

# Market Analysis Report — Hyaluronic Acid

## Product Overview

Hyaluronic acid, also known as HA. It is widely found in the human body and has the highest content in tissues such as the umbilical cord and joint synovial fluid. It is the main component of connective tissues such as human intercellular substance, vitreous body, and joint synovial fluid. This substance plays an important physiological function in the body of retaining water, maintaining extracellular space, regulating osmotic pressure, lubricating, and promoting cell repair. It has excellent water retention, lubricity, viscoelasticity, biodegradability and biocompatibility, and is used in medicine, food, beauty and skin care.

## The Role/ Functions of Hyaluronic Acid

Moisturizing skin

Anti-Aging

Nourish the skin

Promote wound healing

Lubricate joints, anti-bacterial and anti-inflammatory

Other health functions: eye health, brain health, gastrointestinal protection, immunity improvement, etc.

## Product Category

According to different application fields and quality requirements, hyaluronic acid raw materials are mainly divided into three categories: pharmaceutical grade (including injection grade and eye drops grade), cosmetic grade and food grade. The main uses are:

1. In the medical field, using the viscoelasticity of hyaluronic acid, it can be used in orthopedics and ophthalmology surgery, soft tissue filling and wound care, postoperative anti-adhesion, etc., and can also be used as a drug carrier.

2. Food additives: It is approved as a food additive in developed countries such as Japan, France, and South Korea. It can be used as a food additive by adding health products, functional foods, and high-end snacks. To specific beauty and health care functions.

3. Beauty: Hyaluronic acid can be used for injection filling and external application. The former relies on the viscoelasticity, biocompatibility and other characteristics of hyaluronic acid to achieve the filling effect and meet the needs of shaping. The latter is because hyaluronic acid has the characteristics of water retention and skin barrier maintenance. Applying hyaluronic acid directly can replenish, moisturize, lock in moisture and reduce wrinkles. In the past 10 years, the penetration rate of injection-filling medical aesthetic surgery has continued to increase, and the frequency of surgery has increased. The demand for moisturizers in cosmetic daily chemical products has continued to be strong, which has led to a rapid increase in the market demand for hyaluronic acid.

Application field	Effect	Application field
<b>Pharmaceutical</b>	<ol style="list-style-type: none"> <li>1. It can replace joint synovial fluid, relieve pain and promote the healing of joint injuries.</li> <li>2. Used to fill and expand the skin, etc., to improve the defects of the filling site.</li> <li>3. Prevent postoperative adhesions and reduce scar formation.</li> <li>4. Protect the surface of tissues from dehydration and harmful substances.</li> <li>5. It can be used as a targeted drug carrier for tumor treatment.</li> </ol>	<p>Viscoelasticity supplement therapy (medicine for improving knee arthritis, osteoarthritis and frozen shoulder).</p> <p>Viscoelastic filling (soft tissue filler).</p> <p>Viscoelastic barrier (anti-adhesion after operation).</p> <p>Viscoelastic protection (ophthalmic viscoelastic agent, contact lens protector).</p> <p>Drug carrier.</p>
<b>Cosmetics</b>	<ol style="list-style-type: none"> <li>1. It has extremely high water retention performance.</li> <li>2. It can reduce ultraviolet radiation and repair skin damage caused by ultraviolet rays.</li> <li>3. When the skin is mildly burned, applying HA-containing cosmetics can relieve pain and accelerate the healing of the injured area.</li> <li>4. Excellent lubricity and film-forming properties; thickening and stabilizing emulsification.</li> </ol>	Used in skin care, hair, makeup, cleaning and other products.
<b>Food</b>	Replenish water, improve joint function and osteoporosis, repair gastric mucosal damage, promote wound healing, improve cardiovascular system, improve symptoms of rickets, improve human immunity, and promote angiogenesis.	Used in health foods such as capsules, tablets, granules, oral liquids, or ordinary foods such as beverages and candies.

