

Great Lakes Fruit, Vegetable & Farm Market EXPO

December 9-11, 2008

DeVo Place Convention Center, Grand Rapids, MI



Sweet Cider

Wednesday morning 8:30 am

Where: Gallery Overlook (upper level) Room A-B

CCA Credits: PD(1.5)

Moderator: Rob Long, Michigan Vegetable Council Board of Directors

8:30 a.m. Michigan Cider Makers' Guild - How the Organization is Moving Forward/Annual Meeting

- Jim Koan, Al-Mar Orchards, Flushing, MI

9:05 a.m. Marketing Ideas to Power Your Cider Sales

- Debra Power, Power Marketing, Ann Arbor, MI

9:45 a.m. Great Tasting Cider - What Does it Mean at Uncle John's Cider Mill?

- Mike Beck, Uncle John's Cider Mill, St. Johns, MI

10:05 a.m. New Food Safety Changes and Updates in Regulations for 2008

- Jerry Wojtala, Michigan Dept. of Agriculture

10:35 a.m. Going Green at Your Cider Mill - Ideas from Other Cider Makers

- Bob Tritten, District Extension Fruit Educator, MSU Extension
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Food Safety Training Program for the Cider Industry and Brief Review of Cider Safety Research

Leslie D. Bourquin
Great Lakes Expo
December 10, 2008



Section 7106 of HB-4956 (As Passed Senate, October 9, 2007)

SEC. 7106.

(1) ALL PROCESSORS OF JUICE SHALL COMPLY WITH THE REGULATIONS OF THE U.S. FOOD AND DRUG ADMINISTRATION IN 21 CFR PART 120.

(2) AN ESTABLISHMENT THAT PRESSES APPLE CIDER SHALL HAVE AT LEAST 1 ACTIVE EMPLOYEE CURRENTLY CERTIFIED UNDER A PROGRAM DESCRIBED IN SECTION 2129 OR HAVING COMPLETED A CURRENT COURSE RECOGNIZED BY THE DEPARTMENT AS PERTINENT TO SAFE CIDER PRODUCTION.

Cider Making Safety Course

- A two-day training program tailored for the Michigan cider industry
- Will be recognized by MDA as a “current course pertinent to safe cider production”
- Training course:
 - March 10 and 11, 2009
 - Kellogg Center, East Lansing
 - See MAA brochure for additional details
- Written Exam
- Plans for On-line Course at a later date

Cider Making Safety Course - Details

Eight modules:

1. Introduction to cider safety, laws and regulations
2. Food safety hazards
3. Pre- and Post-Harvest Food Safety for Apples
4. Sanitary Facilities and Utensils
5. Cleaning and Sanitizing
6. Worker Health and Hygiene
7. Control of Food Safety Hazards, Processing Technologies
8. HACCP and other Food Safety Management Systems

A Brief Review of Apple Cider and Juice Safety Research at MSU



Michigan Apple Juice Processors' Perceptions About the Need for HACCP (2002)

HACCP will:	Agree with need for HACCP (n=16)	Neutral towards need for HACCP (n=11)	Disagree with need for HACCP (n=25)
	Mean (strongly agree=5 and strongly disagree=1)		
Reduce incidence of foodborne illness	4.2 ^c	3.1 ^b	2.2 ^a
Result in unnecessary expense	3.2 ^a	3.6 ^a	4.3 ^b

Mean values in the same row not having a common superscript are different (P<0.05).

Michigan Apple Juice Processors' Preparation for HACCP Requirements (2002)

Processors who agreed that HACCP was necessary were more likely to implement Sanitation Standard Operating Procedures (SSOPs) and Pathogen-Reduction steps in their processes.

Steps towards HACCP implementation	% Overall	Agree with need for HACCP (n=16)	Neutral towards need for HACCP (n=11)	Disagree with need for HACCP (n=25)
Responses (%)				
SSOPs	44	69 ^a	40 ^{ab}	32 ^b
5-log reduction step	23	44 ^a	18 ^{ab}	12 ^b

Consumer Survey – Where Would You Purchase Apple Juice or Cider With the Following Attributes

	Best tasting	Fresh	Not pasteurized	No preservatives	Safest	Organic or natural
Local farm or orchard	38%	57%	50%	40%	6%	27%
Grocery store	20%	17%	13%	8%	47%	12%
Farmer's market	9%	10%	14%	8%	1%	7%
Health food store	2%	2%	18%	6%	9%	34%
No difference	29%	13%	20%	20%	33%	19%

Surveillance for Microbial Hazards and Indicator Organisms in MI Apple Cider

- No samples of Michigan apple cider obtained between 1997 and 2004 were confirmed as being positive for pathogenic microorganisms
 - *E. coli* O157:H7 (all years; 1,203 samples screened)
 - Salmonella (2003; 257 samples screened)
- Indicator organisms indicated that the risk of pathogen contamination does exist.

