MATERIAL SAFETY DATA SHEET OF

ABAMECTIN 1.8% EC

1. IDENTIFICATION OF THE CHEMICAL PRODUCT AND COMPANY

Supplier: SHANGHAI MINGDOU AGROCHEMICAL CO., LTD
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Product name: Abamectin 1.8% EC
Product use: Insecticide, acaricide

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formulation Type: Emulsifiable concentrate
Active Ingredients: Abamectin

Chemical Abstracts name: 5-O-demethyl avermectin A₁₁ (i) mixture with 5-O-demethyl-25-de(1-methylpropyl)-25-(1-methylethyl) avermectin A₁₈ (ii)
CAS NO. [71751-41-2] (abamectin); [65195-55-3] (i); [65195-56-4] (ii)
Molecular Formula: C₄₈H₇₂O₁₄ (avermectin B₁₁); C₄₇H₇₀O₁₄ (avermectin B₁₈)
Molecular Weight: 873.1 (avermectin B₁₁); 859.1 (avermectin B₁₈)

Structural Formula:

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO</th>
<th>PROPORTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abamectin</td>
<td>[71751-41-2] (abamectin)</td>
<td>≥1.8%</td>
</tr>
<tr>
<td>Others</td>
<td>Not available</td>
<td>≤98.2%</td>
</tr>
</tbody>
</table>

Other ingredients determined not to be hazardous
3. HAZARDS IDENTIFICATION

Emergency overview: Warning! Hazards to humans and domestic animals. May be fatal if swallowed. Causes substantial but temporary eye injury. Do not get into eyes. Harmful if absorbed through skin or inhaled. Avoid contact with skin or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing, or using tobacco. Remove and wash contaminated clothing before reuse.

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

Health hazards:
Inhalation: May irritate upper respiratory tract if inhaled.
Eye contact: Causes substantial but temporary eye injury.
Skin contact: Prolonged or repeated exposure may cause skin irritation in some individuals.
Ingestion: May be fatal if swallowed. May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns.

Environmental hazards: Highly toxic to fish, invertebrates, birds and bees.

4. FIRST AID MEASURES

General: 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: Take off contaminated clothing. Rinse skin immediately with plenty of soap and water for 15-20 minutes. Call a poison control center or doctor for treatment advice if irritation persists.

Eye contact: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

Ingestion: Call a poison control center or doctor immediately for treatment advice. Have person drink a glass of water or two if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Inhalation: Move person to fresh air. If person is not breathing, call an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Note to physician:
Persons suffering a temporary allergic reaction may respond to treatment with antihistamines or steroid creams and/or systemic steroids.
Early signs of intoxication include dilation of pupils, muscular incoordination and muscular tremors. Toxicity following accidental ingestion of abamectin can be minimized by early administration of chemical adsorbents (e.g. activated charcoal). If toxicity from exposure has progressed to cause severe vomiting, the extent of resultant fluid and electrolyte imbalance should be gauged. Appropriate supportive parental fluid replacement therapy should be given, along with other required supportive measures (such as maintenance of blood pressure levels and proper respiratory functionality) as indicated by clinical signs, symptoms and measurements. In severe cases, observations should continue for at least several days until clinical condition is stable and normal. Since abamectin is believed to enhance GABA activity in animals, it is probably wise to avoid drugs that enhance GABA activity (barbiturates, benzodiazepines, valproic acid) in patients with potentially toxic abamectin exposure.

5. FIRE FIGHTING MEASURES

Flash point (method used): >61°C (Closed cup method).

Flammable limits: LFL/UFL: Not applicable

Extinguishing media: Foam, CO₂, dry chemical.

Unusual fire, explosion and reactivity hazards: Combustible liquid. Can release vapors that form explosive mixtures at temperatures at or above the flash point. Heavy vapors can flow along surfaces to distant ignition sources and flash back. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Hazardous combustion products: Thermal decomposition products may include, but are not limited to, carbon monoxide and carbon dioxide.

Fire-fighting instructions: Use appropriate extinguishing media for combustibles in the area. Evacuate non-essential personnel from area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. If water is used to fight fire, dike and collect runoff.

Protective equipment for firefighters: Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENT RELEASE MEASURES

Personal precautions: Use proper personal protection (See Section 8.)

Environmental precautions: Keep spills out of streams and domestic water supplies. Dike to prevent contamination of local water sources.

Method for cleaning up: Control the spill at its source. Clean up small spills immediately, use proper personal protection. Absorb spill with absorbent material such as pet litter. After removal, flush
contaminated area thoroughly with water containing a strong detergent. Sweep up and place in a chemical container. Seal the container and handle in an approved manner. Take special care to avoid contamination of equipment and facilities during cleanup procedures and disposal of wastes. Dispose of all waste and rinsate in the appropriate manner.

7. HANDLING AND STORAGE

**Handling:** Harmful if swallowed or absorbed through skin. Avoid contact with eyes, skin or clothing. Do not breathe spray mist. Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Discard clothing and other absorbent material that have been drenched or heavily contaminated with this product’s concentrate. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Keep container closed when not in use. Handle and open container in a manner as to prevent spillage. Do not contaminate water, food or feed by storage, disposal or by cleaning equipment. Do not reuse empty container.

**Storage:** Do not use, pour, or store near heat or open flame. Store in the original container and keep closed. Store in cool, dry and well-ventilated place. Do not contaminate water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure limit:** 0.02 mg/m$^3$ TWA.

