Status and Core Advantages of China in the Global Centella asiatica Extract Powder Supply Chain

Centella asiatica extract powder, as a natural functional raw material, is widely applied in cosmetics, pharmaceuticals, functional foods, health products, and other fields. The global supply chain has formed a complete system covering "raw material planting → extraction and processing → testing and certification → market circulation". Leveraging its unique resource endowments, mature processing technologies, well-established industrial chain layout, and large-scale production capacity advantages, China has established itself as the core hub of the global Centella asiatica extract powder supply chain, emerging as the "primary supply engine" and "quality benchmark" for the global market. Its influence permeates every link of the supply chain, leading the global supply pattern and development trend of the market.

I. Core Status of China in the Global Centella asiatica Extract Powder Supply Chain

China holds an "irreplaceable core hub" position in the global Centella asiatica extract powder supply chain, which is specifically reflected in three dimensions: production capacity supply, market share, and industrial chain control power. It demonstrates an absolute leading advantage in terms of data, and this status is continuously being consolidated.

(I) The "First Pole" of Global Production Capacity Supply, Leading the Total Global Supply

China is the world's largest producer of Centella asiatica extract powder, with its production capacity and actual output ranking first globally, serving as the primary supply source for the global market. By 2024, the total global production capacity of Centella asiatica extract powder stood at approximately 12,500 tons, of which China's capacity reached 5,250 tons, accounting for 42% of the global total. It is projected to increase to 45% by 2027, with the production capacity scale continuing to expand.

In terms of output, China's annual production of Centella asiatica extract powder exceeded 3,800 tons in 2024, accounting for over 45% of the global total output, far surpassing other major producing countries such as India (22%), Vietnam (10%), and South Korea (8%). Among them, the annual output of high-purity extract powder (with a purity of ≥90%) reached 2,280 tons, accounting for more than 60% of the global total output of high-purity products, dominating the supply of global high-end raw materials. In terms of product coverage, China can scale up the production of full-category products including centella total glycosides powder, asiatic acid powder, and madecassoside powder, covering all specifications such as cosmetic-grade, pharmaceutical-grade, and food-grade. It can meet the diverse needs of

different markets and customers worldwide, with its supply flexibility and comprehensiveness leading the global market.

(II) The "Core Hub" of Global Market Circulation, Controlling Trade Leadership

China is the world's largest exporter of Centella asiatica extract powder, with both export volume and value ranking first globally. Its trade network covers major consumer markets worldwide, enabling it to control the circulation leadership of the global market. In 2024, China's total export value of Centella asiatica extract powder reached 165 million US dollars, a year-on-year increase of 28.4%, with the export volume reaching 3,200 tons, accounting for more than 70% of the global total export volume.

The distribution of export markets features a "diversified layout with key focus areas". The main export destinations include South Korea (accounting for 34.2%), Japan, the United States, Germany, and Southeast Asian countries. Among them, exports to South Korea mainly supply the local K-beauty industry chain, while exports to the European and American markets are dominated by high-purity pharmaceutical-grade and food-grade extract powder. Meanwhile, China is also an important consumer of Centella asiatica extract powder, with its domestic market size reaching 980 million yuan in 2024, accounting for 28% of the global market share. This has formed a two-way circulation pattern of "production capacity supply → domestic consumption → global export", further consolidating the core position of the supply chain.

(III) The "Leader" of the Global Industrial Chain, Controlling the Right to Speak on Core Links

China has formed a complete industrial chain for Centella asiatica extract powder, covering "upstream raw material planting → midstream extraction and processing → downstream in-depth application → supporting service support". It has absolute advantages in each core link, enabling it to control the right to speak in the global supply chain. In the upstream planting link, China has built the world's largest and most standardized Centella asiatica planting bases. In the midstream extraction and processing link, China's extraction technologies, production scale, and product quality are at the global leading level. In the downstream application link, China boasts the world's largest industrial clusters for cosmetics, pharmaceuticals, and food processing, providing broad application scenarios for extract powder. In the supporting service link, China has established a sound system for testing and certification, logistics and warehousing, and R&D innovation, providing comprehensive support for the efficient operation of the supply chain.

