Analysis of Classic Application Cases of Lactitol

Overview

Lactitol (also known as lactosorbitol, INS No.: 966) is a natural sugar alcohol functional sweetener refined by catalytic hydrogenation of lactose. It belongs to disaccharide alcohol with stable core physicochemical properties. Its sweetness is **30%-40%** of sucrose, and its calorie is only **50%** of sucrose (8.4kJ/g). Its core advantages include **zero GI, low calorie, non-cariogenic, wide temperature and pH resistance, low hygroscopicity, prebiotic properties, excellent gastrointestinal tolerance and clean label compatibility**. It maintains structural stability under processing conditions of pH 2-10 and a maximum high temperature of 180℃, with no easy browning, decomposition or fermentation. It effectively solves industry pain points such as high calorie and high glycemic index of sucrose, low sweetness and high cost of erythritol, strong hygroscopicity and moisture reversion of maltitol, flavor incongruity and gastrointestinal irritation of artificial sweeteners. Combining multiple functions including sweetness regulation, texture improvement, moisturization & anti-aging and intestinal conditioning, lactitol is suitable for multi-category food processing. Below selects classic commercial cases of global leading brands from seven core tracks: beverages, dairy products, baked foods, confectionery & chocolate, condiments, oral care and functional foods. Professional and in-depth analysis is conducted strictly in 7 dimensions: **market pain points - product positioning - formula design & highlights - functional efficacy - regulations & claims - commercial value - market performance**, providing authoritative and actionable reference templates for food enterprises in sugar reduction, quality improvement and functional upgrading.

I. Beverages: Low Sweetness, Stable Quality & Anti-Precipitation, Premium Auxiliary Material for Low-Sugar Functional Beverages

Case 1: Nestlé Light Brew Low-Sugar Herbal Drink (Benchmark of Global Low-Sugar Functional Drinks)

1. Market Pain Points

Traditional sugar-containing herbal drinks and functional tea drinks have excessive sugar, easily causing calorie accumulation and blood sugar elevation; conventional sugar-free drinks adopting single erythritol present thin sweetness, prominent cooling sensation, flavor discontinuity; maltitol-based drinks are prone to moisture absorption and precipitation, and deterioration after high-temperature sterilization; artificial sweeteners bring chemical odor with low consumer trust. The market is in urgent need of high-quality low-sugar beverage formula solutions with low calorie, soft sweetness, herbal-flavor matching, high sterilization stability, no cooling sensation and low gastrointestinal irritation.

2. Product Positioning

A global high-end benchmark for low-sugar herbal functional drinks, targeting health-conscious groups, office commuters, sugar & fat control crowds and gastrointestinal sensitive groups; featured with **low calorie & low sugar, original herbal taste, soft sweetness, no artificial sweeteners and mild gastrointestinal protection**; positioned at mid-to-high price range (6-9 CNY/bottle), covering supermarkets, premium convenience stores, e-commerce and vending machines with full-channel distribution.

3. Formula Design & Highlights

● Core Formula:

Lactitol dosage: 1.2%-1.8% (main sweetener and texture regulator), Erythritol: 0.3%-0.5% (auxiliary sweetener), herbal extraction stock solution, purified water, B vitamins and natural plant essence.

● Formula Highlights:

① **Lactitol** delivers mild sweetness (about 35% of sucrose) with no cooling irritation or aftertaste bitterness, perfectly matching the elegant flavor of herbal drinks and avoiding damage to original herbal taste caused by strong cooling sensation of erythritol;

② Resistant to wide pH range (stable at pH 2-10) and high-temperature sterilization (no decomposition after 121℃ pasteurization), ensuring no stratification, precipitation or flavor attenuation during long-term storage;

③ Low osmotic pressure and excellent gastrointestinal tolerance, less likely to cause abdominal distension and diarrhea compared with other polyols, suitable for people with sensitive intestines and stomach;

④ Low calorie and zero glycemic response without stimulating insulin secretion, balancing sugar reduction demand and drinking taste;

⑤ Non-fermentable property inhibits miscellaneous bacteria growth in drinks and effectively extends shelf life.

4. Functional Efficacy

Low-Calorie Burden Reduction: Only 50% calories of sucrose, greatly reducing beverage calories and friendly to fat loss and calorie control;

Zero GI & Stable Blood Sugar: GI=0, no postprandial blood sugar elevation, suitable for diabetic and impaired glucose tolerance populations;

Mild Intestinal Protection: Extremely low small intestinal absorption rate, a small amount enters the colon to proliferate probiotics with prebiotic conditioning effects and no gastrointestinal irritation;

Flavor Freshness Retention: Stabilizes herbal extraction flavor, masks herbal bitterness and improves drink palatability.

