MATERIAL SAFETY DATA SHEET OF
MALATHION 57% 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: Malathion 57% EC
Product use: Insecticide

2. COMPOSITION/INFORMATION ON INGREDIENTS
Formulation Type: Emulsifiable concentrate
Active Ingredients: Malathion
Chemical Abstracts name: Diethyl [(dimethoxyphosphinothioyl)thio]butanedioate
IUPAC Name: diethyl (dimethoxyphosphiniothioylthio)succinate or S-1,2-bis(ethoxycarbonyl)ethyl O,O-dimethyl phosphorodithioate
Chemical Family: Organophosphate insecticide
CAS NO.: 121-75-5
Molecular Formula: C₁₀H₁₉O₆PS₂
Molecular Weight: 330.4
Structural Formula:

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\[
\begin{align*}
\text{H}_3\text{CO} & \quad \text{OCH}_3 \\
\text{S} & \quad \text{O} \\
\text{OC}_2\text{H}_5 & \quad \text{OC}_2\text{H}_5 \\
\end{align*}
\]
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Composition:

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO</th>
<th>PROPORTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>malathion</td>
<td>121-75-5</td>
<td>≥57%</td>
</tr>
<tr>
<td>Other ingredients</td>
<td>Not available</td>
<td>≤43%</td>
</tr>
</tbody>
</table>

Other ingredients determined not to be hazardous
3. HAZARDS IDENTIFICATION

Emergency overview: Keep out of reach of children—caution—Harmful if swallowed. Avoid contact with skin. Avoid breathing of spray mist. Avoid contamination of feed and foodstuff.

Routes of entry: Inhalation, ingestion, contact with skin and eyes.

Health hazards:
If swallowed: Slightly toxic.
If inhaled: Slightly toxic.
Skin contact: This product may cause moderate skin irritant.
Eye contact: This product may cause moderate eye irritant.

Symptoms of acute exposure to organophosphate or cholinesterase-inhibiting compounds may include the following: numbness, tingling sensations, headache, dizziness, tremor, nausea, abdominal cramps, sweating, incoordination, blurred vision, difficulty breathing or respiratory depression, and slow heartbeat. Very high doses may result in unconsciousness, incontinence, and convulsions or fatality.

Environmental hazards: Toxic to aquatic organisms. Toxic to bees.

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: Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.

Eye contact: First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.

Ingestion: Do not induce vomiting if the person is conscious. Give glass of water. Get to a doctor.

Inhalation: Move affect person to fresh air and keep at rest until recovered. If not breathing, give artificial respiration and get to a doctor.

Notes to physician: This product may cause cholinesterase inhibition. Atropine is antidotal. 2-PAM may be effective as an adjunct to Atropine. Vomiting may cause aspiration pneumonia.

5. FIRE FIGHTING MEASURES

Flash point: >61 ºC

Flammable limits:
LFL: Not determined.
UFL: Not determined.

Autoignition temperature: Not determined.

Hazardous combustion products: Thermal decomposition products include oxides of sulfur and phosphorus-containing compounds. Incomplete combustion may lead to formation of carbon monoxide and/or other asphyxiants.

Extinguishing media: Carbon dioxide, foam, powder

Fire-fighting instructions: If water is used to fight fire or cool containers, contain runoff by diking to prevent contamination of water supplies. Containers in fire may burst or explode from excessive heat. Stay well back from fire area.

Protective equipment for firefighters: Wear self-contained breathing apparatus with full protective clothing. Fight fire from upwind and keep all non-essential personnel out of area.

6. ACCIDENT RELEASE MEASURES

Personal precautions: Safety glasses or goggles, rubber gloves, shoes plus socks, long-sleeved shirt, and long pants.

Environmental precautions: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Method for cleaning up: For small spills, absorb with an absorbent material such as pet litter. Sweep up and transfer to containers for possible land application according to label used or for proper disposal. Check local, state and federal regulations for proper disposal. Flush the area with water to remove any residue.

7. HANDLING AND STORAGE

Store in cool, dry, well-ventilated, secure area out of reach of children and animals. Harmful if swallowed or inhaled. Avoid contact with skin. Wash thoroughly after handling. Change contaminated clothing. Do not contaminate food or feed products. Biological activity of malathion premium grade remains practically unvaried for 2 years provided stored in unopened, undamaged original containers, in cool, shaded, well-ventilated places.

