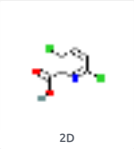
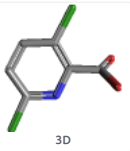
PubChem

COMPOUND SUMMARY

Clopyralid

PubChem CID:	15553
Structure:	 2D  3D Find Similar Structures
Chemical Safety:	 Corrosive Laboratory Chemical Safety Summary (LCSS) Datasheet
Molecular Formula:	$C_6H_3Cl_2NO_2$ or $(C_5H_2N)Cl_2COOH$
Synonyms:	1702-17-6 CLOPYRALID 3,6-Dichloropicolinic acid 3,6-Dichloropyridine-2-carboxylic acid 3,6-Dichloro-2-pyridinecarboxylic acid More...
Molecular Weight:	192 g/mol
Dates:	Modify: 2020-02-26 Create: 2005-03-27

Clopyralid is an organochlorine pesticide having a 3,6-dichlorinated picolinic acid structure. It has a role as a herbicide. It is a member of pyridines and an organochlorine pesticide. It derives from a picolinic acid.

▸ ChEBI

11 Safety and Hazards

11.1 Hazards Identification

11.1.1 GHS Classification

Showing 1 of 3 View More

Pictogram(s)	 Corrosive
Signal	Danger
GHS Hazard Statements	H318: Causes serious eye damage [Danger Serious eye damage/eye irritation]
Precautionary Statement Codes	P280, P305+P351+P338, and P310 (The corresponding statement to each P-code can be found at the GHS Classification page.)

EU REGULATION (EC) No 1272/2008

11.1.2 Fire Hazard

Combustible.

ILO International Chemical Safety Cards (ICSC)

11.1.3 Skin, Eye, and Respiratory Irritations

Severe eye irritant; mild skin irritant on repeated or prolonged contact.

Hartley, D. and H. Kidd (eds.). The Agrochemicals Handbook. 2nd ed. Lechworth, Herts, England: The Royal Society of Chemistry, 1987., p. A433/AUG 87

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11.2 First Aid Measures

11.2.1 Inhalation First Aid

Fresh air, rest.

ILO International Chemical Safety Cards (ICSC)

11.2.2 Eye First Aid

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

ILO International Chemical Safety Cards (ICSC)

11.2.3 Ingestion First Aid

Rinse mouth.

ILO International Chemical Safety Cards (ICSC)

11.3 Fire Fighting

Use water spray, powder.

ILO International Chemical Safety Cards (ICSC)

11.3.1 Fire Fighting Procedures

Use water spray, powder.

International Program on Chemical Safety/Commission of the European Union; International Chemical Safety Card on Clopyralid (November 4, 1997). Available from, as of October 16, 2012: http://www.inchem.org/pages/icsc.htm

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11.4 Accidental Release Measures

11.4.1 Spillage Disposal

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

ILO International Chemical Safety Cards (ICSC)

11.4.2 Cleanup Methods

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. /Lontrel Turf and Ornamental/

Dow AgroSciences LLC; Label for Lontrel Turf and Ornamental, Specimen Label Revised 7/16/2008. Available from, as of November 28, 2012: http://www.cdms.net/LabelsMsds/LMDefault.aspx?t=

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/SRP:/ 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 if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on the 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. /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160

HSDB

/SRP:/ Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if needed. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary ... . Monitor for shock and treat if necessary ... . Anticipate seizures and treat if necessary ... . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with 0.9% saline (NS) during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 mL/kg up to 200 mL of water for dilution if the patient can swallow, has a strong gag reflex, and does not drool ... . Cover skin burns with dry sterile dressings after decontamination ... . /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160

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/SRP:/ Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, has severe pulmonary edema, or is in severe respiratory distress. Positive-pressure ventilation techniques with a bag valve mask device may be beneficial. Consider drug therapy for pulmonary edema ... . Consider administering a beta agonist such as albuterol for severe bronchospasm ... . Monitor cardiac rhythm and treat arrhythmias as necessary ... . Start IV administration of D5W /SRP: "To keep open", minimal flow rate/. Use 0.9% saline (NS) or lactated Ringer's if signs of hypovolemia are present. For hypotension with signs of hypovolemia, administer fluid cautiously. Watch for signs of fluid overload ... . Treat seizures with diazepam or lorazepam ... . Use proparacaine hydrochloride to assist eye irrigation ... . /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160-1

