

## Guidelines for Apple Cider/ Juice Processors in PA



This document provides general guidelines for PA apple cider and juice processors to help them with manufacturing a safe and wholesome juice both fresh and treated. It is intended only as a guide to understand how to apply general food regulations in a cider-production setting. For more information, see list of resources and references below.

Apple cider and juice processors are regulated under the Food Safety Act (3Pa. C.S.A. §§5721-5737) which adopts all the federal regulations (CFR's). Cider processors are subject to the Good Manufacturing Practices (GMPs) and, if applicable, to the provisions found in 21 CFR 120 – Hazard Analysis & Critical Control Point System (HACCP).

### ***PDA Registration:***

All Apple Cider and juice producers in PA shall register with PA Department of Agriculture and pay an annual registration fee of \$35.00.

For more information contact PDA or visit:

[http://www.agriculture.pa.gov/consumer\\_protection/FoodSafety/Pages/default.aspx](http://www.agriculture.pa.gov/consumer_protection/FoodSafety/Pages/default.aspx)

### ***FDA Registration:***

All facilities engaged in manufacturing, processing, packing, or holding food for consumption in the United States are required to register their facilities with FDA. (section 415 of the Federal FD&C)

For more information contact FDA at 1-800-216-7331 or 301-575-0156 or visit their website at:

<http://www.fda.gov/Food/GuidanceRegulation/FoodFacilityRegistration/default.htm>

### ***Definitions:***

***Fresh, Raw, Unpasteurized, or Untreated:*** Any juice produced by methods which do not include processing steps which have been shown to result in a 5-log (99.999%) reduction of disease causing microorganisms.

***HACCP:*** Hazard Analysis Critical Control Points - A systematic approach to the identification, evaluation, and control of food safety hazards that can adversely affect the safety of food products.

***UV treated:*** A juice that has been produced by a method that includes exposure of apple cider to ultraviolet light at a level shown to achieve a 5-log (99.999%) reduction of the pertinent microorganism.

***High Pressure Processing (HPP):*** A non-heat treatment technique by which products, already sealed in its final package, are introduced into a vessel and subjected to a high level of isostatic pressure (up to 600 MPa/ 87,000 psi) transmitted by water.

***Patulin:*** A mycotoxin produced by certain species of molds that grow on a variety of fruits such as apples, peaches and pears but they are most often associated with brown rot on apples.

***Dropped Apples:*** Apples that have contacted the ground in any manner in the orchard, storage cooler, pressing room or any other area.

## General Requirements

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### ***Physical Structure of Facility:***

Cider processing operations must be conducted in a separate, enclosed room or building. The food processing room must have impervious walls and ceilings, the floors must be made of continuous sealed concrete or other equally impervious and cleanable materials provided with adequate floor drains.

Walls and ceilings should be light colored for easier cleaning and to provide better lighting on all work surfaces. Adequate lighting must be provided. All interior lights must be shielded to prevent pieces of glass getting into food in the event of bulb or tube breakage.

Grounds and buildings surrounding the cider operation must be free of conditions that may result in contamination of the product. This includes improperly stored equipment or spray materials, litter, waste, uncut weeds and grass, and other rodent or pest harborage. Grounds must be properly drained.

### ***Pest Control:***

The processing areas must be adequately screened to eliminate insect and rodent entry.

Outer openings must be protected by closed, tight-fitting windows; solid tight-fitting doors or properly designed and installed air curtains or other effective means to prevent pest entry.

The use of insecticides, rodenticides and other pest control measures shall be permitted only under such precautions and restrictions as will prevent the contamination of the product, and as legally applied, under the PA Pesticide Control Act, by a certified Pest Control Operator, if applicable.

### ***Equipment and Utensils:***

Equipment and utensils shall be adequate for their intended use. All food contact surfaces must be constructed of food-grade materials that are safe, durable, corrosion-resistant, non-absorbent, and can be easily cleaned and sanitized.

