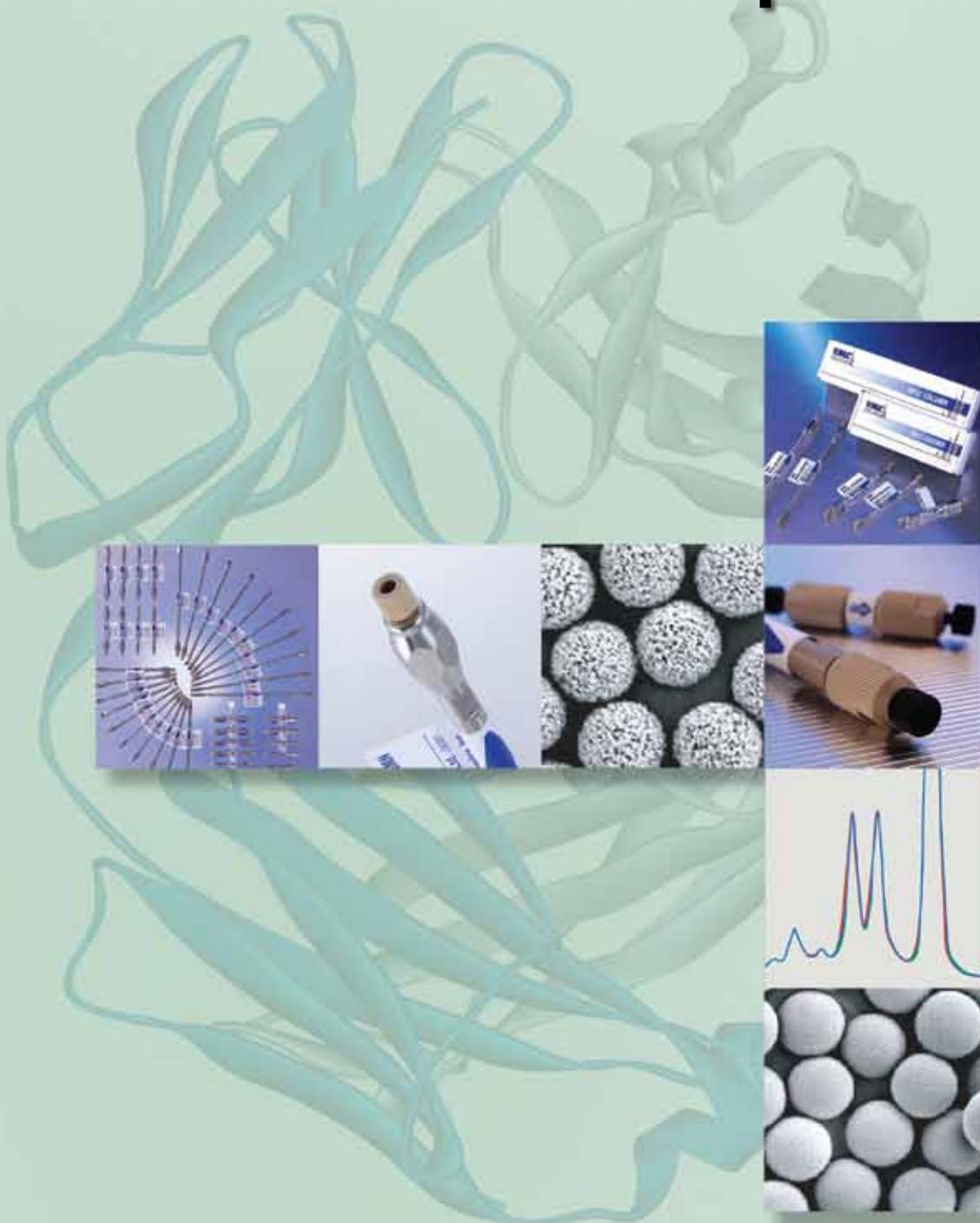


# YMC Solutions for Bioseparations



*YMC offers dozens of different separation chemistries in many different configurations for the separation of biomolecules.*

*Please contact YMC America to discuss the details of your application requirements.*

