

# ***UNPASTEURIZED APPLE CIDER***

## ***BASELINE STUDY***

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**From the Farm Gate to the Dinner Plate**

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# Background

- 49 pressers sampled during 2001 season
- Microbiological analyses:
  - total coliforms
  - *E. coli*
  - VTEC
  - *Cryptosporidium*
- Chemical analyses:
  - >300 pesticide residues
- Self-reporting questionnaire

# Sample Types

<b>Sample</b>	<b># samples</b>	<b>#pressers</b>
<b>Finished cider</b>	<b>504</b>	<b>49</b>
<b>Wash water</b>	<b>85</b>	<b>32</b>
<b>Plant water</b>	<b>112</b>	<b>43</b>
<b>Equip. swabs</b>	<b>119</b>	<b>43</b>
<b>Apple cider/chem.</b>	<b>107</b>	<b>41</b>
<b>Total</b>	<b>927 samples</b>	

# Questionnaire Findings

- Animals to have access to orchards 66%
- Use bruised and/or damaged apples 44%
- Do not sanitize cloths 29%
- Do not disassemble/clean equip. 26%
- Use drops (grounders) 18%
  
- Do not include a “lot number” 62%
- Do not include a “best before date” 50%
- Do not include term “unpasteurized” 36%

# Microbiological results: Finished Apple Cider

# samples (%)\*

Sample	Total coliforms	<i>E. coli</i>
Overall	204 (40)	15 (3.0)
HV	48 (38)	1 (0.8)
MV	75 (41)	6 (3.3)
LV	81 (41)	8 (4.1)

\*N= 504

# Microbiological results: Finished Apple Cider

Sample	# samples (%)*	
	<i>Cryptosporidium</i>	VTEC
Overall	11 (2.2)	1 (0.2)
HV	4 (3.2)	0 (0)
MV	1 (0.6)	1 (0.5)
LV	6 (3.1)	0 (0)

\*N=504

# Microbiological Results: Plant water

Sample	# samples (%) <sup>*</sup>			
	Total coliforms	<i>E. coli</i>	VTEC	<i>Crypto</i>
Overall	44 (39)	4 (3.6)	0	0
HV	10 (40)	0 ( 0 )	0	0
MV	8 (20)	1 (2.4)	0	0
LV	26 (57)	3 (6.5)	0	0

\*N=112

# Microbiological Results: Equipment swabs

Sample	# samples (%)*			
	Total	<i>E. coli</i>	VTEC	<i>Crypto</i>
	Coliforms			
Overall	20 (19)	0	0	NA
HV	7 (18)	0	0	NA
MV	8 (19)	0	0	NA
LV	5 (14)	0	0	NA

