



Getting Started: Resources to Understand and Minimize Microbial Risks to Fresh Produce

Food Safety Fact Sheets and link to EPA Consumer Handbook for composting:

<http://vric.ucdavis.edu>

Food Safety Begins On-the-Farm Brochure (English and Spanish):

<http://www.gaps.cornell.edu/>

FoodSafe Program:

<http://foodsafety.ucdavis.edu>

Partnership for Food Safety Education:

<http://www.fightbac.org>

Foodborne Pathogens: Bad Bug Book:

<http://www.cfsan.fda.gov/~mow/intro.html>

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Key Points of Control and Management of Microbial Food Safety Concerns for Edible Landscape and Home Gardening

Introduction:

The majority of fresh consumed fruits and vegetables in the United States are wholesome and free of the microorganisms that could result in illness under common and sensible handling and food preparation practices. In addition, many fruits and vegetables have natural barriers, like skins and rinds, which minimize the chance that any surface contamination could be transferred to the internal edible portions. These protective barriers can guard the internal parts up to the point of harvest. These same barriers can also make washing and/or light to vigorous brushing of produce more effective, depending on the sensitivity of the item.

Contamination by microbial pathogens can only result, ultimately, from an external environmental source at some point from production to food preparation. Nonetheless, as with all fruits and vegetables that are consumed uncooked, the best approach to maintaining the wholesome nature and safe consumption of your home garden harvest is to be aware of potential risks, and to establish common-sense approaches, from growing to consuming, that minimize the chance of external and internal contamination.



Background:

Whether domestically produced or imported, four key events have brought focus and concern for the microbial food safety of fresh fruits, vegetables, nuts and other edible horticultural foods:

1. Recent reoccurring outbreaks linked to consumption of imported and domestic products.
2. Positive detection and recovery of human pathogens from random survey sampling of both imported and domestically-produced produce.
3. Recent consumer surveys documenting the inconsistency of cleaning and washing produce surfaces by home consumers.
4. Recent reports from several researchers documenting the potential for internalization of pathogens during harvest and handling.

Based on the overall consumption of fresh produce, most foodborne illness is more likely to arise from contamination that takes place during food preparation and storage. However, it is equally clear that outbreaks linked to fresh produce from specific production areas have occurred and have impacted a large number of people. **The home garden and edible landscape environments are not free from concerns for potential contamination by human pathogens.** Some elements of these urban agricultural situations may increase the risk from some sources of contamination. While most individuals can recover from foodborne illness without complications or the need for medical attention, some individuals such as the very young, the very old and those who may be otherwise immuno-compromised are more at-risk and can suffer complications, including those resulting in death.

The purpose of this brochure is to provide a brief outline of the important components of microbial food safety of which we should all be aware.

The diversity and scale of home garden environments, gardening practices, and food handling practices make a single approach to food safety planning in the garden unrealistic; therefore, this quick reference guide will focus on the key guiding principles of preventing contamination, reducing the survival of pathogens, and preventing cross-contamination at each step. Individual food safety planning for home gardening can be developed from the application of these principles, which are the combined outcome of research and practical experience.

What are the Guiding Principles of Microbial Safety for Fresh Produce?

- § Once produce is contaminated, removing or killing the pathogens is very difficult.
- § Preventing microbial contamination at all steps, from production to consumption, is much more effective than efforts to “clean the produce up” after it’s been contaminated.
- § Food safety awareness is the essential tool for designing and implementing home garden solutions to preventing foodborne illness.

Guiding Principles for Water

Wherever water comes into contact with fresh produce, its quality may directly determine the potential for pathogen contamination and its persistence.

- § Become familiar with the seasonal quality of any surface water sources used for gardening or edible landscape management. Surface water can include water from ponds, lakes, streams, and any other water source that is directly susceptible to the environment.
- § Identify potential sources of contamination that affect your water, especially those that are within your ability to control in a manner that will protect its quality.
- § Ensure that home wells are designed and maintained in a manner that prevent surface run-off or soil infiltration from contaminating the water supply.
- § Irrigation methods that minimize contact between the water and the edible parts of the plant (such as trickle irrigation) will reduce the potential for contamination.
- § Water used for all foliar applications should be from a pathogen-free source, such as a municipal source.
- § Water used for cleaning fresh produce at harvest should also be from a pathogen-free source.
- § Carefully review all uses of gray-water for irrigation of edible garden plants. Be sure you aren’t using water that could contain microorganisms that can cause foodborne illness.

