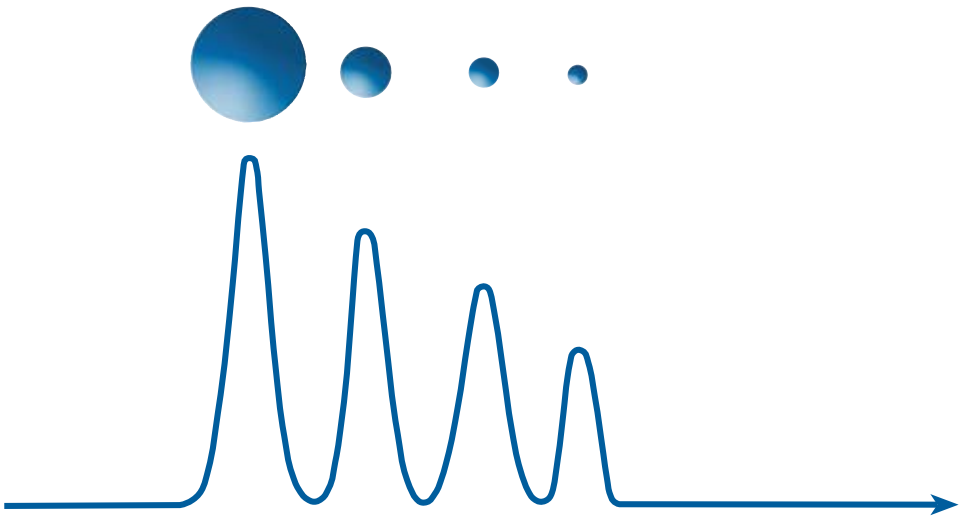
YMC
EUROPE GMBH

Size Exclusion Chromatography
YMC-Pack Diol



www.ymc.de

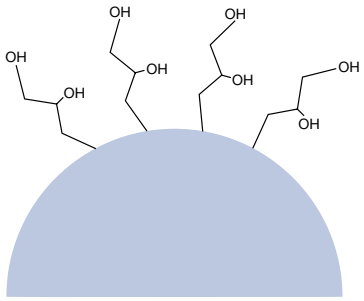
What is special about YMC SEC-Columns?

- **Method development**
- **Scalability**
- **Reproducibility**
- **Cost-effective**

YMC-Column for SEC: YMC-Pack Diol

Analysis of many polymers has an additional complication in that apart from determination of functional groups, etc, such compounds do not vary in chemical composition but their functionality varies as a function of molecular size. Therefore Size Exclusion Chromatography (SEC) can be employed to further characterise polymeric materials.

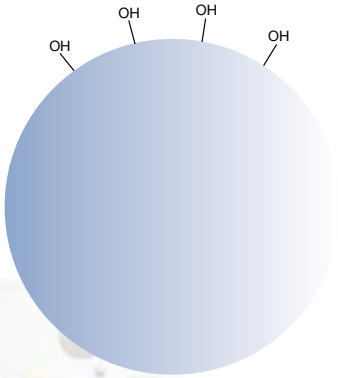
SEC is divided into **Gel Permeation Chromatography (GPC)** which is performed using organic mobile phases and **Gel Filtration Chromatography (GFC)** which is carried out in aqueous eluent systems.



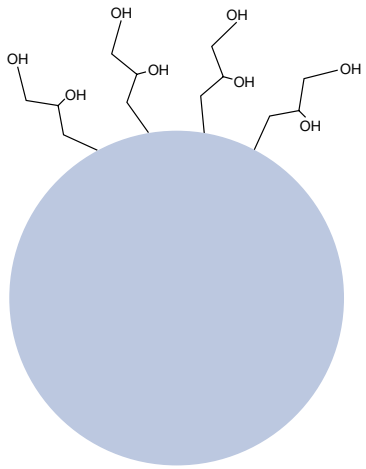
The silica is derivatised with 1,2-dihydroxypropane and, with the variety of pore size available, allows analyses over a broad range of peptide to large proteins

Why modify the phase?

YMC-Pack Diol stationary phases are surface modified for a versatile alternative to underivatised silica. Advantages include a shorter equilibration time as well as good selectivity. Due to this short equilibration time, the Diol phase is a good choice for SEC in comparison with underivatised silica.

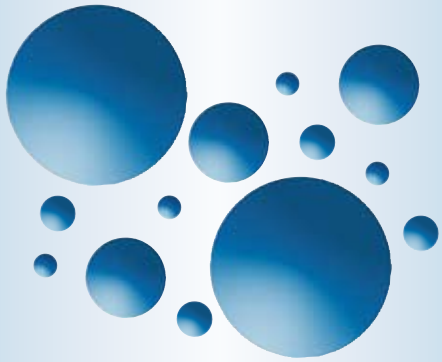


unmodified phase
= long equilibration time

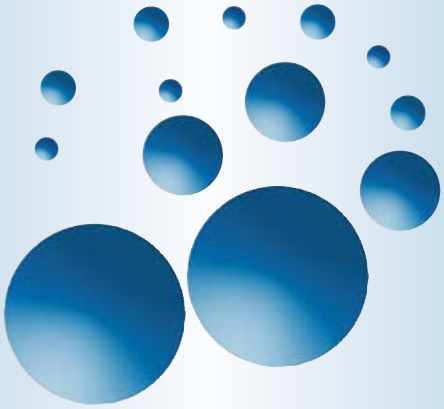


modified phase
= short equilibration time

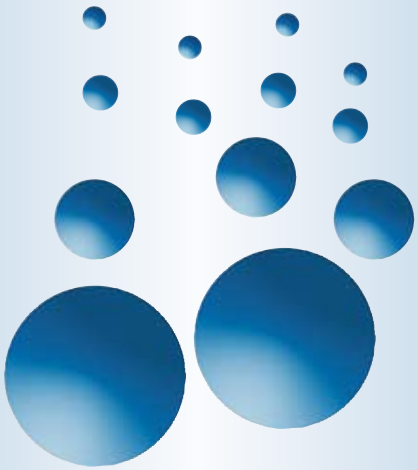
YMC Europe GmbH · Tel.: 02064/427-0 · Fax: 02064/427-222 · Email: info@ymc.de · Website: www.ymc.de



1. Injection



2. Separation

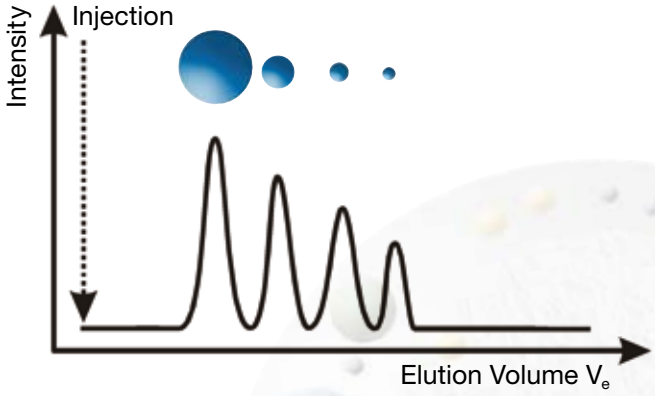


3. Elution of Fraction

Principles of separation

Molecules with shapes such as rigid rods, random chains and spheres but with the same molecular weight can behave differently. The principle of separation is based on different the hydrodynamic radius of the molecules in solution.
Molecules with a larger radius elute earlier and those with the smallest radius are retained longer.

The separation limit can stated such that only those compounds which differ more than 10% in MW can be separated.



