Smart Produce Guide

Safer, sustainable produce for healthy children

Fruits and vegetables provide essential minerals, vitamins and fiber that are critical for growing children and pregnant and nursing women. To maximize health benefits, everyone should try to eat three to five servings of vegetables and two to four servings of fruit each day. On the other hand, produce often contains residues of pesticides, chemicals designed to kill weeds and insects. Pesticide residue levels vary depending on the type of produce and how it's grown. This guide will help you choose fruits and vegetables that have lower residues, so you can minimize pesticide exposure, while enjoying fresh produce. It also provides tips on avoiding other contaminants affecting produce and information on locally produced and organic foods.

By choosing produce that's grown organically or with fewer chemicals parents can support a healthier environment and protect their children by reducing pesticide exposures.

Tips for reducing your family's exposure to pesticides on produce

▸ Wash and peel. Thoroughly wash produce under cold water, and then do what you would normally do: scrub potatoes, peel carrots, stem strawberries, and so on. Washing reduced the amount of produce containing pesticide residue by half in one study, and where residues remained, levels declined significantly after washing.[1] Washing also helps reduce exposure to soil lead and to pathogens (disease-causing microorganisms) on produce.

▸ Buy organic produce as much as possible. Since organic certification restricts the use of chemical pesticides, look for certified organic produce at your local supermarket, food co-op or farmer's market. If you can't buy all organic, selectively purchase organic among the types of produce that typically have the highest pesticide residues, especially for produce your child eats the most.

▸ Choose local produce whenever possible. Not all local farms are organic, but small-scale, local farmers tend to be more receptive to consumer demands. Ask local farmers if they use pesticides and chemical fertilizers.

Why buy local?

Most food in the U.S. is produced on large industrial farms far away from the people who eat it. Local produce is usually fresher and better tasting, because it doesn't have to be shipped long distances. There is also less opportunity for contamination.

Buying local foods can help support farmers, healthier local economies and a healthier environment.[4] Larger, more industrialized farms rely more on petroleum-

Highest pesticide residues		Moderate pesticide residues		Lowest pesticide residues	
Fruits	*Vegetables*	*Fruits*	*Vegetables*	*Fruits*	*Vegetables*
Apples	Bell peppers	Apricots	Collard greens	Apple juice*	Aparagus
Grapes (imported)	Carrots	Blueberries	Cucumbers	Bananas	Avocado
Nectarines	Celery	Cantaloupe	Kale	Kiwifruit	Broccoli
Peaches	Green beans	Grapefruit	Lettuce	Mangoes	Cabbage
Pears	Hot peppers	Grapes (domestic)	Mushrooms	Orange juice*	Cauliflower
Red raspberries	Potatoes	Honeydew melons	Sweet potatoes	Papaya	Onion
Strawberries	Spinach	Oranges	Tomatoes	Peaches (canned)	Sweet corn
			Turnip greens	Pineapples	Sweet peas
			Winter squash	Plums	
				Tangerines	
				Watermelon	

List based on analysis of USDA and FDA data (1992-2001) by the Environmental Working Group[2], except for items with an asterisk (*), which are based on a study by Consumers' Union of USDA, California Department of Pesticide Regulation and CU testing data[3].

Support local food systems

▶ **Shop at your local farmers market.** For information, visit the USDA's national farmers market state-by-state directory at ams.usda.gov/farmersmarkets.

▶ **Grow your own pesticide-free produce in your backyard or join a community garden.** Get more information at communitygarden.org.

▶ **Join a community-supported agriculture farm**, where you can buy a share of the year's crop to guarantee the farmer's income and get fresh organic produce during the growing season. Visit localharvest.org for more information.

derived fertilizers and other chemicals, using an estimated four times the energy and producing more than five times the pollution of local food systems.[5]

Public subsidy of the industrial farm system keeps food prices artificially low, in effect rewarding less sustainable producers. Farm policy tends to provide greater support to large producers of a few commodities and provides little or no support to produce growers.[6] Less directly, the public subsidizes exploration and development of petroleum, as well as heavy industrial use of highways built and maintained at taxpayer expense for transporting food and other goods over long distances. Finally, there is a significant indirect subsidy in that the long-term health and environmental costs of air and water pollution from largely unregulated industrialized farms are borne by the public and not by the polluting farms.

