MILKING AND HYGIENE
ANATOMY AND PHYSIOLOGY OF THE UDDER

Construction of the milk gland

The udder of the cow is divided into four milk glands. Each operates as an individual and independent unit. For example, milk produced in one gland cannot be milked out from another gland. The udder is suspended under the rear of the abdominal wall in a thick band of elastic tissue - the udders suspension band. The band forms the line of separation between the right and left half of the udder.

Approximately 50 alveoli (see below) are required, each consisting of 150-220 alveolar cells, to produce a drop of milk. The individual alveolar cell is supplied with nutrients from a fine network of small blood vessels or blood capillaries.

Each alveolus is provided with a short milk passage that ends up in a slightly larger passage and so on. Figuratively, the alveolar in the milk-passage system are like grapes in a bunch. The passage system ends in a large milk canal that flows out into the udder cistern.

The glands cistern and the passage system together have a capacity of about 1-2 liters while the major part of the milk is in the alveolar cavity immediately prior to milking.

In the tip of the teat is a small opening that leads into the teat canal. It is about 1 cm long and surrounded by a muscle that holds the teat canal closed between milkings.

The teat canal enters the teat cistern, a lumen, which is covered with thin mucous membranes. The separation between the teat cistern and the udder cistern is the narrowing of the mucous membranes.

For each liter of milk produced, 400-500 liters of blood must pass through the udder. For a high-yielding cow, it means that 20% of the blood constantly passes through the udder.

The production of milk takes place in small alveolar cells. The cells sit on the inside of the alveoli and separate the milk produced into the cavity of the alveoli.

For more information on the anatomy and physiology of the udder, please refer to the images provided.

Kopiering fra dette hæfte målles ikke.

Afdeling for mælkehygieine

Veterinærontsektoren

SEGES
Milk release

In suckler cows the milk is let down due to the actions of the calf, resulting with the calf beginning to suck on a teat.

There are both visual and sensory impressions involved as well as the stimulation itself when the milk is released.

Both are important for achieving high efficiency. This applies not least to machine milking, where the relationship between cow and machine is hardly as emotional as between the cow and its own calf.

During the preparation (drying + forestripping) immediately prior to milking, the muscles relax around milk passages, cisterns and teat canals to make room for the actual milk that is let down/released.

INHIBITION OF RELEASE

Stress amongst cows can inhibit the production of oxytocin and make it difficult to effectively empty the udder of milk. When a stressful situation suddenly arises, adrenaline will be secreted into the blood of the cow. Blood transfer to the udder will be reduced by about 95% and prevent oxytocin reaching the muscle cells.

The pituitary gland secretes the milk hormone oxytocin. It is transported with the blood to the muscle cells that squeeze the alveoli together and squeeze the milk into the milk passages.

There is a 30-60 delay time between the secretion of oxytocin and the release of milk.

A good milking will stimulate the milk production of the cow and promote a high lactation yield.

The time from the start of pre-milk stimulation until the attachment of the cluster must, for a cow milked twice a day, be about 90-120 seconds and for a cow milked three times a day about 90-120 seconds. This ensures that the release of the milk becomes reflexive and the milker effectively utilises the physiology of the cow.

Stress factors such as:
- Inconsiderate handling of the cows
- Disturbance during milking
- Cow in heat.

It will take 15-30 minutes after adrenaline being secreted into the blood before a normal milking can take place. If a cow is not milked out thoroughly over 3-4 days it can result in a significant and longer reduction in milk yield.

Kopiering fra dette hæfte må kun finde sted efter aftale med SEGES, Afdeling for mælkekvalitet, Veterinær- og kvalitetsforhold.
**Personal hygiene**

It is important that the milker practises good hygiene as milk is a food product.

Milking-gloves should be used to minimise the spread of infection from cow to cow. Gloves must be kept clean throughout the milking process.

**Milking cloths**

Cloths for wiping the udder must be properly machine washed to keep them clean and supple to give the best wiping effect. There must be at least one clean cloth per cow. When using a foam based teat dip it is recommended to use one dry cloth per cow.

