# Fructo-Oligosaccharide (FOS) Specification Sheet

## I. Basic Product Information

### 1. Product Name

- Chinese Name: 低聚果糖
- English Name: Fructo-oligosaccharide (abbreviated as FOS)

### 2. Core Identification Information

- CAS No.: 30806-33-0 (WHO)
- INS No.: 953 (WHO)
- CNS No.: 19.019
- UN No.: Not applicable (non-dangerous goods)

### 3. Product Type

Food additive (prebiotic, dietary fiber) / Food raw material / Food nutrition fortifier / Water-soluble dietary fiber

### 4. Product Definition

A functional oligosaccharide mixture produced from sucrose, Jerusalem artichoke, chicory, etc., via enzymatic conversion, purification, drying and other processes, composed of 2–9 fructose units linked by β-2,1 glycosidic bonds. It is classified into two types: sucrose-fructose type ($GF_n$, n=2~8) and fructose-fructose type ($F_n$, n=2~9).

### 5. Production Process

- When using sucrose as raw material: catalyzed by β-fructosyltransferase, fructosyl groups in sucrose molecules are transferred to fructose residues of other sucrose molecules to form sucrose-fructose type fructo-oligosaccharides.
- When using Jerusalem artichoke or chicory as raw materials: fructans are extracted by enzymatic hydrolysis, then purified via membrane separation to obtain a mixture of fructose-fructose type and sucrose-fructose type fructo-oligosaccharides. The final product is prepared by drying (solid) or concentration (liquid).

### 6. Applicable Standards

- Food raw material/ingredient: GB/T 23528.2-2021 *Quality Requirements for Oligosaccharides — Part 2: Fructo-oligosaccharides*
- Food nutrition fortifier: GB 1903.40-2022 *National Food Safety Standard — Food Nutrition Fortifier Fructo-oligosaccharides*
- General food safety: GB 2762, GB 2763, GB 7718, GB 28050

- International standards: JECFA (Joint FAO/WHO Expert Committee on Food Additives), FCC (Food Chemicals Codex)

### 7. Product Classification

**(1) By Raw Material Source**

- Sucrose-derived: produced from sucrose via catalysis of β-fructosyltransferase, mainly composed of sucrose-fructose type FOS.
- Plant-derived: produced from Jerusalem artichoke or chicory via enzymatic hydrolysis/membrane separation, containing both fructose-fructose type and sucrose-fructose type FOS.

**(2) By Product Form**

- Solid: powder, granules (FOS-50/80/90/95 grades)
- Liquid: syrup (FOS-55/60/90 grades)

**(3) By Purity Grade**

- Food grade: FOS (dry basis) ≥50%, ≥80%, ≥90%
- High-purity grade: FOS (dry basis) ≥95% (premium grade), ≥93.2% (first grade)
- Nutrition fortifier grade: FOS (dry basis) ≥93.2%

## II. Technical Specifications

### 1. Organoleptic Requirements (applicable to both solid and liquid products)

Color: White to pale yellow (solid); light yellow to brownish yellow (liquid)

Appearance: Powder/granules, no caking; liquid, no stratification or precipitation

Odor: Characteristic odor of FOS, no off-odor or rancidity

Taste: Pure sweet taste, no bitterness or astringency

### 2. Physicochemical & Microbiological Indicators

**(1) Solid Products (Powder/Granules)**

Physicochemical and Microbiological Indicators (Solid Products)

