MATERIAL SAFETY DATA SHEET OF

IMIDACLOPRID 20% SL

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: Imidacloprid 20% SL
Product use: An insecticide for the control of various insect pests of cotton, fruit, vegetables, turf and ornamentals.

2. COMPOSITION/INFORMATION ON INGREDIENTS
Formulation Type: Soluble concentrate
Active Ingredients: Imidacloprid
Chemical Abstracts name: 1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine
IUPAC name: 1-(6-Chloro-3-pyridinyl)methyl-N-nitroimidazolidin-2-ylideneamine
Chemical Family: Neonicotinoid
CAS NO. 138261-41-3; 105827-78-9 former number
Molecular Formula: C9H10ClN5O2
Molecular Weight: 255.7
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>imidacloprid</td>
<td>138261-41-3</td>
<td>≥20%</td>
</tr>
<tr>
<td>other</td>
<td>Not available</td>
<td>≤80%</td>
</tr>
</tbody>
</table>
3. HAZARDS IDENTIFICATION

Emergency overview: Keep out of reach of children. Caution! Harmful if swallowed. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Routes of entry: Ingestion, inhalation, eye and skin contact.

Health hazards:
Ingestion: Significant oral exposure is considered to be unlikely. Available data shows that this product is harmful. Exposure may result in systemic poisoning: depressed respiration, muscular twitching, confusion. This product may be irritating to mucous membranes but is unlikely to cause anything more than transient discomfort.
Eyes contact: This product may be irritating to eyes, but is unlikely to cause anything more than mild transient discomfort.
Skin contact: Available data indicates that this product is not harmful. It should present no hazards in normal use. However product may be irritating, but is unlikely to cause anything more than mild transient discomfort.
Inhalation: Available data indicates that this product is not harmful. However product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.
Medical conditions aggravated by exposure: Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.


Environmental hazards: This product is toxic to wildlife and highly toxic to aquatic invertebrates. This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds.

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.

Inhalation: Remove to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.

Skin contact: Wash thoroughly exposed skin with plenty of soap and water. Remove containated clothing and shoes and launder before reuse.

Eyes contact: Hold eyelids open and flush with plenty of water for at least 15 minutes. Get medical attention if irritation persists.
Ingestion: If ingestion is suspected, call a physician or poison control center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger, or, if available, by administering syrup of ipecac. If syrup of ipecac is available, administer 1 tablespoonful (15ml) of syrup of ipecac followed by 1 to 2 glasses of water. If vomiting does not occur within 20 minutes, repeat the dose once. Do not induce vomiting or give anything by mouth to an unconscious person.

Note to physician: There is no specific antidote against this substance. Treatment is symptomatic and supportive.

5. FIRE FIGHTING MEASURES

Flash point: Does not burn.

Flammable limits: Does not burn.

Autoignition temperature: Does not burn.

Suitable extinguishing media: Foam, CO₂, or dry chemical powders to extinguish.

Hazardous decomposition products: May emit toxic fumes of hydrogen chloride, hydrogen cyanide, carbon monoxide and nitrogen oxides if involved in fires or exposed to extreme heat.

Fire-fighting instructions: Keep unnecessary people away. If it can be done safely, remove intact containers from the fire. Otherwise, use water spray to cool them. Bund area with sand or earth to prevent contamination of drains or waterways. Dispose of fire control water or other extinguishing agent and spillage safely later. Do not release contaminated water into the environment.

Protective equipment for firefighters: Firefighters should wear full protective gear, including self-contained breathing apparatus.

6. ACCIDENT RELEASE MEASURES

Personal precautions: Avoid contact with eyes and skin. Wear suitable protection.

Environmental precautions: Avoid soil and water contamination.

Methods for cleaning up:

In the event of a major spill, prevent spillage from entering drains or water courses. As a minimum, wear overalls, goggles and gloves. Suitable materials for protective clothing include rubber, PVC. Eye/face protective equipment should comprise as a minimum, protective glasses and, preferably, goggles. If there is a significant chance that vapours or mists are likely to build up in the cleanup area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product.

Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into
labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. Refer to product label for specific instructions. After spills, wash area preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this MSDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

7. HANDLING AND STORAGE

Handling:
Special protection measure: Read the label before use. Avoid all contact by mouth. When using do not eat, drink or smoke. Wash hands and exposed skin before meals and after work.

Storage:
Sensitivity to damp, light and oxidation: Stable under normal atmospheric conditions when stored in closed containers.
Special storage requirements: Keep away from food, drink and animal feeding stuffs. Keep out of the reach of children. Keep container in a well ventilated place.
Storage conditions: Store in cool, dry, well-ventilated, secure area out of each of reach of children and animals. Keep at temperature lower than 40 °C, keep in original containers, tightly closed.
Shelf life: At least 2 years if properly packed and stored.
Incompatible substances: Strong alkali and acids.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls:
Handle in well ventilated areas, generally natural ventilation is adequate.

Personal protective equipment:
Respiratory protection: Usually, no respirator is necessary when using this product.
Eye Protection: Eye protection such as protective glasses or goggles is recommended when this product is being used.
Skin protection: You should avoid contact even with mild skin irritants. Therefore you should wear suitable impervious elbow-length gloves and facial protection when handling this product. See below for suitable material types.
Protective Material Types: We suggest that protective clothing be made from the following materials:
rubber, PVC.

**Work/hygienic practices:**
Avoid contact with eyes, skin or clothing. Do not breathe vapour or mist. Remove contaminated clothing immediately. Wash thoroughly after handling. Before removing gloves, wash them with water and soap. After work, take off all work clothes and shoes. Take a shower, using water and soap. Wear only clean clothes when leaving job. Wash protective clothing and protective equipment with water and soap after each use. The respirator must be cleaned and the filter replaced according to the accompanying instructions.

