

Product no.: -
Product name: **FYFANON[®] 500 g/l EC - NONYLPHENOL FREE**
Active ingredient: Malathion

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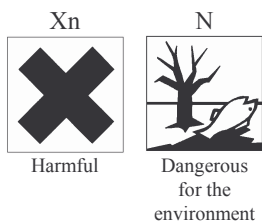
SAFETY DATA SHEET

FYFANON[®] 500 g/l EC NONYLPHENOL FREE

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1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING



Product name

FYFANON[®] 500 g/l EC - NONYLPHENOL FREE

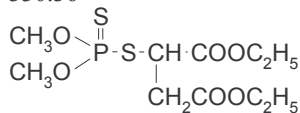
Intended use Insecticide

Manufacturer **CHEMINOVA A/S**
P.O.Box 9
DK-7620 Lemvig
Denmark

Emergency telephone no. (+45) 97 83 53 53

2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1.	ACTIVE INGREDIENT	FYFANON[®]
	CAS name	Butanedioic acid, [(dimethoxyphosphinothioyl)thio]-, diethyl ester
	CAS no.	121-75-5
	IUPAC name	S-1,2-Bis(ethoxycarbonyl)ethyl O,O-dimethyl phosphorodithioate
	ISO name/EU name	Malathion
	EC no. (EINECS no.)	204-497-7
	EU index no.	015-041-00-X
	EU classification of the ingredient	Xn;R22; see 16.
	Empirical formula	C ₁₀ H ₁₉ O ₆ PS ₂
	Molecular weight	330.36
	Structural formula	



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2.2. TYPICAL CONTENT

Active ingredient	Fyfanon® (Malathion) Technical	50 % by weight
Inert ingredients	Solvent	Max. 47 % by weight
	Emulsifiers, etc	Min. 3 % by weight
Reportable ingredients	Solvesso 150	Max. 47 % by weight
	Solvent naphtha (petroleum), heavy aromatic	
	CAS no.: 64742-94-5, EC no. (EINECS no.): 265-198-5	
	EU classification: Xn;R65 R66 R67 N;R51/53; see 16.	
	Naphthalene	4 % by weight
	CAS no.: 91-20-3, EC no. (EINECS no.): 202-049-5	
	EU classification: Xn;R22 N;R50/53; see 16.	
	1,2,4-Trimethylbenzene	3 % by weight
	CAS no.: 95-63-6, EC no. (EINECS no.): 202-436-9	
	EU classification: R10 Xn;R20 Xi;R36/37/38 N;R51/53; see 16.	
	Ethoxylated propoxylated alcohol ...	2 % by weight
	EU classification: R53; see 16.	
	Calcium tetrapropylene benzene sulphonate	1.5 % by weight
	CAS no.: 11117-11-6, EC no. (EINECS no.): 234-360-7	
	EC classification: Xn;R21 C;R34 R52/53; see 16.	

3. HAZARDS IDENTIFICATION

- 3.1. EU classification of the product Xn;R22 R65 R66 R67 N;R50/53; see 15.1.
 (according to 1999/45/EC as amended)
- WHO classification None (Unlikely to present acute hazard in normal use)
- 3.2. Health hazards (acute and chronic) The active ingredient **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, oral, rat, 89 mg/kg). Both malathion and isomalathion rapidly enter the body on contact with all skin surfaces and eyes.
- Repeated exposures to cholinesterase inhibitors such as isomalathion may, without warning, cause increased susceptibility to doses of any cholinesterase inhibitor.
- 3.3. Environmental hazards The product is very toxic to aquatic organisms. See section 12.

