

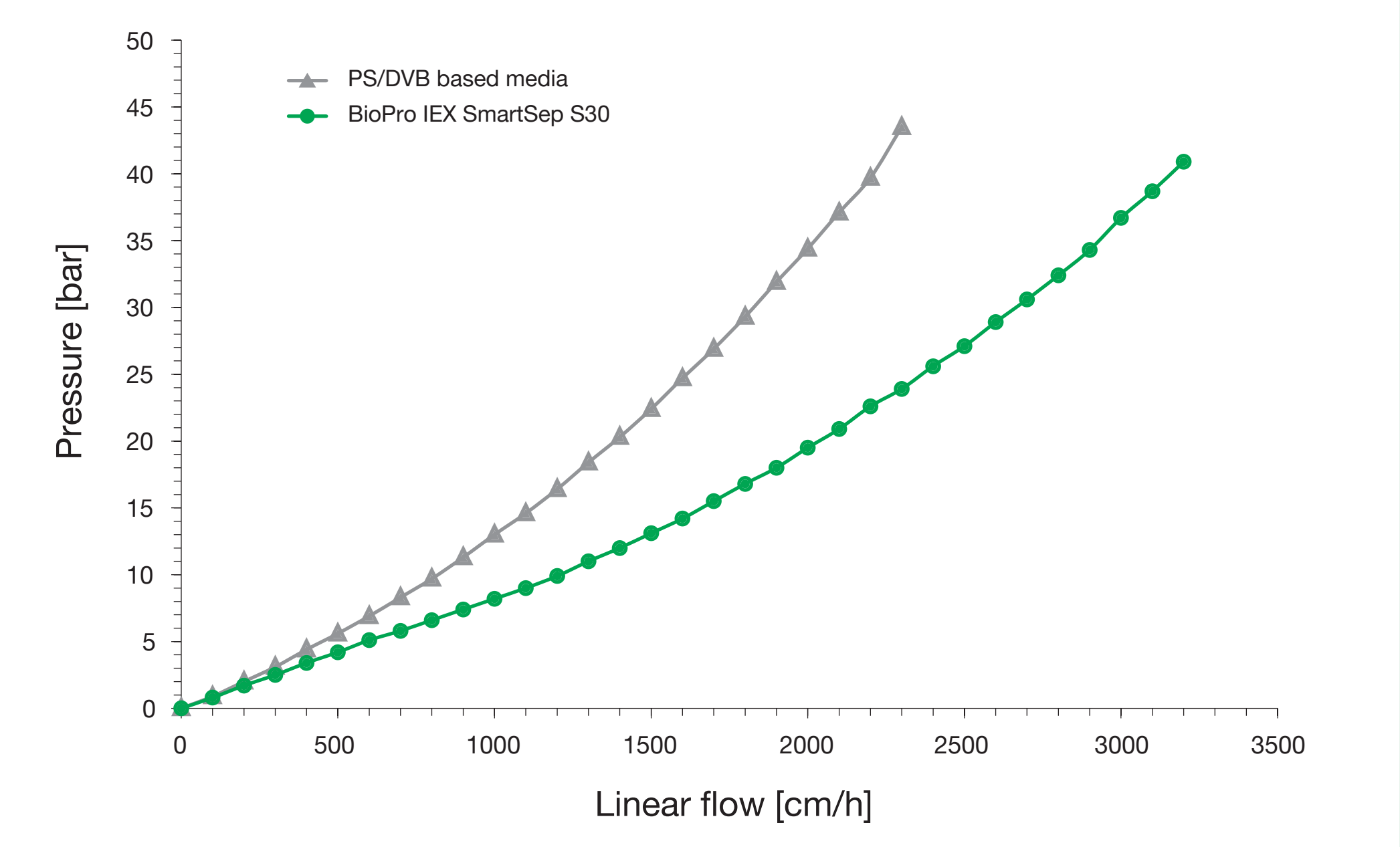
High performance resins for downstream processing of oligonucleotides, proteins and monoclonal antibodies



Ion exchange (IEX) media are widely used in the downstream processing of bio-molecules such as proteins, monoclonal antibodies or oligonucleotides. Hydrophilic polymethacrylate-based IEX resins ensure efficient purification of biomolecules, as they allow high flow rates due to the low back pressure generated.