Utensils and equipment made of galvanized metal, copper and copper alloys must not be used to process or store apple cider or juice products. No container containing lead, lead-containing paint, or lead solder should be used. Under no circumstances should a container which has ever contained a hazardous material be used.

All tubing carrying cider must be approved for food use. Plastic tubing should be transparent for ease of inspection and cleaning. Tubing must be protected from abrasion or breakage and should be easy to replace. Tubing must be as continuous as possible with couplings kept to a minimum and should be positioned so that no pockets of liquid remain when the tubing is rinsed (self-draining).

### ***Sanitation:***

Hot and cold potable water must be available in all processing areas. Sufficient volume and water pressure must be available to dislodge particles of fruit and film from all surfaces. Plumbing systems must be installed and maintained according to Law.

An effective cleaning schedule shall be implemented at all times to maintain the integrity of the products. All utensils and product contact surfaces of equipment used in processing or handling the product shall be cleaned prior to use and following any interruption during which utensils and contact surfaces may have become contaminated. Disassembling, cleaning, and sanitizing of tubing, clamps, couplings, and connections must be performed at least after each day's run and prior to use following extended interruption.

*Chemical cleaners and sanitizers used in food processing operations must be food grade and approved.*

***Water, Sewer, and Waste:***

The water supply shall be ample for all operations (e.g. processing, cleaning, etc.) and shall be obtained from an approved source, either through a municipal supply or private well. Private water supplies must be tested annually preferably prior the commencement of seasonal apple cider operations.

PDA water testing Protocol for Apple Cider processors:

- *Initial testing for Coliform (1 sample) and Nitrate/Nitrite (1sample)*
- *Continual testing for Coliform - Annually*
- *Continual testing for Nitrate/Nitrite will be based on initial results.*

All wash and wastewater must be disposed of in an approved manner (e.g. septic system, municipal sewer system)

Pressed pomace must be disposed of properly and in a timely manner. Waste products must be removed from the premises at a frequency that will minimize the development of objectionable odors and other conditions that attract or harbor insects and rodents.

***Storage facilities:***

Storage of equipment, utensils, chemicals, and supplies not used in food processing must be in an area clearly separated from storage of food processing items.

All food contact equipment and supplies (examples: racks, cloths, tubing) must be stored off the floor at least 6 inches in a well-ventilated location that minimizes the potential for contamination from splash, dust or other contaminants. These items cannot be stored in toilet or mechanical rooms.

During the off-season, press racks and cloths should be stored so that birds, animals, insects, etc. are unable to come in contact with them. Thoroughly clean, sanitize, and dry racks and cloths before storage.

All cleaning and sanitizing chemicals used in food processing must be stored separately from non-processing chemicals and other hazardous materials (e.g. pesticides). All chemicals shall be kept in original containers, used and stored properly so as to prevent contamination of food.

***Sanitary facilities:***

Toilet facilities must be provided and should be conveniently located near the work area. A sign or poster should be posted at all hand washing facilities to remind employees to wash hands. Conveniently located hand washing facilities must be provided and must have hot and cold running water and soap available. Also, there should be disposable towels and covered trash containers.

***Employee Health & Hygiene:***

A person in charge must be assigned the responsibility to supervise the overall sanitation of the facility. The person in charge must ensure that employees working in the food operations are trained in and follow the good manufacturing and hygienic practices.

To prevent contamination of food products, all persons working in the processing and filling areas must wear clean outer garments, maintain a high degree of personal cleanliness and conform to hygienic practices while on duty. Hands must be washed thoroughly before starting work, after each absence from the working area, between operations, and any other time when they have become soiled. All jewelry, except wedding bands, should be removed. Hair restraints (hairnets, headbands, caps, etc.) must be worn.

If gloves are used, they must be designed for food handling operations. Whenever personnel change from non-food contact or cleaning operation to food contact operation, the individual must replace gloves or wash hands thoroughly before resuming food- contact operations.

