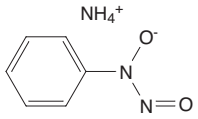
Cupferron

CAS No. 135-20-6

Reasonably anticipated to be a human carcinogen

First listed in the *Third Annual Report on Carcinogens* (1983)



Carcinogenicity

Cupferron is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity from studies in experimental animals.

Cancer Studies in Experimental Animals

Oral exposure to cupferron caused tumors at several different tissue sites in mice and rats. Dietary administration of cupferron caused blood-vessel cancer (hemangiosarcoma or hemangioma) in rats and mice of both sexes and liver cancer (hepatocellular carcinoma) in rats of both sexes and in female mice (NCI 1978). It also caused cancer of the skin of the ear (carcinoma of the auditory sebaceous gland) in female rats and mice, cancer of the forestomach (squamous-cell carcinoma) in rats of both sexes, and benign tumors of the Harderian gland (adenoma) in female mice.

Cancer Studies in Humans

No epidemiological studies were identified that evaluated the relationship between human cancer and exposure specifically to cupferron.

Properties

Cupferron is the ammonium salt of *N*-nitroso-*N*-phenylhydroxylamine and exists as a creamy-white crystalline solid at room temperature. It is soluble in water, alcohol, and ether (ChemIDplus 2009, HSDB 2009). Cupferron can produce irritating, corrosive, or toxic gases as combustion products (Akron 2009). Physical and chemical properties of cupferron are listed in the following table.

Property	Information
Molecular weight	155.2[a]
Melting point	163°C to 164°C[a]
Log K_{ow}	–1.73[b]
Water solubility	608 g/L at 25°C[b]
Vapor pressure	6.29×10^{-5} mm Hg at 25°C[b]

Sources: [a]HSDB 2009, [b]ChemIDplus 2009.

Use

Cupferron is an analytical reagent that complexes with metal ions and is used to separate and precipitate metals such as copper, iron, vanadium, and thorium. It is used to separate tin from zinc and to separate copper and iron from other metals. In analytical laboratories, cupferron is a reagent used for quantitative determination of vanadates and titanium and the colorimetric determination of aluminum (NCI 1978, HSDB 2009).

Production

In 2009, cupferron was produced by one manufacturer in East Asia and four manufacturers in India (SRI 2009) and was available from 28 suppliers, including 17 U.S. suppliers (ChemSources 2009). Reports filed under the U.S. Environmental Protection Agency's Toxic Substances Control Act Inventory Update Rule every four years from 1986 to 2002 (except in 1994) indicated that U.S. production plus imports of cupferron totaled 10,000 to 500,000 lb (EPA 2004). No data were found on U.S. imports or exports of cupferron.

Exposure

The primary routes of potential human exposure to cupferron are ingestion and inhalation of the dust of the dry salt. Dermal contact is a secondary route of potential exposure (HSDB 2009). According to EPA's Toxics Release Inventory, the largest reported environmental releases of cupferron since 1988 were of 1,500 lb in 1989 and 1,200 lb in 1991, mostly to air. No releases were reported from 1995 to 1999, and the last year for which releases were reported was 2000, when 343 lb was released to surface water. In 2007, one industrial facility was listed as using cupferron; however, no releases were reported (TRI 2009). The potential for exposure appears to be greatest among individuals engaged in analytical or research studies involving the use of cupferron. Workers may also potentially be exposed during manufacturing processes (NCI 1978). The National Occupational Exposure Survey (conducted from 1981 to 1983) estimated that 136 workers (in the Primary Metal industries), including 39 women, potentially were exposed to cupferron (NIOSH 1990).

Regulations

Environmental Protection Agency (EPA)

Emergency Planning and Community Right-To-Know Act

Toxics Release Inventory: Listed substance subject to reporting requirements.

References

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