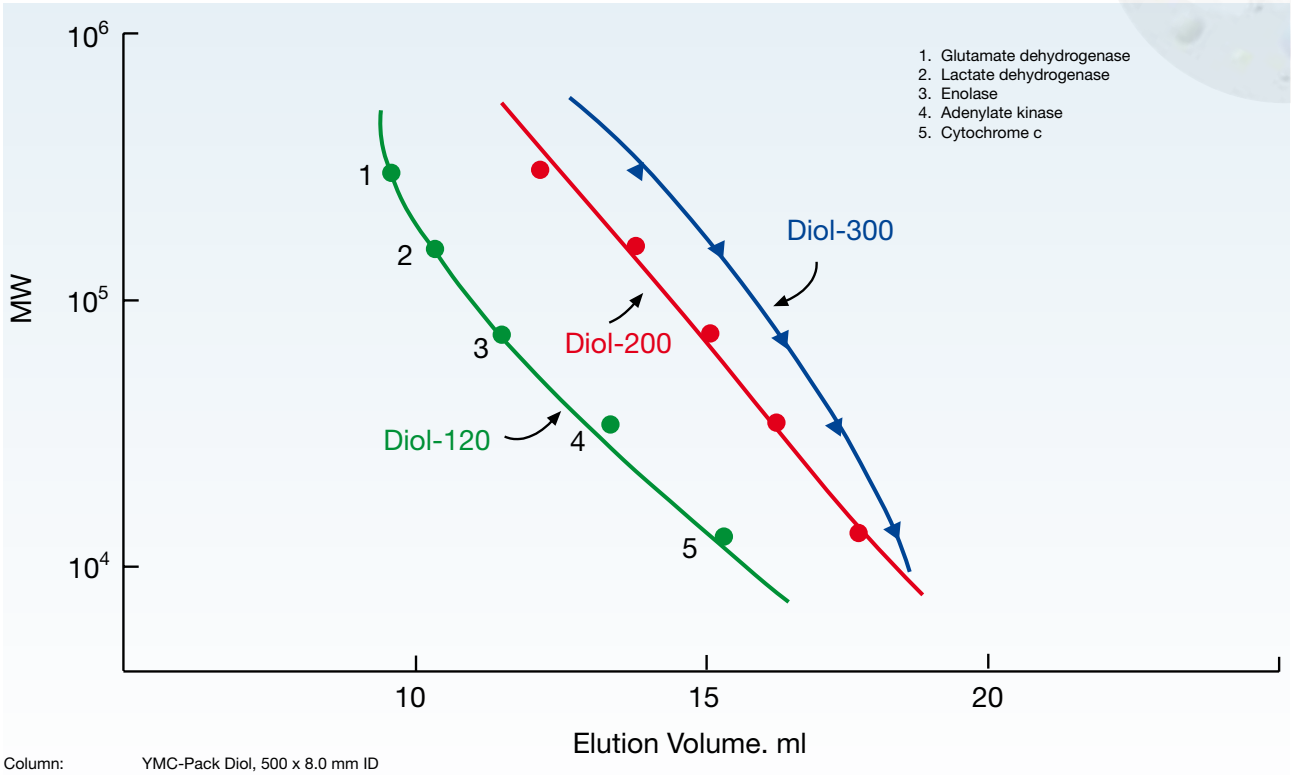
small molecules = long retention time
bigger molecules = short retention time

Large molecules exit the column more rapidly as they cannot permeate the porous structure of stationary phase. Smaller ones with the lowest hydrodynamic volume elute with longer retention times because they are able to penetrate some or all of the pores of the stationary phase. Molecules of intermediate size elute in an intermediate position.

* Application data by courtesy YMC Co., Ltd.

High flexibility

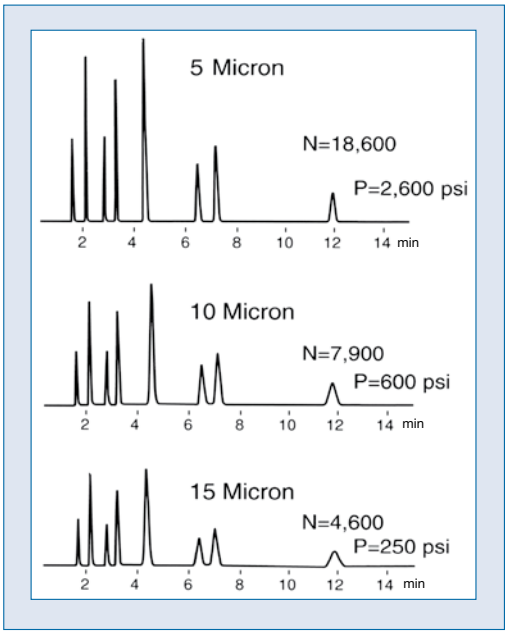
Proteins and Peptides*



Column: YMC-Pack Diol, 500 x 8.0 mm ID
Eluent: 0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2M NaCl
Flow rate: 0.7 ml/min
Temperature: ambient
Detection: UV at 280 nm

YMC-Pack Diol is available in four porosities and is, therefore, suitable for separation and molecular weight determination of a wide range of peptides, proteins, oligonucleotides, carbohydrates and other biopolymers with molecular weights of 10,000 to several hundred thousand.
Furthermore, YMC offers a wide range of column dimensions suitable for analytical determinations to preparative separations.

Scalability

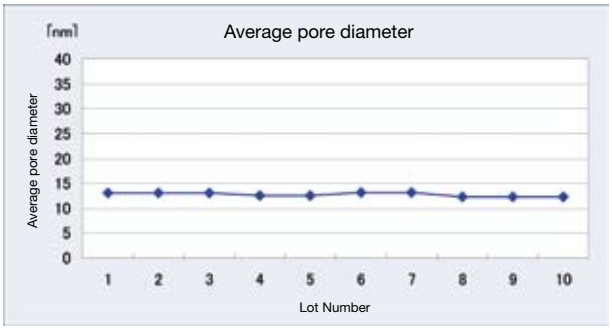


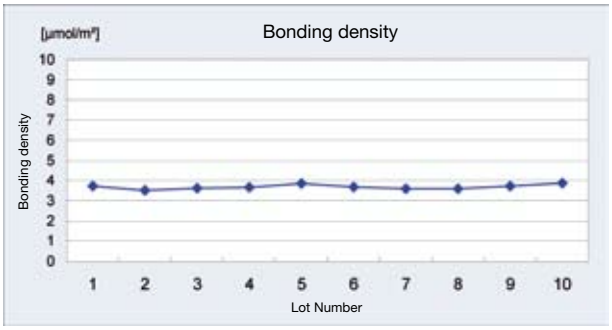
YMC guarantees a seamless, reproducible scale up through all particle sizes for all stationary phases

Reproducibility

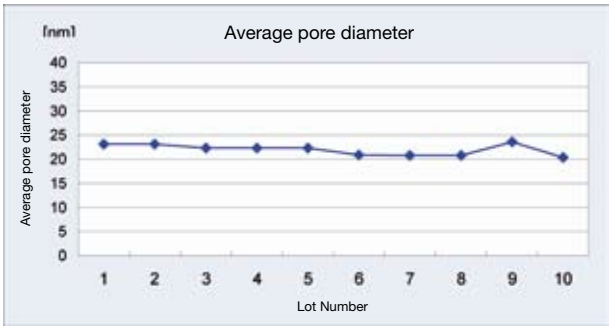
YMC-Pack Diol columns are distinguished, not only by their high flexibility and good cost/performance ratio, but also by their high degree of lot-to-lot reproducibility.

