4-Dimethylaminoazobenzene

Hazard Summary

4-Dimethylaminoazobenzene is used as a dye for coloring polishes, wax products, and soap. Acute (short-term) dermal exposure to 4-dimethylaminoazobenzene may result in contact dermatitis in humans. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of 4-dimethylaminoazobenzene in humans. Animal studies have reported birth defects in the offspring of mice exposed to 4-dimethylaminoazobenzene and tumors of the lung, liver, and bladder from oral exposure to 4-dimethylaminoazobenzene. EPA has not classified 4-dimethylaminoazobenzene for carcinogenicity. The International Agency for Research on Cancer (IARC) has classified 4-dimethylaminoazobenzene as a Group 2B, possibly carcinogenic to humans.

Please Note: The main sources of information for this fact sheet is the Hazardous Substances Data Bank (HSDB) (1), a database of summaries of peer-reviewed literature, and the International Agency for Research on Cancer (IARC) monographs on chemicals carcinogenic to man. (4)

Uses

- 4-Dimethylaminoazobenzene was used as a dye for coloring polishes and other wax products, polystyrene, soap, and as a pH indicator. (4)
- 4-Dimethylaminoazobenzene is not currently produced or used commercially in the U.S. (3)

Sources and Potential Exposure

- Occupational exposure (primarily dermal) has occurred for those workers who manufacture or use azo dyes. (1)

Assessing Personal Exposure

- No information is available on the assessment of personal exposure to 4-dimethylaminoazobenzene.

Health Hazard Information

Acute Effects:
- Contact dermatitis has been observed in workers who handled 4-dimethylaminoazobenzene. (1)
- Tests involving acute exposure of rats have shown 4-dimethylaminoazobenzene to have high acute toxicity from oral exposure. (2)

Chronic Effects (Noncancer):
- No information is available on the chronic effects of 4-dimethylaminoazobenzene in humans or animals.
- EPA has not established a Reference Concentration (RfC) or a Reference Dose (Rfd) for 4-dimethylaminoazobenzene.

Reproductive/Developmental Effects:
- No information is available on the reproductive or developmental effects of 4-dimethylaminoazobenzene in humans.
- Animal studies have reported birth defects in the offspring of mice exposed to 4-
Cancer Risk:

- No information is available on the carcinogenic effects of 4-dimethylaminoazobenzene in humans.
- Animal studies have reported tumors of the lung, liver, and bladder from oral exposure to 4-dimethylaminoazobenzene. (1,4,5)
- EPA has not classified 4-dimethylaminoazobenzene for carcinogenicity. (1)
- IARC has classified 4-dimethylaminoazobenzene as a Group 2B, possibly carcinogenic to humans. (4)
- The Department of Health and Human Services (DHHS) considers 4-dimethylaminoazobenzene to be reasonably anticipated to be a human carcinogen. (3)
- The California Environmental Protection Agency (CalEPA) has calculated an oral cancer slope factor of $4.6 \times 10^{-3} \text{mg/kg/d}$ and an inhalation unit risk factor of $0.0013 \times 10^{-3} \text{µg/m}^3$. (6)

Physical Properties

- 4-Dimethylaminoazobenzene exists as yellowish, crystalline leaflets. (1)
- The chemical formula for 4-dimethylaminoazobenzene is $\text{C}_{14}\text{H}_{15}\text{N}_3$, and the molecular weight is 225.3 g/mol. (1)
- The vapor pressure for 4-dimethylaminoazobenzene is $3.3 \times 10^{-7}$ mm Hg at 25 °C, and it has a log octanol/water partition coefficient ($\log K_{\text{ow}}$) of 4.58. (1)
- 4-Dimethylaminoazobenzene is insoluble in water. (4)

Note: There are very few health numbers or regulatory/advisory numbers for 4-dimethylaminoazobenzene; thus, a graph has not been prepared for this compound. The health information cited in this fact sheet was obtained in December 1999.

Conversion Factors:
To convert concentrations in air (at 25°C) from ppm to $\text{mg/m}^3$: $\text{mg/m}^3 = (\text{ppm}) \times (\text{molecular weight of the compound})/(24.45)$. For 4-dimethylaminoazobenzene: 1 ppm = 9.2 mg/m$^3$.

Summary created in April 1992, updated January 2000

References