

**Fenbendazole Paste Formulation**

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.4	14.04.2025	10099854-00008	Date of first issue: 28.10.2021

**SECTION 1. IDENTIFICATION**

Product name : Fenbendazole Paste Formulation

**Manufacturer or supplier's details**

Company : MSD

Address : Calle 127A #53A-45 Torre 3 – Piso 8  
Bogotá D.C., Colombia Complejo Empresarial Colpatría

Telephone : (+57) 1 2886012

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E-mail address : EHSDATASTEWARD@msd.com

**Recommended use of the chemical and restrictions on use**

Recommended use : Veterinary product

Restrictions on use : Not applicable

**SECTION 2. HAZARDS IDENTIFICATION****GHS Classification**

Reproductive toxicity : Category 2

Specific target organ toxicity - repeated exposure (Oral) : Category 2 (Liver, Stomach, Nervous system, Lymph nodes)

Short-term (acute) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1

**GHS label elements**

Hazard pictograms :



Signal Word : Warning

Hazard Statements : H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.  
H373 May cause damage to organs (Liver, Stomach, Nervous system, Lymph nodes) through prolonged or repeated exposure if swallowed.  
H410 Very toxic to aquatic life with long lasting effects.

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Precautionary Statements : **Prevention:**  
P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P260 Do not breathe vapors.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P391 Collect spillage.

**Storage:**  
P405 Store locked up.

**Disposal:**  
P501 Dispose of contents/ container to an approved waste disposal plant.

**Other hazards which do not result in classification**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance / Mixture : Mixture

**Components**

Chemical name	CAS-No.	Concentration (% w/w)
fenbendazole	43210-67-9	$\geq 10$ - $\leq 18,75$
Ethanol#	64-17-5	$\leq 0,04$
Diethyl malonate#	105-53-3	$\leq 0,006$
2-Furaldehyde#	98-01-1	$\leq 0,006$
Cinnamaldehyde#	104-55-2	$\leq 0,002$
Isovaleraldehyde#	590-86-3	$\leq 0,002$
Acetaldehyde#	75-07-0	$\leq 0,0002$
Trans-hex-2-en-1-ol#	928-95-0	$\leq 0,0002$

# Voluntarily-disclosed substance

**SECTION 4. FIRST AID MEASURES**

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.  
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.  
Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.  
Remove contaminated clothing and shoes.  
Get medical attention.

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In case of eye contact	:	Wash clothing before reuse. Thoroughly clean shoes before reuse. Flush eyes with water as a precaution. Get medical attention if irritation develops and persists.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	Suspected of damaging fertility. Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure if swallowed.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).
Notes to physician	:	Treat symptomatically and supportively.

**SECTION 5. FIRE-FIGHTING MEASURES**

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO <sub>2</sub> ) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NO <sub>x</sub> ) Sulfur oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).
Environmental precautions	:	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g., by containment or oil barriers). Retain and dispose of contaminated wash water.

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Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.  
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.  
Clean up remaining materials from spill with suitable absorbent.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**SECTION 7. HANDLING AND STORAGE**

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Do not breathe vapors.  
Do not swallow.  
Avoid contact with eyes.  
Avoid prolonged or repeated contact with skin.  
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.  
Store locked up.  
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:  
Strong oxidizing agents  
Gases

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Ingredients with workplace control parameters**

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
fenbendazole	43210-67-9	TWA	100 µg/m <sup>3</sup> (OEB 2)	Internal
Ethanol	64-17-5	STEL	1.000 ppm	ACGIH
2-Furaldehyde	98-01-1	TWA	0,2 ppm	ACGIH
Acetaldehyde	75-07-0	C	25 ppm	ACGIH

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**Biological occupational exposure limits**

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
2-Furaldehyde	98-01-1	Furoic acid	Urine	End of shift (As soon as possible after exposure ceases)	200 mg/l	ACGIH BEI

**Engineering measures** : Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., drip-less quick connections).  
All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.  
Laboratory operations do not require special containment.

