Bayer CropScience

Material Safety Data Sheet

MSDS Number: 000000001872

Define™ SC Herbicide

MSDS Version: 1.2

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name	Define™ SC Herbicide
Chemical Name	
Common Name	
MSDS Number	1872
Chemical Family	Heteroaryloxyacetamide
Chemical Formulation	
EPA Registration No.	264-819
Product Use	Herbicide used for control of certain grass and broadleaf weeds in corn and other crops. The maximum use rate is approximately 1.9 lbs of the product per acre (0.77 lbs active per acre).

Bayer CropScience
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USA

For MEDICAL, TRANSPORTATION or Other EMERGENCY call 1-800-334-7577 24 hours/day
For Product Information call 1-866-99BAYER (1-866-992-2937)

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component Name	CAS No.	Concentration % by Weight	
		Minimum	Maximum
Flufenacet Techncial	142459-58-3	39.7000	42.2000

SECTION 3. HAZARDS IDENTIFICATION

NOTE: Please refer to Section 11 for detailed toxicological information.

Emergency Overview	Caution! Harmful if swallowed or absorbed through skin. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use.
Physical State	Liquid Suspension
Odor	Slight Characteristic
Appearance	Off-white
Routes of Exposure	Ingestion, Skin contact, Skin Absorption
Immediate Effects	
Skin	Harmful if absorbed through skin. Avoid contact with skin and clothing.

Ingestion	Harmful if swallowed. Do not take internally.

SECTION 4. FIRST AID MEASURES

General	Have the product container or label with you when calling a poison control center or doctor or going for treatment.
Skin	Take off all contaminated clothing immediately. Rinse immediately with plenty of water for at least 15 minutes. Call a poison control center or doctor for treatment advice.
Ingestion	Call a 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 directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person.
Notes to Physician	
Treatment	Treat symptomatically. There is no antidote.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point	> 100 °C / > 212 °F The product is not flammable.
Autoignition Temperature	425 °C / 797 °F
Suitable Extinguishing Media	Water spray, Dry powder, Foam, Carbon dioxide (CO2), Dry sand
Fire Fighting Instructions	Keep out of smoke. Fight fire from upwind position. Dike area to prevent runoff and contamination of water sources. Equipment or materials involved in pesticide fires may become contaminated. Wear self-contained breathing apparatus and protective suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

General and Disposal	Keep unauthorized people away. Isolate hazard area. Avoid contact with spilled product or contaminated surfaces.
Land Spill or Leaks	Avoid contact with skin, eyes and clothing. Use personal protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. Carefully sweep up absorbed 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 or contact vegetation.

SECTION 7. HANDLING AND STORAGE

Storing Procedures	Keep in a dry, cool place. Do not freeze. Keep away from food, drink and animal feedstuffs.
Work/Hygienic Procedures	Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove Personal Protective Equipment (PPE) immediately after handling this product. Before removing gloves clean them with soap and water. As soon as practical, wash thoroughly and change into clean clothing.
Min/Max Storage Temperatures	Do not transport or store below -10 °C / 14 °F Do not transport or store above 40 °C / 104 °F

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Eye/Face Protection	Tightly fitting safety goggles.
Hand Protection	Chemical resistant gloves made of waterproof material such as polyethylene or polyvinyl chloride.
Body Protection	Wear long-sleeved shirt and long pants and shoes plus socks.
General Protection	Follow all label instructions. Educate and train employees in safe use of the product. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.
Exposure Limits	None Established

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Off-white
Physical State	Liquid Suspension
Odor	Slight Characteristic
pH	5.5 - 7.0
Density	1.2 g/cm3 at 20 °C
Water Solubility	Dispersible
Viscosity	600 - 1,200 mPa.s 20 °C

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability Stable under normal conditions.

Conditions to Avoid Temperatures above 70 C.
Unstable under basic conditions.

Incompatibility Bases

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity studies have not been performed on this product as formulated. The acute toxicology information provided above is from a similar formulation, Tiara SC 500, containing a higher percentage of the active ingredient, flufenacet. The non-acute information pertains to flufenacet technical.