4. FIRST AID MEASURES

- 4.1. Signs and symptoms of exposure .. Headache, nausea, vomiting, cramps, weakness, blurred vision, pin-point pupils, tightness in chest, laboured breathing, nervousness, sweating, watering of eyes, drooling or frothing of mouth and nose, muscle spasms and coma.
- 4.2. Emergency and first aid procedures

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General	<p>When any of the signs of exposure occurs, call a doctor (physician), clinic or hospital immediately. Explain that the victim has been exposed to malathion, an organophosphorus insecticide, and describe his/her condition and the extent of exposure.</p> <p>Immediately remove the victim from the area where Fyfanon[®] is present. Clothing contaminated with material must be removed immediately and all skin washed thoroughly.</p> <p>If breathing has stopped, immediately start artificial respiration and maintain until a physician takes charge of the exposed person.</p>
Inhalation	<p>If experiencing any discomfort, immediately remove the exposed person from exposure. Get medical attention immediately if symptoms (see 4.1.) develop.</p>
Ingestion	<p>If the exposed person is conscious, make him/her vomit quickly. Make the exposed person drink 1 or 2 glasses of water and let him/her induce vomiting by touching the back of the throat with a finger. If vomiting occurs, give water again. Never give anything by mouth to an unconscious person. Get medical attention immediately.</p>
Eye contact	<p>Immediately flush with plenty of water or eyewash solution, occasionally opening eyelids, until no evidence of chemical remains. Remove contact lenses after a few minutes and flush again. See physician immediately if symptoms develop.</p>
Skin contact	<p>Immediately flush with plenty of water while removing contaminated clothing and shoes. Wash with water and soap. See physician immediately if symptoms develop.</p>
4.3. Note to physician	<p>Fyfanon[®] (malathion) is a cholinesterase inhibitor affecting the central and peripheral nervous systems producing respiratory depression.</p> <p>The product contains petroleum distillates which may pose an aspiration pneumonia hazard.</p>
Cholinesterase inhibition – treatment	<p>Decontamination procedures such as whole body washing, gastric lavage and administration of activated charcoal are often required.</p> <p>Antidote: If symptoms (see 4.1.) are present, administer atropine sulphate, which often is a lifesaving antidote, in large doses, TWO to FOUR mg intravenously or intramuscularly as soon as possible. Repeat at 5 to 10 minute intervals until signs of atropinisation appear and maintain full atropinisation until all organophosphate is metabolised.</p> <p>Obidoxime chloride (Toxogonin), alternatively pralidoxime chloride (2-PAM), may be administered as an adjunct to, but not a substitute for atropine sulphate. Treatment with oxime should be maintained as long as atropine sulphate is administered.</p>

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At first sign of pulmonary oedema the patient should be given supplementary oxygen and treated symptomatically.

Relapse can occur after initial improvement.
VERY CLOSE SUPERVISION OF THE PATIENT IS INDICATED FOR AT LEAST 48 HOURS, DEPENDING ON THE SEVERITY OF POISONING.

5. FIRE-FIGHTING MEASURES

- 5.1. Extinguishing media and procedure Dry chemical or carbon dioxide for small fires, water spray or foam for large fires.
- Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours 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.
- 5.2. Hazardous decomposition or byproducts in a fire The essential breakdown products are volatile, malodorous, toxic, irritant and inflammable compounds such as dimethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide and phosphorus pentoxide.
- 5.3. Unusual fire and explosion hazards See 10.1.

6. ACCIDENTAL RELEASE MEASURES

- 6.1. Personal protection Observe all protection and safety precautions when cleaning up spills. Depending on the magnitude of the spill this may mean wearing safety glasses, gloves and chemical resistant clothing. See section 8.
- 6.2. Steps to be taken in case of spill ... It is recommended to have a predetermined plan for the handling of spills.
- Stop the source of the spill immediately if safe to do so. Contain the spill to prevent any further contamination of surface, soil or water. Remove sources of ignition. Keep unprotected persons away from the spill area.
- Spills on the floor or other impervious surface should be absorbed onto an absorptive material such as hydrated lime, universal absorbent, Fuller's earth or other absorbent clays. Collect the contaminated absorbent and transfer to suitable containers. Rinse the area with industrial detergent and much water. Washings must be prevented from entering surface water drains.
- Large spills which soak into the ground should be dug up and placed in suitable containers.

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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 labelled. Refer to section 13 for disposal.

7. HANDLING AND STORAGE

7.1. Precautions to be taken in handling In an industrial environment it is recommended to avoid all personal contact with the product, preferably by use of closed systems and remote system control. Otherwise adequate ventilation or local exhaust ventilation is required. The exhaust gases should be filtered or treated otherwise. For personal protection, see section 8.

