Material Safety Data Sheet

Date Printed: 16/DEC/2004
Date Updated: 14/MAR/2004
Version 1.5
According to 91/155/EEC

1 - Product and Company Information

Product Name	2,4-DICHLOROPHENOXYACETIC ACID, 98%
Product Number	D70724
Company	Sigma-Aldrich Pte Ltd #08-01 Citilink Warehouse Singapore 118529 Singapore
Technical Phone #	65 271 1089
Fax	65 271 1571

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
2,4-DICHLOROPHENOXYACETIC ACID	94-75-7	202-361-1	607-039-00-8

Formula	C8H6Cl2O3
Molecular Weight	221.04 AMU
Synonyms	Acide 2,4-dichloro phenoxyacetique (French) * Acido(2,4-dicloro-fenossi)-acetico (Italian) * Acme LV 4 * Agrotect * Amidox * Amoxone * Aqua-Kleen * Barrage * BH 2,4-D * Brush-rhap * B-Selektonon * Chipco turf herbicide "D" * Chloroxone * Citrus fix * Crop rider * 2,4-D (ACGIH:OSHA) * 2,4-D acid * Debroussaillant 600 * Deherban * (2,4-Dichloor-fenoxy)-azijnzuur (Dutch) * Dichlorophenoxyacetic acid * 2,4-Dichlorophenoxyacetic acid * Dichlorophenoxyacetic acid (OSHA) * 2,4-Dichlorphenoxyacetic acid * (2,4-Dichlor-phenoxy)-essigsaeure (German) * Dicopur * DMA-4 * Dormone * 2,4-Dwuchlorofenoksyoctowy kwas (Polish) * Emulsamine BK * Emulsamine E-3 * ENT 8,538 * Envert 171 * Envert DT * Estone * Farmco * Fernimine * Fernoxone * Ferxone * Foredex 75 * Hedonal (the herbicide) * Herbidal * Hivol-44 * Ipaner * Kwasu 2,4-dwuchlorofenoksyoctowego (Polish) * Kwas 2,4-dwuchlorofenoksyoctowy (Polish) * Kyselina 2,4-dichlorfenoxyoctova (Czech) * Lawn-keep * Macrondray * Miracle *

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Harmful if swallowed. Irritating to respiratory system. Risk of serious damage to eyes. May cause sensitization by skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4 - First Aid Measures

AFTER INHALATION
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

AFTER EYE CONTACT
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS
Specific Hazard(s): Emits toxic fumes under fire conditions.
Explosion Hazards: Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed. Store in a cool dry place. Store in the dark.

SPECIAL REQUIREMENTS: Light sensitive.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	7 MG/M3
Poland		NDSCh	20 MG/M3
Poland		NDSP	-

EXPOSURE LIMITS - DENMARK

	Source	Type	Value
	OEL	TWA	1 mg/m3

Remarks: H

EXPOSURE LIMITS - GERMANY

	Source	Type	Value
	TRGS 900	OEL	1 mg/m3, E

Remarks: 4
Remarks: H,19,Y

EXPOSURE LIMITS - NORWAY

	Source	Type	Value
		OEL	5 mg/m3

EXPOSURE LIMITS - SWITZERLAND

	Source	Type	Value
	OEL	OEL	1 mg/m3

Remarks: E H C

EXPOSURE LIMITS - UNITED KINGDOM

	Source	Type	Value
	OEL	OEL	10 mg/m3
	OEL	STEL	20 mg/m3

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance
Physical State: Solid
Color: Slightly brown
Form: Powder

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	160 °C	
MP/MP Range	134 °C	
Flash Point	N/A	
Flammability	N/A	
Autoignition Temp	> 180 °C	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	< 0.75 mmHg	20 °C

SG/Density	N/A
Partition Coefficient	N/A
Viscosity	N/A
Vapor Density	N/A
Saturated Vapor Conc.	N/A
Evaporation Rate	N/A
Bulk Density	720 kg/l
Decomposition Temp.	N/A
Solvent Content	N/A
Water Content	N/A
Surface Tension	N/A
Conductivity	N/A
Miscellaneous Data	N/A
Solubility	Solubility in Water:Insoluble. Other Solvents: ETHANOL

10 - Stability and Reactivity

STABILITY

Stable: Stable.
Conditions of Instability: May decompose on exposure to light.
Materials to Avoid: Strong oxidizing agents, Copper Iron and iron salts.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: AG6825000

ACUTE TOXICITY

LDLO
Oral
Human
80 mg/kg
Remarks: Gastrointestinal:Nausea or vomiting. Behavioral:Coma. Behavioral:Somnolence (general depressed activity).

LDLO
Oral
Man
93 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold.

LD50
Oral
Rat
375 mg/kg

LD50
Skin
Rat
1500 mg/kg

LD50
Intraperitoneal
Rat

666 MG/KG
Remarks: Peripheral Nerve and Sensation:Spastic paralysis with or without sensory change. Behavioral:Muscle weakness. Behavioral:Coma.

LD50
Oral
Mouse
347 mg/kg

LD50
Oral
Dog
100 mg/kg
Remarks: Behavioral:Stiffness. Behavioral:Coma.

LD50
Skin
Rabbit
1400 mg/kg
Remarks: Behavioral:Ataxia. Skin and Appendages:Skin: After topical exposure:Primary irritation.

LD50
Intraperitoneal
Rabbit
400 MG/KG
Remarks: Peripheral Nerve and Sensation:Spastic paralysis with or without sensory change. Behavioral:Muscle weakness. Behavioral:Coma.

