

Safety Data Sheet (MSDS)

- Clove Leaf Oil

(According to GB/T 16483 and GB/T 17519; Adapts to GHS, IMDG, IATA Standards) **Product**

Name: Clove Leaf Oil **Revision Date:** 18 FEB 2026

SECTION 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Identifiers

- Product Name: Clove Leaf Oil
- Synonyms: Clove oil (leaf); Eugenia caryophyllata leaf oil; Natural clove leaf essential oil
- Product Number: CLO-20260218
- Brand: SIGALD
- CAS-No.: 8015-97-2
- MDL Number: MFCD00147562
- Main Component: Eugenol (CAS: 97-53-0, ≥85%)
- Molecular Weight: Variable (natural mixture)

1.2 Details of the supplier of the safety data sheet

- Company: NEWAY SINOPHC TECH. LIMITED
- Address: RM. 204, BUILDING 3, NO. 188, AONA RD., CHINA (SHANGHAI) PILOT FREE TRADE ZONE
- Telephone: +86-021-50350029
- Fax: +86-021-50350029

1.3 Emergency telephone

- Emergency Phone #: +86-021-50350029 (CHEMTREC)

1.4 Relevant Identified Uses and Uses Advised Against

- **Identified Uses:** Fragrance & flavor industry; cosmetic formulation; food additive; pharmaceutical raw material; disinfectant & antibacterial agent; industrial deodorant.
- **Uses Advised Against:** Direct undiluted skin contact; use in infant cosmetics (0-3 years old) without dilution; excessive oral consumption; use near open flame/high temperature without protection.

SECTION 2: Hazards Identification

2.1 GHS Classification

- Skin Irritation, Category 2 (H315)
- Eye Irritation, Category 2 (H319)
- Skin Sensitization, Category 1 (H317)
- Flammable Liquid, Category 4 (H227)
- Aquatic Acute Toxicity, Category 3 (H402)
- Aquatic Chronic Toxicity, Category 3 (H412)

2.2 GHS Label Elements

- **Hazard Pictograms:** (Exclamation mark)
- **Signal Word:** Warning
- **Hazard Statements:**
 - H227: Combustible liquid
 - H315: Causes skin irritation
 - H317: May cause an allergic skin reaction
 - H319: Causes serious eye irritation
 - H402: Harmful to aquatic life
 - H412: Harmful to aquatic life with long-term effects
- **Precautionary Statements:**
 - P210: Keep away from heat, sparks, open flames and hot surfaces

- P261: Avoid breathing vapors/spray
- P264: Wash hands thoroughly after handling
- P272: Contaminated work clothing should not be allowed out of the workplace
- P273: Avoid release to the environment
- P280: Wear protective gloves/eye protection/face protection
- P302+P352: If on skin: Wash with plenty of soap and water
- P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P333+P313: If skin irritation or rash occurs: Get medical advice/attention
- P362: Take off contaminated clothing and wash before reuse
- P370+P378: In case of fire: Use dry powder, CO₂ or foam for extinction
- P391: Collect spillage
- P501: Dispose of contents/container to an approved waste disposal plant

2.3 Physical and Chemical Hazards

Combustible liquid (flash point >60°C); no explosive hazard; may cause slight oxidation when exposed to air for a long time; no corrosive properties.

2.4 Health Hazards

- **Acute:** Causes skin and serious eye irritation; inhalation of high-concentration vapor may cause mild respiratory tract irritation; undiluted contact may cause skin redness and itching.
- **Chronic:** Repeated contact may cause skin sensitization in sensitive individuals; no known chronic target organ toxicity with normal diluted use.

2.5 Environmental Hazards

Harmful to aquatic organisms with acute and long-term effects; low bioaccumulation potential in aquatic food chains; no obvious harm to soil microorganisms at low concentration.

2.6 Other Hazards

No additional hazards identified.

