ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TIN
CAS # 7440-31-5

This fact sheet answers the most frequently asked health questions (FAQs) about tin. 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. 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.

SUMMARY: Exposure to tin results mostly from eating food and breathing air that contains tin. Breathing or swallowing large amounts of some compounds that contain tin may cause stomachaches, anemia, and liver and kidney problems. Tin has been found in at least 202 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is tin?

(Pronounced tĭn)

Tin is a natural element in the earth's crust. It is a soft, white, silvery metal that doesn't dissolve in water. Tin is used to make cans. It is present in brass, bronze, pewter, and some soldering materials.

Tin can be combined with other chemicals to form compounds. When combined with chemicals like chlorine, sulfur, or oxygen, it is called an inorganic tin compound. These are used in toothpaste, perfumes, soaps, coloring agents, and dyes. When tin is combined with materials that contain carbon, it is called an organotin compound and is used to make plastics, food packages, plastic pipes, pesticides, paints, and pest repellants.

Tin metal, as well as inorganic and organic tin compounds, can be found in the air, water, and soil near places where they are naturally present in the rocks, or where they are mined, manufactured, or used.

What happens to tin when it enters the environment?

- Tin is released into the environment by both natural processes and human activities such as mining, coal and oil combustion, and the production and use of tin products.
- The time that each type of tin compound stays in the air, water, and soil differs for each compound.
- In the atmosphere, tin exists as gases and fumes, and attaches to dust particles.
- Some tin compounds dissolve in water.
- In water, tin attaches to the soil and sediments.
- Organotins build up in fish, other organisms, and plants.

How might I be exposed to tin?

- Eating food or drinking juice or other liquids from tin containers.
- Breathing air that contains tin in the workplace or near hazardous waste sites.
- Touching substances that contain high levels of tin.

How can tin affect my health?

The inorganic tin compounds usually enter and leave your body rapidly when you breathe or eat them, so they usually do not cause harmful effects.

Human and animal studies show that large amounts of these tin compounds can cause stomachaches, anemia, and liver and kidney problems.

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

Breathing or swallowing organotin compounds can cause breathing problems and eye irritation, and can interfere with the way your brain and nervous system work. In severe cases, it can cause death.

Some of the organotin compounds seemed to weaken rats' ability to protect themselves from disease. These effects have not been observed in people.

Rats and mice exposed to organotin compounds had problems with reproduction and with the development of normal babies. We do not know if this would happen to people. Inorganic tin compounds do not affect reproduction or cause birth defects.

There is very little information on the health effects caused by touching tin compounds. When the skin and eyes of people and animals were exposed to both organotin and inorganic tin compounds, their skin and eyes became irritated.

How likely is tin 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 tin for carcinogenicity.

There is no evidence that tin or tin compounds cause cancer in humans. Animal studies show that inorganic tin compounds do not cause cancer in rats and mice, but we do not know if organotin compounds cause cancer in animals.

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

Tin can be measured in your urine and feces. This can tell you how much tin is in your body. It cannot tell you when or how it got there because you always have some tin in your body. This test is only useful if you have been exposed to food and air concentrations that result in much higher than normal body levels. These tests are not routinely performed at your doctor's office, but your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has limited the use of certain organotin compounds in paints.

The Occupational Safety and Health Administration (OSHA) has set a maximum concentration limit of 0.1 milligrams per cubic meter of air (0.1 mg/m^3) for organotin compounds, and 2.0 mg/m^3 for tin and inorganic tin compounds.

The Food and Drug Administration (FDA) regulates the use of some organotin compounds in coating and plastic food packaging.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogenicity: Ability to cause cancer.

Milligram (mg): One thousandth of a gram.

Organotin: Compound that contains both tin and carbon.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for tin. 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.