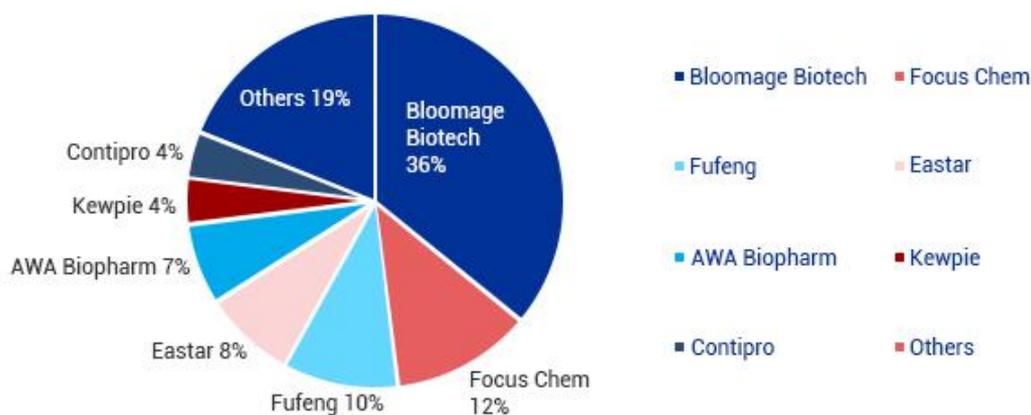
## Market Overview

China is the world's largest producer and marketer of hyaluronic acid, and the top 5 hyaluronic acid manufacturers in global sales are all Chinese companies. Among them, Huaxi Biotech accounts for about 36% of the global sales, and Focus Biotech accounts for 12%. Overseas manufacturers include: Kewpie from Japan, Contipro from Czech, Soliance from France, Bioland from South Korea, Evonik from Germany, Shiseido from Japan, HTL from France, Lifecore from the United States and other companies that focus on the production of pharmaceutical-grade hyaluronic acid raw materials.

In 2018, China accounted for 86% of the global hyaluronic acid raw material production capacity,

with a market size of approximately 3.07 billion yuan. In the next few years, the global hyaluronic acid raw material market will still maintain a compound growth rate of 18%. It is estimated that the global sales of hyaluronic acid raw materials will reach 1,150 tons in 2023.

### 2018 global hyaluronic acid market competition landscape (by sales volume)



From the perspective of raw materials, the global sales of hyaluronic acid raw materials in 2018 were 500 tons, of which food grade and cosmetics grade accounted for 46% and 50% respectively. In 2014-18, the compound growth rate of the sales of food grade, cosmetic grade, and pharmaceutical grade raw materials was 29.4%, 18.0%, and 22.1%, respectively, maintaining a relatively high growth rate. From the perspective of production capacity, Huaxi, the world's leading raw material sales company, has a production capacity of 420 tons, and a focus biological production capacity of 420 tons. Also, there are plans to expand production, so the production capacity is expected to be further increased in the future. From the price point of view, the price of pharmaceutical-grade raw materials is the highest, the price of eye drops is about usd2150/kg, and the price of medical-beauty-grade raw materials is more than usd 14300/kg, while the price of cosmetics and food-grade is about usd150-300/kg. Therefore, the overall increase in the market size of raw materials is mainly driven by the increase in volume and production, as well as the high unit prices of pharmaceutical-grade raw materials.

From the product side, the booming market of cosmetics and medical beauty products is mainly based on

(1) Hyaluronic acid is currently widely used in cosmetics, and more than 80% of skin care products are added with hyaluronic acid. In addition, hyaluronic acid has the characteristics of high safety and strong moisturizing properties, and it has a layout in the public and high-end product lines.

(2) The current penetration rate of China's medical aesthetics market is relatively low, and there is still a lot of room for growth compared with Japan, South Korea, Europe and the United States. In addition, hyaluronic acid injections are currently the main medical aesthetic injection products. The compound growth rate of the terminal product scale in the past five years is about 32%, and the growth is relatively obvious.

