

Zineb; CASRN 12122-67-7

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 Zineb

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 — Zineb

CASRN — 12122-67-7

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.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Thyroid hyperplasia	NOEL: none	500	1	5E-2 mg/kg/day
Rat, Chronic Oral Bioassay	LOAEL: 500 ppm (diet) (converted to 25 mg/kg/day)			
Blackwell-Smith et al., 1953				

* Dose Conversion Factors and Assumptions — Assumed rat food consumption = 5% bw/day

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

Blackwell-Smith, Jr., R.J., J.K. Finnegan, P.S. Larson, P.F. Sahyoun, M.L. Dreyfuss and H.B. Haag. 1953. Toxicologic studies on zinc and disodium ethylene bisdithiocarbamates. J. Pharmacol. Exp. Therap. 109: 159-166.

Groups of 10 male and 10 female rats received 0, 500, 1000, 2500, 5000 or 10,000 ppm zineb in the diet for 2 years. Blackwell-Smith et al. (1953) used the criteria for grading thyroid hyperplasia established by Seifter and Ehrich (1948), who had published an earlier report on goitrogenic effects of zineb feeding in weanling rats. This system grades hyperplastic responses on a scale of 1-5, with a response of 2+ being regarded as within normal limits. In order to ensure consistency in grading of slides, Blackwell-Smith et al. (1953) submitted sections from 10 rats used in a short-term study to Dr. Seifter for evaluation. These readings were used as a guide for subsequent classification of responses. Thyroid hyperplasia was observed in rats of all treated groups, establishing the LOEL of 25 mg/kg/day (500 ppm). At this dose 6/16 rats exhibited hyperplasia graded 3+ or above as compared with the control group, for which no response greater than 2+ was observed. At higher dosages, rats developed more severe thyroid hyperplasia

in addition to renal congestion, nephritis and nephrosis; increased mortality was noted for rats consuming the two highest dietary levels.

Other data summarized in U.S. EPA (1984) attest to the development of thyroid hyperplasia as a consequence of zineb consumption, and collectively support the choice of 25 mg/kg/day as the proper effect level from which to derive an RfD.

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

UF — A composite uncertainty factor of 500 was used consisting of 2 factors of 10 to account for inter- and intraspecies variability and a 5-fold factor for use of a LOAEL. The intermediate uncertainty factor of 5 was used as the observed effects were graded on a subjective, albeit controlled scale, with the resulting impression that these effects were only minimally adverse. Thus, a full 10-fold factor for the extrapolation of a LOAEL to a NOAEL was not deemed necessary.

MF — None

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

Several studies in rats and dogs support the choice of a LOAEL. Terata have been observed in rats administered amounts of zineb in excess of 2000 mg/kg/day (Short et al., 1980).

I.A.5. Confidence in the Oral RfD

Study — Medium

Database — Medium

RfD — Medium

The critical study was of chronic duration, measured multiple endpoints, and included five dose levels. The numbers of animals, however, were relatively small, leading to a medium confidence rating. Supportive studies exist in several species, however, adequate reproductive data are not available. Thus, confidence in the database is also medium. Medium 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 received an Agency Review with the help of two external scientists.

Other EPA Documentation — None

Agency Work Group Review — 11/06/1985, 02/05/1986, 05/15/1986

Verification Date — 02/05/1986

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 Zineb 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 — Zineb

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Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Zineb

CASRN — 12122-67-7

Not available at this time.

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — Zineb
CASRN — 12122-67-7

VI.A. Oral RfD References

Blackwell-Smith, R., J.K. Finnegan, P.S. Larson, P.F. Sahyoun, M.L. Dreyfuss and H.B. Haag. 1953. Toxicologic studies on zineb and disodium ethylene bis(dithiocarbamates). *J. Pharmacol. Accol. Exp. Therap.* 109: 159-166.

Seifter, J. and W.E. Ehrich. 1948. Goitrogenic compounds: Pharmacological and pathological effects. *J. Pharmacol. Exp. Therp.* 92: 303-314. (Cited in: Blackwell-Smith, R., et al. 1953)

Short, R.D., J.L. Minor and T.M. Unger. 1980. Teratology of a zineb formulation. U.S. EPA Report No. 600/1-80-017. NTIS PB80-181175.

U.S. EPA. 1984. Health and Environmental Effects Profile for Zineb. 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 — Zineb

CASRN — 12122-67-7

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

VIII. Synonyms

Substance Name — Zineb

CASRN — 12122-67-7

Last Revised — 03/31/1987

- 12122-67-7
- ASPOR
- ASPORUM
- BERCEMA
- BLIGHTOX
- BLITEX
- BLIZENE
- CARBADINE
- CHEM ZINEB
- CINEB
- CRITTOX
- CYNKOTOX
- DAISEN
- DIPHER
- DITHANE 65
- DITHANE Z
- DITHANE Z-78
- DITHIANE Z-78
- DITIAMINA

- ENT 14,874
- 1,2-ETHANEDIYLBIS(CARBAMODITHIOATO) (2-)-S,S'-ZINC
- ((1,2-ETHANEDIYLBIS(CARBAMODITHIOATO)))(2-)ZINC
- 1,2-ETHANEDIYLBISCARBAMODITHIOIC ACID, ZINC COMPLEX
- 1,2-ETHANEDIYLBISCARBAMODITHIOIC ACID, ZINC SALT
- ETHYLENEBIS(DITHIOCARBAMATO)ZINC
- ETHYLENEBIS(DITHIOCARBAMIC ACID), ZINC SALT
- ETHYL ZIMATE
- HEXATHANE
- KUPRATSIN
- KYPZIN
- LIROTAN
- LONACOL
- MICIDE
- MILTOX
- MILTOX SPECIAL
- NOVOSIR N
- NOVOZIN N 50
- NOVOZIR
- NOVOZIR N
- NOVOZIR N 50
- PAMOSOL 2 FORTE
- PARZATE
- PARZATE C
- PARZATE ZINEB
- PEROSIN
- PEROSIN 75B
- PEROZIN
- PEROZINE
- POLYRAM Z
- SPERLOX-Z
- THIODOW
- TIEZENE
- TRITOFTOROL
- TSINEB
- Z-78
- ZEBENIDE
- ZEBTOX
- ZIDAN
- ZIMATE
- ZINC ETHYLENEBISDITHIOCARBAMATE
- ZINC ETHYLENE-1,2-BISDITHIOCARBAMATE
- ZINC, (ETHYLENEBIS(DITHIOCARBAMATO))-
- Zineb
- ZINEB 75

- ZINEB 75 WP
- ZINEB 80
- ZINK-(N,N'-AETHYLEN-BIS(DITHIOCARBAMAT))
- ZINOSAN