CSI: CowSide Investigation

Proper udder preparation pays

by Dr David Reid

Properly preparing cows for milking can pay off in faster milking, healthier cows and increased milk production. A cow's udder has four separate glands or quarters. A membrane separates each quarter, so milk produced in one quarter must leave through the teat on that quarter. The back or rear quarters contain about 60% of the milk producing cells and the front quarters about 40%. The udder makes milk continuously. Milk production slows only when limited by high pressure in the udder, or the end of the lactation period.

Tiny cells on the inside walls of the alveoli (very small storage units) take nutrients from the cow's blood and convert them to milk. When the cow 'lets down her milk', due to the release of oxytocin into the blood stream, muscles surrounding the tiny alveoli contract, forcing milk into the lower udder.

Fast, complete let-down

To stimulate the cow for machine milking, the teats should be manipulated for 10-12 seconds of contact time. To achieve this level of contact time often requires 15-20 seconds of actual time.

Teat contact time is achieved by either stripping teats, rubbing teats or drying teats.

Milkers should be required to wear gloves during udder preparation and should not use the same towel on other cows.

Teats may be sanitised with a predip product either before stripping or after. Improved bacteria kills can be realised if the teats are sanitised before stripping.

Mastitis checks should be made by drawing one or two squirts of milk out of each quarter and visually examining the milk for any signs of mastitis.

An added benefit of fore-stripping is it also removes high bacteria milk from each quarter. Massage and fore-stripping are the most effective ways to stimulate the nerves in the teat. This sends a message to the cow's brain to allow milk let-down.

Full normal let-down takes about 90 seconds from the time the teats are first touched during udder preparation. Teat cups should be attached as close to 90 seconds as possible. If a choice has to be made between less than or more than 90 seconds choose the longer time as long as the total lag time is less than 2.25 minutes. No massage, a weak massage, or a delay in attaching the teat cups causes slow milking and lost milk production.

The presence of oxytocin in the blood stream is highest for the first 4-6 minutes after stimulation. Therefore, timely attachment and detachment are essential for reducing teat end stress, often referred to as hyperkeratosis.

Fear slows milk let-down

A cow is a highly sensitive animal, reacting to fear and pain. Irregular milking habits, rough treatment, needless noise, and milking machines that cause pain will slow down milking and reduce milk production. Fear and pain cause a second hormone, adrenalin, to enter the blood stream, blocking oxytocin, the let-down hormone.

With poor let-down response, the teats remain flabby for lack of milk pressure, and teat cup crawl slows milking by strangling the teat opening at its attachment to the udder.

When this happens, even efforts to re-stimulate the cow will have little success. The positive effect of oxytocin is reduced and cannot naturally occur for another half to one full hour. Kind and consistent treatment, regular milking routines, proper stimulation and reduced machine 'on' time, will more than pay their way in profitable milking.

Efficient profitable milking

A properly adjusted and maintained milking system which is kind to your cows pays in higher production and healthier cows – and more profitable milking. The milking machine should remove the available milk from the cow, gently, completely, and quickly.

The milker's main focus is to have the milk available. The machine's job is to remove it. Remember calm, clean cows must be brought to the parlour at every milking.

Consistent milking procedures and routines allow a dairy to maximise both milk quality and milk production. ■

Innovation. Solutions. Results. BouMatic

CSI: CowSide Investigation

Trouble shooting herds with poor teat condition

By Dr David A. Reid

Veterinarians and milk quality consultants are frequently asked to investigate situations concerning poor teat skin condition or teat end problems.

A variety of agents and mechanisms can cause changes in teat skin condition and teat end appearance. These can be classified as:

- Milking machine effects.
- Environmental effects.
- Infectious agents.

