MATERIAL SAFETY DATA SHEET OF

DIMETHOATE 40% EC

1. IDENTIFICATION OF THE CHEMICAL PRODUCT AND COMPANY
Supplier: SHANGHAI MINGDOU AGROCHEMICAL CO., LTD
Address: Rm. 1210, Zhenyuan Building, No. 2052 North Zhongshan Rd, Shanghai, China
FAX: +86 21 52912097, 61638378
TEL: +86 21 52912919, 52045380, 52045370
Product name: Dimethoate 40% EC

2. COMPOSITION/INFORMATION ON INGREDIENTS
Formulation Type: Emulsifiable concentrate
Active Ingredients: Dimethoate
Chemical Abstracts name:
\[O,O\text{-dimethyl } S\text{-[2-(methylamino)-2-oxoethyl] phosphorodithioate}\]
IUPAC name:
\[O,O\text{-dimethyl } S\text{-methylcarbamoylmethyl phosphorodithioate;}\]
\[2\text{-dimethoxyphosphinothioylthio-N-methylacetamide}\]
Chemical Family: Organophosphate insecticide
CAS NO.: 60-51-5
Molecular Formula: \(C_5H_{12}NO_3PS_2\)
Molecular Weight: 229.3

Composition:

<table>
<thead>
<tr>
<th>INGRIDIENT</th>
<th>CAS NO</th>
<th>PURITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethoate</td>
<td>60-51-5</td>
<td>40% Min</td>
</tr>
<tr>
<td>Inert ingredients</td>
<td>Not available</td>
<td>60% Max</td>
</tr>
</tbody>
</table>

Other ingredients determined not to be hazardous
3. HAZARDS IDENTIFICATION

Emergency overview: Caution! Flammable liquid. Harmful by inhalation. Harmful if swallowed. Toxic in contact with skin and if swallowed. Keep out of the reach of children

Routes of entry: Inhalation, ingestion, skin and eye contact.

Health hazards: The active ingredient dimethoate is a poison (cholinesterase inhibitor). It rapidly enters the body on contact with all skin surfaces and eyes. Clothing contaminated with material must be removed immediately and all skin washed thoroughly. Repeated exposures to cholinesterase inhibitors such as dimethoate may, without warning, cause increased susceptibility to doses of any cholinesterase inhibitor. The product may cause hypersensitivity by skin contact.

Signs and symptoms of exposure: Headache, nausea, vomiting, cramps, weakness, blurred vision, pinpoint pupils, tightness in chest, laboured breathing, nervousness, sweating, watering of eyes, drooling or frothing of mouth and nose, muscle spasms and coma.

Physical hazards: The product is flammable. It can explode at elevated temperatures.

4. FIRST AID MEASURES

General: If poisoning is suspected, immediately contact the poison information centre, doctor or nearest hospital. Have the product container, label or Material Safety Data Sheet with you when going for treatment. Tell the person contacted the complete product name, and the type and amount of exposure. Describe any symptoms and follow the advice given.

Skin contact: Wash with plenty of soap and water. Get medical attention if irritation persists.

Eye contact: Immediately flush eyes with water for at least 15 minutes. Seek medical attention.

Ingestion: If swallowed, promptly drink large amounts of water. Do not induce vomiting. Never give liquids to an unconscious person. Get medical attention.

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

Note to physician: Dimethoate has moderate toxicity relative to other organophosphates (on the basis of a number of cases, the oral lethal dose for human beings was estimated to be of the order of 50-500 mg/kg); the symptoms of dimethoate poisoning are similar to those of poisoning by other organophosphorus insecticides, but the clinical picture evolves much more slowly. Its acute toxicity is variable and depends strongly upon the kinetics of absorption. Use of opiates, 2-PAM, succinylcholine or other cholinesterase inhibiting drugs is contraindicated.

5. FIRE FIGHTING MEASURES

Flash point: Approx. 47 °C.
Flammable limits: Not determined.
Autoignition temperature: Not determined.