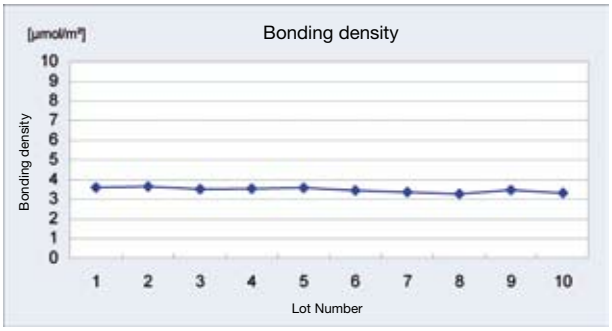
YMC-Pack Diol-120



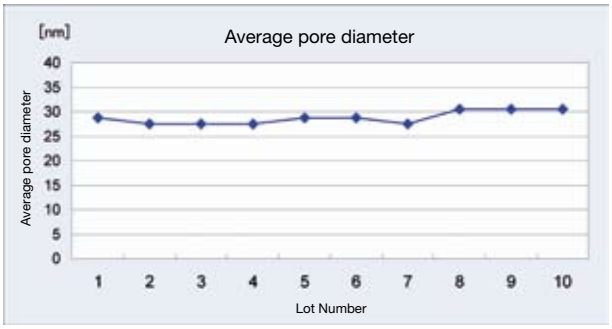


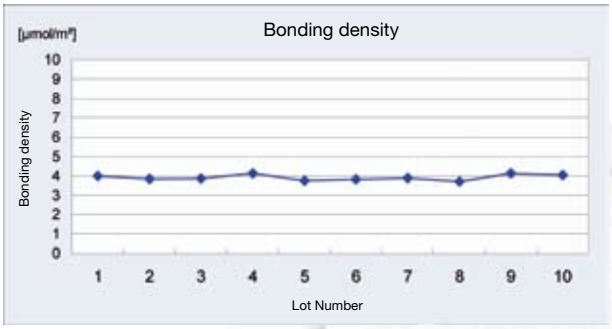
YMC-Pack Diol-200





YMC-Pack Diol-300





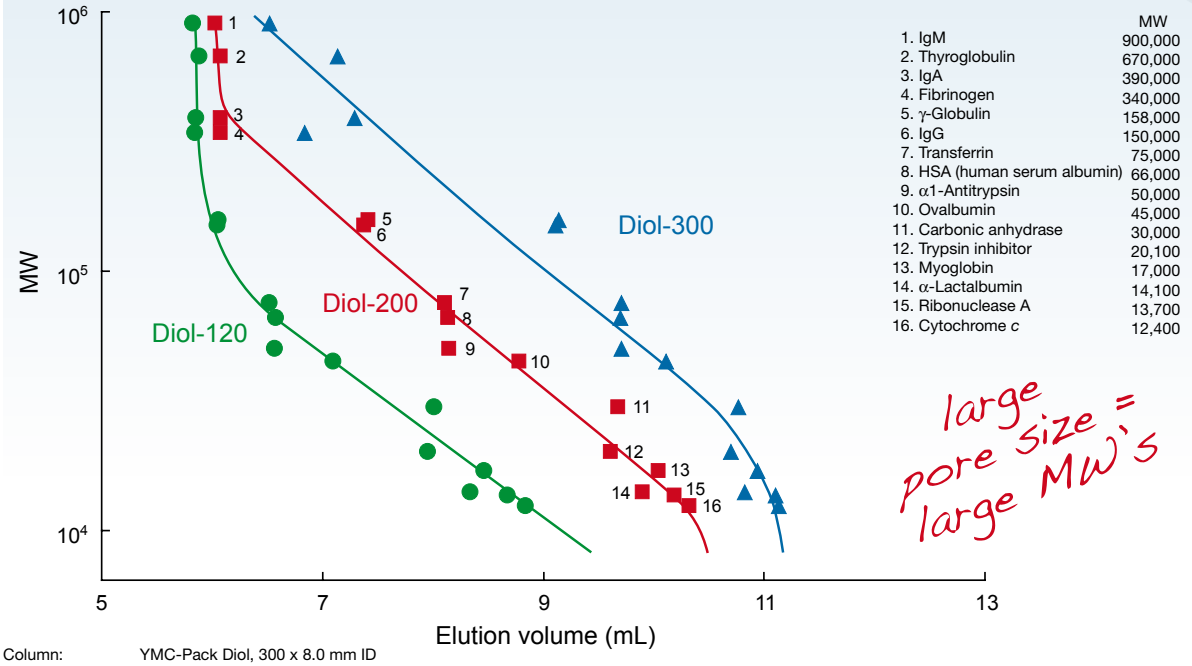
YMC-Pack Diol Columns

YMC-Pack Diol	for small proteins	for intermediate proteins	for large proteins	for very large proteins
pore size / nm	6	12	20	30
particle size / µm	5	5	5	5
surface area / m^2g^{-1}	650	330	175	100
recommended pH range	5.0 - 7.5	5.0 - 7.5	5.0 - 7.5	5.0 - 7.5

* Application data by courtesy YMC Co., Ltd.

YMC applications for SEC

For separation of proteins with molecular weights from 10.000 to several 100.000



	MW
1. IgM	900,000
2. Thyroglobulin	670,000
3. IgA	390,000
4. Fibrinogen	340,000
5. γ-Globulin	158,000
6. IgG	150,000
7. Transferrin	75,000
8. HSA (human serum albumin)	66,000
9. α1-Antitrypsin	50,000
10. Ovalbumin	45,000
11. Carbonic anhydrase	30,000
12. Trypsin inhibitor	20,100
13. Myoglobin	17,000
14. α-Lactalbumin	14,100
15. Ribonuclease A	13,700
16. Cytochrome *c*	12,400

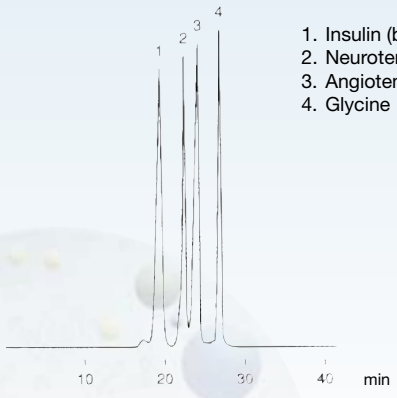
large pore size = large MW`s

Column: YMC-Pack Diol, 300 x 8.0 mm ID
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate: 0.5 ml/min
Temperature: 25 °C
Detection: UV at 280 nm

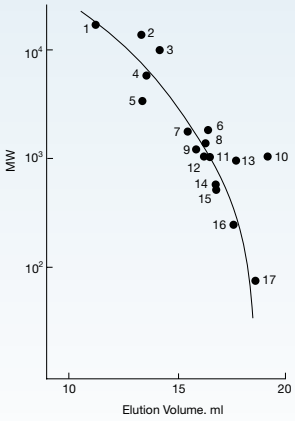
Column Selection Tool

YMC-Pack Diol-60	**for MW < 10.000**
YMC-Pack Diol-120	**for MW 5.000 to 100.000**
YMC-Pack Diol-200	**for MW 10.000 to several 100.000**
YMC-Pack Diol-300	**for MW several 10.000 to 1.000.000**

For separation of proteins with molecular weights from 10.000 or less



1. Insulin (bovine)
2. Neurotensin
3. Angiotensin-II
4. Glycine



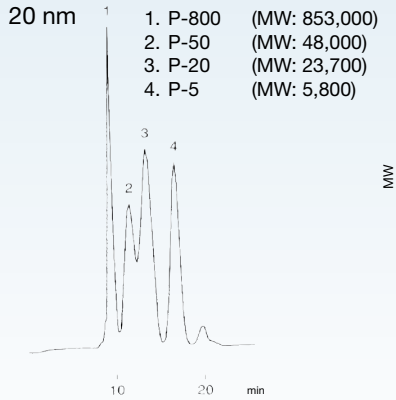
1. Myoglobin	(MW: 17,000)
2. Ribonuclease A	(MW: 13,700)
3. Cytochrome c	(MW: 12,400)
4. Insulin (bovine)	(MW: 5,700)
5. Insulin B chain	(MW: 3,496)
6. α-Mating factor	(MW: 1,684)
7. Neurotensin	(MW: 1,672)
8. Angiotensin-I	(MW: 1,296)
9. CCK-octapeptide	(MW: 1,143)
10. Bradykinin	(MW: 1,060)
11. Angiotensin-II	(MW: 1,040)
12. Oxytocin	(MW: 1,007)
13. Angiotensin-III	(MW: 931)
14. Met-enkephalin	(MW: 573)
15. Leu-enkephalin	(MW: 555)
16. Tetraglycine	(MW: 246)
17. Glycine	(MW: 75)

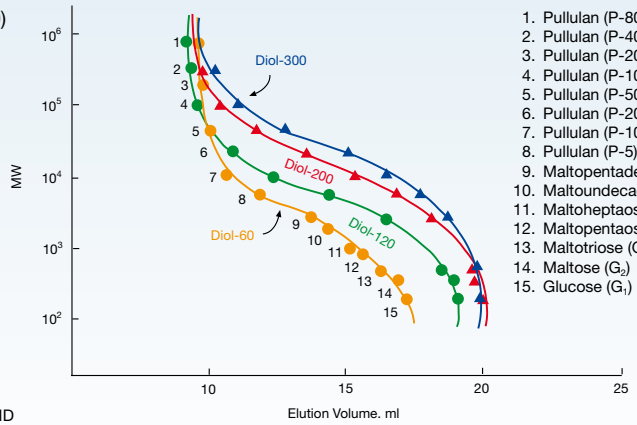
small pore size = small MW`s

Column: YMC-Pack Diol (6 nm) 500 x 8.0 mm ID
Ordering-No.: DL06S055008WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7) containing 0.2 M NaCl / acetonitrile (70/30)
Flow rate: 0.7 ml/min
Temperature: ambient
Detection: UV at 215 nm

