

## Chemical Safety Data Sheet MSDS / SDS

## 2,4-D SDS

Revision Date:2024-04-25 Revision Number:1

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**SECTION 1: Identification of the substance/mixture and of the company/undertaking****Product identifier**

Product name: 2,4-D  
CAS: 94-75-7

**Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.  
Uses advised against: none

**Company Identification**

Company: Chemicalbook.in  
Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090  
Telephone: +91 9550333722

**SECTION 2: Hazards identification****Classification of the substance or mixture**

Acute toxicity - Category 4, Oral  
Serious eye damage, Category 1

Skin sensitization, Category 1  
Specific target organ toxicity - single exposure, Category 3  
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 3

### GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

### Hazard statement(s)

H302 Harmful if swallowed  
H318 Causes serious eye damage  
H317 May cause an allergic skin reaction  
H335 May cause respiratory irritation  
H412 Harmful to aquatic life with long lasting effects

### Precautionary statement(s)

### Prevention

P264 Wash ... thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...  
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.  
P272 Contaminated work clothing should not be allowed out of the workplace.  
P271 Use only outdoors or in a well-ventilated area.  
P273 Avoid release to the environment.

### Response

P301+P317 IF SWALLOWED: Get medical help.  
P330 Rinse mouth.  
P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P317 Get medical help.  
P302+P352 IF ON SKIN: Wash with plenty of water/...  
P333+P317 If skin irritation or rash occurs: Get medical help.  
P321 Specific treatment (see ... on this label).  
P362+P364 Take off contaminated clothing and wash it before reuse.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P319 Get medical help if you feel unwell.

#### **Storage**

P403+P233 Store in a well-ventilated place. Keep container tightly closed.  
P405 Store locked up.

#### **Disposal**

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

#### **Other hazards which do not result in classification**

no data available

### **SECTION 3: Composition/information on ingredients**

#### **Substance**

Chemical name:	2,4-D
Common names and synonyms:	2,4-D
CAS number:	94-75-7
EC number:	202-361-1
Concentration:	100%

### **SECTION 4: First aid measures**

#### **Description of necessary first-aid measures**

##### **If inhaled**

Fresh air, rest. Refer for medical attention.

##### **Following skin contact**

Remove contaminated clothes. Rinse and then wash skin with water and soap.

### **Following eye contact**

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

### **Following ingestion**

Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention .

### **Most important symptoms/effects, acute and delayed**

**SYMPTOMS:** Symptoms of exposure to this material include weakness, muscle twitching, stupor, vomiting, abdominal cramps, diarrhea and anorexia. Central nervous system effects and myotonia can also occur. It is irritating to skin, eyes, mucous membranes and the upper respiratory tract. **ACUTE/CHRONIC HAZARDS:** This compound is irritating to skin, eyes, mucous membranes and upper respiratory tract. It emits toxic fumes when heated to decomposition. (NTP, 1992)

Dust may irritate eyes. Ingestion causes gastroenteric distress, diarrhea, mild central nervous system depression, dysphagia, and possible transient liver and kidney injury. (USCG, 1999)

**INHALATION:** Inflamed mucous membranes. **EYES:** Contact may cause irritation and swelling. **SKIN:** Irritation, rashes and swelling.

**INGESTION:** Weakness and lethargy, anorexia, diarrhea, spasticity and possible death from ventricular fibrillation and subsequent cardiac arrest. (USCG, 1999)

### **Indication of immediate medical attention and special treatment needed, if necessary**

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Chlorophenoxy herbicides and related compounds

## **SECTION 5: Firefighting measures**

### **Suitable extinguishing media**

Extinguishant: Carbon dioxide, dry chemical, foam, and water.

### **Specific hazards arising from the chemical**

Flash point data for this compound are not available. It is probably combustible. (NTP, 1992)

Special Hazards of Combustion Products: Toxic and irritating hydrogen chloride or phosgene gases may form. (USCG, 1999)

Special Hazards of Combustion Products: Emits noxious fumes. Behavior in Fire: Emits noxious fumes, including chlorides. (USCG, 1999)

### **Special protective actions for fire-fighters**

In case of fire in the surroundings, use appropriate extinguishing media.

