

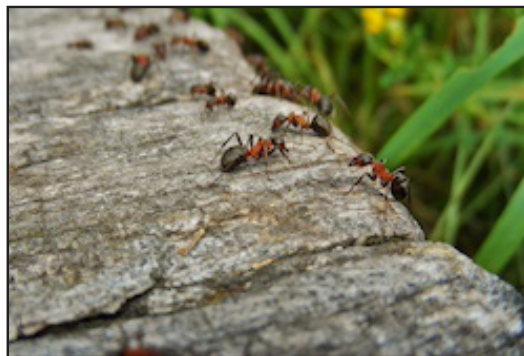
Boric Acid

general fact sheet

What is boric acid?

Boric acid and its sodium borate salts are **pesticides** that we can find in nature and many products. Borax is one of the most common products. Boric acid and its sodium salts each combine boron with other elements in a different way. In general, their toxicities each depend on the amount of boron they contain.

Boric acid and its sodium salts can be used to control a wide variety of pests. These include insects, **spiders**, mites, algae, **molds**, fungi, and **weeds**. Products that contain boric acid have been registered for use in the United States since 1948.



What are some products that contain boric acid?

Products containing boric acid can be liquids, granules, pellets, tablets, wettable powders, dusts, rods, or baits. They are used indoors in places like homes, hospitals and commercial buildings. They are also used in outdoor residential areas, sewage systems, and on food and non-food crops. There are over five hundred products with boric acid sold in the United States. Several non-pesticide products containing boric acid include soil amendments, fertilizers, household cleaners, laundry detergents, and personal care products.

Always **follow label instructions** and take steps to **minimize exposure**. 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 boric acid work?

Boric acid can kill insects if they eat it. It disrupts their stomach and can affect their nervous system. It can also scratch and damage the exterior of insects. Boric acid and borax, a sodium borate salt, can kill plants by causing them to dry out. Sodium metaborate, another sodium borate salt, stops plants from producing the energy they need from light. Boric acid can also stop the growth of fungi, such as mold. It prevents them from reproducing.

How might I be exposed to boric acid?

You can be exposed if you are applying boric acid and you get it on your skin, in your eyes, breathe it in, or accidentally eat a product. This can also happen if you get some on your hands and eat or smoke without washing your hands first. Exposures can also occur if products are accessible to children or pets. You can limit your exposure to boric acid by following all label instructions carefully.

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

Boric acid is low in toxicity if eaten or if it contacts skin. However, in the form of borax, it can be corrosive to the eye. Borax can also be irritating to the skin. People who have eaten boric acid have had nausea, vomiting, stomach aches, and diarrhea. Diarrhea and vomit may have a blue-green color. Eating extreme amounts has resulted in a red, "boiled lobster" like skin rash, followed by skin loss. People who breathed in borax had a dry mouth, nose, and throat. Coughing, sore throat, shortness of breath, and nose bleeds have also been reported. Infants are more sensitive to pesticide exposures. Some infants that ate large amounts of boric acid also had nervous system effects. These include abnormal postures, convulsions, confusion, and coma.

Boric acid affects animals in a similar way. If eaten, signs of poisoning in animals can start within 2 hours. See the fact sheet on [Pets and Pesticide Use](#) for more information.

What happens to boric acid when it enters the body?

Boric acid can absorb rapidly into the body if eaten. It is absorbed poorly by skin contact unless the skin is damaged. Studies with workers and rats showed that boric acid can also be absorbed if inhaled. However, it is not clear how much is directly absorbed in the lungs and how much is cleared from the lungs and swallowed. Once inside, boric acid generally moves evenly throughout the body. However, it can be stored in bone and is generally found at lower levels in fatty tissues. There is no evidence that boric acid is broken down in the body. The majority of boric acid in the body is eliminated in the urine within four days.

Is boric acid likely to contribute to the development of cancer?

No. The U.S. Environmental Protection Agency (U.S. EPA) concluded that boric acid is not likely to be carcinogenic to humans. In some experiments, mice and rats were fed boric acid and borax for two years. No evidence that boric acid or borax causes [cancer](#) was found.

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

Studies with workers breathing borax showed no long-term respiratory effects. However, long-term ingestion of boric acid has resulted in vomiting, nausea, diarrhea, and stomach pain. This is often followed by headaches, fever, tremors, twitching, a lack of energy, and weakness. Skin rashes, peeling and ulcers have also been reported. Severe cases of long-term ingestion have caused coma, seizures, the halting of blood circulation, liver and kidney dysfunction, a low red blood cell count and death.

Are children more sensitive to boric acid than adults?

[Children may be especially sensitive to pesticides](#) compared to adults. Seizures and death have been reported more often in infants exposed long-term to boric acid than adults. In the 1960's, several infant deaths were reported after improperly labeled boric acid disinfectants were accidentally used in infant formulas. In the 1970's and 80's, the use of a gum soothing product containing borax and honey on

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pacifiers resulted in several reports of seizures in infants. However, data which allows for direct comparison of children and adults is not available. Therefore, it is not clear whether children have increased sensitivity specifically to boric acid.

Children have different behaviors than adults that can put them at greater risk. They may crawl or play on the floor and put their hands or other items in their mouths. For this reason, many boric acid products require that they be applied in places out of children's reach. Consider getting down to your child's level to confirm after an application. Always carefully read and follow the label.

What happens to boric acid in the environment?

Boric acid naturally occurs in the **environment**. It can be found in soil, water, and plants. Boric acid dissolves in water and can move with water through the soil. Under certain soil conditions it can reach ground water. However, its mobility in soil depends on pH and the presence of some metals. Boric acid can also be taken up from the soil by plants. It moves through plants into their leaves. Once there, it generally becomes stuck and does not move into the fruit. Plants need boron, a major component of boric acid, to grow. However, too much boron can be toxic to plants affecting their growth. Citrus, stone fruits, and nut trees are most sensitive to boron.



Boric acid does not emit vapors into the atmosphere. Particles that get into the air do not break down. They settle to the ground or are removed by rain.

Can boric acid affect birds, fish, or other wildlife?

Boric acid is practically non-toxic to **birds**. It is slightly toxic to practically non-toxic to **freshwater fish**. Boric acid is practically non-toxic to frogs and toads and aquatic life, such as waterfleas. The U.S. EPA concluded that boric acid is relatively non-toxic to bees.

Where can I get more information?

For more detailed information about boric acid please visit the list of referenced resources below or call NPIC, Monday - Friday, between 8:00am - 12:00pm Pacific Time (11:00am - 3:00pm Eastern Time) at 800-858-7378.

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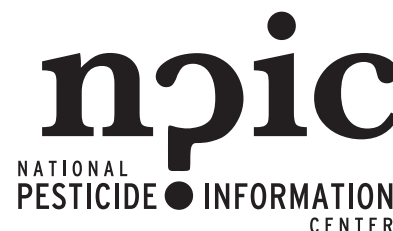
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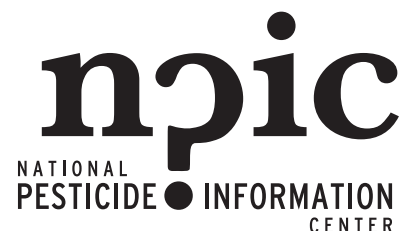
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