

Pentachloronitrobenzene (Quintozene)

82-68-8

Hazard Summary

Occupational exposure may occur in workers engaged in the manufacture, formulation, and application of pentachloronitrobenzene. Conjunctivitis with corneal injury has been reported in humans when pentachloronitrobenzene was splashed into the eye. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of pentachloronitrobenzene in humans. Chronic exposure of dogs to pentachloronitrobenzene in their diet has been observed to result in damage to the liver. Renal agenesis (failure of the kidney to develop), cleft palate, and increased fetal mortality were observed in the offspring of orally exposed mice. Hepatomas were observed in mice exposed to pentachloronitrobenzene via gavage (experimentally placing the chemical in the stomach). EPA has classified pentachloronitrobenzene as a Group C, possible human carcinogen.

Please Note: The main sources of information for this fact sheet are EPA's Integrated Risk Information System (IRIS) (4), which contains information on oral chronic toxicity and the RfD, 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 humans. (5)

Uses

- Pentachloronitrobenzene is used as a soil fungicide on lawns and ornamental crops, as a seed treatment of field crops and vegetables (e.g., barley, corn, cotton, oats, rice, and wheat), and as a slime inhibitor in industrial waters. (1,5,7)

Sources and Potential Exposure

- Workers engaged in the manufacture, formulation, and application of pentachloronitrobenzene may be occupationally exposed via inhalation or dermal contact. (1,2)
- The general public is most likely to be exposed to pentachloronitrobenzene through the consumption of contaminated food. (1)

Assessing Personal Exposure

- No information was located regarding the measurement of personal exposure to pentachloronitrobenzene.

Health Hazard Information

Acute Effects:

- Conjunctivitis with corneal injury has been reported in humans when pentachloronitrobenzene was splashed into the eye. (1)
- Tests involving acute (short-term) exposure of rats, mice, and rabbits, have demonstrated pentachloronitrobenzene to have high acute toxicity via inhalation, and moderate acute toxicity via oral exposure. (3)

Chronic Effects (Noncancer):

- No information is available on the chronic health effects of pentachloronitrobenzene in humans.
- Chronic exposure of dogs to pentachloronitrobenzene in their diet has been observed to result in damage to the liver, including increased liver weight, effects on liver enzymes, and histopathological changes. (1,4)
- Growth inhibition, enlarged liver, and renal and hepatic lesions have been reported in rats chronically exposed to high levels of pentachloronitrobenzene in their diet. (1)
- EPA has not established a Reference Concentration (RfC) for pentachloronitrobenzene. (4)
- The Reference Dose (RfD) for pentachloronitrobenzene is 0.003 milligrams per kilogram body weight per day (mg/kg/d) based on liver toxicity in dogs. The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncancer effects during a lifetime. It is not a direct estimator of risk but rather a reference point to gauge the potential effects. At exposures increasingly greater than the RfD, the potential for adverse health effects increases. Lifetime exposure above the RfD does not imply that an adverse health effect would necessarily occur. (4)
- EPA has medium confidence in the principal study on which the RfD is based because it appears to be of fair quality; medium confidence in the database because of the lack of a complete database on chronic toxicity; and, consequently, medium confidence in the RfD. (4)

Reproductive/Developmental Effects :

- No information is available on the reproductive or developmental effects of pentachloronitrobenzene in humans.
- Renal agenesis (failure of the kidney to develop), cleft palate, and increased fetal mortality were observed in the offspring of orally exposed mice. (1)
- In another study, no effects on development were reported in mice exposed via gavage. (1)

Cancer Risk:

- No information is available on the carcinogenic effects of pentachloronitrobenzene in humans.
- Hepatomas were observed in mice exposed to pentachloronitrobenzene via gavage. In dermally exposed mice, skin tumors were reported, but the lack of adequate controls makes interpretation of these results difficult. (1,5)
- In two National Toxicology Program (NTP) carcinogenesis studies, pentachloronitrobenzene was not carcinogenic in rats and mice exposed in their diet. (9,10)
- EPA considers pentachloronitrobenzene to be a possible human carcinogen and ranked it in EPA's Group C. (6)
- EPA has calculated an oral cancer slope factor of $0.26 \text{ (mg/kg/d)}^{-1}$ and an oral unit risk factor of $7.4 \times 10^{-6} \text{ (}\mu\text{g/L)}^{-1}$. (6)

