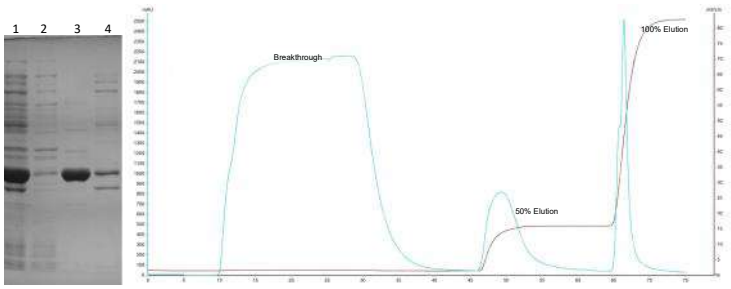
Column: GLKgel DEAE 6FF 1ml

Equilibrium solution: 0.02m Triethanolamine, pI7.5

Eluent: 0.02M Triethanolamine, 1.0M NaCl, pI7.5

Flow Rate: 1 ml / min

1. Original; 2. Breakthrough; 3. 50% Elution; 4. 100% Elution



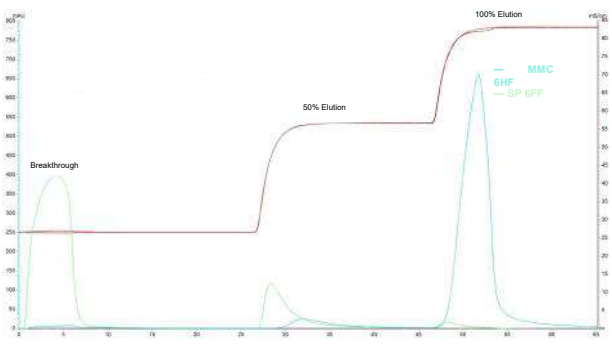
MMC 6HF VS. SP 6FF

Column: 1ml

Sample: 25 mg BSA (pI 5.4-5.6) solve in 5ml equilibrium liquid

Equilibrium liquid: 0.05 M NaAc, 0.25 M NaCl pH4.75

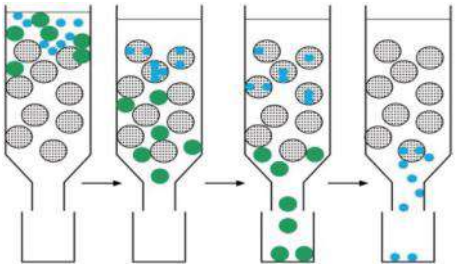
Eluant: 0.02MPB, 1.0M NaCl pH7.4



Gel Filtration Chromatography Media

Gel filtration chromatography achieves the purpose of separation according to the size of solute molecules. Gel filtration chromatography is also known as volume exclusion chromatography, molecular sieve chromatography. Gel filtration chromatography media are inert spherical granular materials with porous network structure.

GALAK provide two types gel filtration media: crosslinked agarose microspheres and crosslinked glucan microspheres.



GLKgel GFC Agarose Media

GALAK offers two types of agarose gel filtration media: 4% and 6% agarose gel. Crosslinked agarose gel (CL) exhibits better physical and chemical stability. High velocity agarose gel (FF) with its higher degree of crosslinking shows higher level of physical and chemical stability. They can be sterilized by heat and humidity, and withstand various working conditions in protein production.

Products	Molecular Weight Range (globulin)	Particle Size	Pressure	Flow Rate	pH Range
GFC 4B	6×10^4-2×10^7	90μm (45-165μm) Customized Size: 25-46μm & 165-300μm	⩽0.02MPa	12 cm/h	4-9 (Long) 4-9 (Short)
GFC 4FF	7×10^4-2×10^7		⩽0.3MPa	250 cm/h	2-12 (Long) 2-14 (Short)
GFC 6B	1×10^4-4×10^6		⩽0.02MPa	14 cm/h	4-9 (Long) 4-9 (Short)
GFC CL-6B	1×10^4-4×10^6		⩽0.05MPa	30 cm/h	3-12 (Long) 2-14 (Short)
GFC 6FF	1×10^4-4×10^6		⩽0.3MPa	300 cm/h	2-12 (Long) 2-14 (Short)

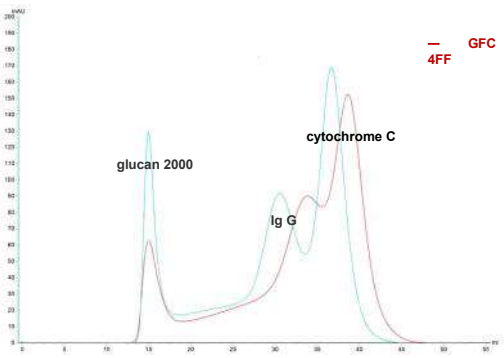
Separation effect of GFC 4FF vs. GFC 6FF

Column volume: 42ml (XK12/40, loading height: 37cm)

Loading Capacity: 0.5% CV (5mg/ml glucan 2000, 10mg/ ml IgG, 10mg/ml cytochrome C)

Flow Rate: 10 cm/h

Buffer: 20 mM Na_2HPO_4, 0.15M NaCl, pH7.0

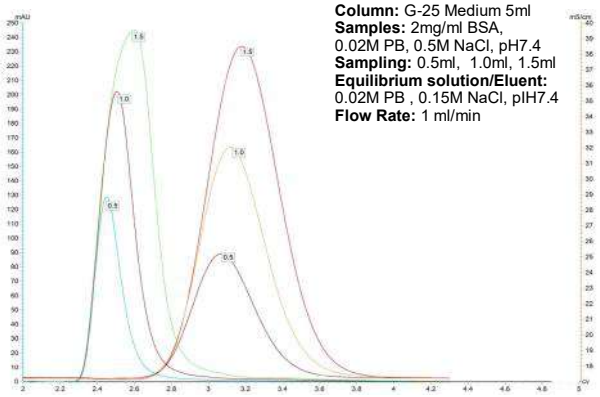


GLKgel GFC Glucan Media

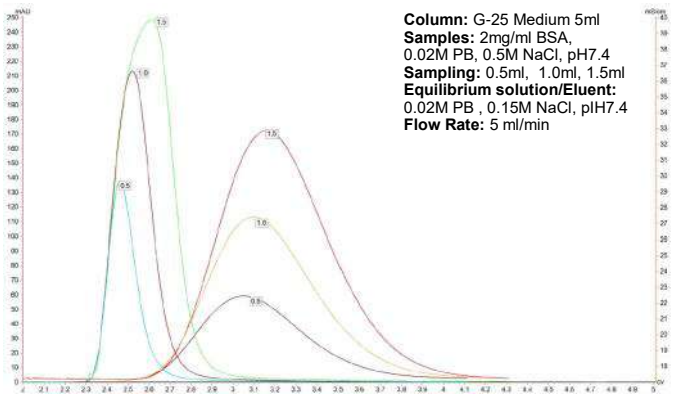
Cross-linked glucan is a globular gel that contains a large number of hydroxyl groups and is prone to swelling in water and electrolyte solutions. G-type cross-linked glucans have different crosslinking degrees, their swelling degree and separation range are different. The swelling degree of crosslinked glucan is not affected by the presence of salt and detergent.

Products	Molecular Weight Range (globulin)	Particle Size (Powder)	Swelling Degree (ml/g)	Flow Rate	pH Range
GFC G-25 Coarse	1×10^3-5×10^3	165-300μm	4-6	300 cm/h	2-13
GFC G-25 Medium		45-165μm	4-6	150 cm/h	
GFC G-75 Medium	3×10^3-8×10^4	45-165μm	12-15	80 cm/h	
GFC G-75 Fine		25-45μm	12-15	20 cm/h	

Desalting Effect Comparison

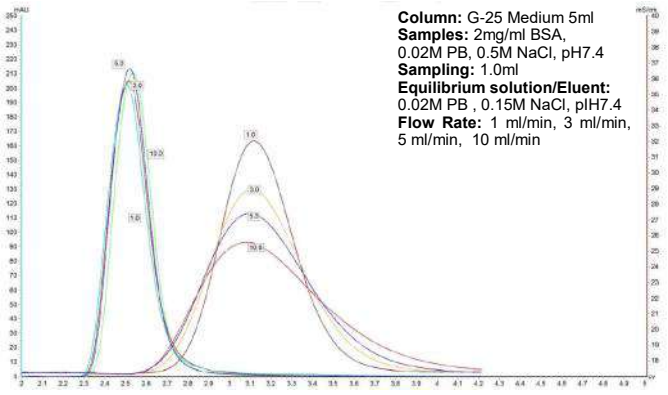


Column: G-25 Medium 5ml
Samples: 2mg/ml BSA,
0.02M PB, 0.5M NaCl, pH7.4
Sampling: 0.5ml, 1.0ml, 1.5ml
Equilibrium solution/Eluent:
0.02M PB , 0.15M NaCl, pIH7.4
Flow Rate: 1 ml/min



Column: G-25 Medium 5ml
Samples: 2mg/ml BSA,
0.02M PB, 0.5M NaCl, pH7.4
Sampling: 0.5ml, 1.0ml, 1.5ml
Equilibrium solution/Eluent:
0.02M PB , 0.15M NaCl, pIH7.4
Flow Rate: 5 ml/min

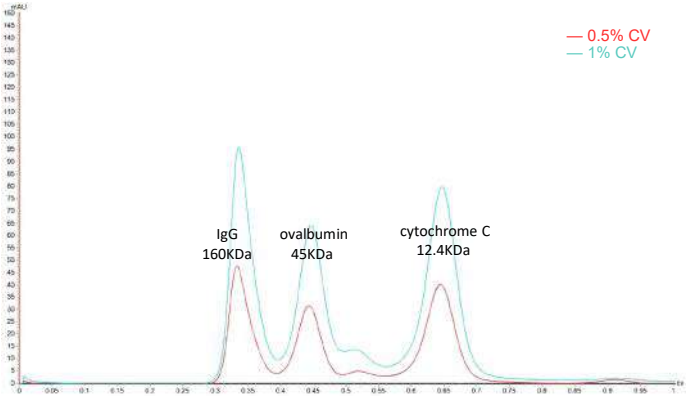
Desalting of G-25 Medium has not effect by different sampling and flow rate.



