

Want an Efficient and Inexpensive Way to Wash Your Produce?

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STORY AT-A-GLANCE

- › Scientists have found baking soda to be a surprisingly simple and affordable solution for getting rid of as much as 96% of the toxic pesticides that contaminate most fruits and vegetables
- › The U.S. Environmental Protection Agency (EPA) requires apple producers to soak their produce in bleach water for two minutes, but that's only designed to remove bacteria and dirt, not get rid of pesticides
- › Prenatal exposure to toxic chemicals commonly used in agriculture has been shown to cause low birth weight in infants and neurodevelopmental problems
- › To ensure you're doing everything possible to decrease the pesticides you ingest when you eat produce, scrub them with baking soda and water appropriately beforehand

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Once upon a time, polishing an apple on your jeans was all it took to clean off dirt or dust before taking your first juicy bite. Nowadays, however, there are a few other things besides dirt to consider when getting your produce ready to eat. Pesticide residue is a common term today, unfortunately, and one that must be taken into consideration, whether you're eating pears from an orchard, spinach from the grocery store or peppers from your local farmers market.

Both small farmers and large corporate crop producers routinely use pesticides, but some of the chemicals they use absorb into the food that will later be eaten, Science Daily reports.¹ Not just the fruits and vegetables themselves but entire trees, orchards, fields and soil are sprayed with toxic chemical pesticides to protect against pests and fungal diseases.

Only in the last handful of years has anyone stopped to ask whether the foods coming out of those fields were healthy any longer. The potentially toxic effects that have been uncovered have made consumers and consumer groups more than a little nervous, and for good reason. Fortunately, research has found one surprisingly simple way to wash some of the pesticides off your produce, using a substance you probably already have in your kitchen – baking soda.

Baking Soda Works Better Than Bleach to Remove Pesticides From Produce

Washing fruits, vegetables and herbs to remove residue is the food industry's standard procedure, but questions have arisen regarding its effectiveness. Does rinsing your carrots, plums or cauliflower do the job before eating it? How about holding it under the faucet and rubbing it with a bit of dish soap? A 2017 study² offered a surprisingly simple and affordable tip on how to get rid of toxic pesticides that contaminate food, and it's not what is currently being used.

The research team approached the problem with a study on which method would be better for reducing toxins on produce. Lili He and colleagues from the University of Massachusetts used apples to examine the effectiveness of commercial and homemade washing agents to remove both surface and internalized residues. Science Daily reports:

"The researchers applied two common pesticides – the fungicide thiabendazole, which past research has shown can penetrate apple peels, and the insecticide phosmet – to organic Gala apples. They then washed these apples with three different liquids: tap water, a 1 percent baking soda/water

*solution, and a U.S.-EPA (Environmental Protection Agency)-approved commercial bleach solution often used on produce."*³

Using highly specialized analysis, the scientists found that surface pesticide residues on apples that had been treated 24 hours prior⁴ were removed most effectively using baking soda. The team tried tap water and even Clorox bleach, and neither worked as well as the baking soda, which is highly alkaline, probably because the pesticides degrade faster in baking soda, which makes them easier to physically remove by washing.⁵

Super-sensitive testing procedures were used to detect the levels of thiabendazole (a systemic fungicide, pesticide and parasiticide) and phosmet (a nonsystemic pesticide), but the researchers didn't test any other cleaning methods, such as vinegar, or test the washing solutions against the plethora of other pesticides often used on [apples](#), CNN observed.⁶

According to Reuters, the EPA mandates that, after harvest, apple producers soak their produce in bleach water for two minutes, but that's designed to remove bacteria and other "organic matter," not to get rid of pesticides.⁷ Daily Mail noted that 80% of the thiabendazole was removed after 12 minutes of gentle scrubbing with the baking soda solution, while it took 15 minutes to remove 96% of the phosmet.⁸

What 'Pesticide Toxicity' Means for Humans

Both substances tested have been deemed potentially [carcinogenic](#), and not just the use of but the problems from them are becoming more widespread. In fact, far from being a harmless substance, Science Direct⁹ contends that with phosmet exposure, the elderly, children and pets are most at risk.

Further, the EPA's User's Guide¹⁰ on the risk for pesticide toxicity in humans assesses such factors as calculating residue levels, aggregate and cumulative exposure, equations for acute and chronic effects, and cancer "endpoints."

In spite of that, a Reuters article observes that the EPA's stance on pesticides is that "They can hurt humans, too, but most of us are exposed to amounts so tiny that they don't pose a risk."¹¹ The U.S. Department of Agriculture (USDA) also contends that "Pesticide residues do not pose a safety concern for U.S. food."¹²

Interestingly, another Reuters article¹³ reported findings from another study at a Boston clinic on the eating habits of 325 women and their newborns. The study, published in JAMA Internal Medicine, found that:¹⁴

- Eating more fruits and vegetables with high levels of pesticide residue was associated with an **increased risk of miscarriages early in pregnancy**.
- Women who ate the highest amounts of fruits and vegetables with high levels of pesticide residue (more than two servings a day) were 18% less likely to have a baby compared with women who ate the lowest amounts of these foods – less than one serving a day.
- Pollutants, like pesticides, could be contributing to "unexplained" fertility problems.

