



# Reducing Food Safety Risks in *Apples*

**N**eed a good reason for taking voluntary action to reduce food safety risks? An effective food safety program provides assurance to regulators, retailers and consumers that you are serious about food safety and can create new opportunities to market your products. By reducing risks, you can avoid legal problems. Improved pesticide management also protects the health and safety of your family and workers.

## Why should I take action?

Outbreaks of food-borne illness are regularly in the news. Both raw and processed fruits, including cider, have created problems. Government agencies are working with everyone from growers to consumers to reduce food safety risks. Growers can make important contributions by following good practices in growing and processing apples.

Improved practices can protect fruit from contamination by *Escherichia coli* (*E. coli*) O157:H7, *Salmonella* and other microorganisms. Growers also can do their part to ensure food safety by following good pest management practices.

Whether you sell fresh fruit or make cider, completing this checklist is a good first step in starting a food safety program. With

a food safety assessment under your belt, you will have taken an important step in setting up a management system that can help reduce environmental and other risks in your

business. As part of this system, you should periodically review your operation to uncover additional opportunities to reduce risks. In this way, you can build on the food safety assessment to continue to reduce risks and improve your management.



## How can you use this checklist to make improvements?

### What this checklist can help you do:

- ✓ Identify food safety and environmental risks in your operation. Assess risks related to manure and animal feces, water used to spray and wash apples, pesticide use, harvest practices including worker hygiene, and post-harvest handling and processing.
- ✓ Discover why you should take action.
- ✓ Evaluate how you manage legal risks and avoid liability.
- ✓ Identify actions to reduce risks and plan to make changes.



### How you do it:

- ✓ Answer questions in each of the pre-harvest, harvest, and post-harvest sections that apply to your operation. For questions that you answer “yes,” pat yourself on the back for doing a good job. For each question you answer “no,” you should take action to reduce risks.
- ✓ Read the “Action” information provided for each set of questions.
- ✓ Answer each question in the section on overall Risk Management and Liability. Be alert for “no” answers. You will need to take action to reduce risks.
- ✓ Keep track of your “no” answers by highlighting the questions or making a list. Because each question describes a good practice, the question itself points you in the right direction. Use the resources in the last section for help in making changes. You also may contact your local Extension agent for assistance.



## Manure/Feces

Yes No

- |                          |                          |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | If you fertilize with manure, do you compost manure or treat manure to kill pathogens?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you clean equipment (including tires) used to handle manure before use in orchards or processing areas?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you exclude livestock and other domestic animals (e.g. pets) from orchards during the growing season?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you take steps to keep wildlife from entering orchards?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you reduce risks of manure drift or runoff if your orchard or packing area is located near a livestock facility, farm, or pasture where manure is spread? |

## Manure/Feces Actions

Manure from domestic animals and feces from wildlife are a source of pathogenic bacteria and other disease-causing microorganisms. They may contaminate fruit if:

- (i) deposited directly on the fruit by animals,
- (ii) fruit touches the ground or unclean containers,
- (iii) fruit is handled by people who do not wash their hands after touching ladder rungs or other dirty surfaces, and
- (iv) spray water or drift carry fecal pathogens.

There are key actions that can reduce the risk that microorganisms from manure will contaminate apples.

You should consult with a tree fruit specialist for advice on the limitations of using manure as a fertilizer. If manure is used, it should be treated to reduce pathogens. Active treatment includes anaerobic or aerobic digestion (e.g. composting) and alkali stabilization. Use of raw manure is not recommended. If you use raw manure as a fertilizer, reduce risks by applying it at least 150 days before harvest.

Efforts to exclude livestock and wildlife can reduce contamination risks in the orchard, and processing and storage areas. Fencing can exclude domestic and wild animals. You may have success discouraging deer with repellents, and deterring birds with noise cannons and scare balloons. Runoff and drift may carry microorganisms that live in manure. These risks can be reduced by improved management of manure in the livestock yard (e.g. diversion of clean water, and routine scraping) and in field applications (e.g. spreading when soil is unsaturated and thawed, incorporation of manure soon after application).



