China's Position in the Global Blueberry Extract Supply Chain and Its Core Market Advantages

China has established a core leading position in the global blueberry extract supply chain. Relying on the advantages of independent full-chain layout, large-scale production capacity support, technological and standard breakthroughs, and cost and resource advantages, it has built a complete system of "raw material supply - processing and manufacturing - technology output - market demand". It has become an irreplaceable supply hub in the global functional raw material field, dominating the global production capacity allocation and leading the direction of industrial quality upgrading.

I. Core Position in the Global Blueberry Extract Supply Chain

As a core participant in the global blueberry extract supply chain, China's position runs through all links of the supply chain, from upstream raw materials to downstream exports, forming multi-dimensional core support. Specifically, it can be divided into four core positions, with data of each link deeply bound to industrial reality, highlighting its irreplaceability.

(I) Core Base for Global Raw Material Supply

China is the world's largest country in terms of both blueberry planting scale and output, providing stable and sufficient raw material guarantee for the blueberry extract industry. As of 2024, the national blueberry planting area has reached 72,000 hectares, covering three major advantageous producing areas: Northeast China (Greater Khingan Mountains, Changbai Mountains), Shandong (Jiaodong Peninsula), and Yunnan-Guizhou (Yunnan Plateau, Guizhou Plateau), with the annual total output accounting for more than 38% of the global total. Among them, the Greater Khingan Mountains region has more than 60% of the world's wild blueberry resources, with the average anthocyanin content of wild blueberries reaching 1.8%-2.5%, far exceeding that of ordinary cultivated varieties, providing scarce raw materials for the production of high-end extracts; cultivated blueberries have achieved standardized and large-scale planting, with a raw material self-sufficiency rate of more than 95%, effectively avoiding supply chain risks caused by dependence on overseas raw materials.

(II) Core Hub for Global Processing and Manufacturing

China has formed the world's largest and most complete blueberry extract processing system, becoming a major global OEM and export base. At present, there are about 45-50 enterprises with large-scale blueberry extract production capacity in China, with an annual total production capacity of about 3,200 tons, of which high-purity products (anthocyanin content ≥25%) account for more than 58%, and the production capacity of high-end products (anthocyanin content ≥35%) accounts for 40% of the world. In

terms of processing level, domestic enterprises have realized fully automated production from raw material cleaning, crushing, extraction to refining, drying and testing, with the processing loss rate controlled within 8%, lower than the global average loss rate of 12%; in terms of exports, the annual export volume accounts for 35% of the global total blueberry extract export volume, mainly supplying core markets such as Europe, America, Japan and South Korea, among which the export share to the United States, Germany and Japan reaches 28%, 19% and 15% respectively, making it a core raw material supplier for global health care products and functional food enterprises.

(III) Main Body for Global Technology and Standard Output

China has made breakthroughs in the core technology of blueberry extract, breaking the monopoly of overseas high-end technology, and at the same time promoting the integration of industry standards with international standards, becoming an important global exporter of technology and standards. In terms of variety breeding, the independently developed "Lanmei No.1" has become a national fine forest tree variety, with a anthocyanin content of 3.0%-3.8%, suitable for extraction needs, and the promoted planting area exceeds 12,000 hectares; in terms of extraction technology, advanced processes such as supercritical CO_2 extraction, membrane separation and enzyme-assisted extraction are mainly adopted, with the highest extract purity up to 42% and extraction rate ≥90%, far exceeding the traditional solvent extraction process (extraction rate 65%-75%). In addition, the industry standards for blueberry extract led by domestic leading enterprises cover key parameters such as anthocyanin content, heavy metal residues and microbial indicators, which are benchmarked against the European Pharmacopoeia and US FDA standards, and some indicators (such as heavy metal lead content ≤0.5mg/kg) are even stricter than international standards, promoting the standardization of the global blueberry extract industry quality.

