TOYOPEARL® MX-Trp-650M

Introduction

TOYOPEARL MX-Trp-650M is a new, high dynamic binding capacity (DBC), mixed-mode resin using tryptophan as the ligand. TOYOPEARL MX-Trp-650M contains both weak cationic and hydrophobic functional groups and is useful for protein purifications even when the target is in a high conductivity feedstock. The resin's 50-100 µm particles are stable to pressures of up to 3 bar.

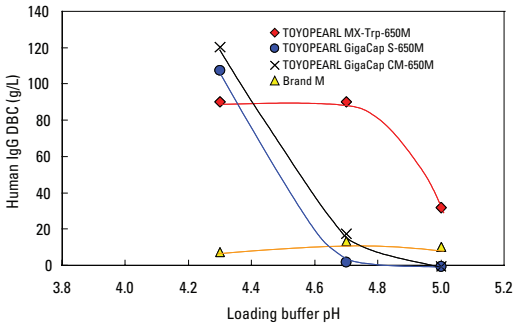
Product Highlights

- High DBC (approximately 90 mg-IgG/mL-resin) when using elevated conductivity buffers
- Smaller elution pools have higher target titer and less WFI volume for use in downstream steps
- Better process throughput when run at higher linear velocities
- Excellent base stability for Clean in Place (CIP) steps

Discussion:

TOYOPEARL MX-Trp-650M is engineered to have 90-100 mg/mL DBC at higher conductivity loading conditions *(Figure 1)*.

Figure 1. DBC Comparison at 12 mS/cm Conductivity and varying pH

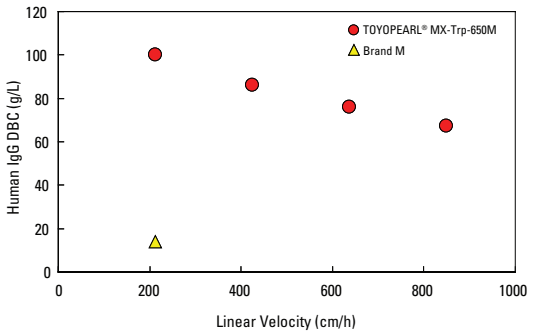


Resins:	TOYOPEARL MX-Trp-650M TOYOPEARL GigaCap S-650M TOYOPEARL GigaCap CM-650M Brand M
Column:	6 mm ID × 4 cm
Mobile phase:	Buffer A: 0.05 mol/L acetate buffer (pH 4.3, 4.7, 5.0) + 0.10 mol/L NaCl (12 mS/cm) Buffer B: 0.1 mol/L Tris-HCl buffer (pH 8.5) + 0.3 mol/L NaCl
Flow rate:	1.0 mL/min (212 cm/hr)
Detection:	UV at 280 nm
Sample;	human polyclonal IgG (1 mg/mL)

Dynamic binding capacity (DBC) calculated from 10 % height of breakthrough curve

Good mass transfer kinetics enable the resin to maintain its DBC at faster linear velocities *(Figure 2)*. This fast uptake capability when coupled with narrow elution peak shape *(Figure 3)* results in smaller and more concentrated in-process pool volumes, reducing the amount of water for injection needed and increasing process throughput downstream. Even at conductivities of 17 mS/cm, DBC and product recovery are better than competitive mixed-mode materials *(Table I)*.

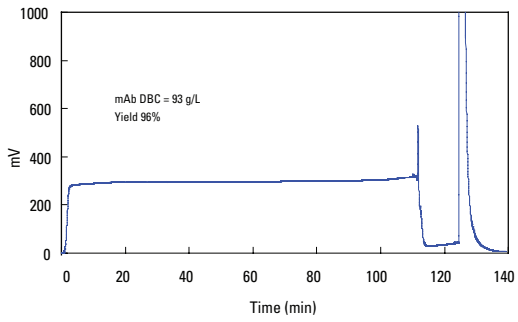
Figure 2. DBC at higher Linear Velocities