Column: G-25 Medium 5ml
Samples: 2mg/ml BSA,
0.02M PB, 0.5M NaCl, pH7.4
Sampling: 1.0ml
Equilibrium solution/Eluent:
0.02M PB , 0.15M NaCl, pIH7.4
Flow Rate: 1 ml/min, 3 ml/min,
5 ml/min, 10 ml/min

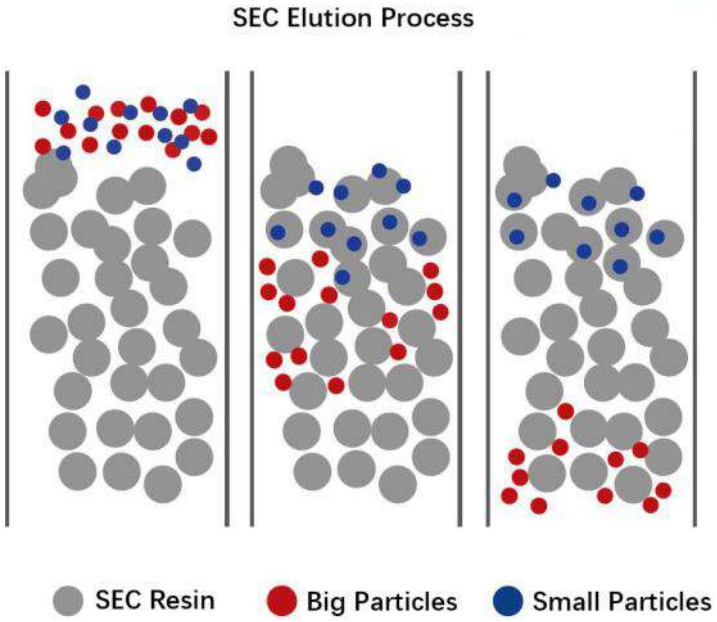
Small Molecular Protein Purification

Column: G-25 Fine HK16/40, bed height 34.5cm
Samples: 2mg/ml IgG, 4mg/ml ovalbumin, 2mg/ml cytochrome C (8mg mixed protein/ml)
Buffer: 20M PB , 150M NaCl, pIH7.4
Flow Rate: 11 ml/min
Sampling: 0.5% CV, 1.0% CV



SEC Column

GALAK SEC columns are a family of high performance, size exclusion chromatography (SEC) columns for separating a broad range of biomolecules based on the size of analytes. The column technology involves creation of a neutral hydrophilic layer on the surface of specially designed high-strength monodispered silica particles followed by well established production process. Therefore, GALAK SEC columns can be used in pharmaceutical, biopharmaceutical and academic research applications.

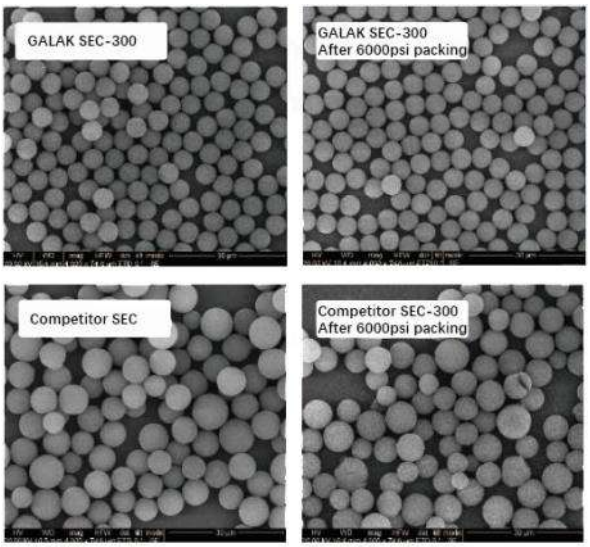


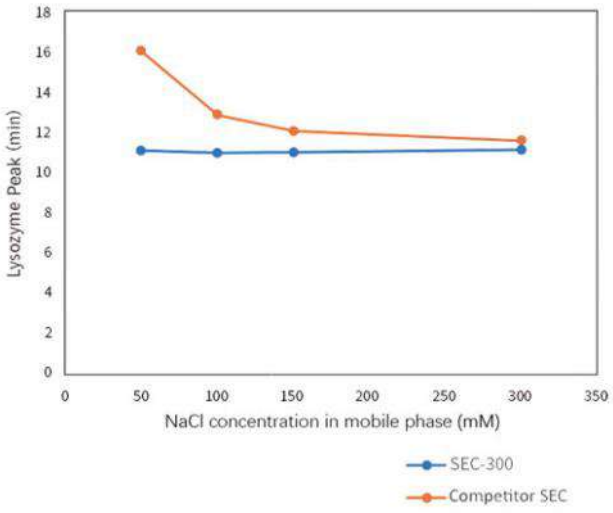
Features

High column efficiency, high resolution;
Minimal undesired interactions between stationary phase and analytes, resulting in good peak shape and recovery;
High physical strength for better column lifetime;
Broad range of applications, including small molecule drugs, peptides, proteins, oligos, glycans, etc.

Types

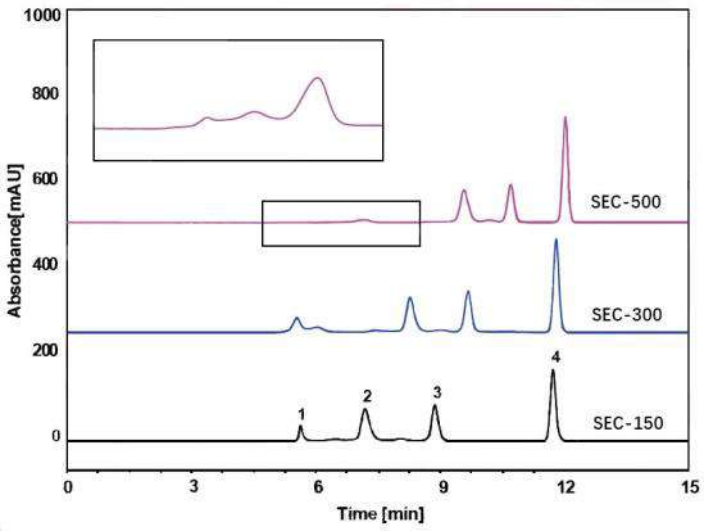
SEC-150 - designed for separating peptides, glycans, small oligos, small proteins.
SEC-300 - designed for mAb aggregate determination.
SEC-500 - designed for separating larger proteins and oligos.





Parameter

	SEC-150	SEC-300	SEC-500
Ligand	Diol		
Substrate	Monodisperse High-pure Silica Particle		
Particle Size	5um		
Pore Size	150A	300A	500A
pH Range	2-8		
Temperature	＜40℃		
Pressure	6000psi		
Ligand Range (PEG)	200-15,000	1.000-100,000	5,000-200,000
Ligand Range (Glucan)	1,000-50,000	5,000-150,000	20,000-500,000
Ligand Range (Globular Protein)	5,000-150,000	10,000-1,000,000	20,000-2,000,000



Column Black: SEC-150, 5μm

Column Blue: SEC-300, 5μm

Column Red: SEC-500, 5μm

Dimension: 4.6×300mm

Mobile phase: 150 mM Phosphate Buffered Saline (pH 6.8)

Flow rate: 0.35 mL/min

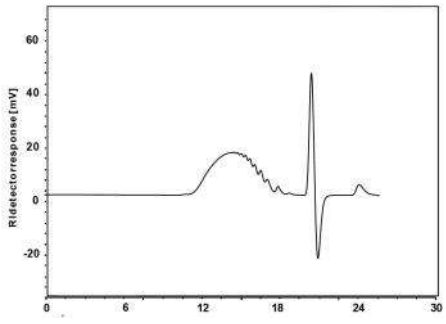
Temperature: 30 ℃

Injection: 5μL

Detection: UV 280 nm

Peaks:

1. Thyroglobulin (0.5mg/mL) -669,000Da
2. Conalbumin (1mg/mL) -75,000Da
3. Ribonuclease A (1mg/mL) -13,700Da
4. Uracil (0.1mg/mL) –112Da



Column: SEC-150, 5μm
Dimension: 7.8×300mm

Mobile phase: 100 mM Ammonium Acetate

Flow rate: 0.5 mL/min

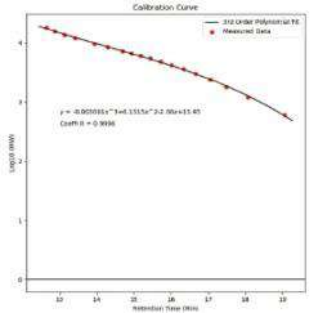
Temperature: 35 ℃

Injection: 25 μL

Detection: RID (35℃)

Sample: Low molecular weight heparin to adjust CRS (10 mg /mL)

GPC simulation software: Correlation coefficient= 0.9996



	5um 7.8×300mm	5um 4.6×300mm	5um 4.6×50mm	5um 4.6×10mm
SEC-150	213-05015-07830	213-05015-04630	213-05015-04605	213-05015-04601
SEC-300	213-05030-07830	213-05030-04630	213-05030-04605	213-05030-04601
SEC-500	213-05050-07830	213-05050-04630	213-05050-04605	213-05050-04601

VirCap® Perfusion Media

Perfusion chromatography media with their large pore structure, are widely used in biomolecule purification due to low mass transfer barriers. During last 25 years, this type of media have been proven as a powerful tool in biopharma separation.

Characteristic

- **Large Pore Size**

1000-3000Å pore size, enable the diffusion and mass transfer for large biomolecules.

- **Particle Size**

35-85 micron particles, satisfy your purification processing requests.

- **Rigid Microspheres**

Maximum pressure is over 870psi(60 bar), excellent mechanical property.

- **Flexible Tentacles**

Higher recovery rate and target purity, with excellent combination and capture capability .

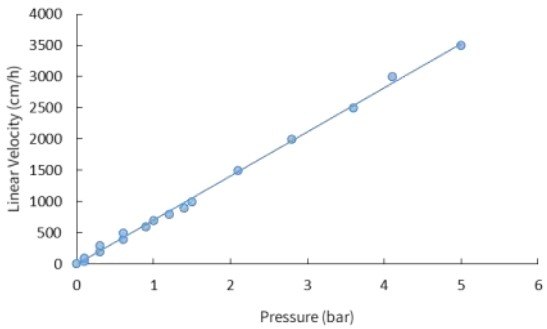
- **Harsh Clean-in-Place Condition (CIP)**

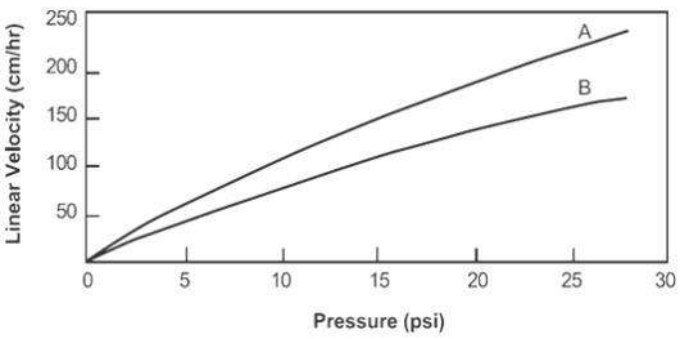
0.5-1M NaOH, organic solvent, high salt solvent.

