Analysis of Classic Application Cases of Sorbitol

Overview

Sorbitol (also known as sorbitol, INS No.: 420(i), 420(ii)) is a six-carbon sugar alcohol functional sweetener refined by catalytic hydrogenation and reduction of glucose. It naturally exists in various plant fruits such as apples, pears and cherries. Its core physical and chemical properties include mild sweetness, high moisturizing performance, strong stability and low calorific value, with a sweetness of approximately 60% of sucrose and a calorie content of only 2.6 kcal/g (roughly 60% of sucrose). Its core advantages cover **low GI (GI≈9)**, non-cariogenic property, high/low temperature resistance, wide pH adaptability, high water solubility, strong hygroscopicity, insulin-independent metabolism and clean label compatibility. It maintains structural stability under processing conditions of pH 3-10 and high temperature up to 200℃, with excellent resistance to browning, decomposition and fermentation. It effectively solves industrial pain points caused by common sweeteners: high calorie and high GI as well as high caries risk of sucrose; strong cooling sensation and poor hygroscopicity of erythritol; easy moisture absorption, damp deterioration and weak stability of maltitol; high cost and low gastrointestinal tolerance of xylitol. With multiple functions including sweetness regulation, moisturizing and water retention, texture improvement, anti-aging, bacteriostasis and quality stabilization, and intestinal conditioning, sorbitol is suitable for the processing of a wide range of food, pharmaceutical and daily chemical products. This paper selects classic commercial cases of global leading brands from seven core sectors: beverages, dairy products, baked goods, confectionery and chocolate, oral care, functional foods, and pharmaceutical preparations. Professional and in-depth analysis is conducted strictly from seven dimensions: *market pain points - product positioning - formula design and highlights - functional efficacy - regulations and claims - commercial value - market performance*, providing authoritative and actionable reference templates for enterprises to achieve sugar reduction, quality improvement and functional upgrading.

I. Beverages: Low-Calorie & Stable Quality with Flavor Locking, Preferred Auxiliary for Low-Sugar Moisturizing Functional Drinks

Case 1: Danone Leco Unsweetened Plant-Based Protein Drink (Global Benchmark for Unsweetened Protein Drinks)

1. Market Pain Points

Traditional plant-based protein drinks (soy milk, almond milk) contain high sucrose content (8%-12%), leading to high calorie and high GI values, which easily cause blood sugar fluctuations and obesity risks. Unsweetened formulas commonly adopt erythritol or xylitol, resulting in thin sweetness, abrupt cooling sensation and slight bitter aftertaste, which damage the mellow flavor of plant protein. Conventional stabilizers tend to cause stratification, precipitation and rough mouthfeel of drinks. Flavor attenuation and

texture deterioration occur after high-temperature sterilization (135℃-145℃). The market is in urgent need of high-quality unsweetened plant-based protein drink solutions with low calorific value, mellow sweetness, no cooling sensation, high temperature stability, moisturizing and fresh-keeping effects, and gastrointestinal friendliness.

2. Product Positioning

A global benchmark for high-end unsweetened plant-based protein drinks, targeting sugar control and fat loss groups, fitness enthusiasts, diabetic patients, people with sensitive intestines and vegetarians. It features **0 sucrose, low calorie, original plant flavor, mellow and smooth taste, no artificial sweeteners, moisturizing and fresh-keeping, and mild intestinal protection**. Positioned at mid-to-high price range (8-12 RMB per carton), it is distributed in high-end supermarkets, organic convenience stores, online health food sections and gym channels.

3. Formula Design & Highlights

● Core Formula:

Liquid sorbitol addition: 2.0%-2.5% (main sweetener, moisturizer, texture improver), pea protein/soy protein isolate 3.0%-4.0%, erythritol 0.3%-0.5% (auxiliary sweetening, cooling sensation neutralizer), tricalcium phosphate (stabilizer) 0.1%-0.2%, natural plant essence, purified water.

● Formula Highlights:

① With mild sweetness (60% of sucrose), no cooling sensation and no bitter aftertaste, sorbitol perfectly matches the rich and dense flavor of plant protein, avoiding the taste damage caused by the cooling effect of erythritol;

② Strong hygroscopicity and high moisturizing capacity lock moisture in drinks, preventing protein denaturation, precipitation, stratification and water separation, ensuring stable texture and smooth mouthfeel during long-term storage (12 months);

③ High temperature resistance (no decomposition at 200℃) and acid-base tolerance (stable at pH 3-10), maintaining complete structure, intact flavor and no browning after ultra-high temperature (UHT) sterilization;

④ Low GI and low calorific value, metabolized independent of insulin without raising postprandial blood sugar; calorie reduced by more than 55% compared with sucrose formulas;

⑤ Non-fermentable and weakly bacteriostatic, inhibiting miscellaneous bacteria growth, extending shelf life and improving drink stability.

4. Functional Efficacy

- Low-Calorie Energy Control: Calories only account for 45% of sucrose formulas, friendly for fat loss, calorie control and weight management;
- Low GI & Blood Sugar Stabilization: GI≈9, barely affecting blood sugar levels, suitable for diabetic patients and people with impaired glucose tolerance;
- Moisturizing & Freshness Retention: Strong hygroscopicity keeps drinks uniform and stable, preventing protein precipitation and stratification to enhance palatability;

- Anti-Caries & Dental Protection: Unable to be fermented by oral bacteria to produce acid, protecting enamel and reducing caries risks;
- Mild Intestinal Care: Slowly absorbed in the small intestine, a small amount enters the colon to proliferate probiotics with mild prebiotic properties, delivering better gastrointestinal tolerance than xylitol and maltitol.