An additional benefit can be the use of increased eluent temperature to improve resolution. This leads to higher overall process productivity. In combination with a high dynamic binding capacity (DBC), which means high sample loading, the process is then economical and efficient.

High throughput – Improved pressure-flow characteristics for high flow rates



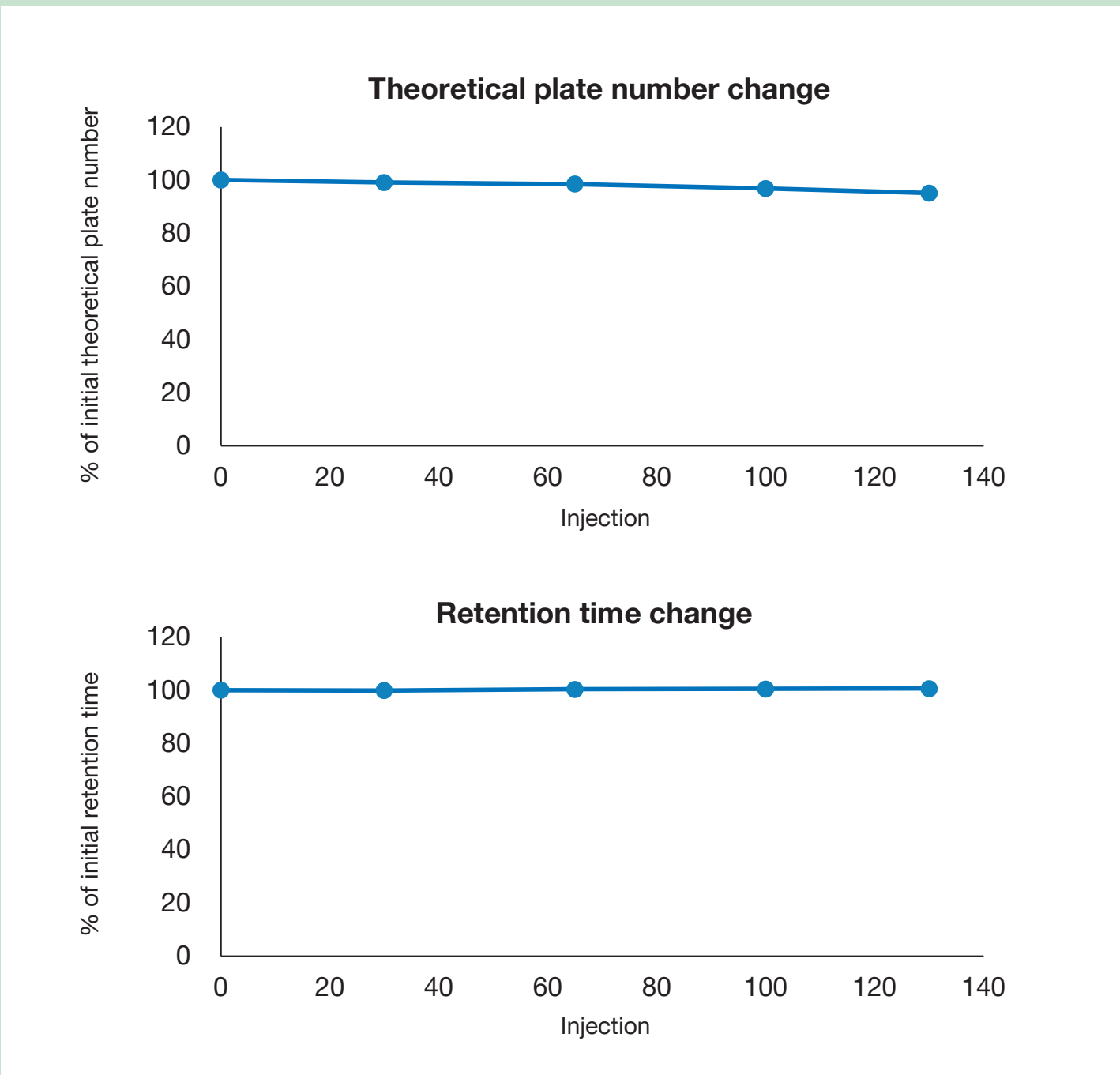