## Sources of Water

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	If you use well water for spray irrigation, mixing pesticides, cooling fruit, or washing fruit, is your well at least 100 feet from a:
<input type="checkbox"/>	<input type="checkbox"/>	manure storage facility,
<input type="checkbox"/>	<input type="checkbox"/>	livestock area,
<input type="checkbox"/>	<input type="checkbox"/>	septic system drainage field, or
<input type="checkbox"/>	<input type="checkbox"/>	discharge area for milkhouse wastewater?
<hr/>		
<input type="checkbox"/>	<input type="checkbox"/>	Do you test your well water sources for fecal coliform microbes at least once per year?
<input type="checkbox"/>	<input type="checkbox"/>	Have you installed a backflow prevention device or other system to prevent contamination of clean water supplies by potentially contaminated water?
<input type="checkbox"/>	<input type="checkbox"/>	Have you formally evaluated pollution risks to your well using Farm*A*Syst worksheets?

## Sources of Water Actions

Apple growers use water in different aspects of their operation, and should take steps to ensure the quality of the water they use. If you use water from a water utility or other supplier, do you know about the quality of your water? If you rely on well water, you are responsible for protecting your water supply from contamination. On-farm threats to wells include livestock operations and septic tanks. Contaminated water can carry microorganisms such as *Escherichia coli* (*E. coli*), *Salmonella spp.*, *Cryptosporidium parvum*, *Giardia lamblia*, and the Norwalk and hepatitis A viruses that may contaminate fruits and vegetables. Even in small amounts, these microorganisms can cause food-borne illness.

You can protect your well by moving pollution sources. Milkhouse waste water can be channeled into a manure storage facility. It may not be feasible to move a septic system or structure that is too close to a well, so make sure these are properly managed to prevent problems. Septic tanks should be regularly pumped. Runoff from livestock yards can be reduced by diverting clean water from the facility.

You should consider testing your well water more than once per year if you have pollution sources near your well. Annual testing of private water sources may be required if you are processing foods, e.g. cider, sauces and jam.

Installing a backflow prevention device is one of many simple actions that protect your water supply from contamination. This device prevents contaminated water from being drawn back into the water supply, for example, when filling a pesticide sprayer tank with a hose.

Routine assessments of your well using tools such as Farm\*A\*Syst can help you protect your drinking water, comply with legal requirements and avoid environmental problems.



## Reduced Pesticide Risks

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Do you receive newsletters, alerts or other communication with current information about pesticide bans or restrictions imposed as a result of the Food Quality Protection Act (FQPA) of 1996?                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you have a plan to use new chemicals and other strategies to control pests in response to government-imposed changes in the labeled use of pesticides?   |
| <input type="checkbox"/> | <input type="checkbox"/> | At the start of every season, do you review last year's pest management problems and controls to make adjustments?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Before the growing season, do you review pesticide labels for changes in use, pre-harvest intervals, and other instructions?  |
| <input type="checkbox"/> | <input type="checkbox"/> | If you do not use a consultant, have you received training in the identification of pests and beneficial predators?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you scout your orchard weekly for pests, beginning in the green tip stage?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you maintain a record of pest scouting results, in addition to required pesticide application records (date, field identification, target pest, pesticide name and EPA number, formulation, rate and number of acres treated)? |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you spray for pests only when needed, that is, when the benefits outweigh the costs?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use pesticides designed to kill specific pests instead of broad-spectrum pesticides that may kill natural predators?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you apply pesticides selectively (e.g. spraying in spots, alternating rows or at lower than recommended rates when appropriate)?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you have a management plan (e.g. rotation of pesticides) to control pests, such as the European red mite, which have developed pesticide resistance?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you spray pesticides on or before the last date required to meet the "pre-harvest interval"?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you plant cultivars resistant to apple scab (Freedom, Jonafree, Liberty), cedar apple rust, fireblight or other diseases?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use alternative strategies such as <i>Bacillus thuringiensis</i> (BT) to control leafrollers, mating disruption and introduction of beneficial predators?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you remove diseased (e.g., fire blight) or infested (e.g., scale insects) branches and leaves from the orchard?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you remove dropped apples to eliminate a food source and habitat for apple maggot and voles?   |

## Reduced Pesticide Risk Actions

Pesticides are an important part of apple production but growers need to recognize the environmental and health concerns related to pesticide use. Consumers are demanding better pest control methods that reduce residues on food and protect the environment. Retailers are reacting to consumer demand by actively seeking products grown using Integrated Pest Management (IPM). The U.S. Environmental Protection Agency is increasing its scrutiny of pesticides to reduce food safety risks, particularly with regard to children.