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12.1.9 Non-Human Toxicity Excerpts

/LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ Clopyralid (purity=95.78+0.25%) was applied to the clipped skin of 5 New Zealand White rabbits per sex per dose level and covered with a water-moistened absorbent gauze for 6 hours per day over a 21 day interval (15 total days exposure). Dose levels of 0, 100, 500, and 1000 mg/kg/day were used. No clinical signs were observed. No treatment-related changes in organ weights were observed. No treatment-related changes in hematological or biochemical parameters were observed. Necropsy revealed no treatment-related findings. Histopathological examination revealed no treatment-related effects. No adverse effects. NOEL (M/F)=1000 mg/kg/day.

California Environmental Protection Agency/Department of Pesticide Regulation; Toxicology Data Review Summaries on Clopyralid (1702-17-6). Available from, as of October 8, 2012: http://www.cdpr.ca.gov/docs/risk/toxsums/toxsumlist.htm

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/LABORATORY ANIMALS: Chronic Exposure or Carcinogenicity/ Clopyralid (3,6-dichloropicolinic acid) was administered in diets of 6 beagle dogs/sex/group at 0, 100, 320, and 1000 mg/kg/day for 12 months. Chronic NOEL = 100 mg/kg/day, based on reductions in RBC parameters, increased liver weights, clinical chemistry changes such as decreased BUN and decreased circulating albumin, and possibly vacuolation and enlargement of adrenal cortical cells. In addition, lungs of some dogs in all treated groups had granulomas associated with foreign body materials (sometimes having the appearance of food particles), brown pigment around bronchioles, and chronic bronchiolitis. The pattern of lung lesions is consistent with inadvertent exposure via inhalation of the meal containing the finely powdered test article, hence not relevant to the intended dietary route of exposure.

California Environmental Protection Agency/Department of Pesticide Regulation; Toxicology Data Review Summaries on Clopyralid (1702-17-6). Available from, as of October 8, 2012: http://www.cdpr.ca.gov/docs/risk/toxsums/toxsumlist.htm

HSDB

/LABORATORY ANIMALS: Chronic Exposure or Carcinogenicity/ The lifetime study involved 50 F344 rats/sex/group at 0, 15, 150, and 1500 mg/kg/day of clopyralid (= Dowco 290), 96.7% purity, in diet for 2 years. ... NOEL = 15 mg/kg/day (epithelial hyperplasia at the limiting ridge between glandular stomach and forestomach: dose-related in degree and incidence in both sexes). Findings (generally in both sexes) at 1500 mg/kg/day were slight food consumption and body weight decrements, slight increases in liver and kidney relative weights (without associated histopathology), and grossly visible increased size of the stomach wall limiting ridge (evident as thickening as well as hyperplasia at that dose level) /were observed/.

California Environmental Protection Agency/Department of Pesticide Regulation; Toxicology Data Review Summaries on Clopyralid (1702-17-6). Available from, as of October 8, 2012: http://www.cdpr.ca.gov/docs/risk/toxsums/toxsumlist.htm

HSDB

/LABORATORY ANIMALS: Chronic Exposure or Carcinogenicity/ The lifetime study involved 50 B6C3F1 mice/sex/group at 0, 100, 500, and 2000 mg/kg/day of clopyralid, 96.7% purity, in diet for 2 years. The interim report contains data on groups maintained for 6 or 12 months (10 mice/sex/group/interval). NOEL = 500 mg/kg/day (reduced body weights in males). There were no other treatment effects identified.

California Environmental Protection Agency/Department of Pesticide Regulation; Toxicology Data Review Summaries on Clopyralid (1702-17-6). Available from, as of October 8, 2012: http://www.cdpr.ca.gov/docs/risk/toxsums/toxsumlist.htm

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For more Non-Human Toxicity Excerpts (Complete) data for CLOPYRALID (11 total), please visit the HSDB record page.