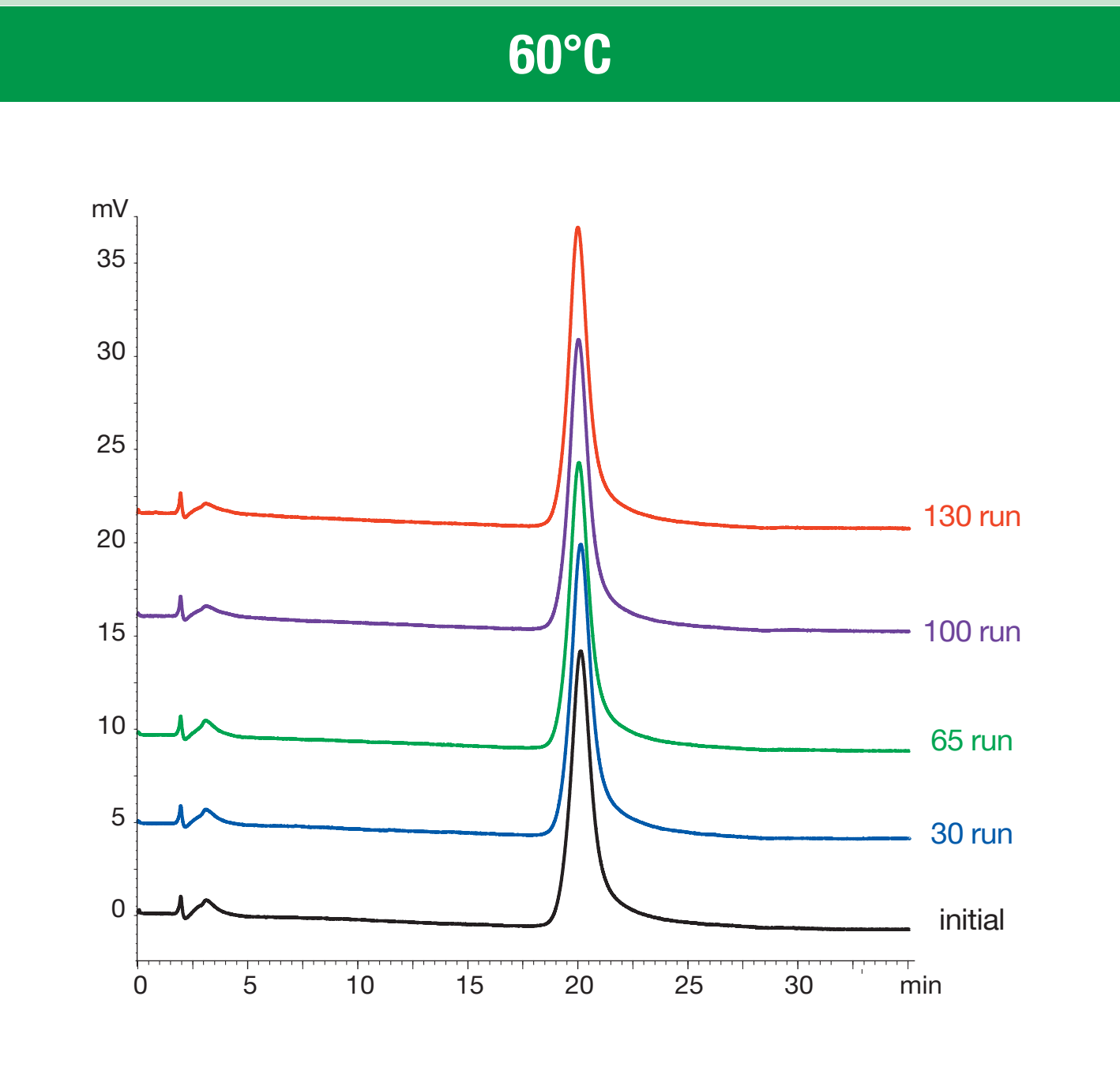
Column: ECO^{PLUS}
15 mm ID
max. bed length 250 mm
AB version
Slurry concentration: 30%
Consolidation flow velocity: 72 cm/h
Consolidated bed height: 10 cm
Mobile phase: 20% EtOH + 0,2 M sodium acetate

The pressure-flow characteristics of IEX resins are mainly based on the physical properties of the base beads. Therefore, the base material plays a decisive role.