Most herds typically have between 5-15% of the cows with pointed or round ended teats. When compared to flat ended teats, these teats end shapes will show more hyperkeratosis lesions. These teats will have these lesions regardless of how well the milking procedures are performed, how well the milking machine is maintained or how well the milking machine is set and designed to remove units in an appropriate manner. Teat end scores will increase during colder months of the year. There is typically a sharp increase in teat condition and teat end scores 2-3 weeks after the first hard frost and the onset of colder weather.

The best way to approach problem teat end herds is to obtain a thorough history from herd management personnel. Determining the products used for pre-dipping and post-dipping is also important.

It is important to evaluate teat end condition scores in pens that management feels has problems. Most experienced veterinarians can recognise some of the characteristic lesions that are present with the common infectious agents.

The two main teat conditions typically seen are poor teat skin condition resulting in chapping and cracking the teat skin and hyperkeratosis. In addition to the previously discussed relationship with teat shape, the degree of hyperkeratosis on teat ends is directly correlated with milking duration.

The main objective when performing evaluations in problem herds is to evaluate both the milking management procedures and the milking machine performance. Dairymen usually look first at milking machine performance when in reality the udder preparation and milking procedures may be a key factor to the development of poor teat skin and teat end condition scores.

The problem can be with low flow and relatively high vacuum either when the machine is first attached, after the cow has finished milking, or at any time during the milking.

Teat Club International has reported the primary correlation to hyperkeratosis is the length of time cows have low milk flow, defined as less than one kilogram per minute milk flow rate.

Several areas of equipment analysis are significant to overall teat end health. The NMC recommendations and the ISO standards call for a minimum of 150 milliseconds of D-phase and/or 15% of the pulsation cycle with a minimum of 150 milliseconds of D-phase.

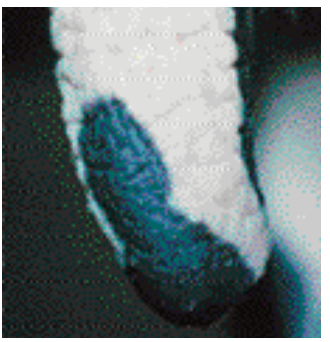
All major brands of pulsators sold at the typically installed ratios in North America and Europe will have over 200 milliseconds of D-phase when graphed on the cow during milking or with teat cup plugs installed in units and vacuum turned on to the units.

Field experience indicates that when D-phases fall below 200 milliseconds there is likely to be some increase in teat end irritation resulting in hyperkeratosis.

Milking duration is influenced by take off settings. Most factory default settings for take offs result in cows being over-milked.

Reductions in average milking durations between 60-90 seconds can commonly be achieved on most dairies by changing take off settings from factory set points. Reducing milking duration will improve teat skin and teat end condition.

An example of dry skin.



Severe hyperkeratosis.

When cows are not being overmilked, then adjustments can be made to the system vacuum level.

System vacuum level is determined by the liner type and the degree of overmilking.

The NMC protocol states that claw vacuums should be maintained between 35.5-42.3 kPa (10.5-12.5" Hg) under peak milk flow conditions. Peak milk flow claw vacuums between 39-42 kPa (11.5-12.5") will decrease milking duration and increase flow per minute of unit attachment.

When higher vacuum levels are set for a dairy, udder preparation must allow adequate oxytocin let-down and units must be removed when milk flow falls to a low level.

Over-milking is often the result of either inadequate udder preparation or poor timing of unit attachment after adequate udder preparation. Frequent observation in the barn is necessary to ensure there are minimal cows with no milk flow at the front end of milking and that units are coming off the cows when milk flow ceases.

The key mechanical factors needed to improve teat condition and reduce teat end lesions are adequate oxytocin let down, adjustment of take off settings and vacuum levels, and maintaining pulsation D-phase above 200 milliseconds.

It is important to realise that even when the udder preparation and mechanical settings are optimised, a small percentage of animals will still have hyperkeratosis lesions because of teat shape and length. ■

Innovation. Solutions. Results. BouMatic
www.boumatic.com

CSI: CowSide Investigation

Thinking clean during milking

By Dr David A. Reid

The key to reducing the new infection rate for mastitis is to attach units to teats that are as clean as possible at every milking.