Acute Oral Toxicity Rat: LD50: 500 - 1,000 mg/kg

Acute Dermal Toxicity Rat: LD50: > 4,000 mg/kg

Acute Inhalation Toxicity Male/Female Rat: LC50: > 2,172 mg/l
Exposure time: 4 h
Maximum attainable concentration.
No deaths

Male/Female Rat: LC50: > 8,688 mg/l
Exposure time: 1 h

Skin Irritation Rabbit: non-irritant

Eye Irritation Rabbit: non-irritant

Sensitization Guinea pig: non-sensitizing

Subchronic Toxicity In 3 month feeding studies in mice, rats, and dogs, the main target organs affected by exposure to flufenacet were brain, thyroid, liver, kidney, and spleen as indicated by changes in clinical chemistries, organ weights and/or histopathological findings. Alterations in circulating serum thyroid hormones (thyroxine and triiodothyronine) were observed in each species and were considered indicative of hepatic interference. Primary hematological parameters affected by treatment in each species included changes in erythrocytes, platelets, hemoglobin, and hemtocrit concentrations. Histopathological findings generally correlated with alterations in organ weights. A decrease in body weight gain was observed in mice and rats.

In a subacute dermal toxicity study, rats were treated with flufenacet at doses of 20, 150, or 1000 mg/kg. Animals were treated for 6 hours/day such that males received 17 applications and females received 18 applications in a period of 21- and 22 days, repectively. An additional control and high-dose group were treated and maintained for a period of two weeks so as to ascertain the extent of recovery. Effects observed included decreased levels for thyroxine (T4) and free thyroxine (FT4), increased liver weights, and centrilobular hepatocytomegaly. The additional animals treated with 1000 mg/kg demonstrated a complete recovery. The no-observed-effect-level (NOEL) was 20 mg/kg.

Chronic Toxicity

Dogs were administered flufenacet at dietary concentrations of 40, 800 or 1600 ppm for 1 year. Effects observed included decreased terminal body weights, head tilt, computerized electrocardiography findings, quantitative electroencephalography findings, clinical neurological findings, organ weight differences, and changes in clinical chemistry and hematology parameters. Micropathological observations were noted in the liver, kidney, eye, brain, spinal cord and sciatic nerve. The NOEL was 40 ppm.

In a 2 year feeding study, rats were administered flufenacet at dietary concentrations of 25, 400 or 800 ppm. The toxicological response of the rat could be broadly characterized as involving structural and/or functional alterations in liver-, kidney-, hematologic/spleen-, and thyroid-related endpoints. Eye effects were also observed and included cataracts and ocular scleral mineralization. The NOEL was 25 ppm.

Assessment Carcinogenicity

Flufenacet was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 400 and 800 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

ACGIH
None
NTP
None
IARC
None
OSHA
None

Reproductive & Developmental Toxicity

In a developmental toxicity study, rats were administered flufenacet by oral gavage during gestation at doses of 5, 25, or 125 mg/kg. The NOEL for both maternal and developmental toxicity was 25 mg/kg.

In a developmental toxicity study using rabbits, flufenacet was administered by oral gavage during gestation at doses of 5, 25, 125, or 200 mg/kg. The NOELs for maternal and developmental toxicity were 5 and 25 mg/kg, respectively.

In a reproduction study using rats, flufenacet was administered at dietary concentrations of 20, 100, or 500 ppm for 2 generations. There were no compound-related effects on the adult reproductive or pup parameters. The NOELs for parental and reproductive toxicity were 20 and 500 ppm, respectively.

Neurotoxicity

In an acute neurotoxicity screening study using rats, flufenacet was administered as a single oral dose at doses of 75, 200, or 450 mg/kg for males and 75, 150, or 300 mg/kg for females. Compound-related deaths occurred at the high-dose for both sexes with all high-dose females dying within three days following treatment. All clinical signs and neurobehavioral effects observed were ascribed to acute systemic toxicity. Based on these results, the NOEL for neurotoxicity was 450 mg/kg for males and 150 mg/kg for females (the highest doses with survivors). The overall NOEL was 75 mg/kg for males and <75 mg/kg for females. In a subsequesnt study, an overall NOEL of 50 mg/kg was established for females.

