

Food Safety Programs and Auditing Protocol for the Fresh Tomato Supply Chain, 2019 Greenhouse

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1. Management Responsibility				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
1.1	Operation has current copies of the <i>Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain, Food Safety Programs and Auditing Protocol for the Fresh Tomato Supply Chain</i> and additional food safety documents as required by state and/or federal regulation.	Operation has a current copy of the Guidelines, this audit document and all other required documents.	Auditor observes the current copies at the operation.	Operation obtains current copies.
1.2	Operation has procedures for conducting self-audits, and conducts self-audits to verify compliance with established internal policies and procedures.	In addition to the requirements of the Harmonized Standards, the operation's self-audit procedure ensures compliance with established internal policies and procedures, the <i>Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain</i> , these Tomato Metrics and additional food safety documents as required by state and/or federal regulation.	Auditor reviews the self-audit procedures, and records of self-audits to verify compliance with the procedures.	Operation develops and maintains self-audit program, with corrective actions preventive measures, documentation and follow-up.

2. Greenhouse				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
2.1	The greenhouse shall be enclosed.	The greenhouse shall be permanent or temporary structure, sufficiently enclosed to maintain a controlled environment. This does not apply to open structures such as shade or hoop houses, which should operate according to the auditing protocol for Open Field Production, Harvest and Field Packing.	The Auditor shall inspect the structure for compliance with this definition.	If the structure is not in compliance, either the facility must be brought into compliance or different audit criteria (i.e., auditing protocol for Open Field Production, Harvest and Field Packing) should be used.
2.2	A foot dip station or other measure should be used to prevent the introduction of harmful microorganisms or agents and a written record of the sanitizer and maintenance kept.	If the facility has determined that footborne contaminants are a risk to food safety, they shall have procedures that effectively prevent contaminants from being brought into the greenhouse on shoes. This could be by means of chemical disinfectants in foot dips, sprays or boot wash, or by means of a shoe change procedure. If chemical disinfectants are used, the chemical shall be used according to label instructions and monitored at a frequency sufficient to assure continual effectiveness, and records shall be maintained to demonstrate compliance.	If the facility is using footborne contamination controls, the auditor shall review the procedure, and will observe whether those procedures are being followed at the time of the audit. The auditor shall also review any associated records, including the label instructions for any chemical disinfectants used, for evidence of compliance with the facility's procedures.	If the facility is using footborne contamination controls, they shall develop or implement the procedures to be effective, including training in their use.

3. Soil and Soil Amendments				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
3.1	Soil or other growth medium shall be stored in a manner that minimizes opportunities for contamination.	If soil or growth medium is stored on-site, it is held in a sanitary manner to ensure it is not a source of contamination. Procedures for storage of growth media shall comply with prevailing laws or regulations in the location of the greenhouse.	The auditor shall observe storage location and procedures for evidence of compliance.	Operation develops a written procedure and provides training. If there is evidence of contamination of public health significance, the medium shall not be used.
3.2	Fertilizer manufacturer's instructions for usage and storage shall be followed.	Non-organic fertilizers must be used and stored in compliance with label instructions and any prevailing federal, state or local regulations. Fertilizer uses shall be documented.	Auditor reviews non-organic fertilizers used, storage location and application records.	Perform training on fertilizer handling and recordkeeping procedures, as needed.
3.3	If fertilizers containing manures or composts are used, only properly treated (composted or heat treated) manures are allowed for use in greenhouses. Biosolids are not permitted.	Soil amendment use records are available, reviewed and current (conventional or organic). If treated manures are used, records of composition, dates of treatment, methods utilized, application dates and letter of guarantee, certificate of analysis (COA) or any test results or verification data demonstrating compliance with process or microbial standards must be documented. For non-composted animal by-products-containing soil amendments, the operations shall retain a certificate or letter showing the lethality of the process. Compost applications shall be no less than 45 days prior to harvest.	Auditor reviews the amendment use documents and records demonstrating compliance with prevailing national or local established composting or heat treatment standards or guidelines.	Operations must obtain the necessary documents. If the documents cannot be obtained, crop cannot be harvested for that crop cycle.

