

California Mastitis Test (CMT)

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Mastitis

Mastitis continues to be one of the most costly problems in many dairy farms. Mastitis can manifest itself in either clinical or subclinical or Chronic form. Clinical mastitis is when milk appears abnormal with the presence of flakes, clots, strings or watery. The mammary gland also may be warm or hard to the touch and may exhibit increased sensitivity. In severe cases, systemic signs may be apparent, such as, fever, cow off feed, and in shock.

Subclinical mastitis occurs when both milk and mammary gland appear normal but Somatic Cell Counts (SCC) are elevated to a level above **200,000 cells/ml**.

Mastitis

Somatic cells are basically white blood cells (leukocytes) that migrate to the mammary gland in response to infection in both clinical and subclinical cases. This cell migration to the mammary gland is part of the inflammatory response to bacterial infection in the udder.

Cows that do not have mammary infections normally have SCC less than **200,000 cells/ml**.

California Mastitis test (CMT)

The CMT is performed to detect the presence of subclinical infections at the beginning of or during lactation as part of an udder health management program.

The California Mastitis Test (CMT) is a cow-side test that allowsto assess the SCC of each quarter of a cow's mammary gland.

The test is very simple, can be performed at milking time, gives instant results and is economical.

CMT Principle

CMT reagent (sodium lauryl sulphate) reacts and ruptures leukocytes (WBCs) and thus deoxyribonucleic acid (DNA) is released from their nuclei which result in gel formation. Thickness of gel indicates the severity of inflammation.

The CMT will only trigger a visible reaction with a concentration of 400,000 cells/ml or more.

The degree of gelling indicates the presence and severity of mastitis. The change in colour indicates the pH variation of the milk and therefore, the level of inflammation.

The CMT Procedure

Materials Required:



Four-compartment paddle with one compartment used per quarter.

CMT reagent (3% sodium lauryl sulphate containing 1:10000 bromocresol purple pH 7.0 to 7.5).

The CMT Procedure

Step 1:

Take about 2–3 ml milk from each quarter in each paddle compartment, after foremilk is removed.

Step 2:

Add CMT solution to each cup in the paddle.

CMT reagent is added to each compartment in volume equal to the milk quantity. The milk reagent mixture is swirled in a circular motion with presence of gel or slime being recorded for each quarter.

The CMT Procedure

Step 3:

Rotate the CMT Paddle in a circular motion to thoroughly mix the contents. Do not mix more than 10 seconds.



Step 4:

Read the test quickly. Visible reaction disintegrates after about 20 seconds. The reaction is scored visually. The more gel formation, the higher the score.

Note:

Rinse the CMT paddle after each test.

The CMT Score

CMT score	Score	Total cell count	Visible reaction	Interpretation
0	Negative (-)	0-200,000 (0-25% neutrophils)	Normal milk fluid	Healthy Quarter
T	Trace (+)	200,000-400,000 (30-40% neutrophils)	Slight precipitation	Subclinical Mastitis
1	Weak positive (++)	400,000- 1200000/ 1,500,000 (40-60% neutrophils)	Distinct precipitation (thickening) but no gel formation	Subclinical Mastitis
2	Distinct positive (+++)	1,500,000-500,000 (60-70% neutrophils)	Mixture thickened immediately and a gel formation	Serious Mastitis Infection
3	Strong positive (++++)	Over 5,000,000	Viscosity greatly increased strong gel that is cohesive with a convex surface.	Serious Mastitis Infection

Advantage-CMT

- The advantage of the CMT over individual cow cell count results is that it assesses the level of infection 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; laboratory testing provides a historical result as it can take days for lab results to be returned.

Advantage-CMT

- Implementing CMT testing as a standard operating procedure on dairy farm may help fine-tune a mastitis therapy program, reduce the risk of antibiotic residues in milk, and increase both quality and quantity of milk produced.

Potential Uses for CMT

- Immediate determination of potential infection status of purchased lactating cows.
- Testing fresh cows on the fourth day of lactation is 80% accurate for predicting infection status. Thus, fresh-cow CMT scores, in conjunction with CMT scores prior to dry off, may help to evaluate the effectiveness of dry cow therapy and the rate of new infections during the dry cow period.
- CMT also could be used to evaluate the success or failure of mastitis treatment during lactation. A negative CMT score at 3 weeks post-treatment with subsequent confirmatory negative tests would suggest that treatment was successful.

Note

- But, Studies have suggested that a single CMT or somatic cell count may only detect 60 to 80% of infected quarters. Multiple tests increase the sensitivity of detecting infections.
- Because the sensitivity of the CMT is not 100%, multiple screenings are suggested.
- Exceptionally, some infected cows may have low CMT scores, and likewise some non-infected cows may have high CMT scores.

Note

- Quarters from fresh cows with high CMT can be selected for milk culture. Depending on bacteriology results and cow history, these animals should be treated or segregated.
- Thus, decisions for treatment or mastitis management programs should be made with a combination of somatic cell testing, cultures, and cow and herd history.
- Continued monitoring, especially for relapsed clinical cases, should be done.