9. PHYSICAL AND CHEMICAL PROPERTIES
**Appearance:** White to yellow liquid suspension.
**Odor:** Slight odor.
**Melting point:** No specific data. Liquid at normal temperatures.
**Specific gravity:** $1.00 \text{ g/cm}^3$ ~ $1.10 \text{ g/cm}^3$ at $20^\circ \text{C}$.
**Water solubility:** Miscible.
**Flammable:** Not flammable.

10. STABILITY AND REACTIVITY
**Chemical stability:** Stable under normal temperatures and conditions.
**Conditions to avoid:** Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight. Avoid heat, flames, sparks and other sources of ignition.
**Hazardous decomposition products:** This product is likely to decompose only after heating to dryness, followed by further strong heating. Carbon dioxide, and if combustion is incomplete, carbon monoxide and smoke. Nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. Hydrogen chloride gas, other compounds of chlorine. Water. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.
**Incompatible materials:** acids, bases, oxidising agents.
**Hazardous reactions:** This product is unlikely to react or decompose under normal storage conditions. Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION
The following information is for the active ingredient, Imidacloprid.
**Acute toxicity:**
Oral: $LD_{50}$ for male and female rats 450 mg/kg.
Dermal: LD₅₀ > 5000 mg/kg (rats).
Inhalation: LC₅₀ > 5 mg/l (rat).

Irritant properties:
Skin: not irritant (rabbit).
Eye: not irritant (rabbit).

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

Chronic toxicity:
A 2-year feeding study in rats fed up to 1,800 ppm resulted in a No Observable Effect Level (NOEL) of 100 ppm (5.7 mg/kg body weight in males and 7.6 mg/kg in females). Adverse effects included decreased body weight gain in females at 300 ppm, and increased thyroid lesions in males at 300 ppm and females at 900 ppm. A 1-year feeding study in dogs fed up to 2,500 ppm resulted in a NOEL of 1,250 ppm (41 mg/kg). Adverse effects included increased cholesterol levels in the blood, and some stress to the liver.

Carcinogenic Effects:
Imidacloprid is considered to be of minimal carcinogenic risk, and is thus categorized by EPA as a "Group E" carcinogen (evidence of noncarcinogenicity for humans). There were no carcinogenic effects in a 2-year carcinogenicity study in rats fed up to 1,800 ppm imidacloprid.

Genetic effects/Mutagenicity:
Imidacloprid may be weakly mutagenic. In a battery of 23 laboratory mutagenicity assays, imidacloprid tested negative for mutagenic effects in all but two of the assays. It did test positive for causing changes in chromosomes in human lymphocytes, as well as testing positive for genotoxicity in Chinese hamster ovary cells.

Reproductive effects:
A three generation reproduction study in rats fed up to 700 ppm imidacloprid resulted in a NOEL of 100 ppm (equivalent to 8 mg/kg/day) based on decreased pup body weight observed at the 250 ppm dose level.

Developmental effects:
A developmental toxicity study in rats given doses up to 100 ppm by gavage on days 6 to 16 of gestation resulted in a NOEL of 30 mg/kg/day (based on skeletal abnormalities observed at the next highest dose tested of 100 ppm). In a developmental toxicity study with rabbits given doses of imidacloprid by gavage during days 6 through 19 of gestation, resulted in a NOEL of 24 mg/kg/day based on decreased body weight and skeletal abnormalities observed at 72 mg/kg/day (highest dose tested).

Target organ effects:
In short-term feeding studies in rats, there were thyroid lesions associated with very high doses of
imidacloprid.

12. ECOLOGICAL INFORMATION

The following information is for the active ingredient, Imidacloprid.

Ecotoxicity:

- **Birds**: Acute oral LD$_{50}$ for Japanese quail 31 mg/kg, for bobwhite quail 152 mg/kg.
  
  Dietary LC$_{50}$ (5 days): 2225 ppm for Japanese quail.

- **Fish**: LC$_{50}$ (96 h): for golden orfe 237 mg/L, rainbow trout 211 mg/L, carp 280 mg/L (96 h).

- **Daphnia**: EC$_{50}$ (48 h): for *Daphnia magna* 85 mg/L.

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

- **Bees**: LD$_{50}$ (oral): 0.0037 μg/bee.

- **Earthworm**: LC$_{50}$ (14 days): 10.7 mg/kg dry soil

**Persistence and degradability**: Imidacloprid is not readily biodegradable. It undergoes slow degradation in the environment and in waste water treatment plants. Degradation is mainly microbiological and aerobic, but photodegradation also occurs. Degradation half-lives in the environment vary much with circumstances, usually from a few months to one year.

**Bioaccumulative potential**: Imidacloprid is not expected to bioaccumulate.

**Mobility in soil**: In the environment, imidacloprid is of moderate mobility.

13. DISPOSAL CONSIDERATION

Triple or preferably pressure rinse containers before disposal. Add rinsings to spray tank. DO NOT dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

14. TRANSPORT INFORMATION

**UN Number**: 3082

**UN Proper shipping name**: Environmentally hazardous substance, liquid, n.o.s. (Imidacloprid)

**Transport hazard class**: 9

**Packing group**: III

**Marine pollutant**: Yes

15. REGULATORY INFORMATION
Hazard symbols:
   Xn Harmful

Risk phrases:
   R22 Harmful if swallowed.
   R36/38 Irritating to eyes and skin.
   R52 Harmful to aquatic organisms.

Safety phrases:
   S20 When using do not eat or drink
   S23 Do not breathe gas/fumes/vapour/spray
   S24/25 Avoid contact with skin and eyes.
   S45 In case of accident or if you feel unwell seek medical advice immediately (show the label when possible)

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