4. Preharvest Agricultural Water				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
4.1	Non-Foliar The water test meets FDA <i>E.coli</i> standards for foliar application of water as described in 21 CFR § 112.44(b).	Written procedure requires a BAM or other testing procedure validated for generic <i>E. coli</i> quantitation in water.	Auditor reviews water test results and any corrective actions taken to bring the water source into compliance.	Perform a sanitary survey for each affected water source, perform any remedial action as required and retest. If the retest also exceeds the standard, further evaluate potential corrective actions, such as treatment, retreatment, or discontinue use of source.
4.2	Foliar The water test meets FDA standards for water in 21 CFR § 112.44(a); i.e., no detectable generic <i>E. coli</i> in 100 milliliters (mL) of agricultural water.	Written procedure requires a BAM or other testing procedure validated for generic <i>E. coli</i> quantitation in water.	Auditor reviews water test results and any corrective actions taken to bring the water source into compliance. If tomatoes have been contacted with non-compliant water, auditor reviews the risk assessment and disposition.	Perform a sanitary survey for each affected water source, perform any remedial action as required and retest. If the retest also exceeds the standard, further evaluate potential corrective actions, such as treatment, retreatment, or discontinue use of source. Operation shall evaluate tomatoes that have been contacted with non-compliant water to assess food safety risk. The assessment is documented and tomatoes dispositioned accordingly.

5. Pesticide Usage				
5.1	Water used to mix pesticides meets FDA <i>E. coli</i> standards for water in 21 CFR § 112.44(a); i.e., no detectable generic <i>E. coli</i> in 100 mL of agricultural water.	Operation has a written policy requiring foliar-application pesticides to be diluted only with water that meets FDA microbial standards for post-harvest agricultural water. Operations will have documentation demonstrating compliance, such as test results for the water source used.	Auditor reviews the policy and inspects pesticide mixing and application records.	Operation develops a written policy. Retraining of pesticide applicator as needed. If unknown or non-drinking quality water was used to prepare pesticides, then test the water source for compliance with drinking water <i>E. coli</i> standards. Do not harvest product unless test results demonstrate compliance.
6. Tomato or Equipment Sanitizing Agents Used During Harvest				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
6.1	All compounds used to clean or sanitize food contact containers, tools, utensils, equipment or other food contact surfaces are approved for that use by the US EPA, FDA or other prevailing agency. Actual use conforms to label directions.	Documentation is available to demonstrate that cleaning and sanitizing products are approved for their use, and are used according to label directions. Sanitizing chemicals uses shall be documented.	Auditors review documentation and supplies to confirm approved use, and interview individuals responsible for their use for knowledge of approved use. Auditor reviews records of use, and visually observes use, to verify compliance with label directions.	Non-compliances are corrected on-site. Records are reviewed for potential product adulteration. Retraining is performed.
6.2	Chemicals used on product that are not registered pesticides may be permitted for food contact use if allowed under regulations of the FDA or prevailing agency.	Any product contact chemicals not specifically approved as registered pesticides shall be identified, the authority permitting their use identified and their uses documented.	Auditors review documentation and supplies to confirm approved use, and interview individuals responsible for their use for knowledge of approved use. Auditor reviews records of use, and visually observes use, to verify compliance with label directions.	Non-compliances are corrected on-site. Records are reviewed for potential product adulteration. Retraining is performed.

7. Equipment, Containers and Packaging Materials				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
7.1	Operation has a written procedure for inspecting incoming packaging material.	All packaging materials are inspected for evidence of contamination upon arrival. Results are recorded.	Auditor reviews procedure and examples of packaging and receiving records for compliance.	Operation creates or revises policy. Contaminated or adulterated packaging material is rejected or discarded. Retraining is performed.
7.2	Finished product containers are prohibited from direct contact with the floor, and pallets, slip sheets, and supports used to keep product containers off the floor are clean and in good condition.	Operation has a policy prohibiting finished product containers in direct contact with the floor, and that pallets, slip sheets, and supports used to keep product containers off the floor are maintained so as not to be a source of contamination.	Auditor reviews policy and examines finished product staging and storage areas and pallets, slip sheets, and supports for compliance with the policy.	Operation creates or revises policy. Non-compliances are corrected on site. Retraining is performed.
8. Cleaning and Washing Procedures - Product Wash Water Management				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
8.1	In systems where tomatoes are submerged or dwell in water, water temperature is monitored and controlled. Water temperature should be at least 10°F above average pulp temperature of tomatoes when entering the water.	Operation shall have methods for determining average pulp temperature of a minimum of 5 tomatoes, a procedure for control of water temperature, shall monitor temperature at a prescribed frequency sufficient to assure continuous compliance (minimum of hourly) and shall maintain records of water temperature. Operation shall have a procedure as to what corrective actions are taken if criteria are not met. Water spray or shower systems, wherein tomatoes are not submerged or dwell, do not require temperature control.	Auditor shall review the procedure and shall review records of temperature monitoring. Auditor observes process including the operation's sampling of pulp and water temperatures. Auditor reviews records for deviations and their disposition.	Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at temperatures less than the average measured pulp temperature shall be discarded back to the last evidence of compliance.