Resin:	TOYOPEARL MX-Trp-650M , Brand M
Column size:	0.6 mm ID × 4.0 cm
Mobile phase:	Buffer A: 0.05 mol/L sodium acetate buffer (pH 4.7) + 0.1 mol/L sodium chloride Buffer B: 0.1 mol/L Tris-HCl buffer (pH 8.5) + 0.3 mol/L sodium chloride
Flow rates:	212, 425, 637, 849 cm/hr
Detection:	UV @ 280 nm
Temperature:	ambient
Sample:	polyclonal human IgG (1 mg/mL)
Sample Load:	1 mg/mL

Dynamic binding capacities (DBC) were determined at 10% breakthrough

Figure 3. Excellent Binding and Elution Kinetics



Resin:	TOYOPEARL MX-Trp-650M
Column size:	6 mm ID × 4 cm
Mobile phase:	Buffer A: 0.05 mol/L acetate buffer (pH 4.7) + 0.1 mol/L NaCl (12 mS/cm) Buffer B: 0.1 mol/L Tris-HCl buffer (pH 8.5) + 0.3 mol/L NaCl
Flow rate:	A: 1.0 mL/min (212 cm/h) B: 2.0 mL/min (started at 124 min)
Detection:	UV @ 280 nm
Sample:	CHO cell culture media, monoclonal antibody (1 mg/mL) diluted with Buffer A

TOYOPEARL MX-Trp-650M is base stable to 0.5 mol/L NaOH *(Figure 4)* making multiple uses of the resin possible after Clean in Place (CIP).

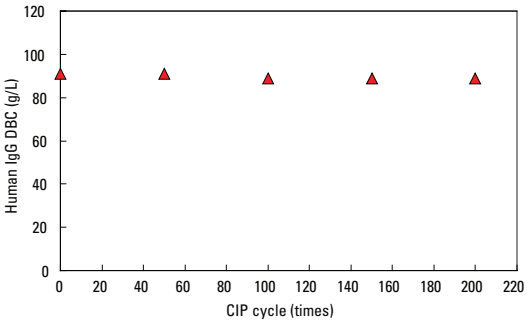
The many benefits of TOYOPEARL MX-Trp-650M shown in this overview increase process throughput and decrease cost of goods for your new therapeutic molecule.

Table 1. Recovery Comparison at Conductivities of 12 and 17 mS/cm

Resin	IgG DBC 12 mS/cm	Recovery 12 mS/cm	IgG DBC 17 mS/cm	Recovery 17 mS/cm
TOYOPEARL MX-Trp-650M	95	97%	48	96%
Capto MMC	14	86%	11	85%

Resins: TOYOPEARL MX-Trp-650M, Capto MMC
Column Size: 6 mm ID × 4 cm
Mobile phase: Buffer (12 mS/cm): 0.05 mol/L acetate buffer (pH 4.7) + 0.1 mol/L NaCl
Buffer (17 mS/cm): 0.05 mol/L acetate buffer (pH 4.7) + 0.15 mol/L NaCl
Flow Rate: 212 cm/hr
Detection: UV @ 280 nm
Sample: polyclonal IgG

Figure 4. CIP Using 0.5 mol/L NaOH



Alkaline cleaning (CIP) conditions
3CV: 0.5 mol/L NaOH,
5CV: 0.1 mol/L Tris-HCl pH 8.5 + 0.3 mol/L NaCl
Flow rate: 1 mL/min
DBC Measurement
Column Size: 6 mm ID × 4 cm
Binding buffer: 0.05 mol/L acetate buffer (pH 4.7) + 0.1 mol/L NaCl
Flow rate: 1 mL/min.
Detection: UV @ 280 nm
Sample: polyclonal human IgG
Sample Load: 1 mg/mL

Ordering Information

Part#	Description	Resin Vol.
22817	**TOYOPEARL MX-Trp-650M**	25 mL
22818	**TOYOPEARL MX-Trp-650M**	100 mL
22819	**TOYOPEARL MX-Trp-650M**	1 L
22820	**TOYOPEARL MX-Trp-650M**	5 L
22824	**ToyoScreen® MX-Trp-650M**	1 mL X 6
22825	**ToyoScreen MX-Trp-650M**	5 mL X 6

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