China's Position and Core Competitive Advantages in the Global Ginger Extract Supply Chain

Overview

As a natural plant-derived active ingredient, ginger extract features gingerols, shogaols, zingerone and other core active components, and is widely used in food and beverages, pharmaceuticals and healthcare, daily chemicals and cosmetics, feed additives and other fields. Its supply chain covers core links including ginger cultivation, primary processing, refined extraction, quality inspection and global distribution.

At present, China has rapidly emerged as a core hub of the global ginger extract supply chain, establishing a complete and competitive supply chain system. Within the global supply chain landscape, China has evolved from an early player focused on ginger cultivation and primary processing into a core manufacturing center and strategic raw material base for the global ginger extract supply chain.

Relying on core strengths such as large-scale cultivation, technological iteration, cost controllability and standardized quality management, China plays a profound role in shaping the global supply pattern, value orientation and industrial development trends of ginger extract, holding a pivotal position in the global supply chain. It is not only the world's largest producer and supplier, but also a promoter of technological innovation, a participant in standard-setting and a shaper of the market structure. China directly influences the global supply volume, quality standards and price trends of ginger extract, providing irreplaceable support for the stable development of relevant downstream industries worldwide. Against the global consumption trends of "natural plant-based ingredients" and "clean labels", China's core position has become increasingly prominent.

I. China's Core Position in the Global Ginger Extract Supply Chain

(I) From the Perspective of Global Industrial Layout and Scale

China firmly occupies a central hub position in the global ginger extract supply chain, serving as both a "stabilizer" of global production capacity and output, and a core raw material base supporting the development of the global industry, making it the "manufacturing center" of the global ginger extract industry. Its dominance is reflected in three dimensions: scale leadership, value upgrading and pattern control, granting it an absolute leading position in the global market.

According to industry research data, the global ginger extract market will expand steadily in 2026 and is projected to exceed **USD 7 billion by 2030**, with a compound annual growth rate of **9.5%** from 2026 to 2030, of which the Asia-Pacific market will contribute 52% of growth. In the same period, global ginger extract output will reach 32,000 tons with an average price of USD 25 per kg, while China's output will reach 18,650 tons, accounting for over **58%** of the global total. Its export volume makes up more than **55%** of global trade, covering more than 80 countries and regions including the United States, the European Union, Japan, South Korea, Southeast Asia and the Middle East.

Fifteen of the world's top 20 food and beverage, pharmaceutical and daily chemical companies regard China as their core raw material supply base. High-purity ginger extract, water-soluble ginger extract and other products from leading Chinese enterprises account for over 60% of global sales in their respective categories, mainly exported to Europe, the United States, Japan and South Korea. China's supply capacity directly determines the global supply-demand balance, acting as the "supply stabilizer" of the global ginger extract industry.

Furthermore, with the continuous advancement of China's "medicine-food homology" policy and the expansion of organic ginger cultivation, China's industrial scale will further grow, consolidating its global leading position.

(II) From the Perspective of Supply Chain Integrity

China is one of the few countries in the world that has achieved independent control over the entire chain of "cultivation–processing–inspection–distribution", and a core supply chain entity capable of efficient closed-loop management throughout the process. This unique advantage further strengthens China's core position.

Unlike most countries that focus on a single link and rely on imported raw materials or processing technologies, China leverages the natural endowments of subtropical and temperate regions such as Shandong, Sichuan, Yunnan and Guizhou to form a large-scale ginger-dominated cultivation pattern, supporting the world's leading ginger raw material supply system. Its midstream refined processing technology has reached international advanced levels, and a global distribution network has been established downstream, supported by a sound quality inspection and logistics system. This enables full independent control from ginger harvesting, pretreatment, extraction and refinement to quality inspection, packaging and global distribution.

This integrated "cultivation–processing" layout has freed China from dependence on overseas raw materials and achieved self-sufficiency, ensuring the stability of its own supply chain while providing global downstream customers with "one-stop" raw material supply solutions. As an indispensable core link in the global ginger extract supply chain, its full-chain layout is difficult for other countries to replicate. For example, relying on 1.26 million mu of fresh ginger planting bases, Shandong has built a complete industrial chain of "cultivation–primary processing–refined extraction", with raw materials processed within 12 hours of harvesting, maximizing the retention of core active ingredients and ensuring stable raw material quality.

(III) From the Perspective of Industrial Discourse Power and Value Upgrading

China has gradually gained core pricing power and standard discourse rights in the global ginger extract supply chain, shifting from "passive participation" to "active leadership". It has also completed a key transformation from "export of roughly processed raw materials" to "export of technology-intensive high-value-added products", continuously moving up the global value chain.