TABLE 2. Data for nonspecific *E. coli* in Michigan apple cider samples, 1997 through 2004^a

Parameter	No. of samples	Presence detected (% of samples)	Count (log MPN/ml)	Range (log MPN/ml)
Totals	1,203	6.4 ± 0.7	1.03 ± 0.07	0.5–3.0
Food safety control measures				
None	912	7.6 ± 0.9 A	1.08 ± 0.08 A	0.5–3.0
Thermal pasteurization	186	2.7 ± 1.2 B	0.61 ± 0.09 A	0.5–0.96
UV light radiation	105	2.9 ± 1.6 AB	0.56 ± 0.00 A	0.6

Bobe et al. 2007. J Food Protect. 70:1187–1193.

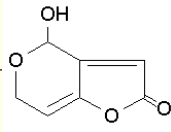
TABLE 2. Data for nonspecific *E. coli* in Michigan apple cider samples, 1997 through 2004^a

Parameter	No. of samples	Presence detected (% of samples)	Count (log MPN/ml)	Range (log MPN/ml)
Year of processing				
1997	160	6.9 ± 2.0 AB	1.62 ± 0.25 A	0.6–3.0
1998	168	6.0 ± 1.8 AB	1.02 ± 0.13 B	0.5–1.6
1999	131	3.1 ± 1.5 B	1.09 ± 0.28 AB	0.6–1.9
2000	69	13.0 ± 4.1 A	0.95 ± 0.21 B	0.5–2.4
2001	90	8.9 ± 3.0 AB	0.82 ± 0.26 B	0.6–2.7
2002	101	3.0 ± 1.7 B	1.01 ± 0.10 AB	0.9–1.2
2003	243	8.6 ± 1.8 AB	0.94 ± 0.14 B	0.5–3.0
2004	241	4.6 ± 1.3 B	0.81 ± 0.13 B	0.5–2.0

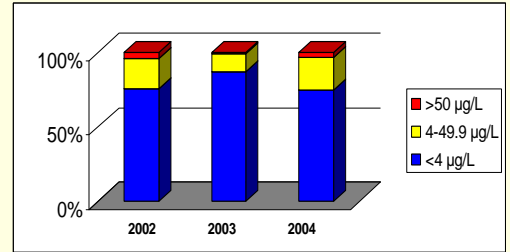
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Patulin

- A mycotoxin produced by certain species of mold (*Penicillium expansum* is most common source)
- Has been found in a number of foods including apple juice, apples and pears with brown rot.
- There is significant concern with juice prepared from moldy or rotten apples and apple juice concentrates.
- FDA action level 50 parts per billion in apple juice, apple juice concentrate (at final dilution), and apple sauce



Patulin Concentrations in Michigan Apple Cider - 2002-2004



Harris et al. J. Food Protect. (submitted).

Patulin Concentrations in Apple Juice Obtained from Retail Grocery Stores

TABLE 2. Patulin concentrations in apple-based beverages sold in Michigan retail grocery stores, 2005 through 2006^a

Parameter	No. of samples	Presence detected (% of samples)	Above ≥ 50 µg/liter (% of samples)	Average Patulin Concentration (µg/liter)	Range (µg/liter)
Totals	159	23.3 ± 3.4	11.3 ± 2.5	226.0 ± 85.4	8.8–2700.4
Ingredients					
Apples	49	40.8 ± 7.1 _A	18.4 ± 5.6 _A	85.2 ± 25.5 _E	8.8– 417.6
Concentrate	99	13.1 ± 3.7 _B	7.1 ± 2.6 _B	472.7 ± 228.7 _D	13.4–2700.4
Both	11	36.4 ± 15.2 _{AB}	18.2 ± 12.2 _{AB}	128.4 ± 78.8 _{DE}	13.6– 347.4

Harris et al. J. Food Protect. (submitted).

Key Take Home Messages

- For microbiological safety of untreated apple cider, quality and proper handling of incoming fruit is of paramount importance.
 - NO DROPS! (illegal for untreated cider, OK for treated)
 - Sanitation and hygiene during harvest and storage
- The industry needs to be diligent about patulin controls.
 - Proper culling of fruit (<1% rot in pressed apples)
 - Be careful about storage conditions of fruit – patulin can form quickly
 - Be selective about fruit – more patulin problems in "bad" years

For Additional Information

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