

# Food Safety Requirements and Considerations for Florida Citrus Growers<sup>1, 2</sup>

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## INTRODUCTION AND OBJECTIVE

Florida citrus growers have implemented voluntary *Good Agricultural Practices (GAPs)* to prevent, minimize, or eliminate contamination and hazards to human health. Essential components of the GAPs process include careful planning, implementation, and documentation of required steps and procedures that together analyze and minimize risks from biological, chemical, and physical hazards. The development of GAPs are based on sound science, including outbreak investigations and scientific literature.

More recently, GAPs are being updated to reflect the mandates outlined in the Produce Safety Rule (PSR) of the Food Safety Modernization Act (FSMA), which formalized and codified many of the previously voluntary GAPs that growers have practiced for years. Although important scientific information and FDA guidance related to PSR requirements are still lacking, enough is known to develop a practical framework. Food safety requirements related to citrus will evolve as new information comes forth. Growers represent the first step in the farm-to-table food chain. Requirements for all fresh-market citrus under the PSR follow many of the GAPs principles already in place, thus growers with a strong GAPs program will be well-positioned to transition smoothly into the regulatory environment.

The objective of this document is to present general GAPs principles and PSR requirements needed to plan, execute, and document production practices that will prevent, minimize, or eliminate the possibility of fruit contamination, and be in compliance with the PSR. The materials contained in this document are a combination of recommendations based on the best available science and minimum required standards outlined in the PSR. The distinction between voluntary GAPs recom-

mendations and PSR requirements is made in this document by the deliberate use of the words “must” and “should.” “Must” is used to denote PSR requirements and “should” is used to denote voluntary GAPs **best practices**. This document will be reviewed and updated as new risk data emerges and as the **PSR** guidance is released from FDA; this is not a comprehensive list of all PSR requirements.

## BACKGROUND

While the consumption of whole fresh-citrus fruit has not been associated with foodborne illness or injury, fresh citrus is covered by the PSR and GAPs represent important procedures that Florida citrus growers should follow to minimize the potential for fruit contamination. Many growers are already documenting production, harvest, and transportation practices before the farm gate as part of their normal operations to mitigate the potential for foodborne illnesses. Some fresh-fruit packers might be covered by the FSMA Preventive Controls for Human Food Rule (21 CFR Part 117)), others will be covered by the PSR, however postharvest and packing activities are not covered here. Citrus juice processors implement the *Hazard Analysis and Critical Control Point Program (HACCP)*, which is required by the FDA (21 CFR Part 120). Farm owners and managers who produce citrus intended for fresh-squeezed juice should be aware of and follow the Juice HACCP regulation (21 CFR Part 120).

In general, GAPs programs (<http://edis.ifas.ufl.edu/fs135>) address the potential risk of three types of contamination or hazards:

- Biological
- Chemical
- Physical

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*Biological hazards*, including *pathogens* such as bacteria, viruses and parasites, can lead to widespread foodborne illness if practices are not in place to minimize or eliminate product contact with such contamination. There are many routes biological hazards may take to contaminate produce. Biological contamination can occur by contact with feces. Direct contact may be through untreated or improperly treated manure used as soil amendments or when animal feces contacts fruit in the grove. Indirect contact can include transfer from contaminated soil, water, bins, gloves, equipment, and hands or clothes of field workers onto produce during production, harvesting or handling.

*Chemical hazards* can include residues of agrochemicals, sanitizers, and pathogen toxins that may be present in or on fruit. While agrochemicals can enhance production of horticultural commodities and are valuable tools for growers, practices should document that materials were applied only according to label instructions, because *the label is the law*.

*Physical hazards* can include hard or sharp objects in food that may result in personal injuries. Such objects, if present, are removed during sorting and culling of citrus fruit.

While acknowledging the potential for chemical and physical hazards to exist, the FSMA PSR focuses exclusively on biological hazards and relies on proper implementation of GAPs programs to prevent the introduction of chemical or physical hazards into the food supply.

