MASTITIS TESTERS

Mastitis is an infection of the mammary gland usually in response to an invasion of bacteria via the teat canal. The milk-secreting tissue of the udder is damaged and inflamed due to toxin produced by the bacteria and the body responds by increasing the number of infection-fighting white blood cells in the area.

With mastitis the blood-milk barrier is breached, causing blood components, such as chloride, sodium, hydrogen, potassium and hydroxide ions, to enter the milk. Changes in the milk include increased conductivity, increased pH, raised water content, increased number of white blood cells (measured as the Somatic Cell Count or SCC) and eventually the presence of visible clots and flakes.

The three main measures of milk infections are changes in conductivity, increased pH and the number of white blood cells or Somatic Cell Count (SCC), none of which have a direct relationship or correlation.

There are many mastitis testing tools available, working on pH, conductivity, reaction to a reagent and also measuring actual cell count. It is useful to have more than one tool in the dairy and know the strengths and weaknesses of each test method.

Conductivity Tests: Mas-D-Tec & Draminski

It is internationally agreed that conductivity tends to be an earlier, and often more accurate indicator of mastitis. Electrical conductivity of milk increases during mastitis due to increases in sodium chloride (salt). Changes in conductivity can be detected by a hand-held detector or through in-line milk instrumentation. The actual level of conductivity is not so important. What is important is the relationship between the quarters. The hand-held Mas-D-Tec and Draminski detectors assist in the early identification of sub-clinical mastitis.

In-line detectors are included in computerized milking systems that track milk electrical conductivity measurements on individual cows at each milking. This data can be analysed by computer programs to identify cows that have milk electrical conductivity that is altered from normal, flagging possible cases of mastitis.

PH test: Mastitis Test Papers

Mastitis test papers have been around for many years and are a quick and reliable mastitis detection tool as there is a very high correlation between mastitis and an increase in the pH of the milk. Mastitis test papers are impregnated with bromothymol blue and will change in colour according to the pH of the milk. They are user friendly, cost effective and rapid. The main disadvantage of the Mastitis Test papers is its lack of sensitivity compared to some other tests.

The Mastitis Test papers come in a re-sealable pack of 25 test papers, each with four spots to test all four quarters simultaneously. Using one spot for each quarter, place a couple of drops of milk on each spot. Normal quarter milk will not affect the colour of the spots, but infected milk will change the spot colour from yellow to green or blue/green as the milk is more alkaline than normal. This test is particularly useful at the beginning and end of the season when the RMT test is less reliable. Papers can also be used to indicate successful recovery 3-4 days after a quarter has been treated.

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Somatic Cell Count (SCC) test: RMT/CMT Mastitis Test

The California Mastitis Test (CMT), sometimes referred to as the Rapid Mastitis Test (RMT), is a quick, simple test that reliably estimates the somatic cell count (SCC) of milk from individual quarters or milk samples.

The CMT is used on cow's and goat's milk and is based on three principles:

1. Infection fighting cell (white blood cell) numbers greatly increase in mastitis.
2. These cells contain large amounts of DNA and
3. These cells have a cell wall containing fat.

CMT is not a replacement for laboratory cell count sampling but is a very useful technique for detecting sub-clinical mastitis on-farm, providing an immediate result and can be used by any member of farm staff.

How the CMT/RMT works

A four-well plastic paddle is used, one well being used for each quarter of the cow to be tested. The foremilk is discarded, and then a little milk drawn into each well. An equal volume of test reagent is added and then the sample is gently agitated.

CMT reagent is a detergent with a pH indicator added (reason for purplish colour). When milk and CMT reagent are mixed in equal amounts, the CMT reagent dissolves or disrupts the outer cell wall which contains fat (detergent dissolves fat). DNA is released from the cells and coalesces to form a stringy, gel mass. As the number of cells increase in the milk, the amount of gel formed increases.

The reaction is subjectively scored on a scale of 0 (the mixture remaining unchanged) to 3 (an almost-solid gel forming), with a score of 2 or 3 being considered a positive result. This result is not a numerical result but is an indication as to whether the cell count is high or low, with positive reactions only occurring when cell counts are at least 300,000.

The advantage of the CMT over individual cow cell count results is that it allows assessment of individual quarters rather than providing an overall udder result, enabling the problem quarter(s) to be identified. It also provides a ‘real-time’ result, whereas laboratory testing provides a historical result as it can take days for lab results to be returned.

There are many mastitis testing tools on the market, working on pH, conductivity, reaction to a reagent and also measuring actual cell count. It is useful to have more than one tool in the dairy and know the strengths and weaknesses of each test method.