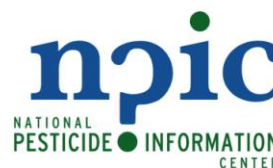


This fact sheet was created in 2003; some of the information may be out-of-date. NPIC is not planning to update this fact sheet. More pesticide fact sheets are available [here](#). Please call NPIC with any questions you have about pesticides at 800-858-7378, Monday through Friday, 7:30 am to 3:30 am PST.



NPIC fact sheets are designed to answer questions that are commonly asked by the general public about pesticides that are regulated by the U.S. Environmental Protection Agency (U.S. EPA). This document is intended to be educational in nature and helpful to consumers for making decisions about pesticides.

Carbaryl

(General Fact Sheet)

For more technical information, please refer to the Technical Fact Sheet.

The Pesticide Label: Labels provide directions for the proper use of a pesticide product. *Be sure to read the entire label before using any product.* Signal words, listed below, are found on the front of each product label and indicate the product's potential hazard.

CAUTION - low toxicity

WARNING - moderate toxicity

DANGER - high toxicity

What is carbaryl?

- Carbaryl is the common name for a chemical known as 1-naphthyl methylcarbamate (1).
- Carbaryl was first registered in the United States in 1959 (1). Currently, over 300 products containing carbaryl are actively registered with the EPA (2). See the box on **Laboratory Testing**.
- Carbaryl belongs to a family of chemicals that kill or control insects (insecticides) known as carbamates (3).

Laboratory Testing: Before pesticides are registered by the U.S. EPA, they must undergo laboratory testing for short-term (acute) and long-term (chronic) health effects. Laboratory animals are purposely fed high enough doses to cause toxic effects. These tests help scientists judge how these chemicals might affect humans, domestic animals, and wildlife in cases of overexposure. When pesticide products are used according to the label directions, toxic effects are not likely to occur because the amount of pesticide that people and pets may be exposed to is low compared to the doses fed to laboratory animals.

How is carbaryl used?

- Carbaryl is used to control a wide variety of pests, including moths, beetles, cockroaches, ants, ticks, and mosquitoes (2).
- Products with carbaryl can be formulated as dusts, wettable powders, liquid concentrates, granules, or baits (2).
- Carbaryl products are used on fruits, vegetables, rangeland, lawns, ornamental plants, trees, and building foundations (2).

What are some products that contain carbaryl?

- Sevin™
- Adios™
- Carbamec™
- Slam™

How does carbaryl work?

- Carbaryl disrupts an insect's nervous system and may be toxic if touched or eaten (3, 4).
- Carbaryl's effect on the nervous system is temporary (5).

How toxic is carbaryl?

- Carbaryl is moderately toxic when fed to rats (1). See box on **Toxicity Category**.
- Carbaryl is low in toxicity when tested on the skin of rats and rabbits (1, 3).
- Carbaryl is very low in toxicity to rats when inhaled (1).

Toxicity Category				
	High Toxicity (Danger)	Moderate Toxicity (Warning)	Low Toxicity (Caution)	Very Low Toxicity (Caution)
Oral LD50	Less than 50 mg/kg	50 - 500 mg/kg	500 - 5000 mg/kg	Greater than 5000 mg/kg
Dermal LD50	Less than 200 mg/kg	200 - 2000 mg/kg	2000 - 5000 mg/kg	Greater than 5000 mg/kg
Inhalation LC50 - 4hr	Less than 0.05 mg/l	0.05 - 0.5 mg/l	0.5 - 2 mg/l	Greater than 2 mg/l
Eye Effects	Corrosive	Irritation persisting for 7 days	Irritation reversible within 7 days	Minimal effects, gone within 24 hrs
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation

U.S. Environmental Protection Agency, Office of Pesticide Programs, Label Review Manual, Chapter 7: Precautionary Labeling
<http://www.epa.gov/oppfod01/labeling/lrm/chap-07.htm>

Signs of Exposure - Animals

- The signs of carbaryl poisoning may include behavioral changes, excessive tearing and salivation, muscle tremors, twitching, vomiting, and diarrhea. Severe intoxications can result in paralysis and death (4).
- Cats are typically more sensitive to the effects of carbaryl than dogs (4).

