Data Sheet

Eshmuno® S resin

For superior downstream mAB purification

Eshmuno® is a unique family of ion-exchange resins specifically designed for highly productive downstream bioprocessing. The cation exchanger Eshmuno® S is the first member of the Eshmuno® resin family and is highly productive in direct capture and post-protein A steps.

Benefits

- Superior productivity for mAB downstream processing
- More selectivity and HCP removal
- Active tentacle adsorption
- Robust and safe packing procedures
- Tangible savings in cost and development time

Eshmuno® S resin characteristics

Type	Strong cation exchanger
Functional group	$-SO_3$
Base matrix	Surface grafted rigid polyvinyl ether hydrophilic polymer
Lysozym capacity	115–165 mg/mL settled resin
Ionic capacity	50–100 µeq/mL settled resin
Mean particle size	75–95 µm
IgG dynamic capacity	>60 mg/mL (2 min. residence time)
Pressure drop (100 x 16 mm, 5 mL/min., 150 cm/h)	<1.0 bar

EMD Millipore is a division of Merck KGaA, Darmstadt, Germany

Superior productivity for mAB downstream processing

Eshmuno® S resin exhibits a superior binding capacity for antibodies compared to other modern cation-exchangers. Fig. 1 shows the dynamic binding capacity (DBC) for direct capture of a monoclonal antibody mAB02 at 5% breakthrough and 5 min. residence time from a real diluted feedstock. The DBC of Eshmuno® S resin is approximately 50% higher than the capacity of other surface-grafted cation exchangers.

A similar superior binding capacity can be shown in post-protein A purification steps. Fig. 2 illustrates the increased binding capacity of Eshmuno® S resin in an intermediate purification step of mAB03.

Pressure versus flow curve of Eshmuno® S resin

In combination with the excellent pressure flow behaviour (Fig. 3) an outstanding productivity of more than 40 mg/mL x h (dimension for productivity) for Eshmuno® S resin can be achieved, resulting in considerable manufacturing cost savings in mAB production.

Superior mAB binding capacity in direct capture step

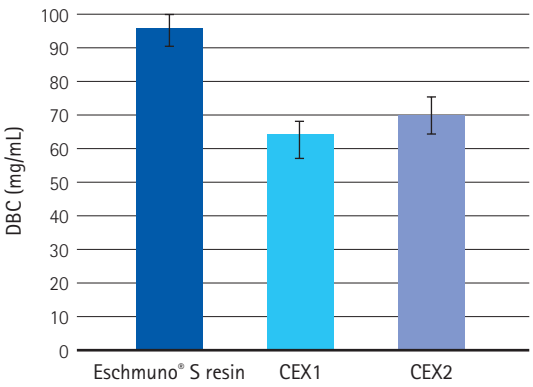

Figure 1.

mAB02 DC, 5% breakthrough, 4.3 mS/cm, pH 6.0 [mAB02] = 0.62 mg/mL, 5 min. residence time, 1 mL scout column

Binding capacity of purified mAB03 on Eshmuno® S resin

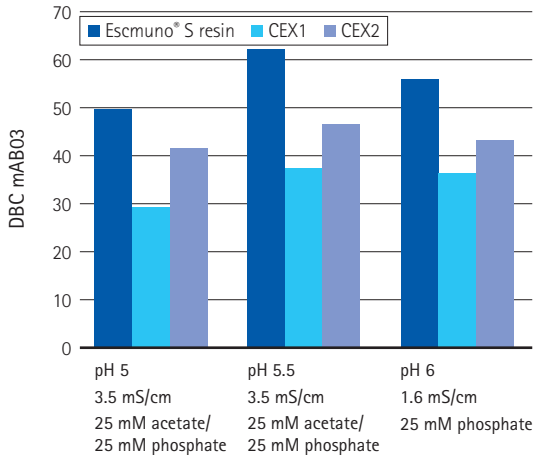

Figure 2.

DBC of mAB03 5 mg/mL in buffer A, 2 min. residence time, 1 mL scout column

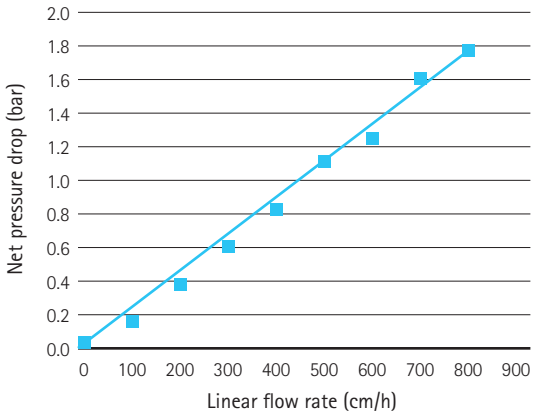

Figure 3.

