MATERIAL SAFETY DATA SHEET

Section 1 - Identification Of Chemical Product And Company

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Substance:	Triadimefon is an azole derivative.
Trade Name:	Genfarm Triadimefon 500 WP Fungicide
Product Use:	Agricultural fungicide for use as described on the product label.
Creation Date:	**December, 2003**
Revision Date:	**August, 2005**

Section 2 - Hazards Identification

Statement of Hazardous Nature

This product is classified as: Hazardous according to the criteria of NOHSC Australia.

Not a Dangerous Good according to the Australian Dangerous Goods (ADG) Code.

Risk Phrases: R22. Harmful if swallowed.
Safety Phrases: S20. When using, do not eat or drink.
SUSDP Classification: S6
ADG Classification: None allocated. Not a Dangerous Good.
UN Number: None allocated

Emergency Overview

Physical Description & colour: White powdered solid.
Odour: Mild chemical odour.
Major Health Hazards: The 4-hour inhalation LC_{50} is greater than 0.48 mg/L in rats and approximately the same in mice. Acute toxicity through skin exposure is also fairly low. The LD_{50} values for the dermal toxicity of technical Triadimefon are greater than 1000 mg/kg in rats and 2000 mg/kg in rabbits. Studies of acute effects in rats have indicated a potential to induce neurobehavioral effects. Data regarding eye and skin irritation are inconclusive. Harmful if swallowed.

Potential Health Effects

Inhalation

Short term exposure: Significant inhalation exposure is considered to be unlikely. Long term inhalation of high amounts of any nuisance dust may overload lung clearance mechanism. 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.
Long Term exposure: No data for health effects associated with long term inhalation.

Skin Contact:

Short term exposure: 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.
Long Term exposure: No data for health effects associated with long term skin exposure.

Eye Contact:

Short term exposure: Exposure via eyes is considered to be unlikely. This product may be irritating to eyes, but is unlikely to cause anything more than mild transient discomfort.
Long Term exposure: No data for health effects associated with long term eye exposure.

Ingestion:

Short term exposure: Significant oral exposure is considered to be unlikely. Available data shows that this product is harmful, but symptoms are not available. This product is unlikely to cause any irritation problems in the short or long term.
Long Term exposure: No data for health effects associated with long term ingestion.

Carcinogen Status:

NOHSC: No significant ingredient is classified as carcinogenic by NOHSC.
NTP: No significant ingredient is classified as carcinogenic by NTP.
IARC: No significant ingredient is classified as carcinogenic by IARC.

Section 3 - Composition/Information on Ingredients

Ingredients	CAS No	Conc,%	TWA (mg/m^3)	STEL (mg/m^3)
Triadimefon	43121-43-3	50	not set	not set
Other non hazardous ingredients	secret	to 100	not set	not set

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non hazardous ingredients are also possible.

The TWA exposure value is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated for more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The term "peak "is used when the TWA limit, because of the rapid action of the substance, should never be exceeded, even briefly.

Section 4 - First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 13 1126 from anywhere in Australia (0800 764 766 in New Zealand) and is available at all times. Have this MSDS with you when you call.

Inhalation: First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.
Skin Contact: Irritation is unlikely. However, if irritation does occur, flush with lukewarm, gently flowing water for 5 minutes or until chemical is removed. If in doubt obtain medical advice.
Eye Contact: No effects expected. If irritation does occur, flush contaminated eye(s) with lukewarm, gently flowing water for 5 minutes or until the product is removed. Obtain medical advice if irritation becomes painful or lasts more than a few minutes.
Ingestion: If swallowed, do NOT induce vomiting. Wash mouth with water and contact a Poisons Information Centre, or call a doctor.

Section 5 - Fire Fighting Measures

Fire and Explosion Hazards: There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. This product, if scattered, may form flammable or explosive dust clouds in air.
Fire decomposition products from this product may be toxic if inhaled. Take appropriate protective measures.
Extinguishing Media: Not Combustible. Use extinguishing media suited to burning materials.
Fire Fighting: If a significant quantity of this product is involved in a fire, call the fire brigade. Do not scatter spilled material with high pressure water jets.

Flash point:	Does not burn.
Upper Flammability Limit:	Does not burn.
Lower Flammability Limit:	Does not burn.
Autoignition temperature:	Not applicable - does not burn.
Flammability Class:	Does not burn.

Section 6 - Accidental Release Measures

Accidental release: 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 dusts are likely to build up in cleanup area, we recommend that you use a suitable Dust Mask. Stop leak if safe to do so, and contain spill. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Consider vacuuming if appropriate. 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.

Section 7 - Handling and Storage

Handling: Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this MSDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace. Also, avoid contact or contamination of product with incompatible materials listed in Section 10.