- **Robust Chemical Stability**

VirCap® particles are rigid polymeric particles that are coated with a proprietary hydrophilic polymer onto which the various functional groups (ion exchange, affinity, etc.) are covalently attached.

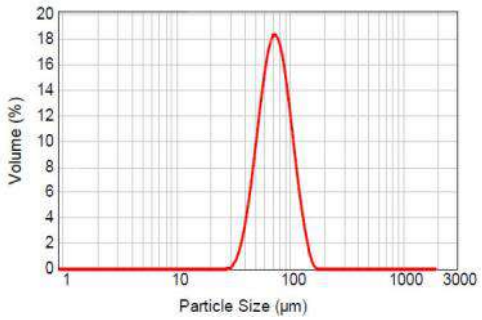
Substrate	Hydrophilic PS/DVB Microspheres
Particle Size	50um, 70um
Function Group	Heparinoid, IEX Ligand
Dynamic Binding Capability	80mg lysozyme/ml
Flow Rate	1000cm/h (20°C, buffer solution viscosity same as water，pressure < 3 bar / 43.5psi, column bed height 20cm)
Column Bed Height	20-40cm
pH Stability	1-14
Working Temperature	4-30°C
CIP Condition	0.5-1M NaOH
Storage	2-8°C 20% EtOH

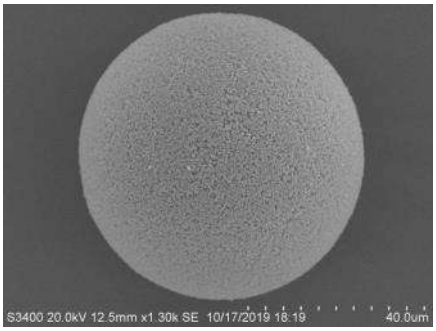


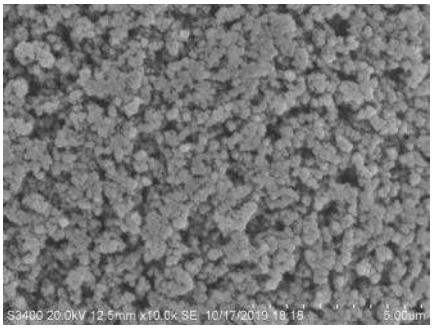


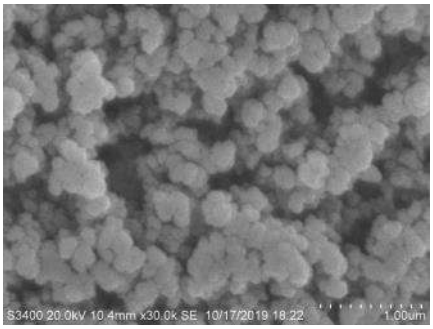
Rigid Microsphere With Large Pore Size

VirCap® particles large “through-pores”. These large through -pores allow part of mobile phase flow through, quickly carrying biomolecules to smaller diffusive pores. The large through-pores reduce diffusion rate of biomolecules and enhance interaction between biomolecules and functional groups on the surface. Consequently, mass transfer barriers are lowered, and flow rate can be increased - without compromising capacity or resolution.





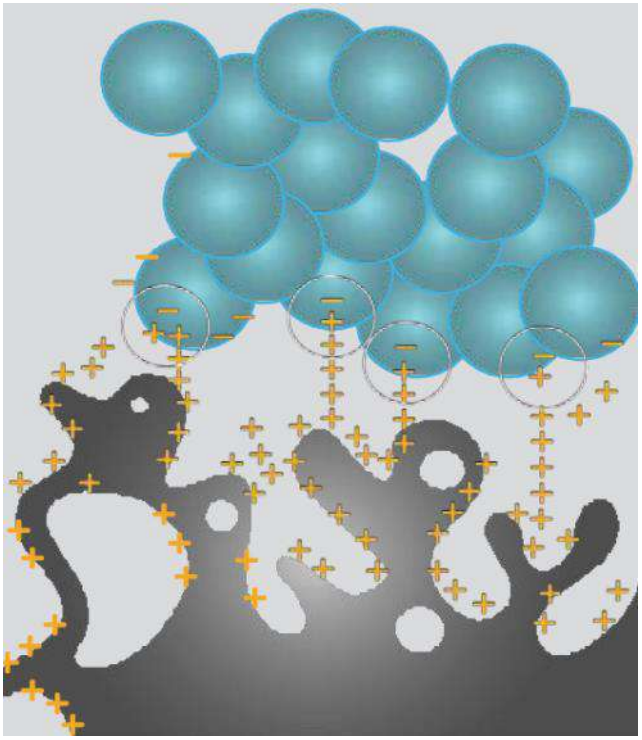




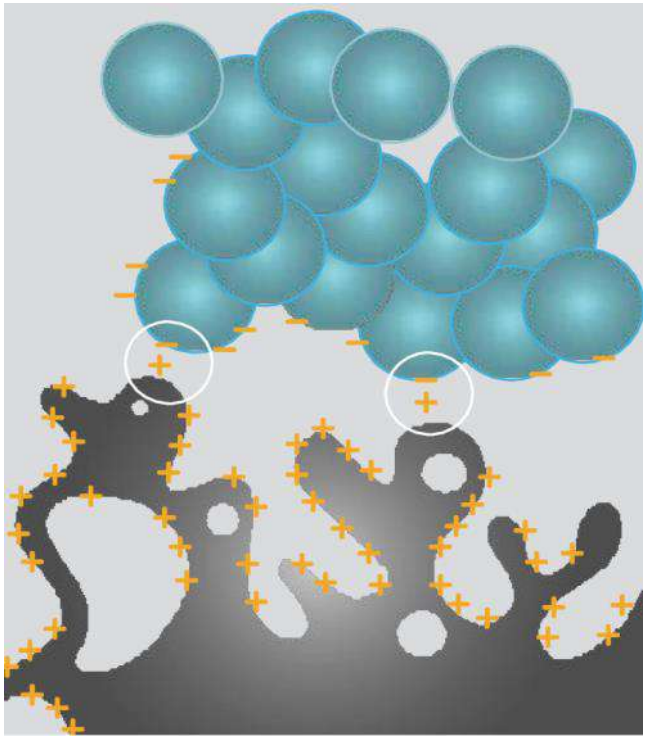
Flexible Tentacles

Flexible tentacle structure minimizes the steric hindrance between functional groups and target molecules. It also improves the binding capability of the target material.
Compared to traditional media, VirCap® media show more effective capture and higher recovery.

Tentacle ion chromatography media



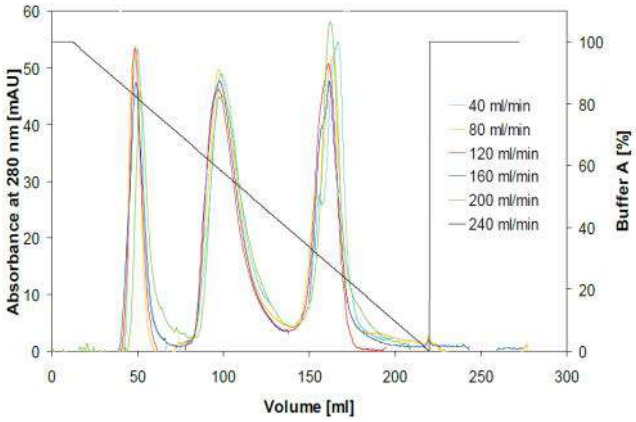
Traditional ion chromatography media



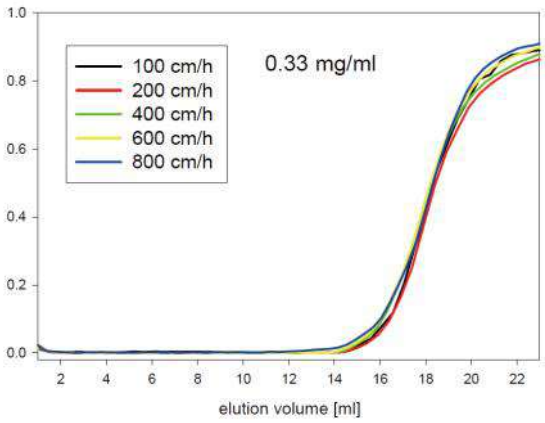
High Flow Rate, Low Backpressure

VirCap® media offer an excellent balance of resolution and operating backpressure.

Under recommended condition of mobile phase, VirCap® media exhibit almost no shrinkage or expansion. The combination of through-pores and flexible tentacles ensures rapid diffusion of solute. It also reduces the barrier of mass transfer, and realizes high dynamic binding capacity (DBC) under the operation of high flow rate.



Peak width at different flow rates (VirCap® media 3000Å)

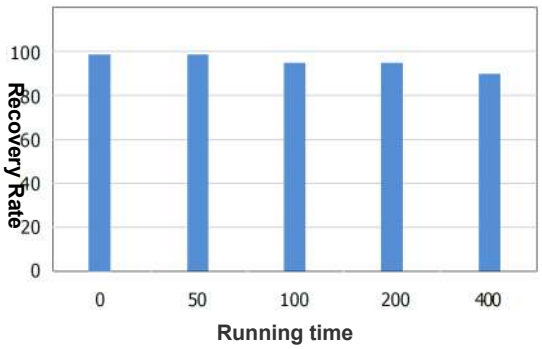


Dynamic capability at different flow rates (VirCap® media 3000Å)

Robust Chemical Stability

VirCap® media are highly cross-linked polymeric particles coated with a proprietary hydrophilic layer on which various functional groups (ion exchange, affinity, etc.) are covalently attached. The result is chemically stable product that is ideally suitable for large-scale biopharmaceutical separation.