**Personal protective equipment**

**Respiratory protection** : If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.

**Filter type** : Combined particulates and organic vapor type

**Hand protection**

**Material** : Chemical-resistant gloves

**Eye protection** : Wear safety glasses with side shields or goggles.  
If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles.  
Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

**Skin and body protection** : Work uniform or laboratory coat.

**Hygiene measures** : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.  
When using do not eat, drink or smoke.  
Wash contaminated clothing before re-use.  
The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance** : paste

**Color** : white to off-white

**Odor** : cinnamon-like

**Odor Threshold** : No data available

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pH	:	6 - 8
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	No data available
Particle characteristics		
Particle size	:	No data available

**SECTION 10. STABILITY AND REACTIVITY**

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Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

**SECTION 11. TOXICOLOGICAL INFORMATION**

Information on likely routes of exposure :

- Inhalation
- Skin contact
- Ingestion
- Eye contact

**Acute toxicity**

Not classified based on available information.

**Components:****fenbendazole:**

Acute oral toxicity	:	LD50 (Rat): > 10.000 mg/kg
		LD50 (Mouse): > 10.000 mg/kg

**Ethanol:**

Acute oral toxicity	:	LD50 (Rat): 10.470 mg/kg
		Method: OECD Test Guideline 401

Acute inhalation toxicity	:	LC50 (Rat, male): 116,9 mg/l
		Exposure time: 4 h
		Test atmosphere: vapor

Acute dermal toxicity	:	LD50 (Rabbit): > 15.800 mg/kg
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**Diethyl malonate:**

Acute oral toxicity	:	LD50 (Rat): > 5.000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2.000 mg/kg
		Method: OECD Test Guideline 402
		Remarks: Based on data from similar materials

**2-Furaldehyde:**

Acute oral toxicity	:	LD50 (Rat): 108 mg/kg
		Method: OECD Test Guideline 401

Acute inhalation toxicity	:	LC50 (Rat): 1 mg/l
		Exposure time: 4 h
		Test atmosphere: vapor

Acute dermal toxicity	:	Acute toxicity estimate: 300 mg/kg
		Method: Expert judgment

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**Cinnamaldehyde:**

Acute oral toxicity	: LD50 (Rat): 2.200 mg/kg
Acute dermal toxicity	: LD50 (Rabbit): 1.260 mg/kg

**Isovaleraldehyde:**

Acute oral toxicity	: LD50 (Rat): 5.740 mg/kg
Acute inhalation toxicity	: LC50 (Rat): 42,7 mg/l Exposure time: 4 h Test atmosphere: vapor
Acute dermal toxicity	: LD50 (Rabbit): 2.534 mg/kg

**Acetaldehyde:**

Acute oral toxicity	: LD50 (Rat): 661 mg/kg
Acute dermal toxicity	: LD50 (Rabbit): 3.540 mg/kg

**Trans-hex-2-en-1-ol:**

Acute oral toxicity	: LD50 (Rat): 3.500 mg/kg
Acute inhalation toxicity	: Assessment: Corrosive to the respiratory tract.
Acute dermal toxicity	: LD50 (Rabbit): 4.500 mg/kg

**Skin corrosion/irritation**

Not classified based on available information.

**Components:****fenbendazole:**

Species	: Rabbit
Result	: No skin irritation

**Ethanol:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

**Diethyl malonate:**

Species	: Rabbit
Result	: No skin irritation

**2-Furaldehyde:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: Mild skin irritation

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**Cinnamaldehyde:**

Species	: human skin
Result	: Skin irritation

**Isovaleraldehyde:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: Mild skin irritation

**Acetaldehyde:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation

**Trans-hex-2-en-1-ol:**

Species	: reconstructed human epidermis (RhE)
Method	: OECD Test Guideline 431
Result	: Corrosive after 3 minutes to 1 hour of exposure

**Serious eye damage/eye irritation**

Not classified based on available information.

