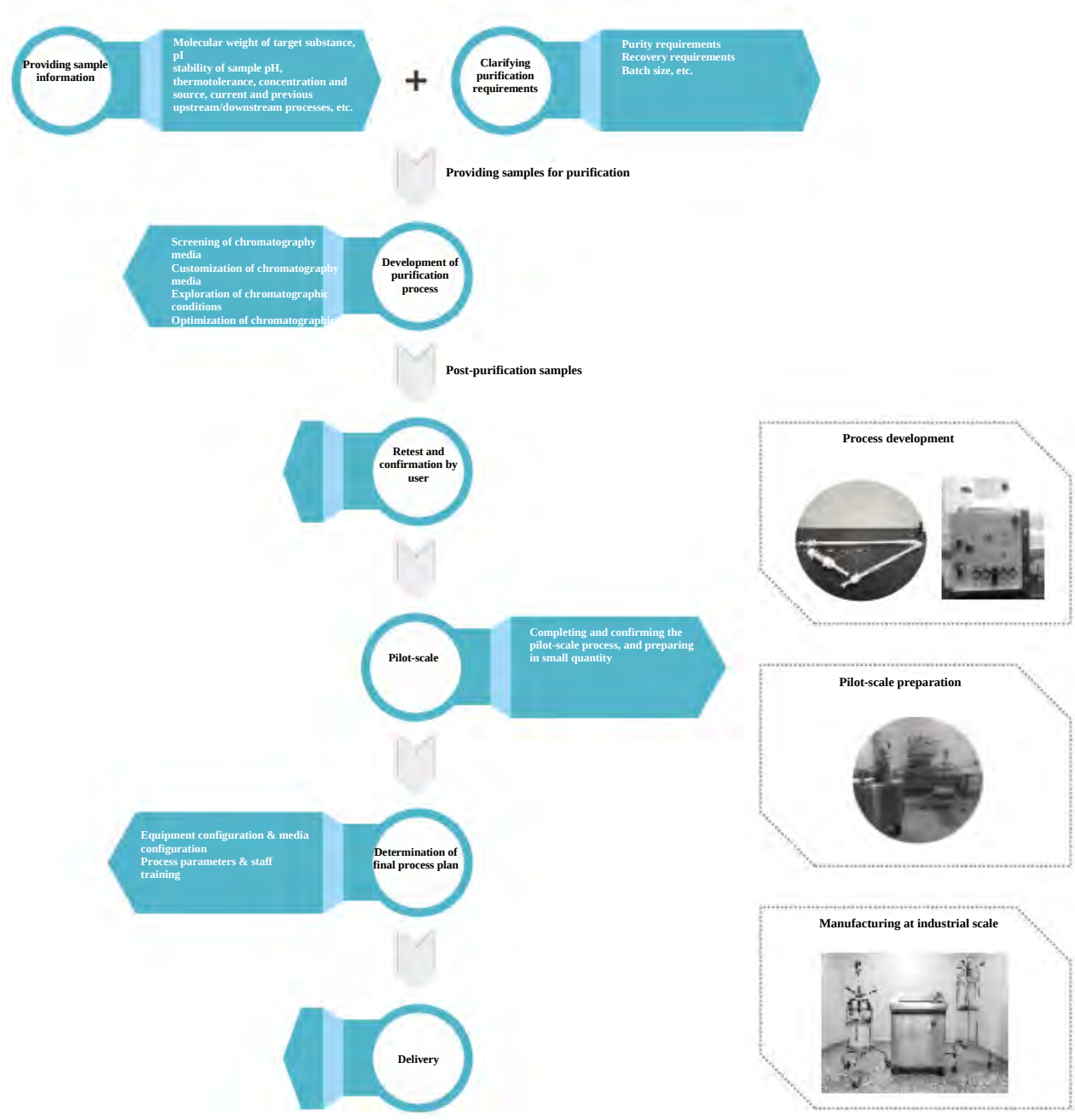
Chromatography Media

Integrated solution for separation and purification of biological products

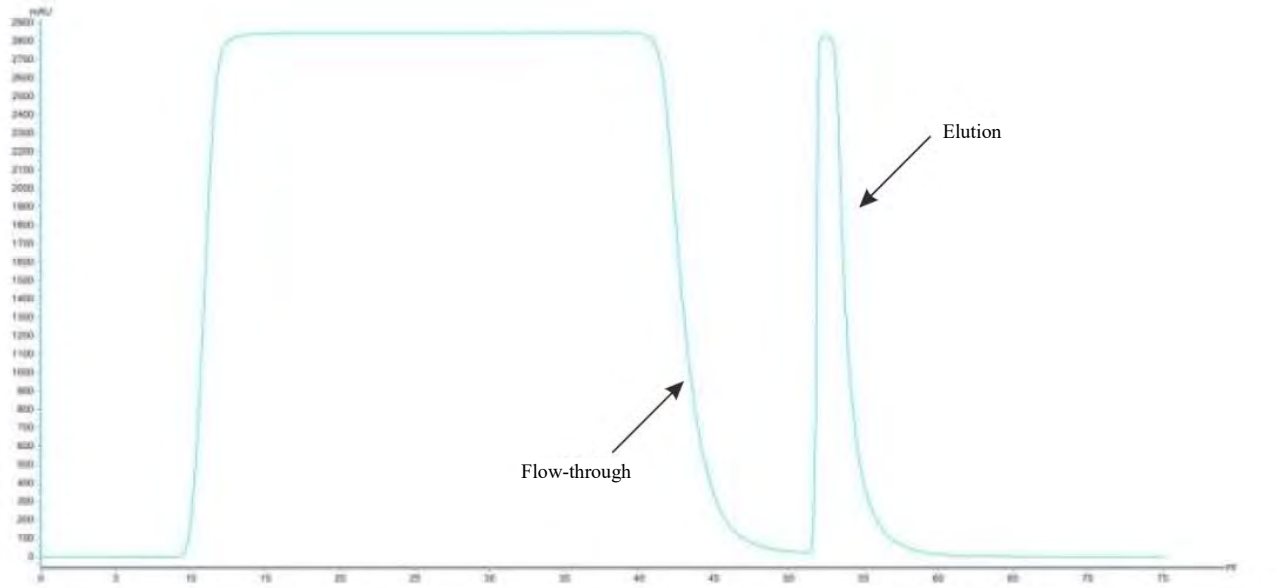
Integrated solution for separation and purification of biological products

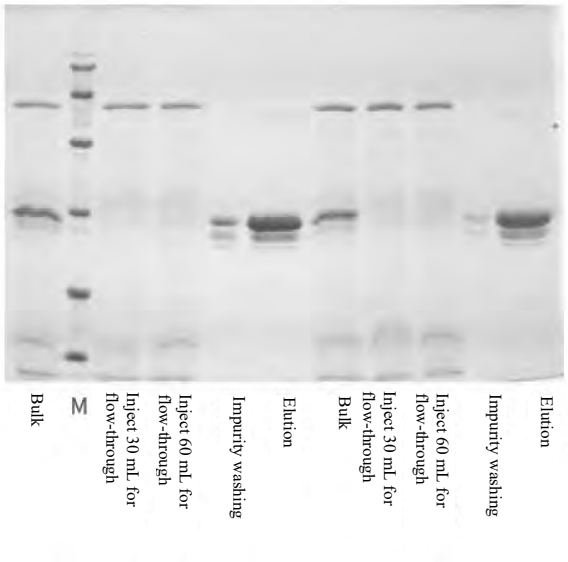
Vdo Biotech has provided multiple clients with comprehensive integrated purification solutions for biological products, covering the screening & customization of media for separation and purification, model selection and configuration of chromatography equipment and chromatographic columns, purification process scale-up from laboratory scale to manufacturing line, operator training and technical guide, so as to provide our clients with products and services at high quality.

Workflow of the integrated solution for separation and purification of biological products



★ This solution is applicable to numerous biological products including vaccines, antibodies, recombinant proteins and other biomacromolecules.





Purification of circovirus vaccine with SP Focurose HPR

Sample: 30 mL (circovirus vaccine bulk)	Column: HT01, 1 mL
Equilibration buffer: 0.05M NaAc, pH 5.0	Elution buffer: 0.02M PB05M NaCl, pH 8.0
Flow rate*: 1 mL/min	

*Linear flow rate (cm/h) = Flow rate (mL/min) × 60/Square of column radius (cm) × Circumference (n)

Guide on selection of biomacromolecule chromatography media

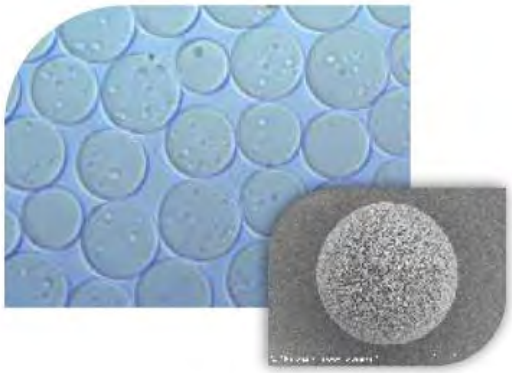
Guide on selection of biomacromolecule chromatography media

Guidance on purification of biomacromolecules

1. Evaluation methods should be established before purification, so as to determine the concentration, activity, yield and major impurities of target protein rapidly and effectively.
2. The goals of purification process should be clarified, and the requirements for purity, specific activity, yield, and batch size for the final target protein should be determined.
3. The physicochemical characterization of target protein should be completed, and the most significant differences between the target protein and impurities in terms of physicochemical properties should be identified during preliminary experiments and media screening.
4. The purity and yield of the target protein should be properly balanced for rational design of purification procedures and test methods.
5. Additives frequently used in the preparation process of protein and their effects on the activity of the target protein should be studied for rational use.

Strategy for purification of biomacromolecules

1. Preliminary purification: For fast removal of numerous impurities and substances having impact on the stability of target protein, capturing and concentrating the target protein to reduce sample volume; purification methods featuring high throughput and capacity are usually selected for this stage, such as salting-out and chromatography media with high flow rate and high capacity.
2. Intermediate purification: For removal of the majority of impurities and further concentration and purification of samples; purification methods featuring high-capacity and high-resolution are usually selected for this stage, such as chromatography media with high flow rate and high resolution.
3. Fine purification: For removal of minor amount of impurity residue and realization of the expected purification goals; due to the higher sample value, purification methods with high recovery and high resolution are generally selected for this stage, such as chromatography media with high recovery and high resolution.



Guide on selection of biomacromolecule purification media

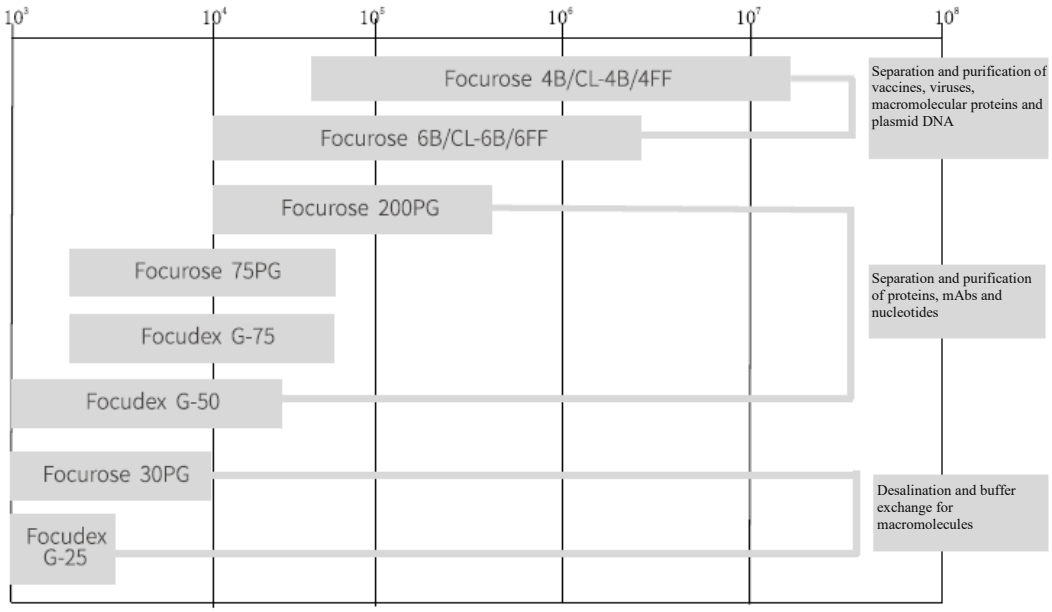
01	Tagged recombinant proteins	Ni Focurose FF IDA/IMAC/TED,GST Focurose 4FF
02	Chromatographic refolding of inclusion body proteins	Ni Focurose FF IMAC,Phenyl/Butyl-S/Butyl/Octyl Focurose FF/4FF, DEAE/Q/SP/CM/ANX Focurose FF/XL/HF,Focurose 30PG
03	Natural proteins	Benzamidine Focurose FF/4FF,Phenyl/Butyl-S/Butyl/Octyl Focurose FF,DEAE/ Q/SP/CM/ANX Focurose FF/XL/HF,MMC/MMA Focurose HF/HPR,Focurose 75PG
04	Vaccines and viruses	PS Focurose HPL,Focurose 6FF/4FF,MMC/MMA Focurose HF/HPR,Phenyl/Butyl-S/ Butyl/Octyl FF/4FF,DEAE/Q/SP/CM/ANX Focurose XL/HF/HPR,Focore 700
05	Salting out samples of ammonium sulfate	Phenyl/Butyl-S/Butyl/Octyl Focurose FF/4FF
06	Desalination of macromolecules	Focurose 30PG,Focurose 75PG,Focurose 200PG
07	Antibody purification	arProtein A Focurose HR, Protein G Focurose 4FF,IgM/IgY Focurose HP, Focurose 200PG,MMC/MMA Focurose HF/HPR
08	Antibody-compound conjugates	CNBr/NHS/Epoxy/ECH/EAH Focurose 4FF

Gel filtration chromatography media

Gel filtration chromatography media

Guide on selection of gel filtration media

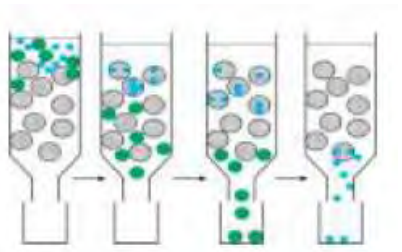
Fractionation range (globulin Da) of gel filtration media products of Vdo Biotech



Fractionation process of gel filtration chromatography

Selection of gel filtration media	Column packing	Injection	Separation
* Suitable media are selected according to sample properties and fractionation range of gel filtration media.	* The column bed height is controlled within the range of 30 cm - 60cm * The ratio of column diameter to media height shall be between 1:15 and 1:60 * The media should be uniform and of appropriate density.	* The injection flow rate should be slow and not too fast * The injection volume may affect the separation result * For group separation (e.g., desalination), the injection volume can be 30%; for separation of components, the injection volume should be controlled at below 10%, preferably within 5%.	* Once the sample flows into the column bed, substances with molecule size greater than the media's size exclusion upper limit will be eluted first. * Substances with molecule size within the media's size exclusion range will be eluted in descending

Application strategy of gel filtration chromatography media



★ Gel filtration chromatography is usually used for the subsequent fine purification stage where the impurity content is low.

