Competitive Advantages of Fructo-oligosaccharides (FOS) and Future Market Development Outlook

Part One: Competitive Advantages of Fructo-oligosaccharides (FOS)

Overview

As a globally recognized **gold-standard prebiotic and benchmark water-soluble dietary fiber**, fructooligosaccharides (FOS) have established an irreplaceable competitive barrier in food, health food, foods for special medical purposes (FSMP), pet food and other sectors by virtue of their highly selective prebiotic activity, all-round functional properties, exceptional process stability and full-scenario adaptability. The global market maintains a compound annual growth rate (CAGR) of **12.8%**, with China leading at **15.2%**. FOS not only meet stringent global regulations and professional standards but also strongly align with commercial imperatives for sugar reduction, fiber enhancement and gut health. They help partners reduce costs, improve efficiency, build differentiation and maximize commercial value.

I. Exclusive Core Functions, Precise Solutions to Industry Pain Points, Leading Healthy Formulation Upgrading

FOS is the only natural/enzymatically synthesized ingredient integrating three core functions: **highly selective prebiotic activity, water-soluble dietary fiber, and low-calorie texture modification**. It perfectly fits the global mainstream consumption trend of "sugar reduction, fat reduction, high fiber and gut health" (China's sugar-reduced food market grows 25% annually), solving the core dilemma in food formulation: "balancing health and taste, functionality and cost" in a one-stop manner.

- **Exclusive prebiotic activity**: 100% resistant to human digestive enzymes; selectively increases Bifidobacteria and Lactobacilli by **2–4 times**, inhibits harmful bacteria, regulates intestinal flora balance and promotes intestinal peristalsis. It is the only core raw material that supports both "gut health claims" and "dietary fiber fortification."
- **Dual benefits of low calorie and texture improvement**: Calorie value of only **1.5 kcal/g** (1/3 of sucrose, 1/6 of fat), sweetness **0.3–0.6 times that of sucrose**, directly replacing **20%–50%** of sugar or fat and reducing formulation costs by **7%–11%**. It provides mild thickening, moisture retention, anti-aging and ice crystal inhibition effects, improving taste and texture while extending shelf life by **12%–25%**, resolving blandness, coarseness and rapid staling in sugar-free/low-fat products.
- **Compliant empowerment for nutritional claims**: Complies with global standards including GB 2760, GB 28050, FDA GRAS and JECFA. Eligible for compliant labeling such as "contains dietary fiber," "high fiber," "prebiotic" and "regulates intestinal flora." Enables core health selling points without extra R&D investment,

raising product premium by **10%–22%**.

II. Strong Core Technical Barriers, Ultra-Stable Quality, Free from Low-End Price Competition

Supported by over **30 years** of enzymatic process expertise and full-process intelligent control, FOS has built an inimitable technological moat, with quality far exceeding industry standards and suitability for high-end applications including infant formula and FSMP.

- **Industry-leading process precision**: Produced via **continuous enzymatic catalysis + nanomembrane separation + chromatographic purification**, achieving **±0.3°C precise temperature control** to minimize byproducts. Product specifications: purity ≥95% (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% — top-tier in the industry.
- **Core patents and large-scale advantages**: Over **15** core patents covering enzymatic synthesis, high-purity purification and customized degree of polymerization. 10,000-ton intelligent production capacity dilutes fixed costs by **12%–18%**, delivering strong cost competitiveness while maintaining premium quality, with gross margins reaching **38%–48%**, helping partners escape low-end price wars.
- **Stringent quality control system**: Full-chain traceability from raw materials to finished products. HPLC accurately tests degree of polymerization, purity and impurities. Every batch complies with GB 1903.40, FDA and EFSA standards, meeting zero-risk requirements for infant and FSMP applications.

III. Authoritative Endorsements of Health Efficacy, Solid Clinical Data, Capturing Market High Ground

FOS is a safe and effective prebiotic and dietary fiber certified by global authorities including FDA, EFSA, National Health Commission of China and Japanese Ministry of Health, Labour and Welfare (FOSHU). Its efficacy is verified by **60+** clinical and human trials, supporting quantifiable and compliant claims.

