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United States Environmental Protection Agency

Office of Water
Office of Pesticides and Toxic Substances

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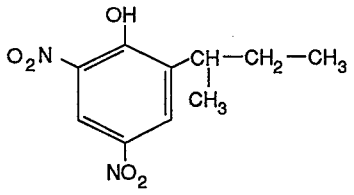
EPA National Pesticide Survey

Dinoseb



Dinoseb

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS), a study of the presence of 127 pesticides, pesticide degradates, and nitrate in community water system (CWS) wells and rural domestic drinking water wells. Dinoseb was one of the pesticides detected in the Survey. This fact sheet provides a description of dinoseb, its potential health effects, and guidance on both treating and preventing well contamination.

What is Dinoseb?

Dinoseb (DNBP, Dinitro) is the common name of an herbicide which is a member of the chemical family of dinitrophenols. Dinoseb was registered for use in 1948. It has been sold under the discontinued trade names of Premerge, Aretit, Ivosit, Dynamyte, and Dinitro Weed Killer. Dinoseb is also a component of the discontinued herbicide Premerge Plus. Dinoseb also has fungicidal and insecticidal properties. In 1986, EPA suspended the commercial use of Dinoseb. Dinoseb was used on agricultural land to control seedling weeds and grasses. Dinoseb was also used in fruit and nut orchards, grape vineyards, and mint, small grain, soybean, squash, strawberry, bean, potato, corn, cotton, pea, pumpkin, certain forage crops, and for controlling perennial weeds and grasses.

How Does Dinoseb Behave in Soil and Ground Water?

The behavior of a pesticide after it is released to the environment is dependent upon its movement in air, water, and soil as well as the rate at which it is transformed, or broken down. Pesticides applied to crops or the soil surface may volatilize (vaporize) to the atmosphere, be carried off by surface runoff, be carried to ground water through leaching, or remain in the soil through adsorption (adherence) to soil particles and undergo little movement in air or water. Pesticides may be transformed by reaction with water, microorganisms, and exposure to sunlight. The likelihood that dinoseb will migrate into ground water is influenced by its tendency to be transported (move) from soil to air and water and to be transformed by these various processes, as well as by the characteristics of the site, such as soil type, moisture, temperature, and depth to ground water. Dinoseb has a medium potential to be transported, and a high potential to be transformed.

How Does Dinoseb Get into Ground Water?

Dinoseb migration into ground water could result from the presence of dinoseb in the soil due to agricultural applications of dinoseb on agricultural land. Dinoseb could also reach ground water from direct entry into a well through accidental chemical spills or improper storage near a well.

Findings of the National Pesticide Survey

Based on the results of the NPS, EPA estimates that dinoseb is present, at or above the analytical detection level of 1.3 μg/L used in the Survey, in about 25 (0.03%) CWS wells nationwide. Considering the precision of the Survey, EPA estimates that this number could be as high as 870. Dinoseb is measured in micrograms per liter (μg/L) which is equivalent to parts per billion (ppb). Dinoseb was not detected at concentrations above EPA's proposed Maximum Contaminant Level (MCL) and drinking water Lifetime Health Advisory Level (HAL) of 7 μg/L. Dinoseb was not detected in any rural domestic wells.

What Health Effects Might be Caused by Dinoseb in Drinking Water?

Non-Cancer Effects: Lifetime HALs are based on health effects that were found in animals given high doses of the pesticides in laboratory studies. This level includes a margin of safety. EPA has set a Lifetime Health Advisory Level for dinoseb in drinking water at 7 μg/L. This level includes a margin of safety to protect human health and should be regarded as a guideline. EPA believes that water containing dinoseb at or below this level is acceptable for drinking every day over the course of one's lifetime, and does not pose health concerns. Consuming dinoseb, however, at high levels well above the Lifetime Health Advisory Level over a long period of time has been shown to result in adverse health effects in animal studies, including changes in liver and thyroid weights, reduced fertility, decreased sperm count, increased incidence of abnormal sperm, reduced fetal weight and survival, and birth defects.

Cancer Risk: Data from laboratory studies are inadequate for EPA to determine if dinoseb can increase the risk of cancer in humans.

Standard: EPA sets enforceable standards for public water systems, called MCLs. These regulatory standards set achievable levels of drinking water quality to protect human health. The proposed MCL for dinoseb is 7 μg/L (proposed as of July 25, 1990).