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**YMC**  
**AMERICA, INC.**

# YMC-BioPro Ion Exchange Columns & Materials

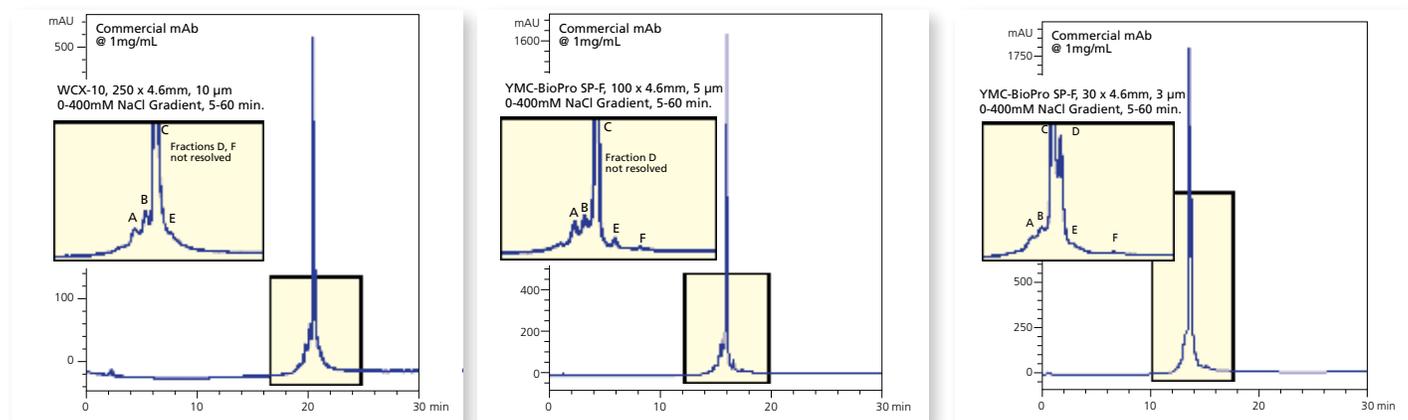
The **YMC-BioPro** family of Ion Exchange (IEX) columns and materials includes SP (strong cation exchange) and QA (strong anion exchange) chemistries on a novel, newly developed hydrophilic polymer with low non-specific adsorption.

**YMC-BioPro IEX** columns are available on 5 µm porous (QA and SP columns) and 3, 5, and 6 µm non-porous (QA-F and SP-F columns) types packed in biocompatible PEEK column housings in a variety of dimensions. In addition, 10, 30, and 75 µm particles are available for preparative scale applications.

All of the **YMC-BioPro IEX** materials are characterized by their speed, reproducibility, and high dynamic binding capacity. **YMC-BioPro** – porous or non-porous; and in a number of particle sizes – is well-suited for a broad range of biomolecule separations.

## YMC-BioPro SP-F for mAb Charge Variant Analyses

These chromatograms show that 5 µm and 3 µm strong cation exchangers produce more and sharper peaks compared to a traditional 10 µm WCX column. Retention time was also reduced by approximately 20%, attributable to the shorter column used for the YMC BioPro SP-F material. This suggests that a strong cation exchanger can be a suitable solution to the analysis of mAb's and should be included in phase screening during method development.



- **3 µm and 5 µm particles** present higher resolution compared to larger particles.
- **Non-porous particles** contribute to high speed, leading to faster analysis and higher throughput (e.g., run times as short as 5-7 minutes for monitoring cell culture).
- **Uniformly sized spherical particles** allow lower operating pressure (and in turn, higher flow rates and faster analysis).
- **Unique hydrophilic polymer** produces an SCX material with no non-specific binding – the entire sample is separated and quantified.
- **Covalently bonded SCX chemistry** is durable and stable, and it exhibits improved resolution of mAb variants compared to WCX chemistry.

## YMC-BioPro Specifications

	Pre-Packed Columns		Bulk Materials	
	YMC-BioPro QA-F / SP-F	YMC-BioPro QA / SP	YMC-BioPro Q / S	
Matrix	non-porous polymer beads	porous polymer beads	porous polymer beads	
Dynamic binding capacity (mg/mL-resin)	QA-F : >12 (BSA) SP-F : >10 (IgG)	QA : >110 (BSA) SP : >70 (IgG)	For 10 µm particles Q : >110 (BSA) S : >70 (IgG)	For 30 and 75 µm particles Q : >160 (BSA) S : >160 (Lysozyme)
Particle size (µm)	3, 5, 6	5	10, 30, 75	
Charged group	QA-F / QA : -CH <sub>2</sub> N <sup>+</sup> (CH <sub>3</sub> ) <sub>3</sub> SP-F / SP : -(CH <sub>2</sub> ) <sub>3</sub> SO <sub>3</sub> <sup>-</sup>		Q : -CH <sub>2</sub> N <sup>+</sup> (CH <sub>3</sub> ) <sub>3</sub> S : -(CH <sub>2</sub> ) <sub>4</sub> SO <sub>3</sub> <sup>-</sup>	
Counter Ion			Cl <sup>-</sup> Na <sup>+</sup>	
pH range	2 - 12			