In contrast, other producing countries such as India and Vietnam are mainly concentrated in

the upstream raw material planting or primary extraction links. They lack a complete industrial chain layout and have a high dependence on China's processing technologies and downstream application markets, making it impossible for them to form an independent supply chain system. This further highlights China's dominant position in the global supply chain.

II. Core Advantages of China in the Global Centella asiatica Extract Powder Supply Chain

The reason why China can establish its core position in the global Centella asiatica extract powder supply chain lies in its five core advantages in the dimensions of "resources, technology, industrial chain, cost, and policies". These advantages support and synergize with each other, forming an irreplicable comprehensive competitiveness. Each advantage is supported by clear data and practical practices, combining professionalism and practicality.

(I) Resource Endowment Advantage: Unique Planting Conditions Ensure Stable and High-Quality Raw Material Supply

Centella asiatica has high requirements for climatic and soil conditions, preferring a subtropical or tropical environment that is warm, humid, well-rained, and fertile. Southern China perfectly meets these growth needs, with unique natural conditions and being one of the world's most suitable regions for Centella asiatica planting, providing a solid guarantee for the upstream raw material supply of the supply chain.

1. **Concentrated and Scaled Planting Areas**

Centella asiatica planting in China is mainly concentrated in southern provinces such as Guangxi, Yunnan, Guizhou, Guangdong, and Fujian, forming a planting pattern of "Guangxi as the main, with multi-provincial collaboration". Among them, Guangxi, as the country's largest artificial planting base for Centella asiatica, had a planting area of over 8,500 hectares (approximately 127,500 mu) in 2024, with an annual output of 4,200 tons, accounting for 38% of the national total output. Yunnan, relying on its plateau humid climate, has a stable wild resource reserve of around 2,800 tons, and its artificial planting area is expanding year by year, with an expected breakthrough of 5,000 hectares by 2027. By 2024, the total planting area of Centella asiatica in China reached 38,000 mu, representing a 216.7% increase compared with 12,000 mu in 2020, making China's large-scale planting degree the world's leading level.

2. **Excellent Raw Material Quality**

Centella asiatica planted in China, especially those from the Guangxi and Yunnan producing areas, has significantly higher content of core active ingredients such as asiaticoside and madecassoside due to the favorable climate and mineral-rich soil. According to testing, the content of core active ingredients in scale-planted Centella asiatica in China is stably

maintained at 1.5%—2.0%. After technical improvement in some experimental fields, the content of active ingredients has been increased to over 2.8%, a 40% improvement compared with traditional planting. In contrast, the content of core active ingredients in Centella asiatica planted in countries such as India and Vietnam is only 1.0%—1.2%. The excellent raw material quality lays a solid foundation for the subsequent extraction of high-purity and high-quality Centella asiatica extract powder, and is the core prerequisite for China's extract powder to lead the global market in quality.

3. **Stable and Controllable Raw Material Supply**

China has achieved a dual layout of "artificial large-scale planting + wild resource protection" for Centella asiatica, which not only avoids resource depletion caused by excessive excavation of wild resources but also ensures the stability of raw material supply. Meanwhile, leading domestic planting enterprises adopt the "company + base + farmers" model, establishing standardized planting processes and implementing full-process control over planting, harvesting, drying, and storage links to ensure uniform and stable raw material quality. In addition, enterprises such as Guangxi Changzhou Natural Pharmaceutical occupy more than 70% of the supply volume in China's wild Centella asiatica raw material market, further enhancing the controllability of raw material supply. In contrast, countries such as India mainly rely on wild Centella asiatica collection, which is greatly affected by climate and environmental changes, resulting in obvious fluctuations in raw material supply and uneven product quality.

(II) Technological R&D Advantage: Leading Extraction Processes Achieve Dual Breakthroughs in Quality and Efficiency

The midstream extraction and processing link is the core determinant of the quality of Centella asiatica extract powder. Through decades of technological accumulation and innovation, China has formed a mature and advanced extraction process system, leading the global market in terms of extraction efficiency, product purity, active ingredient retention, and green environmental protection, with its technological advantages continuing to expand.

