

# Captan

133-06-2

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## Hazard Summary

Captan is a fungicide used on fruits, vegetables, and ornamentals. Acute (short-term) dermal exposure to captan may cause dermatitis and conjunctivitis in humans. Ingestion of large quantities of captan may cause vomiting and diarrhea in humans. Captan was found to be carcinogenic in one strain of mice exposed in their diet, causing tumors of the duodenum. In mice exposed by either gavage (experimentally placing the chemical in the stomach) or injection, an increased incidence of tumors was not observed. EPA has classified captan as a Group B2, probable human carcinogen.

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Please Note: The main sources of information for this fact sheet are EPA's the Integrated Risk Information System (IRIS) (6), which contains information on oral chronic toxicity and the RfD and EPA's Health and Environmental Effects Profile for Captan (3).

## Uses

- Captan is predominantly used in agriculture as a fungicide on a wide variety of fruits, vegetables, and ornamentals on plant seeds, and also on food crop packaging boxes. (3)
- Captan is also used in cosmetics and pharmaceuticals, oil-based paints, lacquers, wallpaper paste, plasticizers, polyethylene, vinyl, rubber stabilizers, and textiles. (3)

## Sources and Potential Exposure

- Occupational exposure may occur during the manufacture, formulation, or application of captan. (1)
- Individuals who pick fruits and vegetables that were treated with captan may be dermally exposed and may also inhale captan that is in the air near the treated plants. (2)
- Captan residues can remain on fruits and vegetables for some time after they are sprayed. Individuals may be exposed from ingestion of contaminated food. (2,3)

## Assessing Personal Exposure

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

## Health Hazard Information

### Acute Effects:

- Acute dermal exposure to captan may cause dermatitis and conjunctivitis in humans. (2)
- Ingestion of large quantities of captan may cause vomiting and diarrhea in humans. (4)
- Acute animal tests in rats and mice have demonstrated captan to have low to moderate acute toxicity by inhalation or dermal exposure and low acute toxicity by oral exposure. (5)

### Chronic Effects (Noncancer):

- No information is available on the effects of chronic (long-term) exposure to captan in humans.
- Decreased body weight has been observed in rodents chronically exposed to captan, and mice have shown

signs of excitability. (3)

- EPA has not established a Reference Concentration (RfC) for captan. (6)
- The Reference Dose (RfD) for captan is 0.13 milligrams per kilogram body weight per day (mg/kg/d) based on decreased mean body weights in rats. 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. (6)
- EPA has high confidence in the RfD due to: medium confidence in the study on which the RfD was based because it is of adequate quality; and high confidence in the database because additional studies are supportive and of adequate quality. (6)

#### Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of captan in humans.
- Evidence on the reproductive and developmental effects of captan in animals is conflicting. In one study where animals were orally exposed, captan was fetotoxic in high-dosed rabbits, a slight reduction in fetal weight was observed in high-dosed rats, and increased resorptions were observed in high-dosed hamsters. Some abnormalities were observed in another study. Other studies have reported no effects. (3)

#### Cancer Risk:

- No information is available on the carcinogenic effects of captan in humans.
- Captan was found to be carcinogenic in one strain of mice exposed to high levels in their diet, causing tumors of the duodenum. (3,8)
- In mice exposed by either gavage or injection, no increased incidence of tumors was observed. (3)
- EPA has classified captan as a Group B2, probable human carcinogen. (7)
- EPA has calculated an oral cancer slope factor of  $3.5 \times 10^{-3} \text{ (mg/kg/d)}^{-1}$ . (7)

## Physical Properties

- The chemical formula for captan is  $\text{C}_9\text{H}_8\text{Cl}_3\text{NO}_2\text{S}$ , and it has a molecular weight of 300.6 g/mol. (3)
- Captan is a white crystalline substance in its pure form, but technical grade material appears as yellow to buff. Captan is practically insoluble in water. (3,4,8)
- Pure captan is odorless, while its technical grade has a pungent smell; the odor threshold has not been established. (3)
- The vapor pressure for captan is less than  $1 \times 10^{-5}$  mm Hg at 25 °C, and its log octanol/water partition coefficient ( $\log K_{ow}$ ) is about 2.352.54. (3)