## MANAGEMENT AND PERSONNEL RESPONSIBILITY

Food safety is a shared responsibility; the collective efforts of growers, processors, packers, and shippers of fresh and processed citrus products are essential to ensure a safe and wholesome product. Each company must specifically designate an individual or team that is responsible for implementing food safety programs and ensuring compliance with the requirements of the PSR. For absentee landowners not directly involved with citrus production, grove caretaking companies or independent consultants may serve in this role through contractual agreement.

At least one supervisor or representative must have received food safety training at least equivalent to the standardized curriculum recognized as adequate by FDA. Successfully completing a Produce Safety Alliance Grower Training course is a way to fulfill this requirement (<https://producesafetyalliance.cornell.edu>). Day-to-day duties and many other key food safety responsibilities can be and are delegated to qualified staff or other third-parties but should be overseen by a responsible supervisor or representative.

## WORKER TRAINING, HEALTH AND HYGIENE

Proper worker hygiene is critical for food safety. Without it, employees who work with citrus fruit may increase the risk of transmitting foodborne illness. A review highlighting information and requirements of field sanitation (OSHA Standard 1928.110) is available from UF/IFAS (<http://edis.ifas.ufl.edu/pdffiles/OA/OA12000.pdf>) and expands on many of the subjects discussed below.

### Health and Hygiene Facilities

Poor management of wastes in the field can significantly increase the risk of contaminating produce. A minimum of one toilet and one hand-washing facility must be maintained for every 20 employees. For both regulatory compliance and workers' convenience, hand-washing and toilet facilities must be located either within a one-quarter-mile walk or five minute drive. Such facilities are not required for employees who do field work for three hours or less each day. For details, see OSHA 29 CFR part 1928.110 – Field Sanitation, and Florida Administrative Code, Rule 64E-14.016 – Field Sanitation.

### PSR REQUIREMENTS

- Toilet and handwashing facilities must be provided during harvesting activities.
- Toilet facilities must be designed, located, and maintained to be directly accessible for servicing.
- Handwashing facilities must be furnished with running water. Water must not contain detectable generic *E. coli* in 100 ml.
- Handwashing facilities must also be well stocked with soap and hand drying devices which may be single-use towels (best practice) or electric dryers.
- Wash and rinse water and garbage must be contained for proper disposal after use.
- Toilet handwashing facilities must be fully serviced on a regular schedule.

### BEST PRACTICES

- Handwashing and toilet facilities should be monitored every day when in use. Monitoring activities should be documented.
- Handwashing facilities should be furnished with running potable water.
- Post signs indicating that water is only for hand washing purposes (best practice).
- Place portable toilets outside the immediate crop production area (best practice) but within one quarter-mile of where workers will be working.
- Toilet facilities should be maintained in clean condition. Keep on file any documentation for maintenance and servicing of toilet and hand-washing facilities.

Keep facilities well supplied with toilet paper, water, soap, and paper towels. Provide a trash container for used hand towels.

- Toilets should be serviced and cleaned to ensure proper use (i.e., employees don't avoid proper use of toilet due to smell or filth). When toilets should be cleaned or serviced near the field, use appropriate barriers to prevent contamination in case of an accidental leak or spill.
- Have a mitigation plan in place so that pickers and supervisors know the company response policy in the event of sewage spill.
- First aid kits should be available, stocked, and monitored.

## Health and Hygiene Practices

Basic practices to ensure worker health and hygiene are necessary in any field activity, especially when workers handle fruit and fruit contact surfaces. The PSR lists health and hygiene practices that must be followed.

### PSR REQUIREMENTS

- Workers must maintain personal cleanliness.
- Avoid contact with animals (other than working animals).
- Maintain gloves in a sanitary condition (if used for harvesting).
- Remove or cover hand jewelry that cannot be cleaned (when handling fruit or fruit contact surfaces).
- Eating, chewing gum, and tobacco use must be limited to non-fruit production areas. OSHA requires potable water readily accessible to all employees and drinking beverages is permitted in designated areas.
- Workers must be instructed to notify their supervisor if they are ill. Growers must take measures to prevent contamination of covered produce and fruit contact surfaces with microorganisms of public health significance from any person with an applicable health condition (such as communicable illnesses that present a public health risk in the context of normal work duties, infection, open lesion, vomiting, or diarrhea).
- Hands must be washed thoroughly with soap and running water and dried before starting work, before putting on gloves, after using the toilet, after breaks, after touching animals or manure, and any other time hands may have become contaminated.

