

GPC Analysis Service: Proteins, Collagen, and DNA

- **GPC Analysis for Proteins, Collagen, and DNA**

For biological macromolecules, molecular weight determines biological activity and efficacy. Precise analysis is essential for quality control in pharmaceuticals and functional food development.

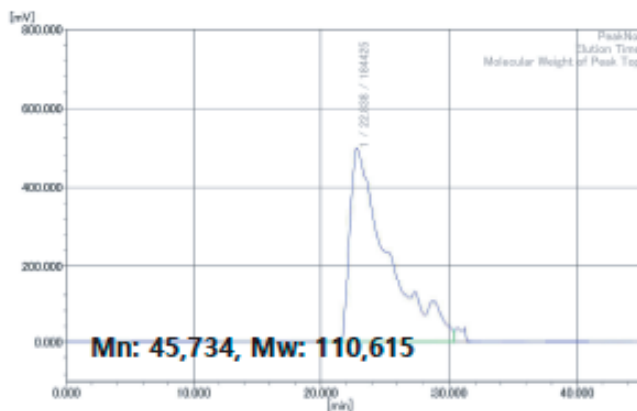
[Sample Submission Guidelines for GPC Analysis]

- 1) Please provide the raw material as-is. Do not perform any pre-treatment, such as dissolution, dilution, or drying, prior to submission.
- 2) 0.5 g to 1.0 g is recommended (Minimum 0.1 g required)

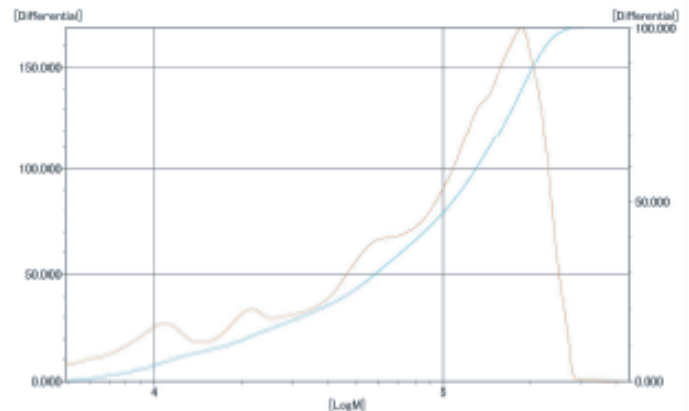
- **Protein Molecular Weight Analysis**

Protein molecular weight is primarily measured using GPC. It is crucial to optimize analysis conditions—including the appropriate column, mobile phase, and reference standards—based on the sample's specific characteristics and expected molecular weight. Furthermore, the selection of RI, UV, or MALS detectors must consider the functional groups and weight range of the sample. For absolute molecular weight determination, MALDI-TOF analysis is also available. Leveraging our extensive analytical expertise, Outermost Technology provides accurate results tailored to your specific sample properties and testing objectives.

<Example of Molecular Weight Analysis for Protein Hydrolysates using GPC-UV>



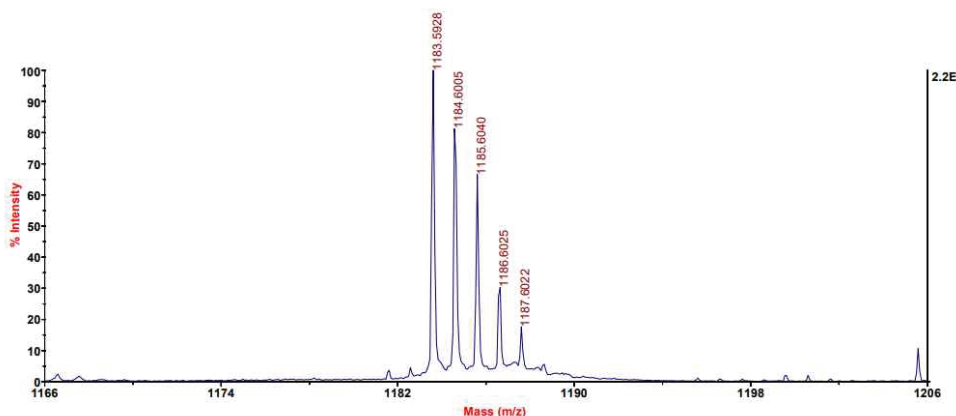
GPC Chromatogram



Molecular Weight Dis

Instrument: Tosoh, HLC-8420 GPC
 Column: Tosoh, Tosoh, TSKgel G4000SWxl + TSKgel G3000SWxl
 Detector: UV
 Eluent: 0.3 M NaCl + 0.1 M NaH₂PO₄, pH 7
 Standard: Protein
 Temperature: 40 °C
 Flow rate: 0.8 mL/min
 Injection volume: 50 µL
 Sample concentration: 1 mg/mL