YMC applications for SEC

For molecular weight determination of carbohydrates



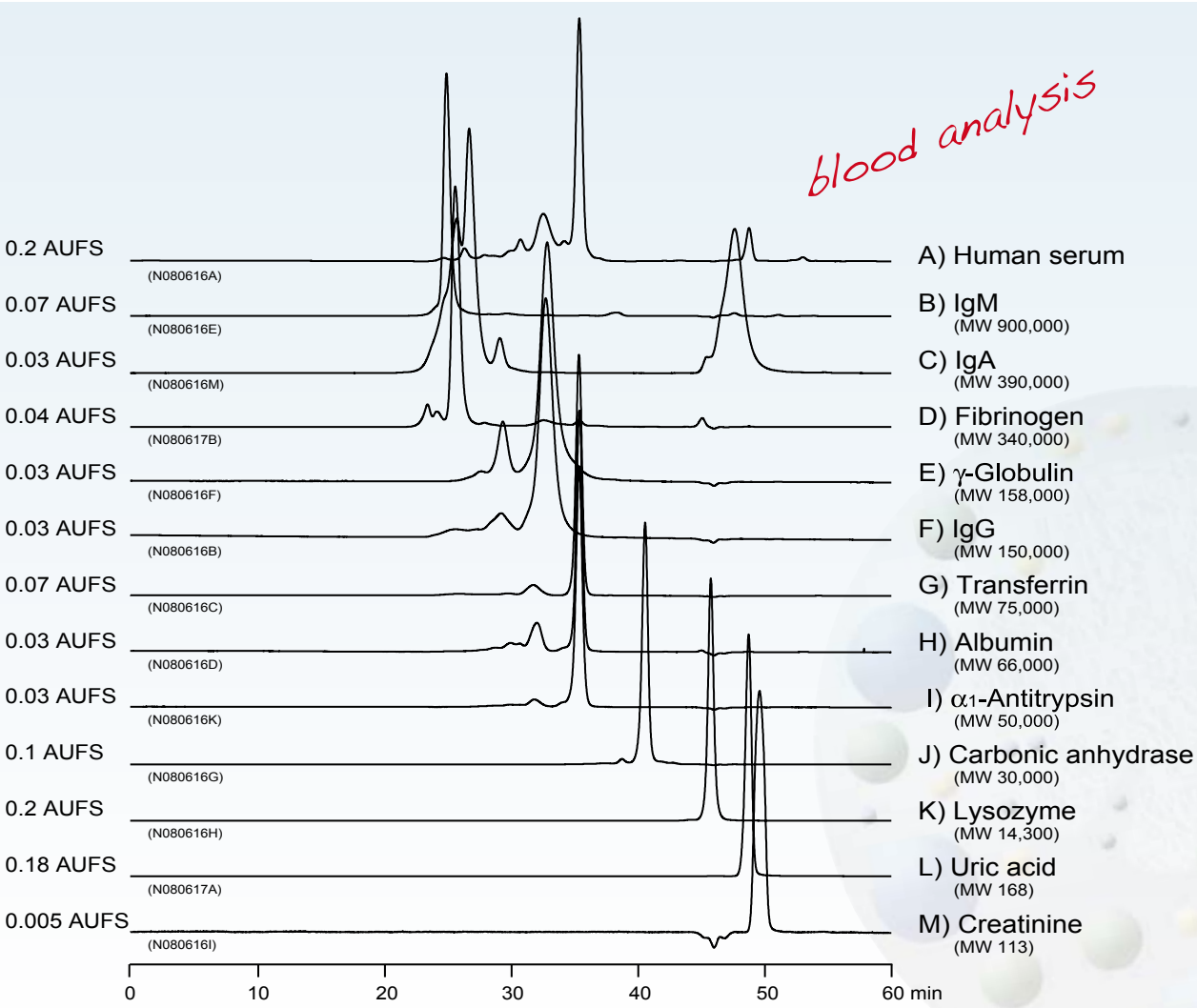


1. Pullulan (P-800) (MW: 853,000)
2. Pullulan (P-400) (MW: 380,000)
3. Pullulan (P-200) (MW: 186,000)
4. Pullulan (P-100) (MW: 100,000)
5. Pullulan (P-50) (MW: 48,000)
6. Pullulan (P-20) (MW: 23,700)
7. Pullulan (P-10) (MW: 12,200)
8. Pullulan (P-5) (MW: 5,800)
9. Maltopentadecaose (G_{15}) (MW: 2,448)
10. Maltoundecaose (G_{11}) (MW: 1,800)
11. Maltoheptaose (G_7) (MW: 1,152)
12. Maltopentaose (G_5) (MW: 852)
13. Maltotriose (G_3) (MW: 504)
14. Maltose (G_2) (MW: 342)
15. Glucose (G_1) (MW: 180)

sugar analysis

Column: YMC-Pack Diol (20 nm) 500 x 8.0 mm ID
Ordering-No.: DL20S055008WT
Eluent: water
Flow rate: 1.0 ml/min
Temperature: ambient
Detection: RI

Plasma constituents

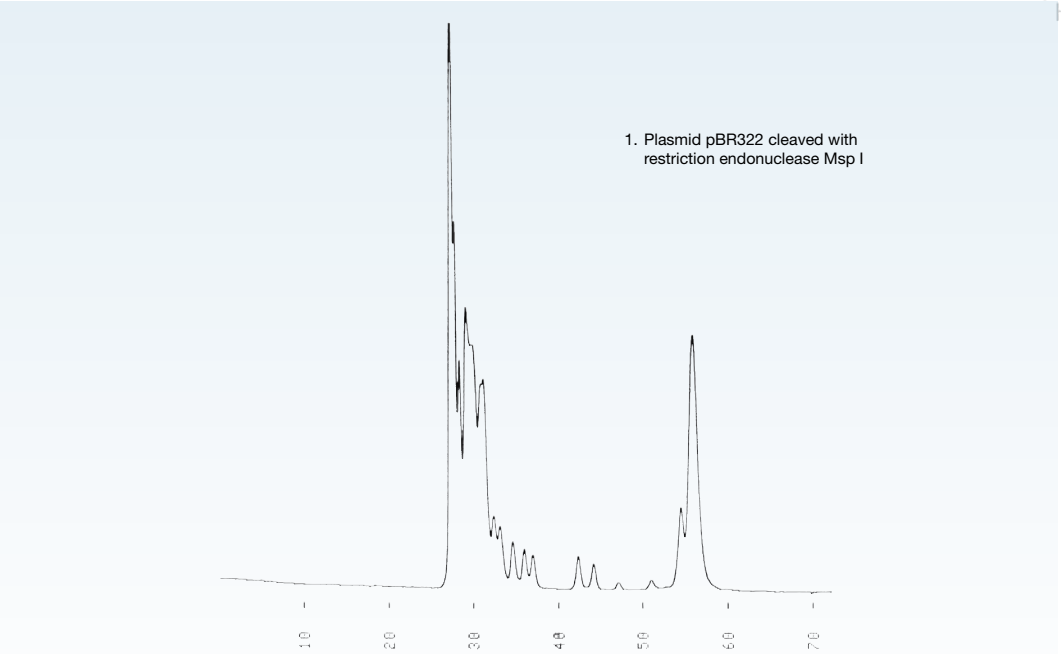


Column: YMC-Pack Diol-300 + Diol-200, 300 x 8.0 mm ID x 2
Ordering-No.: DL30S053008WT + DL20S053008WT
Eluent: 0.1 M $KH_2PO_4K_2HPO_4$ (pH 7.0) containing 0.2 M NaCl
Flow rate: 0.5 ml/min
Temperature: ambient (25 °C)
Detection: UV at 280 nm
Injection: 20 µl (L: 1 µl)
Sample: A) 100 µl/ml; B-M) 1.0 mg/ml

* Application data by courtesy YMC Co., Ltd.

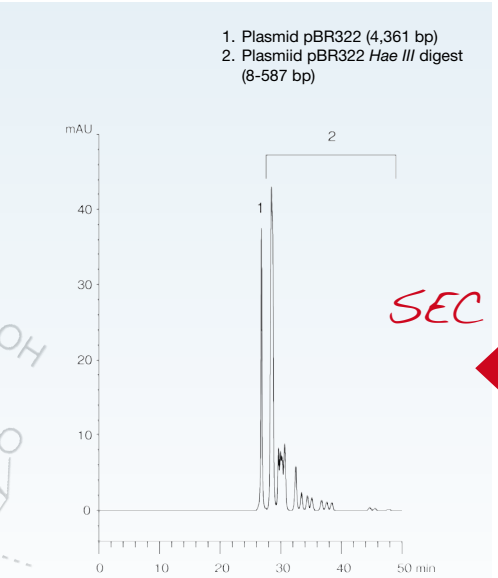
YMC applications for SEC

Plasmid pBR322 restriction fragment

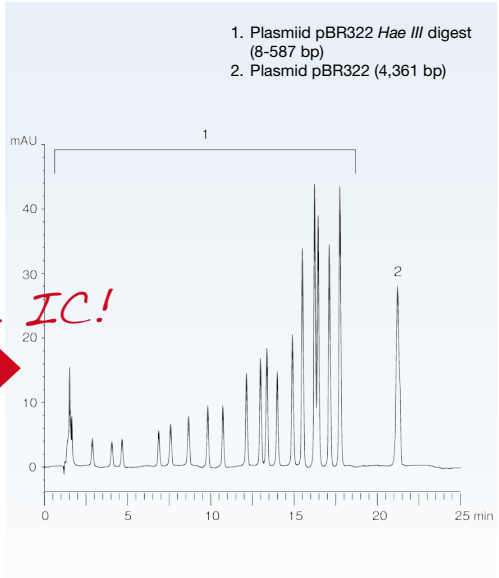


Column:	YMC-Pack Diol-300 + Diol-200, 500 x 8.0 mm ID x 2
Ordering-No.:	DL30S055008WT + DL20S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 260 nm, 0.01 AUFS
Injection:	3 µl (0.49 mg/ml)
Sample:	Plasmid pBR322 cleaved with restriction endonuclease Msp I

Plasmid pBR322 restriction and pBR322 *Hae III* restriction fragment



SEC vs. IC!