Jorge Chavarro, senior study author from Harvard T.H. Chan School of Public Health and Brigham and Women's Hospital in Boston, stated it was already known that:

"Women occupationally exposed to pesticides and women exposed to pesticides used in agriculture by virtue of living in or near agricultural production areas experience greater risk of infertility, pregnancy loss and other adverse reproductive outcomes.

Our study is the first to show that exposure to low doses of pesticide residues, such as those achieved by consuming conventionally grown fruits and vegetables, may also have adverse health effects. This was actually very surprising to me."¹⁵

Pesticide Exposure Is Not as Harmless as Some Agencies Claim

In case you need more information on why pesticides are considered potentially deadly, and washing your produce thoroughly is an important step to take before eating it to remove as much as possible, National Geographic published an article in 2013 on the potentially lethal effects of **organophosphates** (the class of chemicals that phosmet belongs to) after at least 25 children in India died from pesticide exposure.¹⁶

Dana Boyd Barr, an exposure scientist at Emory University in Atlanta, noted that organophosphates "are considered junior-strength nerve agents because they have the same mechanism of action as nerve gasses like sarin." The article noted:

"Upon entering the body – through ingestion, inhalation or contact with skin – organophosphates inhibit cholinesterase, an enzyme in the human nervous system that breaks down acetylcholine, a neurotransmitter that carries signals between nerves and muscles.

*When cholinesterase is inactivated, acetylcholine builds up in the nerves, which become overactive. Victims of organophosphate poisoning typically die because they can't breathe."*¹⁷

Here's another example: "Pet groomers and veterinary workers have become poisoned after skin contact with flea dips containing phosmet (organophosphate). In one case the dog being bathed shook his coat and showered the worker with fluid from the dip. Symptoms included skin irritation, shortness of breath, abdominal cramping and nausea."¹⁸

The U.S. Food and Drug Administration (FDA) recommends that all produce at least be washed under running water, even if you don't plan to eat the skin. (Cutting into an unwashed **cucumber**, **carrot** or cantaloupe exposes the flesh to potential toxins and bacteria on the peel.) Firm produce should be scrubbed with a brush, then dried with a clean towel.¹⁹

A Domino Effect: Problems With Pesticide Use

Still, health experts maintain that the health benefits of eating fruits and vegetables far outweigh any potential pesticide risk. Ideally, however, look for organic varieties. To reiterate He's study, Science Daily²⁰ revealed an interesting domino effect and other pertinent information regarding how fruits, vegetables or other foods that have been sprayed with pesticides are affected:

- Using a 10-milligram (mg) solution of baking soda, it took 12 and 15 minutes, respectively, of soaking to remove most of the thiabendazole and phosmet surface residues from the apples following a 24-hour exposure.
- Thiabendazole and phosmet (to a lesser extent) penetrated inside the fruits, but the thiabendazole penetrated four times deeper and therefore could not be completely washed away even using the baking soda washing solution.
- The food industry typically uses the post-harvest washing method of a bleach solution for two minutes, which does not effectively remove **pesticide residues** on the surface of apples.
- The baking soda method removes surface pesticide residues on apples better than plain water or bleach, but while baking soda can degrade thiabendazole and phosmet, making them easier to remove with a thorough washing, it couldn't remove chemical residues that had penetrated the apple peels.
- Because of the chemical penetration into the apples, peeling is more effective to remove the pesticides. However, peeling also removes the healthy bioactive compounds the peels contain.

The Baking Soda Solution: 'Wash Your Fruits and Vegetables'

He and her research partners used a concentration of about 1 teaspoon of baking soda for every 2 cups of water in their experiments – an effective ratio. "You don't need to be precise. Just adding a little bit is better than not adding it," she explained. It can also be used for washing other types of produce. It might not work for everything, "but it's a general method."²¹

Significantly, as lead of the study, not only did He admit that she'll be washing her children's fruits and vegetables longer and adding baking soda, she also did not eat the apples after they'd been tested. Dr. Philip Landrigan, a researcher at the Arnhold Institute for Global Health at the Icahn School of Medicine at Mount Sinai in New York, advises people to eat organic as often as possible, but to at least [wash your fruits and vegetables](#).²²

However, Motoko Mukai, a toxicologist in the department of food science at Cornell University's College of Agriculture and Life Sciences, contends that even produce labeled as organic can't be trusted altogether, concluding, "It's not entirely pesticide-free. I would still wash before consuming it."²³ She adds that cooking, blanching or juicing may also help remove chemical toxins,²⁴ but not entirely.

A 2012 study²⁵ showed that organic foods have a 30% lower risk of pesticide contamination in comparison with conventionally grown foods. One way they know that is that people who make it a habit to eat organic foods whenever possible have fewer pesticides in their bodies, as indicated via urine testing.²⁶

In addition, it was found that pregnant women with higher levels of pesticides in their bodies, particularly one known as chlorpyrifos (CPF), were more likely to give birth to children with a lower birth weight, a lower IQ and neurodevelopmental problems.²⁷ So choosing organic is great, but even better are your efforts to get the word out about how you can take control of your own and your family's health by doing what you can to avoid illness from pesticide contamination.

The statistics on pesticides in food are real. As Landrigan suggests, "Avoid using pesticides within homes or on lawns and gardens. Join with friends and neighbors to urge reduction in pesticide use in schools, parks, playing fields and other areas used by children and pregnant women."²⁸

Sources and References

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