Personnel shall not use tobacco in the facility or while in contact with food or equipment. Employees shall be free of communicable diseases and wear clean outer garments that will not contribute to the contamination of the product. An employee who has diarrhea or is a carrier of a communicable disease that can be transmitted by is prohibited from working with cider, apples, or other food. That person must be excluded from working in receiving, inspection, washing, or other processing areas.

## Production & Process Control

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### **Harvesting:**

Steps can be taken in the orchard to minimize microbial contamination of apples. Harvest dropped apples as frequently as possible and keep separate from tree-picked apples. Care should be taken during collection to prevent the contact of rotten apples with wholesome fruit.

*(See FDA Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables).*

Dropped apples must not be used for the production of fresh cider; but may be used where processing includes fruit cleaning and culling (i.e., damaged fruit removed) AND other steps (e.g. pasteurization) shown to effectively reduce the pathogenic microbial population in the resulting product by at least 5 logarithms (99.999% destruction). However, the use of dropped apples is strongly discouraged. Many factors should be considered when using dropped apples:

- Dropped apples have been shown to contain a higher bacterial load than tree picked fruit;
- Contact with the orchard floor increases the likelihood for the presence of pathogens;
- A very high level of fruit inspection, culling, and cleaning is required for using dropped apples;
- Patulin levels can be higher in bruised or lower quality fruit such as dropped apples. The regulatory action level for Patulin is 50 parts-per-billion (ppb);
- Cider makers cannot be assured of the safety of purchased dropped apples.

Good hygienic practices should be used by those collecting apples and toilet and hand washing facilities should be readily accessible to field workers.

Know the quality of the apples from which you will be making your cider. Only clean, wholesome apples must be used. The use of written contract specifications is highly recommended for cider producers who purchase cider apples (e.g. supplier guarantee).

Visibly clean containers must be used to harvest and transport apples. Containers should be maintained and inspected continually.

### **Receiving:**

If cider apples are purchased, adequate records should be kept of incoming lots, which identify the date of purchase and source of apples used to produce each lot of cider. Accurate records can limit product recalls and producer liability in the event of an outbreak.

Apples for processing should be kept in an enclosed area or otherwise protected from insects, rodents, and other pests. Animals (cats, birds, dogs, wild animals, etc.) are prohibited from processing and storage areas of the building.

Apple containers must be inspected upon receipt and before apples are used to assure the containers are free of visible filth that may contaminate the apples.

### **Inspection and Culling:**

Effective fruit inspection immediately prior to processing is a critically important step in assuring safe cider. All apples must be inspected so operators should assign enough trained employees to this task and make physical adjustments to equipment for adequate inspection (line speed, use of rollers, depth of

line, ample spacing, etc.). All visible extraneous organic material must be removed by effective means prior to crushing/milling. Wormy, decayed, or rotten fruit must be discarded before the washing step.

(Note: Only intact, wholesome, tree picked fruit shall be used in the production of fresh apple cider).

If used, flume water should contain an adequate level of a sanitizer (e.g. 50-150 ppm chlorine) to prevent the spread of contamination from organic material via wash water. Flume water should be changed or reprocessed frequently to maintain adequate quality.

Apples are susceptible to contamination by certain molds. Key strategies that may be used for the control of hazards associated with these molds are:

- Require supplier guarantees that no dropped apples are used;
- Use apples that have been treated with approved chemicals (e.g. fungicide);
- Review research on the interaction of varieties and storage conditions that limit growth;
- Initiate effective culling and trimming processes;
- Monitor for core rot throughout storage periods;
- Remove decayed apples prior to washing;
- Prevent mold growth on equipment by conducting effective daily cleaning and sanitizing.

Control of patulin levels can be most practically accomplished by adequate inspection and culling of apples prior to processing. Periodic analytical testing for Patulin may be performed to verify culling procedure effectiveness. This will also play a role in HACCP plan verification and establish a quality history.

