

Milk Quality is More Than SCC and SPC, it Now is Shelf-Life

David R. Bray

Department of Animal Sciences

University of Florida

Up To Now

1. SCC 750,000
2. SPC 100,00

NOW

24 day shelf-life

Components of Good Shelf-Life Milk

1. a. Fast Cooling – Chiller Based Plate Cooler 33^o – 34^o Fast
- b. If Kept Cold Until Pasteurization – Best chance of Long Shelf-Life
- c. Proper Tank Agitation
- d. Commingled- Kept Cool as Possible <40^o F



Proper Cleaning Sanitization of Equipment

- a. Hard to do – many components to clean from liners, hoses and tanks
- b. Need hot water 160^o F + to start, to dump 120^o F
- c. Need proper concentration of chemicals
- d. Proper timing and length of cycles



Cows – High SCC – Study I

- a. Not lots of data on SCC and Shelf-Life, lots on cheese making
- b. C. U. study – 8 cows artificially infected Strep Ag
- c. Taste tests – day 1, 7, 14, and 21
- d. 2% milk, pasteurized HTST 165.2^o F, 34 seconds, then homogenized
- e. Milk warmed to 68^o F, to enhance off flavors
- f. No taste difference in taste day 1,7, and 14
- g. On day 21 low SCC tasted better

Cows – Study II

1. The number of days before off flavor, could be extended from 18-56 days when SCC of raw milk was reduced from 1,000,000 cell/ml to 25,000 cell/ml

Post Pasteurization Milk Handling

1. If Milk is not kept cold post pasteurization- it will spoil quickly.
2. If plant equipment is not kept clean – ALL Is Doomed
3. See “Barbano’s Quotes Pg 2

Milk Quality Tests Other Than SCC

1. Coliform Count
2. Preliminary Incubation Count
3. LPC – Lab Pasteurized Count
4. SPC – Standard Plate Count

Standard Plate Count (SPC)

<10000 CFU/ml

1. Total Quantity of Visible Bacteria
2. Counted not Identified

Causes of High SPC

1. Improper Cleaning and or Sanitation of Milking equipment
2. Cow – Strep Uberis and Strep Ag Mastitis Shed Large Numbers of Bacteria
3. Milking Wet and Dirty Udders and Teats
4. Chasing Milk to Receiver Jar with a Rubber Hose

Lab Pasteurized Count (LPC) – Goal <200 CFU/ml

1. In my opinion this may have the most effect on Shelf-Life
2. This test determines how many bacteria represent those that can survive pasteurization and which can then multiply after post pasteurization
3. Most are soil based spores (bacillus) coliforms and many are resistant to sanitizers

Causes of High LPC

1. Milking wet dirty udders
2. Chasing milk to the receiver jar with a rubber hose. Rubber hoses harbor Coli forms, Pseudomonas and Bacillus
3. Rubber milk and wash hoses over 1 year of age (not silicone)
4. Old rubber gaskets in pipelines



Causes of High LPC (cont.)

5. Improper cleaning and sanitizing of pipeline and bulk tank
 - a. Improper concentrations of chemicals/soaps
 - b. Improper water temperature, dump solution at 120° F.
 - c. Sanitization of tank too long before milking
 - d. Air injectors not working properly
 - e. Improper pre milking procedures – excess sand and manure build up in liners, predip cups

Coli Form Counts

Goal <100 CFU/ml

1. Fecal bacteria present in milk, Coli Forms.

Causes of High Coliform Counts

1. Milking wet dirty udders
2. Rubber hoses
3. Chasing milk with old rubber hose
4. Improper cleaning and sanitization of equipment
5. Not cows

Preliminary Incubation Count (PIC)

Goal <10,000 CFU/ml
(Less than 3x SPC count)

The PI Count measures bacteria that grew at refrigerated temperatures (Psychrotrophs) – Grew below 450 F

Psychrotrophs produce enzymes associated with off flavor and affect shelf-life

Causes of High P I Counts

1. Poor milking hygiene and dirty conditions
2. Poor wash up and or poor sanitization of milking equipment
3. Poor cooling of milk

Other Tests

1. Antibiotic residues = 0
2. Sediment count equal or less than 1.5 mg/ml per gallon of milk
 - a. Milking dirty cows and garget
 - b. Observation of milk filters is a good idea.

