

# The Chemistry of How Borax Works as a Cleaner (Sodium Borate)



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[Borax](#) (also known as sodium borate decahydrate; sodium pyroborate; birax; sodium tetraborate decahydrate; sodium baborate) is a natural mineral compound ( $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ).

It was discovered over 4,000 years ago. Borax is usually found deep within the ground, although it has been mined near the surface in Death Valley, California since the 1800s.

Although it has numerous industrial uses, in the home borax is used as:

- Natural laundry booster
- Multipurpose cleaner
- Fungicide

- Preservative
- Insecticide
- Herbicide
- Disinfectant
- Dessicant
- Ingredient in [making "slime"](#)

[Borax crystals](#) are odorless, whitish (can have various color impurities), and alkaline. Borax is not flammable and is not reactive. It can be mixed with most other cleaning agents, including chlorine bleach.

## How Does Borax Clean?

Borax has many chemical properties that contribute to its cleaning power.

Borax and other borates clean and bleach by converting some water molecules to [hydrogen peroxide](#) (H<sub>2</sub>O<sub>2</sub>). This reaction is more favorable in hotter water.

The pH of borax is about 9.5, so it produces a [basic solution](#) in water, thereby increasing the effectiveness of bleach and other cleaners.

In other chemical reactions, borax acts as a buffer, maintaining a stable pH needed to maintain cleansing [chemical reactions](#). The boron, salt, and/or oxygen of boron inhibit the metabolic processes of many organisms. This characteristic allows borax to disinfect and kill unwanted pests.

Borates bonds with other particles to keep ingredients dispersed evenly in a mixture, which maximizes the surface area of active particles to enhance cleaning power.

## Risks

Borax is natural, but that does not mean it is automatically safer for you or for "the environment" than artificially made chemicals.

Although plants need boron, too much of it will kill them, so borax can be used as an herbicide. Borax may also be used as an insecticide to kill roaches, ants, and fleas. It is also toxic to people.

Signs of chronic toxic exposure include red and peeling skin, seizures, and kidney failure. The estimated lethal dose (ingested) for adults is 15-20 grams; less than 5 grams can kill a child or pet. For this reason, borax should not be used around food.

More commonly, borax is associated with skin, eye, or respiratory irritation. It is also important to point out that exposure to borax may impair fertility or cause damage to an unborn child.

None of these risks mean that you shouldn't use borax. A bit of research will show you there are risks associated with all cleaning products. However, you do need to be aware of product risks so you can use those products properly.

Don't use borax around food, keep it out of reach of children and pets, and make sure you rinse borax out of clothes and off of surfaces before use.