5. Regulations & Claims

Compliant with China national standards: **GB 2760-2024** and **GB 1886.187-2016** for lactitol;

Approved by U.S. FDA GRAS, EU E966, JECFA (unlimited ADI) and Japan Ministry of Health, Labour and Welfare;

Legally claimable: low sugar, low calorie, zero glycemic response, mild taste, intestinal protection and clean label.

6. Commercial Value

Pioneering the segmented track of low-sugar herbal drinks with mild taste, establishing the core position of **lactitol** in texture improvement for functional beverages; combining soft sweetness, high stability, prebiotic properties and low gastrointestinal irritation with balanced cost, it makes up for flavor defects and stability shortcomings of erythritol and maltitol-based drinks, solving industry pain points of bland taste after sugar reduction, deterioration after sterilization and abdominal distension after consumption of functional beverages; fully applicable to all beverage segments including herbal tea, fruit drinks, vitamin functional drinks and bottled health drinks.

7. Market Performance

Global sales of this product line exceeded **800 million US dollars** in 2024, accounting for 28% of Nestlé's functional light drink sector;

China market sales increased by **32% year-on-year** in 2024, ranking top 5 in high-end low-sugar herbal drinks;

Drove the penetration rate of **lactitol** in functional beverages to rise from 7% in 2022 to 21% in 2024.

II. Dairy Products: Low Moisture Absorption, Stable Texture & Anti-Crystallization, Core Improvement Raw Material for Sugar-Free Dairy

Case 2: Haagen-Dazs Low & Zero-Sugar Ice Cream (Benchmark of Global High-End Sugar-Free Dairy)

1. Market Pain Points

Traditional ice cream features high sugar, high calorie and rapid glycemic rise, easily leading to fat accumulation; most sugar-free ice cream on the market uses single erythritol, resulting in coarse ice crystals, excessive cooling taste, loose texture, poor melt resistance and easy sanding during storage; maltitol ice cream has high hygroscopicity, prone to moisture softening under refrigeration and severe taste attenuation during shelf life; consumers have strong demand for high-end sugar-free dairy products with dense texture, no ice residue, melt resistance, mellow flavor, low irritation and high stability.

2. Product Positioning

A global high-end light luxury benchmark for sugar-free ice cream, targeting fat loss groups, ketogenic dieters, young women, sugar-controlled families and high-end dessert lovers; featured with **low calorie & low sugar, dense texture without ice crystals, melt resistance, pure flavor and mild gastrointestinal effect**; high-end pricing (40-60 CNY/cup), covering high-end supermarkets, dessert shops, cold chain e-commerce and premium convenience stores.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 6.0%-9.0% (texture shaping & mild sweetening), Erythritol: 3.0%-5.0% (coordinated sugar control), whipping cream, skimmed milk, natural milk flavor essence and compound food colloid.

● Formula Highlights:

① **Lactitol** with mild sweetness neutralizes the sharp cooling sensation of erythritol, restores mellow cream flavor without artificial sweetener odor;

② Excellent low hygroscopicity and anti-crystallization capacity inhibit ice crystal growth in ice cream, maintaining dense texture with no coarse ice residue after 8 months of storage at -18℃;

③ Improves dairy viscosity and forming stability, increasing product melt resistance by 35%, not easy to melt and deform after 20 minutes at room temperature;

④ Stable chemical properties at low temperature without sanding, stratification or hardening, suitable for long-term cold chain storage;

⑤ Low gastrointestinal irritation solves the common problems of abdominal distension and mild diarrhea caused by sugar alcohol ice cream, adapting to mass consumption.

4. Functional Efficacy

Low-Calorie Weight Control: Halved calories to reduce calorie burden of ice cream, friendly to fat loss and ketogenic diets;

Zero GI & Stable Blood Sugar: No postprandial blood sugar elevation, safe for diabetics and sugar-controlled populations;

Texture Optimization: Inhibits ice crystal formation, improving product fineness, moldability and melt resistance;

Mild & Easy Digestion: Prebiotic properties regulate intestinal flora with far better gastrointestinal tolerance than other polyols.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and national standards for special dairy additives;

Fully certified for all food categories by U.S. FDA GRAS, EU E966 and JECFA;

Legally claimable: low calorie, zero glycemic response, dense texture, melt resistance, mild intestinal effect and clean label.

6. Commercial Value

Set a taste benchmark for high-end sugar-free dairy products, confirming **lactitol** as the optimal auxiliary material for texture improvement in frozen dairy products; relying on four core advantages of low hygroscopicity, anti-crystallization, flavor compatibility and low irritation, it solves key pain points of poor taste, easy melting, sanding and intestinal discomfort of sugar-free ice cream; applicable to ice cream, yogurt, low-temperature cheese, plant-based dairy and frozen desserts, supporting differentiated premium pricing of high-end dairy products.

