



**Cornell
Cooperative
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Department of Fruit and Vegetable
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Extension of Ontario County.

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**Department of Fruit
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PREVENTION OF FOODBORNE ILLNESS BEGINS ON THE FARM

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Outbreaks of foodborne illness are making headlines on a regular basis. *Hepatitis* in strawberries, *E. coli* in apple juice and lettuce, and *Cyclospora* in raspberries have shaken consumer confidence in the safety of the food supply. As many as 30 million people contract some type of foodborne illness each year - most cases are not diagnosed or reported, and are probably just thought to be "stomach flu." However, up to 9,000 people die from foodborne illness each year.

Fruits and vegetables may be harvested on a farm, processed in one plant, repackaged in another, and served by an institution or in the home. They may be hand harvested, stored, and displayed in a store prior to home preparation. Each of these steps is an opportunity for a pathogen to enter the food supply.

How much foodborne illness originates on the farm? *No one knows.*

Are there reasonable steps that a grower can take to reduce the risk that a pathogen will contaminate the food produced on the farm? *Absolutely.*

Clean Soil

The improper use of manure is a large risk factor contributing to foodborne illness. Pathogens such as *E. coli*, *Salmonella* and *Campylobacter* can be present in slurry and soil for up to 3 months, depending on temperature and soil conditions. Troubling for growers is the fact that *Listeria* may survive on vegetables growing in the soil, even though it may not survive in the soil itself. *Yersinia* may survive, but not grow, in soil for up to 330 days. Composting manure, incorporating it prior to planting, and avoiding top-dressing are important steps that can reduce the risk of

contamination while making use of this important source of nutrients.

Clean Water

Make sure that water used in overhead irrigation, produce cooling, washing, dipping and processing operations is clean. Where possible, use chlorinated water or groundwater. Surface water close to untreated sewage or a livestock operation should be tested. (See Laboratories-Testing in the yellow pages or call Cornell College of Veterinary Medicine Diagnostic Lab at 607-253-3900.)

Clean Hands

The failure of food handlers to wash hands after using the restroom or when infected with the hepatitis virus has been the cause of outbreaks of foodborne illness as well. Attention should be paid to worker hygiene, not only in the packing house, but in the field as well. Provide soap and clean water in the field, and insist that all workers wash hands before handling fruits and vegetables.

There is, of course, no way to guarantee that everything we grow and consume is free of harmful microbial contamination. But the risk can be reduced if small preventative steps are taken before produce leaves the farm gate. The following page contains detailed suggestions on how you can reduce risks of microbiological contamination on the farm.

Helping You Put Knowledge to Work

Cornell Cooperative Extension provides equal program and employment opportunities. NYS College of Agriculture and Life Sciences, NYS College of Human Ecology, and NYS College of Veterinary Medicine at Cornell University, Cooperative Extension, Ithaca, NY 14853-6909.

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Minimizing Pathogen Contamination During Production of Fresh Fruits and Vegetables

Pre Plant

Manure Source / Type

- ✓ Slurry - store for 60 d in summer or 90 d in winter prior to field application.
- ✓ Fresh - incorporate into soil.
- ✓ Compost - most pathogens killed within days by high temperatures during aerobic composting.

Manure Application Time

- ✓ Fall - preferably onto cover crop to minimize erosion / nutrient losses.
- ✓ Spring - preferably onto agronomic rotation crop. If applied to vegetable or fruit ground, incorporate.
- ✓ Do NOT harvest within 60 d of manure application.

Manure Incorporation

- ✓ Poor survivability of most pathogens in soils.

Crop Choice

- ✓ Avoid root / leafy crops in year manure applied.
- ✓ Preferable to apply manures to agronomic rotation crop.
- ✓ Perennial crops- minimal risk with manure incorporation and harvest delay.

Production

Irrigation Water Contamination

- ✓ Drip- minimizes risk since no direct crop wetting.
- ✓ Overhead / well water - minimal risk if well casing is maintained and livestock excluded from pump areas.
- ✓ Overhead / surface water- consider water testing if downstream from livestock operations or raw sewage.

Manure Sidedressing

- ✓ ABSOLUTELY NOT with fresh or slurry manure.
- ✓ Compost sidedressing- OK.

Animal Exclusion

- ✓ NO grazing of livestock (including poultry) during season of harvest.
- ✓ Minimize wild animal traffic, where possible.

Worker Hygiene

- ✓ Provide restrooms in field.
- ✓ Supply antibacterial soap and fresh water for hand washing and enforce use.

Harvest

Storage Facilities

- ✓ Clean and sanitize with 10% bleach solution prior to harvest.

Bins / Containers

- ✓ High pressure wash and sanitize with 10% bleach solution, prior to harvest.
- ✓ Store bins in full sun (ultraviolet rays destroy several pathogens).
- ✓ No standing in bins during harvest.

Worker Hygiene

- ✓ Provide restroom facilities in the field.
- ✓ Supply antibacterial soap and fresh water for hand washing and enforce use.

U-Pick Operations

- ✓ Promote cleanliness- encourage customer hand washing prior to entering fields.
- ✓ Provide antibacterial soap for hand washing in field and in restrooms.
- ✓ Provide clean and convenient restrooms for customer use.

Drops

- ✓ Do not use decayed or wormy fruit.

Post Harvest

Worker Hygiene

- ✓ Provide restroom facilities.
- ✓ Supply antibiotic soap / fresh water for hand washing and enforce use.

Washing / Packing Lines

- ✓ Use chlorinated wash water.
- ✓ Monitor chlorine levels to maintain 100 ppm solution.

Packing House Sanitation

- ✓ Clean and sanitize packing areas at end of each day.
- ✓ Exclude all animals, especially rodents.
- ✓ No smoking or eating in packing area.

Produce Cooling / Storage

- ✓ Cool product quickly to minimize growth of any potential pathogens.
- ✓ Store at appropriate temperatures to maintain product quality and minimize pathogen growth.