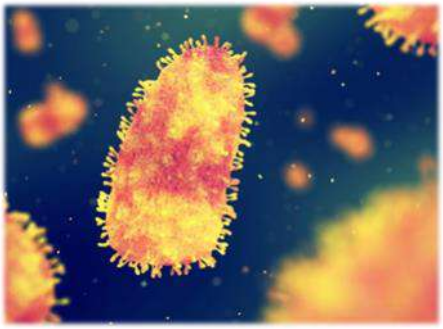
Lot	RT	Area	Height	TP	As
1	2.652	537586	190057	29507	1.10
2	2.641	536434	187236	26529	1.21
3	2.602	533688	186841	27349	1.12
4	2.599	531408	188244	29147	1.05
5	2.622	534911	187224	26901	0.98
6	2.647	540382	188746	26862	1.19
7	2.626	531906	188743	27855	1.08
8	2.628	540015	189618	28034	1.11
9	2.610	541372	188711	26567	1.16
10	2.623	527072	185477	26420	1.20



VirCap® AF media Application

Viruses		Viral/Microbial Antigens
Rabies	Feline Calicivirus	Herpes Simplex gA and gB Glycoprotein Subunits
Influenza	Respiratory Syncytial Virus	Hepatitis B Surface Antigen
Japanese Enchephalitis	Human Herpes Simplex	Filamentous Hemagglutinin from B. pertussis
Feline Leukemia	Human Measles	Leucocytosis Promoting Factor Hemagglutinin
Feline Herpes	Human Parainfluenza	

One-step Rabies Virus Purification



Rabies infection is known to be fatal. Efficacious and safe rabies vaccines for pre and post exposure treatment are available. However the cost of the vaccine and the huge need worldwide are the main hurdles for an equitable and global use of human rabies vaccine. A better option is purified rabies vaccine for dogs. GALAK offers VirCap® AF materials that allow a single step purification of rabies vaccine after inactivation.

Test Condition:

Column: VirCap® AF 1ml prepacked column

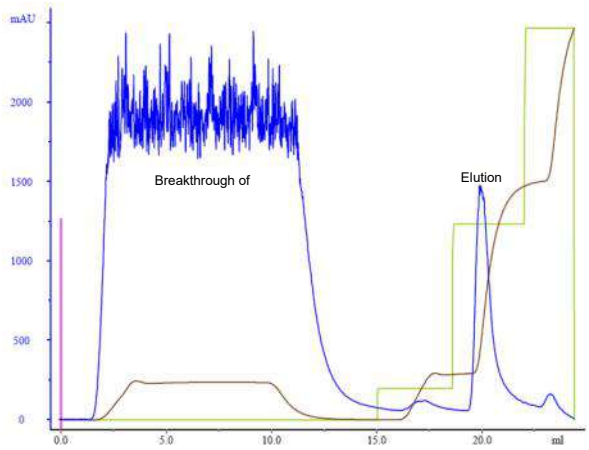
Mobile phase A: 10mM PB pH7.4

Mobile phase B: 10mM PB pH7.4 2M NaCl

Flow Rate: 0.5ml/min

Testing: UV 280nm

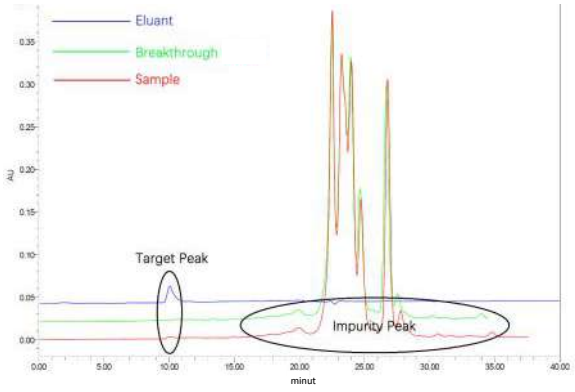
Sample: Clarified virus medium



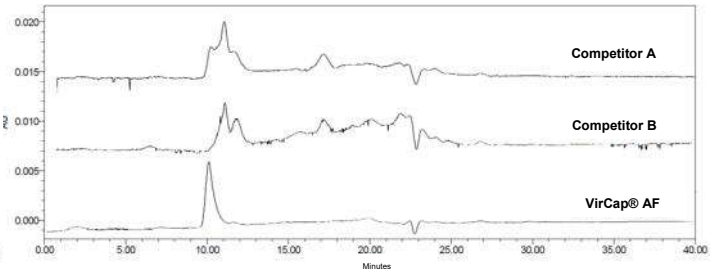
Purification Chromatogram For Rabies Virus

Using HPSEC analysis for the tests of sample solution, percolation fluid and collection fluid, and no peak of target in break-though at RT=10min. VirCap® AF media elutes virus particles by changing the ion strength in mobile phase. Both the purity and concentration of the virus improves significantly.

Parallel tests of HPSEC analysis for target peak collection is also done among competitors.



HPSEC Analysis For Rabies Virus Purification



Parallel tests of HPSEC analysis for target peak collection

CIP and Clearance

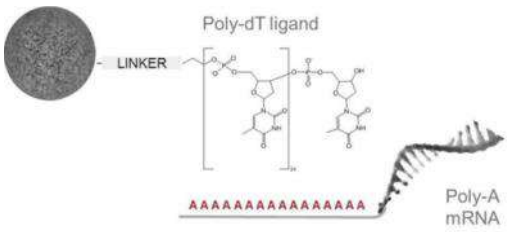
Frequency of Clean-in-Place (CIP) depends on properties and conditions of solvent.

For the capture step, we suppose at least 30 minutes of 1 M NaOH countercurrent CIP process after each running.

To reduce microbial contamination in the prepacked column, clean with 0.5 to 1.0 M NaOH, 1 h contact time is recommended.

VirCap® Oligo dT(25) Affinity Resin

VirCap® Oligo dT(25) Affinity Resin is based on rigid, 50µm polymeric resin designed to isolate messenger RNA (mRNA). The resin backbone consists of crosslinked PS-DVB (polystyrene divinylbenzene).



The polyhydroxy surface coating provides low non-specific binding. The surface is functionalized with a linker and poly dT(25) functional group allowing capture of mRNA through H-bonding pairing with the mRNA polyA tail.

VirCap® Oligo dT(25) Affinity Resin provides efficient capture and easy release under standard mRNA purification conditions. It thereby decreases process development time and enhances productivity. In addition, the selective nature of this resin allows a reduction in plasmid DNA and other transcription mix components. The resin is also stable at elevated temperatures for the breakdown of undesired higher-order structures if required.

Features:

- Easy mRNA purification to separate non-poly A tail contaminents
- Simplified workflow helps to maximize efficiency, thereby reducing complexity of subsequent polish steps
- Excellent scalability
- Non-animal derived

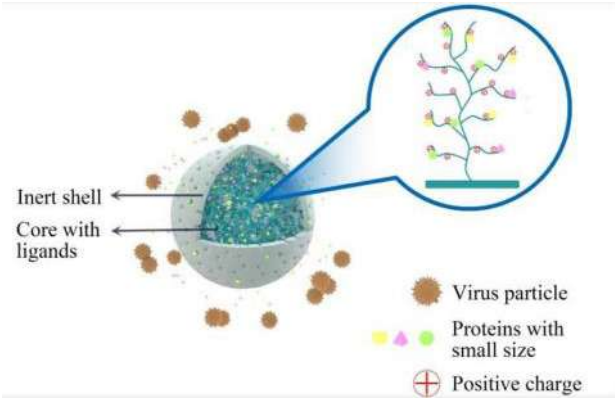
VirCap® Oligo ligands are manufactured using a synthetic manufacturing process that are free of animal components.

Specification

Support matrix	Cross-linked PS-DVB
Surface functionality	dT-25mer
Ligand density	⩾ 0.2 umol dT/mL resin
Shipping solvent	20% ethanol
Average particle size	50 µm
Average pore diameter	200 nm
Mechanical resistance	1000 psi (6.9 MPa)
Suggested compression factor	1.06
Operating temperature	2 to 65℃ Do not freeze

VirCap® InertShell Core-Shell Resin

VirCap® InertShell is designed with the core-shell technology. It is for purification of viruses and other large biomolecules. The core-shell technology allows for combining size exclusion separation with IEX chromatography. Viruses and other large biomolecules that are too large to penetrate the inert shell of the chromatography resins are collected in flow through fraction (FT mode). Contaminants (< Mr 700 000) on the other hand pass through the inert outer shell and bind to the ligands in the inner core.



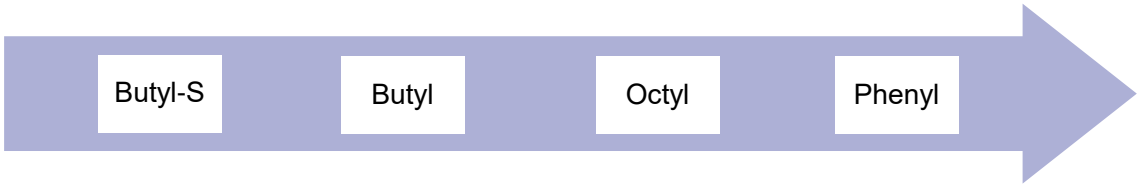
VirCap® InertShell is made polymethacrylate microspheres with octylamine ligand, inside the pore as shown in Pic 1. The shell of the microspheres is neutral and hydrophilic, which has no biomolecule adsorption. The pore size of the shell (50-100 nm) is smaller than that of the core (200-500 nm). And the thickness of the shell is about 0.5-1.0μm. The shell prevents proteins (molecular weights greater than 700 kDa) from entering the core. In the chromatography process, large-size viruses or other large biomolecules cannot enter the microsphere core that they are breakthrough and be collected quickly. The octylamine ligand in the core realize its dual functions of anion exchange and hydrophobicity, capturing protein molecules with molecular weight less than 700 kDa. VirCap® InertShell can effectively remove host cell proteins(HCP's), DNA fragment, endotoxin, albumin and other.

Specification

	VirCap® Inert Shell	Capto Core 700
Matrix	Polyacrylate	Highly cross-linked agarose
Ligand	Octylamine	Octylamine
Average particle size	50-150 μm	50-150 μm
Density of ligand	0.10-0.20 mmol/mL	0.04-0.085 mmol/mL
Binding capacity[1]	6-12 mg BSA/mL resin	12 mg BSA/mL resin
Operational pressure	≤1.0 MPa	≤0.3 MPa
Operational flow rate	100-600 cm/h	100-600 cm/h
pH stability	3-13	3-13
Temperature	4-30℃	4-30℃
Chemical stability	All commonly used aqueous buffers, 1 M sodium hydroxide (NaOH), 6 M guanidine hydrochloride, 30% isopropanol, and 70% ethanol.	
Storage	20% ethanol at 4°C to 25 ℃	

Hydrophobic Interaction Chromatography

Hydrophobic interaction chromatography (HIC) is used for separating based on the difference of hydrophobicity of proteins. The separation is basically reversible interaction between protein and hydrophobic groups on the surface of the hydrophobic media.