Guiding Principles for Manure

Properly composted animal manures, domestic green manures, or municipal biosolids are not a source of microbial pathogens on fresh produce.

- § Become informed about proper home compost management for pathogen reduction, especially when using any animal manure.
- § Maximize the time between application of animal manure to garden areas and harvest of edible crops.
- § Spreading animal manure without incorporating into the soil requires careful attention to ensure that pathogen reduction practices have been met.
- § Gardening practices that use manure slurries or manure teas for pest control and foliar nutrients on any landscape or garden plant should be carefully evaluated for how likely the practice is to result in direct or indirect contamination of edible crops.
- § Make sure that any septic system is properly installed and maintained. Faulty septic systems and poorly designed drain fields have caused foodborne illness or pathogen infections in the home environment.

- § Carefully consider whether weed-eating geese or pest-eating ducks and chickens are sensible additions to your edible garden or edible landscape plantings. Fecal contamination from these kinds of animals have been linked to incidence of foodborne illness.
- § Minimize vegetation at the edges of small fruit and vegetable patches. They can serve as gathering, nesting, or hiding places for animal vectors (rats, mice, etc.) of human pathogens.
- § Minimize the presence of vector attractants (such as piles of decaying fruits and vegetables) adjacent to garden.
- § Minimize the opportunity for vectors to contaminate any harvest aide surfaces (bins, totes, boxes, buckets, bushels).



Guiding Principles for Minimizing Animal Fecal Contamination

It is not possible to eliminate all animal influences from garden environments. However, consider steps to minimize their presence or activities.

- § During the growing and harvesting season, domestic animals and pets should be excluded from areas with edible plants.



Guiding Principles for Personal Hygiene and Gardening

There is no substitute for awareness and constant reinforcement of the importance of personal hygiene and sanitation as critical to preventing food-borne illness in the home, especially for children.

- § Establish family awareness of proper hand washing techniques, with special attention to cleaning around the fingernails.
- § Be aware of the potential for garden gloves to transfer contamination from one place, such as a compost bin, to pre-harvest or harvested produce.

- § Be aware of the habits of children in the garden, especially toddlers in diapers, in handling potentially-contaminated material, playing with or petting domestic animals (turtles, cats, rabbits, chicks, etc.)



Guiding Principles for Field and Harvest Sanitation

All surfaces and implements that touch fresh produce must be treated as food contact surfaces. Well-planned food handling practices in the garden and home can reduce the likelihood of pathogen contamination. Careless handling has the potential to spread localized contamination or create opportunities for pathogen contamination of other foods within the home.

- § Clean all food contact surfaces and harvest containers or bins prior to use.
- § Develop a system of cleaning and sanitizing food contact surfaces that is compatible with the home environment. Chemicals such as dilute bleach, tri-sodium phosphate, dilute peroxide, and dilute white vinegar can be used safely and effectively with appropriate precautions.
- § Minimize the opportunity for vectors to contaminate cleaned and sanitized surfaces and harvest materials.
- § Minimize the access or attraction of vectors to harvest buckets or totes kept in the garden, garage, or storage shed (such as no damaged fruit left in bucket).

Guiding Principles for Washing Fresh Produce Prior to Consumption or Short-term Storage

The quality of postharvest water that contacts fresh produce during cleaning and food preparation is widely recognized as the essential control point for fresh produce.

Washing, in combination with a disinfectant treatment, will reduce but not eliminate microbial contamination. Greater microbial reductions are achieved on smooth, waxy produce than on rough textured, porous or leafy greens.

Mechanical removal of soil and potential contaminants by brush-washing under running tap water is the recommended home practice. Antimicrobials are not generally recommended for home use and washing produce with soap is not advisable.

Refrigeration is important for quality and safety management but cannot alone be relied upon to provide sufficient protection from potential food borne illness.

- § Use only good quality fruit, free from open wounds or defects that may have allowed bacteria to become internalized. Avoid fruit that have visible sunken areas or areas of mold or decay.
- § Cutting away decayed or damaged areas at least 1 inch beyond the edge of the defect is generally effective for produce consumed immediately or promptly refrigerated.
- § Running water is strongly recommended over batch washing in a basin.

