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Technical Data Sheet (TDS)

Issue Date: 27 FEB 2026**Product Name:** DL-malic Acid (Food Grade, Anhydrous)**CAS Number:** 617-48-1

1. Product Overview

- **English Name**: DL-malic Acid (Food Grade, Anhydrous)
- **Chinese Name**: DL - 苹果酸（无水食品级）
- **CAS No.**: 617-48-1
- **Molecular Formula**: $C_4H_6O_5$
- **Molecular Weight**: 134.09 g/mol
- **Source**: Synthesized by food-grade chemical synthesis (maleic anhydride hydration + isomerization) or natural extraction (fruit juice concentrate), followed by high-purity crystallization and refinement; complies with food GMP and food acidulant production requirements.
- **Core Characteristics**: White crystalline powder/crystal, odorless, mild apple-like sour taste (slower sour release, longer aftertaste than citric acid); natural fruit acid (abundant in apples, grapes); multi-functional food additive (acidulant, flavor enhancer, preservative synergist, pH regulator); freely soluble in water, stable in acidic/neutral systems; non-toxic at standard dosages, fully biodegradable; meets national/international food safety standards, widely used as a "mild acidulant" in food industry for improving flavor layering.

2. Technical Specifications (Complies with GB 2760-2021 & International Food Acidulant Standards)

Test Item	Food Grade Specification
Appearance	White to off-white free-flowing crystalline powder/crystal
Assay (DL-malic Acid)	≥ 99.0%
Melting Point	128-132℃
pH Value (25℃, 1% aqueous solution)	2.2-2.6
Loss on Drying (105℃, 2h)	≤ 0.5%
Ash Content	≤ 0.1%
Optical Rotation	±0.5°
Heavy Metals (Pb)	≤ 1 ppm
Arsenic (As)	≤ 0.5 ppm
Cadmium (Cd)	≤ 0.1 ppm
Mercury (Hg)	≤ 0.01 ppm
Residue on Ignition	≤ 0.1%
Total Bacterial Count	≤ 100 CFU/g
Yeast & Mold	≤ 10 CFU/g
E. coli / Salmonella	Negative
Water Solubility	Freely soluble in water (≈550 g/L at 25℃), soluble in ethanol
Temperature Stability	Stable at 0-121℃ (assay retention ≥99%)
pH Stability	Stable & effective at pH 2.0-7.0 (slight decomposition at pH >8.0)
Hygroscopy	Slightly hygroscopic

3. Core Product Advantages

1. **Natural Mild Sour Taste**: Abundant in natural fruits, mild apple-like sour taste with slower release and longer aftertaste than citric acid; no bitter aftertaste; improves food flavor layering and mouthfeel, suitable for beverages, candies and fruit products that require mild sourness.
2. **High Safety & Biodegradability**: FAO/WHO ADI 0-20 mg/kg body weight; FDA GRAS certified; naturally metabolized to CO_2 and water in human body with no residual; fully biodegradable in natural environment, no environmental pollution; safe for infants, pregnant women and the elderly.

3. **Multi-Functional Efficacy**: Integrates **acidulant, flavor enhancer, preservative synergist and pH regulator**; one product meets multiple food processing needs; synergizes with sorbic acid/potassium sorbate/citric acid to enhance preservation efficacy and flavor coordination.
4. **Excellent Solubility & Stability**: Freely soluble in water (550 g/L at 25℃), dissolves faster than citric acid in low-temperature water; extremely stable in acidic/neutral food systems (pH 2.0-7.0); no decomposition in high-temperature sterilization (121℃), baking and low-temperature freezing.
5. **Good Compatibility**: Compatible with all common food additives (citric acid, sorbic acid, sodium citrate, sweeteners, emulsifiers); no incompatibility or flavor conflict; can be used as a substitute or mixture with citric acid to adjust sour taste characteristics.
6. **High Purity & Low Impurity**: Assay ≥99.0%, ultra-low heavy metal/ash/volatile impurity content; meets infant food raw material limits; batch-to-batch quality stability, no color change or efficacy loss in long-term storage.

4. Wide Application Fields

DL-malic Acid is a high-quality mild fruit acidulant, suitable for beverage, bakery, confectionery, dairy, fruit products, seasoning and health food production, especially for foods that require mild sourness and rich flavor layering:

- **Beverage Industry**: Fruit juice, carbonated drink, sports drink, fruit wine, apple cider vinegar, milk beverage; mild acidulant/flavor enhancer, improves sour taste layering, no bitter aftertaste, synergizes with preservatives to extend shelf life.
- **Confectionery Industry**: Candy, jelly, jam, fruit preserve, chocolate, chewing gum; mild sour taste, enhances fruit flavor, balances sweet taste, prevents sugar crystallization, improves product mouthfeel.
- **Bakery Industry**: Bread, cake, pastry, moon cake, biscuit; pH regulator/flavor enhancer, adjusts dough pH, improves fermentation stability, enhances fruit filling flavor, extends product shelf life.
- **Dairy Industry**: Yogurt, cheese, sour milk, ice cream; mild acidulant, adjusts fermentation pH, enhances yogurt fruit flavor, no excessive acid stimulation, improves product smoothness.

5. Usage Methods & Recommended Dosage

Food Type	Recommended Addition Dosage	Optimal pH Range
Fruit Juice/Carbonated Drink/Sports Drink	0.1-0.8%	2.5-4.5
Candy/Jelly/Jam/Fruit Preserve	0.2-1.0%	2.5-5.0
Yogurt/Ice Cream/Cheese/Dairy Drink	0.05-0.5%	3.0-5.5
Bread/Cake/Pastry/Fruit Filling	0.05-0.4%	3.5-6.5
Canned Fruit/Fruit Puree/Dried Fruit	0.1-0.6%	2.5-5.0
Soy Sauce/Salad Dressing/Condiment Sauce	0.08-0.6%	3.0-6.0
Health Food/Infant Fruit Puree	0.02-0.3%	3.5-6.0

6. Packaging, Storage & Transportation

- **Small Batch**: 1kg/5kg/10kg – Food-grade aluminum foil bags (sealed, moisture-proof, oxygen-free) for small-scale production, infant food and laboratory use.
- **Standard Batch**: 25kg – Food-grade HDPE plastic drums with inner aluminum foil liner (sealed, dust-proof, moisture-proof) for medium/large-scale food production.
- **Bulk Batch**: 500kg/1000kg – Food-grade FIBC bulk bags with moisture-proof PE liner (sealed valve) for large-scale industrial production and export.
- **Custom Packaging**: 500g/2kg food-grade customized packaging available upon request (for baby food and small-batch health food production).

7. Safety & Quality Assurance

- The product is food-grade, low-toxic at standard dosages; mild skin/eye irritation in high-concentration contact; wear food-grade nitrile gloves, safety goggles, FFP1 dust mask and non-slip safety shoes for bulk handling operations.
- Follow food hygiene operation standards: wash hands with neutralizing hand soap after handling; use dedicated stainless steel/plastic equipment/containers; avoid cross-contamination with other food raw materials; infant food production uses sterile dedicated equipment.