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4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB); CASRN 94-82-6

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR 2,4-DB

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 — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)

CASRN — 94-82-6

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
Internal hemorrhage, mortality	NOAEL: 8 mg/kg/day LOAEL: 25 mg/kg/day	1000	1	8E-3 mg/kg/day
Dog Subchronic Oral Bioassay				
Rhodia, Inc., 1969a				

*Conversion Factors -- none

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

Rhodia, Inc. 1969a. MRID 0092165. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Four beagle dogs/sex/group were fed 2,4-DB at dose levels of 0, 2.5, 8.0, 25, or 80 mg/kg bw/day for 90 days. The two higher doses produced frank effects including death, hemorrhage throughout the body, and aspermatogenesis within 3-9 weeks of treatment. Slightly increased liver-to-body weight ratios were observed at both lower dose levels, but no gross or microscopic pathology was evident.

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

UF — The uncertainty factor of 1000 reflects 10 for both intraspecies and interspecies variability to the toxicity of this chemical in lieu of specific data, and 10 for extrapolation of a subchronic effect level to its chronic equivalent.

MF — None

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

A subchronic rat study (Rhodia, Inc., 1969b) showed somewhat higher effect and no-effect levels than were observed in the dog study. Severe kidney and liver damage was observed at 1000 ppm 2,4-DB in the diet (80-100 mg/kg bw/day). A NOEL of about 25-30 mg/kg/day was established.

2,4-DB does not appear to be teratogenic, but the data are very limited. Structurally related compounds (2,4-D and 2,4,5-T) are teratogenic.

I.A.5. Confidence in the Oral RfD

Study — Medium

Database — Low

RfD — Low

Confidence in the principal study is medium because of the moderate number of animals and large number of dose groups employed, but not high, because some data are lacking. Confidence in the database is low, because of the general lack of data, but tends toward medium because one moderately supportive study is available. Low confidence in the RfD follows.

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

Source Document — U.S. EPA, 1984

The ADI in the 1984 Health and Environmental Effects Profile has had a limited Agency Review with the help of two external scientists.

Other EPA Documentation — None

Agency Work Group Review — 05/31/1985, 06/17/1985

Verification Date — 06/17/1985

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 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB) conducted in September 2002 identified one or more significant new studies. IRIS users may request the references for those studies from 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 — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)

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Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)

CASRN — 94-82-6

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 — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)

CASRN — 94-82-6

VI.A. Oral RfD References

Rhodia, Inc. 1969a. MRID 0092165. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

Rhodia, Inc. 1969b. MRID 00104739. Available from EPA. Write to FOI, EPA, Washington D.C. 20460.

U.S. EPA. 1984. Health and Environmental Effects Profile for 2,4-DB. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste, Washington, DC.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)
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Date	Section	Description
12/03/2002	I.A.6.	Screening-Level Literature Review Findings message has been added.

VIII. Synonyms

Substance Name — 4-(2,4-Dichlorophenoxy)butyric acid (2,4-DB)
CASRN — 94-82-6
Last Revised — 01/31/1987

- 94-82-6

- BUTOXON
- BUTOXONE
- BUTOXONE AMINE
- BUTOXONE ESTER
- BUTYRAC
- BUTYRAC 118
- BUTYRAC 200
- BUTYRAC ESTER
- 4-(2,4-Dichlorophenoxy)butyric acid
- 2,4-DB
- 4(2,4-DB)
- 2,4-D BUTYRIC
- butyric acid, 4-(2,4-dichlorophenoxy)
- gamma-(2,4-DICHLOROPHENOXY)BUTYRIC ACID
- 2,4-DM
- EMBUTOX
- EMBUTOX E
- LEGUMEX D