

# DIATOMACEOUS EARTH

## fact sheet

### What is diatomaceous earth?

Diatomaceous earth is made from the fossilized remains of tiny, aquatic organisms called diatoms. Their skeletons are made of a natural substance called silica. Over a long period of time, diatoms accumulated in the sediment of rivers, streams, lakes, and oceans. Today, silica deposits are mined from these areas.

Silica is very common in nature and makes up 26% of the earth's crust by weight. Various forms of silica include sand, emerald, quartz, feldspar, mica, clay, asbestos, and glass. Silicon, a component of silica, does not exist naturally in its pure form. It usually reacts with oxygen and water to form silicon dioxide. Silicon dioxide has two naturally occurring forms: crystalline and amorphous. Most diatomaceous earth is made of amorphous silicon dioxide. However, it can contain very low levels of crystalline silicon dioxide. The first pesticide products containing silicon dioxide (diatomaceous earth) were registered in 1960 to kill insects and mites.

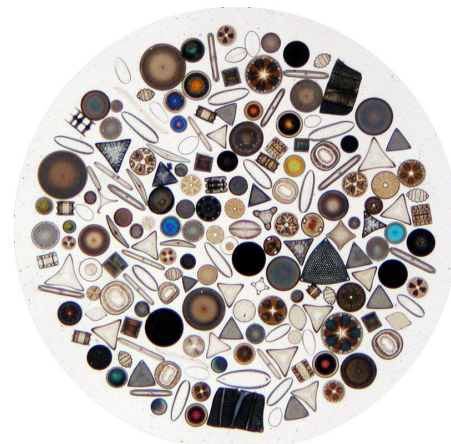


Photo credit: Wipeter

### What are some products that contain diatomaceous earth?

Products containing diatomaceous earth are most commonly dusts. Other formulations include wettable powders and pressurized liquids. Currently, there are over 150 products registered for use inside and outside of buildings, farms, gardens, and pet kennels. Some products can also be used directly on dogs and cats. Diatomaceous earth products are registered for use against bed bugs, cockroaches, crickets, fleas, ticks, spiders, and many other pests.

There are thousands of non-pesticide products that contain diatomaceous earth. These include skin care products, toothpastes, foods, beverages, medicines, rubbers, paints, and water filters. The Food & Drug Administration lists diatomaceous earth as "Generally Recognized as Safe". "Food grade" diatomaceous earth products are purified. They may be used as anticaking materials in feed, or as clarifiers for wine and beer.

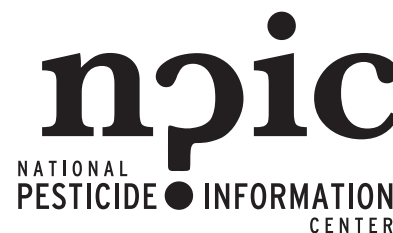
**IMPORANT:** Always follow label instructions and take steps to avoid exposure. If any exposures occur, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 800-222-1222. If you wish to discuss a pesticide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

### How does diatomaceous earth work?

Diatomaceous earth is not poisonous; it does not have to be eaten in order to be effective. Diatomaceous earth causes insects to dry out and die by absorbing the oils and fats from the cuticle of the insect's exoskeleton. Its sharp edges are abrasive, speeding up the process. It remains effective as long as it is kept dry and undisturbed.

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### How might I be exposed to diatomaceous earth?

People can be exposed to diatomaceous earth if they breathe in the dust, eat it, get it on their skin, or get it in their eyes. For example, when applying the dust or when entering a treated area before the dust has settled. Exposures can also occur if products are accessible to children or pets. Exposure can be limited by reading and following label directions.

### What are some signs and symptoms from a brief exposure to diatomaceous earth?

If breathed in, diatomaceous earth can irritate the nose and nasal passages. If an extremely large amount is inhaled, people may cough and have shortness of breath. On skin, it can cause irritation and dryness. Diatomaceous earth may also irritate the eyes, due to its abrasive nature. Any dust, including silica, can be irritating to the eyes.

### What happens to diatomaceous earth when it enters the body?

When diatomaceous earth is eaten, very little is absorbed into the body. The remaining portion is rapidly excreted. Small amounts of silica are normally present in all body tissues, and it is normal to find silicon dioxide in urine. In one study, people ate a few grams of diatomaceous earth. The amount of silicon dioxide in their urine was unchanged.

After inhalation of *amorphous* diatomaceous earth, it is rapidly eliminated from lung tissue. However, *crystalline* diatomaceous earth is much smaller, and it may accumulate in lung tissue and lymph nodes. Very low levels of *crystalline* diatomaceous earth may be found in pesticide products.