### ***Washing and Brushing:***

Apples must be effectively washed and thoroughly cleaned (free of visible filth and debris) by an effective means prior to crushing. This can be accomplished as part of the grading operation.

A food grade detergent and/or sanitizer used in accordance with the manufacturer's specifications is recommended to further reduce biological contamination.

### ***Crushing and Pressing:***

Crushing and pressing equipment must be cleaned and sanitized prior to start-up and at the end of each day of operation at a minimum.

Equipment must be dismantled or disassembled as needed to insure adequate cleaning and sanitizing.

Press cloths must be specifically designed for cider production, made of durable materials, and replaced when necessary. During processing, the cloths must be handled in a sanitary manner, which includes hanging the cloths on a line or placing them in a clean container off the floor between runs. At the end of each day's operation, all press cloths must be washed, rinsed, sanitized, and dried. The cloths may be dried by spreading them on a clean line in a well-ventilated and screened area away from flies and vermin. If a washing machine or dryer is used, it must be dedicated solely for the cloths and not for personal and work clothing. Use only approved detergents for washing press cloths.

Press racks must be made of food-grade plastic or hardwood, which has been maintained free of excessive breaks, open seams, cracks, chips, inclusions, pits and similar imperfections. Poorly maintained equipment can be impossible to clean and sanitize adequately. Keep press racks off the floor at all times. At the end of each day, all used press racks should be cleaned, sanitized, and allowed to dry.

### ***Pathogen Reduction:***

Except for Juice produced by a person who operates a retail establishment where juice is sold directly to consumers from the production site or from a satellite location owned by the producer, all processors of

juice products sold “wholesale” as juice (see definition in 21 CFR 120.1(a)) or for use as an ingredient in other beverages are subject to the requirements of the juice HACCP regulation found in 21 CFR Part 120.

Any juice of this type must be pasteurized or otherwise treated to have an approved and verified 5-log reduction of the pertinent microorganism and must be processed under a HACCP system including an SSOP program addressing sanitation conditions and practices before, during, and after processing.

*(See FDA guidance documents and other training resources listed in the “Reference” section below).*

When pasteurization is used as a means of pathogen lethal treatment, the time/temperature parameters found in FDA guidance or current accepted studies shall be met. These are some recommended time/temperature combinations for apple cider/ juice at pH values of 4.0 or less using the target organism *Cryptosporidium parvum*:

- 161°F for 15 seconds (as used for milk)
- 160°F for 6 seconds
- 165°F for 2.8 seconds
- 170°F for 1.3 seconds
- 175°F for 0.6 seconds
- 180°F for 0.3 seconds
- Or other scientifically validated parameters.

If UV, HPP or any other non-thermal treatment is used, lethality must be effective and validated.

*(See “Pathogen Reduction & System Considerations” section below for more details).*

### ***Bottling/ Packaging:***

Apple cider/ juice must be bottled using new containers and caps, which have been properly stored to be free of dust, debris, and insects. Inspect containers carefully before filling.

Note: Refilling used consumer containers risks contamination of filling equipment and cider and can take place only in a manner approved by the Department of Agriculture.

Periodic microbiological testing on production batches may be performed to identify sanitation failures, lethal treatment effectiveness, or post-treatment product contamination. Indicator organisms such as coliforms or generic *E. coli* may help determine if adequate and consistent sanitation and juice treatment is being practiced. Testing also plays a role in HACCP plan verifications and establishes a quality history.

### ***Labeling:***

Retail containers must be properly labeled with the following information:

- Product identity – the common or usual name of product (*e.g. Apple Cider*).
- Name and address of manufacturer, packer, or distributor.
- Net quantity by volume.
- Ingredients (if additives are used).

If additives/preservatives are used, care must be taken to assure they are weighed properly and added at safe and effective levels. Additives and their functions must be indicated. For example, “potassium sorbate (a preservative)” or “preserved with sodium benzoate”.

