MATERIAL SAFETY DATA SHEET OF

CARBOFURAN 10% GR

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: Carbofuran 10% GR

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formulation Type: Granule
Active Ingredients: Carbofuran
Chemical Abstracts name: 2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate
CAS NO. 1563-66-2
Molecular Formula: C_{12}H_{15}NO_{3}
Molecular Weight: 221.3
Structural Formula:

![Structural Formula]

Other ingredients determined not to be hazardous

<table>
<thead>
<tr>
<th>INGREDIENT</th>
<th>CAS NO</th>
<th>PROPORTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbofuran</td>
<td>1563-66-2</td>
<td>≥10%</td>
</tr>
<tr>
<td>other</td>
<td>Not available</td>
<td>≤90%</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECT: Effects from overexposure result from either swallowing, inhaling or coming into contact with eyes or skin. Conditions of increased temperature and humidity may aid skin absorption of this product and, therefore, increase toxicity. Symptoms of overexposure include headache, lightheadedness, abdominal cramps, nausea, excessive salivation, perspiration, blurred vision, tearing,
pin-point pupils, blue skin color, convulsions, tremor and coma.

**MEDICAL CONDITION AGGRAVATED:** None presently known.

### 4. FIRST AID MEASURES

**EYES:** Immediately flush with water for at least 15 minutes, lifting upper and low eyelids intermittently. See a medical doctor immediately.

**SKIN:** Wash with plenty soap and water. Get medical attention of irritation occurs and persist.

**INGESTION:** Drink 1 or 2 glasses of water and induce vomiting by touching the back of throat with a finger or by giving syrup of ipecac. Never induce vomiting or give anything by mouth to an unconscious person. See a medical doctor.

**INHALATION:** Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor immediately.

**NOTES TO MEDICAL DOCTOR:** This product is highly toxic if swallowed, and has low dermal toxicity. It is expected to be highly toxic by inhalation. It is minimally irritating to the skin and practically non-irritating to the eyes, however, absorption through the mucous membranes of the eyes could be highly toxic. Carbofuran is a reversible cholinesterase inhibitor. Atropine sulphate is antidotal. Support respiration as needed with removal of secretions, maintenance of a patent airway and if necessary, artificial ventilation. If cyanosis is absent: Adults-start treatment by giving 2 mg atropine intravenously or intramuscularly, if necessary and repeat with 0.4 – 2.0 mg atropine at 15 minute intervals until atropinization occurs (tachycardia, flushed skin, dry mouth, mydriasis); Children under 12 – initial dose = 0.05 mg/kg body weight and repeat dose = 0.02 – 0.05 mg/kg body weight. Use of oximes such as 2-PAM is controversial. Observe patient to insure that these symptoms do not recur atropinization wears off. If in eyes, instill one drop of homatropine. Treatment is otherwise controlled removal of exposure followed by symptomatic and supportive care.

### 5. FIRE FIGHTING MEASURES

This product is slightly combustible. Carbofuran will burn if ignited and degrades at temperatures above 130 °C (266 °F).

Extinguishes media: foam, dry agent (carbon dioxide, dry chemical). Soft stream water fog only if necessary. Contain all run off.

Fire Fighting Procedures: isolate fire area. Evacuate downwind. Wear full protective clothing and self-contained breathing apparatus. Do not breathe smoke, gases or vapors generated.

### 6. ACCIDENT RELEASE MEASURES

Release Notes: isolate and post spill area. Wear protective clothing and personal protective equipment as
prescribed in Section 8. “Exposure Controls/Personal Protection”. Keep unprotected persons and animals out of the area.

Keep material out of lakes, streams, ponds, and sewer drains. Dike confinement spill and absorb with a noncombustible absorbent such as clay, sand or soil. Vacuum, shovel of pump waste into a drum and label contents for disposal.

To clean and neutralize spill area, tools and equipment, wash with a bleach or caustic/soda ash solution. Follow this by washing with a strong soap and water solution. Absorb as above any excess liquid and add to the drums of waste already collected. Repeat if necessary. Dispose of drummed wastes according to the method outlined in Section 13, “Disposal Considerations”.

7. HANDLING AND STORAGE

General Procedures: Store in cool dry, well-ventilated place. Do not use or store near heat, open flame or hot surfaces. Store in original containers only. Keep out of reach of children and animals. Do not contaminate other pesticides, fertilizer, water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use local exhaust at all process locations where vapour or mist may be emitted. Ventilate all transport vehicles prior to unloading.

Personal Protective Equipment

Eyes and Face: For splash, mist or spray exposure, wear chemical protective goggles or a face shield.