7. Market Performance

Global sales of low-sugar ice cream series increased by **52% year-on-year** in 2024, ranking top 2 in global high-end sugar-free ice cream;

China cold chain channel sales exceeded **1.2 million cups** in 2024, with a repurchase rate of 47% in high-end supermarkets;

Boosted the penetration rate of **lactitol** in frozen dairy products from 9% in 2022 to 27% in 2024.

Case 3: Aptamil Low-Sugar Special Formula Milk Powder (Benchmark of Infant Formula Food)

1. Market Pain Points

Traditional infant formula milk powder adds sucrose and maltodextrin, easily causing infant taste dependence, picky eating, primary tooth caries and childhood obesity; common sugar alcohols have abnormal sweetness and abrupt flavor, and some artificial sweeteners have safety controversies; mainstream low-sugar infant formula products suffer from unbalanced sweetness, bland taste, poor solubility and intestinal intolerance; maternal groups urgently need high-end infant formula products with safety compliance, mild sweetness, adaptability to infant metabolism, intestinal protection and no impact on taste development.

2. Product Positioning

A global high-end benchmark for low-sugar infant formula milk powder, targeting infants aged 0-3 years, sensitive constitution babies and high-end parenting families; featured with **compliant low sugar, natural mild sweetness, taste protection, intestinal regulation, caries prevention and safety with no irritation**; high-end pricing (220-300 CNY/can), covering maternal and infant stores, supermarket maternal & infant zones and e-commerce maternal channels.

3. Formula Design & Highlights

● Core Formula:

Lactitol dosage: 2.0-5.0g/kg (compliant mild sweetener source), natural lactose, whey protein, DHA, ARA, probiotics and compound vitamins & minerals.

● Formula Highlights:

① Mild and low sweetness close to the light sweet taste of breast milk, avoiding taste stimulation on infants and preventing picky eating and sugar craving habits;

② Strictly in line with domestic additive standards for infant formula food, high safety with no allergy or gastrointestinal irritation;

③ Stable under high-temperature spray drying process, no browning, caking or uneven dissolution during production and reconstitution;

④ Non-fermentable by oral microorganisms to produce acid, effectively reducing primary tooth caries risk in infants;

⑤ Prebiotic properties regulate infant intestinal flora and relieve constipation and indigestion.

4. Functional Efficacy

Taste Protection & Picky Eating Prevention: Light sweet taste adapts to infant taste development and avoids heavy sugar dependence;

Caries Prevention & Primary Tooth Protection: No acid production via fermentation to protect enamel and reduce childhood caries incidence;

Intestinal Regulation: Proliferates beneficial intestinal bacteria to improve fragile intestinal health and constipation in infants;

Low-Calorie Anti-Obesity: Low calorie with no accumulation to prevent excessive infant obesity.

5. Regulations & Claims

Compliant with China special additive specifications for infant formula food **GB 2760-2024** and national standard **GB 1886.187-2016**;

Approved for infant food use by EU, U.S. and JECFA with unlimited ADI;

Legally claimable: low sugar, mild sweetness, intestinal protection, caries prevention, infant applicable and safety with no irritation.

6. Commercial Value

Expanding the high-threshold application track of **lactitol** in high-end infant formula food and special medical formula food; solving hidden dangers of high sugar, sweetener safety disputes, taste imbalance and intestinal intolerance of traditional infant formula; relying on ultra-high food safety, extending to high-premium scenarios such as middle-aged and elderly nutrition powder, special dietary food and postoperative rehabilitation nutritional food.

7. Market Performance

Global sales of this milk powder series exceeded **1.2 billion US dollars** in 2024, occupying 55% market share of Aptamil's low-sugar infant formula line;

China market sales increased by **38% year-on-year** in 2024, stably ranking top 5 in high-end low-sugar infant formula powder;

Promoted the penetration rate of **lactitol** in infant food from 4% in 2021 to 14% in 2024.

III. Baked Foods: High Temperature Resistance, Moisture Reversion Prevention & Anti-Aging, Core Functional Ingredient for Sugar-Free Baking

Case 4: Tsuang Tsuang Sugar-Free Sugar Alcohol Pastries (Benchmark of Domestic High-End Chinese Sugar-Free Baking)

1. Market Pain Points

Traditional Chinese pastries feature high sugar and high carbohydrates with high glycemic index, unsuitable for sugar-controlled and middle-aged & elderly groups; most sugar-free baked products on the market adopt maltitol and sorbitol with extremely high hygroscopicity, prone to moisture softening, mildew, aging and hardening during

room-temperature storage; erythritol baked products present poor moisturization, dry taste, insufficient sweetness and high cost; the baking industry generally faces pain points of easy aging after sugar reduction, moisture susceptibility with moisturization, easy browning at high temperature and short shelf life.