★ Gel filtration chromatography can be used for purification of samples with small volumes.

★ It can also be used at preliminary purification stage for group separation (e.g., desalination).

★ Separation by gel filtration chromatography requires only one buffer, and the type of buffer has almost no effect on the separation results. The non-specific adsorption of target protein can be effectively reduced by adding 150M sodium chloride into the buffer.

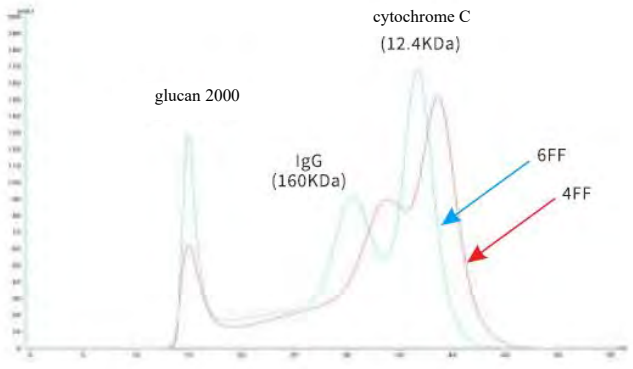
During gel filtration chromatography, target molecules are eluted in descending order of their size and thereby separated. Gel filtration chromatography is also known as size exclusion chromatography, or sieve chromatography. The gel filtration chromatography media are inert spherical particles of porous meshy structure.

Sepharose gel filtration media

Sepharose gel filtration media are available in two porosity specifications (4% and 6%), known as Focurose 4B and Focurose 6B, respectively. Cross-linked (CL) sepharose gel products Focurose CL-4B and Focurose CL-6B are manufactured on the basis of low-degree cross-linking of sepharose gel, and have better physical and chemical stability. High flow rate (FF) sepharose gel products Focurose 4FF and Focurose 6FF are manufactured on the basis of high-degree cross-linking of sepharose gel. The FF series sepharose gels can withstand moist heat sterilization and various working conditions during protein manufacturing due to good physical and chemical stability.

List of sepharose gel filtration media

Product name	Separation range (globulins)	Particle size range μm	Average particle size μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
Focurose 4B	6×10^4- 2×10^7	45-165	90	≤0.02	≥10	4 - 9 (long-term) 4 - 9 (short-term)	Determination of molecular weight of biomacromolecules such as proteins, polysaccharides, etc.; isolation of vaccines, viruses, etc.,
Focurose CL-4B				≤0.03	25	3 - 12 (long-term) 2 - 14 (short-term)	
Focurose 4FF				≤0.3	250~600	2 - 12 (long-term) 2 - 14 (short-term)	
Focurose 6B	1×10^4- 4×10^6	45-165	90	≤0.02	≥15	4 - 9 (long-term) 4 - 9 (short-term)	Determination of molecular weight of biomacromolecules such as proteins, polysaccharides, etc.; purification of plasmid DNA, viruses and vaccines
Focurose CL-6B				≤0.05	≥30	3 - 12 (long-term) 2 - 14 (short-term)	
Focurose 6FF				≤0.3	300~700	2 - 12 (long-term) 2 - 14 (short-term)	
Focurose 30PG	≤1×10^4	25-45	35	≤0.3	≥150	3 - 12 (long-term) 1 - 14 (short-term)	Desalination of biomolecules; separation of polypeptides
Focurose 75PG	3×10^3- 7×10^4			≤0.3	≥150	3 - 12 (long-term) 1 - 14 (short-term)	Separation and purification of polypeptides and low molecular proteins
Focurose 200 PG	1×10^4- 6×10^5			≤0.3	≥150	3 - 12 (long-term) 1 - 14 (short-term)	Separation and purification of mAbs and proteins



Separation of substances of different molecular weights with Focurose 4FF/6FF

Volume and sample injected: 5% CV (5 mg/mL glucan 2000, 10 mg/mL IgG, and 10 mg/mL cytochrome C)
Column: HK16/40; Media height: 37 cm
Buffer: 20 mM PB, 150 mM NaCl, pH 7.4
Flow rate: 10 cm/h

Precautions for use of sepharose gel filtration chromatography media

- ★ The diameter-to-height ratio should be in the range of 1:15 ~ 1:60 during column media; the back-pressure will increase if the media height is excessively high.
- ★ The injection volume during the chromatography should be < 10% of the column bed volume, and preferably controlled within 5%.
- ★ The presence of solid in chromatography samples should be avoided.
- ★ For gel filtration chromatography, the viscosity of the samples should be reduced as far as possible.
- ★ During gel filtration chromatography, the substances to be separated should have a molecular weight ratio of > 2.

Sepharose gel filtration media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Focurose 4B	25mL	HN030301025M	Focurose CL-4B	25mL	HN030302025M	Focurose 4FF	25mL	HN030303025M
	100mL	HN030301100M		100mL	HN030302100M		100mL	HN030303100M
	500mL	HN030301500M		500mL	HN030302500M		500mL	HN030303500M
	1L	HN030301001L		1L	HN030302001L		1L	HN030303001L
	5L	HN030301005L		5L	HN030302005L		5L	HN030303005L
	20 L	HN030301020L		20L	HN030302020L		20L	HN030303020L
Focurose 6B	25mL	HN060305025M	Focurose CL-6B	25mL	HN060306025M	Focurose 6FF	25mL	HN060307025M
	100mL	HN060305100M		100mL	HN060306100M		100mL	HN060307100M
	500mL	HN060305500M		500mL	HN060306500M		500mL	HN060307500M
	1L	HN060305001L		1L	HN060306001L		1L	HN060307001L
	5L	HN060305005L		5L	HN060306005L		5L	HN060307005L
	20L	HN060305020L		20L	HN060306020L		20L	HN060307020L
Focurose 30PG	25mL	HN120208025M	Focurose 75PG	25mL	HN120209025M	Focurose 200PG	25mL	HN120210025M
	100mL	HN120208100M		100mL	HN120209100M		100mL	HN120210100M
	500mL	HN120208500M		500mL	HN120209500 M		500mL	HN120210500M
	1L	HN120208001L		1L	HN120209001L		1L	HN120210001L
	5L	HN120208005L		5L	HN120209005 L		5L	HN120210005L
	20L	HN120208020L		20L	HN120209020 L		20L	HN120210020L

Pre-packed columns of sepharose gel filtration media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Focurose 4B	1mL	HN030301001E	Focurose CL-4B	1mL	HN030302001E	Focurose 4FF	1mL	HN030303001E
	5mL	HN030301005E		5mL	HN030302005E		5mL	HN030303005E
Focurose 6B	1mL	HN060305001E	Focurose CL-6B	1mL	HN060306001E	Focurose 6FF	1mL	HN060307001E
	5mL	HN060305005E		5mL	HN060306005E		5mL	HN060307005E
Focurose 30PG	1mL	HN120208001E	Focurose 75PG	1mL	HN120209001E	Focurose 200PG	1mL	HN120210001E
	5mL	HN120208005E		5mL	HN120209005E		5mL	HN120210005E

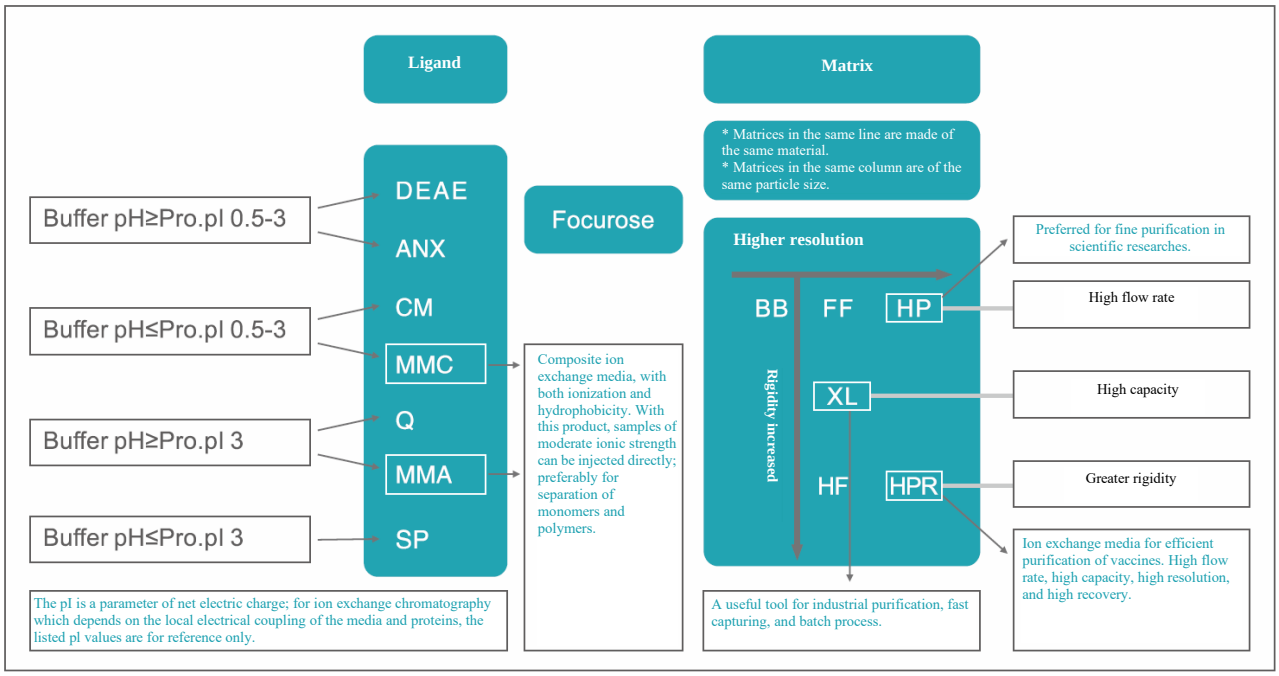
Ion exchange chromatography media

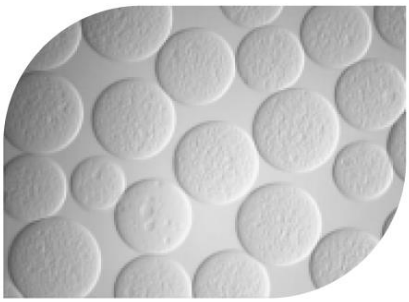
Ion exchange chromatography media

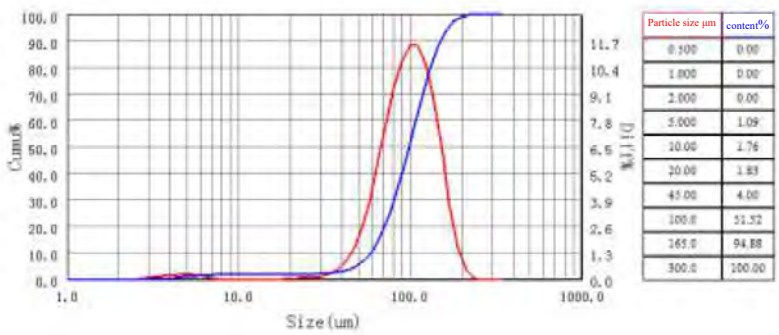
Guide on selection of ion exchange media

Vdo Biotech supplies 7 ligands (DEAE, CM, Q, SP, ANX, MMC, and MMA) and 7 matrices (Focurose BB, Focurose FF, Foeurose HP, Focurose XL, Focurose HF, Focurose HPR, and Focurose HPL); the ligands and matrices can be combined into more than 100 ion exchange media, so as to provide the downstream purification solutions for your bioprocesses precisely.

Guide on selection of ion exchange media (Vdo Biotech)







Particle size distribution of separation media (Vdo Biotech)

Principles for selection of ion exchange media

★ At preliminary capture stage, ion exchange media with high flow rate and high capacity should be selected, such as media of XL product series.

★ At intermediate purification stage, ion exchange media with high capacity and high resolution should be selected, such as media of FF/XL product series.

★ At fine purification stage, ion exchange media with high resolution and high recovery should be selected, such as media of HP/FF/HPR product series.

★ For samples of high viscosity, ion exchange media of large particle size should be selected, such as BB product series.

★ If a sample is unstable at low salt concentration or contains both polymers and monomers, media of MMC or MMA product series should be selected.

Sepharose-based ion exchange media with high flow rate

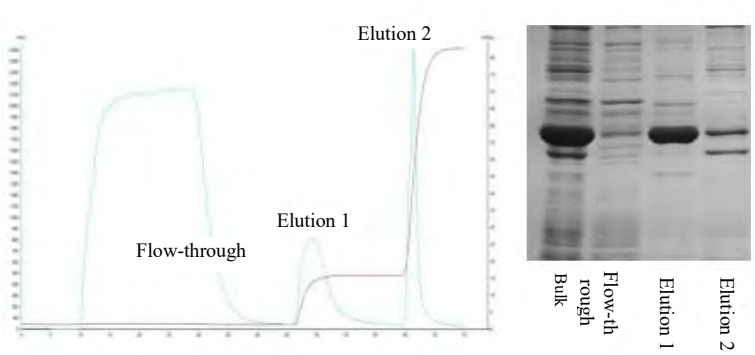
Ion exchange chromatography (IEC) is currently one of the most extensively used methods for protein separation and purification. Proteins of different isoelectric points and molecule sizes can be separated with IEC due to different distribution of electrical charge density in the same mobile phase, different electrical charge, different bonding strength to ion exchange media bearing opposite charges, and different retention time when diluted with mobile phase.