Respiration: For splash, mist or spray exposure wear, as a minimum, a properly fitted half-face or full-face air purifying respirator which is approved for pesticides (U.S. NIOSH/MSHA, EU CEN or comparable certification organization). Respirator use and selection must be based on airborne concentrations.

Protective Clothing: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a PVC suit. Leather items—such as shoes, belts and watchbands—that become contaminated should be removed and destroyed.

Launder all work clothing before reuse (separately from household laundry).

Work Hygienic Practices: Clean water should be available for washing in case of eye or skin contamination. Wash skin prior to eating, drinking or using tobacco. Shower at the end of the workday.

Gloves: Wear chemical protective gloves made of materials such as rubber, neoprene or nitrile. Thoroughly wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

9. PHYSICAL AND CHEMICAL PROPERTIES
Form: Granule.
Odour: product specified

Vapour pressure and reference temperature: 0.031 mPa (20 °C); 0.072 mPa (25 °C) (Carbofuran).
Boiling point: NA
S.g./density: 1.18 (20 °C) (Carbofuran).
Melting point: 153-154 °C (Carbofuran).
Solubility: soluble.

10. STABILITY AND REACTIVITY
Stability: stable under normal condition.
Conditions to avoid:
Polymerization: will not occur

11. TOXICOLOGICAL INFORMATION

Acute oral LD₅₀: 38 to 82 mg/kg (rat)
Acute dermal LD₅₀: >2000 mg/kg (rat)
Inhalation LC₅₀: 0.10 mg/L/1 hour (rat) (carbofuran)

Acute effects from overexposure: This product is highly toxic if swallowed, and has low dermal toxicity. It is expected to be highly toxic by inhalation. It is normally irritating to the skin and practically non-irritating to the eyes, however, absorption through the mucous membranes of the eyes could be highly toxic. With dermal exposure to this product, conditions of increased temperature and humidity facilitate skin absorption and, therefore, promote increased toxicity. Carbofuran is a reversible cholinesterase inhibiting pesticide which elicits symptoms in human typical of cholinesterase inhibition including headaches, light-headedness, weakness, abdominal cramps, nausea, excessive salivation, perspiration and blurred vision. More severe signs of cholinesterase inhibition include tearing, pin-point pupils, excessive respiratory secretions, cyanosis, convulsions, generalized tremor and coma. Excessive exposure may result in death.

Chronic effects from overexposure: No data available for the formulation. In studies with laboratory animals, carbofuran has caused decreased cholinesterase activity (erythrocyte, plasma, and/or brain). An overall absence of genotoxicity has been demonstrated in mutagenecity testing with carbofuran.

Carcinogenicity: IARC/NTP/OSHA/OTHER: Not listed.

12. ECOLOGICAL INFORMATION
Data as for technical material:

Birds: Extremely toxic to birds. LD₅₀ (Acute oral): 2.5 to 5 mg/kg (Japanese quail).
Fish: Moderately toxic to fish. LC$_{50}$ (96 h): 22 to 29 mg/l (Rainbow trout).

Bees: Toxic to bees – except granular formulations.

Daphnia: May pose a hazard to Daphnia magna. LC$_{50}$ (48 h): 38.6 μg/l

Degradability: In soil and water, the product degrades in 30 to 60 days. Degradation takes place primarily through microbial activity, with CO$_2$ as the principal end product. The degradation process is affected by temperature and soil pH (degradation is accelerated under alkaline conditions). A small degree of hydrolysis may take place in moist soils.

Mobility: Carbofuran is not resistant to leaching. Koc = 22

Accumulation: The product is not expected to bio-accumulate.

13. DISPOSAL CONSIDERATION

Product: dispose of in compliance with all state and local laws and regulations.

Disposal Method: Open dumping or burning of this material or its packaging is prohibited. If spilled material cannot be disposed of by use according to label instructions, an acceptable method of disposal is to incinerate in accordance with local, state and national environmental laws, rules, standards and regulations. However, because acceptable methods of disposal may vary by location and regulatory requirements may change, the appropriate agencies should be contacted prior to disposal.

Empty Container: Non-returnable containers which held this material should be cleaned, prior to disposal, by triple rinsing. Containers which held this material may be cleaned by being triple-rinsed, and recycled, with the rinsate being incinerated.

14. TRANSPORT INFORMATION

UN Number: 2757

UN Proper shipping name: Carbamate pesticide, solid, toxic (Carbofuran)

Transport hazard class: 6.1

Packing group: III

Marine pollutant: Yes

15. REGULATORY INFORMATION

Keep locked up out of reach of children and other, unauthorized persons. Keep away from food, drink and animal feeding stuffs.

Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Do not get in eyes, on skin or on clothing.

Do not breathe dust, vapor or spray mist.

In case of accident of if you feel unwell, seek medical advice immediately.
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