20 cm i.d. column; 19,5 cm bed height; 8% compression recorded in 150 mM NaCl

More selectivity and HCP removal

A crucial property of any ion exchange material in biochromatography is the ability to specifically select the biomolecule of interest. While Eshmuno® S resin carries the same functional group like Fractogel® SO_3 resin, a slightly modified selectivity can be observed (Fig. 4), which allows a wider flexibility for the specific purification challenge.

The result: Eshmuno® S resin is the most efficient resin in the removal of host cell proteins (Fig. 5).

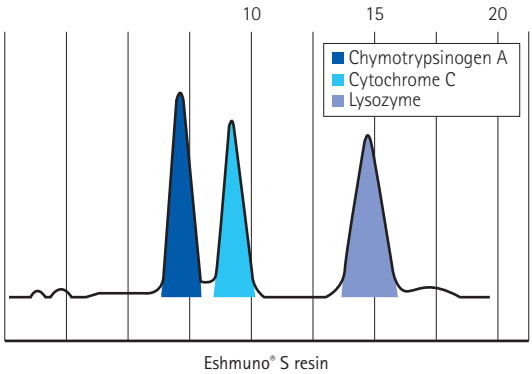

Figure 4.

A mixture of Chymotrypsinogen A, Cytochrome C, and Lysozyme was separated under standard conditions

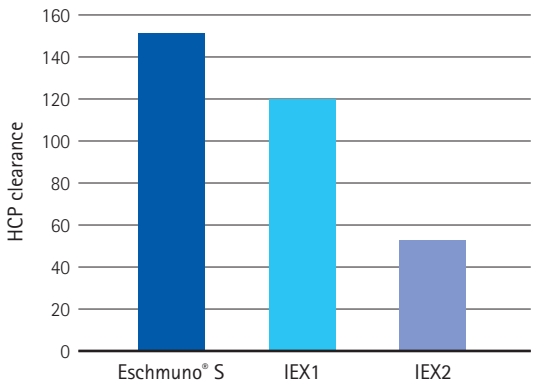

Figure 5.

HCP Clearance factor of mAB02, 5% breakthrough, 4.3 mS/cm, pH 6.0, 5 min. residence time, 1 mL scout column

Active tentacle technology

Merck KGaA was the first manufacturer of a biochromatography resin (Fractogel®) with tentacle structure (Fig. 6). The main advantage of this tentacle chemistry is the increased amount of sterically accessible ligands to more effectively bind the biomolecule of interest thus increasing the capacity of the resin.

Eshmuno® S resin combines both, the reliable tentacle technology with the properties of a new hydrophilic polyvinyl ether base matrix. The polymer matrix allows the use of much higher flow rates, while the biomolecule is still strongly bound by the tentacle.

Figure 6.

Resin tentacles forming a three-dimensional ion exchange network, enable easy access of the proteins to the ligands

Robust and safe packing procedures

Eshmuno® S resin can be easily packed into production scale columns for biochromatography either by simple flow packing or axial compression. To prevent corrosion of the tubing system, Eshmuno® columns can be packed using 0.01 M sodium hydroxide solutions and even pure water resulting in plate numbers >2400/m with good peak symmetry.

For the packing of Eshmuno® and sanitization of the column we recommend EMD Millipore chemicals especially dedicated for the use in biopharmaceutical production with the brandname EMPROVE® bio.

Tangible savings in cost and development time

With the use of Eshmuno® S resin in downstream processing considerable manufacturing cost savings can be achieved. The productivity of purification in a model process of a monoclonal antibody could be increased 5-fold by using Eshmuno® S resin instead of a conventional soft-gel ion exchanger. The use of Eshmuno® S resin instead of a protein A based capture step can save up to 30% of your purification costs.

Ordering Information

Description	Catalogue No.
Eshmuno® S resin	1.20078

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To Place an Order or Receive Technical Assistance

In the U.S. and Canada, call toll-free 1-800-645-5476

For other countries across Europe and the world, please visit www.millipore.com/offices

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