GLKgel HIC Butyl-S Media

	Substrate	Particle Size	Ligand Content	pH Stable	Flow Rate
Butyl-S	6% cross-linked Agarose	90μm 45-165μm	10 μmol/ml media	2-14 (Short) 3-13 (Long)	400 cm/h

GLKgel HIC Butyl Media

	Substrate	Particle Size	Ligand Content	pH Stable	Flow Rate
Butyl 4FF	4% cross-linked Agarose	90μm 45-165μm	40μmol/ml media	2-14 (Short) 3-13 (Long)	400cm/h
Butyl 6HP	6% cross-linked Agarose	37μm 25-45μm	50μmol/ml media	2-14 (Short) 3-13 (Long)	150cm/h

GLKgel HIC Octyl Media

	Substrate	Particle Size	Ligand Content	pH Stable	Flow Rate
Octyl	4% cross-linked Agarose	90μm 45-165μm	40 μmol/ml media	2-14 (Short) 3-13 (Long)	400 cm/h

GLKgel HIC Phenyl Media

	Substrate	Particle Size	Ligand Content	pH Stable	Flow Rate
Phenyl 6FF-LS	6% cross-linked Agarose	90μm 45-165μm	20μmol/ml media	2-14 (Short) 3-13 (Long)	400cm/h
Phenyl 6FF-HS	6% cross-linked Agarose	90μm 45-165μm	40μmol/ml media	2-14 (Short) 3-13 (Long)	400cm/h
Phenyl 6HP	6% cross-linked Agarose	37μm 25-45μm	25μmol/ml media	2-14 (Short) 3-13 (Long)	150cm/h

HIC Column

HIC Column separation materials are prepared by bonding hydrophobic groups on hydrophilic surface based on monodisperse polymer microspheres. Based on the hydrophobic mechanism under non-densification conditions, it is used for the separation and analysis of various biological molecules such as proteins.

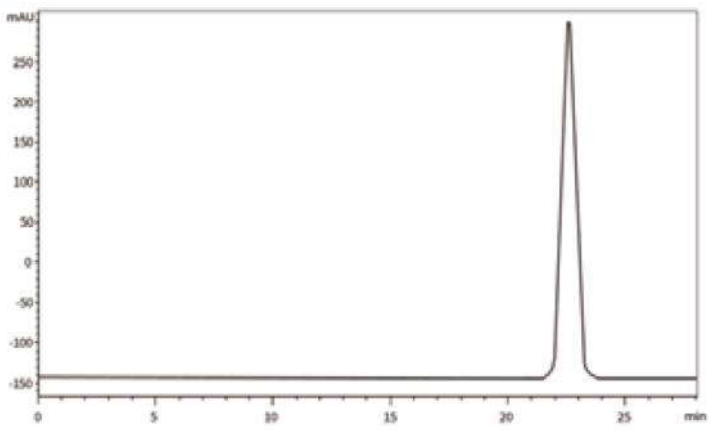
The HIC series includes Hic-Butyl and Hic-phenyl, which offer different selectivity for different types of protein isolation.

Product	Ligand	Particle Size	Pore Size	Pressure
HIC-Butyl	Butyl	15um	1000A	4.0MPa
HIC-Phenyl	Phenyl	15um	1000A	4.0MPa

Sugar Analysis Column

Galaksil suger analysis column can meet the analysis requirements of different types of polysaccharides, sugar alcohols and organic acids. These columns are produced with two kinds of PS-DVB monodisperse microsphere with different degree of cross-linking. Hydrogen-type, sodium-type and calci--type were formed through a unique sulfonation bonding process based on coordination exchange principle., they shows different selectivity in the analysis.

	Suger-10H	Suger-10Ca	Suger-10Na
Ligand	$-SO_3H$	$-SO_3Ca$	$-SO_3Na$
Substrate	Monodisperse PS-DVB substrate		
Particle Size	6um/8um		
Degree of crosslinking	0.1		
pH Range	1-3	5-9	5-9
Temperature	<95°C		
Pressure	1200psi		
Application	Organic acids and alcohols mixer	honey and oligosaccharides	sugars and mannitols



Riboviron, RBV

Column: Sugar-10H, 8um

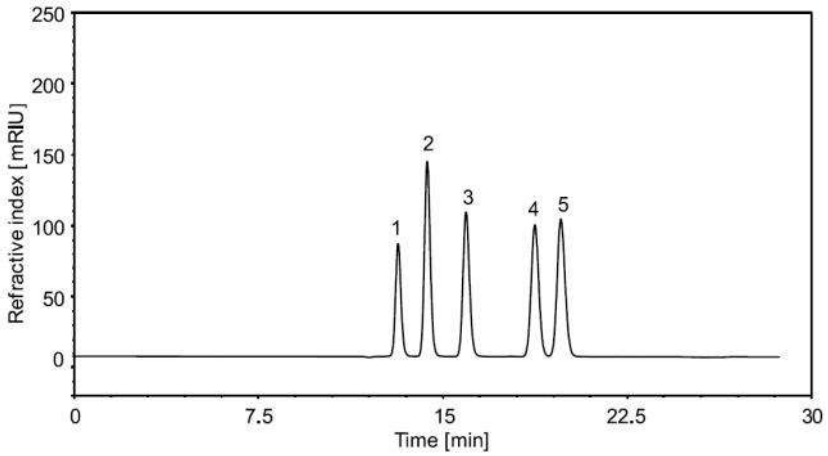
Dimension: 7.8×300mm

Mobile phase: H2SO4 H2O, pH2.5

Flow rate: 0.5mL/min

Temperature: 30°C

Detection: UV207nm



Column: Sugar-10H, 6um

Dimension: 7.8x300mm

Mobile phase: 9mM H2SO4

Flow rate: 0.5mL/min

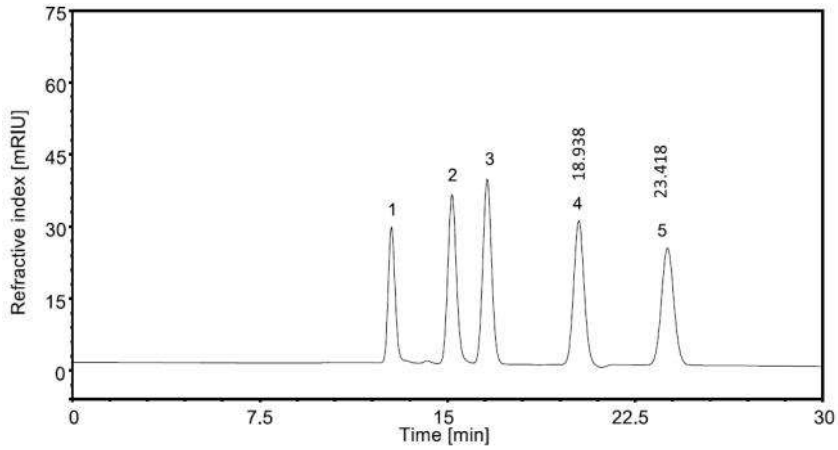
Temperature: 65℃

Injection: 5μL

Detector: RID

Samples:

1. Citric acid; 2. Malic acid; 3. Succinic acid;
4. Formic acid; 5. Acetic acid.



Mannitol

Column: Sugar-10Ca, 6um

Dimension: 7.8x300mm

Mobile phase: H2O

Flow rate: 0.5mL/min

Temperature: 80°C

Injection: 5uL

Detection: RID

Sample:

1. Sucrose; 2. Galactose;
3. Fructose; 4. Mannito; 5. Sorbitol

Particle Size	Column Size	Sugar-10H	Sugar-10Na	Sugar-10Ca
6um	4.6*250mm	017-06010-04625	058-06010-04625	019-06010-04625
	7.8*250mm	017-06010-07825	058-06010-07825	019-06010-07825
8um	4.6*250mm	017-08010-04625	058-08010-04625	019-08010-04625
	7.8*250mm	017-08010-07825	058-08010-07825	019-08010-07825

DNA Analysis Columns

- DNA RP columns are based on macroporous PS/DB microspheres with high crosslinking degree and they are suitable for the separation of large DNA and RNA molecules.
- DNA 120-C18, based on 120A pore diameter monodispersed C18 bonded silica gel, is used for the separation of smaller oligonucleotides.
- DNA 1000-C18 is based on 1000A pore diameter monodispersed C18 bonded silica gel for the separation of large oligonucleotides, DNAs and RNAs.

Product	Substrate	Particle Size	Pore Size	Column Size
DNA RP	PS-DVB	5um	1000A	4.6×150mm 4.6×100mm 4.6×50mm 2.1×150mm 2.1×100mm 2.1×50mm
DNA 120-C18	Silica	3um/5um	120A	
DNA 1000-C18	Silica	3um/5um	1000A	

Magnetic Beads

For histidine-tagged proteins

rProtein A/G & Ni NTA magnetic beads design for simple small-scale purification of histidine-tagged proteins. Magarose beads are suitable for purification of a single sample or multiple samples in parallel for example in screening experiments.

GALAK Magarose Beads can be used together with Eppendorf microcentrifuge tubes and a magnetic rack, for example, MagRack 6. GALAK Magarose Beads can be easily separated from the liquid phase during the different steps of the purification protocol.

rProtein A/G Magnetic Beads

Substrate	Magnetic agarose microspheres
Ligands	Recombinant protein A/G
Combined ability	>10mg hIgGml / magnetic beads
Particle size	30-100 μm
Storage buffer	1XPBS containing 20% ethanol
Volume	Suspend in protection solution, 20% content
Storage temperature	2°C-8°C

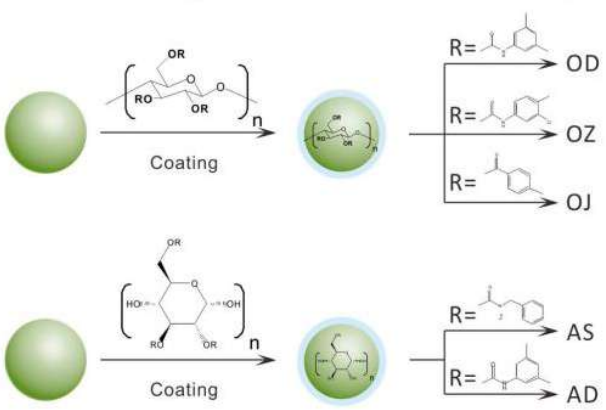
Ni NTA Magnetic Beads

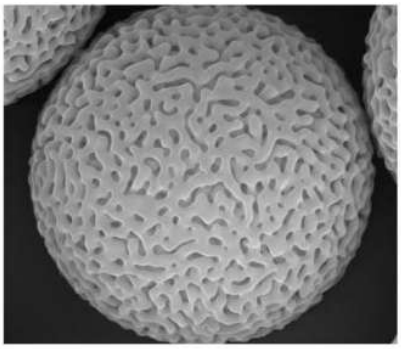
Substrate	Magnetic agarose microspheres
Combined ability	>10mg 6XHis-tagged protein / magnetic beads
Particle size	30-100 μm
Storage buffer	1XPBS containing 20% ethanol
Magnetic bead volumes	Suspend in protection solution, 20% content
Protective buffer	20% EtOH 1XPBS
Storage temperature	2°C-8°C

Chiral Column

GALAK Chiral Columns are designed for chiral separation. Unichiral® is polysaccharide derivative bond with microporous silica-gel substrate which has the advantages of high capacity of cellulose/ amylose derivative, good stability and high chiral separation ability.