1. **Diversified and High-End Extraction Processes**

China has broken through traditional water extraction and alcohol extraction processes, widely applying advanced technologies such as supercritical CO_2 extraction, macroporous resin adsorption, membrane separation, and enzyme hydrolysis-supercritical CO_2 coupling. Among them, the supercritical CO_2 extraction technology can effectively retain the core active ingredients of Centella asiatica, with the extraction rate increased by more than 25% compared with traditional alcohol extraction technology, and no solvent residue. It has become the mainstream process for leading domestic enterprises. The enzyme hydrolysis-supercritical CO_2

coupling technology successfully developed in 2015 improves cell wall permeability through cellulase pretreatment, further increasing the extraction rate of asiaticoside to over 90% and achieving a 98% retention rate of active ingredients. The application of microcapsule encapsulation technology in 2020 solves the industry pain points of poor stability and easy oxidation of Centella asiatica extract powder, extending the product shelf life to more than 24 months and increasing the skin penetration rate by 35%.

2. **Leading Product Purity and Quality**

Relying on advanced extraction and purification technologies, China has achieved a large-scale breakthrough in the purity of Centella asiatica extract powder. It can currently stably produce full-category products with a purity of 50%—99%, among which the pharmaceutical-grade extract powder can reach a purity of over 98% (detected by HPLC), far exceeding the 30%—70% of products from countries such as India and Vietnam. In 2024, the output proportion of high-purity extract powder (≥90%) in China reached 60%, while the global average proportion was only 35%. Meanwhile, domestic enterprises strictly comply with international standards such as the Chinese Pharmacopoeia, ISO, and EP, establishing a full-process quality control system. The product indicators such as heavy metals and pesticide residues all meet the access requirements of major global markets, with a qualification rate of 94% (in 2023), a significant increase compared with 76% in 2020.

3. **Strong R&D and Innovation Capabilities**

China has formed an R&D system dominated by enterprises, supported by universities, and coordinated by research institutions, focusing on core fields such as extraction process optimization, active ingredient separation, and product innovation. By 2024, the cumulative number of patents related to Centella asiatica extract in China reached more than 1,800, accounting for 38% of the global total number of patents, among which the proportion of patents related to extraction processes reached 45%. Leading domestic enterprises such as Xi'an Tianhao, Guilin Rainshine Biotech, and Guangxi Changzhou Pharmaceutical have all established professional R&D teams. The R&D team of Guangxi Changzhou Pharmaceutical is composed of senior researchers in pharmacy, chemical engineering, and bioengineering, with technical strength reaching the international advanced level. Meanwhile, universities such as Jiangnan University and China Pharmaceutical University focus on the research of Centella asiatica active ingredients, promoting the rapid transformation of scientific research achievements and further consolidating the technological leading advantage.

(III) Industrial Chain Advantage: Perfect Full-Chain Layout and Significant Synergistic Effects

China is the only country in the world that has realized the "full-industrial-chain closed-loop layout" of Centella asiatica extract powder. From upstream raw material planting to

downstream terminal application, each link has formed a large-scale and standardized development trend. All links work together to significantly improve the efficiency of the supply chain, reduce operating costs, and form a strong industrial chain barrier.

1. **Upstream Planting**

It has a high degree of large-scale and standardization, forming core producing areas such as Guangxi and Yunnan, with a planting area of 38,000 mu and an annual output of over 100,000 tons (fresh grass). It can meet the raw material demand for domestic extraction and processing, with a raw material self-sufficiency rate of over 95%, eliminating the need for imports and effectively avoiding the risks of international raw material trade fluctuations. Meanwhile, the proportion of GAP-certified planting bases reaches 60%, and the standardized planting process ensures the stability of raw material quality.

2. **Midstream Processing**

The enterprise cluster effect is significant. There are more than 80 Centella asiatica extract processing enterprises in the country, among which 37 are large-scale enterprises, mainly concentrated in provinces such as Guangxi, Yunnan, Shaanxi, and Zhejiang, forming an industrial cluster. Leading enterprises such as Guangxi Changzhou Pharmaceutical have advanced GMP production lines, equipped with more than 100 sets of modern extraction, separation, and purification equipment, with an annual input volume of over 3,000 tons and an annual output value of over 100 million yuan. The industry CR5 reaches 45%, and leading enterprises further improve processing efficiency and reduce unit costs by virtue of their large-scale production advantages.

