

HAZARDS IDENTIFICATION Continued:

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, any disease, medication or prior exposure which reduces normal cholinesterase activity may increase susceptibility to the toxic effects of the active ingredient. In addition, certain pre-existing skin disorders may be aggravated by exposure to this product due to the solvent components.

4. FIRST AID MEASURES:

FIRST AID FOR EYES: 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.

FIRST AID FOR SKIN: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

FIRST AID FOR INHALATION: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment information.

FIRST AID FOR INGESTION: Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by physician or poison control center. Do not give anything by mouth to an unconscious person.

NOTE TO PHYSICIAN: This product contains the organophosphorus insecticide, tribufos, a cholinesterase inhibitor. Cholinesterase inhibition results in stimulation of the central nervous system, the parasympathetic nervous system and the somatic motor nerves. If symptoms of organophosphate poisoning are present, the administration of atropine sulfate is indicated. Administer atropine sulfate in large therapeutic doses. In mild cases, start treatment by giving 1-2 mg of atropine intravenously every 15 minutes until signs of atropinization appear (dry mouth, flushing, and dilated pupils if pupils were originally pinpoint). In severe cases, start treatment by giving 2-4 mg intravenously every 5-10 minutes until fully atropinized. Dosages for children should be appropriately reduced. 2-PAM is also antidotal and may be used in conjunction with atropine. Do not give morphine. Watch for pulmonary edema which may develop in serious cases of poisoning even after 24 hours. At first sign of pulmonary edema, place patient in oxygen tent and treat symptomatically. In case of poisoning, it is also requested that Bayer Corp., Agriculture Division, Kansas City, MO, be notified. Telephone: 800-414-0244.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 184°F (Setaflash)

FLAMMABLE LIMITS:

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

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

EXTINGUISHING MEDIA: Water; Carbon Dioxide; Dry Chemical; Foam

HAZARDS IDENTIFICATION Continued:

SPECIAL FIRE FIGHTING PROCEDURES: Keep out of smoke. Cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES: Isolate area and keep unauthorized people

away. Do not walk through spilled material. Avoid breathing vapors and skin contact. Remove sources of ignition if combustible or flammable vapors may be present and ventilate area. Wear proper protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. If large spill, material should be recovered. Small spills can be absorbed with absorbent granules, spill control pads, or any absorbent materials. Carefully sweep up absorbed spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and 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 or contact vegetation.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): 0°F/30 day average not to exceed 100°F

SHELF LIFE: Time/temperature-dependent. Contact Bayer for additional information.

SPECIAL SENSITIVITY: Not Established

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: Splash-proof goggles and faceshield should be used to prevent liquid splashes from getting into the eyes.

SKIN PROTECTION REQUIREMENTS: Avoid skin contact. Wear long sleeves and trousers, boots or shoe covers and apron to prevent dermal exposure.

HAND PROTECTION REQUIREMENTS: Chemical-resistant gloves such as nitrile

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

RESPIRATOR REQUIREMENTS: Wear a NIOSH-approved organic vapor respirator with particulate pre-filter.

MEDICAL SURVEILLANCE: Plasma and/or red blood cell cholinesterase activity can be used to detect excessive absorption of tribufos. It is preferable to establish a pre-exposure baseline value for best comparisons. Contact Bayer Corp., Agriculture Division, for additional information. If significant cholinesterase depression occurs, no further exposure should be allowed until cholinesterase values return to normal.

PERSONAL PROTECTION Continued:

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 separately after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM: Liquid
APPEARANCE: Clear
COLOR: Colorless to yellow
ODOR: Not established
ODOR THRESHOLD: Not established
MOLECULAR WEIGHT: 314.5 (for tribufos)
pH: Not established
BOILING POINT: Not established
MELTING/FREEZING POINT: Less than -20°F
SOLUBILITY IN WATER: 2.3 ppm @ 20°C (for tribufos)
SPECIFIC GRAVITY: 1.016 @ 20 C/20 C
BULK DENSITY: Not applicable
VAPOR PRESSURE: 1.7 x 10⁻⁶ mm Hg @ 20°C (for tribufos)
VAPOR DENSITY: Not Established (Air = 1)

10. STABILITY AND REACTIVITY:

STABILITY: This is a stable material.
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBILITIES: Not Established
INSTABILITY CONDITIONS: Hydrolyzes slowly under alkaline conditions.
DECOMPOSITION PRODUCTS: Not established

11. TOXICOLOGICAL INFORMATION:

Acute toxicology information provided below has been extrapolated from a similar DEF 6 (VLO) formulation. The non-acute information pertains to the active ingredient, tribufos.