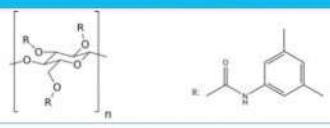
GALAK Chiral Columns include OD, OJ, OZ, AS and AD series. 5um columns are for analysis, 10um columns are for preparation. OD and AD columns are the most widely used for HPLC analysis, semipreparative, SFC of chiral compound.



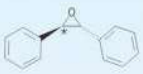


SEM Photo for UniChiral® 5μm 1000Å Chiral (50,000 times)

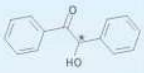
Specification

Product	Functional Group	Particle Size
OD		5μm 10μm
	Cellulose tris (3,5-dimethylphenylcarbamate)	
OJ		
	Cellulose tris (4-methylbenzoate)	
OZ		
	Cellulose tris(3-chloro-4-methylphenylcarbamate)	
AS		
	Amylose tris [(S)-α-methylbenzylcarbamate]	
AD		
	Amylose tris (3,5-dimethylphenylcarbamate)	

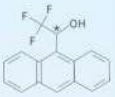
Compare with famous Chiral Column



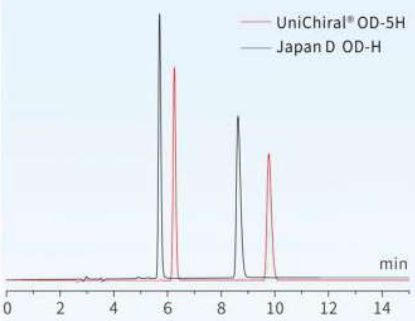
Sample: Trans-Stilbene oxide
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

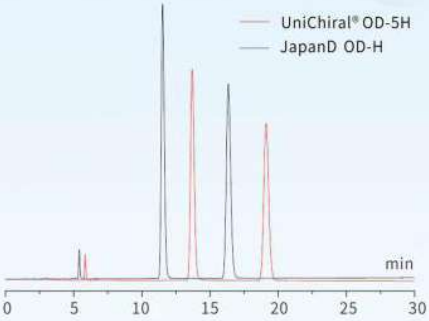


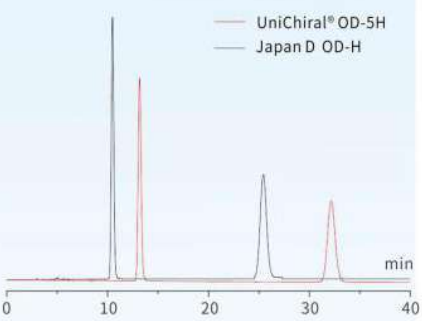
Sample: Benzoin
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



Sample: 2,2,2-Trifliuoro-1
(9-anthryl)ethanol
Column: UniChiral OD-5H
4.6×250mm
Mobile Phase: Hexane/IPA=9:1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C





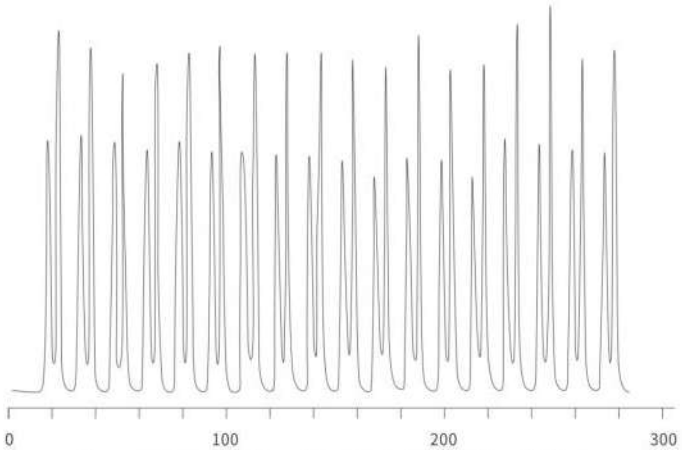


Theoretical Plates		Tailing Factor		α	
UniChiral	Japan D	UniChiral	Japan D	UniChiral	Japan D
16222	15267	1.149	1.214	2.07	2.07
14779	13740	1.345	1.437		

Theoretical Plates		Tailing Factor		α	
UniChiral	Japan D	UniChiral	Japan D	UniChiral	Japan D
11899	12219	1.167	1.197	1.50	1.56
12707	12150	1.114	1.154		

Theoretical Plates		Tailing Factor		α	
UniChiral	Japan D	UniChiral	Japan D	UniChiral	Japan D
9138	8300	1.101	1.090	2.85	2.99
8287	7205	1.066	1.058		

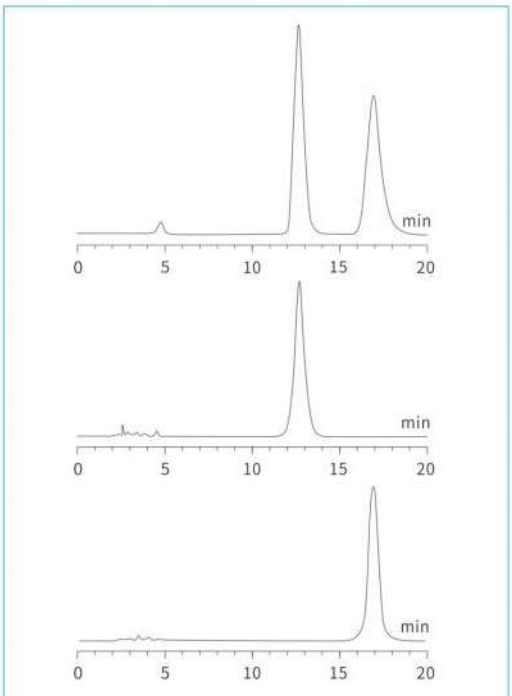
Compare with Japan products, UniChiral® chiral column media has similar selective, higher column efficiency, and better peak type symmetry.



Chromatogram of continuous injection for 20 times

Chiral Column Application

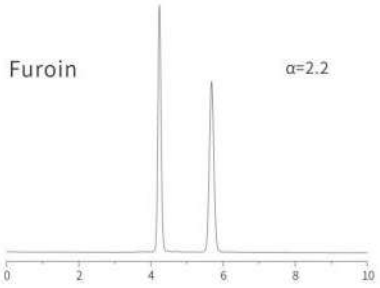
Column: UniChiral® OD-5H
50×250mm
Injection: 100mg every time
ee Value: >99
Yield: ~90%
Flow Rate: 80mL/min
Column Pressure: 2MPa



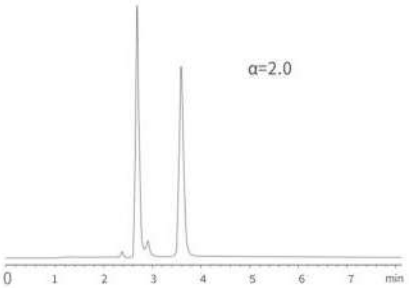
Analysis of compounds before and after resolution

UniChiral® chiral column has lower pressure and satisfied separation ability.