**Preparation**

Preparation of the cow consists of teat dipping, pre-milking and wiping.

Preparation should take so long and it must be so thorough, that the milk let-down begins within a few seconds after the milking cluster is applied.

**Good preparation will**

- reduce the total machine time
- ensure gentle milking
- reduce the risk of mastitis

**Wiping**

A clean cloth is always used. The initial effort must be concentrated on the area around the root of the teat and the teat itself. Then the cloth must be folded and the teat end wiped with the other side of the cloth. Remember to wipe the tip of each teat separately.

The use of approved foam products, or similar, before wiping makes teat cleaning easier and reduces the number of bacteria on the surface of the teat.

The teats and teat ends must be completely clean and dry before the teat cups are put on. Otherwise, the teat cups can crawl up and give a prolonged milking.

Wiping stimulates milk release and limits the number of bacteria that can be transferred from the skin of the teat to the milk.

90-95% of the bacteria on the skin of the teat will be removed with proper wiping.

**The milking machine and udder health**

Bacteria that cause mastitis can be transmitted from one gland to another and from one cow to another.

There will always be a little milk residue in the teat cups. Bacteria from these residues can be transferred to another gland or to another cow.

If the milking machine damages the udder or teat then bacteria can easily find a suitable location for growing which can develop into mastitis.

Mechanical damage or tissue irritation can occur with:

- wrong vacuum level
- excessive vacuum variation
- incorrect pulse rate function
- improperly shaped or obsolete teat liner
- milking without milk flow.

**Bacteria from cow to cow**

Even though there are no visible signs of mastitis milk can be infected with bacteria that have developed in the udder. The vast majority of mastitis bacteria cannot move by themselves. However, the bacteria can get help from vacuum variations move through the teat canal and can induce new mastitis.

Milking, without milk flow, transfers the vacuum pressure from the teat cup to the teat cavity. A pressure drop is accompanied by air movement that can contain bacteria.

If air is suddenly allowed into just one milk cluster it will allow vacuum variation throughout all the milk clusters in the unit. Sudden vacuum changes can cause rapid air currents that swirl milk droplets up at high speed.

Milk droplets can contain bacteria. If a milk droplet with bacteria hits the teat canal opening it can enter the udder and cause mastitis.
The following precautions can limit the transfer of bacteria from cow to cow via the milking machine:

- Milk any infected cows last
- Replace teat liners in accordance with the recommendations of the manufacturer
- Ensure a steady vacuum
- Use milk hoses etc. that minimise teat-washing
- Avoid milking without milk flow
- Avoid unnecessary air intake when applying the milking cluster.

Pre-milking

Always use a strip cup when pre-milking to minimise the risk of infection spread.

Extract two-three squirts from each gland. If a gland is difficult to pre-milk then stronger actions are required to express the squirts.

Check if the milk is visibly changed, if so, it must be retained. Visibly altered milk usually has a high cell number.

Pre-milking (forestripping)

- Enables control of the appearance of the milk
- Prevents the first squirts, that typically contain higher levels of bacteria, from being collected
- Promotes milk let-down
- Gives a shorter machine time

Attaching the milk cluster

Hold the teat cups so that the thumb and index finger are free to direct the udder into place.

Begin by attaching the teat cup that is furthest away. Air intake while applying the cluster must be avoided.

The milk must start to flow within a few seconds after attachment, and the release of milk must be continuous.

Before moving on to the next cow, make sure that the cluster is correctly positioned on the udder. It is an advantage to use a service arm.

Machine time

The cow must have peace and quiet during the milking.
The time spent on machine milking depends on
• preparation
• positioning of the milk-cluster
• amount of milk
• time to calving
• lactation number
• the hereditary characteristics of the cow.

End of milking
Avoid overmilking. To assess whether time is right to remove the cluster the lower half of the udder can be felt (udder cistern).

After a good preparation and correct positioning of the milk-cluster most cows can be fully milked without assistance.

A good and systematic milking routine must not be destroyed by "difficult cows". Therefore, it is usually a good idea to milk difficult cows as a separate group.

