

# Management of Subclinical Mastitis and Early Diagnostic Techniques in Cattle

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## Abstract

The aim of the manuscript is to describe the early diagnosis of subclinical mastitis and its preventive measures with various management practices.

## Introduction

Subclinical mastitis is an infection to cellular without apparent clinical signs. The incidence of subclinical mastitis ranged from 19.20 to 83% in cows. Subclinical mastitis affects milk quality and quantity which cause great economic loss to the farmer. In India, about 70-80% of economic loss has been attributed to sub-clinical mastitis alone (Dua 2001). Subclinical mastitis caused by *Staphylococcus aureus* is a serious and multifactorial problem for the management of dairy herds. In milk concentration of Na and Cl ions is increased in subclinical mastitis which leads to an increase electric conductivity of milk (Fernando et al., 1985).

## Types of mastitis

- Clinical mastitis
- Subclinical mastitis
- Peracute mastitis
- Acute mastitis
- Sub-acute mastitis
- Chronic mastitis



## **Factors that contribute to sub-clinical mastitis**

### Primary factors

- Poor sanitation
- Improper milking techniques/ practices
- Inadequate nutrition
- Stress
- Poor genetics
- Environmental factors such as temperature and humidity

## **Signs in subclinical mastitis**

Generally, the clinical signs are absent and the animal looks apparently healthy with normal vital parameters and milk. The affected mammary glands produce milk, but on palpation of the mammary quarter, may be thickened and hardened. The milk contains increased somatic cell count and detection of pathogenic organisms by microbial culture (Pyorala 2003).

## **Diagnosis of subclinical mastitis**

### **Physical tests**

#### **1. Test for pH and palatability**

Looking outside, of udder no abnormal changes are noticed in the initial stages of subclinical mastitis but may change in the milk composition. It can be detected by testing pH and palpability. The normal pH of milk range between 6.4 to 6.8 but may exceed to 7.0 in subclinical mastitis. With an increase in the pH of milk, the casein and fat content drops, simultaneously the increased chloride and sodium quantity gives a salty taste to the milk.

### **Chemical tests**

#### **1. California Mastitis Test (CMT)**

The composition of CMT reagent contains Sodium hydroxide, Bromo thymol, and Teepol. The subclinical mastitis contains an increased number of leucocytes and somatic cell count reacts with Teepol which causes degeneration of cells, which reacts with sodium hydroxide for gel formation. Leukocyte count in milk influences the gel formation (Fig 1 and 2) of the test which indicated the CMT score seen in Table 1.



Leukocyte count per milliliter	Test appearance	CMT score
Below 2,00,000	A mixture of liquid, No precipitate	Negative
1,50,000 to 5,00,000	Slight precipitate tends to disappear with paddle movement	T
4,00,000 to 15,00,000	Distinct precipitate but no gel formation with paddle movement	1
8,00,000 to 50,00,000	Distinct gel formation	2
Over 50,00,000	Strong gel formation that tends to adhere to paddle	3



Fig 1



Fig 2

## 2. NaOH test or modified white side test or modified Schalm test

It is used to detect the increase in the number of leukocytes in subclinical mastitis milk. For this purpose, 4% NaOH solution was prepared taking 4ml NaOH mixed with 96ml distilled water. Three ml of milk sample was mixed with 3 ml of 4% NaOH solution. The gel formation is indicative of subclinical mastitis.

## 3. Surf field subclinical mastitis test

The milk samples are subjected to surf test. A 3% Surf solution was prepared by the addition of three grams of commonly used detergent powder in 100 ml of water. Take equal quantities of milk



samples and surf solution in petri dishes. The gel formation is taken as subclinical mastitis.

#### 4. Electrical conductivity

The electrical conductivity of milk increases during subclinical mastitis milk due to an increase in sodium and chloride and decreases in potassium and lactose.

### Treatment

The expression, “prevention is better than cure” accurately describes the disease subclinical mastitis, as there are many changes, such as harm to the teat and teat canal, udder alveoli, and to animals.

#### ➤ Common Parental antibiotics

1. Ceftriaxone and tazobactam@ 5-10mg/kg for IV or IM use
2. Cefoperazone and sulbactam@ 5-10mg/kg for IV or IM use
3. Marbofloxacin @ 2mg/kg for IV or IM use

#### ➤ Intramammary administrations

1. Pendistrin-SH<sup>®</sup> One tube every 12 hours
2. Cefzon-IMS<sup>®</sup> - 3<sup>rd</sup> Generation Anti-Microbial Treatment by Cisternae Alveolar Pathway.
3. Yelintra<sup>®</sup> one tube for every 12 hours

#### ➤ Topical administrations

1. Mastilep<sup>®</sup> gel- It increases udder immunity by strengthening the keratin layer of the teat canal lumen and enhancing the udder defense mechanism.

#### ➤ Supportive treatment

1. Amunity<sup>®</sup> powder- builds immunity against mastitis.
2. Trisodium citrate- it changes the pH of milk and eliminates the organism @ 30mg/Kg –PO- for 5 days after a day of antibiotic treatment.
3. Sub-clinical mastitis Lipid coated Tri Sodium Citrate-20g/cow -10 days.

### Prevention of mastitis

1. It is more important to milk the subclinical mastitis cow than the healthy cow
2. Using a disinfectant teat dip after each milking is a means of diminishing by 50% of infections by contagious microorganisms like *Streptococcus agalactiae* and *Staphylococcus aureus*. Teat dipping (Masti dip<sup>®</sup>, Lactifence<sup>®</sup>) also discourages flies.
3. Supplementation with vitamin E and selenium to improve udder immunity.



## Conclusion

Subclinical mastitis is a more serious problem and causes great economical losses to the dairy industry. Change in physical and chemical properties occurs in the milk, which helps in the detection of SCM by various diagnostic tests. An increase in somatic cell count remains the best technique for early diagnosis of subclinical mastitis.

## References

- Fernando, R. S. Spahr, S. L. and Jaster. E. H. 1985. Comparison of electrical conductivity of milk with other indirect methods for detection of subclinical mastitis. *Journal of Dairy Science*, 68(2), 449-456.
- Dua. K. Incidence, etiology, and estimated economic losses due to mastitis in Punjab and in India- An update. *Indian Dairyman*, 53: 41-48 (2001).
- Pyörälä. S. 2003. Indicators of inflammation in the diagnosis of mastitis. *Veterinary research*, 34(5), 565-578.