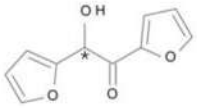
Furoin



UniChiral AD-5H 4.6×250mm

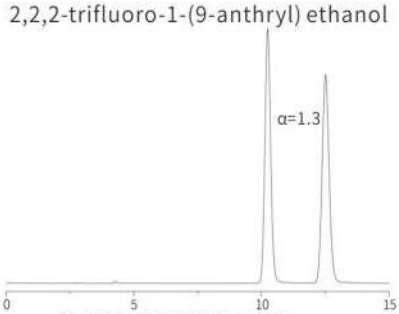


Japan D AD-H 4.6×250mm

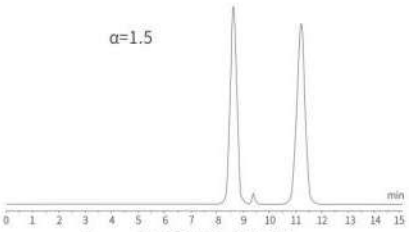


Mobile Phase: EtOH
Flow Rate: 1mL/min
Wavelength: UV 270nm
Temp.: 25°C

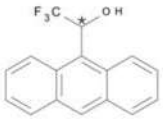
2,2,2-trifluoro-1-(9-anthryl) ethanol



UniChiral AD-5H 4.6×250mm

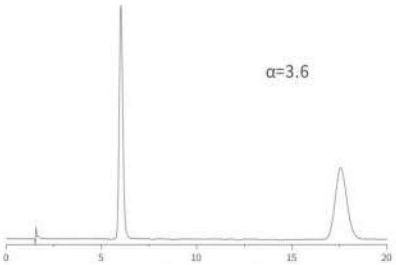


Japan D AD-H 4.6×250mm

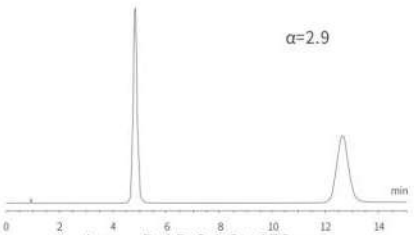


Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

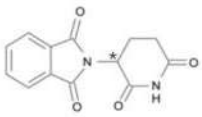
Thalidomide



UniChiral AD-5H 4.6×250mm

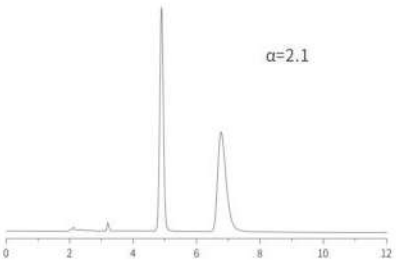


Japan D AD-3 4.6×150mm

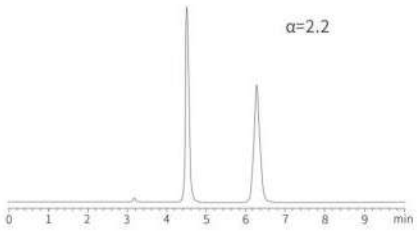


Mobile Phase: MeOH
Flow Rate: 2mL/min
Wavelength: UV 220nm
Temp.: 25°C

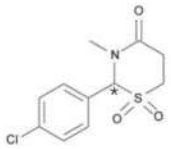
Chlormezanoneh



UniChiral AS-5H 4.6×250mm

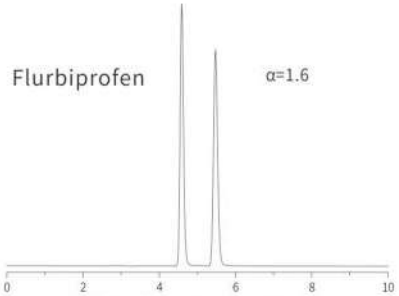


Japan D AS-H 4.6×250mm

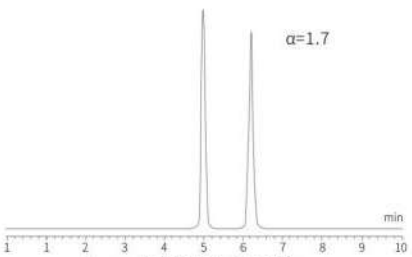


Mobile Phase: MeOH
Flow Rate: 1mL/min
Wavelength: UV 210nm
Temp.: 30°C

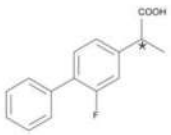
Flurbiprofen



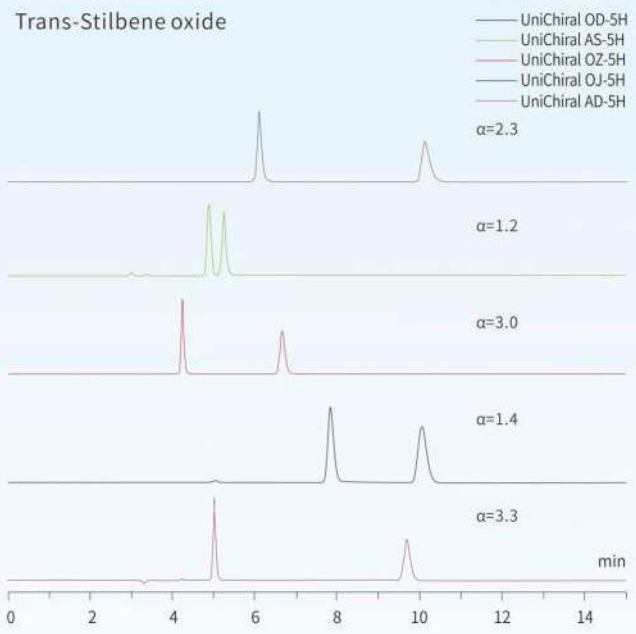
UniChiral AD-5H 4.6×250mm

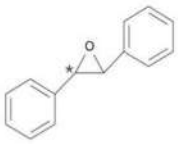


Japan D AD-H 4.6×250mm

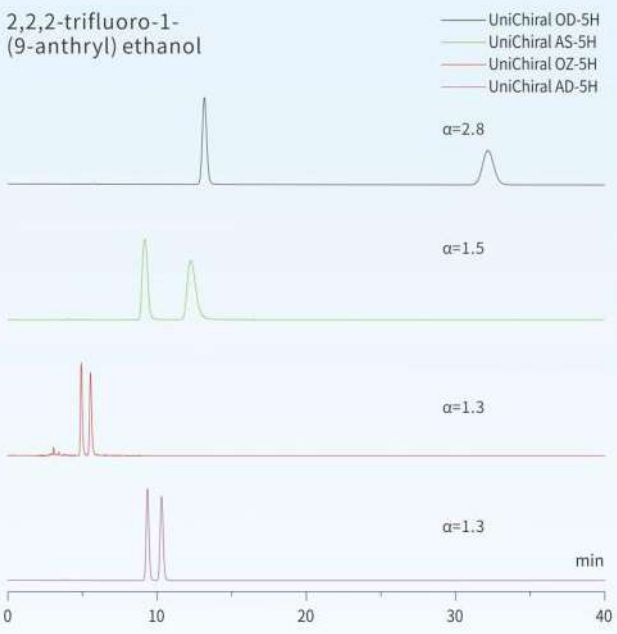


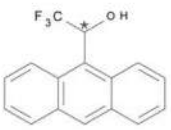
Mobile Phase:
Hexane/IPA/TFA=80:20:0.1
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



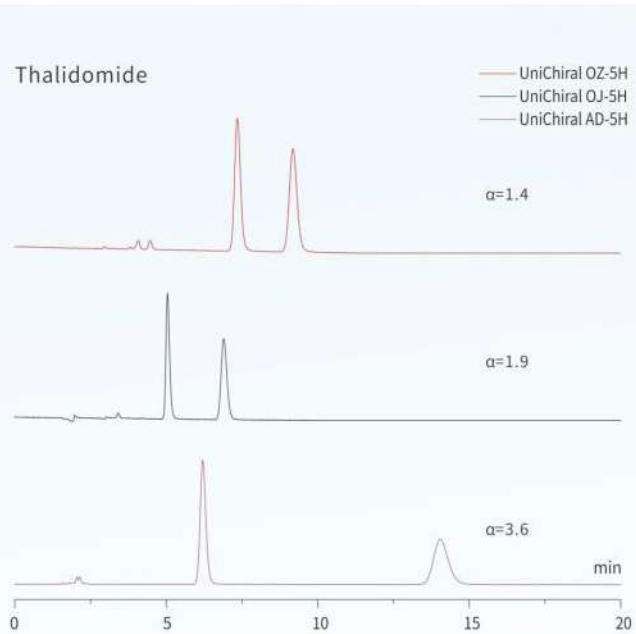


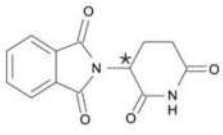
Column: 4.6×250mm, 5μm
Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C



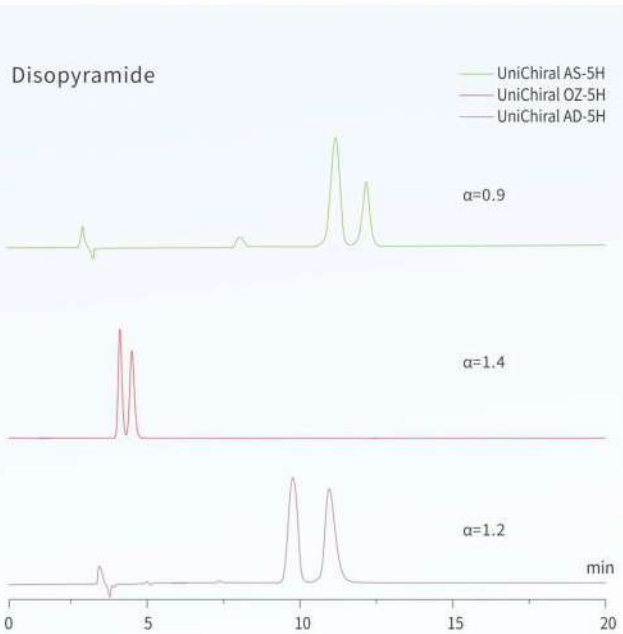


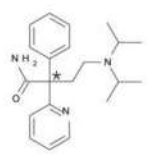
Column: 4.6×250mm, 5μm
Mobile Phase: Hexane/IPA=90:10
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C





Column: 4.6×250mm, 5μm
Mobile Phase: MeOH
Flow Rate: 2mL/min
Wavelength: UV 220nm
Temp.: 25°C





Column: 4.6×250mm, 5μm
Mobile Phase: EtOH/DEA=99.9:0.01
Flow Rate: 1mL/min
Wavelength: UV 254nm
Temp.: 25°C

HPLC Column Packing System

GLK1000 / GLK 2000

GLK1000/ 2000 HPLC Column Packing Systems (ZI:201320503871.6) are designed for packing analysis, semi-preparative and preparative columns.

GLK 1000, designed for packing analytical columns only, is suitable for the packing of conventional silica-gel and polymer HPLC columns.
GLK 2000, with higher pressure and power, are designed for both analytical and preparative columns with inner diameter 10mm~50mm.

Homogenate Tanks (ZL: 201320517976.7) is suitable for homogenate during the packing process.

Service:

1. One year warranty and free replacement parts
2. Free online training for operation and maintenance
3. Recovery of old equipment

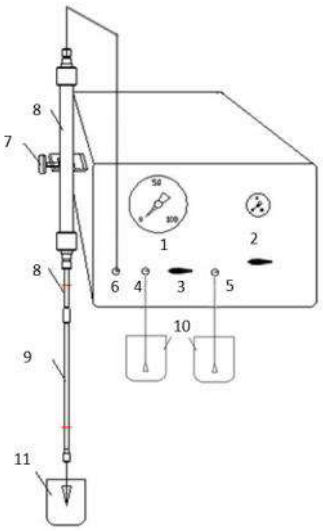
Parameters:

	GLK1000	GLK2000
Column ID	2.0/2.1/4.6mm	4.6/10/20/30/50 mm
Output Pressure	9800 psi	15000 psi
Flow Rate	3.3L/min	3.3L/min
Output Power	1.5hp	2hp
Air Cylinder	Single	Double

Details:

Control Panel Introduction

1 Pressure gauge
2 Pressure regulator
3 Liquid inlet:
4 Inlet A:
5 Inlet B:
6 Liquid outlets:
7 Column support
8 Homogenate tank
9 SS HPLC column
10 Solvent tank
11 Waste liquid recovery



GLK1000/2000 HPLC Column Packing System is widely used in many famous universities and research institutions like Tsinghua University, Sichuan University, Zhengzhou University, Dalian Institute of Chemical Physics Dalian Ocean University.

Standard Parts	Optional Parts
Operation instruction	Air compressor
Pneumatic booster pump	Air purification system
Control panel	Homogenate tanks
Homogenate tank support	Column connection (ID 10-50mm)
Stainless steel connections	Empty HPLC column (ID 4.6-50mm)
Stainless steel column	Packing materials

GALAK provide customized service according to customer's requests.

Empty HPLC columns are available.

High-pressure Injection Pumps

Eldex Optos Injection Pump

Eldex's Optos Series is designing and manufacturing reciprocating piston pumps for a wide variety of applications, while integrating the latest technology and electronics.