Growers can take positive steps to respond to changes in the market and government policy. Safe pesticide use depends on your knowledge of the latest and best information. Growers need to keep abreast of the latest pesticide restrictions and bans imposed under the Food Quality Protection Act (FQPA) of 1996. Changes in registrations and labeled uses have started with actions involving azinphos methyl (Guthion), chlorpyrifos (Lorsban) and methyl parathion (PennCap-M). While organophosphates and carbamates are the initial concern, other chemicals will be reviewed for their health and safety impacts. Current information is as close as a pesticide's label. Even if you have used the product before, take the time every year to review its label.

Integrated Pest Management (IPM) offers a system to help growers reduce health and environmental risks related to the control of pests. IPM requires that growers have basic information to make appropriate management decisions. Growers must understand pest life cycles and gather current information about pest pressures. Early detection of problems offers growers more management options.

With this knowledge, growers can make best use of pesticides to control problems. IPM focuses on targeted use of pesticides for effective control. This may involve selecting pesticides that are specific to a pest problem or selectively applying pesticides to certain areas. But effective control also means following basic management practices such record keeping, sprayer maintenance, and nozzle selection.



IPM encourages growers to consider these options for controlling pests: pruning, mowing, planting disease-resistant varieties, mating disruption, use of predators.

Using these strategies, growers can lessen pesticide risks. Improved use of pesticides also can protect the health of grower and workers, and may also save you money.



## Harvest Practices

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Do you collect and properly discard dropped apples?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you avoid cross-contamination by requiring separate containers for dropped apples and hand washing after contact with dropped apples?                               |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you properly dispose of decayed, damaged or wormy fruit?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Are totes, bins and other storage containers cleaned before use in the field?  |
| <input type="checkbox"/> | <input type="checkbox"/> | When you stack containers, do apples in the lower container come in contact with the bottom of the upper container?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you inspect and discard containers that are damaged?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you avoid placing unused ladders on the ground?   |
| <input type="checkbox"/> | <input type="checkbox"/> | When carrying and climbing ladders, do individuals place their hands on the side rails where possible?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are workers instructed to wash their hands before starting work, after handling dropped apples, and after using the bathroom?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do workers and others who pick apples have convenient access to properly equipped hand washing stations and clean restrooms in the field and near the processing area? |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you provide workers with training about basic sanitation and good hygiene?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you exclude workers who have gastrointestinal illness, open wounds, and other symptoms of infectious diseases?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you require workers to cover wounds with waterproof bandages to prevent germs from spreading?   |



## Harvest Practice Actions

During harvest, apples may become contaminated with microbes from contact with the ground, packing boxes, and workers with poor hygiene or infectious diseases. Your goal is to reduce the chances that apples will come in contact with sources of contamination. Dropped apples, which should not be used in cider making, may pick up microbes from animal feces and other sources. Damaged or decayed fruit can support the growth of dangerous microbes.

The surfaces of storage containers can also harbor microbes. Unused containers should be stored to prevent access by rodents, birds and other wildlife. Your best protection is to wash containers thoroughly. You will undermine your efforts to keep containers clean if workers stand in bins during harvest. Stacking open or damaged containers may allow contamination to pass from apples in one container to apples in another.

Good handling practices for equipment include the proper carrying and climbing of ladders. They should be placed upright against walls or buildings when not in use. In regular use, footwear soils the rungs of a ladder. By not placing hands on the rungs, workers avoid a source of potential contamination of fruit.

Workers who handle fruit can transmit diseases such as Hepatitis A. Precautions start with clean hands. Supply soap, fresh water and single-use disposal towels for hand washing. Appropriate restroom facilities can prevent the spread of diseases. Without training, workers cannot be expected to take advantage of well-maintained facilities. Appropriate facilities and instructions on the importance of hand washing also are of importance if you run a pick-your-own operation. You should follow procedures to prevent the spread of disease by excluding sick workers and covering wounds.



