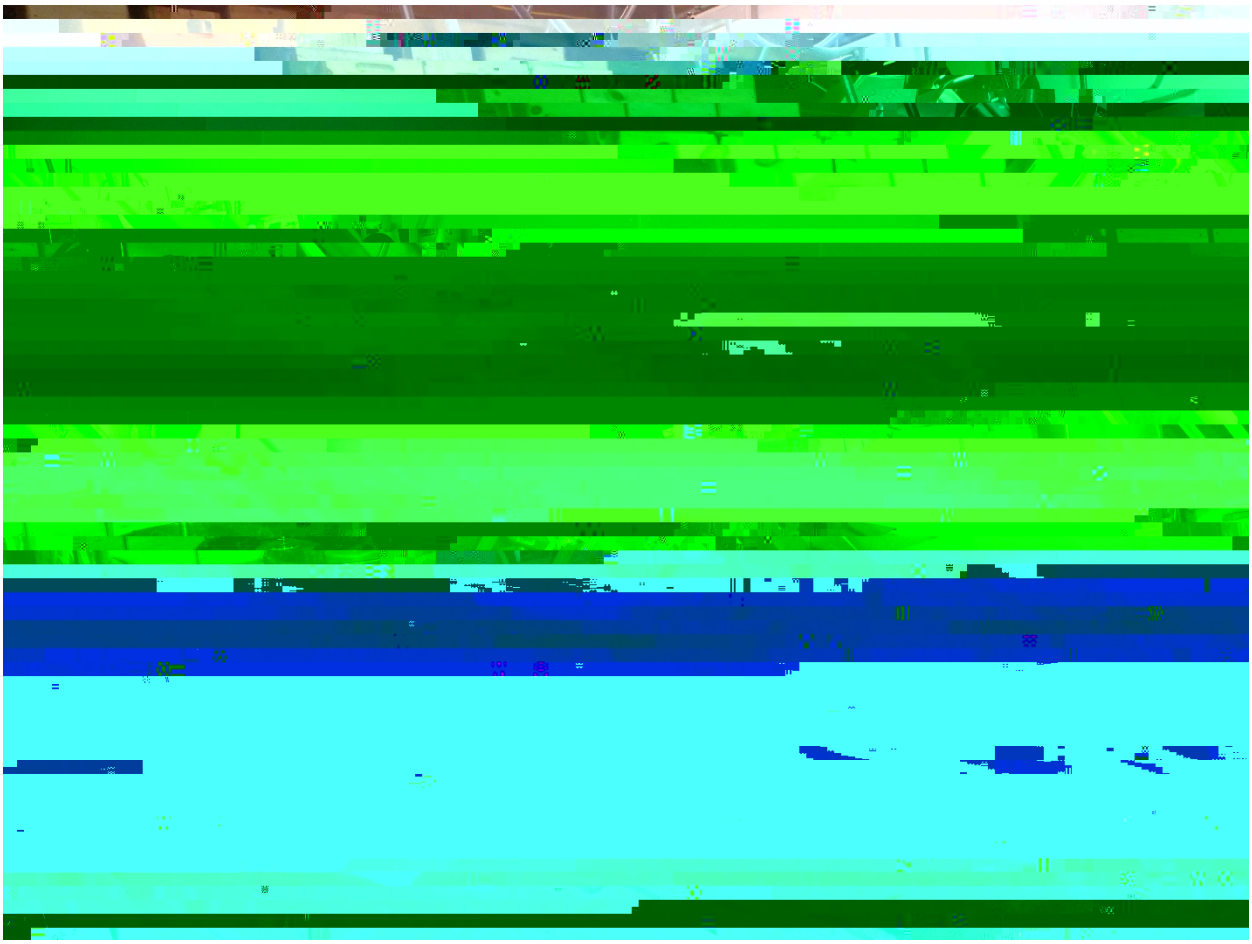
Commercial Production of Unpasteurized and Fermented Ciders in Vermont



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Note: This guide was produced in Fall 2010 to fulfill requirements in an independent study course I was enrolled in as part of my M.S. program at the University of Vermont. While I stand by the information as it was relevant at the time of publication, this was not meant to be a regulatory guidance document. Since the time of this writing, several food safety laws, including and particularly the Food Safety Modernization Act, have been implemented in the U.S. which must be understood and considered when planning and operating a juice processing operation.

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Apple cider is an iconic drink in New England, and an important component to orchard businesses in Vermont. Many orchards either have cider operations included in their offerings, or did in the past; some growers may be considering setting up new mills, and yet other entrepreneurs show interest in establishing independent mills. Sweet and fermented (hard) ciders represent a growing market opportunity with diverse product choices and development (Rowles 2000)With increased interest in cider production in Vermont, cider makers require guidance on setting up a safe mill that meets state and federal requirements while meeting basic safety standards to avoid public health implications.