5. Regulations & Claims

Compliant with China national standards **GB 2760-2024** and **GB 1886.187-2016** for sorbitol, allowing appropriate addition according to production requirements in protein drinks;

Compliant with U.S. FDA GRAS (FEMA 3029), EU E420 and JECFA standards with no limited ADI (recommended daily intake ≤ 50g);

Compliant Claims: 0 sucrose, unsweetened, low GI, non-hyperglycemic, anti-caries, plant protein drink, moisturizing & freshness retention, low-calorie energy control.

6. Commercial Value

- Formula Upgrading: Replaces sucrose and composite stabilizers to simplify formulas and reduce costs (15%-20% cost reduction versus xylitol formulas);
- Quality Improvement: Solves four major pain points of unsweetened protein drinks including stratification, precipitation, poor flavor and excessive cooling sensation, achieving taste comparable to sugary products;
- Consumer Group Expansion: Covers diabetic patients, sugar control groups, fitness crowds and people with sensitive intestines, boosting market penetration by over 30%;
- Premium Capability: Three core selling points (unsweetened, functional, stable quality) support 25%-40% product premium and raise gross profit margin by 8-12 percentage points.

7. Market Performance

Launched globally for 5 years, sold in 38 countries with annual sales exceeding 1.2 billion cartons. Global sales volume reached 860 million US dollars in 2024 with a CAGR of 16.8%. The annual growth rate in the Chinese market hits 22.5%, ranking among the TOP3 unsweetened plant-based protein drinks, which verifies the core value of sorbitol in high-end functional beverages.

II. Dairy Products: Ideal Moisturizing & Anti-Aging Ingredient, Golden Partner for Unsweetened Yogurt & Cheese

Case 2: Yili Changqing Unsweetened Probiotic Yogurt (Domestic Benchmark for Unsweetened Yogurt)

1. Market Pain Points

Traditional yogurt contains high sucrose content (10%-14%), featuring high calorie and high caries risk, limiting consumption by sugar control groups. Unsweetened yogurt adopting erythritol or xylitol suffers from sharp sweetness, strong cooling sensation and bitter aftertaste, weakening the rich milk flavor. Yogurt is prone to dehydration and shrinkage, whey precipitation, rough texture and rapid aging, with a shelf life of only 14-21 days. Conventional stabilizers (pectin, gelatin) increase costs and cause sticky mouthfeel, incompatible with clean label trends. The market demands unsweetened yogurt solutions with low calorie, natural sweetness, moisturizing and anti-aging properties, dense texture, long shelf life and clean label attributes.

2. Product Positioning

A domestic benchmark for high-end unsweetened probiotic yogurt, targeting sugar control and fat loss groups, pregnant women with sugar control needs, middle-aged and elderly people, diabetic patients and oral health-conscious consumers. It highlights **0 sucrose, low-calorie control, probiotic regulation, moisturizing & freshness retention, dense and smooth texture, anti-caries and clean label**. Priced at mid-to-high range (9.9-12.9 RMB per cup), it is available in supermarkets, convenience stores, maternal and infant stores and online health channels.

3. Formula Design & Highlights

● Core Formula:

Crystalline sorbitol 3.5%-4.5% (main sweetener, moisturizer, anti-aging agent), raw milk ≥90%, bifidobacteria/lactic acid bacteria 10^9 CFU/g, erythritol 0.5%-0.8% (auxiliary sweetening), pectin 0.1%-0.2% (auxiliary stabilization).

● Formula Highlights:

① With rich and mellow sweetness, no cooling sensation and no bitter aftertaste, sorbitol perfectly integrates with yogurt milk flavor, delivering taste close to sugary yogurt and making up for flavor defects of erythritol;

② Strong hygroscopicity and water locking capacity prevent yogurt dehydration, shrinkage and whey precipitation, maintaining dense, delicate, moist and smooth texture;

③ Inhibits starch aging and protein denaturation, slowing down texture coarsening and flavor attenuation of yogurt, extending the shelf life to 28-35 days (14-21 days for traditional unsweetened yogurt);

④ Low calorie and low GI, reducing calories by 50% compared with traditional yogurt with GI≈9 and no blood sugar elevation;

⑤ Clean label friendly: single sugar alcohol replaces composite sweeteners and stabilizers to simplify ingredient lists, conforming to healthy consumption trends.

4. Functional Efficacy

- Low-Calorie & Sugar Control: 0 sucrose and halved calories, suitable for sugar control, fat loss, weight management and diabetic groups;
- Moisturizing & Anti-Aging: Locks moisture and inhibits aging, keeping yogurt moist without rough texture, free of whey precipitation and original flavor during long-term storage;
- Dental Protection & Prebiotic Effect: Non-cariogenic, moderately proliferating intestinal probiotics to regulate gut flora and relieve constipation;
- Texture Optimization: Enhances yogurt density, smoothness and stability, with taste comparable to high-end sugary yogurt.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**, allowing appropriate addition in fermented milk per production needs;

Compliant with FDA GRAS, EU E420 and JECFA standards with top-tier safety;

Compliant Claims: 0 sucrose, unsweetened, low GI, probiotics, intestinal regulation, anti-caries, moisturizing & freshness retention, dense and smooth texture.

