

Propoxur (Baygon)

114-26-1

Hazard Summary

Propoxur is an insecticide used to control cockroaches, flies, mosquitoes, and lawn and turf insects. Acute (short-term) exposure of humans to propoxur by ingestion leads to cholinesterase inhibition of red blood cells, with mild cholinergic symptoms including blurred vision, nausea, vomiting, sweating, and tachycardia; however, the effects are transient. Chronic (long-term) inhalation exposure has resulted in depressed cholinesterase levels, headaches, vomiting, and nausea in humans. Chronic ingestion studies in animals have reported depressed cholinesterase levels, depressed body weight, effects to the liver and bladder, and a slight increase in neuropathy. No information is available on the reproductive, developmental, or carcinogenic effects of propoxur in humans. Mixed results are available from cancer studies of propoxur in animals. EPA has not classified propoxur for carcinogenicity.

Please Note: The main source of information for this fact sheet is EPA's Integrated Risk Information System (IRIS) (4), which contains information on oral chronic toxicity and the Reference Dose (RfD). Other secondary sources include the Hazardous Substances Data Bank (HSDB) (1), a database of summaries of peer-reviewed literature, and the Registry of Toxic Effects of Chemical Substances (RTECS) (5), a database of toxic effects that are not peer reviewed.

Uses

- Propoxur is a nonfood carbamate insecticide, marketed under the registered trademark name Baygon. It is used to control cockroaches, flies, mosquitoes, and lawn and turf insects. (1,3)
- Propoxur has been used in malaria control activities and in flea collars for pets. (1)

Sources and Potential Exposure

- Individuals are most likely to be exposed to propoxur dermally or by inhalation during the manufacture, formulation, and application of this insecticide. (1,2)
- Propoxur has been detected in surface water, but not in groundwater. (3)

Assessing Personal Exposure

- Exposure to propoxur can be monitored by measuring levels of phenol metabolites in urine and cholinesterase levels in blood. However, these tests are not reliable indicators of total exposure because they are not specific for propoxur. (2)

Health Hazard Information

Acute Effects:

- Acute oral exposure of humans to propoxur leads to cholinesterase inhibition of red blood cells, with mild cholinergic symptoms that include blurred vision, nausea, vomiting, sweating, and tachycardia; however, the effects are transient. (1,3,4)
- Cholinesterase depression has also been observed in rats acutely exposed by ingestion. (3)
- Acute animal tests in rats, mice, and guinea pigs, have demonstrated propoxur to have high acute toxicity by inhalation exposure and high to extreme acute toxicity by ingestion. (5)

Chronic Effects (Noncancer):

- Chronic inhalation exposure has resulted in depressed cholinesterase levels, headaches, vomiting, and nausea in humans. (3)
- Chronic ingestion studies in animals have reported depressed cholinesterase levels, depressed body weight, effects to the liver and bladder, and slight increase in neuropathy. (3,4)
- The Reference Dose (RfD) for propoxur is 0.004 milligrams per kilogram body weight per day (mg/kg/d) based on mild cholinergic symptoms and red blood cell cholinesterase inhibition in humans. 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 low confidence in the study on which the RfD was based because it appears to be of poor quality; medium confidence in the database because additional studies are of adequate quality; and, consequently, medium confidence in the RfD.
- EPA has not established a Reference Concentration (RfC) for propoxur. (4)

Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of propoxur in humans.
- No adverse reproductive or developmental effects were observed in an oral study of rabbits exposed to propoxur. (3,4)
- In a few studies of rats orally exposed to propoxur, fetotoxic effects, decreased numbers of pups, and depressed fetal weight have been reported. (3,4)

Cancer Risk:

- No information is available on the carcinogenic effects of propoxur in humans.
- In a chronic feeding study of propoxur in rats, tumors of the bladder and the uterus were observed at high doses. (3)
- Another study of mice orally exposed to propoxur did not detect an increased incidence of tumors. (3,4)
- EPA has not classified propoxur for carcinogenicity. (4)

