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Technical Data Sheet (TDS)

- Fumaric Acid (Food Grade)
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1. Product Overview

- **Product Name**: Fumaric Acid (Food Grade)
- **CAS Number**: 110-17-8
- **EINECS/EC Number**: 203-743-0
- **Chemical Formula**: $C_4H_4O_4$
- **Molecular Weight**: 116.07 Da
- **Chemical Name**: trans-Butenedioic acid
- **Product Characteristics**: High-purity food-grade fumaric acid (≥99.5%) produced by catalytic oxidation of maleic anhydride and subsequent purification/crystallization. White free-flowing crystalline powder, odorless with a clean, mild sour taste; low water solubility (increases with temperature), low hygroscopicity, highly stable under food processing conditions. As a high-efficiency food additive, it acts as **acidulant, flavor enhancer, preservative and gelling agent aid**; provides a clean sour taste with no bitter aftertaste, inhibits spoilage microbial growth, stabilizes food pH, and improves the gelling strength of pectin/carrageenan. Natural component of fruits and mushrooms, metabolized to malic acid in the human body; compliant with GB 2760/FDA/EC/CAC/FCC/USP standards, suitable for various food production and processing.
- **Core Application**: Food additive (acidulant/flavor enhancer/preservative) for beverage, bakery, confectionery, dairy, canned food, jam, jelly and processed food industries; gelling aid for fruit jellies and desserts.

2. Technical Specifications (Compliant with GB 2760 & FCC/USP)

Item	Standard Requirement
Appearance	White crystalline powder, free-flowing, no caking
Odor/Taste	Odorless, clean sour taste, no off-taste
Assay (Fumaric Acid)	≥ 99.5%
Loss on Drying	≤ 0.5%
Residue on Ignition	≤ 0.1%
Maleic Acid	≤ 0.1%
Sulfate (SO_4^{2-})	≤ 0.005%
Chloride (Cl^-)	≤ 0.002%
Heavy Metals (as Pb)	≤ 1 ppm
Arsenic (As)	≤ 0.5 ppm
Cadmium (Cd)	≤ 0.05 ppm
Mercury (Hg)	≤ 0.01 ppm
Iron (Fe)	≤ 0.001%
Total Bacterial Count	≤ 100 CFU/g
E. coli	Negative
Salmonella	Negative in 25g
Water Solubility (25℃)	≥ 0.6 g/100mL
pH Value (1% aqueous suspension)	2.0-2.5
Hygroscopy	Low
Temperature Stability	Stable at 0-121℃ (food processing temperature)
Storage Stability	36 months unopened (≤25℃, RH ≤60%, sealed)

3. Product Advantages

1. **Clean Sour Taste**: Mild, clean sour flavor with no bitter/astringent aftertaste; enhances food sour taste without altering the original flavor profile, superior to citric acid in flavor purity for confectionery and beverage.

2. **High Acid Strength**: Higher acid dissociation constant than citric acid/malic acid; small dosage achieves the same acidulation effect, reduces production cost (30-40% less dosage than citric acid for equivalent sourness).
3. **Excellent Preservative Effect**: Inhibits the growth of spoilage bacteria (E. coli, mold) and yeasts at pH 3.0-4.5; synergizes with potassium sorbate/sodium benzoate to double preservation effect, extends food shelf life by 20-30%.

4. Application Fields & Recommended Dosage

(Adjust dosage according to food type, sour taste requirement, preservation need and gelling effect; all dosages are **w/w** based on food raw materials, comply with national/international dosage limits.)

Application Field	Typical Products	Recommended Dosage	Core Effect
Beverage	Carbonated drink, fruit	0.05-0.3%	Clean acidulation, flavor
Confectionery	Hard candy, soft candy,	0.1-0.8%	Sour taste adjustment, flavor
Bakery	Bread, cake, biscuit, pastry,	0.03-0.2%	Dough acidification, improve
Dairy Products	Yogurt, sour milk, cheese,	0.05-0.4%	Sour taste enhancement, pH
Jam & Jelly	Fruit jam, fruit jelly,	0.1-0.6%	Acidulation, gelling agent
Canned Food	Fruit/vegetable cans, meat	0.08-0.5%	Preservation, pH adjustment,
Snack Food	Potato chips, flavored nuts,	0.05-0.4%	Sour taste adjustment, flavor
Sauces &	Salad dressing, ketchup,	0.08-0.5%	Acidulation, flavor balance,

5. Usage Methods & Formulation Guidelines

Key Tip: Fumaric acid has low water solubility at room temperature; dissolve in **hot food-grade deionized water (≥80℃)** for liquid food systems to ensure full dissolution.

1. **Hot Dissolution Method**: For liquid food systems (beverage, sauce, jam), add fumaric acid to hot water (80-90℃) with continuous stirring (5-10% stock solution); cool the stock solution to room temperature before adding to food and mixing evenly (no precipitation).
2. **Dry Mixing Method**: For solid food systems (confectionery powder, baking flour, snack seasoning), premix fumaric acid with other dry food ingredients (sugar, starch, salt) at a ratio of 1:10-1:20; mix thoroughly to ensure uniform dispersion (avoids local high concentration).

6. Packaging, Storage & Transportation

- Small Packaging: 1 kg/5 kg food-grade aluminum foil bags (heat-sealed, moisture-proof; for small food factories/laboratory use)
- Standard Packaging: 25 kg food-grade HDPE plastic drums (inner PE bag, sealed cover; for industrial batch production)
- Bulk Packaging: 500 kg/1000 kg food-grade jumbo bags (moisture-proof film, sealed; for large food factories/bulk purchase)
- **Labeling**: All packages are labeled with product name, CAS number, purity, dosage limits and storage instructions.

7. Quality Assurance & Technical Support

1. **Production Standards**: Manufactured in a GMP/HACCP-compliant food-grade production workshop; catalytic oxidation, purification and crystallization processes meet ISO 9001 (Quality Management) and ISO 22000 (Food Safety) standards; no harmful byproducts, maleic acid content ≤0.1%.
2. **Batch Testing**: Every batch of fumaric acid is subject to **strict multi-index testing** (physical, chemical, microbiological, purity, maleic acid, heavy metals); a detailed Certificate of Analysis (COA) is provided with each shipment to ensure compliance with GB 2760/FCC/USP/EC standards.
3. **Third-Party Validation**: Accepts testing by international authoritative food inspection laboratories (SGS, Intertek, BV); test reports (compliance with FDA/EC/CAC food standards) are available upon customer request; all indicators meet FCC/USP pharmaceutical grade standards.