HSDB

12.1.10 Non-Human Toxicity Values

LD50 Rat male oral 4300 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 1217

HSDB

LD50 Rat ip 900 mg/kg

Lewis, R.J. Sr. (ed) Sax's Dangerous Properties of Industrial Materials. 11th Edition. Wiley-Interscience, Wiley & Sons, Inc. Hoboken, NJ. 2004., p. 1217

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LD50 Rabbit percutaneous > 2000 mg/kg

Hartley, D. and H. Kidd (eds.). The Agrochemicals Handbook. 2nd ed. Lechworth, Herts, England: The Royal Society of Chemistry, 1987., p. A433/AUG 87

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LD50 Mice oral > 5000 mg/kg

Hartley, D. and H. Kidd (eds.). The Agrochemicals Handbook. 2nd ed. Lechworth, Herts, England: The Royal Society of Chemistry, 1987., p. A433/AUG 87

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12.1.11 Ecotoxicity Values

LD50; Species: Apis mellifera (Bee) oral >100 ug/bee for 48 hr /Conditions of bioassay not specified/

Hartley, D. and H. Kidd (eds.). The Agrochemicals Handbook. 2nd ed. Lechworth, Herts, England: The Royal Society of Chemistry, 1987., p. A433/AUG 87

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LC50; Species: Oncorhynchus mykiss (Rainbow trout); Concentration: 103.5 mg/L for 96 hr /Conditions of bioassay not specified/

O'Neil, M.J. (ed.). The Merck Index - An Encyclopedia of Chemicals, Drugs, and Biologicals. Whitehouse Station, NJ: Merck and Co., Inc., 2006., p. 404

HSDB

LC50; Species: Lepomis macrochirus (Bluegill sunfish); Concentration: 125.4 mg/L for 96 hr /Conditions of bioassay not specified/

Hartley, D. and H. Kidd (eds.). The Agrochemicals Handbook. 2nd ed. Lechworth, Herts, England: The Royal Society of Chemistry, 1987., p. A433/AUG 87

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LC50; Species: Oncorhynchus mykiss (Rainbow Trout) juvenile, weight 0.55 g, length 42 mm; Conditions: freshwater, static, 7.6 °C, pH 8.02, hardness 289 mg/L CaCO3, alkalinity 250 mg/L CaCO3, dissolved **oxygen** 8.40 mg/L; Concentration: 700000 ug/L for 96 hr (95% confidence interval: 630000-780000 ug/L) /95% purity/

Fairchild JF et al; Environ Toxicol Chem 27 (3): 623-30 (2008) as cited in the ECOTOX database. Available from, as of October 7, 2012:

HSDB

LC50; Species: Salvelinus confluentus (Bull Trout) juvenile, weight 0.59 g, length 41 mm; Conditions: freshwater, static, 7.6 °C, pH 2.0-7.5, hardness 289 mg/L CaCO3, alkalinity 250 mg/L CaCO3, dissolved **oxygen** 8.40 mg/L; Concentration: 802000 ug/L for 96 hr (95% confidence interval: 674000-955000 ug/L) /95% purity/

Fairchild JF et al; Environ Toxicol Chem 27 (3): 623-30 (2008) as cited in the ECOTOX database. Available from, as of October 7, 2012:

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12.1.12 Ecotoxicity Excerpts

/AQUATIC SPECIES/ Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid) exhibits low acute toxicity to fish, including the rainbow trout (Oncorhynchus mykiss) and the threatened bull trout (Salvelinus confluentus). However, there are no published chronic toxicity data for clopyralid and fish that can be used in ecological risk assessments. We conducted 30-day chronic toxicity studies with juvenile rainbow trout exposed to the acid form of clopyralid. The 30-day maximum acceptable toxicant concentration (MATC) for growth, calculated as the geometric mean of the no observable effect concentration (68 mg/L) and the lowest observable effect concentration (136 mg/L), was 96 mg/L. No mortality was measured at the highest chronic concentration tested (273 mg/L). The acute:chronic ratio, calculated by dividing the previously published 96-hr acutely lethal concentration (96-hr ALC(50); 700 mg/L) by the MATC was 7.3. Toxicity values were compared to a four-tiered exposure assessment profile assuming an application rate of 1.12 kg/ha. The Tier 1 exposure estimation, based on direct overspray of a 2-m deep pond, was 0.055 mg/L. The Tier 2 maximum exposure estimate, based on the Generic Exposure Estimate Concentration model (GEENEC), was 0.057 mg/L. The Tier 3 maximum exposure estimate, based on previously published results of the Groundwater Loading Effects of Agricultural Management Systems model (GLEAMS), was 0.073 mg/L. The Tier 4 exposure estimate, based on published edge-of-field monitoring data, was estimated at 0.008 mg/L. Comparison of toxicity data to estimated environmental concentrations of clopyralid indicates that the safety factor for rainbow trout exposed to clopyralid at labeled use rates exceeds 1000. Therefore, the herbicide presents little to no risk to rainbow trout or other salmonids such as the threatened bull trout.