## **SECTION 6: Accidental release measures**

### **Personal precautions, protective equipment and emergency procedures**

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered plastic containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

### **Environmental precautions**

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered plastic containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

### **Methods and materials for containment and cleaning up**

Accidental Release Measures. Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. Methods and materials for containment and cleaning up: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

## **SECTION 7: Handling and storage**

### **Precautions for safe handling**

NO contact with oxidizing agents. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### **Conditions for safe storage, including any incompatibilities**

Store in an area without drain or sewer access. Separated from strong oxidants and food and feedstuffs. Conditions for safe storage, including any incompatibilities: Keep container tightly closed in a dry and well-ventilated place. Keep in a dry place. Light sensitive. Moisture sensitive.

## SECTION 8: Exposure controls/personal protection

### Control parameters

### Occupational Exposure limit values

TLV: (inhalable fraction): 10 mg/m<sup>3</sup>, as TWA; A4 (not classifiable as a human carcinogen).MAK: (inhalable fraction): 2 mg/m<sup>3</sup>; peak limitation category: II(2); skin absorption (H); pregnancy risk group: C

### Biological limit values

no data available

### Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures, such as personal protective equipment (PPE)

#### Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

#### Skin protection

Protective gloves. Protective clothing.

#### Respiratory protection

Use local exhaust or breathing protection.

#### Thermal hazards

no data available

## SECTION 9: Physical and chemical properties and safety characteristics

### Physical state:

2,4-d sodium salt is a clear brown to black liquid with a characteristic phenoxy odor. Primary hazard is threat to the environment. Immediate steps should be taken to limit spread to the environment. Easily penetrates the soil to contaminate groundwater and nearby waterways.

Colour:	White to yellow crystalline powder /SRP: yellow color is phenolic impurities/
Odour:	Oodorless
Melting point/freezing point:	137-141 °C
Boiling point or initial boiling point and boiling range:	160 °C (0.4 torr)
Flammability:	Noncombustible Solid, but may be dissolved in flammable liquids.
Lower and upper explosion limit/flammability limit:	no data available
Flash point:	160 °C (0.4 torr)
Auto-ignition temperature:	no data available
Decomposition temperature:	no data available
pH:	2,4-D is a strong acid
Kinematic viscosity:	no data available
Solubility:	Soluble (NTP, 1992)
Partition coefficient n-octanol/water:	log Kow= 2.81
Vapour pressure:	0.4 mm Hg ( 160 °C)
Density and/or relative density:	1.563
Relative vapour density:	7.63 (NTP, 1992) (Relative to Air)
Particle characteristics:	no data available

## SECTION 10: Stability and reactivity

### Reactivity

Decomposes on heating. This produces toxic fumes including hydrogen chloride. Reacts with strong oxidants. This generates fire and explosion hazard. Attacks some forms of coating and metals.

### Chemical stability

Stable under recommended storage conditions.

### Possibility of hazardous reactions

Not combustible This material is incompatible with strong oxidizers. (NTP, 1992)

### Conditions to avoid

no data available

### Incompatible materials

Contact with strong oxidizers may cause fires or explosions.

### Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /chlorides/.

## SECTION 11: Toxicological information

### Acute toxicity

Oral: LD50 Rat Fischer-344 male oral 443 mg/kg (95% confidence limits 270-1103 mg/kg) (2,4-D acid in corn oil).

Inhalation: no data available

Dermal: no data available

### Skin corrosion/irritation

no data available



**Serious eye damage/irritation**

no data available

**Respiratory or skin sensitization**

no data available

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

EPA: Not classifiable as to human carcinogenicity. IARC: Possibly carcinogenic to humans. NTP: Not evaluated

**Reproductive toxicity**

no data available

**STOT-single exposure**

The substance is irritating to the skin, respiratory tract and eyes. Exposure at high levels could cause effects on the nervous system.

