



PUBLIC HEALTH STATEMENT

Toxaphene

Division of Toxicology and Environmental Medicine

September 2010

This Public Health Statement is the summary chapter from the Toxicological Profile for Toxaphene. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. 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. For more information, call the ATSDR Information Center at 1-800-232-4636.

This public health statement tells you about toxaphene and the effects of exposure to it.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites are then placed on the National Priorities List (NPL) and are targeted for long-term federal clean-up activities. Toxaphene has been found in at least 68 of the 1,699 current or former NPL sites, respectively. Although the total number of NPL sites evaluated for this substance is not known, the possibility exists that the number of sites at which toxaphene is found may increase in the future as more sites are evaluated. This information is important because these sites may be sources of exposure and exposure to this substance may be harmful.

When a substance is released either from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. Such a release does not always lead to exposure. You can be exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance, or by skin contact.

If you are exposed to toxaphene, many factors will determine whether you will be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with it. You must also consider any other chemicals you are exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

DEPARTMENT of HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

www.atsdr.cdc.gov/ Telephone: 1-800-232-4636 Fax: 770-488-4178 E-Mail: cdcinfo@cdc.gov



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1.1 WHAT IS TOXAPHENE?

Chlorinated camphene	Toxaphene is made by reacting chlorine gas with a substance called camphene. The resulting product (toxaphene) is a mixture of hundreds of different chlorinated camphenes and related chemicals.
Manufactured insecticide	Toxaphene was one of the most heavily used pesticides in the United States in the 1970s and early 1980s. It was used primarily to control insect pests on cotton and other crops in the southern United States. Other uses included controlling insect pests on livestock and killing unwanted fish in lakes.
Banned for all registered uses in the United States	Toxaphene was banned for all registered uses by 1990.
Form	Toxaphene is usually found as a solid or gas. In its original form, toxaphene is a yellow to amber waxy solid that has a piney odor.

1.2 WHAT HAPPENS TO TOXAPHENE WHEN IT ENTERS THE ENVIRONMENT?

Movement between air, water, soil, and sediment	When toxaphene is released to the environment, it can enter the air (by evaporation), the soil (by sticking to soil particles), and the water (from runoff after rains). Toxaphene does not dissolve well and evaporates easily. Toxaphene is more likely to be found in air, soil, or the sediment at the bottom of lakes and streams.
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Breaks down slowly	Once toxaphene is in the environment, it can last for many years because it breaks down very slowly.
Transported by air over long distances	Toxaphene has been found in water, soil, sediment, air, and animals in places far from where it has been used. This shows that toxaphene can be carried long distances by the air.
Biocumulates	Toxaphene levels may be high in some predatory fish and mammals because toxaphene accumulates in fatty tissues. Even when levels are low or confined to a certain area, they could be high in individual animals.

1.3 HOW MIGHT I BE EXPOSED TO TOXAPHENE?

Hazardous waste sites	People living near a location with heavy toxaphene contamination, such as a hazardous waste site, may be exposed to higher levels through breathing contaminated air or through direct skin contact with contaminated soil or water.
Eating contaminated soil	Infants and toddlers, who are likely to put things in their mouth, may be exposed to toxaphene by eating contaminated soil.
Eating fish, shellfish, and wild game	People who eat large quantities of fish, shellfish, or wild game animals from areas contaminated by toxaphene may have higher exposure to this substance since these animals tend to concentrate toxaphene in their fatty tissues.
Drinking water	Individuals may be exposed to toxaphene through drinking water contaminated with toxaphene runoff from contaminated soils.

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1.4 HOW CAN TOXAPHENE ENTER AND LEAVE MY BODY?

May enter your body through food, drinking water, breathing, and skin contact	Toxaphene can enter your body if you eat food contaminated with toxaphene, such as fish caught from water where toxaphene is present. Toxaphene in drinking water can similarly enter your body, although when toxaphene has been detected in drinking water, levels have been generally more than 1,000 times lower than levels measured in toxaphene-contaminated food. Toxaphene could enter your body if it were to come into contact with your skin (for example, by bathing or showering in water contaminated with the chemical) or if you were to breathe air containing toxaphene.
Leave through bodily fluids	Toxaphene is quickly broken down into other substances in your body. Toxaphene and its breakdown products leave your body mostly in urine and feces. Small amounts may leave through breast milk and exhaled air.

1.5 HOW CAN TOXAPHENE AFFECT MY HEALTH?

This section looks at studies concerning potential health effects in animal and human studies.

