

2,4-Dichlorophenol; CASRN 120-83-2

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the [IRIS assessment development process](#). Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the [guidance documents located on the IRIS website](#).

STATUS OF DATA FOR 2,4-Dichlorophenol

File First On-Line 01/31/1987

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	01/31/1987
Inhalation RfC (I.B.)	not evaluated	
Carcinogenicity Assessment (II.)	not evaluated	

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name — 2,4-Dichlorophenol

CASRN — 120-83-2

Last Revised — 01/31/1987

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of

substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Decreased delayed hypersensitivity response	NOEL: 3 ppm (converted to 0.3 mg/kg/day)	100	1	3E-3 mg/kg/day
Rat, Subchronic to Chronic	LOAEL: 30 ppm (converted to 3.0 mg/kg/day)			
Exon and Koller, 1985				

*Conversion Factors -- Doses were estimated by the authors.

I.A.2. Principal and Supporting Studies (Oral RfD)

Exon, J.H. and L.D. Koller. 1985. Toxicity of 2-chlorophenol, 2,4- dichlorophenol and 2,4,6-trichlorophenol. In: Water Chlorination: Chemistry, Environmental Impact and Health Effects, Jolley et al., Ed. Vol. 5.

Female rats were exposed to 3, 30, or 300 ppm 2,4-dichlorophenol in drinking water from weaning age through breeding at 90 days, parturition, and weaning of pups. Ten randomly selected pups/group were weaned at 3 weeks and administered 2,4-dichlorophenol for an additional 15 weeks. The authors estimated the exposure to be approximately 0.3, 3.0, and 30.0 mg/kg bw/day for the low, medium, and high dose groups. Increases in serum antibody levels to keyhole limpet hemocyanin, as measured by an enzyme-linked immunosorbent assay (ELISA) were found to be treatment-related. The increase was statistically significant in the high-dose group, as were spleen and liver weights. Delayed-type hypersensitivity responses to bovine serum albumin in Freund's complete adjuvant were significantly decreased in those animals administered 3.0 mg/kg bw/day. The NOEL for 2,4-dichlorophenol was, therefore, determined to be 3 ppm or 0.3 mg/kg bw/day. This is substantially lower than the NOEL of 100 mg/kg bw/day

reported by Kobayashi et al. (1972) for nonspecific liver changes in mice fed dichlorophenol in the diet for 180 days.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF — A factor of 10 each was employed for extrapolation from animal data to humans and for protection of sensitive human subpopulations. Since the test animals were exposed both in utero and through milk before the 15-week administration in drinking water, an additional factor for use of a subchronic study was not considered necessary.

MF — None

I.A.4. Additional Studies/Comments (Oral RfD)

Exon and Koller (1985) reported that exposure of dams to 300 ppm dichlorophenol resulted in a significant decrease in litter sizes.

I.A.5. Confidence in the Oral RfD

Study — Low

Database — Low

RfD — Low

The study (Exon and Koller, 1985) used an adequate number of animals and measured very sensitive endpoints (immunological functions) in an appropriate manner. As these endpoints are not commonly used in derivation of human health risk evaluations, confidence in the study is rated low. Additional published studies did not look for the critical effects and did not support the magnitude of the NOEL/LOAEL. Therefore, confidence in the database is rated low. Low confidence in the RfD follows.

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document — U.S. EPA, 1985

The Drinking Water Criteria Document is currently undergoing review.

Other EPA Documentation — None

Agency Work Group Review — 11/06/1985, 01/22/1986

Verification Date — 01/22/1986

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the RfD for 2,4-Dichlorophenol conducted in November 2001 did not identify any critical new studies. IRIS users who know of important new studies may provide that information to the IRIS Hotline at hotline.iris@epa.gov or (202)566-1676.

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name — 2,4-Dichlorophenol
CASRN — 120-83-2

Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — 2,4-Dichlorophenol
CASRN — 120-83-2

This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — 2,4-Dichlorophenol
CASRN — 120-83-2

VI.A. Oral RfD References

Exon, J.H. and L.D. Koller. 1985. Toxicity of 2-chlorophenol, 2,4- dichlorophenol and 2,4,6-trichlorophenol. In: Water Chlorination: Chemistry, Environmental Impact and Health Effects, Jolley et al., Ed., Vol.5. (Chap. 25). Lewis Publishers, Chelsea, MI. p. 307-330.

Kobayashi, S., T. Fukuda, K. Kawaguchi, H. Chang, S. Toda and H. Kawamura. 1972. Chronic toxicity of 2,4-dichlorophenol in mice: A simple design for checking the toxicity of residual metabolites of pesticides. J. Med. Soc., Toho Univ., Japan. 19: 356-362.

U.S. EPA. 1985. Drinking Water Criteria Document for Chlorinated Phenols. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, DC.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — 2,4-Dichlorophenol

CASRN — 120-83-2

Date	Section	Description
12/03/2002	I.A.6.	Screening-Level Literature Review Findings message has been added.

VIII. Synonyms

Substance Name — 2,4-Dichlorophenol

CASRN — 120-83-2

Last Revised — 01/31/1987

- 120-83-2
- DCP
- 2,4-DCP
- 2,4-Dichlorophenol
- Dichlorophenol, 2,4-
- NCI-C55345
- PHENOL, 2,4-DICHLORO-
- RCRA WASTE NUMBER U081