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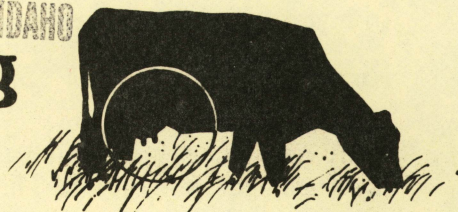
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Cleaning and Sanitizing Milking Equipment

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Production of high quality milk begins on the farm, and a major cause of high bacteria counts and poor milk quality is unclean equipment. To produce quality milk with a pleasing taste, you should consistently maintain a complete dairy sanitation program.

Three classes of bacteria that can affect milk quality are identified by the optimum temperature at which each multiplies:

- Psychrotrops or "cold-loving" bacteria grow at temperatures below 15°C (59°F or less).
- Mesophile bacteria live at moderate temperatures of 15° to 45°C (59° to 113°F).
- Thermophile bacteria grow at 45°C+ (113°F+).

Numbers of each group can reproduce at temperatures outside their optimum growth ranges. All three types are common in the dairy farm environment — in dust, feed, dirt, corrals and on poorly cleaned milking and milk handling equipment.

The four basic steps to maintain sanitary milking units, lines and equipment are: rinse — wash — rinse again — sanitize before milking. Omitting a step can lead to dirty equipment and milk quality problems.

Necessary supplies for proper cleaning are:

- An adequate supply of potable water, water that can be heated and kept at 140° to 160°F or recommended temperature throughout the wash cycle.
- Cleaning compounds or chemicals compatible with on-farm water conditions.
- Turbulence — a very critical ingredient.

Rinse milk lines, milk units and bulk tanks immediately after use in water less than 110°F. Rinse until the water runs clear. The rinse water

should go to a drain and not be recirculated. This rinsing will remove at least 95 percent of the milk residue from equipment surfaces and will help the detergent in the washing cycle that should follow immediately. Key factors in the cleaning process are temperature, time, turbulence and detergent concentration.

Water Temperature

The wash water temperature at the start of the wash cycle should be between 140° and 160°F and should not fall below 110°F during the cycle. At temperatures below 110°F, soils will be redeposited on milking equipment. You may need to install a booster heater in the wash tank or to insulate the milk line to keep the temperature hot enough. Insulation for milk lines must be a closed cell foam with a smooth outside surface to prevent water absorption. Each 18° drop in temperature will cut chemical activity in half. The ideal temperature is between 120° and 130°F, unless a lower temperature is compatible with a specific detergent manufacturer's recommendations.

Time and Turbulence

Time is critical in a wash cycle. About 7 to 15 minutes is required, depending on the manufacturer's recommendation for time and temperature, to remove fats, proteins, sugars and other soils.

Turbulence is also important, especially in large pipe lines. Injecting air into one or more locations will produce an "air slug" which will provide the velocity needed to clean the top of the milk line. Circulating solutions will not clean merely by contact.

Detergent Concentrations

A detergent concentration needs to be consistent with the manufacturer's recommendations. A high quality, chlorinated, alkaline cleaner is essential to remove protein films. These films are colorless until they build up and become yellow. Money you may save by buying cheaper chemical brands can be lost in milk rejection.

Hard water can be a problem and may require specially formulated chemicals to get the results you want. Some "water softening" poly phosphates are not biodegradable and can cause algae growth in streams and lakes. You may find it more economical to invest in a water softener or conditioner.

Rinse Cycle

After washing, the rinse cycle is important in removing materials which the wash cycle has loosened and left in the line. This rinsing should take place immediately after the wash cycle in water between 90° and 110° F. A small amount of acid is helpful.

Sanitizing

Your equipment needs to be sanitized just before milking. This will remove most microorganisms on equipment surfaces and leave a nearly sterile environment for the milk. Use of a sanitizing agent may be necessary. A chlorine concentration of 200 ppm or iodine solution of 25 ppm may be used if the manufacturer's recommendations are followed.

Inspection

You should establish an orderly routine for checking equipment cleanliness and condition. Follow these guidelines.

Rubber parts are clean when:

- They smell clean.
- Inflations squeak when milk contact surfaces are rubbed together.
- Original smooth surface remains smooth and intact.
- No "paste" or "scrape-off" is evident when scraped with a dull knife.
- A tight fitting "burr" comes out clean when drawn through the milk hoses.

Milk pipelines are clean when:

- No water droplet "beads" are visible on the clean inside surface.

- Water drains in layer "sheets" from the top to the bottom of the pipeline.
- Interior surfaces are bright and shiny.

Stainless steel and glass surfaces are clean when:

- Rinse water slips "sheets" in a continuous layer from top to bottom and does not dry in patches.
- No moisture droplets appear on the surface.
- A "squeaky" noise results when clean, dry fingertips are pressed on the dry surface.
- No blue coloration is visible on dry stainless steel.
- Glass and stainless surfaces are bright and shiny when dry.

Bulk Tank

Procedures for cleaning and sanitizing bulk tanks are basically the same as for milking units and pipelines. Manufacturer's recommendations should be followed on all cleaning chemicals to ensure adequate cleaning and safety. If the bulk tank is cleaned by hand, the same process is used; however, detergent selection and water temperatures may differ. Detergents for hand-cleaning are usually less caustic and tend to foam more than clean-in-place detergents.

Cautions and Problem Prevention

"Dead end" milk lines do not clean out properly. Milk and wash lines should be looped so that water solutions circulate. Velocity is needed to give scrubbing action to alkaline cleaners in the lines.

Clean and inspect vacuum and pulsator lines routinely. Moisture and soil can enter them and contribute to the milk quality problem.

Follow these guidelines to prevent problems:

- Clean the system after every milking.
- Do not mix acid and alkaline cleaners together because they nullify each other. The chlorine, released as gas, can cause burns or lung damage if breathed.
- Maintain an adequate supply of hot water.
- Air dry pipes and hoses.
- Sanitize immediately before milking.

If the milking system is properly cleaned and sanitized after each milking, bacteria will not be allowed to grow and multiply. The end result will be high quality milk going from farm to consumer, a quality that will help sell all dairy products.