

Technical Data Sheet (TDS)

- L-Cysteine Free-Base L - 半胱氨酸游离碱

Revision Date: 26 FEB 2026

1. Product Overview

- **Product Name:** L-Cysteine Free-Base (L - 半胱氨酸游离碱)
- **English Name:** L-Cysteine Free Base; (R)-2-Amino-3-mercaptopropanoic acid
- **CAS Number:** 52-90-4
- **Molecular Formula:** C₃H₇ NO₂S
- **Molecular Weight:** 121.16 g/mol
- **Form:** White crystalline powder, slight characteristic odor
- **Grade:** Food Grade / Cosmetic Grade / Pharmaceutical Grade / Feed Grade

L-Cysteine Free-Base is a natural sulfur-containing essential amino acid with high biological activity, prepared by enzymatic synthesis and high-purity purification. It is a key raw material for synthesizing human keratin, collagen and glutathione, with antioxidant, anti-aging and nutritional supplement effects. The product has excellent water solubility, high purity, stable physical and chemical properties, and complies with EU REACH, US FDA, Chinese National Standards and Pharmacopoeia requirements. It is widely used in food, cosmetics, pharmaceuticals, feed and other fields, non-toxic, non-irritating and safe for normal use.

2. Technical Specifications (Complies with Food/Cosmetic/Pharm/Feed Standard)

Item	Specification
Appearance	White crystalline powder, no caking, slight characteristic odor
Assay (L-Cysteine Free-Base)	≥ 98.0%
Specific Rotation [α] ₂₀ ^D	+8.0 ~ +12.0°
pH Value (5% aqueous solution, 25°C)	5.0 ~ 7.0
Loss on Drying (105°C, 2h)	≤ 0.5%
Residue on Ignition	≤ 0.1%
Heavy Metals (Pb)	≤ 5 ppm
Heavy Metals (As)	≤ 1 ppm
Total Bacterial Count	≤ 100 CFU/g
E. coli	Negative
Water Solubility (25°C)	Fully soluble (≥25 g/100 mL)
Clarity of Solution (5% H ₂ O)	Clear, no turbidity
Bulk Density (25°C)	0.5 ~ 0.7 g/cm ³
Temperature Stability	Stable at 0 ~ 40°C (purity retention ≥ 98%)
Storage Stability (25°C)	24 months unopened, no degradation

3. Product Advantages

1. **High Purity & Bioactivity:** Assay ≥98%, no inert impurities, high bioavailability, can be quickly absorbed and utilized by human/animal body and skin.
2. **Excellent Water Solubility:** Fully soluble in water at room temperature, easy to formulate and add, suitable for all water-based systems.
3. **Multi-functional Efficacy:** Antioxidant, scavenges free radicals; promotes collagen/keratin synthesis; nutritional supplement for sulfur-containing amino acid; improves product stability as a food antioxidant.
4. **Multi-grade Available:** Customizable food/cosmetic/pharmaceutical/feed grade, meeting different industry quality requirements.
5. **Natural & Safe:** Complies with international safety standards, low heavy metal content, no microbial contamination, non-toxic, non-irritating, no allergic risk for normal use.



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6. **Stable Performance:** No caking under normal storage conditions, no easy oxidation (sealed), long shelf life, easy to store and transport.

4. Application Fields

- **Food Industry:** Nutritional fortifier for beverages, dairy products, baked goods and health food; antioxidant for meat products, fruit juice and canned food; dough improver for flour products.
- **Cosmetic Industry:** Skin care products (serums, creams, facial masks) - anti-aging, moisturizing, repair skin barrier; hair care products (shampoos, conditioners) - repair damaged hair, improve hair toughness and luster.
- **Pharmaceutical Industry:** Raw material for amino acid infusion, oral nutritional supplements; raw material for glutathione synthesis; adjuvant for respiratory medicine.
- **Feed Industry:** Nutritional additive for poultry, livestock and aquatic feed; improves animal growth performance, enhances immunity and reduces stress response.
- **Other Fields:** Biochemical reagent for scientific research; raw material for cosmetic raw material synthesis (e.g., N-acetyl-L-cysteine).

5. Usage Methods

Recommended Dosage (Adjust according to grade and application scenario)

- **Food Industry:** 0.05 ~ 0.5% of total formulation (beverages/dairy products); 0.1 ~ 1.0% (meat products/antioxidant); 0.2 ~ 0.8% (flour products).
- **Cosmetic Industry:** 0.5 ~ 3.0% of total formulation (skin care products); 0.3 ~ 2.0% (hair care products).
- **Pharmaceutical Industry:** Follow pharmacopoeia and formulation requirements (0.5 ~ 5.0% for oral preparations).
- **Feed Industry:** 0.01 ~ 0.05% of total feed weight (poultry/livestock); 0.02 ~ 0.08% (aquatic products).

Key Application Tips

1. **Dissolution & Addition:** Dissolve the powder in deionized water (5% ~ 10% concentration) at room temperature (20~30°C), stir evenly until fully dissolved, then add to the formulation system; can also be added directly to low-viscosity water-based systems.
2. **Temperature Control:** Avoid heating above 60°C for a long time during formulation to prevent amino acid degradation and activity loss.
3. **Antioxidation Note:** The product contains sulfhydryl groups, easy to oxidize in air; prepare and use immediately after dissolution; add a small amount of antioxidant (e.g., vitamin C) if necessary for long-term storage of the formulation.
4. **pH Adaptation:** Stable in the pH range of 5.0 ~ 8.0; avoid strong acid (pH <3) or strong base (pH >9) environments to prevent denaturation.

6. Packaging & Storage

Packaging Specifications (Sealed Food/Cosmetic/Pharm Grade Packaging)

- 1 kg/5 kg sealed HDPE plastic bag (inner) + carton (outer) (laboratory/R&D/small-batch use)
- 25 kg sealed food/pharm grade PP woven bag (industrial/food/feed bulk use)
- 50 kg sealed HDPE plastic drum (cosmetic/pharmaceutical large-scale use)
- Custom packaging available according to customer requirements (e.g., 100g/500g small package for cosmetics).

7. Safety & Protection

1. The product is non-toxic, non-irritating, safe for human and animal contact; direct contact with skin has a nutritional and repair effect, no adverse reactions.
2. **Recommended PPE:** Nitrile rubber gloves and safety glasses for large-scale handling to avoid powder splashing into eyes and respiratory tract; a dust mask is optional for large-batch powder operation (to prevent mild respiratory discomfort in sensitive individuals).
3. **Accident Treatment:**
 - Skin Contact: No special treatment needed; rinse with water if powder adheres to the skin, and wipe dry with a clean cloth.
 - Eye Contact: Rinse eyes with plenty of clean running water for 5 ~ 10 minutes if powder splashes into eyes; consult an ophthalmologist only if mild irritation persists (rare).