With the acceleration of domestic industrial standardization, China is steadily improving its standard system by promoting group standards such as *Code of Practice for Ginger Extract Production* and *Quality Standard for Ginger Extract*, filling gaps in full-process standards for domestic ginger extract production. A three-tier system of "national

standards + industry standards + enterprise standards" is taking shape.

Quality standards set by leading domestic enterprises have become global industry benchmarks, and their pricing directly influences global ginger extract price trends. In global industrial cooperation, Chinese enterprises are capable of leading cooperation rules and participating in industry standard formulation, gradually changing the previous pattern dominated by Europe and the United States, with growing discourse power especially in the supply of mid-to-high-end raw materials. For instance, the quality standard for high-purity gingerols (6-gingerol ≥25%) formulated by Chinese enterprises has been adopted by most global pharmaceutical companies as a raw material procurement criterion.

(IV) From the Perspective of Industrial Upgrading

In its early stage, China's ginger extract industry mainly exported primary ginger slices and ordinary ginger powder, with low added value, thin profits and a low-end position in the global value chain. Inconsistent product specifications also restricted industrial upgrading.

Today, with technological iteration and product structure optimization, the export mix has undergone a profound transformation: the share of primary ginger slices and ordinary powder has shrunk sharply, while high-value-added products such as ginger extract, high-purity gingerols, water-soluble ginger extract and terminal derivatives have become export mainstays. In 2026, the global market size of pharmaceutical-grade ginger extract will reach approximately USD 1.8 billion, with Chinese products accounting for over 55% of exports, becoming a core growth driver.

Behind this transformation is breakthroughs in refined processing technologies and product structure upgrading. China can now customize products of different specifications for downstream scenarios: high-purity products with 6-gingerol ≥98% for pharmaceuticals, water-soluble extracts for daily chemicals, and antibacterial extracts for feed. Product added value has increased **5–7 times** compared with the early stage. China is no longer a "low-end supporting player" in the global industrial chain, but a core supplier of high-value-added ginger extract ingredients, gradually securing mid-to-high-end segments of the global value chain.

II. Core Competitive Advantages of China in the Global Ginger Extract Supply Chain

(I) Upstream Cultivation: Advantages in Large-Scale Layout and Controllable Quality

Raw material supply forms the foundation of the ginger extract supply chain. Leveraging its unique climatic conditions and large-scale cultivation model, China has built a stable and high-quality raw material supply system. Domestic ginger cultivation is concentrated in Shandong, Sichuan, Yunnan, Guizhou and other regions, forming a large-scale and standardized pattern. Shandong ranks first with a **38.6%** output share, with standardized planting bases producing high-quality ginger with stable gingerol content of **1.2%–1.8%**, providing high-quality raw materials for downstream processing.

Leading domestic enterprises implement standardized and regulated cultivation, including organic farming with strict control over pesticides and fertilizers. Some bases apply IoT sensors and intelligent irrigation for precise water and fertilizer management, and raw materials have obtained triple organic certifications from the United States, the European Union and China, meeting global high-end market requirements.

The "company + cooperative + farmer" model enables large-scale and intensive management, effectively reducing raw material procurement costs. Compared with traditional ginger-producing countries such as India and Thailand, China's ginger raw material costs are **30%–40% lower**, providing a significant cost advantage for downstream processing. In addition, most domestic bases apply the "12-hour production rule", processing ginger within 12 hours of harvest to minimize enzymatic degradation and microbial risks, preserving natural active ingredients and greatly improving raw material quality stability.

(II) Midstream Processing: Core Competitiveness from Technological Iteration and Large-Scale Production

Refined processing is the core link of the ginger extract supply chain, directly determining product quality and added value. China leads the world in processing technology, production scale and process standardization, while facing certain structural bottlenecks, presenting a development pattern of "strong advantages with remaining bottlenecks".

In terms of technological innovation and large-scale production, China has developed a mature and diversified processing system, widely applying advanced technologies such as supercritical CO_2 extraction, enzymatic-assisted extraction, membrane separation coupling and freeze-drying. Leading enterprises have pioneered the use of membrane separation and microencapsulation technologies in ginger deep processing under low-temperature and aseptic conditions, solving problems such as active ingredient loss and solvent residue in traditional solvent extraction. The retention rate of core active ingredients including gingerols and shogaols has increased from 55% in traditional processes to over 95%, while product shelf life is extended by 50%.

There are over 200 ginger extract processors in China, including more than 30 large-scale enterprises with single-plant annual capacity of up to 1,000 tons. High concentration of production capacity and significant economies of scale enable rapid response to large global orders, with delivery cycles shortened to **7–15 days**, far below the international average of 30 days. Production efficiency and stability rank among the world's best.