### BEST PRACTICES

- Supervisors should observe employee behavior to ensure workers follow food safety practices.
- Workers who display symptoms of infectious disease (infection, open lesion, vomiting, or diarrhea) should either be assigned tasks that prevent them from coming in direct contact with fruit or sent home.

- Workers with visible open wounds or sores should cover them sufficiently (for example, hand wounds should be bandaged and gloved) to prevent bodily fluids from contacting fruit.
- Discard any fruit that may be contaminated from worker illness or injury.
- Clean and sanitize any items that came in contact with bodily fluids.
- Workers should report all injuries to a supervisor.

## Employee Food Safety Training

Begin with a written employee-training program. The PSR requires a written record that documents the dates training was conducted, personnel trained, and content of training. All personnel must receive food safety training appropriate to their specific job duties at least annually.

### TRAINING FOR EMPLOYEES MUST:

- Cover the topics of:
  - Principles of food hygiene and food safety.
  - Recognizing symptoms of foodborne illness and the importance of personal hygiene for all personnel and visitors, including instructions on reporting applicable health conditions (illness or injury) to a supervisor.
  - Other training relevant to the worker's job.
  - For harvest workers:
    - Recognizing citrus that must not be harvested, including citrus that may be contaminated with known or reasonably foreseeable hazards including dropped citrus.
    - Inspecting harvest containers and equipment to ensure that they are functioning properly, clean, and maintained so as not to become a source of contamination of citrus with known or reasonably foreseeable hazards.
    - Correcting problems with harvest containers or equipment, or reporting such problems to the supervisor (or other responsible party), as appropriate to the person's job responsibilities.
- Be appropriate for the job and conducted upon hiring.
- Include refresher training throughout the season (at least annually) or when a problem arises.
- Be easily understood.
- Be supervised by a qualified person.
- ***Be documented, including the date of training, topics covered, and individuals trained.***

### TRAINING FOR EMPLOYEES SHOULD ALSO COVER:

- What to do if they become ill or injured in the grove.
- Location of first aid kits.
- Reporting of illness and injuries.

## WATER

Citrus production relies on water supplies for several field operations including irrigation, freeze protection, and the application of agrochemicals. Moreover, water is used in cleaning hands and equipment. Water can be a direct or indirect source of contamination, so policies and procedures should be in place to minimize the risk that may be imposed. Water that is intended or likely to contact fruit or fruit-contact surfaces is called *agricultural water* by the PSR and presents a higher level of risk than water that does not contact fruit or fruit-contact surfaces. Different sources of *agricultural water* can also present different levels of risk, with untreated surface water representing a higher level of risk than ground water or treated water. These risk factors should be weighed when considering best uses of different water supplies (e.g., using higher risk water sources for lower risk applications and vice versa). For example, untreated surface water could be used for seepage or under-canopy irrigation while ground water, municipal water, or properly treated surface water must be used for handwashing of harvest workers. For more information regarding water GAPs, refer to <http://edis.ifas.ufl.edu/fs136>.

### Water for Field Use

*Agricultural water* quality must be safe and adequate for its intended use and meet all applicable federal, state, and local laws and regulations.

Note that *agricultural water* will need to meet specific PSR criteria, FDA is currently reviewing the agricultural water criteria in the PSR and we anticipate FDA clarification around *agricultural water* requirements.

### PSR REQUIREMENTS

- *Agricultural water* distribution systems must be assessed for potential food safety hazards at least annually, with consideration given to the type of water source (e.g., surface, ground), control and protection of each source (e.g., deep well, shared canal), adjacent land use, and maintenance issues, including keeping the source free of debris, trash, and domestic animals. The annual inspection of the water system must be documented.
- Water used in foliar (i.e., fruit contact) applications can be obtained from 1) municipal, treated water sources, 2) ground water obtained from a properly constructed well [<http://edis.ifas.ufl.edu/fe603>] in good condition, and/or 3) surface water that is suitable for its intended use (e.g., as shown through microbial testing and visual inspection).
- Water sources used for foliar applications (i.e., fruit contact) must be tested routinely as needed and records of water quality maintained. Treated water and municipal water do not require testing. FDA is currently readdressing the microbial water quality criteria.

