

Should You Wash Your Produce?

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STORY AT-A-GLANCE

- › The FDA recommends you wash your produce to reduce foodborne pathogens, but has determined washing meat only spreads bacteria and doesn't remove it from your food
- › Cooking kills bacteria on meat, but most produce is eaten raw; using vinegar reduces bacterial load on produce, and baking soda reduces your exposure to pesticides
- › After an 18-month surveillance of imported and locally grown avocados, the U.S. FDA found 17% of the skins of the fruits were contaminated with Listeria; less than 1% was contaminated with Salmonella or the meat of the fruits with Listeria
- › It is important to keep soaps away from your produce as residue remains, exposing you to toxic chemicals from the soap and pesticides remaining on the fruit
- › Safer alternatives to using running water is baking soda and water to degrade pesticide residue and a white vinegar and water mixture to kill foodborne pathogens on produce

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Bacteria live on your skin and nearly every other unsterilized surface. However, not every bacterium is dangerous or harmful to your health. In fact, data have demonstrated the more children are exposed to bacteria the lower their risk of developing allergies.^{1,2}

Your skin is the largest organ in your body and colonized by a diverse number of microorganisms, many of which are harmless or even beneficial. Your skin acts as a

physical barrier to prevent the invasion of foreign pathogens and at the same time provides a home to your microbiome.

Despite environmental variations, the skin microbiota of a healthy adult often remains stable over time. These microorganisms play an important role in the effectiveness of your cutaneous immune system. Researchers have found reversion of an altered microbial state may help prevent or treat disease.³

A break in the skin can lead to local or systemic infection when bacteria are allowed to invade. Data have demonstrated simple household items, such as a smartphone⁴ or kitchen sponge,⁵ may harbor a significant number of harmful bacteria.

Groceries are another way you may bring bacteria into your home. Meat is a suitable growth medium for a host of microorganisms⁶ and produce has been recalled after multistate outbreaks from E. coli contamination. In 2019, the U.S. Food and Drug Administration (FDA) warned that avocado skins carry Listeria and Salmonella.⁷

FDA Finds Listeria and Salmonella on Some Avocado Skins

Starting in 2014, the FDA began microbial surveillance, sampling of whole fresh avocados as part of their preventive approach with “the ultimate goal of keeping contaminated food from reaching consumers.”⁸ In an 18-month sampling period, the agency collected just over 1,600 avocados to determine the prevalence of Salmonella and Listeria monocytogenes.

They gathered 70% of the samples from imported avocados, and the rest were grown domestically in the U.S. In all, just over 17% of the avocado skins contained Listeria, but less than 1% of the meat of the avocados was contaminated.⁹

Salmonella was detected on only 12 skin samples from domestically grown products; none from the imported avocados had the bacteria. The FDA took these findings to confirm Salmonella could potentially be present on avocado skin. On the FDA website, they recommend consumers take steps to reduce the possibility of microbial exposure via avocados. Foodsafety.gov¹⁰ recommends:¹¹

“[W]ashing all produce thoroughly under running water before eating, cutting or cooking. Even if you plan to cut the rind or peel off the produce before eating, it is still important to wash it first so dirt and bacteria aren't transferred from the knife into the fruit.”

Salmonella can lead to diarrhea, fever and abdominal cramps, which can become so severe they lead to hospitalization. Symptoms of Listeria infection depend on the individual but include fever, diarrhea and muscle aches. Symptoms can show up a few days after eating the contaminated food but it may take as long as 30 days before the first signs of infection begin.

Listeria may spread to the nervous system and trigger headache, stiff neck, confusion, convulsions and loss of balance. Those at greatest risk are pregnant women who may suffer a mild illness but could experience miscarriage, stillbirth or premature birth, and those with a weakened immune system.¹²

The FDA Is Unclear About What Should and Shouldn't Be Washed

The Centers for Disease Control and Prevention (CDC)¹³ estimates there are 9.4 million foodborne illnesses each year from 31 known pathogens. This accounts for only 20% of the total number of foodborne illnesses each year. Annually there are just over 3,000 deaths from all foodborne pathogen triggered illnesses and over 125,000 hospitalizations.

One of the U.S. Department of Agriculture's (USDA) food safety educators says people are still shocked when told not to wash poultry, even though it has been known for at least a decade that washing ends up dispersing food pathogens around the kitchen and increases the risk of foodborne illnesses.¹⁴

According to associate professor Benjamin Chapman, Ph.D., who heads up the North Carolina State University's agricultural and human sciences department, washing chicken does not remove bacteria; rather it spreads the germs to hands, work surfaces,

clothing and even nearby utensils and food.¹⁵ “The washing process can really only increase risk.”