*(Studies have shown a combination of both sodium benzoate and potassium sorbate at 0.1% each, to be most effective in controlling *E. coli* O157:H7).*

The “Sell-by Date” and the statement “Keep Refrigerated” should also appear on the label.

Containers should be marked with a lot code (the sell-by-date may be used for the lot code). Positive lot identification can limit the extent of a product recall should that occur. Records must be kept allowing traceback of cider from the point of consumption to the processor, packer or grower.



The method of treatment used on the juice (heat or non-heat), is not required to appear on the label but may be useful information to consumers. However, it is prohibited to use the term “pasteurized” for UV or any other non-heat treatments. Cider and juice products must declare the % of juice.

It is ok to use terms like “tree- picked” or “made with hand-picked apples” if NO dropped apples are used.

Cider or juice that has been treated in any way (heat or non-heat) may not be labeled “fresh” including raw juice containing additives.

Containers of raw untreated cider must be labeled with the following statement:

**WARNING: This product has not been pasteurized and, therefore, may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems.**

If nutrient content claims (i.e. fat free, low sodium, etc.) are made, the product label must bear the Nutrition Facts Panel. Apple cider and juice are not eligible to use health claims (21 CFR 101.14(e)(6)). However, apple cider should be eligible to bear the anti-cancer dietary guidance message (as long as no sugars have been added).

## Pathogen Reduction & System Considerations

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### I. *Pasteurization Equipment and Systems:*

Pasteurization of the juice can be performed in two methods:

1. Batch or Vat Method: often used by small processors. Heat is applied to one large lot or batch in an open kettle or vat where it is held long enough to achieve a validated 5-log reduction. The juice is cooled after pasteurization. This method requires proper mixing and time/temperature monitoring.
2. High Temperature Short Time (HTST) system using either plate or tubular heat exchanger:
  - a. *Plate heat exchangers (PHEs): Similar to those used in dairy pasteurizers, and commonly used for non-citrus juices (e.g. apple cider/juice). If PHEs are used for processing pulp products, the plates should be dismantled for inspection.*
  - b. *Tubular heat exchangers (THEs): Commonly used for citrus juices, because the turbulent flow prevents the pulp of citrus juice from depositing on the surface of the tubes.*

Whether you use batch pasteurization equipment or continuous HTST pasteurization equipment, both the juice temperature and juice heating time shall be designated as critical limits in your HACCP plan and should be continuously monitored to ensure that your process is achieving the 5-log pathogen reduction.

If the HTST equipment you use (e.g. the positive displacement timing pump and holding tube length, volume and slope) is designed to deliver a controlled flow rate of the juice through the heat exchanger to ensure that it is heated for the minimum required time, the heating time may not need to be monitored continuously. In this case, as a monitoring procedure for flow rate may be a periodic visual check of the set point of the positive displacement pump to ensure that it is at the point that has been documented to deliver the proper flow rate. However, as a verification procedure, it is recommended to perform testing of the timing pump and check the actual flow rate at least once annually or prior the cider production season (or whatever is needed to ensure that it is effectively controlling the flow rate).

A magnetic flow-based timing system is another type of flow rate timing system for an HTST pasteurizer. In such a system, the flow rate (heating time) and the juice temperature should be continuously monitored.

Other considerations may include paying close attention to tube slope, accuracy of temperature and pressure measuring instruments, effectiveness of flow diversion valves, proper flow of juice in the

regeneration section and proper operation of vacuum breakers. Poor design, lack of maintenance or misplacement of equipment and parts in the system (e.g. plates integrity, tube slope, pumps, instruments, valves, meters, etc.) may cause introduction of other hazards that would compromise the proper pasteurization of the juice.

There are key control points to focus on when evaluating your whole system to assure the necessary controls are in place that address any identified hazard that could possibly be introduced and or reasonably likely to occur.