Signs of Exposure - Humans

- Early symptoms associated with carbaryl exposure may include headache, muscle weakness, nausea, stomach cramps, sweating, and restlessness (5). See **Exposure** box.
- Greater exposures to carbaryl may lead to pin-point pupils, tearing, excessive salivation, nasal discharge, vomiting, diarrhea, muscle twitching, and coordination problems. Severe poisonings can result in convulsions, coma, and death (5).
- A blood test may be able to document a carbaryl poisoning if administered immediately after exposure. However, too much time between exposure and testing can change the results (5).
- Urine can be tested for breakdown products of carbaryl to determine exposure (6).

Exposure: Effects of carbaryl on human health and the environment depend on how much carbaryl is present and the length and frequency of exposure. Effects also depend on the health of a person and/or certain environmental factors.

Does carbaryl cause cancer?

Animals

- A study with mice found an increase in tumors when they were fed carbaryl throughout their lifetime (1). See **Cancer** box.
- Dogs fed carbaryl in their diet for 1 year had no health effects compared to animals not given the chemical (7).

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, then the EPA considers it unlikely the pesticide will cause cancer in humans. Testing for cancer is not done on human subjects.

Humans

- The EPA considers carbaryl “likely to be carcinogenic in humans” due to increased tumors in mice (1).

Does carbaryl cause reproductive problems or birth defects?

Animals

- Researchers fed carbaryl to pregnant monkeys. They found no adverse reproductive effects (8).
- Rats fed high doses of carbaryl for 60 days had less active sperm and an increase in abnormal sperm. These effects were greater in young rats and those fed larger amounts of carbaryl (9).

Humans

- A study of 47 workers exposed to carbaryl for at least 1 year found no significant differences in testicular function when compared with 90 unexposed workers (10).

Does carbaryl break down and leave the body?

Animals

- Scientists fed carbaryl to rats to determine if the chemical leaves the body. It was completely excreted through the urine and feces within 48 hours (7).
- Carbaryl does not accumulate in mammals because it is rapidly broken down by the liver and eliminated (3, 5).
- Cows given carbaryl excreted almost all of it in their urine within 3 days. A very small amount was found in their milk (11). Some carbaryl was found in goat’s milk 8 hours after it was fed to the animal, but it was not found 3 days later (12).

Humans

- Carbaryl is rapidly broken down by the liver and leaves through the urine. The presence of certain chemicals in the urine may indicate an exposure has occurred (6). See the **Technical** fact sheet for more information.

What happens to carbaryl indoors?

- Residues resulting from indoor applications of carbaryl are greatly reduced after a couple of days (13).

What happens to carbaryl outdoors?

Soil

- Depending upon conditions, carbaryl has a half-life ranging from 4 to 72 days in soil. Carbaryl breaks down faster in sandy, flooded, or well aerated soils (3, 14, 15). See **Half-life** box.

Plants

- Carbaryl has an average half-life of 3.2 days on plant leaves (15).

Water

- Carbaryl does not dissolve well in water and sticks to soil. However, carbaryl is widely used and can last a long time under the right conditions (15, 16).
- Carbaryl is commonly found in groundwater (15).

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

1 half-life=50% remaining
2 half-lives=25% remaining
3 half-lives=12% remaining
4 half-lives= 6% remaining
5 half-lives= 3% remaining

The amount of chemical remaining after a half-life will always depend on the amount of the chemical present initially.

Air

- Carbaryl has low potential to evaporate from water, soil, and other treated surfaces (17).

Does carbaryl affect wildlife?

- Carbaryl is practically nontoxic to birds such as ducks, quail, geese, and pheasants (3, 15).
- Carbaryl ranges from slightly to highly toxic to several species of fish (15, 18).
- Carbaryl ranges from moderately to very highly toxic to marine invertebrates, such as shrimp and oysters (15).
- Carbaryl is very highly toxic to aquatic invertebrates such as shrimp and stoneflies. Carbaryl can also damage frog tadpoles during their development (15, 18).
- Carbaryl is very high in toxicity to honey bees and can harm beneficial insects (1, 3).
- Before applying pesticides, consider the potential effects on birds, aquatic life, and non-target insects.