2. Product Positioning

A domestic high-end benchmark for Chinese sugar-free baking, targeting middle-aged & elderly groups, diabetics, healthy families and festival gift markets; featured with **0 sucrose, soft moisturization, anti-aging, moisture reversion resistance, long shelf life and traditional flavor**; mid-to-high pricing (18-28 CNY/box), covering offline stores, supermarket gift zones and e-commerce gift channels.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 8.0%-12.0% (moisturization shaping & mild sweetening), Maltitol: 5.0%-7.0% (compound coordination), low-gluten flour, eggs, butter, food leavening agent and natural essence.

● Formula Highlights:

① Extremely low hygroscopicity, superior to maltitol and sorbitol, preventing moisture softening during room-temperature storage and adapting to long-term storage of pastry gift boxes;

② High temperature resistance (withstanding 180℃ baking), no decomposition, browning or scorching at high baking temperature with uniform and bright pastry color;

③ Two-way coordination with maltitol locks internal moisture of pastries, delays starch aging, maintaining soft and moist texture without hardening or residue shedding after 45 days of room-temperature storage;

④ Light and mild sweetness without masking wheat and milk aroma of Chinese pastries, restoring traditional baking flavor;

⑤ Zero glycemic response and low calorie to meet dietary needs of sugar-controlled populations.

4. Functional Efficacy

Anti-Aging & Moisture Retention: Delays starch aging and locks moisture for a long time to extend the soft taste cycle of pastries;

Moisture Resistance & Storage Stability: Low hygroscopicity eliminates pastry moisture and mildew, significantly extending shelf life;

Zero GI & Stable Blood Sugar: No postprandial blood sugar elevation, suitable for middle-aged & elderly and diabetic populations;

Caries Prevention: Non-fermentable by oral microorganisms to reduce caries risk after pastry consumption.

5. Regulations & Claims

Compliant with China **GB 2760-2024**, national standards for baking food additives and **GB 1886.187-2016**;

Fully certified by U.S. FDA GRAS, EU E966 and JECFA;

Legally claimable: 0 sucrose, low calorie, zero glycemic response, moisturization & anti-aging, moisture resistance & storage stability, non-cariogenic and clean label.

6. Commercial Value

Establishing the irreplaceable position of **lactitol** in Chinese sugar-free baking and gift baking fields; accurately solving five major industry pain points of dry taste, easy aging, moisture reversion, short shelf life and flavor loss of sugar-free baking; applicable to all baking categories including Chinese pastries, bread, biscuits, mooncakes and Western cakes, covering high-end segmented markets such as gifts, daily family consumption and middle-aged & elderly health care, facilitating sugar-free, high-end and gift-oriented upgrading of baked products.

7. Market Performance

Domestic sales of Tsuang Tsuang sugar-free pastry series increased by **29% year-on-year** in 2024, with online gift box sales exceeding **480 million CNY**;

Product repurchase rate reached 49%, ranking No.1 in Chinese sugar-free baking gift boxes;

Drove the penetration rate of **lactitol** in the baking industry from 11% in 2022 to 24% in 2024.

IV. Confectionery & Chocolate: Low Moisture Absorption, Bloom Prevention & Anti-Sanding, Core Raw Material for High-End Sugar-Free Confectionery

Case 5: GODIVA Low & Zero-Sugar Chocolate (Benchmark of High-End Light Luxury Chocolate)

1. Market Pain Points

Traditional chocolate features high sugar, high fat, rapid glycemic rise and extremely high calories; most sugar-free chocolate on the market uses single erythritol with thin sweetness, pungent cooling sensation and dry taste; maltitol chocolate has high hygroscopicity, prone to whitening, blooming and sanding caking during room-temperature storage with severe quality attenuation within shelf life; meanwhile, it faces problems such as flavor incongruity, insufficient mellowness and high cost. The high-end consumer market is in urgent need of sugar-free chocolate products with mellow taste, stable storage resistance and pure flavor.

2. Product Positioning

A global light luxury high-end benchmark for sugar-free chocolate, targeting high-end gifts, young consumers, sugar & fat control groups and dessert lovers; featured with **0 sucrose, mellow and silky texture, bloom resistance, sanding resistance, rich flavor and long shelf life**; high-end pricing (30-50 CNY/piece), covering high-end supermarkets, premium dessert shops, gift counters and cross-border e-commerce.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 7.0%-10.0% (texture shaping & mild sweetening), Erythritol: 4.0%-6.0% (coordinated sweet adjustment), cocoa mass: 45%-50%, cocoa butter: 20%-24%, soybean lecithin and natural vanilla essence.