- Are the heating parameters (time/temperature) scientifically based/validated to achieve 5-log reduction of the pertinent microorganism in juice?
- Are the heating requirements for temperature met and continuously monitored?
- Are recording charts accurate and records kept? Are indicating thermometers verified and calibrated?
- Are the holding time requirements met, verified and properly monitored?
- Is the timing system (pump) properly set and verified/ tested to ensure proper flow delivery and rate? Is it being monitored?
- Is the holding tube properly constructed (proper slope)?
- Are vacuum breakers, that help maintain pressure differential in the regenerator section, are installed properly and working? (possible cross-contamination hazard)
- Is equipment shared? (possible Allergen hazard)
- Are there any other possible hazards that might be introduced due to inadequate equipment design, maintenance or verification?  
(e.g. timing pump should always be placed downstream from the raw regenerator to ensure proper pressure differential between raw-pasteurized juice sides).

## **II. UV Processing Systems:**

The use of ultraviolet radiation as an alternative to thermal pasteurization to achieve the 5-log pathogen reduction required for apple cider was approved by FDA in 2000. The process works by exposing juice to ultraviolet light at a level which breaks down the DNA of microorganisms.

FDA, in 21 CFR 179.39, requires that the UV radiation be provided by low pressure mercury lamps emitting 90% of the emission at a wavelength of 253.7 nanometers (2,537 Angstroms). In addition, any juice treated with UV irradiation must undergo turbulent flow through tubes with a minimum Reynolds number of 2,200.

The level of UV necessary to kill microorganisms can vary depending on the composition and color of the juice. Therefore, the use of UV treatment requires proper validation and documentation of the 5-log reduction process. Validation of the process must be conducted by a recognized process authority to address the following:

- What is the appropriate pathogen as the "pertinent microorganism" for apple cider/ juice considering the use of UV treatment?
- Is the UV system validated to achieve effectively a 5-log pathogen reduction for the "pertinent microorganism" in the apple cider or juice?  
*The effectiveness of given UV treatment conditions and parameters (e.g. flow rate, UV energy level) can vary from one juice to another due to factors such as the opacity, viscosity and color of the juice.*
- What are the critical limits for the process? (e.g. flow rate, level of UV exposure)
- What monitoring procedures must be carried out to ensure that the critical limits are met?
  - ✓ Does the flow rate need to be monitored continuously or does the design of the equipment regulate the flow rate automatically to not exceed the critical limit?



- ✓ What monitoring procedure (e.g. UV sensors) will indicate that the juice continually receives the critical level of UV energy?
- ✓ Is the system designed to shut down automatically if a sensor fails or indicates that a critical limit is not being met?
- What verification procedures must be carried out?  
(e.g. *checking UV sensors periodically for proper operation*)
- What cleaning procedures should be carried out between runs to ensure that residues?
- What corrective action procedures must be specified in the HACCP plan?  
(e.g. *in case of UV lamp failure, any juice that may not have received the 5-log reduction is segregated and, if necessary, treated again, and that the failed lamp is replaced*).

Adequate controls must be in place with supporting records to verify the process has been properly implemented. Typical records and controls for automated UV systems (e.g. CiderSure) may include:

- Validation document signed and dated by the recognized process authority;
- Auto-calibration performed at start-up for lamp function, UV sensors, and pump flow rate;
- Intact tamper evident seals on quartz sensors;
- Printed fault occurrences (supported by corrective action records).

Note: If the UV system is not automated, additional hazards may be introduced and controls must be implemented to address those hazards.

(e.g. *How lamp function and flow rate are controlled and monitored? What are CA procedures?*)

### III. High Pressure Processing Systems (HPP):

High pressure processing, a technology in which pressure (up to 600 MPa or 87000 psi) is the principal anti-microbial agent, has been shown to be effective in reducing vegetative pathogens. Both semi-continuous and batch processes have been developed using high pressure processing. We recommend that the process parameters including time, pressure be monitored as critical limits for both types of processes. In certain circumstances, based on the process validation, pH may also be monitored as a critical limit if pH was a parameter taken into consideration by the process authority.

