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Technical Data Sheet (TDS)

- Magnesium Citrate Food Grade
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1. Product Overview

- **Product Name**: Magnesium Citrate - Food Grade (Tetrahydrate)
- **CAS Number**: 7779-25-1
- **EINECS/EC Number**: 231-900-3
- **Chemical Formula**: $C_6H_6Mg_3O_{14}·4H_2O$
- **Molecular Weight**: 451.11 g/mol
- **Product Characteristics**: High-purity food-grade magnesium citrate is a white crystalline powder with weak acidity, slight hygroscopy and high water solubility, odorless and slightly salty in taste. As a **multi-functional food additive and essential mineral fortifier**, it has six core functions in food production: (1) Mineral Fortifier: Supplements magnesium (an essential human mineral) with high bioavailability; (2) Acidity Regulator: Adjusts and stabilizes food system pH (weakly acidic to neutral); (3) Sequestrant: Chelates metal ions (Ca^{2+} , Fe^{3+} , Cu^{2+}), prevents food discoloration, oxidation and turbidity; (4) Buffering Agent: Maintains food pH stability during processing and storage; (5) Anticaking Agent: Improves flowability of powder food, prevents caking; (6) Emulsifier Auxiliary: Promotes oil-water emulsification in dairy/meat products. FDA GRAS/EU E345 certified; compliant with GB 1886.242-2021/GB 2760-2021 standards, high solubility and bioavailability, widely used in beverage, dairy, nutritional supplement and bakery food industries with excellent process adaptability and safety.

2. Technical Specifications (Compliant with GB 1886.242-2021 & FCC/USP)

Item	Standard Requirement (Food Grade)
Appearance	White crystalline powder, free-flowing, no caking
Odor/Taste	Odorless, slightly salty, no off-taste
Assay ($C_6H_6Mg_3O_{14}·4H_2O$, dry basis)	≥98.0%
Loss on Drying (105℃, 4h)	15.0~19.0%
pH Value (1% aqueous solution, 25℃)	5.5~7.0
Chloride (as Cl^-)	≤0.01%
Sulfate (as SO_4^{2-})	≤0.01%
Heavy Metals (as Pb)	≤1 ppm
Arsenic (As)	≤0.5 ppm
Calcium (Ca)	≤0.05%
Iron (Fe)	≤5 ppm
Insoluble Matter in Water	≤0.01%
Water Solubility (25℃)	≥10.0 g/100mL
Total Bacterial Count	≤100 CFU/g
Yeast & Mold	≤10 CFU/g
E. coli	Negative
Salmonella	Negative in 25g
Temperature Stability	Stable at 0-100℃ (food processing temp); decomposes >150℃
pH Stability	Stable at pH 4.0-8.0 (100% efficacy retention)
Sequestrant Capacity	Chelates Ca^{2+} /Fe^{3+} (≥0.2 g/g at 25℃)
Magnesium Content (as Mg)	11.5~13.0% (dry basis)
Storage Stability	24 months (unopened), 6 months after opening

3. Product Advantages

1. **High Bioavailability Magnesium Fortifier**: Magnesium citrate is an organic magnesium salt with far higher bioavailability than inorganic magnesium salts (e.g., magnesium oxide); easily absorbed by the human body, suitable for food and nutritional supplement fortification.

2. **Multi-Functional**: Integrates magnesium fortification, acidity regulation, sequestration, buffering, anticaking and emulsification auxiliary functions; one additive meets multiple food processing needs, reducing production cost and ingredient types.

4. Application Fields & Recommended Dosage

Comply with **GB 2760-2021** and **GB 14880 (Mineral Fortifier Standard)** (China), EC 1333/2008 (EU) and FDA 21 CFR 182.5446 (US) standards; adjust dosage according to food type, processing technology and magnesium fortification requirements (all dosages are **w/w** based on food raw materials; GMP use for EU/US).

Application Field	Typical Products	Recommended Dosage	Core Effect
Beverage	Mineral water, fruit juice, sports drink, plant beverage	0.05-0.5%	Magnesium fortification, sequestration, pH buffering
Dairy Products	Milk, yogurt, cheese, milk powder, ice cream	0.1-0.8%	Magnesium fortification, emulsification auxiliary, sequestration
Nutritional Supplement	Magnesium tablets, oral liquid, protein powder, cereal	0.5-2.0%	High-bioavailability magnesium fortification
Bakery & Pastry	Bread, cake, biscuit, nutritional bread	0.05-0.3%	Magnesium fortification, anticaking, dough improvement
Confectionery	Candy, chocolate, chewing gum	0.05-0.2%	Magnesium fortification, sequestration (prevents discoloration)
Canned Food	Canned fruit/vegetable/meat/fish, bean products	0.1-0.4%	Sequestration, pH buffering, corrosion inhibition (can)
Infant Food	Infant formula milk powder, complementary food	0.03-0.1%	Low-dose magnesium fortification (complies with GB 10765/76)
Powder Food	Seasoning, nutritional powder, solid beverage	0.1-0.5%	Magnesium fortification, anticaking, flowability improvement

5. Usage Methods & Formulation Guidelines

Key Tip: Can be used as solid powder or aqueous solution; high solubility, suitable for all food types; for magnesium fortification, strictly follow GB 14880 dosage limits; sequestration effect is optimal at pH 5.0-7.0; avoid contact with strong alkalis at high temperature.

1. **Aqueous Solution Preparation**: Weigh the required amount of magnesium citrate, dissolve in **food-grade deionized water** to prepare a 5-10% aqueous solution (1:9-1:19 powder:water); stir until completely dissolved (no undissolved particles). Suitable for liquid food (beverage, dairy, oral liquid) and semi-solid food (yogurt, jam).

6. Packaging, Storage & Transportation

- **Small Packaging**: 1 kg/5 kg food-grade sealed HDPE plastic bags (inner PE liner, for small food factories and nutritional supplement production)
- **Standard Packaging**: 25 kg food-grade HDPE plastic drums (sealed, dust-proof, moisture-proof; for industrial batch production)
- **Bulk Packaging**: 500 kg/1000 kg food-grade jumbo bags (inner PE liner, sealed; for large-scale food production)

7. Safety Operation & Protection

1. **Operation Personnel**: Ordinary operators can operate after simple training (familiar with dosage limits and irritation protection); conduct regular occupational health examinations (at least once a year, focus on skin, eyes and respiratory system).
2. **Personal Protection**: Wear **basic PPE** during all operations: N95/P95 dust mask (dry operation), safety goggles (prevent dust/solution splashing) and nitrile rubber gloves (avoid skin contact); wear dust-proof overalls for large-scale operation.