- **Clear gut health efficacy**: Significantly improves bowel movement frequency and consistency, relieves constipation; regulates intestinal flora structure, increases beneficial bacteria and reduces pathogens; strengthens intestinal barrier function and enhances immunity — recognized by JECFA and Chinese Nutrition Society.
- **Outstanding metabolic management advantages**: Not metabolized into blood glucose, GI value ≈ 0; delays glucose absorption, lowering postprandial blood glucose peak by **20%–28%**; enhances satiety, reduces caloric intake and assists weight management, ideal for sugar-control and fat-reduction positioning.
- **Enhanced mineral absorption**: Improves absorption of calcium, magnesium and iron by **25%–45%**, supporting bone health and nutritional fortification for middle-aged, elderly and infant populations.

IV. Extreme Full-Scenario Adaptability, Cross-Border Synergy, Expanding Commercial Boundaries

FOS leads globally in compatibility and adaptability, spanning five trillion-level sectors: food, beverages, health food, FSMP and pet food, suitable for **200+** product categories. It is the only prebiotic fiber that withstands extreme processing conditions including high temperature, high pressure, acidity and freezing.

- **Unlimited process compatibility**: Heat-resistant (121°C for 30 min), acid-resistant (pH ≥ 2.0), shear-resistant, suitable for UHT sterilization, baking, sugar cooking, extrusion and freezing. 10% aqueous solution is colorless and transparent, with no impact on product color or flavor and a clean, neutral taste.
- **Strong synergistic compounding effects**: Excellent compatibility with natural sweeteners (steviol glycosides, erythritol, mogrosides), probiotics, colloids and starches. Enables the golden formula of "natural sweetness + prebiotic fiber + probiotics" for **1+1>2** performance, shortening R&D cycles by **35%** and reducing formulation complexity and cost.
- **Full-scenario penetration**: Applied across beverages, dairy products, bakery, confectionery, frozen food, health food, FSMP, pet food and pharmaceutical excipients, enabling partners to rapidly iterate product portfolios and achieve multi-track layout and diversified profitability.

V. Complete Global Compliance Qualifications, Stable and Controllable Supply Chain, Solid Foundation for Trusted Cooperation

FOS holds comprehensive global compliance credentials and a mature, stable supply chain, serving as a "passport" for entering international markets including Europe, the US, Japan, South Korea and Southeast Asia, effectively avoiding trade and regulatory risks.

- **Full coverage of compliance qualifications**: Certified to FSSC 22000, ISO 9001, ISO 22000. Approved in **15+** countries and regions including FDA GRAS (GRN 000044), EFSA, Japan FOSHU, KOSHER and HALAL, with 100% compliance pass rate.
- **Secure and stable supply chain**: Global sourcing of chicory/sucrose raw materials with long-term strategic agreements ensuring stable supply. Intelligent production plus emergency inventory guarantees **7×24-hour** delivery, shortening lead times by **20%** to meet large-scale and customized customer demands.
- **Global service network**: Local service teams in China, Europe, North America and Southeast Asia provide one-to-one technical support, formulation optimization and compliance consulting, responding quickly to customer needs and reducing cooperation risks.

Part Two: Future Market Development Outlook for Fructooligosaccharides

I. Market Size and Growth Forecast (2026–2035)

- **Global market**: Reached **USD 6.8 billion** in 2025; CAGR of **12.8%** from 2026 to 2035, exceeding **USD 22 billion** by 2035. Asia-Pacific accounts for over **45%**, the largest consumer market, with steady growth in North America and Europe.
- **Chinese market**: Reached **CNY 18.5 billion** in 2025; CAGR of **15.2%** from 2026 to 2035, surpassing **CNY 75 billion** by 2035, representing over **34%** of the global total and becoming the core growth engine.
- **Segment growth rates**: FSMP **22.5%** CAGR, pet food **19.8%**, health food **16.3%**, beverages/dairy **12.5%**, with high-end and functional segments growing significantly faster.

II. Core Future Development Trends

(I) High-End, Customized and Functional Products Become Mainstream

- **Boom in high-purity and FSMP-grade products**: Share of FOS-95+, pharmaceutical-grade and FSMP-grade products rises from **28%** in 2025 to over **60%** by 2035, becoming the growth driver. Customized degree of polymerization (precise GF2/GF3/GF4 ratios), GOS compounding and probiotic synergy become focal points of differentiated competition.
- **Enhanced and precise functionality**: Targeted products for gut flora regulation, blood glucose management, weight control and mineral absorption; enzymatic optimization and molecular modification improve activity and stability for high-end FSMP and pharmaceutical uses.
- **Diversified forms**: Expanded from powder to liquid, granules, tablets and microcapsules, improving convenience and stability for varied applications.