Achieving clean teats requires that milking personnel are 'thinking clean' during milking.

This means clean teat ends and teats, clean milking equipment, clean hands, and clean platforms under the cows. Providing the proper tools for milkers will improve the overall cleanliness of these critical areas. Every dairy should establish protocols specifying how often cleaning procedures must be performed in the parlour, holding area and transfer lanes from the pens to the parlour.

Additional protocols will be needed outlining the procedures and timing interval for cleaning units, platforms under the cows and parlour entrance areas.

The overall goals are to bring cows to the parlour as clean and as calm as possible at every milking.

Cow movement protocols are also important because when cows are moved aggressively to the parlour or barn they move faster and do not pick up their feet, which increases the amount of manure splash. When cows are handled properly they move slower reducing manure splashing. Calm cows have better primary milk letdown and therefore they milk faster and more completely than agitated cows.

The best way to evaluate cow cleanliness is closely observe the back sides of cows' front legs. If there is minimal manure splashing as cows move, then there will be very little manure on the front legs.

The consequences of manure splash are dirty udders and udders caked with dried manure when the cows enter the parlour. This results in much poorer milker attitudes during milking and poor conformance to any clean cow protocols because the cause of the contamination is not in the control of the milkers in the parlour or barn.

Research has demonstrated the very best udder preparation procedures only reduce the total bacterial population on teats by 80-85%.

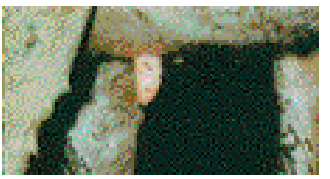
The key to reducing the new infection rate is to reduce the number of bacteria on teats when units are attached. When clean, calm cows enter the parlour, the goal of cleaner teats is more achievable on a milking by milking basis.

Installing drop hoses in parlours equipped with a system to meter in a germicide will improve the cleanliness of units and cow platforms.

The best time to spray units is immediately after cows begin exiting the parlour. The goal is to allow time for excess water to drain off the equipment before units are attached to the next set of cows.

Protocols should be developed to maintain the cleanliness of any containers used to hold clean cloth or paper towels. All containers should have covers that are only opened when towels are removed.

Do not forget to wash and clean any aprons used for either paper or cloth towels by milkers. Remember, the goal is to reduce the number of



Udders caked with manure.

bacteria on the teats when units are attached. Clean drying towels are the key factor to removing bacteria during normal udder preparation.

Many milking protocols involve stripping cows with gloved hands.

A frequent recommendation is to wash gloves after each group of cows are prepped. Some dairies have installed automatic valves to make it easy for milkers to clean their hands on a regular basis. These automatic valves can either have a sensor or a manual push top, both of which keep

Clean front legs.

Manure splashing and dirty front legs.

the water flowing for a set period of time, generally 8-10 seconds and then automatically turn off. These valves can be strategically located depending on the milking routine.

Many dairies have fabricated a wash sink on wheels to clean units at the completion of milking. The sink is filled with warm water and a manual chlorinated cleaner that is designed to have lots of foaming activity. Units are scrubbed with a brush before they are installed in the jetter cups for CIP washing.

Most parlours that do not use a sink will have buildups of organic material on the claws, shells, and hoses. When milkers set the system up to wash when the units have not been properly cleaned, they will already have dirty gloves or hands and it then is impossible for employees to 'think clean'.

One of the best methods to keep parlours clean is to use an equipment foaming device on a regular basis. Specific chemicals are available that are designed to foam as they are applied with foaming equipment and a compressed air source to surfaces in the parlour.

Parlours that foam alternately with either a chlorinated alkali or acid foaming chemical will be as bright and shiny as they were when they were first installed.

A clean environment in the milking parlour or barn is essential to have all employees 'thinking clean' during milking. Having the correct equipment and protocols for using the equipment at scheduled times will result in fewer bacteria on the milking equipment and therefore the gloves and hands of the milking personnel.

