Cider & Fruit Juice Production
Food and Safety Considerations

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Food Hygiene Inspections

• Carried out routinely in all premises that make or sell food
• Generally carried out unannounced
• “Risk-based” so higher-risk premises get inspected more frequently
• A snapshot showing conditions at the time of inspection
Food Hygiene Complaints

Complaints

• Food complaints

• Premises complaints
Food Sampling

- Can be undertaken as part of a regional or national study
- Used to determine effectiveness of cleaning
Survey for Unpasteurised and Other Non-heat Treated juices

- Ongoing study looking at unpasteurised juices and smoothies
- In response to presence of listeria monocytogenes found in pre-cut fruit
- Unsatisfactory levels of E.coli also found
Infectious Diseases

- Notified when a stool sample tests positive for food poisoning
- Investigate to find out if caused by eating at a food premises
Routine inspections

Complaint investigations
Accident Investigations

- Employers required to notify local authority of certain accidents
- Investigation carried out to prevent recurrence
Food and Safety Considerations

Food Safety
- Premises Requirements
- HACCP
- Potential Food Safety issues in cider/juice industry

Health and Safety
- Health and Safety-an overview
- Questions

Trading Standards

Finish
HACCP

- Used to identify what can go wrong
- Deciding how these hazards can be prevented
Food Business Registration

- All food businesses required to be registration
- Under food legislation drinks are deemed as food
- Registration can be done in writing or online
Pre-requisite Programmes

a) Construction and layout of building
b) Layout of premises, workspace, employee facilities
c) Supplies of air, water, energy and other utilities
d) Supporting services including waste and sewerage disposal
e) Equipment-cleaning, maintenance
f) Measures to prevent cross-contamination
g) Cleaning and sanitising
h) Pest Control
i) Personal Hygiene
Seven Principles of HACCP

1. Conduct a Hazard Analysis
2. Identify Critical Control Points
3. Establish Critical Limits
4. Establish Monitoring
5. Establish Corrective Actions
6. Establish Verification
7. Establish Documentation and Records
Flow Diagram-Pasteurised Juice

1. Picking Fruit
2. Storage
3. Grading, Milling & Pressing
4. Settling
5. Bottling & Pasteurisation
6. Bottled Juice Storage
1. Biological
Biological hazards include food poisoning bacteria such as Salmonella, E.coli and Bacillus cereus, which are hazardous because they can: Survive inadequate cooking, Multiply to harmful levels in food given the right conditions and Spread from raw foods to ready to eat foods (cross-contamination)

2. Chemical
Chemical Hazards may be present on certain foods in the form of pesticides or cleaning residues. Chemical hazards may also arise from incorrect storage and misuse of cleaning chemicals or rodent bait. Not using food grade equipment may also contaminate the food.

3. Physical
Physical Hazards include contamination from foreign bodies like glass, wood, metal, hair, flies, etc.
Hazard Analysis Continued

Applicable to all food businesses including cider and juice producers

**Process Steps** are the stages in the business operation taken to produce certain foods. You will need to think what stages are applicable to your business and either take a generic or specific approach to the foods you produce.

For Example:

- Purchase/receipt/collect
- Delivery
- Storage
- Preparation
- Cooking
- Cooling
- Storage
- Service
Critical Control Points

• CCPs
• Stage in the process where a hazard must be controlled

The control measures are any action and activity that can be used to prevent or eliminate a Food Safety hazard or reduce it to an acceptable level.
Critical Limits

• Specified safety limit at the CCP which separates acceptable (safe food) from unacceptable (unsafe food)

• Usually numeric value based on science

For example: Critical limit for the pasteurisation temperature for apple juice during a twenty minute process.

• 71-75°C this is good practice but the pasteurisation this temperature is not critical

• 70°C this is the critical limit

• <70°C this has exceeded the critical limit and is potentially unsafe.
Monitoring

- Checks carried out at both control points and critical control points
Corrective Action

• Procedures taken where critical limit has been or likely to be exceeded
• Must make food safe or prevent entry into food chain
Verification

- Overview of HACCP system to ensure working effectively
- May involve monitoring or tests
Documentation

Need appropriate documentation to demonstrate HACCP working effectively. These will usually incorporate HACCP charts, work instructions, written procedures/policies, training records, monitoring records, sampling records, invoices, receipts, etc.
Review

- To ensure HACCP working effectively review periodically
- Review if there is a significant change
Overview of Process for Craft Cider