In contrast, buying more locally produced food benefits both the farmer-producer and the local economy, because a higher percentage of profits go to the farmer and stay and circulate in the community.[7,8,9] Local food systems like farmer's markets and community-supported agriculture strengthen the social fabric of communities by allowing face-to-face interactions with food producers.[10]

Health and environmental impacts of pesticides

Children are more vulnerable to health risks from pesticides. Many pesticides are known to be toxic to the brain, causing lasting effects on brain function and behavior.[11] Other pesticides have been found to increase the risk of cancer.[12] Health effects depend not only on the amount of pesticide and the length of exposure, but also on the vulnerability of the exposed person. Exposure begins in the womb, even to neurotoxic pesticides.[13]

Children are especially vulnerable to the effects of pesticides and they consume more of some types of produce than adults. Take apples, for example. They are a favorite fruit of children and are also among the fruits with the highest pesticide residues. Thus a young child who consumes many apples in short period of time may exceed a safe dose of pesticides. Since young children develop quickly, this exposure could coincide with a critical time in their development.

▶ Pound for pound, children ages 1–2 eat nearly four times as much food as the average person – so they can proportionally consume more pesticide residues.[14]

▶ Children eat more of certain foods that tend to carry more pesticides, such as apples. The average 1- to 2-year-old's weight-adjusted apple consumption is four times that of the average person. Kids that age also consume four times more fruit juice and drinking water.[15,16]

▶ A young child's immune system and organ systems for detoxifying poisons are too immature to protect against some pesticides. The "blood-brain barrier," which protects the brain from toxins in the bloodstream, is not fully developed until a child is one year old.[17]

Pesticides in produce: How children are exposed

Pesticides are widely used in growing fruits and vegetables and pesticide residues are common in the U.S. food supply. The U.S. Dept. of Agriculture found that 55 percent of produce tested had detectable residues,[18] while the Food and Drug Administration (FDA) found pesticide residues on 60 percent of fruits and 30 percent of vegetables tested.[19] Some pesticides can penetrate the peel and others can be absorbed into the plant's roots. Although washing and peeling do not eliminate pesticide residues, they do reduce them. Organic produce has far lower pesticide residues than conventionally grown produce. Two published studies suggest about one-quarter of organic produce samples carry pesticide residues, compared to about three-quarters of conventionally grown produce.[20,21] Besides having lower pesticide residues, several studies show that organic produce has more vitamin C and micronutrients than conventional produce.[22,23]

Children eating organic produce tend to have a lower body burden of pesticides and pesticide metabolites. Among Seattle preschoolers, those eating at least 75 percent organic produce and juices had concentrations of pesticide breakdown products (metabolites) in their urine that were six to nine-fold lower, on average, than

What else can parents do?

- Ask your local supermarket to carry more organic produce.
- Ask baby food companies to label pesticides used in growing produce used in their products.
- Work with your child's school or child-care center to include fresh produce grown with no or reduced pesticides in children's meals.
- Elminiate or reduce your personal use of pesticides in your home and in your garden.

did preschoolers eating mostly "conventional" produce and juices, in one recent study. The compounds found are metabolites common to several organophosphate insecticides—brain toxins that EPA considers the most risky class of pesticides.[24]

Pesticide residues on produce are only one way children are exposed. Although pesticides are by definition toxic, the amount that we are exposed to on produce often would be less than other exposures, such as through home, garden, child-care center, school, park and athletic field use. Children are also exposed to pesticides in drinking water, which is a child's most consumed food, including water used in formula and in reconstituted fruit juices. A Minnesota study found multiple pesticides in the urine of children residing in both rural and urban communities.[25] According to data from the Centers for Disease Control and Prevention (CDC), children have higher levels of many pesticides and pesticide metabolites in their urine than do adults. For example, children ages 6-11 had nearly twice the body burden of a breakdown product (or metabolite) of chlorpyrifos (Dursban)—a widely used insecticide—compared to adults.[26] Note, because of new EPA restrictions on use of chlorpyrifos in homes and on crops, children's body burdens of this chemical should begin to decline.