Storage: This product is a Scheduled Poison. Observe all relevant regulations regarding sale, transport and storage of this class of poison. Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight. Make sure that the product does not come into contact with substances listed under "Materials to avoid" in Section 10. Check packaging - there may be further storage instructions on the label.

Section 8 - Exposure Controls and Personal Protection

The following Australian Standards will provide general advice regarding safety clothing and equipment:

Respiratory equipment: **AS/NZS 1715**, Protective Gloves: **AS 2161**, Industrial Clothing: **AS2919**, Industrial Eye Protection: **AS1336** and **AS/NZS 1337**, Occupational Protective Footwear: **AS/NZS2210**.

Exposure Limits **TWA (mg/m^3)** **STEL (mg/m^3)**

Exposure limits have not been established by NOHSC for any of the significant ingredients in this product.

The ADI for Triadimefon is set at 0.03mg/kg/day. The corresponding NOEL is set at 2.5mg/kg/day. ADI means Acceptable Daily Intake and NOEL means No-observable-effect-level. Values taken from Australian ADI List, Dec 2002.

Ventilation: No special ventilation requirements are normally necessary for this product. However make sure that the work environment remains clean and that dusts are minimised.

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.

Respirator: If there is a significant chance that dusts are likely to build up in the area where this product is being used, we recommend that you use a suitable Dust Mask.

Section 9 - Physical and Chemical Properties:

Physical Description & colour:	White powdered solid.
Odour:	Mild chemical odour.
Boiling Point:	Decomposes before boiling at 100kPa.
Freezing/Melting Point:	No specific data. Solid at normal temperatures.
Volatiles:	No specific data. Expected to be low at 100°C.
Vapour Pressure:	No data.
Vapour Density:	No data.
Specific Gravity:	Bulk density about 2.7-2.9
Water Solubility:	Wettable - forms slurry/suspension.
pH:	No data.
Volatility:	No data.
Odour Threshold:	No data.
Evaporation Rate:	No data.
Coeff Oil/water distribution:	No data
Autoignition temp:	Not applicable - does not burn.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Conditions to Avoid: Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight.

Incompatibilities: water, strong acids, strong bases, strong oxidising agents.

Fire Decomposition: 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. 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.

Polymerisation: This product is unlikely to undergo polymerisation processes.

Section 11 - Toxicological Information

Toxicity: **Acute toxicity:** At 92.6%, Triadimefon has an acute oral LD_{50} of 300 to 600 mg/kg in rats, about 1000 mg/kg in mice, and about 500 mg/kg in rabbits and dogs. Triadimefon has a potential to cause adverse chronic effects at low to moderate dose levels. Lower potency formulations of Triadimefon have lower acute toxicities (higher LD_{50} values). Acute inhalation toxicity of the compound is moderate. The 4-hour inhalation LC_{50} is greater than 0.48 mg/L in rats and approximately the same in mice. Acute toxicity through skin exposure is also fairly low. The LD_{50} values for the dermal toxicity of technical Triadimefon are greater than 1000 mg/kg in rats and 2000 mg/kg in rabbits. Studies of acute effects in rats have indicated a potential to induce neurobehavioral effects. Data regarding eye and skin irritation are inconclusive.

Chronic toxicity: A number of 2-year studies have indicated that there are several toxic responses to low to moderate doses of the compound. Long-term studies of Triadimefon in several species (rat, mouse, dog) over a range of doses indicated a reduction in body weight, changes in red blood cell counts, an increase in blood cholesterol levels, and increased liver weights. Increased liver weights may be seen as an adaptation to toxic stress, rather than a toxic endpoint related to exposure.

Reproductive effects: Female rats fed up to 90 mg/kg/day of 92.6% Triadimefon over three generations showed a number of adverse effects. No effects were noted in the foetuses at maternal doses below 2.5 mg/kg/day. At the middle doses tested (around 15 mg/kg/day) the second-generation offspring experienced a decrease in weight gain. At the highest dose, the females experienced a reduction in body weight and a decrease in fertility. In another study conducted over two generations, the female rats showed decreased ovary weight at the 2.5 mg/kg/day dose. At 90 mg/kg/day reductions in litter size, reduced offspring viability and lower birth weight were observed in second-generation offspring. This evidence suggests it is unlikely that Triadimefon will cause reproductive toxicity in humans under normal circumstances.

Teratogenic effects: The teratogenic potential of Triadimefon is relatively low. Doses causing birth defects in rats were high enough to also produce maternal toxicity. Cleft palates were noted in the offspring of female rats fed moderate doses of 75 mg/kg/day for an unspecified time period. In a second study, no teratogenic effects were noted in the offspring of female rats fed 50 mg/kg/day of 92.6% Triadimefon in the form of an emulsion. A study of occupationally-exposed female workers showed that the highest combined dermal and inhalation level of exposure for workers was around 60 µg which corresponds to approximately 0.008 mg/kg/shift for a 70 kg worker, a value considerably lower than the lowest dose that caused teratogenic effects in test animals. Thus, it is unlikely that Triadimefon will cause birth defects in humans under normal circumstances.