The sepharose-based ion exchange media with high flow rate is prepared by connecting 4% or 6% high-strength cross-linked sepharose beads to DEAE/CM/Q/SP/ANX ligand. They can be divided into high resolution (HP), ultra-high flow rate (BB), and fast flow rate (FF) series of media according to the particle size of their matrices.

List of sepharose-based ion exchange media with high flow rate

Product name	Ion capacity μmol/mL	Particle size range, μm	Flow rate (max.) cm/h	Pressure tolerance MPa	pH stability	Applications
SP Focurose BB	180-250 H^+	100-300	≥1000	≤0.3	3-14 (short-term) 4-13 (long-term)	Fast capture and purification of biomacromolecules bearing positive charge
SP Focurose FF	180-250 H^+	45-165	≥300			
SP Focurose HP	150-200 H^+	25-45	≥150			Fine purification of biomacromolecules bearing positive charge
CM Focurose BB	90-130 H^+	100-300	≥1000		2 - 14 (short-term) 4 - 13 (long-term)	Fast capture and purification of biomacromolecules bearing positive charge
CM Focurose FF	90-130 H^+	45-165	≥300			
CM Focurose HP	90-130 H^+	25-45	≥150			Fine purification of biomacromolecules bearing positive charge
Q Focurose BB	180-250 Cl^-	100-300	≥1000		2 - 14 (short-term) 2 - 12 (long-term)	Fast capture and purification of biomacromolecules bearing negative charge
Q Focurose FF	180-250 Cl^-	45-165	≥300			
Q Focurose HP	140-200 Cl^-	25-45	≥150			Fine purification of biomacromolecules bearing negative charge
DEAE Focurose BB	100-150 Cl^-	100-300	≥1000		1 - 14 (short-term) 2 - 13 (long-term)	Fast capture and purification of biomacromolecules bearing negative charge
DEAE Focurose FF	110-160 Cl^-	45-165	≥300			
DEAE Focurose HP	90-130 Cl^-	25-45	≥150			Fine purification of biomacromolecules bearing negative charge
ANX Focurose 4FF	130-180 Cl^-	45-165	≥250		2 - 14 (short-term) 3 - 10 (long-term)	Fast capture and purification of biomacromolecules bearing negative charge

Note: Focurose BB/FF/HP series are all high-strength cross-linked sepharose-based media, with particle sizes in descending order listed as: BB > FF > HP. The resolution and flow rate of media made of the same matrix and ligand are mainly depend on particle size, therefore, media of HP series are also referred to as "high-resolution media", and products of BB series as "ultra-high flow media".



Separation of recombinant proteins with DEAE Focurose FF

Sample: 20 mL (recombinant protein expressed by Escherichia coli)
Column: HT 01, 1.0 mL
Buffers: Buffer A (20mM PB, pH 7.5)
Buffer B (20 mM PB, 1.0M NaCl, pH 7.5)
Flow rate:0.6 mL/min during injection, and 1 mL/min at other times

Characteristics of sepharose-based ion exchange media with high flow rate

★ Fast, simple, and convenient.

★ Wide scope of application range, applicable to separation or fine purification of all electronically charged biomolecule components.

★ High capacity (relative to other types of chromatography media).

★ High flexibility for application in purification process; capable of improving sample purity by screening the purification process parameters in the early stage.

Sepharose-based ion exchange media with high flow rate - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose BB	25mL	HL060501025M	SP Focurose FF	25mL	HL060301025M	SP Focurose HP	25mL	HL060201025M
	100mL	HL060501100M		100mL	HL060301100M		100mL	HL060201100M
	500mL	HL060501500M		500mL	HL060301500M		500mL	HL060201500M
	1L	HL060501001L		1L	HL060301001L		1L	HL060201001L
	5L	HL060501005L		5L	HL060301005L		5L	HL060201005L
	20L	HL060501020L		20L	HL060301020L		20L	HL060201020L
CM Focurose BB	25mL	HL060503025M	CM Focurose FF	25mL	HL060303025M	CM Focurose HP	25mL	HL060203025M
	100mL	HL060503100M		100mL	HL060303100M		100mL	HL060203100M
	500mL	HL060503500M		500mL	HL060303500M		500mL	HL060203500M
	1L	HL060503001L		1L	HL060303001L		1L	HL060203001L
	5L	HL060503005L		5L	HL060303005L		5L	HL060203005L
	20L	HL060503020L		20L	HL060303020L		20L	HL060203020L
Q Focurose BB	25mL	HL060506025M	Q Focurose FF	25mL	HL060306025M	Q Focurose HP	25mL	HL060206025M
	100mL	HL060506100M		100mL	HL060306100M		100mL	HL060206100M
	500mL	HL060506500M		500mL	HL060306500M		500mL	HL060206500M
	1L	HL060506001L		1L	HL060306001L		1L	HL060206001L
	5L	HL060506005L		5L	HL060306005L		5L	HL060206005L
	20L	HL060506020L		20L	HL060306020L		20L	HL060206020L
DEAE Focurose BB	25mL	HL060507025M	DEAE Focurose FF	25mL	HL060307025M	DEAE Focurose HP	25mL	HL060207025M
	100mL	HL060507100M		100mL	HL060307100M		100mL	HL060207100M
	500mL	HL060507500M		500mL	HL060307500M		500mL	HL060207500M
	1L	HL060507001L		1L	HL060307001L		1L	HL060207001L
	5L	HL060507005L		5L	HL060307005L		5L	HL060207005L
	20L	HL060507020L		20L	HL060307020L		20L	HL060207020L
ANX Focurose 4FF	25mL	HL030308025M						
	100mL	HL030308100M						
	500mL	HL030308500M						
	1L	HL030308001L						
	5L	HL030308005L						
	20L	HL030308020L						

Pre-packed columns of sepharose-based ion exchange media with high flow rate - Ordering information

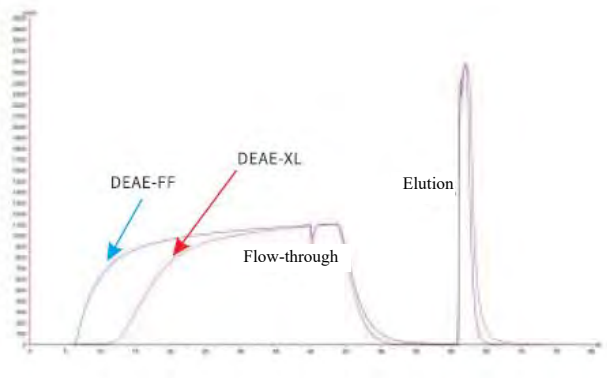
Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose BB	1mL	HL060501001E	CM Focurose BB	1mL	HL060503001E
	5mL	HL060501005E		5 mL	HL060503005E
SP Focurose FF	1mL	HL060301001E	CM Focurose FF	1mL	HL060303001E
	5mL	HL060301005E		5mL	HL060303005E
SP Focurose HP	1mL	HL060201001E	CM Focurose HP	1mL	HL060203001E
	5mL	HL060201005E		5mL	HL060203005E
Q Focurose BB	1mL	HL060506001E	DEAE Focurose BB	1mL	HL060507001E
	5mL	HL060506005E		5mL	HL060507005E
Q Focurose FF	1mL	HL060306001E	DEAE Focurose FF	1mL	HL060307001E
	5mL	HL060306005E		5 mL	HL060307005E
Q Focurose HP	1mL	HL060206001E	DEAE Focurose HP	1mL	HL060207001E
	5mL	HL060206005E		5 mL	HL060207005E
ANX Focurose 4FF	1mL	HL030308001E			
	5mL	HL030308005E			

Sepharose-based ion exchange media with ultra-high capacity

The Focurose XL series products are sepharose-based ion exchange media with ultra-high capacity, they are prepared by inserting linear glucan molecules into 6% high-strength sepharose, so as to reduce the steric hindrance when binding to proteins, and increase the density of ion exchange ligand DEAE/CM/Q/SP, thus further increase the binding capacity substantially.

List of sepharose-based ion exchange media with ultra-high capacity

Product name	Ion capacity, μmol/mL	Particle size range, μm	Flow rate (max.) cm/h	Pressure tolerance MPa	pH stability	Applications
SP Focurose XL	180-250 H^+	45-165	≥ 300	≤0.3	3 - 14 (short-term) 4 - 13 (long-term)	Downstream purification of biological samples; fast capture and purification of proteins, nucleic acids, polysaccharides, vaccines, and viruses Ultra-high capacity, particularly suitable for fast capture and purification in industrial manufacturing.
SP Focurose BB XL		100-300	≥ 1000			
CM Focurose XL	90-130 H^+	45-165	≥ 300		2 - 14 (short-term) 4 - 13 (long-term)	
CM Focurose BB XL		100-300	≥ 1000			
Q Focurose XL	180-250 Cl^-	45-165	≥ 300		2 - 14 (short-term) 2 - 12 (long-term)	
Q Focurose BB XL		100-300	≥ 1000			
DEAE Focurose XL	200-400 Cl^-	45-165	≥ 300		2 - 14 (short-term) 2 - 12 (long-term)	
4		100-300	≥ 1000			



A comparison of binding capacity: sepharose-based ion exchange media with high flow rate (DEAE Focurose FF) vs. sepharose-based ion exchange media with ultra-high capacity (DEAE Focurose XL)

Sample: 10 mg/mL BSA, injection 40 mL (saturated injection)
Column: HT 01, 1.0 mL
Equilibration buffer: 0.02M Tris-HCl, pH 8.5
Elution buffer: 0.02M Tris-HCl, 1.0M NaCl, pH 8.5
Flow rate: 1 mL/min

Characteristics of sepharose-based ion exchange media with ultra-high capacity

★ Ultra-high capacity allows capture of more target substance from samples, so as to achieve excellent cost-effectiveness.

★ High dynamic binding capacity at high flow rate.

★ Suitable for fast purification of all biomolecules (e.g., vaccines, viruses, proteins, and polysaccharides).

Sepharose-based ion exchange media with ultra-high capacity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose XL	25mL	HL120301025M	CM Focurose XL	25mL	HL120303025M	Q Focurose XL	25mL	HL120306025M
	100mL	HL120301100M		100mL	HL120303100M		100mL	HL120306100M
	500mL	HL120301500M		500mL	HL120303500M		500mL	HL120306500M
	1L	HL120301001L		1L	HL120303001L		1L	HL120306001L
	5L	HL120301005L		5L	HL120303005L		5L	HL120306005L
	20L	HL120301020L		20L	HL120303020L		20L	HL120306020L
DEAE Focurose XL	25mL	HL120307025M	SP Focurose BB XL	25mL	HL120501025M	CM Focurose BB XL	25mL	HL120503025M
	100mL	HL120307100M		100mL	HL120501100M		100mL	HL120503100M
	500mL	HL120307500M		500mL	HL120501500M		500mL	HL120503500M
	1L	HL120307001L		1L	HL120501001L		1L	HL120503001L
	5L	HL120307005L		5L	HL120501005L		5L	HL120503005L
	20L	HL120307020L		20L	HL120501020L		20L	HL120503020L
Q Focurose BB XL	25mL	HL120506025M	DEAE Focurose BB XL	25mL	HL120507025M			
	100mL	HL120506100M		100mL	HL120507100M			
	500mL	HL120506500M		500mL	HL120507500M			
	1L	HL120506001L		1L	HL120507001L			
	5L	HL120506005L		5L	HL120507005L			
	20L	HL120506020L		20L	HL120507020L			

Pre-packed columns of sepharose-based ion exchange media with ultra-high capacity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose XL	1mL	HL120301001E	CM Focurose XL	1mL	HL120303001E
	5mL	HL120301005E		5mL	HL120303005E
SP Focurose BB XL	1mL	HL120501001E	CM Focurose BB XL	1mL	HL120503001E
	5mL	HL120501005E		5mL	HL120503005E
Q Focurose XL	1mL	HL120306001E	DEAE Focurose XL	1mL	HL120307001E
	5mL	HL120306005E		5mL	HL120307005E
Q Focurose BB XL	1mL	HL120506001E	DEAE Focurose BB XL	1mL	HL120507001E
	5mL	HL120506005E		5mL	HL120507005E

Sepharose-based ion exchange media with high rigidity

The sepharose-based ion exchange media with high rigidity are prepared by the cross-linking of high-strength cross-linked sepharose with cellulose matrix, and subsequent conjugation with a variety of ligands. They have higher rigidity, faster mass transfer rate, and better tolerance when compared with sepharose-based ion exchange media with high flow rate, and the capacity is also improved by inserting of linear cellulose molecules into sepharose. The sepharose-based ion exchange media with high rigidity can be divided into media with high capacity and high flow rate (HF) and media with high capacity, high flow rate and high resolution (HPR), based on the particle size of matrix.

List of sepharose-based ion exchange media with high rigidity

Product name	Ion capacity μmol/mL	Particle size range μm	Flow rate (max.) cm/h	Pressure tolerance MPa	pH stability	Applications
SP Focurose HF	110-140 H^+	45-165	≥700	≤0.5	3 - 14 (short-term) 4 - 12 (long-term)	High flow rate and high capacity; capable of improving efficiency when used for large-scale manufacturing.
SP Focurose HR	120-160 H^+	25-45	≥150			Fast flow rate, high capacity, high resolution, and high recovery; applicable to efficient purification of vaccines, viruses, and proteins.
SP Focurose HPR	110-140 H^+	45-165	≥700			
CM Focurose HF	80-120 H^+	45-165	≥700		2 - 14 (short-term) 4 - 13 (long-term)	High flow rate and high capacity; capable of improving efficiency when used for large-scale manufacturing.
CM Focurose HR	90-130 H^+	45-165	≥700			Fast flow rate, high capacity, high resolution, and high recovery; applicable to efficient purification of vaccines, viruses, and proteins.
CM Focurose HPR	80-120 H^+	25-45	≥150			
Q Focurose HF	160-220 Cl^-	45-165	≥700		2 - 14 (short-term) 2 - 12 (long-term)	High flow rate and high capacity; capable of improving efficiency when used for large-scale manufacturing.
Q Focurose HR	150-180 Cl^-	45-165	≥700			Fast flow rate, high capacity, high resolution, and high recovery; applicable to efficient purification of vaccines, viruses, and proteins.
Q Focurose HPR	130-160 Cl^-	25-45	≥150			
DEAE Focurose HF	290-350 Cl^-	45-165	≥700		2 – 14 (short-term) 2 – 12 (long-term)	High flow rate and high capacity; capable of improving efficiency when used for large-scale manufacturing.
DEAE Focurose HR	110-160 Cl^-	45-165	≥700			Fast flow rate, high capacity, high resolution, and high recovery; applicable to efficient purification of vaccines, viruses, and proteins.
DEAE Focurose HPR	100-200 Cl^-	25-45	≥150			

Characteristics of sepharose-based ion exchange media with high rigidity

Cross-linked sepharose-cellulose matrices have good biocompatibility. When used for the purification of biomacromolecules such as vaccines, they can achieve high recovery, and can maintain the activity of the biomacromolecules. Their feature of high rigidity renders them with very high flow rate, which can effectively improve product quality and reduce cost during industrial manufacturing.