With upgrade to Plus Version

- Pressure monitoring with high and low pressure limits
- Integrated low volume pulse damper

Model 1

	Flow Rate (mL/min)	Max. Pressure (psi)	Piston Diameter (in.)	Piston Stroke (in.)	Model
316 stainless steel	0.002 - 2.5	6000	3/32	.125	1LM
	0.003 - 5	6000	1/8	.125	1SM
	0.01 - 20	3000	1/4	.125	1HM
PEEK	**Flow Rate (mL/min)**	**Max. Pressure (psi)**	**Piston Diameter (in.)**	**Piston Stroke (in.)**	**Model**
	0.002 - 2.5	4000	3/32	.125	1LI
	0.003 - 5	4000	1/8	.125	1SI
	0.01 - 20	3000	1/4	.125	1HI

Model 2

	Flow Rate (mL/min)	Max. Pressure (psi)	Piston Diameter (in.)	Piston Stroke (in.)	Model
316 stainless steel	0.003 - 5	6000	3/32	.250	2LM
	0.01 - 10	6000	1/8	.250	2SM
	0.02 - 40	1500	1/4	.250	2HM
	Flow Rate (mL/min)	**Max. Pressure (psi)**	**Piston Diameter (in.)**	**Piston Stroke (in.)**	**Model**
PEEK	0.003 - 5	4000	3/32	.250	2LI
	0.01 - 10	4000	1/8	.250	2SI
	0.02 - 40	1500	1/4	.250	2HI

Model 3

	Flow Rate (mL/min)	Max. Pressure (psi)	Piston Diameter (in.)	Piston Stroke (in.)	Model
316 stainless steel	0.01 - 10	3000	3/32	.500	3LM
	0.01 - 20	1500	1/8	.500	3SM
	0.04 - 80	750	1/4	.500	3HM
PEEK	**Flow Rate (mL/min)**	**Max. Pressure (psi)**	**Piston Diameter (in.)**	**Piston Stroke (in.)**	**Model**
	0.01 - 10	3000	3/32	.500	3LI
	0.01 - 20	1500	1/8	.500	3SI
	0.04 - 80	750	1/4	.500	3HI

Optos Plus Model: Minimize Pulsation, Monitor Pressure

Add Plus to your Optos Series pump to integrate a pulse damper to further reduce pulsation and have the ability to monitor pressure and set high and low pressure limits. Plus is available on L and S piston pumps.

	Flow Rate* (mL/min)	Max. Pressure (psi)	Piston Diame-ter (in.)	Piston Stroke (in.)	Model
316 stainless steel	0.002 - 2.5	6000	3/32	.125	1LMP
	0.003 - 5	6000	1/8	.125	1SMP
	Flow Rate* (mL/min)	**Max. Pressure (psi)**	**Piston Diame-ter (in.)**	**Piston Stroke (in.)**	**Model**
PEEK	0.002 - 2.5	4000	3/32	.125	1LIP
	0.003 - 5	4000	1/8	.125	1SIP

Single-layer Glass Column

- Pressure-resistant borosilicate glass, visualization and stability
- Supporting foot, adjustable level, convenient for users to use
- Reasonable price, high cost performance
- Reproducibility, excellent column efficiency and reliable results
- Zero dead volume structural connections

Working Temperature	4-40℃
pH Range	1-14
Chemical Stability	Tolerant to salt, acid, alkali, and a small number of organic solvents alcohols, ketones, phenols.
Column Material	Borosilicate glass
Column Head Material	PTFE
Thread-end Material	PEEK
Seal Ring Material	PTFE/EPDM
Tubing Material	1/16&1/8
Connector Material	PEEK 1/16&1/8

No.	Internal Diameter (mm)	Length (mm)	One-side Adjustable Type		Double-side Adjustable Type		Pressure (bar)
			Volume (mL)	Bed Height (cm)	Volume (mL)	Bed Height (cm)	
YS16/200	16	200	4-30	2-14.5	0-30	0-14.5	7
YS16/400	16	400	46-72	22-34.5	17-72	8.5-34.5	7
YS16/700	16	700	109-136	52-64.5	81-136	38.5-64.5	7
YS16/1000	16	1000	173-199	82-94.5	144-199	68.5-94.5	7
YS26/200	26	200	10-73	2-14.5	0-73	0-14.5	7
YS26/400	26	400	111-174	22-34.5	43-174	8.5-34.5	7
YS26/700	26	700	263-326	52-64.5	195-326	38.5-64.5	7
YS26/1000	26	1000	415-479	82-94.5	347-479	68.5-94.5	7
YS50/200	50	200	19-275	1-14	0-275	0-14	5
YS50/400	50	400	215-471	11-24	0-471	0-24	5
YS50/600	50	600	804-1060	41-54	549-1060	28-54	5
YS50/1000	50	1000	1589-1845	81-94	1334-1845	68-94	5

BSXK Double-layer Glass Column

BSXK glass columns are made of borosilicate glass. They allow visual inspection of media bed and exhibit excellent chemical resistance. Column packing can be performed using either a packing reservoir or extra column tube attached with a packing connector. QuickLock of the adapter shaft facilitates rapid and easy movement of the adapter, simplifying adjustments of the bed height and cleaning. Adapter plunger gives a uniform flow which maintains the integrity of the packed bed during operations.

Working Temperature	4-40℃
pH Range	1-14
Chemical Stability	Tolerant to salt, acid, alkali, and a small number of organic solvents alcohols, ketones, phenols.
Column Material	Borosilicate glass
Column Head Material	PTFE
Thread-end Material	PEEK
Seal Ring Material	PTFE/EPDM
Tubing Material	1/16&1/8
Connector Material	PEEK 1/16&1/8
Max. Pressure	5 bar

No.	Internal Diameter (mm)	Length (mm)	One-side Adjustable Type		Double-side Adjustable Type	
			Volume (mL)	Bed Height (cm)	Volume (mL)	Bed Height (cm)
BSXK10/100	10	100	4-7.5	0-9	0-7	0-8
BSXK10/150	10	150	7.5-12	9-12	4.7-12	5-13
BSXK16/200	16	200	4-30	2-14.5	0-30	0-14.5
BSXK16/400	16	400	46-72	22-34.5	17-72	8.5-34.5
BSXK16/700	16	700	109-136	52-64.5	81-136	38.5-64.5
BSXK16/1000	16	1000	173-199	82-94.5	144-199	68.5-94.5
BSXK26/200	26	200	10-73	2-14.5	0-73	0-14.5
BSXK26/400	26	400	111-174	22-34.5	43-174	8.5-34.5
BSXK26/700	26	700	263-326	54-64.5	195-326	38.5-64.5
BSXK26/1000	26	1000	415-479	82-94.5	347-479	68.5-94.5
BSXK50/200	50	200	19-275	1-14	0-275	0-14
BSXK50/300	50	300	215-471	11-24	0-471	0-24
BSXK50/600	50	600	804-1060	41-54	549-1060	28-54
BSXK50/1000	50	1000	1589-1849	81-94	1334-845	68-94

Single-layer Fixed Glass Column

HT series chromatographic columns have unique flared cylinder design for more even fluid distribution. The columns are equipped with a unique nozzle instead of the sieve plate, which is especially suitable for solid sample loading and dry sample mixing. It effectively prevents the destruction of the column bed caused by high mobile phase line velocity. HT chromatographic column has a large volume of sample loading. It can be pumped to eliminate the blocking of the inlet valve interface caused by high concentration of samples.

HT series chromatography columns are suitable for reverse-phase, ion-exchange, gel-permeation and affinity chromatography. Compared with ordinary open glass columns purification time is shortened 2-10 times with higher purification efficiency and less solvent usage. The column tube is convenient to disassemble and wash, which saves time for the researchers.

No.	Inner diameter (mm)	Length (mm)	Max. Pressure (bar)	Silica Resin (40-60um) (g)	Sampling (g)	Flow Rate (mL/min)
HT10/110	10	110	40	Protective column, on-column injector.		
HT-15/310	15	310	40	45	0.45-4.5	5-20
HT-15/460	15	460	40	70	0.7-7.00	5-20
HT-15/920	15	920	40	140	1.4-14.00	5-20
HT26/100	26	100	40	Protective column, on-column injector.		
HT-26/310	26	310	40	130	1.30-13.00	20-70
HT-26/460	26	460	40	200	2.00-20.00	20-70
HT-26/920	26	920	40	400	4.00-40.00	20-70
HT-36/310	36	310	30	240	2.40-24.00	45-135
HT-36/460	36	460	30	350	3.50-35.00	45-135
HT-36/920	36	920	30	700	7.00-70.00	45-135
HT-49/100	49	100	20	Protective column, on-column injector.		
HT-49/310	49	310	20	450	4.50-45.00	80-200
HT-49/460	49	460	20	650	6.50-65.00	80-200
HT-49/920	49	920	20	1300	13.00-130.00	80-200
HT-70/310	70	310	10	880	8.80-88.00	170-250
HT-70/460	70	460	10	1300	13.00-130.00	170-250
HT-70/920	70	920	10	2600	26.00-260.00	170-250
HT-100/310	100	310	10	1900	19.00-190.00	200-250
HT-100/460	100	460	10	2750	27.50-275.00	170-250
HT-100/920	100	920	10	5500	55.00-550.00	200-250
HT-150/300	150	300	5	3180	36.50-365.00	500-800
HT-150/600	150	600	5	6360	55.00-550.00	500-800
HT-150/900	150	900	5	9540	110.00-1100.00	500-800

Economic HPLC column

- Inner diameter: 4.0mm, 4.6mm, 7.8mm, 10mm, 20mm, 21.2mm, 30mm, 50mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm, 250mm, 300mm, 500mm
- Material: 316 L stainless steel
- Original country: China

High-performance HPLC column

Inner diameter: 2.0mm, 3.0mm, 4.0mm, 4.6mm

- Length: 20mm, 30mm, 50mm, 100mm, 150mm, 250mm, 300mm
- Material: 316 L stainless steel
- Original country: USA

PEEK Columns

- Inner diameter: 2.1mm, 3.0mm, 4.0mm, 4.6mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm
- Material: PEEK
- Original country: USA

- Inner diameter: 2.1mm, 4.0mm, 4.6mm
- Length: 25mm, 30mm, 50mm, 100mm, 150mm
- Material: PEEK
- Original country: China

Guard Columns

For Analysis Column

4.6-10mm

For Preparative Column

10-30mm

20-30mm

50-30mm

In-filter for HPLC column

Type:

20mm

30mm

50mm

Mini, Micro & Nano Filters (Made-in-USA)

In-line Holder Configuration (Made-in-USA)

Mini Guard Columns (Made-in-USA)

Back Pressure Regulator (Made-in-USA)

UPLC Column Accessories (Made-in-USA)

1	1/16" Stainless steel tubing	8	EXP® 10-32 Nuts & Titanium Hybrid Ferrule
2	1/32" PEEK PEEKsil® tubing	9	EXP®2 Stem Filter / Trap
3	EXP®2 TI-LOK™ Adapters with Interal PEEK Sleeves	10	EXP®2 Pre-column Filter
4	EXP®2 TI-LOK™ 10-32 Fitting	11	EXP®2 In-line Filter / Nano Trap
5	EXP®2 TI-LOK™ 6-64 Fitting	12	EXP® Direct-connect Trap / Guard
6	EXP®2 Driver	13	EXP® In-line Trap
7	EXP®2 TI-LOK™ AIO 10-32 Fitting	14	EXP® Analysis Column