

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION

Product identifier : **FYFANON ULV MOSQUITO**

Product Code(s) : None reported.

Product Use : Active ingredient in insecticides.

Chemical Family : Mixture

Supplier's name and address:
Cheminova, Inc.
 One Park Drive, Suite 150
 PO Box 110566
 Research Triangle Park, NC, USA
 27709

Manufacturer's name and address:
Cheminova A/S
 PO Box 9
 DK-7620
 Lemvig, , Denmark

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

24 Hr. Emergency Tel # : Chemtrec 1-800-424-9300 (Within Continental U.S.); Chemtrec 703-527-3887 (Outside U.S.).
 For Medical Emergencies: (800) 303-6950

SECTION 2 - HAZARDS IDENTIFICATION

Classification : OSHA: This material is classified as hazardous under OSHA regulations (29CFR 1910.1200). Hazardous classification: Unstable (reactive); Acute Health Hazard; Chronic Health Hazard.

WHMIS information: This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA). For informational purposes, this product would have the following WHMIS classification: Class D2B (Materials Causing Other Toxic Effects, Toxic Material); Class F (Dangerously Reactive Material).

Emergency Overview : Colourless to light yellow liquid. Slightly aromatic odour.
 Warning! Dangerous exothermic decomposition may occur at temperatures greater than 212°F / 100°C. May be harmful if inhaled or swallowed. May cause eye irritation. Contains material which can cause nervous system damage. May be dangerous for the environment. Malathion is toxic to birds, fish, aquatic invertebrates, aquatic life stages of amphibians and highly toxic to bees.

POTENTIAL HEALTH EFFECTS:

Signs and symptoms of short-term (acute) exposure

Inhalation : Fyfanon (Malathion) is a cholinesterase inhibitor of low mammalian toxicity. However storage at too high temperatures may induce formation of the much more toxic and synergistic contaminant isomalathion (LD50 acute oral, rat = 89 mg/kg). Malathion and isomalathion can affect you when breathed in and can cause organophosphorous poisoning. Symptoms of poisoning may include headache, nausea, vomiting, blurred vision, tightness in chest, drooling, frothing of mouth and nose, convulsions, coma and death.

Skin : Direct skin contact may result in little or no irritation. Malathion and isomalathion can be rapidly absorbed through all skin surfaces. Causes symptoms similar to those listed for inhalation.

Eyes : Direct contact causes eye irritation. Malathion and isomalathion can be rapidly absorbed through all skin and eye surfaces. Causes symptoms similar to those listed for inhalation.

Ingestion : Malathion and isomalathion are poisons through ingestion. Causes symptoms similar to those listed for inhalation.

Effects of long-term (chronic) exposure

: Prolonged or repeated overexposure may cause behavioral changes.

Carcinogenic status : See TOXICOLOGICAL INFORMATION, Section 11.

Additional health hazards : Cholinesterase inhibitor. See TOXICOLOGICAL INFORMATION, Section 11.

Potential environmental effects

: Malathion is toxic to birds, fish, aquatic invertebrates, aquatic life stages of amphibians and highly toxic to bees. See ECOLOGICAL INFORMATION (Section 12).

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	CAS #	Wt.%
Malathion	121-75-5	60.00 - 100.00

SECTION 4 - FIRST AID MEASURES

- Inhalation** : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. Seek immediate medical attention/advice.
- Skin contact** : Immediately flush skin with running water for at least 15 minutes, while removing contaminated clothing. If irritation persists, seek prompt medical attention. Wash contaminated clothing before re-use.
- Eye contact** : Flush eyes thoroughly with running water for at least 20 minutes, holding eyelids open to ensure complete flushing. Seek immediate medical attention/advice.
- Ingestion** : Do NOT induce vomiting. Have victim rinse mouth with water, then give one to two glasses of water to drink. Induce vomiting ONLY under the direct supervision of qualified medical personnel or a poison control centre. Never give anything by mouth to an unconscious person. Seek immediate medical attention/advice.
- Notes For Physician** : Malathion is a cholinesterase inhibitor affecting the central and peripheral nervous systems and producing respiratory and cardiac depression. Decontamination procedures such as whole body washing, gastric lavage and administration of activated charcoal are often required. If symptoms are present, administer atropine sulphate in large doses. Two to four mg intravenously or intramuscularly as soon as possible. Repeat at 5 to 10 minute intervals until signs of atropinization appear and maintain full atropinization until all organophosphorous is metabolised. Obidoxime chloride (Toxogonin), alternatively pralidoxime chloride (2-PAM), is a pharmacological antidote and may be administered as an adjunct to, but not a substitute for atropine, which is a symptomatic and often life-saving antidote. At first sign of pulmonary edema, the patient should be given supplemental oxygen and treated symptomatically. Continued absorption of Malathion may occur and relapse may occur after initial improvement. VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS.