Sepharose-based ion exchange media with high rigidity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose HF	25mL	HL280301025M	SP Focurose HR	25mL	HL190201025M	SP Focurose HPR	25mL	HL190301025M
	100mL	HL280301100M		100mL	HL190201100M		100mL	HL190301100M
	500mL	HL280301500M		500mL	HL190201500M		500mL	HL190301500M
	1L	HL280301001L		1L	HL190201001L		1L	HL190301001L
	5L	HL280301005L		5L	HL190201005L		5L	HL190301005L
	20L	HL280301020L		20L	HL190201020L		20L	HL190301020L
CM Focurose HF	25mL	HL280303025M	CM Focurose HR	25mL	HL190203025M	CM Focurose HPR	25mL	HL190303025M
	100mL	HL280303100M		100mL	HL190203100M		100mL	HL190303100M
	500mL	HL280303500M		500mL	HL190203500M		500mL	HL190303500M
	1L	HL280303001L		1L	HL190203001L		1L	HL190303001L
	5L	HL280303005L		5L	HL190203005L		5L	HL190303005L
	20L	HL280303020L		20L	HL190203020L		20L	HL190303020L
Q Focurose HF	25mL	HL280306025M	Q Focurose HR	25mL	HL190206025M	Q Focurose HPR	25mL	HL190306025M
	100mL	HL280306100M		100mL	HL190206100M		100mL	HL190306100M
	500mL	HL280306500M		500mL	HL190206500M		500mL	HL190306500M
	1L	HL280306001L		1L	HL190206001L		1L	HL190306001L
	5L	HL280306005L		5L	HL190206005L		5L	HL190306005L
	20L	HL280306020L		20L	HL190206020L		20L	HL190306020L
DEAE Focurose HF	25mL	HL280307025M	DEAE Focurose HR	25mL	HL190207025M	DEAE Focurose HPR	25mL	HL190307025M
	100mL	HL280307100M		100mL	HL190207100M		100mL	HL190307100M
	500mL	HL280307500M		500mL	HL190207500M		500mL	HL190307500M
	1L	HL280307001L		1L	HL190207001L		1L	HL190307001L
	5L	HL280307005L		5L	HL190207005L		5L	HL190307005L
	20L	HL280307020L		20L	HL190207020L		20L	HL190307020L

Pre-packed columns of sepharose-based ion exchange media with high rigidity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose HF	1mL	HL280301001E	SP Focurose HR	1mL	HL190201001E	SP Focurose HPR	1mL	HL190301001E
	5mL	HL280301005E		5mL	HL190201005E		5mL	HL190301005E
CM Focurose HF	1mL	HL280303001E	CM Focurose HR	1mL	HL190203001E	CM Focurose HPR	1mL	HL190303001E
	5mL	HL280303005E		5mL	HL190203005E		5mL	HL190303005E
Q Focurose HF	1mL	HL280306001E	Q Focurose HR	1mL	HL190206001E	Q Focurose HPR	1mL	HL190306001E
	5mL	HL280306005E		5mL	HL190206005E		5mL	HL190306005E
DEAE Focurose HF	1mL	HL280307001E	DEAE Focurose HR	1mL	HL190207001E	DEAE Focurose HPR	1mL	HL190307001E
	5mL	HL280307005E		5mL	HL190207005E		5mL	HL190307005E

Sepharose-based ion exchange media with macroporous structure and high rigidity

The sepharose-based ion exchange media with macroporous structure and high rigidity are suitable for isolation and purification of biomacromolecules (e.g., PEG-proteins, viruses, etc.).

List of sepharose-based ion exchange media with macroporous structure and high rigidity

Product name	Ion capacity, μmol/mL	Particle size range, μm	Flow rate (max.) cm/h	Pressure tolerance MPa	pH stability	Applications
SP Focurose HPL	70-100 H^+	45-165	300	≤0.3	4 - 11 (long-term) 2 - 13 (short-term)	For the separation and purification of biomacromolecules (e.g., PEG-proteins, VLPs, viruses, etc.).
CM Focurose HPL	60-100 H^+	45-165	300		4 - 13 (long-term) 2 - 14 (short-term)	
Q Focurose HPL	70-100 Cl^-	45-165	300		3 - 10 (long-term) 1 - 12 (short-term)	
DEAE Focurose HPL	70-100 Cl^-	45-165	300		2 - 13 (long-term) 1 - 14 (short-term)	

Sepharose-based ion exchange media with macroporous structure and high rigidity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose HPL	25mL	HL220301025M	CM Focurose HPL	25mL	HL220303025M	Q Focurose HPL	25mL	HL220306025M
	100mL	HL220301100M		100mL	HL220303100M		100mL	HL220306100M
	500mL	HL220301500M		500mL	HL220303500M		500mL	HL220306500M
	1L	HL220301001L		1L	HL220303001L		1L	HL220306001L
	5L	HL220301005L		5L	HL220303005L		5L	HL220306005L
	20L	HL220301020L		20L	HL220303020L		20L	HL220306020L
DEAE Focurose HPL	25mL	HL220307025M						
	100mL	HL220307100M						
	500mL	HL220307500M						
	1L	HL220307001L						
	5L	HL220307005L						
	20L	HL220307020L						

Pre-packed columns of sepharose-based ion exchange media with macroporous structure and high rigidity - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
SP Focurose HPL	1mL	HL220301001E	CM Focurose HPL	1mL	HL220303001E
	5mL	HL220301005E		5mL	HL220303005E
Q Focurose HPL	1mL	HL220306001E	DEAE Focurose HPL	1mL	HL220307001E
	5mL	HL220306005E		5mL	HL220307005E

Multi-modal chromatography media

Multi-modal chromatography media

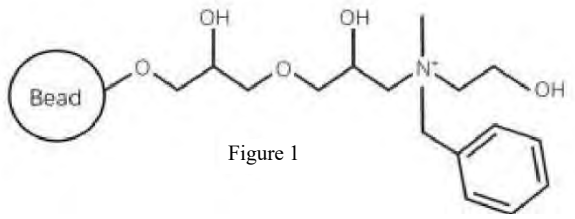


Figure 1

The MMA ligand is a multi-modal ligand having various types of interactions with target molecules; the interactions are mainly ion interaction (strong anion interactions), and, secondarily, hydrogen bonding and hydrophobic interactions. (Figure 1)

The MMC ligand is a multi-modal ligand having various types of interactions with target molecules; the interactions are mainly ion interaction, and, secondarily, hydrogen bonding and hydrophobic interactions. (Figure 2)

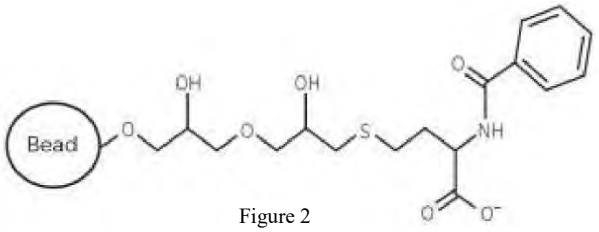


Figure 2

List of multi-modal chromatography media

Product name	Particle size range μm	Average particle size, μm	Flow rate (max.) cm/h	Pressure tolerance MPa	pH stability	Applications
MMA Focurose BB	100-300	200	1800	≤0.3	2 - 14 (short-term) 4 - 12 (long-term)	Mainly used for the intermediate purification and fine purification of mAbs (removing Protein A, dimers, polymers, host cell proteins and nucleic acids from post-purification samples of Protein A), or for the fine purification of other biomolecules (removing dimers, polymers, host cell proteins, nucleic acids, etc.).
MMA Focurose FF	45-165	90	≥300			
MMA Focurose HP	25-45	34	≥150			
MMA Focurose XL	45-165	90	600			
MMA Focurose BB XL	100-300	200	1800			
MMA Focurose HF	45-165	90	≥700	≤0.5		
MMA Focurose HR	45-165	75	≥700			
MMA Focurose HPR	25-45	34	≥150			
MMA Focurose HPL	45-165	90	300	≤0.3		
MMC Focurose BB	100-300	200	1800	≤0.3	2 - 14 (short-term) 4 - 12 (long-term)	A multi-modal salt-tolerant bioseparation media suitable for intermediate purification and fine purification of all electronically charged biomolecules, including proteins, polypeptides, nucleic acids, etc.
MMC Focurose FF	45-165	90	≥300			
MMC Focurose HP	25-45	34	≥150			
MMC Focurose XL	45-165	90	600			
MMC Focurose BB XL	100-300	200	1800			
MMC Focurose HF	45-165	90	≥700	≤0.5		
MMC Focurose HR	45-165	75	≥700			
MMC Focurose HPR	25-45	34	≥150			
MMC Focurose HPL	45-165	90	300	≤0.3		
Focore 700	45-165	90	≥300	≤0.5	2 - 14 (short-term) 4 - 12 (long-term)	Mainly used for separation and purification of viruses, virus-like particles, virus vectors, etc., under flow-through mode
Focore 400	45-165	90	≥300			

Characteristics of multi-modal chromatography media MMC/MMA Focurose HF/HPR

★ Wider scope of applications due to joint action of ion exchange and hydrophobicity.

★ More stable and longer service life due to high rigidity of matrix.

★ Removal of impurities including HCP and DNA in one step by virtue of antibody penetration at multiple sites.

Multi-modal chromatography media - Ordering information (MMA ligand series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
MMA Focurose BB	25mL	HL060509025M	MMA Focurose FF	25mL	HL060309025M	MMA Focurose HP	25mL	HL060209025M
	100mL	HL060509100M		100mL	HL060309100M		100mL	HL060209100M
	500mL	HL060509500M		500mL	HL060309500M		500mL	HL060209500M
	1L	HL060509001L		1L	HL060309001L		1L	HL060209001L
	5L	HL060509005L		5L	HL060309005L		5L	HL060209005L
	20 L	HL060509020L		20L	HL060309020L		20L	HL060209020L
MMA Focurose XL	25mL	HL120309025M	MMA Focurose BBXL	25mL	HL120509025M	MMA Focurose HF	25mL	HL280309025M
	100mL	HL120309100M		100mL	HL120509100M		100mL	HL280309100M
	500mL	HL120309500M		500mL	HL120509500M		500mL	HL280309500M
	1L	HL120309001L		1L	HL120509001L		1L	HL280309001L
	5L	HL120309005L		5L	HL120509005L		5L	HL280309005L
	20 L	HL120309020L		20L	HL120509020L		20L	HL280309020L
MMA Focurose HR	25mL	HL190209025M	MMA Focurose HPR	25mL	HL190309025M	MMA Focurose HPL	25mL	HL220309025M
	100mL	HL190209100M		100mL	HL190309100M		100mL	HL220309100M
	500mL	HL190209500M		500mL	HL190309500M		500mL	HL220309500M
	1L	HL190209001L		1L	HL190309001L		1L	HL220309001L
	5L	HL190209005L		5L	HL190309005L		5L	HL220309005L
	20L	HL190209020L		20L	HL190309020L		20L	HL220309020L

Pre-packed columns of multi-modal chromatography media - Ordering information (MMA ligand series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
MMA Focurose BB	1mL	HL060509001E	MMA Focurose FF	1mL	HL060309001E	MMA Focurose HP	1mL	HL060209001E
	5mL	HL060509005E		5mL	HL060309005E		5mL	HL060209005E
MMA Focurose XL	1mL	HL120309001E	MMA Focurose BB XL	1mL	HL120509001E	MMA Focurose HF	1mL	HL280309001E
	5mL	HL120309005E		5mL	HL120509005E		5mL	HL280309005E
MMA Focurose HR	1mL	HL190209001E	MMA Focurose HPR	1mL	HL190309001E	MMA Focurose HPL	1mL	HL220309001E
	5mL	HL190209005E		5mL	HL190309005E		5mL	HL220309005E

Multi-modal chromatography media - Ordering information (MMC ligand series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
MMC Focurose BB	25mL	HL060505025M	MMC Focurose FF	25mL	HL060305025M	MMC Focurose HP	25mL	HL060205025M
	100mL	HL060505100M		100mL	HL060305100M		100mL	HL060205100M
	500mL	HL060505500M		500mL	HL060305500M		500mL	HL060205500M
	1L	HL060505001L		1L	HL060305001L		1L	HL060205001L
	5L	HL060505005L		5L	HL060305005L		5L	HL060205005L
	20L	HL060505020L		20L	HL060305020L		20L	HL060205020L
MMC Focurose XL	25mL	HL120305025M	MMC Focurose BB XL	25mL	HL120505025M	MMC Focurose HF	25mL	HL280305025M
	100mL	HL120305100M		100mL	HL120505100M		100mL	HL280305100M
	500mL	HL120305500M		500mL	HL120505500M		500mL	HL280305500M
	1L	HL120305001L		1L	HL120505001L		1L	HL280305001L
	5L	HL120305005L		5L	HL120505005L		5L	HL280305005L
	20L	HL120305020L		20L	HL120505020L		20L	HL280305020L
MMC Focurose HR	25mL	HL190205025M	MMC Focurose HPR	25mL	HL190305025M	MMC Focurose HPL	25mL	HL220305025M
	100mL	HL190205100M		100mL	HL190305100M		100mL	HL220305100M
	500mL	HL190205500M		500mL	HL190305500M		500mL	HL220305500M
	1L	HL190205001L		1L	HL190305001L		1L	HL220305001L
	5L	HL1902051005L		5L	HL190305005L		5L	HL220305005L
	20L	HL1902055020L		20L	HL190305020L		20L	HL220305020L