How is Water Treated to Remove Contaminants?

Dinoseb can be detected in drinking water by a laboratory using an EPA method such as #515.1. If dinoseb is detected in well water and confirmed by retesting to be above 7 μg/L, State or County health officials should be consulted. They may advise periodic retesting to get an accurate overall picture of the water quality because changes in seasonal precipitation and changes in pesticide use can cause variations in the amount of chemicals found in water wells. They also may advise using an alternative drinking water supply (bottled water is an example of a temporary alternative), treating the water, or drilling a new or deeper well. Public water systems are required to notify customers if the drinking water that they deliver contains a contaminant that exceeds its MCL.

You may also be able to treat your well water to remove pesticides and other contaminants. Treatment technologies that can remove dinoseb from water include activated carbon adsorption and ion exchange. However, these techniques are not necessarily appropriate or available in every situation. Your State or County health officials should be able to provide advice on the best approach to follow.

How Can Water Contamination be Prevented?

Several steps may be taken to prevent pesticides or nitrate from entering wells, such as eliminating direct entry through the well wall, drilling a new well, or modifying or reducing pesticide and fertilizer use.

Eliminate Direct Entry Through the Well Wall

If pesticides or nitrate are present in well water, they may be entering the ground water through the well itself rather than through the soil. If the well is old or poorly constructed, or if there are visible cracks in the well casing, obtain expert advice on whether or not improvements can be made to the well. In addition, investigate simple methods of capping the well or sealing it at the surface to prevent

entry. Do not conduct any mixing activities near the well if you use well water to mix pesticides because a spill could lead to direct contamination of the well.

Drill a New Well

If the soil surrounding the well is the source of contamination, drilling a new or deeper well may make sense if water can be drawn from a deeper, uncontaminated aquifer. Unfortunately, it often is difficult to know the quality of the ground water without drilling or extensive testing. Seek expert advice before you drill.

Learn More about Pesticide Use

If you use pesticides, whether for agricultural or home lawn and garden purposes, you should consider attending training courses given by your State or County agriculture department on how to reduce activities that can contaminate ground water. You may find that you can eliminate or lessen the frequency or quantity of your pesticide usage by choosing alternative methods of pest control.

Why was the National Pesticide Survey Conducted?

EPA conducted this Survey to determine the frequency and concentration of pesticides, pesticide degradates, and nitrate in drinking water wells nationwide and to examine the relationship between the presence of pesticides in drinking water wells and patterns of pesticide use and ground-water vulnerability. The Survey sampled 566 community water system wells and 783 rural domestic wells for 127 pesticides, pesticide degradates, and nitrate. The wells were selected as a representative statistical sample to provide nationwide estimates of the presence of pesticides and nitrate in drinking water wells, and are not meant to provide an assessment of pesticide contamination at the local, County, or State level.

Where to Go for More Information

This fact sheet is part of a series of NPS outreach materials, fact sheets and reports. The following additional fact sheets are available through EPA's Public Information Center (401 M Street SW, Washington, DC 20460, (202) 382-2080):

Survey Design	***Analytical Methods***	***Project Summary***
Survey Analytes	***Summary Results***	***Glossary***
Quality Assurance/ Quality Control	***Fact Sheet for each detected analyte***	***How EPA Will Use The NPS Results***

Additional information on the Survey and on pesticides in general can be obtained from the following sources:

U.S. EPA Safe Drinking Water Hotline 1-800-426-4791 (In Washington, DC (202) 382-5533) Monday-Friday, 8:30 am to 4:30 pm Eastern Time	Information on regulation of pesticides in drinking water
National Pesticide Telecommunications Network 1-800-858-7378 24 hours a day	Information on health effects and safe handling of pesticides
U.S. EPA Office of Pesticide Programs (OPP) Docket 401 M Street, SW Room NEG004 Washington, DC 20460 (202) 382-3587	Background documents for Survey (available for review)

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

Copies of the
NPS Phase I Report
(available 1991)
and
NPS Phase II Report
(when available)

If you are concerned about the presence of pesticides and nitrate in your private water well, contact your local or State health department. Other experts in your State environmental agency or agriculture and health departments may also be helpful to you. If you receive your drinking water from a community water system and have questions about your water quality, contact your local community water system owner/operator or the State water supply agency.

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