In a collaborative effort between North Carolina State University and the USDA, preliminary results from a multiyear study demonstrate participants spread bacteria from raw meat across the kitchen to spice containers, refrigerator handles and even salads without realizing it.¹⁶

Recommendations from the FDA are confusing though. According to the agency, consumers should rinse their fresh fruit and vegetables with cold water, even though cold water doesn't reduce the number of pathogens or kill bacteria,¹⁷ but not raw poultry, meat or eggs as this disperses foodborne pathogens.¹⁸

The International Association for Food Protection also states that produce clearly labeled as having already been washed should not be washed again as it doesn't reduce pathogens, but increases the risk of spreading bacteria around the kitchen.¹⁹ According to Chapman:²⁰

“Pathogens are just so small and the surface of produce is so creviced, that the pathogens do a really good job attaching and hiding where water can't even get to. There are a lot of myths out there that if I wash, I can wash the pathogens off. You can wash a little bit off, but not enough to significantly reduce your risk.”

Keep Soap and Detergents Away From Your Produce

The FDA also recommends keeping soaps and detergents away from your produce as they leave a residue on the product and likely also affect the taste. According to Kaiser Health News:²¹

“There are no FDA-approved food cleaners on the market, and the agency hasn't found anything to be more effective at removing bacteria than cold running water.”

However, it's important to remember bacteria are particularly adept at adhering to surfaces, including your skin, produce, meat and kitchen surfaces. In order to remove all bacteria from your produce, your skin and counter surfaces must first be sterilized. Once you handle the produce, bacteria from the skin of an avocado, or leaf of lettuce may then adhere to your skin.

The process becomes a cycle of cleaning your hands, kitchen surfaces and then produce – and then back to your hands and kitchen surfaces again – all while not truly killing pathogens but only displacing them to another area of produce or the kitchen.

Pesticide Exposure Is Not Harmless

It may seem innocuous to add a few squirts of dish soap to your produce with the intention of removing bacterial pathogens, but of the 232 hand-washing soaps listed on the Environmental Working Group's (EWG) Healthy Cleaning database,²² 58 scored an F. Those receiving the lowest score contained specific toxic ingredients detailed by Treehugger, including:²³

Cocamide DEA – Suspicions include cancer, chronic aquatic toxicity, acute aquatic toxicity.

DMDM hydantoin – Suspicions include chemical release of formaldehyde and irritation of the skin, eyes or lungs.

Ethanolamine – Suspicions include respiratory effects, general systemic/organ effects, chronic aquatic toxicity, nervous system effects, skin irritation/allergies/damage.

Formaldehyde – Suspicions include cancer, general systemic and organ effects, skin irritation/allergies/damage, acute aquatic toxicity.

Sodium borate – Suspicions include developmental, endocrine and reproductive effects, skin irritation, allergies and damage, and respiratory effects.

Sulfuric acid – Suspicions include cancer, respiratory effects, skin irritation and allergies.

Triclosan – Suspicions include aquatic and general ecotoxicity, developmental, endocrine and reproductive effects, cancer and immune system effects.

Washing produce helps reduce your exposure to the vast amounts of pesticides and insecticides used in agriculture today. The very same companies that developed chemical warfare weapons during World War II transitioned into agriculture after the war, using some of the same chemicals on food.

Nearly 80% of the genetically engineered crops are designed to withstand herbicide application, most often a glyphosate-based product. As a result, foods contain far greater quantities of pesticides than ever before.

The Endocrine Society Task Force warns the health effects of hormone-disrupting chemicals is so great everyone needs to take proactive steps to avoid them, especially those seeking to get pregnant, pregnant women and young children.²⁴ Even at extremely low levels, pesticide exposure increases the risk of certain diseases, such as Parkinson's disease.²⁵

According to the pesticide residue report from the USDA, nearly 85% of more than 10,000 samples of fresh fruits and vegetables were contaminated with pesticide residues. A similar report from the FDA also showed a majority of U.S. fruits and vegetables are contaminated with pesticides.

