What is hydroprene?

- Hydroprene is an insecticide used against cockroaches, beetles, and moths (1). It was registered by the U.S. Environmental Protection Agency (EPA) in 1984. (2).

- Hydroprene belongs to the class of insecticides known as insect growth regulators (IGRs) (3). The U.S. EPA currently categorizes hydroprene as a biopesticide based on its biochemical properties (4, 5).

- Hydroprene is an amber liquid that is soluble in water (2 g/L at 20 °C) and common organic solvents. It is slightly volatile with a vapor pressure ranging from 1.88 x 10⁻⁴ mm Hg to 3 x 10⁻⁴ mm Hg at 25 °C. Hydroprene is stable for more than 3 years under normal storage conditions (6).

- Signal words for hydroprene products range from Caution to Warning (1). The signal word reflects the combined toxicity of hydroprene and other ingredients in each product. See the Pesticide Label box above.

- Hydroprene products are used on a variety of indoor sites including homes, offices, warehouses, restaurants, hospitals, and greenhouses. Commercial formulations of the insecticide include pressurized liquids, emulsions, and impregnated materials (i.e., bait stations) (1).

How does hydroprene work?

- Hydroprene disrupts normal development and emergence of insects by mimicking juvenile hormones produced by immature insects as they develop into reproductive adults (3).

- Hydroprene causes different effects on different insect. It may cause adult sterility, physical abnormalities, dessication, and premature death (7).
What are some products that contain hydroprene?

- Gencor®
- Gentrol®
- Raid® Max Sterilizer Discs

How toxic is hydroprene?

**Animals**

- Hydroprene is very low in toxicity when ingested. The acute oral LD50 for rats is >5000 mg/kg and >10,000 mg/kg for dogs (6). See boxes on Laboratory Testing, Toxicity Category, and LD50/LC50.

- Hydroprene is low in toxicity when applied to the skin. The acute dermal LD50 for rabbits is >5100 mg/kg and >5000 mg/kg for rats (6).

- Hydroprene is very low in toxicity when inhaled. The acute inhalation LC50 (4 hour) in rats is >5.5 mg/L (6).

- In skin irritation studies, hydroprene was non-irritating to rabbits and mildly irritating to rats (6, 8). The U.S. EPA classifies hydroprene as very low in toxicity for skin effects (8).

- In an eye irritation study with rabbits, hydroprene caused mild eye irritation (6). The U.S. EPA classifies hydroprene as very low in toxicity for eye effects (8).

- The U.S. EPA classifies hydroprene as very low in toxicity for skin sensitization based on studies in guinea pigs (8).

- Scientists fed rats hydroprene for 28 days and noted kidney effects at the higher doses (>250 mg/kg/day). The no observed adverse effect level (NOAEL) was 250 mg/kg/day (8).

- In a 90-day feeding study, investigators exposed male and female rats to hydroprene. The NOAEL was 50 mg/kg/day. At higher doses (≥250 mg/kg/day), scientists observed liver cell effects in both sexes and ovarian cell effects in female rats (8).

**Humans**

- Data are not available from occupational exposure, accidental poisonings, or epidemiological studies regarding the acute toxicity of hydroprene.
Is hydroprene metabolized and eliminated from the body?

**Animals**
- In a rat metabolism study, hydroprene levels peaked in the blood at 5 to 7 hours. Researchers detected the highest residue levels in the liver, fat, and adrenal glands after 6 hours. Elimination of the chemical was biphasic, and the second half-life occurred 2 to 10 days after exposure. Approximately 13% of the hydroprene was retained in rats (8). See box on Half-life.

**Humans**
- Data are not available regarding the metabolism and elimination of hydroprene in humans.

Does hydroprene cause reproductive or teratogenic effects?

**Animals**
- In a reproductive study, researchers fed rats hydroprene in the diet at doses of 0, 300, 1500, or 7500 mg hydroprene/kg diet. They detected no fertility effects related to treatment. Adult and progeny rats had lower body weight gains at the highest dose (7500 mg hydroprene/kg diet). The NOAEL for parental effects was 1500 mg hydroprene/kg diet (8).

- In a developmental study, scientists exposed pregnant rabbits to hydroprene and detected no developmental effects. At the highest dose (90 mg/kg/day), scientists noted maternal weight loss. The developmental NOAEL was 90 mg/kg/day (8).

**Humans**
- Data are not available from occupational exposure, accidental poisonings, or epidemiological studies regarding the reproductive and developmental toxicity of hydroprene.

Is hydroprene a carcinogen?

**Animals**
- In a cancer study, laboratory workers fed rats hydroprene at doses of 0 (two control groups), 100, 1000, or 10,000 mg hydroprene/kg diet. Workers noted no evidence of treatment-related carcinomas or precancerous changes (8).

- Methoprene, an IGR that is a structural analog of hydroprene, has not displayed carcinogenicity (8).

- Researchers often use studies designed to test for mutagenicity to screen chemicals for carcinogenicity. Sufficient evidence exists to determine that hydroprene does not have significant potential for mutagenicity (8).

**Humans**
- The U.S. EPA currently classifies hydroprene as a group D carcinogen (10). This classification denotes that hydroprene is not classifiable as to human carcinogenicity (10). See box on Cancer.

- Data are not available from occupational exposures or epidemiological studies regarding the carcinogenicity of hydroprene.

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**Half-life** is the time required for half of the compound to degrade.

1 half-life = 50% degraded
2 half-lives = 75% degraded
3 half-lives = 88% degraded
4 half-lives = 94% degraded
5 half-lives = 97% degraded

Remember that the amount of chemical remaining after a half-life will always depend on the amount of the chemical originally applied.

**Cancer:** The U.S. EPA has strict guidelines that require testing of pesticides for their potential to cause cancer. These studies involve feeding laboratory animals large daily doses of the pesticide over most of the lifetime of the animal. Based on these tests, and any other available information, EPA gives the pesticide a rating for its potential to cause cancer in humans. For example, if a pesticide does not cause cancer in animal tests at large doses, then the EPA considers it unlikely the pesticide will cause cancer in humans. Cancer tests are not conducted on human subjects.
What is the environmental fate and behavior of hydroprene?

- Hydroprene rapidly degrades in soil with a half-life of a few days (6).
- No data are available regarding the aquatic fate of hydroprene.
- Plants degrade hydroprene (6).

What effects does hydroprene have on wildlife?

- Hydroprene is practically non-toxic to fish (LC50 > 100 mg/L) (6). It may be toxic to aquatic invertebrates. Scientists observed that hydroprene causes premature metamorphosis in immature aquatic invertebrates (11).
- No data are available regarding the toxicity of hydroprene to birds.
- Hydroprene is low in toxicity to adult bees. The acute oral and contact LD50s for bees are more than >1000 µg/bee. Bee larvae are affected by hydroprene at levels of 0.1 µg/bee (6).

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For more information contact: NPIC
Oregon State University, 310 Weniger Hall, Corvallis, Oregon 97331
Phone: 1-800-858-7378   Fax: 1-541-737-0761   Email: npic@ace.orst.edu
NPIC at www.npic.orst.edu   EXTOXNET at http://extoxnet.orst.edu/

References

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