(II) In-Depth Expansion of Application Scenarios and Extended Boundaries

- **Upgrading of traditional foods**: Penetration in dairy, beverages, bakery and confectionery rises from **35%–45%** in 2025 to **70%–85%** by 2035, becoming a standard functional ingredient.
- **Explosive growth in emerging sectors**: **FSMP (infants, elderly, post-operative rehabilitation), precise pet nutrition, sports nutrition, oral beauty and pharmaceutical excipients (disintegrants, fillers)** emerge as new growth poles, contributing **over 30%** of market share by 2035.

- **Cross-border integrated innovation**: Prebiotic + probiotic + sweetener + functional component compounds dominate, creating one-stop solutions for "gut health + sugar control + fat reduction + nutritional supplementation."

(III) Optimized Industrial Structure, Increased Concentration and Intensified High-End Competition

- **Rising concentration**: Global CR5 increases from **54%** in 2025 to over **75%** by 2035; China's CR4 rises from **62%** to over **80%**. Low-end capacity is continuously phased out, significantly improving industry standardization.
- **Shift in competition focus**: From price competition to technology, quality, compliance, service and customization. High-end certifications, clinical data and scenario-based solutions become core competitiveness.
- **Deeper global layout**: Leading enterprises establish production and R&D centers in Europe, the US, Southeast Asia and South America, proximity to downstream customers to avoid trade barriers, achieving global supply with local service.

(IV) Technology-Driven Innovation, Green Intelligent Manufacturing as Standard

- **Enzymatic process iteration**: Immobilized enzyme continuous catalysis, synthetic biology and enzyme directed evolution reduce energy consumption by **30%+**, raise conversion rate to **65%–75%**, and further improve uniformity and purity.
- **Green low-carbon production**: Full-process digital and intelligent control, membrane separation recycling, zero wastewater discharge and clean energy use align with "dual carbon" goals and enhance international competitiveness.
- **Precise quality control and traceability**: Online HPLC detection, AI intelligent regulation and blockchain traceability enable full-process quality monitoring, ensuring safety and stability.

(V) Dual Drivers of Policy and Consumption, Sustained Release of Health Demand

- **Policy support**: Healthy China 2030, global sugar reduction policies, FSMP regulations and pet food standards continue to be implemented, providing policy support and market space for FOS.
- **Consumption upgrading**: Rising awareness of gut health, sugar control, fat reduction and precise nutrition; Generation Z, middle-aged/elderly consumers and pet owners become core groups, driving explosive demand for high-end and functional products.
- **Stricter compliance**: Tighter global standards for food additives, nutritional claims and labeling. With authoritative certifications and clear compliance, FOS further replaces inulin, resistant dextrin and other alternatives.

III. Corporate Action Plans

(I) Capacity Layout Action Plan

- **Focus on high-end capacity**: Achieve ≥**55%** share of high-purity (FOS-95+), FSMP-grade and pharmaceutical-grade capacity by 2030, phase out low-end capacity to meet high-end downstream demand.
- **Optimize regional layout**: Focus on East China and South China domestically; establish production bases in Europe, Southeast Asia and North America globally to improve supply efficiency and proximity to customers.
- **Strengthen capacity management**: Adopt full-process intelligent control systems to raise capacity utilization to **90%+**; build a 30-day emergency inventory system to ensure stable procurement for customers.

(II) Technological Innovation Action Plan

- **Increase R&D investment**: Allocate **12%+** of annual revenue to R&D, focusing on enzymatic optimization, molecular modification, customized polymerization and functional compounding to reduce costs and improve efficiency.
- **Build patent and cooperation systems**: Deploy **20+** full-industry-chain patents; jointly develop scenario-based customized products with universities, research institutes and leading downstream customers.
- **Promote product upgrading**: Enrich portfolios of high-end, functional and multi-form products to meet differentiated needs in FSMP, pet and pharmaceutical sectors.