**Components:****fenbendazole:**

Species	: Rabbit
Result	: No eye irritation

**Ethanol:**

Species	: Rabbit
Result	: Irritation to eyes, reversing within 21 days
Method	: OECD Test Guideline 405

**Diethyl malonate:**

Species	: Rabbit
Result	: Irritation to eyes, reversing within 21 days

**2-Furaldehyde:**

Species	: Rabbit
Result	: Irritation to eyes, reversing within 21 days
Method	: OECD Test Guideline 405

**Cinnamaldehyde:**

Species	: Rabbit
Result	: Irritation to eyes, reversing within 21 days
Method	: OECD Test Guideline 405

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**Isovaleraldehyde:**

Species	:	Rabbit
Result	:	Irritation to eyes, reversing within 21 days

**Acetaldehyde:**

Species	:	Rabbit
Result	:	Irritation to eyes, reversing within 21 days

**Trans-hex-2-en-1-ol:**

Result	:	Irreversible effects on the eye
Remarks	:	Based on skin corrosivity.

**Respiratory or skin sensitization****Skin sensitization**

Not classified based on available information.

**Respiratory sensitization**

Not classified based on available information.

**Components:****Ethanol:**

Test Type	:	Mouse ear swelling test (MEST)
Routes of exposure	:	Skin contact
Species	:	Mouse
Result	:	negative

**Diethyl malonate:**

Test Type	:	Buehler Test
Routes of exposure	:	Skin contact
Species	:	Guinea pig
Method	:	OECD Test Guideline 406
Result	:	negative
Remarks	:	Based on data from similar materials

**2-Furaldehyde:**

Test Type	:	Maximization Test
Routes of exposure	:	Skin contact
Species	:	Guinea pig
Method	:	OECD Test Guideline 406
Result	:	negative

**Cinnamaldehyde:**

Test Type	:	Maximization Type
Routes of exposure	:	Skin contact
Species	:	Guinea pig
Result	:	positive

Assessment	:	Probability or evidence of high skin sensitization rate in
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humans

**Isovaleraldehyde:**

Test Type	: Maximization Test
Routes of exposure	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: positive
Remarks	: Based on data from similar materials
Assessment	: Probability or evidence of low to moderate skin sensitization rate in humans

**Acetaldehyde:**

Test Type	: Maximization Test
Routes of exposure	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative

**Trans-hex-2-en-1-ol:**

Test Type	: Local lymph node assay (LLNA)
Routes of exposure	: Skin contact
Species	: Mouse
Method	: OECD Test Guideline 429
Result	: negative
Remarks	: Based on data from similar materials

**Germ cell mutagenicity**

Not classified based on available information.

**Components:****fenbendazole:**

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Result: negative
	Test Type: DNA Repair Result: negative
	Test Type: Chromosomal aberration Result: negative
	Test Type: in vitro test Test system: mouse lymphoma cells Metabolic activation: Metabolic activation Result: equivocal

**Ethanol:**

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative
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Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

Test Type: Chromosome aberration test in vitro  
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Diethyl malonate:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: Directive 67/548/EEC, Annex V, B.13/14.  
Result: negative

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative  
Remarks: Based on data from similar materials

**2-Furaldehyde:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Result: positive

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: positive

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)  
Result: positive

Test Type: In vitro sister chromatid exchange assay in mammalian cells  
Result: positive

Genotoxicity in vivo : Test Type: Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo  
Species: Rat  
Application Route: Ingestion  
Result: negative

Test Type: Transgenic rodent somatic cell gene mutation assay  
Species: Mouse  
Application Route: Ingestion

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Result: negative

**Cinnamaldehyde:**

Genotoxicity in vitro

: Test Type: Bacterial reverse mutation assay (AMES)  
Result: negativeTest Type: In vitro mammalian cell gene mutation test  
Result: negativeTest Type: Chromosome aberration test in vitro  
Result: negative

