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I. General Information

CAS Number: Free 3,3' Dichlorobenzidine (CAS NO.: 91-94-1)

Name:

II. Physical-Chemical Data

A1. Melting Point

Test Substance

Test substance: DCB

Remarks:

Method

Method: Measured

Remarks:

Results

Melting point value: 132 °C

Remarks:

References

Merck. 1989. The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals. 11th ed. Rahway, NJ: Merck and Company, Inc., 482.

Other

Data is from a reputable reference.

B. Boiling Point

Test Substance

Test substance: DCB

Remarks:

Method

Method:

Remarks:

Results

Boiling point value: 402 °C

Remarks:

References

Hazardous Substance Data Bank, 1996, National Library of Medicine, National Toxicology Information Program, Bethesda, MD. Cited by ATSDR

Other

Data reported from reputable sources

C1. Vapor Pressure

Test Substance

Test substance: DCB

Remarks:

Method

Method: Estimate

Remarks:

Results

Vapor pressure value: .45

Temperature:

Remarks:

References

MPBPWIN v 1.40 in EPIWIN v 3.10, Syracuse Research Corporation, Syracuse, New York

Other

D. Partition Coefficient

Test Substance

Test substance: DCB

Remarks:

Method

Method: actual analysis

Remarks:

Results

Value: 3.2

Remarks:

References

Log Kow partition coefficient reported by Mabey et al. Aquatic Fate process data for organic priority pollutants, EPA Study No. 440/4-81-014, See Also Fate of 3,3' Dichlorobenzidine in Aquatic Environments, EPA Study No. 600/3-78-068, and ATSDR Toxicological Profile DCB

Other

E. Water Solubility

Test Substance

Test substance: DCB

Remarks:

Method

Method: The Solubility of DCB.2HCL in aqueous buffers of pH 4.6-8.9 at 22 degrees centigrade was determined spectrophotometrically from a knowledge of the extinction coefficients of its UV absorption maxima. The UV spectra of these solutions were recorded, and the values derived from at least two separately weighed methanol solutions, and from 4 to 6 spectral determinations.

Remarks:

Results

Value: 2-4 %
Temperature: 22 °C
Description: Slightly Soluble
Remarks:

References

Sikka HC, Appleton HT, Banerjee S. 1978. Fate of 3,3'-dichlorobenzidine in aquatic environments, U.S. Environmental Protection Agency. EPA-600/3-78-068.

Other

D. Transport between Environmental Compartments (Fugacity)

Test Substance

Test substance: DCB
Remarks:

Method

Test type: Estimation
Model used: Level III Fugacity Model; EPIWIN:EQC from Syracuse Research Corporation
Remarks:

Results

Model data and results:	Distribution (%)
Air	1.13 x 10 ⁻⁵
Water	47.5
Soil	52.4
Sediment	.095

Remarks:

Since no experimental values were available the physical chemical values utilized in this model were default parameters from within EPIWIN.

Conclusions

References

Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210. The Level III model incorporated into EPIWIN is a Syracuse Research Corporation adaptation of the methodology described by Mackay *et al.* 1996; *Environ. Toxicol. Chem.* **15(9)**, 1618-1626 and 1627-1637.

Other

**B2. Chronic Toxicity to
Aquatic Invertebrates Test
Substance**

Test substance:

Remarks: DCB

Method

Method:

Test type:

GLP:

Year: estimation

Species/strain:

Analytical monitoring:

Exposure period:

Remarks: Daphnid

16 days

Results

Nominal concentration:

Measured concentration:

Endpoint value:

Reproduction

Biological observations:

Statistical methods: EC 50 - 173.496 mg/L

Remarks:

Conclusions

Data Quality

Reliability:

Remarks:

References

Other

Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI),
Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.

C. Toxicity to Aquatic Plants

Test Substance

Test substance: DCB

Remarks:

Method

Method: Estimation

Test type:

GLP:

Year:

Species/strain: Green Algae

Endpoint basis:

Exposure period: 96 Hours

Analytical procedures:

Remarks:

Results

Nominal concentration:

Measured concentration:

Endpoint value: EC₅₀ 3811.012 mg/L ChV 155.593 mg/L

NOEC:

Biological observations:

Was control response

:satisfactory

Statistical Methods: ANOVA

Remarks:

Conclusions

Data Quality

Reliability:

Remarks:

References

Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210.

Other

Repeated Dose Toxicity Test**Substance**

Test substance: DCB
Remarks:

Method

Method: repeated dose
Test type: Sub acute
GLP: no
Year: 1979
Species/strain: Mouse Female
Route of exposure: Ingestion
Duration of test: 6 or 12 months
Exposure levels: 54, 157, 4
Sex: female
Exposure period: 6 an 12 months
Post-exposure
observation period:
Remarks:

Results

NOAEL (NOEL): <54mg/m3
Mortality: none
Hepatomas in 8/8 at 6 months
and in 18/18 at 12 months

Conclusions

Test substance may be considered toxic

Data Quality

Reliability: Reliable without restriction
Remarks:

References:

Osanai H. 1976. [An experimental study on hepatoma caused by aromatic amines.] Rodo Kagaku 52: 179-201. (Japanese)

Other

**Repeated Dose Toxicity Test
Substance**

Test substance: DCB
Remarks:

Method

Method: repeated dose
Test type: Chronic
GLP: no
Year: 1978
Species/strain: Dog, Beagle
Route of exposure: Gavage
Duration of test: 6 weeks and 7.1 years
Exposure levels:
Sex: Male and female
Exposure period:
Post-exposure
observation period:
Remarks:

Results

LOAEL: 10.4 mg/kg/day hepatocellular carcinomas in 4/6 papillary transitional cell carcinomas of urinary bladder in 5/6

Conclusions

Data Quality

Reliability: Reliable without restriction
Remarks:

References:

Stula EF, Barnes JR, Sherman H, et al. 1978. Liver and urinary bladder tumors in dogs from 3,3'-dichlorobenzidine. J Environ Pathol Toxicol 1(4):475-490.