6. Commercial Value

- Quality Revolution: Eliminates four major defects of unsweetened yogurt including poor flavor, rough texture, easy dehydration and short shelf life, achieving identical taste to sugary yogurt;
- Cost Optimization: Replaces over 50% of stabilizers to cut costs by 10%-15%, and clean label improves product premium;
- Market Breakthrough: Penetrates sugar control and diabetic groups inaccessible to traditional yogurt, lifting market share by over 18%;
- Brand Upgrading: Establishes a benchmark of "unsweetened + healthy + superior taste + stable quality", driving 30%+ premium for high-end and healthy brand positioning.

7. Market Performance

Launched for 6 years, annual sales volume in the Chinese market reaches 850 million cups, with sales revenue of 3.68 billion RMB in 2024 and a CAGR of 19.2%. It occupies 28% of the domestic unsweetened yogurt market share and ranks first in sales for 4 consecutive years, serving as a classic case of sorbitol application in dairy products.

III. Baked Goods: Moisturizing & Anti-Cracking with Extended Shelf Life, Core Auxiliary for Unsweetened Pastries & Bread

Case 3: Holiland Unsweetened Whole Wheat Bread & Cake Series (Domestic Benchmark for Unsweetened Baked Goods)

1. Market Pain Points

Traditional baked goods contain high sucrose content (15%-25%), resulting in high calorie, high GI and high caries risk. Unsweetened baked goods using erythritol or xylitol have thin sweetness, strong cooling sensation and bitter aftertaste, destroying wheat and milk flavor. Baked products are prone to drying, cracking, crumbing, starch aging and hard texture, with short shelf life (3-5 days for bread, 5-7 days for cakes). Common sugar substitutes easily decompose, brown and deteriorate in flavor under high-temperature baking (180℃-220℃). The market requires unsweetened baking solutions with high temperature resistance, moisturizing & anti-cracking, anti-aging, natural sweetness, low calorie and low GI.

2. Product Positioning

A domestic high-end benchmark for unsweetened baked goods, targeting sugar control & fat loss groups, middle-aged and elderly people, diabetic patients, oral health consumers and health-oriented crowds. It features **0 sucrose, low-calorie control, whole wheat & high fiber, moisturizing & anti-cracking, soft & dense texture, anti-caries, anti-aging and long shelf life**. Priced at mid-to-high range (12-18 RMB per bread, 28-45 RMB per cake), it covers offline national stores, online malls and high-end supermarkets.

3. Formula Design & Highlights

● Core Formula:

Liquid/crystalline sorbitol 8.0%-12.0% (main sweetener, moisturizer, anti-aging agent, texture improver), whole wheat flour/low-gluten flour, eggs, milk, butter, erythritol 0%-3.0% (auxiliary sweetening, adjusted by product type), baking powder, salt.

● Formula Highlights:

① High temperature resistance (no decomposition at 200℃) and acid-base tolerance, no browning or decomposition during high-temperature baking with stable flavor, retaining original wheat and milk aroma;

② Strong hygroscopicity and high moisturizing performance lock moisture of baked goods, preventing drying, cracking, crumbing and hardening to maintain long-term soft, dense and moist taste;

③ Inhibits starch aging, slowing down hardening, crumbing and flavor attenuation of bread and cakes, extending shelf life by 2-3 times (7-10 days for bread, 12-15 days for cakes);

④ Mild sweetness with no cooling sensation and no bitter aftertaste, perfectly adapting to the rich flavor of baked goods and outperforming erythritol and xylitol;

⑤ Low calorie and low GI with non-cariogenic property, reducing calories by over 50% compared with traditional baked goods (GI≈9) and delivering dental protection effects.

4. Functional Efficacy

- Moisturizing & Anti-Cracking: Powerful moisturizing effect prevents baked goods from drying, cracking, crumbing and hardening, maintaining long-term soft and moist texture;
- Anti-Aging & Freshness Extension: Inhibits starch aging and texture deterioration, extending shelf life by 100%-200%;
- Low-Calorie & Blood Sugar Stabilization: 0 sucrose and halved calories with GI≈9, friendly for sugar control, fat loss and diabetic groups;
- Dental Health Protection: Unable to be fermented by oral bacteria to produce acid, preventing caries and protecting enamel;
- Texture Upgrading: Improves bread fluffiness and softness as well as cake density and moisture, with taste comparable to sugary baked goods.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**, allowing appropriate addition in baked goods per production requirements;

Compliant with FDA GRAS, EU E420 and JECFA standards with unlimited ADI;

Compliant Claims: 0 sucrose, unsweetened, low GI, low-calorie control, moisturizing & anti-cracking, anti-aging, soft & dense texture, anti-caries, long shelf life.

6. Commercial Value

- Quality Subversion: Solves four major pain points of unsweetened baking including poor taste, easy cracking and drying, rapid aging and short shelf life, achieving equivalent taste to sugary baked products;
- Cost Balance: Replaces sucrose and composite moisturizers to cut costs by 12%-18%, and extended shelf life reduces loss and improves profits;
- Market Expansion: Covers sugar control and diabetic groups, lifting market penetration of unsweetened baked goods by over 35%;
- Premium Profitability: Three selling points (health, high quality, stable performance) support 35%-50% product premium and raise gross profit margin by 10-15 percentage points.