As a result, sales continued to grow. The compound growth rate of hyaluronic acid raw materials in 2014-18 reached 22.8%, and it has strong competitiveness in the international market. The data shows that China's export sales of hyaluronic acid raw materials in 2018 was about 292 tons, Bloomage Biotech accounted for 34.0%, and Focus Chem accounted for 16.6%. The industry concentration is relatively high.

In terms of trends, cosmetic-grade hyaluronic acid has the largest sales base in 2018, but it is expected that food-grade hyaluronic acid will grow the fastest in the future. Hyaluronic acid is the main moisturizing function in cosmetic raw materials. The water absorption can be adjusted according to the environmental humidity to meet the skin's moisturizing needs in different environments and times. It also has the characteristics of protecting the skin barrier, reducing UV transmission, and promoting the proliferation and differentiation of epidermal cells. Scavenging free radicals to achieve double protection, mainly used in skin care products, color cosmetics, etc. The price range of hyaluronic acid cosmetics continues to expand, and the terminal demand continues to increase. Hyaluronic acid used to be only used in higher-end cosmetics, but with continuous technological breakthroughs, hyaluronic acid is gradually added to low-end products, and the scope of application continues to expand. According to data from Zhiyan Consulting, China's mass cosmetics market share is gradually shrinking, and the high-end and luxury goods market is gradually expanding. Coupled with the full price band application of hyaluronic acid raw materials, it is expected that the terminal demand for hyaluronic acid cosmetics will continue to

increase in the future.

In 2018, the sales of food-grade hyaluronic acid increased by 20% year-on-year to 230 tons, and the compound growth rate from 2018 to 2023 is expected to reach 23.3%. Hyaluronic acid has been recognized as a food raw material in many countries and regions. It is mainly used in oral health foods in European and American countries. Oral hyaluronic acid foods can replenish water, improve joint function and osteoporosis, repair gastric mucosal damage, and promote trauma. Healing, improving the cardiovascular system, improving the symptoms of rickets, improving human immunity, and promoting angiogenesis. The growth rate of global food grade sales is higher than that of cosmetics and pharmaceuticals.

The pharmaceutical grade uses a small amount, but the price is much higher than other grades. It is the product with the highest added value. Pharmaceutical grade The compound growth rate of sales volume from 2014-18 is 22.1%, and the compound growth rate is expected to be 15.6% in the next 18-23 years. According to the survey data, the regulated Chinese medical beauty market reached 121.7 billion yuan in 2018, and it is expected to reach 360.1 billion yuan in 2023, with a compound growth rate of 24.2%. In 2018, the number of consultations per 1,000 people in the Chinese medical aesthetics category was approximately 14.8, which is only 1/2 of Japan and 1/6 of Korea. Among women aged 18-40, the penetration rate of the Chinese medical beauty market is 7.4%, and that of South Korea is 42%. Therefore, there is still a lot of room for growth in the Chinese medical beauty market.

**Global market sales of hyaluronic acid**



## **Relationship between Molecular Weight and Application**

According to the range of molecular weight, hyaluronic acid can be divided into three categories: large, medium and small. The molecular weight range of macromolecular hyaluronic acid is usually 1,800,000-2,200,000 Dalton, which is more viscous in aqueous solution and has a longer metabolic time in the human body. The molecular weight of small-molecule hyaluronic acid is usually 400,000-1,000,000 Dalton, which is easily absorbed by the body and metabolized quickly in the body. The molecular weight of hyaluronic acid obtained by animal tissue extraction method is generally between 200,000 Dalton-2,000,000 Dalton, and microbial fermentation method can not only obtain hyaluronic acid with a molecular weight greater than 2,000,000 Dalton, but also through the later chemical degradation technology or microbial enzyme digestion technology. Obtain hyaluronic acid with a molecular weight of less than 200,000 Dalton.

