

This fact sheet answers the most frequently asked health questions (FAQs) about nitrophenols. 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: Everyone is exposed to very low levels of the nitrophenols in air, water, and soil. Workers who make or process the chemicals may be exposed to higher levels of them. Animal studies suggest that 4-nitrophenol may cause a blood disorder. These chemicals have been found in at least 113 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What are nitrophenols?

(Pronounced nī/trō fē/ nolz)

Nitrophenols include two chemicals, 2-nitrophenol and 4-nitrophenol, which are very similar to each other. They are manufactured chemicals that do not occur naturally in the environment. The manufacture of one almost always produces a little of the other, so they are grouped together when discussing their properties and harmful effects.

2-Nitrophenol is a light yellow solid with a peculiar sweet smell. 4-Nitrophenol is a colorless to light yellow solid with very little odor.

2-Nitrophenol is used mainly to make dyes, paint coloring, rubber chemicals, and substances that kill molds. 4-Nitrophenol is used mainly to make drugs, fungicides, dyes, and to darken leather.

What happens to nitrophenols when they enter the environment?

- Most nitrophenols enter the environment during manufacturing and processing.
- Nitrophenols can be formed in the air as a result of the breakdown of many other manufactured chemicals.
- Most goes to water and soil; little goes to the air.

- Very little is known about the fate of nitrophenols in air.
- They readily break down in surface water.
- It takes a long time for nitrophenols to break down in deep soil and in groundwater.
- Nitrophenols have not been found in foods.
- They are a breakdown product of other pesticides including parathion and fluoridifen. They are also formed in auto exhaust.

How might I be exposed to nitrophenols?

- Exposure to very low levels of nitrophenols in air, water, and soil.
- Breathing contaminated workplace air with higher levels of the chemicals (especially during spills).
- Breathing contaminated air (during application) or drinking contaminated water near farming areas where certain fungicides are used.
- Breathing contaminated air or drinking contaminated water near waste sites and landfills.

How can nitrophenols affect my health?

There are no studies that have looked at the effects of the nitrophenols in people. All our information comes from studies in animals. Some studies in animals have shown that

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4-nitrophenol is more harmful than 2-nitrophenol when given in high amounts over a short time, but we have very little other information on the effects from longer time exposures at lower levels.

Rats that breathed moderate levels of 4-nitrophenol for two weeks developed a blood disorder that reduced the ability of the blood to carry oxygen to tissues and organs. However, these abnormalities disappeared a few days after exposure stopped. No other harmful effects to other systems or organs were seen.

Skin irritation has been noted in animals that had large amounts of 4-nitrophenol applied to their skin, and eye irritation when it was applied to the eye. These effects are most likely due to the large amount used and not to a specific harmful effect of nitrophenols.

No birth defects were seen in the offspring of animals that ingested large quantities of 4-nitrophenol. There is no information from animal studies on the effects of ingesting low levels of nitrophenols.

The amounts given to animals that produce the harmful effects are several hundred to several thousand times higher than those people are generally exposed to.

How likely are nitrophenols to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified the nitrophenols as to their human carcinogenicity.

An animal study found no evidence of cancer when 4-nitrophenol was applied to the skin of mice, and no studies in people are available.

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

There is a medical test available to measure levels of 4-nitrophenol in urine and blood. However, this test will only detect the chemical when exposure has been very recent because 4-nitrophenol leaves the body through the urine within a few hours.

Other chemicals can produce the same effects on the blood as 4-nitrophenol, so it is not possible to tell from the blood test whether the exposure was from 4-nitrophenol only.

No tests are available to measure exposure to 2-nitrophenol.

Has the federal government made recommendations to protect human health?

The EPA requires that discharges or accidental spills into the environment of 100 pounds or more of the nitrophenols be reported.

Glossary

Carcinogenicity: Ability to cause cancer.

Fungicide: Substance that kills molds.

Ingesting: Taking food or drink into your body.

Short time: Lasting 14 days or less.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for nitrophenols: 2-nitrophenol and 4-nitrophenol. 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.