BioPro IEX SmartSep S30 is based on a hydrophilic polymethacrylate. It shows improved pressure-flow behaviour compared to a polystyrene/divinylbenzene (PS/DVB) based resin. Higher flow rates could be obtained at an equal backpressure over the entire range of linear velocities investigated. The possibility to apply higher flow rates leads to an improved resolution and increased productivity of the overall purification process.

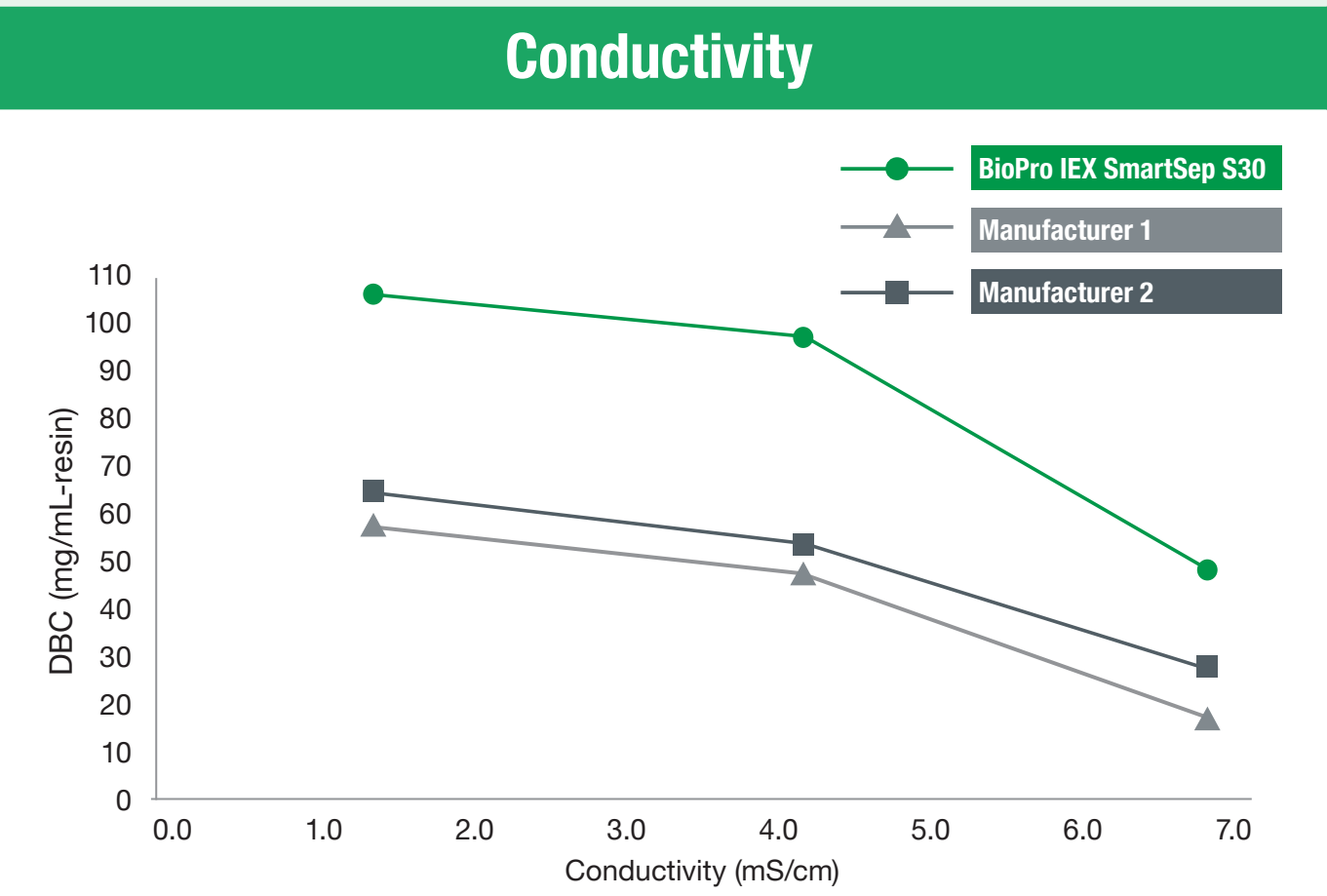
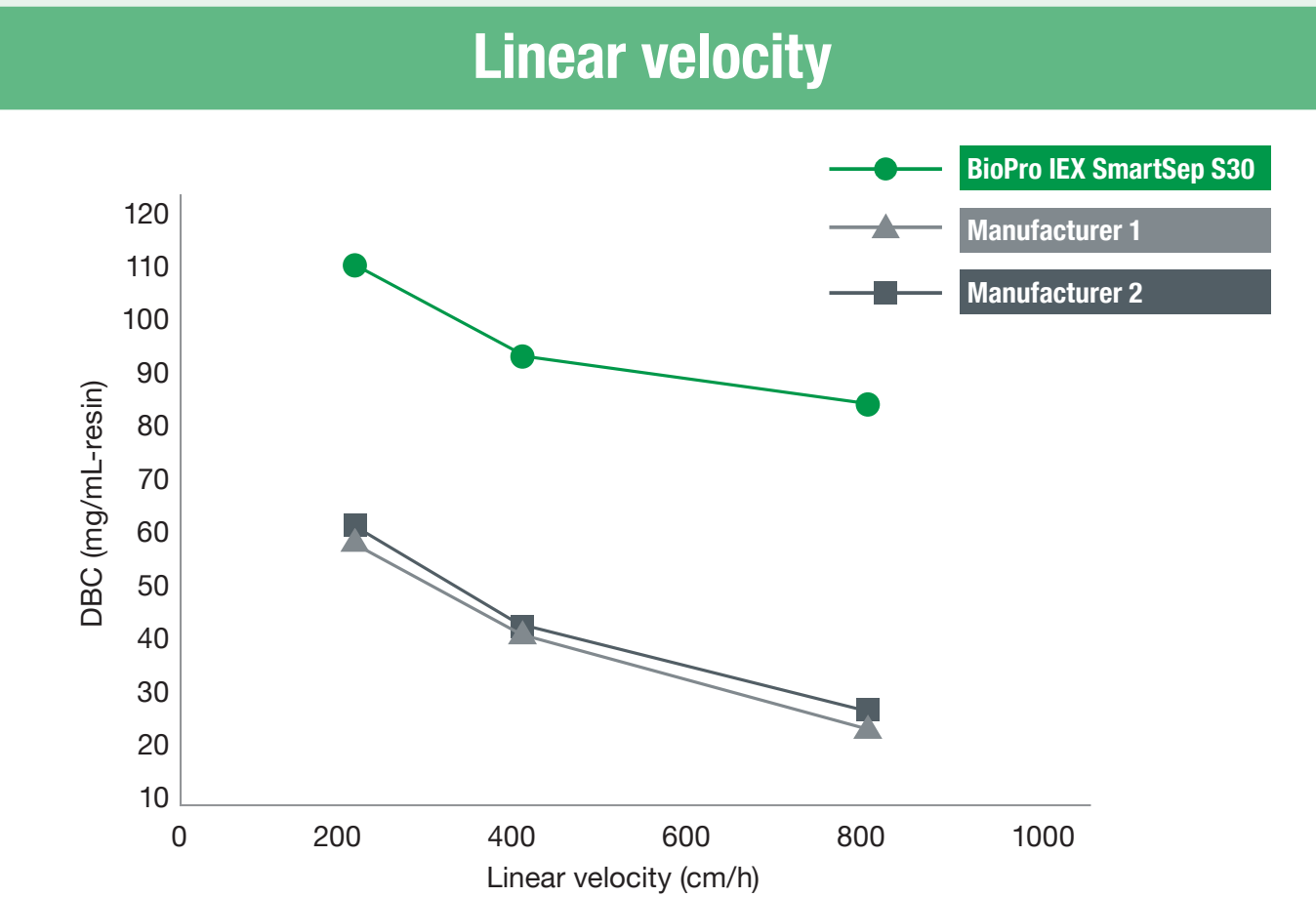
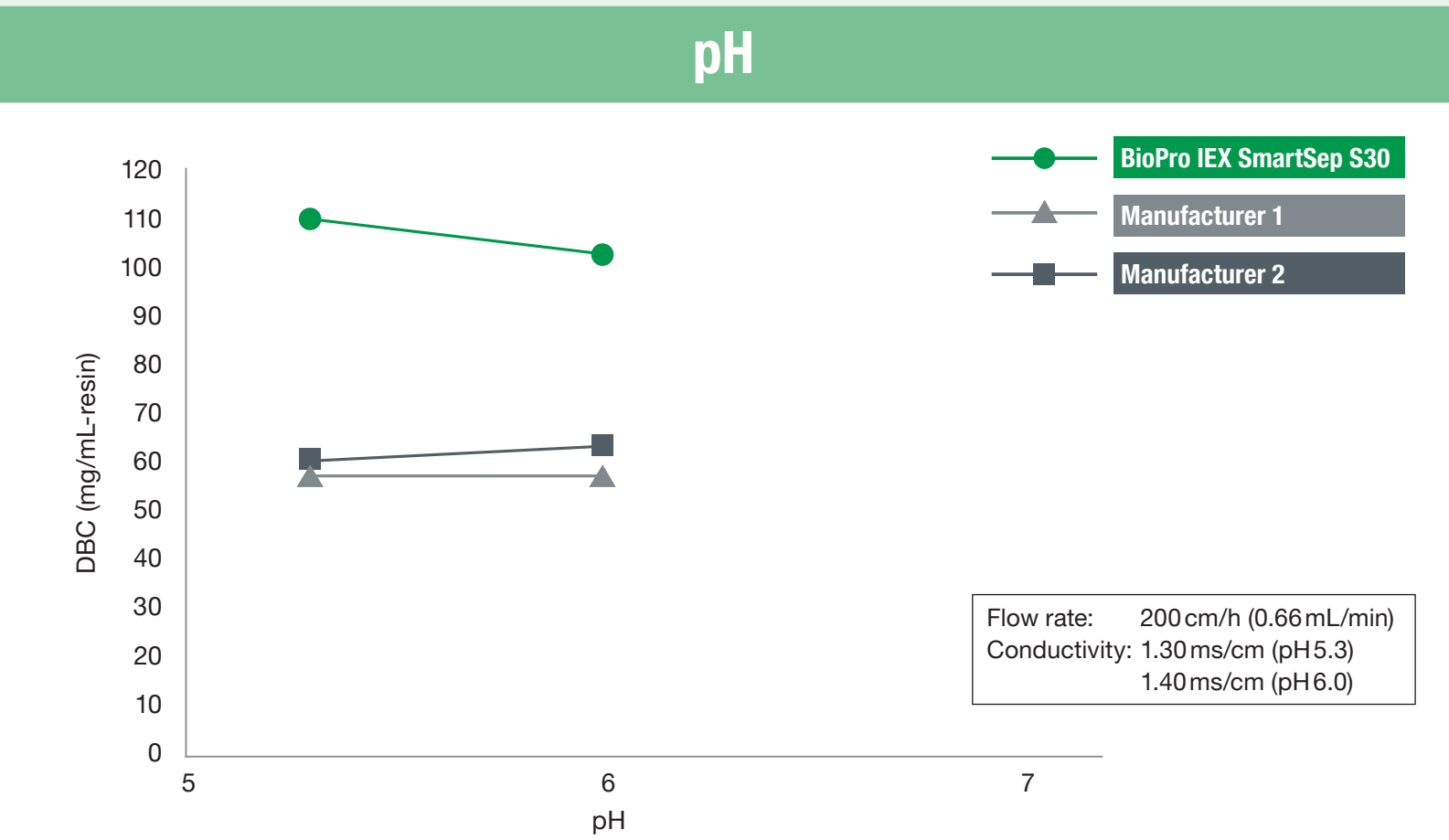
Broad temperature range – Extended temperature stability for better resolution