Pre-packed columns of multi-modal chromatography media - Ordering information (MMC ligand series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
MMC Focurose BB	1mL	HL060505001E	MMC Focurose FF	1mL	HL060305001E	MMC Focurose HP	1mL	HL060205001E
	5mL	HL060505005E		5mL	HL060305005E		5mL	HL060205005E
MMC Focurose XL	1mL	HL120305001E	MMC Focurose BB XL	1mL	HL120505001E	MMC Focurose HF	1mL	HL280305001E
	5mL	HL120305005E		5mL	HL120505005E		5mL	HL280305005E
MMC Focurose HR	1mL	HL190205001E	MMC Focurose HPR	1mL	HL190305001E	MMC Focurose HPL	1mL	HL220305001E
	5mL	HL190205005E		5mL	HL190305005E		5mL	HL220305005E

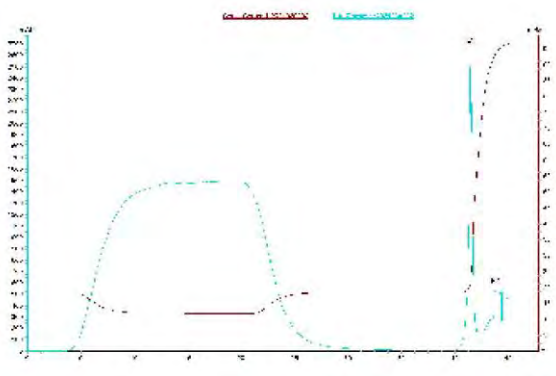
Media of Focore 700/400 series are prepared by linking octylamine functional groups to the internal karyosphere of high rigidity sepharose, and the karyosphere is enclosed in an inert shell; its size exclusion limit is 700 KDa/400 KDa. Under the condition of high electric conductivity, target substances with size exclusion greater than 700 KDa/400 KDa can flow through the gaps between the beads (micropheres) and can be purified by gel filtration; impurities with size exclusion smaller than 700 KDa/400 KDa will enter into the internal karyospheres of the beads, be linked to the octylamine functional groups inside the beads and adsorbed by ion exchange and multi-modal hydrophobic interactions. Thus, the sample can be purified after the removal of impurities including small molecule proteins.

Multi-modal chromatography media - Ordering information (Focore 700/400 series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Focore 700	25mL	HL270311025M	Focore 400	25mL	HL220311025M
	100mL	HL270311100M		100mL	HL220311100M
	500mL	HL270311500M		500mL	HL220311500M
	1L	HL270311001L		1L	HL220311001L
	5L	HL270311005L		5L	HL220311005L
	20L	HL270311020L		20L	HL220311020L

Pre-packed columns of multi-modal chromatography media - Ordering information (Focore 700/400 series)

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Focore 700	1mL	HL270311001E	Focore 400	1mL	HL220311001E
	5mL	HL270311005E		5mL	HL220311005E



Pre-packed column: Focore 700, 1 mL pre-packed column;
Equilibration buffer: 20 mM PB, 0.15M NaCl, pH 7.38;
Elution buffer: 30% isopropanol, 1M NaOH;
The prepared solutions should be filtered through 0.45 μm aqueous phase filter membrane.

Rabies virus samples should be filtered through 0.45 μm membrane before injection for purification by chromatography.
The injection flow rate is 0.33 mL/min during the purification process.

Equilibrium	Equilibration buffer 30 CV; 1.0 mL/min
Injection	15.8 mL, collect flow-through fluid-L: 23.31 mL; 0.33 mL/min
Wash with equilibration buffer	20CV； 0.33mL/min
Elution with 100%B, 10.2CV	Collect eluting peak E1:1.9 mL (Red); 0.5 mL/min

	OD595		MEAN	C (mg/mL)	V (ML)	M (mg)	Protein removal (%)
Bulk (Y)	0.5778	0.5826	0.5802	0.003333333	15.8	0.052666667	/
Flow-through fluid (L)	0.5862	0.5830	0.5846	0.010666667	23.31	0.24864	75.58
Eluting peak (E1)	0.5822	0.5946	0.5884	0.017	1.9	0.0323	96.83

Note: Protein removal rate = [1 - components of M/M (L + E1 + E2)] * 100%.

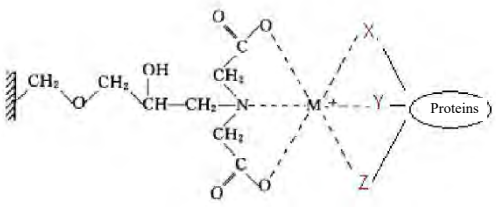
Name	OD450-1	OD450-2 (after correction with blank)	V (ML)	Viral recovery (%)
Blank	0.0629	0.0000	/	/
Bulk (Y)	/	/	15.8	/
Flow-through fluid (L - 128X)	0.1371	0.0742	23.31	108.92
Flow-through fluid (L - 64X)	0.2298	0.1669		127.58
Flow-through fluid (L - 32X)	0.3045	0.2416		123.46
Flow-through fluid (L - 16X)	0.4478	0.3849		122.20

Note: Viral recovery (%) = OD450 (L) / OD450 (Y) * 100%

Affinity chromatography media

Affinity chromatography media

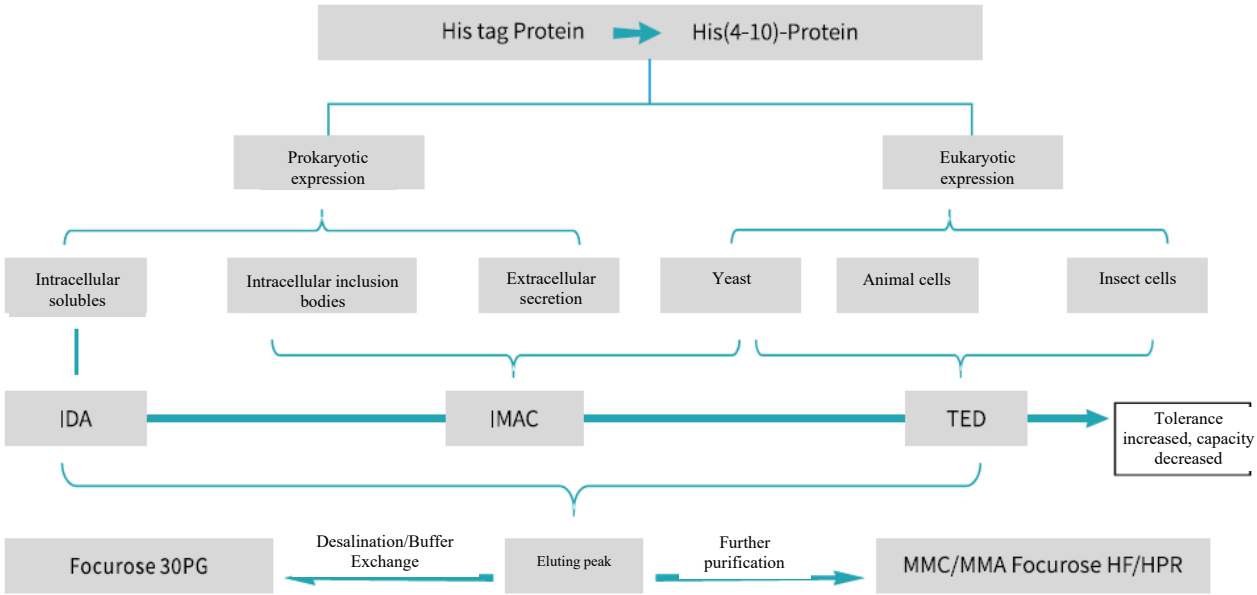
Affinity chromatography is established and developed on the basis of the specific adsorption between biomolecules and other ligand molecules (e.g., antigen and antibody, enzyme and substrate, hormone and receptor, complementary strands in nucleic acid, polysaccharide and protein complex, etc.). The target molecules can be purified via the specific adsorption between the media ligand and the target molecule. Due to the specificity of this adsorption, affinity chromatography is characterized by good selectivity and high activity recovery.



Affinity chromatography media are prepared by linking various affinity ligands to the cross-linked sepharose, and can be divided into several types based on the ligands.

Guide on selection of affinity media selection for purification of His-tag proteins

Transition metal ions ($Cu^{2+} > Ni^{2+} > Zn^{2+} > Co^{2+}$) can be linked to electron donors (e.g., N, S, O atoms, etc.) by coordination bonding; the remaining empty orbits in metal ions are coordination sites of the electron donors, and will be occupied by water molecules or anions in the solution; when the bonding force between the amino acid residues (His) on protein surface and the metal ions is strong, the donor atoms in the amino acid residues will displace the bonded water molecules or anions to form complexes with the metal ions. Thus, the protein molecules can be bound to the solid surface. For the bonding of His in the His-tag proteins to the media, the binding affinity with the specific metal ligands will be different because of the differences in the types, quantities, positions and spatial configurations of the amino acids on protein surface. Thus, the samples can be separated and purified by proper selection of metal ligands.



★The chelating ions (on the basis of His-binding capacity in descending order) are $Cu^{2+} > Ni^{2+} > Zn^{2+} > Co^{2+}$, among which, Cu^{2+} has the highest binding capacity, Ni^{2+} is the most frequently used ion, and Co^{2+} has high resolution in spite of weaker binding capacity.

His-tag purification affinity media

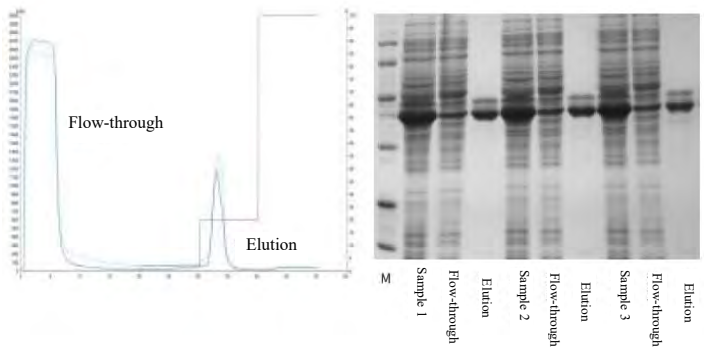
His-tag purification affinity media are prepared by chelating metal ions ($Cu^{2+} > Ni^{2+} > Zn^{2+} > Co^{2+}$) to high-strength cross-linked sepharose. They can be divided into IDA, IMAC, and TED according to the chelating mode.

Comparison on His-tag purification affinity media

Name	Ni-IDA	Ni-IMAC	Ni-TED
Chelated ratio	3 : 3	4 : 2	5 : 1
Reducing agent (mM)	Avoid use	1	20
Chelating agent (mM)	Avoid use	5	100
pH range	3 - 12 (working); 2 - 14 (washing)	3 - 12 (working); 2 - 14 (washing)	3 - 12 (working); 2 - 14 (washing)
Washing & regeneration	9-step (denickel - washing - regeneration)	9-step (denickel - washing - regeneration)	5-step (washing)
Scope of application	Conventional purification of His-tag proteins (active conditions)	Conventional purification of His-tag proteins (active conditions and denatured conditions)	Can be used for purification of His-tag protein samples containing potent reducing agents and chelating agents, as well as purification of eukaryotic secreted His-tag proteins (the purification result will be adversely affected for samples of low abundance and samples containing denaturing agents)

List of His-tag purification affinity media

Product name	Protein/chelating amount per 1 mL of media	Particle size range μm	Flow rate (max.) cm/h	Pressure tolerance Mpa	pH stability	Applications
Ni Focurose FF (IDA)	≥ 30 mg His-tag proteins	45-165	≥ 300	≤0.3	2 - 14 (short-term) 3 - 12 (long-term)	Purification of His-tag proteins
Ni Focurose HPL (IDA)	≥ 20 mg His-tag proteins	45-165	300			
IDA Focurose FF	≥ 30 μmol Cu^{2+}	45-165	≥ 300			Chelating of metal ions, and purification of His-tag proteins
Ni Focurose FF (IMAC)	≥ 40 mg His-tag proteins	45-165	≥ 300			Large-scale purification of His-tag proteins
Ni Focurose HP (IMAC)	≥ 40 mg His-tag proteins	25-45	≥ 150			
Ni Focurose HPL (IMAC)	≥ 25 mg His-tag proteins	45-165	300			
Ni Focurose FF (TED)	≥ 10 mg His-tag proteins	45-165	≥ 300			Can tolerate 100 mM EDTA and 10mM DTT, and can be thoroughly washed with 1M NaOH without denickel treatment. Purification of His-tag proteins containing EDTA and DTT.
IMAC Focurose FF	20 μmol Cu^{2+}	45-165	≥ 300			Chelating of metal ions, and purification of His-tag proteins
TED Focurose FF	≥ 10 mg His-tag proteins	45-165	≥ 300			



Purification of His-tag proteins with Ni Focurose FF(TED)

Sample 1 (Green): His-tag protein
Sample 2 (Orange): His-tag protein (containing 0.1M EDTA)
Sample 3 (Purple): His-tag protein (containing 0.1M EDTA + 0.01M DTT)
Column: HT 01, 1.0 mL
Equilibration buffer: 0.05M Tris-HCl,0.5M NaCl, pH 8.0
Elution buffer: 0.05M Tris-HCl, 0.5M imidazole, 0.5M NaCl, pH 8.0
Flow rate: 0.5 mL/min during injection, and 1 mL/min at other times

