MATERIAL SAFETY DATA SHEET OF

DIMETHOATE 98% TECH

1. IDENTIFICATION OF THE CHEMICAL PRODUCT AND COMPANY

Supplier: SHANGHAI MINGDOU AGROCHEMICAL CO., LTD
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Product name: Dimethoate 98% TECH

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formulation Type: Technical material
Active Ingredients: Dimethoate

Chemical Abstracts name:

\[ O,O\text{-}dimethyl\ S\text{-}[2\text{-}(methylamino)\text{-}2\text{-}oxoethyl]\text{ phosphorodithioate} \]

IUPAC name:

\[ O,O\text{-}dimethyl\ S\text{-}methylcarbamoylmethyl\ phosphorodithioate; \]
\[ 2\text{-}dimethoxyphosphinothiolthio-N\text{-}methylacetamide \]

Chemical Family: Organophosphate insecticide
CAS NO.: 60-51-5
Molecular Formula: \( C_5H_{12}NO_3PS_2 \)
Molecular Weight: 229.3
Structural Formula:

\[
\begin{align*}
\text{CH}_3\text{NHCOCH}_2\text{S} & \quad \text{P(OCH}_3\text{)}_2 \\
\text{S} & \\
\end{align*}
\]

Other ingredients determined not to be hazardous

<table>
<thead>
<tr>
<th>INGRIDIENT</th>
<th>CAS NO</th>
<th>PURITY</th>
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</thead>
<tbody>
<tr>
<td>Dimethoate</td>
<td>60-51-5</td>
<td>≥98%</td>
</tr>
<tr>
<td>Inerts</td>
<td>Not available</td>
<td>Up to 100%</td>
</tr>
</tbody>
</table>
3. HAZARDS IDENTIFICATION

Emergency overview: Cholinesterase inhibitor may be fatal if swallowed. Harmful if absorbed through skin or inhaled. Causes moderate eye irritation. Avoid breathing product vapors or spray mist. Avoid contact with eyes, skin or clothing. Keep out of reach of children.

Symptoms of over exposure are headaches, nausea, vomiting, cramps, weakness, blurred vision, pin point pupils, tightness in chest, labored breathing, nervousness, sweating, watering of eyes, drooling, muscle spasms and coma.

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

Health hazards:

Eye: Irritating, and may injure eye tissue if not removed promptly.

Skin: Harmful if absorbed through the skin. Large exposures could be fatal.

Inhalation: Vapor or mist concentrations may be harmful if inhaled. High concentrations could be fatal.

Ingestion: May be fatal if swallowed.

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.

Eye contact: Flush eyes with plenty of water for 15 minutes. Call a physician.

Ingestion: Do not induce vomiting. Call a physician immediately.

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

Note to physician: This product is an organophosphorus ester that inhibits cholinesterase. In cases of severe acute poisoning, the decision of whether to induce vomiting or not should be made by the attending physician. If lavage is performed, endotracheal and/or esophageal control is suggested. Danger from lung aspiration must be evaluated against toxicity when considering emptying the stomach.

Antidote: Treat symptomatically based on judgment of the attending physician in response to reactions of the patient. Atropine only by injection is an antidote. Oximes such as 2-PAM/protopam may be therapeutic but should only be used in conjunction with atropine. You may want to contact your supplier or a doctor to ensure that this information is up to date.
5. FIRE FIGHTING MEASURES

Flash point: 266°F (closed cup)
Flammable limits: (LFL-UFL): 2% - 15%
Autoignition temperature: Not determined.

Extinguishing Media: Dry chemical, carbon dioxide, halon, water spray or standard foam.

Unusual fire and explosion hazards: Thermal decomposition may product CO, CO₂, SO₂ and/or strong oxidizers.

Fire-fighting instructions: Evacuate area and fight fire from a safe distance. Approach from upwind to avoid hazardous vapors and decomposition products. Fire exposed containers can build up pressure and should be kept cool with water spray if possible. Explosive vapor could form from ruptured containers. Foam fire extinguishing system is preferred to prevent environmental damage from excessive water run off. If water is used, avoid heavy hose streams. If possible, dike and collect water used to fight fire to prevent minimize run off.

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: Small spill: Absorb spill with inert material such as dry sand, vermiculite or fuller's earth, then place in a chemical waste container. Rinse area with dilute soda ash and place rinsate into chemical waste container. Large spill: Same as for small spills; may neutralize with dilute alkaline solutions of soda and ash and place into chemical waste container. Do not allow material to run off into soil, drainage systems, or bodies of water. Notify and consult with proper regulatory authorities

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
Ventilation: No special ventilation is needed. Local exhaust is recommended.
Protective gloves: impermeable gloves.
Eye protective: chemical goggles
Other protective equipment: boots, body-covering clothing, wide-brimmed hat.

User safety recommendations: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless, solid.
Odor: Sulfurous.
Boiling point: 117 °C/0.1 mmHg.
S.g./density: Approx. 1.3 (20 °C)
Vapor pressure: 0.25 mPa at 25°C.

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

The following information is for the active ingredient, dimethoate.

Acute toxicity:
Oral: LD₅₀ for rats 387, mice 160, rabbits 300, guinea pigs 350 mg/kg b.w.
Dermal: LD₅₀ for rats >2000 mg/kg.
Inhalation: LC₅₀ for rat >1.6 mg/l air (4 hr)

Irritant properties:
Skin: Non-irritating to skin (rabbit).
Eye: Non-irritating to eyes (rabbit).
Allergenic and sensitizing effects:
Not considered to be a skin sensitizer (Guinea pig).

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, runting 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:

<table>
<thead>
<tr>
<th>Class</th>
<th>Species</th>
<th>Endpoint</th>
<th>Effect Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td>Acute oral LD$_{50}$</td>
<td>mallard ducks 42, bobwhite quail 10.5, Japanese quail 84, ring-necked pheasants 14.1 mg/kg b.w.</td>
<td></td>
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<tr>
<td></td>
<td>Dietary LC$_{50}$ (5 days)</td>
<td>mallard ducks 1011, bobwhite quail 154, Japanese quail 346, ring-necked pheasants 396 ppm.</td>
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<tr>
<td>Fish</td>
<td>LC$_{50}$ (96 h)</td>
<td>rainbow trout 24.5, bluegill sunfish 17.6 mg/l.</td>
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<tr>
<td>Daphnia</td>
<td>EC$_{50}$ (48 h)</td>
<td>2 mg/l.</td>
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<tr>
<td>Algae</td>
<td>EC$_{50}$</td>
<td>Selenastrum capricornutum 90.4 mg/l.</td>
<td></td>
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</tbody>
</table>
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.  

**Persistance 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:** Pesticide wastes are toxic and hazardous. Dispose of in accordance with applicable and local laws and regulations. Do not discharge or pour into soil, drainage system or bodies of water.  

**Container:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by state and local authorities, by burning (plastic containers). If burned, stay out of smoke.  

**14. TRANSPORT INFORMATION**  
**UN Number:** 2783  
**UN Proper shipping name:** Organophosphorus pesticides, solid, toxic  
**Transport hazard class:** 6.1  
**Packing group:** III  
**Marine pollutant:** Yes  

**15. REGULATORY INFORMATION**  
**Risk symbols:**  
Xn Harmful  

**Risk phrases:**  
R21/22 Harmful in contact with skin and if swallowed.  
R48 Danger of serious damage to health by prolonged exposure.  

**Safety phrases:**
S2 Keep out of the reach of children
S36 Wear suitable protective clothing
S37 Wear suitable gloves

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