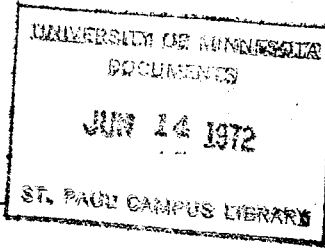


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**KEEP YOUR BACTERIA COUNT DOWN**



It pays to keep bacteria counts low. Low bacteria count assures the best price to the producer and helps maintain high-quality dairy products with long shelf-life. This fact sheet will remind you of the importance of each of the approved farm sanitation steps to reduce bacteria counts. The following procedures are recommended:

- 1. Keep the milking area clean and dry. Bacteria are ever-present in barns and milking parlors. Without moisture bacteria can't multiply.
- 2. Sweep the milking area but never just before milking. Dust carries bacteria, and bacteria in dust are usually heat resistant. They survive pasteurization and reduce shelf-life of products.
- 3. Clip cows around the flanks and udders. Long hair holds manure, chaff, and bedding. Even with milking machines, bacteria counts are lower when cows are clipped. Note Table I below.

Table I (1)

Farm	No. of Cows	Average Bacteria Per Ml.	
		Cows not Clipped	Cows Clipped
A	80	20,000	5,000
B	45	48,000	10,000
C	35	200,000	80,000
D	20	350,000	200,000

Note: Clipping reduced the bacteria count in all cases.

- 4. Sanitize milking machines just before milking. Be sure the sanitizer is of proper strength. Remember, sanitizer action is a function of 1) strength, 2) surface cleanliness, 3) contact with surfaces to be sanitized, and 4) contact time. Most sanitizers require two minutes of contact to assure complete bacteria destruction.
- 5. Wash the udder with warm sanitizer solution. This will stimulate milk letdown. And, as shown in Table II, bacteria counts are lowered.

Table II (1)

Farm	No. of Cows	Average Bacteria Count Per Ml.	
		Udder Not Washed	Udder Washed
A	80	20,000	6,800
B	45	48,000	20,000
C	35	200,000	100,000
D	20	350,000	225,000

Note: Washing the udder with a warm sanitizer reduced the count in all cases.

- 6. Attach milking units within 1 to 2 minutes following udder wash. Be careful not to get bedding or manure or other material into the units. A thimbleful of manure may contain as many as 4 billion bacteria. In 5 gallons of milk this amounts to 10,000 bacteria per drop.
- 7. Cool the milk rapidly. Milk temperature must be below 40° F. within 2 hours. Table III shows the influence of temperature on bacteria numbers.

Table III (1)

Increase in Bacteria Numbers in "Clean" Milk Over a 12-Hour Period

Temperature	Increase
40° F.	none
50° F.	5-fold
60° F.	15-fold
70° F.	700-fold
80° F.	3000-fold

- 8. Rinse equipment in lukewarm or cool water immediately after milking. Follow the plain water rinse with a detergent rinse. Don't use hot water or the milk solids will bake onto equipment surfaces.
- 9. Wash equipment with a dairy cleaner. Follow label directions. Make up the solution

to the correct concentration. Use the detergent at the prescribed temperature. Don't use household detergents. They cause off-flavors and odors in milk.

When washing the bulk tank, add water to the tank, then detergent. If you add detergent first, it may eventually cause corrosion of the stainless steel. Or, make up the solution in a plastic bucket. Place the bucket inside the tank and work from the bucket with a hard bristled brush. Never use metal sponges or rags for cleaning equipment.

10. Store equipment drained and dry. This is important. Small numbers of bacteria can multiply many times between milkings, especially during warm weather. As noted before, bacteria can't multiply without water. They may survive on a dry surface, but their numbers won't increase. Table IV shows the range of difference on four farms.

Table IV (1)

Bacteria Numbers Per Ml. of Rinse Water

Farm	Washed Equipment Stored Moist	Washed Equipment Stored Drained & Dry
A	19,000,000	4,000
B	60,000,000	39,000
C	16,000,000	14,000
D	700,000	3,000

Total bacteria count of milk is a reflection of the day-by-day use of the preceding steps. Bacteria in "clean" milk do not grow at refrigeration temperatures. Bacteria in "dirty" milk will multiply even at cold temperatures. With 2-day storage on the farm, it's important to keep milk clean. Note Table V.

Table V (2)

Effect of Temperature on Bacteria Growth in Milk Produced Under Various Conditions

Production Conditions	Storage Temperature	Fresh	Standard Plate Count (Bacteria Numbers) Per Ml. After:	
			24 Hours	48 Hours
1. Clean cows, environment, and utensils	40° F.	4,295	4,138	4,566*
	50° F.	4,295	13,961	127,727
	60° F.	4,295	1,587,333	33,011,111**
2. Clean cows, dirty environment and utensils	40° F.	39,082	88,028	121,864
	50° F.	39,082	177,437	831,615
	60° F.	39,082	4,461,111	99,120,000
3. Dirty cows, environment, and utensils	40° F.	136,533	281,646	538,775
	50° F.	136,533	1,170,546	13,662,115
	60° F.	136,533	24,673,571***	639,884,615

\* Note: Bacteria count doesn't increase in "clean" milk held at low temperatures.

\*\* Note: Bacteria count increases in "clean" milk when storage temperatures are too high.

\*\*\* Note: Bacteria count increases to a high level in a short period of time even at refrigeration temperatures when bacteria come from "dirty" sources.

Use good practices every day. Low count milk helps assure a quality product and a solid position in the marketplace.

References:

(1) Unpublished data, Department of Food Science and Industries, University of Minnesota.

(2) E. M. Foster, et. al., Dairy Microbiology, Prentice-Hall, Inc., p. 180, 1957.

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