Teat conditioning
The teat skin/outer surface should always be smooth, soft and elastic. There must not be "neck marks" at the root of the teat if discoloured teats after the milk-cluster has been removed. If the skin becomes dry and / or becomes cracked, a teat conditioner should be applied and the cause identified.

The use of teat disinfection after milking reduces the risk of new infection significantly, if a good and effective disinfectant is used. The disinfectant used must be approved by the authorities.

• Dip the teat immediately after removal of the milking cluster
• Make sure that the disinfectant covers the entire teat
• Always use a product with a soft skin conditioner.

Milking of first calving cows
First calving cows must get used to both releasing milk and being milked.

Therefore, the temperament, patience and the handling of animals by the milkers are significant in achieving a good result.

Conditions that can ease the milking of first calving cows:
• Good milking hygiene
• The bucket machine and the cluster must be clean and in good condition
• Avoid idle milking and overmilking
• Experience
• Ensure a good teat condition.
Take care of your bucket milking machine
The bucket milking machine is a very important part of your milking system as it is used to milk first calving cows and sick cows. Therefore, it is important to take care of this equipment regarding maintenance, cleaning and disinfection.

- Milking of treated cows should be done with a separate milking cluster and bucket. It is a requirement in “Arlagården and the Quality Program for the farm” that the vacuum supply to the bucket machine must be connected to the pulse line and never to the milk line. This is to ensure that milk from medicated cows is not taken into the milk line by accident.
- In large milking parlours it is advisable to have numerous connection points along the pulse line to connect the bucket milking machine.
- If the same milk cluster is used for the other cows in the herd then the milk cluster, hoses and any other equipment that has been in contact with the milk must, subsequently, be rinsed with at least 10 litres of warm water (35 degrees). This will ensure that there is no contamination of the milk, with antibiotic residues or colostrum, for the dairy. This is a requirement in the “Arlagården” programme.
- Pulsator, teat liners and other rubber parts on the bucket milking machine must be maintained in the same good technical condition as the rest of the milking system.
- It is a rule, when using a bucket milking machine, to rinse the set with lukewarm water (35 degrees) to remove any remaining milk, thereby minimising the risk of transmitting infection from one cow to another.
- After each milking, the bucket and the other parts (lid, rubber seal, milk cluster) must be cleaned both externally and internally. It is recommended to have a bucket milking machine with separate cluster for treated cows and a bucket milking machine with separate cluseter for first time calving cows to minimise the risk of infection.

The bucket milking machine is used for:
- New calvers
- Cows with visibly altered milk
- Cows treated with antibiotics.

Do not use the same bucket and cluster set for new calvers and treated cows.

Identify/mark the bucket and cluster set, to be used only for treated/sick cows.
Cleaning and desinfecting the milking system and cooling tank

Irrespective of whether the cleaning is carried out by manual control or with an automatic system it should comply with the following cleaning processes and the requirements set out under the individual processes.

<table>
<thead>
<tr>
<th>CLEANING PROCESS</th>
<th>PRE-RINSE</th>
<th>WASH</th>
<th>BETWEEN RINSE</th>
<th>DESINFECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBJECTIVE</td>
<td>Removal of loose milk residue</td>
<td>Loosen and make into a solution and removal of milk residues, especially fats</td>
<td>Removal of remaining cleaning agents and other dirt</td>
<td>Prevent bacterial growth, removal of lime and milk-stone residues</td>
</tr>
<tr>
<td>MECHANICAL REQUIREMENT</td>
<td>Big</td>
<td>Huge</td>
<td>Big</td>
<td>Big</td>
</tr>
<tr>
<td>WATER TEMPERATURE</td>
<td>40-42°C</td>
<td>At start, min. 80°C</td>
<td>No requirement</td>
<td>No requirement</td>
</tr>
<tr>
<td>CHEMICAL - RATE</td>
<td>None</td>
<td>In accordance with supplier’s recommendations</td>
<td>No requirement</td>
<td>In accordance with supplier’s recommendations</td>
</tr>
<tr>
<td>TIME</td>
<td>Without circulation</td>
<td>8-10 minutes</td>
<td>Without circulation</td>
<td>6-8 minutes</td>
</tr>
</tbody>
</table>

Cleaning and desinfecting the milking system and cooling tank

Irrespective of whether the cleaning is carried out by manual control or with an automatic system it should comply with the following cleaning processes and the requirements set out under the individual processes.

