

MATERIAL SAFETY DATA SHEET

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

Product identifier: FYFANON® PLUS ULV

Product use: Insecticide.

EPA Reg. No. 67760-108

Supplier's name and address:

Manufacturer's name and address:

Cheminova Inc.

Refer to supplier.

P.O. Box 110566

One Park Drive, Suite 150

Research Triangle Park, NC 27709

USA

Phone #: (919) 474-6600 (8 AM to 5:00 PM EST, Monday to Friday)

Emergency Telephone #: 1-866-303-6950 (Medical Emergencies)

1-800-424-9300 (24 Hr. Chemtrec Number)

MSDS Prepared by: Cheminova Inc.

MSDS Preparation date: January 4, 2011

Revision date:

Revision reasons:

SECTION 2 — HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Yellow liquid. Pungent, sulphur-like odor.

Warning!

Toxic by inhalation. Avoid breathing vapors. Harmful if swallowed.

Harmful in contact with skin.

Causes skin and serious eye irritation. Contains a material which can cause nervous system damage.

May be dangerous for the environment.

The product is highly toxic to fish, aquatic invertebrates and insects.

In case of fire, use dry chemical, CO₂, water spray or foam.

POTENTIAL HEALTH EFFECTS

Target organs: Eyes, skin, respiratory system, digestive system, nervous system.

Signs and symptoms of short-term (acute) exposure:

Inhalation: Toxic by inhalation. Avoid breathing vapors.

Skin contact: Harmful in contact with skin. Causes skin irritation. May cause an allergic skin reaction. May cause feelings of burning, tingling or numbness in exposed areas (paraesthesia).

Eye contact: Causes serious eye irritation.

Ingestion: Harmful if swallowed.

Effects of long-term (chronic) exposure: Chronic exposure may cause changes in the central and peripheral nervous system.

Carcinogenicity: See TOXICOLOGICAL INFORMATION (Section 11).

Other important hazards: Cholinesterase inhibitor. May cause central nervous system depression. May cause damage to the peripheral nervous system. See TOXICOLOGICAL INFORMATION (Section 11).

Potential environmental effects: This product is highly toxic to fish, aquatic invertebrates and insects. See ECOLOGICAL INFORMATION (Section 12).

SECTION 3 — COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>
Malathion	121-75-5	90-100	1 mg/m ³	15 mg/m ³
Gamma-cyhalothrin	76703-62-3	1-2	NE	NE
NE= None established				

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

SECTION 4 — FIRST AID MEASURES

- IF IN EYES:** **This product is an organophosphate and a cholinesterase inhibitor.**
Hold eye open and rinse slowly and gently with water for 15-20 minutes.
Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
Call a poison control center or doctor for treatment advice.
- IF SWALLOWED:** Call a poison control center or doctor immediately for treatment advice.
Have person sip a glass of water if able to swallow.
Do not induce vomiting unless told to by a poison control center or doctor.
Do not give anything by mouth to an unconscious person.
- IF ON SKIN OR CLOTHING:** Take off contaminated clothing.
Rinse skin immediately with plenty of water for 15-20 minutes.
Call a poison control center or doctor for treatment advice.
- IF INHALED:** Move person to fresh air.
If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.
Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-866-303-6950 for emergency medical treatment information.

NOTE TO PHYSICIAN: This product is a cholinesterase inhibitor. Treat symptomatically. Atropine is antidotal. Induced vomiting as first aid for this substance may result in increased risk of chemical pneumonia or pulmonary edema caused by aspiration of the hydrocarbon solvent. Vomiting should be induced only under professional supervision. Skin exposure may also result in a sensation described as a tingling, burning, or prickly feeling. Onset may occur immediately to 4 hours after exposure and may last 2 to 30 hours, without damage. Wash exposed

SECTION 5 — FIRE FIGHTING MEASURES

Flash point (Method): 260° F (126.7° C).

Flammable limits (% by volume): Not applicable

Explosive properties: Not explosive

Suitable extinguishing media: For small fires, use dry chemical or carbon dioxide. For large fires, use water spray or foam.

Special fire-fighting procedures/equipment: Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Fight fire from protected location or maximum possible distance. Avoid heavy hose streams. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

Hazardous decomposition products: Dimethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, hydrogen chloride, hydrogen fluoride, nitrogen oxides, hydrogen cyanide and various chlorinated and fluorinated organic compounds.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions: Observe all protection and safety precautions when cleaning up spills. Depending on the magnitude of the spill this may mean wearing face mask or respirator, chemical resistant clothing, gloves and rubber boots. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions: Ensure spilled product does not enter drains, sewers, waterways, or confined spaces.

Spill response/Cleanup: Spills on the floor or other impervious surface should be contained or diked and then absorbed onto an absorptive material such as universal binder, hydrated lime, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers (see Section 13). Rinse area with much water and detergent. Absorb wash liquid with absorbent and transfer to suitable containers. Wash waters must be prevented from entering surface water drains.

Spills which soak into the ground should be dug up and transferred to suitable containers.

Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

The used containers should be properly closed and labelled. Refer to Section 13 for disposal.

Prohibited materials: None known.

Special spill response procedures: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the national response center (phone: 1-800-424-8002).

EPA/CERCLA Reportable quantity: **Malathion** (RQ 100 lbs.)

SECTION 7 — HANDLING AND STORAGE

Do not use or store near heat or open flame.

Safe handling procedures: Avoid inhalation of aerosol or mist. Avoid skin contact with aerosol as well.

Storage recommendations: Fyfanon® PLUS ULV should be stored in the original unopened container in a secure, dry place. Do not contaminate with other pesticides or fertilizers. The product should never be heated above 55°C (131°F), and should not be stored for long periods of time at a temperature in excess of 25°C (77°F). Do not allow product to freeze.

Special packaging materials: Always keep in containers made of the same materials as the supply container.

SECTION 8 — EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ventilation and engineering controls: If handled indoors, provide mechanical exhaust ventilation to keep concentrations below specified TLV's and PEL's.

Protective gloves: Wear impervious chemical gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton. Advice should be sought from glove suppliers.

Eye protection: Wear protective eyewear (goggles, face shield, safety glasses). It is recommended to have an eye wash fountain immediately available in the workplace when there is a potential for eye contact.

Other protective equipment: Wear long sleeved shirt and long pants, shoes and socks.

Permissible exposure levels: See Section 2.

General hygiene considerations: Avoid contact with eyes, skin or clothing. Avoid breathing vapors or spray mist. Remove contaminated clothing immediately. Wash thoroughly after handling. Before removing gloves, wash them with water and soap and then throw them out. After work, take off all work clothes and footwear. Take a shower, using water and soap. Wear only clean clothes when leaving job. Wash protective clothing and protective equipment with water and soap after each use. Persons working with this product for a longer period should have frequent blood tests for cholinesterase levels. If the cholinesterase levels fall below a critical point, no further exposure should be allowed until it has been determined, by means of blood tests, that cholinesterase levels have returned to normal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Physical state, odor and appearance: Yellow liquid. No odor.

Odor threshold: N/A

Specific gravity (water = 1): 1.22 g/ml

Solubility in water: Malathion: 148.2 mg/l at 77° F (25° C)
Gamma-cyhalothrin: 0.0021 mg/l at 68° F (20° C)

pH: Not available

Boiling point: Malathion: 313 - 315° F (156 - 157° C) at 0.7 mm Hg (however, see Section 10 for Thermal Decomposition)
Gamma-cyhalothrin: decomposes at 293° C at 1 mm Hg

Melting: Below 32° F (0° C).

Vapor pressure: Malathion: 3.4×10^{-6} mm Hg at 77° F (25° C).
Gamma-cyhalothrin: 1.4×10^{-4} mm Hg at 68° F (20° C)

Viscosity: Not available

Partition coefficient of n-octanol/water: Malathion: $\log K_{ow} = 2.75$
Gamma-cyhalothrin: $\log K_{ow} = 5.65$

SECTION 10 — REACTIVITY AND STABILITY DATA

Stability and reactivity: This product is stable under the recommended storage and handling conditions described in Section 7.

Hazardous polymerization: Not known.

Conditions to avoid: Avoid heat and flame.

Materials to avoid (incompatibles): Strong alkalis, amines and strong oxidizing compounds. The product can corrode metals. Malathion is rapidly hydrolyzed at pH > 7.0.

Thermal Decomposition: Malathion will decompose rapidly when heated to temperatures above 212° F (100° C), significantly increasing the risk of explosion. Direct local heating such as electric heating or by steam must be avoided. The decomposition is to a considerable extent dependent on time as well as temperature due to self-accelerating exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerisation releasing volatile malodorous and inflammable compounds such as dimethyl sulphide and methyl mercaptan.

Hazardous decomposition products: Dimethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, hydrogen chloride, hydrogen fluoride, nitrogen oxides, hydrogen cyanide and various chlorinated and fluorinated organic compounds.

SECTION 11 — TOXICOLOGICAL INFORMATION

Routes of exposure: Skin contact, skin absorption, eye contact, inhalation, and ingestion.

Toxicological data: LC₅₀, inhalation, rat (mg/L/4 hrs) = >2.05

LD₅₀, oral, rat (mg/kg) = 1750

LD₅₀, dermal, rat (mg/kg) = >5000

Eye irritation = Serious

Skin irritation = The product may be irritating to skin. However, it causes other effects (paraesthesia) on contact.

Skin sensitizer = May cause sensitization by skin contact.

Carcinogenicity: None of the ingredients are classified as carcinogenic by IARC, ACGIH, OSHA or NTP.

Teratogenicity, mutagenicity, other reproductive effects: No known teratogenic, mutagenic or reproductive effects.

Conditions aggravated by exposure: Repeated exposures to cholinesterase inhibitors, such as this product, may without warning cause increased susceptibility to doses of any cholinesterase inhibitor.