ACUTE TOXICITY:

ORAL LD50: Male Rat: 570 mg/kg; Female Rat: 349 mg/kg
DERMAL LD50: Male and Female Rat: >2000 mg/kg
INHALATION LC50: 4-hr exposure to liquid aerosol: Male Rat: 3.55 mg/L (analytical); Female Rat: 2.34 mg/L (analytical) - 1-hr exposure to liquid aerosol (extrapolated from 4-hr LC50): Male Rat: 3.55 mg/L (analytical); Female Rat: 2.34 mg/L (analytical)
EYE EFFECTS: Based on the corrosive dermal irritation hazard of this formulation, this product has the potential to be corrosive to the eyes, causing possible irreversible eye damage.
SKIN EFFECTS: Rabbit: Severely irritating and corrosive to the skin.
SENSITIZATION: Guinea pig: Not a dermal sensitizer.

SUBCHRONIC TOXICITY:

In a 3 week dermal toxicity study, rabbits were treated with the active ingredient, tribufos, at doses of 2, 11 or 29 mg/kg for 6 hours/day, 5 days/week. Effects observed included clinical signs of toxicity, decreased body weight gain and food consumption, skin changes at or adjacent to the

TOXICOLOGICAL INFORMATION Continued:

SUBCHRONIC TOXICITY continued:

dose site, clinical biochemical and hematological changes, mortality, and inhibition of cholinesterase activities (plasma, erythrocyte and brain). The no-observed-effect-level (NOEL) was 2 mg/kg. In a 13 week inhalation study, rats were exposed to liquid aerosol concentrations of tribufos at 0.93, 2.43, 12.2 or 59.5 mg/m³ for 6 hours/day, 5 days/week. Effects observed at the high concentration included clinical signs of toxicity, clinical biochemical changes, eye effects, increased adrenal weights, and inhibition of cholinesterase activities (plasma, erythrocyte and brain). The NOEL was 2.43 mg/m³.

CHRONIC TOXICITY:

In a 1 year study, dogs were administered tribufos at dietary concentrations of 4, 16 or 64 ppm. Effects at the high dose included transient hematological changes and inhibition of plasma and erythrocyte cholinesterase activities. The NOEL on the basis of cholinesterase inhibition was 4 ppm. In a 2 year study, tribufos was administered to rats at dietary concentrations of 4, 40 or 320 ppm. The following effects were observed: decreased body weight gains and food consumption, clinical signs of toxicity, clinical biochemical and hematological changes, eye effects, inhibition of cholinesterase activities (plasma, erythrocyte and brain), organ weight changes (spleen, kidney, adrenal and testicular), hyperplasia and vacuolation of the mucosa of the proximal small intestine, and vacuolation of the adrenal cortex. The NOEL was 4 ppm.

CARCINOGENICITY:

Tribufos was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 250 and 320 ppm, respectively. In mice, at the highest dose tested, a dose which exceeded the maximum tolerated dose (MTD), neoplastic changes were observed in the small intestine, liver and lungs. There was no evidence of a carcinogenic potential observed in rats.

MUTAGENICITY:

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

DEVELOPMENTAL TOXICITY:

In a developmental toxicity study using rats, tribufos was administered by oral gavage during gestation at doses of 1, 7 or 28 mg/kg. Maternal toxic effects were observed at all treatment levels. There was no evidence of developmental toxicity at any of the dose levels tested. The NOEL for developmental toxicity was 28 mg/kg. When rabbits were administered tribufos by oral gavage during gestation at doses of 1, 3 or 9 mg/kg, there was no evidence of any developmental effects. The NOELs for maternal and developmental toxicity were 3 and 9 mg/kg, respectively.

REPRODUCTION:

In a reproduction study using rats, tribufos was administered for 2 generations at dietary concentrations of 4, 32 or 260 ppm. Reproductive effects occurred at the high dose in conjunction with maternal toxicity. These effects included increased length of gestation, increased incidence of stillborn pups, decreased pup body weight gains, reduction in pup viability, cannibalization of pups, and inhibition of plasma and erythrocyte cholinesterase activities in 21 day old pups. The NOELs for parental and reproductive effects were 4 and 32 ppm, respectively.

