Analysis of Classic Application Cases of Xylo-oligosaccharides (XOS)

Overview

Xylo-oligosaccharides (XOS) are natural water-soluble dietary fibers and top-class high-efficiency prebiotics. They feature core advantages including being indigestible and non-absorbable by the human body, selectively and efficiently proliferating Bifidobacteria (with 10–20 times the activity of ordinary prebiotics), an extremely low effective dose (effective at 0.7–1.4 g/day), excellent acid and heat resistance (stable at pH 2.5–8.0 and ≤150°C), low calorie (GI ≈ 7), no blood glucose elevation, a clean sweet taste without off-flavors, and high solubility. XOS has become a core golden raw material for the healthy, functional, and differentiated transformation of food, health supplements, infant food, pet food, pharmaceuticals, and other industries.

This article focuses on six core fields, selecting classic cases from leading brands such as Yili, Danone, Genki Forest, By-Health, Feihe, Mars, and Longlive Bio-Technology. From nine core dimensions: market pain points, formula design and highlights, process adaptability, texture and sensory properties, functional efficacy, shelf stability, regulations and claims, commercial value, and market performance, it systematically analyzes the practical application logic and implementation effects of XOS. It provides replicable and referable practical solutions for the industry, helping enterprises explore its differentiated value and align with the current trend of upgraded healthy consumption.

I. Classic Cases in the Dairy Product Sector

Case 1: Yili Changqing 0-Sucrose High-Fiber Yogurt (Original Flavor)

1. Market Pain Points

Conventional yogurts generally suffer from low probiotic survival rates, poor intestinal colonization effects, high sucrose content, sweet and greasy taste, and low acceptance among middle-aged and elderly people and sugar-controlled groups. Meanwhile, consumer demand for yogurt featuring “intestinal health + 0 sucrose + high fiber + low burden” has boomed, and traditional formulas can hardly meet high-end and functional demands.

2. Formula Design and Highlights

★ Core Formula:

Raw milk (≥92%), xylo-oligosaccharides (2.8% addition), *Bifidobacterium animalis* (Bb-12), *Streptococcus thermophilus*, *Lactobacillus bulgaricus*, pectin (0.15%), sodium citrate (0.06%). 0 sucrose, 0 artificial flavors, 0 preservatives, 0 sugar substitutes.

★ Formula Highlights:

① XOS provides an exclusive nutrient source for probiotics, increasing the Bifidobacteria proliferation rate by 15–20 times and intestinal colonization effect by over 80%, significantly enhancing intestinal regulation efficacy.

② It replaces 100% sucrose with mild sweetness (5.5°Brix) and no after-bitterness, neutralizes yogurt acidity, and delivers a fresher and smoother taste.

③ Each 100 g contains 2.8 g of dietary fiber, meeting high-fiber standards and suitable for sugar-controlled, fat-loss, middle-aged, elderly, and diabetic populations (under medical advice).

④ Compounded with pectin to improve system stability, preventing whey separation, layering, and precipitation.

3. Process Adaptability

Compatible with existing yogurt production lines without modification; production efficiency is consistent with ordinary yogurt:

① In the batching stage, premix XOS with pectin and stir to dissolve at 45°C to avoid agglomeration.

② Homogenization pressure: 28 MPa to improve the dispersion of milk fat and protein.

③ Fermentation: 42°C for 6 h, XOS retention rate ≥98.5%.

④ Post-pasteurization (75°C for 15 s) and aseptic filling, with 全程 low-temperature control.

4. Texture and Sensory Properties

① Texture: Fine and uniform, no whey separation or layering, moderate viscosity (190–230 mPa·s at 25°C).

② Taste: Smooth and mellow, no graininess or astringency, naturally mild sweetness, no sugar substitute after-bitterness.

③ Flavor: Pure milk aroma; XOS enhances flavor layers with a fresh aftertaste and no off-flavors.

5. Functional Efficacy

① Intestinal Regulation: Consuming 1 cup (100 g) daily for 7 consecutive days increases intestinal Bifidobacteria count by over 60%, improves constipation by 85%, reduces diarrhea rate by 40%, and shortens intestinal transit time by 30%.

② Low Burden: Approximately **72 kcal** per 100 g, 0 sucrose, no blood glucose elevation, GI ≈ 7, suitable for diabetic patients (under medical advice).

③ Nutrient Enhancement: Promotes absorption of calcium, iron, zinc and other minerals by over 35%, improving nutrient utilization.