<Example of MALDI-TOF Analysis for Synthetic Peptides>



Index	Centroid Mass	Lower Bound	Upper Bound	Charge (z)	Height	Relative Intensity	Area	S/N Ratio	Resolution	Isotope Cluster Area
1	1183.592773	1182.87	1184.2	1	21629	100	50008.57	7497.8	8287.17	111371.5
2	1184.600464	1184.2	1185.24	1	17563	81.2	41472.59	3982.19	7459.07	0
3	1185.604004	1185.24	1186.27	1	14396	66.56	26989.06	2687.84	9880.44	18885.42
4	1186.602539	1186.27	1187.01	1	6559	30.32	13443.5	1320.78	7757.9	0
5	1187.602173	1187.01	1188.05	1	3811	17.62	7319.56	661.7	11325.77	0

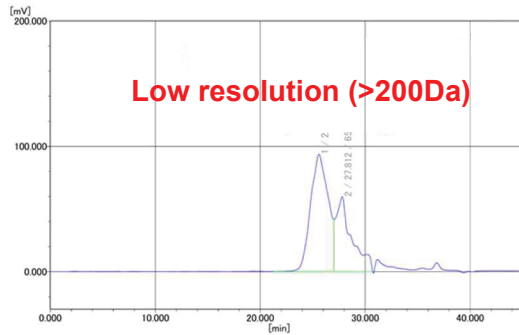
Instrument: AB SCIEX, 5800 System
 Solvent: Acetonitrile
 Matrix: α-Cyano-4-hydroxy-cinnamic acid (CHCA)
 Laser: Nd-YAG laser

- **Molecular Weight Analysis of Low-Molecular-Weight Collagen Peptides**

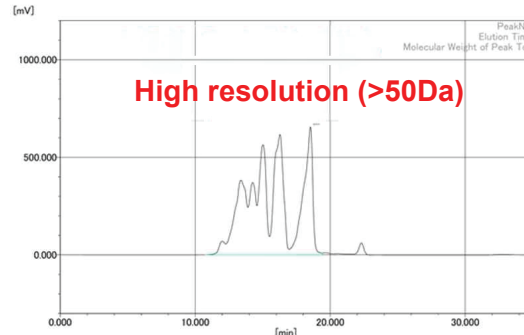
Recently, a wide range of cosmetics and health functional foods featuring collagen as a primary ingredient have been launched. In particular, "low-molecular-weight collagen peptides"—produced by hydrolyzing collagen to maximize bioavailability—are gaining significant attention as a key raw material. Unlike typical high-molecular polymers, lowmolecular collagen has a weight of less than 1,000 Da. Accurately analyzing these materials requires a specialized system, including peptide-specific columns, optimized mobile phases, and professional protein standards.

Following the GB31645 national standards for collagen analysis, Outermost Technology provides precise analysis of even the finest molecular weight differences. Our dedicated systems support both innovative product development and rigorous quality control.

<Comparison of Molecular Weight Analysis Results: General vs. Collagen-Specific Conditions>



[Aqueous Polymer analysis conditions]



[Collagen analysis conditions]

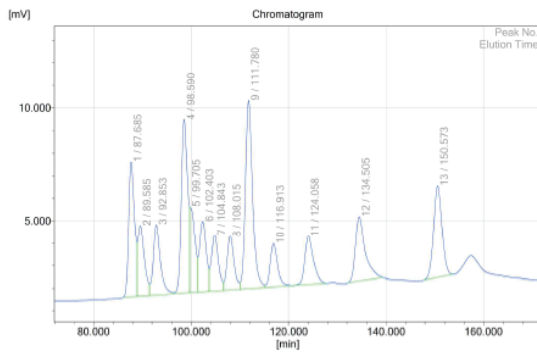
Instrument: Tosoh, HLC-8420 GPC
 Column: Tosoh, TSKgel GMPWxl+G2500PWxl
 Detector: RI
 Eluent: 0.1 M NaNO3
 Standard: PEG/PEO
 Temperature: 40 °C
 Flow rate: 1 mL/min
 Injection volume: 50 µL
 Sample concentration: 1 mg/mL