LD50
Intravenous
Rabbit
400 MG/KG
Remarks: Peripheral Nerve and Sensation:Spastic paralysis with or without sensory change. Behavioral:Muscle weakness. Behavioral:Coma.

LD50
Oral
Guinea pig
469 mg/kg

LD50
Intraperitoneal
Guinea pig
666 MG/KG
Remarks: Peripheral Nerve and Sensation:Spastic paralysis with or without sensory change. Behavioral:Muscle weakness. Behavioral:Coma.

LD50
Oral
Hamster
500 mg/kg

LD50
Oral
Chicken
541 mg/kg
Remarks: Gastrointestinal:Gastritis. Behavioral:Somnolence

(general depressed activity). Liver:Fatty liver degeneration.

LD50
Oral
Mammal
375 mg/kg

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
0.75 mg
24H
Remarks: Severe irritation effect

SENSITIZATION
Sensitization: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

SIGNS AND SYMPTOMS OF EXPOSURE
Symptoms include nausea, vomiting, anorexia, weakness, dizziness, vertigo, headache, and sweating. Exposure to large amounts can cause: Ataxia. Convulsions.

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: Harmful if absorbed through skin.
Eye Contact: Causes eye irritation.
Inhalation: Harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

TARGET ORGAN INFORMATION
Central nervous system. Skeletal muscle. Cardiovascular system. Liver. Kidneys. Peripheral nervous system.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

CHRONIC EXPOSURE - MUTAGEN

Human
1 UMOL/L
Cell Type: fibroblast
Unscheduled DNA synthesis

Human
20 UG/L
Cell Type: lymphocyte
Cytogenetic analysis

Human
10 MG/L
Cell Type: lymphocyte

Sister chromatid exchange

Rat
100 UG/KG
Intraperitoneal
Cytogenetic analysis

Mouse
200 MG/KG
Oral
DNA inhibition

Mouse
100 MG/KG
Oral
Cytogenetic analysis

Hamster
1 MMOL/L
Cell Type: ovary
DNA inhibition

Hamster
2400 MG/L
Cell Type: ovary
Cytogenetic analysis

Hamster
167 MG/L
Cell Type: ovary
Sister chromatid exchange

Hamster
10 UMOL/L
Cell Type: lung
Mutation in mammalian somatic cells.

Cattle, Horse
1 PPM
Cell Type: kidney
Cytogenetic analysis

Mammal
1 MMOL/L
Cell Type: lymphocyte
DNA damage

CHRONIC EXPOSURE - TERATOGEN
Result: Laboratory experiments have shown teratogenic effects.

Species: Rat
Dose: 220 UG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG)
Result: Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Species: Rat
Dose: 1 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal

system. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Species: Rat
Dose: 125 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 500 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 80 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 707 MG/KG
Route of Application: Oral
Exposure Time: (11-14D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death. Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse
Dose: 882 MG/KG
Route of Application: Subcutaneous
Exposure Time: (6-14D PREG)
Result: Effects on Embryo or Fetus: Fetal death. Specific Developmental Abnormalities: Central nervous system. Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord).

Species: Mouse
Dose: 900 MG/KG
Route of Application: Subcutaneous
Exposure Time: (6-14D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 1600 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (9-25D PREG)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Biochemical and metabolic.

Species: Rat
Dose: 600 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (9-15D PREG)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Biochemical and metabolic.

Species: Rat
Dose: 1 GM/KG
Route of Application: Intraperitoneal
Exposure Time: (15-24D PREG)
Result: Effects on Newborn: Biochemical and metabolic.

Species: Mouse
Dose: 900 MG/KG
Route of Application: Oral
Exposure Time: (6-14D PREG)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Specific Developmental Abnormalities: Eye, ear.

Species: Mouse
Dose: 438 MG/KG
Route of Application: Oral
Exposure Time: (8-12D PREG)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse
Dose: 900 MG/KG
Route of Application: Subcutaneous
Exposure Time: (6-14D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Hamster
Dose: 200 MG/KG
Route of Application: Oral
Exposure Time: (7-11D PREG)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: EC50 Algae
Species: Selenastrum capricornutum resp.
Time: 96 h
Value: 0.024 - 0.026 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: > 100 mg/l

Test Type: LC50 Fish
Species: Salmon
Time: 96 h

Value: 100 mg/l

Test Type: LC50 Fish
Species: Cyprinus carpio
Time: 96 h
Value: 20 - 96.5 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 180 mg/l

13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR
UN#: 3077
Class: 9
PG: III
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s

IMDG
UN#: 3077
Class: 9
PG: III
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
Marine Pollutant: Yes
Severe Marine Pollutant: No
Technical Name: Required

IATA
UN#: 3077
Class: 9
PG: III
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
Inhalation Packing Group I: No
Technical Name: Required

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
ANNEX I INDEX NUMBER: 607-039-00-8
INDICATION OF DANGER: Xn
Harmful.
R-PHRASES: 22 37 41 43 52/53
Harmful if swallowed. Irritating to respiratory system. Risk of serious damage to eyes. May cause sensitization by skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-PHRASES: 24/25 26 36/37/39 46 61
Avoid contact with skin and eyes. In case of contact with eyes,

rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. If swallowed, seek medical advice immediately and show this container or label. Avoid release to the environment. Refer to special instructions/safety data sheets.

COUNTRY SPECIFIC INFORMATION

Germany
WGK: 2

SWITZERLAND
SWISS POISON CLASS: 3

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16 - Other Information

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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