| Item | Premium Grade (≥95%) | First Grade (≥93.2%) | Food Grade (≥90%) | Food Grade (≥80%) | Food Grade (≥50%) |
|---|---|---|---|---|---|
| Fructo-oligosaccharide (dry basis), % | ≥95.0 | ≥93.2 | ≥90.0 | ≥80.0 | ≥50.0 |
| Dry matter, % | ≥95.0 | ≥94.0 | ≥93.0 | ≥92.0 | ≥90.0 |
| Moisture, % | ≤3.0 | ≤4.0 | ≤5.0 | ≤6.0 | ≤8.0 |
| Ash, % | ≤0.1 | ≤0.2 | ≤0.3 | ≤0.5 | ≤1.0 |
| pH (10% aqueous solution) | 4.0~7.0 | 4.0~7.0 | 4.0~7.0 | 4.0~7.0 | 4.0~7.0 |
| Light transmittance (10% aqueous solution), % | ≥95.0 | ≥90.0 | ≥85.0 | ≥80.0 | ≥70.0 |
| Arsenic (As), mg/kg | ≤0.1 | ≤0.1 | ≤0.1 | ≤0.1 | ≤0.1 |
| Lead (Pb), mg/kg | ≤0.2 | ≤0.2 | ≤0.2 | ≤0.2 | ≤0.2 |
| Total plate count, CFU/g | ≤1000 | ≤1000 | ≤3000 | ≤5000 | ≤10000 |
| Coliforms, MPN/100g | ≤30 | ≤30 | ≤90 | ≤90 | ≤150 |
| Molds and yeasts, CFU/g | ≤50 | ≤50 | ≤100 | ≤100 | ≤200 |
| Pathogenic bacteria | *Salmonella*, *Shigella*, *Staphylococcus aureus*: Not Detected | *Salmonella*, *Shigella*, *Staphylococcus aureus*: Not Detected | *Salmonella*, *Shigella*, *Staphylococcus aureus*: Not Detected | *Salmonella*, *Shigella*, *Staphylococcus aureus*: Not Detected | *Salmonella*, *Shigella*, *Staphylococcus aureus*: Not Detected |

**(2) Liquid Products (Syrup)**

| Item | High-Purity Syrup (≥90%) | Food Grade Syrup (≥60%) | Food Grade Syrup (≥55%) |
|---|---|---|---|
| FOS (dry basis), % | ≥90.0 | ≥60.0 | ≥55.0 |
| Dry matter, % | ≥75.0 | ≥75.0 | ≥75.0 |
| Moisture, % | ≤25.0 | ≤25.0 | ≤25.0 |
| pH | 4.0~7.0 | 4.0~7.0 | 4.0~7.0 |
| Light transmittance, % | ≥90.0 | ≥80.0 | ≥75.0 |
| Microbiological indicators | Same as corresponding grade of solid products | | |

### 3. Key Component Distribution (High-Purity FOS, dry basis)

| Component | Content Range, % \| | Description |
|---|---|---|
| Kestose ($GF_2$) | 30~40 | Key functional component |
| Nystose ($GF_3$) | 40~50 | Key functional component |
| Fructosylnystose ($GF_4$) and higher | 10~20 | Functional component |
| Glucose / Fructose / Sucrose | ⩽5.0 | Residual sugars |

## III. Product Properties & Functions

### 1. Physical Properties

- Solubility: Freely soluble in water; solubility ≥70% at 25℃.
- Sweetness: 30%~50% of sucrose, clean sweet taste with no after-bitterness.
- Caloric value: Approx. 1.5~2.0 kcal/g, low-calorie.
- Stability: Stable at pH 4.0~7.0 and temperature ≤140℃; good acid and heat resistance.
- Moisture retention: Excellent; suitable for food moisture retention and anti-crystallization.

### 2. Functional Properties

- Prebiotic effect: Not digested by human digestive enzymes, reaches the intestine intact, selectively proliferates beneficial bacteria such as Bifidobacterium and inhibits harmful bacteria.
- Dietary fiber function: Water-soluble dietary fiber, promotes intestinal peristalsis, relieves constipation, lowers intestinal pH.
- Metabolic characteristics: Does not raise blood glucose, non-cariogenic; suitable for diabetics and sugar-controlled populations.
- Nutritional fortification: Used as a nutrition fortifier in infant food, health food, etc., in compliance with GB 14880.

## IV. Application Fields & Usage Limits

### 1. Application Fields

- Food industry: Dairy products, beverages, baked goods, confectionery, snack foods, condiments.
- Health food: Probiotic preparations, intestinal health products, weight management products.

- Infant food: Infant formula, complementary foods (within GB 14880 limits).
- Pet food/feed: Pet treats, main rations; improves intestinal health in pets.

### 2. Usage Limits (GB 14880-2012)

- Infant formula foods: ≤64.5 g/kg (total with other oligosaccharides).
- Infant grain complementary foods: ≤30.0 g/kg.
- Other foods: Used appropriately as required for production (GB 2760).
- Recommended daily intake for adults: 5~15 g/day; excessive intake (>30 g/day) may cause bloating or diarrhea.