For its use as a pesticide, first look for precautions and personal protection measures on the officially approved label on the packaging or for other official guidance or policy in force. If these are lacking, see section 8. The precautions of section 8 are primarily meant for handling of the undiluted product and for preparing the spray solution, but can be recommended for spraying as well.

7.2. Precautions to be taken in storing **Fyfanon[®]** is stable when stored at temperatures not exceeding 20-25°C.

The product should never be heated above 55°C. Local heating above this temperature should be avoided as well. Preferably store in the shade and avoid exposure to direct sunlight for prolonged periods.

Store in closed containers. Do not store in unlabelled containers.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

7.3. Specific use This product is a pesticide which may only be used for officially allowed applications.

7.4. Fire and explosion precautions Protect from exposure to fire and heat.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure limit values

		Year	
Malathion	OSHA (USA) PEL	2002	TWA 15 mg/m ³ total dust; skin notation
	ACGIH (USA) TLV	2001	TWA 10 mg/m ³ ; skin notation; BEI
	EU, 2000/39/EC	2000	Not established

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	Germany, MAK	2002	TWA 15 mg/m ³ measured as inhalable fraction of the aerosol Excursion factor 4, 15 min, average value Number per shift 4, interval 1 h BAT
	HSE (UK) OEL	2002	8-hr TWA 10 mg/m ³ ; skin notation
Naphthalene	OSHA (USA) PEL	2002	8-hr TWA 10 ppm (50 mg/m ³)
	ACGIH (USA) TLV	2001	TWA 10 ppm (52 mg/m ³) STEL/CEILING 15 ppm (75 mg/m ³) Skin notation
	EU, 2000/39/EC	2000	Not established
	Germany, MAK	2002	Skin notation
	HSE (UK) OEL	2002	8-hr TWA 10 ppm (53 mg/m ³) STEL 15 ppm (80 mg/m ³); 15 min. reference period Chemical hazard alert notice
1,2,4-Trimethylbenzene	OSHA (USA) PEL	2002	Not established
	ACGIH (USA) TLV	2001	TWA 25 ppm (123 mg/m ³)
	EU, 2000/39/EC	2000	8-hr TWA 20 ppm (100 mg/m ³)
	Germany, MAK	2002	TWA 20 ppm (100 mg/m ³), all isomers Peak level 40 ppm (200 mg/m ³) Max. duration per shift: 15 min. (average value) Max. number per shift: 4, 1 hour interval
	HSE (UK) OEL	2002	8-hr TWA 25 ppm (125 mg/m ³), all isomers or mixtures Indicative OEL value
Solvesso 150			100 ppm total hydrocarbon is recommended. Solvesso 150 contains trimethylbenzene. The ACGIH recommends a TLV-TWA of 25 ppm (123 mg/m ³) for trimethylbenzene.

However, other threshold limit values defined by local regulations may exist and must be observed.

8.2. Personal protection When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system. Consider the need to render equipment or piping systems nonhazardous before opening.

Respiratory protection The product does not automatically present an airborne exposure concern when handled carefully, but in the event of discharge of the material during manufacturing or handling which produces a heavy vapour or mist, workers should put on officially approved respiratory protection equipment with a universal filter type including particle filter.

Protective gloves Wear chemical resistant gloves, such as barrier laminate, butyl rubber, nitrile rubber or viton. The breakthrough times of these materials for malathion are unknown, but it is expected that they will give adequate protection based on the low dermal toxicity of the substance.

Eye protection Wear safety glasses. It is recommended to have an eye wash

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fountain immediately available in the workplace.

