

Milk Quality and Quality Milk

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WSU

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Quality Milk is a Function of:



- Healthy Cows
- Healthy Farms

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Healthy Cows

- Cows free of mastitis and other diseases and good milk production
- Cows are on a good plane of nutrition.



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Healthy Farms

- Employ practices to keep cows healthy:
 - Maintenance of milking equipment



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Good Housing

- Loafing area clean
- Bedding Clean and Dry
- Ventilation adequate



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Why Worry About Quality

- Pasteurized Milk Ordinance (PMO)
- Profit
 - Premiums
 - Milk Yield



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The PMO is designed to

1. Regulate all milk that is produced in this country
2. The trade of milk that passes interstate lines
3. Be developed by the NCIMS and FDA
4. To effect only the processors
5. To effect only the dairy producers

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NDA Quality Program

ITEM	NDA QUALITY STANDARDS	PRICE ADJUSTMENT IF STANDARDS ARE EXCEEDED
Raw Bacteria	100,000 or less	-5 cents
Preincubation	50,000 or less	-5 cents
LPC	< 100	
Sediment	#1 or #2	-5 cents
Water	Normal	-5 cents

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Topics to Cover

- What is Quality Milk
- What impacts Quality Milk
- Mastitis impact on Quality Milk
- New and old methods in mastitis control

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What is Quality Milk

- Standard Composition
 - Protein: 3.5% (casein-2.8%)
 - Lactose: 4.9%
 - Fat: 3.5%
 - Minerals: 0.8%
 - Water: ~ 87%
 - Spg: 1.01

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What is Quality Milk

- Organoleptic appeal
- Slightly sweet
- Pleasant in the mouth

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How is Quality Milk Secreted

Essential nutrients from the ration
Proper blood flow
Good secretory cell health

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Question on Milk Quality

- Quality Milk is:
- 1) The taste
- 2) The normal milk components
- 3) The integrity of the blood milk barrier
- 4) The amount of residues and other foreign substances
- 5) All of the above
- 6) None of the above

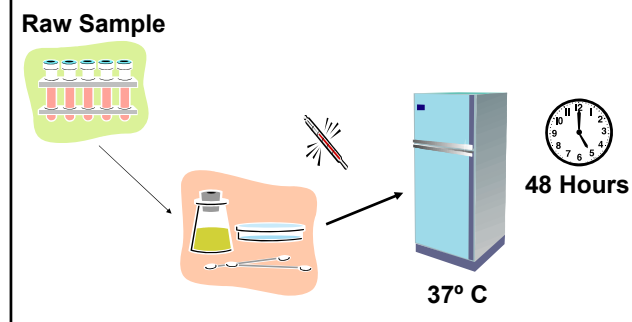
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Contamination from Outside

- “Chemicals”
 - Disinfectants
- Bacteria-
 - SPC- specific plate count (raw or total count)
 - LPC- Lab Pasteurized count
 - PI- Preliminary Incubation Count
 - Coliforms (lactose and gram neg rods)

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Std Plate Count (SPC) Raw Sample Count



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Standard Plate Count

- Causes of high SPC
- Bacterial origin:
 - Inside the gland....hold this thought
 - Outside the gland-
 - Unclean udders- wet udders
 - Contamination of the milking system
 - Poor cleaning of the milking system (time, temperature, concentration of disinfectant)

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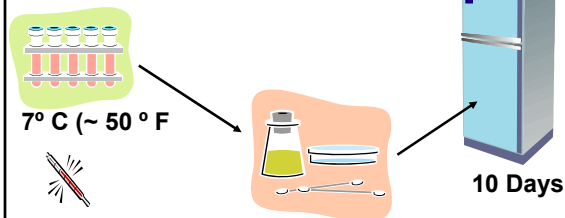
Standard Plate Count

- Milk Cooling problem
- Counts should be less than 10,000* bacteria (CFU)/ml, but.....
- Many farms can maintain counts less than 1000 bacteria/ml of milk.
- *ten fold less than PMO

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Preliminary Incubation Count- PI Psychrotrophic Bacteria

Raw Sample



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Preliminary Incubation Count

