



MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
AGRICULTURE DIVISION
P.O. Box 4913 Hawthorn Road
Kansas City, MO 64120-001

TRANSPORTATION EMERGENCY:
CALL CHEMTREC: (800) 424-9300
DISTRICT OF COLUMBIA: (202) 483-7616

NON-TRANSPORTATION:
BAYER EMERGENCY PHONE: (800) 414-0244
BAYER INFORMATION PHONE: (800) 842-8020

1. CHEMICAL PRODUCT IDENTIFICATION:	
PRODUCT NAME:	BAYLETON 50 DF
PRODUCT CODE:	229601
CHEMICAL FAMILY:	Triazole Fungicide
CHEMICAL NAME:	1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone
SYNONYMS:	Triadimefon
FORMULA:	C14 H16 Cl N3 O2

2. COMPOSITION/INFORMATION ON INGREDIENTS:		
INGREDIENT NAME		
/CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
BAYLETON (triadimefon)		
43121-43-3	OSHA : Not Established	50%
	ACGIH: Not Established	
Ingredient 2444		
Specific chemical identity is withheld as a trade secret.		
	OSHA: Not Established	1-3%
	ACGIH: Not Established	
Ingredient 1611		
Specific chemical identity is withheld as a trade secret.		
	OSHA: Not Established	3-5%
	ACGIH: Not Established	
Total crystalline silica (quartz)		
14808-60-7	OSHA: .10 mg/m3 TWA (respirable)	<1.5%
	ACGIH: .10 mg/m3 TWA (respirable)	
Ingredient 1606		
Specific chemical identity is withheld as a trade secret.		
	OSHA: 5.00 mg/m3 TWA (respirable)	30-40%
	ACGIH: 2.00 mg/m3 TWA (respirable)	

3. HAZARDS IDENTIFICATION:		
EMERGENCY OVERVIEW		CAUTION!
Color: Brown;	Form: Solid; Granular;	Odor: Sharp, musty;
Harmful if inhaled or ingested; May be harmful if absorbed through skin.		
POTENTIAL HEALTH EFFECTS:		
ROUTE(S) OF ENTRY: Inhalation; Skin Contact; Skin Absorption; Eye Contact		

HAZARDS IDENTIFICATION continued:
HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:
ACUTE EFFECTS OF EXPOSURE: Moderate eye irritation may occur from contact with the granular material or spray mixture. Based on the EPA Toxicity Category criteria, this product is mildly toxic orally and dermally. Animal studies have shown that it can cause minimal irritation to the conjunctiva with all remarkable irritation resolving within 1 day. It is a slight dermal irritant. Dermal sensitization studies have not been performed on this product as formulated; however, dermal sensitization studies performed on a similar formulation, BAYLETON 25 Turf & Ornamental, and the active ingredient, triadimefon, have been positive.
CHRONIC EFFECTS OF EXPOSURE: Based on the results of animal studies, no deleterious effects or symptoms would be expected from chronic exposure to BAYLETON (triadimefon) during normal use. This product may contain up to approximately 1.5% total crystalline silica. However, the amount of respirable crystalline silica is expected to be significantly lower based on data provided by the raw material manufacturer. Excessive long-term exposure to respirable crystalline silica may cause silicosis, a form of progressive pulmonary fibrosis. Severe and permanent lung damage may result.
CARCINOGENICITY: This product is not listed as a carcinogen by NTP or IARC, or regulated as a carcinogen by OSHA. However, it may contain crystalline silica (quartz), a substance which is classified by NTP as a Group 2 carcinogen and by IARC as a Group 1 carcinogen. Crystalline silica is a naturally-occurring mineral component of many sands and clays. Although controversial, the carcinogenic potential of crystalline silica must be considered if it is inhaled under excessive exposure conditions. However, the respirable portion of the silica which may be contained in this product is small, such that excessive inhalation exposure during normal conditions of use is unlikely.
NTP: Crystalline Silica is classified as an NTP Anticipated Human Carcinogen - "Substances or groups of substances that may reasonably be anticipated to be carcinogens."
IARC: IARC has classified crystalline silica as a Group 1 carcinogen. "There is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica (quartz) from occupational sources."
OSHA: Not regulated
MEDICAL CONDITIONS:
AGGRAVATED BY EXPOSURE: No specific medical conditions are known which may be aggravated by exposure to the active ingredient in this product; however, pulmonary and respiratory diseases may be aggravated by exposure to respirable crystalline silica.
EXPOSURE LIMITS: 1.0 mg/m3 BAYER EXPOSURE LIMIT (BEL) for BAYLETON Technical. The BEL is an internal guideline established by a scientific committee within Bayer. It is based on available literature and Bayer experience with the product. The BEL is used as a guideline for Bayer operations only and is not a recommendation for any other purpose.