Less bacteria will result in fewer cases of clinical mastitis. Fewer mastitis cases will result in better overall attitudes of all milking personnel and more profitability for the dairy. ■

Innovation. Solutions. Results. BouMatic
www.boumatic.com

CSI: CowSide Investigation

Simple steps to improve 'milkability'

By Dr David A. Reid,
Director of Milk Harvest,
Science and Technology

My definition of milkability is really very simple and easy to understand. A basic prerequisite for good milkability are properly stimulated cows that have teats full of milk when the units are attached.

Good milkability is when the unit is attached and milk flow is apparent immediately after the last teat cup is attached to the cow. The cow then milks out quickly, completely and evenly with a very good steady milk flow. Milk flow will then suddenly slow down and very shortly thereafter the units will be removed from the cow. During this milking the cow does not move about, step, lift a foot or kick at the unit or at the operator.

There are many factors that influence milkability. The milking personnel control some and some are related to and controlled by the milking equipment.

In this article I want to focus on some simple steps that can significantly improve milkability without costing the producer large amounts of cash.

The most basic consideration is to closely evaluate the milk path from the claw to the milkline. Is the path downhill for the entire distance? Are there uphill sections of milk hose? Are hoses too long and are they causing milk to move in a loop?

Any of these issues will impact milkability and cow behaviour in the parlour or barn. Because of lifting milk, the average peak milk flow claw vacuum will be lower when any of these conditions are present.

The photograph below shows a milk path issue that can commonly be observed on farms.

When peak milk flow claw vacuums (defined as during the first and second minute after attachment) are lowered, the time to milk individual cows will increase.

This means longer periods of low flow as cows run out of oxytocin towards the end of milking.

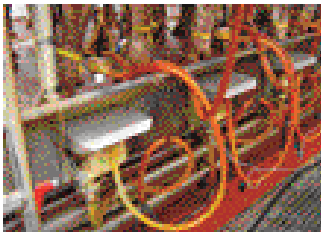
Low milk flow periods are the time when cows are most at risk to new mastitis infections due to squawking liners created by the longer milking times and the associated cow behaviour issues.

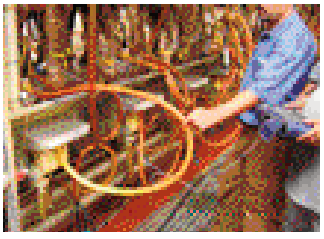
Higher peak milk flow claw vacuum is the single best way to increase the average milk flow rate. By improving the milk path, the peak milk flow claw vacuum is increased but the vacuum that teats are exposed to just before the units are detached is not increased as it would be if the vacuum on the system is arbitrarily increased.

The following pictures illustrate the significant increase in peak milk flow claw vacuum that can be obtained by improving the milk path to the pipeline.

In these two pictures the milk hose is lifted to eliminate most of the uphill movement but the vacuum level increased by almost 2kPa.

When the milk hose is also shortened, the increase in peak milk flow claw vacuum is further increased. In this parlour, shortening the hoses to eliminate the uphill movement of milk resulted in an average peak milk flow claw vacuum increase of just over 3kPa.





One objection many producers have to recommendations to shorten milk hoses is they cannot milk all of the cows with shortened hoses.

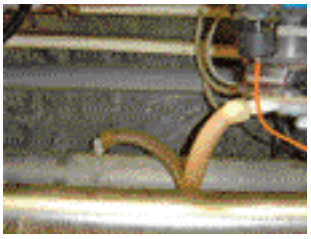
The solution is to have one or more short sections of milk hose with a stainless nipple that can be used to milk cows that either missload or when a short side is loaded into a parlour.

I often talk to producers about why they will milk 95-98% of their cows wrong, to milk 2-5% correctly!

Every farm can benefit by shortening hoses, because the only change will be to milk the best, highest producing cows faster, without exposing the cows to any higher vacuum at the end of the point of milking.

