TOYOPEARL® Sulfate-650F

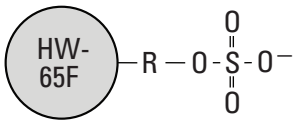
Strong cation exchange resin for capture and removal of mAb aggregates

Introduction

TOYOPEARL Sulfate-650F resin is a strong cation exchange resin that exhibits high salt tolerance. This resin offers the strongest capture of monoclonal antibody (mAb) aggregates over a wide pH range without losing its binding capacity for mAb. With the use of optimized binding conditions, a dynamic binding capacity of >120 g/L of mAb can be easily achieved with TOYOPEARL Sulfate-650F. This high binding capacity translates into lower operating costs per gram of antibody produced.

A TOYOPEARL HW-65F polymeric bead has been functionalized with a sulfate (SO4-) group (see *Structure*). The 100 nm pore size of this resin, along with proprietary bonding technology, makes TOYOPEARL Sulfate-650F ideal for applications performed in physiological conditions or for post-protein A removal of aggregates.

STRUCTURE:



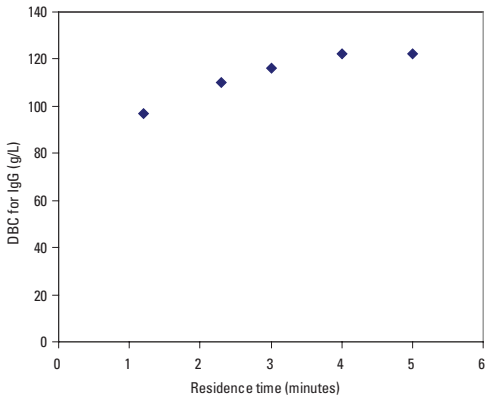
Product Attributes

Pore size (mean):	100 nm
Particle size (mean):	45 µm (F-grade)
Pressure rating:	0.3 MPa
Shipping buffer:	20% ethanol
pH stability:	2-13

High Dynamic Binding Capacity

TOYOPEARL Sulfate-650F offers high dynamic binding capacities for IgG, obtainable even at higher flow rates, as shown in *Figure 1*.

Figure 1. Dynamic Binding Capacities

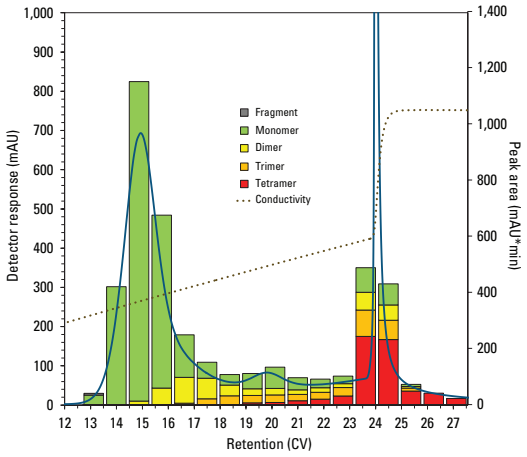


Resin:	TOYOPEARL Sulfate-650F
Column size:	6.0 mm ID × 4 cm
Mobile phase:	0.15 mol/L NaCl + 0.054 mol/L acetate buffer, pH 4.7
Residence time:	1.2, 2.3, 3.0, 4.0 or 5.0 min
Sample:	polyclonal human IgG, 1.0 g/L

Effectively Capture and Remove Aggregates from mAb Sample

TOYOPEARL Sulfate-650F resin is effective at removing aggregates from mAbs, as demonstrated in *Figure 2*. A protein A-purified IgG sample was loaded onto a TOYOPEARL Sulfate-650F column, fractions were collected using an ÄKTA® and further analyzed using a TSKgel® G3000SW$_{XL}$ HPLC column. TOYOPEARL Sulfate-650F resin provides stronger binding of mAb aggregates, resulting in the high resolution separation of monomer and aggregates.