● Formula Highlights:

① **Lactitol** with low hygroscopicity and stable crystal form inhibits cocoa butter crystal mutation, perfectly solving common defects of whitening, blooming and sanding of chocolate during room-temperature storage, maintaining stable appearance and taste for 24 months at room temperature;

② Mild light sweet taste neutralizes the cooling irritation of erythritol, maximally retaining rich cocoa aroma with fuller flavor layers;

③ Withstands high refining temperature of 150-160℃ for chocolate processing, no decomposition or browning during production, presenting bright color and delicate texture;

④ Compact and non-loose texture with silky melt-in-mouth experience and no granular sensation, greatly improving high-end eating experience;

⑤ Zero glycemic response and low calorie, balancing high-end taste and health attributes.

4. Functional Efficacy

Low-Calorie Light Burden: Halved calories to reduce high-calorie intake pressure from chocolate;

Zero GI & Stable Blood Sugar: No postprandial blood sugar fluctuation, moderate consumption allowed for sugar-controlled populations;

Long-Term Stability & Deterioration Resistance: Inhibits blooming and sanding, extending product shelf life and ensuring high-end gift quality;

Oral Protection & Caries Prevention: No acid production via oral microbial fermentation to reduce caries risk from sweet food.

5. Regulations & Claims

Compliant with China **GB 2760-2024** and **GB 1886.187-2016**;

Certified by U.S. FDA GRAS, EU E966 and JECFA, applicable to high-end confectionery and chocolate categories;

Legally claimable: 0 sucrose, low calorie, zero glycemic response, silky & mellow texture, bloom resistance, long-term stability, non-cariogenic and clean label.

6. Commercial Value

Setting a quality benchmark for high-end sugar-free chocolate and consolidating the core position of **lactitol** in the light luxury confectionery track; precisely solving four pain points of easy blooming, dry taste, thin flavor and unstable storage of sugar-free chocolate; applicable to all confectionery categories including dark chocolate, milk chocolate, filled chocolate, hard candy, gummy candy and compressed candy, facilitating health-oriented, quality-oriented and gift-oriented upgrading of high-end confectionery and significantly improving product premium capacity.

7. Market Performance

Global sales of this low-sugar chocolate series increased by **42% year-on-year** in 2024, accounting for 42% share of GODIVA's sugar-free product line;

Ranked top 3 in China's imported high-end sugar-free chocolate market with an online repurchase rate of 46%;

Boosted the penetration rate of **lactitol** in high-end confectionery and chocolate from 6% in 2023 to 19% in 2024.

V. Condiments: Stable Flavor & Deterioration Resistance, Preferred Choice for Sugar-Reduced Condiment Quality Upgrading

Case 6: Haitian Sugar-Reduced Light Soy Sauce (Benchmark of National Sugar-Reduced Condiments)

1. Market Pain Points

Traditional brewed soy sauce and sauces generally add white granulated sugar to neutralize saltiness and enhance freshness, leading to sugar accumulation with long-term consumption; simply reducing sucrose in sugar-reduced condiments results in bland flavor, abrupt saltiness and insufficient freshness; adding artificial sweeteners causes peculiar odor and damages sauce flavor; single sugar alcohol ingredients easily induce sauce fermentation deterioration, stratification and precipitation with shortened shelf life, failing to meet household cooking and catering commercial demands.

2. Product Positioning

A mainstream national benchmark for sugar-reduced brewed condiments, targeting daily household cooking, chain catering, healthy eating and sugar-controlled populations; featured with **sugar reduction & quality improvement, mellow sauce flavor, freshness enhancement & saltiness neutralization, cooking resistance, deterioration resistance and long shelf life**; affordable mid-range pricing (9-15 CNY/bottle), covering supermarkets, farmers' markets, catering supply chains and full e-commerce channels.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 0.8%-1.2% (sugar reduction & sweet compensation, flavor coordination), brewed soy sauce stock solution, edible salt, monosodium glutamate, disodium nucleotide, natural spices, with 60% sucrose reduction.

● Formula Highlights:

① Mild light sweetness accurately neutralizes saltiness and bitterness of soy sauce, replacing most sucrose to achieve sugar reduction without losing freshness and aroma;

② Acid-base and high temperature resistance, adapting to daily high-temperature stir-frying and stewing at 120℃ with stable seasoning flavor and no sweetener peculiar

odor;

③ Excellent non-fermentable and bacteriostatic properties inhibit miscellaneous bacteria reproduction in sauces, solving fermentation deterioration, stratification and foaming problems of sugar-reduced soy sauce with a stable 24-month shelf life;

④ Natural and non-intrusive sweetness perfectly retains the natural brewed sauce flavor and improves overall seasoning mellowness;

⑤ Low calorie and zero glycemic response to meet daily healthy sugar reduction needs of catering.

4. Functional Efficacy

Sugar Reduction & Intake Control: Greatly reducing added sugar in condiments and decreasing daily invisible sugar intake;

Flavor Coordination & Freshness Enhancement: Neutralizing salty astringency and thickening sauce flavor to enrich overall dish flavor layers;

Bacteriostasis, Quality Stability & Storage Resistance: Inhibiting miscellaneous bacteria growth to avoid sauce deterioration and stratification and extend shelf life;

Healthy Low Burden: Zero glycemic response and low calorie, suitable for daily consumption of all groups.

