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PROCESS MEDIA - FIND YOUR BEST FIT!

TOYOPEARL®, TSKgel®, and CA^{++}PURE-HA® Chromatography Resins

Biomolecules are purified by a succession of chromatography steps. Each step uses a different mode of separation, based on specific interactions between the biomolecules and the packing material.

The various modes are based on specific physical, chemical, or biological features of the target or sample, like size, charge, hydrophobicity, function or specific content of the molecule.

TOSOH BIOSCIENCE offers a comprehensive line of media and pre-packed columns for all modes of liquid chromatography - affinity, ion-exchange, mixed-mode, hydrophobic, hydroxyapatite, and size exclusion.

AFC Affinity Chromatography

AF-rProtein A HC-650F binds to the Fc part of antibodies. It allows for increased productivity and reduced production costs. IgG DBCs over 100 g/L can even be observed at higher titers. This prevents DSP bottlenecks even at short residence times.

AF-rProtein L-650F binds to the Kappa-light chain of antibodies and antibody derivates. It excels all other commercially available protein L media with regards to binding capacity and robustness. It is especially suited for the purification of new antibody formats such as antibody fragments, single chain variable fragments, domain antibodies and immunoglobulin types that cannot be purified with Protein A media.

Antibody AFC resins	Min. static capacity (mAb)	Special feature
PROTEIN A		
AF-rProtein A HC-650F	68 g/L	Highest binding capacity
AF-rProtein A-650F	45 g/L	Fast flow rates
PROTEIN L		
AF-rProtein L-650F	64 g/L	Highest binding for non-standard mAb formats

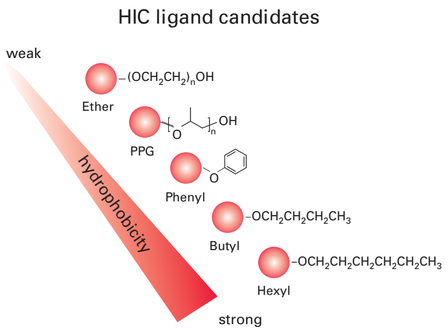
Other AFC resins		
GROUP SPECIFIC	**ACTIVATED RESINS***	**REACTIVE RESINS***
AF-Chelate-650M	AF-Tresyl-650M	AF-Formyl-650M
AF-Red-650M	AF-Epoxy-650M	AF-Amino-650M
AF-Heparin HC-650M		AF-Carboxy-650M

* Activated and reactive resins are used to couple your ligand of choice.

HIC Hydrophobic Interaction Chromatography

The large choice of pore and particle sizes for TOYOPEARL and TSKgel HIC resins gives the possibility to screen for the resin offering at the same time the highest binding capacity, the highest recovery, and the highest selectivity.

PPG-600M is specially well suited for the purification of antibodies and antibody-drug conjugates.



HIC resins	Typical capacity (g/L) Lysozyme (L) or mAb (A)	Special feature Target molecules
Ether-650 (S, M)	20 (L)	Very hydrophobic proteins
PPG-600M	30 (A)	Antibodies and ADCs
Phenyl-600M	50 (A)	Antibodies
Phenyl-650 (S, M, C)	30 (A)	Recombinant proteins
SuperButyl-550C	40 (L)	Recombinant proteins
Butyl-600M	50 (A)	Antibodies
Butyl-650 (S, M, C)	40 (L)	Recombinant proteins
Hexyl-650C	40 (L)	Hydrophilic proteins
Ether-5PW (20, 30)	20 (L)	Very hydrophobic proteins
Phenyl-5PW (20, 30)	20 (L)	Highest resolution

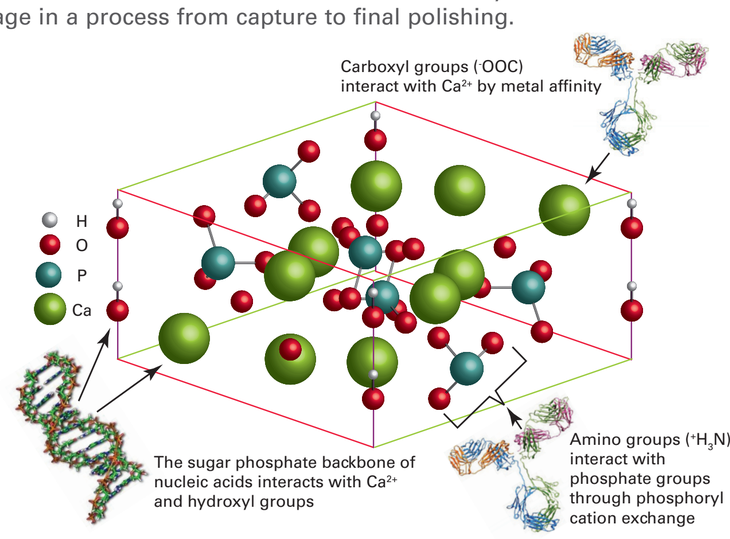
MXC Mixed Mode Chromatography

MX-Trp-650M is a multimodal resin with unique selectivity and high recovery. Its ligands have both ionic and hydrophobic groups. This unique ligand allows the separation of acidic, basic, and neutral proteins by one resin. It provides high binding capacity and outstanding selectivity for mAbs and mAb aggregates.