3. **Downstream Application**

China has the world's largest terminal application industry cluster, with strong demand in the three major fields of cosmetics, pharmaceuticals, and functional foods, providing a broad market for the digestion of Centella asiatica extract powder. Among them, the cosmetics field accounted for 58.3% in 2024, and mainstream domestic skincare brands such as Winona and Yuze use it as a core functional ingredient, driving the continuous growth of raw material procurement. In the pharmaceutical field, by the end of 2024, the number of domestically registered drugs and medical devices containing Centella asiatica extract exceeded 120 items, representing a nearly double increase compared with 2020. In the functional food field, products such as Centella asiatica soothing beverages and meal replacements have been gradually launched to further expand application scenarios. The vigorous development of downstream industries has driven the coordinated upgrading of upstream planting and midstream processing links, forming a positive cycle of "demand driving supply and supply supporting demand".

4. **Supporting Services**

A sound supporting system ensures the efficient operation of the supply chain. In terms of testing and certification, multiple professional testing institutions have been established in China, which can conduct full-index testing such as active ingredient content, heavy metals, and pesticide residues, with testing technologies in line with international standards. In terms of logistics and warehousing, relying on the logistics hubs in producing areas such as Guangxi and Yunnan, a logistics network of "origin warehousing → national distribution → global export" has been formed, featuring high logistics efficiency and low costs, enabling the rapid delivery of extract powder to global customers. In terms of supply chain finance, financial institutions provide special credit support for all links of the industrial chain, alleviating the capital pressure of enterprises and promoting the continuous upgrading of the industrial chain.

(IV) Cost Advantage: Large-Scale and Intensive Production, Leading the Global Cost-Effectiveness

By virtue of its full-industrial-chain layout, large-scale production, and low production factor costs, China has formed a global leading cost advantage. The cost-effectiveness of Centella asiatica extract powder is significantly higher than that of other countries, which is one of the core competitiveness for China's products to dominate the global market. The cost advantage is mainly reflected in three aspects: raw materials, processing, and logistics.

1. **Low Raw Material Costs**

The large-scale degree of artificial planting of Centella asiatica in China is high, and the "company + base + farmers" model reduces planting costs. Meanwhile, the raw material self-sufficiency rate is over 95%, eliminating the need to pay import tariffs and transportation costs. The raw material cost is 15%—20% lower than that in India and 30%—40% lower than that in South Korea and Japan.

2. **Low Processing Costs**

In the midstream processing link, the enterprise cluster effect is significant, and large-scale production reduces the unit processing costs such as equipment depreciation, labor, and energy consumption. Meanwhile, the labor costs, electricity costs, and land costs in China are all lower than those in countries and regions such as South Korea, Japan, and Europe and the United States, further reducing processing costs. For example, the processing cost of producing Centella asiatica extract powder with a purity of 90% using supercritical CO_2 extraction technology is 40%—50% lower than that in South Korea and 60%—70% lower than that in Europe and the United States. In 2010, the combination of low-temperature vacuum extraction and high-pressure microfluidization technology further reduced production costs by 40% and

improved production efficiency by 30%.

3. **Low Logistics Costs**

The producing areas of Centella asiatica in China are concentrated and close to ports (such as Guangxi Qinzhou Port and Yunnan Mohan Port), with a sound logistics network. The domestic logistics cost is 20%—25% lower than that in India, and the export logistics cost is 15%—30% lower than that in India. Meanwhile, the batch advantages formed by large-scale exports can reduce the unit costs of links such as sea transportation and customs declaration, further improving cost-effectiveness.

In general, the comprehensive cost of China's Centella asiatica extract powder is 25%—35% lower than the global average level. Under the premise of the same purity and quality, the price is 10%—15% lower than that in India and 25%—35% lower than that in South Korea and Japan. The high cost-effectiveness has become the core advantage for China's products to capture the global market. In 2024, the average price of extract powder with a content of 40% was stably maintained at 1,200—1,400 yuan/kg, far lower than the price of international similar products.

(V) Policy and Market Advantages: Policy Support and Market Demand-Driven Upgrading

The policy support from the Chinese government and the huge domestic market demand have provided strong support for the development of the Centella asiatica extract powder supply chain, promoting the continuous upgrading of the supply chain and further consolidating its global core position.

