Avoid medicine residues in milk
– Safe milking in automatic milking systems (AMS)
This leaflet gives sound advice on how to avoid accidents which result in medicine residues in your milk.

Why is it important?
- Milk which contains medicine residues cannot be delivered to the dairy.
- If an accident occurs, it can be a costly affair for the farmer.
- The image of dairy products as being healthy and pure foods must be maintained.

You can read much more about why it is important in this leaflet.

Good daily routines
To avoid accidents, daily routines must be optimised. The advice given in this leaflet is very straightforward and can easily be transformed into everyday routines.

Besides good routines, we recommend that you draw up standard operating procedures (SOP) for ‘Safe Milking’ in order to ensure that good habits are adapted to precisely your herd and are made clear to all members of staff. Remember to translate your SOP to other languages if you employ foreign workers.
Marking

• All cows must be marked before treatment is started, preferably as soon as they are singled out for treatment.

• In AMS herds, cows should be marked with a visible band around their tail. This provides additional assurance that the correct cows are re-treated.

• Ensure that everyone on the farm is aware of a precise procedure for marking.

• Correct marking ensures that the right cows are treated.

• All dry cows undergoing treatment must also be marked.

Registration

• Always enter milk separation before treatment is started, e.g. as soon as the cow is singled out for treatment.

• **Do not enter an end date.** Alternatively, enter a very long milk separation period, e.g. six to twelve months. This will ensure that milk separation continues until the retention time has elapsed and the cow’s milk and yield have been approved.

• Print a daily list of the cows whose milk is to be separated and hang it where staff can see it.

• Only the cows on the list may be treated.

Treatment records must contain:
1. date of treatment start and end
2. which and how many cows have been treated, including precise identification
3. reason for treatment
4. name of medicine used
5. medicine dosage (the amount of medicine used per dose and the number of treatments per day) and method of application
Milk separation
Check that the milk of treated cows really is led to the drain during milking.

With Lely, ensure that a response is received from T4C confirming that milk separation has been registered. Otherwise, the cow may still be milked normally.

Treat alarms from Delaval with caution. When an antibiotics-treated cow is present in the box, the system MUST be flushed before a new cow is milked.

Check regularly that the valves function correctly so than contaminated milk is prevented from entering the milk line.

If a high cell count cow which is already registered for milk separation is to be treated with antibiotics, it is important to ensure that:
• The milk is led to a drain.
• The system is flushed with warm water at 35-38°C after milking.
• The retention period is adjusted for treatment – never take it for granted that the cow is registered for milk separation. Check that there is either no end date for milk separation or that the end date has been set to six or twelve months in the future. A mistake can easily be made if a cow with a known high cell count is assigned an end date which does not take into account the prescribed retention time for the treatment.
• If several cows whose milk is to be discarded are segregated from the rest of the herd and milked consecutively without intermediate flushing, it is important that there are NO new calvers or cows for insemination among them so milk is led to the tank.

In case of accident:
• Contact your dairy immediately.
• Prevent the milk from being weighed in. Attach a clearly visible STOP sign to the tank.
• Dispose of discarded milk correctly, i.e. in the slurry tank.
• Wash the milk tank before re-use.
• Remember to check that the tank is clean and free of deposits.

Avoid contamination of the milk
Milk is a food, and it is therefore important that there is no risk of the milk becoming contaminated during milking. It goes without saying that teats must be clean and dry before milking is commenced.

Avoid the use of teat creams which contain antibiotics before milking. If they are used after milking, the udder and teats must be thoroughly wiped before the next milking.

Do not perform hoof wash during milking. Milking machines suck in large quantities of air during milking. This air is mixed with the milk. It is therefore very important that the milking area is kept clean enough to allow milking to be performed hygienically without the air becoming contaminated with spray from the hooves.

If you are in doubt, you can have a preliminary analysis performed on a sample by prior agreement with the dairy. Even if no souring inhibitors are detected in the preliminary analysis, the quality of the milk remains your responsibility if it is delivered.
Never use sprays of any kind against digital dermatitis during milking. Doing so would involve a risk that the spray is sucked into the milk during milking.

Use only approved products for udder wiping and teat disinfection both before and after milking.

**On-farm rapid tests**

**Tank milk** can be tested before delivery using Delvotest. The test takes three hours and has the same sensitivity as the test used at Eurofins Steins.

Ensure thorough mixing of the milk in the tank before the sample is taken – preferably through a special sampling tap on the tank. If the sample is removed through the connector, it may be necessary to allow at least 50 litres to flow through the connector before the sample is representative.

**Milk from individual cows** can be tested with Betastar® Combo HS before the milk is added to the bulk milk tank. Betastar is a rapid test that takes eight minutes. The test has good sensitivity at single cow level and can determine whether the milk is now free of antibiotics. It must, of course, be ensured that only antibiotics which can be detected by the test are used on the farm.