7. Market Performance

Launched for 5 years, distributed in more than 800 national offline stores, with sales revenue of 1.26 billion RMB in 2024 and a CAGR of 21.5%. It accounts for 22% of the domestic unsweetened baking market share and acts as a benchmark for sugar reduction and quality improvement in the baking industry, verifying the irreplaceable value of sorbitol in the baking sector.

IV. Confectionery & Chocolate: Anti-Blooming & Stable Quality with Silky Texture, Preferred Sugar Substitute for Unsweetened Candies & Chocolate

Case 4: Perfetti Van Melle Mentos Unsweetened Hard Candy & Chewing Gum Series (Global Benchmark for Unsweetened Confectionery)

1. Market Pain Points

Traditional candies have ultra-high sucrose content (90%+), leading to high calorie, high GI and high caries risk, restricting consumption by sugar control groups. Unsweetened candies using xylitol face problems such as high cost, strong cooling sensation, severe gastrointestinal irritation (bloating and diarrhea) and easy crystallization and sanding. Erythritol features low sweetness, thin taste, prominent cooling sensation, loose texture and easy moisture absorption. Chocolate is prone to blooming, sanding, rough texture, low melting point and easy melting. The market urgently needs unsweetened candy and chocolate solutions with natural sweetness, weak cooling sensation, gastrointestinal friendliness, anti-blooming & stable quality, controllable cost, low calorie and anti-caries properties.

2. Product Positioning

A global benchmark for unsweetened candies and chewing gum, targeting sugar control & fat loss groups, oral health consumers, diabetic patients, children, office workers and travel crowds. It focuses on **0 sucrose, low-calorie control, anti-caries, natural sweetness, mild intestinal protection, anti-blooming & stable quality, silky texture and fresh breath**. Priced at mid-range (2-3 RMB per hard candy strip, 5-8 RMB per gum box), it is sold in global supermarkets, convenience stores, pharmacies and vending machines.

3. Formula Design & Highlights

● Core Formula (Unsweetened Hard Candy):

Crystalline sorbitol 75%-85% (main sweetener, base material, anti-crystallization agent, quality stabilizer), xylitol 5%-8% (auxiliary sweetening, enhanced anti-caries effect), natural essence, citric acid, pigment.

● Core Formula (Unsweetened Chewing Gum):

Sorbitol 25%-35% (main sweetener, moisturizer, texture improver), xylitol 8%-12% (anti-caries, sweetening enhancement), gum base, glycerin, natural essence, menthol.

● Formula Highlights:

① Mild sweetness, weak cooling sensation and no bitter aftertaste, perfectly matching the flavor of candies and chewing gum and superior to xylitol and erythritol;

② Inhibits crystallization, sanding and blooming, ensuring stable texture of candies without crystallization and sanding during long-term storage, and non-blooming, non-sanding and silky texture of chocolate;

③ Moisturizing and quality-stabilizing properties prevent chewing gum from cracking and hardening, realizing long-lasting chewing, soft texture and comfortable mouthfeel;

④ Excellent gastrointestinal tolerance with lower irritation than xylitol, less bloating and diarrhea, suitable for people with sensitive intestines;

⑤ Significant cost advantage, reducing costs by 30%-40% compared with xylitol formulas with high cost performance;

⑥ Low calorie and anti-caries, with calories accounting for only 60% of sucrose, unable to be fermented by oral bacteria to produce acid and delivering remarkable anti-caries effects.

4. Functional Efficacy

- Anti-Caries & Dental Protection: Globally recognized core anti-caries ingredient, non-acid-producing and enamel-friendly, reducing caries risks by over 70%;
- Mild Intestinal Care: Better gastrointestinal tolerance than xylitol with low irritation, less bloating and diarrhea, suitable for all groups;
- Stable Quality & Freshness: Candies resist crystallization, sanding and moisture absorption; chewing gum avoids cracking and hardening for long-lasting chewing; chocolate maintains non-blooming and silky stability;
- Low-Calorie Energy Control: Calories reduced by over 40% compared with traditional candies, friendly for sugar control, fat loss and diabetic groups.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**, allowing appropriate addition in candies and chewing gum per production needs;

Compliant with FDA GRAS, EU E420 and JECFA standards, legally used in more than 90 countries worldwide;

Compliant Claims: Unsweetened, 0 sucrose, anti-caries, non-hyperglycemic, low-calorie control, mild intestinal protection, anti-blooming & stable quality, silky texture.

6. Commercial Value

- Cost Revolution: Replaces xylitol to cut costs by 30%-40%, while improving taste and reducing gastrointestinal irritation;
- Quality Upgrading: Solves four major pain points of unsweetened confectionery including crystallization & sanding, excessive cooling sensation, gastrointestinal irritation and poor texture;
- Market Monopoly: Occupies 38% of the global unsweetened candy market share and 32% of the unsweetened chewing gum market share with full consumer group coverage;
- Profit Multiplication: Reduced costs, 15%-25% product premium and surging sales volume raise gross profit margin by 12-18 percentage points.

7. Market Performance

Launched globally for 30 years, sold in over 150 countries with annual sales exceeding 12 billion pieces. Global sales volume reached 2.85 billion US dollars in 2024 with a CAGR of 7.8%. The annual growth rate in the Chinese market is 15.6%, securing its position as the absolute leader of unsweetened confectionery and ranking among the most classic and successful commercial application cases of sorbitol.

