Data Sheet

Eshmuno® HCX media

New, high salt-tolerant multi-mode chromatography resin

Eshmuno® HCX media, the newest member of the innovative Eshmuno® resin product offering, is a smart mixed-mode resin that couples EMD Millipore's renowned tentacle structure with the new hydrophilic polyvinyl ether base matrix. As a result, Eshmuno® HCX media offers outstanding performance results at higher salt concentration in typical ion exchange and flow-through applications.

Proven Technology

Eshmuno® chromatography resins are a new and unique family of ion exchange resins that are designed specifically for highly productive downstream bioprocessing. The first members of the family, Eshmuno® S resin and Eshmuno® Q resin, are smart ion exchangers designed for fast and efficient purification of antibodies.

Eshmuno® HCX media, a perfect line extension to the existing Eshmuno® chromatography resin family, is the result of extensive investigation to address the developing needs of the industry of performing state-of-the-art chromatography steps in the manufacture of today's approved biotherapeutics.

With Eshmuno® HCX media, you benefit from:

- Greater capacity at high-salt concentrations
- Superior productivity
- Outstanding selectivity
- Rigid base beads for easy packing
- Excellent pressure flow behavior

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

The new multi-mode cation exchanger Eshmuno® HCX media was specifically designed for the direct capture of recombinant proteins at higher salt concentrations. The applied and proven tentacles technology allow for a multipoint interaction between biopharmaceutical and media resulting in higher binding capacities. The specially designed hydrophilic polyvinyl ether base bead allows for high flow rates and therefore faster processing in biopharmaceutical operations.

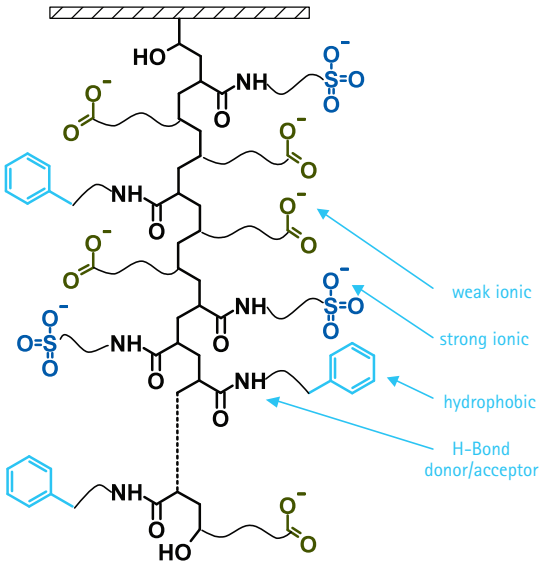


Figure 1.
Eshmuno® HCX media: Chemical structure of multifunctional tentacles for salt-tolerant interactions

Eshmuno® HCX resin tentacles, forming a three-dimensional ion exchange network, enable easy access of the proteins to the ligands.

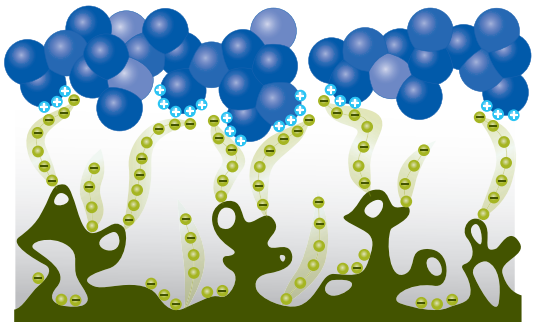
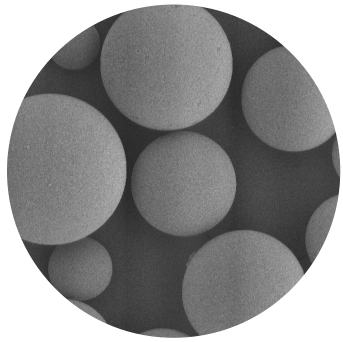


Figure 2.
Eshmuno® HCX media: Flexible tentacle-type ion exchange for multi-point interactions

Spherical regular shape and appropriate particle size distribution allow for easy packing and scale-up. The open and regular pore system enables good accessibility.



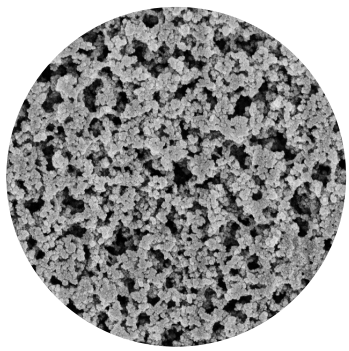


Figure 3.
Rigid base beads: Highly cross-linked hydrophilic polyvinyl derivative assuring outstanding robustness compared to other bead-based technologies

Superior productivity for downstream processing

Safety and efficiency are the key elements of any purification scheme for biological molecules. Downstream processing is the most time-consuming and most costly process step in the manufacture of biological drugs. Particular care has to be taken into account when selecting the raw materials which come in direct contact with the biological active ingredient.

Process Window Contour Plot

Both, static and dynamic testing methods demonstrate the wide range of operating conditions of Eshmuno® HCX media achieving high protein binding capacities at high salt levels. The open interconnected pore structure maintains rapid mass transfer, resulting in these higher dynamic capacities being achievable over a wide range of process conditions.

