SAFETY DATA SHEET

Fenbendazole Paste Formulation

Section 1: Identification

Product name: Fenbendazole Paste Formulation

Manufacturer or supplier’s details

Company: MSD
Address: 33 Whakatiki Street - Private Bag 908
Upper Hutt - New Zealand
Telephone: +1-908-740-4000
Emergency telephone number: +1-908-423-6000
E-mail address: EHSDATASTEWARD@msd.com

Recommended use of the chemical and restrictions on use

Recommended use: Veterinary product

Section 2: Hazard identification

GHS Classification

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

GHS label elements

Hazard pictograms: [Warning]

Signal word: Warning

Hazard statements: H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.
H373 May cause damage to organs (Liver, Lymph nodes, Stomach, Nervous system) through prolonged or repeated exposure if swallowed.

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 vapours.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P308 + P313 IF exposed or concerned: Get medical advice/
SAFETY DATA SHEET

Fenbendazole Paste Formulation

Version 4.2
Revision Date: 27.08.2021
SDS Number: 887508-00015
Date of last issue: 09.04.2021
Date of first issue: 16.09.2016

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

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>fenbendazole</td>
<td>43210-67-9</td>
<td>&gt;= 10 - &lt;= 18.75</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>&gt;= 15 - &lt;= 15.16</td>
</tr>
<tr>
<td>Glycerine</td>
<td>56-81-5</td>
<td>10</td>
</tr>
<tr>
<td>Ethanol#</td>
<td>64-17-5</td>
<td>&lt;= 0.04</td>
</tr>
<tr>
<td>Diethyl malonate#</td>
<td>105-53-3</td>
<td>&lt;= 0.006</td>
</tr>
<tr>
<td>2-Furaldehyde#</td>
<td>98-01-1</td>
<td>&lt;= 0.006</td>
</tr>
<tr>
<td>Cinnamaldehyde#</td>
<td>104-55-2</td>
<td>&lt;= 0.002</td>
</tr>
<tr>
<td>Isovaleraldehyde#</td>
<td>590-86-3</td>
<td>&lt;= 0.002</td>
</tr>
<tr>
<td>Acetaldehyde#</td>
<td>75-07-0</td>
<td>&lt;= 0.0002</td>
</tr>
<tr>
<td>Trans-hex-2-en-1-ol#</td>
<td>928-95-0</td>
<td>&lt;= 0.0002</td>
</tr>
</tbody>
</table>

# Voluntarily-disclosed non-hazardous 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.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : 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 (CO2)
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

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 firefighters: In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

Hazchem Code: 3Z

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. 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 dyking or other appropriate containment to keep material from spreading. If dyked 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 vapours. 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.

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.

Conditions for safe storage: Keep in properly labelled 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

Section 8: Exposure controls/personal protection

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>fenbendazole</td>
<td>43210-67-9</td>
<td>TWA</td>
<td>100 µg/m3 (OEB 2)</td>
<td>Internal</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>WES-TWA (particulate)</td>
<td>10 mg/m3</td>
<td>NZ OEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WES-TWA (Vapour and particulates)</td>
<td>150 ppm 474 mg/m3</td>
<td>NZ OEL</td>
</tr>
<tr>
<td>Glycerine</td>
<td>56-81-5</td>
<td>WES-TWA (Mist)</td>
<td>10 mg/m3</td>
<td>NZ OEL</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>WES-TWA</td>
<td>1,000 ppm 1,880 mg/m3</td>
<td>NZ OEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>1,000 ppm</td>
<td>ACGIH</td>
</tr>
<tr>
<td>2-Furaldehyde</td>
<td>98-01-1</td>
<td>WES-TWA</td>
<td>0.2 ppm 0.8 mg/m3</td>
<td>NZ OEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

Further information: Suspected carcinogen, Skin absorption
Acetaldehyde | 75-07-0 | WES-Ceiling | 20 ppm | NZ OEL
|              |           |             | 36 mg/m³ |          |
|              | Further information: Suspected carcinogen |
| C            | 25 ppm   | ACGIH |

### Biological occupational exposure limits

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

**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 vapour 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.

### Section 9: Physical and chemical properties

- **Appearance**: paste
- **Colour**: white to off-white
- **Odour**: cinnamon-like
- **Odour Threshold**: No data available
- **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
Vapour pressure: No data available
Relative vapour 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
Auto-ignition 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 size: No data available

