

This fact sheet answers the most frequently asked health questions (FAQs) about dinitrophenols. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to dinitrophenols occurs mainly from breathing air, drinking water, or eating food that contains the chemicals. At low levels, these chemicals may cause cataracts, serious skin rashes, and decreases in white blood cells. At high levels, these chemicals may cause increased heart and breathing rates, and even death. These chemicals have been found in at least 61 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are dinitrophenols?

(Pronounced dī-nī'trō-fē'nōlz')

Dinitrophenols are a class of manufactured chemicals that do not occur naturally in the environment. There are six different dinitrophenols.

The most commercially important dinitrophenol, 2,4-dinitrophenol (DNP), is a yellow solid with no smell. It is used in making dyes, wood preservatives, explosives, insect control substances, and other chemicals, and as a photographic developer.

It was used in diet pills in the 1930s but was banned for this use in 1938. It may be sold under several trade names, including Caswell No. 392, Sulfo Black B, and Nitro Kleenup. Use of trade names is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry, the Public Health Service, or the U.S. Department of Health and Human Services.

What happens to dinitrophenols when they enter the environment?

DNP enters the air, water, and soil during its manufacture and use.

- It may be formed from reaction of other chemicals in the air.
- DNP may also enter the environment through landfill and storage tank leaks, or accidental spills during manufacture or transport.
- It dissolves slightly in water, and does not easily evaporate to air.
- It can be broken down slowly in water and soil by small organisms or by reacting with other chemicals.
- DNP sticks to particles in water, which will cause it to eventually settle to the bottom sediment.
- DNP also sticks to some types of soil particles, which may prevent it from moving very deep into the soil with rainwater.
- DNP probably does not build up significantly in fish.

How might I be exposed to dinitrophenols?

- Breathing contaminated workplace air where it is manufactured or used.
- Breathing contaminated air from DNP-containing waste sites, waste incineration, or automobile exhaust.
- Touching contaminated soil or water near DNP-containing waste sites.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

- Ingesting contaminated soil or water near DNP-containing waste sites.

How can dinitrophenols affect my health?

Most of the information on the health effects of dinitrophenols comes from old studies of patients who were prescribed diet pills containing dinitrophenol before it was banned.

Deaths have occurred in people who ingested 3–46 milligrams of dinitrophenols per kilogram of body weight per day (3–46 mg/kg/day) for short periods, or 1–4 mg/kg/day for long periods. Also, people who breathed air containing 40 mg dinitrophenols per cubic meter of air (40 mg/m³) for long periods have died.

The amount of dinitrophenols ingested that causes harmful effects varies among people. Increased basal metabolic rate (the rate that you use energy at complete rest), increased sweating, a feeling of warmth, weight loss, and increased heart rate, breathing rate, and body temperature have been observed in people who swallowed as little as 1 mg/kg/day or as much as 46 mg/kg/day for short or long periods of time.

Ingesting 2–4 mg/kg/day DNP for short or long periods has caused cataracts in some people, while ingesting 1–4 mg/kg/day for short or long periods has caused skin rashes and decreases in white blood cells.

How likely are dinitrophenols to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified dinitrophenols for carcinogenicity.

There are no studies available in people or animals on the carcinogenic effects of dinitrophenols.

Is there a medical test to show whether I've been exposed to dinitrophenols?

Tests are available that measure the amount of DNPs or their breakdown products in blood, urine, and samples of tissue from the body. However, these tests may require special equipment and may not be available in your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA recommends that not more than 70 parts of dinitrophenols per billion parts of water (70 ppb) be present in lakes or streams used for swimming.

The EPA lists DNPs as hazardous air pollutants (HAP) under the Clean Air Act. The EPA also requires that discharges or spills into the environment of 10 pounds or more be reported.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstract Service.

Cataract: A decrease in the transparency of eye lenses.

Evaporate: To change into a vapor or a gas.

Ingest: Take food or drink into your body.

Kilogram (kg): One thousand grams.

Milligram (mg): One thousandth of a gram.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for dinitrophenols. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