In a 13 week neurotoxicity screening study, flufenacet was administered to rats at dietary concentrations of 120, 600, or 3000 ppm. Effects observed at the high-dose included reduced body weights, reduced forelimb grip strength, slightly

uncoordinated righting response, decreased body temperature, increased hindlimb footsplay, increased activity, and increased relative brain weight. Microscopic examinations revealed an increased incidence of axonal swelling in the brain and spinal cord tissues at the mid-and high-dose levels. The NOEL for subchronic neurotoxicity was 120 ppm based on microscopic lesions.

In a one generation developmental neurotoxicity study, flufenacet technical was administered to rats at dietary concentrations of 20, 100, or 500 ppm during gestation and postnatal development. Maternal toxicity observed included decreased body weights and feed consumption. Effects observed in the offspring included decreased body weights, delayed development (eye opening and preputial separation) and changes in feed consumption. Fluefenacet did not cause any specific neurobehavioral effects in the offspring. The overall NOEL for both maternal and F1 offspring toxicity was 20 ppm.

Mutagenicity In vivo and in vitro mutagenicity studies conducted on flufenacet have all been negative. Thus, flufenacet is not mutagenic.

SECTION 12. ECOLOGICAL INFORMATION

Acute and Prolonged Toxicity to Fish
Rainbow trout
LC50: 5.84 mg/l

Bluegill sunfish
LC50: 2.13 mg/l

Toxicity to Aquatic Plants
Algae
EC50: 0.031 mg/l

Acute Toxicity to Aquatic Invertebrates
Daphnia
EC50: 30.9 mg/l

Environmental Precautions Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water. Do not apply when weather conditions favor runoff or drift. Do not allow sprays to drift onto adjacent desirable plants.

Ecological Information Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 13. DISPOSAL CONSIDERATIONS

General Disposal Guidance Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal Triple rinse containers. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by State and Local authorities, by burning. If burned, stay out of smoke.

RCRA Classification Not Regulated under this Statute

SECTION 14. TRANSPORT INFORMATION

TRANSPORTATION CLASSIFICATION:
Not Regulated for transportation

FREIGHT CLASSIFICATION:
Compounds, Tree or Weedkilling, N.O.I., other than poison, having a density of 20 LBS or greater per cubic foot

SECTION 15. REGULATORY INFORMATION

EPA Registration No. 264-819

US Federal Regulations

TSCA list
None

US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
None

SARA Title III - section 302 - notification and information
None

SARA Title III - section 313 - toxic chemical release reporting
None

US States Regulatory Reporting

CA Prop65
This product does not contain any substances known to the State of California to cause cancer.

This product does not contain any substances known to the State of California to cause reproductive harm.

US State right-to-know ingredients

None

Canadian Regulations

Canadian Domestic Substance List
None

Environmental

CERCLA
None

Clean Water Section 307 Priority Pollutants
None

Safe Drinking Water Act Maximum Contaminant Levels
None

International Regulations

EU Classification

Flufenacet Technical	142459-58-3	Harmful Dangerous for the environment
R-phrase(s)	Harmful if swallowed. May cause sensitization by skin contact. Harmful: danger of serious damage to health by prolonged exposure if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the	

	aquatic environment.
S-phrase(s)	Keep out of the reach of children. Keep away from food, drink and animal feedingstuffs. Avoid contact with the skin. Wear suitable gloves. This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

European Inventory of Existing Commercial Substances (EINECS)
None

SECTION 16. OTHER INFORMATION

NFPA 704: (National Fire Protection Association)
Health - 2 Flammability - 1 Reactivity - 0 Others - None
0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

MSDS REVISION INDICATOR: Update name in Section 1; updated other sections as needed.

Approval Date: 11/24/2004

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