Genotoxicity in vivo

: Test Type: Mammalian erythrocyte micronucleus test (in vivo  
cytogenetic assay)  
Species: Mouse  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materialsTest Type: Mammalian erythrocyte micronucleus test (in vivo  
cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: negativeTest Type: Mutagenicity (in vivo mammalian bone-marrow  
cytogenetic test, chromosomal analysis)  
Species: Mouse  
Application Route: Ingestion  
Result: negativeTest Type: Unscheduled DNA synthesis (UDS) test with  
mammalian liver cells in vivo  
Species: Rat  
Application Route: Ingestion  
Result: negative**Isovaleraldehyde:**

Genotoxicity in vitro

: Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: Based on data from similar materialsTest Type: DNA damage and repair, unscheduled DNA syn-  
thesis in mammalian cells (in vitro)  
Result: positive  
Remarks: Based on data from similar materials

Genotoxicity in vivo

: Test Type: Mammalian erythrocyte micronucleus test (in vivo  
cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Method: OECD Test Guideline 474  
Result: negative

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**Acetaldehyde:**

- Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative
- Test Type: In vitro mammalian cell gene mutation test  
Result: positive
- Test Type: Chromosome aberration test in vitro  
Result: positive
- Test Type: in vitro micronucleus test  
Result: positive
- Test Type: In vitro sister chromatid exchange assay in mammalian cells  
Result: positive
- Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)  
Result: positive
- Genotoxicity in vivo : Test Type: In vivo micronucleus test  
Species: Rat  
Application Route: Intraperitoneal injection  
Result: positive
- Test Type: Mammalian bone marrow sister chromatid exchange  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: positive
- Germ cell mutagenicity - Assessment : Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

**Trans-hex-2-en-1-ol:**

- Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative
- Test Type: in vitro micronucleus test  
Method: OECD Test Guideline 487  
Result: negative
- Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Based on data from similar materials

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**Carcinogenicity**

Not classified based on available information.

**Components:****fenbendazole:**

Species	: Mouse
Application Route	: oral (feed)
Exposure time	: 2 Years
NOAEL	: 405 mg/kg body weight
Result	: negative

Species	: Rat
Application Route	: Oral
Exposure time	: 2 Years
NOAEL	: 5 mg/kg body weight
Result	: negative
Target Organs	: Lymph nodes, Liver

**2-Furaldehyde:**

Species	: Mouse
Application Route	: Ingestion
Exposure time	: 103 weeks
Method	: OECD Test Guideline 451
Result	: positive
Remarks	: The mechanism or mode of action is not relevant in humans.

Species	: Hamster
Application Route	: inhalation (vapor)
Exposure time	: 52 weeks
Result	: negative

Species	: Mouse
Application Route	: Skin contact
Exposure time	: 47 weeks
Result	: positive

Carcinogenicity - Assessment	: Limited evidence of carcinogenicity in animal studies
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**Cinnamaldehyde:**

Species	: Rat
Application Route	: Ingestion
Exposure time	: 106 weeks
Result	: negative
Remarks	: Based on data from similar materials

Species	: Mouse
Application Route	: Intraperitoneal injection
Exposure time	: 24 weeks
Result	: negative

**Isovaleraldehyde:**

Species	: Rat
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Application Route : inhalation (vapor)  
Exposure time : 2 Years  
Result : negative  
Remarks : Based on data from similar materials

**Acetaldehyde:**

Species : Rat  
Application Route : Inhalation  
Exposure time : 121 weeks  
Result : positive

Carcinogenicity - Assessment : Sufficient evidence of carcinogenicity in animal experiments

**Reproductive toxicity**

Suspected of damaging fertility. Suspected of damaging the unborn child.

**Components:****fenbendazole:**

Effects on fertility : Test Type: Three-generation reproduction toxicity study  
Species: Rat  
Application Route: oral (feed)  
General Toxicity Parent: NOAEL: 15 mg/kg body weight  
Fertility: LOAEL: 45 mg/kg body weight  
Result: Effects on fertility.

Effects on fetal development : Test Type: Development  
Species: Dog, female  
Application Route: Oral  
Developmental Toxicity: LOAEL: 100 mg/kg body weight  
Result: Embryotoxic effects and adverse effects on the offspring were detected., No teratogenic effects.