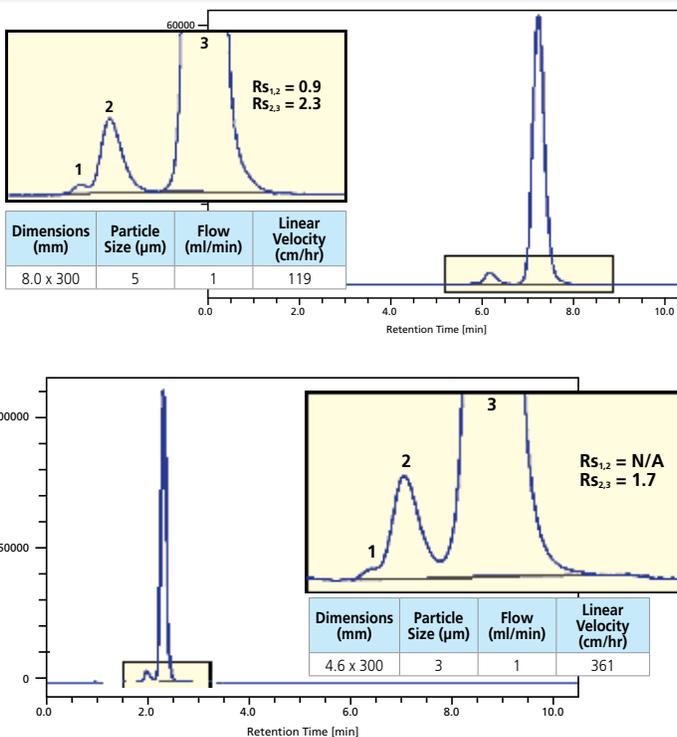
**YMC's focus on reproducibility from column-to-column and from lot-to-lot enables reliable lab-to-lab and site-to-site results.**

# YMC-Pack Diol Size Exclusion (SEC) Columns

**YMC-Pack Diol-SEC** is a size exclusion chromatography column utilizing a silica gel base. Diol-120, 200, and 300 are suitable for separation or molecular weight determination of proteins with molecular weights of 10,000 to several hundred thousand. Diol-60 is the most suitable for separation of peptides or oligosaccharides whose molecular weights are 10,000 or less.

- Utilizes silica gel base with high resistance to pressure in 3  $\mu\text{m}$  and 5  $\mu\text{m}$  particles
- Wide range of pore sizes to suit wide range of applications
- Range of column diameters (mm): 3.0, 4.6, 6.0, 8.0
- Range of column lengths (cm): 15, 25, 30, 50
- Useful for molecular weight determination of proteins and polysaccharides
- Minimal secondary interactions; low non-specific binding
- Low detectable bleed with light scattering detection
- Cost effective

## Comparison of 3 $\mu\text{m}$ and 5 $\mu\text{m}$ Diol-SEC Particles



Comparison of SEC chromatograms of a commercial mAb shows the effect of particle size on speed and resolution. Columns are both 300 mm long but differ in i.d. They are packed with different particle sizes and run at the same flow rate - resulting in different linear velocity. Pore size in both columns is 200 Å.

# YMC Triart Hybrid Reversed-phase Columns

**YMC-Triart** hybrid material exhibits superior reproducibility, making it ideal for peptide mapping. This hybrid material has the added advantage of tolerating elevated temperature, enabling higher resolution separations.

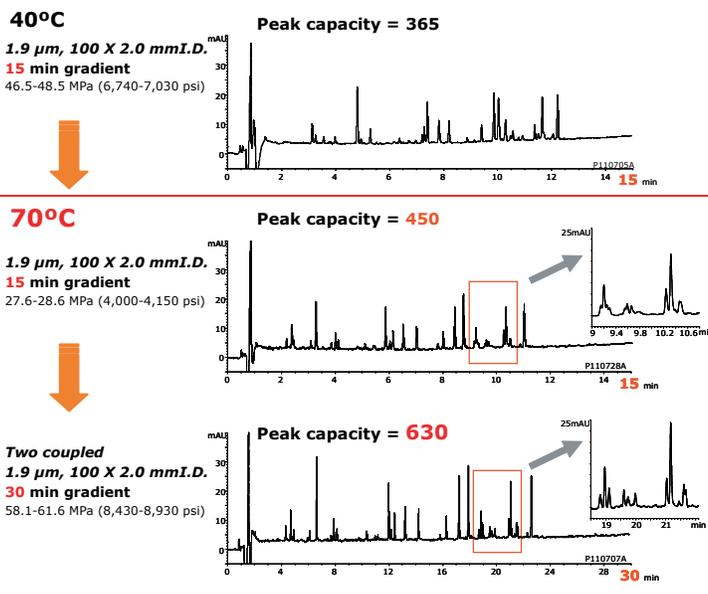
As shown here, 23% more peaks can be resolved by increasing the column temperature to 70°C in the separation of tryptic digest of Hemoglobin.