4. FIRST AID MEASURES:

FIRST AID FOR EYES: Hold eyelids open and flush with copious amounts of water for 15 minutes. Call a physician if irritation develops or persists after flushing.

FIRST AID FOR SKIN: Remove contaminated clothing. Wash skin with plenty of soap and warm water. Get medical attention if irritation develops or persists. If signs of intoxication (poisoning) occur, get medical attention immediately.

FIRST AID FOR INHALATION: If a person is overcome by excessive exposures to dusts or aerosols of this material, remove to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.

FIRST AID FOR 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 (15 mL) 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: No specific antidote is available. Treat symptomatically. In case of poisoning, it is also requested that Bayer Corp., Agriculture Division, Kansas City, Missouri be notified. Telephone: 1-800-414-0244

5. FIRE FIGHTING MEASURES:

FLASH POINT: Not Applicable

FLAMMABLE LIMITS:

UPPER EXPLOSIVE LIMIT (UEL)(%): Not Established

LOWER EXPLOSIVE LIMIT (LEL)(%): Not Established

EXTINGUISHING MEDIA: Water

SPECIAL FIRE FIGHTING PROCEDURES: If involved in a fire, stay upwind, wear self-contained breathing equipment and avoid water runoff.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing dusts and skin contact. Avoid generating dust (a fine water spray mist, plastic film cover, or floor sweeping compound may be used if necessary). Use recommended protective equipment while carefully sweeping up spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with soap and water. Rinse with water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be removed and disposed. Do not allow material to enter streams, sewers, or other waterways.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): None/60 day average not to exceed 100°F

SHELF LIFE: At least 2 years at 75°F

SPECIAL SENSITIVITY: Extreme heat, moisture

HANDLING/STORAGE PRECAUTIONS: Store in a cool dry area designated specifically for pesticides. Do not store near any material intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS: Goggles should be used when needed to prevent dust or spray mixture from getting into the eyes.

SKIN PROTECTION REQUIREMENTS: Avoid skin contact. Use chemical-resistant gloves and wear long sleeves and trousers to prevent dermal exposure.

VENTILATION REQUIREMENTS: Maintain exposure levels below the applicable exposure limits through the use of general and local exhaust ventilation.

RESPIRATOR REQUIREMENTS: Under normal handling conditions no respiratory protection is needed. However, if needed to prevent respiratory irritation, wear a NIOSH-approved particulate respirator.

ADDITIONAL PROTECTIVE MEASURES: Clean water should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM: Solid
APPEARANCE: Granular
COLOR: Brown
ODOR: Sharp, musty
MOLECULAR WEIGHT: 293.8 (for triadimefon)
pH: 7.5 - 8.5
BOILING POINT: Not applicable
MELTING/FREEZING POINT: 82.3°C (for triadimefon)
SOLUBILITY IN WATER: 64 ppm @ 20°C (for triadimefon)
SPECIFIC GRAVITY: Not established
BULK DENSITY: 33-36 lb/cu ft
% VOLATILE BY VOLUME: Not Applicable
VAPOR PRESSURE: 1.5 x 10⁻⁷ mm Hg @ 20°C (for triadimefon)
VAPOR DENSITY: Not applicable (Air = 1)

