



SHANGHAI MINGDOU AGROCHEMICAL CO., LTD

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MATERIAL SAFETY DATA SHEET OF CLETHODIM 120 G/L EC

1. IDENTIFICATION OF THE CHEMICAL PRODUCT AND COMPANY

Supplier: SHANGHAI MINGDOU AGROCHEMICAL CO., LTD

Address: Rm. 1210, Zhenyuan Building, No. 2052 North Zhongshan Rd, Shanghai, China

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Product name: Clethodim 120 G/L EC

Product use: Herbicide

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formulation Type: Emulsifiable concentrate

Active Ingredients: Clethodim

Chemical Abstracts name:

2-[(1E)-1-[[[(2E)-3-chloro-2-propenyl]oxy]imino]propyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one

IUPAC name:

(5RS)-2-[(E)-1-[(2E)-3-chloroallyloxyimino]propyl]-5-[(2RS)-2-(ethylthio)propyl]-3-hydroxycyclohex-2-en-1-one

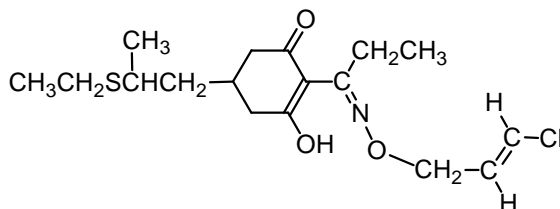
Chemical Family: cyclohexanedione oxime

CAS NO. 99129-21-2

Molecular Formula: C₁₇H₂₆ClNO₃S

Molecular Weight: 359.9

Structural Formula:



Composition:

INGREDIENT	CAS NO	PROPORTION
Clethodim	99129-21-2	120 G/L Min
Inert ingredients	Not available	Up to 100%

Other ingredients determined not to be hazardous



3. HAZARDS IDENTIFICATION

Emergency overview: Warning! Causes substantial but temporary eye irritation. Causes skin irritation. Harmful if swallowed or absorbed through the skin. Avoid breathing vapors or spray mist. Aspiration hazard, do not induce vomiting. May cause allergic skin reactions. Do not get in eyes, on skin or on clothing. Keep out of reach of children.

4. FIRST AID MEASURES

General: Have the product container, label or Material Safety Data Sheet with you when going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given.

Skin contact: Remove contaminated clothing. Wash skin thoroughly with soap and water. See a doctor if any signs or symptoms described in this document occur. Discard contaminated non-waterproof shoes and boots. Wash contaminated clothing separately.

Eye contact: Flush eyes immediately with fresh water for at least 15 minutes while holding eyelids open. Remove contact lenses if worn. Get medical attention.

Ingestion: If swallowed, do not induce vomiting. Call a physician or poison control center. Promptly drink a large quantity of milk, egg whites or gelatin solution. If these are not available, drink large quantities of water. Avoid alcohol. Get medical attention immediately.

Inhalation: If respiratory discomfort or irritation occurs, move the person to fresh air. See a doctor if discomfort or irritation continues. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

Note to physician: No specific antidote. Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash point: 64°C (Closed up)

Flammable limits:

LFL: Not determined.

UFL: Not determined.

Autoignition temperature: Not determined.

Hazardous combustion products: Normal combustion forms carbon dioxide, water vapor and may produce oxides of nitrogen, sulfur. Combustion may produce toxic compounds of chlorine. Incomplete combustion can produce carbon monoxide.

Extinguishing media: CO₂, dry chemical, foam, water fog.

Fire-fighting instructions: Avoid breathing smoke and mists. Avoid personnel and equipment contact



with fallout and runoff. Minimize the amount of water used for fire fighting. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse.

Protective equipment for firefighters: Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment.

6. ACCIDENT RELEASE MEASURES

Personal precautions: See Section 8.

Environmental precautions: Avoid runoff into storm sewers and ditches which lead to waterways. Contain spilled liquids with dry sorbents.

Method for cleaning up: Clean up spill immediately. Absorb spill with inert material (such as dry sand or earth), then place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

7. HANDLING AND STORAGE

Handling: Read the label before use. Do not use or store near flame, sparks or hot surface. Use only in well ventilated area. Keep container closed. Do not weld, heat or drill container.

Storage: Keep pesticide in original container. Do not store or transport near food or feed. Do not contaminate food or feed. Do not put concentrate into food or drink containers. Store in a cool, dry place, out of direct sunlight.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits: No exposure limits have been established for this material.

Engineering controls: Use assisted ventilation in enclosed spaces if needed, especially storage areas.

Personal protective equipment (PPE):

Respiratory protection: Should not be necessary under normal conditions. If spray mist may be encountered, a particulate filter should be worn.

Skin protection: Overalls, PVC gloves and apron, face shield.