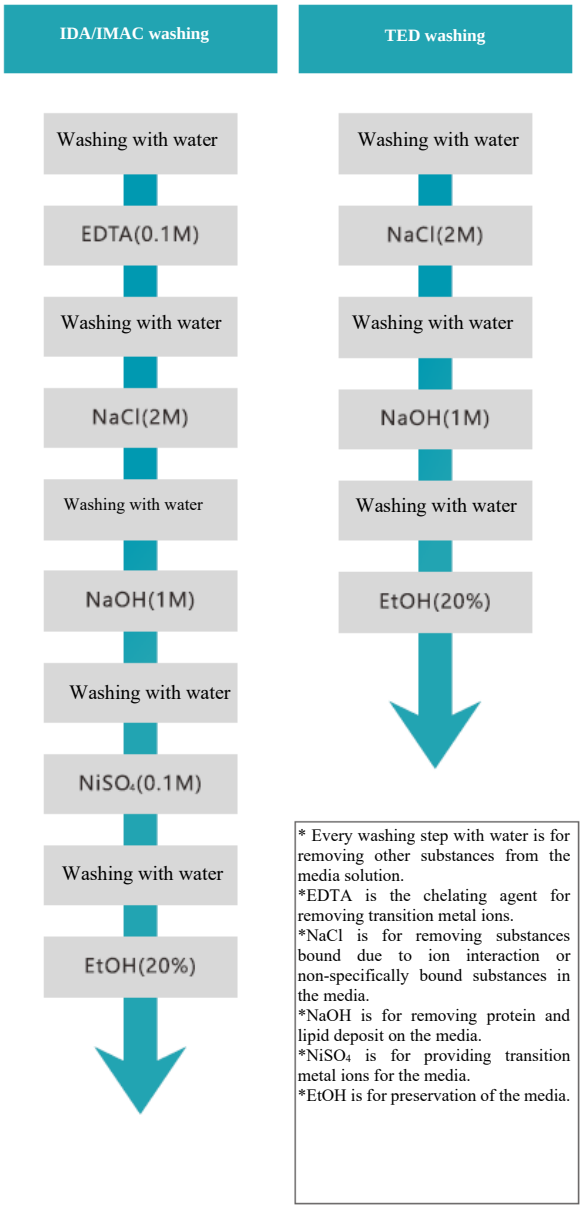
Affinity media for purification of His-tag protein - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Ni Focurose FF(IDA)	25mL	HQ060311025M	Ni Focurose HPL(IDA)	25mL	HQ2203110225M	IDA Focurose FF	25mL	HQ060308025M
	100mL	HQ060311100M		100mL	HQ2203111000M		100mL	HQ060308100M
	500mL	HQ060311500M		500mL	HQ2203115000M		500mL	HQ060308500M
	1L	HQ060311001L		1L	HQ2203110001L		1L	HQ060308001L
	5L	HQ060311005L		5L	HQ2203110005L		5L	HQ060308005L
	20L	HQ060311020L		20L	HQ2203110200L		20L	HQ060308020L
Ni Focurose FF(IMAC)	25mL	HQ060312025M	Ni Focurose HP (IMAC)	25mL	HQ0602120225M	Ni Focurose HPL(IMAC)	25mL	HQ220312025M
	100mL	HQ060312100M		100mL	HQ0602121000M		100mL	HQ220312100M
	500mL	HQ060312500M		500mL	HQ0602125000M		500mL	HQ220312500M
	1L	HQ060312001L		1L	HQ0602120001L		1L	HQ220312001L
	5L	HQ060312005L		5L	HQ0602120005L		5L	HQ220312005L
	20L	HQ060312020L		20L	HQ0602120200L		20L	HQ220312020L
Ni Focurose FF(TED)	25mL	HQ060313025M	IMAC Focurose FF	25mL	HQ0603090225M	TED Focurose FF	25mL	HQ060310025M
	100mL	HQ060313100M		100mL	HQ0603091000M		100mL	HQ060310100M
	500mL	HQ060313500M		500mL	HQ0603095000M		500mL	HQ060310500M
	1L	HQ060313001L		I1L	HQ0603090001L		1L	HQ060310001L
	5L	HQ060313005L		5L	HQ0603090005L		5L	HQ060310005L
	20L	HQ060313020L		20 L	HQ0603090200L		20L	HQ060310020L

Pre-packed columns of affinity media for purification of His-tag protein - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Ni Focurose FF(IDA)	1mL	HQ060311001E	Ni Focurose HPL(IDA)	1mL	HQ220311001E	IDA Focurose FF	1mL	HQ060308001E
	5mL	HQ060311005E		5mL	HQ220311005E		5mL	HQ060308005E
Ni Focurose FF(IMAC)	1mL	HQ060312001E	Ni Focurose HP (IMAC)	1mL	HQ060212001E	Ni Focurose HPL(IMAC)	1mL	HQ220312001E
	5mL	HQ060312005E		5mL	HQ060212005E		5mL	HQ220312005E
Ni Focurose FF(TED)	1mL	HQ060313001E	IMAC Focurose FF	1mL	HQ060309001E	TED Focurose FF	1mL	HQ060310001E
	5mL	HQ060313005E		5mL	HQ060309005E		5mL	HQ060310005E

Washing of His-tag purification affinity media



FAQ of His-tag purification affinity media

(1) The His-tag protein fails to bind to the media

Possible cause a: Incorrect ultrasonic power (protein carbonization if too high, and incomplete protein release if too low).
Solution: Change the ultrasonic power, or break the cells with other methods
Possible cause b: Unsuitable sample or buffer used
Solution: Make sure the concentrations of chelating agent, reducing agent, and imidazole in the buffer are not too high
Possible cause c: Incomplete His-tag exposure
Solution: Add denaturing agent (4 - 8M urea, 4 - 6M guanidine hydrochloride) into the buffer, then carry out purification with IMAC media
Possible cause d: His-tag missing
Solution: If necessary, the number of His can be increased to guarantee the correct expression, and the sample injection rate can be decreased to ensure the adequate incubation duration

(2) His-tag proteins bound to media are hard to be eluted

Possible cause a: Mild elution conditions
Solution: Increase the concentration of imidazole in the elution buffer, or lower the pH of the elution buffer
Possible cause b: Protein deposit on the media
Solution: Reduce the injection volume, and optimize chromatographic conditions
Possible cause c: Nonspecific binding
Solution: Add 2% Triton X-100 and NaCl into the buffer

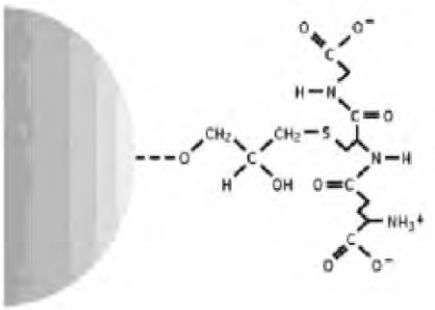
(3) Too many impurities eluting peaks

Possible causes: Nonspecific binding, incomplete washing, degradation, etc.
Solution: Add protein inhibitor during the purification to prevent degradation, wash thoroughly after completing injection, and add a certain amount of NaCl and imidazole to reduce nonspecific binding

(4) The media's binding efficiency is decreased after several times of use, leading to lower column efficiency

Possible causes: Excessive deposition of impurities on the media
Solution: wash the column thoroughly, and perform regeneration by denickel with IDA/IMAC

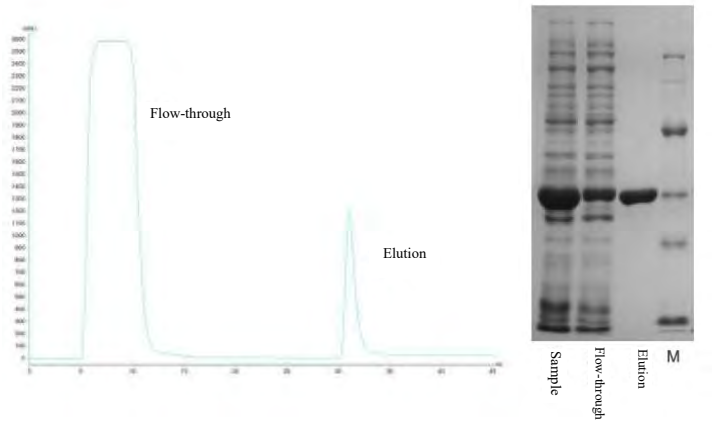
GST-tag purification affinity media



The GST (glutathione transferase) can specifically bind to glutathione due to action between the enzyme and the substrate, in light of which, GST-tag fusion protein is expressed for specific binding to the affinity media of the glutathion ligand, so as to achieve purification of the target protein. Purification by GST fusion protein is characterized by high purity, mild purification conditions, stable protein activity, and improved soluble expression of protein.

List of GST-tag purification affinity media

Product name	Functional capacity per 1 mL of media	Particle size range μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
GST Focurose 4FF	≥ 20 mg GST-tag proteins	45-165	≤0.3	≥250	3-12	Purification of GST-tag protein



Purification of GST-tag protein with GST Focurose 4FF

Sample: GST-tag protein
Column: HT01, 1.0 mL
Equilibration buffer: 0.05M Tris-HCl, 0.14M NaCl, pH 7.3
Elution buffer: 0.05M Tris-HCl, 0.01M GSH, pH '8.0
Flow rate: 0.5 mL/min during injection, and 1 mL/min at other times

GST-tag purification affinity media - Ordering information

Product name	Specification	Art. No.	Specification	Art. No.	Specification	Art. No.
GST Focurose 4FF	25mL	HQ030307025M	500mL	HQ030307500M	5L	HQ030307005L
	100mL	HQ030307100M	1L	HQ030307001L	20L	HQ030307020L

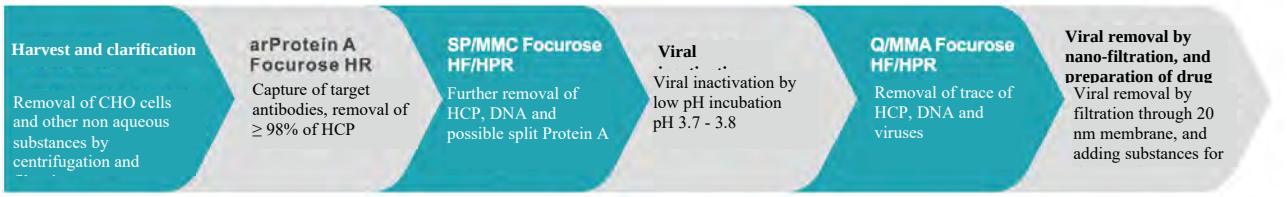
Pre-packed columns of GST-tag purification affinity media - Ordering information

Product name	Specification	Art. No.	Specification	Art. No.
GST Focurose 4FF	1mL	HQ030307001E	5mL	HQ030307005E

Affinity media for antibody purification

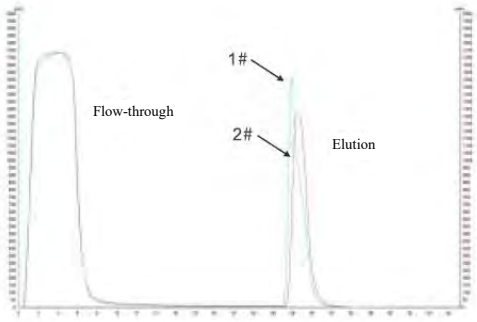
Such media are prepared by conjugating certain substances (such as Protein A, Protein G, etc.) to high-strength cross-linked sepharose, and are extensively used for purification of antibodies.

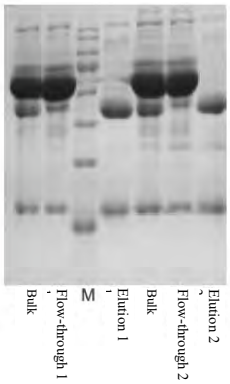
Antibody purification process



List of affinity media for antibody purification

Product name	Functional capacity, mg/mL	Particle size range μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
arProtein A Focurose HR	≥50 human IgG	45-165	≤0.5	≥700	2 - 10 (short-term) 3 - 9 (long-term)	Purification of antibodies, immunoglobulins and FC fusion proteins
Protein G Focurose 4FF	20 - 30 human IgG	45-165		≥250		
IgM Focurose HP	5 human IgM	25-45	≤0.3	≥150	2 - 13 (short-term) 3 - 11 (long-term)	Antibodies such as IgM, IgY, etc.
IgY Focurose HP	20 human IgY	25-45		≥150		





Purification of IgG in human serum with Protein G Focurose 4FF

Samples: 5 mL human serum diluted by a factor of 5 (with two different buffer types)
Column: HT01, 1.0 mL
Equilibration buffer: 1# (0.02M PB, pH 7.0)
2# (0.02M PB,0.3M NaCl, pH 7.0)
Elution buffer: 0.1M Glycine-HCl, pH 2.7
Flow rate: 0.25 mL/min during injection, and 1 mL/min at other times

Affinity media for antibody purification - Ordering information

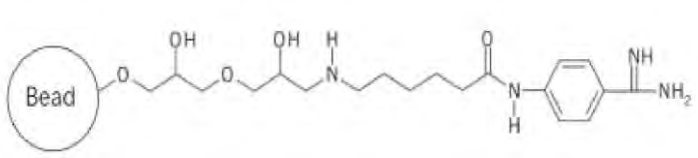
Product name	Specification	Art. No.	Product name	Specification	Art. No.
arProtein A Focurose HR	25mL	HQ170827025M	Protein G Focurose4FF	25mL	HQ030316025M
	100mL	HQ170827100M		100mL	HQ030316100M
	500mL	HQ170827500M		500mL	HQ030316500M
	1L	HQ170827001L		1L	HQ030316001L
	5L	HQ170827005L		5L	HQ030316005L
	20L	HQ170827020L		20L	HQ030316020L
IgM Focurose HP	25mL	HQ060218025M	IgY Focurose HP	25mL	HQ060219025M
	100mL	HQ060218100M		100mL	HQ060219100M
	500mL	HQ060218500M		500mL	HQ060219500M
	1L	HQ060218001L		1L	HQ060219001L
	5L	HQ060218005L		5L	HQ060219005L
	20L	HQ060218020L		20L	HQ060219020L

Pre-packed columns of affinity media for antibody purification - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
arProtein A Focurose HR	1mL	HQ170827001E	Protein G Focurose 4FF	1mL	HQ030316001E
	5mL	HQ170827005E		5mL	HQ030316005E
IgM Focurose HP	1m	HQ060218001E	IgY Focurose HP	1mL	HQ060219001E
	5mL	HQ060218005E		5mL	HQ060219005E

Serine protease purification affinity media

Affinity media Benzamidine Focurose FF (LS) and Benzamidine Focurose 4FF (HS) for purification of serine protease are prepared by conjugating p-anisidine, a broad-spectrum inhibitor of serine protease, to sepharose beads Focurose FF and high-strength cross-linked sepharose Focurose 4FF.



