



Best Food-Safety Practices for Hawai'i Gardeners

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Growing your own food is a wonderful thing to do. Home gardens provide the freshest food, good exercise, and reductions in your household food costs.

However, according to the U.S. Food and Drug Administration, in the past 50 years 20 new pathogens causing human diseases have become resident in our food system. Therefore, we need to take extra precautions, even in our home gardens, with our food. The following advice and recommendations not only make good sense, but they are based on good science.

I want to use compost in my garden; are there any food safety issues with compost?

Compost will help your garden have better drainage, increased levels of beneficial microorganisms, and some additional nutrients (although compost is not very effective as a sole source of plant nutrients). From a food-safety standpoint, make sure that your compost heap creates enough heat for microorganisms to break down the components of the compost. This heat eventually sterilizes the compost and makes it safe to apply where food crops are grown. Do not apply home compost to your garden until you are sure that it is safe. For more information on home composting and vermicomposting, please see publications at www.ctahr.hawaii.edu/freepubs. If you apply raw manure, you could be introducing harmful pathogens into your production area. Between growing seasons, if you are adding raw or uncomposted manures as a soil additive or fertilizer, do not plant anything for 120

days. Especially, do NOT put raw or uncomposted manure on crops during a growing season, where you have crops that will be harvested in less than 60 days.

If you are purchasing commercially produced compost, make sure you buy only products that have been fully composted according to EPA 503 standards. Compost that has been sterilized according to EPA 503 standards may be safely applied to your garden soil at any time in the production cycle.

Can I use earthworm castings, vermicompost, and worm "teas" and still be safe?

Yes, worm castings, vermicompost, and earthworm compost teas are safe when used correctly. Please use caution: there is scientific evidence indicating that human pathogens can be found in teas produced from worm castings, vermicompost, and earthworm compost, especially those that are prepared incorrectly. The safety of the product has a lot to do with what was originally put into the compost pile or worm bin and the process used to produce the teas. The advice from the USDA National Organic Standards Board on compost (and earthworm/vermiculture) teas includes:

- Use only potable water to make compost tea or to dilute it (other water, such as from rainwater catchment systems, might introduce pathogens into the tea).
- Sanitize all equipment used to prepare compost tea.
- Make compost tea only from compost that has maintained a temperature of at least 131°F for three days and has been mixed so the entire



pile or windrow has heated up.

- Avoid additives when fermenting compost tea, as these can promote the growth of harmful organisms. In particular, simple sugar sources, like molasses, should be avoided.
- Additives can be used if sample batches of compost tea are tested before using to make sure it meets the EPA's recreational water quality guidelines for coliform bacteria.
- If compost tea is made with additives but is not tested, or if it doesn't meet water quality guidelines, then food crops may not be harvested until 90–120 days after the compost tea has been applied (the same rule applies to raw manure used on farms) (Source: www.uvm.edu/vtvegandberry/factsheets/coposttea.html)

Another safety precaution, especially if you have not had your compost tea tested for pathogens by a certified laboratory, is to avoid letting the tea contact the edible portion of the crop—especially near harvest time. This is because the tea can collect within the plant (in the stalk base of lettuces, for example). If there are pathogens in the tea, then the plants could become a breeding ground for them.

I live “off the grid” and don't get my irrigation water from a municipal water source; are there any food safety issues with doing this?

There are many sources of irrigation water including streams, irrigation ditches, open reservoirs, wells and rainwater catchment systems. Birds, rodents, cats and other animals can contaminate the water by defecating adjacent to these water sources. When it rains, animal manure (and slugs and snails) can be washed into your rain barrel/tank. In order for this contamination not to impact the safety of the produce you are growing, only apply untreated water to the base of the plants and not directly on the “edible portion of the crop.” Find out about the quality of your irrigation water and test well or surface water sources for the presence of E.coli and other coliform bacteria, which indicate that the water may have been contaminated by fecal sources that can carry harmful pathogens. To treat your rainwater, see “Guidelines on rainwater catchment systems for Hawai'i” (www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-12.pdf).

I need to use chemical pesticides to control pests in my garden. Can I get some from my farm friends?