Eye protection: Chemical goggles.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Light yellow to saffron yellow liquid.

Odor: Mild aromatic odor.

Density: Approx. 0.95 g/ml at 20 °C.

Solubility in water: Emulsifies.



10. STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.

Conditions to avoid: Avoid extreme pH, temperature and direct sun-light.

Hazardous decomposition: Oxides of nitrogen and chlorine. Burning with limited oxygen may produce carbon monoxide.

Incompatible materials: Strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Oral: LD₅₀ for rats >2000 mg/kg

Dermal: LD₅₀ for rabbits >5000 mg/kg

Inhalation: LC₅₀ for rats >2.0 mg/l

Irritant properties:

Skin: Irritation.

Eye: Irritation.

Allergenic and sensitizing effects: May be a skin sensitizer (Guinea pig).

Subchronic: Compound-related effects, noted at high doses of Clethodim Technical in subchronic toxicity studies conducted in mice, rats and dogs, were decreased body weights, increased liver size (increased liver weight and hypertrophy) and anemia (decreased hemoglobin, hematocrit, or erythrocyte counts).

Chronic toxicity/Carcinogenicity: In chronic studies with Clethodim Technical in the mouse, rat and dog, similar effects as seen in subchronic have been noted. No treatment related increases in neoplasms were observed in any study.

Genetic effects/Mutagenicity: Clethodim Technical was negative in the following genotoxicity assays: microbial reverse mutation, *in vitro* chromosome aberration assay in Chinese Hamster Ovary Cells, *in vivo* chromosome aberration assay in Rat Bone Marrow Cells, and *in vivo* Unscheduled DNA Synthesis Assay. Clethodim Technical does not present a genetic hazard to intact animal systems.

Reproductive effects: No reproductive toxicity was observed in a study with rats exposed to Clethodim Technical for two generations.

Developmental effects: Developmental toxicity in rats and rabbits was observed only at maternally toxic dose levels of Clethodim Technical.

12. ECOLOGICAL INFORMATION

The following information is for the active ingredient, Clethodim.



Ecotoxicity:

- Birds Acute oral LD₅₀: for bobwhite quail >2000 mg/kg.
Dietary LC₅₀ (5 days): for mallard ducks >5000 mg/kg.
- Fish LC₅₀ (96 h): for rainbow trout 67, bluegill sunfish >120 mg/l.
- Daphnia EC₅₀ (48 h): >120 mg/l.
- Algae EC₅₀ (5 d): for fresh-water algae 57.8 mg/l.
- Bees LD₅₀ (contact): >100 µg/bee.
- Earthworm: LC₅₀ (14 days): 454 mg/kg soil.

Persistence and degradability: Clethodim is of low persistence in most soils with a reported half-life of approximately 3 days. Breakdown is mainly by aerobic processes, although photolysis may make some contribution. Clethodim may be highly persistent in the aquatic environment. Reported half-lives for clethodim in the aquatic environment are 128 days in the aqueous phase and 214 days in the sediment.

Bioaccumulative potential: BCF (Bio-concentration factor): 2.1, low potential.

Mobility in soil: Clethodim and these degradates are weakly bound to soils, with reported soil K_d (soil-water partition coefficient unadjusted for soil organic matter) values of 0.05 and 0.23 over a range of five soils. Thus, while it may be somewhat mobile in the soil environment, it is very short-lived.

13. DISPOSAL CONSIDERATION

Product: Whenever possible, product should be used for its intended purpose, even if reclaimed from spillage (reclaimed product must be uncontaminated).

Containers: Whenever possible, follow directions given on container. If not available, triple or pressure rinse plastic or metal containers before disposal. Recycle containers if possible (replace cap and return clean containers to recycler or designated collection point). Treat rinsings as for product above. If not recycling, break, crush or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

14. TRANSPORT INFORMATION

UN Number: 3082

UN Proper shipping name: Environmentally hazardous substance, n.o.s. (Clethodim)

Transport hazard class: 9

Packing group: III

Marine pollutant: Yes



15. REGULATORY INFORMATION

Hazard symbols:

Xn Harmful

Risk phrases:

R36/38 Irritating to eye and skin

R52 Harmful for aquatic organisms

R65 Harmful: may cause lung damage if swallowed

Safety phrases:

S2 Keep out of reach of children

S13 Keep away from food, drink and animal feeding stuffs

S37 Wear suitable gloves

S46 If swallowed, seek medical advice immediately and show this container or label

S49 Keep only in the original container

S62 If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label

16. OTHER INFORMATION

This MSDS summarizes our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of the how the product will be handled and used in the workplace including in conjunction with other products.

If clarification or further information is needed to ensure that an appropriate risk assessment can be made the user should contact the company.

END OF MSDS