



Raw Juice Preparation & Storage for Retail Food Service Establishments

Juice

Raw fruits and vegetables that are squeezed for juice and stored for future service are subject to specific food safety requirements. That is because like other ready to eat foods, there is no cooking step to help with the destruction of potentially hazardous pathogens. When fresh produce is harvested and transported from fields and farms, there exists the possibility that pathogens may not be fully removed during subsequent cleaning steps. Even a very small number of pathogens can multiply to unsafe levels under extended storage.

Foodborne illnesses from raw juices

The use of contaminated produce in the preparation of raw juices has been linked as a common factor in foodborne illness outbreaks. Acid juices have most commonly been implicated. Potentially hazardous pathogens for acidic juices (pH 4.6 or less) include enteric bacterial pathogens, such as *E. coli* O157:H7, various *Salmonella* species, and the protozoan parasite *Cryptosporidium parvum*. These microorganisms inhabit the intestinal tracts of animals and are excreted through manure or feces. When animals are located in an area near crops, produce can become contaminated through direct contact with feces or indirectly through contaminated irrigation water or runoff. Other possible contaminants of acidic juices are organisms that are pervasive in nature, such as *Listeria monocytogenes*.

Low acid juices have the potential to become unsafe, too. They are capable of harboring harmful microorganisms, so when prepared for raw service, consideration should be given to toxins produced by non-proteolytic and proteolytic strains of *Clostridium botulinum* as potential hazards to be controlled.

Raw juice regulations

In retail establishments raw juice prepared for future service is regulated by the South Carolina Department of Health and Environmental Control (SC DHEC). Retail business refers to establishments that prepare food for direct, on premise sales and service.

Juice is defined as the aqueous liquid expressed or extracted from one or more fruits or vegetables, purees of the edible portions of one or more fruits or vegetables, or any concentrate of such liquid or puree. This publication strictly pertains to juices that are prepared on site for immediate service and/or stored for future service.

Retail establishments that offer raw juices are required to apply to SC DHEC for a variance and may be required to develop and implement a juice hazard analysis and critical control point (HACCP) safety plan.

Juice variance requirements

- Remain properly refrigerated below 41 °F.

- Be date marked for no more than 7 days holding followed by the discard of any unused juice at the end of hold time.
- Be treated under a HACCP plan to attain a 5-log reduction, which is equal to a 99.999% reduction, of the most resistant microorganisms of public health significance.
- OR
- Labeled, "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 system."
 - The warning statement shall appear prominently and conspicuously on the information panel or on the principal display panel of the label of the container.
 - The word "WARNING" shall be capitalized and shall appear in bold type.
 - The warning statement of this section, when on a label, shall be set off in a box by use of hairlines.

Establishments that are processing (canning or bottling) raw juices with the intent of creating a shelf stable product and have met FDA requirements for registration and Better Process Control School may not be required to implement a HACCP plan. However, it is strongly encouraged.

What is HACCP?

HACCP is a food safety system that helps to achieve active control of foodborne illness risk factors. Implementing a HACCP plan for raw juices adds a layer of food safety security by focusing on prevention not reaction.

These plans require that establishments strictly follow seven principals. The seven principals are common to all HACCP plans, however each establishment will have a unique plan that reflects their products and preparation methods.

The seven HACCP principals:

- Conduct a hazard analysis: This step identifies potential biological, chemical, and physical hazards. Common examples for raw juices include: listeria, salmonella), norovirus, allergens from cross contamination, and fragments from glass or metal.
- Determine the critical control points (CCPs): The point or place during the flow of food through manufacturing where significant hazards are most likely to occur.
- Establish critical limits: The precise thresholds for minimizing or eliminating hazards that are deemed to be significant.
- Develop monitoring procedures: A strict plan that identifies what, how, who, and how often the critical control points and limits are monitored.
- Identify corrective actions: If something goes wrong, what will be done to correct the problem? This should be very specific and established before production starts.
- Verify that the system works: Observation and documentation to confirm that the HACCP plan is working.
- Establish procedures for record keeping and documentation: Procedures are planned in advance and include an establishment's specific HACCP plan, operational records, and documentation of monitoring. It should also define where and for how long records will be stored and maintained.

Additional practices

Additional food safety practices that are critical to safely preparing and storing raw juices includes a Standard Operating Procedure (SOP) that emphasizes:

- Pathogen reduction of microbes that an establishment identifies as pertinent microorganisms through cleaning or pasteurization*,
- Prevention of cross contamination,
- Temperature control throughout the flow of service,
- Employee hygiene program,
- Purchasing from an approved source,
- Avoid premixing different types of juices, but rather mix on order.

*Commercial processors for raw juices are required by FDA to obtain a 5-log reduction of the most resistant organism of public health significance for their individual juice product. Pasteurization is one of the most efficient and reliable ways to obtain that 5-log reduction. High-temperature short-time (HTST) pasteurization is a method of heat pasteurization for perishable beverages including fruit and vegetable juices, which compared with other pasteurization processes maintains color and flavor better.

Pasteurization examples

For an apple juice at pH values of 4.0 or less, the FDA recommends the following thermal processing procedures be followed to achieve the desired 5-log reduction for oocyst of *Cryptosporidium parvum*, as well as the other three previously mentioned vegetative bacterial pathogens, based upon a conservative evaluation of the available scientific data:

- 160 °F for 6 seconds (recommended treatment conditions in New York),
- 165 °F for 2.8 seconds,
- 170 °F for 1.3 seconds,
- 175 °F for 0.6 seconds,
- OR
- 180 °F for 0.3 seconds

Special requirements

There are special requirements for establishments that serve high-risk populations. These include:

- Juices that bear a warning label and have not been processed per 3-404.11 to reduce or eliminate pathogens may not be served or sold.
- Unpackaged juices prepared on premise for sale or service in ready-to-eat form shall be processed under a HACCP Plan as specified under 8-201.14 (B-E) and 21 CFR 120(B), 120.24 Process Controls.

Sources:

1. SC DHEC Retail Food Establishments Regulation 61-25 July 2014: (section 3-404.11(B): <http://www.dhec.sc.gov/FoodSafety/Docs/NewRegulation/Regulation%2061-25.pdf>

2. Guidance for Industry: Juice HACCP Hazards and Controls Guidance First Edition; Final Guidance: <http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/Juice/ucm072557.htm>

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