**Note:** During HPP processing, the temperature of the product may increase depending on the composition of the product, the initial temperature of the product/vessel, the pressure transmitting fluid for batch systems, and the time the product is held at the processing pressure. However, temperature may not be monitored as a critical limit.

Generally, challenge tests\* performed for evaluating the inactivation of Salmonella and E coli O517:H7 showed a reduction of more than 5 log is achieved for all juices when processed at 600 MPa (87000 psi) for 2 minutes. If a processor wants to apply less severe treatment, they would have to conduct a validation study to demonstrate the lethality of the treatment.

\*(Teo et al., 2001 and Lukas, 2013)

**Note:** HPP is widely used for acidic juices. HPP alone as a control measure in low acid juices (e.g. carrot juice) is proven not to be sufficient to inactivate bacterial spores of *Clostridium botulinum*. Critical control measures for such juices are likely to involve multiple control measures, e.g., a combination of a process step to destroy the non-proteolytic spores of *Clostridium botulinum* and measures to ensure the treated juice is kept under refrigeration throughout the post-processing steps as well as measures to ensure the statement "Keep Refrigerated" is included in labeling.

If you are using a **toll processor**, control measures should be in place to ensure time and temperature during transport to the toll processor. After arriving at the toll processor, a method of product traffic

control is needed to ensure no unprocessed product is commingled with processed product. Other critical factors delineated by the process authority must be followed including time, pressure, and acidity (pH).

Records showing process authority documentation (validation and challenge studies), instrument calibration and maintenance, production print-outs, CCP monitoring and verification, and corrective actions shall all be kept, maintained and available for regulators review during inspection.

Adequate controls must be in place with supporting records to verify the process has been properly implemented. Typical records for HPP systems may include:

- Documentation showing validation of the process (signed and dated by the recognized process authority). Processors may also use published scientific research that support their process validation and established controls;
- Written Hazard Analysis and HACCP plan (hazards, critical limits, monitoring and verification SOPs and recordkeeping system);
- CCP monitoring and verification records (including equipment calibration records);
- Printed production reports supported with corrective action records in case of fault occurrence.

***This is not an all-inclusive document. It is only intended to be a guideline to help apply general food safety regulations in a juice producing setting. See below resources for more information.***

## REFERENCE & OTHER RESOURCES

- [PA Food Safety Act \(3 Pa. C.S.A. §§5721 - 5737\).](#)
- [FDA 21 CFR Part 110 – Current Good Manufacturing Practice \(cGMPs\)](#)
- [AFDO - Apple Cider Processing Operations Requirements and Guidelines.](#)
- [FDA Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables.](#)

### Juice HACCP Implementation

- Guidance for Industry: [Juice HACCP and the FDA Food Safety Modernization Act](#) August 2017
- Guidance for Industry: [Letter to State Regulatory Agencies and Firms That Produce Treated \(but not Pasteurized\) and Untreated Juice and Cider](#) September 22, 2005
- Guidance for Industry: [Juice HACCP Hazards and Controls Guidance - First Edition](#) March 3, 2004
- Guidance for Industry: [Questions & Answers for the Juice HACCP Regulation](#) September 4, 2003
- Guidance for Industry: [Juice HACCP Small Entity Compliance](#) Guide April 4, 2003
- [Adulteration with Patulin in Apple Juice and Apple Juice Concentrates](#)

### Juice HACCP Training and Education

- Guidance for Industry: [Standardized Training Curriculum for Application of HACCP Principles to Juice Processing](#) June 13, 2003
- Juice HACCP Alliance Training – [Juice HACCP Training Curriculum](#): 1<sup>st</sup> Edition (PDF, 704Kb)
- [Juice HACCP Regulator Training](#) September 2002