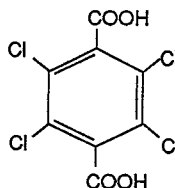




National Pesticide Survey

DCPA Acid Metabolites



DCPA Acid Metabolite

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. The acid metabolites or degradates (tetrachloroterephthalic acids) of the pesticide DCPA were detected in the Survey. This fact sheet provides a description of the DCPA acid metabolites, related potential health effects, a summary of the concentrations of DCPA acid metabolites found by the NPS in wells, and guidance on both treating and preventing well contamination.

What are DCPA Acid Metabolites?

DCPA acid metabolites are the degradates of the pesticide Dacthal. The chemical name for Dacthal is dimethyl tetrachloroterephthalate (DCPA). Dacthal is the trade name of a selective herbicide also known by the common names DCPA and chlorthal dimethyl, the coded number DAC 893, and the discontinued name Fatal. DCPA was registered for use in 1958. DCPA is used to combat smooth and hairy crabgrass, witchgrass, green and yellow foxtails, fall panicum, and other annual grasses. It is also used against certain broadleaf weeds such as carpet weed, dodder, purslane, and common chickweed. It is presently approved for use on turf, ornamentals, strawberries, collards, cucumbers, eggplant, garlic, horseradish, kale, mustard greens, onions, peppers, potatoes, radish, seeded melons, squash, sweet potatoes, tomatoes, turnips, cotton, soybeans, and field beans.

How Do DCPA Acid Metabolites Behave in Soil and Ground Water

The behavior of a pesticide breakdown product in the environment is dependent upon its movement in air, water, and soil as well as the rate at which it is transformed, or further 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. The parent compound, DCPA, is tightly bound (adsorbed) by clay particles and organic matter in the soil and has relatively low solubility in water (0.5 ppm). Thus, DCPA is subject to little leaching into ground water. However, pesticides may be transformed by reaction with water, microorganisms, and exposure to sunlight. Microorganisms break down DCPA to form the acid metabolites. The likelihood that DCPA acid metabolites will migrate into ground water is influenced by their 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. DCPA acid metabolites have a high potential to be transported, and a low potential to be transformed.

How Do DCPA Acid Metabolites Get into Ground Water? Migration of DCPA acid metabolites into ground water could result from the presence of DCPA in the soil due to agricultural and non-agricultural uses. Non-agricultural uses of DCPA include use on turf and ornamental plants. DCPA can 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 DCPA acid metabolites are present, at or above the analytical detection level of 0.10 µg/L used in the Survey, in about 6,010 (6.4%) CWS wells and 264,000 (2.5%) rural domestic wells nationwide. Considering the precision of the Survey, EPA estimates that the number of CWS wells with detectable levels of DCPA acid metabolites could be as low as 3,170 or as high as 8,840, and the number of rural domestic wells could be as low as 129,000 or as high as 477,000. DCPA acid metabolites are measured in micrograms per liter (µg/L) which is equivalent to parts per billion (ppb). The maximum concentrations of DCPA acid metabolites detected were 7.2 µg/L in CWS wells sampled by the Survey and 2.4 µg/L in rural domestic wells sampled by the Survey. The median concentrations of detectable DCPA acid metabolites was 0.34 µg/L in CWS wells and 0.38 µg/L in rural domestic wells.

The health-based guidelines established for DCPA apply to the DCPA acid metabolites as well. The maximum concentrations of these breakdown products detected in CWS wells and rural domestic wells are well below the Lifetime Health Advisory Level (HAL) established for DCPA and its acid metabolites of 4,000 µg/L.

What Health Effects Might be Caused by DCPA Acid Metabolites in Drinking Water?

Non-Cancer Effects: EPA has set a Lifetime Health Advisory Level for DCPA in drinking water at 4000 µg/L. A Lifetime HAL represents the concentration of a contaminant in water that may be consumed over an average human lifetime without causing adverse health effects. Lifetime HALs are based on health effects that were found in animals given high doses of pesticides in laboratory studies. This level includes a margin of safety. Consuming DCPA acid metabolites, however, at high levels well above the Lifetime Health Advisory Level over a long period of time has been shown to result in damage to the liver, kidney, and thyroid in animal studies.

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

Standard: EPA sets enforceable standards for public water systems, called Maximum Contaminant Levels (MCLs). These regulatory standards set achievable levels of drinking water quality to protect human health. EPA has not established a MCL for DCPA or its acid metabolites, but plans to list DCPA and its acid metabolites on the Drinking Water Priority List for future MCL consideration.

How is Water Treated to Remove Contaminants?

DCPA acid metabolites can be detected in drinking water by a laboratory using an EPA method such as #515.1. If DCPA acid metabolites are detected in well water and confirmed by retesting to be above 4000 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.

You may also be able to treat your well water to remove pesticides and other contaminants. At present, reverse osmosis appears to be a possible method for removing DCPA acid metabolites from water. Filtration through activated charcoal has

also been shown to be effective in removing this chemical. However, these techniques may not necessarily be appropriate or available in every situation. 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

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 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):

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

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 <u>NPS Phase I Report</u> (available 1991) and <u>NPS Phase II Report</u> (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.

Bibliography

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- U.S. Environmental Protection Agency. Drinking Water Regulations and Health Advisories, April, 1990.
- U.S. Environmental Protection Agency. Health Advisory Summaries, January 1989.
- U.S. Environmental Protection Agency. Pesticides in Drinking Water Wells, September 1989.