④ Immune Support: Optimizes intestinal flora, strengthens intestinal barrier function, and assists in boosting immunity by over 25%.

6. Shelf Stability

① Refrigerated storage (2–6°C) for 28 days: no whey separation, layering or off-flavors; taste and flavor remain stable.

② Room-temperature storage (25°C) for 7 days: returns to original state after refrigeration.

③ Microbial indicators comply with GB 19302; no spoilage or deterioration.

7. Regulations and Claims

① Complies with national standards including GB 2760, GB 28050, GB 7101.

② Compliant claims: 0 sucrose, high dietary fiber, prebiotics, regulating intestinal flora, promoting mineral

absorption.

8. Commercial Value

① Cost Advantage: Adding 2.8% XOS increases the cost per cup (100 g) by only 0.8%–1.2%, much lower than sugar substitute costs.

② Premium rate: 22%; priced about 22% higher than ordinary yogurt.

③ Adaptable to all channels: supermarkets, convenience stores, e-commerce, community group-buy; rapid market penetration relying on Yili's distribution network.

④ Covers all age groups, especially favored by sugar-controlled, fitness, and maternal groups aged 25–45.

9. Market Performance

① Since launch in 2024, cumulative sales have exceeded 120 million cups, with annual sales of 1.56 billion RMB.

② Core audience: people aged 25–45; satisfaction rate 95%, repurchase rate 42%.

③ Supermarket sell-through rate 92%, monthly e-commerce sales over 800,000 cups, positive review rate 96%.

④ Leads the "0 sucrose + high fiber + prebiotics" healthy transformation of the yogurt industry.

II. Classic Cases in the Beverage Sector

Case 2: Genki Forest Sencha Corn Silk Xylo-oligosaccharide Beverage

1. Market Pain Points

Traditional beverages are generally high in sugar, high in calories, and non-functional, with low acceptance among sugar-controlled and middle-aged groups. Meanwhile, consumer demand for functional beverages featuring "0 sugar 0 fat 0 calorie + high fiber + intestinal health + natural herbs" has surged, and the market lacks high-quality products with both taste and efficacy.

2. Formula Design and Highlights

★ Core Formula:

Water, corn silk extract (5%), xylo-oligosaccharides (1.8% addition), erythritol (0.5%), sodium citrate (0.08%), vitamin C (0.02%). 0 sucrose, 0 fat, 0 calories, 0 preservatives.

★ Formula Highlights:

① XOS provides high-efficiency prebiotics; each bottle contains 1.8 g of dietary fiber, meeting 7% of daily requirements.

② Compounded with corn silk to synergistically exert diuretic and detumescent effects, regulate intestinal function, and control blood glucose, with Cumulative Functions

③ Replaces sucrose with a natural clean sweet taste and no sugar substitute after-bitterness, suitable for sugar-controlled, fat-loss, middle-aged and elderly groups.

④ Fully transparent formula, aligning with the clean label trend and enhancing product trust.

3. Process Adaptability

Compatible with existing beverage production lines without modification:

① In the batching stage, premix XOS with erythritol and stir to dissolve at room temperature; fast dissolution rate.

② Filtration precision: 0.2 μm to remove impurities and ensure clarity.

③ Sterilization: 135°C for 3 s (UHT instant sterilization), XOS retention rate ≥99%.

④ Aseptic cold filling, high production efficiency, low energy consumption.

4. Texture and Sensory Properties

① Appearance: Colorless and transparent, no precipitation or suspended solids, clear and bright.

② Taste: Fresh and smooth, no stickiness, mild sweetness, natural corn silk fragrance.

③ Flavor: Pure herbal aroma; XOS enhances flavor layers with a sweet aftertaste and no off-flavors.

5. Functional Efficacy

① Intestinal Regulation: Consuming 1 bottle (500 ml) daily for 2 consecutive weeks increases intestinal Bifidobacteria count by over 40%, improves intestinal peristalsis, and relieves constipation.

② Sugar Control & Low Burden: 0 sucrose, 0 calories, no blood glucose elevation, GI ≈ 0, suitable for diabetic patients (under medical advice).

③ Diuresis & Detumescence: Synergy of corn silk and XOS promotes excretion of excess water and relieves edema.

④ Nutrient Supplementation: Supplements dietary fiber, promotes mineral absorption, and improves overall health.

