Chlorobenzilate

510-15-6

Hazard Summary

Until 1999, chlorobenzilate was used as a pesticide in citrus and deciduous fruit trees. Limited information is available on the acute (short-term) or chronic (long-term) effects of chlorobenzilate in humans. No inhalation data are available. Poor appetites, anemia, cardiac changes, and effects on the liver, spleen, and bone marrow were observed in dogs chronically exposed to high levels of chlorobenzilate by ingestion. No information is available on the carcinogenic effects of chlorobenzilate in humans. Chlorobenzilate has been found to be carcinogenic in orally exposed mice, with increased incidences of liver tumors observed. EPA has classified chlorobenzilate as a Group B2, probable human carcinogen.

Please Note: The main sources of information for this fact sheet are EPA's Integrated Risk Information System (IRIS) (5), which contains information on oral chronic toxicity and the Reference Dose (RfD), and EPA's Health and Environmental Effects Profile for Chlorobenzilate (2).

Uses

- Chlorobenzilate was primarily used as a nonsystemic pesticide in spider and mite control, usually against phytophagus mites on citrus and deciduous fruit trees. (2,6)
- All uses have been canceled.5)

Sources and Potential Exposure

- Workers may be occupationally exposed to chlorobenzilate, dermally or by inhalation, during its use as an acaricide to control mites and spiders. The major use is for citrus crops in Florida, Texas, California, and Arizona. (1,2)
- Chlorobenzilate may enter the air or water through spray drift during application to crops. (2)
- Individuals may be exposed by breathing contaminated air, drinking contaminated water, or eating contaminated fruit. (2)

Assessing Personal Exposure

- Chlorobenzilate and its metabolites, present in the urine of exposed individuals, can be oxidized to p,p'-dichlorobenzophenone, and this can be analyzed to monitor human exposure. (3)

Health Hazard Information

Acute Effects:

- A worker developed muscle pains, ataxia, mild delirium, and fever from acute exposure to chlorobenzilate. (3)
- Lacrimation, salivation, diarrhea, and deep rapid respiration have been observed in rodents acutely exposed to chlorobenzilate by ingestion. Intestinal irritation and hemorrhage in the lungs were also observed. (1,2)
- Acute animal tests in rats, mice, and hamsters have demonstrated chlorobenzilate to have moderate acute

toxicity by ingestion. (4)

Chronic Effects (Noncancer):

- No information is available on the chronic effects of chlorobenzilate in humans.
- Poor appetites, anemia, cardiac changes, extramedullary hematopoiesis of the liver and spleen, and erythroid hyperplasia of the bone marrow were observed in dogs chronically exposed to high levels of chlorobenzilate by ingestion. (2,5)
- Maternal effects in rabbits chronically exposed to chlorobenzilate include a decrease in stool quantity, food consumption, and body weight gain and hyperirritability. (5)
- EPA has not established a Reference Concentration (RfC) for chlorobenzilate. (5)
- The Reference Dose (RfD) for chlorobenzilate is 0.02 milligrams per kilogram body weight per day (mg/kg/d) based on decreased stool quantity, food consumption, and body weight gains and hyperirritability in rabbits. 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. (5)
- EPA has low confidence in the study on which the RfD was based because the observed gastrointestinal effects are somewhat equivocal; medium to high confidence in the database because the supporting database is of good quality; and, consequently, medium to high confidence in the RfD. (5)

Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of chlorobenzilate in humans.
- Injury to the sperm and atrophy of the testes have been observed in rats exposed to chlorobenzilate in their diet. (2)
- Teratogenic effects were not observed in the offspring of rats exposed to chlorobenzilate in the diet or in rabbits exposed by gavage. (3,5)

Cancer Risk:

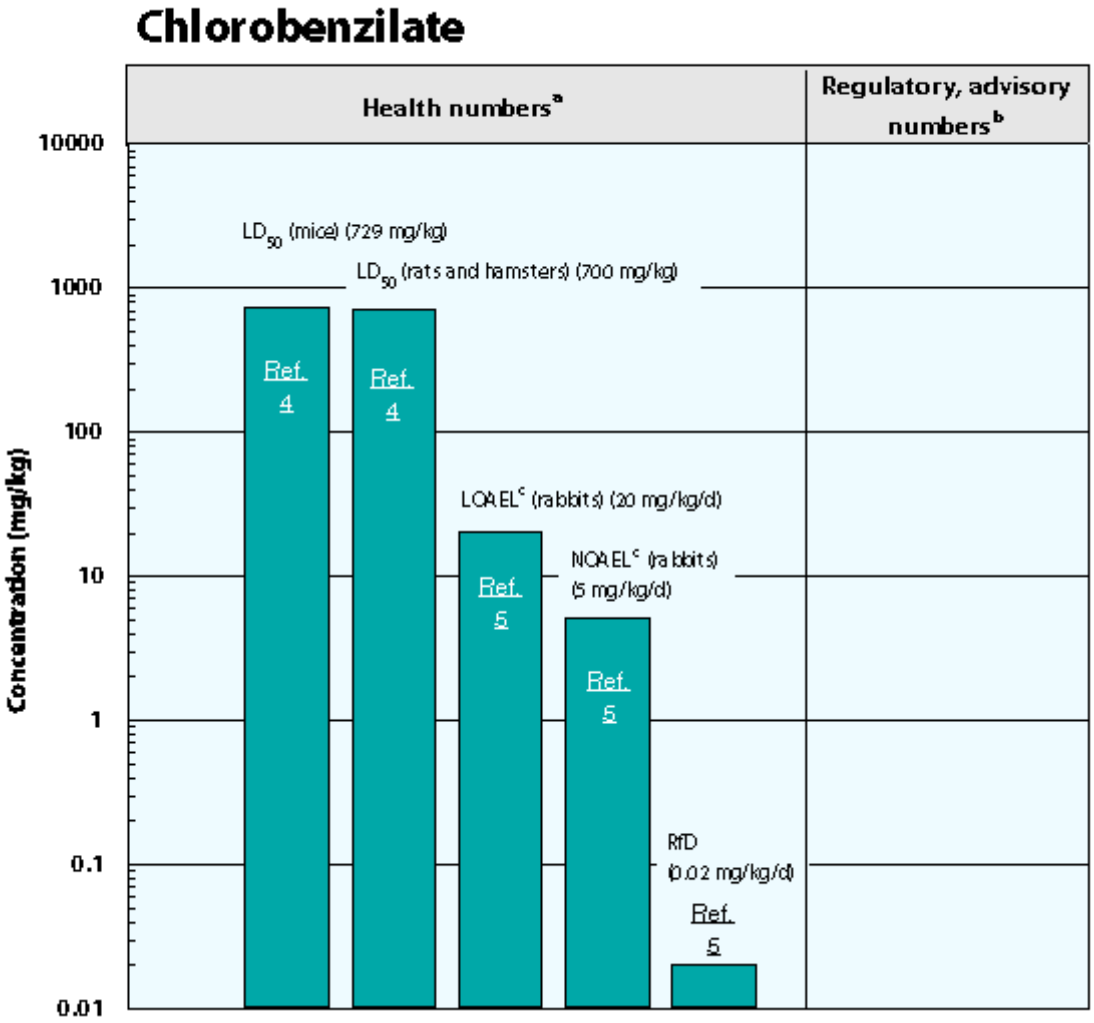
- No information is available on the carcinogenic effects of chlorobenzilate in humans.
- In a National Toxicology Program (NTP) study, chlorobenzilate was found to be carcinogenic in orally exposed mice, with increased incidences of liver tumors observed. (2,3,8)
- EPA has classified chlorobenzilate as a Group B2, probable human carcinogen. (6)
- EPA has calculated an oral cancer slope factor of 0.27 $(mg/kg/d)^{-1}$ and an inhalation unit risk factor of 7.8 x 10^{-5} $(\mu g/m^3)^{-1}$ for chlorobenzilate. (6)

Physical Properties

- The chemical formula for chlorobenzilate is $C_{16}H_{14}Cl_2O_3$, and its molecular weight is 325.2 g/mol. (2)
- Pure chlorobenzilate occurs as a pale yellow solid, while its technical grade is a brownish liquid that is slightly soluble in water. (2)
- The odor threshold for chlorobenzilate has not been established.
- The vapor pressure for chlorobenzilate is 2.2×10^{-6} mm Hg at 20 °C. (2)

Conversion Factors:
To convert concentrations in air (at 25 °C) from ppm to mg/m^3: mg/m^3 = (ppm) × (molecular weight of the compound)/(24.45). For chlorobenzilate: 1 ppm = 13.3 mg/m^3.

Health Data from Oral Exposure



LD_{50} (Lethal Dose $_{50}$)--A calculated dose of a chemical in water to which exposure for a specific length of time is expected to cause death in 50% of a defined experimental animal population.

LOAEL--Lowest-observed-adverse-effect level.

NOAEL--No-observed-adverse-effect level.

The health values cited in this fact sheet 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.

[c] The LOAEL and NOAEL are from the critical study used as the basis for the EPA RfD.

Summary created in April 1992, updated in February 2007.

References

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