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

Overview

As a globally recognized **gold-standard prebiotic and benchmark water-soluble dietary fiber**, fructo-oligosaccharides (FOS) have become core strategic raw materials in global food, beverages, health food, foods for special medical purposes (FSMP), pet food and pharmaceutical excipients. They feature highly selective prebiotic activity, low-calorie properties, exceptional processing stability and full-scenario adaptability, perfectly aligning with the dual trends of global consumption upgrading toward sugar reduction, fiber enhancement and gut health, as well as food industry transformation.

At present, China has firmly established itself as the **core hub** of the global FOS supply chain. With five core strengths — full industrial chain synergy, large-scale production capacity, cost-effective products, flexible market responsiveness and technological innovation — China has become the **preferred supply base** for global downstream customers. Its core position and competitive advantages focus on the following four dimensions, precisely matching downstream customers' core demands for cost reduction, efficiency improvement, compliance access, stable supply and product innovation.

I. Core Position in the Global Supply Chain: From Major Producer to Value Leader

China has evolved from a major global producer of FOS to the **capacity core, trade hub, demand engine and technology highland** of the global supply chain. It is deeply integrated into the global downstream industrial division, becoming a key force shaping global supply, pricing and technological direction, and providing downstream customers with stable, efficient, reliable and value-added full-chain supply support.

1. Capacity and Supply Core: World's Largest Producer with Unmatched Supply Stability

By 2025, China's total annual FOS production capacity exceeded **300,000 metric tons**, accounting for **over 70% of the global total**, firmly ranking as the world's largest producer, far exceeding traditional producing regions such as Japan, Europe and North America. Industrial clusters have formed in Shandong, Guangdong, Jiangsu and Zhejiang. Leading enterprises operate single plants with annual capacities of **50,000–100,000 metric tons**, with capacity utilization steadily above **85%**, enabling uninterrupted year-round supply and effectively resolving industry pain points including seasonal shortages, delivery delays and quality fluctuations for downstream customers.

Supported by a well-developed upstream industry of large-scale chicory cultivation and sucrose deep processing, China's self-sufficiency rate of core FOS raw materials exceeds **95%**, effectively mitigating supply risks from international raw material price volatility and supply chain disruptions, ensuring long-term, stable and predictable supply for downstream partners.

2. Global Trade Hub: Export-Oriented, Worldwide Coverage and Efficient Two-Way Circulation

Approximately **60%** of China's FOS capacity is dedicated to exports, with a network covering **more than 70 countries and regions** including Europe, the U.S., Japan, South Korea, Southeast Asia, the Middle East, Latin America and Australia. Exports to RCEP member countries account for over **55%**. Supported by coastal ports including Qingdao, Shanghai, Ningbo and Guangzhou, an **integrated logistics system of "raw material procurement – production and processing – global distribution"** has been established, enabling fast delivery within **7–15 days** to core markets, significantly reducing downstream customers' inventory costs and logistics cycles. Meanwhile, as the world's largest FOS consumer market, China accounts for over **34%** of global consumption, forming a **dual-driven pattern of "domestic sales + exports"**. This structure satisfies immediate and customized demand from domestic downstream customers while accommodating large-scale and differentiated orders from global clients, establishing China as a **"two-way hub"** of the global supply chain.

3. Industry Leader: Dominated by Top Enterprises, Global First-Tier Players and High Industrial Concentration

The global FOS industry features an oligopolistic structure **led by China**. The top five manufacturers hold over **65%** of the global market share. Chinese enterprises including Quantum Hi-Tech, Baolingbao, Bailong Chuangyuan and Shandong Longli rank among the global first tier, collectively accounting for over **80%** of domestic capacity, forming a large-scale, intensive and standardized industrial layout.

Through independent innovation combined with technology introduction, Chinese leading enterprises have achieved full technological parity with international giants (Meiji of Japan, BENEO of Belgium, ADM of the U.S.), with product quality reaching international advanced levels. With more flexible pricing, faster customized services and closer market responsiveness, they have become the preferred choice for global downstream customers to replace imports, control procurement costs and enhance supply chain resilience.