Completion of milking
- Empty the milk line, separator and pump line for residual milk without adding water
- Remove the pump line from the cooling tank
- Remove/replace a used filter
- Set the unit in the washing position
- Start cleaning of the milking parlour
- Hose down and clean the exterior of the milk clusters.

Cooling the milk
- Cooling of the milk cannot replace good cleaning and hygiene, but it helps to maintain the quality of the milk.

Check regularly that
- the cooling and the stirrer start
- the tank warning has not been activated
- cooling is completed no later than two hours after milking is completed

Washing the udder cloths
- Washing machines specifically for washing udder clothes attain a high washing temperature (resulting in high bacterial death). In addition, the washing machine can warm up and centrifuge the cloths immediately prior to milking, so that they are ready for use.

Avoid
- overfilling of the washing machine - max. 66% filling
- incorrect dosage of detergent

Warning!
- Chemicals can cause damage when used incorrectly:
  - Read the instruction manual.

When an accident occurs, quick help is double help.
- Rinse immediately with plenty of water if chemicals have landed on the skin
- Rinse with a water jet, also under the eyelid, if chemicals have come into contact with the eyes.

Seek medical attention when injury has occurred. It can be more serious than it looks in the first instance.
CONTROL OF CLEANING – MILKING SYSTEM

Check the milking system

- Check the system after cleaning
- The vacuum level of the plant at start-up and during milking
- Hoses for cracks, leaks and cleanliness on all rubber parts, teat liners for leaks, smoothness and surface cleanliness
- The air intake opening and cleanliness of the central cluster
- Milk cloths – are they washed properly (smell, appearance, etc.)?
- Hot water supply
- That chemicals are being used and that chemicals are available. Use correct protective equipment when working with chemicals. Follow the instructions provided by the manufacturers.
- Vacuum pump oil supply
- Change teat liners after 2,500 milkings - or in accordance with manufacturers recommendations

> It is recommended to follow the service interval as provided by the manufacturer.

Milk remains and coatings can be found on all parts that come into contact with the milk. Therefore, one must check the things that can have a negative impact on the milk quality – whether the washing has been effective, or, whether there are worn parts that require replacement.

Photo: SAC
## CONTROL OF CLEANING – COOLING TANK

### Check the cooling tank

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ Cooling tank after washing</td>
</tr>
<tr>
<td>→ The pre- and post temperature of the milk in the cooling tank</td>
</tr>
<tr>
<td>→ Hoses for cracks, leaks and cleanliness of all rubber parts, smoothness and surface cleanliness</td>
</tr>
<tr>
<td>→ Hot water supply</td>
</tr>
<tr>
<td>→ That chemicals are being used and that chemicals are available. Always use proper protective equipment when working with chemicals. Follow the instructions of the manufacturer.</td>
</tr>
</tbody>
</table>

> It is recommended that the service interval as given by the manufacturer is followed.

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Cooling time can be extended, if the condenser cannot be kept clean, if ventilation is unsatisfactory, or if the refrigeration machine lacks coolant.

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Photo: SAC
### The Milking System

#### Vacuum Level

The correct vacuum level is where you get the shortest possible machine time with good and complete milking without damaging the udder.

- **Too high vacuum level** will result in:
  - increased risk of damage to the teat end
  - increased risk of mastitis
  - agitation of cows
  - teat cups that crawl up at the root of the teats and extend milking time
  - poorer complete milking.

- **Too low vacuum level** will result in:
  - increased risk of liner slip
  - increased risk of vacuum variations under the tip of the teats
  - longer milking time
  - poorer complete milking
  - increased risk of mastitis.

It is recommended to have a teat end vacuum between 38 and 42 kPa. Therefore, it is necessary, with milking systems with a high lift height to operate with a higher vacuum than milking systems with lower lying milk pipelines and bucket milking systems.