3. Cryoscope reading equal or less than -
.530° Horvet

- a. Chasing milk
- b. Poor system drainage
- c. Freezing milk in tank
- d. Too few cows for parlor size
- e. Greedy

4. Rancidy – High Acid Value – Goal <1.0

Causes:

1. Lifting or over agitating milk, leaks, gaskets or pumps
2. Old gaskets, rubber hoses harbor bacteria, Pseudomonas, Bacillus and Aerobacter
3. Late lactation cows – small herds

DO YOU WANT?

1. 28 day shelf-life milk
2. SCC < 300,000 CFU/ml
3. SPC < 10,000 CFU/ml
4. LPC < 200 CFU/ml
5. PIC < 10,000 CFU/ml
6. Coliform counts <100 CFU/ml
7. Make more profit and worry less

What Do You Have to Do?

1. What we have been telling you for the past 25 years
2. Hire fewer herd health people –cow treaters
3. Hire more people with Dairy Husbandry mind set
4. Spend your time and money preventing mastitis rather than treating it

HERE IS THE “MAJIC BULLET” FOR SUCCESS

1. Milk clean dry udders and teats
2. Post dip all teats milked
3. Dry treat all cows going dry with approved dry treatment and sealant
4. Keep your milking system in GOOD REPAIR (pulsation and vacuum controlers)

“MAGIC BULLET” (cont.)

5. Change all rubber goods every 6 months, liners per directions, change short air tubes every time you change liners
6. Have adequate and timely cooling, chiller and plate cooler give the Best Results. Keep compressors clean
7. Use proper chemical concentrations and water volumes and temperatures – dump @ 120° F
8. Keep cows in a clean and comfortable environment

OBSTACLES TO SUCCESSFUL IMPLIMENTAION OF QUALITY INCENTIVES AND COMPLIANCE PROBLEMS

1. No history of milk quality production or getting paid to do so
2. Our incentives plan was we milk high SCC cows they can't in the North
3. There are plenty of producers who produce a very high quality of milk, Their Reward is Pride!

Obstacles (cont.)

4. It is expensive to produce high quality milk, terrible climate, milker training, build barns and expensive manure systems etc.
5. It is expensive to produce poor quality milk, production losses due to mastitis, expensive treatment costs, high culling costs, loss of income if a quality product is not produced
6. A lot of our milk going to stores, is bottled by the store (Publix). They have complete control of the pasteurization and post pasteurization process, clean plant, clean cool trucks and super markets – solves the post pasteurization problem

Problems In The Southeast Dairy Industry

We are losing our infrastructure, support for the dairy industry is shrinking

1. Very few dairy equipment dealers
2. Large distances for them to travel increases expenses
3. Less supplies of drugs, vaccines, feed etc.
4. Erosion of the Extension Service
5. Loss of competition for supplies and services

Losses of Dairies in Florida

1. To obtain enough milk to process must go North
2. Many of the dairies are much smaller
3. Many are older dairies
4. These dairies may not have adequate cooling, hot water supply etc.

How are We Going to get all Producers to Produce High Quality Milk??

1. Do we expect ever dairy to make the commitment to do so, with the reward being they won't be fined for poorer quality or loss of their permit?
2. It seem that if we want high quality we need how to do it and someone to show them how and see if they do it.
3. Do we expect every dairy to produce 24 day shelf-life milk?

High quality Milk (cont.)

4. Looking for some test to foresee the future of a tanker if milk from the farm to the Big Box Store is unrealistic.
5. Would it not be wise to put a few of high quality producers milk into plants needing long shelf-life. Let the trucking departments make the decision.

Where Are our Milk Quality Field men (Woman)??