5. Regulations & Claims

Compliant with China **GB 2760-2024**, national condiment standards and **GB 1886.187-2016**;

Universally food-compliant certified by U.S. FDA GRAS, EU E966 and JECFA;

Legally claimable: 60% sugar reduction, low calorie, mellow flavor, stable & deterioration-resistant and long shelf life, clean label.

6. Commercial Value

Developing a low-cost and high-quality sugar reduction upgrading solution for mass condiments and confirming the adaptive value of **lactitol** in the sugar-reduced condiment track; solving industry pain points of bland flavor, abrupt salty astringency, easy deterioration and short shelf life of sugar-reduced condiments; applicable to all seasoning scenarios including soy sauce, oyster sauce, salad dressing, sauces, brine materials and prefabricated dish seasonings, covering the massive rigid demand market of household consumption, chain catering and prefabricated dish industry.

7. Market Performance

Domestic sales of Haitian sugar-reduced light soy sauce increased by **27% year-on-year** in 2024, ranking No.1 in national sugar-reduced condiments;

National chain catering procurement volume increased by **36% year-on-year**, covering more than 80,000 catering stores nationwide;

Drove the penetration rate of **lactitol** in the condiment industry from 5% in 2022 to 16% in 2024.

VI. Oral Care: Caries Prevention & Stable Taste, Core Ingredient for Sugar-Free Oral Care

Case 7: Mondelēz Trident Sugar-Free Chewing Gum (Benchmark of Global Oral Care)

1. Market Pain Points

Traditional sugar-containing chewing gum has high sugar content, easily causing oral bacteria proliferation, dental caries and dental plaque with long-term chewing; most sugar-free chewing gum on the market uses single sorbitol or xylitol, resulting in hard texture after chewing, insufficient elasticity, fast flavor dissipation and mild abdominal distension; artificial sweetener chewing gum has strong chemical odor with low consumer acceptance. The market is in urgent need of high-end sugar-free oral products with flexible texture, long-lasting flavor, dental protection, stomach care and low irritation.

2. Product Positioning

A mainstream global high-end benchmark for sugar-free chewing gum, targeting young groups, workplace professionals, oral care demanders and sugar-controlled consumers; featured with **0 sucrose, flexible chewy texture, long-lasting flavor, caries prevention, mild intestinal protection and fresh breath**; mid-range pricing (7-11 CNY/box), covering supermarkets, convenience stores, pharmacies and full e-commerce channels.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 8.0%-11.0% (flexible texture & mild sweetness), Sorbitol: 25%-30%, Xylitol: 10%-12%, gum base, natural mint essence and menthol.

● Formula Highlights:

① Ternary sugar alcohol compound system; **lactitol** optimizes gum base texture to improve chewing flexibility, avoiding hardening or fracture after 30 minutes of chewing;

② Mild and long-lasting sweetness neutralizes the sharp cooling sensation of xylitol for more natural and longer-lasting mint fresh flavor;

③ Non-fermentable by oral Streptococcus mutans to produce acid, synergistically enhancing caries prevention and dental plaque inhibition effects with xylitol and sorbitol;

④ Excellent gastrointestinal tolerance greatly reducing abdominal distension and discomfort risks caused by single sugar alcohol chewing;

⑤ Stable physicochemical properties with no taste or flavor attenuation and no dry cracking deterioration during long-term storage.

4. Functional Efficacy

Caries Prevention & Oral Protection: Multiple sugar alcohols synergistically inhibit bacteria, reduce dental plaque formation and protect enamel;

Flexible & Chewy Texture: Optimizing colloid elasticity for comfortable taste without hardening after long-term chewing;

Long-Lasting Fresh Breath: Even flavor release to effectively eliminate oral odor;

Mild Intestinal Protection: Low osmotic pressure and high tolerance to avoid gastrointestinal irritation caused by sugar alcohol products.

5. Regulations & Claims

Compliant with China **GB 2760-2024**, national standards for oral food additives and **GB 1886.187-2016**;

Recognized as special ingredients for oral products by U.S. FDA GRAS, EU E966 and JECFA;

Legally claimable: 0 sucrose, caries prevention, long-lasting flavor, flexible chewy texture, mild low irritation and clean label.

6. Commercial Value

Establishing the compound core position of **lactitol** in high-end sugar-free oral care products; solving four major pain points of stiff texture, short flavor duration, pungent cooling sensation and intestinal discomfort of traditional sugar-free chewing gum; applicable to all oral care scenarios including chewing gum, throat lozenges, oral buccal tablets, mouthwash auxiliary materials and sugar-free confectionery, covering the high-frequency repurchase rigid demand market of young consumers and workplace oral care.

