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Milk cultures

What is milk culturing?

It isn't possible to tell which bacteria are responsible for infections by looking at milk, udders or cell counts – you have to actually grow the bugs to know for sure.

A milk sample can be processed in microbiology labs so that the bacteria that are present can be identified. This involves the lab spreading some of the milk on sterile plates covered with particular growth factors, incubating the plates for defined periods and assessing the bacterial colonies that grow. This is called milk culturing.

The lab can also check which antibiotics are likely to be effective against each bacteria (called 'sensitivity testing'), but these tests only provide a guide because conditions in the lab are never exactly the same as in the cow.

When is it worthwhile culturing milk samples from cows?

Milk cultures are recommended whenever a herd problem emerges – either more clinical cases than acceptable, or rising cell counts. They are used to indicate which bacteria are present within the herd, so samples from a number of cows (a minimum of 10) are required to give a representative picture.

Virtually all mastitis is caused by bacterial infection. It is essential to know which bacteria (e.g. *Staph aureus*, *Strep agalactiae*, *Strep uberis*) are present to choose where to look for problems and select appropriate management strategies.

Cost is important but if a herd mastitis problem is emerging, the cost of the cultures is likely to only be a small issue. Cultures vary from about \$6 to \$20 per sample depending on factors such as the number submitted at the same time and transport costs, etc.

Would you sample quarters with clinical mastitis?

Yes, in most cases it is a good insurance policy to take samples – but you won't necessarily choose to have them all cultured. You can collect them from all clinical cases **before treatment** (any antibiotic in the sample will make it very difficult to culture), store them **frozen** and only submit them if a cow fails to respond to treatment, or there are a higher number of cases than you expected (e.g. more than five clinical cases per 100 cows in the first month of lactation).

If you only end up having a couple of cases and they respond to treatment, you don't need to send the samples for culture, but if you do wish to investigate further, you've got some to start with.

What about cows with high cell counts?

To investigate a herd cell count problem, it is sensible to sample some of the individual cows with high cell counts. Here the sample is often a composite one (some milk from all four quarters) and some infections will be missed because the bacteria from an infected quarter are diluted by milk from the others. To ensure you get results from at least 10 cows, it is worth taking samples from a few extras.

Current research shows that it is not economic to treat lactating cows with high cell counts caused by *Staph aureus* infections, but infections with *Strep* bacteria are more responsive to antibiotic treatment and may be worth treating. Cultures are essential if you are contemplating treatments, and discussion with your veterinarian is recommended.

Are there any traps in milk culturing?

The main problems are associated with collection and transport of samples. Milk is a good place for contaminants to survive, and most of these bacteria can also cause mastitis, so very confusing results can occur if any contamination occurs. Spread of bacteria between cows can also occur, so it is important to use gloves and disinfectant.

There is a specific procedure to follow to collect good quality samples. Bottles must be sterile (not just clean) and teat ends must be scrubbed with 70% alcohol to disinfect them adequately. You can get sterile containers from your vet or lab. The step-by-step guide below tells you how to collect the milk.

Ideally samples should be kept cool and arrive at the lab within 24 hours. If this isn't possible, most mastitis bacteria survive freezing, so you can store them in the freezer until delivery.

Collecting milk samples

Sterile collection is the most important step for successful culturing of milk samples. Poor technique will give misleading results and resampling will be required. A good technique involves planning and some patience.

■ Have the following ready in the dairy:

- Sterile sample bottles. You can obtain these from your vet or lab. Sterile collection requires using only sterile bottles. It doesn't matter how well washed a Vegemite jar is – it won't do.
- A marker to label the bottle
- Disposable gloves
- Paper towels

- Cotton balls
- A mixture of 70% alcohol (seven parts methylated spirits and three parts water) or teat wipes
- A cooled esky or similar portable and temporary cooling system.

■ **Label the bottle.**

- Unlabelled samples are useless, so make sure you identify the sample.
- Do this before collection as it can be difficult to write on a label with milk sprayed on it.
- Use the marker pen to clearly label details of the sample – the date, your name, the cow's ID, the quarter samples, and why the sample was collected.

■ **Restrain the cow so she can't move around too much.**

- Sometimes this is difficult on a platform, but do what is possible.
- Another person holding the cow's tail as a 'tail jack' can be helpful.

■ **Put on disposable gloves.**

■ **Wash and dry the teats.**

- You might skip this step if the teats look clean.
- Wash the teats with running water. Avoid getting too much water on the udder – the udder is hard to dry, and drops of contaminated water can easily fall in the sample.
- Dry with a paper towel.

■ **Completely disinfect the end of the teats to be sampled. This step is critical.**

- If you are sampling more than one teat, disinfect the ones furthest away first. This reduces the risk of unintentionally contaminating an already disinfected teat.
- Disinfect by vigorously scrubbing the teat opening with a cotton ball and alcohol (or teat wipes) for a minimum of 10 seconds.
- Check the cotton ball. If there is any dirty colour, repeat the scrub using a clean cotton ball until there is no more dirt seen.

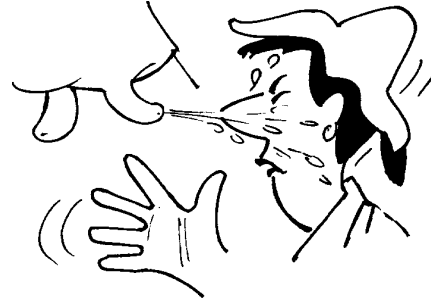


■ **Get the sterile bottle ready.**

- Remove the cap and place upside down in a position not likely to be contaminated.
- Do not touch the inside surface of the cap or bottle.

■ **Establish the direction of flow from the teat.**

- Squeeze the first couple of squirts of milk onto the ground.
- This also helps to remove any contaminants that might be just inside the opening of the teat.



■ **Collect the sample in the bottle.**

- Hold the bottle at an angle (to avoid anything falling into it) at least 3–4 cm from the end of the teat.
- Squirt 2–4 mL of milk into the bottle. Only a small amount of milk is required for culture – trying to get a large sample increases the chance of contamination.
- If you are collecting a combined sample from all quarters, move the bottle away from the first teat and repeat the initial squirts of the next teat before moving the bottle back. Take the first samples from the teats closest to you. Try to get the same amount from each teat. (Note: a combined sample from all quarters may be less likely to grow bacteria because milk from one infected quarter is diluted by milk from the clean quarters.)

■ **Replace the cap and secure it tightly.**

■ **Place the sample in the cooled esky.**

■ **Wash your hands.**

- Use running water and dry on paper towel.
- Wash your hands **after each** cow, including the last cow.

■ **Deliver the sample to the vet or lab that day, or freeze until delivery is arranged.**

- Samples for mastitis culture can be frozen and stored before being sent to the laboratory.
- Frozen storage of more than four weeks reduces the chance of obtaining a positive culture result.

