

## N,N'-Diethylthiourea

N,N'-Diethylthiourea is a thiourea compound. It is used as a corrosion inhibitor for ferrous metals and aluminum alloys, and as a vulcanization accelerator in the manufacture of rubber and some types of paints. Exposures may occur in occupational settings, and also to consumers that come in contact with products containing N,N'-diethylthiourea (e.g., rubber wetsuits).

N,N'-Diethylthiourea passed the animal data screen, underwent a preliminary toxicological evaluation, and is being brought to the Carcinogen Identification Committee for consultation. This is a compilation of the relevant studies identified during the preliminary toxicological evaluation.

### Epidemiological data

No cancer epidemiology studies were identified.

### Animal carcinogenicity data

- Long-term diet studies
  - Two-year studies in male and female B6C3F<sub>1</sub> mice: NCI (1979)
  - Two-year studies in male and female F344 rats: NCI (1979)
- Long-term diet studies of mixtures containing N,N'-diethylthiourea in rats
  - Two-year study in male F344/DuCrj rats fed a 40-chemical mixture: Takayama *et al.* (1989)
  - One-year study in male F344 rats fed 2,4-diaminoanisole sulfate, N,N'-diethylthiourea and 4,4'-thiodianiline: Hasegawa *et al.* (1991)
  - One-year study in male Wistar rats fed 2,4-diaminoanisole sulfate, N,N'-diethylthiourea and 4,4'-thiodianiline: Pomorski *et al.* (2002)

### Other relevant data

- Genotoxicity
  - Mouse lymphoma cell mutation assay: McGregor *et al.* (1988)
  - DNA fragmentation and DNA repair synthesis assays in rat and human thyroid cells: Mattioli *et al.* (2006)
  - Reviews: IARC (2001, pp. 653-654)
- Structural activity considerations
  - Structurally similar to ethylene thiourea and thiourea, which are listed under Proposition 65 as carcinogens.
- Thyroid hormone disruption: thioureas inhibit thyroid peroxidase (IARC, 1999, pp. 2-5 and pp. 218-220)

## References<sup>1</sup>

Hasegawa R, Shirai T, Hakoi K, Wada S, Yamaguchi K, Takayama S (1991). Synergistic enhancement of thyroid tumor induction by 2,4-diaminoanisole sulfate, *N,N'*-diethylthiourea and 4,4'-thiodianiline in male F344 rats. *Carcinogenicity* **12**(8):1515-1518.

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International Agency for Research on Cancer (IARC, 2001). *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Some Thyrotropic Agents*. Volume 79. IARC, Lyon, France.

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McGregor DB, Brown A, Cattnach P, Edwards I, McBride D, Riach C, Caspary WJ (1988). Responses of the L5178Y tk+/tk- mouse lymphoma cell forward mutation assay: III. 72 coded chemicals. *Environ Mol Mutagen* **12**(1): 85-154.

National Cancer Institute (NCI, 1979). *Bioassay of N,N'-diethylthiourea for possible carcinogenicity*. Technical Report Series No. 149. National Institute of Health, Public Health Service, U.S. Department of Health, Education, and Welfare.

Pomorski L, Bartos M, Okruszek A, Matejkowska M, Tazbir J, Kuzdak K (2002). Carcinogenic effect of combined administration of 2,4-diaminoanisole sulfate, 4,4'-thiodianiline and *N,N'*-diethylthiourea in male Wistar rats. *Neoplasma* **49**:247-50.

Takayama S, Hasegawa H, Ohgaki H (1989). Combination effects of forty carcinogens administered at low doses to male rats. *Jpn J Cancer Res* **80**:732-736.

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<sup>1</sup> Copies of these listed references, as either the abstract, the relevant sections of the publication, or the complete publication, have been provided to members of the Carcinogen Identification Committee. These references have been provided in the order in which they are discussed in this document.