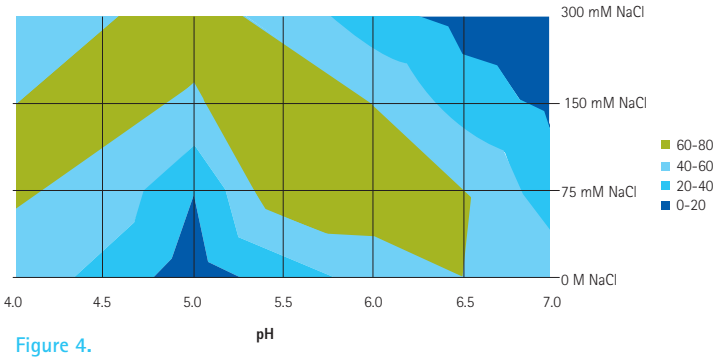


Figure 4.

Static binding capacity of polyclonal human IgG in mg/ml in 25 mM acetate, 25 mM phosphate, 0 – 300 mM NaCl

53 mg/mL	14 mg/mL	150 mM NaCl
27 mg/mL	n.d.	75 mM NaCl
pH 5.5	pH 6.0	

Table A. Dynamic binding capacity of polyclonal human IgG in 20 mM phosphate at 10% breakthrough, 5 min residence time

In combination with the excellent pressure flow behavior an outstanding productivity of the Eshmuno® HCX media can be achieved, resulting in considerable manufacturing cost savings.

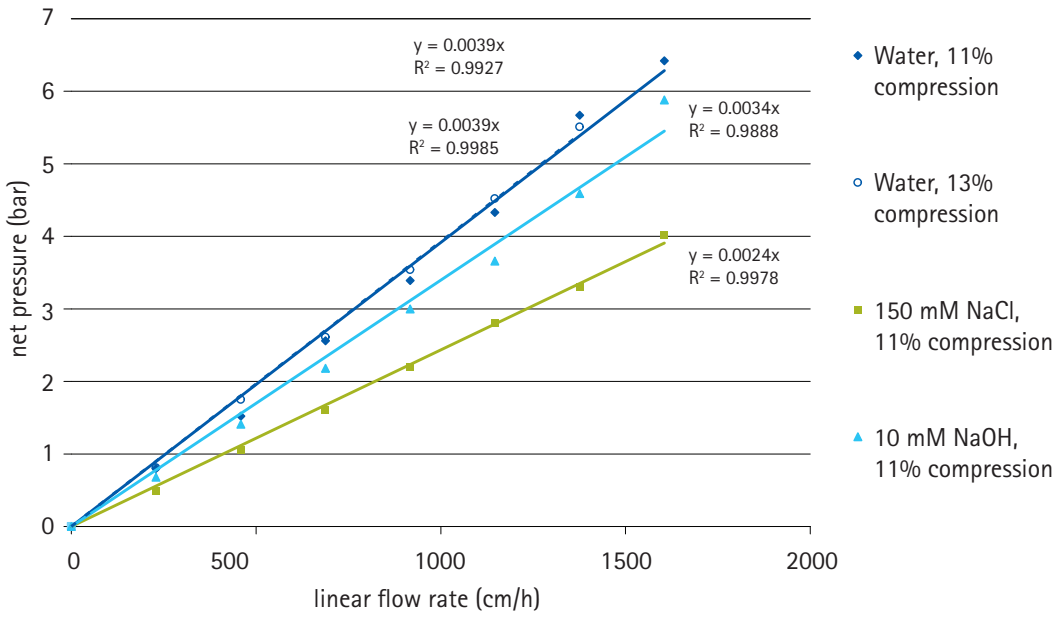


Figure 5.

Operational Flexibility: Pressure vs. Flow curve showing excellent pressure flow properties enabling easy packing and scale-up, similar like for the other members of the Eshmuno® resin family

Streamlined scouting and process development

Eshmuno® HCX media is available in pre-packed, ready-to-use, disposable columns. These small-scale columns are the ideal tool for performing initial media screening, scaling and optimization studies. These easy-to-use, economical columns can be used with any chromatography system.

Sanitization

Eshmuno® HCX media can easily be sanitized and is compatible over a wide range of pH conditions and has an excellent stability against alkaline and acids.

Storage

Eshmuno® HCX media is supplied in 20% Ethanol and 150 mM NaCl suspension as a preservative.

Type of chromatography	Multi-modal cation exchange chromatography
Functional group	Sulfo, carboxy and phenyl groups
Base matrix	Surface grafted rigid polyvinyl ether hydrophilic polymer
Mean particle size (d_{50})	75 – 95 µm
IgG Dynamic Capacity (pH 5.5, 5 min residence time, 10% breakthrough)	≥ 50 mg/ml
Ionic capacity	170-300 µeq/ml
Linear flow rate	up to 1000 cm/h < 2.5 bar net pressure
pH stability	pH 2 up to 12
Pressure limit	8 bar

Table B. Eshmuno® HCX media characteristics

Ordering Information

Eshmuno® HCX media	1.20087

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.emdmillipore.com/offices

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