Section 10: Stability and reactivity
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

Exposure routes:
- 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

Propylene glycol:
Acute oral toxicity: LD50 (Rat): 22,000 mg/kg
Acute inhalation toxicity: LC50 (Rat): > 44.9 mg/l
   Exposure time: 4 h
   Test atmosphere: dust/mist
Acute dermal toxicity: LD50 (Rabbit): > 2,000 mg/kg
   Assessment: The substance or mixture has no acute dermal toxicity

Glycerine:
Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
Acute dermal toxicity: LD50 (Guinea pig): > 5,000 mg/kg

Ethanol:
Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
   Method: OECD Test Guideline 401
Acute inhalation toxicity: LC50 (Rat): 124.7 mg/l
   Exposure time: 4 h
   Test atmosphere: vapour

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: vapour

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Assessment: The substance or mixture has no acute dermal toxicity

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: vapour

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

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

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
Propylene glycol:
- Species: Rabbit
- Result: No eye irritation
- Method: OECD Test Guideline 405

Glycerine:
- 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

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 sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.
### Components:

#### Propylene glycol:
- **Test Type:** Maximisation Test
- **Exposure routes:** Skin contact
- **Species:** Guinea pig
- **Result:** negative

#### Ethanol:
- **Test Type:** Local lymph node assay (LLNA)
- **Exposure routes:** Skin contact
- **Species:** Mouse
- **Result:** negative

#### Diethyl malonate:
- **Test Type:** Buehler Test
- **Exposure routes:** Skin contact
- **Species:** Guinea pig
- **Method:** OECD Test Guideline 406
- **Result:** negative
- **Remarks:** Based on data from similar materials

#### 2-Furaldehyde:
- **Test Type:** Maximisation Test
- **Exposure routes:** Skin contact
- **Species:** Guinea pig
- **Method:** OECD Test Guideline 406
- **Result:** negative

#### Cinnamaldehyde:
- **Test Type:** Local lymph node assay (LLNA)
- **Exposure routes:** Skin contact
- **Species:** Mouse
- **Result:** positive
- **Assessment:** Probability or evidence of low to moderate skin sensitisation rate in humans

#### Isovaleraldehyde:
- **Test Type:** Maximisation Test
- **Exposure routes:** 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 sensitisation rate in humans
Acetaldehyde:
Test Type: Maximisation Test
Exposure routes: 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)
Exposure routes: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: negative
Remarks: Based on data from similar materials

Chronic toxicity

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 assay
Test system: mouse lymphoma cells
Metabolic activation: Metabolic activation
Result: equivocal

Propylene glycol:
Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

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

Glycerine:
Genotoxicity in vitro:
- Test Type: In vitro mammalian cell gene mutation test
  Result: negative
- Test Type: Bacterial reverse mutation assay (AMES)
  Result: negative
- Test Type: Chromosome aberration test in vitro
  Result: negative
- Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
  Result: negative

Ethanol:
- Genotoxicity in vitro:
  Test Type: In vitro mammalian cell gene mutation test
  Result: negative
  Test Type: Bacterial reverse mutation assay (AMES)
  Result: negative

Genotoxicity in vivo:
- Test Type: Rodent dominant lethal test (germ cell) (in vivo)
  Species: Mouse
  Application Route: Ingestion
  Result: equivocal

Diethyl malonate:
- Genotoxicity in vitro:
  Test Type: Bacterial reverse mutation assay (AMES)
  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
Result: negative

Cinnamaldehyde:
Genotoxicity in vitro:
Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: In vitro mammalian cell gene mutation test
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: Mouse
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Mouse
Application Route: Ingestion
Result: negative

Test 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 materials
### Genotoxicity in vivo

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Result: positive
Remarks: Based on data from similar materials

### Genotoxicity in vitro

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

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
Genotoxicity in vivo:
Method: OECD Test Guideline 487
Result: negative

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

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

Propylene glycol:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

Glycerine:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

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 (vapour)
SAFETY DATA SHEET

Fenbendazole Paste Formulation

<table>
<thead>
<tr>
<th>Exposure time</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>52 weeks</td>
<td>negative</td>
</tr>
</tbody>
</table>