- Other protection Wear coveralls or long sleeved shirt and long pants. Wear shoes plus socks.
- 8.3. Work/hygienic practices Persons working with this product for a longer period should have frequent blood tests of their cholinesterase levels. If the cholinesterase level falls below a critical point, no further exposure should be allowed until it has been determined by means of blood tests that the cholinesterase level has returned to normal.
- Keep all unprotected persons and children away from working area.
- Avoid contact with eyes, skin or clothing. Avoid breathing vapour or spray mist. Before removing gloves, wash them with water and soap. Wash thoroughly with water and soap after handling. Remove contaminated clothing immediately and wash before reuse.
- After work, take off all work clothes and shoes. Shower, using water and soap. Wear only clean clothes when leaving job. Do not wear contaminated clothing.
- 8.4. Environmental exposure controls .. See section 13.

9. PHYSICAL AND CHEMICAL PROPERTIES
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- | | |
|---|--|
| 9.1. Physical state | Clear liquid |
| 9.2. Colour | Colourless |
| 9.3. Odour | Aromatic |
| 9.4. Melting point | Below 0°C |
| 9.5. Boiling point | Malathion : 156-157°C at 0.7 mm Hg (however, see 10.1. Thermal Decomposition)
Solvesso 150 : 178-209°C |
| 9.6. Specific gravity | Approx. 1.04 g/ml |
| 9.7. Vapour pressure | Malathion : 3.4 x 10 ⁻⁶ mm Hg at 25°C
1.4 x 10 ⁻⁴ mm Hg at 45°C
Solvesso 150 : 0.6 mm Hg at 20°C
3 mm Hg at 38°C |
| 9.8. Viscosity | Not available |
| 9.9. Solubility in water | Malathion : 148.2 mg/l at 25°C |
| 9.10. Solubility in organic solvents | Solubility of malathion at 20°C in:
Xylene > 250 g/l
1,2-Dichloromethane > 250 g/l
Heptane 57-67 g/l
Ethyl acetate > 250 g/l
Methanol > 250 g/l
Acetone > 250 g/l |
| 9.11. Partition coefficient n-octanol/water | Malathion : K _{ow} = 560 |
| 9.12. Surface tension | Not available |
| 9.13. pH | Not available |
| 9.14. Flash point | 70-72°C (Pensky-Martens closed cup) |
| 9.15. Autoignition temperature | Malathion : 278°C
Solvesso 150 : 450°C |

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- 9.16. Flammable limits **Solvesso 150** : 0.6 - 7.0 vol%
9.17. Explosive properties Not explosive
9.18. Oxidising properties Not oxidising

10. STABILITY AND REACTIVITY

- 10.1. Thermal decomposition **Fyfanon® (malathion)** will decompose rapidly when heated to temperatures above 100°C, significantly increasing the risk of explosion.

The decomposition is to a considerable extent dependent on time as well as temperature due to exothermic and autocatalytic reactions. The reactions involve rearrangements and polymerisation releasing volatile malodorous and inflammable compounds such as dimethyl sulphide.
- 10.2. Hazardous decomposition or byproducts See 3.1. and 5.2.
- 10.3. Materials to avoid Strong alkalis, amines and strong oxidising compounds. It can corrode iron, steel, tin plate, lead and copper. **Fyfanon®** is rapidly hydrolysed at pH > 7.0 or < 5.0.

11. TOXICOLOGICAL INFORMATION

- 11.1. Acute toxicity The product is not considered to be harmful, neither by inhalation, in contact with skin nor if swallowed. However, it may become harmful after storage at too high temperatures. See 3.1.

The acute toxicity of the product, measured on a similar product, is:
- | | | |
|-------------------|--------------|--|
| Route(s) of entry | - Ingestion | LD ₅₀ , oral, rat : approx. 3400 mg/kg |
| | - Skin | LD ₅₀ , dermal, rat: > 2000 mg/kg |
| | - Inhalation | LC ₅₀ , inhalation, rat: > 4.9 mg/l/4 h |
- 11.2. Irritancy The product is slightly irritating to skin. It causes substantial but temporary eye injury, as shown in animal tests. However, in one out of nine rabbits permanent eye damage occurred.
- 11.3. Allergic sensitisation The product is not a sensitiser.
- 11.4. Carcinogenicity IARC evaluation: The available data provide no evidence that **malathion** is likely to present a carcinogenic risk to humans.
- 11.5. Effects on reproductivity No effects on reproductivity are found for **malathion** in rats and rabbits at maternal non-toxic doses.
- 11.6. Teratogenicity No indications of teratogenic effects of **malathion** are found.
- 11.7. Mutagenicity **Malathion** is not mutagenic.