Efficiency can be enhanced further by coupling two 100 mm Triart C18 1.9  $\mu\text{m}$  columns. This improves peak separation in situations where maximum resolution is desired.

YMC also offers a number of other C18 and other reversed-phase materials.

Column	: YMC-Triart C18 (1.9 $\mu\text{m}$ , 12 nm)
Eluent	: A) water/TFA (100/0.1) B) acetonitrile/TFA (100/0.08) 5-40%B (0-15 min) for a single column 5-40%B (0-30 min) for two coupled columns
Flow rate	: 0.4 mL/min
Detection	: UV at 220 nm
Injection	: 10 $\mu\text{L}$ for a single column 20 $\mu\text{L}$ for two coupled columns
Sample	: Tryptic digest of Bovine Hemoglobin
System	: Agilent 1290

## Peptide Mapping by UHPLC



YMC America welcomes your inquiry concerning product selection and applicability.  
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## Ordering Information

Phase	Pore Size (Å)	Particle Size (µm)	Length (mm)	I.D. (mm)	Intended Use	Product Number
<b>BioPro IEX</b>						
BioPro SP-F	non-porous	3	30	4.6	analytical	SF00S03-0346WP
			50	4.6	analytical	SF00S03-0546WP
		5	30	4.6	analytical	SF00S05-0346WP
			50	4.6	analytical	SF00S05-0546WP
			100	4.6	analytical	SF00S05-1046WP
6	100	10	semipreparative	SF00S06-1010WT		
BioPro SP	1000	5	50	4.6	analytical/semiprep	SPA0S05-0546WP
			100	4.6	analytical/semiprep	SPA0S05-1046WP
BioPro QA-F	non-porous	3	30	4.6	analytical	QF00S03-0346WP
			50	4.6	analytical	QF00S03-0546WP
		5	30	4.6	analytical	QF00S05-0346WP
			50	4.6	analytical	QF00S05-0546WP
			100	4.6	analytical	QF00S05-1046WP
		6	100	10	semipreparative	QF00S06-1010WT
BioPro QA	1000	5	50	4.6	analytical/semiprep	QAA0S05-0546WP
			100	4.6	analytical/semiprep	QAA0S05-1046WP

\* Scouting column for BioPro Q/S bulk is available on request.

<b>Diol-SEC</b>						
Diol-GFC	60	5	300	8	standard resolution	DL06S05-3008WT
			500	8	superior resolution	DL06S05-5008WT
			300	4.6	sample limited/standard resolution	DL06S05-3046WT
	120	5	300	8	standard resolution	DL12S05-3008WT
			500	8	superior resolution	DL12S05-5008WT
			300	4.6	sample limited/standard resolution	DL12S05-3046WT
	200	3	150	4.6	sample limited/fast analysis	DL20S03-1546WT
			300	4.6	sample limited/standard resolution	DL20S03-3046WT
		5	300	8	standard resolution	DL20S05-3008WT
			500	8	superior resolution	DL20S05-5008WT
	300	3	300	4.6	sample limited/standard resolution	DL20S05-3046WT
			150	4.6	sample limited/fast analysis	DL30S03-1546WT
			300	4.6	sample limited/standard resolution	DL30S03-3046WT
		5	300	8	standard resolution	DL30S05-3008WT
			500	8	superior resolution	DL30S05-5008WT
	300	4.6	sample limited/standard resolution	DL30S05-3046WT		

<b>Peptide Mapping</b>						
Triart C18	120	2	50	2	UHPLC	TA12SP9-0502PT
			50	3	UHPLC	TA12SP9-0503PT
			50	4.6	UHPLC	TA12SP9-0546PT
			100	2	UHPLC	TA12SP9-1002PT
			100	3	UHPLC	TA12SP9-1003PT
			150	2	UHPLC	TA12SP9-1502PT
			150	3	UHPLC	TA12SP9-1503PT
			75	2	UHPLC	TA12SP9-L502PT
			75	3	UHPLC	TA12SP9-L503PT
		3	150	2	HPLC	TA12S03-1502WT
			150	3	HPLC	TA12S03-1503WT
			150	4.6	HPLC	TA12S03-1546WT
		5	250	2	HPLC	TA12S05-2502WT
			250	3	HPLC	TA12S05-2503WT
			250	4.6	HPLC	TA12S05-2546WT

1. The above is a partial listing. Contact YMC America for complete product configuration and details.

2. Orders are subject to the normal terms and conditions of order acceptance at YMC America. Prices effective in North, Central, South America, and are subject to change.

3. YMC America welcomes your inquiry concerning product selection and applicability.



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