In terms of process standardization and technological bottlenecks, domestic processors have standardized full-process production with clear technical parameters for each stage. For example, a combined process of enzymatic hydrolysis and supercritical CO_2 extraction is used for gingerols, with strict control over temperature, pressure and time; chromatographic techniques are applied in refinement to improve quality consistency, driving the industry from extensive development to standardized quality improvement.

However, China still lags behind top European and American enterprises in high-purity single active ingredient separation and customized high-end extract R&D. Core separation technologies for ultra-high-purity 6-gingerol (purity ≥98%) have not been fully independently mastered, leading to gaps in purity and stability compared with

international top levels. This results in a small reliance on imports for high-end ginger extract, creating a structural mismatch of "overcapacity in low-end segments, insufficient capacity in high-end segments". This bottleneck is both a challenge for current industrial upgrading and a key direction for future technological breakthroughs.

(III) Quality Control: Advantages in Complete Standards and Testing Capabilities

The quality of ginger extract directly determines the safety and efficacy of downstream products. China has established a full-chain quality control system, serving as a core guarantee of trust in the global supply chain, while accelerating alignment with international standards to gradually enhance global standard discourse power.

In terms of the standard system, China is accelerating the improvement of relevant standards by issuing group standards including *Code of Practice for Ginger Extract Production* and *Quality Standard for Ginger Extract*, alongside national general standards such as *Plant Extracts – Terminology* and *Limit of Heavy Metals in Plant Extracts*. Enterprises have implemented internal control standards higher than international benchmarks, forming a three-tier system covering raw material quality, processing techniques, product purity, active ingredient content, heavy metals and microbial limits. Some enterprise standards require gingerol ≥25%, moisture ≤8.0 g/100 g, and heavy metals ≤10 ppm, all reaching international advanced levels.

China actively participates in international standard discussions and promotes alignment between domestic and global mainstream standards, with some enterprise standards meeting or exceeding international norms. Nevertheless, it still lacks dominance in core global standard-setting and high-end certification access, with European and American enterprises retaining control over key standards.

In terms of testing capabilities, leading domestic enterprises are equipped with advanced instruments including HPLC, GC and atomic absorption spectrophotometers, with comprehensive laboratories enabling precise detection of gingerols, shogaols, heavy metals and microorganisms at ppm level, ensuring compliance with regulatory requirements of the US FDA, the EU and other regions. A full-process traceability system is implemented, with some enterprises applying blockchain to establish a "one-item-one-code" system, retaining records for at least 3 years to reduce quality risks and enhance customer trust.

Domestic enterprises actively pursue international certifications including US FDA GRAS, EU ECOCERT and Japan JAS, breaking technical barriers in international trade and further consolidating China's core position as a global supplier.

(IV) Cost and Supply Chain Efficiency: Comprehensive Advantages of Full-Chain Coordination

Compared with other global suppliers, China maximizes cost controllability and supply chain efficiency through full-chain coordination, representing one of its most competitive strengths in the global ginger extract supply chain, especially with absolute dominance in emerging markets.

In cost control, large-scale upstream cultivation reduces raw material costs, large-scale midstream production and technological iteration lower processing costs, and a complete downstream logistics and distribution network cuts

circulation costs. Overall costs are **40%–50% lower** than those of European and American enterprises, providing significant cost-performance advantages and supporting competitive global pricing while avoiding cyclical pressure of "volume growth with price decline".

The "company + cooperative + farmer" model underpins large-scale management, with ginger raw material costs 30%–40% lower than in India and Thailand. Intelligent processing lines further reduce unit processing costs and improve efficiency.

In supply chain efficiency, China has formed a coordinated system of "planting bases – processing enterprises – logistics – global distribution". Industrial clusters in Shandong, Sichuan, Yunnan and other provinces share cultivation, processing and logistics resources. Proximity between bases and processors shortens transportation time and reduces loss, with raw materials processed within 12 hours of harvest. Close connection between processors and distributors, supported by upgraded cold chain logistics covering 95% of core cities, enables fast exports. Production plans and specifications can be quickly adjusted to global demand, supporting customized products such as low-irritation ginger extract for infant food and anti-fatgage extract for sports nutrition.

These advantages grant China over **80% market share** in emerging markets including Southeast Asia and the Middle East, making it the sole core source of ginger extract raw materials, while penetration in European and American markets is steadily rising.

III. Global Market Structure and Supply Chain Risk Resilience

(I) Market Structure: Dual Challenges of Regional Divergence and Standard Barriers

China's global market layout for ginger extract is characterized by regional divergence: "strong in emerging markets, difficult to break through in mature markets". Enhancing standard discourse power and overcoming market barriers have become core tasks.