List of Serine protease purification affinity media

Product name	Functional capacity, mg/mL	Particle size range, μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
Benzamidine Focurose FF(LS)	10 ~ 20 mg trypsin	45-165	≤ 0.3	≥300	1 - 9 (short-term) 2 - 8 (long-term)	Separation and purification of trypsin, chymotrypsin, elastase, thrombin, chymotrypsin, urokinase, enterokinase, pancreatic kininogenase fibrinolysin, tissue plasminogen activator, serine proteinase of nerve origin, etc.
Benzamidine Focurose 4FF(HS)	≥ 30 mg trypsin	45-165		≥250		

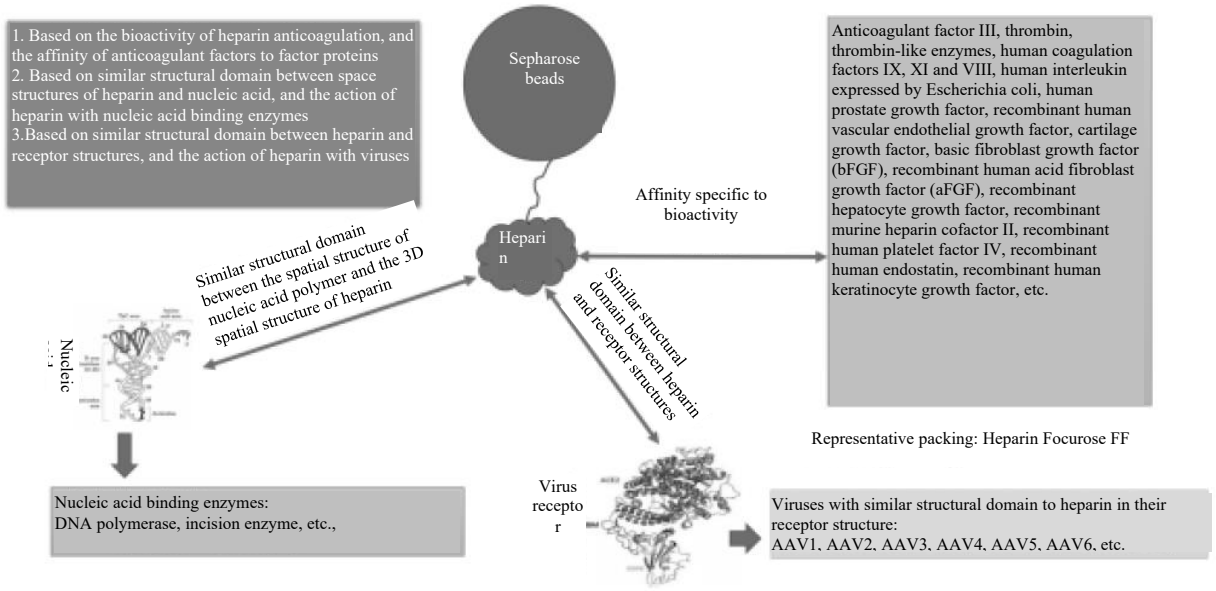
Serine protease purification affinity media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Benzamidine Focurose FF(LS)	25mL	HQ060317025M	Benzamidine Focurose 4FF(HS)	25mL	HQ030317025M
	100mL	HQ060317100M		100mL	HQ030317100M
	500mL	HQ060317500M		500mL	HQ030317500M
	1L	HQ060317001L		1L	HQ030317001L
	5L	HQ060317005L		5L	HQ030317005L
	20L	HQ060317020L		20L	HQ030317020L

Pre-packed columns of Serine protease purification affinity media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Benzamidine Focurose FF(LS)	1mL	HQ060317001E	Benzamidine Focurose 4FF(HS)	1mL	HQ030317001E
	5mL	HQ060317005E		5mL	HQ030317005E

Heparin affinity media



List of heparin affinity media

Product name	Ligand density, mg/mL media	Particle size range μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
Heparin Focurose FF	≥2	45-165	≤0.3	≥300	4 - 13 (short-term) 4 - 12 (long-term)	As shown above
Heparin Focurose HF	≥1.4	45-165	≤0.5	≥700		

Heparin affinity media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Heparin Focurose FF	25mL	HQ060321025M	Heparin Focurose HF	25mL	HQ190321025M
	100mL	HQ060321100M		100mL	HQ190321100M
	500mL	HQ060321500M		500mL	HQ190321500M
	1L	HQ060321001L		1L	HQ190321001L
	5L	HQ060321005L		5L	HQ190321005L
	20L	HQ060321020L		20L	HQ190321020L

Pre-packed columns of heparin affinity media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Heparin Focurose FF	1mL	HQ060321001E	Heparin Focurose HF	1mL	HQ190321001E
	5mL	HQ060321005E		5mL	HQ190321005E

Plasmid DNA purification affinity media

The principle of purification by Plasmid series media is the thiophilic adsorption of ligands, which is suitable for the separation and purification of closed-circle supercoil plasmid DNA.

List of Plasmid DNA purification affinity media

Product name	Capacity, mg/mL media	Particle size range μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
Plasmid Foeurose HPR	≥2mg(pDNA)	25-45	≤0.5	≥150	3 - 11 (short-term) 2 - 13 (long-term)	Separation and purification of pDNA
Plasmid Foeurose HF	2mg(pDNA)	45-165	≤0.5	≥700		

Plasmid DNA purification affinity media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
Plasmid Focurose HPR	25mL	HQ190220025M	Plasmid Focurose HF	25mL	HQ190320025M
	100mL	HQ190220100M		100mL	HQ190320100M
	500mL	HQ190220500M		500mL	HQ190320500M
	1L	HQ190220001L		1L	HQ190320001L
	5L	HQ190220005L		5L	HQ190320005L
	20L	HQ190220020L		20L	HQ190320020L

Pre-packed columns of Plasmid DNA purification affinity media - Ordering information

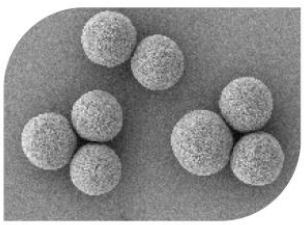
Product name	Specification	Art. No.	Product name	Specification	Art. No.
Plasmid Focurose HPR	1mL	HQ190220001E	Plasmid Focurose HF	1mL	HQ190320001E
	5mL	HQ190220005E		5mL	HQ190320005E

Viruses and viral/microbial antigen purification affinity media

The PS Focurose HPL products are affinity media with specificity, and are suitable for purification of certain viruses, virus-like particles and some specific antigens and protein by affinity chromatography.

Parameter list of Viruses and viral/microbial antigen purification affinity media

Product name	PS Focurose HPL
Matrix	High-rigidity sepharose
Particle size range	45-165 nm
Average particle size	75μm
Lysozyme capacity	≥ 3 mg/mL media
pH stability	5 - 12 (long-term) , 5 - 12 (short-term)
Operating pressure	≤0.3MPa
Flow rate	(16 mm × 300 mm, 0.1 MPa) ≥ 300 cm/h
Stock solution	20% ethanol
Storage temperature	4-30°C



Suitability of PS Focurose HPL

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

Viruses and viral/microbial antigen purification affinity media - Ordering information

Product name	Specification	Art. No.	Specification	Art. No.	Specification	Art. No.
PS Focurose HPL	25mL	HQ220325025M	500mL	HQ220325500M	5L	HQ220325005L
	100mL	HQ220325100M	1L	HQ220325001L	20L	HQ220325020L

Pre-packed columns of Viruses and viral/microbial antigen purification affinity media - Ordering information

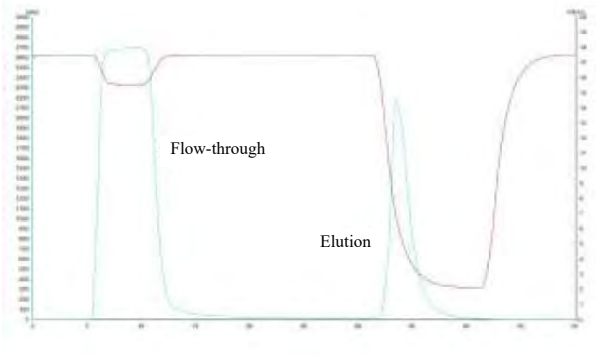
Product name	Specification	Art. No.	Specification	Art. No.
PS Focurose HPL	1mL	HQ220325001E	5mL	HQ220325005E

Pre-activated media

Pre-activated media, also known as activation intermediate of affinity media, are prepared by linking various active groups (active spacer arms) to sepharose of different cross-linking strength by a variety of conjugating methods. The active groups can be further conjugated to a variety of ligands to prepare other media (mainly affinity media) and fix corresponding substances. Users may, depending on their needs, conjugate the desired ligands with ease, thus eliminating the preliminary complicated procedures of connecting active groups.

List of pre-activated media

Product name	Amount of ligand/conjugate 1 mL media	Particle size range μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Conjugated functional group
CNBr Focurose 4FF	≥13mg Trypsinogen	45-165	≤0.3	≥250	3 - 11 (long-term) 2 - 11 (short-term)	$-NH_2$
NHS Focurose 4FF	16-23μmol NHS				3 - 13 (long-term) 2 - 13 (short-term)	
Epoxy Focurose 4FF	≥ 10 μmol Epoxy group				2 – 14 (long-term) 2 - 14 (short-term)	$-NH_2$, -OH, -SH
ECH Focurose 4FF	15 μmol Carboxyl group				3 – 14 (long-term) 3 – 14 (short-term)	$-NH_2$
EAH Focurose 4FF	10 - 20 μmol Amino				3 - 14 (long-term) 3 – 14 (short-term)	-COOH



Purification of recombinant Protein G with CNBr Focurose 4FF by conjugating human IgG

Sample: Recombinant Protein G expressed by Escherichia coli
Column: HT 01, 1.0 mL
Equilibration buffer: 0.02M PB, 0.15M NaCl, pH 7.4
Elution buffer: 0.05M citrate buffer, pH 3.0

Characteristics of pre-activated media

★ CNBr Focurose 4FF has wide scope of application; it can directly conjugate to a variety of biomacromolecules containing amino group at multiple sites without the need for conjugation spacer arms. The operation is simple, flexible, fast, and effective, and it is capable of maintaining the bioactivity and stability of biomolecules.

★ NHS Focurose4FF is susceptible to form amide linkage (of good chemical stability) with proteins

★ Epoxy Focurose4FF is used extensively and characterized by mild conjugation conditions and high conjugation efficiency.

Pre-activated media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
CNBr Focurose 4FF	25mL	HQ030301025M	NHS Focurose 4FF	25mL	HQ030302025M	Epoxy Focurose 4FF	25mL	HQ030303025M
	100mL	HQ030301100M		100mL	HQ030302100M		100mL	HQ030303100M
	500mL	HQ030301500M		500mL	HQ030302500M		500mL	HQ030303500M
	1L	HQ030301001L		1L	HQ030302001L		1L	HQ030303001L
	5L	HQ030301005L		5L	HQ030302005L		5L	HQ030303005L
	20 L	HQ030301020L		20L	HQ030302020L		20L	HQ030303020L
ECH Focurose 4FF	25mL	HQ030305025M	EAH Focurose 4FF	25mL	HQ030306025M			
	100mL	HQ030305100M		100mL	HQ030306100M			
	500mL	HQ030305500M		500mL	HQ030306500M			
	1L	HQ030305001L		1L	HQ030306001L			
	5L	HQ030305005L		5L	HQ030306005L			
	20 L	HQ030305020L		20L	HQ030306020L			

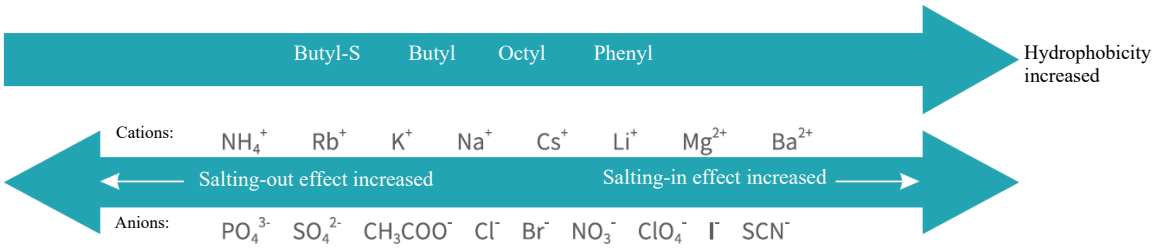
Pre-packed columns of pre-activated media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.
CNBr Focurose 4FF	1mL	HQ030301001E	NHS Focurose 4 FF	1mL	HQ030302001E
	5mL	HQ030301005E		5mL	HQ030302005E
Epoxy Focurose 4FF	1mL	HQ030303001E	ECH Focurose 4FF	1mL	HQ030305001E
	5mL	HQ030303005E		5mL	HQ030305005E
EAH Focurose 4FF	1mL	HQ030306001E			
	5mL	HQ030306005E			

Hydrophobic chromatography media

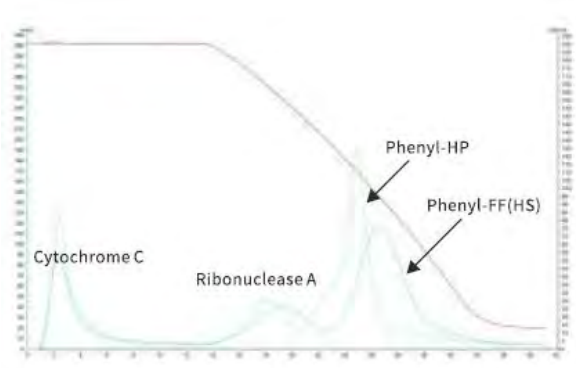
Hydrophobic chromatography media

During hydrophobic chromatography, proteins are separated based on the differences in hydrophobicity, i.e., the reversible interaction between proteins and the hydrophobic groups on the surface of hydrophobic media. The hydrophobicity can be increased at high ionic strength, therefore, proteins bound to the media in high ionic strength environment are generally eluted by reducing ionic strength. This unique adsorption-separation mode makes hydrophobic chromatography an ideal purification mode for samples after salting out with ammonium sulfate or after ion exchange and high-salt elution.