Note: for this guide the terms ‘cider’, ‘fresh cider’, and ‘sweet cider’ are used interchangeably

The FDA Juice Rule

The 2001 FDA 'Juice Rule', Hazard Analysis and Critical Control Point (HACCP); Procedures for the Safe and Sanitary Processing and Importing of Juice, 66 FR 6137, applies to all processors of juices in the United States (U.S. Food and Drug Administration 2001). The bulk of the rule addresses the HACCP procedure, which is a systematic analysis of potential hazards and associated correction processes for food processors. The hazard analysis is a process of collecting and evaluating information on hazards associated with juice to determine which hazards are reasonably likely to occur and, thus, should be addressed in a HACCP plan.

A HACCP-directed juice processor is required to produce, for each type of juice processed, a written hazard analysis to determine whether

warnings found on meat, eggs, and shellfish, in that it warns the consumer of potential safety

Appendices C and D for sample SSOPs and record forms.

Specific Requirements for Cider Operators in Vermont

Growers and cider makers who operate under the retail exemption must comply with the following list of items, as collated from the Federal Food Code, the FDA Juice Rule, and recommendations from Michigan Department of Agriculture. The following guidelines are summarized in the Unpasteurized Apple Cider Processing Guidelines And Generic HACCP Plan from the Maine Department of Agriculture (Maine Department of Agriculture Food and Rural Resources unknown) and have been adapted for this publication. An important distinction exists in the wording of these rules, where must or shall indicate actions that a processor is required to do, while should indicates an optional but strongly recommended tactic.

Orchard Management

Good Agricultural Practices

Cider mill operators must ensure that raw materials (apples) used for juice are produced in a safe manner. Many cider mills are associated with an orchard, so the grower and processor are the same business. Whether independent or part of another business, orchard production practices must follow food safe guidelines and documentation of safe practices must be kept by the grower and cider processor. Many orchards have adopted formal Good Agricultural Practices (GAPs) in recent years to address food safety issues associated with their products. Growers should consider adoption of a GAP program, which formalizes many production and safety practices which reduce food safety risk

Extensive information on GAPs standards and compliance can be found at the Vermont Vegetable and Berry Association Food Safety web page: http://www.uvm.edu/vtvegandberry/foodlinks.html.

Equipment

Equipment should be made of stainless steel as it is easier to clean, sanitize and maintain than equipment made from other materials. Other satisfactory materials for food contact surfaces included laminates, plastics, or wood treated with a food-grade sealer such as paraffin wax. Galvanized buckets, pipes or fishing should not be used. Equipment that comes into contact with fruit juice/cider should not be made of a material that could lead to undesirable or unacceptable migration or leaching of chemicals into juice/cider, for example, brass equipment should not be used since the acidity of the juice/cider could leach the copper5l-4.9 (-0.7 (l)-3.3 (d)-0.7 3.3 (e)-3 (h)2rt3 (r)-2..9 (h)10.1 (e)-6 (4)]TJ -

Appendix A. Fermented Cider Production in Vermont

Fermented cider or wine productions present a unique opportunity for marketing diversification. Fermented cider production is different from fresh juice processing in many ways, but both require the operation of an efficient and clean milling system, so the above considerations should apply. Because fermented cider contains significant alcohol, it enters a new realm of state, federal, and local regulation that go beyond the scope of this document. General regulatory and production guidelines are included in the guide "Making & Marketing Vermont Ice Cider" (Leger 9/2010). This comprehensive publication describes general licensing requirements for wineries in Vermont, as well as detailed production methods to make ice cider. Ice cider, developed in Quebec, is made by fermenting highly concentrated apple juice that has been subject to freezing and partial thawing to remove substantial amounts of water. Because ice ciders must be frozen naturally by outdoor weather conditions, it can only be made in a limited area subject to winters of sufficient cold and length, yet with a reasonable local apple industry.

Standard fermented cider is an historic beverage in Vermont and New England, with production and marketing of craft ciders increasing in recent years (Rowles 2000; Mainville and Peterson 2005; Trechter, Hadley et al. 2008). The basic information on cider making presented here was originally published at http://www.lostmeadowvt.com/cider.htm

type of cider is that residual sugars are not added, but rather result from the original sweetness in the apple. Fruit used typically include at least a portion of European bittersweet fruit, usually low in soluble nitrogen. Due to the lower alcohol levels and residual sugars in these ciders, microbial stability can be an issue, and producers should address this in their production SSOPs.