Test Type: Embryo-fetal development  
Species: Rabbit  
Application Route: Oral  
Developmental Toxicity: NOAEL: 25 mg/kg body weight  
Result: Fetotoxicity.

Test Type: Embryo-fetal development  
Species: Rabbit  
Application Route: Oral  
Developmental Toxicity: LOAEL: 63 mg/kg body weight

Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Oral  
Developmental Toxicity: NOAEL: 120 mg/kg body weight  
Result: No effects on fetal development.

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, based on animal experiments., Some evidence of adverse effects on development, based on animal experiments.

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**Ethanol:**

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Mouse  
Application Route: Ingestion  
Result: negative

**Diethyl malonate:**

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: Based on data from similar materials

**2-Furaldehyde:**

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Cinnamaldehyde:**

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Mouse  
Application Route: Ingestion  
Result: negative

**Acetaldehyde:**

Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Trans-hex-2-en-1-ol:**

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 422  
Result: negative  
Remarks: Based on data from similar materials

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Effects on fetal development : Test Type: Embryo-fetal development  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative  
Remarks: Based on data from similar materials

**STOT-single exposure**

Not classified based on available information.

**Components:****2-Furaldehyde:**

Assessment : May cause respiratory irritation.

**Isovaleraldehyde:**

Assessment : May cause respiratory irritation.

**Acetaldehyde:**

Assessment : May cause respiratory irritation.

**STOT-repeated exposure**

May cause damage to organs (Liver, Stomach, Nervous system, Lymph nodes) through prolonged or repeated exposure if swallowed.

**Components:****fenbendazole:**

Routes of exposure : Ingestion  
Target Organs : Liver, Stomach, Nervous system, Lymph nodes  
Assessment : May cause damage to organs through prolonged or repeated exposure.

**2-Furaldehyde:**

Assessment : No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

**Repeated dose toxicity****Components:****fenbendazole:**

Species : Rat  
LOAEL : 500 mg/kg  
Application Route : Oral  
Exposure time : 2 Weeks  
Target Organs : Kidney, Liver

Species : Rat  
NOAEL : > 2.500 mg/kg  
Application Route : Oral

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Exposure time : 30 Days  
Remarks : No significant adverse effects were reported

Species : Rat  
LOAEL : 1.600 mg/kg  
Application Route : Oral  
Exposure time : 90 Days  
Target Organs : Central nervous system  
Symptoms : Tremors

Species : Dog  
NOAEL : 4 mg/kg  
LOAEL : 8 mg/kg  
Exposure time : 6 Months  
Target Organs : Stomach, Nervous system, Lymph nodes

**Ethanol:**

Species : Rat  
NOAEL : 1.730 mg/kg  
LOAEL : 3.200 mg/kg  
Application Route : Ingestion  
Exposure time : 90 Days

**2-Furaldehyde:**

Species : Rat  
NOAEL : 53 mg/kg  
Application Route : Ingestion  
Exposure time : 13 Weeks

**Cinnamaldehyde:**

Species : Rat  
NOAEL : 200 mg/kg  
Application Route : Ingestion  
Exposure time : 12 Weeks

**Acetaldehyde:**

Species : Rat  
NOAEL : 125 mg/kg  
LOAEL : 675 mg/kg  
Application Route : Ingestion  
Exposure time : 28 Days

Species : Rat  
NOAEL : 0,3 mg/kg  
LOAEL : 1 mg/kg  
Application Route : inhalation (vapor)  
Exposure time : 13 Weeks

**Trans-hex-2-en-1-ol:**

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Species	:	Rat
NOAEL	:	> 100 mg/kg
Application Route	:	Ingestion
Exposure time	:	98 Days
Remarks	:	Based on data from similar materials

**Aspiration toxicity**

Not classified based on available information.