Extinguishing Media: Dry chemical or carbon dioxide for small fires, water spray or foam for large fires.

Unusual fire and explosion hazards: The essential breakdown products are dimethyl sulphide, sulphur dioxide, carbon monoxide, carbon dioxide, nitrogen oxides and phosphorus pentoxide.

Fire-fighting instructions: Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible distance. Avoid heavy hose streams. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

Protective equipment for firefighters: Firefighters should be equipped with self contained breathing apparatus to protect from potentially toxic and irritating fumes.

6. ACCIDENT RELEASE MEASURES

Personal precautions: Wear protective equipment to prevent skin and eyes being affected. Breathing protection is advised if contact will be prolonged. Evacuate unprotected and unnecessary personnel from area. If material is leaking from a container, stop the leak only if this can be done safely.

Environmental precautions: Prevent spillage entering drains or watercourse.

Method for cleaning up: Vermiculite, Sand, Soil is a suitable absorbent, especially soils high in clay. Soil can be used to form bunds to contain spillage. Contaminated soil should be collected for disposal at a suitable landfill. Contaminated area and tools should be washed down with hypochlorite bleach. Personal protective equipment and clothing should be washed with soapy water.

7. HANDLING AND STORAGE

Handling and storage: Store in well-closed, upright containers in a cool, dry, well-ventilated area out of reach of children. Do not contaminate water, food or feed by storage or disposal. Do not reuse container. Store between 45 - 77°F. Avoid breathing vapor or particles. Avoid contact with skin or clothing. Remove pets, and cover fish aquariums before applying.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: Use assisted ventilation in enclosed spaces if needed, especially storage areas.

Personal protective equipment (PPE):
Respiratory protection: respirator
Protective gloves: impermeable gloves.
Eye protective: chemical goggles
Other protective equipment: boots, body-covering clothing, wide-brimmed hat.
9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear light yellow liquid.
Flash point: Not available.
S.g./density: Approx. 1.1
Acidity (calculated as H$_2$SO$_4$): 0.2
Water solubility: Emulsifiable

10. STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions.
Conditions to avoid: Very high or low temperatures.
Hazardous decomposition products: Oxides of nitrogen and chlorine. Burning with limited oxygen may produce carbon monoxide.
Incompatible materials: Strong oxidizing agents.
Hazardous reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:
Oral: LD$_{50}$ for rat 425 mg/kg
Dermal: LD$_{50}$ for rabbit 2020 mg/kg
Inhalation: LC$_{50}$ for rat $>$2.0 mg/L (4 hr)

Irritant properties:
Skin: Slight irritant (rabbit)
Eye: Substantial but temporary eye injury. Skin Irritation (rabbit)

Reproductive effects: When mice were given 9.5 to 10.5 mg/kg/day dimethoate in their drinking water, there was decreased reproduction, pup survival, and growth rates of surviving pups. Adults in this study exhibited reduced weight gain, but their survival was not affected. In a three-generation study with mice, 2.5 mg/kg/day did not decrease reproductive performance or pup survival. Once in the bloodstream, dimethoate may cross the placenta. Impaired reproductive function in humans is not likely under normal conditions.

Teratogenic effects: Dimethoate is teratogenic in cats and rats. A dosage of 12 mg/kg/day given to pregnant cats increased the incidence of extra toes on kittens. The same dosage given to pregnant rats produced birth defects related to bone formation, runtng and malfunction of the bladder. Dosages of 3 or 6 mg/kg/day were not teratogenic in cats or rats. No effects were observed in cats and rats at doses of 2.8 mg/kg/day. There were no
teratogenic effects seen in the offspring of mice given 9.5 to 10.5 mg/kg/day dimethoate in their drinking water. It is not likely that teratogenic effects will be seen in humans under normal circumstances.