Species: Mouse
Application Route: Skin contact

Carcinogenicity - Assessment: Limited evidence of carcinogenicity in animal studies

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

Isovaleraldehyde:
Species: Rat
Application Route: Inhalation (vapour)
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 foetal 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-foetal development
Species: Rabbit
Application Route: Oral
Developmental Toxicity: NOAEL: 25 mg/kg body weight
Result: Fetotoxicity

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

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

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

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

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

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

**Ethanol:**
Effects on fertility: Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
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 foetal 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 foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Result: negative

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

Acetaldehyde:
Effects on foetal development : Test Type: Embryo-foetal 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

Effects on foetal development : Test Type: Embryo-foetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative
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, Lymph nodes, Stomach, Nervous system) through prolonged or repeated exposure if swallowed.

Components:

fenbendazole:
Exposure routes : Ingestion
Target Organs : Liver, Lymph nodes, Stomach, Nervous system
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
Exposure time : 30 Days
Remarks : No significant adverse effects were reported
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, Lymph nodes, Nervous system

**Propylene glycol:**
Species : Rat, male
NOAEL : >= 1,700 mg/kg
Application Route : Ingestion
Exposure time : 2 yr

**Glycerine:**
Species : Rat
NOAEL : 0.167 mg/l
LOAEL : 0.622 mg/l
Application Route : Inhalation (dust/mist/fume)
Exposure time : 13 Weeks

Species : Rat
NOAEL : 8,000 - 10,000 mg/kg
Application Route : Ingestion
Exposure time : 2 yr

Species : Rabbit
NOAEL : 5,040 mg/kg
Application Route : Skin contact
Exposure time : 45 Weeks

**Ethanol:**
Species : Rat
NOAEL : 1,280 mg/kg
LOAEL : 3,156 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
SAFETY DATA SHEET

Fenbendazole Paste Formulation

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: Inhilation (vapour)
Exposure time: 13 Weeks

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

**Section 12: Ecological information**

**Ecotoxicity**

**Components:**

**fenbendazole:**
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): > 7.5 mg/l
Exposure time: 96 h
Remarks: No toxicity at the limit of solubility

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 0.008 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 0.0015 mg/l
Exposure time: 21 Days
Method: OECD Test Guideline 211

Propylene glycol:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 40,613 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Ceriodaphnia dubia (water flea)): 18,340 mg/l
Exposure time: 48 h

Toxicity to algae/aquatic plants: ErC50 (Skeletonema costatum (marine diatom)): 19,300 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Ceriodaphnia dubia (water flea)): 13,020 mg/l
Exposure time: 7 d

Toxicity to microorganisms: NOEC (Pseudomonas putida): > 20,000 mg/l
Exposure time: 18 h

Glycerine:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 54,000 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 1,955 mg/l
Exposure time: 48 h

Toxicity to microorganisms: NOEC (Pseudomonas putida): > 10,000 mg/l
Exposure time: 16 h
Method: DIN 38 412 Part 8

Ethanol:
Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates: EC50 (Ceriodaphnia (water flea)): > 1,000 mg/l
Exposure time: 48 h

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

EC10 (Chlorella vulgaris (Fresh water algae)): 11.5 mg/l
Exposure time: 72 h

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 (Pseudomonas putida): 6,500 mg/l
Exposure time: 16 h