As an organic or conventional gardener you are allowed to use chemical products labeled “for home use.” However, if one day you are a home gardener, and the next day you are selling at a farmers market, there are different rules. Commercial farms must use only those products labeled for commercial use, and products labeled only for “home and garden” must not be used. Conversely, some products state, “Do not use in or around the home.” These are clearly not for the homeowner use. Most agricultural chemicals state, “For agricultural use only,” so the homeowner may NOT use these. Bottom line is that all labels differ...you cannot make generalizations. If you have any questions, call the nearest Hawai'i Department of Agriculture Pesticides Branch office (<http://hawaii.gov/hdoa/pi/pest/Pesticide%20Branch%20Contacts.pdf>)

Homemade pest control remedies are another option for controlling pests, and many (including soap and water solutions) have very little risk associated. However, safety precautions need to be taken for homemade remedies, as improper use may cause risk to you, your family, and your pets. Just because pest control options can be found around the home, lack of a product label does not imply they are safe under all circumstances.

The Environmental Protection Agency has exempted 31 products described in 40 CFR section 152.25(g) (www.epa.gov/oppbppd1/biopesticides/regtools/25b_list.htm) as pesticides posing little or no risk. Some of these are castor oil, linseed oil, mint, and thyme. Follow these steps to minimize risks when applying homemade pest control remedies:

- Use all homemade pesticides immediately—discard leftovers, do not store them.
- Only mix the amount of homemade pesticide remedy needed for immediate use.
- Do not leave homemade pesticides unattended or spray them near children, pets, or others.
- Do your homework. Understand the active ingredient and safety risks. For example, milk- and seafood-based products are sometimes used as natural pesticides, but for a consumer with a particular food allergy, these might cause a severe reaction. Find more information about food allergies at www.foodallergy.org. (Source: www.pesticides.montana.edu/News/Bulletins/MT%20Pest%20Bulletin-May.pdf)

Can I have pets or animals in my garden?

Pets and other animals bring us comfort and companionship, but it is best to avoid bringing them into your

vegetable and fruit garden. While in your garden, your pet's excretions might come in contact with your hands, shoes or boots, harvest tools and equipment, or the edible portion of your crop.

It is also important to keep out stray animals and birds. Allowing ducks or chickens to enter your garden to eat pests may sound like a great idea at first, but where are the ducks or chickens going to defecate while in your garden? Fowl (ducks, chicken, and geese) can have salmonella and other pathogens in their bodies, which can be excreted in their manure throughout the garden. This caution extends to keeping caged birds near your garden.

If you cannot manage all pets and animals completely, be sure to take time to harvest only feces-free produce—do not attempt to wash off bird manure. For example, bird manure can contaminate your hands, gloves, wash water, cutting boards, bowls, and sponges with salmonella and other human pathogens. Cover the ends of stakes and posts with plastic or metal cones to keep birds from resting and defecating in or near the garden. The best practice is to leave all produce that has come in contact with feces in the garden to be removed during a non-harvest period or at the end of a production cycle. (Find more information on animal pathogens at <http://nasdonline.org/document/911/d000752/zooses-animals-can-make-you-sick.html>.)

My family likes to work in the garden together; are there any precautions I should be taking?

Yes, especially with infants and toddlers. Human feces are full of pathogens that can make us sick. If diapers are handled carelessly, the contamination on your hands can get on the produce. Since children are often handling pets and other things, they need to keep their hands as clean as possible (after first being washed) if they are helping you harvest. Other safety precautions to follow include:

- Avoid using home garden chemicals in the areas that your kids will help plant or tend.
- Store home garden chemicals in the original containers in a locked cabinet out of the reach of children; never store chemicals in soda, water or juice bottles.
- If you apply home garden chemicals, keep children out of the garden for the time period stated on the chemical label, as they may touch sprayed plants and transfer some of the chemicals into their mouths or eyes.
- Teach your children which plants are not safe to eat. For instance, some mushrooms are dangerous, but

since they are difficult to identify and sometimes grow unintentionally in your garden, it's best to stress that *all* mushrooms are off limits for touching and eating.

Common plants can cause allergic reactions, dermatitis, skin irritation, or internal poisoning. Some good reference sources are “Poisonous Plants of Paradise” (Scott and Thomas, 2002), the Washing State Poison Control Center, www.wapc.org/poisons/plantlist.htm, and the Hawai'i Department of Agriculture, http://hawaii.gov/hdoa/pi/pest/BROCHURE_TOPTENproof.pdf.

What is the issue with people getting sick by eating snails and slugs on their produce?