**STOT-repeated exposure**

See Notes.

**Aspiration hazard**

A harmful concentration of airborne particles can be reached quickly on spraying or when dispersed, especially if powdered.

**SECTION 12: Ecological information****Toxicity**

Toxicity to fish: LC50; Species: *Salvelinus namaycush* (lake trout) weight 0.3 g; Conditions: static bioassay at 10 deg C, without aeration, pH 7.2-7.5, water hardness 40-50 mg/L as calcium carbonate and alkalinity of 30-35 mg/L; Concentration: 45 mg/L for 96 hr (95% confidence limit 35-56 mg/L) /2,4-D acid, granular 100%

Toxicity to daphnia and other aquatic invertebrates: LC50; Species: *Daphnia magna* (water flea); Concentration: 363-389 mg/L for 48 hr /Conditions of bioassay not specified, SRP: Unspecified salt or ester of 2,4-D

Toxicity to algae: LC50; Species: *Pseudokirchneriella subcapitata* (Green Algae); Conditions: freshwater, static; Concentration: 20700 ug/L for 5 days /96.1% purity

Toxicity to microorganisms: no data available

### **Persistence and degradability**

AEROBIC: 2,4-D is readily and rapidly degraded in soil(1). The kinetics of 2,4-D disappearance suggest that microorganisms are responsible(1). The rate will depend on a number of factors including presence of acclimated organisms, nutrient levels, moisture level, temperature, and concentration of 2,4-D(1-3). Typical half-lives range from less than 1 day to more than several weeks under the conditions used(4-8). Degradation with a mixture of microorganisms from activated sludge, soil and sediments lead to half-lives of 1.8-3.1 days under aerobic conditions(4,9). Particular species of microorganisms, of various types, have been isolated and shown to degrade phenoxyacetic acid herbicides in pure culture(1). Degradation of the phenoxyacetic acids proceeds by two main pathways(1). These are via a hydroxyphenoxy acetic acid intermediate or via the corresponding phenol(1). Warm, moist conditions and addition of organic matter stimulate degradation of 2,4-D(7). The breakdown of 2,4-D in two types of soil was investigated under dry and moist conditions and at two different temperatures(7). Generally, 2,4-D disappeared more rapidly from moist soil; after 14 days of a slow rate of disappearance, however, the removal rate from dry, sandy soil increased(7). Numbers of organisms degrading 2,4-D were initially much lower in sandy than in clay loams(7). However, numbers increased rapidly in sandy soils after the addition of the herbicide and, as a result, 2,4-D was eventually degraded more rapidly in sandy than in clay loams(7). In moist conditions, at 25 deg C, the half-life of 2,4-D was 7 days or less, whereas in dry conditions, at 35 deg C, it could be as long as 250 days(7). These latter conditions are unlikely to apply in most natural conditions where 2,4-D is likely to be used(7). First-order kinetics were observed for the degradation of 2,4-D in sandy loam and muck soils from Malaysia(10). Short half-lives were observed for 2,4-D in aerobic (3.4 days) muck soils(10).

### **Bioaccumulative potential**

An estimated BCF of 3 was calculated in fish for 2,4-D(SRC), using a log Kow of 2.81(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC). The Japanese Chemicals Evaluation and Research Institute has classified 2,4-D as not highly bioaccumulative(4). A depuration half-life of 1.32 days was measured channel catfish (*Ictalurus punctatus*) exposed to 0.01 ppm 2,4-D over a period of 4 days(5). Rapid depuration was observed for rainbow trout (*Salmo gairdneri*), channel catfish (*Ictalurus punctatus*) and bluegill sunfish (*Lepomis macrochirus*) following 8-hr exposure to 0.3 or 1.0 mg/L C14-labeled 2,4-D butoxyethanol ester(6). Uptake by three seaweeds (*Ulva* sp, *Enteromorpha* sp, *Rhododymenia* sp) at pH 7.8 ranged from 0.01-0.03% of 2,4-D added using 25 ppb C14 ring-labeled 2,4-D(7). Bioaccumulation factors of <10 and 6 were reported for golfer orfe (*Leuciscus idus mealnotus*) and algae (*Chlorella fusca*),

respectively(8).

