Competitive Advantages of Xylo-Oligosaccharide (XOS) Products and Future Market Development Outlook

Part 1: Competitive Advantages of Xylo-Oligosaccharide (XOS) Products

Overview

As a benchmark third-generation functional oligosaccharide, highly efficient prebiotic and high-quality water-soluble dietary fiber, xylo-oligosaccharide (XOS) has built a differentiated core competitive barrier in food, health food, special medical purpose formula food, pet food, feed and other sectors by virtue of its ultra-high selective prebiotic activity, extreme processing stability, zero-calorie metabolic property and full-scenario adaptability. From 2020 to 2025, the global market achieved a compound annual growth rate of 8.4%, while the Chinese market led the growth at 10.8%. The product fully complies with stringent global regulatory standards including GB 2760, GB 1903.50, FDA GRAS, EU Novel Food Ingredients and Japan's Ministry of Health, Labour and Welfare. It deeply aligns with the global rigid consumer demand for sugar reduction, glycemic control, intestinal health and green nutrition, helping partners create product differentiation, enhance premium, reduce costs and improve efficiency, and maximize commercial value.

I. Exclusive Core Functions, Precise Solutions to Industry Pain Points, Leading the Upgrade of Healthy Formulations

XOS is the only natural enzymatic synthetic ingredient that combines three core functions: ultra-high selective prebiotic, water-soluble dietary fiber and zero-calorie texture modification. It perfectly fits the global mainstream consumption trend of **"sugar reduction, glycemic control, high fiber and intestinal health"** (the domestic glycemic control food market grows at 28% annually), and provides a one-stop solution to the core pain points in food formulation: **difficulty balancing health and taste, difficulty reconciling functionality and cost, and insufficient processing stability**.

- **Exclusive Prebiotic Activity Advantage**: 100% resistant to degradation by human digestive enzymes, reaching the large intestine intact. Its bifidogenic capacity is 10–20 times that of other prebiotics; only 0.7–1.4g per day for adults significantly improves intestinal flora and inhibits harmful bacteria by 44.6%. It is the **only core raw material that can simultaneously satisfy "intestinal health claims" and "dietary fiber fortification" at an extremely low dosage**, suitable for special scenarios such as infants and young children, and people with diabetes.
- **Dual Effects of Zero Calorie and Texture Improvement**: Caloric value **<0.1kcal/g** (only 1/40 of sucrose and 1/90 of fat), with sweetness 0.3–0.4 times that of

sucrose. It can directly replace 30%–60% of sugar/fat, reducing formulation costs by 9%–15%. It features acid resistance (stable at pH 2.5–7), heat resistance (non-degradable at 120℃), mild thickening, moisturizing, anti-aging and ice crystal growth inhibition properties, improving product taste and texture, extending shelf life by 15%–30%, and completely solving the problems of blandness, roughness, easy aging and processing degradation of sugar-free/low-fat products.

- **Compliance Empowerment for Nutritional Claims**: Compliant with global standards including GB 2760, GB 1903.50, FDA GRAS, EU Novel Food Ingredients and JECFA. It can be legally labeled as "contains dietary fiber", "high fiber", "prebiotic", "regulates intestinal flora" and "zero calorie", empowering products with core health selling points without additional R&D and increasing product premium by 12%–25%.

II. Profound Core Technical Barriers, Extremely Stable Quality, Free from Low-End Price Competition

Relying on over 20 years of precipitation in enzymatic processes, full-process intelligent control and agricultural and forestry waste resource utilization technology, XOS has established an irreplicable technical moat. Its quality far exceeds industry standards, making it suitable for high-end scenarios such as infant formula, special medical purpose formula food and pharmaceutical excipients.

- **Industry-Leading Process Precision**: Adopts a full-process technology of corn cob/sugarcane bagasse pretreatment + genetically engineered xylanase-directed enzymatic hydrolysis + nanomembrane separation + chromatographic purification + vacuum drying, achieving **precise temperature control of ±0.2℃** and strictly controlling by-product generation. Product purity ≥95% (XOS-95), effective degree of polymerization (X2–X4) ≥92%, ash content ≤0.08%, xylose residue ≤0.3%, color difference $\Delta E<0.3$, batch stability error ≤2.0%, ranking top in the industry.
- **Core Patents and Large-Scale Advantages**: Holds more than 20 core patents covering efficient enzymatic conversion, high-purity purification, customized degree of polymerization and green manufacturing. With 10,000-ton intelligent production capacity, it dilutes fixed costs by 15%–22%, building strong cost competitiveness while ensuring high-end quality, with a gross profit margin of 42%–52%, helping partners break away from low-end price wars.
- **Stringent Quality Control System**: Establishes a full-process traceability system from agricultural and forestry waste raw materials to finished products. The degree of polymerization, purity and impurities are accurately detected by HPLC. Each batch complies with GB 1903.50, FDA, EFSA and Japan’s Ministry of Health, Labour and Welfare standards, meeting zero-risk requirements for infants, special medical use and pharmaceutical scenarios.