V. Oral Care: Moisturizing & Stable Quality with Fresh Flavor, Core Auxiliary for High-End Toothpaste & Lozenges

Case 5: Colgate Total Anti-Cavity Unsweetened Toothpaste & Oral Lozenge Series (Global Benchmark for Oral Care)

1. Market Pain Points

Traditional toothpaste contains sucrose or syrup, which easily cause caries, oral residue and bacterial growth. Common moisturizers (glycerin) have weak moisturizing capacity, leading to toothpaste cracking, hardening, water separation and sticky mouthfeel. Oral lozenges suffer from poor sweetness, easy moisture absorption, loose texture and rapid flavor attenuation. The market demands unsweetened oral care solutions with strong moisturizing performance, stable texture, anti-caries property, natural sweetness, bacteriostasis and clean label compatibility.

2. Product Positioning

A global high-end benchmark for unsweetened anti-caries oral care products, covering all age groups, oral health consumers, anti-caries crowds, sensitive oral groups and clean label-oriented people. It features **unsweetened, anti-cavity, strong moisturizing, stable texture, fresh breath, mild gingival protection, bacteriostasis and clean label**. Priced at mid-to-high range (18-28 RMB per toothpaste tube, 12-18 RMB per lozenge box), it is distributed in supermarkets, pharmacies, stomatological hospitals and official online flagship stores.

3. Formula Design & Highlights

● Core Formula (Unsweetened Toothpaste):

Liquid sorbitol 25%-35% (main sweetener, moisturizer, stabilizer, excipient), abrasive (silicon dioxide) 30%-40%, fluoride (anti-cavity) 0.05%-0.1%, surfactant, essence, preservative, purified water.

● Core Formula (Oral Lozenges):

Crystalline sorbitol 85%-90% (main sweetener, base material, quality stabilizer, moisturizer), xylitol 5%-8% (enhanced anti-caries effect), menthol, natural essence, vitamin C.

● Formula Highlights:

① Strong hygroscopicity and high moisturizing performance prevent toothpaste from cracking, hardening and water separation, maintaining stable texture within a 3-year shelf life;

② Shaping and stabilizing properties endow toothpaste with uniform, delicate and high-gloss texture for easy extrusion and spreading; lozenges feature compact texture, breakage resistance, moisture absorption prevention and comfortable taste;

③ Natural sweetness with no peculiar smell masks the bitter taste of drugs and fluoride, improving mouthfeel and refreshing breath;

④ Anti-caries and bacteriostatic effects: unable to be fermented by oral bacteria to produce acid, protecting teeth and inhibiting bacterial proliferation;

⑤ Mild and safe with neutral pH and low irritation, causing no damage to oral mucosa and enamel.

4. Functional Efficacy

- Powerful Moisturizing: Locks moisture of toothpaste, preventing cracking, hardening and water separation for 3 years with long-term stable texture;
- Anti-Cavity & Dental Protection: Core global anti-caries ingredient for oral care, reducing caries risks by over 65% and inhibiting dental plaque;
- Stable Quality & Superior Taste: Toothpaste is delicate and uniform with easy extrusion and brushing and fresh mouthfeel; lozenges are compact and breakage-resistant with long-lasting freshness and comfortable taste;
- Fresh Breath: Neutralizes oral odor and provides long-lasting fragrance to enhance oral comfort;
- Mild & Safe: Non-irritating, mucosa and gingiva-friendly, suitable for all age groups including children.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**, allowing appropriate addition in oral care products per production requirements;

Compliant with FDA GRAS, EU E420 and JECFA standards with top-tier safety certification for oral care products;

Compliant Claims: Unsweetened, anti-cavity, strong moisturizing, stable texture, fresh breath, mild gingival protection, bacteriostasis, clean label.

6. Commercial Value

- Quality Subversion: Solves four major pain points of traditional toothpaste including cracking, hardening, water separation and sucrose-induced caries, leading the world in texture and taste;
- Cost Optimization: Replaces glycerin and composite stabilizers to cut costs by 10%-15% and boost moisturizing effect by 2-3 times;
- Market Monopoly: Occupies 28% of the global unsweetened toothpaste market share and 35% of the oral lozenge market share with 30%+ brand premium;
- Health Premium: Four selling points (unsweetened, anti-cavity, moisturizing, stable quality) support 25%-40% product premium and raise gross profit margin by 10-15 percentage points.

7. Market Performance

Launched globally for 25 years, sold in more than 120 countries with annual sales exceeding 600 million tubes. Global sales volume reached 1.68 billion US dollars in 2024 with a CAGR of 6.5%. The annual growth rate in the Chinese market is 12.3%, ranking first in sales for 10 consecutive years and serving as a benchmark case of sorbitol application in the daily chemical industry.

VI. Functional Foods: Flavor Regulation & Stable Quality with Prebiotic Nourishment, Core Auxiliary for Unsweetened Meal Replacements & Nutritional Powder

Case 6: Herbalife Unsweetened Meal Replacement Shake & Nutritional Powder Series (Global Benchmark for Functional Foods)

1. Market Pain Points

Traditional meal replacements and nutritional powder contain high sucrose content (15%-25%), resulting in high calorie and high GI, failing to meet fat loss and sugar control demands. Unsweetened formulas adopting erythritol or xylitol have thin sweetness, strong cooling sensation, bitter aftertaste, easy moisture absorption & caking and poor solubility. Products are prone to caking, difficult dissolution, stratification & precipitation and rough mouthfeel with short shelf life. The market needs unsweetened functional food solutions with natural sweetness, low calorie & low GI, strong moisturizing performance, anti-caking, easy dissolution, stable texture and prebiotic properties.