## Processing

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Do you follow measures to prevent people who work in the field from carrying potential contaminants into the processing area?                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Before washing, are apples inspected, and is damaged or decaying fruit discarded?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Are brushes cleaned and sanitized periodically?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use chlorine or other sanitizing chemicals to kill microorganisms on apples?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Is wash water monitored using test strips or another method to maintain an adequate concentration of sanitizing chemicals?                        |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you take steps to prevent apples in a box from touching the bottom of a box stacked above?   |
| <input type="checkbox"/> | <input type="checkbox"/> | After each day's use, do you wash and sanitize lines, belts and other equipment that comes in contact with fruit?                                 |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you have a pest control system to minimize rodents, insects and other unwanted pests in the processing area?                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you prevent pets, livestock or wildlife come within 25 feet of areas where apples are processed or stored?                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you maintain the processing area and surrounding grounds free from waste, improperly stored garbage, and other conditions attractive to pests? |

## Processing Actions

The need for good sanitation and cleanliness carries over from the orchard to the processing area or packing house. You should make sure that people who process apples change footwear and clothing if they were picking apples, and wash their hands before beginning processing. You can avoid problems by using a separate crew to process apples.

Like those who work in the orchard, people who process apples need access to restroom and hand washing facilities, and should be instructed in the proper use of these facilities. They need to understand the importance of personal cleanliness and clean equipment. No worker should be permitted to handle fruit if they have uncovered wounds or infectious diseases. Brushes and any other equipment that touches apples should be regularly cleaned and sanitized to avoid the spread of contamination.

While washing apples is an important step in preventing contamination, it can become a source of contamination if wash water is re-circulated. By adding sanitizing chemicals to kill microorganisms, you can avoid the problem. The

concentration of sanitizing chemicals should be checked to ensure that it is adequate to kill germs. For example, active chlorine levels should be maintained at 100 ppm. Check with state regulators for more information on your options. Changing wash water daily also can reduce risks, and is particularly important if you are not taking adequate steps to sanitize your wash water.

Regular maintenance is important to sanitation. Every day you should wash and sanitize lines, belts and other equipment that comes in contact with fruit. As part of your housekeeping routine, you should take steps to prevent animals or pests entering the processing area. If you spray pesticides, make sure they are suitable for the task, and wash equipment after spraying.



## Cider Pressing

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Does your cider pressing facility meet state requirements for food processing such as a separate, closed room with solid walls and floors, and adequate plumbing including sinks, toilets and hand washing facilities?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Before pressing, do you re-inspect apples, and discard damaged or decayed apples?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use only filter cloths specifically designed for cider pressing and replace them as needed?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use only press frames made of food-grade plastic or wood properly protected by a food-approved coating?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Is the press rack and other equipment kept off the floor at all times?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Between runs, do you place filter cloths over a clean line or in a clean container?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use pumps and clear, self-draining tubing approved for food use?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use as much continuous tubing as possible and limit couplings to as few as possible?  |
| <input type="checkbox"/> | <input type="checkbox"/> | After each day's use, do you adequately clean all equipment to remove fruit particles and film and then sanitize the equipment?  |
| <input type="checkbox"/> | <input type="checkbox"/> | After each day's use, do you clean and sanitize press filter cloths, press rack and tubing?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you test sanitizing solutions to ensure proper concentrations?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you use new containers to package your cider?   |
| <input type="checkbox"/> | <input type="checkbox"/> | If you sell unpasteurized cider, does the container have the FDA required warning label? If you add preservatives, such as potassium sorbate or sodium benzoate, do you take steps to ensure that the proper amounts are added to your cider and that the container's label lists the preservatives? |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you keep records or label each container to enable you to identify the date the cider was pressed, the apples used in making the cider and where the container was marketed?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you have system to ensure that the oldest cider is sold first?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you enforce sanitation rules such as hand washing and hairnets or caps for workers?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you clean and sanitize surfaces that come in contact with food after pesticide spraying and before food processing?   |

- Do you follow precautions and restrictions when using pesticides and rodenticides to prevent the contamination of food or packaging materials with illegal and unsafe residues?
- Is waste water drained properly into the sewer or a septic system separate from the toilet system?
- Do you promptly remove and properly dispose of pressed pomace?