SECTION 3: Composition/Information on Ingredients

- **Substance / Mixture:** Natural essential oil mixture (plant extract)
- **Main Active Component:** Eugenol (C₁₀ H₁₂O₂, CAS 97-53-0, 85.0-90.0%)
- **Other Minor Components:** Caryophyllene, eugenyl acetate, benzyl alcohol (natural trace amounts)

表格

Hazardous Ingredients	CAS No.	Concentration (w/w)	GHS Classification
Eugenol	97-53-0	85.0-90.0%	H315, H317, H319, H402, H412
Clove Leaf Oil (mixture)	8015-97-2	100%	H227, H315, H317, H319, H402, H412

SECTION 4: First Aid Measures

4.1 Description of First-Aid Measures

- **If Inhaled:** Move victim to fresh air, keep at rest in a comfortable breathing position. If cough/chest tightness persists, consult a doctor.
- **In Case of Skin Contact:** Immediately wash skin with plenty of soap and running water for 15 minutes; remove contaminated clothing and wash before reuse. Do not use alcohol to clean.
- **In Case of Eye Contact:** Rinse eyes thoroughly with plenty of running water for 15-20 minutes (hold eyelids open); remove contact lenses if present. Consult a doctor immediately if irritation persists.
- **If Swallowed:** Rinse mouth with water; do not induce vomiting. Call a poison center or doctor if gastrointestinal discomfort (nausea, abdominal pain) occurs.

4.2 Most Important Symptoms and Effects

- **Acute:** Skin redness, itching, burning; eye redness, pain, tearing; mild cough, throat irritation (vapor inhalation).
- **Delayed:** Skin allergic reaction (may occur 24-48 hours after contact in sensitized individuals).

4.3 Indication of Immediate Medical Attention

Seek medical attention for severe eye irritation, persistent skin allergic reaction, excessive oral ingestion or severe respiratory discomfort.

4.4 Notes to Physician

Treat symptomatically; inform the physician of the main component (eugenol) and CAS number; note the skin sensitization potential.

SECTION 5: Firefighting Measures

5.1 Extinguishing Media

- **Suitable:** Dry powder, carbon dioxide (CO₂), foam, water spray (cool containers only).
- **Unsuitable:** High-pressure water jet (may spread the fire).

5.2 Special Hazards Arising from the Substance

High-temperature combustion may produce carbon oxides (CO, CO₂) and slight aromatic fumes; no toxic combustion products. Vapor may form flammable mixtures with air at high temperature.

5.3 Advice for Firefighters

- Wear standard fire-fighting gear (helmet, fire suit, self-contained breathing apparatus) to avoid inhalation of combustion fumes and vapor.
- Cool containers with water spray if exposed to fire; fight fire from a safe distance; prevent fire water from entering water bodies.

SECTION 6: Accidental Release Measures

6.1 Personal Precautions

- Wear nitrile rubber gloves, chemical safety goggles, disposable face mask and protective clothing when cleaning up spills.
- Ensure good ventilation; keep away from heat, sparks and open flames; prohibit smoking in the spill area.

6.2 Environmental Precautions

- Prevent spilled liquid from entering drains, sewers, rivers or other water bodies; use absorbent materials to contain spillage and avoid environmental contamination.

6.3 Methods and Materials for Containment and Cleaning Up

- **Small Spill:** Absorb with inert materials (sand, diatomaceous earth, vermiculite), transfer to a sealed fire-resistant container for disposal; wipe the area with ethanol and water.
- **Large Spill:** Contain with dikes or sand barriers; pump into sealed HDPE drums for recycling or professional disposal; do not flush directly with water.

6.4 Reference to Other Sections

For disposal, see Section 13.

SECTION 7: Handling and Storage

7.1 Precautions for Safe Handling

- Operate in a well-ventilated area; avoid breathing vapor, undiluted skin and eye contact.
- Use diluted (1:10-1:100) for skin/cosmetic application; no undiluted use.
- Keep away from heat, sparks, open flames and hot surfaces; use explosion-proof electrical equipment if needed.
- Do not eat, drink or smoke during handling; wash hands thoroughly with soap and water after operation.

7.2 Conditions for Safe Storage



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- **Storage Conditions:** Store in a cool, dark, well-ventilated fire-resistant warehouse at 10-25°C; keep container tightly sealed to prevent vapor loss and oxidation; avoid direct sunlight and high temperature (>30°C).
- **Incompatibilities:** Strong oxidizing agents (hydrogen peroxide, potassium permanganate), concentrated acids, strong bases, iron/copper metal salts.
- **Storage Class (TRGS 510):** 3 (Flammable Liquids, Category 4)
- **Shelf Life:** 24 months (unopened, under specified storage conditions; fill with nitrogen for long-term storage).