SECTION 12 — ECOLOGICAL INFORMATION

Chemical fate information: Malathion is not persistent. It is biodegradable. It undergoes rapid degradation in the environment and in waste water treatment plants. No adverse effects are observed at concentrations up to 100 mg/l in waste water treatment plants. Degradation occurs both aerobically and anaerobically, biologically as well as abiotically. Degradation half-lives vary with circumstances, but are usually a few days in aerobic soil and water. pH has a major influence. Degradation will increase at higher pH.

Gamma-cyhalothrin is not readily biodegradable. Its half-life in soil is measured to be 4 - 8 weeks depending on circumstances. It is not toxic to microorganisms in waste water treatment plants, but it is degraded only slowly.

Ecotoxicological information: The product is highly toxic to fish, aquatic invertebrates and insects. It is not considered as harmful to aquatic plants, soil micro- and macroorganisms, birds and mammals. The ecotoxicity measured on the active ingredients is:

Malathion:

Fish – 96-Hr LC₅₀, Rainbow trout (*Oncorhynchus mykiss*) = 0.18 mg/l

Invertebrates – 48-Hr EC₅₀, Daphnids (*Daphnia magna*) = 0.72 µg/l

21-day NOEC, Daphnids (*Daphnia magna*) = 60 ng/l

Birds – LD₅₀, Bobwhite quail (*Colinus virginianus*) = 359 mg/kg

Bees – 24-Hr LD₅₀, Bees (*Apis mellifera*), topical = 0.27 µg/bee

24-Hr LD₅₀, Bees (*Apis mellifera*), oral = 0.38 µg/bee

Gamma-cyhalothrin:

Fish – 96-Hr LC₅₀, Rainbow trout (*Oncorhynchus mykiss*) = 0.07 µg/l

Invertebrates – 48-Hr EC₅₀, Daphnids (*Daphnia magna*) = 0.1 µg/l

21-day NOEC, Daphnids (*Daphnia magna*) = 2.2 ng/l

Birds – LD₅₀, Bobwhite quail (*Colinus virginianus*) = > 2000 mg/kg

Bees – LC₅₀, Bees (*Apis mellifera*), topical = 0.005 µg/bee

LC₅₀, Bees (*Apis mellifera*), oral = 4.2 µg/bee

SECTION 13 — DISPOSAL CONSIDERATIONS

Handling for disposal: To avoid wastes, use all material in this container by application according to label directions. If wastes cannot be avoided, offer remaining product to waste disposal facility or pesticide disposal program (often such programs are run by state or local governments or by industry).

Methods of disposal: Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not reuse containers for any other purpose. For disposable containers, triple rinse (or equivalent) containers, and add rinse material to the application equipment or a mix tank or store for disposal. Follow any additional local, state or federal requirements for cleaning containers prior to disposal. Make the empty, rinsed container unsuitable for further use. Dispose of at any EPA approved facility or dispose of in compliance with all Federal, State and local regulations. Contact your local, state or federal environmental agency for specific rules.

SECTION 14 — TRANSPORTATION INFORMATION

US DOT 49 CFR information:

For **non-bulk** shipments of **less than 10.5 gallons in one package** by all modes of transportation:

This material is not regulated for transport.

For **non-bulk** shipments **greater than or equal to 10.5 gallons in one package** by all modes of transportation:

SECTION 14 — TRANSPORTATION INFORMATION (cont'd.)

UN3082, Environmentally hazardous substance, liquid, n.o.s. (malathion), 9, PGIII, RQ

For **bulk** shipments by all modes of transportation:

UN3082, Environmentally hazardous substance, liquid, n.o.s. (malathion), 9, PGIII, RQ, Marine Pollutant

INTERNATIONAL:

IMDG/IMO (vessel): UN3082, Environmentally hazardous substance, liquid, n.o.s. (malathion), 9, PGIII, Marine Pollutant

IATA/ICAO (air): UN3082, Environmentally hazardous substance, liquid, n.o.s. (malathion), 9, PGIII, Marine Pollutant

SECTION 15 — REGULATORY INFORMATION

Regulations under FIFRA: All pesticides are governed under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act). Therefore, the regulations presented are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulating facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

EPA/CERCLA Reportable Quantity (RQ): 100 lbs. (Malathion).

SARA TITLE III:

Sec. 302, Extremely Hazardous Substance Notification: This material is not known to contain any Extremely Hazardous Substances.

Sec. 311/312, Hazard Categories: Immediate (acute) health hazard
Chronic (delayed) health hazard

Sec. 313, Toxic Chemicals Notification: Malathion (CAS #: 121-75-5)

California Proposition 65: This product does not contain any chemicals known to the state of California to cause cancer or reproductive harm.

SECTION 16 — OTHER INFORMATION

HMIS Rating: *2 Health; 0 Flammability; 0 Reactivity

NFPA Rating: 2 Health; 0 Flammability; 0 Reactivity

0-minimal 1- slight 2-moderate 3-severe 4-extreme

Prepared by: Cheminova Inc.

Telephone #: (919) 474-6600 (8 AM to 5:00 PM EST, Monday to Friday)

Preparation date: January 4, 2011