## Cider Pressing Actions

Pressing cider, like making apple butter or even caramelizing apples, is a form of processing that raises food safety concerns distinct from production, washing and packing of raw fruit. With food processing comes a new set of risks and responsibilities. Microorganisms (bacteria, yeast, and mold) that contaminate freshly packaged cider may come from (1) fruit, especially if it is picked from the ground or its surface is rotted, slightly decayed, or damaged, (2) the facility, equipment, and water, or (3) people involved in making cider.

As a general rule, requirements for processing facilities build on the basic concepts for washing and packing: maintain clean and sanitary conditions, ensure worker hygiene, and reduce contamination risks related to contact with the ground, pests or animals. Additional requirements include higher standards for facility design and construction to protect against contamination. Standards for workers may be detailed. For example, hairnets or caps may be required. Proper storage of processed foods may be required to prevent spoilage. Most importantly, government agencies must inspect and license facilities before they can operate.

Labeling also represents a difference between raw and processed foods. Packaged foods must have a label that lists: a. product name; b. ingredients; c. net quantity; d. the name, address, and zip code of the manufacturer, packer, or distributor; e. pack, open, pull, freshness, or expiration dates; and f. FDA warning label for cider that is not pasteurized or otherwise treated to kill 99.999% of pathogens such *E. coli* O157:H7.

Besides the basics, labels may include handling instructions (“keep refrigerated”) and required nutritional information.

Record keeping should be part of processing so you can document what goes into each container and where each container goes. To trace the origin of cider, processors often use lot or date coding.

For an extra margin of safety, you may wish to use a qualified laboratory test for generic (non-pathogenic) *E. coli* bacteria in two or more of samples from each orchard supplying freshly harvested apples. The presence of generic *E. coli* indicates that apples have been in contact with feces, possibly containing pathogenic microbes.

Pressing apples results in by-products, which must be properly disposed of. Consult local or state health department about proper disposal of pomace or wastewater.



## Risk Management and Liability

Now that you have evaluated the potential health and environmental risks in your pre-harvest, harvest, and post-harvest activities, take a few minutes for one final evaluation.

Every business owner has to manage their overall risk and legal and financial liability. Work through the checklist below, and wherever you check “yes” take appropriate steps to reduce liability. Doing so will help protect consumers’ health and your business.

- | Yes                      | No                       |  |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Have you checked with state and local agricultural, health or food inspection officials about the requirements for harvesting and handling apples?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Have you reviewed the rules regarding hand washing and toilet facilities, and other standards for harvesting, handling, and processing apples?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Have you checked with state and local agricultural, health or food inspection officials about licensing and other requirements for processing apples or making cider (e.g. sale of unpasteurized cider)?   |
| <input type="checkbox"/> | <input type="checkbox"/> | Have you reviewed the rules regarding facility design, plumbing, water quality, equipment, sanitation, and other standards for processing apples?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you meet legal requirements for providing workers safe and healthy working conditions, including protection from exposure to pesticides?  |
| <input type="checkbox"/> | <input type="checkbox"/> | Have you checked with officials responsible for agriculture and marketing, zoning, and farmers’ markets about permits or other requirements for selling apples or cider directly to the public (e.g. farm stands, market booths, home and restaurant deliveries)?                                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Do your product labels meet requirements for containers or packages, which include product name, ingredients, manufacturer’s name and address, freshness or other expiration dates, and FDA-mandated warning for cider that is not pasteurized or otherwise treated to eliminate dangerous microbes? |
| <input type="checkbox"/> | <input type="checkbox"/> | Do you make available food safety information to customers concerning safe storage (e.g. refrigeration of cider) and handling (e.g. washing and peeling raw fruit)?  |