Increased temperature can be a useful parameter to improve resolution – especially for IEX oligonucleotide purification processes. The elution profile of an antisense oligonucleotide remained constant even after applying 60°C for 130 runs (=130 hours) to BioPro IEX SmartSep Q20. Theoretical plates and retention time were also maintained. This extended temperature stability can be advantageous for many applications.



Column: BioPro IEX SmartSep Q20, 100 x 4.6 mm ID
Eluent: A) 20 mM Tris-HCl (pH 8.6)
B) 20 mM Tris-HCl (pH 8.6) containing 1 M NaCl
Gradient: 40–90%B (0–25 min), 90%B (25–35 min), 40%B (35.01–60 min)
Flow rate: 0.5 mL/min
Temperature: 60°C
Detection: UV at 260 nm
Injection: 12 µL
Sample: Firefly Luciferase GL2, antisense strand (5 nmol/mL)
5'-UCG AAG UAU UCC GCG UAC GdTdT-3

High productivity – superior DBC for high loadabilities



Column: 50 x 5.0 mm ID
Equilibration buffer: 20 mM citric acid-NaOH buffer (pH 5.3 or 6.0)
Flow rate: 200–800 cm/h (0.66–2.62 mL/min)
Temperature: ambient (25°C)
Detection: UV at 280 nm
Sample: 1.5 mg/mL human polyclonal Adalimumab in equilibration buffer

The DBC determines the loadability and therefore the productivity of an IEX resin. Superior DBC is achieved with BioPro IEX SmartSep S30 regardless of elution pH, linear velocity or salt concentration qualifying it as a highly efficient resin.

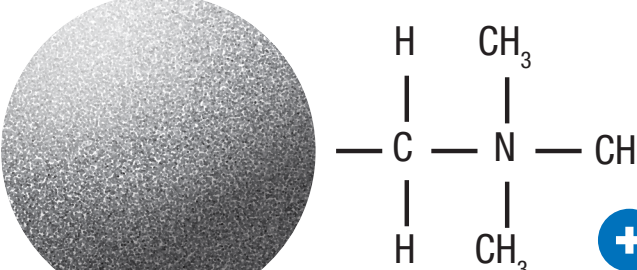
DBC	pH 5.3	pH 6.0	200 cm/h	400 cm/h	800 cm/h	1.36 mS/cm	4.14 mS/cm	6.8 mS/cm
BioPro IEX SmartSep S30	110	103	110	93	84	107	97	50
Manufacturer 1	58	58	58	41	23	58	49	19
Manufacturer 2	61	64	61	42	26	64	55	27

BioPro IEX Series	BioPro IEX SmartSep Q30	BioPro IEX SmartSep Q20	BioPro IEX SmartSep Q10	BioPro IEX SmartSep S30	BioPro IEX SmartSep S20	BioPro IEX SmartSep S10
Ion exchange type	Strong anion exchanger			Strong cation exchanger		
Charged group	-R-N ⁺ -(CH ₃) ₃			-R-SO ₃ ⁻		
Matrix	Hydrophilic polymer beads					
Pore Size	porous					
pH Range	2–12					
Particle size	30 µm	20 µm	10 µm	30 µm	20 µm	10 µm
Pressure resistance	2 MPa Max. 3 MPa		3 MPa Max. 4 MPa	2 MPa Max. 3 MPa		3 MPa Max. 4 MPa
Typical flow rate	200–1,000 cm ³ /h Max. 2,000 cm ³ /h					
Ion exchange capacity	0.08 meq/mL resin					
Dynamic binding capacity	Min. 100 mg/mL resin (BSA)			Min. 100 mg/mL resin (Lysozyme)		

Resin characteristics

BioPro IEX SmartSep resins provide high mechanical stability and chemical resistance. Additionally, they are temperature stable and deliver excellent pressure-flow characteristics. BioPro IEX resins are an ideal choice in downstream processing.

Strong anion exchanger



Strong cation exchanger