10. STABILITY AND REACTIVITY:

STABILITY: This is a stable material.
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBILITIES: Strong oxidizing agents, acids
INSTABILITY CONDITIONS: Not Noted
DECOMPOSITION PRODUCTS: Proposed compounds due to fire or other extreme conditions: HCl, amines, nitrogen oxides, CO

11. TOXICOLOGICAL INFORMATION:

Acute toxicology information provided below has been extrapolated from a similar formulation, BAYLETON 50% WP. The non-acute information pertains to the active ingredient, triadimefon.

ACUTE TOXICITY:

ORAL LD50: Male Rat: 812 mg/kg -- Female Rat: 1470 mg/kg

DERMAL LD50: Male and Female Rat: >2000 mg/kg -- Male and Female Rabbit: >2000 mg/kg

INHALATION LC50: 4 Hr. Exposure to Dust: Male and Female Rat: >3.532 mg/l (analytical) -- 1 Hr. Exposure to Dust (extrapolated from 4 Hr. LC50): Male and Female Rat: >14.128 mg/l (analytical)

EYE EFFECTS: Rabbit: Minimal irritation to the conjunctiva was observed with remarkable irritation resolving within 1 day.

SKIN EFFECTS: Rabbit: Slight dermal irritant.

TOXICOLOGICAL INFORMATION continued:

SENSITIZATION: Guinea Pig: Dermal sensitization studies have not been performed on this product as formulated, however, dermal sensitization studies performed on a similar formulation, BAYLETON 25 T/O, and the active ingredient, triadimefon, have been positive.

SUBCHRONIC TOXICITY:

In a 4 week dermal toxicity study, rabbits were exposed to the active ingredient for 7 hours/day, 5 days/week, at levels of 50 and 250 mg/kg. Slight dermal irritation was exhibited by rabbits of both dose groups. In a 3 week dermal toxicity study, rats were treated with triadimefon at levels of 100, 300 or 1000 mg/kg for 6 hours/day, 5 days/week. At 1000 mg/kg, behavioral changes observed included increased reactivity and increased activity. Based on clinical signs, the no-observed-effect-level (NOEL) was 300 mg/kg. In a subchronic inhalation study, rats were exposed to triadimefon for 6 hours/day, for 15 days to liquid aerosol concentrations of 78.7 and 307 mg/cubic meter. The no effect concentration was 78.7 mg/cubic meter. Liver weights were increased at 307 mg/cubic meter.

CHRONIC TOXICITY:

In a 2 year study, dogs were administered triadimefon at dietary concentrations of 100, 330 or 1000 ppm. The high dose was administered at 1000 ppm for 54 weeks and then increased to 2000 ppm for the remainder of the study. Liver weights and liver enzyme levels were increased at the high dose, however, histopathological examinations did not reveal any damage to the liver. The NOEL was 330 ppm. When rats were administered triadimefon for 2 years at dietary concentrations ranging from 50 to 1800 ppm, the NOEL was 300 ppm. Effects observed at the high dose included reduced body weights, increased feed consumption, changes in serum chemistries, increased liver weights and thyroid effects.

CARCINOGENICITY:

Triadimefon was tested for carcinogenicity in 2 feeding studies using rats. In the first study, rats were administered dietary concentrations of 50 or 500 ppm for 2 years. No evidence of a carcinogenic effect was found. In the second study, triadimefon was administered for 2 years at dietary concentrations of 50, 300 or 1800 ppm. At the high dose only, there was a slight increase in the incidence of benign follicular adenomas of the thyroid. In oncogenicity studies using mice, triadimefon was administered at dietary concentrations of 50, 300 or 1800 ppm. At the high dose only, there was an increase in the incidence of benign liver tumors. No increase in malignant tumors occurred.

