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Dairy Guidelines

COOPERATIVE EXTENSION SERVICE, V.P.I., BLACKSBURG, VIRGINIA

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WHOLESOME MILK FOR HEALTH

(A reference for 4-H & FFA Dairy Projects)

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Milk is nature's most nearly perfect food because it contains many food nutrients necessary for good nutrition. It is also one of nature's most highly perishable products--it serves as an excellent food for microorganisms that cause spoilage. Proper care of milk from the cow to the table is necessary to protect your health and the keeping quality of milk for home use.

Animal Health

Safe, good quality milk can come only from healthy cows. All milking animals must be free of tuberculosis, brucellosis, and mastitis. These diseases may be carried in milk from cows to man. Be sure that your home milk supply comes from animals that are tested periodically and found free of disease. Purchase animals only from farms certified disease-free. When in doubt about the health of any of your cows, or the safety of their milk, have your veterinarian check them and treat or prescribe the proper medication.

Cleanliness Maintains Quality

Though milk may be high in quality as it comes from the cow, it can easily become contaminated with spoilage-causing bacteria from a number of sources.

The People Milkers and milk handlers should always wear clean clothing and be free of communicable diseases. Hands must be kept clean, for they come in contact with the cow's udder and many utensils that milk touches.

The Places Always milk in clean, dust-free surroundings. Feed hay and dusty grain far in advance of milking so the dust will have a chance to settle; or feed cows after milking. Control flies by prompt removal and proper disposal of manure, protective screening, and necessary application of approved fly baits and sprays.

The Cows Keep cows clean. Periodic clipping of hair on udders and flanks will help keep them clean. Brush or curry regularly. If a cow is extremely dirty, wash it all over.

The Utensils Use only clean pails, milking machines, strainers, and cans that are free from dents, deep scratches or pits, open seams, and rust. Clean all utensils by the "Rinse-Clean-Rinse" method:

First - Rinse all surfaces with cool or lukewarm water to remove the milk film.

Second - Wash in hot water using a dairy detergent or soapless cleaner. Use a brush! Cloths soon become sources of contamination.

Third - Rinse in acidified hot water (1½ ozs. of milkstone remover in 10 gal. water). Turn all utensils upside down on clean racks to drain and dry. Before the next milking, rinse with a sanitizing solution.

To properly clean a milking machine, rinse by drawing 2 gal. or more of cool or lukewarm water into the machine from a pail. Dipping the teat cups in and out of the water causes an air-scrubbing action which helps remove milk film. Then, take the machine apart and wash and rinse as outlined above. After the final rinse, store all parts on clean racks to drain and dry. Before using again, put the machine back together and draw about 2 gal. of warm sanitizing solution through the teat cups. This solution can be used again to wash the cows' udders and teats before milking.

The Methods

Machine Milking - Practice managed milking:

1. Wash the udder with a clean, single-service towel that has been dipped in a warm sanitizing solution. Dry the udder with another single-service towel.
2. Use the strip cup to check for abnormal milk.
3. Attach the milking machine about one minute after starting to wash the udder.
4. Repeat steps 1 and 2 on next cow.
5. Return to first cow and machine strip.
6. Release the vacuum and gently remove the machine.
7. Dip teat cups first in clean water and then in disinfectant solution.
8. Attach machine to second cow.
9. Dip teats of first cow in disinfectant solution and prepare third cow.

Hand Milking - Milk with clean, dry hands. Wash the cow's udder with a single-service towel dipped in warm sanitizing solution. This cleans the udder and stimulates milk let-down. Dry the udder and your hands with a clean, dry towel. Using a strip cup, remove 2 or 3 streams of milk from each teat and check for abnormal milk. If the milk seems normal, proceed to milk the cow gently but rapidly into a small-top pail. Dip the teats in a sanitizing solution after milking.

Straining Milk

Straining milk does not improve its quality. It only removes the large particles of dirt resulting from sloppy milking methods. Bacteria that cause milk spoilage are small enough to flow freely through the strainer. Use single-service strainer pads and change the pads frequently. Check your milking methods by observing the amount of dirt on the strainer pad after milking. Clean habits will result in clean strainer pads.