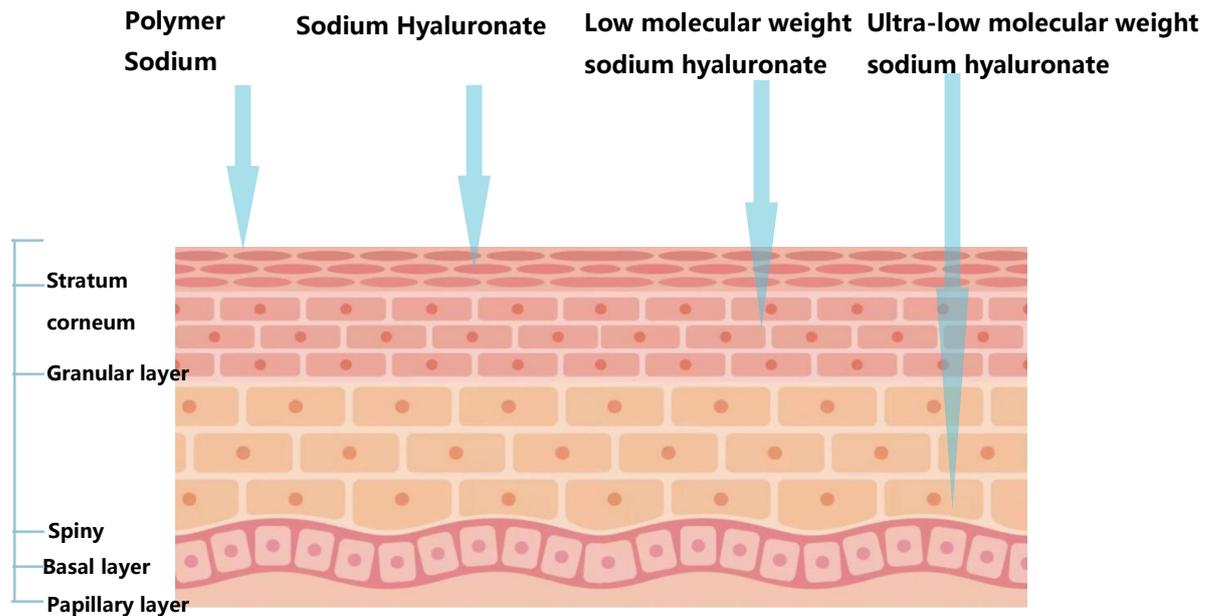
### **For the beauty and skin care effects of cosmetics:**

Macromolecule sodium hyaluronate > 1.8 million Da, forming a dense biological moisturizing film on the skin surface, long-term moisturizing, anti-PM2.5.

Medium-molecular sodium hyaluronate 200,000~1.8 million Da, good moisturizing and lubricity, slow release, stable emulsification.

Low-molecular-weight sodium hyaluronate 10,000~200,000 Da, repair damaged and old skin; hydrate and soften the stratum corneum, lasting moisturizing, soft skin; increase skin elasticity, delay skin aging; promote the proliferation and differentiation of epidermal cells, and clear oxygen free base.

Ultra-low molecular weight sodium hyaluronate <10000Da, transdermal absorption, deep moisturizing. Anti-aging, repair after sun.



### For the Medical Beauty Industry

The difference in molecular weight of hyaluronic acid for topical injection:

The macromolecular hyaluronic acid (molecular weight range of 1 800 000 ~ 2200 000da) is mainly used for deep depression or rhinoplasty and chin augmentation. It is also very suitable for local adjustment of hip shape. The effect of macromolecular hyaluronic acid is natural and lifelike, without allergies, rejection, and movement.

Medium-molecular hyaluronic acid (molecular weight range 1 000 000 ~ 1 800 000 da), mainly used for tear grooves, small wrinkles or plump and soft lips, has also achieved a good volume accumulation effect, and consumer satisfaction is also good .

Small molecule hyaluronic acid (molecular weight range 400 000 ~ 1 000 000da), mainly used for injection in the dermis of the whole face, can really feel the skin's smooth and tender water retention.