Instrument: Tosoh, HLC-8420 GPC
 Column: Tosoh, TSKgel G2000SWxl
 Detector: UV
 Eluent: 0.1 M NaNO3 + 40 % ACN + 0.05 % TFA
 Standard: Protein
 Temperature: 40 °C
 Flow rate: 0.5 mL/min
 Injection volume: 10 µL
 Sample concentration: 5 mg/mL

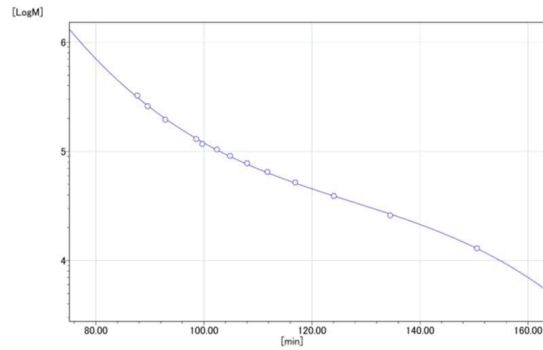
• Molecular Weight Analysis of DNA and PDRN

Recently, PDRN (Polydeoxyribonucleotide), known for inducing tissue regeneration, has gained significant attention in the medical device and cosmetic industries. Selecting the appropriate molecular weight is crucial for efficacy, and precise analysis is essential for verifying raw material performance and quality control. Unlike traditional electrophoresis, which relies on visual confirmation, GPC analysis provides quantified reports featuring Mn, Mw, and PDI, ensuring high data objectivity and reliability. By utilizing high-sensitivity detectors and DNA-specific columns, we identifies even the smallest differences in molecular weight, offering the optimal solution for proving the safety and functionality of your raw materials.

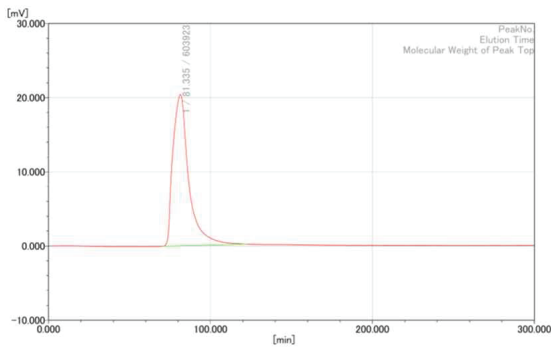
<Example of Calibration Curve and Molecular Weight Analysis Results using DNA Standards>



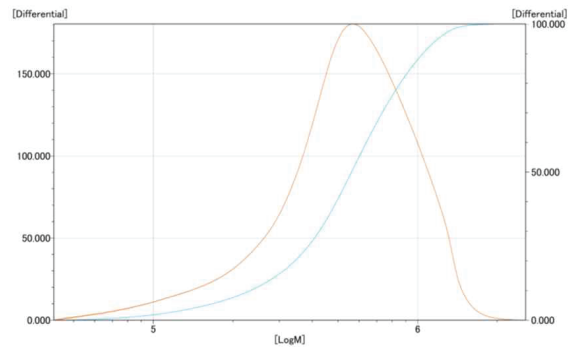
[GPC chromatogram of standard (DNA ladder) material]



[Calibration curve]



[GPC Chromatogram]



[Molecular Weight Distribution Curve]

Instrument: Tosoh, HLC-8420 GPC
Column: Tosoh, TSKgel G4000SWxl + TSKgel G3000SWxl
Detector: UV
Eluent: 0.1 M NaNO₃ + 0.3 M NaCl
Standard: DNA Ladder
Temperature: 40 °C
Flow rate: 0.2 mL/min
Injection volume: 10 µL
Sample concentration: 1 mg/mL