Why Milk Sanitarians Are Interested in Better Milking

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In general, the duties of a Milk Sanitarian are to supervise the production and handling of milk from the farm to the consuming public. To improve and maintain quality in the milk supply is their constant aim. This is accomplished essentially through education of the producer and distributor.

The term quality as it pertains to milk has a very broad meaning. It includes safety, cleanliness, appearance, palatability, flavor and keeping qualities.

Milk should be produced only from healthy and clean cows, with clean equipment. The quality of milk can be no better than the health of the udder from which it is obtained. Diseased udders are responsible for much of the abnormal and low-grade milk rejected at plant receiving platforms. It requires constant vigilance on the part of the dairyman to maintain udder health.

More dairy cows are sold because of mastitis than for any other reason. Trauma of the udder is no doubt the underlying cause of mastitis, with bacterial invasion being secondary. It is difficult to define what constitutes trauma of the udder, as it has been developed to such a high degree of specialization. Improper milking may cause trauma of the udder.

In years gone by little or no attention was paid to the manner in which cows were milked, other than to require that the hands be clean and dry, and that the mechanical milker be in a clean and sanitary condition.

Dairymen, scientists and dairy physiologists during the past several years have given much study to the phenomenon of milk secretion and have definitely proven that the manner in which a cow is milked is reflected in udder health, production, and length of lactation period. Observations in the field have proven this to be true. This being the case, it is only natural that milk sanitarians are interested in “Better Milking.”

“Better Milking” may be defined as that method of milking cows which will milk the greatest number in the least time, maintaining udder health and maximum production of milk and fat.

Milking cows by machine is the modern method; it has now become a science, requiring thoughtful planning and a definite routine for every dairy barn.

The milking operation may be compared to an assembly line in a modern industrial plant. The cows are arranged in the milking line in the order in which they will respond best; the younger animals first, as these milk more quickly, and then the older ones. The older ones are milked last, as what they see and hear may induce them to milk better and faster.

Problem cows must be placed where they will not interrupt or stop this important “assembly line of production.”

The man who operates the mechanical milker is worthy of his title—the “milking machine technician.” His work requires the highest skill, as the success of the dairyman depends upon the production of his dairy herd. It is only through the milk pail that the final harvest is made. The tilling of the land, planting, cultivating and storage of the crops are only intermediary steps.
in dairy farming. The final and important harvest comes when the crops are fed to the cattle and converted into milk. The proper milking of cows will increase milk production as much as 10 per cent.

It is a natural instinct for a cow to be suckled. The act of milking, however, is a substitute for the calf’s nursing action and if performed in the correct manner will be received by the cow with splendid response. It should always be kept in mind that a cow likes to be milked if she is handled correctly and is in the proper environment.

Only persons who appreciate cows should milk them. This qualification is quickly recognized as being beyond the scope of possibility in many instances on a vast number of dairy farms. The value of such employees should never be underestimated in better milk production.

Certain conveniences, such as a low cart to carry timers, milk pails, stripping pails, water to wash udders, teat-cup dip water, strip cup, teat-cup dipper, etc., help to speed up the operation and eliminate the necessity of the operator’s carrying the equipment as he milks down a line of cows.

Every dairy barn requires some originality of thought in planning a milking routine, as they all differ in construction, arrangement of cows and location of the milk house. The general procedure, however, is similar.

The following simple rules, if observed, will result in producing a higher quality milk. Why is this true? The average dairy farmer will more gladly follow measures which will enable him to produce more milk and to milk his cows more quickly than he will for the purpose of improving quality. Does it matter too much for what reason he pursues the task so long as the desired results are obtained? Obviously, the answer is “no.”

Rule No. 1

Milk at the same time every milking. Cows are creatures of habit and react favorably to regularity. This practice also is important in maintaining uniform daily production, particularly with three-times-a-day milking.

Last but not least in importance, the daily milk harvest will always be ready for the trucks, to be taken to the receiving plant.

Rule No. 2

All milking equipment should be in readiness before the milking is begun. Covers of milk cans should be loosened and properly arranged for filling. Strainers should be placed on the first cans to be filled. The milking machine should be assembled and placed in the rear of the first cows to be milked. Transfer pails with slip covers should be placed in proper position for convenient transfer of the operating head.

This proper preparation makes for easy and quick handling of the milk in the dairy barn and milk house, with less chance of contamination. Once milking starts, no attempt should be made to do other jobs at the same time. Milking is no longer a “chore” but a full-time job, and requires the operator’s entire attention during the milking period.

Rule No. 3

Cows should not be fed during the milking act. Under natural conditions the cow never grazes when the calf suckles. The milking act also requires the animal’s full attention and cooperation.

Feeding cows during milking only serves to divert their attention, and is also liable to cause feed odors and flavors in the milk, which is always objectionable.