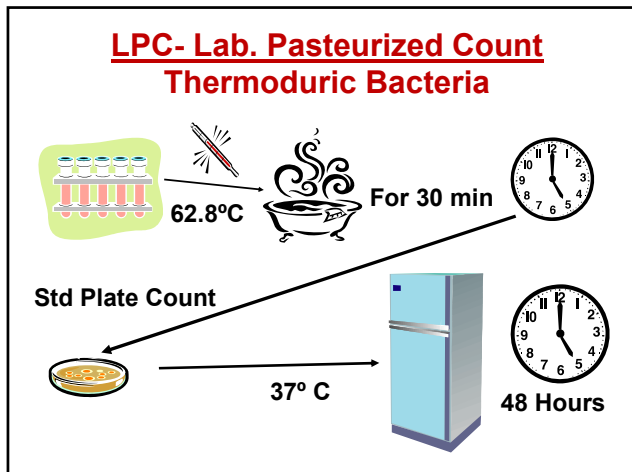
- Good milk cooling can keep the PI count organisms (psychrotrophs) low.....but.....
- Some psychrotrophs will live through pasteurization and then will multiply in milk on the supermarket shelf.
- Will reduce the shelf life of milk considerably.

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Preliminary Incubation Counts- Psychrotrophs

- Poor udder prep (poor cleaning and drying of the udder)
- Inadequate post-dipping
- Poor cleaning of the milking system
- Cracked rubber surfaces (liners, o-rings, etc.)
- Not sanitizing milking system before each milking
- PI counts < 50K but best if < 10K

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Lab- Pasteurized Count

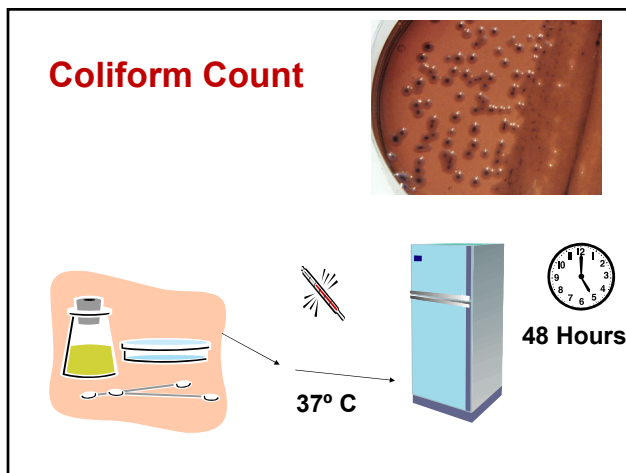
- Bacteria that will survive pasteurization
- Very good cooling will keep counts down on the farm.....but.....these will grow up on the shelf in milk cartons!

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Lab Pasteurized Count

- Less likely to be a cow-cleaning problem and more likely to be a milking system cleaning problem!
- LPC < 200 bacteria/ml, but excellent herds: <100.

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Coliform Count

- Sources
 - Poor milking preparation and very dirty cows
 - Water contamination
 - Severe milking equipment problems

- < coliforms/ml of milk <100

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Bacteria can affect milk quality and can be measured by

1. Total bacteria count which selectively measures all mastitis causing bacteria
2. The PI count that measures the psychrotrophs or cold loving bacteria
3. Lab Pasteurized count that measures the thermophilic organisms which affect shelf life

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Differential

	Low Coliform <100	High Coliform >750
Low LPC <300	No problem	Teat Contam Cow Env
High LPC >500	Machine Cleaning	All

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Other Tests of Quality “Added Water”

- Addition of water dilutes salts and lactose
- Tested for using a cryoscope
- Freezing pt. Of >-.530 Hortvet indicates that milk composition is abnormal
- Intentional addition of water, poor system drainage, use of excessive water during prep, backflushing units with the vacuum on, rinsing top of bulk tank, freezing bulk tank milk

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Other Tests of Quality "Rancidity"



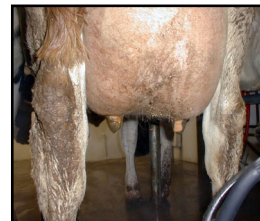
- Result of hydrolysis of fatty acids
 - Violent agitation, airleaks or excessive pumping
- Causes objectionable flavors
- Psychotrophic organism in milking equipment can produce lipases
 - Pseudomonas, aerobacter & bacillus
- Expressed as acid degree value (ADV)
 - MI of 1 N base required to neutralize acids in 100 g of fat
- Normal value of milk: 0.25 to 0.40
 - Not considered abnormal until ADV >1.0

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Other Tests of Quality "Sediment"

- Required test but frequency of testing is undefined
- Sediment scores on filters
- Excessive udder hair + sand bedding + poor premilking hygiene



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