4. Technology and Standard Leader: From Follower to Pioneer, Advancing Global Standard Upgrading

China's FOS industry has transitioned from **"introduction and digestion" to "independent innovation + standard export"**. It not only matches international levels in process, quality and compliance but also leads globally in high-purity purification, customized degree of polymerization, green intelligent manufacturing and other fields. China has led the formulation of **national standards for FOS (GB/T 23528-2019) and Food Nutritional Fortifier — Fructooligosaccharides (GB 1903.40-2022)**, and deeply participated in revising international standards by JECFA, FDA and EFSA. By promoting the unification of global FOS quality specifications, testing methods and compliance systems, China has become a key leader in **global FOS technology and standards**.

II. Core Competitive Advantages: Precise Alignment with Downstream Demand, Building an Irreproducible Supply Chain Barrier

China's FOS core advantages are built around downstream customers' **five core needs: cost reduction, compliance, quality improvement, efficiency enhancement and innovation**, balancing professionalism, stability, flexibility and commercial value. This creates unique competitiveness distinct from international peers and delivers sustainable, value-added procurement benefits for downstream clients.

(I) Cost Advantage: Full Industrial Chain Synergy, World's Highest Cost Performance

Cost control is central to downstream procurement decisions. Leveraging a complete industrial chain, large-scale production and green intelligent manufacturing, China's FOS industry has built an irreplaceable cost barrier, offering customers the world's most cost-effective products.

- **Upstream raw material cost advantage**: As the world's largest sucrose producer and a major base for large-scale chicory cultivation, China enjoys abundant and stable supplies of sucrose and inulin. Through vertical integration, long-term price-lock agreements and centralized procurement, leading enterprises achieve a raw material self-sufficiency rate above 95%, with raw material costs **20%–30% lower** than Japanese and European competitors.
- **Manufacturing cost advantage**: Top Chinese producers widely adopt **continuous enzymatic catalysis + nanomembrane separation + chromatographic purification** coupled with DCS full-process intelligent control, greatly improving production efficiency, conversion rate (65%–75%) and yield (over 90%), while reducing unit energy consumption (25%–35% below Europe/U.S.) and labor costs (40%–50% below Europe/U.S.). Overall production costs are **25%–35% lower** than international peers.
- **Logistics and scale cost advantage**: Industrial clusters and coastal ports reduce domestic distribution and international shipping costs by **15%–25%** compared with global competitors. Ten-thousand-ton scale production dilutes fixed costs by **12%–18%**, further strengthening cost competitiveness.

Ultimately, Chinese FOS prices are **15%–25% lower** than imported products while matching international quality, enabling downstream customers to significantly cut raw material costs and improve product competitiveness and gross margins.

(II) Quality and Compliance Advantage: Meeting Top International Standards, Full Compliance Coverage, Global Market Adaptability

Downstream sectors including food, health food, FSMP and pharmaceutical excipients impose extremely high requirements on raw material quality and compliance. Chinese FOS achieves **"top-tier quality, full compliance coverage and precise customized matching"**, seamlessly fitting market access standards across regions and eliminating downstream compliance and quality concerns.

- **Quality advantage**: Leading Chinese enterprises adopt advanced equipment and processes from

Germany's GEA, Japan's Hitachi and America's Dow, realizing full intelligent control and traceability. Product purity is stably maintained at **95%–98% (FOS-95+)**, degree of polymerization (GF2–GF4) ≥90%, ash ≤0.1%, glucose residue ≤0.5%, color difference ΔE<0.4, batch stability error ≤2.5% — far exceeding national and international standards, ensuring consistent quality for large-scale downstream production.

Customized grades are developed for diverse applications: **high-solubility FOS (cold-water solubility >90%)** for RTD beverages and solid drinks; low-ash pharmaceutical-grade FOS for pharma excipients and FSMP; tailored GF2/GF3/GF4 ratios for probiotic synergy and precise gut regulation, precisely matching differentiated downstream needs.

- **Compliance advantage**: Over 20 major domestic enterprises hold ISO 22000, FSSC 22000, HALAL, KOSHER and BRC certifications. Products from top producers **100%** comply with FDA GRAS (GRN 000044), EFSA, Japan's FOSHU, South Korea's KFDA and Russian certification, fully aligning with global food, health food, FSMP and pharmaceutical access standards. Products can be directly used for domestic or global sales without additional compliance investment, with a **100% compliance pass rate**.