Rule No. 4

The preparation of the udder for milking is exceedingly important for “better milking,” as well as for the production of a clean milk. A minute before application of the milking machine the udder should be washed or
wiped with an individual towel moistened in a warm chlorine water of 130° F. with 250 p.p.m. of available chlorine.

This operation cleanses the udder and insures clean milk. The manipulation of the udder with hot water is a substitute for the nursing action of the calf's warm, moist mouth.

Manipulating the udder results in the sending of an impulse or message to the brain, which in turn releases a hormone which enters the bloodstream, and upon reaching the udder causes the smooth musculature to contract and squeeze out the milk into the teat and gland cistern. This is more generally spoken of as the cow letting down her milk. This act is necessary for proper milking.

As the milk is made within the udder it is held in minute drops in millions of alveoli and recesses. Each alveolus, containing only a fraction of a drop of milk, is drained by ducts which coalesce with other ducts until they enter larger ducts and finally the cisterns above each teat. The droplet in each alveolus is too tiny to flow out of its own accord, so some pressure exerted from the outside of the alveolus is necessary to force it out.

Surrounding each alveolus are small muscle cells that squeeze and expel these tiny droplets.

The "letting down" of milk may be described as a conditioned reflex, and directly due to a high-intra-glandular pressure caused by the presence of active oxytocin in the blood, which is responsible for the contraction of the alveoli and small ductule muscle.

On the other hand, the failure to "let down" milk is due to the presence of adrenalin in the blood, which prevents the muscular contractions that are responsible for the high intra-glandular pressure.

When the teats and lower portion of the udder become turgid it is an indication commonly seen in dairy barns is cows "leaking" milk.

Cows should never be prepared too far in advance of milking as the muscles within the udder become tired or fatigued because the hormone within the blood stream is dissipated; thus milking cannot be complete.

The greatest volume of milk is taken away immediately after "let down," consequently this task of preparation is important to udder health, in that it encourages the gland to function normally.

Many milk ordinances require that the udder be wiped with a damp cloth immersed in a chlorine solution. No mention is made as to temperature of the water. Experience has shown that the water was cold or of atmospheric temperature, actually hindering milk "let down." Cleansing results obtained are also questionable.

**Rule No. 5**

Just before the teat-cups are applied a few streams of milk are drawn from each teat into a strip cup. This opens the natural seal on the ends of the teats, which permits the machine immediately to take milk from the udder, and shortens the milking time by at least a minute. Foremilk, which is low in fat and higher in bacteria, is also eliminated from the general supply.

The aforementioned steps take approximately a minute per cow. It is obvious, however, that this preparation actually saves time in the end.

**Rule No. 6**

Teat-cups must be applied quickly, without the loss of vacuum. This is necessary for the proper functioning of the other milker units in operation and important in keeping sediment out of the milk.

Most cows will milk out in three minutes. This is determined by examination and feeling of the udder. The gland will become soft and flaccid, depending somewhat on the udder structure.
Do not permit the cups to climb to the base of the teats, or at least to remain there, as some of the more delicate tissues may be irritated.

As the udder starts to collapse, a small amount of pull is placed on the unit with one hand, while the quarters are manipulated with the other hand. Only a few seconds are required to carry out this operation and to remove what residual milk may be left in the gland sinus. This is called machine stripping, a method which is rapidly gaining in popularity. Some Health Departments are recommending its adoption, as less sediment gets into the milk.

Hand stripping is satisfactory if conducted quickly and with full hand squeezes. Slow hand stripping will lead to slow milking habits in cows. The major objection from a quality standpoint is the large amount of sediment.

**The Transfer Pail**

The transfer pail is essential for speed, convenience, and eliminates the necessity of pouring milk in the dairy barn, which is unsanitary and contrary to sanitary regulations.

As the unit is taken from the cow, the operating head is transferred to the empty pail and the slip cover is placed on the pail containing milk. While the unit is being applied to the next cow, there is no danger of cats, dogs or dirt getting into the milk from the previous cow before it is taken to the milk house.

**Teat-Cup Sanitation**

It is important to dip the teat-cups first in a pail of clean water and then in chlorine water (250 p.p.m.) between cows, in order to sanitize the cups so that no bacteria will be carried from cow to cow. This act also keeps the cups clean and consequently there is less sediment in the milk. The water and chlorine should be changed every 12 to 15 cows, or more often if necessary.

**Udder Sanitation**

After the cows have been milked the teats are dipped in a chlorine solution of 250 p.p.m. The milking surface of the teats will be rinsed clean of milk, eliminating the possibility of bacterial growth which might gain entrance into the teat duct.

Contrary to the belief of some, it prevents chapping, cowpox, and promotes skin health. Overly strong antiseptic solution may cause dermatitis, however.

**Problem Cows**

In nearly every dairy there may be one or two cows that are slow or hard milkers. They take longer to milk due to some anatomical or physiological reason.

Such cows are placed in the milking line so that they will be milked when it will not interfere with the milking of other cows. These cows require special attention and this cannot be given simultaneously with the proper milking of the rest of the herd.