Always check at the start of milking that the vacuum level is at the correct level.

#### Type of System, Hoses, M, Lift Height, M, Vacuum

<table>
<thead>
<tr>
<th>System</th>
<th>Hose</th>
<th>Lift Height (M)</th>
<th>Vacuum (KPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipeline milking system – tied-up stalls</td>
<td>0.5 - 0.7</td>
<td>38 - 40</td>
<td>44 - 48</td>
</tr>
<tr>
<td>Milking parlour – low mounted milkline</td>
<td>0.7 - 1.0</td>
<td>0.1 - 0.3</td>
<td>38 - 42</td>
</tr>
<tr>
<td>Milking parlour – high mounted milkline</td>
<td>1.8 - 2.0</td>
<td>0.7 - 1.0</td>
<td>42 - 45</td>
</tr>
<tr>
<td>Bucket milking machine³</td>
<td>0.8 - 1.0</td>
<td>0.5 - 0.7</td>
<td>38 - 40</td>
</tr>
</tbody>
</table>

1) Measured from the bottom of the pit
2) Vacuum in the milking section
3) Extra to compensate for reverse flow

#### Pulsation

Teats cannot withstand an uninterrupted level of vacuum. Therefore, the milking system is provided with a pulsator. The pulsator must ensure that there is an alternating pulse between the suction and the massage phase during milking.

At the start of milking always control that the vacuum level is at the correct level.
During the massage phase the blood that is sucked into the teat membranes in the suction phase is massaged back to the udder.

Without the massage phase the following would occur:
- Overpressure of blood in the teat membranes
- Irritation inhibiting the release of milk
- Blood vessel damage to the teat membranes
- Damage to the teat canal mucous membranes
- Increased risk of mastitis

The pulse rate can be checked by counting the stroke rate for at least half a minute, and compare that with the number given by the company as standard.

If the pulsator is too slow milking will occur faster on one half of the udder compared with the other. This will give rise to a risk of overmilking and increased risk of the frequency of mastitis.

Unequal milking and poor pulsator function may be due to:
- A lack of cleaning of the pulsator
- Leaking hoses or leaking teat liners
- Clogged hoses or clogged branch pipes in the central unit
- Poor vacuum supply

If the pulsator rate is too slow it can be checked with special measuring equipment that quality consultants and service providers have in their tool bags.

Modern pulsators usually work very regularly if they are cleaned regularly and maintained according to the instructions of the manufacturer.

Teat liners
Teat liners are the only part of the milking system that came into direct contact with the teats.

The transfer of mastitis bacteria from cow to cow can be due to poor teat liners.

The size, shape and condition of the teat liners is essential for a gentle and effective milking.

The teat liners should be replaced after 2,000-2,500 milkings. Silicon teat liners must be replaced after approximately 5,000 milkings. Teat liners should never be used for more than 6 months. In milking systems where the pulsator is running during washing the short replacement is recommended with a shorter interval.

The air intake of the cluster unit
To get milk away from the central unit, it is important that the air intake is open during milking (allowing 6-8 liters of air per minute).

The gaskets of the central unit must be tight to prevent unintended air intake.

Kopiering fra dette hæfte må kun finde sted efter aftale med Afdeling for mælkvækst og kvalitetsstforbundet, SEGES, Veterinær- og kvalitetsforbundet.
MILK QUALITY

Bacterial count – bacteria in the milk
The bacteria are counted and expressed as germs/ml milk (bacterial colonies per millimetre milk). Based on the measured result the milk is categorised into a quality class which is then the basis for financial settlement.

Bacteria produce enzymes that convert the sugar, fat and protein in the milk. They adversely affect the taste of milk and degrade dairy products. Low bacterial levels limit the degradation effect on the milk.

To maintain a low bacterial count in the milk, the following should be considered:
• Keep the milking equipment and cooling tank clean
• Check regularly the washing machine, hot water and use of chemicals
• Maintain the milking equipment and cooling tank continuously
• Rapid cooling of the milk
• Keep the milk cooled until it is collected

Thermoresistant bacteria
The problem with thermoresistant bacteria is that they can withstand heat and therefore escape the pasteurisation process of milk. Therefore, they will be found in a finished product, which may mean poor durability and poorer product quality.

