

Revision Date: 10.01.2026 | Version: 1.0

1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Identifier

Product Name: Ginger Root CO₂ Extract (Gingerol-Rich Total Fraction)

Product Code: AF-ZNGO2TSF

CAS Number: 84696-15-1

EC Number: 283-634-2

INCI Name: Zingiber Officinale (Ginger) Root Extract

Synonyms: Ginger CO₂ Total Extract, Ginger Oleoresin CO₂, Ginger SFE Total, Supercritical Ginger Extract Total, Zingiber officinale Extract

1.2 Identified Uses and Restrictions

Recommended Uses: Food and beverage flavoring, pharmaceutical preparations, nutraceutical formulations, anti-nausea applications, cosmetic formulations, perfumery ingredient, aromatherapy.

Restrictions on Use: Not intended for use undiluted on skin. For industrial/professional use only.

1.3 Supplier Information

AltraFlora Natural Botanicals Inc.

Zafer Mah., 1033 sokak, No: 16/A, Merkezefendi / Denizli, TURKEY

Phone: +90 538 051 7405 | Email: info@altraflora.com

1.4 Emergency Phone: +90 538 051 7405 (12/7)

2. Hazards Identification

2.1 Classification of the Substance or Mixture

Classification according to Regulation (EC) No 1272/2008 (CLP) and OSHA HCS (29 CFR § 1910.1200):

GHS Classification:

Skin Sensitization Category 1 (H317)

Skin Irritation Category 2 (H315)

2.2 Label Elements

Signal Word: Warning

Hazard Pictograms: GHS07 (Exclamation Mark)

Hazard Statements:

H315: Causes skin irritation.

H317: May cause an allergic skin reaction.

Precautionary Statements:

P261: Avoid breathing mist/vapours/spray.

P264: Wash hands thoroughly after handling.

P272: Contaminated work clothing should not be allowed out of the workplace.

P280: Wear protective gloves.

P302+P352: IF ON SKIN: Wash with plenty of water.

P333+P313: If skin irritation or rash occurs: Get medical advice/attention.

P362+P364: Take off contaminated clothing and wash it before reuse.

P501: Dispose of contents/container in accordance with local regulations.

2.3 Other Hazards

PBT/vPvB Assessment: Does not meet criteria for PBT or vPvB under REACH.

Physical Hazards: Combustible liquid. Flash point >100°C.

Potential Allergenicity: Contains naturally occurring sensitizing compounds including citronellol and farnesol. May cause skin sensitization in susceptible individuals. Higher phenolic content than select fraction.

Classification System:

NFPA Rating (0-4)	HMIS Rating (0-4)
Health: 2 Fire: 1 Reactivity: 0	Health: 2 Fire: 1 Reactivity: 0

Note: Gingerol-rich total fraction has higher viscosity than select fraction, reducing aspiration hazard. Classification adjusted accordingly.

3. Composition/Information on Ingredients

3.1 Substance

Chemical Name: Ginger Root Supercritical CO₂ Extract (Gingerol-Rich Total Fraction)

Botanical Name: Zingiber officinale Roscoe

Plant Family: Zingiberaceae (Ginger family)

Plant Part: Rhizomes (roots)

Extraction Method: Supercritical carbon dioxide (SC-CO₂) extraction — Total/Second fraction (Total)

Origin: China

Typical Composition (Gingerol-Rich Total Fraction):

Component	CAS No.	Class	Content
6-Gingerol	23513-14-6	Phenolic	12-32%
α-Zingiberene	495-60-3	Sesquiterpene	15-30%
Zingerone	122-48-5	Phenolic	5-13%
8-Gingerol	23513-08-8	Phenolic	2-9%
Sesquisabinene (ar-Curcumene)	644-30-4	Sesquiterpene	4-9%
6-Shogaol	555-66-8	Phenolic	3-6%
β-Bisabolene	495-61-4	Sesquiterpene	2-5%
γ-Sitosterol	83-47-6	Phytosterol	2-4%
α-Curcumene	644-30-4	Sesquiterpene	1-3%
(E)-β-Farnesene	18794-84-8	Sesquiterpene	1-3%

Note: Composition determined by GC-MS and GC-FID analysis. This is the gingerol-rich total fraction (Total), characterized by high phenolic content (gingerols, shogaols, zingerone) and moderate sesquiterpene content. Values may vary based on source material and extraction parameters. The extract provides the characteristic pungent, warming properties of ginger due to elevated gingerol and shogaol content (Ali et al., 2008; Mesomo et al., 2013).

