

This fact sheet answers the most frequently asked health questions (FAQs) about parathion. For more information, call the CDC Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information 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.

HIGHLIGHTS: Parathion is an organophosphorus pesticide no longer used or produced in the United States. Therefore, exposure of the general population or workers is unlikely. Parathion affects the function of the nervous system and exposure to high amounts can cause death. Parathion has been found in at least 20 of the 1,832 current and former National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is parathion?

Parathion is the common name of a formerly used organophosphorus insecticide used in the United States and is still available in other countries to control sucking and chewing insects and mites in a wide variety of crops.

The pure chemical is a pale-yellow liquid with a faint phenol-like odor. Technical parathion is a pale-yellow to dark-brown liquid.

What happens to parathion when it enters the environment?

- Parathion's past production and use as a pesticide resulted in its release into the air, water, and soil.
- Parathion in the air is rapidly transformed by sunlight and ozone into a degradation product, paraoxon, a substance more toxic than parathion.
- In water, parathion can be degraded by sunlight and by microorganisms.
- In water, reaction with other chemicals and with sunlight produces paraoxon.
- In soil, parathion can be degraded by chemical reactions, sunlight, and microorganisms.
- Parathion does not build up to a significant extent in the body of animals that live in parathion-contaminated water.

How might I be exposed to parathion?

- Breathing very low levels that may still be present in air in agricultural regions.
- Touching soils that may still contain low levels of parathion from when it was used as a pesticide.
- The EPA terminated most production of parathion as of December, 2002. The EPA also terminated the registration for the few remaining parathion products effective on December 21, 2006, which was the last date parathion could be used legally in the U.S.
- Because parathion is no longer produced or used in the United States, and due to environmental degradation processes, it is likely that neither the general population nor workers are exposed to parathion in the United States.

How can parathion affect my health?

The main target of parathion toxicity is the nervous system. People who ingested parathion either intentionally or in contaminated food, who were exposed during application of the pesticide to fields, or who entered areas that had been sprayed too soon after application of this substance suffered excessive eye watering and salivation, blurred vision, stomach cramps, diarrhea, difficulty breathing, tremors, and seizures, and some died.

Studies of agricultural workers suggested that long-term exposure (i.e., years) to low-to-moderate amounts of parathion may be associated with allergic asthma, hearing loss, alterations of the thyroid gland, and diabetes. A study of Chinese male workers suggested that parathion may be associated with low sperm count. In all of these cases, the associations were weak and the subjects may have been exposed to other chemicals at the same time.

How likely is parathion to cause cancer?

A study of agricultural workers suggested that exposure to parathion may be associated with increased risk of skin cancer. However, the evidence was not conclusive because it was based on a small number of cases. Parathion caused cancer of the adrenal cortex in rats.

The U.S. Department of Health and Human Services (DHHS), has not classified parathion as to its carcinogenicity. The EPA has classified parathion as a possible human carcinogen. The International Agency for Research on Cancer (IARC) has concluded that parathion is possibly carcinogenic to humans.

How can parathion affect children?

Children who accidentally ate parathion or had skin contact with high amounts of parathion suffered the same effects seen in adults exposed to high amounts of parathion (excessive secretions, stomach cramps, diarrhea, tremors, and seizures).

We do not know whether parathion can produce birth defects in children. A study of women from an agricultural community in California did not find an association between exposure to parathion and growth of the fetus.

How can families reduce the risk of exposure to parathion?

Because parathion is no longer produced or used in the United States and it degrades in the environment, there should be little risk of exposure to parathion. Thus, no action should be needed to reduce the risk of exposure to parathion in the United States.

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

Parathion and its breakdown products (metabolites) can be measured in blood and urine. However, the detection of parathion or its metabolites cannot predict the kind of health effects that might develop from that exposure. Because parathion and its metabolites leave the body fairly rapidly, the tests need to be conducted within days after exposure. One of parathion's degradation products, *p*-nitrophenol, has been widely used to determine exposure to parathion. However, *p*-nitrophenol is also a breakdown product of a similar pesticide, methyl parathion and a product used in the production of some medicines, like acetaminophen. So the presence of *p*-nitrophenol in your urine cannot be used to indicate exposure to parathion without information on possible sources of exposure.

Has the federal government made recommendations to protect human health?

The EPA does not regulate or provide guidelines for parathion in drinking water.

The Occupational Safety and Health Administration (OSHA) set a legal limit of 0.1 milligrams per cubic meter (0.1 mg/m³) for parathion in air averaged over an 8-hour work day.

The National Institute for Occupational Safety and Health (NIOSH) recommends limiting exposure to 0.05 mg/m³ for parathion in air averaged over a 10-hour work day.

References

This ToxFAQs™ information is taken from the 2017 Toxicological Profile for Parathion produced by the Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333-4027.

Phone: 1-800-232-4636.

ToxFAQs™ on the web: www.atsdr.cdc.gov/toxFAQs.

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.