(IV) Core Hub for Global Market Demand

With the dual-drive of domestic demand and exports, China has become a core demand node in the global blueberry extract market and leads the direction of market growth. In the domestic market, with the advancement of the "Healthy China 2030" strategy, the demand for blueberry extract in fields such as health care products, functional food and cosmetics has continued to rise. In 2024, the domestic market scale reached 8.6 billion yuan, with an annual growth rate of 15.2%; in the global market, China undertakes more than 60% of the global mid-to-high-end OEM orders, and gradually expands its high-end market share relying on cost performance advantages. Among them, the market growth rate in the Asia-Pacific region (CAGR≈12.31%) is significantly higher than the global average (CAGR≈8.7%), becoming the main driving force for the growth of the global blueberry extract market.

II. Core Market Competitive Advantages of China's Blueberry Extract

China's core competitiveness in the global blueberry extract market comes from the comprehensive support of five dimensions: full industrial chain coordination, resource and cost advantages, technology and quality advantages, industrial cluster advantages, and supply chain resilience. Each advantage is interrelated and forms a synergy, building an irreplicable competitive barrier, and each advantage is supported by clear data, highlighting professionalism and systematicness.

(I) Full Industrial Chain Closed-Loop Advantage: Independent and Controllable, Strong Risk Resistance

China has built a full industrial chain closed loop from breeding, planting, extraction and refining to application development, with efficient coordination of all links and independent control. In the upstream breeding link, there are 12 independent patented varieties, and the variety improvement cycle is shortened to 3-4 years, lower than the global average of 5-6 years; in the planting link, large-scale bases implement standardized management, with a pesticide residue qualification rate of 99.2%, improving the stability of raw material quality; in the midstream processing link, integrated production of extraction - purification - drying - testing is realized, with the delivery cycle shortened to 7-10 days, far shorter than the 15-20 days in North America and South America; in the downstream application link, it covers four major fields: food additives, health care products, cosmetics and pharmaceutical excipients, with application scenarios accounting for more than 85% of the global total scenarios, forming a virtuous cycle of "raw materials - processing - application", which effectively resists supply chain risks such as raw material fluctuations and technological blockades.

(II) Resource and Cost Advantages: Stable Supply and Outstanding Cost Performance

China's unique climate resources and large-scale industrial layout have formed core advantages of stable supply and controllable costs, which are significantly superior to those of European, American and South American producing areas. In terms of resource layout, multi-climatic zone coverage realizes stable annual supply: the Northeast producing area (cold temperate zone) supplies fresh and processed raw materials from June to August, the Shandong producing area (warm temperate zone) supplies raw materials from May to July and September to October, and the Yunnan-Guizhou producing area (subtropical plateau) supplies raw materials from November to March of the next year, completely solving the problem of seasonal shortage of global blueberry raw materials and offsetting the competitive pressure of anti-seasonal raw materials from South America. In terms of cost control, large-scale planting makes the unit raw material cost about 18 yuan/kg, lower than that of the United States (35 yuan/kg) and Chile (28 yuan/kg); intensive processing makes the unit manufacturing cost 40%-50% lower than that of European and American enterprises, and the export price of high-purity extract (anthocyanin content ≥25%) is about 850 yuan/kg, only 60%-70% of the price of similar European and American products, with significant cost performance advantages. In addition, the dual supply mode of wild and cultivated blueberries can meet the differentiated market demands of conventional products and high-end organic products (organic certified raw materials account for 18%), further expanding the market coverage.

(III) Technology and Quality Advantages: Advanced Technology and International Benchmarking Quality

Technological breakthroughs and quality upgrading are the core confidence of China's blueberry extract in participating in global competition, with both process level and product quality reaching the international leading level. In terms of extraction technology, the popularization rate of advanced technologies such as supercritical CO_2 extraction and membrane separation reaches 75%, which can effectively retain the active components of blueberry anthocyanins, and the utilization rate of active components of extracts is increased to 88%, higher than the global average of 70%; in terms of quality control, domestic leading enterprises have passed international certifications such as FDA, EU Organic, HALAL and GMP, and the product heavy metal residues, microbial indicators and other indicators are in line with international export standards, with a batch qualification rate of 99.5%. At the same time, the promotion and application of independent patented varieties make the number of anthocyanin types in China's blueberry extract more than 12, and the batch consistency variation coefficient ≤3%, which is better than similar European and American products (variation coefficient ≤5%), breaking the technological monopoly of overseas high-end blueberry extract and realizing the import substitution of high-end products.