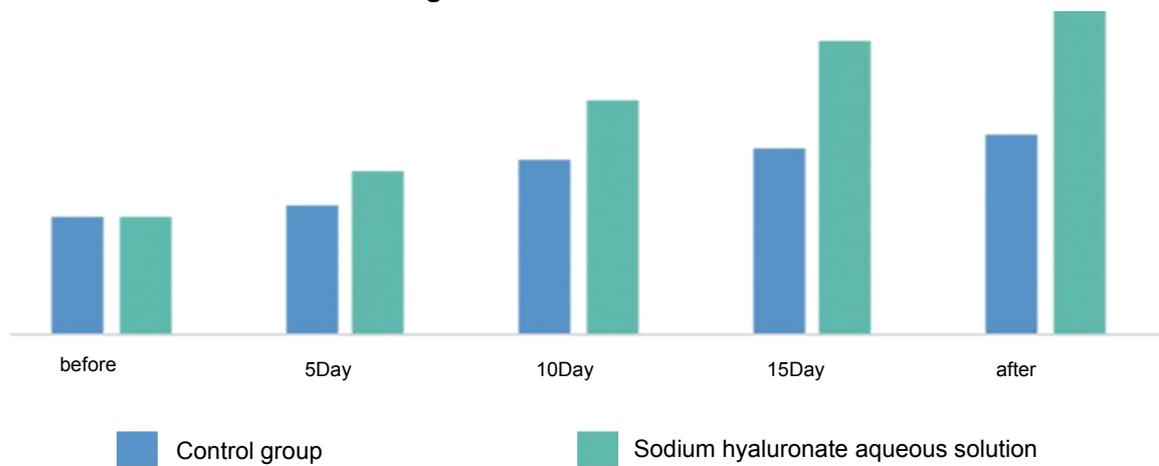
### For Food/Health Food

The main characteristic of oral hyaluronic acid is its extremely small molecular weight, excellent skin permeability and cell penetration. The human body does not need to digest it, but directly absorbs it to supplement the hyaluronic acid lost in the body.

## Experiments Sharing

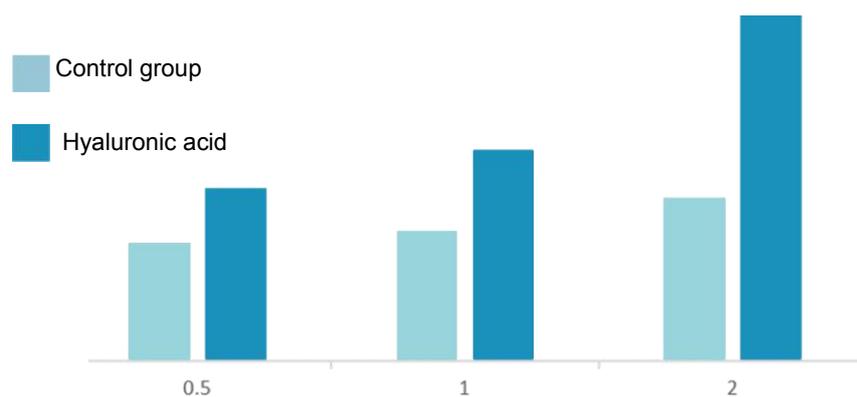
The experimental effect of hyaluronic acid in cosmetics is very obvious. It has nourishing skin, repairing damaged cells, scavenging free radicals, anti-oxidation and anti-aging, as well as very obvious moisturizing effects. Experiments have proved that HA has a good moisturizing effect. In skin care and hair care products, adding hyaluronic acid can increase the moisture content of the skin.

**Schematic diagram of skin moisture content**



Hyaluronic acid has free radical scavenging ability and reducing ability, can eliminate active oxygen free radicals (such as DPPH free radicals) produced by radiation and ultraviolet radiation, reduce the formation of melanin, sunscreen, whiten and anti-aging. Compared with the control product, the hyaluronic acid group has a stronger ability to scavenge free radicals. The higher the concentration, the more obvious the effect.

**DPPH free radical scavenging ability comparison**



Hyaluronic acid can repair damaged cells and improve cell viability. Promote wound healing. Used in skin care products to repair damaged cells, make the skin smooth, moisturized and elastic. Compared with the other two groups of products, the added hyaluronic acid group has better cell repair ability, can promote wound healing and make the skin smooth as before.

**Comparison of cell proliferation rate**