- Wells must be inspected for cracks, leaks etc. and records of repairs kept.
- Results of a microbial analysis of a water source from a public entity, such as local water authority, may serve as acceptable documentation in lieu of testing by the grower, and must be kept on file.
- Domestic animals, trash, and debris must be excluded from surface water used for foliar application to the extent practicable.

### BEST PRACTICES

- Well water used for foliar applications should be drawn from properly engineered and protected sources. Wells should be properly cased and above grade.
- Surface water sources should be assessed for runoff risks from adjacent landuse and upstream water activities that may affect microbial water quality, including sewage discharges, wildlife, or manure runoff. Use berms or ditches to minimize runoff where necessary.
- Extend the amount of time between the last foliar application of agricultural water and harvest as much as possible to allow time for microbial die-off.
- Backflow prevention devices should be used.
- If water testing results are higher than expected, take action as soon as possible to investigate water sources for possible causes and implement corrective actions.

## SOIL AMENDMENTS

*Biological soil amendments of animal origin* are identified in the PSR as the soil amendments most vulnerable to microbial contamination. *Biological soil amendments of animal origin* are anything that includes manure, bone meal, blood meal, feather meal, fish emulsions, or other animal-based products or by-products, including any liquid “teas” made with those animal-based products. *Biological soil amendments of animal origin* and municipal *biosolids* can serve as effective and safe fertilizer if proper treatment and application procedures are in place. Such treatment procedures can include *composting* to reduce microbial pathogens in number and thereby the risks associated with their presence in soil amendments. The PSR outlines the criteria to determine whether a *biological soil amendment of animal origin* is considered treated or untreated, and such designation determines the allowable application methods and minimum application-to-harvest intervals. Only specific composting methods can be used to produce treated amendments, and certain treatment conditions must be monitored and documented. Currently, FDA does not intend to take exception to growers using (raw) manure in compliance with National Organic Program standards. Additional research and risk assessments are being conducted to determine an appropriate time interval between application of raw manure and crop harvest. The PSR does not restrict use of Class A biosolids. Detailed GAPs related to manure and biosolids are available at <http://>

edis.ifas.ufl.edu/fs150. Compost made from pre-consumer vegetative waste is not regulated under the PSR. Preventing fruit from touching the ground will greatly reduce the potential for contamination. In cases where fruit may fall to the ground, they must never be harvested for use in the fresh market.

### PSR REQUIREMENTS

- Obtain certificate of conformance annually from compost suppliers to demonstrate the compost treatment process met PSR requirements for treated compost (required if using purchased compost in a way that it may contact fruit during or after application).
- Untreated compost must never be applied in a way that contacts fruit during application.
- Compost must be handled and stored in a location and manner to minimize potential for contamination of citrus fruit and surface waters.

### BEST PRACTICES

- Document the source of the soil amendment, compost producer, amount used, and when and how it was applied.
- Record the type of application, and time interval between application and harvest.
- Only use biological soil amendments that have been properly composted.
- Apply compost in a way that prevents contact with fruit.
- Designate specific tools and equipment for handling biological soil amendments.

## ANIMAL CONTROL

Wildlife and domestic animals, including but not limited to dogs, cattle, rodents, hogs, deer, reptiles, amphibians, and birds may serve as sources of contamination. While minimizing animal contact with fresh produce also minimizes the risk of product contamination, it is understood that wildlife is difficult to control in grove settings. Growers should balance these management efforts with their responsibility for environmental stewardship; this is commonly referred to as co-managing food safety and ecological health ([http://caff.org/wp-content/uploads/2011/09/Safe\\_\\_Sustainable1.pdf](http://caff.org/wp-content/uploads/2011/09/Safe__Sustainable1.pdf)).