1. We want perfection and don't want to pay for it.
2. It will take on farm monitoring to do this
3. Field men need to be a person of authority – not the dairyman's buddy.

What is a Field Man (Woman)?

1. Trained in all aspects of milk quality, wash up and sanitation
2. Trained in dairy husbandry and microbiology and science
3. Active membership in NMC, attend annual meeting and participate in workshops and short courses
4. Teacher, trainer, investigator and problem solver

What should the Field man Do?

1. Monitor the data available to him and take action on the dairies that have indicated problems.
2. Proper hot water temperature and volume
3. Soap and chemical concentrations and wash times and cycles

4. Cooling time and temperatures and tank agitation times
5. Monitor milking procedures and mastitis control practices
6. Have the training and equipment to spot check pulsation, vacuum control and other milking machine problems (not to replace the service man) to problem solve
7. Monitor truck drivers on farm procedures

How Can We Assure That Every Dairy Produces High Quality Long Shelf-Life Milk?

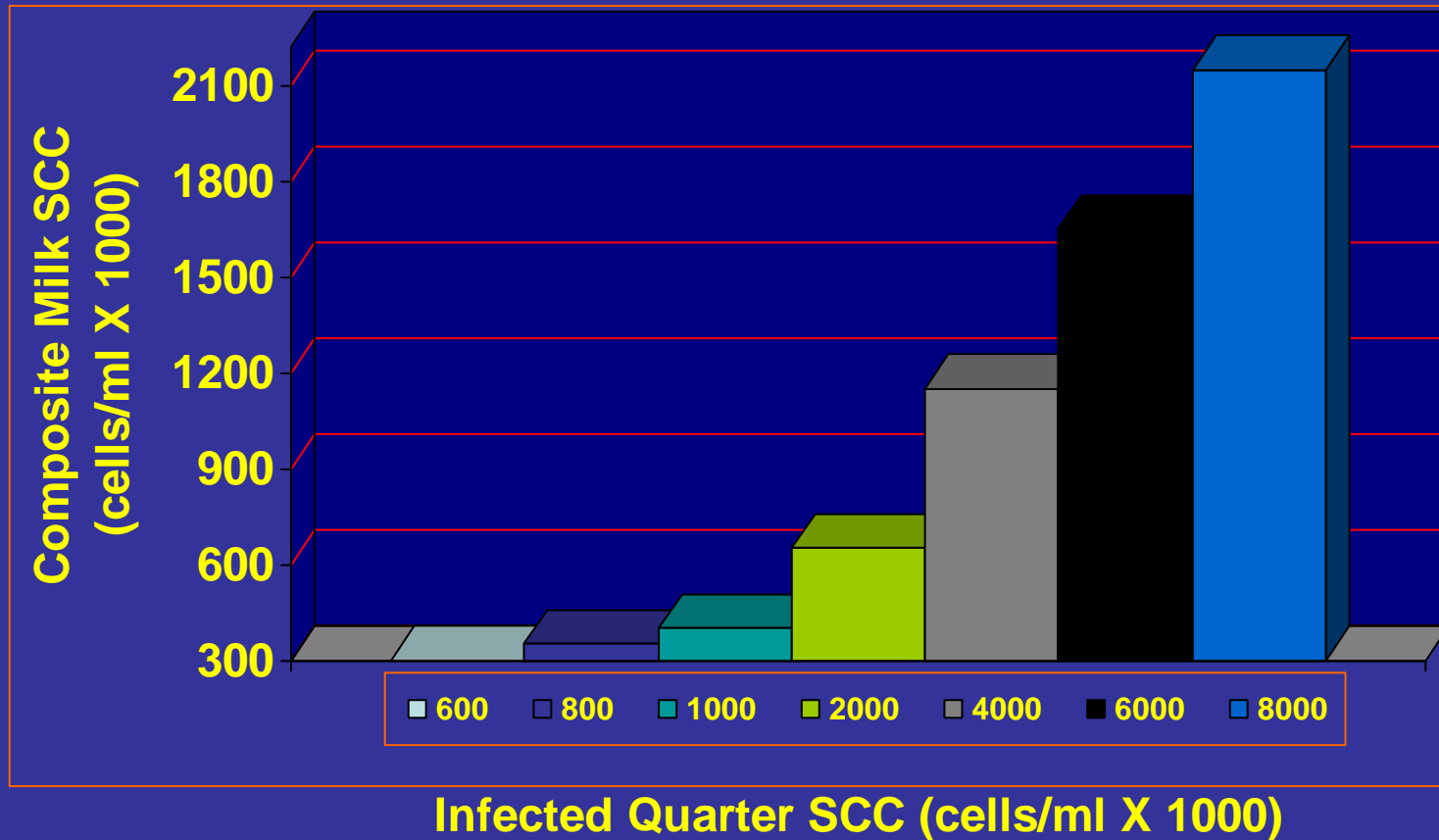
1. Have enough field men to be able to spend quality time with every dairyman who needs help on quality and visit non problem herds also.
- 2 Every producer have a Bulk tank analysis Done weekly or monthly depending on size.