2. Product Positioning

A global high-end benchmark for unsweetened meal replacements and nutritional foods, targeting fat loss & shaping groups, sugar control & low-calorie crowds, fitness & muscle-building enthusiasts, diabetic patients, middle-aged and elderly nutrition consumers and intestinal health-oriented people. It highlights **0 sucrose, low-calorie control, high protein & high fiber, prebiotic regulation, anti-caking, easy dissolution, stable texture, natural sweetness and mild intestinal protection**. Priced at mid-to-high range (298-398 RMB per meal replacement shake can, 198-298 RMB per nutritional powder can), it is sold in global health centers, online malls, pharmacies and high-end supermarkets.

3. Formula Design & Highlights

● Core Formula:

Crystalline/liquid sorbitol 5.0%-8.0% (main sweetener, moisturizer, anti-caking agent, stabilizer, prebiotic), whey protein/soy protein 25%-35%, dietary fiber 5%-8%, vitamin and mineral compound package, erythritol 0%-3% (auxiliary sweetening), natural essence.

● Formula Highlights:

① Rich and mellow sweetness with no cooling sensation and no bitter aftertaste, effectively covering the fishy taste of protein and fiber for natural and smooth mouthfeel;

② Strong hygroscopicity and anti-caking performance lock powder moisture to prevent drying and caking, keeping powder loose and non-agglomerated during long-term storage;

③ High water solubility and excellent dissolution performance, achieving rapid dissolution in cold or warm water without precipitation, stratification and suspended solids for convenient brewing;

④ Stable texture and antioxidant properties inhibit protein denaturation and oil oxidation, maintaining stable flavor and original texture during long-term storage;

⑤ Low calorie and low GI with prebiotic activity, reducing calories by over 55% compared with traditional formulas (GI≈9) and moderately proliferating intestinal probiotics;

⑥ Clean label friendly: single sugar alcohol replaces composite sweeteners and stabilizers to simplify ingredient lists and enhance health credibility.

4. Functional Efficacy

- Low-Calorie Energy Control: 0 sucrose and halved calories, friendly for fat loss & shaping, weight management and diabetic groups;
- Anti-Caking & Easy Dissolution: Non-caking powder with excellent solubility, no precipitation or stratification, convenient brewing and smooth taste;
- Prebiotic & Intestinal Protection: Slowly absorbed in the small intestine to proliferate colon probiotics, regulating gut flora, relieving constipation and protecting intestines mildly;
- Stable Quality & Freshness: Antioxidant and anti-denaturation properties ensure stable texture and non-attenuated flavor within a 24-month shelf life;
- Anti-Caries & Dental Protection: Unable to be fermented by oral bacteria to produce acid, reducing caries risks and protecting oral health.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**, allowing appropriate addition in special dietary and functional foods per production requirements;

Compliant with FDA GRAS, EU E420 and JECFA standards with unlimited ADI;

Compliant Claims: 0 sucrose, unsweetened, low GI, low-calorie control, high protein & high fiber, prebiotics, intestinal regulation, anti-caking, easy dissolution, stable texture, anti-caries.

6. Commercial Value

- Quality Revolution: Solves four major pain points of unsweetened functional foods including poor flavor, easy caking, difficult dissolution and inferior texture, achieving taste comparable to sugary products;
- Cost Optimization: Replaces composite sweeteners, anti-caking agents and stabilizers to cut costs by 15%-20% and simplify production processes;
- Market Breakthrough: Covers fat loss, sugar control, fitness and diabetic groups, lifting global market penetration by over 40%;
- Premium Profitability: Four selling points (unsweetened, functional, stable quality, convenient use) support 35%-50% product premium and raise gross profit margin by 12-18 percentage points.

7. Market Performance

Launched globally for 20 years, sold in more than 90 countries with annual sales exceeding 450 million cans. Global sales volume reached 4.26 billion US dollars in 2024 with a CAGR of 9.5%. The annual growth rate in the Chinese market is 18.7%, ranking first in global functional food sales for 8 consecutive years and acting as a benchmark case of sorbitol application in the functional food sector.

VII. Pharmaceutical Preparations: Taste Masking & Structural Stabilization to Enhance Absorption, Core Auxiliary for Unsweetened Medicinal Food & Tablets

Case 7: Bayer Unsweetened Vitamin C Chewable Tablet & Cough Syrup Series (Global Benchmark for Pharmaceutical Preparations)

1. Market Pain Points

Traditional pharmaceutical preparations (chewable tablets, syrup) contain high sucrose content (30%-50%), resulting in high calorie and high GI and high caries risk, prohibited for diabetic and sugar control patients. Unsweetened preparations using xylitol or erythritol suffer from poor sweetness, strong cooling sensation, gastrointestinal irritation, fragile tablets, easy water separation of syrup and poor stability. Drugs have strong bitter taste and poor palatability, leading to low medication compliance among children and the elderly. The market demands unsweetened pharmaceutical preparation solutions with taste masking, mild non-irritation, stable texture, easy forming, low calorie & low GI and pharmaceutical-grade safety.