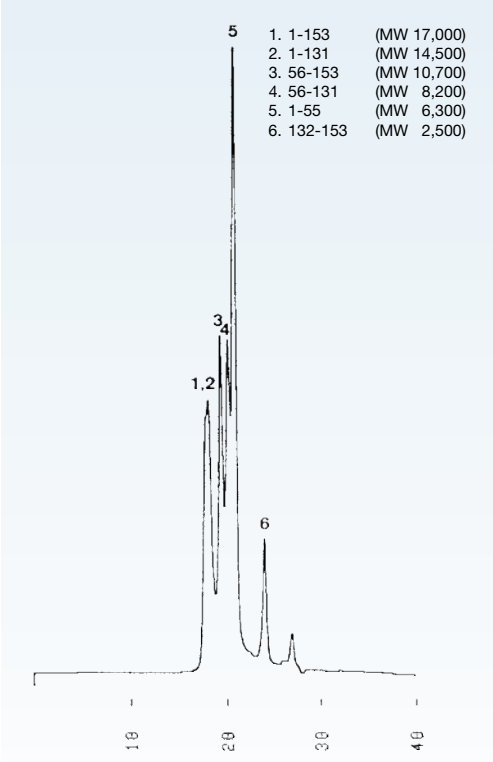


Column:	YMC-Pack Diol-300 + Diol-200, 500 x 8.0 mm ID x 2
Ordering-No.:	DL30S055008WT + DL20S055008WT
Eluent:	0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (25 °C)
Detection:	UV at 260 nm
Injection:	10 µl

Column:	YMC-BioPro QA-F (5 µm), 100 x 4.6 mm ID
Ordering-No.:	QF00S051046WT
Eluent:	A) 20 mM Tris-HCl (pH 8.1) B) 20 mM Tris-HCl (pH 8.1) containing 0.1 M NaCl 70-85% B (0-20 min), 85% B (20-25 min)
Flow rate:	0.5 ml/min
Temperature:	35 °C
Detection:	UV at 260 nm
Injection:	10 µl

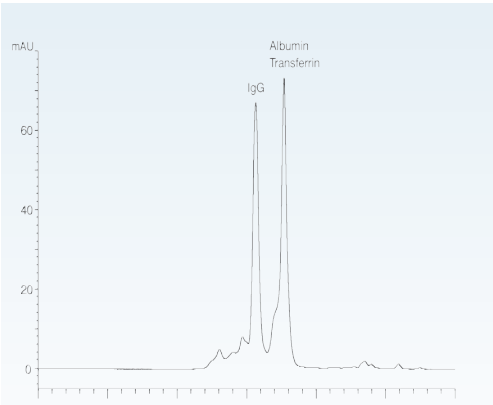
YMC applications for SEC

Peptide fragments from myoglobin



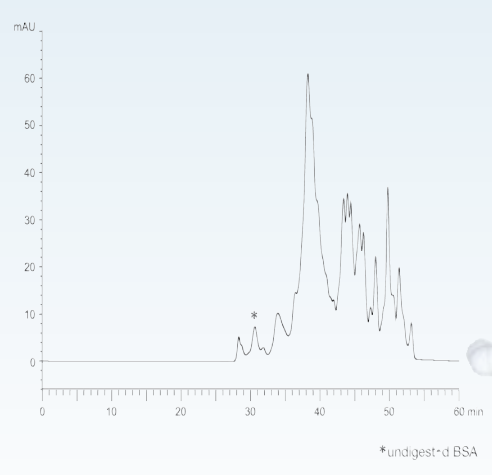
Column: YMC-Pack Diol-120, 500 x 8.0 mm ID
Ordering-No.: DL12S055008WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl/ acetonitrile (70/30)
Flow rate: 0.7 ml/min
Temperature: ambient (25 °C)
Detection: UV at 215 nm, 0.32 AUFS
Injection: 20 µl (2.0 mg/ml)
Sample: Cyanogen bromide cleavages of horse heart myoglobim. Molecular Weight Marker for proteins, manufactured by Fluka Chemie AG.

Proteins in mouse ascites fluid



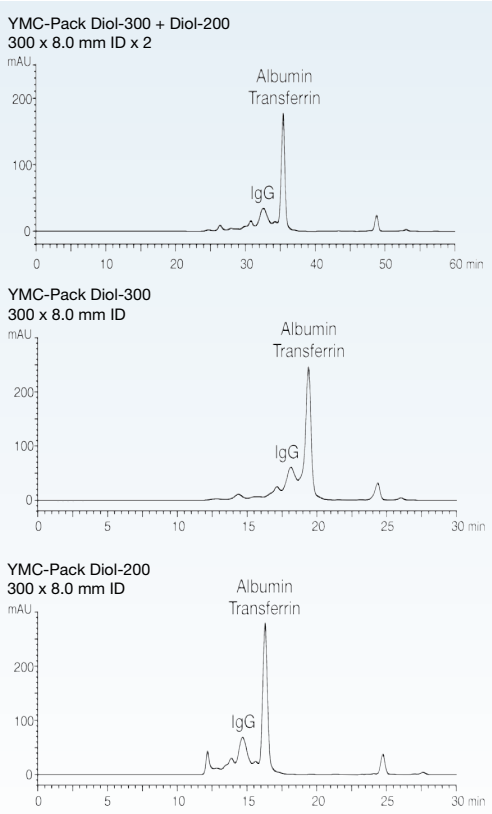
Column: YMC-Pack Diol-300 + Diol-200, 300 x 4.6 mm ID x 2
Ordering-No.: DL30S053046WT + DL20S053046WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0)
Flow rate: 0.17 ml/min
Temperature: ambient (25 °C)
Detection: UV at 220 nm
Injection: 10 µl (60 times dilution with water)

Peptide mapping



Column: YMC-Pack Diol-120 + Diol-60, 500 x 8.0 mm ID x 2
Ordering-No.: DL12S055008WT + DL06S055008WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl/ acetonitrile (70/30)
Flow rate: 0.7 ml/min
Temperature: ambient (25 °C)
Detection: UV at 220 nm
Injection: 5 µl
Sample: Tryptic digest of BSA

Proteins in human serum

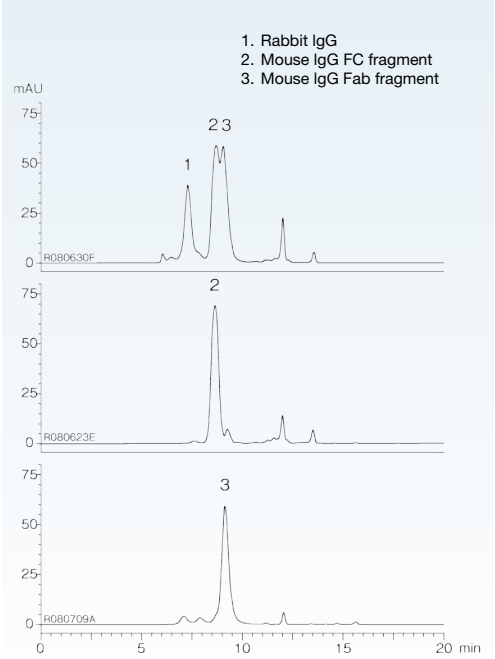


Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate: 0.5 ml/min
Temperature: ambient (25 °C)
Detection: UV at 280 nm
Injection: 20 µl
Sample: Human serum (100 µl/ml)

* Application data by courtesy YMC Co., Ltd.

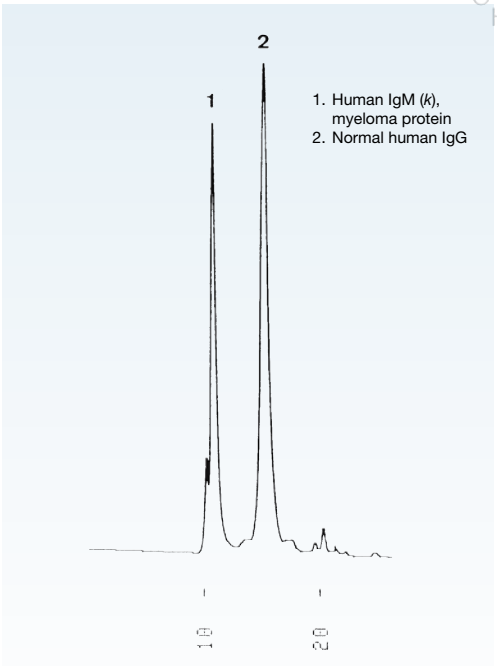
YMC applications for SEC

IgG, Fab and Fc fragments



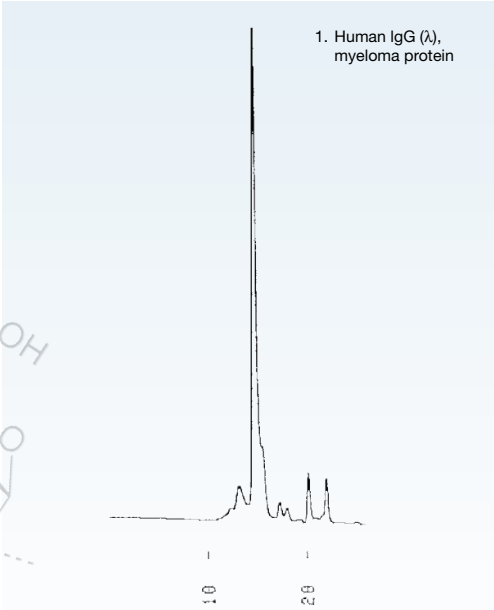
Column: YMC-Pack Diol-200, 300 x 8.0 mm ID
Ordering-No.: DL20S053008WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 6.9) containing 0.2 M NaCl
Flow rate: 1.0 ml/min
Temperature: ambient (27 °C)
Detection: UV at 220 nm
Injection: 5 µl (0.4, 0.5 mg/ml)