MXC resins	Typical capacity (mAB)	Recovery (mAb)
MX-Trp-650M	95 g/L	97 %

HA Hydroxyapatite

Ca^{++}Pure-HA provides exceptional separation properties and unequalled selectivity and resolution for multiple classes of biomolecules. The robust nature of Ca^{++}Pure-HA offers the flexibility to use this resin at any stage in a process from capture to final polishing.



HA resin	Typical capacity (human IgG)
Ca^{++}Pure-HA	> 30 g/L (2 min residence time)

IEC Ion Exchange Chromatography

Sulfate-650F is a highly selective, salt tolerant and high capacity cation exchange resin for the capture and intermediate polishing of biomolecules. It offers the ability to use mobile phases at physiological conditions without any loss of capacity or selectivity.

NH2-750F is a salt-tolerant anion-exchange resin, working both in flow-through and bind/elute mode. It is ideal for removing impurities from target proteins without dilution, or for intermediate or final purification of monoclonal antibodies. One of its major benefits is the possibility to remove aggregates as well as endotoxins, HCPs, viruses and DNA in a single step.

SuperQ-5PW (20) is the industry standard for the purification of oligonucleotides.

IEC resins	Typical capacity (g/L resin) BSA	Lyso-zyme	mAb	Insulin	Special feature Target molecules
STRONG ANION EXCHANGERS					
NH2-750F			70		Salt-tolerant
GigaCap Q-650 (S, M)	150		110		Highest capacity
SuperQ-650 (S, M, C)	145		15		Proteins <50 kDa
Q-600C AR	110		90		Alkaline stability
QAE-550C	50		30		Capturing of small proteins
SuperQ-5PW (20, 30)					Oligonucleotides
WEAK ANION EXCHANGERS					
GigaCap DEAE-650M					Blood products and nucleic acids. GigaCap - highest capacity
DEAE-650 (S, M, C)	25		30		
DEAE-5PW (20, 30)					
STRONG CATION EXCHANGERS					
Sulfate-650F			115		Salt-tolerant
GigaCap S-650 (S, M)	200		150	140	Highest capacity
SP-650 (S, M, C)	40		10	50	Cost efficient
SP-550C	100		15	80	Capturing of small proteins
MegaCap II SP-550EC	70			90	Insulin capturing
SP-3PW (30)				65	Insulin polishing
SP-5PW (20, 30)				30	Highest resolution
WEAK CATION EXCHANGERS					
GigaCap CM-650M	35		100		Highest capacity
CM-650 (S, M, C)	35				Cost efficient

SEC Size Exclusion Chromatography

All TOYOPEARL resins are based on the polymeric HW-type beads. Their rigid polymeric backbone has better pressure-flow properties than most other commercially made materials. The base resins are stable over the pH 2-12 range for operating conditions and pH 1-13 for cleaning conditions.

SEC resins	Pore size	Target molecules
HW-40 (S, F, C)	5 nm	Separation of low MW compounds / buffer echange
HW-50 (S, F)	12.5 nm	Peptide fragments
HW-55 (S, F)	50 nm	Proteins and antibodies
HW-65 (S, F, C)	100 nm	
HW-75 (F)	> 100 nm	Large nucleic acids, viruses and plasmid DNA

WHAT'S IN A NAME?

1. Resin types

Tosoh Bioscience offers three base beads: TOYOPEARL, TSKgel, and Ca^{++}Pure-HA.

TOYOPEARL and TSKgel products are hydroxylated methacrylic polymer resins and are offered in many different pore sizes and particle diameters. The key differences between the two types are particle size availability, degree of crosslinking, dynamic binding capacity, and operating pressures.

Since similarly functionalized TOYOPEARL and TSKgel resins have the same backbone polymer chemistry, the selectivity remains the same when scaling up or down.

Unlike all other TOYOPEARL and TSKgel products, Ca^{++}Pure-HA is a hydroxyapatite resin. Ca^{++}Pure-HA is a spherical, macroporous form of the hexagonal crystalline structure of $Ca_{10}(PO_4)_6(OH)_2$.

2. Particle sizes

Grade	TOYOPEARL	GigaCap	TSKgel	Ca^{++}Pure-HA
EC	200 µm			
C	100 µm (SEC are 75 µm)			
M	65 µm (MX-Trp is 75 µm)	75 µm		
F	45 µm			
S	35 µm (SEC are 30 µm)	35 µm		
(30)			30 µm	
(20)			20 µm	
HA				39 µm

3. Pore sizes of base media for AFC, MXC, IEC, and HIC

TOYOPEARL 550 resins	HW-55 base resin	50 nm
TOYOPEARL 600 resins	HW-60 base resin	75 nm
TOYOPEARL 650 resins	HW-65 base resin	100 nm
TOYOPEARL 750 resins	HW-75 base resin	> 100 nm
TSKgel 3PW resin	PW-3000 base resin	25 nm
TSKgel 5PW resin	PW-5000 base resin	100 nm

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