Nervous system	Convulsions were experienced by some people who accidentally or intentionally swallowed large amounts of toxaphene, including three women who ate collard greens contaminated with toxaphene. However, since toxaphene is no longer used as a pesticide, you would not likely eat enough toxaphene-contaminated food to affect your nervous system in this way.
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Immune system	Effects on the immune system have been observed in laboratory studies of animals that were given toxaphene by mouth in amounts that you would not likely get by eating food or drinking water containing toxaphene.
Liver	Toxaphene temporarily damaged the liver of a man who attempted suicide by drinking a large amount of an insecticide that contained toxaphene. Liver damage was seen in laboratory studies of animals that were given toxaphene by mouth in amounts that you would not likely get by eating food or drinking water containing toxaphene.
Kidneys	Toxaphene temporarily damaged the kidneys of a man who attempted suicide by drinking a large amount of an insecticide that contained toxaphene. Swollen kidneys were seen in a small boy who died after drinking a large amount of toxaphene. Kidney damage was seen in laboratory studies of animals that were given toxaphene by mouth in amounts that you would not likely get by eating food or drinking water containing toxaphene.
Cancer	Toxaphene caused liver cancer in mice and possibly thyroid cancer in rats that were given toxaphene by mouth in large amounts that you would not likely get by eating food or drinking water containing toxaphene. We do not know whether toxaphene would cause cancer in humans. However, based on animal studies, the Department of Health and Human Services (DHHS) has determined that toxaphene may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer (IARC) has determined that toxaphene is possibly carcinogenic to humans. The EPA has determined that toxaphene is a probable human carcinogen.

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1.6 HOW CAN TOXAPHENE AFFECT CHILDREN?

This section discusses potential health effects in humans from exposures during the period from conception to maturity at 18 years of age.

Effects in children	Toxaphene would be expected to affect children in the same manner as adults. It is not known whether children are more susceptible than adults to the effects of toxaphene.
Developmental effects	A few studies in animals have shown minor changes in fetal development. We do not know if toxaphene would cause developmental effects in humans.

1.7 HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO TOXAPHENE?

Reduce consumption of foods and drinking water that contain toxaphene	For people who live in areas where surface waters (lakes) have been contaminated with toxaphene, consumption of toxaphene-contaminated foods such as fish may need to be reduced. Also, do not drink water that has been contaminated with toxaphene.
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1.8 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO TOXAPHENE?

Can be measured in blood and urine	Toxaphene and some of its breakdown products can be measured in blood and urine. However, it is not likely that you would be exposed to enough toxaphene to affect your health.
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1.9 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government develops regulations and recommendations to protect public health. Regulations can be enforced by law. The EPA, the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA) are some federal agencies that develop regulations for toxic substances. Recommendations provide valuable guidelines to protect public health, but cannot be enforced by law. The Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH) are two federal organizations that develop recommendations for toxic substances.

Regulations and recommendations can be expressed as “not-to-exceed” levels. These are levels of a toxic substance in air, water, soil, or food that do not exceed a critical value. This critical value is usually based on levels that affect animals; they are then adjusted to levels that will help protect humans. Sometimes these not-to-exceed levels differ among federal organizations because they used different exposure times (an 8-hour workday or a 24-hour day), different animal studies, or other factors.

Recommendations and regulations are also updated periodically as more information becomes available. For the most current information, check with the federal agency or organization that provides it.

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Some regulations and recommendations for toxaphene include the following:

Levels in drinking water set by EPA	The EPA has determined that exposure to toxaphene in drinking water at concentrations of 0.004 mg/L for up to 10 days is not expected to cause any adverse effects in a child. The EPA has determined that lifetime exposure to 0.01 mg/L toxaphene in the drinking water is not expected to cause any adverse noncancer effects if the only source of exposure to toxaphene is the drinking water. EPA established a maximum contaminant level (MCL) of 0.003 mg/L for toxaphene in drinking water.
Bottled water	The FDA has determined that the concentration of toxaphene in bottled drinking water should not exceed 0.003 mg/L.
Levels in workplace air set by OSHA	OSHA set a legal limit of 0.5 mg/m³ for toxaphene in air averaged over an 8-hour work day.

1.10 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department, or contact ATSDR at the address and phone number below.

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses that result from exposure to hazardous substances.

Toxicological profiles are also available on-line at www.atsdr.cdc.gov and on CD-ROM. You may request a copy of the ATSDR ToxProfiles™ CD-ROM by calling the toll-free information and technical

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assistance number at 1-800-CDCINFO (1-800-232-4636), by e-mail at cdcinfo@cdc.gov, or by writing to:

Agency for Toxic Substances and Disease Registry
Division of Toxicology and Environmental Medicine
1600 Clifton Road NE
Mailstop F-62
Atlanta, GA 30333
Fax: 1-770-488-4178

Organizations for-profit may request copies of final Toxicological Profiles from the following:

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Phone: 1-800-553-6847 or 1-703-605-6000
Web site: <http://www.ntis.gov/>

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