TOXICOLOGICAL INFORMATION Continued:

NEUROTOXICITY continued:

In a 90 day study using hens, undiluted tribufos was administered to the comb at concentrations of 2.6, 11 or 42 mg/kg. Clinical and histopathological examinations revealed signs of delayed neurotoxicity in hens of the high dose. The NOEL for delayed neurotoxicity was 11 mg/kg. Hens tested by the oral and inhalation route of exposure also demonstrated a potential for tribufos to cause delayed neurotoxicity. In an acute neurotoxicity screening study using rats, tribufos was administered as a single oral dose at levels of 2, 20, or 100 mg/kg. Clinical observations and neurotoxicity evaluations were performed over a period of 2 weeks followed by a neurohistopathological examination. Deaths attributed to tribufos were observed in females that received the high dose. All clinical signs and neurobehavioral effects were ascribed to acute cholinergic activity, occurring at dose levels that produced substantial inhibition of cholinesterase activity. Complete recovery generally occurred within seven days following treatment. The only effect that persisted to day 14 was decreased motor activity in surviving high-dose females. There were no correlative micropathological findings at doses that produced severe toxicity. The overall NOEL for toxicity was 2 mg/kg in males and females. In a one generation developmental neurotoxicity screening study, tribufos was administered to rats at dietary concentrations of 4, 40 or 200 ppm during gestation and postnatal development. Maternal toxicity at the high-dose included clinical signs at parturition, reduced body weights during lactation, and cholinesterase inhibition. Cholinesterase inhibition also occurred in dams at the mid-dose. Toxicity in the offspring occurred only at the high-dose and in conjunction with maternal toxicity. Effects in the offspring included a substantial decrease in body weights after parturition, clinical signs, decreased food consumption, decreased startle response amplitude, and cholinesterase inhibition. Morphologic changes in neural tissues from the offspring were limited to transient decrease in brain measurements. The overall NOELs for maternal and offspring toxicity were 4 and 40 ppm, respectively.

12. ECOLOGICAL INFORMATION:

This product is toxic to fish. 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. 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, incinerate in a RCRA hazardous waste incinerator. Do not reuse container unless authorized by Bayer.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME: Tribufos: DEF (70.5%)
FREIGHT CLASS BULK: Defoliants, Plant, NOI - NMFC 56320
FREIGHT CLASS PACKAGE: Defoliants, Plant, NOI - NMFC 56320
PRODUCT LABEL: DEF 6 Emulsifiable Defoliant Very Low Odor

TRANSPORTATION INFORMATION Continued:

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME: Organophosphorus Pesticides, Liquid, Toxic
HAZARD CLASS OR DIVISION: 6.1
UN/NA NUMBER: UN3018
PACKING GROUP: III
HAZARDOUS SUBSTANCE: Naphthalene
DOT PRODUCT RQ lbs (kgs): 2000 lbs (907.2 kgs)
HAZARD LABEL(s): Toxic
HAZARD PLACARD(s): Toxic
DOT POSTNOTE: *Only bulk packages (greater than 119 gallons) are regulated as Marine Pollutants when shipped by highway or rail(See 49 CFR 171.4(c)).

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME: Organophosphorus Pesticides, Liquid, Toxic
HAZARD CLASS DIVISION NUMBER: 6.1
UN NUMBER: UN3018
ADDITIONAL IMO INFORMATION: Marine Pollutant
PACKAGING GROUP: III
HAZARD LABEL(s): Toxic; Marine Pollutant (Mark)
HAZARD PLACARD(s): Toxic; Marine Pollutant

ICAO / IATA (AIR)

PROPER SHIPPING NAME: Organophosphorus Pesticides, Liquid, Toxic
HAZARD CLASS DIVISION NUMBER: 6.1
UN NUMBER.: UN3018
SUBSIDIARY RISK: None
PACKING GROUP: III
HAZARD LABEL(s): Toxic
RADIOACTIVE?: Non-Radioactive
PASSENGER AIR - MAX. QTY: 60 L
PASSENGER PACKING INSTRUCTION: 611
CARGO AIR - MAX. QTY: 220 L
CARGO AIR PACKING INSTRUCTION: 618

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: 3891 lbs of the formulation which contains 100 lbs of naphthalene
SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: No components listed
SECTION 311/312 HAZARD CATEGORIES: Immediate Health Hazard; De-layed Health Hazard; Fire Hazard
SECTION 313 TOXIC CHEMICALS: Tribufos: CAS No. 78-48-8 (70.5%); Naphthalene: CAS No. 91-20-3 (1-5%)

REGULATORY INFORMATION Continued:

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 3 Flammability 2 Reactivity 0 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 1 (modify product name to match label); 8 (respirator statement); 11 (additional neurotoxicity data); 14 (transportation); 15 (Section 313)

PREPARED BY: V. C. Standart

APPROVED BY: D. C. Eberhart

TITLE.: Director Product Safety & Stewardship

APPROVAL DATE: 03/28/2002

SUPERSEDES DATE: 05/03/2001

MSDS NUMBER: 18173

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