Human Immunglobulin



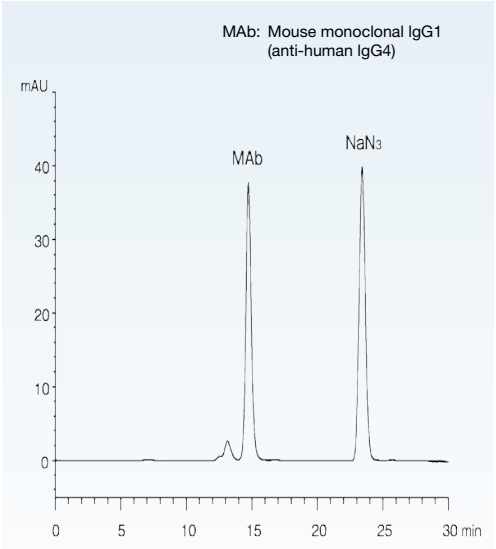
Column: YMC-Pack Diol-300, 500 x 8.0 mm ID
Ordering-No: DL30S055008WT
Eluent: 0.1M NaH_2PO_4-Na_2HPO_4 (pH 6.8) containing 0.1M Na_2SO_4
Flow rate: 1.0 ml/min
Temperature: ambient (24 °C)
Detection: UV at 280 nm, 0.04 AUFS
Injection: 40 µl (0.5 mg/ml)

Human IgG (λ), myeloma protein



Column: YMC-Pack Diol-300 + Diol-200, 500 x 8.0 mm ID x 2
Ordering-No.: DL30S055008WT + DL20S055008WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate: 0.7 ml/min
Temperature: ambient (25 °C)
Detection: UV at 260 nm
Injection: 10 µl

Monoclonal antibody (MAb)

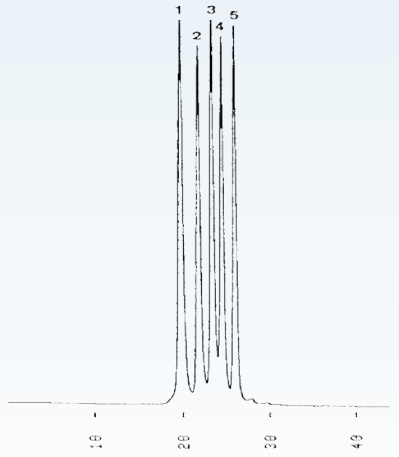


Column: YMC-Pack Diol-200, 300 x 4.6 mm ID
Ordering-No.: DL20S053046WT
Eluent: 0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0)
Flow rate: 0.17 ml/min
Temperature: ambient (25 °C)
Detection: UV at 220 nm
Injection: 10 µl
Sample: a commercially available mouse monoclonal IgG1 (0.05 mg/ml) (purified by DEAE chromatography, containing NaN_3)

YMC applications for SEC

Proteins for molecular weight marker

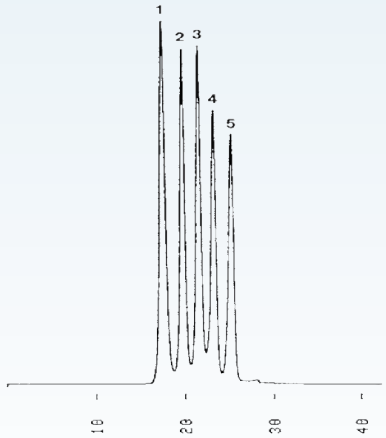
1. Glutamate dehydrogenase (MW 290,000)
2. Lactate dehydrogenase (MW 142,000)
3. Enolase (MW 67,000)
4. Adenylate kinase (MW 32,000)
5. Cytochrome c (MW 12,400)



Column:	YMC-Pack Diol-300, 500 x 8.0 mm ID
Ordering-No.:	DL30S055008WT
Eluent:	0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl / 1 vial)
Sample:	MW-Marker (HPLC), manufactured by ORIENTAL YEAST CO., LTD.

Proteins for molecular weight marker

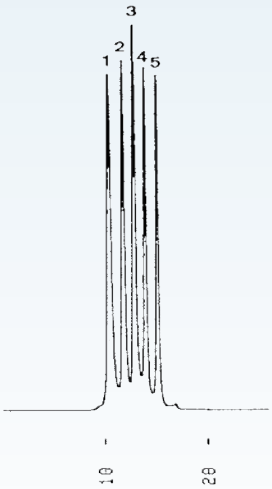
1. Glutamate dehydrogenase (MW 290,000)
2. Lactate dehydrogenase (MW 142,000)
3. Enolase (MW 67,000)
4. Adenylate kinase (MW 32,000)
5. Cytochrome c (MW 12,400)



Column:	YMC-Pack Diol-200, 500 x 8.0 mm ID
Ordering-No.:	DL20S055008WT
Eluent:	0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl / 1 vial)
Sample:	MW-Marker (HPLC), manufactured by ORIENTAL YEAST CO., LTD.

Proteins for molecular weight marker

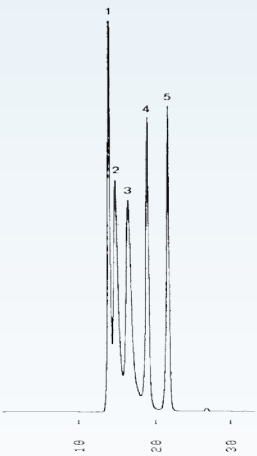
1. Glutamate dehydrogenase (MW 290,000)
2. Lactate dehydrogenase (MW 142,000)
3. Enolase (MW 67,000)
4. Adenylate kinase (MW 32,000)
5. Cytochrome c (MW 12,400)



Column:	YMC-Pack Diol-200, 300 x 8.0 mm ID
Ordering-No.:	DL20S053008WT
Eluent:	0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl / 1 vial)
Sample:	MW-Marker (HPLC), manufactured by ORIENTAL YEAST CO., LTD.

Proteins for molecular weight marker

1. Glutamate dehydrogenase (MW 290,000)
2. Lactate dehydrogenase (MW 142,000)
3. Enolase (MW 67,000)
4. Adenylate kinase (MW 32,000)
5. Cytochrome c (MW 12,400)

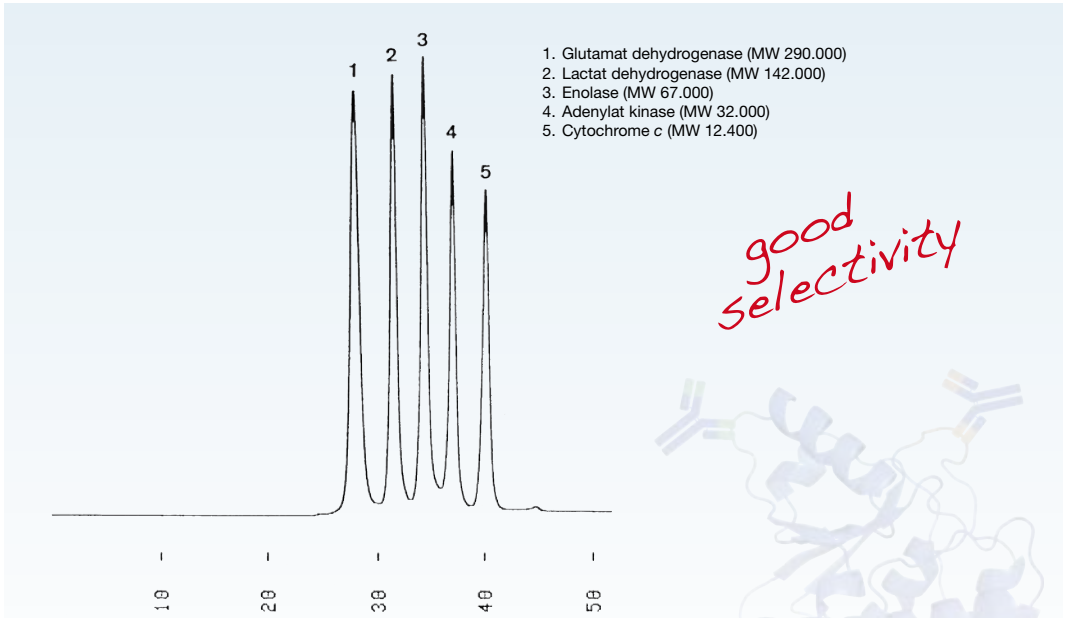


Column:	YMC-Pack Diol-120, 500 x 8.0 mm ID
Ordering-No.:	DL12S055008WT
Eluent:	0.1 M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2 M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl / 1 vial)
Sample:	MW-Marker (HPLC), manufactured by ORIENTAL YEAST CO., LTD.