### Is diatomaceous earth likely to contribute to the development of cancer?

When mice were forced to breathe diatomaceous earth for one hour each day for a year, there was an increase in lung cancers. When rats were fed silica at a high dose for two years, there was no increase in cancer development.

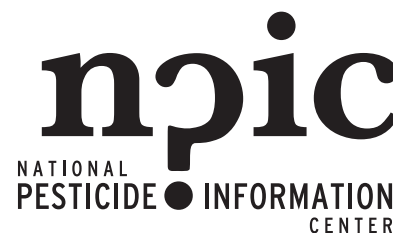
Most diatomaceous earth is made of amorphous silicon dioxide. However, it can contain very low levels of crystalline silicon dioxide. Amorphous diatomaceous earth has not been associated with any cancers in people.

### Has anyone studied non-cancer effects from long-term exposure to diatomaceous earth?

In a rabbit study, researchers found no health effects after applying diatomaceous earth to the rabbits' skin five times per week for three weeks. In a rat study, researchers fed rats high doses of diatomaceous earth for six months. They found no reproductive or developmental effects. In another rat study, the only effect was more rapid weight gain. That study involved 90 days of feeding rats with a diet made of 5% diatomaceous earth.

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When guinea pigs were forced to breathe air containing diatomaceous earth for 2 years, there was slightly more connective tissue in their lungs. When researchers checked before the 2-year mark, no effects were found.

A very small amount of *crystalline* diatomaceous earth may be found in pesticide products. Long-term inhalation of the crystalline form is associated with silicosis, chronic bronchitis, and other respiratory problems. The bulk of diatomaceous earth is *amorphous*, not crystalline. The *amorphous* form is only associated with mild, reversible lung inflammation.

### **Are children more sensitive to diatomaceous earth than adults?**

Children may be especially sensitive to pesticides compared to adults. However, there are currently no data to conclude that children have an increased sensitivity specifically to diatomaceous earth.

### **What happens to diatomaceous earth in the environment?**

Silicon is a major component of diatomaceous earth. It is the second most abundant element in soils. It's a common component of rocks, sands, and clays. It is also abundant in plants and plays a role in their growth and development. Due to its chemical makeup, diatomaceous earth is not degraded by microbes or by sunlight. Also, it does not emit vapors or dissolve well in water.

The ocean contains vast amounts of diatomaceous earth. Many marine organisms use it to build their skeletons.

### **Can diatomaceous earth affect birds, fish, or other wildlife?**

Diatomaceous earth is practically non-toxic to fish and aquatic invertebrates. It is commonly encountered by birds and other wildlife, and it's not known to be harmful. However, no toxicity evaluations for wildlife were found. Agencies have stated that diatomaceous earth is unlikely to affect birds, fish, or other wildlife in a harmful way.

Diatomaceous earth is made of silicon dioxide. When chickens were fed a diet that contained less silicon dioxide than normal, their bone formation was harmed. This suggests that silicon dioxide plays an important role in bone formation.

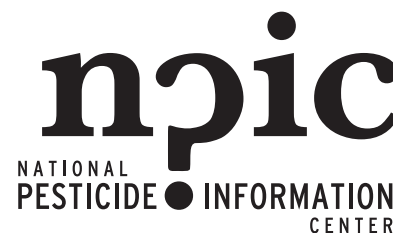
### **Where can I get more information?**

For more detailed information about diatomaceous earth please visit the list of referenced resources below, call NPIC between 8:00 AM and 12:00 PM Pacific Time (11:00 AM to 3:00 PM Eastern Time), Monday - Friday, at 800-858-7378, or visit us on the web at [npic.orst.edu](http://npic.orst.edu). NPIC provides objective, science-based answers to questions about pesticides.

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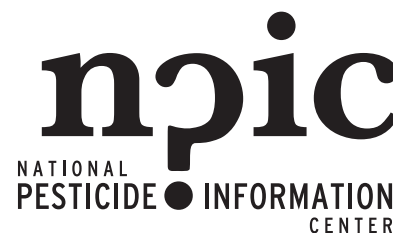
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NPIC is a cooperative agreement between Oregon State University and the U.S. Environmental Protection Agency (U.S. EPA, cooperative agreement #X8-84067801). The information in this publication does not in any way replace or supercede the restrictions, precautions, directions, or other information on the pesticide label or any other regulatory requirements, nor does it necessarily reflect the position of the U.S. EPA.



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