The test can also be used on tank milk, e.g. in AMS herds, if delivery cannot be postponed for the three hours a Delvotest takes. However, if Betastar is used for tank milk, there is a risk of a negative result even though the milk tests positive at Eurofins Steins. This is because Betastar is a less sensitive test than Delvotest.

**IMPORTANT**

If milk from a treated cow is accidentally added to the bulk milk tank, the tank milk should NOT be tested. The tank milk MUST be discarded.

You can find further information in the leaflet 'Rapid tests for antibiotic residues', available at www.maelkekvalitet.dk.

**No inhibitors in milk**

Inhibitors are undesirable in milk because:

- Consumers expect milk to be a pure product.
- Antibiotics can occasionally pose a risk of serious allergic reactions in humans.
- They can lead to resistance problems.
- To make cheese and soured milk products, the dairy adds lactic acid bacteria to the milk. If these bacteria are inhibited/affected by the inhibitor in the milk supplied, the quality of the product and usefulness of the milk will be reduced.

**What are inhibitors and souring inhibitors?**

As a starting point, supplier milk is analysed once a week for inhibitors and souring inhibitors.

Inhibitors and souring inhibitors are substances which can inhibit bacteria growth. Most often, they are residues of penicillin in the milk of treated cows, which accidentally enters the milk. They can, however, also be chemical substances such as residues of detergents used to clean the milking equipment.
In practice, it is usually penicillin that is the problem when inhibitors are detected in the weekly supplier analysis. More than 95% of the inhibitors detected in 2011 proved to be antibiotics.

**Dairy policy**

Dairy policy in this matter is that antibiotics are unwanted in milk for food-safety reasons.

A precondition for meeting this quality requirement is that milk producers utilise fixed routines to ensure that milk from treated cows is separated off using suitable milking equipment and techniques.

Dairy guidelines for such routines have been written into the self-monitoring programme, the quality programme ‘Arlagården’ and the quality programme ‘Gården’.

**Dairies’ self-control of inhibitors in milk**

The authorities demand that all dairies have their own self-control system and check the milk for its content of inhibitors/antibiotics among other things.

In Denmark, supplier milk is analysed for inhibitors as a starting point once a week, cf. dairy sector code.

The sample is taken automatically when the milk is brought to the dairy.

The milk producer does not know which day his milk will be analysed for inhibitors.

Analysis is performed by Eurofins Steins Laboratorium A/S in Holstebro.

Milk samples are analysed in two steps: The first step is a screening method capable of detecting inhibition in the sample. The second step identifies the type of antibiotic found and its concentration in the sample.

Dairies recommend that the following model be used in determining the consequences for the farmer of a positive test:

- **First time** antibiotics are detected: value of two days milk delivery + DKK 3,000
- **Second time** antibiotics are detected: value of four days milk delivery + DKK 6,000
- **Third time** antibiotics are detected: value of eight days milk delivery + DKK 12,000 and separate transport of milk to the dairy for the next 14 days at the producer’s expense.

If the concentration of antibiotics in the sample exceeds the EU threshold, the authorities must be informed and this may result in additional fines and possible contravention of the cross-compliance rules causing reduced EU subsidy.

If fined, cf. the above, the herd will be placed in the category ‘strict inspection’ with more frequent visits by a veterinarian.

Before the milk is used by the dairy, it is analysed for antibiotics.

**THE METHOD USED TO DETECT MEDICINE RESIDUES IS VERY EFFECTIVE**

1 gram of penicillin can be detected in 1,000 tons of milk.
1 tube of teat cream may contain 0.6 g penicillin.
Reasons for accidents with antibiotics

Quality advisors from the Knowledge Centre for Agriculture, Cattle interview milk producers who have had accidents with antibiotics. This has provided much valuable knowledge on the specific reasons for accidents. The most common are:

- **Milking of treated cow.** Many accidents are caused by human error. That is why communication and safe procedures for data entry and milk separation are of great help in preventing accidents.

- **Lacking or incorrect data entry.**

- **Lack of flushing after milking.**

- **Lacking or insufficient cleaning of equipment** which has been in contact with contaminated milk. All milk-separation cows should be followed by flushing and all antibiotic-treated cows should be followed by local flushing.

- **Flushing temperature.** All flushing should be performed with warm water at 35-38°C.

- **Accidents related to temporary/replacement staff** are most often caused by poor communication or ill luck, e.g. the loss of a band. Accidents can be prevented by good, two-way communication about treated cows (both oral and written) and correct marking of treated cows. Temporary staff must be given a fair chance of doing their job properly.

- **Dry cows treated with antibiotics** are overlooked or forgotten because they have not been marked. Several accidents occur through the milking of dry cows after the cows have been converged. Accidents also happen because treated cows calve earlier than expected. Dry cows must also be marked.

- **Prolonged excretion of antibiotics** into the milk can occur. Retention time must be extended for cows that have received a high dose of medicine, cows that have been treated but remain sick and cows with low yield.

Medicine must be stored according to the manufacturer’s/veterinarian’s instructions. Correct injection is also important. Injection beneath the skin or in fatty tissue prolongs excretion time.