

## GPC Analysis Service: Hyaluronic Acid

### • **Molecular Weight Analysis of Hyaluronic Acid**

Hyaluronic Acid (HA) is the primary raw material for high-value medical devices such as dermal fillers. Its molecular weight is a critical factor that determines the product's viscoelasticity, and it directly influences moldability, longevity within the body, and overall safety. Therefore, measuring molecular weight is an essential process in high-quality product development; it verifies whether physical properties meet the design intent and ensures consistency across different production lots or throughout the manufacturing process. By securing reliable molecular weight data with our ISO/IEC 17025 accredited laboratory—you can enhance your R&D outcomes, ensure systematic quality control, and strengthen your product's competitiveness and market value.

#### • Guide for Sample Preparation

- 1) Please provide samples in their original state without any pre-treatment, such as dissolution, dilution, or drying.
- 2) Standard amount: 0.5 g – 1 g (Minimum: 0.1 g or more)

### • **Characteristics and Key Applications of Hyaluronic Acid**

Hyaluronic Acid (HA) possesses exceptional biocompatibility and powerful moisture retention capabilities. By controlling its molecular weight, viscosity and absorption rates can be precisely engineered, making it an essential ingredient for high-performance formulations in the pharmaceutical and aesthetic industries. We recommend selecting raw materials that align with your product's specific objectives and ensuring their suitability and homogeneity through precise molecular weight measurement.

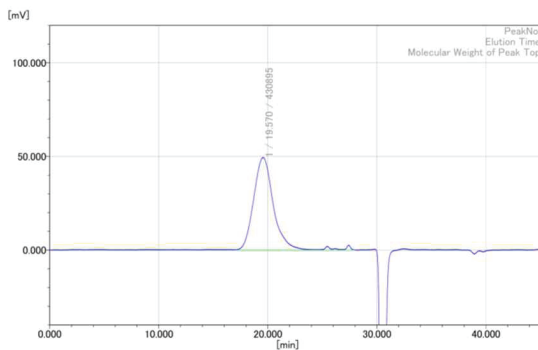
#### <Example of MALDI-TOF Analysis for Synthetic Peptides>

Category	Features	Uses
Low Molecular Weight (LMW) HA	High skin penetration/absorption, deep hydration, promotes tissue regeneration.	Anti-aging serums, functional cosmetics, supplement ingredients.
High Molecular Weight (HMW) HA	Superior viscoelasticity, surface moisture barrier formation, anti-inflammatory properties.	Dermal fillers, ophthalmic viscoelastics (eye surgery), topical moisturizers.

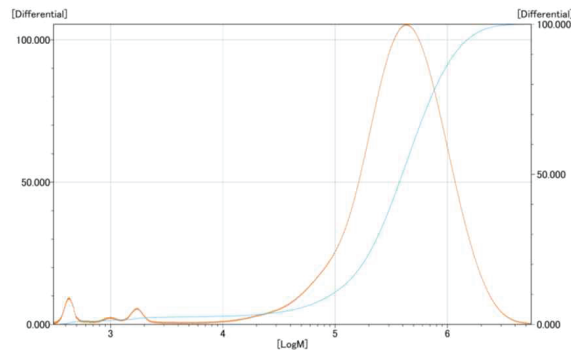
- **Customized Molecular Weight Analysis for Hyaluronic Acid Materials**

We utilize GPC (Gel Permeation Chromatography) to provide high-precision molecular weight data for Hyaluronic Acid. Setting the right analytical parameters—such as columns, mobile phases, and standards—is crucial for reliable results. For standard samples, we employ RI detection; however, for ultra-high molecular weight HA (over 1,000,000 Da) we offer absolute molecular weight measurement via MALS (Multi-Angle Light Scattering) for superior accuracy. Leverage our accumulated expertise to obtain the most reliable analytical solutions customized to your specific research and quality control needs.

**<Analysis Example of Hyaluronic Acid via GPC-RI>**



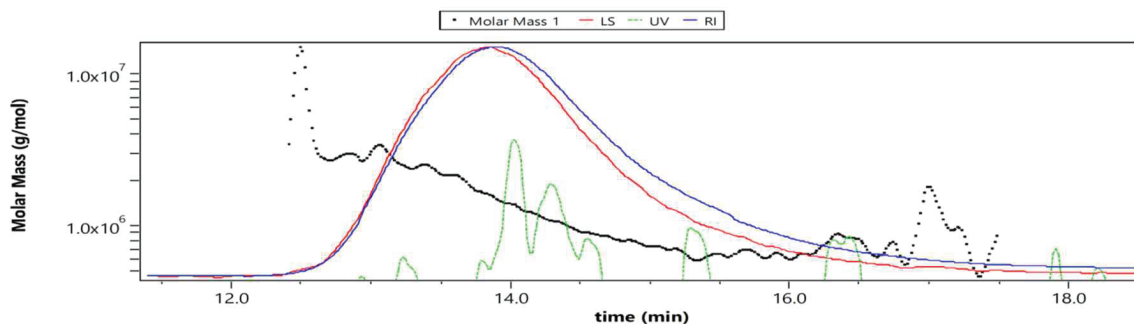
**[GPC Chromatogram]**



**[Molecular Weight Distribution Curve]**

Instrument: Tosoh, HLC-8420 GPC  
Column: Tosoh, TSKgel GMPWxl + TSKgel G2500PWxl  
Detector: RI  
Eluent: 0.1 M NaNO<sub>3</sub>  
Standard: Polysaccharide (Pullulan)  
Temperature: 40 °C  
Flow rate: 1 mL/min  
Injection volume: 50 µL  
Sample concentration: 1 mg/mL