4. First Aid Measures

General Advice	Remove from exposure. Seek medical attention if symptoms persist. Show this SDS to the attending physician.
Inhalation	Move to fresh air. If breathing is difficult, administer oxygen. Seek medical attention if symptoms persist.
Skin Contact	Immediately wash with plenty of soap and water. Remove contaminated clothing and launder before reuse. If skin irritation or rash occurs, seek medical attention. Product may cause warming sensation on skin.
Eye Contact	Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Seek medical attention if irritation persists. May cause significant irritation.
Ingestion	Rinse mouth with water. Do not induce vomiting unless advised by medical personnel. Seek medical attention if large amounts ingested or if symptoms develop.

Most Important Symptoms and Effects: May cause skin sensitization (allergic skin reaction). May cause skin irritation with redness and burning sensation due to pungent phenolic compounds. Eye contact may cause significant irritation. Ingestion of undiluted material may cause gastrointestinal irritation.

Medical Attention: Treat symptomatically. Antihistamines may be administered for allergic reactions.

5. Fire-Fighting Measures

Suitable Extinguishing Media	Foam, carbon dioxide (CO ₂), dry chemical powder, water spray.
Unsuitable Extinguishing Media	Water jet (may spread fire).
Special Hazards	Combustible liquid. Flash point: >100°C (>212°F). Higher flash point than select fraction due to increased viscosity and phenolic content. At elevated temperatures, irritating and toxic fumes may be produced.
Firefighter Protection	Wear self-contained breathing apparatus and full protective clothing for large fires. Cool containers exposed to fire with water spray. Prevent fire-fighting water from entering drains or waterways.

6. Accidental Release Measures

Personal Precautions	Avoid contact with skin, eyes, and clothing. Use appropriate protective equipment. Ensure adequate ventilation. Eliminate ignition sources. Material is viscous and may be slippery on floors.
Environmental Precautions	Prevent entry into drains, waterways, and soil. Contain and collect spill.
Containment and Cleanup	Absorb with inert absorbent material (sand, vermiculite, earth). Collect in suitable containers for disposal. Clean area with detergent and water. Dispose of in accordance with local regulations. Viscous material may require scraping for cleanup.

Additional Information: May create slipping hazard on floors. Dispose of contaminated materials in accordance with applicable regulations.

7. Handling and Storage

7.1 Precautions for Safe Handling

Avoid contact with skin and eyes. Wear appropriate protective gloves. Do not eat, drink, or smoke when handling. Wash hands thoroughly after handling. Use only with adequate ventilation. Avoid breathing vapors, mist, or spray. Keep away from heat, sparks, open flames, and hot surfaces. Contaminated work clothing should not be allowed out of the workplace. Due to viscous nature, may require warming (40-50°C) for easier handling.

7.2 Conditions for Safe Storage

Storage Temperature	Store in a cool, dry place. Recommended: 15-25°C. Avoid heat sources and direct sunlight. May become more viscous at lower temperatures; this is normal.
Storage Conditions	Store in a well-ventilated area. Keep container tightly closed. Store away from oxidizing agents and strong acids/bases. Protect from light. Minimize air exposure. Nitrogen blanketing recommended for bulk storage.
Container Materials	Stainless steel, glass, aluminum, food-grade HDPE. Avoid unlined copper, iron, or zinc containers.
Shelf Life	12 months when properly stored in sealed containers. Phenolic compounds provide some antioxidant protection.

8. Exposure Controls/Personal Protection

8.1 Control Parameters

No specific occupational exposure limits have been established for this product. For individual components, refer to applicable regulations.

8.2 Exposure Controls

Engineering Controls	Use with adequate ventilation. Local exhaust ventilation recommended when heating product. Eyewash stations and emergency showers should be accessible.
Eye/Face Protection	Safety glasses or goggles recommended. Face shield when pouring or if splash hazard exists. Higher eye irritation potential than select fraction.
Hand Protection	Chemical-resistant gloves (nitrile, neoprene, or PVC recommended). Double gloving recommended for extended contact. Consider breakthrough time and permeation rate.
Skin Protection	Wear protective clothing. Long sleeves recommended. Full body suit for large-scale handling. Pungent phenolic compounds may cause skin irritation.