**Mutagenic effects:** Mutagenic effects due to dimethoate exposure were seen in mice. They were more prominent in male mice given a single high dose of dimethoate than in male mice given one twelfth of the same dose daily for 30 days. Mutagenic effects are unlikely in humans under normal circumstances.

**Carcinogenic effects:** An increase in malignant tumors was reported in rats given oral doses of 5, 15 or 30 mg/kg/day dimethoate for over a year. The increases were not, however, dose dependent. That is, higher doses did not necessarily result in higher tumor rates. Thus the evidence of carcinogenicity, even with high-dose, long-term exposure, is inconclusive. This suggests carcinogenic effects in humans are unlikely.

**12. ECOLOGICAL INFORMATION**

The following information is for the active ingredient, dimethoate.

**Ecotoxicity:**

**Birds**
- Acute oral LD\(_{50}\): for mallard ducks 42, bobwhite quail 10.5, Japanese quail 84, ring-necked pheasants 14.1 mg/kg b.w.
- Dietary LC\(_{50}\) (5 days): for mallard ducks 1011, bobwhite quail 154, Japanese quail 346, ring-necked pheasants 396 ppm.

**Fish**
- LC\(_{50}\) (96 h): for rainbow trout 24.5, bluegill sunfish 17.6 mg/l.

**Daphnia**
- EC\(_{50}\) (48 h): 2 mg/l.

**Algae**
- EC\(_{50}\): for *Selenastrum capricornutum* 90.4 mg/l.

**Bees**
- LD\(_{50}\) (oral): 0.15 μg/bee.
- LD\(_{50}\) (contact): 0.12 μg/bee.

**Earthworm:**
- LC\(_{50}\) (14 days): 31 mg/kg dry soil.

**Persistence and degradability:** Dimethoate is of low persistence in the soil environment. Soil half-lives of 4 to 16 days, or as high as 122 days have been reported, but a representative value may be on the order of 20 days. Because it is rapidly broken down by soil microorganisms, it will be broken down faster in moist soils. Biodegradation may be significant, with a 77% loss reported in a nonsterile clay loam soil after 2 weeks. In water, dimethoate is not expected to adsorb to sediments or suspended particles, nor to bioaccumulate in aquatic organisms. It is subject to significant hydrolysis, especially in alkaline waters.

**Bioaccumulative potential:** Low potential.

**Mobility in soil:** Dimethoate is highly soluble in water, and it adsorbs only very weakly to soil particles so it may be subject to considerable leaching. However, it is degraded by hydrolysis, especially in alkaline soils, and evaporates from dry soil surfaces.
13. DISPOSAL CONSIDERATION
Waste disposal: Spill and waste disposal procedures in conformity with state and local regulations must be followed. Do not contaminate water, foodstuffs, feed or seed by storage or disposal.
Container disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill. However, if other procedures are prescribed by state or local regulations, these must be followed.

14. TRANSPORT INFORMATION
UN Number: 3017
Transport hazard class: 6.1
UN Proper shipping name: Organophosphorus pesticide, liquid, toxic, flammable (Dimethoate).
Packing group: III
Marine pollutant: Yes

15. REGULATORY INFORMATION
Risk symbols: Xn Harmful
Risk phrases:
R20 Harmful by inhalation.
R22 Harmful if swallowed.
R24/25 Toxic in contact with skin and if swallowed.
R65 Harmful – may cause lung damage if swallowed.
Safety phrases:
S20/21 When using do not eat or drink/smoke
S22 Do not breathe dust.
S23 Do no breathe spray.
S24/25 Avoid contact with skin/eyes
S29/35 Do not empty into drains/Dispose of material and container in a safe way

16. OTHER INFORMATION
This MSDS summarizes our best knowledge of the health and safety hazard information of the product and how to safely handle and use the product in the workplace. Each user should read this MSDS and consider the information in the context of the how the product will be handled and used in the workplace including in conjunction with other products.
If clarification or further information is needed to ensure that an appropriate risk assessment can be made the user should contact the company.
END OF MSDS