This is a very serious issue in Hawai'i and other areas of the tropics. The pathogen is called the rat lungworm, and it can lead to serious health problems (angiostrongyliasis). If you accidentally eat a slug or snail, or part of them, that has the pathogen inside, you are at risk of contracting the disease. The actual pathogen is a nematode (microscopic worm). The best thing you can do is to keep your garden free of slugs, snails, and rats by

- removing boxes, dead leaves, brush, logs, bricks, boards—anything under which slugs or snails can hide
- setting up rat traps to eliminate them
- wearing gloves to pick up and dispose of slugs and snails (putting them in a plastic bag and then putting that bag in the trash is easiest method)
- not composting snails or slugs—dispose of them in the trash
- using commercial slug/snail baits as per their labeled directions (be careful around dogs and other animals, as they like to eat some types of poison baits)
- searching the Internet for other methods of slug, snail, and rat control.

For more information on rat lungworm protection, read “Best On-Farm Food Safety Practices: Reducing Risks Associated with Rat Lungworm Infection and Human Eosinophilic Meningitis” (www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-39.pdf) and “Avoid Contracting Angiostrongyliasis (Rat Lungworm Infection): Wash Fresh Fruits and Vegetables Before Eating!” (www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-35.pdf).

How do I prepare to harvest produce in the safest way possible?

Wash your hands for 20 seconds with warm water and

soap, and dry them with a clean paper towel before harvesting. Wash your gloves (or use disposables), sanitize your harvest tools and containers in an appropriate solution, and try to avoid putting them directly on the ground (put them on a pallet, in a bucket or wheelbarrow, etc.). Do not eat or smoke in your garden during harvesting, because you can transfer pathogens from your mouth to your hands and then they can be transferred to the produce.

My garden was flooded by heavy rains? Can I still eat my vegetables if I wash them well?

Rain is great for growing plants, especially when there has been drought conditions for a long time. There are concerns, however, about the safety of flood-damaged vegetables and fruits for fresh consumption, especially those crops grown close to the ground, because flood waters can transfer fertilizers, pesticides, feces, slugs, snails, and other pests into your garden from farms, lawns, septic and sewer systems, parking lots, etc. If your garden has been inundated by water, follow these recommendations made by the FDA for commercial crops:

- If the edible portion of a crop is exposed to flood waters, it is considered contaminated and should not be eaten. There is no practical method of sanitizing the edible portion of a vegetable or fruit that will provide a reasonable assurance of human food safety. Home gardeners are encouraged to reduce the risk by discarding affected crops or incorporating the crops into the soil.
- Crops in proximity to, or exposed to, a lesser degree of flooding, where the edible portion of the crop has NOT come in contact with flood waters, may need to be evaluated on a case-by-case basis. Factors to consider in the evaluation include
 - the source of the flood waters, and are there potential upstream contributors of bacterial and/or chemical contaminants?
 - the type of crop and its stage of growth; e.g., is the edible portion of the crop developing, and how far above the ground does the lowest edible portion grow?
 - were conditions such that the crop may have been exposed to prolonged periods of moisture and stress that could foster fungal growth, and possibly, development of mycotoxins?

(Source: www.fda.gov/Food/FoodDefense/Emergencies/FloodsHurricanesPowerOutages/ucm112723.htm)

Why do I need to rinse produce when it is from my home garden?

Regardless of the source (home-grown or store-bought) or the growing method (organic or conventional), produce should be rinsed thoroughly before consumption, for a variety of reasons.

The most important reason to rinse produce is to remove surface soil, bacteria, fungi, insects, chemicals, slugs, and snails. Organic produce in particular tends to have a higher population of slugs and insects because that production style does not use many pesticides. All produce also carries a certain amount of soil or dust, whether it is a root vegetable or a tree fruit. Some produce, especially leafy greens such as lettuce, spinach, and bok choy, need to be washed even more thoroughly because the edible portion is in close contact with the soil and irrigation water. It is also a good idea to rinse produce so that you can remove bacteria and fungi, which occur naturally on most crops but can cause stomach upset.

All types of produce can be rinsed, although different techniques are required for different kinds of produce. Many markets also sell special washes for produce. Follow product use instructions. Do not use regular dish soap as a produce wash, as that can leave residues that can cause digestion problems. In most cases, clean water is sufficient. To clean produce with a hard surface, like root vegetables and tree fruits, scrub with a produce brush under running water. For more delicate vegetables like leafy greens, wash under cool running water until the surface soil is removed, and then dry with a salad spinner. Fruits and berries should also be rinsed, especially fruits that grow near the ground, like strawberries. Berries that are washed and then stored in the refrigerator will soon become moldy, so they should be thoroughly rinsed just before consuming them. (Adapted from www.wisegeek.com/why-do-i-need-to-wash-produce.htm.)

Disclaimer

Reference to a supplemental information source is not intended as an endorsement or recommendation in preference to other sources that may also be suitable.

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