Respiratory Protection	Not required under normal conditions with adequate ventilation. If mist is generated or in poorly ventilated areas, use approved respirator.
Hygiene Measures	Wash hands thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not eat, drink, or smoke in work areas. Wash skin immediately if product contact occurs.

9. Physical and Chemical Properties

Appearance	Dark-orange oleoresin
Odor	Characteristic pungent, warm, spicy ginger; less aromatic than select fraction
Odor Threshold	Not determined
pH	Not applicable (non-aqueous)
Melting/Freezing Point	Not determined; may become semi-solid below 15°C
Boiling Point	Not determined (complex mixture)
Flash Point	>100°C (>212°F) closed cup
Evaporation Rate	Very low
Flammability	Combustible liquid (not classified as flammable)
Upper/Lower Flammability Limits	Not determined
Vapor Pressure	Very low at ambient temperature
Vapor Density	Heavier than air
Relative Density (20°C)	0.950-1.020 g/cm ³
Water Solubility	Insoluble; partially dispersible
Solubility in Other Solvents	Soluble in ethanol, vegetable oils, aromatic solvents; requires warming
Partition Coefficient (log K _{ow})	~4.5 (estimated; lower than select fraction)
Auto-ignition Temperature	Not determined
Decomposition Temperature	Not determined
Viscosity	High viscosity; semi-solid at room temperature
Refractive Index (40°C)	1.510-1.530
Optical Rotation	(-5°) to (-20°)

10. Stability and Reactivity

Reactivity	Combustible liquid. No hazardous reactions known under normal conditions of use.
Chemical Stability	Stable under recommended storage conditions. May slowly oxidize with prolonged exposure to air and light. Phenolic compounds (gingerols) provide some antioxidant stability.
Hazardous Reactions	Hazardous polymerization does not occur under normal conditions.
Conditions to Avoid	Heat, open flames, sparks, and ignition sources. Prolonged exposure to air and light. Extreme temperatures.
Incompatible Materials	Strong oxidizers. Strong acids and bases. Reactive metals.
Hazardous Decomposition Products	Combustion produces carbon monoxide (CO), carbon dioxide (CO ₂), and irritating fumes.

11. Toxicological Information

11.1 Information on Toxicological Effects

Acute Oral Toxicity	LD50 (rat): >2000 mg/kg bw (ginger extract). Low acute oral toxicity. FDA GRAS status for ginger extracts (21 CFR 182.20). Traditional food use supports safety.
Acute Dermal Toxicity	Not classified. May cause skin sensitization in susceptible individuals. Pungent compounds may cause transient skin irritation.
Acute Inhalation Toxicity	Not classified. Vapors or mist may cause respiratory tract irritation.
Skin Corrosion/Irritation	Category 2 — Causes skin irritation. Higher irritation potential than select fraction due to elevated phenolic (gingerol/shogaol) content.
Serious Eye Damage/Irritation	May cause significant eye irritation. Higher potential than select fraction. Flush immediately if contact occurs.
Respiratory/Skin Sensitization	Skin Sensitization Category 1 — May cause an allergic skin reaction. Contains potential sensitizers (citronellol, farnesol, citral).
Germ Cell Mutagenicity	Not classified. No mutagenic potential reported for ginger extracts (Ali et al., 2008).
Carcinogenicity	Not classified. Not listed by IARC, NTP, or OSHA. Ginger has demonstrated anticarcinogenic properties; gingerols shown to have cancer-preventive effects (Shukla & Singh, 2007).
Reproductive Toxicity	Not classified. No reproductive toxicity reported at normal use levels.
STOT - Single Exposure	Not classified.
STOT - Repeated Exposure	Not classified. 35-day gavage study in rats showed no adverse effects up to 2000 mg/kg/day (Rong et al., 2009).
Aspiration Hazard	Not classified. High viscosity reduces aspiration risk compared to select fraction.