Mutagenic effects: Six separate studies indicate that the 92.6% Triadimefon compound is nonmutagenic. Several other tests were inconclusive. It is unlikely that the compound poses a significant mutagenic risk.

Carcinogenic effects: In a 2-year dietary study with mice, the highest dose tested (600 mg/kg/day) did not produce significant increases in tumor incidence. Due to high mortality, the reliability of this data is suspect. Another 2-year dietary study in mice showed increased liver cell hypertrophy (which may be related to tumor formation) at doses of greater than 36 mg/kg/day in males and 6 mg/kg/day for females. Increased liver cell adenoma was detected at all levels, but carcinoma was not detected at any level in this study. Based on this evidence, no conclusion can be drawn about the overall carcinogenicity of Triadimefon.

Organ toxicity: Triadimefon has been associated with changes in the liver, decreased kidney weights, and altered urinary bladder structure in laboratory animals exposed to 18 to 60 mg/kg/day. There is evidence that acute effects on the central nervous system may also occur.

Fate in humans and animals: After oral administration of a single dose of Triadimefon, most of the compound was eliminated unchanged in the urine and faeces within 2 to 3 days. Some breakdown of a small amount of the compound occurred in the liver. The compound has a very short residence time in the blood stream, about 2 ½ hours. When applied to the skin of rats, 40% of the applied amount was excreted in urine and faeces within 8 days. Additional amounts (up to 40%) were recovered unabsorbed from the skin surface and in the cage.

Section 12 - Ecological Information

Effects on birds: Triadimefon ranges from slightly toxic to practically nontoxic to birds. For instance, the compound has an LD_{50} value of greater than 4000 mg/kg in mallard ducks. Japanese quail are less tolerant of the compound (LD_{50} of 2000 mg/kg) and canaries are even less tolerant (LD_{50} >1000 mg/kg). Even the most tolerant species exhibited some compound-related acute toxicity such as diarrhoea and regurgitation within 5 minutes of administration of the highest doses. At the lowest dose tested (500 mg/kg) no signs of diarrhoea were noted.

Effects on aquatic organisms: The compound is slightly toxic to fish, indicating that they are more susceptible to the presence of the compound than are birds. Bluegill sunfish are the most susceptible, followed closely by goldfish, with 96-hour LC_{50} values of 11 mg/L and 10 to 50 mg/L, respectively. The compound is only slightly toxic to rainbow trout, with a reported LC_{50} of 14 mg/L.
Effects on other organisms: The compound is nontoxic to honeybees.
Environmental Fate:
Breakdown in soil and groundwater: Triadimefon has low to moderate persistence in soils. In a sandy loam type of soil, half of the initial amount of the compound was lost within 18 days. In loamy soil the half-life was much shorter (about 6 days), which indicates that breakdown of the compound varies with soil type. Other reported soil half-lives are 14 to 60 days with an average of 26 days. Triadimefon and its residues are moderately mobile and may have potential to leach to groundwater.
Breakdown in water: In water with a pH 3.0, 6.0, or 9.0, almost 95% of the compound remained after 28 weeks. The compound is very stable in water and does not readily undergo hydrolysis.
Breakdown in vegetation: In plants, a breakdown product is triadimenol , and translocation and metabolism may vary according to plant species. Triadimenol is of comparable toxicity to Triadimefon.

Section 13 - Disposal Considerations

Disposal: Instructions concerning the disposal of this product and its containers are given on the product label. These should be carefully followed.

Section 14 - Transport Information

ADG Code: This product is not classified as a Dangerous Good. No special transport conditions are necessary unless required by other regulations.

Section 15 - Regulatory Information

AICS: All of the significant ingredients in this formulation are to be found in the public AICS Database.
The following ingredients: Triadimefon, are mentioned in the SUSDP.

Section 16 - Other Information

This MSDS contains only safety-related information. For other data see product literature.

Acronyms:

ADG Code	Australian Code for the Transport of Dangerous Goods by Road and Rail
AICS	Australian Inventory of Chemical Substances
CAS number	Chemical Abstracts Service Registry Number
IARC	International Agency for Research on Cancer
NOHSC	National Occupational Health and Safety Commission
NOS	Not otherwise specified
NTP	National Toxicology Program (USA)
R-Phrase	Risk Phrase
SUSDP	Standard for the Uniform Scheduling of Drugs & Poisons
UN Number	United Nations Number

Please read all labels carefully before using product.

This MSDS is prepared in accord with the NOHSC document “National Code of Practice for the Preparation of Material Safety Data Sheets” 2nd Edition [NOHSC:2011(2003)]

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