Other common issues are worn or kinked hoses that can act as restrictions to milk flow and lower the peak milk flow claw vacuum.

If the bottom hose on many metered systems are restricted, then there will be sharp vacuum drops of up to 6kPa each time these meters dump milk due to the inability for the milk to move rapidly away form the meter.



These drops in average vacuum will increase the milking duration and subject cows to more time in low flow and more pulsation cycles of opening and closing teats that are not in peak milk flow.

Pinch valves are another source of lowered peak milk flow claw vacuum in many parlours.

The actual time units are attached to cows is really quite low, often in the 25-35% of the total milking time of first unit on to last unit detached during an average milking.

This means the pinch valve is compressing the hose for 65-75% of the total milking. Pinch valves need to be moved to a new position on the pinch hose as often as every seven days to minimise the restriction caused by the pinch valve.

Spending time evaluating the milk path and making minor changes can improve the milkability on your dairy. The overall goal is to milk cows as quickly, gently and completely as possible at every milking. ■

OPERATOR RELATED

Main effects on milking time and milk yield:
Cow handling
Cow preparation

Main effects on even, complete milking, or liner slips:
Unit attachment procedure
Unit alignment

EQUIPMENT RELATED

Main effects on peak milk flow:
System vacuum
Pulsator characteristics
Milk hose length and diameter
Restrictions in milk flow path to the milk line

Main effects on even, complete milking out:
Unit alignment and support
Liner type and condition
Cluster weight
Automatic detacher settings
Regulator response

Main effects on slipping or falling teat cups:
Unit alignment and support
Liner type and condition
Cluster weight and weight distribution
Liner vacuum (restrictions in flow path)
Size and condition of cluster air vent(s)

Innovation. Solutions. Results. BouMatic
www.boumatic.com

CSI: CowSide Investigation

Cow handling

By Dr David A. Reid, Director of Milk Harvest, Science and Technology

Several years ago, Graeme Mein from Australia made the following quote at a NMC meeting – 'machine milking is a mechanical process that requires the willing cooperation of the cow to be successful'.

If a cow has an adrenaline release by being startled or scared within a half hour of milking, then normal milk letdown cannot be achieved. This is true even if the udder preparation is completed in a timely and consistent manner.

How are cows moved into the parlour or barn on your dairy? What 'instruments' do you or your employees use to 'encourage' cows to move?

I have observed milkers yelling, whistling, using water hoses as crowd control, and using all kinds of devices as well as aggressively pushing units into the legs of cows to get them to move in parlours.

Stanchion barns have just as many issues as parlours. I have seen electric prods used to move first calf heifers into stalls as well several large people forcibly moving a heifer across the gutter into a stall for the first time. Producers then wonder why these animals do not let their milk down or willingly come into the barn again!

I have also observed producers that gently guide first calf heifers into a stall several days to a couple of weeks before calving to acclimatise the heifer to the stall.

These same producers after a few days hang a milking unit next to the heifer and allow her to see the milking unit, hear the pulsator, smell and even touch the hoses before she is milked for the first time. The first milking in these herds is more relaxed and successful.

The practice of bringing close up cows and heifers into the parlour before they calf can dramatically improve the first milking of heifers. Older springing dry cows will lead the heifers into the stalls so they are acclimatised to the milking parlour before the first milking. Many producers will also touch the teats lightly and teat dip these close up cows before releasing them. The best way to accomplish moving heifers for the first time into the parlour is to open the fronts of the stalls, move the heifers with a few springing dry cows into the holding pen and allow the animals to move at their own pace in the holding pen and stalls.

Ask all people to move out of the parlour for this first heifer exposure and you will be amazed at how calmly they enter the parlour for the first milking. Some farms move the close up cows and heifers through the parlour three times a week.

First calf animals are moved into the close up group weekly so their first exposure is by the just mentioned method.