Diethyl malonate:
### Fenbendazole Paste Formulation

<table>
<thead>
<tr>
<th>Component</th>
<th>Toxicity to fish</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
<th>Toxicity to algae/aquatic plants</th>
<th>Toxicity to microorganisms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LC50 (Pimephales promelas (fathead minnow)): 12 - 17 mg/l Exposure time: 96 h</td>
<td>EC50 (Daphnia magna (Water flea)): 179 mg/l Exposure time: 48 h Method: Directive 67/548/EEC, Annex V, C.2.</td>
<td>ErC50 (Desmodesmus subspicatus (green algae)): &gt; 800 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 115 mg/l Exposure time: 72 h</td>
<td>EC50 (Pseudomonas putida): 3,097 mg/l Exposure time: 16 h Method: DIN 38 412 Part 8</td>
</tr>
<tr>
<td>2-Furaldehyde:</td>
<td>EC50 (Leuciscus idus (Golden orfe)): 29 mg/l Exposure time: 48 h</td>
<td>EC50 (Daphnia magna (Water flea)): 29 mg/l Exposure time: 24 h</td>
<td>NOEC (Microcystis aeruginosa (blue-green algae)): 2.7 mg/l Exposure time: 8 d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOEC (Danio rerio (zebra fish)): 0.33 mg/l Exposure time: 12 d Method: OECD Test Guideline 211</td>
<td>NOEC (Daphnia magna (Water flea)): 1.9 mg/l Exposure time: 21 d Method: OECD Test Guideline 209</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cinnamaldehyde:</td>
<td>LC50 (Danio rerio (zebra fish)): 4.15 mg/l Exposure time: 96 h Method: Directive 67/548/EEC, Annex V, C.1.</td>
<td>EC50 (Daphnia magna (Water flea)): 3.21 mg/l Exposure time: 48 h Method: OECD Test Guideline 202</td>
<td>ErC50 (Chlorella vulgaris (Fresh water algae)): 16.09 mg/l Exposure time: 72 h Method: OECD Test Guideline 201</td>
<td>EC50: 71 mg/l Exposure time: 3 h Method: ISO 8192</td>
</tr>
</tbody>
</table>
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:
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

**Propylene glycol**:
- Biodegradability: Result: Readily biodegradable. Biodegradation: 98.3 % Exposure time: 28 d Method: OECD Test Guideline 301F

**Glycerine**:
- Biodegradability: Result: Readily biodegradable. Biodegradation: 92 % Exposure time: 30 d Method: OECD Test Guideline 301D

**Ethanol**:
- Biodegradability: Result: Readily biodegradable. Biodegradation: 84 % Exposure time: 20 d

**Diethyl malonate**:

**2-Furaldehyde**:
- Biodegradability: Result: Readily biodegradable. Biodegradation: 93.5 % Exposure time: 14 d

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

**Isovaleraldehyde**:
- Biodegradability: Result: Not readily biodegradable. Biodegradation: 49.5 % Exposure time: 28 d Method: OECD Test Guideline 301D

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

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

Bioaccumulative potential

Components:

fenbendazole:

Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)
Bioconcentration factor (BCF): 240

Partition coefficient: n-octanol/water : log Pow: 2.3

Propylene glycol:

Partition coefficient: n-octanol/water : log Pow: -1.07

Glycerine:

Partition coefficient: n-octanol/water : log Pow: -1.75

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
SAFETY DATA SHEET

Fenbendazole Paste Formulation

Mobility in soil

Components:

fenbendazole:
Distribution among environmental compartments : log Koc: 4.37

Other adverse effects
No data available

Section 13: Disposal considerations

Disposal methods
Waste from residues : 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 : Miscellaneous

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

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 Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations

**NZS 5433**

- UN number: UN 3082
- Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (fenbendazole)
- Class: 9
- Packing group: III
- Labels: 9
- Hazchem Code: 3Z

**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.

Section 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

**HSNO Approval Number**
HSR100759 Veterinary Medicines Non dispersive Open System Application Group Standard 2017

**HSW Controls**
Certified handler certificate not required.
Tracking hazardous substance not required.
Refer to the Health and Safety at Work (Hazardous Substances) Regulations 2017, for further information.

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

- AICS: not determined
- DSL: not determined
- IECSC: not determined

Section 16: Other information

**Further information**
Sources of key data used to compile the Safety Data Sheet:

Date format: dd.mm.yyyy

Full text of other abbreviations
SAFETY DATA SHEET

Fenbendazole Paste Formulation

Version: 4.2  Revision Date: 27.08.2021  SDS Number: 887508-00015  Date of last issue: 09.04.2021  Date of first issue: 16.09.2016

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI : ACGIH - Biological Exposure Indices (BEI)
NZ OEL : New Zealand. Workplace Exposure Standards for Atmospheric Contaminants

ACGIH / TWA : 8-hour, time-weighted average
ACGIH / STEL : Short-term exposure limit
ACGIH / C : Ceiling limit
NZ OEL / WES-TWA : Workplace Exposure Standard - Time Weighted average
NZ OEL / WES-Ceiling : Workplace Exposure Standard - Ceiling

AIIIC - 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 - Transportation 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.

NZ / EN