Export markets show clear divergence:

- **Emerging markets (Southeast Asia, Middle East, Latin America)**: Chinese products dominate with over 80% market share due to cost-performance and fast delivery, becoming the preferred raw material supplier for local food, beverage and feed enterprises, accounting for over 90% of regional exports.
- **Mature markets (Europe, US, Japan, South Korea)**: Export share is relatively low and penetration is difficult. Strict consumer demand and high technical barriers impose multiple restrictions on market entry, notably EU limits on active ingredients and pesticide residues, and strict US organic certification requirements. Japanese and Korean markets demand extremely high quality and certification, with Chinese products mainly concentrated in mid-to-low-end segments and limited high-end breakthroughs.

This divergence stems mainly from strict technical and certification standards in mature markets and China's technological gaps in high-end sectors, forming core entry barriers. Meanwhile, domestic market education on ginger extract remains insufficient, leaving untapped potential.

(II) Risk Resilience: Comprehensive Support for Supply Chain Security and Industrial Resilience

Amid global supply chain uncertainty, China's ginger extract industry has built strong supply chain security and industrial resilience through full-chain independent layout and strategic planning by leading enterprises, though hidden risks require vigilance.

1. Supply Chain Security

Overall external dependence is low, but structural hidden risks exist:

- **Dependence on high-end raw material imports**: Core extraction technologies for ultra-high-purity single active ingredients (e.g., 6-gingerol ≥98%) are not fully breakthrough, resulting in small-scale imports from Europe and the US, with risks of supply control and cost volatility.
- **International trade policy fluctuations**: Tariff adjustments and trade barriers may impact exports, especially to mature markets, with observed effects on corporate procurement and pricing strategies.
- **Natural risks**: Climate, pests and diseases may disrupt raw material supply. Although cultivation is large-scale, single variety structure weakens resistance to risks.

2. Industrial Resilience

China's fully independent and controllable "cultivation–processing–inspection–distribution" industrial chain forms the foundation of industrial resilience, a key advantage over countries focused on single links. It enables efficient closed-loop management, ensuring stability and flexibility.

Leading enterprises are building competitive barriers through full-industry-chain layout:

- Upstream: Expanding planting bases and optimizing varieties to ensure self-sufficiency and quality control.
- Downstream: Developing deep processing and brand layout, launching terminal products to enhance added value and risk resistance.
- Digital upgrading: Adopting AI intelligent replenishment systems to shorten inventory cycles and reduce stockouts.

This full-chain layout provides strong buffer against global market fluctuations and raw material price hikes, enabling stable support for the global supply chain and acting as a stabilizer for the global ginger extract industry.

IV. Summary and Outlook

In summary, China has established an irreplaceable position as a core manufacturing center and strategic raw material base in the global ginger extract supply chain, holding an unshakable hub role:

- Macroscopically: Leading global supply, driving value upgrading and commanding core discourse power.
- Microscopically: Possessing core competitiveness through large-scale technology, high-quality control and cost performance, while acknowledging high-end technological gaps.
- Market-wise: Dominating emerging markets and steadily penetrating mature markets.
- Risk-wise: Securing supply chain resilience through full-chain layout with gradually manageable hidden risks.

This position stems from China's unique natural conditions, industrial policy support, corporate technological innovation and full-chain layout, enabling sustained delivery of high-quality, low-cost and fast-delivery ginger extract to global downstream enterprises. It serves as a core guarantee for the stable development of global food, pharmaceutical, daily chemical and other related industries, with irreplaceable core value in the global ginger extract supply chain.

Going forward, driven by the global trends of "natural plant-based" and "clean label" consumption and wider recognition of ginger extract's health benefits, market demand will continue to grow. China will further strengthen and consolidate its core position, enhancing industrial discourse power and influence by focusing on three strategic directions: **addressing shortcomings, strengthening advantages, and elevating discourse power**.

1. Break through bottlenecks in high-end extraction technologies, achieve independent production of high-purity single active ingredients, with a focus on 6-gingerol purification and separation.
2. Continue industrial upgrading, expand high-value-added exports, move up the global value chain, while deepening the domestic market through education and tapping internal potential.
3. Accelerate international alignment of standards, participate actively in global rule-making, and break standard barriers in mature markets.
4. Strengthen full-chain coordination, optimize ginger varieties, improve supply chain risk resistance, and consolidate the global hub position.
5. Optimize market layout, deepen emerging markets and break mature market barriers, while diversifying product forms into sports nutrition, pet care, green agriculture and other applications.

Ultimately, China will transition from a **major raw material supplier** to a **global industrial power**, providing stable, efficient and high-quality support for the global ginger extract supply chain and leading the high-quality development of the global ginger extract industry.