## V. Packaging, Transportation & Storage

### 1. Packaging

- Solid products: Food-grade aluminum foil bags, kraft paper bags, fiber drums with PE liners; specifications: 1 kg/bag, 5 kg/bag, 25 kg/drum.
- Liquid products: Food-grade plastic drums, stainless steel drums; specifications: 25 kg/drum, 50 kg/drum, 200 kg/drum.
- Packaging labeling: Complies with GB 7718; marked with product name, specification, purity, applicable standard, production date, shelf life, storage conditions.

### 2. Transportation

Transport at ambient temperature; avoid direct sunlight, rain, heavy pressure. Do not transport with toxic, harmful or odorous substances.

### 3. Storage

- Solid products: Cool, dry, ventilated area; temperature ≤25℃, relative humidity ≤65%; shelf life 24 months.
- Liquid products: Cool, dark area; temperature ≤20℃; shelf life 12 months.
- Keep sealed after opening and use as soon as possible to prevent moisture absorption and contamination.

## VI. Inspection Rules

1. Products shall be inspected batch by batch and released only upon passing.
2. Inspection items: Organoleptic, physicochemical, microbiological; conducted in accordance with GB/T 23528.2-2021 and GB 1903.40-2022.
3. Sampling method: In accordance with GB/T 6678; retained samples stored for 3 months after shelf life expiry.

## VII. Safety & Compliance Statement

1. This product complies with Chinese national food safety standards and relevant regulatory requirements.
2. When used as food raw material/ingredient/nutrition fortifier, strictly follow the limits specified in GB 2760, GB 14880, etc.
3. Allergy notice: No known allergens. Special populations (e.g., patients with intestinal diseases) are advised to use under medical supervision.

# Fructo-Oligosaccharide (FOS) Nutrition Facts Table

## I. Nutrition Facts (per 100 g, dry basis)

| Item | Content (per 100 g) | NRV% |
|---|---|---|
| Energy | 1.5~2.0 kcal/g (150~200 kcal/100g) | 7~10% |
| Protein | ≤0.1 g | ≤0.2% |
| Fat | ≤0.1 g | ≤0.2% |
| Total carbohydrates | ≤99.0 g | 33% |
| — Available carbohydrates (sugars) | ≤5.0 g | 2.5% |
| — Dietary fiber (water-soluble, as FOS) | ≥93.2~95.0 g (by purity grade) | ≥373~380% |
| Sodium | ≤1 mg | ≤0.1% |
| Moisture | ≤3.0~8.0 g (by purity grade) | — |

**Core References**

JECFA, FCC, GB 28050-2025, GB/T 23528.2-2021, GB 1903.40-2022

**Notes**

- Energy: Internationally recognized as 1.5~2.0 kcal/g, low-calorie property in line with JECFA and EFSA standards.
- Dietary fiber: FOS is recognized globally as water-soluble dietary fiber (CAC/CODEX, FDA, EFSA, National Health Commission of China).
- GI value: GI ≈ 10 (very low glycemic); does not elevate blood glucose, suitable for sugar-controlled and diabetic populations.
- Purity note: Premium grade (≥95.0 g), first grade (≥93.2 g); dietary fiber content graded accordingly.

## II. Labeling Instructions

**1. Product Name**

- Chinese: 低聚果糖（水溶性膳食纤维）
- English: Fructo-oligosaccharide (FOS, Soluble Dietary Fiber)

**2. Nutritional Claims**

- Low Calorie
- High in Dietary Fiber
- Soluble Dietary Fiber
- Low Glycemic Index
- Low Sodium
- Allergen Free
- Non-GMO

**3. Compliant Functional Claims**

- Dietary fiber helps maintain normal intestinal function.
- Low glycemic property, suitable for sugar-controlled populations.
- Low calorie and high fiber, supportive of weight management.
- Prebiotic effect that selectively promotes the growth of beneficial intestinal bacteria (internationally compliant; for Chinese labeling, avoid “health function” statements and prioritize dietary fiber-related claims).

**4. Compliance Statement**

✅ Applicable Standards

- International: CAC/GSFA, JECFA, FCC
- Chinese: GB/T 23528.2-2021, GB 1903.40-2022, GB 2760, GB 28050

✅ Production Practices: Compliant with cGMP, ISO 9001, HACCP

✅ Safety Statement: Non-GMO, allergen-free, non-irradiated, no solvent residues, heavy metals meet national standards, free of preservatives, colorants and flavors