### Domestic Animals

The activities of domestic animals are the easiest to manage and their access into production, packing, and equipment-storage areas should be prevented. If not totally excluded (e.g., in the case of guide or guard dogs), reasonable precautions should be taken to prevent contamination.

### BEST PRACTICES

- Fencing or other barriers should be maintained to prevent intrusion by neighboring cattle or other domestic livestock, as appropriate.

- Have a policy in place to mitigate fecal material deposited by domestic animals from the grove to the extent possible.

## Wild Animals

Growers are not expected to take extraordinary measures to exclude all animals from outdoor growing areas or to destroy wildlife habitat. However, if there is a reasonable possibility that animals will contaminate crops, the grove areas must be monitored for evidence of animal intrusion immediately prior to harvest and as needed throughout the year. Fruit visibly contaminated with feces must not be harvested.

### PSR REQUIREMENTS

- Immediately prior to and during harvest activities, you must visually assess the growing area and fruit to be harvested for evidence of fecal contamination.
- Fruit with visible fecal contamination must never be harvested for the fresh market.

### BEST PRACTICES

- To the extent possible, minimize animal attractants by discarding old equipment and containers, and removing excess water from the field.
- Storage areas should be inspected for rodents, birds and insects, and use pest control procedures (e.g., traps, screens, etc.) to minimize pests.
- Keep cull and debris piles away from crop production areas.
- Have a policy in place to look for and mitigate risks from fecal material deposited by wild animals from the grove to the extent possible.
- Monitor for animal intrusion throughout the year and take corrective actions when necessary.
- Fruit with visible fecal contamination should be removed from the grove.

## AGROCHEMICAL USE

Neither the PSR or this document is intended to provide guidance for pest management practices (for this guidance, please see the *UF/IFAS Citrus Production Guide*).

Agrochemicals such as sanitizers, disinfectants, fungicides, insecticides, and herbicides can enhance production, quality and the safety of horticultural commodities when used according to their product label. Pesticides are closely regulated by the Environmental Protection Agency (EPA), and EPA approval of each pesticide formulation includes specific limitations regarding the means by which the agrochemical may be applied, conditions of application, labeled rates, target organisms against which the chemical may be employed, use restrictions, and requirements for pesticide disposal and its containers.

EPA also has the responsibility to determine tolerances or exemptions from tolerances for pesticide residues on raw agricultural commodities in the US. Residue tolerances for export markets are regulated and enforced by their respective countries. Proper pesticide use involves close working relationships among citrus growers, packers, shippers, and processors. A table of citrus maximum residue limits (MRLs) for domestic and several export markets is available at <http://edis.ifas.ufl.edu/cg087>.

## Pesticides

As part of GAPs documentation, labels and SDS sheets of pesticides that are used should be kept on file and a detailed written procedure for the application of all pesticides should be recorded. Pesticide labels clearly state the maximum allowable rate, methods of application, and the target organism. Using a pesticide in a manner inconsistent with its label, including for a purpose not specifically identified on the label, constitutes a violation of federal and state law. Florida law requires maintaining specific records for Restricted Use Products (i.e., products for which use and application is restricted to certified applicators or under the direct supervision of such) that include the EPA registration number, the date each pesticide was applied, the quantity used, and where and how the application was made. For additional information and requirements, see the Florida Department of Agriculture and Consumer Services, Pesticide Applicator Licenses website (<http://www.freshfrom-florida.com/Divisions-Offices/Agricultural-Environmental-Services/Business-Services/Pesticide/Pesticide-Applicator-Certification/Pesticide-Applicator-Certification-Licensing>).

## EPA REQUIREMENTS

- Use only pesticides registered for the citrus variety to be treated.
- Follow all label requirements. Remember, **“The label is the law!”**
- Meet all federal, state, and local pesticide application, field posting, preharvest intervals, and documentation requirements.
- Verify proper licensing and registration of sub-contractors, custom applicators, and crop advisors, etc.
- Document compliance with EPA’s Worker Protection Standard (<http://www.epa.gov/agriculture/htc.html>).

