MATERIAL SAFETY DATA SHEET OF

ABAMECTIN 95% TC

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: Abamectin 95% TC

2. COMPOSITION/INFORMATION ON INGREDIENTS
Formulation Type: Technical material
Active Ingredients: Abamectin
Chemical Abstracts name: 5-O-demethylavermectin A₁₄a (i) mixture with 5-O-demethyl-25-de(1-methylpropyl)-25-(1-methylene)avermectin A₁₄a (ii)
CAS NO. [71751-41-2] (abamectin); [65195-55-3] (i); [65195-56-4] (ii)
Molecular Formula: C₄₈H₇₂O₁₄ (avermectin B₁₄a); C₄₇H₇₀O₁₄ (avermectin B₁₄b)
Molecular Weight: 873.1 (avermectin B₁₄a); 859.1 (avermectin B₁₄b)
Structural Formula:

Other ingredients determined not to be hazardous

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO</th>
<th>PROPORTION</th>
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<tbody>
<tr>
<td>abamectin</td>
<td>71751-41-2</td>
<td>≥95%</td>
</tr>
<tr>
<td>other</td>
<td>Not available</td>
<td>≤5%</td>
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</table>
3. HAZARDS IDENTIFICATION

Emergency overview: Very toxic if swallowed. Harmful if inhaled. Very toxic to aquatic organisms.

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

Health hazards:

Eye contact: causes eye irritation.
Skin contact: abamectin is not readily through the skin. It is however mildly irritation to skin. Allergic skin reactions are possible.
Inhalation: harmful by inhalation and may be irritation to the respiratory system.
Ingestion: Harmful if swallowed.

Environmental hazards: Abamectin is highly toxic to fish and aquatic invertebrates. Abamectin is highly toxic to bees.

4. FIRST AID MEASURES

General: Have the product container, label or Material Safety Data Sheet with you when calling a poison control center or doctor, or going for treatment.

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: Not applicable.
Flammable limits: LFL/UFL: Not applicable.
Hazardous combustion products: Thermal decomposition products may include, but are not limited to, carbon monoxide and carbon dioxide.
Extinguishing media: Extinguish fires with water, carbon dioxide, dry powder, or alcohol-resistance form.
Fire-fighting instructions: Evacuate non-essential personnel from area to prevent human exposure to fire, smoke, fumes or products. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water spray can be used for cooling of unaffected stock, but avoid high-pressure hose, which may spread the product from the broken container. This will increase the contaminated hazard. Water runoff can cause environmental damage. If water is used to fight fire, dike and collect runoff.
Protective equipment for firefighters: Use positive -pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENT RELEASE MEASURES

Clean up small spills immediately, use proper personal protection. Absorb spill with absorbent material. 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. Keep spills out of streams and domestic water supplies. Prevent contamination of local water sources. 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: 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: Store in a tightly closed container in a cool, dry place. Do not contaminate water, food or feed by storage or disposal. Store this product away from heat, sparks and other sources of ignitions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Eye protection: Protective eyewear (e.g., goggles or full-face shield).
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.
Hand protection: Chemical-resistant gloves.
Respiratory requirements: 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.
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: white powder.
Odour: not significant.
Boiling point: NA.
Melting point: 161.8-169.4 °C (decomp.)
Flammability: not highly flammable.
P:\ 4.5-7
Water Solubility: In water 7-10μg/l (20 °C). In toluene 350, acetone 100, isopropanol 70, chloroform 25, ethanol 20, methanol 19.5, n-butanol 10, cyclohexane 6 (all in g/l, 21 °C).
Storage stability: stable for 2 years under normal storage.

10. STABILITY AND REACTIVITY
Chemical stability: Stable under normal use and storage conditions.
Hazardous decomposition: Thermal decomposition products may include, but are not limited to, carbon monoxide and carbon dioxide.
Incompatible materials: Strong oxidizing agents, alkalis and acids.
Hazardous polymerization: will not occur.

11. TOXICOLOGICAL INFORMATION
11. ACUTE TOXICITY/IRRITATION STUDIES:

Acute Oral LD<sub>50</sub> (in sesame oil): rat 10 mg/kg, mice 13.6 mg/kg, in water for rats 221 mg/kg.

Acute Dermal LD<sub>50</sub> (Rabbits): >2,000 mg/kg.

Eye Irritation (Rabbit): Mild irritating.

Dermal Irritation (Rabbit): non-irritating.

Dermal Sensitization (Guinea Pig): Not a skin sensitizer.

12. 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

Ecological effects (Abamectin):

Rainbow Trout 96-hour LC<sub>50</sub>: 3.2 μg/L

Bluegill sunfish 96-hour LC<sub>50</sub>: 9.6 μg/L

Daphnia EC<sub>50</sub> (48 h) 0.34 ppb.

Algae (72 h) for Pseudokirchneriella subcapitata >100 mg/l.

Other aquatic spp. LC<sub>50</sub> (96 h) for pink shrimp (Panacea duorarum) 1.6ppb, blue crab (Callinectes sapidus) 153 ppb.
Bees Toxic to bees.
Worms LC$_{50}$ (28 d) for earthworms 28 mg/kg soil.

**Environmental fate (Abamectin):**

Breakdown in soil and groundwater: Abamectin is rapidly degraded in soil. At the soil surface, it is subject to rapid photodegradation, with half-lives of 8 hours to 1 day reported. When applied to the soil surface and not shaded, its soil half-life is about 1 week. Under dark, aerobic conditions, the soil half-life was 2 weeks to 2 months. Loss of abamectin from soils is thought to be due to microbial degradation. The rate of degradation was significantly decreased under anaerobic conditions. Because abamectin is nearly insoluble in water and has a strong tendency to bind to soil particles, it is immobile in soil and unlikely to leach or contaminate groundwater. Compounds produced by the degradation of abamectin are also immobile and unlikely to contaminate groundwater.

Breakdown in water: Abamectin is rapidly degraded in water. After initial distribution, its half-life in artificial pond water was 4 days. Its half-life in pond sediment was 2 to 4 weeks. It undergoes rapid photodegradation, with a half-life of 12 hours in water. When tested at pH levels common to surface and groundwater (pH 5, 7, and 9), abamectin did not hydrolyze.

Breakdown in vegetation: Plants do not absorb abamectin from the soil. Abamectin is subject to rapid degradation when present as a thin film, as on treated leaf surfaces. Under laboratory conditions and in the presence of light, its half-life as a thin film was 4 to 6 hours.

**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. Dispose of in compliance with all state and local haws and regulation.

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

**14. TRANSPORT INFORMATION**

Proper shipping name: Pesticide, Solid, Toxic, N.O.S.

UN number: 2588

Class: 6.1

Marine pollutant: Yes

Package group: II

**15. REGULATORY INFORMATION**

Risk phrases:
R20/21/22: Harmful by inhalation, in contact with skin and swallowed.
R36/38: Irritation to skin and eyes.
R50: Very toxic to aquatic organisms.

Safety phrases:
S2: Keep out of the reach children.
S36/37: Wear suitable protective clothing and gloves.
S39: Wear eye/face protection.
S45: In case of insufficient ventilation wear suitable respiratory equipment.
S60: This material and its container must be disposed of as hazardous waste.
S61: Avoid release to the environment.

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