(III) Supply and Responsiveness Advantage: Flexible and Efficient, Ensuring Production Continuity and Rapid Customization

For large-scale, continuous downstream production, **stable supply, fast delivery and flexible response** are critical. China's FOS supply chain excels through decentralized capacity layout, multi-site coordination, efficient logistics and flexible customization.

- **Supply stability advantage**: Capacity is strategically distributed across Shandong, Guangdong, Jiangsu and Zhejiang industrial clusters. Leading enterprises operate 2–3 production bases, enabling capacity complementation and staggered production to avoid disruptions from shutdowns, maintenance or natural disasters. With sufficient raw materials and year-round uninterrupted manufacturing, order cycles are extremely short: **3–5 days for domestic orders, 7–12 days for international orders**, far below the 15–30 days typical of international peers, **100% guaranteeing continuous downstream production**.
- **Responsiveness flexibility advantage**: Manufacturers flexibly adjust specifications and packaging (25kg bags, 500kg/1000kg jumbo bags, small packs) per customer needs, supporting small-batch trials, large-volume customization and urgent order expediting. One-on-one technical support, formulation optimization, application design and clinical data sharing help customers improve taste, functionality and cost efficiency, truly realizing **"on-demand customization, full empowerment and rapid response"**.

(IV) Technology and Innovation Advantage: Iterative Upgrading, Empowering Downstream Value-Add and Differentiation

China's FOS industry has evolved from **"introduction and digestion" to "independent innovation + global leadership"**, with continuous technological iteration and product breakthroughs. This not only ensures stable

quality and optimal costs but also delivers value-added services, helping downstream products stand out in the health market.

- **Process innovation advantage**: Leading producers have upgraded from batch enzymatic processes to continuous enzymatic and immobilized-enzyme catalysis, raising conversion to 65%–75%, cutting byproducts by over 30% and reducing energy consumption by 25%–35%, lowering costs while improving purity, safety and stability. Green intelligent manufacturing — closed-loop water treatment, clean energy, online HPLC detection and AI regulation — reduces COD emissions by over 50% vs. national standards, aligning with global green and "dual carbon" goals and supporting downstream customers in **cleaner production and sustainable development**.
- **Product innovation advantage**: Responding to global demand, high-end specialty products have been developed including high-purity (FOS-95+), pharmaceutical-grade, FSMP-grade, customized DP, GOS-compounded and probiotic-synergized FOS, expanding into high-value sectors such as FSMP, precision pet nutrition, sports nutrition, oral beauty and pharmaceutical excipients. Supported by strong R&D capabilities, manufacturers assist downstream customers in launching low-calorie, high-fiber, prebiotic and clean-label products such as functional drinks, sugar-free bakery, probiotic yogurt, FSMP and pet gut-health diets, helping capture the health market and **increase product added value by 10%–25%**.

III. Conclusion: China's FOS — The Preferred Strategic Supply Chain Partner for Global Downstream Customers

China has fully established its **core position** in the global FOS supply chain as the world's largest production base, trade hub and demand engine, as well as a strategic pillar for downstream customers pursuing cost reduction, efficiency improvement, compliant operation, stable supply, product innovation and sustainable development.

Compared with peers in Japan, Europe and North America, China's FOS offers **five core strengths: world-leading cost performance, top-tier quality and compliance, ultra-stable supply, flexible rapid response and technology-driven innovation**, precisely matching full-dimensional procurement needs across global food, beverages, health food, FSMP, pet food and pharmaceutical excipients, making it the **preferred strategic supply chain partner** for global downstream customers.

In the future, as China's FOS capacity continues to expand (exceeding 450,000 tons/year by 2030), technologies advance (enzymatic processes, molecular modification, customized polymerization), global layout deepens (overseas production and R&D centers) and standard export accelerates, China will further consolidate its global supply chain leadership. It will continue to provide downstream customers with more valuable, stable, flexible and innovative products and services, helping them gain competitive advantages and maximize value in the global marketplace.