In an analysis from EWG of 48 fruits and vegetables, strawberries have earned the dubious moniker of most contaminated with pesticide residues for the last several years. This year the top 12 most contaminated fruits and vegetables are:²⁶

Strawberries

Spinach

Nectarines

Apples

Grapes

Peaches

Cherries	Pears	Tomatoes
Celery	Potatoes	Sweet bell peppers

Safe Food Handling

It is safer to separate and clean produce and meat to help prevent cross-contamination. Raw meat and poultry should also be kept separate in your grocery bag, in your refrigerator and during food preparation.

Food safety experts recommend washing utensils and anything else used in food preparation in hot, soapy water to remove food pathogens. Washing your hands properly before and after handling food can help prevent contamination of other kitchen items.

While washing meat doesn't remove pathogens, cooking it does. Therefore, cooking your pastured, organic meat to the correct temperature helps reduce your risk of foodborne illness. Washing produce presents a different challenge as many times your fruits and vegetables are eaten raw.

Effectively and Efficiently Clean Your Produce

A research team from the University of Massachusetts²⁷ undertook a study to compare three methods of reducing toxins on produce. The team used apples to examine the effectiveness of commercial and homemade washing agents to remove pesticide residue.

They applied two common pesticides to organic Gala apples and then washed them with three different liquids: tap water, 1% baking soda water solution and an EPA-approved commercial bleach solution often used on produce. Using specialized analysis the scientists found surface pesticide residues on apples were removed most effectively using baking soda.

Dr. Philip Landrigan, researcher at the Arnhold Institute for Global Health from the school of medicine at Mount Sinai, advises people to eat organic as often as possible, but to at least wash your fruits and vegetables.²⁸

Organic foods have a 30% lower risk of pesticide contamination,²⁹ but it's not entirely possible to guarantee organic produce is pesticide-free, as it is sometimes located in adjacent fields to farms where pesticides are used.

The research team believe the alkalinity of baking soda likely degrades pesticides faster, making it easier to physically remove the chemicals through washing. The researchers recommended a concentration of 1 teaspoon of baking soda for every 2 cups of water and gentle scrubbing.³⁰

You may also reduce your exposure to foodborne pathogens from produce by using white vinegar, as the acidic vinegar crosses bacterial cell membranes and kills the cells.³¹ Before misting thoroughly with a blend of vinegar and water in a 1-to-3 ratio, ensure you've removed the baking soda, as it will neutralize the vinegar. Let the produce rest for 30 minutes and then wash lightly under cold running water.³²

Through the practice of safe food handling, separating meat and produce, and washing your produce to reduce your exposure to pesticides, you may reduce your risk for exposure to foodborne pathogen illnesses and risks of exposure to endocrine disrupting chemicals and known carcinogens.

Sources and References

- ¹ [Current Opinion in Allergy and Clinical Immunology, 2016;16\(2\):165](#)
- ² [Journal of Allergy and Clinical Immunology, 2014;134\(3\):593](#)
- ³ [Nature Reviews, 2018;16:143](#)
- ⁴ [Time Magazine, August 23, 2017](#)
- ⁵ [NPR, September 11, 2017](#)
- ⁶ [Center for Food Safety, Bacteria in Raw Meat vs. Cooked Meat](#)
- ^{7, 8, 9, 11, 17} [Food and Drug Administration, December 7, 2018](#)
- ¹⁰ [FoodSafety.gov, Playing It Safe With Produce](#)
- ¹² [Mayo Clinic, Listeria Infection](#)
- ¹³ [Centers for Disease Control and Prevention, Burden of Foodborne Illness: Findings](#)

- ^{14, 15, 20, 21} Kaiser Health News, December 21, 2018
- ¹⁶ U.S. Department of Agriculture, June 28, 2018
- ¹⁸ U.S. Food and Drug Administration, Food Safety Tips for Healthy Holidays
- ¹⁹ International Association for Food Protection, 2007;27(11):892
- ²² Environmental Working Group, Healthy Cleaning
- ²³ Treehugger, March 23, 2017
- ²⁴ Endocrine Society Task Force, Endocrine Disrupting Chemicals
- ²⁵ FASEB Journal, 2018; doi: 10.1096/fj.201700759RR
- ²⁶ Environmental Working Group, Shoppers Guide to Pesticides in Produce
- ²⁷ Journal of Agricultural and Food Chemistry, 2017;65(44):9744
- ^{28, 30} Reuters Pesticide Residue on Fruits and Veggies Tied to Infertility October 31, 2017
- ²⁹ Annals of Internal Medicine, 2012;157(5):348
- ³¹ David Suzuki Foundation, Does Vinegar Kill Germs
- ³² SFGate, December 12, 2018