PMID:19777152
Fairchild JF et al; Arch Environ Contam Toxicol 57 (4): 725-31 (2009)

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/AQUATIC SPECIES/ ...96-hr static acute toxicity studies /were conducted/ to evaluate the relative sensitivity of juveniles of the threatened bull trout (Salvelinus confluentus) and the standard cold-**water** surrogate rainbow trout (Onchorhyncus mykiss) to three rangeland herbicides commonly used for controlling invasive weeds in the northwestern United States. Relative species sensitivity was compared using three procedures: standard acute toxicity testing, fractional estimates of lethal concentrations, and accelerated life testing chronic estimation procedures. The acutely lethal concentrations (ALC) resulting in 50% mortality at 96 hr (96-hr ALC50s) were determined using linear regression and indicated that the three herbicides were toxic in the order of **picloram** acid > **2,4-D acid** > clopyralid acid. The 96-hr ALC50 values for rainbow trout were as follows: **picloram**, 41 mg/L; 2.4-D, 707 mg/L; and clopyralid, 700 mg/L. The 96-hr ALC50 values for bull trout were as follows: **picloram**, 24 mg/L; 2.4-D, 398 mg/L; and clopyralid, 802 mg/L. Fractional estimates of safe concentrations, based on 5% of the 96-hr ALC50, were conservative (overestimated toxicity) of regression-derived 96-hr ALC5 values by an order of magnitude. Accelerated life testing procedures were used to estimate chronic lethal concentrations (CLC) resulting in 1% mortality at 30 days (30-day CLC1) for the three herbicides: **picloram** (1 mg/L rainbow trout, 5 mg/L bull trout), **2,4-D** (56 mg/L rainbow trout, 84 mg/L bull trout), and clopyralid (477 mg/L rainbow trout; 552 mg/L bull trout). Collectively, the results indicated that the standard surrogate rainbow trout is similar in sensitivity to bull trout. Accelerated life testing procedures provided cost-effective, statistically defensible methods for estimating safe chronic concentrations (30-day CLC1s) of herbicides from acute toxicity data because they use statistical models based on the entire mortality:concentration:time data matrix.

Fairchild JF et al; Environ Toxicol Chem 27 (3): 623-30 (2008)

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/FIELD STUDIES/ In this study, a curtained wetland approach was used to investigate the effects of a herbicide mixture (**2,4-D**, **MCPA**, clopyralid, **dicamba**, **dichlorprop**, **mecoprop**, **bromoxynil**, and **glyphosate**) on the structure and function of microbial communities in an ephemeral wetland and a semi-permanent wetland. In the two studied wetlands, located in Manitoba Zero Till Research Association Farm, Brandon, Manitoba, Canada, herbicide treatment based on maximum-exposure scenarios had a significant effect on pelagic and biofilm phytoplankton productivity over relatively short time periods. The stimulation of phytoplankton productivity in the ephemeral wetland appeared to be the result of a hormonal effect of the auxin-type herbicides present in the mixture, similar to naturally occurring auxins. Herbicidal effects of auxin-type herbicides were also noticed in the semi-permanent wetland where phytoplankton productivity was suppressed during the first week as a result of the concentration addition effect of the auxin-type herbicides present in the mixture. BIOLOG and pigment profiles of the biofilm community suggested a change in the community structure in both wetlands.

PMID:22846761
Sura S et al; Sci Total Environ 435-436: 34-43 (2012)

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12.2 Ecological Information

12.2.1 EPA Ecotoxicity

Pesticide Ecotoxicity Data from EPA