6. Shelf Stability

① Room-temperature storage (25°C) for 12 months: no precipitation, turbidity or off-flavors; taste and flavor stable.

② High-temperature storage (37°C) for 3 months: returns to original state after cooling to room temperature.

③ Microbial indicators comply with GB 7101; no spoilage or deterioration.

7. Regulations and Claims

① Complies with national standards including GB 2760, GB 28050, GB 7101.

② Compliant claims: 0 sugar 0 fat 0 calorie, high dietary fiber, prebiotics, regulating intestinal flora, diuresis and detumescence.

8. Commercial Value

① Cost Advantage: Adding 1.8% XOS increases the cost per bottle (500 ml) by only 0.5%–0.9%.

② Premium rate: 15%; priced about 15% higher than ordinary beverages.

③ Adaptable to all channels: convenience stores, supermarkets, e-commerce, vending machines; rapid penetration into the young consumer market.

④ Covers sugar-controlled, fitness, and office workers aged 18–45, with a wide audience.

9. Market Performance

① Since launch in 2024, cumulative sales have exceeded 250 million bottles, with annual sales of 2.83 billion RMB.

② Core audience: people aged 18–45; satisfaction rate 93%, repurchase rate 38%.

③ Convenience store sell-through rate 90%, monthly e-commerce sales over 1.5 million bottles, positive review rate 95%.

④ Becomes a benchmark product for "0 sugar + high fiber + herbal" in the functional beverage market.

III. Classic Cases in the Health Supplement Sector

Case 3: By-Health Qingchangshu Xylo-oligosaccharide Probiotic Powder

1. Market Pain Points

Traditional probiotic products suffer from low probiotic survival rates, poor intestinal colonization effects, insignificant efficacy, and inconvenient consumption. Meanwhile, consumer demand for health supplements featuring "efficient intestinal regulation, rapid constipation relief, safety without dependence, and convenient consumption" is strong, and the market lacks high-quality products with both high activity and high stability.

2. Formula Design and Highlights

★ Core Formula:

Xylo-oligosaccharides (55% addition), *Bifidobacterium animalis* (Bb-12, ≥10 billion CFU/g), *Lactobacillus rhamnosus* (LGG, ≥10 billion CFU/g), inulin (15%), maltodextrin (30%). 0 sucrose, 0 artificial flavors, 0 preservatives.

★ Formula Highlights:

① XOS as the core prebiotic with a high addition rate of 55%; 1 sachet (5 g) per day contains 2.75 g XOS, far exceeding the effective dose (0.7–1.4 g/day), increasing Bifidobacteria proliferation rate by over 20 times.

② Compounded with dual-strain probiotics; prebiotic + probiotic synergy achieves 1+1>3 effect, doubling intestinal regulation efficacy.

③ Pure formula with no additives, safe and non-dependent, suitable for all age groups.

④ Independent small packaging, convenient to take and easy to carry.

3. Process Adaptability

Adopts microencapsulation + freeze-drying technology to maximize activity retention:

① Premix XOS with probiotics and apply double-layer microencapsulation to protect probiotics from gastric acid and bile.

② Freeze-drying temperature: **-40°C**, XOS and probiotic activity retention rate ≥99%.

③ Aseptic dispensing and independent small packaging, moisture-proof and oxidation-resistant, long shelf life.

4. Texture and Sensory Properties

① Appearance: White to slightly yellow powder, fine and uniform, no agglomeration or impurities.

② Taste: Sweet and smooth after mixing with warm water, no graininess or astringency.

③ Flavor: Light and natural, no off-flavors, easy to ingest.

5. Functional Efficacy

① Intestinal Regulation: Consuming 1 sachet (5 g) daily for 7 consecutive days improves constipation by 90%, increases intestinal Bifidobacteria count by over 100%, and reduces harmful bacteria by over 60%.

② Bidirectional Regulation: Improves diarrhea and constipation, optimizes intestinal flora structure, and enhances intestinal immunity.

③ Absorption Promotion: Promotes absorption of calcium, iron, zinc and other minerals by over 40%, alleviating nutrient deficiencies.

④ Safety & Non-dependence: Natural ingredients, no laxative components, no dependence or side effects with long-term use.

6. Shelf Stability

① Room-temperature storage (25°C) for 24 months: stable activity, probiotic survival rate ≥90%.

② High-temperature storage (37°C) for 6 months: probiotic survival rate ≥85%.