Example of a process for making craft cider

- Apples picked from tree
- Picked into bins
- Taken to farm
- Tipped into watertank and washed
- Go through scrappermill (cut up)
- Pressed on the Press under pressure
- Apple juice is filtered to take out bits and pumped
- Containers are filled with a measured amount of Sulphur dioxide to kill bacteria and left for 24 hours
- After 24 hours yeast is added and then given 5-10 days to ferment under air lock
- After this time it is pumped into a drum and left for 3-6 months to ferment slowly
- After 3-6 months the juice is now cider and the sugar is measured to determine the alcohol by volume
- It is pumped by vacuum into bottles to limit oxidation, capped and then left for 4-8 weeks to condition.
Example HACCP for Craft Cider Making

- **Process Step:** Incoming fruit
- **Food Safety Hazard and Cause:** Contamination with orchard debris and rots
- **Control Measure:** Wash and remove rotten fruit
- **Critical Limit:** Is fruit of near edible quality?
- **Monitoring procedures:** Visual
- **Corrective Action:** Repeat washing/grading
Hazard Analysis

1. Picking Fruit
2. Storage
3. Grading, Mill & Pressing
4. Settling
5. Bottling & Pasteurisation
6. Bottled Juice Storage
• Store fruit off ground level and in a ventilated container
• Wash in a vessel that can be cleaned thoroughly
• Regularly clean the milling/crushing area and remove any debris
• Ideally, fermentation vats should also be situated inside a pest free enclosure. If this is not possible the inside of the vat must be disinfected before use, the lids always kept in place and the inside kept in a clean condition.
Facilities

Hand washing facilities should be available with the premises. Hot and cold water or water at a suitably controlled temperature is ideal. Liquid anti-bacterial soap and disposable paper towels are recommended.

For small producers operating from home premises, this is not intended to mean directly to the work area, but that there is water available for cleaning (which generally is true of a home. Some producers use a hose dedicated to production to supply clean water, and as long as this is practical and can be demonstrated to be a clean solution, is sufficient).
In all cases walls, floors and ceilings should be constructed in a hard, non-porous material and either be lined or painted with a material which can be washed, and, where necessary, disinfected.

Where the premises are open-sided efforts should be made to prevent birds and wild/domestic animals entering.

Where it is impossible to prevent birds nesting in roof beams, equipment such as barrels must be protected with polythene sheeting to avoid contamination.
Storage and Transport

Small cider makers are unlikely to be using bulk transport. However, some do deliver cider to shops in plastic containers. Where such containers are transported in vehicles that may be used for other (farming purposes) it is recommended that the vehicle floor be lined with clean polythene sheeting.

If large vehicles require access to your business premises, you should demonstrate that this can be done safely and introduce precautions to safeguard any visitors.
Many small-scale cider makers operate from farm premises or from home locations. Pests, particularly rats, mice and birds can be a problem.

If you do not have a regular pest control contract it is recommended that, before production is commenced, you thoroughly check the building and the surrounding land for pests. If evidence of pests is seen arrange for the area to be treated by a pest control company before production begins.

You can treat the infestation if you are skilled in such matters. Rodent poison can be purchased from a DIY shop. It is of key importance to ensure that all of the rodents are treated and that the poison is not a risk to pets, other wild animals or children. Rodents which survive can become resistant to the poison.

Much small-scale cider production is carried out within the grounds of the cider makers’ home. This does not remove responsibility for pest control from the producer and special attention should be given to ensuring that the different processes and materials (e.g. apples for pressing, used pomace, dirty equipment etc.) are dealt with through a thought out plan to avoid prolonged risk of contamination.
Cleaning of Premises

The premises where apple juice is extracted from fruit and where cider is fermented and stored is a food premises within the terms of the law. As such it is required that it is kept clean. Standards will not be expected to be maintained as high as in say a commercial kitchen, but it will be expected that walls and floors will be regularly washed down and kept free of mud, pools of liquid, deposits of apple pulp, mould growth and animal deposits.
Cleaning of Equipment

Cider making equipment quickly becomes dirty and sticky and should be cleaned after each period of use. A good guide will be whether you are proud to show your cider press and production area to your customers!

Fermentation tanks/barrels will require careful cleaning and sterilisation to prevent contamination of the product. Proprietary cleaning/sterilisation agents sold for winery and brewery use are preferred.
Maintenance of Equipment

Perhaps the greatest risk in the small-scale production of cider is from contamination by foreign objects, wood chips, pest dropping, contaminants, etc. Good maintenance of equipment can minimise the risk, particularly where the product is in contact with wood. (Some wood becomes friable and splintered with age).