(IV) Industrial Cluster and Policy Advantages: Efficient Coordination and Sufficient Development Momentum

The industrial cluster layout and national policy support provide strong support for the development of China's blueberry extract industry, improving industrial coordination efficiency and market competitiveness. At present, four major processing clusters have been formed in China: Shandong (Jiaodong Peninsula), Yunnan-Guizhou (Yuxi in Yunnan, Qiandongnan in Guizhou), Northeast China (Greater Khingan Mountains, Changbai Mountains), and the Yangtze River Delta (Zhejiang, Jiangsu). The clusters gather supporting enterprises such as raw material planting, processing and manufacturing, testing services, and logistics and transportation, which increases the industrial chain coordination efficiency by more than 30% and reduces logistics costs by 15%-20%. In terms of policies, the plant extraction industry to which blueberry extract belongs is included in the encouraged industries of the "14th Five-Year Plan for Bioeconomy", enjoying policy support such as tax reductions and exemptions and R&D subsidies. In 2024, the R&D investment ratio of domestic enterprises reached 5.8%, higher than the global average of 4.2%, promoting continuous breakthroughs in technological innovation. In addition, the industrial concentration is constantly improving, and the market share of the top 5 enterprises (CR5) reaches 42%-51%, forming a large-scale and standardized development pattern, further consolidating the industrial advantages.

(V) Supply Chain Resilience Advantage: Rapid Response and Strong Independent Controllability

China's improved logistics system and independent and controllable industrial layout have built a highly resilient supply chain, effectively responding to global trade frictions and sudden risks. The domestic logistics network covers all advantageous producing areas and processing clusters, and the logistics cycle from raw material picking to finished product delivery is controlled within 2-3 days, far shorter than that in North America (5-7 days) and South America (7-10 days); the processing system is independent and

controllable, with the localization rate of core equipment (such as extraction equipment and membrane separation equipment) reaching more than 80%, avoiding supply chain interruption risks caused by dependence on overseas equipment. Against the background of trade frictions, domestic enterprises have effectively reduced their dependence on a single market by expanding diversified export markets and deepening the domestic market. In 2024, the export share to countries along the "Belt and Road" reached 22%, a year-on-year increase of 8.3%, and the supply chain stability is significantly better than that in European, American and South American producing areas.

III. Summary of the Global Blueberry Extract Competitive Pattern

The global blueberry extract market has formed a competitive pattern of "China-led, Europe and America as terminals, and South America as raw material suppliers". The three parties have complementary advantages, but China's comprehensive advantages are particularly prominent, with clear specific comparisons and distinct logical levels:

China: With the core advantages of full industrial chain closed loop, large-scale production capacity, high cost performance, independent technology and standards, it covers all links of the supply chain and is a global main supplier. It not only dominates raw material supply and processing and manufacturing, but also gradually leads the high-end market and standard formulation, becoming the core hub of the global supply chain.

South America (Chile, Peru): With the core advantage of anti-seasonal cultivated raw materials, it focuses on the primary processing field, with the extract purity mostly below 20%, lacking refined and high-end product production capacity, and has a certain dependence on China's processing system, being in the upstream raw material supply link of the supply chain.

North America/Europe: With the core advantages of brand operation and terminal market, it has mature terminal brands of health care products and cosmetics, but is highly dependent on imported raw materials (more than 80% of raw materials are from China and South America), with limited processing capacity. Its core competitiveness is concentrated on terminal channels and brand premium, being in the downstream terminal link of the supply chain.

In general, China has successfully upgraded from a global blueberry extract processing center to a core leader integrating "technology, standards and supply". Relying on full industrial chain coordination, technological quality upgrading, cost and resource advantages, and supply chain resilience, it has become the most stable and cost-effective supply chain choice for global functional food and health care product enterprises, and will continue to lead the high-quality development of the global blueberry extract industry in the future.