

Technical Data Sheet (TDS)

- Clove Leaf Oil

Product Name: Clove Leaf Oil **English Name:** Clove Leaf Oil **CAS Number:** 8015-97-2 **MDL Number:** MFCD00147562 **Main Component:** Eugenol (C₁₀ H₁₂O₂, CAS 97-53-0, ≥85%) **Molecular Weight:** Variable (natural essential oil mixture) **Revision Date:** 18 FEB 2026

1. Product Overview

Clove Leaf Oil (CAS 8015-97-2) is a natural essential oil extracted from the leaves of *Syzygium aromaticum* (clove) by steam distillation, with eugenol as the core active component (≥85%). It features a strong, characteristic spicy aromatic clove scent, and has excellent antibacterial, antifungal, antioxidant and fragrance properties. This product is manufactured in accordance with international essential oil industrial standards, with high eugenol content, stable physical and chemical properties, and compliant with GB 2760, EU Cosmetics Regulation and IFRA standards. It is widely used in fragrance & flavor, cosmetics, food, pharmaceutical and industrial fields, with high application value and safety when used as directed.

Core Characteristics: High eugenol content (≥88.6%); natural plant-sourced; strong antibacterial/antifungal activity; characteristic clove aromatic scent; good solubility in organic solvents; compliant with food/cosmetic safety standards.

2. Technical Specifications (Complies with Industrial Standard)

| Item | Specification |
|--------------------------------|---|
| Appearance | Colorless to pale yellow clear mobile liquid |
| Eugenol Content | ≥ 85.0% (GC), typical 88.6% |
| Refractive Index (20°C) | 1.5280-1.5380 |
| Relative Density (20/20°C) | 1.038-1.060 |
| Optical Rotation (20°C) | -2.0° to +1.0° |
| Acid Value | ≤ 2.0 mg KOH/g |
| Water Content | ≤ 0.5% (Karl Fischer) |
| Heavy Metals (Pb) | ≤ 5 ppm |
| Heavy Metals (As) | ≤ 1 ppm |
| Solubility (70% Ethanol, 25°C) | 1:2 soluble |
| Solubility in Water | <0.5g/100mL (25°C) |
| Viscosity (25°C) | 15-25 mPa·s |
| Flash Point | ≥ 65°C (Closed Cup) |
| Odor | Strong pungent spicy aromatic clove scent (no off-odor) |
| Microbiological Index | Total bacterial count ≤ 100 CFU/mL, E. coli negative |

3. Product Advantages

- Natural & High Purity:** Steam-distilled from natural clove leaves, no artificial additives; eugenol content ≥85%, high active component ratio.
- Multi-Functional Properties:** Integrates fragrance, antibacterial, antifungal, antioxidant and deodorant effects, one material for multiple uses.
- Excellent Compatibility:** Soluble in most organic solvents (ethanol, propylene glycol, vegetable oil), compatible with fragrance, cosmetic and food raw materials, easy to compound.
- Safety & Compliance:** Compliant with food and cosmetic safety standards worldwide, safe for human use when diluted as directed.
- Stable Storage:** 24-month shelf life under specified conditions; nitrogen-filled packaging can further extend storage time without obvious quality degradation.
- Wide Application:** Covers fragrance, food, cosmetics, pharmaceuticals and industrial fields, with diverse application scenarios and high cost performance.

4. Application Fields

4.1 Fragrance & Flavor Industry

- Fragrance Formulation:** Perfume, eau de toilette, soap, candle, air freshener (formulation ratio 0.5-5.0%); spicy, woody and oriental fragrance systems core raw material.



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- **Food Flavor:** Bakery, candy, beverage, meat products, condiments (compliant with GB 2760, formulation ratio 0.001-0.05%); enhances spicy and aromatic flavor.

4.2 Cosmetic & Daily Chemical Industry

- **Cosmetic Formulation:** Skin care products, hair care products, mouthwash, hand sanitizer (diluted use, formulation ratio 0.1-2.0%); antibacterial, anti-inflammatory and fragrance effects.
- **Daily Chemicals:** Disinfectant, household cleaner, deodorant (formulation ratio 1.0-10.0%); natural antibacterial and deodorant raw material.

4.3 Pharmaceutical & Health Industry

- **Pharmaceutical Raw Material:** Antibacterial, anti-inflammatory and analgesic drugs; dental care products (toothpaste, mouthwash) core additive.
- **Health Products:** Natural antioxidant and antibacterial supplement (diluted use only).

4.4 Industrial Field

- **Industrial Antibacterial/Deodorant:** Textile, paper, plastic product antibacterial treatment; industrial wastewater and waste deodorant (formulation ratio 0.5-5.0%).
- **Feed Additive:** Livestock and poultry feed antibacterial and flavor modifier (compliant with feed additive standards, diluted use).

5. Usage Methods & Dosage

5.1 General Usage Principles

- **Dilution Required:** No undiluted direct skin/eye contact; dilute with solvent (ethanol/propylene glycol/vegetable oil) before use (dilution ratio 1:10 to 1:100 according to scenario).
- **Avoid High Temperature:** Heating temperature during processing $\leq 80^{\circ}\text{C}$ to avoid fragrance loss and active component degradation.
- **Sealed Use:** Prepare the formulated product on site; avoid long-term exposure to air to prevent oxidation.
- **Compatibility Test:** Conduct a small-scale compatibility test before large-scale use with other raw materials.

5.2 Recommended Dosage (Diluted Formulation Ratio)

| Industry | Application Scenario | Recommended Dosage |
|-----------------|---------------------------------------|---------------------------------|
| Fragrance | Perfume/soap/candle | 0.5-5.0% |
| Food Flavor | Bakery/meat/condiments | 0.001-0.05% (GB 2760 compliant) |
| Cosmetics | Skin care/hair care/mouthwash | 0.1-2.0% |
| Daily Chemicals | Disinfectant/household cleaner | 1.0-10.0% |
| Pharmaceuticals | Dental care products/topical ointment | 0.5-3.0% |
| Industry | Antibacterial treatment/deodorant | 0.5-5.0% |

5.3 Processing Notes

- Add at the final stage of formulation to reduce vapor loss and oxidation of the essential oil.
- For aqueous system formulation, first dissolve in ethanol/propylene glycol (1:1) then add to water and stir evenly.
- Avoid mixing with strong oxidizing agents, concentrated acids and alkalis to prevent product degradation.

6. Packaging & Storage

6.1 Packaging Specifications

- **Food/Cosmetic Grade:** 100mL/500mL/1L brown glass bottles (sealed with teflon stopper); 5L/10L light-proof HDPE plastic drums.
- **Industrial/Pharmaceutical Grade:** 25L/50L light-proof HDPE plastic drums; 200L iron drums with inner plastic lining (nitrogen-filled for bulk).
- **Sample Package:** 10mL/30mL brown glass vials (for formulation testing).
- **Custom Packaging:** Available upon customer request (small/bulk package, nitrogen-filled packaging).