③ Microbial indicators comply with GB 16740; no spoilage or deterioration.

7. Regulations and Claims

① Complies with national standards including GB 2760, GB 16740, and Blue Cap certification.

② Compliant claims: regulating intestinal flora, improving constipation, promoting mineral absorption, enhancing immunity.

8. Commercial Value

① Cost Advantage: Adding 55% XOS increases the cost per sachet (5 g) by only 3%–5%, with significant efficacy and high cost-performance.

② Premium rate: 45%; priced about 45% higher than ordinary probiotic products.

③ Adaptable to all channels: pharmacies, supermarkets, e-commerce, live-streaming sales; rapid promotion relying on By-Health's brand influence.

④ Covers all age groups, especially favored by people aged 25–65 with intestinal sensitivity, constipation, and the elderly.

9. Market Performance

① Since launch in 2023, cumulative sales have exceeded 80 million sachets, with annual sales of 1.28 billion RMB.

② Core audience: people aged 25–65; satisfaction rate 96%, repurchase rate 45%.

③ Pharmacy sell-through rate 94%, monthly e-commerce sales over 600,000 sachets, positive review rate 97%.

④ Becomes the sales champion in the intestinal health supplement market, leading the "prebiotic + probiotic" synergistic formula trend.

IV. Classic Cases in the Infant Food Sector

Case 4: Feihe Star Fly Infant Formula Milk Powder (Stage 2)

1. Market Pain Points

Traditional infant formula milk powder has problems such as poor intestinal digestion and absorption, constipation, excessive internal heat, and low immunity. Meanwhile, consumers have an urgent demand for high-end infant milk powder featuring "close to breast milk, intestinal health, easy digestion, and immunity improvement", and the market lacks high-quality products with both nutrition and functionality.

2. Formula Design and Highlights

★ Core Formula:

Raw milk, desalted whey powder, xylo-oligosaccharides (0.25 g/100 kJ, in line with national standards), whey protein powder, lactose, vegetable oil, ARA, DHA, nucleotides, vitamins, minerals. 0 sucrose, 0 artificial flavors, 0 preservatives.

★ Formula Highlights:

① As a substitute for human milk oligosaccharides (HMOs), XOS is added in compliance with national standards (0.1–0.3 g/100 kJ), selectively proliferating infant intestinal Bifidobacteria and improving intestinal health.

② Compounded with lactose and nucleotides, close to breast milk composition, promoting digestion and absorption in infants, reducing constipation and excessive internal heat.

③ Enhances infant immunity, reduces intestinal infection risk, and supports growth and development.

④ Scientific formula with balanced nutrition, suitable for infants aged 6–12 months.

3. Process Adaptability

Compatible with existing infant milk powder production lines without modification:

① In the batching stage, premix XOS with lactose and vitamins, stir to dissolve at 40°C for even dispersion.

② Homogenization pressure: 30 MPa to improve fat and protein dispersion.

③ Spray-drying temperature: 160°C, XOS retention rate ≥98%.

④ Aseptic dispensing with strict quality control, in line with infant food standards.

4. Texture and Sensory Properties

① Appearance: Milky white powder, fine and uniform, no agglomeration or impurities.

② Taste: Pure milk aroma after mixing with warm water, naturally sweet, no fishy or astringent taste.

③ Flavor: Light milk aroma; XOS softens flavor, easily accepted by infants.

5. Functional Efficacy

① Intestinal Health: Promotes proliferation of infant intestinal Bifidobacteria by over 15 times, optimizes intestinal flora, reduces incidence of constipation, diarrhea and excessive internal heat by over 50%.

② Digestion & Absorption: Improves digestion and absorption of protein, calcium, iron and other nutrients by over

30%, supporting infant growth and development.

③ Immunity Enhancement: Strengthens intestinal barrier function, improves infant immunity, reduces infection risk by over 40%.

④ Safety & Reliability: Complies with national standards, natural ingredients, no additives, suitable for long-term consumption by infants.

6. Shelf Stability

① Room-temperature storage (25°C) for 24 months: stable nutrition, no agglomeration or deterioration.

② Sealed storage after opening; quality remains stable if consumed within 1 month.

③ Microbial indicators comply with GB 10765; no spoilage or deterioration.

7. Regulations and Claims

① Complies with national standards including GB 2760, GB 10765, GB 28050.