After the initial exposure, cows and heifers are loaded into the parlour and teats are dipped and udders examined before releasing the animals. I was recently at a large dairy while fresh animals were being milked.

I took this picture (above) of a cow

loaded backwards in the parallel milking stall after quite a fight. This heifer will have a hard time adjusting to the parlour because of the first experience.

Cows are very sensitive to high pitched sounds such as whistling, yelling or banging on the piping in the parlour or holding area. If animals must be touched to move them, use an open hand to put pressure over a relatively wide area. This is closer to the normal cow to cow movement of pushing with the head or shoulders.

The correct method to move cows to a holding pen is to talk to them in conversational tones and move back and forth across the alleyway behind the cows. This allows the cows at the rear to see the individual so they are less likely to stop and turn around to see the person, if the person is walking directly behind the cow. Cows can see almost everywhere except directly behind.

Cow movement protocols should be written so cow movers go to the far end of a pen and begin to clean stalls and move cows by not yelling or hitting any animals.

Cows will then move slowly and in a relaxed manner to the parlour. They will be cleaner due to less manure splashing and they will be relaxed and ready for milking.

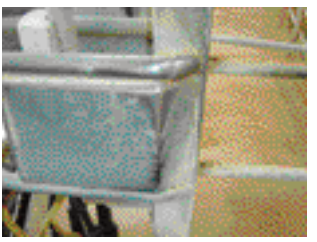
In Graeme's words, they will cooperate in the milking process.

Even if the cow handling is very good on your dairy there can still be issues that result in poor milk let down. Have you ever gone out into the holding pen to closely observe the cow entrance area to your parlour? Examine the pipes, brackets and other physical barriers that could be impacting cows as they enter the parlour. Do any of these show evidence of cows polishing the piping as they enter?

If cows hit any obstructions as they enter the parlour the induced pain can override milk letdown in the parlour. The pictures above and below illustrate common areas often overlooked in herds with poor overall milkability.

Cow movement protocols, improving cow handling in the parlour or barn, and repairing any potential cow injuring obstructions can yield very substantial results.

When faced with the current low prices for our product, even a 0.5kg increase in milk can make a difference. Most of these recommendations require little or no capital outlay to achieve more relaxed cows and more milk. ■



Innovation. Solutions. Results. BouMatic
www.boumatic.com

CSI: CowSide Investigation

Fresh cow milking

By Dr David A. Reid, Director of Milk Harvest, Science and Technology

The first few milkings are the basis for a successful lactation, but in many herds the first milking can be very stressful for both the cows and the milking personnel.

Proper milking procedures, cow handling and milking machine performance and settings are all important factors needed for the most efficient first milkings.

The most important factor is for milking personnel to understand how important the first few milkings are for the entire lactation.

The first milking is also very important for overall calf health. Colostrum must be harvested in a sanitary manner and then handled properly to achieve the maximum benefit for the newborn calf.

Protocols for acceptable procedures and routines for harvesting the first milk are important.

The following picture shows the cleanliness of the inside of a fresh cow/treated milk pail found on a dairy. The fresh cow milking protocol must include proper cleaning of teats and milking with clean milking equipment.

The fresh cow milking equipment should also consist of the same pulsations system, claw, shells and liners that will be used after cows are moved to the normal milking barn or parlour.

I often observe dairies where the pulsation system is set at different ratios and rates and the units are entirely different and often much heavier than the units in the main milking barn. It is very important to not overmilk fresh animals.

Often teats of first calf heifers have some oedema or swelling and these do not milk out completely.

When milk flow ceases from the teats the units must be removed to prevent damage to teats.

Most oedema will pass in a few milkings and then these animals will milk out much cleaner.

Putting units back onto purple swollen teats will only cause more damage to teats.

Colostrum must be handled to minimise contamination with bacteria between the time of milking and the time of feeding to the calf if it is held past the first feeding.

The condition of nipples for calf bottles or the condition of oesophageal feeders are two areas that can create calf issues, even after harvesting high quality clean colostrum.