12. ECOLOGICAL INFORMATION

- 12.1. Ecotoxicity The product is highly toxic to aquatic invertebrates and insects and toxic to fish. It is harmful to aquatic plants. It is not considered as harmful to soil micro- and macroorganisms, birds and mammals.

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The ecotoxicity, measured on a similar product, is:

- Fish	Zebrafish (<i>Brachydanio rerio</i>)	96 h-LC ₅₀ : 16.5 mg/l
- Invertebrates	Daphnids (<i>Daphnia magna</i>)	48 h-EC ₅₀ : < 0.01 mg/l
- Algae	Green algae (<i>Selenastrum capricornutum</i>)	96-h IC ₅₀ : 61.7 mg/l
- Birds	Japanese quail (<i>Coturnix coturnix japonica</i>)	LD ₅₀ : 237.5 mg/kg
- Earthworms	<i>Eisenia foetida</i>	14-day LC ₅₀ : 170.4 mg/kg soil
- Bees	Honey bees (<i>Apis mellifera</i>)	24 h-LD ₅₀ , contact: 0.301 µg/bee

12.2. Mobility Under normal conditions **Fyfanon®** is of medium mobility in soil.

12.3. Persistence and degradability **Fyfanon®** 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.

12.4. Bioaccumulative potential **Fyfanon®** does not bioaccumulate. It is rapidly degraded and excreted. The bioaccumulation factor of **Fyfanon®** is measured to be 95 for whole fish (bluegill sunfish, *Lepomis macrochirus*).

13. DISPOSAL CONSIDERATIONS

13.1. Waste disposal method Left-over material can be removed by controlled discharge to a waste water treatment plant. Other possible methods of disposal are controlled incineration with flue gas scrubbing or removal to a licensed chemical destruction plant.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

13.2. Container disposal Triple rinse (or equivalent) and offer for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill.

Disposal of waste and packagings must always be in accordance with all applicable local regulations.

14. TRANSPORT INFORMATION

UN CLASSIFICATION:

Proper Shipping Name	Environmentally Hazardous Substance, Liquid, N.O.S. (Malathion)
Class	9
UN no.	3082
Packaging group	III
Primary hazard	Miscellaneous
Subsidiary risk	-

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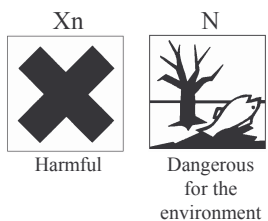
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Marine pollutant (P/PP) Marine pollutant
 (IMDG Code)

15. REGULATORY INFORMATION

15.1. **IN THE EU:**
 Classification and labelling:
 (according to 1999/45/EC as amended):
 Hazard symbols



Contains **Malathion and Solvent naphtha (petroleum), heavy aromatic**
R-phrases R22-65-66-67-50/53: Harmful if swallowed. Harmful: may cause lung damage if swallowed. Repeated exposure may cause skin dryness and cracking. Vapours may cause drowsiness and dizziness. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-phrases S57-60-61: Use appropriate container to avoid environmental contamination. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

15.2. Regulatory status All components in this product are in compliance with EU chemical legislation.

16. OTHER INFORMATION

Used R-phrases R10 Flammable
 R20 Harmful by inhalation.
 R21 Harmful in contact with skin.
 R22 Harmful if swallowed.
 R34 Causes burns.
 R36/37/38 Irritating to eyes, respiratory system and skin.
 R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
 R53 May cause long-term adverse effects in the aquatic environment.
 R65 Harmful: may cause lung damage if swallowed.
 R66 Repeated exposure may cause skin dryness and cracking.
 R67 Vapours may cause drowsiness and dizziness.

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This material should only be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.

The information provided in this safety data sheet is believed to be accurate and reliable, but uses of the product vary and situations unforeseen by Cheminova A/S may exist. The user of the material has to check the validity of the information under local circumstances.