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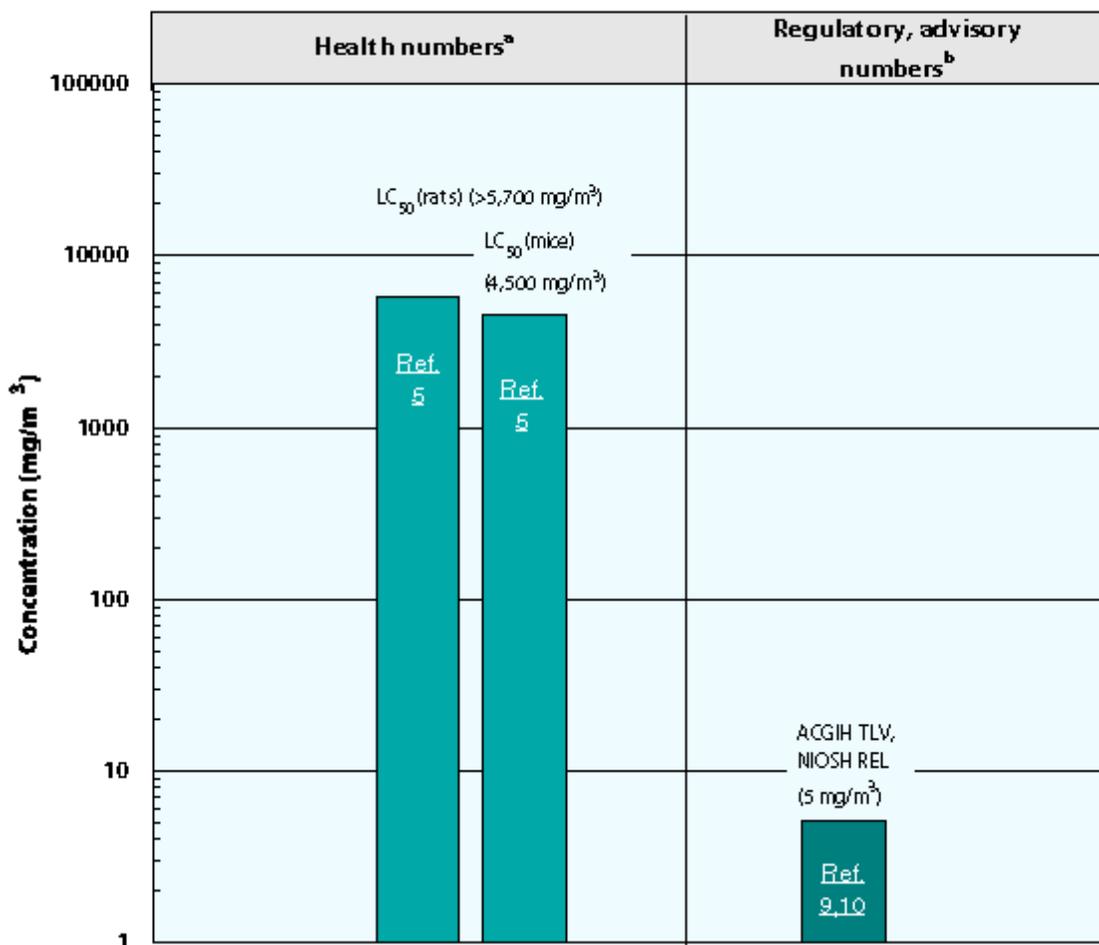
#### Conversion Factors:

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 captan:  $1 \text{ ppm} = \frac{12.29 \text{ mg/m}^3}{3}$ .

To convert concentrations in air from  $\mu\text{g/m}^3$  to  $\text{mg/m}^3$ :  $\text{mg/m}^3 = (\mu\text{g/m}^3) \times (1 \text{ mg}/1,000 \mu\text{g})$ .

### Health Data from Inhalation Exposure

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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.

LC<sub>50</sub> (Lethal Concentration<sub>50</sub>)--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.

NIOSH REL--National Institute of Occupational Safety and Health's recommended exposure limit; NIOSH--recommended exposure limit for an 8- or 10-h time-weighted-average exposure and/or ceiling.

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

<sup>a</sup> Health numbers are toxicological numbers from animal testing or risk assessment values developed by EPA.

<sup>b</sup> 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. NIOSH and ACGIH numbers are advisory.

Summary created in April 1992, updated in January 2000.

## References

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