**Components:****fenbendazole:**

No aspiration toxicity classification

**Experience with human exposure****Components:****fenbendazole:**

Ingestion : Symptoms: Rapid respiration, Salivation, anorexia, Diarrhea

**SECTION 12. ECOLOGICAL INFORMATION****Ecotoxicity****Components:****fenbendazole:**

Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 0,009 mg/l  
Exposure time: 21 d

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0,0088 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202

M-Factor (Acute aquatic toxicity) : 100

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0,00113 mg/l  
Exposure time: 21 Days  
Method: OECD Test Guideline 211

M-Factor (Chronic aquatic toxicity) : 10

**Ethanol:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 14.200 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Ceriodaphnia dubia (water flea)): 5.012 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : ErC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l  
Exposure time: 72 h

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EC10 (*Chlorella vulgaris* (Fresh water algae)): 11,5 mg/l  
Exposure time: 72 h

Toxicity to fish (Chronic toxicity) : NOEC (*Oryzias latipes* (Japanese medaka)):  $\geq 79$  mg/l  
Exposure time: 100 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (*Daphnia magna* (Water flea)): 9,6 mg/l  
Exposure time: 9 d

Toxicity to microorganisms : EC50 (Protozoa): 5.800 mg/l  
Exposure time: 4 h

**Diethyl malonate:**

Toxicity to fish : LC50 (*Pimephales promelas* (fathead minnow)): 12 - 17 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 179 mg/l  
Exposure time: 48 h  
Method: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae/aquatic plants : ErC50 (*Desmodesmus subspicatus* (green algae)):  $> 800$  mg/l  
Exposure time: 72 h

EC10 (*Desmodesmus subspicatus* (green algae)): 115 mg/l  
Exposure time: 72 h

Toxicity to microorganisms : EC50 (*Pseudomonas putida*): 3.097 mg/l  
Exposure time: 16 h  
Method: DIN 38 412 Part 8

**2-Furaldehyde:**

Toxicity to fish : EC50 (*Leuciscus idus* (Golden orfe)): 29 mg/l  
Exposure time: 48 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 29 mg/l  
Exposure time: 24 h

Toxicity to algae/aquatic plants : NOEC (*Microcystis aeruginosa* (blue-green algae)): 2,7 mg/l  
Exposure time: 8 d

Toxicity to fish (Chronic toxicity) : NOEC (*Danio rerio* (zebra fish)): 0,33 mg/l  
Exposure time: 12 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (*Daphnia magna* (Water flea)): 1,9 mg/l  
Exposure time: 21 d  
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50: 760 mg/l  
Exposure time: 30 min  
Method: OECD Test Guideline 209

**Cinnamaldehyde:**

Toxicity to fish : LC50 (*Danio rerio* (zebra fish)): 4,15 mg/l

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Exposure time: 96 h  
Method: Directive 67/548/EEC, Annex V, C.1.

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 3,21 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : ErC50 (Chlorella vulgaris (Fresh water algae)): 16,09 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50: 71 mg/l  
Exposure time: 3 h  
Method: ISO 8192

**Isovaleraldehyde:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 3,25 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 177 mg/l  
Exposure time: 48 h

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 137,37 mg/l  
Exposure time: 96 h

EC10 (Desmodesmus subspicatus (green algae)): 101,83 mg/l  
Exposure time: 96 h

Toxicity to microorganisms : EC10 (Pseudomonas putida): 310 mg/l  
Exposure time: 17 h  
Method: DIN 38 412 Part 8

**Acetaldehyde:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 30,8 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 57,4 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

EC10 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

**Trans-hex-2-en-1-ol:**

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Toxicity to fish	: LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 163 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	: ErC50 (Pseudokirchneriella subcapitata (green algae)): 226 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

**Persistence and degradability****Components:****Ethanol:**

Biodegradability	: Result: Readily biodegradable. Biodegradation: 84 % Exposure time: 20 d
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**Diethyl malonate:**

Biodegradability	: Result: Readily biodegradable. Biodegradation: 99 % Exposure time: 28 d Method: Regulation (EC) No. 440/2008, Annex, C.4-A
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**2-Furaldehyde:**

Biodegradability	: Result: Readily biodegradable. Biodegradation: 93,5 % Exposure time: 14 d
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**Cinnamaldehyde:**