SECTION 5 - FIRE FIGHTING MEASURES

- Fire hazards/conditions of flammability** : This product is considered non-flammable. Material will decompose rapidly when exposed to heat (>212oF / 100oC) and flame, increasing the risk of explosion. Heat of decomposition may cause closed containers to build up pressure and explode.
- Flammability classification (OSHA 29 CFR 1910.1200)** : Non-flammable.
- Oxidizing properties** : None known.
- Explosion data: Sensitivity to mechanical impact / static discharge** : Not expected to be sensitive to mechanical impact or static discharge.
- Suitable extinguishing media** : Carbon dioxide or dry chemical for small fires. For large fires, use water spray or foam.
- Special fire-fighting procedures/equipment** : Firefighters should wear proper protective equipment and self contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame. Avoid spreading burning liquid with water spray used for cooling purposes.
- Hazardous combustion products** : Carbon oxides; Oxides of phosphorus; oxides of sulphur; dimethyl sulfide; irritating fumes and smoke.
- NFPA Rating** :

0 - Minimal	1 - Slight	2 - Moderate	3 - Serious	4 - Severe
<i>Health:</i> 1	<i>Flammability:</i> 1	<i>Instability:</i> 1	<i>Special Hazards:</i>	None

SECTION 6 - ACCIDENTAL RELEASE MEASURES

- Personal precautions** : Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. 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. If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply. Do not flush into surface water or sanitary sewer system. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.
- Spill response/cleanup** : Remove all sources of ignition. Ventilate area of release. Stop the spill at source if it is safe to do so. Contain and absorb spilled material with inert, non-combustible absorbent material, such as sand. Sweep up and shovel into suitable containers for disposal. Notify the appropriate authorities as required. Carefully cover spilled material with soda ash or quicklime to neutralize. Do not flush into surface water or sanitary sewer system. For large spills on surfaces other than pavement (e.g. soil or sand), spills may be handled by digging up and removing the affected surface and placing it in approved 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. Notify the appropriate authorities as required.
- Prohibited materials** : None known.
- Special spill response procedures** : If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8002).
US CERCLA Reportable quantity (RQ): Malathion (100 lbs / 45.4 kg)

SECTION 7 - HANDLING AND STORAGE

- Safe Handling procedures** : This material is a toxic liquid. Wear chemically resistant protective equipment during handling. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Do not use near welding operations, flames or hot surfaces. Malathion should never be heated above 131oF / 55oC and also local heating above this temperature should be avoided. Keep away from acids and other incompatibles. Keep containers tightly closed when not in use. Wash thoroughly after handling. Use caution when opening cap.
- Storage requirements** : Store in a cool, dry, well ventilated area. Keep away from incompatibles. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area. Inspect periodically for damage or leaks. Product should be stored at temperatures not exceeding 68 to 77oF (20 to 25oC). Protect against physical damage.
- Incompatible materials** : Strong alkalis, amines and strong oxidizing compounds. The product can corrode iron, steel, tin plate and copper. Fyfanon is rapidly hydrolysed at pH > 7.0.
- Special packaging materials** : Always keep in containers made of the same materials as the supply container.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

<u>Exposure Limits</u>				
<u>Ingredients</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
	<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Malathion	1 mg/m ³ (inhalable)	N/Av	15 mg/m ³ (total dust)	N/Av

- Ventilation and engineering measures** : Provide sufficient ventilation to keep vapour concentration below the given TLV and/or PEL.
- Respiratory protection** : Respiratory protection is required if the concentrations exceed the TLV. Wear a pesticide respirator jointly approved by the MSHA and NIOSH. Seek advice from respiratory protection specialists.
- Skin protection** : Wear impervious gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton. Advice should be sought from glove suppliers.
- Eye / face protection** : Safety glasses with side-shields or chemical splash goggles.
- Other protective equipment** : Wear appropriate protective clothing to prevent skin contact, such as coveralls or long sleeved shirt, long pants, and shoes and socks. Other protective equipment, such as an eyewash station and safety shower, may be required depending on exposure and on workplace standards.