Date Reviewed: November, 2003

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 EXTTOXNET at http://exttoxnet.orst.edu/

References

1. U.S. Environmental Protection Agency. *Interim Reregistration Eligibility Decision for Carbaryl*. Case 0080. http://www.epa.gov/oppsrrd1/REDS/carbaryl_ired.pdf (accessed Oct 2003).
2. *Pest-Bank Pesticide Product Data* [CD-ROM]; Purdue Research Foundation: West Lafayette, IN, 2001.
3. *A World Compendium: The Pesticide Manual*, 12th ed.; Tomlin, C. D. S., Ed.; British Crop Protection Council: Farnham, Surrey, UK, 2000; pp 67-68.
4. Osweiler, Gary D. *Toxicology*. National Veterinary Medical Series; Williams and Wilkins: Media, PA, 1996; pp 231-236.
5. Riegart, J. R.; Roberts, J. R. *Recognition and Management of Pesticide Poisonings*, 5th ed.; U.S. Environmental Protection Agency, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 1999; pp 48-54.
6. Best, E. M., Jr.; Murray, B.L. Observations on Workers Exposed to Sevin Insecticide: A Preliminary Report. *J. Occup. Med.* **1962**, *4*, 507-517.
7. Carpenter, C. P.; Weil, C. S.; Palm, P. E.; Woodside, M. W.; Nair III, J. H.; Smyth, H. F., Jr. Mammalian Toxicity of 1-Naphthyl-N-methylcarbamate (Sevin insecticide). *J. Agr. Food Chem.* **1961**, *9*, 30-39.
8. Dougherty, W.J.; Coulston, F. Teratogenic Evaluation of Carbaryl in the Rhesus Monkey (*Macaca mulatta*); Unpublished report submitted to Union Carbide Corp, June 6, 1975. Cited in *Occupational Medicine: Principles and Practical Applications*, 2nd ed.; Zenz, C., Ed.; Chicago: Mosby Year Book Medical Publishers, 1988.
9. Pant, N.; Shankar, R.; Srivastava, S. P. Spermatotoxic effects of carbaryl in rats. *Hum. Exp. Tox.* **1996**, *15*, 736-738.
10. Whorton, D. M.; Milby, T. H.; Stubbs, H. A. Testicular Function Among Carbaryl-Exposed Employees. *J. Tox. Environ. Health* **1979**, *5*, 929-941. Wills, J. H. Effects of Oral Doses of Carbaryl on Man. *Clin. Tox.* **1968**, *1*, 265-271.
11. Baron, R. L.; Sphon, J. A.; Chen, J. T.; Lustig, E.; Doherty, J. D.; Hansen, E. A.; Kolbye, S. M. Confirmatory Isolation and Identification of a Metabolite of Carbaryl in Urine and Milk. *J. Agric. Food Chem.* **1969**, *17*, 883-887.

12. Dorough, H. W.; Casida, J. E. Nature of Certain Carbamate Metabolites of the Insecticide Sevin. *J. Agric. Food Chem.* **1964**, *12*, 294-304.
13. Wright, C. G.; Leidy, R. B.; Dupree, H. E. Jr. Insecticides in the Ambient Air of Rooms Following their Application for Control of Pests. *Bull. Environ. Contam. Toxicol.*, **1981**, *26*, 548-53.
14. Venkateswarlu, K.; Chendrayan, K.; Sethunathan, N. Persistence and Biodegradation of Carbaryl in Soils. *J. Environ. Sci. Health* **1980**, *B15*, 421-429.
15. U.S. Environmental Protection Agency, Office of Pesticide Programs, Environmental Fate and Effects Division. Revised EFED Risk Assessment of Carbaryl in Support of the Reregistration Eligibility Decision (RED). http://cascade.epa.gov/RightSite/getcontent/Tempfile.pdf?DMW_OBJECTID=090007d480153434&DMW_FORMAT=pdf (accessed Oct 2003).
16. Vogue, P.; Kerle, E.; Jenkins, J. *Oregon State University Extension Pesticide Properties Database*; Oregon State University Extension Service: Corvallis, OR, 1994.
17. Xu, S. Environmental Fate of Carbaryl. California Environmental Protection Agency, Department of Pesticide Regulation. <http://www.cdpr.ca.gov/docs/empm/pubs/envfate.htm> (accessed Jan 2002).
18. Johnson, W. W.; Finley, M. T. *Handbook of Acute Toxicity of Chemicals to Fish and Aquatic Invertebrates*. Resource Publication 137; United States Department of the Interior Fish and Wildlife Service: Washington, D.C. 1980.