(III) Marketing and Customer Service Action Plan

- **Deepen domestic market**: Strengthen cooperation with leading customers in dairy, beverages, health food and pet food; tap potential in central-western and lower-tier markets to cultivate new growth.
- **Expand global market**: Complete compliance certifications in key export regions (Europe, US, Japan, South Korea, Southeast Asia); establish local service teams to raise export share to **40%+**.
- **Optimize customer service**: Implement tiered service mechanisms; provide one-to-one technical support, formulation optimization, compliance consulting and clinical data sharing to quickly respond to needs and enhance loyalty.

(IV) Compliance and Cost Control Action Plan

- **Establish global compliance system**: Monitor policy updates worldwide and advance international certifications in advance to reduce customer procurement risks.
- **Strengthen cost control**: Promote upstream raw material integration, long-term agreements and green intelligent manufacturing to lower overall costs by **10%–15%**.
- **Build risk prevention mechanisms**: Monitor fluctuations in raw material and energy prices, market demand and policy changes; develop contingency plans to ensure stable operation and supply.

IV. Risk and Opportunity Analysis

(I) Core Risks

- **Market risks**: Phased overcapacity after low-end capacity elimination may trigger price wars; intensified competition from inulin, resistant dextrin, GOS and other alternatives diverts partial demand.
- **Compliance risks**: Updates to global food additive and nutritional claim standards raise export certification costs, affecting enterprise exports and downstream product market access.
- **Cost risks**: Volatility in chicory, sucrose and energy prices plus rising environmental costs cause price fluctuations, impacting corporate profits and customer budgets.
- **Technical risks**: Slow iteration of enzymatic and molecular modification technologies fails to meet high-end and customized downstream demand; risk of patent infringement exists.

(II) Core Opportunities

- **Policy opportunities**: Continuous implementation of Healthy China, global sugar reduction, FSMP and pet food policies unleashes 100-billion-level market demand.
- **Consumption opportunities**: Upgrading around gut health, sugar control, fat reduction and precise nutrition; rapidly rising penetration in FSMP, pet and sports nutrition creates new growth.
- **Technical opportunities**: Breakthroughs in enzyme engineering, synthetic biology and green manufacturing help enterprises reduce costs, improve quality and deliver high-value products.
- **Globalization opportunities**: RCEP, China-EU Investment Agreement and other pacts boost trade facilitation, supporting global expansion and access to high-end

international customers.

- **Emerging scenario opportunities**: Expansion into pharmaceutical excipients, oral beauty and bio-based materials opens diversified growth and win-win outcomes.

V. Development Outlook and Conclusion

(I) Core Development Outlook

From 2026 to 2035, the FOS market will maintain rapid growth, with **high-end, customized, functional, globalized and scenario-diversified** as core themes.

- **Product structure**: High-purity, FSMP-grade and pharmaceutical-grade products exceed **60%** share, becoming growth engines; customized and functionally compounded products lead differentiation.
- **Competitive landscape**: Leading enterprises dominate the market; SMEs focus on niche segments. Technology, quality, compliance and service define core competitiveness.
- **Application boundaries**: Extend deeply from traditional food to FSMP, pet food, pharmaceuticals, sports nutrition and oral beauty, with **emerging sectors contributing over 30%** of share by 2035.
- **Industrial status**: FOS will become a foundational pillar raw material of the global health food industry, playing an irreplaceable role in gut health, metabolic management and precision nutrition.

(II) Conclusion

Driven by the global **"sugar reduction, high fiber, gut health"** trend and policy dividends, FOS boasts **exclusive prebiotic functions, exceptional process stability, full-scenario adaptability and global compliance qualifications**, supporting extremely broad market prospects.

- **For enterprises**: Focus on high-end development, technological innovation and customer-centricity to build core competitiveness and capture growth opportunities.
- **For downstream customers**: Leverage the technological, capacity, compliance and service strengths of leading enterprises to select high-end, customized products matching their applications, achieving product upgrading, differentiation and value maximization.

In the future, joint efforts between enterprises and downstream customers to mitigate risks and seize opportunities will drive the high-quality and sustainable development of the FOS industry, achieve mutual benefit, and provide safe, efficient and sustainable modern nutritional solutions for humanity.