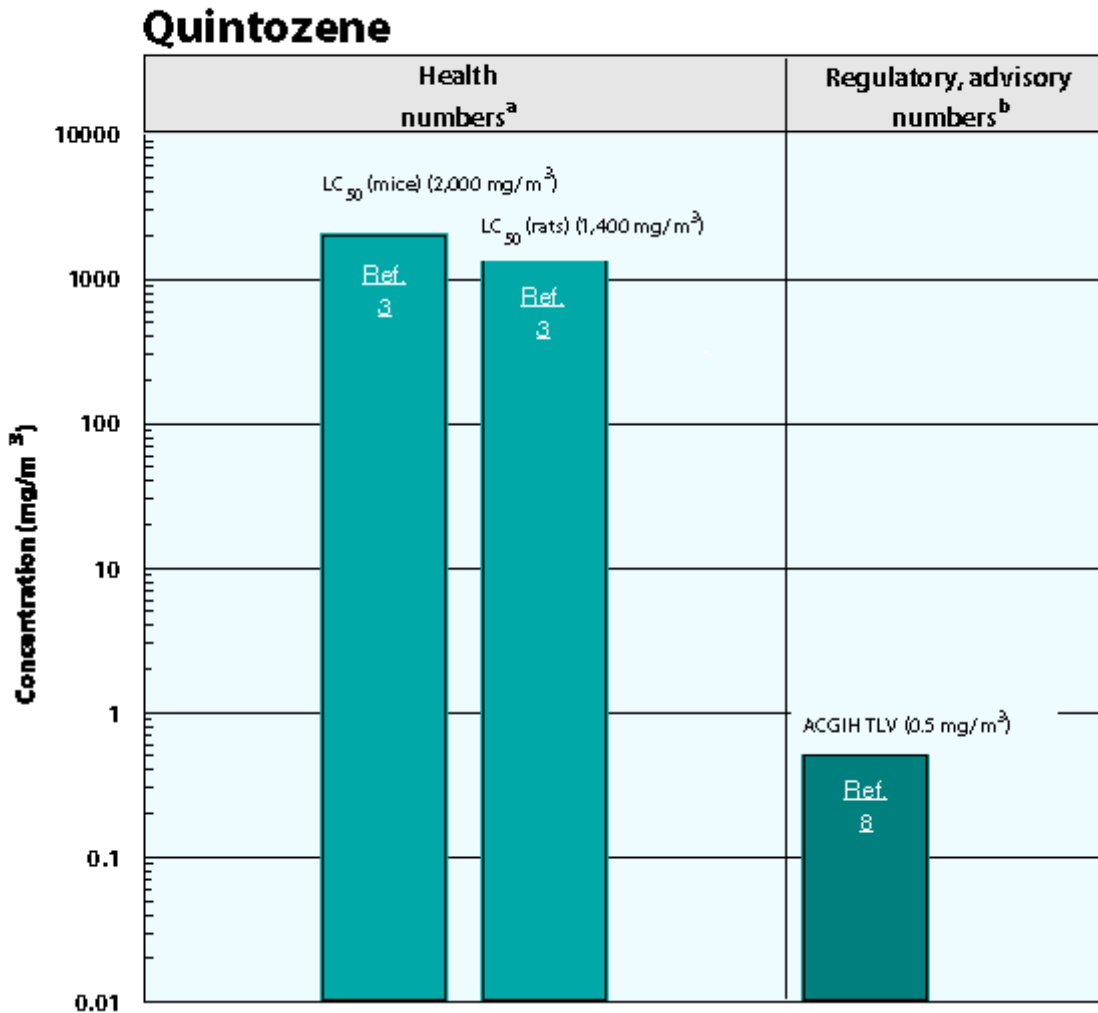
Physical Properties

- Pentachloronitrobenzene is also called quintozene.
 - The chemical formula for pentachloronitrobenzene is $\text{C}_6\text{Cl}_5\text{NO}_2$, and its molecular weight is 295.36 g/mol. (7)
 - Pentachloronitrobenzene occurs as fine, colorless needles that are practically insoluble in water. (1,5,7)
 - Pentachloronitrobenzene has a musty odor; the odor threshold has not been established. (1)
 - The vapor pressure for pentachloronitrobenzene is 0.0133 mm Hg at 25 °C, and its log octanol/water partition coefficient ($\log K_{ow}$) is 4.46. (1,5)
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Conversion Factors:

To convert concentrations in air (at 25 °C) from ppm to mg/m^3 : $\text{mg}/\text{m}^3 = (\text{ppm}) \times (\text{molecular weight of the compound}) / (24.45)$. For pentachloronitrobenzene: $1 \text{ ppm} = 12.1 \text{ mg}/\text{m}^3$.

Health Data from Inhalation Exposure



ACGIH TLV--American Conference of Governmental and Industrial Hygienists' threshold limit value expressed as a time-weighted average; the concentration of a substance to which most workers can be exposed without adverse effects.

LC₅₀ (Lethal Concentration₅₀)--A calculated concentration of a chemical in air to which exposure for a specific length of time is expected to cause death in 50% of a defined experimental animal population.

The health and regulatory values cited in this factsheet were obtained in December 1999.

^a Health numbers are toxicological numbers from animal testing or risk assessment values developed by EPA.

^b Regulatory numbers are values that have been incorporated in Government regulations, while advisory numbers are nonregulatory values provided by the Government or other groups as advice. ACGIH numbers are advisory.

Summary created in April 1992, updated January 2000

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