SAFETY DATA SHEET

Fenbendazole (10%) Liquid Formulation

Version 1.2 Revision Date: 13.09.2019 SDS Number: 3572224-00003 Date of last issue: 24.04.2019
Date of first issue: 24.10.2018

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Fenbendazole (10%) Liquid Formulation

Manufacturer or supplier’s details
Company: MSD
Address: 50 Tuas West Drive
Singapore - Singapore 638408
Telephone: 908-740-4000
Emergency telephone number: 65 6697 2111 (24/7/365)
E-mail address: EHSDATASTEWARD@msd.com
Telefax: 908-735-1496

Recommended use of the chemical and restrictions on use
Recommended use: Veterinary product

2. HAZARDS IDENTIFICATION

GHS Classification
Reproductive toxicity: Category 2
Specific target organ toxicity - repeated exposure (Oral): Category 2 (Liver, Lymph nodes, Stomach, Nervous system)
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, Lymph nodes, Stomach, Nervous system) through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.
Precautionary statements:
Prevention:
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P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapours.
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.

### 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; 20</td>
</tr>
<tr>
<td>Silicon dioxide</td>
<td>7631-86-9</td>
<td>&gt;= 1 - &lt; 10</td>
</tr>
</tbody>
</table>

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

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water spray  
Alcohol-resistant foam  
Carbon dioxide (CO2)  
Dry chemical

Unsuitable extinguishing media: None known.

Specific hazards during firefighting: Exposure to combustion products may be a hazard to health.

Hazardous combustion products: Carbon oxides  
Metal oxides  
Nitrogen oxides (NOx)

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment.  
Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Discharge into the environment must be avoided.  
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
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:
- Avoid inhalation of vapour or mist.
- 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 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

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>Silicon dioxide</td>
<td>7631-86-9</td>
<td>PEL (long term)</td>
<td>10 mg/m³</td>
<td>SG OEL</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: Particulates 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,
**Skin and body protection**

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.

**Hygiene measures**

Wear a face shield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

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.

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance**: suspension
- **Colour**: white
- **Odour**: characteristic
- **Odour Threshold**: No data available
- **pH**: 6 - 7
- **Melting point/freezing point**: < 2 °C
- **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**: 1.062 - 1.072 g/cm³
- **Solubility(ies)**
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.

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

Silicon dioxide:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
                      Method: OECD Test Guideline 401
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**Acute inhalation toxicity**: LC50 (Rat): > 2.08 mg/l  
- Exposure time: 4 h  
- Test atmosphere: dust/mist  
- Assessment: The substance or mixture has no acute inhalation toxicity

**Acute dermal toxicity**: LD50 (Rabbit): > 5,000 mg/kg

**Skin corrosion/irritation**: Not classified based on available information.

**Components**:

**fenbendazole**:
- Species: Rabbit  
- Result: No skin irritation

**Silicon dioxide**:
- Species: Rabbit  
- Method: OECD Test Guideline 404  
- Result: No skin irritation

**Serious eye damage/eye irritation**: Not classified based on available information.

**Components**:

**fenbendazole**:
- Species: Rabbit  
- Result: No eye irritation

**Silicon dioxide**:
- Species: Rabbit  
- Method: OECD Test Guideline 405  
- Result: No eye irritation

**Respiratory or skin sensitisation**

**Skin sensitisation**: Not classified based on available information.

**Respiratory sensitisation**: Not classified based on available information.

**Germ cell mutagenicity**: Not classified based on available information.

**Components**:

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

### Silicon dioxide:

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

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

### Carcinogenicity

Not classified based on available information.

### Components:

#### Fenbendazole:

<table>
<thead>
<tr>
<th>Species</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Route</td>
<td>oral (feed)</td>
</tr>
<tr>
<td>Exposure time</td>
<td>2 Years</td>
</tr>
<tr>
<td>NOAEL</td>
<td>405 mg/kg body weight</td>
</tr>
<tr>
<td>Result</td>
<td>negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Route</td>
<td>Oral</td>
</tr>
<tr>
<td>Exposure time</td>
<td>2 Years</td>
</tr>
<tr>
<td>NOAEL</td>
<td>5 mg/kg body weight</td>
</tr>
<tr>
<td>Result</td>
<td>negative</td>
</tr>
</tbody>
</table>

**Target Organs:** Lymph nodes, Liver

#### Silicon dioxide:

<table>
<thead>
<tr>
<th>Species</th>
<th>Rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Route</td>
<td>Ingestion</td>
</tr>
<tr>
<td>Exposure time</td>
<td>103 weeks</td>
</tr>
<tr>
<td>Result</td>
<td>negative</td>
</tr>
</tbody>
</table>

### 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.

### Silicon dioxide:

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

### STOT - single exposure

Not classified based on available information.

### 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.

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

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, Lymph nodes, Nervous system

Silicon dioxide:
Species: Rat
NOAEL: 1.3 mg/m3
Application Route: Inhalation (dust/mist/fume)
Exposure time: 13 Weeks

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
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

M-Factor (Acute aquatic toxicity) : 100

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

M-Factor (Chronic aquatic toxicity) : 10

Silicon dioxide:
Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 10,000 mg/l
    Exposure time: 96 h
    Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1,000 mg/l
    Exposure time: 24 h
    Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Desmodesmus subspicatus (green algae)): > 10,000 mg/l
    Exposure time: 72 h
    Method: OECD Test Guideline 201
    Remarks: Based on data from similar materials

    NOEC (Desmodesmus subspicatus (green algae)): 10,000 mg/l
    Exposure time: 72 h
    Method: OECD Test Guideline 201
    Remarks: Based on data from similar materials

Persistence and degradability
No data available

Bioaccumulative potential

Components:

fenbendazole:
Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)
    Bioconcentration factor (BCF): 240
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- **Partition coefficient: n-octanol/water**
  - log Pow: 2.3

- **Mobility in soil**

**Components:**

- **fenbendazole:**
  - Distribution among environmental compartments: log Koc: 4.37

**Other adverse effects**

- No data available

### 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.

### 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

**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
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</table>

- **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.

**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.

### 15. REGULATORY INFORMATION

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

**Workplace Safety and Health Act and Workplace Safety and Health (General Provisions) Regulations**: This product is subjected to the SDS, labelling, PEL and other requirements in the Act/Regulations.

**Environmental Protection and Management Act and Environmental Protection and Management (Hazardous Substances) Regulations**: Not applicable

**Fire Safety (Petroleum and Flammable Materials) Regulations**: Not applicable

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

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

### 16. OTHER INFORMATION

**Further information**


**Date format**: dd.mm.yyyy

**Full text of other abbreviations**

- **SG OEL**: Singapore. Workplace Safety and Health Act - First Schedule Permissible Exposure Limits of Toxic Substances
- **SG OEL / PEL (long term)**: Permissible Exposure Level (PEL) Long Term
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.