

# Mastitis Part 2 - The Bacteria

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Mastitis in dairy cattle is almost always caused by bacterial infection. Understanding which bacteria are causing mastitis on your farm can provide you with significant information as to what the likely key risk factors are and also, what control measures you need consider.

Mastitis-causing bacteria can be divided into two groups: environmental and contagious. Environmental bacteria usually come from the environment so spread outside of the milking parlour, while contagious bacteria generally spread during milking. This division is not complete, some environmental bacteria can spread during milking and some contagious bacteria spread outside of milking, but it's a useful starting point.

A good example of the difference between the two groups is the role of the dry cow period. Most infections during the dry period come from environmental bacteria, so if you have a peak of mastitis in the first few days after calving then it is likely to be a problem with the environment, particularly the environment in the late dry period. However if mastitis peaks 10 - 14 days after calving then a milking machine problem is more likely. It is important to stress that these are useful rules rather than laws, and individual farm investigation and bacteriology is required to confirm these suspicions.

## Environmental bacteria

The two most common environmental bacteria which cause mastitis are *E. coli* and *Streptococcus (Strep.) uberis*. Their relative importance has increased since the introduction of the five-point plan which focussed on controlling contagious mastitis. Both bacteria can cause a wide variety of signs, ranging from inapparent subclinical mastitis to severe, toxic mastitis. Traditionally *E. coli* mastitis has been more commonly associated with toxic mastitis and a severely ill cow, but it is now more commonly seen in association with a much milder form of the disease. *Strep uberis* is most commonly associated with relatively moderate mastitis with no systemic signs.

*Strep dysgalactiae* is the third most common environmental bacterium. It currently causes mastitis much less commonly than either *Strep. uberis* or *E. coli* because it can generally be effectively controlled by following the five-point plan. This is because spread in the milking parlour is more common for *Strep dysgalactiae* than the other environmental bacteria and because its most common site outside of the udder is teat skin so post-milking teat dipping will reduce mastitis risk.

## Contagious bacteria

The two most important contagious bacteria are *Staphylococcus (Staph.) aureus* and *Strep. agalactiae*. *Strep. agalactiae* bacteria used to be the most important cause of clinical mastitis and high cell count but because it is only found in the udder it is effectively controlled by the five-point plan. However *Staph aureus* has been less well controlled by the plan and is the third most commonly isolated bacterium from milk samples sent to the VLA / SAC. *Staph aureus* can cause a wide variety of signs including a severe, toxic mastitis, but it is as a cause of high cell count problems that it is most commonly encountered. This is because *Staph aureus* often sets up a chronic, grumbling, walled-off infection deep in the udder. These can be very difficult to treat.

**Fig 1 ( a - e below): Good sampling technique is essential if contaminated samples are to be avoided**



**a: Label the tube**



**b: Clean the teat end thoroughly**



*c: Avoid contaminating the lid*



*d: 5mL of milk is all that is needed*



*e: Get the milk cool as soon as possible after sampling*

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### Sampling for bacteriology

Identifying which bacteria are causing the problem is an important part of any mastitis management plan. There are two key rules for sampling:

1) Sample the cows that are representative of your problem. If the main problem is a high cell count without obvious signs then samples from clinical cases will be of little value and vice-versa. It is fairly easy to get representative samples if you have a cell count

problem as you can sample 10 - 12 cows with high cell count and get useful results within 24-48 hours. However if it is a clinical problem then many of the samples you want will be in the past as the cows have been treated, and you may have to wait a considerable period of time before you can collect 10 or so samples. It's thus a good idea to collect a sample from every cow that has mastitis before you treat her and to freeze it. So if you develop a problem, you have representative samples available with no waiting period.

2) Take clean samples so that the only bacteria in the milk are those causing the mastitis. Aseptic technique is essential as many of the bacteria which cause contamination can also cause disease, which means that contamination can lead to misdiagnosis and frustration as well as increased costs. A good technique is summarised below:

### Sampling milk for bacteria (see photo sequence above)

- 1) Label the tube with cow and quarter
- 2) Remove loose dirt, bedding etc. from the udder with a paper towel. Only wash the udder and teats if they are grossly dirty. Always dry thoroughly
- 3) Discard a few streams of milk
- 4) Clean the teat end with an alcohol wipe for at least 10-15 seconds. If necessary use additional wipes until no more dirt is visible on the wipe or the teat end
- 5) Take the cap off the sterile sample pot, keeping the open end facing downward
- 6) Keep the pot at a 45° angle, don't allow it to touch the teat end
- 7) Discard a few streams of milk
- 8) Collect up to 5mL of milk, 2-3 mL is usually sufficient
- 9) Freeze



*Fig 2: A pure culture of the organism causing the mastitis is the goal*

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*Fig 3: A chronically infected shrunken quarter is often secondary to Staph aureus infection*

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