**Engineering control:** Ventilation equipment should be explosion-resistant if explosive concentrations of material are present.

**Eye/face protection:** To protect against accidental eye contact, goggles/face-shield should be worn.

**Skin protection:** Coveralls over long- or short-sleeved shirt and long or shot pants, chemical-resistant footwear plus socks and head covering (for overhead exposure). Chemical-resistant apron when cleaning equipment, mixing or loading. Wash thoroughly with soap and water after handling.

**Hand protection:** Rubber gloves should be worn. Wash thoroughly with soap and water after handling.

**Respiratory protection:** Ensure good ventilation. In areas with inadequate ventilation a approved chemical cartridge respirator with organic vapor cartridges and pesticide pre-cartridges or a self-contained breathing apparatus may be required when working with this product.

**Additional protective measures:** Discarded clothing and other absorbent materials that have been drenched or heavily contaminated with this product’s concentrate. Do not reuse them. Follow manufacturer’s instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

**User safety recommendations:** Users should: Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing immediately after handling this product. Wash outside of
gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: yellow to red brown liquid.
Odor: characteristic odor.
Boiling point: Not available.
Melting point: Not applicable.
Specific gravity/Density: approximately 0.96 g/ml.
PpH: 2.6~3.6 (1% in deionized water).
Water Solubility: emulsifiable.

10. STABILITY AND REACTIVITY

Stability: Stable under normal use and storage conditions.
Incompatibilities: Avoid mixed with highly reactive chemicals such as strong acid, strong base or strong oxidizing agent.
Hazardous decomposition products: Thermal decomposition products may include, but are not limited to, carbon monoxide and carbon dioxide.
Hazardous polymerization: will not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:
Oral: LD50 (rats): 316 mg/kg body weight.
Inhalation: LC50 (rats): >2.0 mg/l air - 4 hours.

Irritant properties:
Skin: Moderately irritating.
Eye: Moderately irritating.
Allergic and sensitizing effects: Not a sensitizer.
Chronic toxicity: In a 1-year study with dogs given oral doses of abamectin, dogs at the 0.5 and 1 mg/kg/day doses exhibited pupil dilation, weight loss, lethargy, tremors, and recumbency. Similar results were seen in a 2-year study with rats fed 0.75, 1.5, or 2 mg/kg/day. Rats at all the dosage levels exhibited body weight gains significantly higher than the controls. A few individuals in the high dose group exhibited tremors. When mice were fed 8 mg/kg/day for 94 weeks, the males developed dermatitis and changes in blood formation in the spleen, while females exhibited tremors and weight loss.
Reproductive effects: Rats given 0.40 mg/kg/day of abamectin had increased stillbirths, decreased pup
viability, decreased lactation, and decreased pup weights. These data suggest that abamectin may have the potential to cause reproductive effects at high enough doses.

**Teratogenic effects:** Abamectin produced cleft palate in the offspring of treated mice and rabbits, but only at doses that were also toxic to the mothers. There were no birth defects in the offspring of rats given up to 1 mg/kg/day. Abamectin is unlikely to cause teratogenic effects except at doses toxic to the mother.

**Mutagenic effects:** Abamectin does not appear to be mutagenic. Mutagenicity tests in live rats and mice were negative. Abamectin was shown to be nonmutagenic in the Ames test.

**Carcinogenic effects:** Abamectin is not carcinogenic in rats or mice. The rats were fed dietary doses of up to 2 mg/kg/day for 24 months, and the mice were up to 8 mg/kg/day for 22 months. These represent the maximum tolerated doses.

**Organ toxicity:** Animal studies indicate that abamectin may affect the nervous system.

12. ECOLOGICAL INFORMATION

The following information is for the active ingredient, Abamectin.

**Ecotoxicity:**

- **Birds**
  - Acute oral LD$_{50}$: or mallard ducks 84.6, bobwhite quail >2000 mg/kg.

- **Fish**
  - LC$_{50}$ (96 h): for rainbow trout 3.2, bluegill sunfish 9.6 μg/l.

- **Daphnia**
  - EC$_{50}$ (48 h): 0.34 ppb.

- **Algae**
  - EC$_{50}$ (72 h): for Pseudokirchneriella subcapitata >100 mg/l.

- **Bees**
  - Toxic to bees.

- **Earthworm**
  - LC$_{50}$ (14 days): ≤ 28 mg/kg soil.

**Persistence and degradability:** This product degraded rapidly by soil microorganisms.

**Bioaccumulative potential:** Low potential of bio-accumulate.

**Mobility in soil:** Binds tightly to soil.

13. DISPOSAL CONSIDERATION

**Product disposal:** Pesticide spray mixture or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides. Improper disposal of excess pesticide spray mixture or rinsate is a violation of Federal law. Ensure that the disposal is in compliance with federal requirements and state or local regulations.

**Container disposal:** Triple rinse (or equivalent) and dispose of in an incinerator or landfill approved for pesticide containers.

14. TRANSPORT INFORMATION

**UN Number:** 2902
UN Proper shipping name: Pesticide, Liquid, Toxic, N.O.S. (Abamectin Solution)
Transport hazard class: 6.1
Packing group: III
Marine pollutant: Yes

15. REGULATORY INFORMATION

Risk symbols:
- Xn—Harmful

Risk phrases:
- R20/21/22—Harmful by inhalation, in contact with skin and swallowed.
- R36/38—Irritating to eyes and skin.

Safety phrases:
- S2—Keep out of reach of children.
- S36/37—Wear suitable protective clothing and 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 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