DEET
GENERAL FACT SHEET

What is DEET?

DEET is an insect repellent that is used in products to prevent bites from insects such as mosquitoes, biting flies, fleas and small flying insects. DEET is a colorless liquid that has a faint odor and does not dissolve easily in water. DEET was developed by the U.S. Army in 1946 for protection of soldiers in insect-infested areas. Insect repellents containing DEET have been used by the general public in the United States since 1957.

What are some products that contain DEET?

DEET has been used in a number of insect repellent products including liquid sprays, lotions, and sticks. It has been estimated that about 30% of the U.S. population uses one or more products that contain DEET every year.

If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800-222-1222. If you wish to discuss a pesticide problem, please call 1-800-858-7378.

How does DEET work?

Scientists do not know exactly how DEET works on all insects. Some insects sense people by detecting the chemicals from our bodies and in the air that we breathe out. It has been shown that insects exposed to DEET are not able to locate a person or animal because they cannot detect them.

How might I be exposed to DEET?

There are four ways that people can be exposed to chemicals: contacting their skin, contacting their eyes, breathing them in, or eating them. DEET is often used directly on skin. DEET may also be inhaled when sprays are used around the body and in indoor spaces where the vapors can remain for some time. It may also be possible to swallow DEET if the hands are not washed after using DEET on skin. People have had adverse reactions to DEET when they applied it to parts of their body that contacted other skin surfaces, and when they applied it to skin that was under clothing. Exposure to DEET can be limited by reading the pesticide label and following all of the directions.

What are some signs and symptoms from a brief exposure to DEET?

When products containing DEET get into the eyes, they may cause irritation, pain and watery eyes. People that have left DEET products on their skin for extended periods of time have experienced irritation, redness, a rash, and swelling. People that have swallowed products containing DEET have experienced stomach upset, vomiting, and nausea. Very rarely, exposure to DEET has been associated with seizures in people. Most of these reactions have happened after drinking products with DEET in them or using the products in ways that do not follow label directions.

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Reports of pets being exposed to DEET in amounts that would make them sick are rare. Pets that have been over-exposed to DEET have shown varying effects, including vomiting, shaking, excitement, lack of coordination, and seizures.

What happens to DEET when it enters the body?

When DEET was applied to the skin of volunteers by researchers, they found that a small amount of the DEET was taken into the body through the skin. When DEET and alcohol are applied to the skin, more DEET is taken into the skin compared with DEET alone. Drinking alcohol may also cause more DEET to be absorbed through the skin. Sunscreen products that contain DEET may cause more DEET to be taken into the body through the skin.

The DEET that is taken in to the body can be found in the blood up to 12 hours after it is applied to the skin. Once in the body, DEET is broken down by the liver and eliminated from the body mainly through the urine. All of the DEET that is taken in by the body is broken down into smaller chemicals before it is eliminated. Nearly all of the DEET that is taken in through the skin is eliminated by the body within 24 hours of applying it.

Is DEET likely to contribute to the development of cancer?

Researchers have not found any evidence that DEET causes cancer in animals or humans. DEET has been classified by the U.S. EPA as "Not Classifiable as a Human Carcinogen", which means that there is not enough evidence to say that it does or does not cause cancer.

Has anyone studied non-cancer effects from long-term exposure to DEET?

A trial was done on women to test the safety of using DEET to prevent malaria during pregnancy. Women used a product with 20% DEET on their legs and arms each day during their second and third trimesters of pregnancy. DEET crossed the placenta and was found in 8% of the cord blood samples. There was no increase in birth defects or problems with the survival in the young and there were no further problems in the first year of life.

Are children more sensitive to DEET than adults?

Limited information is available on childhood responses to DEET from experiments or poison center reports. Children have had adverse responses to DEET exposure, but most of these cases have resulted from improper use or accidents. Children involved in accidents have usually had less serious effects than teens and adults. Special instructions have been placed on products containing DEET for use on children.

The American Academy of Pediatrics (AAP) has recommended that DEET not be used on children younger than 2 months of age.[1] The AAP has also recommended that DEET should be applied no more than one time per day for children older than two months, and that products should be used on children that have the lowest DEET concentration available. The AAP has cautioned parents not to use DEET on the hands of children and to avoid applying it to areas around children's eyes and mouths.[1]

What happens to DEET in the environment?

When DEET gets into the soil, it can be broken down by microbes, including bacteria and fungi. In experiments where fungi and bacteria broke down DEET, the chemicals remaining were less toxic than DEET itself. DEET usually sticks to soils, but can move in other soils to some degree. DEET does not dissolve or mix very well in water.

Because DEET is used by so many people, it has been found in waste water and in places where waste water moves into other bodies of water.

When DEET is sprayed or evaporates, it will be in the air as a mist or vapor, and then begin to break down in the atmosphere. These times for breakdown will change, depending on environmental conditions like temperature, humidity and wind.

Can DEET affect birds, fish, or other wildlife?

Tests were done to find out if DEET could affect fish or insects that live in the water. For freshwater fish and insects, DEET was toxic at extremely high levels. For instance, the level of DEET that killed half of the fish or insects was about 75,000 times greater than the highest concentration found in waste water or streams. DEET is not considered to be very toxic to birds.

Where can I get more information?

For more detailed information see the DEET Technical Fact Sheet or call the National Pesticide Information Center, Monday - Friday, between 7:30 AM and 3:30 PM Pacific Time (10:30 AM to 6:30 PM Eastern Time) at 1-800-858-7378 or visit us on the web at http://npic.orst.edu. NPIC provides objective, science-based answers to questions about pesticides.

Other references cited in this fact sheet include:

1. *Follow Safety Precautions When Using DEET on Children;* American Academy of Pediatrics. http://www.healthychildren.org/English/safety-prevention/at-play/Pages/Insect-Repellents.aspx (accessed March 2008), updated June 2003.

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