III. Authoritative Endorsement of Health Efficacy, Solid Clinical Data, Seizing Market High Ground

XOS is a safe and effective prebiotic and dietary fiber certified by global authoritative institutions including the National Health Commission of China (Novel Food Ingredient), FDA, EFSA, EU and Japan's Ministry of Health, Labour and Welfare (FOSHU). Its efficacy is verified by more than 70 clinical and human trials, enabling quantifiable and legally compliant promotion.

- **Clear Intestinal Health Efficacy**: Significantly improves defecation frequency and stool consistency, relieving constipation (effective rate 82%); regulates intestinal flora structure, increasing bifidobacteria proportion by over 100% and reducing harmful bacteria abundance; promotes short-chain fatty acid production, strengthens intestinal barrier function and enhances body immunity.
- **Outstanding Metabolic Health Efficacy**: Zero-calorie and non-glycemic-raising, suitable for people with diabetes; assists in regulating blood lipids and reducing cholesterol absorption; promotes mineral (calcium, magnesium) absorption for bone health; adapts to health scenarios such as glycemic control, fat loss and weight management.
- **Strong Adaptability to Special Populations**: Safe for consumption by infants, the elderly and post-operative rehabilitation groups; not degraded by oral bacteria, preventing dental caries; applicable to pet food and feed sectors, regulating animal intestinal health and improving immunity and feed conversion rate.

IV. Full-Scenario Adaptation and Supply Chain Advantages, Building a Comprehensive Competitive Barrier

- **Full-Scenario Application Coverage**: Widely applicable to dairy products, beverages, baking, confectionery, health products, special medical purpose formula food, pet food, feed, pharmaceutical excipients and other fields. It is the only functional oligosaccharide that can simultaneously meet the demands of food, feed and pharmaceutical industries.
- **Green and Sustainable Raw Materials**: Uses agricultural and forestry wastes such as corn cobs, sugarcane bagasse and wheat bran as raw materials, with abundant supply and low cost. It conforms to the "dual carbon" goals and green manufacturing trends, gaining policy support and market recognition.
- **Rapid Supply Chain Response**: Leading domestic enterprises have realized the layout of the whole industrial chain from raw materials to production and sales, with short delivery cycles and stable inventory. Multi-form products such as powder, syrup and granules are available to meet the customized needs of downstream customers.

Part 2: Future Market Development Outlook for Xylo-Oligosaccharide (XOS)

I. Market Size and Growth Forecast

In 2025, the global XOS market reached **$720 million**, and the Chinese market approached **CNY 3 billion**, accounting for 66% of the global market, making China the world's largest producer and consumer. From 2026 to 2035, the market will maintain high-speed growth of 8%–12%. It is projected that by 2030, the global market size will exceed $1.2 billion, and the Chinese market will reach CNY 5.2 billion. High-endization, customization, functionalization, globalization and scenario diversification will become the core development lines.

II. Core Development Strategies and Action Plans

(I) Product and Technological Innovation Action Plan

- **Increase R&D Investment**: Allocate over 15% of annual revenue to R&D, focusing on core technologies such as genetically engineered xylanase, molecular modification, customized degree of polymerization, functional compounding and microencapsulation, improving conversion efficiency by over 30% and reducing production costs by over 15%.
- **Build a Patent and Cooperation System**: Lay out more than 30 full-industry-chain patents, conduct joint R&D with universities, research institutes and leading downstream customers, and develop scenario-based products for special medical grade, pharmaceutical grade, pet-specific and customized degree of polymerization.
- **Promote Product Upgrading**: Enrich the product matrix of high-purity (≥98%), special medical grade, pharmaceutical grade, compound functional and multi-form products to adapt to differentiated demands in special medical care, pets, pharmaceuticals, sports nutrition and other fields.

(II) Market and Customer Service Action Plan

- **Deepen the Domestic Market**: Strengthen cooperation with leading customers in dairy, beverage, health product, pet food and feed sectors, tap the potential of central and western regions and sinking markets to foster new growth; expand segmented markets such as elderly nutrition, children's health and glycemic control food.
- **Expand the Global Market**: Improve compliance certifications in core export regions including Europe, the US, Japan, South Korea, Southeast Asia and the Middle East, establish localized service teams, and increase export share to over 45%; connect with international high-end customers to enhance global market influence.
- **Optimize Customer Service**: Establish a hierarchical service mechanism, providing one-on-one exclusive technical support, formulation optimization, compliance

consultation, clinical data sharing and customized production services, quickly responding to customer needs and improving customer stickiness and repurchase rate.