* Application data by courtesy YMC Co., Ltd.

YMC Applications for SEC

Proteins for molecular weight marker

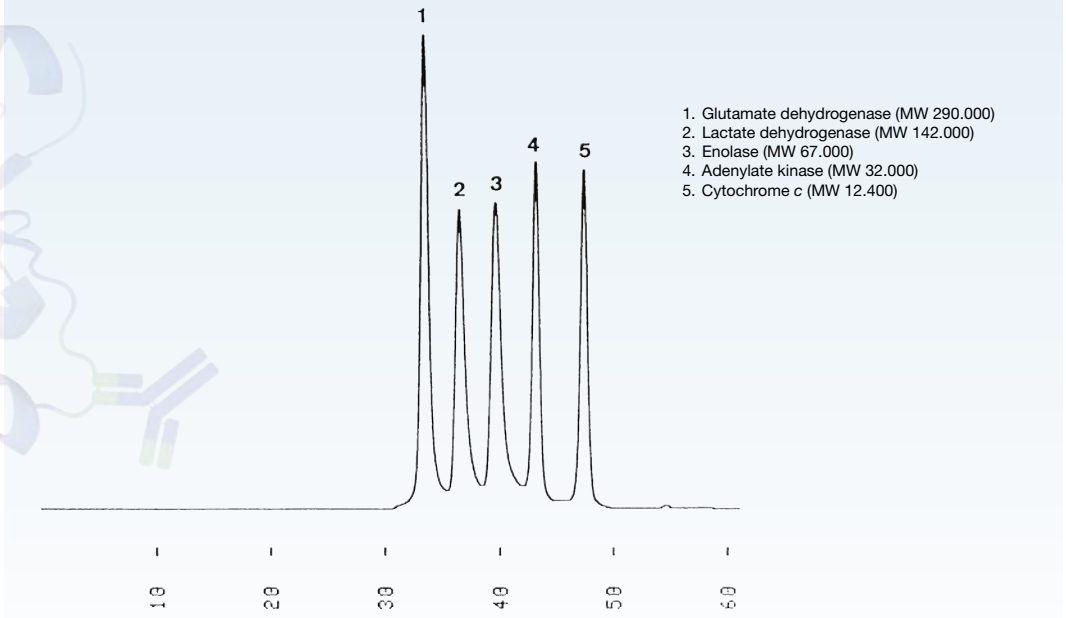


1. Glutamat dehydrogenase (MW 290.000)
2. Lactat dehydrogenase (MW 142.000)
3. Enolase (MW 67.000)
4. Adenylat kinase (MW 32.000)
5. Cytochrome *c* (MW 12.400)

good selectivity

Column:	YMC-Pack Diol-200 + Diol-200, 500 x 8.0 mm ID + 300 x 8.0 mm ID
Ordering-No.:	DL20S055008WT + DL20S053008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl/1 vial)
Sample:	MW-Marker (HPLC) manufactured by ORIENTAL YEAST CO., LTD.

Proteins for molecular weight marker

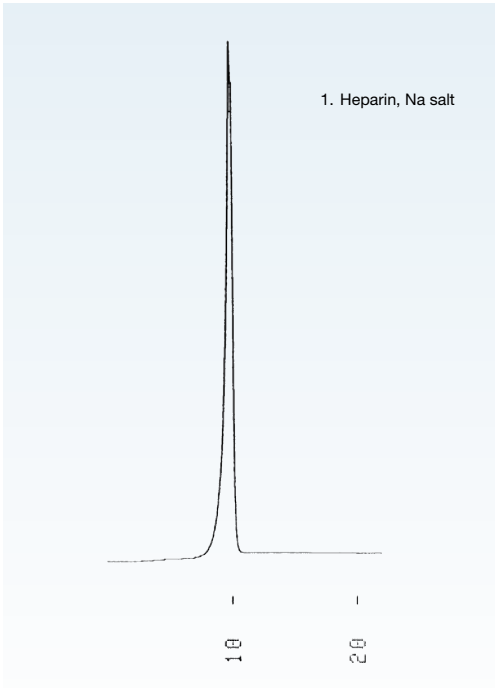


1. Glutamate dehydrogenase (MW 290.000)
2. Lactate dehydrogenase (MW 142.000)
3. Enolase (MW 67.000)
4. Adenylate kinase (MW 32.000)
5. Cytochrome *c* (MW 12.400)

Column:	YMC-Pack Diol-120 + Diol-300, 500 x 8.0 mm ID x 2
Ordering-No.:	DL12S055008WT + DL30S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) containing 0.2M NaCl
Flow rate:	0.7 ml/min
Temperature:	ambient (26 °C)
Detection:	UV at 280 nm, 0.08 AUFS
Injection:	15 µl (100 µl/1 vial)
Sample:	MW-Marker (HPLC) manufactured by ORIENTAL YEAST CO., LTD.

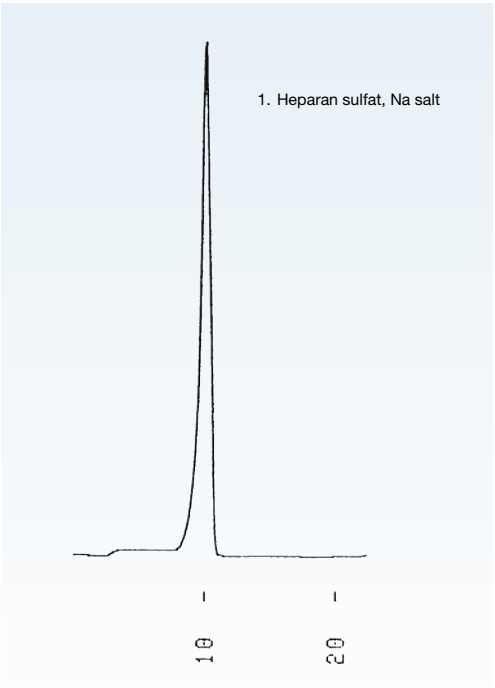
YMC applications for SEC

Heparin



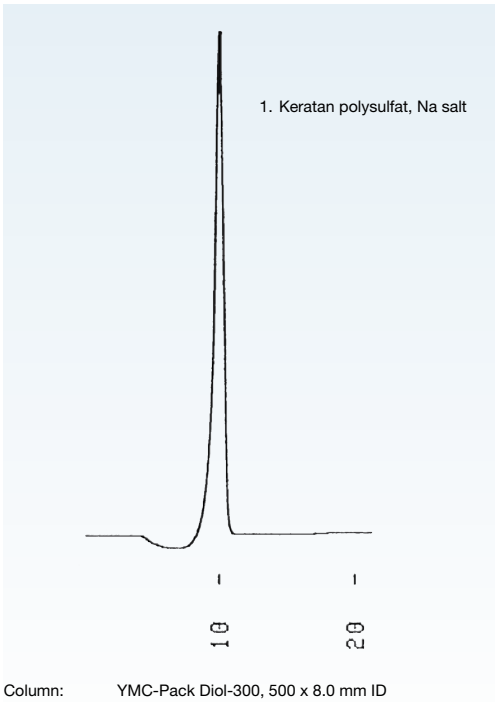
Column: YMC-Pack Diol-300, 500 x 8.0 mm ID
Ordering-No.: DL30S055008WT
Eluent: water
Flow rate: 1.0 ml/min
Temperature: ambient (24 °C)
Detection: RI, 32 x 10^{-6} RIU/FS
Injection: 20 µl (5.0 mg/ml)

Heparin sulfat



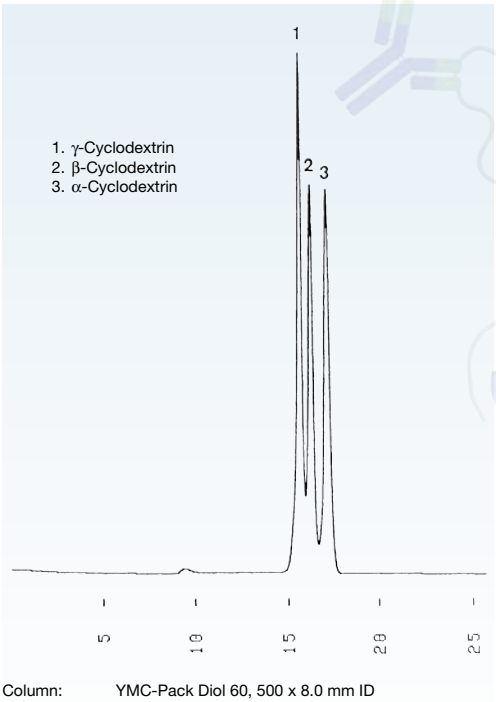
Column: YMC-Pack Diol-300, 500 x 8.0 mm ID
Ordering-No.: DL30S055008WT
Eluent: water
Flow rate: 1.0 ml/min
Temperature: ambient (24 °C)
Detection: RI, 32 x 10^{-6} RIU/FS
Injection: 20 µl (5.0 mg/ml)