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

- **Occupational Exposure Limit (OEL):** Eugenol - TWA: 5 ppm (25 mg/m³) (US ACGIH); Clove Leaf Oil - no unified OEL (follow eugenol standard).

8.2 Exposure Controls

- **Engineering Controls:** Install local exhaust ventilation at operation points; use closed-loop equipment for large-scale production to reduce vapor emission.
- **Personal Protective Equipment (PPE):**
 - Eye/Face Protection: Chemical safety goggles or face shield (prevent splashing and vapor irritation)
 - Skin Protection: Nitrile rubber gloves (thickness ≥0.11 mm), chemical-resistant protective clothing (avoid latex gloves)
 - Respiratory Protection: Organic vapor cartridge respirator for routine handling; self-contained breathing apparatus for high-concentration vapor exposure
 - Hand Protection: Nitrile rubber gloves (replace if damaged or contaminated)

8.3 Hygiene Measures

- Provide eye wash and emergency shower facilities in the workplace; change contaminated clothing immediately.
- Avoid touching eyes, mouth and nose with contaminated hands; do not reuse contaminated gloves and cleaning materials.

SECTION 9: Physical and Chemical Properties

1. Physical State: Clear mobile liquid
2. Color: Colorless to pale yellow
3. Odor: Strong, pungent spicy aromatic clove scent
4. Boiling Point: 250-260°C (main component eugenol)
5. Flash Point: 68°C (Closed Cup)
6. Autoignition Temperature: > 380°C
7. Refractive Index (20°C): 1.5280-1.5380
8. Relative Density (20/20°C): 1.038-1.060
9. Optical Rotation (20°C): -2.0° to +1.0°
10. Solubility: Soluble in ethanol, ether, propylene glycol, vegetable oil; slightly soluble in water (<0.5 g/100 mL at 25°C)
11. Vapor Pressure (25°C): < 0.001 hPa
12. Viscosity (25°C): 15-25 mPa·s
13. Acid Value: ≤ 2.0 mg KOH/g
14. Decomposition Temperature: > 200°C (slight thermal decomposition)
15. Evaporation Rate: Slow (slower than water)

SECTION 10: Stability and Reactivity

10.1 Chemical Stability

Stable under recommended storage conditions (10-25°C, sealed, dark); slight oxidation may occur when exposed to air/light for a long time (color darkens).

10.2 Possibility of Hazardous Reactions

No hazardous reactions under normal use conditions; no polymerization occurs.

10.3 Conditions to Avoid

High temperature (>30°C), direct sunlight, long-term exposure to air, contact with strong oxidizing agents/acids/alkalis, open flame.

10.4 Incompatible Materials

Concentrated sulfuric acid, nitric acid, hydrogen peroxide, potassium permanganate, concentrated sodium hydroxide, iron chloride, copper sulfate.

10.5 Hazardous Decomposition Products

Carbon monoxide (CO), carbon dioxide (CO₂) (high-temperature combustion); slight acidic oxides from oxidation (no toxic decomposition products).

SECTION 11: Toxicological Information

11.1 Information on Toxicological Effects

• Acute Toxicity:

- Oral (Rat, LD₅₀): 2600 mg/kg (clove leaf oil); 1500 mg/kg (eugenol)
- Dermal (Rabbit, LD₅₀): > 5000 mg/kg (clove leaf oil)
- Inhalation (Rat, LC₅₀): > 5000 mg/m³ (4-hour exposure, vapor)

- **Skin Corrosion/Irritation:** Category 2, causes mild skin irritation (Rabbit, 4-hour exposure)

- **Serious Eye Damage/Eye Irritation:** Category 2, causes serious eye irritation (Rabbit, 24-hour exposure)

- **Skin Sensitization:** Category 1, may cause allergic skin reaction (Guinea pig test, positive)

- **Respiratory Sensitization:** No respiratory sensitization effects

- **Germ Cell Mutagenicity:** Negative (Ames test, in vitro)

- **Carcinogenicity:** Not classified as carcinogenic (IARC Group 3)

- **Reproductive Toxicity:** No reproductive toxicity (Rat test, normal diluted dosage)

- **Specific Target Organ Toxicity:** No target organ toxicity with normal diluted exposure

SECTION 12: Ecological Information

12.1 Toxicity

- Fish (Zebrafish, LC₅₀): 28 mg/L (96-hour exposure)

- Daphnia (EC₅₀): 16 mg/L (48-hour exposure)

- Algae (EC₅₀): 35 mg/L (72-hour exposure)

12.2 Persistence and Degradability

Biodegradable (BOD₅/COD = 0.65) in natural aquatic environments; degradation rate > 70% in 28 days.

