

Diquat; CASRN 85-00-7

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 Diquat

File First On-Line 03/31/1987

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	03/31/1987
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 — Diquat

CASRN — 85-00-7

Last Revised — 03/31/1987

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.

NOTE: The Oral RfD for diquat may change in the near future pending the outcome of a further review now being conducted by the RfD/RfC Work Group.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Minimal lens opacity and cataracts	NOEL: 0.22 mg/kg/day [average of males (0.19 mg/kg/day) and females (0.24 mg/kg/day)]	100	1	2.2E-3 mg/kg/day
Chronic Rat Study, Dietary				
Chevron Chemical, 1985	LEL: 0.58 mg/kg/day (males); 0.72 mg/kg/day (females)			

*Conversion Factors -- none

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

Chevron Chemical Company. 1985. MRID No. 00145855, 00155474, 00160673. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Groups of 50 male and 50 female Sprague-Dawley rats were fed diets containing 0, 5, 15, 75, or 375 ppm of diquat for 2 years. Experimental doses were expressed in terms of diquat cation and reported as ppm in the diet and as mg/kg bw/day. An additional group of 10 animals/sex/dose level was used for interim (at 1 year) sacrifice. The dose levels at the NOEL (15 ppm) were 0.19 mg/kg/day for males and 0.24 mg/kg/day for females. The dose levels at the LEL (75 ppm) were 0.19 mg/kg/day for males and 0.24 mg/kg/day for females. The principal toxic effects at the 75 and 375 ppm dose levels were as follows:

75 ppm - lens opacity/ataracts in eyes with secondary effects, males and females; possible kidney effects in males.

375 ppm - lens opacity/cataracts in eyes with secondary effects, males and females; decreased body weights, males and females; decreased food consumption, males and females; possible kidney effects, males; possibly increased arthritis/periarthritis in blood vessels, males; possibly increased paracortical cell hyperplasia in lymph nodes, males.

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

UF — Based on a chronic exposure study, an uncertainty factor of 100 was used to account for the inter- and intraspecies differences.

MF — None

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

Data Considered for Establishing the RfD:

- 1) 2-Year Feeding (oncogenic) - rat: Principal study - see previous description; core grade guideline
- 2) Chronic Feeding (2-4 years) - dog: NOEL=1.7 mg/kg/day; LEL=5.0 mg/kg/day (cataract formation); core grade supplementary (Chevron Chemical, 1966)
- 3) Teratology - rat: Teratogenic NOEL=500 ppm (25 mg/kg/day) (HDT); Systemic NOEL=125 ppm (6.25 mg/kg/day); Systemic LEL=500 ppm; Maternal toxicity and Fetotoxic effects were observed at the HDT; core grade minimum (Chevron Chemical, 1973)
- 4) Teratology - rabbit: Systemic NOEL=1.25 mg/kg/day; Teratogenic NOEL=5.0 mg/kg/day (HDT) (maternal weight loss occurred at this level); core grade minimum (Chevron Chemical, 1974)
- 5) Teratology - mouse: Teratogenic NOEL=4 mg/kg/day (HDT); Systemic LEL=1.0 mg/kg/day, this level was fetotoxic (ossification was retarded) and also caused maternal toxicity; core grade minimum (Chevron Chemical, 1978)
- 6) 3-Generation Reproduction - rat: NOEL=500 ppm (25 mg/kg/day) (HDT) for adverse reproductive effects; NOEL=125 ppm (6.25 mg/kg/day) (minor body weight decreases only); LEL (for definite effects)=500 ppm (cataracts observed after 91 days, weight loss); core grade minimum (Chevron Chemical, 1972)

Data Gap(s): Chronic Dog Feeding Study

I.A.5. Confidence in the Oral RfD

Study — High
Database — Medium
RfD — Medium

The principal study appears to be of high quality and is given a high confidence rating. In addition, there are generally good toxicologic studies available on diquat which, overall, provide medium to high confidence in the database, oncogenic considerations notwithstanding. Confidence in the RfD is considered medium to high.

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

Pesticide Registration Standard

Pesticide Registration Files

Agency Work Group Review — 07/22/1986, 12/09/1994

Verification Date — 07/22/1986

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 Diquat conducted in November 2001 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 — Diquat
CASRN — 85-00-7

Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Diquat
CASRN — 85-00-7

Not available at this time.

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — Diquat
CASRN — 85-00-7

VI.A. Oral RfD References

Chevron Chemical Company. 1966. MRID No. 00140578, Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Chevron Chemical Company. 1972. MRID No. 00140589. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Chevron Chemical Company. 1973. EPA Accession No. 224405. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Chevron Chemical Company. 1974. MRID No. 00161635. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Chevron Chemical Company. 1978. MRID No. 00061637. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

Chevron Chemical Company. 1985. MRID No. 00145855, 00155474, 00160673. Available from EPA. Write to FOI, EPA, Washington, DC 20460.

VI.B. Inhalation RfD References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — Diquat
CASRN — 85-00-7

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

VIII. Synonyms

Substance Name — Diquat

CASRN — 85-00-7

Last Revised — 03/31/1987

- 85-00-7
- 1,1'-AETHYLEN-2,2'-BIPYRIDINIUM-DIBROMID
- AQUACIDE
- DEIQUAT
- DEXTRONE
- 9,10-DIHYDRO-8a,10a-DIAZONIAPHENANTHRENE(1,1'-ETHYLENE-2,2'-BIPYRIDYLIUM)
- DIBROMIDE
- 9,10-DIHYDRO-8a,10,-DIAZONIAPHENANTHRENE DIBROMIDE
- 5,6-DIHYDRO-DIPYRIDO(1,2a,1c)PYRAZINIUM DIBROMIDE
- 6,7-DIHYDROPYRIDO (1,2-a',1'-c)PYRAZINEDIUM DIBROMIDE
- DIPYRIDO(1,2-a',1'-c)PYRAZINEDIUM, 6,7-DIHYDRO-, DIBROMIDE
- Diquat
- DIQUAT DIBROMIDE
- 1,1'-ETHYLENE-2,2'-BIPYRIDYLIUM DIBROMIDE
- ETHYLENE DIPYRIDYLIUM DIBROMIDE
- 1,1-ETHYLENE 2,2-DIPYRIDYLIUM DIBROMIDE
- FB/2
- NA 2781
- PREEGLONE
- REGLON
- REGLONE
- REGLOX
- WEEDTRINE-D