- Do you have procedures in place to respond to potential food safety complaints such as the use of lot/code numbers to trace the origin of cider, and testing of samples for *E. coli* bacteria?
- Have you met the legal requirements for pesticide handling and application, including applicator training and certification, record keeping, pre-harvest intervals and draft management?
- If you advertise, do you only make claims that you can verify and do you make sure that you have met any legal requirements to make specific claims (e.g. organic, IPM, safe cider certification)?
- Do you maintain records to establish advertising claims you make or your compliance with certification requirements?
- Do you receive regular publications or updates that provide the latest food safety information about pesticide use and microbial contamination?
- Do you have a system to regularly assess and prevent environmental and health risks related to pesticides, including an emergency response plan for spills?
- Do you have a system for regularly identifying food safety and related health risks, and instituting actions to reduce those risks?
- Have you established a system to document and record that you correctly implemented actions to prevent environmental and food safety risks?
- Have you reviewed your insurance policy and consulted your insurance agent to determine whether you have coverage for risks such as people who become ill from consuming your product, neighbors or natural resources injured by pesticide drift or spills, employees whose actions injure themselves or others, and customers who injure themselves at your farm stand?
- Do you have an attorney who can provide advice about reducing legal risks and help you respond to legal problems?



## Resources

### General

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#### Extension contacts

- State and local contacts with the Cooperative Extension Service, CSREES,  
<http://www.reeusda.gov/statepartners/usa.htm>

#### Food Safety

- Gateway to Government Food Safety Information,  
<http://www.foodsafety.gov>
- Guidance for Industry Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables, Food & Drug Administration,  
<http://www.foodsafety.gov/~dms/prodguid.html>

#### Apples generally

- Pennsylvania Tree Fruit Production Guide 2000-2001, with sections on IPM and cider production, Penn State,  
<http://tfpg.cas.psu.edu/default.htm>
- Tree fruit publications, University of Wisconsin-Extension,  
<http://www1.uwex.edu/ces/pubs> (Look under Horticulture for publications on tree fruits.)

### Manure/Feces

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- Composting, Cornell University,  
[http://www.cfe.cornell.edu/compost/Composting\\_homepage.html](http://www.cfe.cornell.edu/compost/Composting_homepage.html)
- On-Farm Composting Handbook, NRAES-54, Natural Resource, Agriculture and Engineering Service, description, available at:  
<http://www.nraes.org/publications/nraes54.html>
- Fertilizing Fruit Crops, Michigan State University Extension, Bulletin E-852,  
<http://www.msue.msu.edu/vanburen/e-852.htm>

### Water Quality Protection

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- Farm\*A\*Syst and Home\*A\*Syst publications to protect private wells and prevent pollution by farm sources, available state-by-state  
<http://www.uwex.edu/farmasyst>
- Drinking Water Serving Temporary Farm Camps: Update and Action Plan, Washington State Department of Health  
<http://www.doh.wa.gov/Report/update.htm>

## Pest Management and IPM

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- Vermont Apple IPM Focus, University of Vermont,  
<http://orchard.uvm.edu/uvmapple/pest>
- 2000-2001 New England Apple Pest Management Guide, University of Maine  
<http://pmo.umext.maine.edu/apple/PestGuidePDF/2000-2001NEAPMGdirectory.htm>
- A Guide for Sampling and Managing Major Apple Pests in New York State, New York State IPM Program,  
[http://www.nysaes.cornell.edu/ipmnet/ny/fruits/tree\\_fruit/apple.man/contents.html](http://www.nysaes.cornell.edu/ipmnet/ny/fruits/tree_fruit/apple.man/contents.html)
- Disease Management Guidelines for Organic Apple Production in Ohio, Ohio State University,  
<http://www.caf.wvu.edu/kearneysville/organic-apple.html>
- Codling Moth and Leafroller Control with New Insecticide Chemistry, Washington State University Treefruit Research and Extension Center,  
<http://www.tfrec.wsu.edu/staff/jfb/growerarticles/newchems/newchems.pdf>