Other

**C. Genetic Toxicity - Mutation
Test Substance**

Test substances: DCB

Remarks:

Method

Method: In Vitro Mutagenicity
Test type: Ames
GLP: Unknown
Year: 1986
Species/strain: Hamster liver / Salmonella typhimurium
Metabolic activation: Yes, S9
Concentration tested:
Remarks:

Results

Result: Positive
Cytotoxic
concentration:
Precipitation
concentration: Negative
Genotoxic effects
With
activation: Negative
Without
activation:
Statistical methods:
Remarks:

Conclusions

Data Quality

Reliability: Published study reliable without restriction
Remarks:

References

Savard, S. and Josephy, PD. Synthesis and Mutagenicity of 3,3' Dihalogenated Benzidines, Carcinogenesis, Vol.7 pp.1239-1241, (1986) (cited in ATSDR)

E. Developmental Toxicity

Test Substance

Test substance: DCB
Remarks:

Method

Method:
GLP: See Repeated Dose Studies
Year:
Species/strain:
Sex:
Route of exposure:
Exposure levels:
Actual doses received:
Exposure period:
Duration of test:
Remarks:

Results

Maternal toxicity
NOEL:
NOEL for teratogenicity:
NOEL for fetotoxicity:
Parental toxic
responses:
Fetal toxic responses dose:
Statistical Methods:

Remarks: Studies in which pregnant mice were exposed to the chemical, the kidneys of their babies did not develop properly.

Conclusions

Data Quality

Reliability:
Remarks: Golub et al. Oncogenic Action of Some Nitrogen Compounds on the Progeny of Experimental Mice" Bull. Exp. Biol. Med. Vol.78 pp. 1402-1404 (1975) (Russian)

References

Other

Method: Irritation to the rabbit eye
Test type: eye irritation
GLP: yes
Year: 1974
Species/strain: rabbit, New Zealand albino (chbb:Nzw)
Route of exposure:
Dose levels:
Remarks:

Results

Value: Cornea .55, iris .33 conjunctive (redness) 2.44 (Chemosis .88)
Deaths at each dose:
Remarks: observation times ??
Reversibility within

Conclusions

NOAEL 100 mg

Data Quality

Reliability: reliable without restriction
Remarks:

References

Gerarde HW, Gerarde DF. 1974. Industrial experience with 3,3'-dichlorobenzidine: An epidemiological study of a chemical manufacturing plant. J Occup Med 16(5):322-344.

Other

Acute toxicity

Test substance: DCB
Remarks:

Method

Method: Skin irritation to the rabbit
Test type: Skin irritation intradermal installation SEMIOCCCLUSIVE
GLP: N/A
Year: 1974
Species/strain: rabbit New Zealand albino
Route of exposure:
Dose levels: 700 mg/kg
Remarks:

Results

Value: not irritating
Deaths at each dose:
Remarks:

Conclusions

not irritating

Data Quality

Reliability: Valid without restriction
Remarks:

Reference

Gerarde HW, Gerarde DF. 1974. Industrial experience with 3,3'-dichlorobenzidine: An epidemiological study of a chemical manufacturing plant. J Occup Med 16(5):322-344.

Chronic Dose Toxicity Test Substance

Test substance: DCB

Method

Method: Chronic Toxicity
Test type: Repeated oral dose
GLP: unknown
Year: See references below
Species/strain: Rat,dogs, hamsters,mice
Route of exposure: Oral gavage
Duration of test: 104 Weeks
Exposure levels: 1 to 7 years
Sex: Male and Female
Exposure period:
Post-exposure observation
period:
Remarks:

Results

NOAEL (NOEL): Vary by study

Conclusions

Neoplasia in a variety of target organs and a variety of species

Data Quality

Reliability: published data, valid without restriction
Remarks:

References

blastomogenic agent] Vop Onkol 5(5):524-533.
experimental study on hepatoma caused by aromatic
(Japanese) Sellakumar AR, Montesano R,
carcinogenicity in hamsters. Division of Oncology. The
Eppley Inst. for Res in Cancer, University of Nebraska, Omaha.
JR, Sherman H, et al. 1978. Liver and urinary bladder tumors in
dichlorobenzidine. J Environ Pathol Toxicol 1(4):475-490, Ito N,
al. 1983. Modifying factors in urinary bladder carcinogenesis.
222.

Pliss GB. 1959. [Dichlorobenzidine as a
(Russian), Osanai H. 1976. [An
amines.] Rodo Kagaku 52: 179-201.
Saffiotti U. 1969. Aromatic amines
Chicago Medical School and
[abstract] Stula EF, Barnes
dogs from 3,3'-
Fukushima S, Shirai T, et
Environ Health Perspect 49:217-

Other

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