1. **Strong Policy Support**

The Chinese government has included the plant extract industry in the "14th Five-Year Plan" for the development of traditional Chinese medicine, and included Centella asiatica in the list of key development varieties of traditional Chinese medicine, introducing a number of supporting policies. On the one hand, it has increased support for upstream Centella asiatica planting, subsidizing the construction of standardized planting bases and planting technology training, promoting the large-scale and standardized development of planting, and planning to build 15 standardized planting demonstration bases by 2030 with the goal of increasing the annual output to 18,000 tons. On the other hand, it supports technological innovation of midstream processing enterprises, providing tax incentives and financial subsidies for extraction process upgrading and R&D investment, encouraging enterprises to carry out international certifications such as GMP and ISO, and promoting products to enter the global market. Meanwhile, the "Group Standard for Centella asiatica Raw Materials for Cosmetics" was officially released in 2025, unifying the raw material efficacy and safety evaluation system, filling the gap in industry standards, and promoting the standardized development of the industry.

The improvement of environmental protection policies has promoted processing enterprises to transform towards green and low-carbon development, enhancing the international competitiveness of products.

2. **Strong Domestic Market Demand, Driving Supply Chain Upgrading**

China is one of the world's largest consumers of Centella asiatica extract powder, with its domestic market size reaching 980 million yuan in 2024, representing a compound annual growth rate of 22.7% (2020—2024). The vigorous development of the domestic cosmetics, pharmaceuticals, and functional food industries has formed a huge demand market. Especially in the cosmetics field, the "ingredient-focused" consumption trend has driven the surge in demand for Centella asiatica extract powder, with the consumption proportion in the cosmetics field reaching 58.3% in 2024, a significant increase compared with 42.1% in 2020. In 2022, the single-day sales volume of a domestic brand's Centella asiatica repair essence exceeded 1 billion yuan during the Double 11 shopping festival, and the annual sales volume of Winona's Centella asiatica repair series exceeded 350 million yuan, directly driving the growth of upstream raw material demand. The huge domestic demand has driven the continuous upgrading of upstream planting and midstream processing links, promoting technological innovation and product quality improvement, and providing a guarantee for the large-scale production of enterprises, further reducing costs.

3. **Increasing International Market Recognition**

Thanks to its excellent quality and high cost-effectiveness, China's Centella asiatica extract powder has gained widespread recognition in major global markets. At present, China's products have passed international authoritative certifications such as the European Pharmacopoeia (EP), the U.S. FDA, and the Japanese Ministry of Health, Labour and Welfare, and can directly enter major global markets. Meanwhile, domestic enterprises have actively expanded the international market, establishing long-term cooperative relations with international well-known enterprises such as L'Oréal and Estée Lauder. In 2023, the revenue of international well-known enterprises' Centella asiatica-related products in the Chinese market reached 1.27 billion yuan, further enhancing the international influence of China's products. In 2023, China's global market share of Centella asiatica extract powder increased from 23% in 2018 to 38%, successfully capturing the traditional market share of South Korea, India, and other countries.

III. Advantage Summary and Future Development Outlook

In summary, China holds an irreplaceable core hub position in the global Centella asiatica extract powder supply chain, serving as the global production capacity supply center, market circulation hub, and industrial chain leader. This status is established due to China's unique resource endowments, leading extraction technologies, well-established full-industrial-chain layout, significant cost advantages, and dual support from policies and markets. The five core advantages support and synergize with each other, building an irreplicable comprehensive competitiveness for China's products, promoting the continuous growth of China's Centella asiatica extract powder in the global market, and leading the development trend of the global supply chain.

In the future, with the continuous growth of global demand for natural functional raw materials, as well as the continuous innovation of domestic technologies and the upgrading of the industrial chain, China's core position in the global Centella asiatica extract powder supply chain will be further consolidated. On the one hand, enterprises will continue to focus on technological innovation, promoting extraction processes to develop in a more efficient, green, and precise direction, focusing on breaking through new technologies such as synthetic biology and enzyme modification to enhance product value-added. On the other hand, we will further improve the industrial chain layout, promote the standardization of upstream planting, the high-end upgrading of midstream processing, and the diversification of downstream applications, and expand new scenarios such as pet care and metabolic disease auxiliary conditioning. At the same time, we will strengthen international cooperation, promote the integration of Chinese standards with international standards, enhance China's voice in the global supply chain, promote the high-quality development of China's Centella asiatica extract powder industry, and continue to provide stable, high-quality, and cost-effective product supply for the global supply chain.