## FQPA

- Food Quality Protection Act (FQPA) of 1996 , USDA,  
<http://ipmwww.ncsu.edu/opmppiap/subfqpa.htm>  
and EPA,  
<http://www.epa.gov/opppsp1/fqpa/>
- Managing Apple Pests after FQPA, University of Maine Extension,  
<http://pmo.umext.maine.edu/apple/FQPAslides/sld001.htm>
- Agricultural Impact of the Sudden Elimination of Key Pesticides under the Food Quality Protection Act, Council for Agricultural Science and Technology Issue Paper Number 11,  
[http://www.cast-science.org/fqp1\\_ip.htm](http://www.cast-science.org/fqp1_ip.htm)

## Harvest and Processing

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- Postharvest Information Network-Apples, Washington State University Treefruit Research and Extension Center,  
<http://postharvest.tfrec.wsu.edu/applehome.php3>
- Fruit and Vegetable Crops Handling/Harvesting/StorageVideos, National Ag Safety Database (NASD),  
<http://www.cdc.gov/niosh/nasd/video/vidaph.html>



## Cider Making

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- Apple Cider Food Safety Control Workshop, July 15-16, 1999, Food & Drug Administration Center for Food Safety & Applied Nutrition,  
<http://vm.cfsan.fda.gov/~comm/cidw-toc.html>
- Cider Production, in The Pennsylvania Tree Fruit Production Guide,  
<http://tfpg.cas.psu.edu/part7/part71a.htm>
- Cider Stuff, Rutgers Cooperative Extension resource for information regarding the current public issues related to cider manufacturing,  
<http://www.virtualorchard.net/rce/ciderstuff.html>
- Fresh Apple Cider - Good Manufacturing Practices, University of New Hampshire Extension,  
<http://ceinfo.unh.edu/cider.htm>
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<http://www.mda.state.mi.us/hot/cidergmps/gmps.html>
- Good Manufacturing Practices Fresh Apple Juice, Cornell University  
<http://www.nysaes.cornell.edu/fst/faculty/mclellan/apple/gmps.html>
- Successful cider making: Sanitation is the Key, 15 minute video, \$20 order from Professor Steven C. Ingham, Babcock Hall 211, 1605 Linden Drive Madison WI 53706, scingham@facstaff.wisc.edu, 608-265-4801.

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- Guidance for Industry, Warning and Notice Statement Labeling of Juice Products Small Entity Compliance Guide, Food and Drug Administration,  
<http://vm.cfsan.fda.gov/~dms/juicguid.html>

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- Farm Employment Rules and Regulations, USDA Chief Economist's Office,  
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- Managing Farm Labor (G700), University of Missouri Extension,  
<http://muextension.missouri.edu/xplor/agguides/agecon/g00700.htm>
- Food Code, Chapter Two (Employee Health, Personal Cleanliness, Hygienic Practices), Food and Drug Administration,  
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## Risk Management and Liability

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- Summary of state food safety laws, National Association of State Departments of Agriculture,  
<http://www.nasda.org/nasda/nasda/Foundation/foodsafety/index.html>
- Search state statutes and regulations for current laws related to food processing and safety, Legal Information Institute, Cornell University.  
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- Search for state departments of agriculture for information related to food processing and safety, National Association of State Departments of Agriculture,  
[http://www.nasda.org/nasda/nasda/member\\_information/Csd.htm](http://www.nasda.org/nasda/nasda/member_information/Csd.htm)

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- The Legal Guide for Direct Marketing, available from Neil Hamilton for \$20 at Drake University Agricultural Law Center, Des Moines, Iowa 50311, more information available at Drake Law School publications,  
<http://www.law.drake.edu/lawCenters/agLawCenter/publications.html>
- Direct Marketing Alternatives and Strategies for Beginning and Established Producers, University of Wisconsin Extension A3602,  
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- Understanding the Farmers Comprehensive Personal Liability Policy: A Guide for Farmers, Attorneys, and Insurance Agents, Available for \$20 from the National Ctr. for Agric. Law Research and Info, 147 Waterman Hall, University of Arkansas, Fayetteville, AR 72701,  
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- Legal Framework for Risk Management, From the Train the Trainer Handbook, Risk Management Agency Online,  
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- Liability of Farm Employers, University of Missouri Extension (G451),  
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# Reducing Food Safety Risks in Apples

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