

# Dairy Baseline Studies

Bruce Keown, Rena Hubers and Pat Johnson  
Food Inspection Branch  
Ontario Ministry of Agriculture & Food

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# OMAF's Baseline Studies

- Studies of targeted microbial pathogens and indicator organisms and/or studies of chemical and biological contaminants across a segment of a population
- Dairy Baseline Studies:
  - Pasteurized fluid dairy products (02-03)
  - Raw goat & sheep milk (02-04)
  - Unripened cheeses (04-05)
  - Cheddar cheeses (04-05)
  - Veterinary drugs & environmental contaminants in raw cow, goat & sheep milk (04-05)

# Dairy Baseline Studies

- **Objectives**

- Determine prevalence of pathogens and levels of indicator organisms - quantitative risk assessment
- Establish baseline to measure impact of intervention programs (e.g. HACCP, regulations)
- Set science-based & achievable performance standards for industry
- Target & prioritize resources & programs

# Current Dairy Baseline Studies

- Microbiological Baseline Study of Pasteurized Fluid Dairy products
- Microbiological Baseline Study of Raw Goat & Sheep Milk

# Pasteurized Fluid Dairy Products Baseline Study

- **Target population**
  - All pasteurized milks, creams and flavoured milk produced by Ontario's 23 fluid product processors
  - In excess of 1 billion litres/yr. = 4-5 billion servings

# Pasteurized Fluid Dairy Products Study Design

- **Stratified Sampling Plan**
  - three distinct strata
  - high volume - 3 plants  
≥175 million litres/yr
  - medium volume - 9 plants  
>20 million - 174 million litres/yr
  - small volume - 11 plants  
≤20 million litres/yr

# Study Design (Cont'd)

- **Random sampling of plants and products**  
(sampling plan for plants and random number tables to select product at plant)
- **Equal numbers of samples/stratum**
  - (~600 samples/stratum, 1900 in total; sample size determined using data from previous studies)
- **Sampling frequency based on processor's relative volume**
- **Study period is one calendar year**
- **Geographic representation - Ontario**

# Sampling/Testing protocol

- Packaged product sampled at plant location
- Sample shipped to lab via sampler or courier
- Sample tested within 24-48 hours of processing (only product produced on the day of sampling is collected)
- Temperature of adjacent package measured at time of sampling
- Temperature of product determined by lab at time of receipt; temperature-abused samples rejected
- Unopened container of same product tested again at its “Best Before Date”

# Microbiological Analyses

- **Indicators**

- total aerobic plate count
- coliform count
- psychrotroph count, 7 day incubation at 7°C
- *Enterobacteriaceae* count

- **Pathogens**

- *Listeria monocytogenes*
- *Yersinia enterocolitica*
- *Bacillus cereus*

# Analytical Laboratory

- Analytical services were provided by microbiological laboratory, Laboratory Services Division, University of Guelph under the direction of Dr. Joseph Odumeru

# Analytical Methods

Analysis	Methods	HPB Reference
ACC	Petrifilm	MFHPB-33
TCC	Petrifilm	MFLP-85
Psychrotroph Count	Petrifilm	MFHPB-33 (mod)
Enterobacteriaceae	Petrifilm	MFLP-43
L. monocytogenes	Detection & Enumeration	MFHPB-30 MFLP-74
Y. enterocolitica	Detection	U.S. F.D.A. B.A.M
B. cereus	Enumeration	MFLP-42

# Preliminary Findings

- “Fresh” product testing a poor indicator of product quality and safety over the length of product shelf life
- Pre-pasteurization of raw milk by microfiltration provides improvement in product quality
- Chocolate milks at “Best Before Date” very high non-compliance rate to current standard of  $<50,000$  cfu/ml
- Very high compliance rate to proposed coliform standard  $< 10$  cfu/ml, yet poor indicator of acceptable product quality or safety throughout a product’s shelf life
- A more sensitive indicator of product hygiene is needed

# Preliminary Findings (Cont'd)

- At “Best Before Date”, very high non-compliance rate to proposed total aerobic plate count standard of < 25,000 cfu/ml
- Data may not support proposed microbiological standards in National Dairy Regulation and Code for pasteurized fluid products
- Sampling still underway
- Statistical analysis not conducted

# Raw Goat & Sheep Milk Microbiological Baseline Study

- **Issues**

- Lack of scientific info: quality and safety
- State of the industry, quality issues, producers and processors looking for guidance

- **Objectives**

- Obtain necessary information to develop appropriate regulations and standards
- Develop commodity specific quality and food safety program

# Raw Goat & Sheep Milk MBS Study Design

- Target population:
  - all goat (240) and sheep milk (10) producers
  - no stratification involved (individual producer volumes not known)
- Raw goat milk collection routes randomly selected
  - all producers on route sampled
- Raw sheep milk collected at farm from bulk milk cooler or from pails prior to freezing (only farms actually shipping were sampled, composite sample collected from pails of that day's milking)
- 1400 samples to be collected

# Preliminary Results

- Wide variability in microbial quality of raw goat and sheep milk
- Prevalence of pathogens in decreasing order, *Yersinia enterocolitica*, *Listeria monocytogenes*, VTEC, *Campylobacter spp.*
- No Salmonella isolated to date
- Statistical analysis not yet done
- Sampling still underway

# Next Steps

- Complete sample collection
- Analyze data from completed studies
- Determine correlation between the numbers of microbial indicators & prevalence of pathogens
- Use data to develop regulations & standards for these new commodities