**Diseased Udders**

Cows with diseased udders must be handled separately. If milked by machine the units must be sterilized with hot water of at least 180° F. All too frequently the milker is not properly sterilized at the conclusion of milking, and is applied on healthy udders at the next milking.

Some dairymen maintain a separate unit for infected udders and thus eliminate the possibility of carrying infection to healthy cows. Others say if such cows are milked by hand it makes those in charge more conscious that they are dealing with infected animals.

**Training Heifers to First Milking**

The manner in which heifers are first milked is often the determining factor as to whether or not they will be satisfactory milkers.

Do not subject them to the following milking procedure, as many dairymen
do: first the calf; second, milking by hand; third, machine milking. By so doing the heifer will have gone through three transitory periods.

Milk her first by machine and she will respond splendidly. The colostrum will not adhere to the milk surfaces if the milker is promptly rinsed.

Milk in the Air Lines

Milk in the air lines is always of concern to the milk sanitarian. The most frequent cause is over-filling the milker unit, due to milking two cows into a single unit. The installation of a stall cock for every cow will correct this objectionable habit. It also eliminates additional steps and permits every cow to be milked on the right side, regardless of where she is placed in the herd—an important asset in good herd management.

Care and Maintenance of Machine Important to Udder Health and Quality Milk

Care of and attention to the milking machine to keep it in perfect shape is most important to better milking. Low or high vacuum is a frequent cause of incomplete milking.

The usual causes of low vacuum are a worn pump, clogged pipe line, worn or leaky stall cocks, or even a cracked pipe line.

High vacuum is usually caused by a worn vacuum controller.

Even though both conditions cause incomplete milking, they act differently in doing so. Low vacuum will not open up the meatus of the teat sufficiently to allow a large stream of milk to flow, nor will it take what milk there is away with sufficient speed.

High vacuum may cause enough congestion and irritation on the ends of the teats so that cows will not let down their milk. Also, high vacuum used over an extended period of time will cause a chronic thickening of the end of the teat, resulting in what is sometimes called a spray teat, or a partial obstruction of the teat opening.

Frequent checking of the vacuum with a tested gauge is very important and should be done occasionally.

The teat-cups are the only part of the milker that comes in direct contact with the cow's udder and teats, and should be given special attention. The liners should be kept at the correct tension so that the cows are milked in the same way every day. Two sets of liners should always be used, rotating the sets every seven days. Two sets used in this manner will not only milk much better but should last longer than three sets used continuously.

Cows respond to the minutest change, such as a gradual change in the loss of elasticity in the liners. The change is so gradual that it may not be noticed by the operator until its effect is shown after a period of time.

Unfortunately cows cannot be relieved or broken of their bad milking habits as quickly as the mechanical condition can be corrected. It is much more satisfactory to keep the equipment in good repair and save the time and energy of training the animals over again.

Hot water is a prerequisite in producing quality milk. It has been a misnomer to call the majority of equipment on the farm for heating water hot water heaters; they are more nearly warm water heaters.

Dairymen deserve to be told the limitations of such equipment.

Keeping Milkers Clean

The secret of clean milking machines is to keep them clean and not let them get dirty.

Prompt rinsing after use with plenty of clean water for each unit is the one biggest factor in keeping them clean. Sufficient brushing after each milking, to keep the units clean, is also necessary.

The mutual interest of the milk sanitarian and the dairymen in this important and popular subject of "Better Milking" is certain to do much in improving quality milk production.
Above—Washing scene conducted at annual meeting of the International Association of Milk Sanitarians.

Below—Equipment used for Better Milking Demonstration at the same meeting.
Above—Close-up of milker properly applied to cow’s udder. Note position of teat-cups and udder. Sight glass indicates perfect “let-down” of milk.

Below—Beautiful example of perfect udder with satisfactory “let-down.” Note distention at the base of the udder almost equal to the distention at the floor of the udder.
Above—Side view of the same animal indicating proper “let-down.”

Below—Complete collapse of udder after 3-minute milking. Portrays perfectly how a normal udder should appear when completely milked.
Above—Side view of same animal after milking portraying complete disappearance of the posterior view of the udder.

Below—Close-up showing an udder that has been completely milked out and time that the units should be removed. Note the collapse of the udder tissue above the teat-cups which is an indication that the cow has been milked out.
Above—Milk at same time every milking—cows are creatures of habit.

Below—Have everything in readiness to start. Avoid noise and confusion. (Operator is Mr. Paul Lovelace, Clinton Corners, N. Y.)
Above—Wipe each udder with cloth and good warm water (130° F.) containing 250 p.p.m. of chlorine.

Below—Draw a few streams from each quarter into strip cup. Inspect for abnormal milk.
Above—Next apply teat-cups immediately. Handle cups properly to avoid loss of vacuum.

Below—Remove teat-cups at end of 3-4 minutes. Strip briefly by hand or machine.