### **Mobility in soil**

Reported experimental 2,4-D (free acid) Koc values are 19.6 (average of 9 soils)(1) to 109.1 (average of 3 soils and range of 72.2-135.7)(2), and 20 to 79(3). According to a classification scheme(4), these Koc values suggest that 2,4-D is expected to have high to very high mobility in soil(SRC). The pKa of 2,4-D is 2.73(5). Anionic 2,4-D adsorption is affected by soil mineralogy (in particular iron and aluminum oxide content), exchangeable aluminum content, and soil phosphate content(6). Adsorption appears to increase with increasing organic content and decreasing pH of soil(7). Average mobility for 14 soils was 0.72 (Rf units), ranging from 0.41 for silty loam to 1.0 for sandy loam(7). In general little runoff occurs with 2,4-D or its amine salts and runoff behavior is the inverse of adsorption behavior(8). Thus, 2,4-D can be desorbed from mineral soils, but not from those containing much organic matter(8). Percolating water appears to be the principal means of movement and diffusion is important only for transport over very small distance(8). Geometric mean concentrations of leached 2,4-D ranged from 0.55-0.87 ug/L at a depth of 0.2 m following applications (rate 0.1-3.3 kg/ha-yr) of the herbicide and irrigation of home garden lawns(9). Upward movement of 2,4-D occurs when the soil surface dries or if rapid evaporation occurs(9). Thus, 2,4-D can be concentrated at the soil surface, where it can be photolyzed, transported by wind either on dust or in vapor form, or leached downwards again(9).

### **Other adverse effects**

no data available

## **SECTION 13: Disposal considerations**

### **Disposal methods**

#### **Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

#### **Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

## **SECTION 14: Transport information**

### **UN Number**

ADR/RID: UN3077 (For reference only, please check.)  
IMDG: UN3077 (For reference only, please check.)  
IATA: UN3077 (For reference only, please check.)

#### **UN Proper Shipping Name**

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)  
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)  
IATA: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)

#### **Transport hazard class(es)**

ADR/RID: 9 (For reference only, please check.)  
IMDG: 9 (For reference only, please check.)  
IATA: 9 (For reference only, please check.)

#### **Packing group, if applicable**

ADR/RID: III (For reference only, please check.)  
IMDG: III (For reference only, please check.)  
IATA: III (For reference only, please check.)

#### **Environmental hazards**

ADR/RID: Yes  
IMDG: Yes  
IATA: Yes

#### **Special precautions for user**

no data available

#### **Transport in bulk according to IMO instruments**

no data available

## **SECTION 15: Regulatory information**

Safety, health and environmental regulations specific for the product in question

**European Inventory of Existing Commercial Chemical Substances (EINECS)**

Listed.

**EC Inventory**

Listed.

**United States Toxic Substances Control Act (TSCA) Inventory**

Listed.

**China Catalog of Hazardous chemicals 2015**

Not Listed.

**New Zealand Inventory of Chemicals (NZIoC)**

Listed.

**(PICCS)**

Listed.

**Vietnam National Chemical Inventory**

Listed.

**IECSC)**

Listed.

**Korea Existing Chemicals List (KECL)**

Listed.

**SECTION 16: Other information**

**Abbreviations and acronyms**

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

### References

IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>

HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website:  
[http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)

CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website:  
<http://www.phmsa.dot.gov/hazmat/library/erg>

Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

### Other Information

2,4-D is a chlorophenoxy-herbicide which, as a group, has been classified by IARC (1987) as possibly carcinogenic to humans, but the data on this specific substance are inconclusive. Carrier solvents used in commercial formulations may change physical and toxicological properties.

Disclaimer: 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. We as supplier shall not be held liable for any