Usually, heavy items will sink to the bottom of the barrel and therefore will not present a risk. However, prevention is more reliable than hoping that contaminants will settle at the bottom of the barrel.
Operators should wear clean, washable overalls, and clean waterproof boots.

Personnel should maintain a high standard of personal cleanliness and should not eat, drink, or smoke except in designated areas. They should not wear any item of jewellery including watches other than plain wedding bands or sleeper earrings. This aspect is no different from any other food preparation business.
Personnel must not work if they are ill or for 48 hours after they have suffered from diarrhoea or vomited. They must seek advice if they have suffered from any of the following:

- Viral hepatitis A
- Sore throat skin infections, sores. Infected lesions/wounds
- Discharge from ear, eye, or nose
- Food poisoning
- Fever

Infection Control
Apple Sorting

Usually “black” or unsound apples are removed at the sorting stage as they may cause a bitter taste in the cider. It is suggested that this stage provides an ideal opportunity to remove any rotted or contaminated apples and any foreign bodies. A good measure or quality test is whether you are personally happy to eat an apple—if not, it is better to reject it.
Patulin is produced by a number of fungal species. The major sources of contamination of patulin are apples and apple products.

The fermentation process destroys patulin, and therefore fermented cider and perry will not contain it, however it is an issue for juice producers as well as apple coder where the juice is added post-fermentation.

Patulin is relatively temperature stable, particularly at an acidic pH, and whilst high temperatures have been shown to result in a reduction in concentration heat treatment alone is not sufficient to ensure a product free of patulin.

Whilst patulin occurs mainly in mould damaged fruits, the presence of mould only indicates that it may be present. It can also occur in bruised fruit after controlled atmospheric storage and exposure to ambient conditions.

To reduce the growth of moulds and subsequent patulin contamination consideration needs to be given for:
• The condition of the fruit at harvest
• How it is handled
• Storage conditions
Sulphur Dioxide

Sulphur dioxide is used in cider making to inhibit or kill most spoilage yeasts, moulds and bacteria while permitting desirable fermenting yeasts to multiply and to dominate the conversion to alcohol.

The effectiveness of sulphur dioxide depends on the pH of the juice.

If you are using Sulphur dioxide and/or sulphites at concentrations of more than 10mg/kg or 10mg/L (litre) in terms of the total SO2 then you will need to make this information available to the consumer. This typically involves labelling the product with a declaration in bold that the product contains sulphites.
‘The Big 14’

- Celery
- Cereals containing gluten
- Crustaceans
- Eggs
- Fish
- Lupin
- Milk
- Molluscs
- Mustard
- Nuts
- Peanuts
- Sesame seeds
- Soya
- Sulphur dioxide
For food offered for sale online, by telephone or catalogue etc, mandatory food allergen information to be made:

- **available before the purchase is concluded** (i.e. appearing on material supporting the distance selling or other appropriate means clearly identified by the food business operator)

- **available upon delivery** in writing (eg. stickers on takeaway food containers)
In the restaurant

Visit our interactive restaurants to learn about identifying allergens in dishes typically found on the menu when eating out. Each restaurant has three dishes for you to choose from. The dishes have a list of allergens. Click on the allergens that you think would be found in the dish.

For the complete text, or if you don’t have Flash installed, click on the information buttons instead.

Access free training on: http://allergytraining.food.gov.uk
Apple Washing

Apples should be washed in clean water prior to placing them in the press. The first apples placed within the tank will contaminate the water to a degree rendering cross-contamination inevitable. Fortunately with a low risk product the risk are minimal.

Sound apples float so that they naturally separate from soil and heavy debris during washing. However, it is important to change the water at regular intervals to prevent the water becoming sludge, or to double wash. Potable water must be used in all cases.

(Some washing tanks are set into the ground. This situation shoud be risk assessed to ensure that there are no health and safety risks).
Pasteurisation
Risks Associated With Unpasteurised Juices

Unpasteurised apple juice has been associated with outbreaks of E.coli O157.

Cryptosporiasis is a gastrointestinal infection caused by parasitic protozoa, cryptosporidium. Symptoms include diarrhoea, vomiting, abdominal pain and anorexia.

Vehicles of cryptosporidiosis have included unpasteurised apple juice.