Additional Toxicological Information: Ginger and its extracts have been used extensively in traditional medicine for centuries and are recognized as safe (GRAS) by FDA. 6-Gingerol and related compounds are the primary bioactive phenolics responsible for ginger's pharmacological properties, including anti-inflammatory, antioxidant, antiemetic, and gastroprotective effects (Ali et al., 2008). The CIR Expert Panel concluded that Zingiber officinale-derived ingredients are safe in cosmetics when formulated to be non-sensitizing (CIR, 2022). Gingerols convert to shogaols upon drying or heating, with similar safety profiles.

12. Ecological Information

Toxicity	No specific aquatic toxicity data available. Natural plant extract; low aquatic toxicity expected.
Persistence and Degradability	Expected to be readily biodegradable. Natural phenolic and terpene-based product.
Bioaccumulative Potential	Low bioaccumulation potential expected based on composition.

Mobility in Soil	Low mobility expected due to low water solubility and high viscosity.
PBT/vPvB Assessment	Does not meet criteria for PBT or vPvB under REACH.
Endocrine Disruptor Properties	No data indicating endocrine disrupting properties.
Other Adverse Effects	Avoid release to the environment. May be harmful to aquatic organisms.

13. Disposal Considerations

Product Disposal	Dispose of in accordance with local, regional, national, and international regulations. Do not pour down drains, waterways, or soil. Incinerate in an approved facility or dispose of at an authorized hazardous waste facility.
Contaminated Packaging	Empty containers should be taken to an approved waste handling facility for recycling or disposal. Empty containers may contain residual product.
Waste Code (EU)	EWC: 07 02 99 — Wastes not otherwise specified, or appropriate code based on use.

14. Transport Information

This product may be regulated for transport. Classification may vary based on package size.

UN Number	Not regulated for small quantities (<5L); may be UN3082 for larger volumes
UN Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (if applicable)
Transport Hazard Class	Class 9 (Miscellaneous) when regulated
Packing Group	III (when regulated)
Environmental Hazards	May be classified as marine pollutant depending on concentration
Road Transport (ADR/RID)	Consult regulations for package size thresholds
Sea Transport (IMDG)	Consult regulations for package size thresholds
Air Transport (IATA)	Consult regulations for package size thresholds

Special Precautions: Keep container upright. Store and transport in accordance with applicable regulations. Protect from heat and direct sunlight. Product may solidify in cold conditions; this does not affect quality.

15. Regulatory Information

15.1 Safety, Health, and Environmental Regulations

EU Legislation:

- Regulation (EC) No 1907/2006 (REACH) — Registered substance
- Regulation (EC) No 1272/2008 (CLP) — Classified as Skin Irrit. 2, Skin Sens. 1
- Regulation (EC) No 1223/2009 (Cosmetic Regulation) — Compliant for cosmetic use
- Regulation (EC) No 1334/2008 (Flavoring Regulation) — Approved flavoring substance
- IFRA (International Fragrance Association) — Restricted; maximum use levels apply

US Legislation:

- FDA: Generally Recognized as Safe (GRAS) — 21 CFR 182.10, 182.20
- FEMA Number: 2522 (Ginger root oil)
- TSCA (Toxic Substances Control Act): Listed
- SARA 313: Not listed
- California Proposition 65: Not listed

Food and Pharmaceutical Applications:

- FDA GRAS status permits use in food and beverages
- European Pharmacopoeia: Monograph available for Zingiberis rhizoma
- WHO: Included in WHO monographs on selected medicinal plants
- ESCOP: European Scientific Cooperative on Phytotherapy monograph available

Other Regulatory Information:

- RIFM (Research Institute for Fragrance Materials): Safety assessment conducted
- CIR (Cosmetic Ingredient Review): Safe when used in formulation to be non-sensitizing (2022)

International Inventories:

Inventory	Status
TSCA (USA)	Listed
DSL (Canada)	Listed
EINECS/ELINCS (EU)	Listed (283-634-2)
IECSC (China)	Listed
AICS (Australia)	Listed
ENCS (Japan)	Listed
KECL (Korea)	Listed
PICCS (Philippines)	Listed

15.2 Chemical Safety Assessment: A chemical safety assessment has not been carried out for this substance/mixture by the supplier.