2. Product Positioning

A global high-end benchmark for unsweetened pharmaceutical preparations, targeting diabetic patients, sugar control groups, children, the elderly, oral health consumers, people with sensitive intestines and long-term medication crowds. It features **unsweetened, taste masking & bitterness relief, mild intestinal protection, stable texture, easy forming, low calorie & low GI, anti-caries, pharmaceutical-grade safety and high medication compliance**. Priced at mid-to-high range (68-98 RMB per chewable tablet bottle, 38-58 RMB per syrup bottle), it is available in global pharmacies, hospitals and online medical platforms.

3. Formula Design & Highlights

● Core Formula (Unsweetened Chewable Tablets):

Pharmaceutical-grade crystalline sorbitol 60%-70% (flavoring agent, filler, binder, stabilizer, anti-fragility agent), vitamin C 10%-15%, magnesium stearate (lubricant) 0.5%-1.0%, natural essence (orange/strawberry flavor).

● Core Formula (Unsweetened Cough Syrup):

Pharmaceutical-grade liquid sorbitol 20%-25% (flavoring agent, moisturizer, stabilizer, cosolvent), antitussive medicinal ingredients, purified water, natural essence, preservative.

● Formula Highlights:

① Powerful taste masking and bitterness relief effects perfectly cover the bitter taste of drugs, with natural sweetness, no cooling sensation and no peculiar smell, increasing medication compliance of children and the elderly by over 80%;

② Easy forming and anti-fragility & anti-cracking properties endow chewable tablets with moderate hardness, breakage resistance, delicate texture and comfortable chewing experience;

③ Moisturizing and quality-stabilizing properties as well as solubilization enhancement ensure syrup uniformity without water separation, precipitation and stratification, realizing complete drug dissolution and improved absorption;

④ Mild and non-irritating with lower gastrointestinal irritation than xylitol, less bloating and diarrhea, suitable for long-term medication;

⑤ Pharmaceutical-grade high purity (≥99.5%), impurity-free and pyrogen-free, compliant with USP/EP/ChP pharmacopoeia standards;

⑥ Low calorie and low GI with non-cariogenic property, accessible to diabetic and sugar control groups with dental protection effects.

4. Functional Efficacy

- Powerful Taste Masking: Completely covers drug bitterness with natural taste and no peculiar smell or cooling sensation, greatly improving medication compliance;
- Stable Texture & Superior Structure: Tablets are easy to form with moderate hardness, anti-fragility and delicate taste; syrup maintains uniform stability without water separation and precipitation;
- Mild Intestinal Protection: Extremely low gastrointestinal irritation, no bloating or diarrhea during long-term administration, suitable for people with sensitive intestines and long-term medication crowds;
- Solubilization & Efficacy Enhancement: Improves drug solubility, stability and bioavailability for more stable efficacy and better absorption;
- Safe & Widely Applicable: Pharmaceutical-grade high purity, suitable for diabetic patients, sugar control groups, children, the elderly and oral-sensitive people.

5. Regulations & Claims

Compliant with the 2025 Edition of Chinese Pharmacopoeia and **GB 1886.187-2016 (pharmaceutical grade)**, allowing appropriate addition in preparations per production needs;

Compliant with U.S. USP, EU EP, FDA GRAS and JECFA pharmaceutical-grade standards with unlimited ADI and top-tier safety;

Compliant Claims: Unsweetened, taste masking & bitterness relief, mild intestinal protection, stable texture, easy forming, low calorie & low GI, anti-caries, pharmaceutical-grade safety, high compliance.

6. Commercial Value

- Clinical Breakthrough: Solves four major pain points of unsweetened preparations including poor taste, strong irritation, inferior texture and low compliance, enabling use by diabetic and sugar control patients and expanding clinical coverage by over 50%;
- Quality Upgrading: Pharmaceutical-grade sorbitol replaces common sugar substitutes with higher purity, stronger stability and better safety;

- Market Monopoly: Occupies 32% of the global unsweetened vitamin preparation market share and 28% of the cough syrup market share with 40%+ brand premium;
- Profit Multiplication: Controllable costs, high premium and surging sales volume raise gross profit margin by 15-22 percentage points, achieving dual success in clinical application and commercialization.

7. Market Performance

Launched globally for 18 years, sold in more than 85 countries with annual sales exceeding 380 million bottles. Global sales volume reached 1.95 billion US dollars in 2024 with a CAGR of 8.2%. The annual growth rate in the Chinese market is 14.5%, ranking first in unsweetened pharmaceutical preparation sales for 6 consecutive years and serving as a benchmark case of sorbitol application in the pharmaceutical industry.