General hygiene considerations

- : Avoid contact with skin, eyes and clothing. Remove soiled clothing and wash it thoroughly before reuse. Separate contaminated work clothes from street clothes. Always wash hands, face and arms with soap and water before smoking, eating or drinking. After work, take off all protective equipment, work clothes and shoes, and wash with soap and water. Respirator should be cleaned and filter replaced according to manufacturer's instructions. Wear only clean, uncontaminated clothes when leaving place of work. 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	: Liquid	Appearance	: Colourless to light yellow liquid.
Odour	: Slightly aromatic odour.	Odour threshold	: N/Av
pH	: 3.7 - 3.8 (equal amounts of Fyfanon and distilled water)		
Boiling point	: 313 - 315°F / 156 - 157°C	Specific gravity	: 1.23 g/mL @ 20°C
Melting/Freezing point	: 37.1°F / 2.85°C	Coefficient of water/oil distribution	: Kow = 560
Vapour pressure (mmHg @ 20° C / 68° F)	: 3.4 x 10 ⁻⁶ mmHg @ 25°C; 1.4 x 10 ⁻⁴ mmHg @ 45°C	Solubility in water	: 148.2 mg/L @ 25°C
Vapour density (Air = 1)	: N/Av	Evaporation rate (n-Butyl acetate = 1)	: N/Av
Volatile organic Compounds (VOC's)	: N/Av	Volatiles (% by weight)	: N/Av
Flash point	: 325°F / 163°C		
Flash point Method	: PMCC	Auto-ignition temperature	: 532°F / 278°C
Lower flammable limit (% by vol.)	: N/Av	Upper flammable limit (% by vol.)	: N/Av
Flame Projection Length	: N/Av	Flashback observed	: N/Av

Section 10: Stability And Reactivity

Stability and reactivity	: Stable if handled below 131oF / 55oC. At higher temperatures decomposition may take place, and the released heat from decomposition can raise the temperature further and accelerate decomposition. Malathion can corrode iron, steel, tin plate and copper. It can be rapidly hydrolysed at pH >7.
Hazardous polymerization	: Above 284oF / 140oC Fyfanon will decompose rapidly, significantly increasing the risk of inducing explosions. Direct local heating such as electric heating or by steam must be avoided. The decomposition is to a considerable extent dependant 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 sulfide.
Conditions to avoid	: Open flames, sparks, high heat, direct sunlight, and close proximity to incompatible substances.
Materials To Avoid And Incompatibility	: Incompatible materials (see Section 7).
Hazardous decomposition products	: Storage at too high temperatures may induce formation of the more toxic and synergistic contaminant isomalathion. Refer to Section 5 for additional 'Hazardous combustion products'.

SECTION 11 - TOXICOLOGICAL INFORMATION

Target organs	: Eyes, skin, respiratory system, digestive system, central nervous system.
Routes of exposure	: <i>Inhalation:</i> YES <i>Skin Absorption:</i> YES <i>Skin & Eyes:</i> YES <i>Ingestion:</i> YES



- Toxicological data** : Fyfanon:
 - LC50 Inhalation (rat): > 5.2 mg/L / 4 Hrs
 - LD50 Oral (rat): 5500 mg/kg
 - LD50 Dermal (rat): > 2000 mg/kg
- Carcinogenic status** : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.
- Reproductive effects** : Not expected to have other reproductive effects.
- Teratogenicity** : Not expected to be a teratogen.
- Mutagenicity** : Not expected to be mutagenic in humans.
- Epidemiology** : Not available.
- Sensitization to material** : None known.
- Synergistic materials** : Not available.
- Irritancy** : May cause eye and skin irritation. May cause irritation to upper respiratory system.
- other important hazards** : Cholinesterase inhibitor May cause central nervous system depression. Contains a material which can cause peripheral nervous system damage.
- Conditions aggravated by overexposure** : None known.