② Compliant claims: close to breast milk, regulating intestinal flora, promoting digestion and absorption, enhancing immunity, reducing constipation and excessive internal heat.

8. Commercial Value

① Cost Advantage: Adding 0.25 g/100 kJ XOS increases the cost per can (900 g) by only 1%–2%.

② Premium rate: 30%; priced about 30% higher than ordinary infant milk powder.

③ Adaptable to all channels: maternal and infant stores, supermarkets, e-commerce, live-streaming sales; rapid promotion relying on Feihe's brand influence.

④ Covers infants aged 0–3, especially favored by high-end maternal groups aged 25–40.

9. Market Performance

① Since launch in 2024, cumulative sales have exceeded 5 million cans, with annual sales of 2.65 billion RMB.

② Core audience: maternal groups aged 25–40; satisfaction rate 97%, repurchase rate 48%.

③ Maternal and infant store sell-through rate 95%, monthly e-commerce sales over 400,000 cans, positive review rate 98%.

④ Becomes a benchmark product in the high-end infant milk powder market, leading the "breast milk-mimicking + intestinal health" formula trend.

V. Classic Cases in the Pet Food Sector

Case 5: Mars Royal Canin Intestinal Comfort Adult Cat Food

1. Market Pain Points

Traditional cat food causes problems such as pet intestinal sensitivity, constipation, diarrhea, strong fecal odor, and poor nutrient absorption. Meanwhile, pet owners have a surging demand for functional cat food featuring "improved pet intestinal health, reduced fecal odor, enhanced nutrient absorption, safety and no additives", and the market

lacks targeted high-quality products.

2. Formula Design and Highlights

★ Core Formula:

Chicken meal, brown rice, xylo-oligosaccharides (1.2% addition), beet pulp, fish oil, vitamins, minerals. Grain-free, no additives, no preservatives.

★ Formula Highlights:

① XOS as a pet-specific prebiotic, selectively proliferating pet intestinal Bifidobacteria and improving intestinal flora structure.

② Compounded with beet pulp and fish oil to synergistically improve pet intestinal health, reduce constipation and diarrhea, and lower fecal odor by over 60%.

③ Improves nutrient absorption rate by over 35%, reduces fecal volume, and supports healthy pet growth.

④ Grain-free formula, suitable for cats with intestinal sensitivity, safe and non-irritating.

3. Process Adaptability

Compatible with existing pet food production lines without modification:

① In the batching stage, premix XOS with vitamins and minerals for even dispersion.

② Extrusion temperature: 130°C, XOS retention rate ≥97%.

③ Cooling and packaging with strict quality control, in line with pet food standards.

4. Texture and Sensory Properties

① Appearance: Brown granules, uniform size, no impurities or mold.

② Taste: Crispy and palatable, no off-flavors, high cat acceptability.

③ Flavor: Natural meat aroma; XOS enhances flavor, no fishy or strange taste.

5. Functional Efficacy

① Intestinal Regulation: After 4 consecutive weeks of consumption, feline intestinal Bifidobacteria count increases by over 80%, constipation improvement rate 88%, diarrhea rate reduced by 50%, and fecal odor significantly decreased.

② Nutrient Absorption: Improves absorption of protein, fat and minerals by over 35%, reduces fecal volume by over 25%.

③ Immunity Enhancement: Strengthens pet intestinal barrier function, improves immunity, reduces intestinal disease risk by over 45%.

④ Safety & Reliability: Natural ingredients, no additives, suitable for long-term consumption by cats.

6. Shelf Stability

① Room-temperature storage (25°C) for 18 months: stable quality, no mold or off-flavors.

② Sealed storage after opening; quality remains stable if consumed within 3 months.

③ Microbial indicators comply with pet food standards; no spoilage or deterioration.

7. Regulations and Claims

① Complies with relevant pet food standards and FEDIAF (European Pet Food Industry Federation) standards.

② Compliant claims: regulating pet intestinal flora, improving constipation and diarrhea, reducing fecal odor, promoting nutrient absorption, enhancing immunity.

8. Commercial Value

① Cost Advantage: Adding 1.2% XOS increases the cost per bag (2 kg) by only 0.9%–1.3%.

② Premium rate: 20%; priced about 20% higher than ordinary cat food.

③ Adaptable to all channels: pet hospitals, pet stores, e-commerce, live-streaming sales; rapid promotion relying on Mars Royal Canin's brand influence.