List of hydrophobic chromatography media

Product name	Ligand concentration	Particle size range, μm	Pressure tolerance MPa	Flow rate (max.) cm/h	pH stability	Applications
Phenyl Focurose FF (LS)	20	45-165	≤0.3	≥300	2 - 14 (short-term) 3 - 13 (long-term)	Separation and purification of proteins: it is suitable for purification of substances containing aromatic groups, and is preferred for purification of samples after salting-out.
Phenyl Focurose FF (HS)	40			≥ 300		
Phenyl Focurose HPL	20			300		
Phenyl Focurose HP	25	25-45		≥ 150		
Butyl-S Focurose FF	10	45-165		≥ 300	2 - 14 (short-term) 3 - 13 (long-term)	
Butyl Focurose 4FF	40			≥ 250	2 - 14 (short-term) 3 – 13 (long-term)	
Butyl Focurose 4B	12		≤0.08	12	4 - 8 (short-term) 4 - 8 (long-term)	
Butyl Focurose HPL	20		≤0.3	300	2 – 14 (short-term) 3 – 13 (long-term)	
Butyl Focurose HP	50	25-45		≥ 150		
Octyl Focurose 4FF	5	45-165		≥ 250	2 - 14 (short-term) 3 - 13 (long-term)	



Separation of different hydrophobic proteins with Phenyl Focurose FF(HS) and Phenyl Focurose HP

Sample: 4 mg/mL mixed protein (Cytochrome C: Ribonuclease A:Lysozyme = 1:2:1)
Column: HT 01, 1.0 mL
Equilibration buffer: 0.1M Na_2HPO_4, 1.7M $(NH_4)_2SO_4$, pH 7.0
Elution buffer: 0.1M Na_2HPO_4, pH 7.0
Flow rate: 1 mL/min

Precautions for use of hydrophobic chromatography media

- ★ The hydrophobic interaction with media varies with ligand type and concentration.
- ★ Therefore, the salt concentration in buffer also varies during hydrophobic chromatography for different proteins, or during purification with different hydrophobic chromatography media.
- ★ Temperature and pH have considerable effect on the hydrophobicity of proteins. Therefore, pH and temperature during hydrophobic chromatography should be maintained constant.

Hydrophobic chromatography media - Ordering information

Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Phenyl Focurose FF(LS)	25mL	HS060301025M	Phenyl Focurose FF(HS)	25mL	HS060302025M	Phenyl Focurose HPL	25mL	HS220302025M
	100mL	HS060301100M		100mL	HS060302100M		100mL	HS220302100M
	500mL	HS060301500M		500mL	HS060302500M		500mL	HS220302500M
	1L	HS060301001L		1L	HS060302001L		1L	HS220302001L
	5L	HS060301005L		5L	HS060302005L		5L	HS220302005L
	20L	HS060301020L		20L	HS060302020L		20L	HS220302020L
Phenyl Focurose HP	25mL	HS060202025M	Butyl-S Focurose FF	25mL	HS060307025M	Butyl Focurose 4FF	25mL	HS030306025M
	100mL	HS060202100M		100mL	HS060307100M		100mL	HS030306100M
	500mL	HS060202500M		500mL	HS060307500M		500mL	HS030306500M
	1L	HS060202001L		1L	HS060307001L		1L	HS030306001L
	5L	HS060202005L		5L	HS060307005L		5L	HS030306005L
	20L	HS060202020L		20L	HS060307020L		20L	HS030306020L
Butyl Focurose 4B	25mL	HS030305025M	Butyl Focurose HPL	25mL	HS220306025M	Butyl Focurose HP	25mL	HS060206025M
	100mL	HS030305100M		100mL	HS220306100M		100mL	HS060206100M
	500mL	HS030305500M		500mL	HS220306500M		500mL	HS060206500M
	1L	HS030305001L		1L	HS220306001L		1L	HS060206001L
	5L	HS030305005L		5L	HS220306005L		5L	HS060206005L
	20L	HS030305020L		20L	HS220306020L		20L	HS060206020L
Octyl Focurose 4FF	25mL	HS030303025M						
	100mL	HS030303100M						
	500mL	HS030303500M						
	1L	HS030303001L						
	5L	HS030303005L						
	20L	HS030303020L						

Pre-packed columns of hydrophobic chromatography media - Ordering information

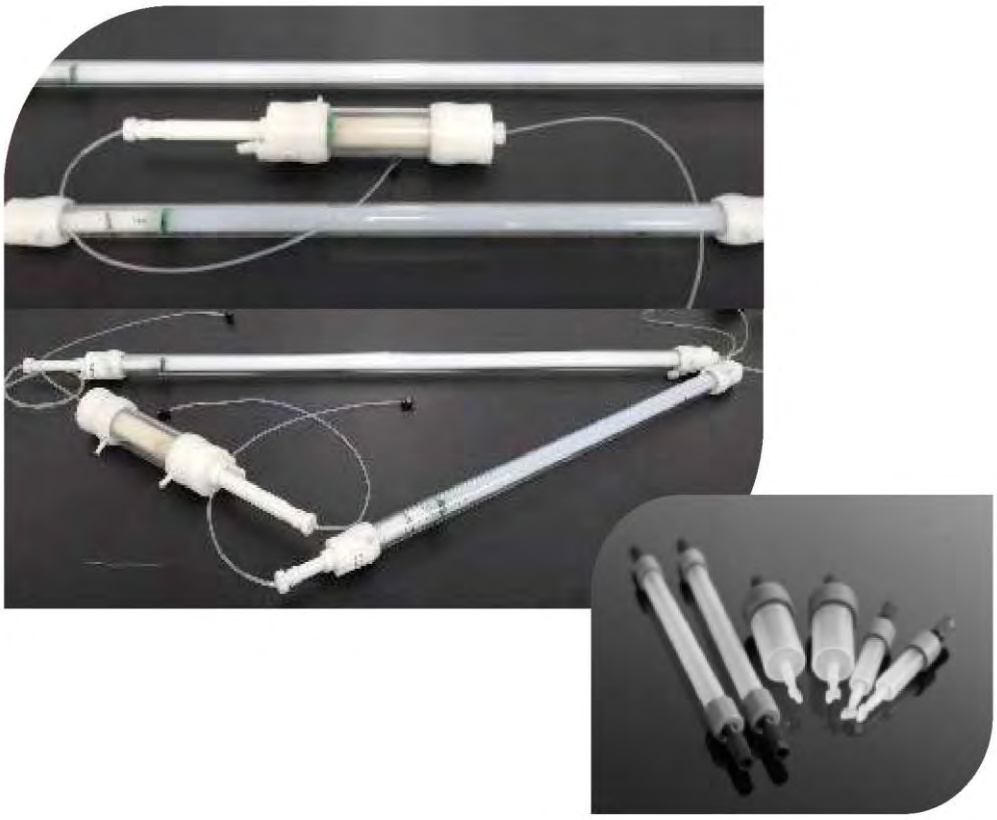
Product name	Specification	Art. No.	Product name	Specification	Art. No.	Product name	Specification	Art. No.
Phenyl Focurose FF (LS)	1mL	HS060301001E	Phenyl Focurose FF(HS)	1mL	HS060302001E	Phenyl Focurose HPL	1mL	HS220302001E
	5mL	HS060301005E		5mL	HS060302005E		5mL	HS220302005E
Phenyl Focurose HP	1mL	HS060202001E	Butyl-S Focurose FF	1mL	HS060307001E	Butyl Focurose 4FF	1mL	HS030306001E
	5mL	HS060202005E		5mL	HS060307005E		5mL	HS030306005E
Butyl Focurose 4B	1mL	HS030305001E	Butyl Focurose HPL	1mL	HS220306001E	Butyl Focurose HP	1mL	HS060206001E
	5mL	HS030305005E		5mL	HS220306005E		5mL	HS060206005E
Octyl Focurose 4FF	1mL	HS030303001E						
	5mL	HS030303005E						

Chromatographic columns for media screening

Chromatographic columns for media screening

List of chromatographic columns for media screening

Art. No.	Product name	Media volume (mL)	Media	Application
HT01	Empty column, 1 mL	1	All media are acceptable	Connection to injector, pump, and AKTA
HT05	Empty column, 5 mL	5		
HT12	SPE empty column, 12mL	1-10		Mainly used for manual purification by affinity chromatography
HT30	SPE empty column, 30mL	5-20		
HT60	SPE empty column, 60mL	10-50		
Remarks	Column tubules are made of polypropylene (PP), and the frits are made of polyethylene. Empty column includes upper and lower frits, upper and lower end plugs, column tubule, and outer loop SPE empty column includes upper and lower frits, column tubule, and upper cap of column tubule			

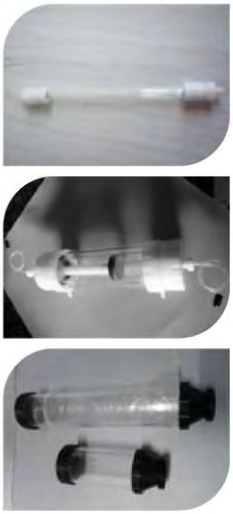


Empty chromatographic columns for process development

Empty chromatographic columns for process development are glass columns (of 16 mm ~ 50mm in diameter and 20 mm ~ 1000 mm in length) provided for sample preparation and process development in laboratory scale, they are also provided with jackets for convenient temperature control.

List of empty chromatographic columns for process development

Art. No.	Product name	Specification (diameter/length) mm/mm	Media volume, mL	Media height mm	Applications
HT16-20	HK16/20	16/200	4-34	20-170	Used for purification and process development of proteins at laboratory scale; can be packed with SEC, ion exchange, affinity, hydrophobic chromatography media for use
HT16-40	HK16/40	16/400	44-76	220-370	
HT16-70	HK16/70	16/700	104-134	520-670	
HT16-100	HK16/100	16/1000	164-194	820-970	
HT26-20	HK 26/20	26/200	10-90	20-170	
HT26-40	HK 26/40	26/400	117-193	220-370	
HT26-70	HK 26/70	26/700	276-355	520-670	
HT26-100	HK 26/100	26/1000	435-514	820-970	
HT50-30	HK 50/30	50/300	235-529	120-270	
HT50-70	HK 50/70	50/700	1020-1314	520-670	
HT50-100	HK 50/100	50/1000	1607-1901	820-970	
HP16	HK16 column packer	-	-	-	Media of HK series columns
HP26	HK26 column packer	-	-	-	
HP50	HK50 column packer	-	-	-	
Remarks	The empty chromatographic columns of HK series can be operated at the 4℃ ~ 60℃ and within pH range of 1 ~ 14 The fast lock adapter for chromatographic columns of HK series can ensure uniform flow rate and minimum dead volume The jackets of chromatographic columns can maintain stable operation temperature The accompanying column packer can be used for uniform media, with bubbles avoided, so as to achieve desired efficiency The raw materials of the empty column have excellent chemoresistance and extensive application scope.				

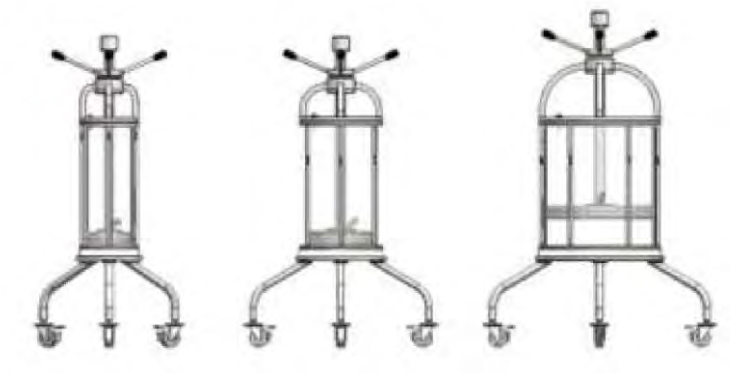


Chromatographic columns for pilot-scale and industrial scale

Chromatographic columns for pilot-scale and industrial scale

EK chromatographic columns for pilot-scale and industrial scale

The EK manual chromatographic columns are designed on the basis of innovative idea. Their patented sealing mode and rotational structure of column cap make it a simple task to pack the gel media manually. The media of various chromatography media requires only a few tools and can be manually performed in less time and with less working strength. The manual media results are accurate and reproducible. Therefore, these columns can be used for faster and better coordinated switching between product lines.



List of EK chromatographic columns for pilot-scale and industrial scale

Art. No.	Product name	Specification (inner diameter/height) mm/mm	Cross-sectional area, cm^2	Media volume, L	Media height mm	Applications
HE10-50	EK10/50	100/500	78.5	0.39-2.35	50-300	Chromatographic column for bioprocess downstream purification and separation at pilot-scale and industrial scale
HE10-100	EK10/100	100/1000		3.90-5.85	500-750	
HE14-50	EK14/50	146/500	167	0.84-5.01	50-300	
HE14-100	EK14/100	146/1000		8.40-12.60	500-750	
HE20-50	EK20/50	200/500	314	1.57-9.42	50-300	
HE20-100	EK20/100	200/1000		15.7-23.55	500-750	
HE30-50	EK30/50	296/500	688	3.44-20.64	50-300	
HE30-100	EK30/100	296/1000		34.4-51.6	500-750	
HE45-50	EK45/50	446/500	1561	7.81-46.83	50-300	
HE45-100	EK45/100	446/1000		78.10-117.15	500-750	
Remarks	The chromatographic columns of EK series are sealed and of IP65 protection grade Applicable ambient temperature: 5℃ ~ 30℃ Eluant container made of 316U PP, EPDM, or glass are optional					

AK automatic chromatographic columns for industrial scale

List of AK automatic chromatographic columns for industrial scale

Art. No.	Product name	Specification (inner diameter/height) mm/mm	Cross-sectional area cm^2	Media volume L	Media height mm	Applications
HA450	AK450	446/550	1561.5	7.8-54.6	50-350	Chromatographic column for bioprocess downstream purification and separation at pilot-scale and industrial scale
HA630	AK630	630/550	3115.6	15.6-109.0		
HA800	AK800	800/550	5024.0	25.1-175.8		
HA1000	AK1000	1000/550	7850.0	39.2-274.7		
Remarks	The chromatographic columns of EK series are sealed and of IP65 protection grade Applicable ambient temperature: 5℃ ~ 30℃ Eluant container made of 316L, PP, EPDM, or acrylic are optional					

Manufacture

Select First-class

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