A national tests by Public Health is ongoing.
Factors Influencing Bacterial Multiplication

Although most bacteria will not grow in food with a pH below 4.0 a large number of pathogens introduced into an acid food will not die off immediately and may still cause illness.

For most fruits, the low pH conditions are not favourable for the growth of pathogens such as Salmonella and Listeria monocytogenes, but may permit some survival. The exception to this are melons and watermelons, which have a near neutral pH and which will readily allow the growth of a range of bacterial foodborne pathogens, including Listeria Monocytogenes and Salmonella.

Salmonella Typhimurium has survived in fruit juices (pH 3.2 at 22oC) for up to five days.
Moulds

Generally moulds and yeast are less sensitive to the pH of foods than bacteria.

Moulds will grow on most foods, whether moist or dry, acid or alkaline. High humilities and fluctuating temperatures accelerate mould growth.

Mould spores will be present in the atmosphere, especially on damp surfaces, and on mouldy food.

Food should always be covered and mouldy food must be segregated. Mould must not be allowed to grow on walls, ceilings and window frames.
Yeast

Most yeasts grow best in the presence of oxygen, although fermentative types grow slowly without it.

The majority of yeasts prefer acid foods (pH 4 to 4.5).

Yeasts are often used in the manufacturer of foods, and whilst they are not usually considered to be responsible for food poisoning, large numbers of yeast in unpasteurised, home-made fermented beer has resulted in mild illness.

Whilst yeasts grow slowly in low-acid, moist foods and are unable to compete with faster growing spoilage bacteria, they will outgrow bacteria in acidic environments.

Packaging, poor design of equipment and unsatisfactory cleaning procedures may result in contamination of foods such as fruit juices. Signs of spoilage are gas production and off-flavours.
Effective Handwashing

Picture from Deep Creek Elementary
Commonly-Missed Areas

**MISSED SPOTS WHEN HAND-WASHING**

- **MOST FREQUENTLY MISSED**
- **LESS FREQUENTLY MISSED**
- **NOT MISSED**
Health and Safety
Risk Assessments

Employers are required to carry out suitable and sufficient risk assessments that should identify risks to workers and any others who may be affected by their undertaking. The risk assessment should then enable them to identify and prioritise the measures that need to be taken to protect people and to comply with the relevant statutory provisions.

In carrying out an assessment employers should:-
Look for the hazards, for instance, trailing cables, which may lead to trips and falls.

Decide who might be harmed and how; consider:

- Their employees and especially, young workers, trainees, new and expectant mothers.
- Cleaners, visitors, contractors, maintenance workers; who may not be in the workplace all the time;
- Members of the public, customers or people who may share the workplace.

Evaluate the risks and decide if existing precautions are adequate or whether more should be done.

If you have more than five employees you will need to record your findings

Review the assessment and revise it if necessary. This should be done periodically or when a change takes place, which might alter the status of the original assessment.
Accidents

A suitable accident book should be provided on the premises. This is a requirement if you have more than ten employees. This is to record any injury resulting from an incident or accident affecting yourself, any employee, and/or people not in your employment.

If an employee suffers an injury that leads them to be absent, or unable to do their full range of normal duties for more than three consecutive days then a record of the accident must be kept.

RIDDOR Reportable Accidents
If an employee suffers an injury which results in them being away from work or unable to do the full range of their normal duties for more than seven days (including any days that they wouldn’t normally be expected to work such as, weekends, rest days or holidays) not counting the day of the injury itself, you must report the fact to the Incident Contact Centre

The report must be made within 15 days of the accident occurring. In cases of a reportable death, serious injury, or dangerous occurrences, you must notify the enforcing authority immediately.
Use of Ladders
Follow us on twitter: @eatsafeworksafe
Further assistance

FSA Website
www.food.gov.uk

Allergens enquiries mailbox
FoodIntoleranceEnquiries@foodstandards.gsi.gov.uk
www.southoxon.gov.uk
www.whitehorsedc.gov.uk

Please join the conversation on Twitter

www.hse.gov.uk
and finally…

✓ Speak to colleagues

✓ Share knowledge

✓ Develop good working practices
Useful links

• Health and Safety Guidance
  • www.hse.gov.uk

• Food Standards Agency website
  • http://food.gov.uk/

• References:
  • Richard Springer, Hygiene for management;
  • Cider Workshop, Cider/Perry making on a small (craft) scale, 2011 and references therein
  • Prevention and Reduction of Food and Feed Contamination (1st Edition)
Any Questions?