Proper Cooling

Milk must be cooled to below 50°F. within 2 hours after milking. Prompt cooling helps to maintain high quality by retarding the growth of bacteria which cause milk spoilage. What happens to the growth of bacteria in milk held at different temperatures is shown in the following table:

Hours After Milking	Effect of Temperature on Bacterial Growth		
	Milk cooled and stored at		
	40°F.	60°F.	80°F.
0	31,000	31,000	31,000
10	30,000	150,000	180,000,000

G. M. Trout, et.al., American Milk Review, Dec., 1951

Set cans of milk in cold water to cool. Never cool milk in the open air, even in winter weather. It takes almost 20 times as long to cool milk in air at 32°F. as in water at the same temperature. If the milk is to be pasteurized immediately, it is not necessary to cool before pasteurization.

Pasteurize Your Home Milk Supply

Pasteurization kills all disease-causing bacteria. It also destroys more than 95% of all other bacteria which may affect the keeping quality of the milk. Milk pasteurization is simple and easily done in the home. It may be done by either of 2 methods.

1. Long-time, low-temperature method - heat the milk to 145°F. and hold at that temperature for 30 minutes; cool immediately.
2. Short-time, high-temperature method - heat the milk to 165°F. and cool it immediately.

Use an accurate dairy or cooking thermometer. Never overheat the milk--this causes a caramel or cooked flavor. Use a double boiler to prevent scorching of the milk. If a double boiler is not available, or is too small for the amount of milk to be pasteurized, heat the milk over low heat with constant stirring. For additional information on the home pasteurization of milk, obtain a copy of Circular 482, "How Safe Is Your Milk Supply."

After pasteurization is completed, and the milk has been cooled to 50°F. or below, pour it into clean, scalded containers. Cover and refrigerate until needed.

Tips on Maintaining Quality in Pasteurized Milk

Fresh milk for the table may be of high quality, but improper care can cause it to spoil quickly. The following tips should help lengthen the keeping time of high-quality milk.

1. Keep milk away from sunlight. It will develop an oxidized flavor quickly if exposed to the sun for even a short time.
2. Store in the refrigerator in tightly closed containers to prevent its picking up flavors from other stored foods.

3. When serving at mealtime, pour out the amount needed and set the container back in the refrigerator.
4. Never pour unused milk back into the original container. Put it back in the refrigerator in another container.
5. Allow no one to drink directly from the milk storage container.
6. As soon as the container is empty, rinse it with cool or lukewarm water to remove most of the milk film. Wash it thoroughly and rinse with hot water.
7. Do not use containers meant for milk for anything which might taint it. Examples: kerosene, turpentine, fly spray, etc.

Suggested Dairy Demonstrations

<u>Demonstration or Activity</u>	<u>References</u>
1. Pasteurization of Milk	V.P.I. Circular 482 "How Safe Is Your Milk Supply"
2. Cleaning of Milk Utensils	U.S.D.A. Bul. 2017 "Clean Milk Production"
3. Cleaning Milking Machines	V.P.I. Circular 846-S "Machine Sanitation and Mastitis"
4. Care of Milking Machine Rubber Parts	V.P.I. Circular 846-U "Rubber Milking Machine Parts and Mastitis"
5. Care of Milk in the Home	This Circular or V.P.I. Circular 482
6. Milk Drinks	V.P.I. Circular 618 "Milk Drinks"
7. Tour of Dairy Plant	
8. Making Various Dairy Foods	
Homemade Ice Cream	V.P.I. Dairy Guidelines - Series 502
Cottage Cheese	V.P.I. Dairy Guidelines - Series 503
Cream Cheese, Neufchatel Cheese, or Farm Cheese	V.P.I. Dairy Guidelines - Series 453
Cultured Buttermilk, Sour Cream, or Yogurt	V.P.I. Dairy Guidelines - Series 504
Butter Making	U.S.D.A. Bulletin 1979 "Making and Storing Farm Butter"
American Type Cheese	U.S.D.A. Bulletin 2075 "An American-Type Cheese--How to Make it for Home Use"
9. Use of Cottage Cheese	V.P.I. Bulletin 249 "Recipes for Cottage Cheese Dishes"
10. Cleaning Milking Machine Vacuum Lines	Dairy Guidelines - Series 476 "How to Clean Milking Machine Vacuum Lines"
11. Managed Milking	V.P.I. Circular 846-M "Good Herd Management for Mastitis Prevention"