**<Analysis Example of Hyaluronic Acid via SEC-MALS>**

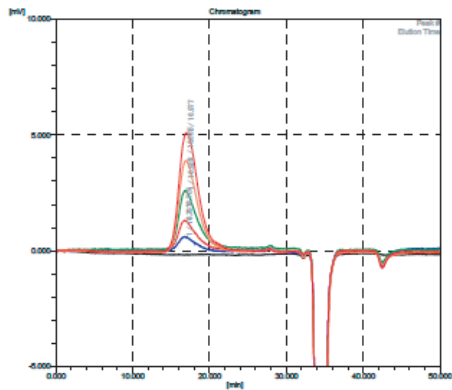


Instrument: Wyatt Technology, DAWN®  
 Column: Tosoh, TSKgel G6000PWxl + TSKgel G5000PWxl  
 Eluent: 0.1 M NaNO3  
 Temperature: 20 °C  
 Flow rate: 1 mL/min  
 Injection volume: 50 µL  
 Sample concentration: 1 mg/mL  
 dn/dc: 0.16 mL/g

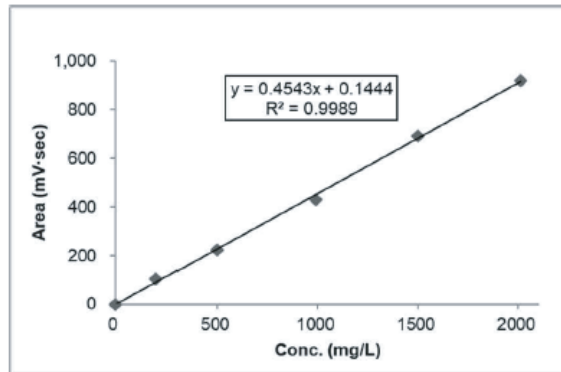
• **Analysis of Hyaluronic Acid Content**

Dermal fillers often feature sophisticated blends of Hyaluronic Acid and other materials like PLA, PCL, collagen, CMC, or PDRN. For these finished products, precisely measuring the HA content is a vital quality metric alongside molecular weight analysis. Wel provides specialized GPC solutions to isolate and analyze HA content within even the most complex matrices. Leverage our analytical insights to optimize your product formulations and maintain rigorous quality standards for large-scale production.

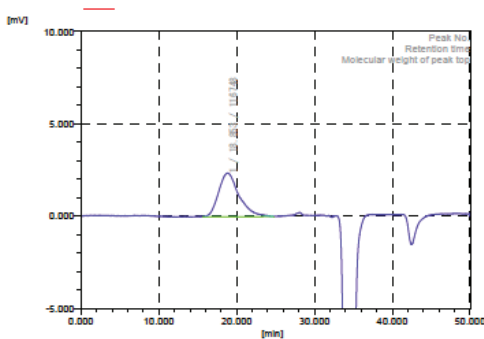
<Example of Hyaluronic Acid Content Analysis in Dermal Fillers via GPC>



[GPC Chromatogram of Standard material]



[Calibration curve]



[GPC Chromatogram of Sample material]

Area (mV·s)	HA Density (mg/kg)	Dilution factor	HA Content (%)
738.43	1 625.11	202.53	32.91

[Content of Hyaluronic acid]

- **Evaluation of Performance and Physico-chemical Properties of Dermal Fillers**

We offers comprehensive testing for Hyaluronic Acid fillers, aligned with MFDS guidelines. Beyond molecular weight and content, we provide precise evaluations of essential properties—including residual BDDE, viscosity, pH, heavy metals, and Melt Flow Index (MFI)—to ensure product safety and regulatory compliance.

**<Physico-chemical Test Specifications for Dermal Fillers>**

Test Items	Specifications	Test Methods
Appearance	Colorless, transparent, and free from foreign matter	Visual Inspection
Extractable Volume	Not less than the labeled volume	USP <697>
HA Identification	Must comply with established identification methods	USP monograph for sodium hyaluronate
HA Content	90% - 110% of the labeled amount	USP monograph for sodium hyaluronate
Residual BDDE	≤ 2 ppm	USP <621>
Viscosity	0 ± 0 cP	USP <911> & <912>
pH	5.5 ~ 8.5	USP <791>
Heavy Metals	Not darker than the control	USP <231>
Lidocaine Hydrochloride	2.7 ~ 3.3 mg/mL	USP monograph for lidocaine hydrochloride