Nipples that are worn or cut, as shown below, can allow milk to enter the calf at too fast a rate and some may pass into the lungs creating pneumonia or calf fatalities.

The cleanliness of all calf feeding equipment must be consistent at a high level of sanitation to minimise contamination.

Placing calf feeding bottles, nipples or other equipment such as oesophageal feeders in the milking equipment wash sink is not proper cleaning. All feeding equipment must be aggressively washed by scrubbing to ensure adequate sanitation.

Having fresh cow and heifer handling, milking and moving protocols will help train or condition these animals to the milking process. The time taken is well spent on any size dairy to minimise problems during the entire lactation.

Protocols for handling of colostrum and feeding amounts can also minimise health issues for newborn calves. ■

Innovation. Solutions. Results. BouMatic

www.boumatic.com

CSI: CowSide Investigation

CowSide Investigation

Milk quality goals

By Dr David A. Reid, Director of Milk Harvest, Science and Technology

The goals for milk quality should be a somatic cell count of 150,000 and a standard plate count below 1,000, a coliform count below 10, a laboratory pasteurised count of below 10 and no added water or detectable antibiotic residues.

Another goal I commonly recommend for dairies is to maintain a situation where 85% of the cows being milked have a cell count below 150,000 when individual milk samples are tested. Tank samples for somatic cell count are not a sensitive test.

However, trends over time are important for the dairy. If the somatic cell count begins to increase on the dairy, then an analysis of the milking procedures in the barn or parlour with special attention to teat cleanliness and the detection of clinical mastitis must be implemented.

When bacteria counts in milk increase, then analysis of specific test results will help find the cause of the higher counts.

Parlour managers or supervisors should check the cleanliness of teat ends on a regular basis in all parlours. To perform teat cleanliness scoring the materials needed are 3"x3" gauze pads or cotton balls, isopropyl alcohol and some type of container to lay out alcohol pads or cotton balls.

The method is simply to scrub teat ends after the final drying has been accomplished and just before units are attached. It is best to randomly sample cows.

Every fourth cow should be checked on the same teat on every cow sampled.

It is important to minimise the interference with the milkers and to scrub the teats for at least three to four turns of a parlour to determine how well milkers are cleaning teat ends.

Typically, a one to four scoring system is used to score teats.

- Score 1: no dirt or dip residue.
- Score 2: dip residue only.
- Score 3: visible manure/dirt.
- Score 4: large amounts of manure/dirt.

Achievable goals are at least 90% with a score of less than three. When milkers are trained and they are following the established pre-milking protocols, they should be able to have at least 90% scored below three.

The two main sources of bacteria in raw milk are mastitis organisms from within the udder and organisms transported from the environment on the surface of the teats.

Normal bacteria deposited during milking on milk handling equipment will multiply and become a major source of contamination if equipment is not cleaned and sanitised properly.

High bacteria counts may result from Streptococcus agalactia mastitis infections in a herd.

If the SCC and SPC are both high, thorough bulk tank and clinical mastitis cultures should be performed to determine the type of mastitis organism present in the milk.

Other types of bacteria in bulk tank cultures represent contamination from the environment and the skin of teats.

These organisms are transported during milking from the skin of the udder into the milk and milk handling equipment.

These bacteria multiply during the milking process and continue to multiply between milkings if they are not killed or removed.

Methods for routine bulk tank culture analysis have been presented by Guterbock and Blackmer, 1984.

These tests and interpretation methods provide an indication of whether high bacterial counts are due to mastitis, pre-milking hygiene, equipment cleaning and sanitation or incubation of bacteria in the milk handling system during milking.

The recommended tests for bulk tank milk will be considered in the next issue of International Dairy Topics.

Remember, milk quality will never be improved after the milk leaves the farm!

Attention to properly milking cows and removing all abnormal milk are very important to the industry. ■

Innovation. Solutions. Results. BouMatic

www.boumatic.com