Keratan polysulfat



Column: YMC-Pack Diol-300, 500 x 8.0 mm ID
Ordering-No.: DL30S055008WT
Eluent: water
Flow rate: 1.0 ml/min
Temperature: ambient (24 °C)
Detection: RI 32 x 10-6 RIU/FS
Injection: 20 µl (5.0 mg/ml)

Cyclodextrins

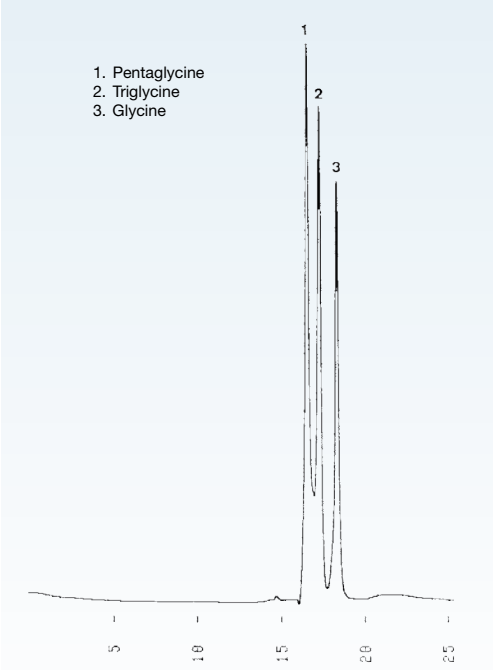


Column: YMC-Pack Diol 60, 500 x 8.0 mm ID
Ordering-No.: DL06S055008WT
Eluent: water
Flow rate: 1.0 ml/min
Temperature: ambient (24 °C)
Detection: RI 32 x 10-6 RIU/FS
Injection: 30 µl (1.67 mg/ml)

* Application data by courtesy YMC Co., Ltd.

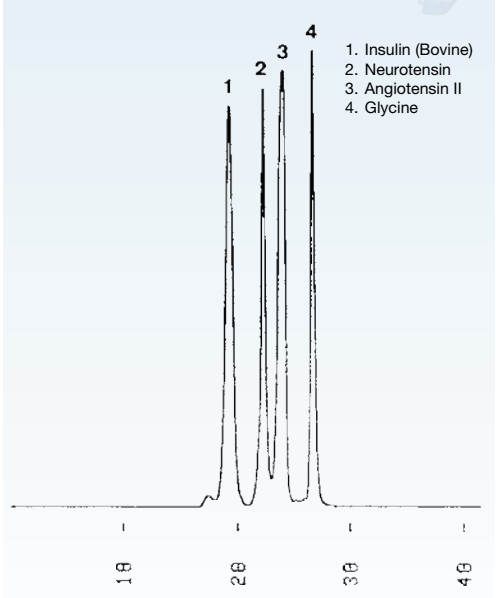
YMC applications for SEC

Glycine oligomers



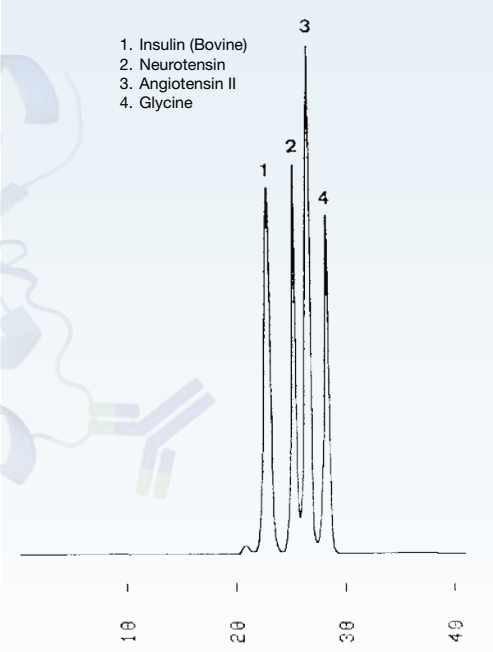
Column:	YMC-Pack Diol-60, 500 x 8.0 mm ID
Ordering-No.:	DL06S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) / acetonitrile (70/30)
Flow rate:	1.0 ml/min
Temperature:	ambient (24 °C)
Detection:	UV at 215 nm, 0.08 AUFS
Injection:	20 µl (0.25 ~ 2.5 mg/ml)

Peptides



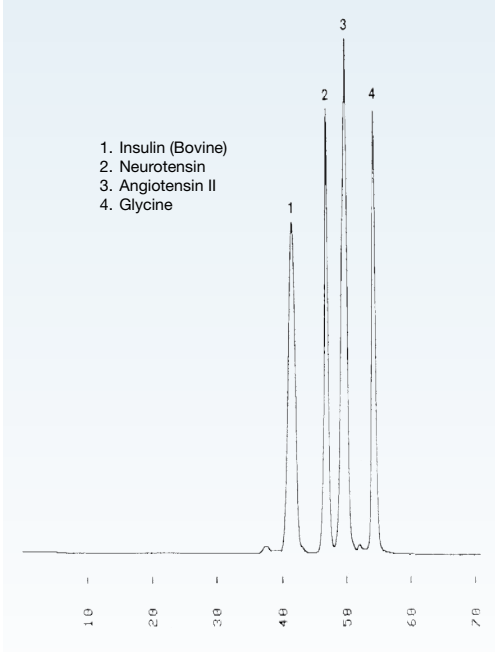
Column:	YMC-Pack Diol-60, 500 x 8.0 mm ID
Ordering-No.:	DL06S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) / containing 0.2 M NaCl / acetonitrile (70/30)
Flow rate:	0.7 ml/min
Temperature:	ambient (25 °C)
Detection:	UV at 215 nm, 0.16 AUFS
Injection:	25 µl (0.07 ~ 5.3 mg/ml)

Peptides



Column:	YMC-Pack Diol-120, 500 x 8.0 mm ID
Ordering-No.:	DL12S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) / containing 0.2 M NaCl / acetonitrile (70/30)
Flow rate:	0.7 ml/min
Temperature:	ambient (25 °C)
Detection:	UV at 215 nm, 0.16 AUFS
Injection:	25 µl (0.07 ~ 5.3 mg/ml)

Peptides



Column:	YMC-Pack Diol-120 + 60, 500 x 8.0 mm ID x 2
Ordering-No.:	DL12S055008WT + DL06S055008WT
Eluent:	0.1M KH_2PO_4-K_2HPO_4 (pH 7.0) / containing 0.2 M NaCl / acetonitrile (70/30)
Flow rate:	0.7 ml/min
Temperature:	ambient (25 °C)
Detection:	UV at 215 nm, 0.16 AUFS
Injection:	25 µl (0.07 ~ 5.3 mg/ml)

Ordering Information

YMC-Pack Diol, 6 nm, 5 µm

Column i.d. (mm)	Column length (mm) 250	300	500
4.6	DL06S052546WT	DL06S053046WT	n.a.
6.0	DL06S052506WT	DL06S053006WT	DL06S055006WT
8.0	n.a.	DL06S053008WT	DL06S055008WT
10.0	DL06S052510WT	DL06S053010WT	DL06S055010WT

YMC-Pack Diol, 12 nm, 5 µm

Column i.d. (mm)	Column length (mm) 250	300	500
4.6	DL12S052546WT	DL12S053046WT	n.a.
6.0	DL12S052506WT	DL12S053006WT	DL12S055006WT
8.0	n.a.	DL12S053008WT	DL12S055008WT
10.0	DL12S052510WT	DL12S053010WT	DL12S055010WT

YMC-Pack Diol, 20 nm, 5 µm

Column i.d. (mm)	Column length (mm) 250	300	500
4.6	DL20S052546WT	DL20S053046WT	n.a.
6.0	DL20S052506WT	DL20S053006WT	DL20S055006WT
8.0	n.a.	DL20S053008WT	DL20S055008WT
10.0	DL20S052510WT	DL20S053010WT	DL20S055010WT

YMC-Pack Diol, 30 nm, 5 µm

Column i.d. (mm)	Column length (mm) 250	300	500
4.6	DL30S052546WT	DL30S053046WT	n.a.
6.0	DL30S052506WT	DL30S053006WT	DL30S055006WT
8.0	n.a.	DL30S053008WT	DL30S055008WT
10.0	DL30S052510WT	DL30S053010WT	DL30S055010WT

Guard Columns are available in different dimensions.
For more details please contact us: Phone 02064-427-0 or email info@ymc.de.

YMC SEC columns provide:

- ✔ **wide range of applications: Proteins, peptides, carbohydrates and nucleic acid components**
- ✔ **good cost/performance ratio**
- ✔ **scalability: from 5 µm to 75 µm**
- ✔ **minimal secondary interactions**

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