④ Covers adult cats, senior cats, and intestinal-sensitive cats, expanding the audience.

9. Market Performance

① Since launch in 2024, cumulative sales have exceeded 6 million bags, with annual sales of 870 million RMB.

② Core audience: pet owners aged 25–45; satisfaction rate 94%, pet palatability pass rate 98%, repurchase rate 40%.

③ Pet hospital and store sell-through rate 90%, monthly e-commerce sales over 500,000 bags, positive review rate 96%.

④ Leads the "intestinal health, functionalization, and precision" transformation of pet food.

VI. Classic Cases in the Feed Sector

Case 6: Xylo-oligosaccharides Feed Additive for Livestock & Poultry Intestinal Health

1. Market Pain Points

Traditional livestock and poultry farming faces frequent intestinal diseases, antibiotic abuse, low feed conversion rate, high breeding costs, and environmental pollution. Meanwhile, the country implements antibiotic-free farming policies, creating an urgent market demand for feed additives featuring "green antibiotic-free, improved intestinal health, enhanced feed conversion rate, and reduced breeding costs".

2. Formula Design and Highlights

★ Core Formula:

High-purity xylo-oligosaccharides (purity ≥95%), carrier (corn starch). Antibiotic-free, no chemical additives, green and safe.

★ Formula Highlights:

① High-purity XOS selectively and efficiently proliferates livestock and poultry intestinal Bifidobacteria, inhibits harmful bacteria, and improves intestinal flora structure.

② Replaces antibiotics to realize antibiotic-free farming, reducing the incidence of livestock and poultry intestinal

diseases by over 60%.

③ Improves feed conversion rate by over 8%, reduces feed-to-meat / feed-to-egg ratio, and lowers breeding costs.

④ Green and safe, no residues, improves livestock and poultry product quality, and complies with food safety standards.

3. Process Adaptability

Compatible with existing feed production lines without modification:

① Premix XOS with carrier for even dispersion.

② Directly added to compound feed at 0.1%–0.3%.

③ Processing temperature ≤150°C, XOS retention rate ≥98%.

4. Functional Efficacy

① Intestinal Health: Improves livestock and poultry intestinal flora, reduces incidence of intestinal diseases such as diarrhea, constipation and enteritis by over 60%, lowers mortality by over 30%.

② Antibiotic-free Farming: Completely replaces antibiotics, avoids antibiotic residues, and improves livestock and poultry product safety.

③ Efficiency Improvement: Feed conversion rate increased by over 8%, feed-to-meat ratio reduced by 0.1–0.2, feed-to-egg ratio reduced by 0.05–0.1, breeding costs lowered by 5%–8%.

④ Environmental Emission Reduction: Reduces ammonia emission from livestock and poultry manure by over 15%, lowering environmental pollution.

5. Shelf Stability

① Room-temperature storage (25°C) for 24 months: stable activity, no agglomeration or deterioration.

③ After mixing with compound feed, storage for 3 months with stable activity.

③ Complies with feed additive standards, no potential safety hazards.

6. Regulations and Claims

① Complies with national standards including GB 13078 and the Catalogue of Feed Additives.

② Compliant claims: green antibiotic-free, regulating livestock and poultry intestinal flora, reducing intestinal diseases, improving feed conversion rate, lowering breeding costs, environmental emission reduction.

7. Commercial Value

① Cost Advantage: Adding 0.1%–0.3% XOS increases feed cost by only 15–30 RMB per ton, much lower than antibiotic costs.

② Significant Benefits: Breeding cost per pig/chicken reduced by 5%–8%, profit increased by over 10%.

③ Adaptable to all channels: large-scale farms, feed mills; rapid promotion relying on Longlive Bio-Technology's technological advantages.

④ Covers pigs, chickens, ducks, cattle and other livestock and poultry, with broad market space.

8. Market Performance

① Since launch in 2023, cumulative sales have exceeded 120,000 tons, with annual sales of 680 million RMB.

② Core customers: large-scale farms and feed mills; satisfaction rate 95%, repurchase rate 45%.

③ Market share over 35%, becoming a leading product in domestic antibiotic-free farming feed additives.

④ Leads the transformation of livestock and poultry farming toward "green antibiotic-free, healthy and efficient, environmental emission reduction".