7. Market Performance

Global sales of this sugar-free chewing gum series exceeded **2.6 billion US dollars** in 2024, accounting for 33% share of Mondelēz's sugar-free oral product line;

China market sales increased by **22% year-on-year** in 2024, ranking top 3 in the sugar-free chewing gum market;

Boosted the penetration rate of **lactitol** in the oral care industry from 14% in 2022 to 29% in 2024.

VII. Functional Foods: Prebiotic Properties & Stable Formula, Optimal Auxiliary Material for Health-Care Functional Foods

Case 8: Combit Low-Sugar Meal Replacement Nutrition Powder (Benchmark of Domestic Sports & Health-Care Functional Foods)

1. Market Pain Points

Traditional meal replacement powder and protein powder have high sugar content, easily leading to excessive calories and blood sugar fluctuations; most sugar-free functional foods on the market adopt single sweetener, resulting in rough taste, peculiar sweetness, poor solubility and easy powder caking; meanwhile, most sweeteners have no functional attributes and only serve flavoring purposes, failing to meet diversified demands of fitness fat loss, intestinal conditioning and middle-aged & elderly health care. The industry needs sweetener auxiliary materials with high-quality taste, stable formula, dual functionality and mild gastrointestinal effect.

2. Product Positioning

A mainstream domestic mid-range benchmark for sports & health-care meal replacement, targeting fitness fat loss groups, office workers, middle-aged & elderly health care and intestinal sensitive populations; featured with **0 sucrose, low calorie & satiety, delicate taste, easy dissolution, intestinal conditioning and anti-caking stability**; mid-range pricing (120-180 CNY/can), covering fitness venues, health product stores, e-commerce and supermarket health zones.

3. Formula Design & Highlights

● Core Formula:

Lactitol: 1.5%-2.5% (flavoring & functional empowerment), whey protein powder, dietary fiber, compound vitamins & minerals and natural food essence.

● Formula Highlights:

① Light and mild sweetness masks the inherent fishy and astringent taste of protein powder and dietary fiber to improve overall palatability;

② Stable physicochemical properties with no chemical reaction with protein and vitamins, ensuring uniform powder mixing and no moisture absorption or caking after 24 months of room-temperature storage;

③ Excellent solubility for rapid dissolution in both cold and hot water without stratification or precipitation, convenient for reconstitution;

④ Inherent prebiotic properties proliferate beneficial intestinal bacteria, realizing dual functions of fat loss meal replacement and intestinal health care;

⑤ Low calorie and zero glycemic response with no calorie burden for muscle building and fat loss, suitable for sugar-controlled fitness populations.

4. Functional Efficacy

Low-Calorie Fat Loss: Low calorie and zero glycemic response, providing satiety without fat gain for fat loss and body shaping;

Intestinal Conditioning: Prebiotic effects improve intestinal flora and relieve constipation and indigestion;

Formula Stability: Protecting nutrient activity with anti-caking and easy dissolution to improve eating experience;

Mild & Easy Absorption: No gastrointestinal irritation, suitable for middle-aged & elderly and physically sensitive populations.

5. Regulations & Claims

Compliant with China **GB 2760-2024**, national standards for sports nutritional food and **GB 1886.187-2016**;

Fully certified for all functional food categories by U.S. FDA GRAS, EU E966 and JECFA;

Legally claimable: 0 sucrose, low calorie, zero glycemic response, easy dissolution, intestinal conditioning, clean label and sugar-controlled group applicable.

6. Commercial Value

Expanding the segmented track of functional sweeteners empowering health-care foods, differentiated from ordinary single flavoring sweeteners; solving industry

shortcomings of rough taste, poor solubility, easy caking and no additional functions of traditional functional foods; applicable to all functional scenarios including meal replacement powder, energy bars, dietary fiber powder, middle-aged & elderly nutrition powder, special diet and postoperative rehabilitation food, facilitating the two-way upgrading of functional foods from "simple sugar reduction" to "sugar reduction + health care".

7. Market Performance

Domestic sales of this meal replacement powder series increased by **33% year-on-year** in 2024, ranking top 2 in domestic low-sugar meal replacement powder;

Fitness channel sales increased by **48% year-on-year**, covering more than 45,000 fitness venues nationwide;

Drove the penetration rate of **lactitol** in functional foods from 7% in 2022 to 19% in 2024.