Farm workers are at highest risk. Two recent studies found that agricultural workers and their families had higher levels of organophosphate (OP) pesticides in their bodies than people in other occupations.[27,28]

Environmental impacts of pesticides and chemical fertilizers.

Environmental problems caused by conventional agriculture's long-term use of pesticides and chemical fertilizers make it less sustainable in the long run, than organic agriculture. Chemical fertilizers and pesticides create pollution of both ground and surface water. Growing pest resistance is a big problem, constantly requiring newer and stronger pesticides to control pests. Pesticides, as is true with environmental dispersion of many chemicals, can have detrimental impacts on plants and wildlife that are not their targets. Bee populations, for example, can be greatly reduced. And there is evidence that atrazine, the world's most widely used pesticide, leads male frogs to develop female sexual organs even at levels of exposure far lower than what is currently allowed in drinking water.[29]

Chemical fertilizers, with high concentrations of nitrogen, also contribute to nitrate pollution. Agricultural run-off in the Mississippi River basin creates nitrate pollution in the Gulf of Mexico, contributing to a "dead zone" or oxygen-deprived environment that drives off or kills aquatic life.[30] For more information, go to iatp.org/enviroag.

Aside from benefits to the environment, organic agriculture has demonstrated economic benefits. For example, a 2001 study of apple production documents the benefits of organic compared with conventional and integrated methods. Researchers found that yields were similar regardless of method, but the organic and integrated systems resulted in higher soil quality. The organic system produced sweeter, less tart apples, higher profitability and greater energy efficiency, putting the organic method first in economic and environmental sustainability, with the integrated system ranking second.[31]

Buying food, and supporting policies to decrease pesticide and chemical fertilizer use, therefore is a way to move agriculture in a more sustainable direction. ●

U.S. national standards for organic produce

All foods labeled and sold as "organic" must be certified by the United States Department of Agriculture's accredited independent certifying agencies. To be considered certified organic—as defined by the USDA's October 21, 2002 final rule—farms and products must meet the following standards:

- Three years with no application of prohibited materials (synthetic fertilizers, pesticides and/or sewage sludge) prior to certification.
- No use of prohibited substances while certified; no genetically modified organisms or irradiation.
- Proactive soil building, conservation and crop rotation systems.
- Manure must be composted or applied at least 90 to 120 days prior to harvest.
- No comingling or contamination of organic products during processing; and mandatory record keeping for all operations.

Other contaminants affecting produce

▶ **Sewage sludge**—which can contain bacteria, viruses, heavy metals, synthetic organic chemicals and prescription drugs—is often used as a fertilizer in conventional agriculture. Organic standards currently prohibit the use of sewage sludge. For more information, visit iatp.org/foodandhealth.

▶ **Pathogens.** The most common disease-causing bacteria found on produce are *E. coli* and salmonella. There is no evidence to support a greater risk of pathogens on organic produce than on conventional produce tested at the retail sales level.[32,33,34] A recent study found no statistically significant difference between levels of pathogens on certified organic and conventional produce samples *tested before harvest*.[35] Thoroughly washing all produce, especially lettuce, helps reduce your risk from pathogens on produce.

▶ **Lead** on produce grown in city gardens can be a problem. Lead from paint chips or from older auto emissions persists in the soil. Although very little lead is taken up into the plant itself, external lead dust can adhere to the plant, especially leafy and root plants. To reduce lead exposure, thoroughly wash all produce. To have your garden soil tested for lead, contact your local university soil testing laboratory.

For more information

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Relevant government agencies and organizations working on this issue

National

Beyond Pesticides
▶ beyondpesticides.org
Environmental Protection Agency
▶ epa.gov/safewater
Environmental Working Group
▶ ewg.org
Health Care Without Harm
▶ noharm.org
Organic Consumers Association
▶ organicconsumers.org
Pesticide Action Network
▶ panna.org

Minnesota

Minnesota Center for Environmental Advocacy (MCEA)
▶ mncenter.org
Minnesota Department of Agriculture
▶ mda.state.mn.us
Minnesota Department of Health
▶ health.state.mn.us/divs/eh/water
Minnesota Food Association
▶ mnfoodassociation.org
Minnesota Pesticide Resource Center
▶ mnpesticide.org

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