## FIELD SANITATION, HARVEST, AND TRANSPORT

Fresh citrus can become contaminated when contacted by soil, soil amendments, water, workers, and harvesting equipment during growing and harvest activities. General sanitation of the grove, bins, and equipment is necessary to prevent contamination of fruit with biological hazards.

## PSR REQUIREMENTS

- Harvesting equipment such as gloves, hand tools, and picking sacks must be routinely cleaned and, as appropriate, sanitized. Non-fruit contact surfaces must also be cleaned, and as appropriate, sanitized when necessary (e.g., if tractor tires become contaminated with raw manure).
- A record must be kept that documents the date and method of cleaning and sanitizing equipment used for harvesting activities.
- Picking bins must be maintained free from debris and contaminants. A pressurized sprayer with a labeled cleaning agent can be an effective means to remove field dirt.
- Inspect bins for evidence of fecal contamination. Clean and sanitize as needed and document.
- Exclude from the fresh market all fruit that touch the ground or are visibly contaminated with fecal matter.
- The vehicle must be cleaned and sanitized if evidence of debris, animal manure, or other raw, animal by-product exists

## BEST PRACTICES

- Bins should be used only for the purpose of holding and transporting fruit. Any out-of-service bins used for storage need to be clearly marked and never returned to service. Separate, segregate, and dispose of fruit if exposed to hydraulic oils or other chemical contaminants from harvesting equipment. Good hygienic and sanitation practices should be used when loading, unloading, and inspecting produce.
- Inspect transportation vehicles for obvious dirt and debris before loading.
- Load produce carefully to minimize physical damage.

## TRACEABILITY AND RECORD KEEPING

A written food safety plan is central to successfully implementing any GAPs program, although a full food safety plan is not required by the PSR. Having records to document these practices, and the resulting traceability benefits, are vital to the GAPs process. Documentation, including records of all corrective actions, is required to prove to regulatory agencies, handlers, and retailers that you are following GAPs. Such documentation is important to demonstrate that proper procedures (e.g., cleaning and sanitation) were followed.

Traceability is an important part of GAPs documentation. *Trace-back* is the ability to track food back to its source. *Trace-forward* is the ability to identify all receivers of your citrus fruit from a given grove or source. It is critical that growers establish tracking systems from the earliest stages that follow their fruit within

the distribution system. This system includes supply-chain partners involved in processing, packing, storing, shipping, and transporting Florida citrus fruit. Both traceback and traceforward actions are necessary to identify the potential source of any safety problems that might occur, and for supply chain-partners to implement targeted recalls efficiently and effectively. GAPs forms should be readily available or collected together in a single location for ease of rapid access in the event that fruit is associated with an alleged contamination issue. For more information about preparing for and conducting a recall, see the *UF/IFAS Food Recall Manual* (<http://edis.ifas.ufl.edu/fs108>).

Basic sample record-keeping forms of the records that are required under the PSR are available online (<https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Records-Required-by-the-FSMA-PSR.pdf>), but these are not intended to replace other required state report forms or forms prescribed by your packer or processor as part of their quality management systems. While they represent excellent examples, forms should be adapted to fit individual operation needs.

In addition to the documentation and record keeping indicated in this document, each load of harvested product should include the source of the product, the date of harvest, farm identification, and a record of who handled the product. These may include properly completed Trip Tickets (<https://www.flrules.org/gateway/chapterhome.asp?chapter=20-2>).

## PSR REQUIREMENTS

- Potential records required, as applicable, under the PSR include:
  - Documentation supporting an exemption from some PSR requirements (e.g., if all fruit will go to pasteurized juice, or if a grower sells less than \$25,000 in total produce annually averaged over previous three years). Must be reviewed, dated, and signed.
  - Worker training records are required that document the date of training, topics covered, names of persons trained. Must be reviewed, dated, and signed by supervisor or responsible party.
  - The annual inspection of the agricultural water system must be documented. A review of this record is not required but is a best practice.
  - Documentation of agricultural water testing results.
  - Documentation of scientific data or information used to support the adequacy of water treatment methods, as applicable.
  - Documentation of corrective measures taken if agricultural water does not meet water quality criteria (currently under FDA review).
  - If municipal water is used, annual records from the public water system must be kept.