Physical Properties

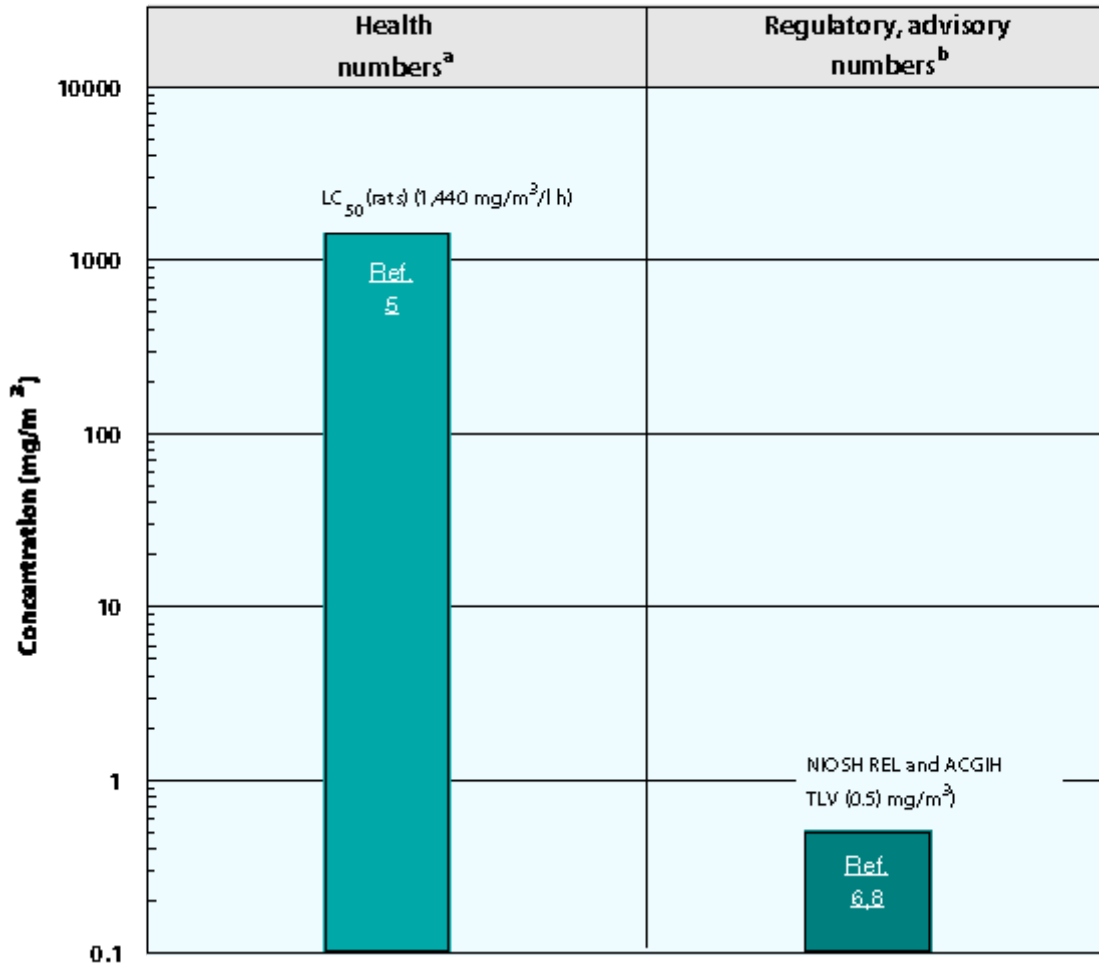
- The chemical formula for propoxur is $C_{11}H_{15}NO_3$, and its molecular weight is 209.24 g/mol. (3,7)
 - Propoxur occurs as colorless or white to tan crystalline powder and is relatively insoluble in water. (1,2)
 - Propoxur has a faint characteristic odor; the odor threshold has not been established. (2)
 - The log octanol/water partition coefficient ($\log K_{ow}$) for propoxur is 0.14. (3)
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Conversion Factors:

To convert concentrations in air (at 25 °C) from ppm to mg/m^3 : $mg/m^3 = (ppm) \times (\text{molecular weight of the compound}) / (24.45)$. For propoxur: 1 ppm = 8.56 mg/m^3 .

Health Data from Inhalation Exposure

Propoxur



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 effect.

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.

NIOSH REL--National Institute of Occupational Safety and Health 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.

^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. NIOSH and ACGIH numbers are advisory.

Summary created in April 1992, updated in January 2000

References

1. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
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3. U.S. Environmental Protection Agency. Baygon (Propoxur) Health Advisory. Office of Drinking Water, Washington, DC. 1989.
4. U.S. Environmental Protection Agency. *Integrated Risk Information System (IRIS) on Baygon*. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.
5. U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
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7. The Merck Index. *An Encyclopedia of Chemicals, Drugs, and Biologicals*. 11th ed. Ed. S. Budavari. Merck and Co. Inc., Rahway, NJ. 1989.
8. American Conference of Governmental Industrial Hygienists (ACGIH). 1999 TLVs and BEIs. *Threshold Limit Values for Chemical Substances and Physical Agents. Biological Exposure Indices*. Cincinnati, OH. 1999.