16. Other Information

Product Specifications

Botanical Source	Zingiber officinale Roscoe (Ginger)
Plant Family	Zingiberaceae (Ginger family)
Plant Part Used	Rhizomes (roots)
Extraction Method	Supercritical CO ₂ extraction — Total/Second fraction (Total)
Country of Origin	China
Processing Location	Turkey
Extract Type	Gingerol-rich total fraction (Total)
Primary Bioactive	6-Gingerol (12-32%)
Total Phenolics	~25-45% (gingerols, shogaols, zingerone)
Sesquiterpene Content	~25-45% (reduced vs. select fraction)
Shelf Life	12 months (sealed, cool, dark storage)
Storage	Store at 15-25°C, protect from light and air

Comparison: Select vs. Total Fraction

Property	Select Fraction (Stage 1)	Total Fraction (Total)
Primary Character	Terpene-rich, aromatic	Gingerol-rich, pungent
6-Gingerol Content	4-10%	12-32%
Sesquiterpene Content	>60%	25-45%
Appearance	Pale yellow liquid	Amber-brown viscous liquid
Viscosity	Low-medium	High (semi-solid)
Aroma	Fresh, citrus-spicy	Warm, pungent, less aromatic
Typical Applications	Perfumery, aromatherapy	Food, pharma, nutraceuticals
Aspiration Hazard	Category 1	Not classified

Traditional Use and Applications

Ginger (*Zingiber officinale* Roscoe) is a tropical flowering plant native to Southeast Asia, cultivated worldwide for its aromatic rhizomes. The gingerol-rich total fraction (Total extract) captures the full spectrum of ginger's bioactive compounds, particularly the phenolic gingerols and shogaols responsible for ginger's characteristic pungency and therapeutic properties. 6-Gingerol is the primary bioactive compound, with well-documented anti-inflammatory, antioxidant, antiemetic, and gastroprotective effects (Ali et al., 2008). This fraction is preferred for food flavoring (providing warming, pungent character), pharmaceutical applications (anti-nausea medications, digestive aids), and nutraceutical formulations. The higher viscosity and phenolic content distinguish it from the aromatic select fraction used primarily in perfumery.

Revision Information

Revision Date: 10.01.2026

Revision: 1.0 — Initial release

Key Literature References:

- Mesomo, M.C. et al. (2013). Supercritical CO₂ extracts and essential oil of ginger (*Zingiber officinale* R.): Chemical composition and antibacterial activity. *Journal of Supercritical Fluids*, 80, 44-49.
- Ali, B.H. et al. (2008). Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): A review of recent research. *Food and Chemical Toxicology*, 46(2), 409-420.
- Salea, R. et al. (2017). Supercritical fluid carbon dioxide extraction of *Zingiber officinale* Roscoe: Optimization of process parameters. *Chemical Engineering Transactions*, 56, 1705-1710.
- Shukla, Y. & Singh, M. (2007). Cancer preventive properties of ginger: A brief review. *Food and Chemical Toxicology*, 45(5), 683-690.
- Rong, X. et al. (2009). A 35-day gavage safety assessment of ginger in rats. *Regulatory Toxicology and Pharmacology*, 54(2), 118-123.

- CIR Expert Panel (2022). Safety Assessment of Zingiber officinale (Ginger)-Derived Ingredients. International Journal of Toxicology, 41(Suppl 1), 28S-50S.
- European Medicines Agency (2023). Assessment report on Zingiber officinale Roscoe, rhizoma. EMA/HMPC/749154/2022.

Abbreviations:

CAS: Chemical Abstracts Service | EC: European Community | GHS: Globally Harmonized System | CLP: Classification, Labelling and Packaging | REACH: Registration, Evaluation, Authorization, and Restriction of Chemicals | TSCA: Toxic Substances Control Act | FDA: Food and Drug Administration | GRAS: Generally Recognized as Safe | FEMA: Flavor and Extract Manufacturers Association | CIR: Cosmetic Ingredient Review | RIFM: Research Institute for Fragrance Materials | IFRA: International Fragrance Association | NFPA: National Fire Protection Association | HMIS: Hazardous Materials Identification System | STOT: Specific Target Organ Toxicity | SC-CO₂: Supercritical Carbon Dioxide

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Users should review their operations in light of applicable regulations. Keep away from children.

End of Safety Data Sheet