(Cont.)

2. Every dairy should have a bulk tank sample analyzed by All Florida Vet Laboratory at least monthly, large dairies weekly. Many do this now but need to be refreshed on how to use them
3. Every herd should be on DHIA test and use the SCC option and the data that this program has to offer

DRU 2005													
DATE	SA+	STA	STD	C.B.	MYCO	STU	COLI	BACIL	SA-	LPC	SCC	SPC	PIC
5/25	0	0	1600	0	Neg	800	52400	0	400	200	261,025	106000	56400
6/8	0	0	400	0	Neg	22000	3000	0	400	6700	325,499	21400	17800
6/22	0	0	400	0	Neg	400	46800	0	400	400	415,530	100000	221200
7/7	0	0	400	0	Neg	2400	14600	0	400	400	330,116	28400	20800
7/15	0	0	600	0	Neg	3200	58400	0	400	700	410,913	129000	447400
7/20	0	0	4200	0	Neg	5400	400	0	800	1900	510,179	2600	4200
7/26	0	0	5200	0	Neg	2000	1400	0	400	100	210,074	6000	4200
8/10	0	0	400	0	Neg	2800	1600	0	400	900	450,178	14400	11200
8/23	0	0	2400	0	Neg	3600	68200	400	400	1700	399,371	79600	91000
9/13	800	0	600	0	Neg	2400	200	0	400	100	300,105	8400	5400
10/11	200	0	10200	0	Neg	8400	12600	1800	600	2800	339,350	24600	30200
10/21	200	200	400	0	Neg	2800	600	0	400	500	628,679	7200	7000
10/26	0	200	2200	0	Neg	3000	1000	0	400	400	454,775	9400	11200
11/2	0	0	3000	0	Neg	6200	7600	0	400	1000	339,350	24000	32200
11/9	200	0	600	0	Neg	1600	1200	200	400	200	475,551	7800	6400
12/7	0	0	14400	0	Neg	7000	800	0	400	3200	311,648	13800	10000
12/14	200	0	400	0	Neg	8200	200	0	1000	600	244,701	7800	5000
12/7	0	0	14400	0	Neg	7000	800	0	400	3200	311,648	13800	10000
12/14	200	0	400	0	Neg	8200	200	0	1000	600	244,701	7800	5000

Composite Milk SCC if only 1 Quarter is infected and the baseline SCC in uninfected quarters is 200,000 per ml



Show Me The Money

- Who is going to pay the producer for:
- 1 New Hot Water Heaters
- 2 Bulk Tank Analysis
- 3 DHIA Testing
- 4 Nice New Barns

Does Every Steer have to Grade “Prime”?

- We have lots of Dairies Producing very high quality milk
- Can we select these for 24 day Milk?
- Let the Truck Dispatcher's Computer make the selection
- Or are we going to be paid for Quality?

THE END