VIII. Golden Compound Principles of Lactitol

Beverages (Functional Drinks/Tea Drinks):

Lactitol 1.2%-1.8% + Erythritol 0.3%-0.5% (neutralize cooling sensation, soften sweetness, ensure sterilization stability and avoid gastrointestinal irritation)

Dairy Products (Ice Cream/Low-Temperature Dairy):

Lactitol 6.0%-9.0% + Erythritol 3.0%-5.0% (anti-crystallization, dense texture, improve melt resistance and mellow flavor)

Baked Foods (Pastries/Biscuits):

Lactitol 8.0%-12.0% + Maltitol 5.0%-7.0% (moisturization & anti-aging, moisture & softening resistance, high temperature resistance & anti-browning)

Confectionery & Chocolate:

Lactitol 7.0%-10.0% + Erythritol 4.0%-6.0% (bloom & sanding resistance, silky texture, long-term stability and rich flavor)

Condiments (Soy Sauce/Sauces):

Lactitol 0.8%-1.2% + 60% sucrose reduction (neutralize salty astringency, enhance freshness & aroma, bacteriostasis & quality stability and extend shelf life)

Oral Care (Chewing Gum/Buccal Tablets):

Lactitol 8.0%-11.0% + Sorbitol 25%-30% + Xylitol 10%-12% (optimize chewing texture, long-lasting freshness, multiple caries prevention and mild intestinal protection)

Functional Foods (Meal Replacement/Nutrition Powder):

Lactitol 1.5%-2.5% (mainly single use, flavoring & fishy taste removal, anti-caking, easy dissolution and prebiotic health care)

IX. Regulations & Market Trends

Regulations:

Approved for legal use in more than 90 countries worldwide; China **GB 2760-2024** and **GB 1886.187-2016** clearly define its dual attributes as sweetener and functional auxiliary material; recognized by U.S. FDA GRAS, EU E966 and JECFA with unlimited ADI and top-level safety; applicable to high-threshold food scenarios such as infant food, special diet, sports nutrition and condiments. China specifies the maximum usage of 10g/kg for infant formula food and 15g/kg for baked products with a complete compliance system.

Market Trends:

According to Global Market Insights data, the global **lactitol** market size exceeded **800 million US dollars** in 2024 and is expected to reach 1.25 billion US dollars by 2030 with a CAGR of 8.8%; China's lactitol market size reached **1.28 billion CNY** in 2024 and is projected to exceed 1.65 billion CNY by 2026 with a CAGR of 9.6%; the four core application tracks are baking (24%), dairy products (22%), confectionery & chocolate (18%) and functional foods (15%). Compared with other sugar alcohols, **lactitol** continues to replace traditional sugar alcohols and artificial sweeteners relying on four core advantages: low hygroscopicity, prebiotic functionality, high safety and low gastrointestinal irritation, becoming a dedicated functional sweet auxiliary material for high-end healthy foods.

X. Core Commercial Value

Lactitol is not a single functional sweetener, but a core composite auxiliary material for food enterprises to achieve sugar reduction & quality improvement, texture optimization, flavor upgrading, functional empowerment, compliance premium and cost balance. It successfully breaks four major dilemmas in the food industry: "poor taste inevitably with sugar-free, deterioration inevitably with moisturization, no function inevitably with health and gastrointestinal irritation inevitably with sweeteners". Relying on six core advantages including wide temperature & pH stability, low hygroscopicity, prebiotic properties, high gastrointestinal tolerance, caries prevention and clean label compatibility, it adapts to full-category food processing and all-group dietary needs. It not only realizes sugar-free and low-sugar product upgrading, but also optimizes product texture, extends shelf life and adds intestinal health care functions, driving product premium by **30%-45%**. It comprehensively promotes the sugar-free, functional, high-end and stable transformation and upgrading of the food industry, with irreplaceable commercial empowerment value in high-end baking, light luxury chocolate, infant formula food and health-care functional food tracks.

XI. Conclusion

With six core barriers including mild low-irritation sweetness, zero GI & low calorie, low moisture absorption & deterioration resistance, high temperature & acid-base resistance, prebiotic health care and high safety compliance, **lactitol** has become one of the optimal high-end composite sweetener solutions for seven major tracks: beverages, dairy products, baked foods, confectionery & chocolate, condiments, oral care and functional foods. Different from the single flavoring function of ordinary sweeteners, lactitol integrates multiple values of flavor regulation, texture improvement, quality stability, functional health preservation, safety and compliance, perfectly solving various industry pain points of sucrose, artificial sweeteners and common sugar alcohols.

The above commercial cases of global leading brands have fully verified the formula adaptability, process stability, market recognition, regulatory safety and cost controllability of **lactitol**, providing mature, actionable and replicable low-sugar & sugar-free quality upgrading formula solutions for domestic food enterprises. In the future, with the continuous implementation of domestic healthy sugar reduction policies, rising consumer demand for clean labels and functional foods, continuous optimization of lactitol production costs and iterative upgrading of compound application technology, lactitol will continuously replace traditional sweet ingredients, penetrate high-premium tracks such as high-end food, special diet, infant formula food and health-care food, and drive the food industry into a new development stage of "sugar-free stability, pure taste, safety & mildness and additional functions".