MUTAGENICITY:

Numerous in vitro and in vivo mutagenicity studies have been conducted on triadimefon, all of which are negative.

DEVELOPMENTAL TOXICITY:

In developmental toxicity studies using rats, triadimefon was administered during gestation at oral doses ranging from 10 to 100 mg/kg. The overall NOELs derived from these studies for maternal and developmental toxicity were 10 and 30 mg/kg, respectively. In an inhalation developmental toxicity study, rats were exposed to triadimefon during gestation at liquid aerosol concentrations of 14.0, 33.2 or 113.7 mg/cubic meter for 6 hours/day. The NOEL for maternal toxicity was 14.0 mg/cubic meter. No developmental effects were observed. In developmental toxicity studies using rabbits, triadimefon was administered during gestation at oral doses ranging from 5 to 120 mg/kg. The overall NOEL derived from these studies for both maternal and developmental toxicity was 20 mg/kg.

REPRODUCTION:

In reproduction studies, triadimefon was administered to rats at dietary concentrations of 50, 300 or 1800 ppm. At 1800 ppm, reproductive effects including smaller litter sizes, reduced litter weights, and reduced viability and lactation were observed; at this dose, parental body weight gains were depressed and a reduction in mating occurred. The reproductive NOEL was 300 ppm.

TOXICOLOGICAL INFORMATION continued:

NEUROTOXICITY:

In acute and subchronic neurotoxicity screening studies using rats, triadimefon caused neurobehavioral changes related to hyperactivity. The origin of hyperactivity development has been elucidated by a number of mechanistic studies in the published literature and was shown to be a pharmaco-toxicological phenomenon involving dopaminergic neurotransmitter systems. There were no micropathologic findings in the skeletal muscle or neural tissues in either study. The NOEL in the acute neurotoxicity study for irreversible effects on the nervous system was 600 mg/kg for males and 450 mg/kg for females, the highest dose tested for each sex. In the subchronic neurotoxicity study the NOEL for irreversible effects on the nervous system was 2200 ppm for males and females, the highest dose tested.

12. ECOLOGICAL INFORMATION:

This compound has been thoroughly evaluated for ecological effects. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern. In event of a spill emergency, call 1-800-414-0244.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, bury in an EPA approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME: Triadimefon
FREIGHT CLASS BULK: Do not ship in bulk
FREIGHT CLASS PACKAGE: Fungicides, NOI (NMFC 102120)
PRODUCT LABEL: Not Applicable
DOT (DOMESTIC SURFACE):
HAZARD CLASS OR DIVISION: Non-Regulated
IMO / IMDG CODE (OCEAN)
HAZARD CLASS DIVISION NUMBER: Non-Regulated
ICAO / IATA (AIR)
HAZARD CLASS DIVISION NUMBER: Non-Regulated

15. REGULATORY INFORMATION:

OSHA STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA STATUS: This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.

CERCLA REPORTABLE QUANTITY: No components are listed.

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: No components listed

SECTION 311/312 HAZARD CATEGORIES: Immediate Health Hazard

SECTION 313 TOXIC CHEMICALS: Triadimefon- CAS # 43121-43-3 (50%)

RCRA STATUS: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

16. OTHER INFORMATION:

NFPA 704M RATINGS:

Health: 1 Flammability: 1 Reactivity: 1 Other
 0=Insignificant 1=Slight 2=Moderate 3=High
 4=Extreme

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

REASON FOR ISSUE: Revise Sections 3 (carcinogenicity and IARC statements); 11 (add neurotoxicity data); 15 (revise Section 313)

PREPARED BY: V. C. Standart

APPROVED BY: D. C. Eberhart

TITLE: Product Safety Manager

APPROVAL DATE: 03/30/2000

SUPERSEDES DATE: 08/05/1996

MSDS NUMBER: 26679

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