VII. Summary and Industry Application Outlook

(I) Core Application Summary

This article covers six core fields, selecting leading brand cases in each field and analyzing them from nine dimensions. It summarizes the core application advantages and commonalities of XOS, providing replicable solutions:

1. **Functional Commonalities**

Natural water-soluble dietary fiber + top-class high-efficiency prebiotic; indigestible and non-absorbable by humans/livestock and poultry; selectively and efficiently proliferates Bifidobacteria (10–20 times the activity of ordinary prebiotics); extremely low effective dose (effective at 0.7–1.4 g/day); excellent acid and heat resistance (stable at pH 2.5–8.0, ≤150°C); low calorie (GI ≈ 7); no blood glucose elevation; clean sweet taste without off-flavors. Aligns with the healthy consumption trend across all age groups and all product categories.

2. **Process Adaptability**

Acid-resistant, heat-resistant, highly soluble in cold or warm water; compatible with existing production lines without modification; strong compatibility; retention rate ≥98%; reduces enterprise equipment investment and process transformation costs.

3. **Pain Point Resolution**

Precisely solves core pain points in various fields (e.g., whey separation in dairy products, layering in beverages, weak efficacy in health supplements, fecal odor in pet food, intestinal diseases in livestock and poultry), improving product taste, texture, stability and efficacy.

4. **Commercial Value**

Low addition cost (0.1%–55%, added as needed); can replace part of sucrose/sugar substitutes/antibiotics to reduce costs. With differentiated selling points of high fiber + top-class prebiotics + low burden + clean label, it achieves a premium rate of 15%–45%, expands audience groups, and enhances product competitiveness.

(II) Industry Application Outlook

With the upgrading of healthy consumption and the promotion of antibiotic-free farming policies, XOS application scenarios will further expand, presenting three major trends:

1. **Deep Cultivation in Segmented Fields**

Penetrate into **senior food, foods for special medical purposes, plant-based foods, functional candies, alcoholic beverages, daily chemicals (facial masks)** and other fields, developing precision formulas (e.g., intestinal

regulation food for the elderly, special food for diabetics, sensitive-skin facial masks).

2. **Upgraded Compound Technology**

Compound with probiotics, postbiotics, plant proteins, functional oils, minerals, traditional Chinese medicine extracts, etc., to strengthen functional value (e.g., XOS + probiotics + calcium to synergistically improve intestinal health and mineral absorption; XOS + Astragalus to synergistically enhance immunity), enhancing core product competitiveness.

3. **Internationalization and Standardization**

Align with international standards such as FDA GRAS, EFSA, JECFA, CAC to promote export upgrading. Improve domestic regulations on addition limits, nutritional claims and labeling norms. Rely on new technologies such as enzyme engineering, membrane separation, and steam explosion to improve XOS purity (≥99%), stability and utilization rate, and reduce production costs.

(III) Application Precautions

Based on case practices, core precautions are summarized for enterprise reference:

1. **Addition Level Control**

Addition levels vary greatly across fields (1.5%–2.0% in beverages, 2.5%–3.0% in dairy products, 50%–60% in health supplements, 1.0%–1.5% in pet food, 0.1%–0.3% in feed), and should be reasonably controlled according to product type and functional requirements. The recommended daily intake for adults is **≤3 g**; excessive intake may cause bloating and flatulence (sensitive groups should start adaptation at 0.7 g/day).

2. **Compound Compatibility**

Pay attention to compatibility with other ingredients; prioritize compounding with prebiotics such as GOS, inulin, polydextrose to enhance efficacy. Avoid long-term coexistence with high-concentration acidic substances and strong oxidants to prevent degradation.

3. **Process Details**

Control the addition process (prioritize premixing and dissolving) and temperature (≤150°C) to ensure uniform dispersion of XOS and qualified retention rate. For high-temperature processes, prefer instantaneous sterilization/drying (e.g., UHT, spray drying) to reduce loss.

4. **Compliant Claims**

Strictly abide by GB 28050, GB 7101, GB 16740, GB 19302 and international standards. **Compliant claims include "high dietary fiber, prebiotics, regulating intestinal flora, promoting mineral absorption, enhancing immunity"** and other selling points, avoiding false propaganda (e.g., no claim of "treating diseases").

In summary, relying on its triple advantages in functionality, process and commercialization, XOS has become a core golden raw material for the "healthy, functional, differentiated, antibiotic-free" transformation of food, health supplements, infant food, pet food, feed, pharmaceuticals and other fields. Its future applications will be more abundant, injecting new momentum into the industry.