

California Mastitis Test and Somatic Cells Count

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What is mastitis ?

- Inflammation of one or more quarters of the udder
- Clinical mastitis is when milk appears abnormal with the presence of flakes, clots, strings or watery
- 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

Signs of mastitis

- Fever
- Depression
- Decreased milk production
- Abnormal milk
- Sensitivity of the udder
- Loss of appetite

Causes of mastitis:

- **Intramammary Infection (IMI):**
 - Bacterial infection
 - Mycoplasmal infection
 - Mycotic (fungal) infection
 - Algal infection
- **Thermal trauma**
- **Mechanical trauma**
- **Chemical insult**



What is CMT :

California Mastitis Test (CMT) is a test used to identify the number of **leukocytes**, or white blood cells, present in the milk. Since white blood cells are produced to combat infection and disease, the greater the number of leukocytes, the greater the indication of an infection

- IT IS IMPORTANT TO ONLY TEST RAW MILK WITH THE CMT
- PASTEURIZED MILK WILL **NOT** CONTAIN ANY BACTERIA BECAUSE OF THE HIGH HEAT DURING PASTEURIZATION

Somatic cells

- Are basically white blood cells (leukocytes) that migrate to the mammary gland in response to infection in both clinical and subclinical cases.
- Cows that do not have mammary infections normally have SCC less than 142,000 cells/mL

The CMT Procedure

It is a four-compartment paddle with one compartment used per quarter, one or two squirts of milk per quarter are collected in each paddle compartment after foremilk is removed, CMT reagent is added to each compartment in volume equal to the milk, swirled in a circular motion with presence of gel or slime being recorded for each quarter, the reaction is scored on a scale of 0 (mixture remains unchanged) to 3 (almost-solid gel forms), with a score of 1 - 3 being considered a positive result. Results should appear almost instantly

Reading the CMT



N = Negative
No infections. No thickening of the mixture.
100,000 SCC



T = Trace
Possible infections. Slight thickening of the mixture.
Trace reaction seems to disappear with continued rotation of the paddle. 300,000 SCC
Example: If all four quarters read trace there is no infection.
If one or two quarters read trace, infections are possible.



1 = Weak Positive
Infected. Distinct thickening of the mixture, but no tendency to form a gel. If CMT paddle is rotated more than 20 seconds, thickening may disappear.
900,000 SCC



2 = Distinct Positive

Infected. Immediate thickening of the mixture, with a slight gel formation. As mixture is swirled, it moves toward the center of the cup, exposing the bottom of the outer edge. When motion stops, mixture levels out and covers bottom of the cup. 2.7 million SCC

3 = Strong Positive

Infected. Gel is formed and surface of the mixture becomes elevated (like a fried egg). Central peak remains projected even after the CMT paddle rotation is stopped. 8.1 million SCC



Rinse Paddle

Remember to rinse the CMT paddle after each test.

THE DEGREE OF MASTITIS PRESENT IS DIRECTLY RELATED TO THE AMOUNT OF PRECIPITATE OR GEL THAT THE MIXTURE FORMS. THE GREATER THE GEL FORMATION, THE MORE ASSURED THE PRODUCER CAN BE ABOUT THE PRESENCE OF MASTITIS.

N-acetyl- β -D-glucosaminidase (NAGase)

- A lysosomal enzyme which increases in milk when mastitis is present
- Can be used as indicator

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Interpretation of CMT scores

- CMT scores are directly related to average somatic cell counts
- Normal or uninfected cow: 50,000-200,000 cells/ml
- >200,000 cells/ml: the likelihood of infection increase

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CMT Score	Somatic Cell Range (/ml)	Interpretation	Gelling
N (Negative)	0 – 200000	Healthy Quarter	None
T (Trace)	200000 – 400000	Subclinical Mastitis	Very Mild
1	400000 – 1200000	Subclinical Mastitis	Mild
2	1200000 – 5000000	Serious mastitis infection	Moderate
3	Over 5000000	Serious mastitis infection	Heavy , almost solidifies

References

- ▶ <https://msu.edu/> ,  MICHIGAN STATE UNIVERSITY
- ▶ <http://milkquality.wisc.edu/> ,  MILK QUALITY