Ice Cider

This style originated in Quebec in the last twenty years. It is made by freezing pressed juice, or sometimes pressing whole frozen apples. After partial thawing, much of the water in the juice is left behind as ice crystals, with the resulting juice being very rich, syrupy, and sweet. This juice is then fermented and the fermentation is halted by increasing alcohol levels in the cider. One primary difference between ice ciders and French cider is alcohol content, the former being in the 8-12% range, the latter 3-6%. A complete production guide for making ice ciders is available here:

Pasteurization

Pasteurization is confused by new regulations applying to sweet cider which is sold wholesale in the U.S. Many people to whom I talk of cider think that the fermented type cannot be sold unless it is pasteurized. This is untrue, but many ciders, especially the fizzy, 'draft' or 'pub' type are pasteurized before or even during bottling. Pasteurization is the process of heating the cider for a sufficient time and temperature to kill any microorganisms that may referment or otherwise spoil the cider after packaging.

flavors from contact with the yeast for an extended period.

Another system for carbonating ciders involves storing the cider in stainless steel tanks and

Appendix B. Potential Hazards in Fresh Cider

The following information originally appeared in "Guidance for Industry: Juice HACCP Hazards and Controls Guidance First Edition" from the U.S. Food and Drug Administration. (http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/Juice/ucm072557.htm)

A food safety plan for an operating cider mill should address each of these hazards. Hazards are categorized as biological, chemical, or physical in nature.

Biological Hazards

Pathogens that may Occur in Acidic Juices (pH 4.6 or less):

Acidic juices (pH 4.6 or less) containing enteric bacterial pathogens such as E. coli O157:H7, various Salmonella species, and the protozoan parasite Cryptosporidium parvum have caused serious foodborne illness outbreaks. Some of the illnesses associated with juices have been very severe (e.g., cases of long-term reactive arthritis and severe chronic illness). In one case, consumption of contaminated juice resulted in the death of a child and in another case, consumption of contaminated juice contributed to the death of an elderly man. These microorganisms inhabit the intestinal tracts of animals; when animals and their manure or feces share proximity in an environment, produce can become contaminated, either directly or indirectly through such means as contaminated irrigation water or runoff. The use of contaminated produce to produce the juice, and the ability of some of these pathogens to survive in acidic foods like juices, along with use of inadequate controls for these pathogens during juice processing, are believed to be among the causative factors for these outbreaks. Illness causing organisms that are ubiquitous in nature, such as Listeria monocytogenes, have also been identified as possible contaminants in juice.

Viruses

Juices contaminated with viruses have been implicated in foodborne illness outbreaks. Contamination of food by viruses is most likely to be caused by an ill individual, such as a farm worker or food handler. Thus, contamination of juice by viruses is not likely to occur in a processing facility that controls, under its SSOPs, employee health and hygiene conditions that could result in the microbiological contamination of food, food packaging materials, and food contact surfaces. SSOPs must outline basic worker hygiene and prohibit mill operation by employees while ill.

Chemical Hazards

Patulin

Patulin is a mycotoxin that is produced by fungi commonly found on apples. High levels of patulin can be produced in rotting or moldy apples. Fallen fruit, apples that have been damaged, e.g., by insects or birds, or bruised, e.g., during handling, are more susceptible to the growth of patulin-producing molds. Storage of apples under conditions that are not inhibitory to the growth of molds also can lead to high levels of patulin in the apples. If fallen fruit, moldy, rotten, bruised or damaged apples, or improperly stored apples, are used to make juice, high levels of patulin may occur in the juice, including pasteurized juice, because thermal processing does not destroy patulin.

objects in the juice typically are prevented by utilizing a suitable screen or filter just prior to filling the bottling tank. Use and maintenance of the screen must be

c. Racks.
    i. Pressure wash racks in stock tank. Carefully wash each side, applying water pressure with rack orientation.
    ii. Set aside in oak box. Fill with 5 gallons Star-San mix, soak five minutes, drain.
    iii. Place racks on end on bottom of box cart.
d. Bottling stand
    i. Remove valve, clean, place in star-san bucket.
    ii. Clean bottling tank in stock tank, using brush and soapy water. Rinse.
    iii. Attach valve to tank, place in tub, fill with 5 gallons star-san and brush to wet all surface.
    iv. Rinse all bottling hoses incl. screen filter, soak in star-san in tank.
    v. Pressure wash bottling stand using soap injector. Apply Star-San with brush or sprayer.
    vi. Invert tank over sink on stand, allow hoses and fittings to drain in bottling sink.
    vii. Roll stand to back of mill
e. Press
    i. Tilt stainless pan out of press, rinse in stock tank. Pressure wash with soap into tank, rinse with water.
    ii. Pressure wash press frame with soap.
    iii. Apply star-san to all surfaces of press pan and frame. Invert pan on frame, roll back into mill.
f. Grinder

T i.1 Remove hopper box, pop on end of box Apply 0 0 Std 0.7 LBody <</MCID a.62 C -0.-34.5 (o)-0.7 (1.6 (o)1d)-3 Tw

OESCO http://www.orchardsupply.com Conway, MA

Good Nature, Inc. –

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