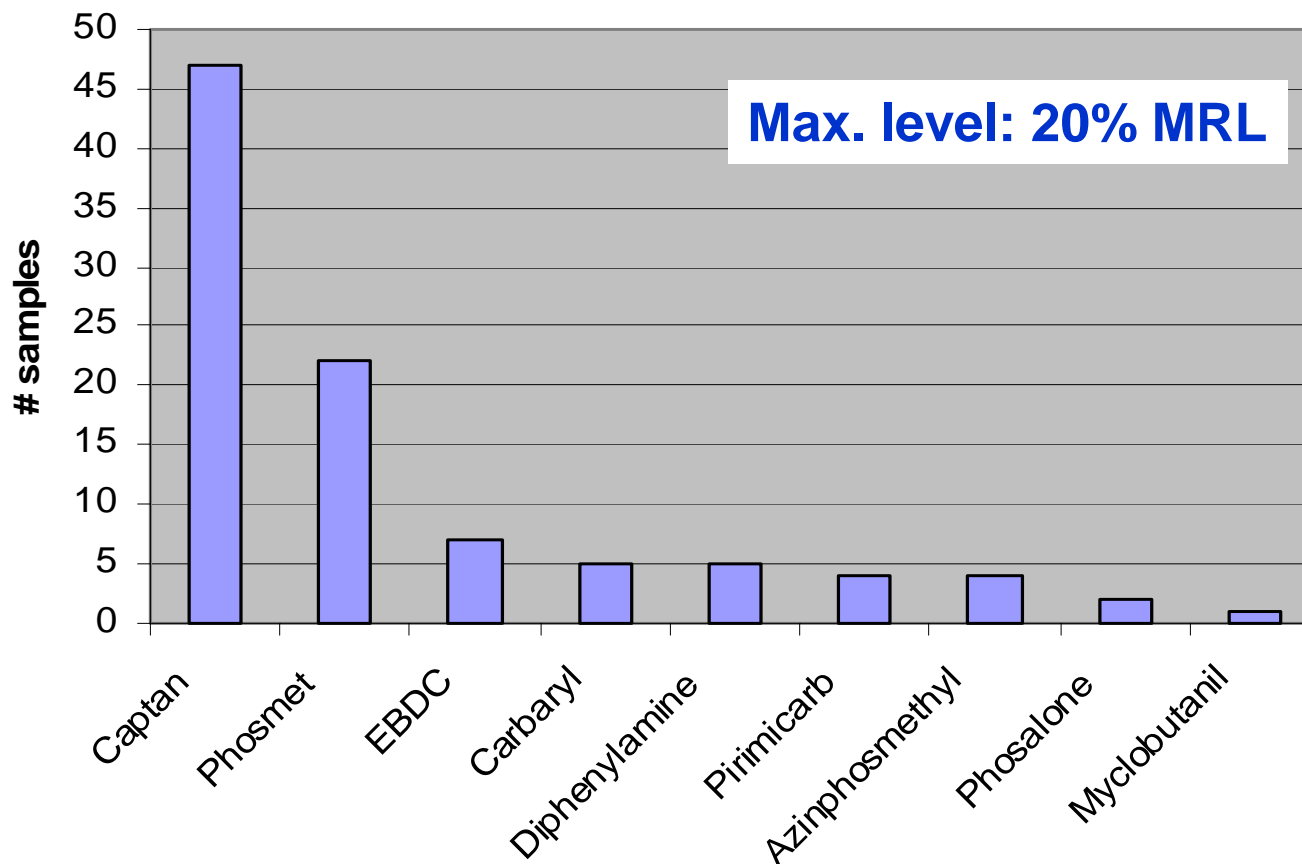
\*N=119

# Microbiological Results: Wash water

Sample	Total coliforms	# samples (%) <sup>*</sup>		
		<i>E. coli</i>	VTEC	<i>Crypto</i>
Overall	64 (75)	19 (22)	0	0
HV	15 (63)	2 ( 8)	0	0
MV	29 (85)	8 (24)	0	0
LV	20 (74)	9 (33)	0	0

\*N=85

# Pesticide Residues in Finished Apple Cider



# CONCLUSIONS

- Numerous potential sources of contamination:
  - water (plant supply, irrigation, wash)
  - apples (drops, bruised, damaged)
  - grazing of animals in orchards
  - lack of GAP, GMP

# CONCLUSIONS (cont'd)

- Some pressers seem to be aware of the risk posed by unpasteurized apple cider, but this is not reflected in their practices:
  - 66% allow grazing of animals
  - 44% use bruised or damaged apples
  - 18% use drops (grounders)
  - 26% do not disassemble/clean equipment
  - 29% do not sanitize cloths

## CONCLUSIONS (cont'd)

- High prevalence of coliforms (40%) in apple cider (indicates poor sanitary conditions)
- *E.coli* (3.0%) and *Cryptosporidium* (2.2%) in apple cider
- High prevalence of coliforms and *E.coli* in plant water (39% and 3.6%)

# CONCLUSIONS (cont'd)

- Unpasteurized apple cider has potential for human health risk
  - particularly for high risk consumers
    - children, elderly, immunocompromised

# RECOMMENDATIONS

- Cleaning and sanitation (GMP, SSOP)
- However, cleaning and sanitation alone is not enough, therefore recommend:
  - Processors implement a program combining several risk mitigation factors (GAP, GMP, HACCP, pasteurization, and/or UV treatment) that together would achieve a 5-log reduction of pathogenic microorganisms

# RECOMMENDATIONS (cont'd)

- Educational and training program delivered by OMAF
  - improve pressers' understanding of hazards
  - increase support for different risk management options (that regulatory authorities may encourage)



## **Food Safety Practices in the Production of Unpasteurized Apple Cider**

### **Cider Producer's Workbook**

Ontario Ministry of Agriculture and Food, October 2002

## RECOMMENDATIONS (cont'd)

- If no mitigation steps are employed that result in 5 log reduction
  - implement education program for individuals at high risk
- Make results available to Apple Cider Industry
- Follow-up study to evaluate the outcome of these recommendations