- If treated biological soil amendments are purchased, certificates of conformance from the supplier are recorded; if biological soil amendments are treated onsite, records of treatment are required.
- Records must be kept to document cleaning and sanitizing of equipment. This record must be reviewed, dated and signed by a supervisor or responsible party.
- All required records must include:
  - The name and location of the farm.
  - Actual values and observations obtained during monitoring.
  - Growing area location (grove identifier).
  - The date and time that the activity was observed and documented.
  - All required records must be:
    - Retrievable within 24 hours of official request.
    - Kept for at least two years beyond the date created.

## BEST PRACTICES

- Ensure a food safety plan and traceability plan are in place.
- Organize all documentation so that records can be accessed quickly.
- Demonstrate that product can be traced one step forward and one step back.
- Include tracking information with each citrus load (e.g., fruit source, harvest date, harvest crew, etc.). This can usually be satisfied with a properly completed Trip Ticket.
- Mark records as “Confidential” to reduce the likelihood that farm records would be released in response to a Freedom of Information Act (FOIA) request submitted to FDA should FDA obtain or copy farm records.

## SUMMARY

It is important to ensure the food safety of all citrus commodities in order to maintain consumer trust. As with other commodities, producers of fresh-market Florida citrus should follow the guidelines and requirements outlined above. Audit tools generally follow these guidelines quite closely, although individual customers often impose requirements of their own that should be addressed.

## GLOSSARY

**agricultural water (FSMA definition).** Water used in FSMA-covered activities on FSMA-covered produce where water is intended to, or is likely to, contact covered produce or food-

contact surfaces, including water used in growing activities (including irrigation water applied using direct water application methods, and water used for preparing crop sprays) and in harvesting, packing, and holding activities (including water used for washing or cooling harvested produce and water used for preventing dehydration of covered produce). This definition differs from the definition given in the Good Agricultural Practices guide because (i) it is not limited to water in the growing environment and (ii) water that does not contact covered produce is excluded.

**biological hazards.** Organisms, often microscopic, that can cause harm to human health and include pathogenic bacteria (e.g., *Salmonella* and *E. coli* O157:H7), viruses (e.g., *Hepatitis* and norovirus) and parasites (e.g., *Giardia* and *Cryptosporidium*).

**biological soil amendments of animal origin.** Consists in whole or in part of materials of animal origin, such as manure, or non-fecal animal byproducts, including animal mortalities, or table waste, alone or in combination; this does not include any form of human waste.

**biosolids.** Products of human sewage treatment facilities that may be applied to cropland as a fertilizer or soil amendment.

**chemical hazards.** Pesticides, sanitizers, etc. that may cause illness, injury or death when not used according to label instructions.

**composting.** A process in which organic material is decomposed by the actions of microorganisms for a designated period of time at a designated temperature (e.g., 3 days at 131°F (55°C)), followed by a curing stage under cooler conditions.

**covered activity.** An activity regulated by FSMA produce safety rule, specifically growing, harvesting, packing, or holding covered produce.

**covered produce.** Produce that is subject to FSMA produce safety rule; the harvestable or harvested part of the crop (excluding specific exemptions).

**Good Agricultural Practices (GAPs).** Science-based standards that can be implemented or adapted to regular farming practices to ensure that the crops grown and harvested are free from contamination.

**Hazard Analysis Critical Control Points (HACCP).** A risk-based system that identifies dangers to food safety and develops controls to minimize risks to food safety during storage, handling, processing, and selling.

**pathogens.** An organism that can cause disease in another organism (i.e., humans).

**physical hazards.** Physical objects such as hard or sharp glass, metal, or wood debris that can cause personal injuries.

**potable water.** Water that meets the quality standards of human drinking water.

**traceback.** A system of recordkeeping that allows for rapid identification of the origin of a food product and all production and subsequent handling treatments and conditions imposed on it.

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