Recommended 68-86°F (20-25°C) for good shelf-life. Do not heat above 55°C. Above 100°C, decomposes rapidly and explosion may be induced.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits: (Malathion) OSHA PEL 8 hour TWA 15 mg/m³ (skin)

Engineering controls: Control process conditions to avoid contact. Use local exhaust ventilation during manufacture and spark proof equipment. Use in a well-ventilated area only.
Personal protective equipment (PPE):
Respiratory protection: Approved respirator
Protective gloves: Rubber gloves
Eye protection: Safety goggles or face shield.
Industrial hygiene: Adequate ventilation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Straw yellow to amber liquid.
Odor: Solvent odor.
Boiling point: above 149 °C.
Melting point: NA.
S.g./density: Specific gravity (water=1): Approx. 1.077g/ml at 20 °C.
Solubility in water: emulsifies.
Vapor pressure: approx. 28.4 mm/Hg at 25 °C.

10. STABILITY AND REACTIVITY

Conditions to avoid: High temperature, flame, fire, and moist condition.
Incompatibility (Products to avoid): Strong oxidizers, acids and bases.
Hazardous decomposition products: Thermal decomposition (e.g. fire) may produce dimethyl sulfide, sulfur dioxide, carbon monoxide, carbon dioxide, phosphorus pentoxide, nitrogen oxides.
Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

The following information is for the active ingredient, Malathion.

Acute toxicity:
Oral: LD₅₀ for rats 1375-5500 mg/kg (pure), mice 775-3320 mg/kg.
Dermal: LD₅₀ for rabbits 4100-8800, rats >2000 mg/kg.
Inhalation: LC₅₀ for rats >5.2 mg/l.

Irritant properties:
Skin: Slight skin irritation. (rabbits)
Eye: Slight eye irritation. (rabbits)

Allergenic and sensitizing effects: Not considered to be a skin sensitizer (Guinea pig).

Reproductive effects: In a two-generation reproduction study in rats, effects on pre-weaning pup growth at doses lower than those causing parental body weight decreases was considered evidence of quantitative differences in susceptibility between adult and young animals.
Developmental effects: In prenatal developmental toxicity studies, no developmental toxicity was observed in rats. In rabbits, increased incidences of mean resorption sites were considered evidence of qualitative differences in susceptibility between adult and developing animals.

Mutagenic effects: The mutagenicity database indicates that there is weak evidence of a mutagenic effect in mammalian cells at high and cytotoxic concentrations.

Neurotoxicity: From the full complement of neurotoxicity studies in adult and juvenile test animals, there was evidence of quantitative differences in susceptibility between adults and young in the developmental neurotoxicity study and its companion comparative ChEI study in the rat.

Carcinogenic effects: Following long-term oral exposures, increased incidences of liver and nasal/oral tumors were observed in rats and increased incidence of liver tumors were observed in mice. Malathion has been classified as “suggestive evidence of carcinogenicity” in accordance with the EPA.

12. ECOLOGICAL INFORMATION
The following information is for the active ingredient, Malathion.

Ecotoxicity:

Birds   Dietary LC$_{50}$ (5 days): for bobwhite quail 3500, ring-necked pheasants 4320 mg/kg diet.
Fish   LC$_{50}$ (96 h): for bluegill sunfish 0.1, largemouth bass 0.28 mg/l.
Daphnia   EC$_{50}$ (48 h): 1.0 µg/l.
Algae   EC$_{50}$: 13 mg/l.
Bees   Toxic to bees. LD$_{50}$ (topical): 0.71 µg/bee.
Earthworm:  LC$_{50}$ (14 days): 613 mg/kg soil.

Persistence and degradability: Malathion is of low persistence in soil with reported field half-lives of 1 to 25 days. Degradation in soil is rapid and related to the degree of soil binding. Breakdown occurs by a combination of biological degradation and nonbiological reaction with water. If released to the atmosphere, malathion will break down rapidly in sunlight, with a reported half-life in air of about 1.5 days. In raw river water, the half-life is less than 1 week, whereas malathion remained stable in distilled water for 3 weeks.

Bioaccumulative potential: BCF (Bio-concentration factor): 103.

Mobility in soil: Malathion is moderately bound to soils, and is soluble in water, so it may pose a risk of groundwater or surface water contamination in situations which may be less conducive to breakdown.

13. DISPOSAL CONSIDERATION
Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other approved state and local procedures.
Collect leaking and spilled liquid in sealable containers as far as possible.

14. TRANSPORT INFORMATION
Do not transport with food and feedstuffs.
Description: Environmental hazardous substance, liquid, n.o.s. (Malathion)
UN Number: 3082
Hazard class: 9
Packing group: III
Marine Pollutant: Yes

15. REGULATARY INFORMATION
Hazard symbols:
   Xn Harmful
   N Dangerous for the environment
Risk phrases:
   R22 Harmful if swallowed.
   R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety phrases:
   S2 Keep out of the reach of children.
   S24 Avoid contact with skin.
   S60 This material and its container must be disposed of as hazardous waste
   S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

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