8.2	Operations utilizing spray systems in place of whole tomato immersion shall design the line so that the entire tomato surface is rinsed.	Spray systems shall be designed such that rinse water contacts all surfaces of the tomato.	Auditor observes spray system for compliance.	Equipment or process is redesigned or retrofitted to ensure all surfaces of tomato are contacted.
8.3	If water quality is based upon a chlorine-based sanitizer, the process shall be targeted to be at least 100 ppm free available chlorine (FAC), measured at the exit of the product from the water system, unless validation data are available to demonstrate a lower FAC is effective under operating conditions.	Operation shall have a procedure to manage FACE levels, shall establish process adjustments for when the FAC drops below 100 ppm, and shall maintain records to verify proper management of levels.	Auditor shall review the procedure and shall review records of FAC measurement and appropriate management. Auditor reviews records for deviations and their disposition.	Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at FAC less than 100 ppm shall be discarded back to the last evidence of compliance.
8.4	If water quality is based upon a peroxyacetic, peracetic or peracid system, levels shall be maintained in accordance with manufacturer's label directions.	Operation shall have a procedure to manage peracid levels, shall establish process targets so as not to drop below the minimum ppm, shall establish adjustments for when the peracid level drops below the target ppm, and shall maintain records to verify proper management of levels.	Auditor shall review the procedure and shall review records of peracetic measurement and appropriate management. Auditor reviews records for deviations and their disposition.	Procedure is developed or revised. Retraining is performed. Tomatoes washed in water at less than manufacturer's recommendation shall be discarded back to the last evidence of compliance.
9. Hygiene Policies and Employee Training				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
9.1	Restrooms should not open directly into greenhouse production areas.	Restrooms that do open directly into greenhouse production areas shall be equipped with self-closing mechanisms or have a maze-type entrance/exit.	Auditor visually verifies that the toilet facilities are located and designed in a compliant manner.	Operation retrofits or relocates the toilet facility.

9.2	If portable hand wash water tanks are used, they are cleaned and sanitized and the water is changed periodically.	Water tanks used to provide hand wash water shall be maintained at a prescribed frequency in a clean and sanitary manner.	Auditor reviews cleaning and sanitizing protocol and service logs, and visually observes condition of water tanks for signs of non-compliance.	Clean and sanitize the tank, replace water to compliance.
9.3	Operation shall have a written policy regarding employees' outer garments.	Policy includes that employees shall wear suitable outer garments, not reasonably likely to serve as a source of contamination of tomato or food contact surface, and, as appropriate to the operation, use of plastic aprons and sleeves, and empty pockets above the waist. Outer garments shall be changed after cleaning drains, restrooms or other activities that may result in contamination.	Auditor reviews the policy, observes employees for compliance and interviews employees for knowledge of the policy.	Policy is developed or revised. Non-compliances are corrected on site. Retraining is performed.

10. Record Keeping and Traceability

A. Greenhouse Packing

Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
10.1	Containers shall be accurately labeled with commodity name, greenhouse firm name and information sufficient to allow for source and lot identification.	A product coding system is in place where product shall be labeled with grower and lot identification, and coded to enable access to date of harvest and/or packing, origin (name of greenhouse, grower and/or packing location), and country of origin for traceback purposes. If using reusable containers, procedures ensure that labels are accurate prior to packing.	Auditor reviews coding procedures, observes cases for appropriate coding, and verifies compliance by review of records.	Boxes with missing, inaccurate or illegible coding are labeled with appropriate identification. Procedure is developed or revised. Retraining is performed.

B. Packinghouse Packed Greenhouse Tomatoes				
Item#	Requirement	Procedure	Verification	Corrective Action/Disposition
10.2	The greenhouse shall maintain supply chain information available to the packinghouse to facilitate accurate traceability; i.e., quantity, greenhouse identification and date of harvest/pack.	Operation has procedures to retain and provide to the packinghouse records of source of seed or transplants, soil inputs, irrigation water sources and test records, names of crews involved in greenhouse operations, and other crop history information relevant to product safety. Records are retained for at least two years or as required by prevailing regulation.	Auditor reviews policy and reviews records for compliance.	Policy is developed or revised. Non-compliances are corrected on-site. Retraining is performed.

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