Biodegradability	: Result: Readily biodegradable. Biodegradation: 100 % Exposure time: 28 d Method: OECD Test Guideline 301B
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**Isovaleraldehyde:**

Biodegradability	: Result: Not readily biodegradable. Biodegradation: 49,5 % Exposure time: 28 d Method: OECD Test Guideline 301D
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**Acetaldehyde:**

Biodegradability	: Result: Readily biodegradable. Biodegradation: 80 % Exposure time: 14 d Method: OECD Test Guideline 301C
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**Trans-hex-2-en-1-ol:**

Biodegradability : Result: Readily biodegradable.  
Remarks: Based on data from similar materials

**Bioaccumulative potential****Components:****fenbendazole:**

Partition coefficient: n-octanol/water : log Pow: 3,32

**Ethanol:**

Partition coefficient: n-octanol/water : log Pow: -0,35

**Diethyl malonate:**

Partition coefficient: n-octanol/water : log Pow: 0,96

**2-Furaldehyde:**

Partition coefficient: n-octanol/water : log Pow: 0,83  
Remarks: Calculation

**Cinnamaldehyde:**

Partition coefficient: n-octanol/water : log Pow: 2,107

**Isovaleraldehyde:**

Partition coefficient: n-octanol/water : log Pow: 1,5

**Acetaldehyde:**

Partition coefficient: n-octanol/water : log Pow: 0,45

**Trans-hex-2-en-1-ol:**

Partition coefficient: n-octanol/water : log Pow: 1,61  
Remarks: Calculation

**Mobility in soil****Components:****fenbendazole:**

Distribution among environmental compartments : log Koc: 3,8 - 4,7  
Method: FDA 3.08

**Other adverse effects**

No data available

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**SECTION 13. DISPOSAL CONSIDERATIONS****Disposal methods**

Waste from residues	:	Do not dispose of waste into sewer. Dispose of in accordance with local regulations.
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

**SECTION 14. TRANSPORT INFORMATION****International Regulations****UNRTDG**

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	9
Environmentally hazardous	:	yes

**IATA-DGR**

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

**IMDG-Code**

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (fenbendazole)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

**Transport in bulk according to IMO instruments**

Not applicable for product as supplied.

**Special precautions for user**

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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**SECTION 15. REGULATORY INFORMATION****Safety, health and environmental regulations/legislation specific for the substance or mixture**

Substances and chemicals controlled by the Ministry of Justice : Neither banned nor restricted

List of substances included for special control and subject to supervision by the Ministry of Health and Social Protection : Not applicable

Resolution 2715/2014, which establishes the substances subject to registration of retail sales, based on defined classification criteria. : Not applicable

**The ingredients of this product are reported in the following inventories:**

AICS : not determined

DSL : not determined

IECSC : not determined

**SECTION 16. OTHER INFORMATION**

Revision Date : 14.04.2025  
Date format : dd.mm.yyyy

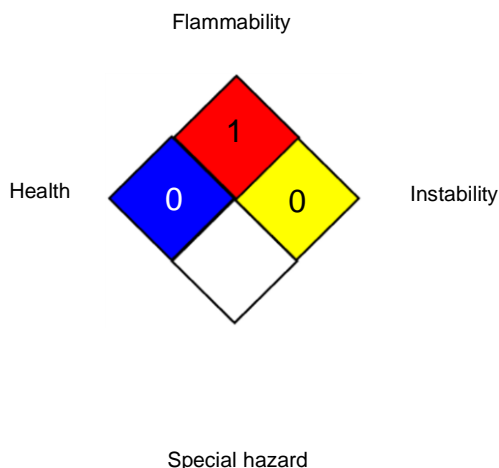
**Further information**

Sources of key data used to compile the Material Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

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## NFPA:



## HMIS® IV:

HEALTH	*	2
FLAMMABILITY		1
PHYSICAL HAZARD		0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "\*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

## Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
ACGIH / C	:	Ceiling limit

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transporta-

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tion of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

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