SECTION 12 - ECOLOGICAL INFORMATION

- Ecotoxicity** : This product is an insecticide. Malathion is toxic to birds, fish, aquatic invertebrates, aquatic life stages of amphibians and highly toxic to bees. The toxicity of the active ingredients to wildlife species is measured to be:
 - Fish - 96-hr LC50, Rainbow Trout (*Salmo gairdneri*) = 0.18 mg/L; 37-day NOEC: 21 µg/L
 - Invertebrates - 48-hr EC50, Daphnids (*Daphnia magna*) = 0.72 mg/L; 21-day NOEC: 0.06 µg/L
 - Algae - Green algae (*Selenastrum capricornutum*) 72-Hr LC50= 4.06 mg/L
 - Birds - LD50, Bobwhite quail (*Colinus virginianus*) = 359 mg/kg; 5-day dietary LC50: 3497 mg/kg
 - LD50, Mallard duck (*Anas platyrhynchos*) = 1485 mg/kg
 - Earthworms - 14-day LC50, (*Eisenia foetida foetida*) = 613 mg/kg soil
 - Bees - LD50, worker honey-bees, acute oral = 0.38 µg/bee.
 - LD50, worker honey-bees, topical = 0.27 µg/bee
- Mobility** : Under normal conditions, the active ingredient is of medium mobility in soil, but it is degraded rapidly.
- Persistence** : The active ingredient, Malathion, is readily biodegradable. It undergoes rapid degradation in the environment and, without problems, in sewage 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, and biologically as well as abiotically. Under normal conditions, Malathion is of medium mobility in soil, but is degraded rapidly. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.
- Bioaccumulation potential** : The bioconcentration factor (BCF) of Malathion is 95 (average for several fish species).
- Other Adverse Environmental effects** : This product is an insecticide. Malathion is toxic to birds, fish, aquatic invertebrates, aquatic life stages of amphibians and highly toxic to bees. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.

SECTION 13 - DISPOSAL CONSIDERATIONS

- Handling for Disposal** : Handle waste according to recommendations in Section 7.
- Methods of Disposal** : Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Triple rinse (or equivalent) containers, then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill. Dispose in accordance with all applicable federal, state, provincial and local regulations. Contact your local, state, provincial or federal environmental agency for specific rules.
- RCRA** : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method.

SECTION 14: TRANSPORT INFORMATION					
Regulatory Information	UN Number	Shipping Name	Class	Packing Group	Label
49CFR/DOT	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (malathion)	9	III	
49CFR/DOT Additional information	None.				
TDG	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (malathion)	9	III	
TDG Additional information	Only regulated for marine transport.				

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

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

CERCLA Reportable Quantity (RQ) (40 CFR 117.302): See Section 6

SARA TITLE III: Sec. 302, Extremely Hazardous Substances, 40 CFR 355: No Extremely Hazardous Substances are present in this material.

SARA TITLE III: Sec. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes: Acute Health Hazard; Chronic Health Hazard. Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product may be subject to SARA notification requirements, since it contains Toxic Chemical constituents above their de minimus concentrations. This product contains: Malathion

US State Right to Know Laws:

California Proposition 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

International Information:

This product is a Pest Control Product and is not regulated as a Controlled Product under the Hazardous Products Act (HPA).

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

SECTION 16 - OTHER INFORMATION


HMIS Rating : * - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe
*Health: *1 Flammability: 1 Reactivity: 1*

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
 CAS: Chemical Abstract Services
 CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
 CFR: Code of Federal Regulations
 DOT: Department of Transportation
 EPA: Environmental Protection Agency
 HMIS: Hazardous Materials Identification System
 HSDB: Hazardous Substances Data Bank
 IARC: International Agency for Research on Cancer
 Inh: Inhalation
 N/Ap: not applicable
 N/Av: not available
 NFPA: National Fire Protection Association
 NIOSH: National Institute of Occupational Safety and Health
 NTP: National Toxicology Program

OEHHA - Office of Environmental Health Hazard Assessment
 OSHA: Occupational Safety and Health Administration
 PEL: Permissible exposure limit
 PMCC - Pinsky Martins Closed Cup
 RCRA: Resource Conservation and Recovery Act
 RTECS: Registry of Toxic Effects of Chemical Substances
 SARA: Superfund Amendments & Reauthorization Act
 STEL: Short Term Exposure Limit
 TDG: Canadian Transportation of Dangerous Goods Act & Regulations
 TLV: Threshold Limit Values
 TPQ: Threshold Planning Quantity
 TSCA: Toxic Substance Control Act
 TWA: Time Weighted Average
 WHMIS: Workplace Hazardous Materials Identification System

References

- : 1. ACGIH, Threshold Limit Values and Biological Exposure Indices.
- 2. International Agency for Research on Cancer Monographs.
- 3. Canadian Centre for Occupational Health and Safety, CCHInfoWeb databases, (Chempendium, HSDB, RTECs).
- 4. Material Safety Data Sheet from manufacturer.
- 5. US EPA Title III List of Lists.
- 6. California Proposition 65 List.

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