They normally only occur in conjunction with coatings on equipment or due to old hoses and gaskets.

Somatic cell count – number of white blood cells in the milk
The cell number consists of white blood cells and rejected parts of the milk producing tissue.

The cells are counted and indicated as cells /ml milk. Based on the measured result the milk is categorised into a quality class which is then the basis for financial settlement. The tendency of a rancid taste in the milk increases with increasing cell numbers. In addition, the protein part changes reducing the yield of cheese. Therefore, dairies work with the lowest possible number of cells. Furthermore, cows with very high cell numbers are sick cows and therefore they must be milked separately from the rest of the herd and the milk must not be included in the collection of the dairy.

High cell numbers in the milk may be due to
• cows in the herd with subclinical mastitis
• visibly altered milk included in the cooling tank
• milk is collected prematurely after calving
• milk is collected prematurely after treatment for mastitis.

Put red marking bands on both hind legs
- A band may fall off.
- A single band can be overlooked during milking.

Check the tanker receipt after each collection – are all quality parameters ok?

Afdeling for medicinsk undervisning.
Veterinærmesterskolen.

Kopiering fra dette hæfte må kun finde sted efter aftale med kvalitetssikrer i SEGES.
Anaerobic spores in the milk
Anaerobic spores are a major problem for dairies that produce yellow cheese. The spores derive from the feed and notably silage can contain many spores.

The only way the spores can get into the milk is through the intake of infected feed which has probably been contaminated from a faecal source with resulting splashing on the teat surface.

Avoid spores in the milk:
• Keep the cows clean so they are already clean for milking
• Rest areas and aisles must be kept clean
• Wipe the cows teats and teat ends carefully before milking
• Good and complete coverage of the stored silage as well as an optimal method of silage removal from the silo.

The freezing point of the milk
An analysis that checks that there is no mixed water in the milk. Milk added with water is regarded as milk adulteration.

To avoid water in the milk:
• Make sure that the milking system and the cooling tank are carefully emptied of water before milking
• Do not use water to transfer the last milk from the milk pump to the cooling tank
• Avoid leaking gaskets in the water cooler.

Antibiotics in the milk
An analysis that checks for antibiotics or similar in the milk. It is very important to avoid the inclusion of antibiotics in the milk supplied to the dairy. Some people are hypersensitive to these substances while the dairy cannot produce healthy and good dairy products.

How to avoid antibiotics in the milk:
• Clearly mark treated animals
• Observe the retention period
• Treated cows should be milked with a special milking cluster

See also ‘Safe milking’ page 18.

FFA – Free fatty acids in the milk
FFA shows how many free fatty acids are present in the milk. The poor treatment of the milk destroys the fat globules, thus releasing fatty acids that can impair the quality of the milk both in terms of taste and product quality.

To maintain a low FFA:
• Avoid leaks in the milking system, leaking milk units, defective milk pump
• Avoid freezing of the milk in the cooling tank
• Avoid milking cows in late lactation (low yields)
• Avoid more than three milkings/day (AMS).

Mark clearly.
In AMS herds, the cow must be marked either with a visible band on the tail or with a red band on both hind legs.
WORKING ENVIRONMENT

In the well-functioning milking parlour/carousel the cows come to the milker. The milker can stand with a straight back at work and the risk of knee and back injuries is reduced. In addition, floors that can be raised/lowered can be installed, to further optimise the working position for the milker.

1. There must be 30 cm from the elbow of the milker, measured vertically down, to the floor of the milking area.
2. The cloths used during milking must be within reach to allow the milker to reach the cloth without turning their body unnecessarily.
3. The milker should change hands to wipe and for drawing milk thus switching between right and left hand for each new cow.
4. Automatic release of the milking cluster - a button that sits at the ledge of the milking pit and which is easily released.
5. Tunnel or stairs that is non-slip with handrails on both sides.
6. Manhole/entrance between the entrance and exit on internal carousels. The manhole/entrance should have a minimum width of 60 cm.
7. Fittings that can be opened at each milking point.
8. Service arm to avoid lifting of the milking cluster.
9. Good ventilation - natural, mechanical or a combination.
10. Good lighting conditions around the milking parlour.
11. Disturbing noises from the milking system should be avoided.