12.3 Bioaccumulative Potential

Low bioaccumulation potential (BCF < 200, fish test); no biomagnification in aquatic food chains.

12.4 Mobility in Soil

Low mobility in soil; binds to soil organic matter (K_{oc} = 490); may be degraded by soil microorganisms.

12.5 PBT/vPvB Assessment

Not classified as PBT/vPvB (meets biodegradability criteria).

12.6 Other Adverse Effects

Harmful to aquatic invertebrates; has antibacterial effect on soil microorganisms at high concentration; no eutrophication risk.

SECTION 13: Disposal Considerations



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13.1 Waste Treatment Methods

- **Product Waste:** Unused or contaminated clove leaf oil shall be disposed of to licensed waste treatment facilities; incineration is recommended (with flue gas treatment); do not dump into the environment.
- **Packaging Waste:** Rinse packaging with ethanol for residual removal, then dispose of as flammable non-hazardous packaging waste or recycle after professional decontamination.
- **Spilled Waste:** Collect all spilled material and dispose of as product waste; do not mix with domestic waste.

13.2 Disposal Notes

Comply with China's Solid Waste Pollution Control Law and EU REACH waste disposal regulations; avoid environmental release during disposal; handle as flammable waste.

SECTION 14: Transport Information

14.1 UN Number

ADR/RID: 1993; IMDG: 1993; IATA-DGR: 1993

14.2 UN Proper Shipping Name

ADR/RID: Flammable liquids, n.o.s. (Clove Leaf Oil); IMDG: Flammable liquids, n.o.s. (Clove Leaf Oil); IATA-DGR: Flammable liquids, n.o.s. (Clove Leaf Oil)

14.3 Transport Hazard Class(es)

ADR/RID: 3; IMDG: 3; IATA-DGR: 3 (Packing Group III)

14.4 Packaging Group

ADR/RID: III; IMDG: III; IATA-DGR: III

14.5 Environmental Hazards

ADR/RID: No; IMDG Marine Pollutant: No; IATA-DGR: No

14.6 Special Precautions for User

- Transport in sealed, light-proof HDPE plastic drums or brown glass bottles (small package); use fire-resistant packaging for bulk transport.
- Avoid collision, extrusion, direct sunlight, high temperature and rain during transport; keep away from heat, sparks, open flames and oxidizing agents.
- Transport in accordance with flammable liquid transport regulations; no mixed transport with food, beverages, drugs and infant products.

SECTION 15: Regulatory Information

15.1 National and International Regulations

- **China:** GB 2760-2021 (approved food flavor additive); Cosmetic Safety Technical Specification (2015 version, approved for cosmetic use); Hazardous Chemicals Safety Management Regulation (Class 3 flammable liquid)
- **EU:** REACH (registered); CLP (GHS classification as H227, H315, H317, H319, H402, H412); Cosmetics Regulation (EC 1223/2009, approved for cosmetic use)
- **US:** TSCA (listed on inventory); FDA (approved for food flavor use); OSHA (flammable liquid standard)
- **International:** GHS Rev.9 (classification compliance); IFRA (International Fragrance Association) standards (approved for fragrance use); IMDG Code (Class 3 flammable liquid)

15.2 Other Regulations

Comply with local fragrance, food and cosmetic raw material safety standards; comply with aquatic environmental protection and flammable liquid storage/transport regulations.

SECTION 16: Other Information

- **Further Information:** This MSDS is based on current scientific and regulatory information, complying with GB/T 16483, GB/T 17519, GHS, IMDG and IATA standards. It is for safe handling,



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storage, transport and disposal of the product. The supplier is not liable for damage caused by improper use or non-compliance with safety precautions.

