



# Pesticide Residues on Fresh Fruits and Vegetables: What's the Risk?

Fruits and vegetables are essential to a nutritionally adequate diet. Research shows that eating five or more servings each day can decrease the incidence of some cancers. Unfortunately, many people believe that fresh fruits and vegetables may contain harmful levels of pesticides. Are you afraid that eating more of them will increase your exposure to pesticide residues? If so, it is important to remember that the benefits of eating fresh fruits and vegetables far outweigh the risk of exposure to pesticide residues. Let's take a look at the facts.

## Pesticides and Their Use

Pesticides are human-made and naturally occurring chemicals that control insects, weeds, fungi, and other pests that destroy crops. Each year these pests destroy almost half of the world's food crops. Thus, the prudent use of pesticides actually improves our diet by decreasing the cost of food and increasing the availability, abundance, quality, and variety of foods. Several controls, both economic and regulatory, are in place to encourage the prudent use of pesticides.

Pesticides are expensive. Therefore, farmers must be careful with pesticide application to avoid increasing food production costs. They do this through a process called integrated pest

management (IPM), the coordinated use of pest and environmental information with the best available pest control methods. IPM prevents unacceptable levels of pest damage by using the most economical controls that entail the least possible risk to people, property, and the environment.

Pesticides used in the United States must be registered with the Environmental Protection Agency (EPA). This process ensures that all pesticides have been adequately tested and evaluated for potentially adverse effects on human health and the environment before they can be licensed and sold.

People who apply pesticides that are defined by the EPA as "restricted use"

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must be certified to do so. Restricted use pesticides carry a greater level of risk to the applicator, the environment, or both than do nonrestricted use pesticides. Certification means the individual must pass a written exam that tests his or her knowledge about the proper handling of pesticides and the laws governing their use. Individuals who are certified must continue to learn about applying pesticides by completing continuation education credits that allow them to keep their certification.

Not all pesticides are defined as restricted use. Some are defined as “general use” pesticides. These types of pesticides can be purchased at discount stores, hardware stores, and nurseries. These carry a lower level of risk to the applicator, the environment, or both, so anybody can use them.

## Government Regulation and Monitoring

Three federal agencies share responsibility for regulating pesticides: the EPA, the Food and Drug Administration (FDA), and the U.S. Department of Agriculture (USDA). The EPA approves the use of pesticides and sets tolerance levels (the maximum amounts of pesticide residues permitted in or on a food). These tolerance levels are often 10 to 1,000 times less than the amount needed to pose a health risk. Furthermore, because many people eat raw or partially cooked food, the EPA sets tolerance levels for raw fruits and vegetables and not for cooked fruits and vegetables. Studies have shown that peeling, blanching, cooking, or a combination of these steps can significantly reduce the amount of pesticide residues that might be present on fruits and vegetables. In addition, the new Food Quality Protection Act of 1996 set a tougher standard for pesticide use on food and required the EPA to consider the public’s cumulative exposure to pesticides through food, water, and home environments when setting standards for pesticide use on food. Most important, the EPA regulatory processes require that each pesticide decision must ultimately protect infants and children, who may be more sensitive to pesticides than adults.

Except for meat, poultry, and certain egg products, the FDA enforces the tolerance levels set by the EPA for imported foods and for domestic foods shipped across state lines. The FDA enforces tolerance levels by testing food samples for the presence of pesticide residues. Keep in mind that the laboratory equipment used to detect pesticide residues is extremely sensitive. Some equipment can detect residues present at 1 part per trillion (ppt). To understand how small this amount is, think of 1 second in 320 centuries. These are extremely small amounts.

The USDA enforces tolerance levels in meat and poultry. Some states also contract with the Agricultural Marketing Service within USDA to carry out a residue testing program directed at raw agricultural products and various processed foods.

## Government Findings

The FDA has found through its monitoring program that pesticide residues on fresh fruits and vegetables are so low that they do not represent a significant safety hazard to any population group, including infants and children. In 2001, 98.9 percent of domestically grown fruit samples, 98.5 percent of domestically grown vegetable samples, and 95.2 percent of imported samples did not have residues that exceeded the EPA tolerance levels. Furthermore, according to the FDA report, most samples that did exceed the tolerance levels did not pose a serious health risk because of the margin of safety built into the EPA tolerance levels. For more information about these government findings, go to [www.cfsan.fda.gov/~dms/pes01rep.html](http://www.cfsan.fda.gov/~dms/pes01rep.html) (which links to the FDA *Pesticide Program Residue Monitoring 2001* report).

## Home Food Preparation

The following basic food preparation practices and habits can further reduce your exposure to pesticide residues on fresh fruits and vegetables:

- Wash produce in cold or warm tap water (with no soap) before serving. Washing removes bacteria, dirt, waxes, and pesticide residues that might be on the surface of these foods.

- Peel away and discard outer leaves, skin, or rinds.
- Cook fruits and vegetables thoroughly. Cooking can break down some pesticide residues because they tend to be heat sensitive.
- Eat a variety of foods to prevent overexposure to any one food.
- Do not eat berries or other wild foods that grow on the edges of roads and fields where herbicides might have been sprayed.
- Follow the instructions on pesticide container labels when using pesticides on a home garden. The most likely exposure to pesticide residues is from the over-application of pesticides or application without protective clothing or masks.

## Summary

Some consumers are concerned about pesticide residues on fresh fruits and vegetables because some pesticides have been associated with some cancers. The government's regulatory and monitoring processes exist to prevent or minimize such adverse health effects. Moreover, recent data have shown that the risk of pesticide exposure from fresh food is extremely low. Nevertheless, if you are still concerned about the risk associated with pesticide residues on conventionally grown produce, other market choices, such as organically grown fruits and vegetables, are available.

For more information about pesticides, contact your local Cooperative Extension Center. The telephone number can be found in the government section of your telephone directory, or you can connect online via the following Web site: [www.ces.ncsu.edu/counties/](http://www.ces.ncsu.edu/counties/)

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