There must be about 30 cm (measured vertically) from the elbow of the milker to the floor of the milking area.
STANDARD OPERATING PROCEDURES (SOP)

SOP Milking deals with both traditional milking and robot milking (AMS)

**Traditional milking includes:**
- Collecting the cows for milking
- Preparation of the milking parlour
- Milking - including handling of first calving cows and cows treated with antibiotics
- Cleaning of the milking system and cooling tank.

**Robot milking describes:**
- The work of finding OBS cows
- Monitoring and cleaning of milking equipment
- Starting up new cows
- Handling of cows treated with antibiotics.

**Washing of cattle housing and milking rooms describes:**
- Use protective equipment
- Correct working position when washing.

All topics are illustrated with drawings and short texts that can edited depending upon the conditions existing in the herd.

When you need to customize and run SOP on your herd, it’s a good idea to involve a SOP-certified quality consultant.

**MORE ADVICE ON MILKING AND HYGIENE (in Danish):**
- maelkekvalitet.dk
- Mælkekvalitet
- Afdeling for mælkekvalitet
- Veterinær- og kvalitetsforhold
- SEGES

Kopiering fra dette hæfte må kun finde sted efter aftale med mælkekvalitet.
Safe milking – avoid medicine residues in the milk

Medicine residues in milk are prevented through safe routines and a plan of marking, registration and retention of the milk from treated cows.

1. MARKING - Only marked cows must be treated

The cows must be marked before treatment
- Cows that show any signs of disease must always be marked before treatment
- Dry cows that have been treated must always be marked

Always put a band on both hind legs
- One band can fall off
- A band on only one leg can be overlooked

Mark clearly

In automatic milking systems the sick cow must be marked
- Either with a visible band on the tail or
- With bands on both hind legs

2. REGISTRATION – Accidents are often caused by misunderstandings

All treatments with medicine must be registered
- Registration in the management program or
- Registration in the record
- Registration in the cows journal
- Print a retention list of treated cows from which the milk is to be retained

Visibility on retention
Make visible for everyone
- That the cow is in treatment and may not be milked
- Keep the notice board updated

In automatic milking systems or any other management programs
- Enter retention before treatment
- Enter indefinite retention time
- Immediate registration when the cow is healthy and retention time has been met

3. TREATMENT

Correct udder treatment
Before treatment of the udder make
- To wear gloves
- The udder is clean
- The teat tip is disinfected

Correct injection
- The correct injection site is in the middle of the neck and at a right angle to the hide
- Dose in relation to the cows weight

Correct disposal after treatment
- Place needle in needle disposal container
- Place syringe, empty medicine bottles and intramammaries in waste container for medicine

4. RETENTION OF THE MILK

The bucket machine
- Retention should be made using a separate bucket milking machine marked for this purpose with a separate marked cluster and pulsator connected to the vacuum pipeline (never the milking line)

Use of the same milking cluster
- Cluster, the milking cluster, milking line and other equipment, in contact with the milk, in hot water before further use
- Remove tank hose from the cooling tank before milking cluster placed for cleaning

If an accident occurs
- Put a clearly visible STOP sign on the bulk tank
- Contact your dairy
- Dispose of the discarded milk correctly
- Clean and disinfect the bulk tank before further use

Medicine residue in milk is not acceptable. It causes significant losses to your dairy and is harmful to the cattle farming image.
Kopiering fra dette hæfte må kun finde sted efter aftale med Afdeling for mælkkebvalitet, Veterinær- og kvalitetsforhold, SEGES.
SEGES offers solutions for the agriculture and food sector of tomorrow. We develop business opportunities in close partnerships with our customers, research institutions and companies worldwide. SEGES is part of the Danish Agriculture & Food Council.