VIII. Sorbitol Premium Compound Application System (Authoritative Formula Guide for All Categories)

Beverages (Protein/Flavored Drinks):

Sorbitol 2.0%-2.5% + Erythritol 0.3%-0.5% (low calorie & stable quality, fresh-keeping & moisturizing, no cooling sensation, mellow flavor)

Dairy Products (Yogurt/Cheese):

Sorbitol 3.5%-4.5% (mainly single-component formula, moisturizing & anti-aging, dense & smooth texture, whey precipitation resistance)

Baked Goods (Pastry/Bread):

Sorbitol 8.0%-12.0% (mainly single-component formula, high temperature resistance, moisturizing & anti-cracking, anti-aging, long shelf life)

Confectionery & Chocolate:

Sorbitol 70%-85% + Xylitol 5%-8% (anti-blooming & anti-sanding, silky texture, mild intestinal protection, optimal cost)

Oral Care (Toothpaste/Lozenges):

Sorbitol 25%-35% (toothpaste) / 85%-90% (lozenges) (strong moisturizing, stable texture, anti-caries & fresh breath, mild & safe)

Functional Foods (Meal Replacements/Nutritional Powder):

Sorbitol 5.0%-8.0% (mainly single-component formula, anti-caking, easy dissolution, stable texture, prebiotic health care)

Pharmaceutical Preparations (Tablets/Syrup):

Sorbitol 60%-70% (tablets) / 20%-25% (syrup) (pharmaceutical grade, taste masking & bitterness relief, structural stabilization & solubilization assistance, mild & safe)

IX. Regulations & Market Trends

Regulations:

Approved for legal use in more than 100 countries worldwide; China **GB 2760-2024** and **GB 1886.187-2016** clarify its multiple functions as a sweetener, moisturizer, stabilizer and thickener, allowing appropriate addition according to production requirements;

Recognized by U.S. FDA GRAS, EU E420 and JECFA with unlimited ADI and top-tier safety; applicable to high-threshold scenarios such as food, pharmaceuticals, daily chemicals, special diets and infant foods, owning the most comprehensive global compliance system.

Market Trends:

According to data from IMARC Group and Guanyan Tianxia, the global sorbitol market size reached 1.938 billion US dollars with a sales volume of 2.76 million tons in 2024, and it is expected to reach 2.68 billion US dollars and 3.2 million tons by 2030 with a CAGR of 5.8%. In 2024, China's sorbitol market scale hit 6.85 billion RMB with a sales volume of 850,000 tons, and it is projected to exceed 11.2 billion RMB and 1.28 million tons by 2030 at a CAGR of 8.6%. The four core application sectors are confectionery & chocolate (31%), oral care (28%), food & beverage (22%) and pharmaceuticals (12%). Compared with other sugar alcohols, sorbitol continues to replace traditional sugar alcohols and artificial sweeteners by virtue of six core advantages: optimal cost, widest application range, strongest moisturizing performance, highest stability, medium-to-upper gastrointestinal tolerance and full-category compatibility, becoming the functional sugar alcohol with the largest global consumption and widest application (accounting for over 65% of the global polyol market).

X. Core Commercial Value

As a composite multi-functional auxiliary material, sorbitol is not a single functional sweetener. It helps enterprises in the food, pharmaceutical and daily chemical industries achieve sugar reduction & quality improvement, moisturizing & quality stabilization, texture optimization, flavor upgrading, functional empowerment, compliance premium and cost balance. It successfully breaks four major industry dilemmas: poor taste of unsweetened products, easy deterioration of moisturized products, lack of functions for healthy products, and high cost or strong irritation of sugar substitutes. Relying on nine core strengths including strong moisturizing & water locking, high temperature and acid-base stability, mild natural sweetness, low calorie & low GI, anti-caries property, mild prebiotic activity, optimal cost, full-category compatibility and pharmaceutical-grade safety, it covers full-category products and all age groups. It not only realizes unsweetened and low-sugar upgrading, but also delivers multiple benefits including moisturizing & anti-aging, shelf life extension, texture optimization, taste improvement, functional addition, cost reduction and premium improvement, supporting 30%-50% product premium and comprehensively promoting the transformation and upgrading of the industry towards sugar-free, functional, high-end, stable and low-cost development. It possesses irreplaceable and globally leading commercial empowerment value in the fields of unsweetened confectionery, high-end toothpaste, baked goods, functional beverages and pharmaceutical preparations.

XI. Conclusion

With nine core competitive barriers including strong moisturizing & water retention, high temperature and structural stability, mild natural sweetness, low calorie & low GI, anti-caries property, mild prebiotic effect, optimal cost, full-category compatibility and pharmaceutical-grade safety, sorbitol has become the globally preferred composite functional auxiliary material for seven major sectors: beverages, dairy products, baked goods, confectionery & chocolate, oral care, functional foods and pharmaceutical preparations. Different from common sweeteners with single flavoring function, sorbitol integrates eight core values: flavor regulation, moisturizing, quality stabilization, anti-aging, prebiotic activity, dental protection, cost reduction and premium appreciation, perfectly solving various industrial pain points caused by sucrose, artificial sweeteners and ordinary sugar alcohols.

Decades of commercial application and billion-level sales cases of global leading brands have fully verified sorbitol's excellent formula compatibility, technological stability, market recognition, regulatory safety, cost controllability and full-category versatility. It provides domestic enterprises with the most mature, authoritative, actionable and replicable overall solutions for unsweetened & low-sugar transformation, quality upgrading, functional empowerment and cost optimization.

In the future, with the deepening of global healthy sugar reduction policies, the explosive growth of consumer demand for clean labels and functional products, the iteration of green production processes, continuous cost optimization and upgrading of compounding technology, sorbitol will comprehensively replace traditional sweeteners and deeply penetrate high-value-added sectors such as high-end food, pharmaceuticals, daily chemicals, special diets and infant formula foods, driving the global industry into a new development stage featuring **sugar-free stability, pure taste, safety and mildness, additional functions and optimal cost**.