(III) Compliance and Cost Control Action Plan

- **Build a Global Compliance System**: Track policy updates on food additives, nutritional claims and feed additives in various countries, deploy international certifications in advance, and reduce customers' procurement risks and compliance costs.
- **Strengthen Cost Control**: Promote upstream raw material integration, long-term agreement procurement, green intelligent manufacturing and comprehensive by-product utilization, reducing comprehensive costs by 12%–18%; improve energy efficiency in line with "dual carbon" goals.
- **Establish a Risk Prevention and Control Mechanism**: Monitor fluctuations in raw material prices, energy prices, market demand, policy changes and technological iteration, formulate response plans to ensure stable operation and supply.

III. Risk and Opportunity Analysis

(I) Core Risks

- **Market Risk**: Expansion of low-end capacity may lead to phased oversupply and price wars; intensified competition from substitutes such as fructooligosaccharide, inulin, resistant dextrin and galactooligosaccharide will divert part of low-to-mid-end demand.
- **Compliance Risk**: Updates to global standards for food additives, nutritional claims and feed additives, as well as rising export certification costs, will affect enterprises' exports and downstream customers' product access.
- **Cost Risk**: Price fluctuations of corn cobs, sugarcane bagasse, energy and enzyme preparations, as well as rising environmental protection costs, will cause product price volatility, impacting corporate profits and customers' procurement budgets.
- **Technical Risk**: Slow iteration of enzymatic processes, molecular modification and microencapsulation technologies fails to meet downstream high-end and customized demands; patent infringement risks exist.

(II) Core Opportunities

- **Policy Opportunity**: Continuous implementation of policies such as Healthy China 2030, global sugar reduction, special medical purpose formula food, pet food, green agriculture and "dual carbon" goals releases a 100-billion-level market demand.
- **Consumption Opportunity**: Consumption upgrading in intestinal health, glycemic control, fat loss, precision nutrition, elderly health and pet health, as well as rapid

penetration growth in special medical care, pets, sports nutrition and pharmaceutical excipient scenarios, create new growth drivers.

- **Technical Opportunity**: Breakthroughs in enzyme engineering, synthetic biology, green manufacturing and AI formulation optimization help enterprises reduce costs, improve efficiency and quality, and provide high-value products for customers.
- **Globalization Opportunity**: RCEP, China-EU Investment Agreement and the Belt and Road Initiative promote trade facilitation, helping enterprises expand global markets and connect with international high-end customers.
- **Emerging Scenario Opportunity**: Expansion into pharmaceutical excipients, oral beauty, bio-based materials, elderly meals and special medical purpose formula food opens up diversified development space and achieves win-win results for enterprises and customers.

IV. Development Outlook and Conclusions

(I) Core Development Outlook

From 2026 to 2035, the XOS market will enter a stage of high-quality, high-value-added and globalized development, with core trends as follows:

- **Product Structure**: High-purity (≥95%), special medical grade and pharmaceutical grade products will account for over 65%, becoming the growth engine; customized, functionally compounded and pet-specific products will be the core of differentiated competition.
- **Competitive Landscape**: Leading enterprises will dominate the global market, while small and medium-sized enterprises will focus on segmented scenarios for breakthroughs; technology, quality, compliance, service and supply chain will become core competitiveness, with continuous improvement in industry concentration (CR5≥70%).
- **Application Boundary**: Deeply extend from traditional food to special medical care, pets, pharmaceuticals, sports nutrition, oral beauty and elderly nutrition. By 2035, **emerging scenarios will contribute over 35%** of the market share.
- **Industrial Status**: XOS will become a core pillar raw material for the global big health food, pet nutrition and green feed industries, playing an irreplaceable role in intestinal health, metabolic management, precision nutrition and green manufacturing.

(II) Conclusions

Driven by the global health trend of **"sugar reduction, glycemic control, high fiber, intestinal health, green sustainability"** and policy dividends, XOS boasts extremely broad market prospects by virtue of its exclusive ultra-high prebiotic function, extreme processing stability, zero-calorie property, full-scenario adaptability, global compliance

qualifications and green raw material advantages.

- **For Enterprises**: Focus on high-endization, technological innovation, customer demand orientation, green manufacturing and global layout to build core competitiveness and seize market growth opportunities.
- **For Downstream Customers**: Rely on the technological, production, compliance, service and supply chain advantages of leading enterprises, select high-end, customized and functional XOS products suitable for their own scenarios to achieve product upgrading, differentiated competition and value maximization.

In the future, enterprises and downstream customers will work together to avoid risks, seize opportunities, innovate technologies, operate in compliance and develop greenly, jointly promoting the high-quality and sustainable development of the XOS industry, achieving mutual benefit and win-win results, and providing safe, efficient, green and sustainable modern nutritional solutions for humans and animals.