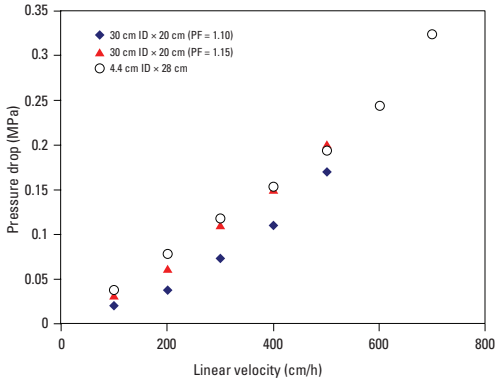
Figure 2. Aggregate Removal



Resin:	TOYOPEARL Sulfate-650F
Column size:	6.6 mm ID × 20 cm (6.8 mL)
Mobile phase	A: 0.1 mol/L sodium acetate, pH 5.0
	B: mobile phase A + 1 mol/L NaCl
Gradient:	0-50% B, 20 CV
	100% B, 5 CV
Flow rate:	300 cm/hr (4 min residence time)
Detection:	UV @ 280 nm (mAU), conductivity (mS/cm)
Temperature:	ambient
Injection vol.:	6.8 mL (10 mg/mL-resin load ratio)
Sample:	IgG, protein A-purified, aggregated, 10 g/L
Instrument:	ÄKTA avant 25

Figure 3 demonstrates the excellent pressure-flow rate properties of the TOYOPEARL Sulfate-650F resin. A flow rate of >600 cm/hr on a large process column is easily achieved at a pressure drop of only 0.2 MPa.

Figure 3. Pressure-Flow Rate Curve on Large Process Column (30 cm ID x 20 cm bed height)

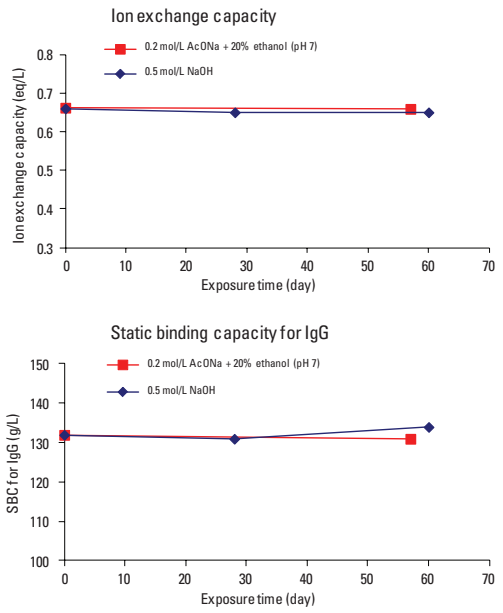


Column system: AxiChrom® 30 cm ID × 20 cm, QuickScale 4.4 cm ID × 28 cm
Packing Factor (PF): 1.10 or 1.15
Packing: Slurry 50% in 0.2 mol/L NaCl
Eluent: water

Alkaline Stability

TOYOPEARL Sulfate-650F resin is stable in 0.5 mol/L NaOH *(Figure 4)*. It can be stored in this solution for up to 8 weeks without loss in its binding capacity.

Figure 4. Alkaline Stability of TOYOPEARL Sulfate-650F



Ordering Information

Part #	Description	Resin Volume
23467	TOYOPEARL Sulfate-650F	100 mL
23468	TOYOPEARL Sulfate-650F	250 mL
23469	TOYOPEARL Sulfate-650F	1 L
23470	TOYOPEARL Sulfate-650F	5 L
23471	TOYOPEARL Sulfate-650F	50 L
23472	TOYOPEARL Sulfate-650F	1 mL × 6
23473	TOYOPEARL Sulfate-650F	5 mL × 6
45117	TOYOPEARL Sulfate-650F MiniChrom Column	5 mL
45027	ToyoScreen Sulfate-650F RoboColumn	8 × 200 µL
45028	ToyoScreen Sulfate-650F RoboColumn	8 × 600 µL
OC41MDSLFT-650F	TOYOPEARL Sulfate-650F Resin Seeker 96-Well Plate	20 µL resin bed

TOSOH BIOSCIENCE

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