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Technical Data Sheet (TDS)

Calcium Citrate (Food Grade, Powder)

1. Product Overview

- Product Name: Calcium Citrate
- English Name: Calcium Citrate
- CAS Number: 5785-44-4
- Formula: $C_{12}H_{10}$ Ca_3O_{14}
- Molecular Weight: 498.43 g/mol
- **Product Characteristics**: Food-grade Calcium Citrate is an odorless white free-flowing organic calcium salt powder with high purity (≥98.0%) and high calcium bioavailability (21.2% calcium content). It is a multifunctional food additive with the functions of calcium nutritional fortification, anticaking, texture modification and mild sequestering. Slightly soluble in water, stable in most food systems, non-toxic and safe, compliant with GB 2760-2021, FDA, FAO/WHO and EU food safety standards. It is widely used in the global food, pharmaceutical and feed industries, especially suitable for calcium fortification of infant food, functional food and dairy products due to its gentle absorption and low irritation to the stomach.

2. Technical Specifications (Complies with GB 1886.235-2016 / FCC / FAO/WHO)

Item	Specification (Food Grade, Powder)
Appearance	White to off-white free-flowing powder, no caking
Assay ($C_{12}H_{10}$ Ca_3O_{14})	≥ 98.0%
Calcium (Ca) Content	20.5-21.5%
pH Value (25℃, 1% suspension)	6.0-7.5
Heavy Metals (Pb)	≤ 0.5 ppm
Arsenic (As)	≤ 0.1 ppm
Fluoride (F)	≤ 10 ppm
Loss on Drying (105℃, 2h)	≤ 0.5%
Residue on Ignition	30.0-32.0%
Insoluble Matter in Water	≤ 0.1%
Total Bacterial Count	≤ 100 CFU/g
E. coli	Negative
Salmonella	Negative
Particle Size	80-200 mesh (uniform fine powder)
Bulk Density	0.7-1.1 g/cm³
Water Solubility	Slightly soluble (≈0.09 g/100 mL at 25℃)
Acid Solubility	Soluble in dilute acids (lactic/citric/acetic acid)
Temperature Stability	Stable at 0-121℃ (all food processing conditions)
pH Stability	Stable at pH 5.0-8.0 (calcium stability ≥95%)

3. Product Advantages

1. **High Calcium Bioavailability**: Organic calcium salt with gentle absorption in the human body, low irritation to the gastric mucosa, suitable for all age groups including infants, the elderly and people with weak stomach.
2. **Multifunctional Performance**: Integrates calcium nutritional fortification, anticaking, texture modification and mild sequestering functions; one product for multiple uses, reducing the use of other food additives.
3. **Excellent Safety**: FAO/WHO ADI not specified, no intake limitation; FDA/CFDA GRAS certified, can be used in infant food (0-36 months) with specified limits.
4. **High Stability**: Stable in all food processing conditions (pasteurization, boiling, freezing, high-temperature sterilization); no decomposition, no loss of calcium content, compatible with neutral/weak acid/weak base food systems.

5. **Good Anticaking Effect**: Improves fluidity of powder food (milk powder, cereal powder), prevents caking and agglomeration, extends food shelf life.
6. **Mild Sequestering Property**: Forms stable complexes with minor metal ions (Fe^{3+} , Cu^{2+}), inhibits metal ion-catalyzed food oxidation and discoloration, improves food stability.
7. **Environmentally Friendly**: Biodegradable, no bioaccumulation, no environmental pollution; expired powder can be used as feed additive or soil calcium supplement.

4. Application Fields

Food-grade Calcium Citrate is a high-quality calcium nutritional fortifier and multifunctional food additive (specified dosage limit for infant food in GB 2760-2021), suitable for **various food and beverage processing**; also used in pharmaceuticals and feed:

- **Infant Food Industry**: Infant formula milk powder, rice flour, cereal paste, baby snacks; calcium nutritional fortifier (complies with specified dosage limits), gentle absorption, suitable for infant calcium supplement.
- **Dairy Industry**: Milk powder, yogurt, cheese, condensed milk, dairy beverage; calcium fortifier, anticaking agent, texture modifier; supplements calcium, prevents milk powder caking, improves dairy texture.
- **Beverage Industry**: Plant beverage, protein beverage, sports beverage, fruit juice beverage; calcium nutritional fortifier, stabilizer; supplements calcium, improves beverage system stability (used with solubilizer for clear beverage).

5. Usage Methods

Food Type	Recommended Dosage	Main Function
Infant Formula Milk Powder/Rice Flour	0.2-0.8% (specified limit)	Calcium nutritional fortifier
Milk Powder/Cereal Powder	0.5-2.0%	Calcium fortifier, anticaking agent
Yogurt/Cheese/Dairy Beverage	0.3-1.0%	Calcium fortifier, texture modifier
Plant/Protein/Sports Beverage	0.1-0.5% (with solubilizer)	Calcium fortifier, stabilizer
Bread/Cake/Biscuit	0.2-0.8%	Calcium fortifier, anticaking agent
Calcium Supplement Functional Food	5.0-20.0%	High-bioavailability calcium source
Candy/Chocolate/Snacks	0.5-3.0%	Calcium fortifier, texture modifier

6. Packaging & Storage

- **Small Batch**: 500 g/1 kg/5 kg food-grade HDPE plastic drums (small-scale food processing/retail/pharmaceutical use)
- **Standard Batch**: 10 kg/25 kg food-grade paper composite bags with plastic inner lining (medium-scale food production/feed use)
- **Bulk Batch**: 50 kg/100 kg food-grade HDPE plastic drums/ton bags (large-scale food production/export)
- **Custom Packaging**: Available upon request (according to customer's processing, dosage and application requirements)

7. Safety & Protection

- The product is non-toxic and mild eye/respiratory irritant; wear nitrile rubber gloves and chemical protective goggles during handling to avoid dust entering eyes and direct contact with large amounts of powder.
- Wear FFP1/FFP2 respirator during bulk handling/powder mixing to prevent inhalation of dust and mild respiratory irritation; wear a face shield for large-scale dust generation operations.
- In case of eye contact: Rinse with plenty of running water for 5-10 minutes; consult a doctor if irritation, redness or blurred vision persists.
- In case of skin contact: Rinse with water and mild neutral soap for 5 minutes if prolonged contact occurs; apply moisturizer if skin dryness occurs.